GEL Laboratories LLC
a member of The GEL Group INC

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October 03, 2016

Ms. Laurie Losey
MJW Technical Services
15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Re: Soil Radioisotopes
Work Order: 405240

Dear Ms. Losey:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 21, 2015. 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. 4422.

Sincerely,

Jake Crook
Project Manager

Purchase Order: GELP15-0894
Chain of Custody: NYSERDA-20
Enclosures



MJW Technical Services
Soil Radioisotopes
SDG: 405240

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.....5

Data Review Qualifier Definitions.....6

Radiological Analysis.....9

Case Narrative.....10

Sample Data Summary.....30

Quality Control Summary.....79

Alpha Spectroscopy Raw Data.....91

Continuing Calibration Data.....223

Background and Efficiency Data.....230

RAD Standards Traceability.....726

Runlogs.....800

Gamma Spectroscopy Raw Data.....806

Continuing Calibration Data.....1388

Background and Efficiency Data.....1394

RAD Standards Traceability.....1495

Runlogs.....1520

Gas Flow Raw Data.....1523

Continuing Calibration Data.....1541

Background and Efficiency Data.....1550

RAD Standards Traceability.....1603
Runlogs.....1612
Liquid Scintillation Raw Data.....1615
Continuing Calibration Data.....1738
Background and Efficiency Data.....1760
RAD Standards Traceability.....1765
Runlogs.....1787

Case Narrative

Case Narrative
for
MJW Technical Services
SDG: 405240

October 03, 2016

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 December 21, 2015 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2

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: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.



Jake Crook
Project Manager

List of current GEL Certifications as of 03 October 2016

State	Certification
Alaska	UST−0110
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−16−11
Utah NELAP	SC000122016−20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
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
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
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
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services (MJWC)
SDG #: 405240

Product: **Alphaspec Th229 + 228,230,232 Solid**
Analytical Method: DOE EML HASL-300, Th-01-RC Modified
Analytical Procedure: GL-RAD-A-032 REV# 21
Analytical Batch: 1596438

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621827	Method Blank (MB)
1203621828	405240001(HO.1.1) Sample Duplicate (DUP)
1203621829	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section. 1203621828 (HO.1.1DUP), 405240001 (HO.1.1), 405240002 (HO.1.2), 405240003 (HO.1.5), 405240004 (HO.1.6), 405240005 (HO.2.1), 405240006 (HO.2.2), 405240007 (HO.3.1), 405240008 (HO.3.2), 405240009 (HO.4.1), 405240010 (HO.4.2), 405240011 (HO.5.1), 405240012 (HO.5.2), 405240013 (REACH7.1.1), 405240014 (REACH7.1.2), 405240015 (REACH21.1.1) and 405240016

(REACH21.1.2).

Recounts
Samples 1203621828 (HO.1.1DUP), 405240001 (HO.1.1), 405240002 (HO.1.2), 405240003 (HO.1.5), 405240004 (HO.1.6), 405240005 (HO.2.1), 405240006 (HO.2.2), 405240007 (HO.3.1), 405240008 (HO.3.2), 405240009 (HO.4.1), 405240010 (HO.4.2), 405240011 (HO.5.1), 405240012 (HO.5.2), 405240013 (REACH7.1.1), 405240014 (REACH7.1.2), 405240015 (REACH21.1.1) and 405240016 (REACH21.1.2) were given additional clean-up steps and recounted in order to remove suspected interferences. The recounts are reported.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621828 were logged in and analyzed outside of the holding time. 1. Reporting results.

Product: **ASP Uranium Isotopic, Solid**
Analytical Method: DOE EML HASL-300, U-02-RC Modified
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1596443

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621839	Method Blank (MB)
1203621840	405240001(HO.1.1) Sample Duplicate (DUP)
1203621841	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

QC Information
All of the QC samples meet the required acceptance limits with the following exceptions: The U-233/234 and U-238 blank results are greater than the MDC but less than the detection limit.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621840 were logged in and analyzed out of holding. 2. Sample 405240003 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the U-232 tracer. 1. Reporting results. 2. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the U-232 region of interest. Reporting results.

Product: **Am241, Cm Solid**
Analytical Method: DOE EML HASL-300, Am-05-RC Modified
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1596445

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2

405240015	REACH21.1.1
405240016	REACH21.1.2
1203621842	Method Blank (MB)
1203621843	405240001(HO.1.1) Sample Duplicate (DUP)
1203621844	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Recounts
Sample 405240016 (REACH21.1.2) was recounted due to a peak shift. The recount is reported. Samples 405240005 (HO.2.1), 405240009 (HO.4.1), 405240010 (HO.4.2), 405240012 (HO.5.2), 405240013 (REACH7.1.1) and 405240014 (REACH7.1.2) were recounted due to a suspected false positive. The recounts are reported.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621843 were logged in and analyzed out of holding. 1. Reporting results.

Product: **Alphaspec Np237, Solid**
Analytical Method: ASTM C 1475-00 Modified
Analytical Procedure: GL-RAD-A-032 REV# 21
Analytical Batch: 1596446

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1

405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621845	Method Blank (MB)
1203621846	405240001(HO.1.1) Sample Duplicate (DUP)
1203621847	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section. 1203621845 (MB), 1203621846 (HO.1.1DUP), 405240001 (HO.1.1), 405240002 (HO.1.2), 405240003 (HO.1.5), 405240004 (HO.1.6), 405240005 (HO.2.1), 405240006 (HO.2.2), 405240007 (HO.3.1), 405240008 (HO.3.2), 405240009 (HO.4.1), 405240010 (HO.4.2), 405240011 (HO.5.1), 405240012 (HO.5.2), 405240013 (REACH7.1.1), 405240014 (REACH7.1.2), 405240015 (REACH21.1.1) and 405240016 (REACH21.1.2).

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621846 were analyzed outside of the holding time. 1. Reporting results.

Product: **ASP Plutonium Isotopic, Solid**
Analytical Method: DOE EML HASL-300, Pu-11-RC Modified
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1596447

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2

405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621848	Method Blank (MB)
1203621849	405240001(HO.1.1) Sample Duplicate (DUP)
1203621850	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Recounts
Sample 405240003 (HO.1.5) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621849 were logged in and analyzed out of holding. 2. Samples 405240001, 405240005, and 405240015 do not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 1. Reporting results. 2. The samples do meet the tracer yield requirement, the detection limits, and their tracer peaks are within the Pu-242 region of interest. Reporting results

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batch: 1596280

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1

405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621428	405240001(HO.1.1) Sample Duplicate (DUP)

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

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batch: 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
1203621429	405245001(HO.1.1) Sample Duplicate (DUP)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments
Data for Batch# 1596281 is the same as data for Batch# 1596280. Separate gamma containers created for each batch.

Product: **Gamma with Ingrowth**

Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 25
Analytical Batch: 1596386

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621682	Method Blank (MB)
1203621683	405240001(HO.1.1) Sample Duplicate (DUP)
1203621684	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Miscellaneous Information

1. Sample Analyzed out of Holding: QC 1203621683DUP 2. Sample Logged out of Holding: 405240 001,002,003,004,005,006,007,008,009, 010,011,012,013,014,015,016 1. Sample was analyzed in a timely manner upon receipt. Reporting results. 2. Samples were analyzed in a timely manner upon receipt. Reporting results.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Data rejected due to high counting uncertainty.	Cesium-137	405240001	HO.1.1
			1203621683	HO.1.1(405240001DUP)
		Thallium-208	1203621682	MB for batch 1596386
UI	Data rejected due to high peak-width.	Bismuth-212	405240009	HO.4.1
UI	Data rejected due to interference.	Protactinium-231	405240002	HO.1.2
			405240003	HO.1.5
			405240007	HO.3.1
			405240008	HO.3.2
			405240011	HO.5.1
			405240012	HO.5.2
			405240013	REACH7.1.1
			405240014	REACH7.1.2
			1203621683	HO.1.1(405240001DUP)
		Tin-126	405240002	HO.1.2
			405240003	HO.1.5
			405240004	HO.1.6
			405240005	HO.2.1
			405240009	HO.4.1
			405240010	HO.4.2
			405240011	HO.5.1
			405240012	HO.5.2
			405240013	REACH7.1.1
			405240016	REACH21.1.2
			1203621683	HO.1.1(405240001DUP)
UI	Data rejected due to low abundance.	Bismuth-212	405240002	HO.1.2
			405240004	HO.1.6
			405240005	HO.2.1
			405240006	HO.2.2
			405240010	HO.4.2

	405240011	HO.5.1
	405240012	HO.5.2
	1203621683	HO.1.1(405240001DUP)
Cesium-137	405240005	HO.2.1
Lead-212	405240008	HO.3.2
Protactinium-231	405240005	HO.2.1
Radium-228	405240002	HO.1.2
	405240003	HO.1.5
Tin-126	405240008	HO.3.2

Product: **Gamma I129, Solid**
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Procedure: GL-RAD-A-006 REV# 21
Analytical Batch: 1598666

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203627535	Method Blank (MB)
1203627536	405240001(HO.1.1) Sample Duplicate (DUP)
1203627537	405240001(HO.1.1) Matrix Spike (MS)
1203627538	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Miscellaneous Information

1. Sample Analyzed out of Holding: QC 1203627536DUP,1203627537MS 2. Sample Logged out of Holding: 405240 001,002,003,004,005,006,007,008,009, 010,011,012,013,014,015,016 1. Samples were analyzed in a timely manner upon receipt. Reporting results. 2. Samples were analyzed in a timely manner upon receipt. Reporting results.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Data rejected due to low abundance.	Iodine-129	405240005	HO.2.1
			405240013	REACH7.1.1

Product: **GFPC, Sr90, solid**
Analytical Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
Analytical Procedure: GL-RAD-A-004 REV# 17
Analytical Batch: 1597807

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1

405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203625428	Method Blank (MB)
1203625429	405240005(HO.2.1) Sample Duplicate (DUP)
1203625430	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Recounts
Samples 1203625429 (HO.2.1DUP), 405240002 (HO.1.2), 405240013 (REACH7.1.1) and 405240016 (REACH21.1.2) were recounted due to results more negative than the three sigma TPU. The second counts are reported. Sample 405240003 (HO.1.5) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information

1. Samples 1203625429DUP, 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, and 405240016 were logged and analyzed out of holding. 1. Reporting results

Product: **GFPC, Gross A/B, solid**
Analytical Method: EPA 900.0/SW846 9310/SM 7110B Modified
Analytical Procedure: GL-RAD-A-001B REV# 17
Analytical Batch: 1597818

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1

405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203625464	Method Blank (MB)
1203625465	405240003(HO.1.5) Sample Duplicate (DUP)
1203625466	405240003(HO.1.5) Matrix Spike (MS)
1203625467	405240003(HO.1.5) Matrix Spike Duplicate (MSD)
1203625468	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

QC Information
All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203625465 (HO.1.5DUP) and 405240003 (HO.1.5) , did not meet the alpha relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.65. The matrix spike and matrix spike duplicate, 1203625466 (HO.1.5MS) and 1203625467 (HO.1.5MSD) , did not meet the alpha relative percent difference requirement; however, they do meet the recovery requirement.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Gross Alpha/Beta Preparation Information
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203625465, 1203625466, and 1203625467 were logged and analyzed out of holding. 1. Reporting results

Product: **Liquid Scint Pu241, Solid**
Analytical Method: DOE EML HASL-300, Pu-11-RC Modified
Analytical Procedure: GL-RAD-A-035 REV# 17
Analytical Batch: 1596448

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203621851	Method Blank (MB)
1203621852	405240001(HO.1.1) Sample Duplicate (DUP)
1203621853	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Recounts
Sample 1203621852 (HO.1.1DUP) was recounted due to the quench number being outside the calibration range. The recount is reported.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621852 were logged in and analyzed out of holding. 2. Samples 405240001, 405240005, 405240015, and 1203621853 do not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 1. Reporting results. 2. The samples do meet the tracer yield requirement, the detection limits, and their tracer peaks are within the Pu-242 region of interest. Reporting results

Product: **Liquid Scint Tc99, Solid**
Analytical Method: DOE EML HASL-300, Tc-02-RC Modified
Analytical Procedure: GL-RAD-A-059 REV# 4
Analytical Batch: 1597418

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203624314	Method Blank (MB)
1203624315	405240001(HO.1.1) Sample Duplicate (DUP)
1203624316	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016 and 1203624315 were received and analyzed out of the method specified hold time. 1. Reporting results.

Product: **LSC, Tritium Dist, Solid**
Analytical Method: EPA 906.0 Modified
Analytical Procedure: GL-RAD-A-002 REV# 21
Analytical Batch: 1597481

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203624533	Method Blank (MB)
1203624534	405240001(HO.1.1) Sample Duplicate (DUP)
1203624535	405240001(HO.1.1) Matrix Spike (MS)
1203624536	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Recounts
Sample 1203624536 (LCS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203624534, and 1203624535 were received and analyzed out of the method specified hold time. 1. Reporting results.

Product: **Liquid Scint C14, Solid**
Analytical Method: EPA EERF C-01 Modified
Analytical Procedure: GL-RAD-A-003 REV# 15
Analytical Batch: 1598055

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batches: 1596280 and 1596281

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
405240001	HO.1.1
405240002	HO.1.2
405240003	HO.1.5
405240004	HO.1.6
405240005	HO.2.1
405240006	HO.2.2
405240007	HO.3.1
405240008	HO.3.2
405240009	HO.4.1
405240010	HO.4.2
405240011	HO.5.1
405240012	HO.5.2
405240013	REACH7.1.1
405240014	REACH7.1.2
405240015	REACH21.1.1
405240016	REACH21.1.2
1203626057	Method Blank (MB)
1203626058	405240001(HO.1.1) Sample Duplicate (DUP)
1203626059	405240001(HO.1.1) Matrix Spike (MS)
1203626060	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Time
Refer to Miscellaneous Information section.

Miscellaneous Information

1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203626058, and 1203626059 were received and analyzed out of the method specified hold time. 1. Reporting results.

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.

GEL LABORATORIES LLC

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Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 405240 GEL Work Order: 405240

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
H Analytical holding time was exceeded
U Analyte was analyzed for, but not detected above the Lc.
UI Gamma Spectroscopy--Uncertain identification
h Preparation or preservation holding time was exceeded

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:  **Name: Theresa Austin**

Date: 03 OCT 2016 **Title: Group Leader**

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.1
Sample ID: 405240001
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 15.8%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		15.8						percent			JXO1	09/08/16	1343	1596281	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	Hh	0.00	+/-0.0759	0.115	0.00	+/-0.0763	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.0182	+/-0.108	0.211	0.0482	+/-0.108	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00375	+/-0.0562	0.131	0.0376	+/-0.0563	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.611	+/-0.225	0.123	0.0314	+/-0.251	1.00	pCi/g							
Uranium-235/236	Hh	0.0963	+/-0.0981	0.097	0.0182	+/-0.0997	1.00	pCi/g							
Uranium-238	Hh	0.676	+/-0.235	0.112	0.0256	+/-0.265	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.059	+/-0.202	0.374	0.102	+/-0.202	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	0.728	+/-0.590	0.727	0.235	+/-0.607	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	0.118	+/-0.267	0.459	0.131	+/-0.268	1.00	pCi/g							
Thorium-230	Hh	0.639	+/-0.449	0.457	0.131	+/-0.462	1.00	pCi/g							
Thorium-232	Hh	0.554	+/-0.407	0.360	0.0825	+/-0.417	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.00385	+/-0.0402	0.084	0.0214	+/-0.0403	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.0437	+/-0.123	0.131	0.00	+/-0.123	1.00	pCi/g							
Curium-243/244	HUh	-0.0167	+/-0.0317	0.0977	0.0279	+/-0.0317	1.00	pCi/g							
Curium-245/246	Hh	0.0591	+/-0.0697	0.0754	0.0141	+/-0.0701	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	5.27	+/-6.69	11.3	5.53	+/-6.83	15.0	pCi/g			MXS2	09/16/16	1429	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.356	+/-0.381	0.923	0.389	+/-0.415	1.00	pCi/g			BSW1	09/29/16	0837	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.139	+/-0.209	0.434	0.201	+/-0.219		pCi/g			MXR1	10/03/16	0437	1596386	9
Antimony-125	HUh	0.0139	+/-0.0981	0.193	0.0866	+/-0.0983		pCi/g							
Bismuth-212	HUh	0.502	+/-0.514	1.13	0.509	+/-0.562		pCi/g							
Bismuth-214	Hh	0.755	+/-0.177	0.148	0.0672	+/-0.180		pCi/g							
Cesium-137	HUIh	0.00	+/-0.0787	0.0739	0.033	+/-0.0787	0.100	pCi/g							
Cobalt-60	HUh	0.00356	+/-0.0358	0.0668	0.027	+/-0.0358		pCi/g							
Europium-154	HUh	0.0114	+/-0.111	0.224	0.095	+/-0.111		pCi/g							
Lead-212	Hh	0.723	+/-0.139	0.110	0.0516	+/-0.144		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.1.1
Sample ID: 405240001

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Lead-214	Hh	0.998	+/-0.177	0.309	0.149	+/-0.182		pCi/g							
Potassium-40	Hh	12.1	+/-1.50	0.447	0.165	+/-1.63		pCi/g							
Protactinium-231	HUh	0.119	+/-0.416	0.830	0.382	+/-0.420		pCi/g							
Radium-226	Hh	0.755	+/-0.177	0.148	0.0672	+/-0.180		pCi/g							
Radium-228	Hh	0.689	+/-0.260	0.246	0.107	+/-0.263		pCi/g							
Thallium-208	Hh	0.241	+/-0.0769	0.0697	0.0313	+/-0.0776		pCi/g							
Tin-126	HUh	0.00664	+/-0.145	0.173	0.0825	+/-0.146		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	12.0	+/-3.47	3.93	1.71	+/-4.18	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	21.7	+/-2.47	1.93	0.876	+/-3.98	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.897	+/-0.734	1.56	0.707	+/-0.734	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.625	+/-2.10	3.72	1.71	+/-2.10	6.00	pCi/g			TXP3	09/20/16	2221	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	-0.319	+/-0.669	1.16	0.568	+/-0.669	2.00	pCi/g			TXJ1	09/27/16	2222	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.532	+/-1.32	2.28	1.12	+/-1.32	5.00	pCi/g			GXR1	09/27/16	0809	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596281

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.1
Sample ID: 405240001

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EML HASL-300, Tc-02-RC Modified														

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	57.1	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	67.6	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	80.4	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	95.2	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	72.4	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	84.3	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	57.1	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	105	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	75.9	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.1.2
Sample ID: 405240002
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 15.5%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		15.5						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	Hh	0.00	+/-0.0781	0.118	0.00	+/-0.0785	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.0154	+/-0.0796	0.204	0.0431	+/-0.080	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00729	+/-0.0504	0.123	0.0364	+/-0.0505	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.616	+/-0.237	0.124	0.0284	+/-0.263	1.00	pCi/g							
Uranium-235/236	Hh	0.152	+/-0.125	0.108	0.0202	+/-0.129	1.00	pCi/g							
Uranium-238	Hh	0.482	+/-0.211	0.124	0.0284	+/-0.230	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.0344	+/-0.237	0.578	0.172	+/-0.238	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.24	+/-0.779	0.889	0.306	+/-0.812	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	-0.0619	+/-0.267	0.648	0.219	+/-0.267	1.00	pCi/g							
Thorium-230	Hh	0.477	+/-0.420	0.492	0.141	+/-0.427	1.00	pCi/g							
Thorium-232	Hh	0.579	+/-0.438	0.427	0.109	+/-0.448	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	Hh	0.0336	+/-0.0534	0.0739	0.0169	+/-0.0536	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0854	0.127	0.00	+/-0.0856	1.00	pCi/g							
Curium-243/244	HUh	0.00378	+/-0.0396	0.0825	0.021	+/-0.0396	1.00	pCi/g							
Curium-245/246	Hh	0.0421	+/-0.0606	0.0731	0.0137	+/-0.0609	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-2.81	+/-6.81	11.7	5.76	+/-6.81	15.0	pCi/g			MXS2	09/16/16	1603	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	-0.104	+/-0.244	0.455	0.153	+/-0.248	1.00	pCi/g			BSW1	09/29/16	0837	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.136	+/-0.216	0.417	0.194	+/-0.225		pCi/g			MXR1	10/03/16	0454	1596386	9
Antimony-125	HUh	-0.0491	+/-0.0912	0.168	0.075	+/-0.0938		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.572	1.21	0.554	+/-0.663		pCi/g							
Bismuth-214	Hh	0.971	+/-0.187	0.119	0.0533	+/-0.191		pCi/g							
Cesium-137	Hh	0.221	+/-0.082	0.0595	0.026	+/-0.0826	0.100	pCi/g							
Cobalt-60	HUh	-0.0197	+/-0.0237	0.0351	0.0113	+/-0.0253		pCi/g							
Europium-154	HUh	-0.0358	+/-0.103	0.189	0.0781	+/-0.104		pCi/g							
Lead-212	Hh	0.717	+/-0.100	0.0736	0.0338	+/-0.107		pCi/g							
Lead-214	Hh	1.20	+/-0.173	0.316	0.153	+/-0.180		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.1.2
Sample ID: 405240002

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	11.6	+/-1.48	0.608	0.247	+/-1.60		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.922	0.695	0.318	+/-0.952		pCi/g							
Radium-226	Hh	0.971	+/-0.187	0.119	0.0533	+/-0.191		pCi/g							
Radium-228	HUIh	0.00	+/-0.188	0.425	0.197	+/-0.255		pCi/g							
Thallium-208	Hh	0.222	+/-0.0638	0.0415	0.0174	+/-0.0645		pCi/g							
Tin-126	HUIh	0.00	+/-0.0803	0.0649	0.0303	+/-0.0819		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	6.35	+/-3.11	3.95	1.64	+/-3.39	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	23.3	+/-3.57	3.94	1.84	+/-4.85	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	Hh	0.645	+/-0.608	0.994	0.439	+/-0.619	2.00	pCi/g			BXF1	09/29/16	1314	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.438	+/-2.17	3.89	1.79	+/-2.17	6.00	pCi/g			TXP3	09/20/16	2258	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.377	+/-0.673	1.14	0.558	+/-0.674	2.00	pCi/g			TXJ1	09/27/16	2333	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.514	+/-1.54	2.66	1.30	+/-1.54	5.00	pCi/g			GXR1	09/27/16	0902	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.2
Sample ID: 405240002

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	54.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	56.2	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	91.2	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	88.2	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	86.5	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	80.4	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	54.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	100	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	67.8	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.1.5
Sample ID: 405240003
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 16.8%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		16.8						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	0.0358	+/-0.194	0.372	0.083	+/-0.195	1.00	pCi/g			MXS2	09/15/16	1151	1596447	2
Plutonium-239/240	HUh	-0.0164	+/-0.137	0.322	0.0583	+/-0.138	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	Hh	0.0765	+/-0.0931	0.125	0.034	+/-0.096	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	1.36	+/-0.690	0.256	0.00	+/-0.809	1.00	pCi/g							
Uranium-235/236	HUh	-0.0205	+/-0.177	0.410	0.0767	+/-0.179	1.00	pCi/g							
Uranium-238	Hh	1.00	+/-0.605	0.409	0.0765	+/-0.680	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.0228	+/-0.197	0.456	0.0854	+/-0.197	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	0.330	+/-0.599	0.972	0.285	+/-0.606	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	-0.143	+/-0.325	0.887	0.290	+/-0.326	1.00	pCi/g							
Thorium-230	Hh	0.698	+/-0.650	0.855	0.275	+/-0.665	1.00	pCi/g							
Thorium-232	Hh	0.842	+/-0.637	0.621	0.158	+/-0.660	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	Hh	0.0549	+/-0.0873	0.121	0.0277	+/-0.0877	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	HUh	-0.0166	+/-0.143	0.332	0.0622	+/-0.144	1.00	pCi/g							
Curium-243/244	HUh	-0.00442	+/-0.0663	0.155	0.0443	+/-0.0664	1.00	pCi/g							
Curium-245/246	Hh	0.0628	+/-0.0998	0.138	0.0316	+/-0.100	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-1.82	+/-7.56	13.0	6.37	+/-7.56	15.0	pCi/g			MXS2	09/16/16	1736	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.132	+/-0.350	1.00	0.358	+/-0.356	1.00	pCi/g			BSW1	09/29/16	0838	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.125	+/-0.212	0.413	0.189	+/-0.220		pCi/g			MXR1	10/03/16	0454	1596386	9
Antimony-125	HUh	0.0019	+/-0.0934	0.186	0.0823	+/-0.0934		pCi/g							
Bismuth-212	HUh	-0.00808	+/-0.487	0.933	0.408	+/-0.487		pCi/g							
Bismuth-214	Hh	0.603	+/-0.172	0.133	0.059	+/-0.174		pCi/g							
Cesium-137	Hh	0.164	+/-0.0681	0.063	0.0272	+/-0.0685	0.100	pCi/g							
Cobalt-60	HUh	0.0116	+/-0.0334	0.076	0.0311	+/-0.0338		pCi/g							
Europium-154	HUh	0.0545	+/-0.117	0.256	0.110	+/-0.120		pCi/g							
Lead-212	Hh	0.619	+/-0.156	0.111	0.0518	+/-0.160		pCi/g							
Lead-214	Hh	0.802	+/-0.176	0.123	0.0555	+/-0.179		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.5
Sample ID: 405240003

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	12.0	+/-1.48	0.596	0.236	+/-1.61		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.654	0.778	0.353	+/-0.685		pCi/g							
Radium-226	Hh	0.603	+/-0.172	0.133	0.059	+/-0.174		pCi/g							
Radium-228	HUIh	0.00	+/-0.233	0.535	0.250	+/-0.455		pCi/g							
Thallium-208	Hh	0.214	+/-0.0829	0.0606	0.0265	+/-0.0834		pCi/g							
Tin-126	HUIh	0.00	+/-0.0968	0.116	0.0538	+/-0.0975		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	13.6	+/-3.54	3.92	1.72	+/-4.41	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	19.1	+/-2.79	3.33	1.58	+/-4.00	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.121	+/-0.641	1.24	0.552	+/-0.641	2.00	pCi/g			BXF1	09/28/16	0805	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	Hh	2.46	+/-2.91	4.91	2.26	+/-2.91	6.00	pCi/g			TXP3	09/20/16	2336	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.272	+/-0.663	1.13	0.551	+/-0.664	2.00	pCi/g			TXJ1	09/28/16	0044	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.282	+/-1.59	2.72	1.33	+/-1.59	5.00	pCi/g			GXR1	09/27/16	0954	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.5
Sample ID: 405240003

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	48.1	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	15.3	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	77.9	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	58.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	52.3	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	48.3	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	48.1	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	96.4	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	64.4	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Address : 15 Hazelwood Drive
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.1.6
Sample ID: 405240004
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 14.9%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		14.9						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.0038	+/-0.0577	0.124	0.0183	+/-0.0579	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.0227	+/-0.0597	0.176	0.0447	+/-0.0599	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.0121	+/-0.0548	0.138	0.0423	+/-0.0549	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.621	+/-0.232	0.129	0.0329	+/-0.259	1.00	pCi/g							
Uranium-235/236	Hh	0.085	+/-0.0937	0.0638	0.00	+/-0.095	1.00	pCi/g							
Uranium-238	Hh	0.609	+/-0.228	0.102	0.019	+/-0.255	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.102	+/-0.194	0.599	0.171	+/-0.194	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	0.679	+/-0.681	0.942	0.309	+/-0.697	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	0.171	+/-0.378	0.662	0.208	+/-0.379	1.00	pCi/g							
Thorium-230	Hh	0.556	+/-0.490	0.574	0.164	+/-0.500	1.00	pCi/g							
Thorium-232	Hh	0.493	+/-0.460	0.537	0.146	+/-0.469	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.00382	+/-0.040	0.0834	0.0212	+/-0.040	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0875	0.130	0.00	+/-0.0877	1.00	pCi/g							
Curium-243/244	HUh	-0.00664	+/-0.0294	0.0766	0.0176	+/-0.0294	1.00	pCi/g							
Curium-245/246	Hh	0.0312	+/-0.0535	0.0468	0.00	+/-0.0537	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-3.9	+/-5.19	9.00	4.42	+/-5.19	15.0	pCi/g			MXS2	09/16/16	1909	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	-0.277	+/-0.384	0.256	0.00	+/-0.404	1.00	pCi/g			BSW1	09/29/16	0838	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.204	+/-0.230	0.400	0.181	+/-0.250		pCi/g			MXR1	10/03/16	0455	1596386	9
Antimony-125	HUh	-0.0163	+/-0.110	0.205	0.0909	+/-0.110		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.888	1.40	0.633	+/-1.06		pCi/g							
Bismuth-214	Hh	0.830	+/-0.182	0.164	0.0739	+/-0.195		pCi/g							
Cesium-137	Hh	0.141	+/-0.0924	0.0729	0.0316	+/-0.0931	0.100	pCi/g							
Cobalt-60	HUh	-0.00976	+/-0.0483	0.0929	0.038	+/-0.0485		pCi/g							
Europium-154	HUh	-0.0264	+/-0.142	0.272	0.114	+/-0.143		pCi/g							
Lead-212	Hh	0.622	+/-0.111	0.0906	0.0414	+/-0.126		pCi/g							
Lead-214	Hh	0.963	+/-0.185	0.121	0.0541	+/-0.203		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.6
Sample ID: 405240004

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	12.2	+/-1.60	0.705	0.276	+/-1.91		pCi/g							
Protactinium-231	HUh	0.383	+/-0.491	0.999	0.461	+/-0.527		pCi/g							
Radium-226	Hh	0.830	+/-0.182	0.164	0.0739	+/-0.195		pCi/g							
Radium-228	Hh	0.817	+/-0.292	0.266	0.112	+/-0.307		pCi/g							
Thallium-208	Hh	0.230	+/-0.0692	0.0676	0.0295	+/-0.0719		pCi/g							
Tin-126	HUIh	0.00	+/-0.102	0.0894	0.0419	+/-0.103		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	8.94	+/-3.44	3.88	1.59	+/-3.86	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	15.6	+/-2.62	2.65	1.21	+/-3.49	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.594	+/-0.520	1.24	0.533	+/-0.521	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-0.369	+/-1.92	3.57	1.64	+/-1.92	6.00	pCi/g			TXP3	09/21/16	0014	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	-0.0511	+/-0.683	1.18	0.575	+/-0.683	2.00	pCi/g			TXJ1	09/28/16	0308	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.288	+/-1.46	2.50	1.22	+/-1.46	5.00	pCi/g			GXR1	09/27/16	1046	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.1.6
Sample ID: 405240004

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	68.5	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	65.3	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	81.5	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	65.4	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	54.1	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	79.4	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	68.5	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	99.1	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	58.5	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.2.1
Sample ID: 405240005
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 20.8%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		20.8						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	0.0119	+/-0.071	0.139	0.0318	+/-0.0711	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.00982	+/-0.0505	0.130	0.0274	+/-0.0507	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.0425	+/-0.0411	0.144	0.048	+/-0.0412	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.900	+/-0.250	0.127	0.0376	+/-0.295	1.00	pCi/g							
Uranium-235/236	Hh	0.168	+/-0.118	0.120	0.0344	+/-0.122	1.00	pCi/g							
Uranium-238	Hh	1.20	+/-0.285	0.113	0.0307	+/-0.353	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.035	+/-0.246	0.506	0.165	+/-0.246	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	2.03	+/-0.913	0.813	0.273	+/-0.979	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	0.0894	+/-0.280	0.525	0.161	+/-0.281	1.00	pCi/g							
Thorium-230	Hh	1.12	+/-0.565	0.374	0.0857	+/-0.593	1.00	pCi/g							
Thorium-232	Hh	0.606	+/-0.419	0.202	0.00	+/-0.430	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.0159	+/-0.0701	0.127	0.026	+/-0.0702	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.0795	+/-0.221	0.239	0.00	+/-0.222	1.00	pCi/g							
Curium-243/244	HUh	-0.0151	+/-0.0516	0.144	0.034	+/-0.0517	1.00	pCi/g							
Curium-245/246	Hh	0.0251	+/-0.0795	0.120	0.0172	+/-0.0797	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-0.981	+/-4.07	6.98	3.43	+/-4.07	15.0	pCi/g			MXS2	09/16/16	2042	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUIh	0.00	+/-0.369	0.853	0.372	+/-0.418	1.00	pCi/g			BSW1	09/29/16	0906	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.161	+/-0.313	0.575	0.267	+/-0.322		pCi/g			MXR1	10/03/16	0503	1596386	9
Antimony-125	HUh	-0.124	+/-0.144	0.246	0.110	+/-0.154		pCi/g							
Bismuth-212	HUIh	0.00	+/-1.16	1.82	0.838	+/-1.63		pCi/g							
Bismuth-214	Hh	1.21	+/-0.203	0.121	0.0515	+/-0.210		pCi/g							
Cesium-137	HUIh	0.00	+/-0.0634	0.130	0.0595	+/-0.0712	0.100	pCi/g							
Cobalt-60	HUh	-0.02	+/-0.0634	0.116	0.0495	+/-0.0641		pCi/g							
Europium-154	HUh	-0.0525	+/-0.169	0.269	0.112	+/-0.171		pCi/g							
Lead-212	Hh	1.29	+/-0.154	0.113	0.0521	+/-0.169		pCi/g							
Lead-214	Hh	1.11	+/-0.229	0.173	0.0793	+/-0.234		pCi/g							

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.2.1
Sample ID: 405240005

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	16.0	+/-1.93	0.715	0.279	+/-2.10		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.874	1.03	0.473	+/-0.895		pCi/g							
Radium-226	Hh	1.21	+/-0.203	0.121	0.0515	+/-0.210		pCi/g							
Radium-228	Hh	1.59	+/-0.474	0.379	0.168	+/-0.481		pCi/g							
Thallium-208	Hh	0.425	+/-0.121	0.0785	0.0346	+/-0.122		pCi/g							
Tin-126	HUIh	0.00	+/-0.106	0.106	0.0501	+/-0.107		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	15.7	+/-3.95	3.92	1.67	+/-5.00	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	25.1	+/-2.86	2.51	1.16	+/-4.55	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	Hh	0.554	+/-0.691	1.17	0.508	+/-0.698	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-0.225	+/-2.16	3.97	1.83	+/-2.16	6.00	pCi/g			TXP3	09/21/16	0051	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.276	+/-0.747	1.27	0.621	+/-0.747	2.00	pCi/g			TXJ1	09/28/16	0419	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.229	+/-1.74	2.98	1.46	+/-1.74	5.00	pCi/g			GXR1	09/27/16	1139	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.2.1
Sample ID: 405240005

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	88.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	66	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	88.3	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	89.6	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	78.3	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	91.6	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	88.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	102	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	64.7	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.2.2
Sample ID: 405240006
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 18.6%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		18.6						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.00811	+/-0.062	0.148	0.0277	+/-0.0623	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.00245	+/-0.0879	0.195	0.0515	+/-0.0881	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.0343	+/-0.0673	0.187	0.0623	+/-0.0674	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.951	+/-0.275	0.157	0.0492	+/-0.326	1.00	pCi/g							
Uranium-235/236	Hh	0.122	+/-0.109	0.119	0.0302	+/-0.112	1.00	pCi/g							
Uranium-238	Hh	0.970	+/-0.275	0.128	0.0348	+/-0.328	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.0649	+/-0.250	0.485	0.153	+/-0.251	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.59	+/-0.763	0.697	0.230	+/-0.808	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	Hh	0.274	+/-0.321	0.445	0.132	+/-0.323	1.00	pCi/g							
Thorium-230	Hh	0.931	+/-0.487	0.332	0.0761	+/-0.507	1.00	pCi/g							
Thorium-232	Hh	1.06	+/-0.513	0.287	0.0537	+/-0.537	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.0138	+/-0.0472	0.0876	0.0239	+/-0.0473	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0851	0.127	0.00	+/-0.0853	1.00	pCi/g							
Curium-243/244	HUh	0.035	+/-0.068	0.117	0.0382	+/-0.0681	1.00	pCi/g							
Curium-245/246	HUh	0.00426	+/-0.0445	0.0928	0.0236	+/-0.0445	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	0.589	+/-5.35	9.13	4.48	+/-5.36	15.0	pCi/g			MXS2	09/16/16	2215	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	-0.0297	+/-0.396	0.791	0.319	+/-0.396	1.00	pCi/g			BSW1	09/29/16	0912	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.0797	+/-0.252	0.490	0.225	+/-0.255		pCi/g			MXR1	10/03/16	0503	1596386	9
Antimony-125	HUh	-0.0198	+/-0.147	0.264	0.120	+/-0.148		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.993	1.84	0.852	+/-1.33		pCi/g							
Bismuth-214	Hh	0.986	+/-0.222	0.165	0.0735	+/-0.226		pCi/g							
Cesium-137	Hh	0.201	+/-0.0701	0.0896	0.0396	+/-0.0706	0.100	pCi/g							
Cobalt-60	HUh	-0.0119	+/-0.0594	0.114	0.0484	+/-0.0596		pCi/g							
Europium-154	HUh	-0.064	+/-0.167	0.309	0.132	+/-0.169		pCi/g							
Lead-212	Hh	1.23	+/-0.183	0.136	0.064	+/-0.194		pCi/g							
Lead-214	Hh	1.21	+/-0.201	0.139	0.0624	+/-0.207		pCi/g							

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.2.2
Sample ID: 405240006

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	21.0	+/-2.14	0.926	0.383	+/-2.41		pCi/g							
Protactinium-231	HUh	0.437	+/-0.907	1.04	0.478	+/-0.912		pCi/g							
Radium-226	Hh	0.986	+/-0.222	0.165	0.0735	+/-0.226		pCi/g							
Radium-228	Hh	1.81	+/-0.351	0.322	0.139	+/-0.363		pCi/g							
Thallium-208	Hh	0.510	+/-0.107	0.0798	0.0353	+/-0.110		pCi/g							
Tin-126	HUh	0.0153	+/-0.153	0.204	0.0964	+/-0.154		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	26.0	+/-6.61	3.82	1.29	+/-8.19	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	22.5	+/-3.33	2.45	1.08	+/-4.62	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	0.0192	+/-0.850	1.60	0.711	+/-0.850	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.232	+/-2.20	3.98	1.83	+/-2.20	6.00	pCi/g			TXP3	09/21/16	0244	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.406	+/-0.684	1.16	0.566	+/-0.684	2.00	pCi/g			TXJ1	09/28/16	0530	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.126	+/-1.35	2.32	1.13	+/-1.35	5.00	pCi/g			GXR1	09/27/16	1231	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.2.2
Sample ID: 405240006

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	69.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	65.4	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	70.5	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	93.2	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	90	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	85.2	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	69.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	95	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	66.3	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.3.1
Sample ID: 405240007
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 14.9%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		14.9						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	Hh	0.0254	+/-0.082	0.126	0.0188	+/-0.0822	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.0214	+/-0.0819	0.140	0.0264	+/-0.0821	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.032	+/-0.0496	0.143	0.0488	+/-0.0496	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.661	+/-0.206	0.137	0.0454	+/-0.234	1.00	pCi/g							
Uranium-235/236	Hh	0.096	+/-0.086	0.0934	0.0238	+/-0.0875	1.00	pCi/g							
Uranium-238	Hh	0.565	+/-0.190	0.123	0.0387	+/-0.212	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.0428	+/-0.276	0.565	0.168	+/-0.276	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.17	+/-0.623	0.638	0.218	+/-0.652	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	Hh	0.384	+/-0.303	0.283	0.0649	+/-0.309	1.00	pCi/g							
Thorium-230	Hh	0.281	+/-0.268	0.282	0.0647	+/-0.271	1.00	pCi/g							
Thorium-232	Hh	0.421	+/-0.319	0.311	0.079	+/-0.325	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	-0.0275	+/-0.0346	0.116	0.0363	+/-0.0346	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0917	0.136	0.00	+/-0.0919	1.00	pCi/g							
Curium-243/244	Hh	0.00	+/-0.0292	0.0435	0.00	+/-0.0293	1.00	pCi/g							
Curium-245/246	Hh	0.0327	+/-0.0561	0.0491	0.00	+/-0.0562	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	1.24	+/-5.37	9.13	4.48	+/-5.37	15.0	pCi/g			MXS2	09/16/16	2348	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	-0.0275	+/-0.369	0.758	0.294	+/-0.370	1.00	pCi/g			BSW1	09/29/16	0912	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0134	+/-0.269	0.514	0.237	+/-0.269		pCi/g			MXR1	10/03/16	0538	1596386	9
Antimony-125	HUh	0.0865	+/-0.115	0.243	0.110	+/-0.122		pCi/g							
Bismuth-212	HUh	0.451	+/-0.574	1.22	0.542	+/-0.609		pCi/g							
Bismuth-214	Hh	0.775	+/-0.228	0.151	0.0669	+/-0.230		pCi/g							
Cesium-137	Hh	0.257	+/-0.0758	0.0681	0.0291	+/-0.0766	0.100	pCi/g							
Cobalt-60	HUh	-0.017	+/-0.0472	0.0911	0.0374	+/-0.0479		pCi/g							
Europium-154	HUh	0.0249	+/-0.140	0.293	0.125	+/-0.140		pCi/g							
Lead-212	Hh	0.814	+/-0.128	0.116	0.0539	+/-0.135		pCi/g							
Lead-214	Hh	0.847	+/-0.207	0.348	0.167	+/-0.210		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.3.1
Sample ID: 405240007

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	12.1	+/-1.65	0.576	0.213	+/-1.76		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.807	0.882	0.401	+/-0.815		pCi/g							
Radium-226	Hh	0.775	+/-0.228	0.151	0.0669	+/-0.230		pCi/g							
Radium-228	Hh	0.977	+/-0.323	0.255	0.107	+/-0.327		pCi/g							
Thallium-208	Hh	0.328	+/-0.0923	0.0759	0.0335	+/-0.0933		pCi/g							
Tin-126	HUh	0.0595	+/-0.138	0.182	0.0865	+/-0.139		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	10.8	+/-3.43	3.99	1.75	+/-4.10	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	18.3	+/-2.82	3.45	1.64	+/-3.85	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.0914	+/-0.895	1.63	0.757	+/-0.895	2.00	pCi/g			BXF1	09/27/16	1432	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-1.0	+/-1.94	3.71	1.71	+/-1.94	6.00	pCi/g			TXP3	09/21/16	0321	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	Hh	0.542	+/-0.643	1.08	0.528	+/-0.644	2.00	pCi/g			TXJ1	09/28/16	0642	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.769	+/-1.69	2.93	1.43	+/-1.69	5.00	pCi/g			GXR1	09/27/16	1323	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.3.1
Sample ID: 405240007

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	69	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	79.4	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	93	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	84.3	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	88.6	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	81.1	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	69	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	95	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	68	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.3.2
Sample ID: 405240008
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 14.2%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		14.2						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	Hh	0.00	+/-0.0491	0.0745	0.00	+/-0.0493	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.0115	+/-0.070	0.137	0.0316	+/-0.0701	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00756	+/-0.0334	0.0872	0.020	+/-0.0335	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.691	+/-0.192	0.0875	0.0238	+/-0.222	1.00	pCi/g							
Uranium-235/236	Hh	0.127	+/-0.092	0.0985	0.0293	+/-0.0943	1.00	pCi/g							
Uranium-238	Hh	0.748	+/-0.199	0.0811	0.0206	+/-0.233	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.0337	+/-0.187	0.359	0.0822	+/-0.187	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	0.863	+/-0.767	1.05	0.368	+/-0.787	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	HUh	0.0646	+/-0.289	0.566	0.162	+/-0.290	1.00	pCi/g							
Thorium-230	Hh	0.847	+/-0.551	0.446	0.102	+/-0.569	1.00	pCi/g							
Thorium-232	Hh	0.784	+/-0.525	0.385	0.072	+/-0.541	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	-0.00324	+/-0.0279	0.0647	0.0121	+/-0.028	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0864	0.129	0.00	+/-0.0866	1.00	pCi/g							
Curium-243/244	HUh	0.00109	+/-0.0503	0.110	0.0347	+/-0.0503	1.00	pCi/g							
Curium-245/246	Hh	0.0426	+/-0.0613	0.074	0.0138	+/-0.0616	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-2.04	+/-4.66	8.03	3.94	+/-4.66	15.0	pCi/g			MXS2	09/17/16	0317	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.0239	+/-0.258	0.738	0.238	+/-0.258	1.00	pCi/g			BSW1	09/29/16	0913	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.0893	+/-0.238	0.453	0.209	+/-0.242		pCi/g			MXR1	10/03/16	0538	1596386	9
Antimony-125	HUh	-0.0639	+/-0.102	0.187	0.0836	+/-0.106		pCi/g							
Bismuth-212	Hh	1.21	+/-0.473	0.111	0.00	+/-0.487		pCi/g							
Bismuth-214	Hh	0.648	+/-0.192	0.121	0.0533	+/-0.199		pCi/g							
Cesium-137	Hh	0.224	+/-0.081	0.060	0.0259	+/-0.0831	0.100	pCi/g							
Cobalt-60	HUh	0.0182	+/-0.0363	0.0833	0.0347	+/-0.0373		pCi/g							
Europium-154	HUh	-0.0205	+/-0.116	0.226	0.0949	+/-0.116		pCi/g							
Lead-212	HUIh	0.00	+/-0.0972	0.232	0.112	+/-0.322		pCi/g							
Lead-214	Hh	0.909	+/-0.201	0.121	0.0543	+/-0.217		pCi/g							

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.3.2
Sample ID: 405240008

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	14.9	+/-1.67	0.507	0.190	+/-2.09		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.465	0.702	0.316	+/-0.478		pCi/g							
Radium-226	Hh	0.648	+/-0.192	0.121	0.0533	+/-0.199		pCi/g							
Radium-228	Hh	0.800	+/-0.272	0.191	0.0781	+/-0.291		pCi/g							
Thallium-208	Hh	0.294	+/-0.0809	0.0591	0.0259	+/-0.0847		pCi/g							
Tin-126	HUIh	0.00	+/-0.156	0.152	0.0725	+/-0.162		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	15.9	+/-4.26	3.94	1.62	+/-5.22	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	27.6	+/-3.90	3.83	1.77	+/-5.38	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.766	+/-0.635	1.42	0.629	+/-0.635	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-0.274	+/-2.05	3.79	1.74	+/-2.05	6.00	pCi/g			TXP3	09/21/16	0359	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	-0.228	+/-0.656	1.14	0.555	+/-0.656	2.00	pCi/g			TXJ1	09/28/16	0753	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.107	+/-1.51	2.59	1.27	+/-1.51	5.00	pCi/g			GXR1	09/27/16	1416	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.3.2
Sample ID: 405240008

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	77	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	94	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	89.4	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	104	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	67.9	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	89.2	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	77	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	97.8	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	60.5	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.4.1
Sample ID: 405240009
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 22.2%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		22.2						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.00702	+/-0.0527	0.126	0.0238	+/-0.0529	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.0105	+/-0.0529	0.136	0.0289	+/-0.0531	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00704	+/-0.0486	0.118	0.0352	+/-0.0487	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.602	+/-0.197	0.104	0.0284	+/-0.222	1.00	pCi/g							
Uranium-235/236	Hh	0.139	+/-0.099	0.0762	0.0143	+/-0.102	1.00	pCi/g							
Uranium-238	Hh	0.816	+/-0.226	0.0877	0.0201	+/-0.265	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.00872	+/-0.310	0.670	0.226	+/-0.311	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	0.802	+/-0.647	0.821	0.275	+/-0.665	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	Hh	0.140	+/-0.278	0.452	0.123	+/-0.279	1.00	pCi/g							
Thorium-230	Hh	0.892	+/-0.524	0.451	0.123	+/-0.544	1.00	pCi/g							
Thorium-232	Hh	0.887	+/-0.501	0.205	0.00	+/-0.521	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.0217	+/-0.0801	0.135	0.0244	+/-0.0803	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.0912	+/-0.254	0.274	0.00	+/-0.254	1.00	pCi/g							
Curium-243/244	HUh	0.0185	+/-0.0814	0.147	0.0303	+/-0.0816	1.00	pCi/g							
Curium-245/246	Hh	0.0941	+/-0.129	0.137	0.0197	+/-0.130	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-4.08	+/-4.60	8.00	3.93	+/-4.60	15.0	pCi/g			MXS2	09/17/16	0450	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.176	+/-0.484	1.18	0.442	+/-0.491	1.00	pCi/g			BSW1	09/29/16	0913	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.0155	+/-0.229	0.451	0.208	+/-0.229		pCi/g			MXR1	10/03/16	0539	1596386	9
Antimony-125	HUh	-0.0446	+/-0.100	0.183	0.0812	+/-0.102		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.653	0.702	0.294	+/-0.656		pCi/g							
Bismuth-214	Hh	0.754	+/-0.157	0.121	0.0534	+/-0.161		pCi/g							
Cesium-137	Hh	0.269	+/-0.076	0.0674	0.0295	+/-0.0769	0.100	pCi/g							
Cobalt-60	HUh	0.00263	+/-0.0404	0.0825	0.0345	+/-0.0404		pCi/g							
Europium-154	HUh	-0.00606	+/-0.126	0.247	0.105	+/-0.126		pCi/g							
Lead-212	Hh	0.909	+/-0.118	0.102	0.0476	+/-0.127		pCi/g							
Lead-214	Hh	0.751	+/-0.197	0.143	0.0653	+/-0.200		pCi/g							

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.4.1
Sample ID: 405240009

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	14.5	+/-1.63	0.503	0.190	+/-1.80		pCi/g							
Protactinium-231	HUh	0.281	+/-0.673	0.781	0.356	+/-0.676		pCi/g							
Radium-226	Hh	0.754	+/-0.157	0.121	0.0534	+/-0.161		pCi/g							
Radium-228	Hh	0.444	+/-0.355	0.249	0.107	+/-0.355		pCi/g							
Thallium-208	Hh	0.151	+/-0.0836	0.0741	0.0333	+/-0.0839		pCi/g							
Tin-126	HUIh	0.00	+/-0.0962	0.113	0.0529	+/-0.097		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	10.1	+/-3.43	3.91	1.66	+/-3.96	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	20.0	+/-2.86	2.81	1.29	+/-4.03	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.0151	+/-0.719	1.37	0.605	+/-0.719	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	1.18	+/-2.41	4.20	1.93	+/-2.41	6.00	pCi/g			TXP3	09/21/16	0436	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.402	+/-0.706	1.20	0.585	+/-0.707	2.00	pCi/g			TXJ1	09/28/16	0904	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.015	+/-1.82	3.12	1.52	+/-1.82	5.00	pCi/g			GXR1	09/27/16	1508	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.4.1
Sample ID: 405240009

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	77.1	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	67.2	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	94.7	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	89.5	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	73.1	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	74.4	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	77.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	95	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	68.4	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Address : 15 Hazelwood Drive
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.4.2
Sample ID: 405240010
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 17.6%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		17.6						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.0138	+/-0.0698	0.180	0.0382	+/-0.0702	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.00703	+/-0.099	0.234	0.0658	+/-0.0992	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	Hh	0.0378	+/-0.0669	0.101	0.0258	+/-0.0672	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.572	+/-0.188	0.0938	0.0239	+/-0.212	1.00	pCi/g							
Uranium-235/236	Hh	0.104	+/-0.086	0.0738	0.0138	+/-0.0877	1.00	pCi/g							
Uranium-238	Hh	0.768	+/-0.218	0.101	0.0275	+/-0.253	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.0377	+/-0.244	0.499	0.148	+/-0.244	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.39	+/-0.848	0.897	0.293	+/-0.887	1.00	pCi/g			MXS2	09/19/16	1749	1596438	5
Thorium-229	Hh	0.537	+/-0.474	0.554	0.159	+/-0.482	1.00	pCi/g							
Thorium-230	Hh	0.930	+/-0.585	0.553	0.158	+/-0.606	1.00	pCi/g							
Thorium-232	Hh	0.846	+/-0.536	0.377	0.0705	+/-0.555	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.0178	+/-0.0658	0.110	0.020	+/-0.0659	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	HUh	-0.00899	+/-0.149	0.315	0.0452	+/-0.149	1.00	pCi/g							
Curium-243/244	HUh	0.00951	+/-0.0673	0.135	0.0321	+/-0.0674	1.00	pCi/g							
Curium-245/246	HUh	0.0204	+/-0.0752	0.126	0.0229	+/-0.0753	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-3.96	+/-5.91	10.2	5.02	+/-5.91	15.0	pCi/g			MXS2	09/17/16	0623	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	-0.347	+/-0.282	0.360	0.154	+/-0.325	1.00	pCi/g			BSW1	09/29/16	0939	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0978	+/-0.183	0.337	0.157	+/-0.189		pCi/g			MXR1	10/03/16	0539	1596386	9
Antimony-125	HUh	-0.00454	+/-0.0883	0.161	0.0741	+/-0.0884		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.528	0.883	0.408	+/-0.665		pCi/g							
Bismuth-214	Hh	0.646	+/-0.120	0.0971	0.0441	+/-0.123		pCi/g							
Cesium-137	Hh	0.225	+/-0.075	0.0536	0.0243	+/-0.0756	0.100	pCi/g							
Cobalt-60	HUh	-0.00446	+/-0.0259	0.0492	0.0208	+/-0.026		pCi/g							
Europium-154	HUh	0.0609	+/-0.133	0.175	0.0776	+/-0.136		pCi/g							
Lead-212	Hh	0.857	+/-0.119	0.0793	0.0372	+/-0.128		pCi/g							
Lead-214	Hh	0.870	+/-0.151	0.106	0.049	+/-0.155		pCi/g							

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Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.4.2
Sample ID: 405240010

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	12.9	+/-1.20	0.443	0.187	+/-1.38		pCi/g							
Protactinium-231	HUh	0.0127	+/-0.364	0.659	0.306	+/-0.364		pCi/g							
Radium-226	Hh	0.646	+/-0.120	0.0971	0.0441	+/-0.123		pCi/g							
Radium-228	Hh	0.809	+/-0.251	0.187	0.0833	+/-0.254		pCi/g							
Thallium-208	Hh	0.274	+/-0.0696	0.0532	0.0243	+/-0.0705		pCi/g							
Tin-126	HUIh	0.00	+/-0.0944	0.113	0.0534	+/-0.0953		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	14.6	+/-3.65	3.97	1.75	+/-4.63	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	17.5	+/-2.47	2.58	1.20	+/-3.51	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	0.0316	+/-0.715	1.34	0.596	+/-0.715	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-1.44	+/-1.93	3.77	1.74	+/-1.93	6.00	pCi/g			TXP3	09/21/16	0514	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.228	+/-0.654	1.11	0.545	+/-0.655	2.00	pCi/g			TXJ1	09/28/16	1015	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.00569	+/-1.41	2.41	1.18	+/-1.41	5.00	pCi/g			GXR1	09/27/16	1600	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Client Sample ID: HO.4.2
Sample ID: 405240010

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	60.6	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	74.9	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	89.9	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	99.2	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	65.6	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	89.8	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	60.6	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	97.8	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	74.3	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.5.1
Sample ID: 405240011
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 21.9%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		21.9						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.019	+/-0.0579	0.165	0.0404	+/-0.0581	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.0181	+/-0.0978	0.197	0.0568	+/-0.0979	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	Hh	0.0317	+/-0.0624	0.0864	0.0162	+/-0.0626	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.760	+/-0.218	0.123	0.0385	+/-0.253	1.00	pCi/g							
Uranium-235/236	Hh	0.141	+/-0.100	0.093	0.0237	+/-0.103	1.00	pCi/g							
Uranium-238	Hh	0.945	+/-0.238	0.0927	0.0236	+/-0.287	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.0479	+/-0.145	0.406	0.103	+/-0.145	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.32	+/-0.848	0.823	0.238	+/-0.887	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	Hh	0.224	+/-0.400	0.649	0.193	+/-0.401	1.00	pCi/g							
Thorium-230	Hh	1.75	+/-0.787	0.262	0.00	+/-0.844	1.00	pCi/g							
Thorium-232	Hh	0.677	+/-0.516	0.418	0.0783	+/-0.530	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	0.0101	+/-0.0379	0.0637	0.0119	+/-0.0379	1.00	pCi/g			MXS2	09/15/16	1105	1596445	6
Curium-242	Hh	0.00	+/-0.0851	0.127	0.00	+/-0.0852	1.00	pCi/g							
Curium-243/244	HUh	-0.00969	+/-0.0292	0.0822	0.0209	+/-0.0293	1.00	pCi/g							
Curium-245/246	HUh	-0.00364	+/-0.0314	0.0728	0.0136	+/-0.0315	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-2.35	+/-5.49	9.45	4.64	+/-5.49	15.0	pCi/g			MXS2	09/17/16	0756	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.080	+/-0.337	0.767	0.301	+/-0.339	1.00	pCi/g			BSW1	09/29/16	0953	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0299	+/-0.206	0.398	0.184	+/-0.206		pCi/g			MXR1	10/03/16	0540	1596386	9
Antimony-125	HUh	-0.0176	+/-0.0939	0.178	0.080	+/-0.0943		pCi/g							
Bismuth-212	HUIh	0.00	+/-0.763	1.18	0.544	+/-0.869		pCi/g							
Bismuth-214	Hh	0.731	+/-0.175	0.123	0.0554	+/-0.177		pCi/g							
Cesium-137	Hh	0.445	+/-0.0993	0.0547	0.0238	+/-0.101	0.100	pCi/g							
Cobalt-60	HUh	-0.00131	+/-0.0373	0.0743	0.0314	+/-0.0373		pCi/g							
Europium-154	HUh	0.0549	+/-0.0979	0.202	0.0861	+/-0.101		pCi/g							
Lead-212	Hh	1.08	+/-0.121	0.085	0.0394	+/-0.134		pCi/g							
Lead-214	Hh	0.960	+/-0.201	0.114	0.0519	+/-0.205		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.5.1
Sample ID: 405240011

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	13.3	+/-1.49	0.720	0.308	+/-1.64		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.548	0.713	0.326	+/-0.562		pCi/g							
Radium-226	Hh	0.731	+/-0.175	0.123	0.0554	+/-0.177		pCi/g							
Radium-228	Hh	0.976	+/-0.294	0.218	0.0944	+/-0.299		pCi/g							
Thallium-208	Hh	0.320	+/-0.0734	0.0483	0.0209	+/-0.0746		pCi/g							
Tin-126	HUIh	0.00	+/-0.109	0.0939	0.0441	+/-0.111		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	13.7	+/-3.88	3.97	1.67	+/-4.63	4.00	pCi/g			JXC9	09/23/16	1523	1597818	10
Beta	Hh	18.3	+/-2.63	2.29	1.03	+/-3.51	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	0.0538	+/-0.896	1.61	0.748	+/-0.896	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.800	+/-2.30	4.07	1.87	+/-2.30	6.00	pCi/g			TXP3	09/21/16	0551	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.00152	+/-0.704	1.21	0.590	+/-0.704	2.00	pCi/g			TXJ1	09/28/16	1127	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.997	+/-1.74	3.02	1.48	+/-1.74	5.00	pCi/g			GXR1	09/27/16	1652	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.5.1
Sample ID: 405240011

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	66.3	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	73.8	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	77.1	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	98.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	74	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	87	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	66.3	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	93.7	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	59.4	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: HO.5.2
Sample ID: 405240012
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 19.7%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		19.7						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	Hh	0.0743	+/-0.113	0.150	0.032	+/-0.114	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.0193	+/-0.0588	0.168	0.041	+/-0.059	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.0199	+/-0.0377	0.116	0.0332	+/-0.0378	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.916	+/-0.237	0.118	0.0361	+/-0.283	1.00	pCi/g							
Uranium-235/236	Hh	0.0963	+/-0.0919	0.118	0.0362	+/-0.0933	1.00	pCi/g							
Uranium-238	Hh	0.684	+/-0.205	0.100	0.0273	+/-0.235	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.0508	+/-0.153	0.431	0.110	+/-0.154	1.00	pCi/g			MXS2	09/15/16	1621	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	2.22	+/-1.04	0.888	0.283	+/-1.12	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	Hh	0.268	+/-0.367	0.500	0.127	+/-0.370	1.00	pCi/g							
Thorium-230	Hh	1.06	+/-0.626	0.538	0.147	+/-0.652	1.00	pCi/g							
Thorium-232	Hh	0.977	+/-0.577	0.244	0.00	+/-0.601	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	Hh	0.0387	+/-0.0874	0.138	0.0307	+/-0.0876	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.00	+/-0.160	0.244	0.00	+/-0.161	1.00	pCi/g							
Curium-243/244	HUh	-0.00515	+/-0.0742	0.176	0.0492	+/-0.0743	1.00	pCi/g							
Curium-245/246	HUh	-0.0105	+/-0.0586	0.148	0.0304	+/-0.0588	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-1.65	+/-5.47	9.40	4.62	+/-5.47	15.0	pCi/g			MXS2	09/17/16	0929	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.0657	+/-0.340	0.761	0.298	+/-0.342	1.00	pCi/g			BSW1	09/29/16	0953	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0588	+/-0.215	0.375	0.171	+/-0.217		pCi/g			MXR1	10/03/16	0540	1596386	9
Antimony-125	HUh	-0.0368	+/-0.107	0.200	0.0909	+/-0.108		pCi/g							
Bismuth-212	HUIh	0.00	+/-1.08	1.19	0.544	+/-1.16		pCi/g							
Bismuth-214	Hh	0.866	+/-0.180	0.105	0.0461	+/-0.184		pCi/g							
Cesium-137	Hh	0.667	+/-0.108	0.0721	0.0323	+/-0.112	0.100	pCi/g							
Cobalt-60	HUh	0.00049	+/-0.0376	0.0661	0.0271	+/-0.0376		pCi/g							
Europium-154	HUh	0.092	+/-0.0956	0.222	0.0954	+/-0.104		pCi/g							
Lead-212	Hh	0.898	+/-0.145	0.120	0.0569	+/-0.153		pCi/g							
Lead-214	Hh	1.05	+/-0.170	0.112	0.0505	+/-0.176		pCi/g							

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Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.5.2
Sample ID: 405240012

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	13.0	+/-1.39	0.502	0.197	+/-1.55		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.717	0.764	0.350	+/-0.743		pCi/g							
Radium-226	Hh	0.866	+/-0.180	0.105	0.0461	+/-0.184		pCi/g							
Radium-228	Hh	0.960	+/-0.346	0.184	0.0765	+/-0.350		pCi/g							
Thallium-208	Hh	0.316	+/-0.0785	0.0592	0.0263	+/-0.0796		pCi/g							
Tin-126	HUIh	0.00	+/-0.101	0.124	0.0583	+/-0.102		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	7.92	+/-3.28	3.95	1.67	+/-3.68	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	24.7	+/-3.33	3.38	1.57	+/-4.86	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.912	+/-0.831	1.75	0.790	+/-0.831	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	Hh	1.89	+/-2.26	3.82	1.76	+/-2.26	6.00	pCi/g			TXP3	09/21/16	0629	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	Hh	0.689	+/-0.672	1.13	0.550	+/-0.674	2.00	pCi/g			TXJ1	09/28/16	1238	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.361	+/-1.27	2.17	1.06	+/-1.27	5.00	pCi/g			GXR1	09/27/16	1745	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: HO.5.2
Sample ID: 405240012

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	67.3	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	74.4	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	85.2	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	98.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	76.1	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	88.8	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	67.3	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	97.8	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	66.5	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: REACH7.1.1
Sample ID: 405240013
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 25.4%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		25.4						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.00844	+/-0.0628	0.150	0.0284	+/-0.063	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.0377	+/-0.0661	0.213	0.0599	+/-0.0663	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.0333	+/-0.150	0.379	0.116	+/-0.151	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.514	+/-0.402	0.421	0.115	+/-0.431	1.00	pCi/g							
Uranium-235/236	HUh	-0.0308	+/-0.136	0.355	0.0813	+/-0.137	1.00	pCi/g							
Uranium-238	Hh	0.866	+/-0.507	0.473	0.140	+/-0.572	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.00404	+/-0.300	0.666	0.181	+/-0.300	1.00	pCi/g			MXS2	09/15/16	1720	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.89	+/-1.21	1.24	0.386	+/-1.27	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	HUh	0.158	+/-0.497	0.930	0.285	+/-0.498	1.00	pCi/g							
Thorium-230	Hh	1.77	+/-0.977	0.839	0.240	+/-1.04	1.00	pCi/g							
Thorium-232	Hh	1.43	+/-0.845	0.358	0.00	+/-0.890	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	-0.00358	+/-0.0593	0.125	0.018	+/-0.0596	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.00	+/-0.188	0.286	0.00	+/-0.189	1.00	pCi/g							
Curium-243/244	HUh	0.00121	+/-0.0864	0.194	0.0516	+/-0.0866	1.00	pCi/g							
Curium-245/246	Hh	0.0982	+/-0.134	0.143	0.0206	+/-0.135	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-1.63	+/-5.61	9.63	4.73	+/-5.61	15.0	pCi/g			MXS2	09/17/16	1102	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUIh	0.00	+/-0.226	0.312	0.00	+/-0.00	1.00	pCi/g			BSW1	09/29/16	0954	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0698	+/-0.233	0.404	0.186	+/-0.235		pCi/g			MXR1	10/03/16	0541	1596386	9
Antimony-125	HUh	-0.00952	+/-0.0958	0.185	0.0837	+/-0.0959		pCi/g							
Bismuth-212	Hh	1.02	+/-0.924	0.754	0.328	+/-0.929		pCi/g							
Bismuth-214	Hh	0.664	+/-0.152	0.108	0.0475	+/-0.161		pCi/g							
Cesium-137	Hh	0.0846	+/-0.0495	0.0578	0.0253	+/-0.050	0.100	pCi/g							
Cobalt-60	HUh	-0.00606	+/-0.0281	0.0576	0.0228	+/-0.0283		pCi/g							
Europium-154	HUh	-0.0181	+/-0.0982	0.196	0.082	+/-0.0986		pCi/g							
Lead-212	Hh	1.01	+/-0.123	0.0892	0.0413	+/-0.148		pCi/g							
Lead-214	Hh	0.887	+/-0.158	0.296	0.143	+/-0.174		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH7.1.1
Sample ID: 405240013

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	13.0	+/-1.45	0.513	0.202	+/-1.86		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.672	0.616	0.276	+/-0.679		pCi/g							
Radium-226	Hh	0.664	+/-0.152	0.108	0.0475	+/-0.161		pCi/g							
Radium-228	Hh	1.17	+/-0.296	0.210	0.0897	+/-0.338		pCi/g							
Thallium-208	Hh	0.367	+/-0.0808	0.0489	0.0212	+/-0.0862		pCi/g							
Tin-126	HUIh	0.00	+/-0.112	0.0951	0.0443	+/-0.113		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	20.5	+/-4.31	3.99	1.72	+/-5.88	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	26.7	+/-2.94	2.64	1.23	+/-4.84	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.432	+/-0.742	1.47	0.666	+/-0.742	2.00	pCi/g			BXF1	09/28/16	0806	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	1.19	+/-2.44	4.25	1.96	+/-2.44	6.00	pCi/g			TXP3	09/21/16	0706	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.423	+/-0.794	1.35	0.658	+/-0.795	2.00	pCi/g			TXJ1	09/28/16	1349	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-1.1	+/-2.32	4.03	1.97	+/-2.32	5.00	pCi/g			GXR1	09/27/16	1837	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Company : MJW Technical Services
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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH7.1.1
Sample ID: 405240013

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	63.8	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	19.1	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	29.2	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	69.5	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	58.8	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	81.4	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	63.8	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	93.7	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	60.6	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: REACH7.1.2
Sample ID: 405240014
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 15.3%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		15.3						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.036	+/-0.0923	0.273	0.0701	+/-0.0928	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	-0.00962	+/-0.128	0.303	0.0853	+/-0.128	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	0.029	+/-0.0765	0.138	0.0409	+/-0.0766	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.823	+/-0.232	0.124	0.0381	+/-0.272	1.00	pCi/g							
Uranium-235/236	Hh	0.117	+/-0.0958	0.0983	0.025	+/-0.0979	1.00	pCi/g							
Uranium-238	Hh	0.631	+/-0.205	0.124	0.0381	+/-0.232	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.162	+/-0.169	0.586	0.192	+/-0.169	1.00	pCi/g			MXS2	09/15/16	1720	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.28	+/-0.823	0.854	0.265	+/-0.859	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	HUh	0.0885	+/-0.341	0.662	0.208	+/-0.342	1.00	pCi/g							
Thorium-230	Hh	0.965	+/-0.607	0.573	0.164	+/-0.629	1.00	pCi/g							
Thorium-232	Hh	0.287	+/-0.363	0.451	0.103	+/-0.367	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	Hh	0.0509	+/-0.0924	0.114	0.0163	+/-0.0928	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.00	+/-0.171	0.259	0.00	+/-0.171	1.00	pCi/g							
Curium-243/244	HUh	-0.00988	+/-0.0553	0.140	0.0287	+/-0.0555	1.00	pCi/g							
Curium-245/246	HUh	-0.00371	+/-0.0615	0.130	0.0187	+/-0.0618	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-10.2	+/-7.40	13.0	6.37	+/-7.40	15.0	pCi/g			MXS2	09/17/16	1235	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.181	+/-0.251	0.841	0.298	+/-0.265	1.00	pCi/g			BSW1	09/29/16	0954	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.166	+/-0.283	0.499	0.232	+/-0.293		pCi/g			MXR1	10/03/16	0543	1596386	9
Antimony-125	HUh	-0.0335	+/-0.131	0.233	0.106	+/-0.132		pCi/g							
Bismuth-212	HUh	0.455	+/-1.05	1.29	0.586	+/-1.07		pCi/g							
Bismuth-214	Hh	0.812	+/-0.195	0.158	0.0719	+/-0.198		pCi/g							
Cesium-137	Hh	0.136	+/-0.0546	0.073	0.0323	+/-0.0549	0.100	pCi/g							
Cobalt-60	HUh	0.0269	+/-0.0422	0.0973	0.0419	+/-0.0439		pCi/g							
Europium-154	HUh	0.028	+/-0.132	0.270	0.117	+/-0.133		pCi/g							
Lead-212	Hh	0.877	+/-0.127	0.134	0.0634	+/-0.136		pCi/g							
Lead-214	Hh	0.800	+/-0.238	0.158	0.0731	+/-0.241		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH7.1.2
Sample ID: 405240014

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	14.0	+/-1.66	0.637	0.257	+/-1.81		pCi/g							
Protactinium-231	HUIh	0.00	+/-0.868	0.778	0.354	+/-0.949		pCi/g							
Radium-226	Hh	0.812	+/-0.195	0.158	0.0719	+/-0.198		pCi/g							
Radium-228	Hh	0.814	+/-0.350	0.325	0.145	+/-0.353		pCi/g							
Thallium-208	Hh	0.327	+/-0.0842	0.0794	0.0359	+/-0.0853		pCi/g							
Tin-126	HUh	0.0938	+/-0.154	0.213	0.102	+/-0.154		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	19.1	+/-4.39	3.94	1.66	+/-5.76	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	28.7	+/-3.11	2.42	1.11	+/-5.13	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.424	+/-0.523	1.15	0.500	+/-0.523	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	-0.381	+/-2.00	3.72	1.71	+/-2.00	6.00	pCi/g			TXP3	09/21/16	0744	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.244	+/-0.697	1.19	0.580	+/-0.698	2.00	pCi/g			TXJ1	09/28/16	1500	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.909	+/-1.79	3.03	1.48	+/-1.79	5.00	pCi/g			GXR1	09/27/16	1929	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH7.1.2
Sample ID: 405240014

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	48	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	75	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	76.3	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	90.9	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	74.7	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	86.2	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	48	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	95	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	60.3	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: REACH21.1.1
Sample ID: 405240015
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 29.6%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		29.6						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	-0.0147	+/-0.0557	0.152	0.0351	+/-0.0559	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.016	+/-0.0763	0.142	0.0302	+/-0.0764	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00352	+/-0.0529	0.124	0.0354	+/-0.053	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	0.959	+/-0.249	0.119	0.0354	+/-0.299	1.00	pCi/g							
Uranium-235/236	Hh	0.073	+/-0.0787	0.0895	0.0205	+/-0.0797	1.00	pCi/g							
Uranium-238	Hh	0.987	+/-0.251	0.0984	0.025	+/-0.303	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	-0.0896	+/-0.216	0.553	0.188	+/-0.217	1.00	pCi/g			MXS2	09/15/16	1720	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.95	+/-1.08	0.911	0.256	+/-1.15	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	Hh	0.482	+/-0.491	0.485	0.0908	+/-0.499	1.00	pCi/g							
Thorium-230	Hh	0.860	+/-0.631	0.559	0.128	+/-0.652	1.00	pCi/g							
Thorium-232	Hh	1.18	+/-0.714	0.483	0.0903	+/-0.749	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	HUh	-0.00348	+/-0.0522	0.122	0.0349	+/-0.0523	1.00	pCi/g			MXS2	09/15/16	1106	1596445	6
Curium-242	Hh	0.00	+/-0.111	0.166	0.00	+/-0.112	1.00	pCi/g							
Curium-243/244	HUh	0.0134	+/-0.0503	0.0845	0.0158	+/-0.0503	1.00	pCi/g							
Curium-245/246	Hh	0.00	+/-0.0401	0.0597	0.00	+/-0.0402	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	0.790	+/-4.63	7.89	3.88	+/-4.64	15.0	pCi/g			MXS2	09/17/16	1408	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.126	+/-0.276	0.650	0.267	+/-0.282	1.00	pCi/g			BSW1	09/29/16	1104	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	0.161	+/-0.316	0.623	0.289	+/-0.325		pCi/g			MXR1	10/03/16	0543	1596386	9
Antimony-125	HUh	0.00379	+/-0.150	0.282	0.128	+/-0.150		pCi/g							
Bismuth-212	HUh	0.607	+/-0.875	1.68	0.764	+/-0.917		pCi/g							
Bismuth-214	Hh	1.10	+/-0.232	0.165	0.0727	+/-0.237		pCi/g							
Cesium-137	Hh	0.306	+/-0.124	0.0889	0.0388	+/-0.124	0.100	pCi/g							
Cobalt-60	HUh	0.0209	+/-0.0597	0.127	0.0539	+/-0.0605		pCi/g							
Europium-154	HUh	-0.046	+/-0.174	0.325	0.138	+/-0.175		pCi/g							
Lead-212	Hh	1.15	+/-0.162	0.129	0.0597	+/-0.173		pCi/g							
Lead-214	Hh	1.15	+/-0.259	0.429	0.207	+/-0.263		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH21.1.1
Sample ID: 405240015

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	16.3	+/-2.07	1.17	0.500	+/-2.24		pCi/g							
Protactinium-231	HUh	0.222	+/-0.654	1.26	0.584	+/-0.664		pCi/g							
Radium-226	Hh	1.10	+/-0.232	0.165	0.0727	+/-0.237		pCi/g							
Radium-228	Hh	1.22	+/-0.387	0.361	0.157	+/-0.392		pCi/g							
Thallium-208	Hh	0.373	+/-0.142	0.0802	0.0351	+/-0.143		pCi/g							
Tin-126	HUh	0.0321	+/-0.134	0.162	0.0776	+/-0.135		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	18.3	+/-4.31	3.84	1.61	+/-5.59	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	25.9	+/-3.35	3.58	1.68	+/-4.95	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.106	+/-0.606	1.23	0.525	+/-0.606	2.00	pCi/g			BXF1	09/27/16	1431	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.259	+/-2.54	4.59	2.11	+/-2.54	6.00	pCi/g			TXP3	09/21/16	0821	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.0124	+/-0.799	1.37	0.670	+/-0.799	2.00	pCi/g			TXJ1	09/28/16	1611	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	-0.372	+/-1.67	2.88	1.41	+/-1.67	5.00	pCi/g			GXR1	09/27/16	2022	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH21.1.1
Sample ID: 405240015

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	77.6	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	74.4	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	81.9	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	50.3	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	62.6	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	87.8	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	77.6	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	97.8	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	61.9	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Buffalo, New York 14228

Report Date: October 3, 2016

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: REACH21.1.2
Sample ID: 405240016
Matrix: Soil
Collect Date: 15-DEC-15
Receive Date: 21-DEC-15
Collector: Client
Moisture: 21.6%

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids															
ASTM D 2216 % Moisture "As Received"															
Moisture		21.6						percent			JXO1	09/08/16	1343	1596280	1
Rad Alpha Spec Analysis															
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"															
Plutonium-238	HUh	0.0128	+/-0.0791	0.156	0.0361	+/-0.0793	1.00	pCi/g			MXS2	09/15/16	0905	1596447	2
Plutonium-239/240	HUh	0.014	+/-0.0976	0.202	0.0595	+/-0.0977	1.00	pCi/g							
ASP Uranium Isotopic, Solid "Dry Weight Corrected"															
Uranium-232	HUh	-0.00337	+/-0.0506	0.118	0.0338	+/-0.0507	1.00	pCi/g			MXS2	09/15/16	1104	1596443	3
Uranium-233/234	Hh	1.06	+/-0.261	0.113	0.0323	+/-0.318	1.00	pCi/g							
Uranium-235/236	Hh	0.0691	+/-0.079	0.0987	0.0251	+/-0.0799	1.00	pCi/g							
Uranium-238	Hh	1.10	+/-0.262	0.0483	0.00	+/-0.322	1.00	pCi/g							
Alphaspec Np237, Solid "Dry Weight Corrected"															
Neptunium-237	HUh	0.294	+/-0.527	0.898	0.322	+/-0.528	1.00	pCi/g			MXS2	09/15/16	1720	1596446	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"															
Thorium-228	Hh	1.13	+/-0.746	0.769	0.233	+/-0.777	1.00	pCi/g			MXS2	09/19/16	1740	1596438	5
Thorium-229	HUh	0.0585	+/-0.219	0.369	0.0691	+/-0.220	1.00	pCi/g							
Thorium-230	Hh	1.19	+/-0.624	0.425	0.0975	+/-0.656	1.00	pCi/g							
Thorium-232	Hh	1.42	+/-0.674	0.424	0.0972	+/-0.716	1.00	pCi/g							
Am241, Cm Solid "Dry Weight Corrected"															
Americium-241	Hh	0.0369	+/-0.117	0.176	0.0253	+/-0.117	1.00	pCi/g			MXS2	09/16/16	1129	1596445	6
Curium-242	Hh	0.134	+/-0.372	0.401	0.00	+/-0.373	1.00	pCi/g							
Curium-243/244	HUh	-0.0153	+/-0.0856	0.216	0.0444	+/-0.086	1.00	pCi/g							
Curium-245/246	Hh	0.186	+/-0.211	0.202	0.0289	+/-0.214	1.00	pCi/g							
Liquid Scint Pu241, Solid "Dry Weight Corrected"															
Plutonium-241	HUh	-1.49	+/-4.49	7.72	3.79	+/-4.49	15.0	pCi/g			MXS2	09/17/16	1541	1596448	7
Rad Gamma Spec Analysis															
Gamma I129, Solid "Dry Weight Corrected"															
Iodine-129	HUh	0.0428	+/-0.412	0.867	0.351	+/-0.413	1.00	pCi/g			BSW1	09/29/16	1104	1598666	8
Gamma with Ingrowth "Dry Weight Corrected"															
Actinium-227	HUh	-0.0581	+/-0.290	0.546	0.251	+/-0.292		pCi/g			MXR1	10/03/16	0551	1596386	9
Antimony-125	HUh	0.0425	+/-0.131	0.258	0.116	+/-0.132		pCi/g							
Bismuth-212	Hh	1.82	+/-1.06	1.17	0.511	+/-1.07		pCi/g							
Bismuth-214	Hh	0.830	+/-0.220	0.180	0.0809	+/-0.223		pCi/g							
Cesium-137	HUh	0.0341	+/-0.0588	0.115	0.052	+/-0.0608	0.100	pCi/g							
Cobalt-60	HUh	-0.0169	+/-0.0581	0.107	0.045	+/-0.0586		pCi/g							
Europium-154	HUh	-0.0614	+/-0.112	0.196	0.0754	+/-0.115		pCi/g							
Lead-212	Hh	1.08	+/-0.158	0.128	0.0597	+/-0.168		pCi/g							
Lead-214	Hh	0.996	+/-0.237	0.151	0.068	+/-0.241		pCi/g							

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Certificate of Analysis

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH21.1.2
Sample ID: 405240016

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis															
Gamma with Ingrowth "Dry Weight Corrected"															
Potassium-40	Hh	18.4	+/-2.02	0.846	0.346	+/-2.24		pCi/g							
Protactinium-231	HUh	0.226	+/-0.613	1.10	0.504	+/-0.623		pCi/g							
Radium-226	Hh	0.830	+/-0.220	0.180	0.0809	+/-0.223		pCi/g							
Radium-228	Hh	1.22	+/-0.431	0.333	0.144	+/-0.435		pCi/g							
Thallium-208	Hh	0.335	+/-0.124	0.083	0.0368	+/-0.124		pCi/g							
Tin-126	HUIh	0.00	+/-0.197	0.188	0.089	+/-0.198		pCi/g							
Rad Gas Flow Proportional Counting															
GFPC, Gross A/B, solid "Dry Weight Corrected"															
Alpha	Hh	14.1	+/-4.08	3.90	1.60	+/-4.89	4.00	pCi/g			JXC9	09/23/16	1524	1597818	10
Beta	Hh	50.7	+/-4.37	3.14	1.45	+/-7.70	10.0	pCi/g							
GFPC, Sr90, solid "Dry Weight Corrected"															
Strontium-90	HUh	-0.388	+/-0.773	1.51	0.685	+/-0.773	2.00	pCi/g			BXF1	09/28/16	0806	1597807	11
Rad Liquid Scintillation Analysis															
LSC, Tritium Dist, Solid "Dry Weight Corrected"															
Tritium	HUh	0.220	+/-2.19	3.95	1.82	+/-2.19	6.00	pCi/g			TXP3	09/21/16	0859	1597481	12
Liquid Scint C14, Solid "Dry Weight Corrected"															
Carbon-14	HUh	0.391	+/-0.739	1.25	0.612	+/-0.739	2.00	pCi/g			TXJ1	09/28/16	1723	1598055	13
Liquid Scint Tc99, Solid "Dry Weight Corrected"															
Technetium-99	HUh	0.293	+/-1.93	3.29	1.61	+/-1.93	5.00	pCi/g			GXR1	09/27/16	2114	1597418	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JXO1	09/08/16	1343	1596280

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1475-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300,I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified
14	DOE EML HASL-300, Tc-02-RC Modified

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Report Date: October 3, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: REACH21.1.2
Sample ID: 405240016

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1596447	80.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	72.5	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1596443	85	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1596446	32.4	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1596438	77.8	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1596445	69	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1596448	80.4	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1597807	95	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1597418	59.2	(15%-125%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Summary

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

QC Summary

Client : MJW Technical Services
15 Hazelwood Drive
Suite 112
Buffalo, New York

Contact: Ms. Laurie Losey

Workorder: 405240

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1596438										
QC1203621828 405240001 DUP										
Thorium-228	Hh	0.728	H	1.29	pCi/g	55.7		(0% - 100%)	MXS2	09/19/1617:40
	Uncert:	+/-0.590		+/-0.982						
	TPU:	+/-0.607		+/-1.02						
Thorium-229	HUh	0.118	H	0.274	pCi/g	0		N/A		
	Uncert:	+/-0.267		+/-0.436						
	TPU:	+/-0.268		+/-0.439						
Thorium-230	Hh	0.639	H	1.28	pCi/g	66.5		(0% - 100%)		
	Uncert:	+/-0.449		+/-0.770						
	TPU:	+/-0.462		+/-0.809						
Thorium-232	Hh	0.554	H	0.706	pCi/g	24		(0% - 100%)		
	Uncert:	+/-0.407		+/-0.606						
	TPU:	+/-0.417		+/-0.622						
QC1203621829 LCS										
Thorium-228			U	0.0219	pCi/g				MXS2	09/15/1611:07
	Uncert:			+/-0.216						
	TPU:			+/-0.217						
Thorium-229				0.114	pCi/g					
	Uncert:			+/-0.262						
	TPU:			+/-0.263						
Thorium-230	17.2			17.4	pCi/g		102	(75%-125%)		
	Uncert:			+/-2.24						
	TPU:			+/-3.75						
Thorium-232			U	0.0567	pCi/g			(75%-125%)		
	Uncert:			+/-0.213						
	TPU:			+/-0.213						
QC1203621827 MB										
Thorium-228			U	-0.166	pCi/g				MXS2	09/15/1611:06
	Uncert:			+/-0.232						
	TPU:			+/-0.232						
Thorium-229			U	0.0628	pCi/g					
	Uncert:			+/-0.242						
	TPU:			+/-0.243						
Thorium-230				0.149	pCi/g					
	Uncert:			+/-0.264						
	TPU:			+/-0.266						
Thorium-232			U	0.00231	pCi/g					
	Uncert:			+/-0.171						
	TPU:			+/-0.172						
Batch 1596443										
QC1203621840 405240001 DUP										
Uranium-232	HUh	-0.00375	HU	-0.0387	pCi/g	0		N/A	MXS2	09/15/1611:04

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1596443										
	Uncert:	+/-0.0562		+/-0.0441						
	TPU:	+/-0.0563		+/-0.0442						
Uranium-233/234	Hh	0.611	H	0.428	pCi/g	35.3		(0% - 100%)		
	Uncert:	+/-0.225		+/-0.190						
	TPU:	+/-0.251		+/-0.205						
Uranium-235/236	Hh	0.0963	H	0.071	pCi/g	0		N/A		
	Uncert:	+/-0.0981		+/-0.0899						
	TPU:	+/-0.0997		+/-0.0908						
Uranium-238	Hh	0.676	H	0.558	pCi/g	19.2		(0%-20%)		
	Uncert:	+/-0.235		+/-0.213						
	TPU:	+/-0.265		+/-0.236						
QC1203621841 LCS										
Uranium-232			U	0.00843	pCi/g				MXS2	09/15/1611:04
	Uncert:			+/-0.0469						
	TPU:			+/-0.047						
Uranium-233/234				6.33	pCi/g					
	Uncert:			+/-0.861						
	TPU:			+/-1.58						
Uranium-235/236				0.690	pCi/g					
	Uncert:			+/-0.298						
	TPU:			+/-0.331						
Uranium-238	5.19			6.14	pCi/g		118	(75%-125%)		
	Uncert:			+/-0.846						
	TPU:			+/-1.54						
QC1203621839 MB										
Uranium-232			U	-0.0103	pCi/g				MXS2	09/15/1611:04
	Uncert:			+/-0.0465						
	TPU:			+/-0.0465						
Uranium-233/234				0.133	pCi/g					
	Uncert:			+/-0.0946						
	TPU:			+/-0.0972						
Uranium-235/236				0.084	pCi/g					
	Uncert:			+/-0.0799						
	TPU:			+/-0.0812						
Uranium-238				0.103	pCi/g					
	Uncert:			+/-0.0848						
	TPU:			+/-0.0865						
Batch 1596445										
QC1203621843 405240001 DUP										
Americium-241	HUh	0.00385	HU	-0.00478	pCi/g	0		N/A	MXS2	09/15/1611:06
	Uncert:	+/-0.0402		+/-0.0412						
	TPU:	+/-0.0403		+/-0.0413						
Curium-242	Hh	0.0437	HU	-0.0152	pCi/g	0		N/A		
	Uncert:	+/-0.123		+/-0.131						
	TPU:	+/-0.123		+/-0.131						
Curium-243/244	HUh	-0.0167	H	0.00	pCi/g	0		N/A		

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1596445										
	Uncert:	+/-0.0317		+/-0.0407						
	TPU:	+/-0.0317		+/-0.0408						
Curium-245/246	Hh	0.0591	HU	0.0173	pCi/g	0		N/A		
	Uncert:	+/-0.0697		+/-0.0649						
	TPU:	+/-0.0701		+/-0.065						
QC1203621844 LCS										
Americium-241	3.79			3.98	pCi/g		105	(75%-125%)	MXS2	09/15/1611:06
	Uncert:			+/-0.527						
	TPU:			+/-0.781						
Curium-242				0.00	pCi/g					
	Uncert:			+/-0.0362						
	TPU:			+/-0.0363						
Curium-243/244	5.02			5.52	pCi/g		110	(75%-125%)		
	Uncert:			+/-0.616						
	TPU:			+/-1.01						
Curium-245/246				0.0777	pCi/g					
	Uncert:			+/-0.0916						
	TPU:			+/-0.0922						
QC1203621842 MB										
Americium-241				0.0196	pCi/g				MXS2	09/15/1611:05
	Uncert:			+/-0.045						
	TPU:			+/-0.0451						
Curium-242			U	0.00668	pCi/g					
	Uncert:			+/-0.0371						
	TPU:			+/-0.0371						
Curium-243/244			U	-0.00915	pCi/g					
	Uncert:			+/-0.0276						
	TPU:			+/-0.0277						
Curium-245/246				0.0295	pCi/g					
	Uncert:			+/-0.0506						
	TPU:			+/-0.0507						
Batch 1596446										
QC1203621846 405240001 DUP										
Neptunium-237	HUh	0.059	HU	0.0844	pCi/g	0		N/A	MXS2	09/15/1617:20
	Uncert:	+/-0.202		+/-0.250						
	TPU:	+/-0.202		+/-0.250						
QC1203621847 LCS										
Neptunium-237	36.6			37.7	pCi/g		103	(75%-125%)	MXS2	09/15/1617:20
	Uncert:			+/-2.96						
	TPU:			+/-5.06						
QC1203621845 MB										
Neptunium-237				0.00	pCi/g				MXS2	09/15/1617:20
	Uncert:			+/-0.130						
	TPU:			+/-0.130						
Batch 1596447										
QC1203621849 405240001 DUP										

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1596447										
Plutonium-238	Hh	0.00	HU	-0.0139	pCi/g	0		N/A	MXS2	09/15/1609:05
	Uncert:	+/-0.0759		+/-0.0692						
	TPU:	+/-0.0763		+/-0.0695						
Plutonium-239/240	HUh	0.0182	H	0.0585	pCi/g	0		N/A		
	Uncert:	+/-0.108		+/-0.116						
	TPU:	+/-0.108		+/-0.116						
QC1203621850 LCS										
Plutonium-238				0.0457	pCi/g			(75%-125%)	MXS2	09/15/1609:05
	Uncert:			+/-0.0987						
	TPU:			+/-0.099						
Plutonium-239/240	3.81			4.34	pCi/g		114	(75%-125%)		
	Uncert:			+/-0.696						
	TPU:			+/-1.05						
QC1203621848 MB										
Plutonium-238			U	-0.0119	pCi/g				MXS2	09/15/1609:05
	Uncert:			+/-0.0592						
	TPU:			+/-0.0594						
Plutonium-239/240				0.0834	pCi/g					
	Uncert:			+/-0.115						
	TPU:			+/-0.116						
Batch 1596448										
QC1203621852 405240001 DUP										
Plutonium-241	HUh	5.27	HU	-2.7	pCi/g	0		N/A	MXS2	09/19/1614:15
	Uncert:	+/-6.69		+/-6.89						
	TPU:	+/-6.83		+/-6.89						
QC1203621853 LCS										
Plutonium-241	147			140	pCi/g		95.1	(75%-125%)	MXS2	09/17/1620:20
	Uncert:			+/-8.93						
	TPU:			+/-32.8						
QC1203621851 MB										
Plutonium-241			U	-0.762	pCi/g				MXS2	09/17/1617:14
	Uncert:			+/-5.17						
	TPU:			+/-5.17						
Rad Gamma Spec										
Batch 1596386										
QC1203621683 405240001 DUP										
Actinium-227	HUh	0.139	HU	-0.0567	pCi/g	0		N/A	MXR1	10/03/1605:52
	Uncert:	+/-0.209		+/-0.214						
	TPU:	+/-0.219		+/-0.215						
Antimony-125	HUh	0.0139	HU	0.0178	pCi/g	0		N/A		
	Uncert:	+/-0.0981		+/-0.0899						
	TPU:	+/-0.0983		+/-0.0903						
Bismuth-212	HUh	0.502	HUI	0.00	pCi/g	0		N/A		
	Uncert:	+/-0.514		+/-0.534						
	TPU:	+/-0.562		+/-0.595						

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1596386										
Bismuth-214	Hh	0.755	H	0.789	pCi/g	4.42		(0%-20%)		
	Uncert:	+/-0.177		+/-0.161						
	TPU:	+/-0.180		+/-0.164						
Cesium-137	HUIh	0.00	HUI	0.00	pCi/g	0		N/A		
	Uncert:	+/-0.0787		+/-0.0628						
	TPU:	+/-0.0787		+/-0.0629						
Cobalt-60	HUh	0.00356	HU	0.0205	pCi/g	0		N/A		
	Uncert:	+/-0.0358		+/-0.0377						
	TPU:	+/-0.0358		+/-0.0388						
Europium-154	HUh	0.0114	HU	-0.0346	pCi/g	0		N/A		
	Uncert:	+/-0.111		+/-0.0897						
	TPU:	+/-0.111		+/-0.091						
Lead-212	Hh	0.723	H	0.838	pCi/g	14.7		(0%-20%)		
	Uncert:	+/-0.139		+/-0.121						
	TPU:	+/-0.144		+/-0.129						
Lead-214	Hh	0.998	H	0.963	pCi/g	3.6		(0% - 100%)		
	Uncert:	+/-0.177		+/-0.211						
	TPU:	+/-0.182		+/-0.215						
Potassium-40	Hh	12.1	H	14.8	pCi/g	19.8		(0%-20%)		
	Uncert:	+/-1.50		+/-1.47						
	TPU:	+/-1.63		+/-1.66						
Protactinium-231	HUh	0.119	HUI	0.00	pCi/g	0		N/A		
	Uncert:	+/-0.416		+/-0.635						
	TPU:	+/-0.420		+/-0.656						
Radium-226	Hh	0.755	H	0.789	pCi/g	4.42		(0%-20%)		
	Uncert:	+/-0.177		+/-0.161						
	TPU:	+/-0.180		+/-0.164						
Radium-228	Hh	0.689	H	0.633	pCi/g	8.5		(0% - 100%)		
	Uncert:	+/-0.260		+/-0.308						
	TPU:	+/-0.263		+/-0.309						
Thallium-208	Hh	0.241	H	0.228	pCi/g	5.49		(0% - 100%)		
	Uncert:	+/-0.0769		+/-0.0758						
	TPU:	+/-0.0776		+/-0.0764						
Tin-126	HUh	0.00664	HUI	0.00	pCi/g	0		N/A		
	Uncert:	+/-0.145		+/-0.108						
	TPU:	+/-0.146		+/-0.108						
QC1203621684 LCS										
Americium-241	489			567	pCi/g		116	(75%-125%)	MXR1	10/03/1605:10
	Uncert:			+/-9.30						
	TPU:			+/-42.8						
Actinium-227			U	1.35	pCi/g					
	Uncert:			+/-3.21						
	TPU:			+/-3.27						
Antimony-125			U	-1.2	pCi/g					
	Uncert:			+/-1.50						
	TPU:			+/-1.59						

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1596386										
Bismuth-212			U	-0.0868	pCi/g					
	Uncert:			+/-7.30						
	TPU:			+/-7.30						
Bismuth-214			U	0.803	pCi/g					
	Uncert:			+/-0.980						
	TPU:			+/-1.05						
Cesium-137	179			190	pCi/g		106	(75%-125%)		
	Uncert:			+/-3.34						
	TPU:			+/-8.81						
Cobalt-60	162			154	pCi/g		95.5	(75%-125%)		
	Uncert:			+/-3.44						
	TPU:			+/-6.64						
Europium-154			U	-0.491	pCi/g					
	Uncert:			+/-1.02						
	TPU:			+/-1.05						
Lead-212				0.912	pCi/g					
	Uncert:			+/-0.684						
	TPU:			+/-0.800						
Lead-214			U	-0.858	pCi/g					
	Uncert:			+/-1.00						
	TPU:			+/-1.08						
Potassium-40				3.30	pCi/g					
	Uncert:			+/-3.49						
	TPU:			+/-3.50						
Protactinium-231				5.83	pCi/g					
	Uncert:			+/-6.65						
	TPU:			+/-6.77						
Radium-226			U	0.803	pCi/g					
	Uncert:			+/-0.980						
	TPU:			+/-1.05						
Radium-228			U	-1.02	pCi/g					
	Uncert:			+/-2.83						
	TPU:			+/-2.87						
Thallium-208			U	0.315	pCi/g					
	Uncert:			+/-0.513						
	TPU:			+/-0.533						
Tin-126				39.8	pCi/g					
	Uncert:			+/-2.23						
	TPU:			+/-3.33						
QC1203621682 MB										
Actinium-227			U	-0.0416	pCi/g				MXR1	10/03/1605:51
	Uncert:			+/-0.121						
	TPU:			+/-0.123						
Antimony-125			U	0.0201	pCi/g					
	Uncert:			+/-0.0407						
	TPU:			+/-0.0417						

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1596386										
Bismuth-212			U	0.0362	pCi/g					
	Uncert:			+/-0.257						
	TPU:			+/-0.257						
Bismuth-214			U	-0.0354	pCi/g					
	Uncert:			+/-0.0472						
	TPU:			+/-0.0498						
Cesium-137			U	-0.0102	pCi/g					
	Uncert:			+/-0.0144						
	TPU:			+/-0.0151						
Cobalt-60			U	-0.0026	pCi/g					
	Uncert:			+/-0.0196						
	TPU:			+/-0.0196						
Europium-154			U	0.00189	pCi/g					
	Uncert:			+/-0.0405						
	TPU:			+/-0.0405						
Lead-212			U	-0.0143	pCi/g					
	Uncert:			+/-0.0273						
	TPU:			+/-0.0281						
Lead-214			U	-0.0372	pCi/g					
	Uncert:			+/-0.0516						
	TPU:			+/-0.0543						
Potassium-40			U	-0.0514	pCi/g					
	Uncert:			+/-0.255						
	TPU:			+/-0.256						
Protactinium-231			U	0.065	pCi/g					
	Uncert:			+/-0.197						
	TPU:			+/-0.200						
Radium-226			U	-0.0354	pCi/g					
	Uncert:			+/-0.0472						
	TPU:			+/-0.0498						
Radium-228			U	-0.0161	pCi/g					
	Uncert:			+/-0.0797						
	TPU:			+/-0.080						
Thallium-208			UI	0.00	pCi/g					
	Uncert:			+/-0.0205						
	TPU:			+/-0.0206						
Tin-126			U	0.00344	pCi/g					
	Uncert:			+/-0.0283						
	TPU:			+/-0.0284						
Batch 1598666										
QC1203627536 405240001 DUP										
Iodine-129	HUh	0.356	HU	0.130	pCi/g	0		N/A	BSW1	09/29/16 11:05
	Uncert:	+/-0.381		+/-0.221						
	TPU:	+/-0.415		+/-0.229						
QC1203627538 LCS										
Iodine-129	12.3			13.1	pCi/g		107	(75%-125%)	BSW1	09/29/16 11:06

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1598666										
	Uncert:			+/-1.82						
	TPU:			+/-2.30						
QC1203627535 MB										
Iodine-129			U	-0.377	pCi/g				BSW1	09/29/1611:05
	Uncert:			+/-0.370						
	TPU:			+/-0.409						
QC1203627537 405240001 MS										
Iodine-129	13.6 HUh	0.356	H	12.5	pCi/g		91.8	(75%-125%)	BSW1	09/29/1611:05
	Uncert:	+/-0.381		+/-2.50						
	TPU:	+/-0.415		+/-2.80						
Rad Gas Flow										
Batch 1597807										
QC1203625429 405240005 DUP										
Strontium-90	Hh	0.554	HU	-0.122	pCi/g	0		N/A	BXF1	09/29/1613:14
	Uncert:	+/-0.691		+/-0.690						
	TPU:	+/-0.698		+/-0.690						
QC1203625430 LCS										
Strontium-90	57.9			65.4	pCi/g		113	(75%-125%)	BXF1	09/27/1614:30
	Uncert:			+/-3.71						
	TPU:			+/-12.3						
QC1203625428 MB										
Strontium-90			U	0.251	pCi/g				BXF1	09/27/1614:30
	Uncert:			+/-0.515						
	TPU:			+/-0.517						
Batch 1597818										
QC1203625465 405240003 DUP										
Alpha	Hh	13.6	H	19.7	pCi/g	36.5*		(0%-20%)	JXC9	09/23/1615:23
	Uncert:	+/-3.54		+/-4.25						
	TPU:	+/-4.41		+/-5.74						
Beta	Hh	19.1	H	21.6	pCi/g	12.4		(0%-20%)		
	Uncert:	+/-2.79		+/-2.68						
	TPU:	+/-4.00		+/-4.06						
QC1203625468 LCS										
Alpha	109			109	pCi/g		99.7	(75%-125%)	JXC9	09/23/1615:23
	Uncert:			+/-10.3						
	TPU:			+/-23.8						
Beta	396			441	pCi/g		111	(75%-125%)		
	Uncert:			+/-15.6						
	TPU:			+/-62.6						
QC1203625464 MB										
Alpha			U	-0.0818	pCi/g				JXC9	09/23/1615:23
	Uncert:			+/-1.69						
	TPU:			+/-1.69						
Beta			U	1.38	pCi/g					
	Uncert:			+/-2.20						

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1597818										
	TPU:			+/-2.21						
QC1203625466 405240003 MS										
Alpha	119 Hh	13.6	H	119	pCi/g		89.1	(75%-125%)	JXC9	09/23/16 15:23
	Uncert:	+/-3.54		+/-13.9						
	TPU:	+/-4.41		+/-28.1						
Beta	431 Hh	19.1	H	366	pCi/g		80.5	(75%-125%)		
	Uncert:	+/-2.79		+/-15.0						
	TPU:	+/-4.00		+/-53.6						
QC1203625467 405240003 MSD										
Alpha	119 Hh	13.6	H	158	pCi/g	27.7*	121	(0%-20%)	JXC9	09/23/16 15:23
	Uncert:	+/-3.54		+/-17.4						
	TPU:	+/-4.41		+/-35.1						
Beta	431 Hh	19.1	H	418	pCi/g	13.2	92.4	(0%-20%)		
	Uncert:	+/-2.79		+/-16.1						
	TPU:	+/-4.00		+/-62.3						
Rad Liquid Scintillation										
Batch 1597418										
QC1203624315 405240001 DUP										
Technetium-99	HUh	-0.532	HU	-1.08	pCi/g	0		N/A	GXR1	09/27/16 22:59
	Uncert:	+/-1.32		+/-1.30						
	TPU:	+/-1.32		+/-1.30						
QC1203624316 LCS										
Technetium-99	55.6			58.7	pCi/g		106	(75%-125%)	GXR1	09/27/16 23:51
	Uncert:			+/-1.80						
	TPU:			+/-6.96						
QC1203624314 MB										
Technetium-99			U	0.0408	pCi/g				GXR1	09/27/16 22:06
	Uncert:			+/-0.879						
	TPU:			+/-0.879						
Batch 1597481										
QC1203624534 405240001 DUP										
Tritium	HUh	0.625	HU	0.730	pCi/g	0		N/A	TXP3	09/21/16 10:14
	Uncert:	+/-2.10		+/-2.29						
	TPU:	+/-2.10		+/-2.29						
QC1203624536 LCS										
Tritium	38.8			34.4	pCi/g		88.8	(75%-125%)	TXP3	09/21/16 18:26
	Uncert:			+/-5.83						
	TPU:			+/-5.86						
QC1203624533 MB										
Tritium			U	-0.84	pCi/g				TXP3	09/21/16 09:37
	Uncert:			+/-1.82						
	TPU:			+/-1.82						
QC1203624535 405240001 MS										
Tritium	41.6 HUh	0.625	H	33.5	pCi/g		80.5	(75%-125%)	TXP3	09/21/16 10:52
	Uncert:	+/-2.10		+/-5.98						

QC Summary

Workorder: **405240**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Liquid Scintillation										
Batch 1597481										
	TPU:	+/-2.10		+/-6.00						
Batch 1598055										
QC1203626058 405240001 DUP										
Carbon-14	HUh	-0.319	H	0.609	pCi/g	0		N/A	TXJ1	09/28/16 19:45
	Uncert:	+/-0.669		+/-0.652						
	TPU:	+/-0.669		+/-0.653						
QC1203626060 LCS										
Carbon-14	65.3			64.0	pCi/g		97.9	(75%-125%)	TXJ1	09/28/16 22:08
	Uncert:			+/-1.55						
	TPU:			+/-4.92						
QC1203626057 MB										
Carbon-14			U	0.414	pCi/g				TXJ1	09/28/16 18:34
	Uncert:			+/-0.647						
	TPU:			+/-0.648						
QC1203626059 405240001 MS										
Carbon-14	66.3 HUh	-0.319	H	65.7	pCi/g		99	(75%-125%)	TXJ1	09/28/16 20:57
	Uncert:	+/-0.669		+/-1.57						
	TPU:	+/-0.669		+/-5.05						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the Lc.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.

QC Summary

Workorder: **405240**

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

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ 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 or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence 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.
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.

Alpha Spectroscopy
Raw Data

Batch# 1596443 Product: U Date: 9/16/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		Case narrative
Sample was run within hold time.		✓	DER# 1558506
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER# 1558506
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER# 1558506
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.)	✓		

Primary Review Performed By: [signature] 9/16/16

Secondary Review Performed By: [signature] 9/16/16

10/4

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
16-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	DOE EML HASL-300, U-02-RC Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596443	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Other

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621840 were logged in and analyzed out of holding. 2. Sample 405240003 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the U-232 tracer.	1. Reporting results. 2. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the U-232 region of interest. Reporting results.

Originator's Name:

Melanie Aycock 16-SEP-16

Data Validator/Group Leader:

Scott Moreland 16-SEP-16

Uranium Que Sheet

S-RUN

07-SEP-16

Batch #: 1596443 Analyst: MXS2 First Client Due Date:04-OCT-16 Internal Due Date:30-SEP-16

Tracer Isotope: U-232/U-236 Tracer Code: 1564-I Expiration Date: 11-23-16 Vol: 0.1 Analyzed Sequentially with Pu Analyzed Sequentially with:

LCS Isotope: U-238 LCS Code: 1600-E Expiration Date: 7-12-17 Vol: 0.1 Pu-236 ID: — Pu: 1596447

Spike Isotope: U-238 Spike Code: — Expiration Date: — Vol: — Vol.: — Am: 1596445

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840022 Balance ID: 16107662 Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	U Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.506	2
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.503	4
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.508	5
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.519	6
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.514	8
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.500	10
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.503	11
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.516	12
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.507	13
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.508	14
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.510	15
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.501	16
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.511	17
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.505	18
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.508	20
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.509	21
1203621839-1	MB for batch 1596443	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.519	1
1203621840-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.502	22
1203621841-1	LCS for batch 1596443	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.519	~~23~~ 24

OF 9/13/16

Choose SOP used: GL-RAD-A-011 Solid Sample Dissolution by: LEACH or DIGESTION (Circle One) Data Reviewed By: mlawrence 9/16/16

Uranium Que Sheet

T - RUN 07-SEP-16

Batch #: 1596443 Analyst: MXS2 First Client Due Date:04-OCT-16 Internal Due Date:30-SEP-16

Tracer Isotope: U-232/U-236 Tracer Code: 1570-E Expiration Date: 7-18-17 Vol: 0.1 Analyzed Sequentially with Pu Analyzed Sequentially with:

LCS Isotope: U-238 LCS Code: — Expiration Date: — Vol: — Pu-236 ID: — Pu: —

Spike Isotope: U-238 Spike Code: — Expiration Date: — Vol: — Vol.: — Am: —

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840022 Balance ID: PD07662 Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l / f)	U Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.508	113
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.506	114
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.508	115
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.503	116
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.515	117
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.501	118
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.514	121
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.517	122
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.509	124
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.506	126
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.511	127
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.515	128
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.503	129
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.500	130
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.512	131
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.506	132
1203621839-1	MB for batch 1596443	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.517	3
1203621840-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.503	133
1203621841-1	LCS for batch 1596443	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.517	134

Choose SOP used: GL-RAD-A-011 Solid Sample Dissolution by: LEACH or DIGESTION (Circle One) Data Reviewed By: [signature] 9/16/16

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

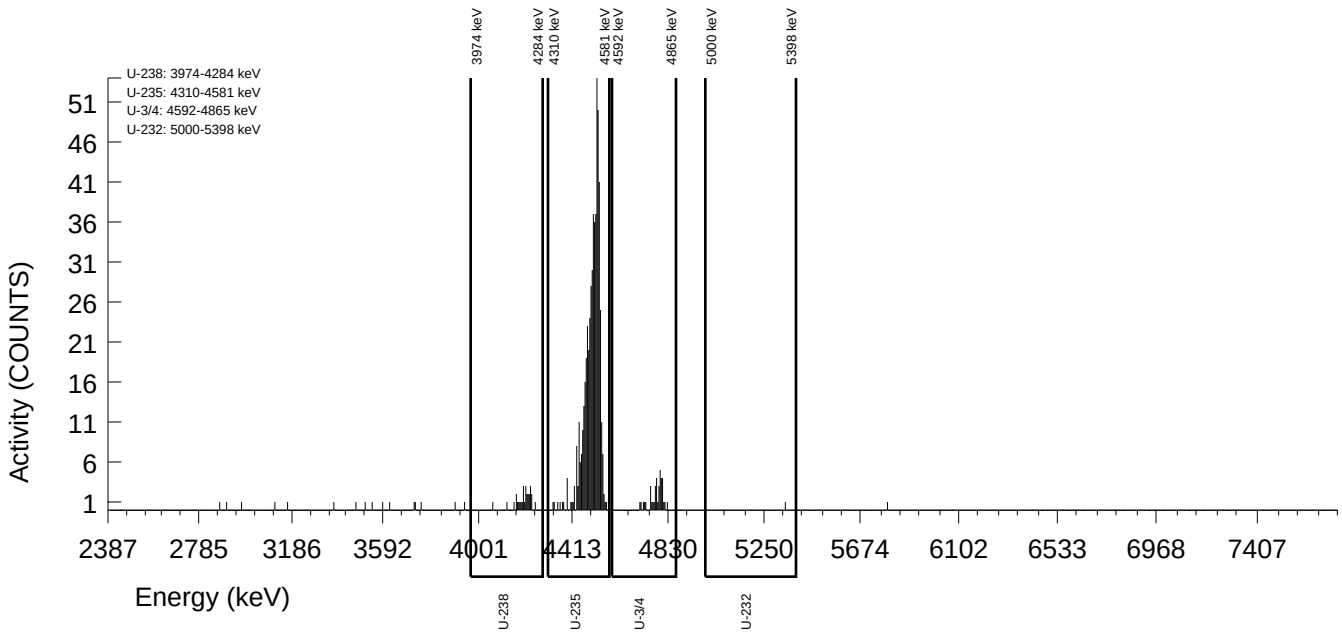
BATCH NUMBER : 1596443	CHAMBER : 113	LIB FILE : U236
SAMPLE ID : T0405240001_UU	DETECTOR S/N : 80009	BKG FILE : B113.CNF;1163
SAMPLE QTY : 0.506 G +/-0.198 %	AVERAGE %EFFICIENCY : 24.7132	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4794	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:56	EFF FILE : W113.CNF;318
CORRECTED % YIELD : 67.1 +/-9.126 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.508 G +/-0.197 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 8.9727E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4501.44	4442.62	530.59	4.76	80.427	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5345.25	5319.60	-0.20	205.28	67.583	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5345.25	4.949	1.000	-0.200	1.200	1.0954	100.000	-3.75E-03	5.63E-02	1.31E-01	3.76E-02	5.62E-02
U-3/4	4763.02	4782.37	52.785	31.000	30.280	0.720	0.8485	100.000	6.11E-01	2.51E-01	1.23E-01	3.14E-02	2.25E-01
U-235	4391.00	4501.44	40.207	5.000	4.760	0.240	0.4899	99.700	9.63E-02	9.97E-02	9.70E-02	1.82E-02	9.81E-02
U-238	4184.73	4201.12	66.806	34.000	33.520	0.480	0.6928	100.000	6.76E-01	2.65E-01	1.12E-01	2.56E-02	2.35E-01



NOTES:

* Results are a compilation of S0405240001_UU and T0405240001_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

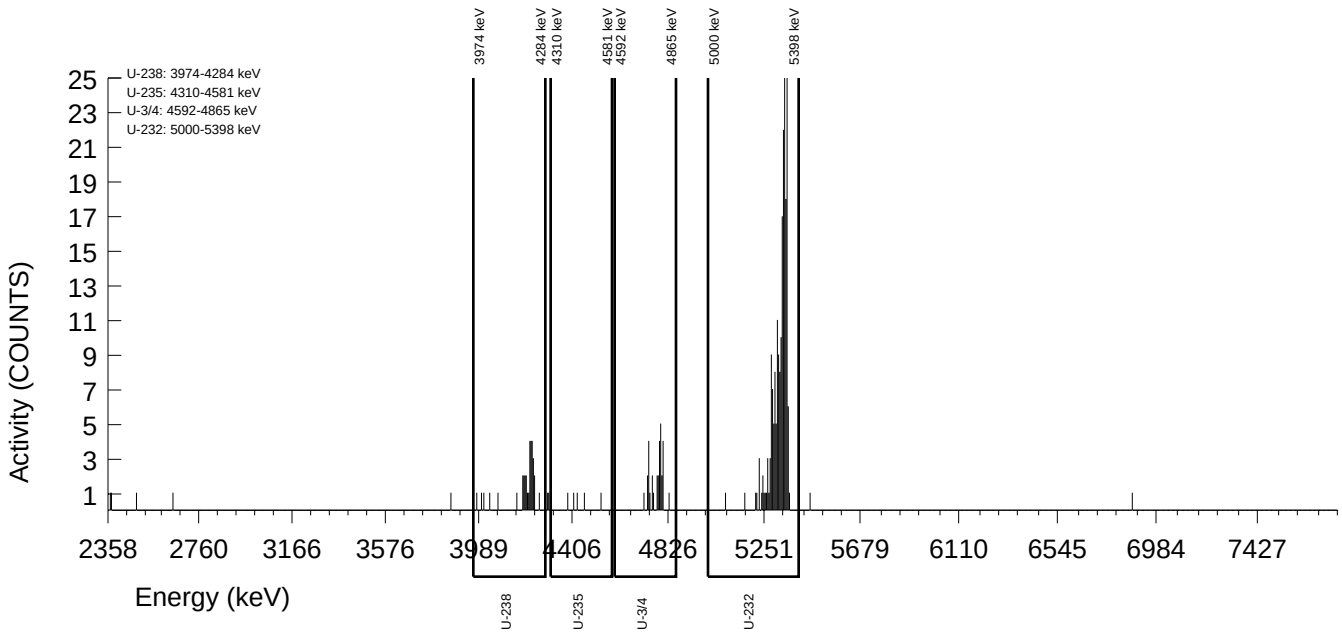
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 002	LIB FILE : U236
SAMPLE ID : S0405240001_UU	DETECTOR S/N : 79452	BKG FILE : B002.CNF;1841
SAMPLE QTY : 0.506 G +/-0.198 %	AVERAGE %EFFICIENCY : 27.4069	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5303	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W002.CNF;518
% YIELD : 67.6 +/-7.682 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.1446E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5319.60	26.526	206.000	205.280	0.720	0.8485	100.000	4.14E+00	8.59E-01	1.23E-01	3.14E-02	5.69E-01
U-3/4	4763.02	4777.47	65.679	31.000	30.280	0.720	0.8485	100.000	6.06E-01	2.42E-01	1.22E-01	3.11E-02	2.23E-01
U-235	4391.00	4442.62	145.120	5.000	4.760	0.240	0.4899	99.700	9.56E-02	9.85E-02	9.63E-02	1.80E-02	9.74E-02
U-238	4184.73	4187.42	23.353	34.000	33.520	0.480	0.6928	100.000	6.71E-01	2.55E-01	1.11E-01	2.54E-02	2.33E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

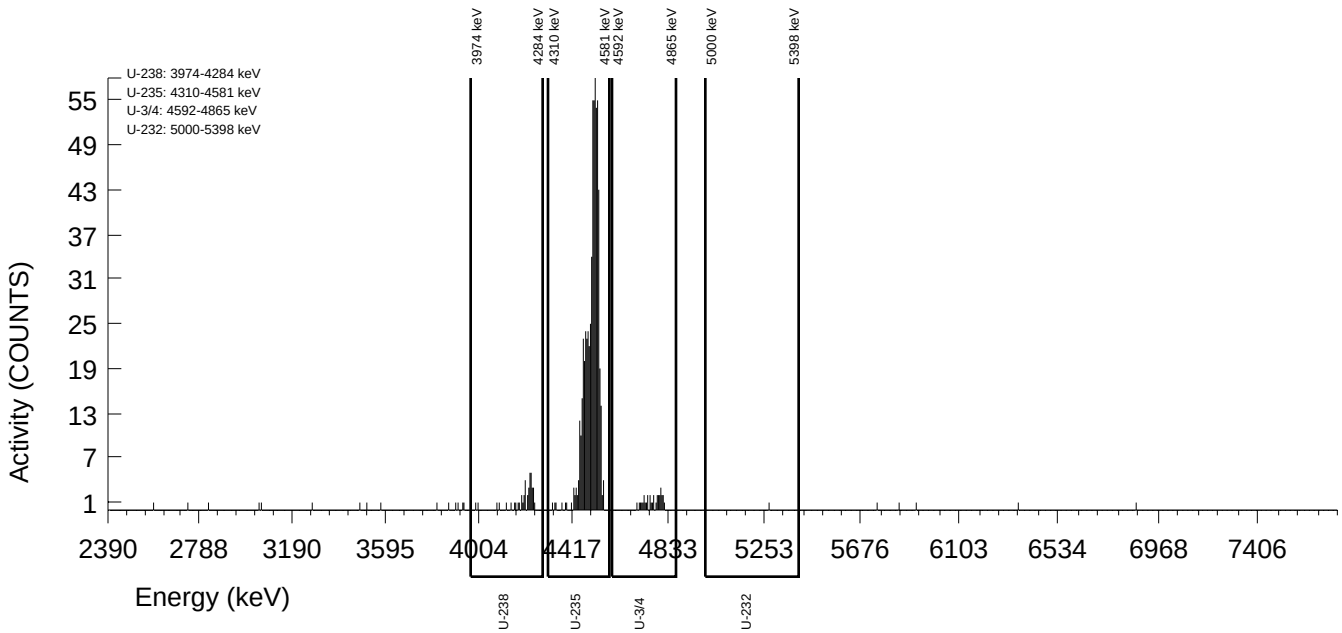
BATCH NUMBER : 1596443	CHAMBER : 114	LIB FILE : U236
SAMPLE ID : T0405240002_UU	DETECTOR S/N : 78258	BKG FILE : B114.CNF;1166
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 24.7116	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4794	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:59	EFF FILE : W114.CNF;324
CORRECTED % YIELD : 55.7 +/-9.302 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.506 G +/-0.198 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 1.0178E+01 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4500.51	4419.95	601.84	6.76	91.232	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5274.02	5290.42	-0.44	186.08	56.162	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5274.02	4.954	1.000	-0.440	1.440	1.2000	100.000	-7.29E-03	5.05E-02	1.23E-01	3.64E-02	5.04E-02
U-3/4	4763.02	4767.08	84.210	28.000	27.520	0.480	0.6928	100.000	6.16E-01	2.63E-01	1.24E-01	2.84E-02	2.37E-01
U-235	4391.00	4500.51	35.363	7.000	6.760	0.240	0.4899	99.700	1.52E-01	1.29E-01	1.08E-01	2.02E-02	1.25E-01
U-238	4184.73	4199.07	39.628	22.000	21.520	0.480	0.6928	100.000	4.82E-01	2.30E-01	1.24E-01	2.84E-02	2.11E-01



NOTES:

* Results are a compilation of S0405240002_UU and T0405240002_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

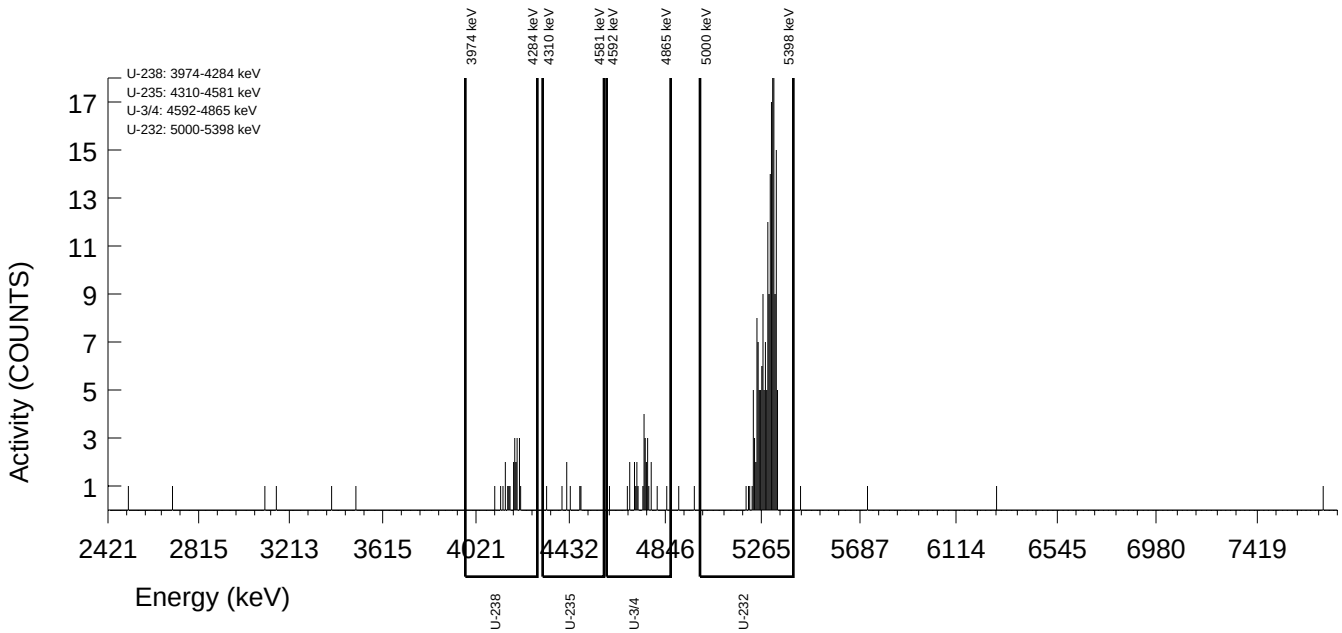
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 004	LIB FILE : U236
SAMPLE ID : S0405240002_UU	DETECTOR S/N : 76389	BKG FILE : B004.CNF;1842
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 29.8956	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5774	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W004.CNF;539
% YIELD : 56.2 +/-8.034 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 2.6132E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5290.42	39.314	188.000	186.080	1.920	1.3856	100.000	4.17E+00	9.06E-01	1.81E-01	5.68E-02	6.04E-01
U-3/4	4763.02	4744.01	20.403	28.000	27.520	0.480	0.6928	100.000	6.12E-01	2.55E-01	1.23E-01	2.82E-02	2.35E-01
U-235	4391.00	4419.95	4.897	7.000	6.760	0.240	0.4899	99.700	1.51E-01	1.27E-01	1.07E-01	2.00E-02	1.24E-01
U-238	4184.73	4179.24	63.658	22.000	21.520	0.480	0.6928	100.000	4.78E-01	2.24E-01	1.23E-01	2.82E-02	2.10E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

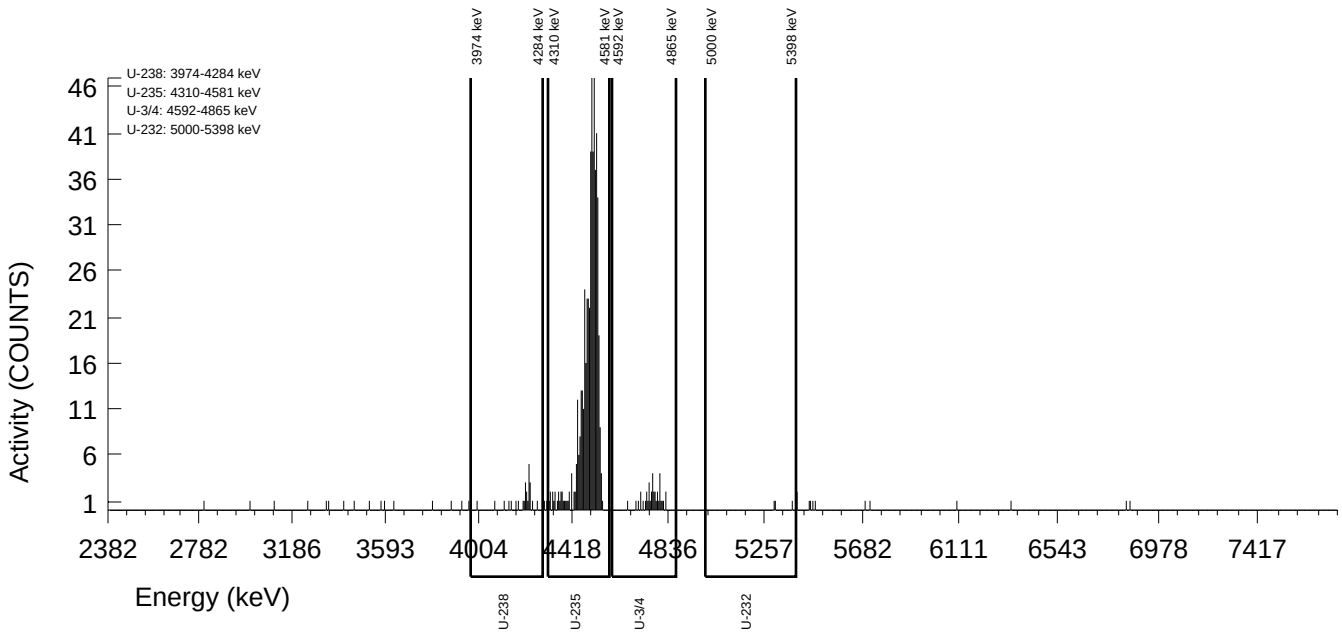
BATCH NUMBER : 1596443	CHAMBER : 115	LIB FILE : U236
SAMPLE ID : T0405240003_UU	DETECTOR S/N : 79995	BKG FILE : B115.CNF;1175
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 25.2291	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4892	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:01	EFF FILE : W115.CNF;335
CORRECTED % YIELD : 15.0 +/-15.668 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.508 G +/-0.197 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 8.6941E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4490.45	4445.50	524.85	-0.24	77.929	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5356.61	5308.82	4.04	49.28	15.342	1.0262

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5356.61	0.000	5.000	4.040	0.960	0.9798	100.000	7.65E-02	9.60E-02	1.25E-01	3.40E-02	9.31E-02
U-3/4	4763.02	4765.30	50.594	16.000	16.000	0.000	0.0000	100.000	1.36E+00	8.09E-01	2.56E-01	0.00E+00	6.90E-01
U-235	4391.00	4490.45	58.416	0.000	-0.240	0.240	0.4899	99.700	-2.05E-02	1.79E-01	4.10E-01	7.67E-02	1.77E-01
U-238	4184.73	4193.56	21.979	12.000	11.760	0.240	0.4899	100.000	1.00E+00	6.80E-01	4.09E-01	7.65E-02	6.05E-01



NOTES:

* Results are a compilation of S0405240003_UU and T0405240003_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

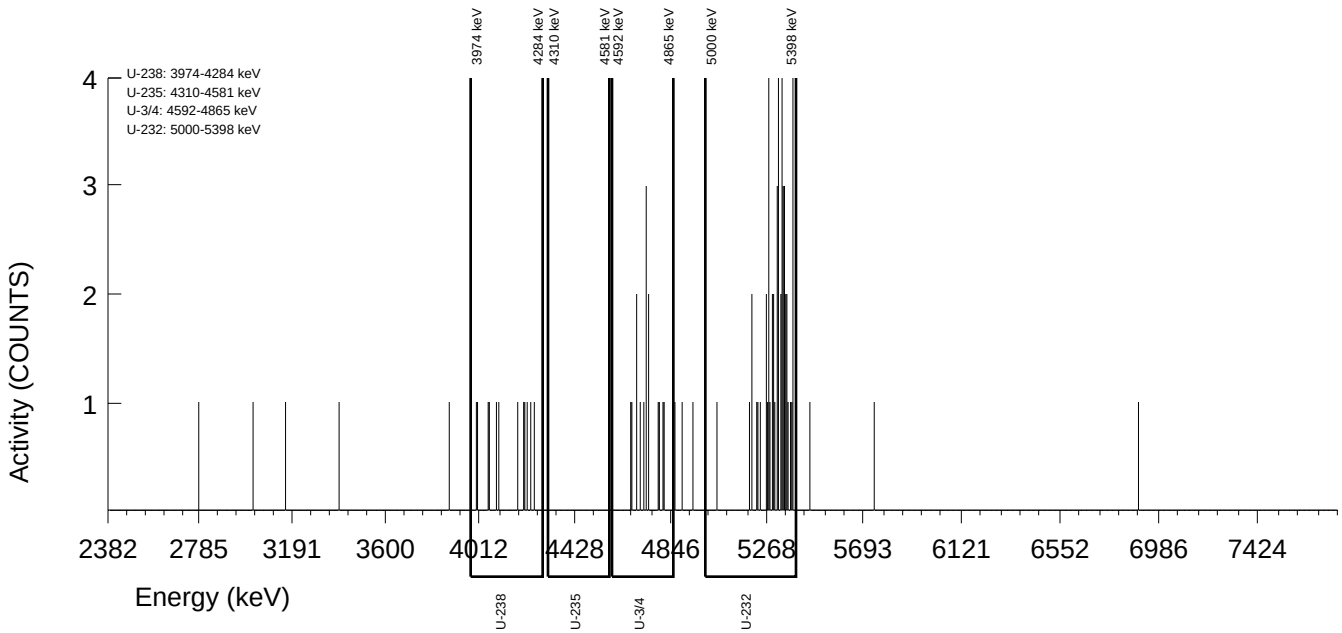
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 005	LIB FILE : U236
SAMPLE ID : S0405240003_UU	DETECTOR S/N : 79454	BKG FILE : B005.CNF;1824
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 28.9835	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5602	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W005.CNF;575
% YIELD : 15.3 +/-14.859 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 7.1385E-01 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5308.82	106.159	50.000	49.280	0.720	0.8485	100.000	4.13E+00	1.69E+00	5.11E-01	1.30E-01	1.17E+00
U-3/4	4763.02	4751.23	52.662	16.000	16.000	0.000	0.0000	100.000	1.33E+00	7.78E-01	2.49E-01	0.00E+00	6.73E-01
U-235	4391.00	4445.50	0.000	0.000	-0.240	0.240	0.4899	99.700	-2.00E-02	1.74E-01	4.00E-01	7.48E-02	1.72E-01
U-238	4184.73	4131.44	250.770	12.000	11.760	0.240	0.4899	100.000	9.77E-01	6.56E-01	3.98E-01	7.46E-02	5.90E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

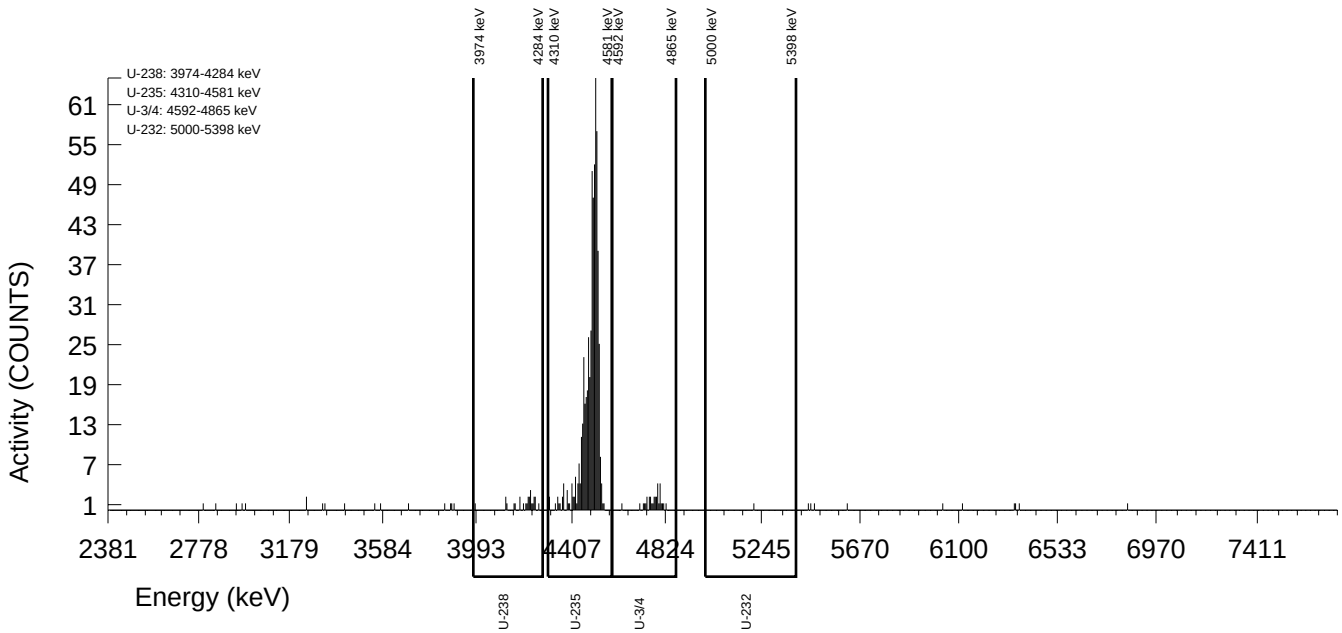
BATCH NUMBER : 1596443	CHAMBER : 116	LIB FILE : U236
SAMPLE ID : T0405240004_UU	DETECTOR S/N : 80004	BKG FILE : B116.CNF;1157
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 25.8624	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5011	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:04	EFF FILE : W116.CNF;295
CORRECTED % YIELD : 64.8 +/-9.291 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.503 G +/-0.199 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.0934E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4494.90	4406.29	562.73	4.00	81.508	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5208.09	5317.01	-0.68	190.56	65.320	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5208.09	4.939	1.000	-0.680	1.680	1.2961	100.000	-1.21E-02	5.49E-02	1.38E-01	4.23E-02	5.48E-02
U-3/4	4763.02	4768.41	18.110	30.000	29.280	0.720	0.8485	100.000	6.21E-01	2.59E-01	1.29E-01	3.29E-02	2.32E-01
U-235	4391.00	4494.90	30.796	4.000	4.000	0.000	0.0000	99.700	8.50E-02	9.50E-02	6.38E-02	0.00E+00	9.37E-02
U-238	4184.73	4199.78	125.947	29.000	28.760	0.240	0.4899	100.000	6.09E-01	2.55E-01	1.02E-01	1.90E-02	2.28E-01



NOTES:

* Results are a compilation of S0405240004_UU and T0405240004_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

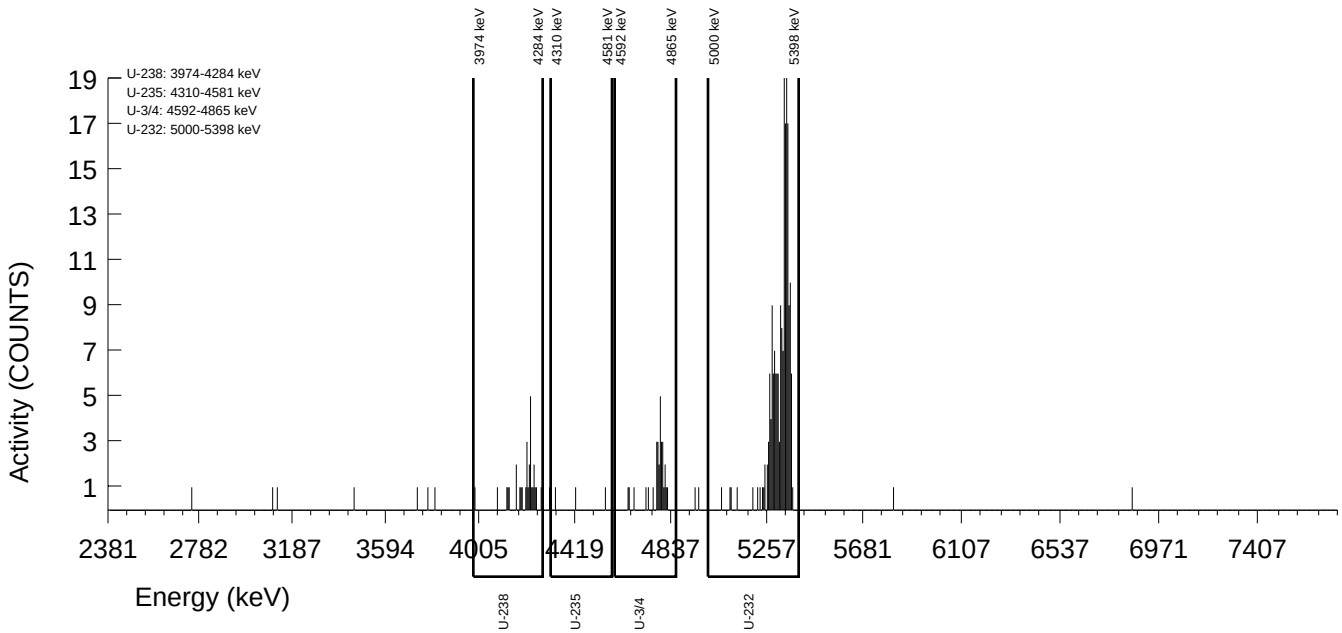
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 006	LIB FILE : U236
SAMPLE ID : S0405240004_UU	DETECTOR S/N : 79455	BKG FILE : B006.CNF;1835
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 26.3231	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5098	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W006.CNF;571
% YIELD : 65.3 +/-7.944 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.0393E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5317.01	29.554	192.000	190.560	1.440	1.2000	100.000	4.04E+00	8.68E-01	1.57E-01	4.66E-02	5.78E-01
U-3/4	4763.02	4779.14	27.056	30.000	29.280	0.720	0.8485	100.000	6.16E-01	2.51E-01	1.28E-01	3.27E-02	2.30E-01
U-235	4391.00	4406.29	0.000	4.000	4.000	0.000	0.0000	99.700	8.44E-02	9.40E-02	6.33E-02	0.00E+00	9.30E-02
U-238	4184.73	4197.05	19.356	29.000	28.760	0.240	0.4899	100.000	6.05E-01	2.46E-01	1.01E-01	1.89E-02	2.26E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

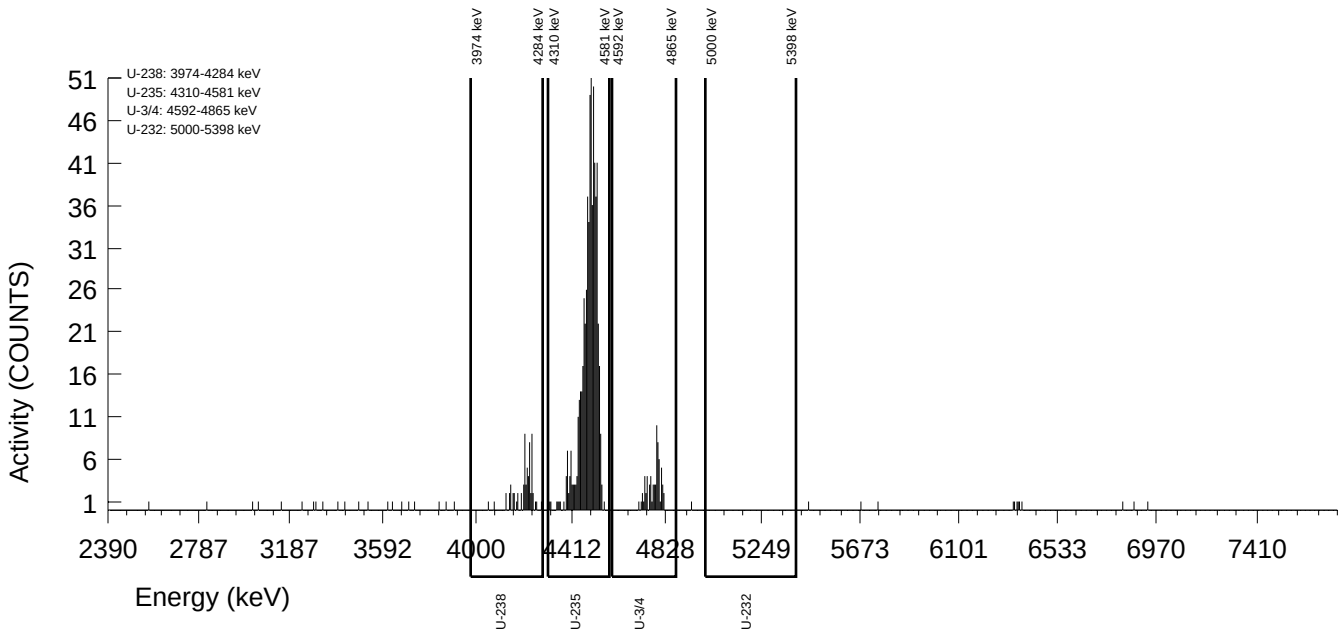
BATCH NUMBER : 1596443	CHAMBER : 117	LIB FILE : U236
SAMPLE ID : T0405240005_UU	DETECTOR S/N : 80003	BKG FILE : B117.CNF;1160
SAMPLE QTY : 0.514 G +/-0.195 %	AVERAGE %EFFICIENCY : 25.8068	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5001	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:05	EFF FILE : W117.CNF;308
CORRECTED % YIELD : 65.5 +/-8.658 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.515 G +/-0.194 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.8505E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4490.48	4408.31	608.27	9.80	88.294	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5198.54	5313.05	-2.64	238.24	66.038	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5198.54	0.000	0.000	-2.640	2.640	1.6248	100.000	-4.25E-02	4.12E-02	1.44E-01	4.80E-02	4.11E-02
U-3/4	4763.02	4775.54	14.366	54.000	52.560	1.440	1.2000	100.000	9.00E-01	2.95E-01	1.27E-01	3.76E-02	2.50E-01
U-235	4391.00	4490.48	49.004	11.000	9.800	1.200	1.0954	99.700	1.68E-01	1.22E-01	1.20E-01	3.44E-02	1.18E-01
U-238	4184.73	4206.89	36.444	71.000	70.040	0.960	0.9798	100.000	1.20E+00	3.53E-01	1.13E-01	3.07E-02	2.85E-01



NOTES:

* Results are a compilation of S0405240005_UU and T0405240005_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

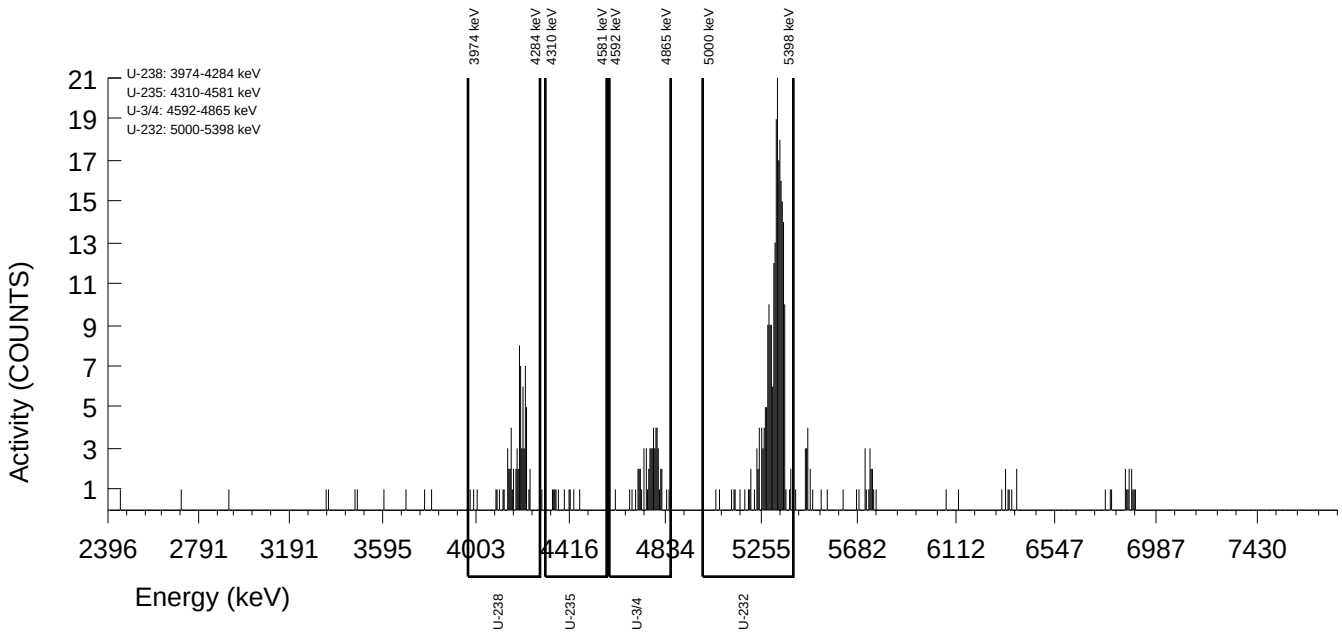
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 008	LIB FILE : U236
SAMPLE ID : S0405240005_UU	DETECTOR S/N : 78788	BKG FILE : B008.CNF;1831
SAMPLE QTY : 0.514 G +/-0.195 %	AVERAGE %EFFICIENCY : 32.5514	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6275	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:31	EFF FILE : W008.CNF;515
% YIELD : 66.0 +/-7.296 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.0728E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5313.05	44.819	244.000	238.240	5.760	2.4000	100.000	4.08E+00	8.01E-01	2.02E-01	7.52E-02	5.27E-01
U-3/4	4763.02	4771.92	63.033	54.000	52.560	1.440	1.2000	100.000	8.93E-01	2.81E-01	1.26E-01	3.73E-02	2.48E-01
U-235	4391.00	4408.31	0.000	11.000	9.800	1.200	1.0954	99.700	1.67E-01	1.20E-01	1.19E-01	3.42E-02	1.17E-01
U-238	4184.73	4185.35	33.727	71.000	70.040	0.960	0.9798	100.000	1.19E+00	3.33E-01	1.12E-01	3.05E-02	2.83E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

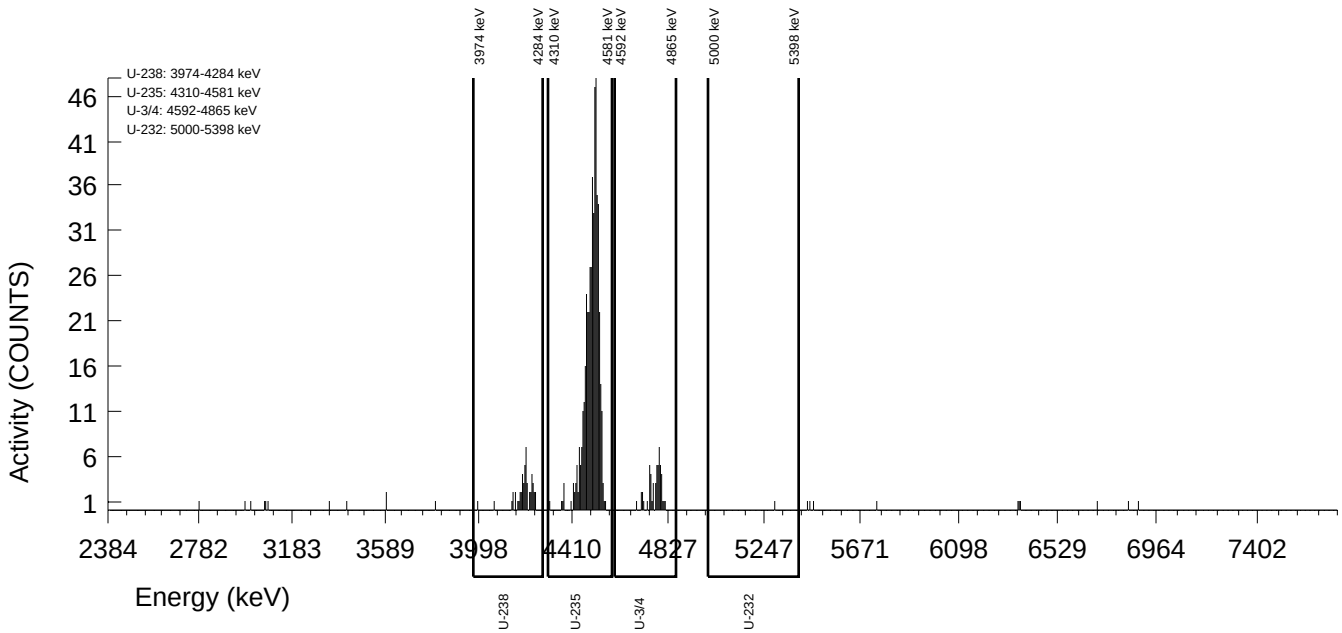
BATCH NUMBER : 1596443	CHAMBER : 118	LIB FILE : U236
SAMPLE ID : T0405240006_UU	DETECTOR S/N : 80061	BKG FILE : B118.CNF;1169
SAMPLE QTY : 0.500 G +/-0.200 %	AVERAGE %EFFICIENCY : 25.6062	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4962	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:09	EFF FILE : W118.CNF;318
CORRECTED % YIELD : 64.9 +/-9.189 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.501 G +/-0.200 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 7.8612E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4495.97	4441.08	481.66	6.28	70.463	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5294.34	5301.76	-1.64	216.32	65.367	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5294.34	4.952	1.000	-1.640	2.640	1.6248	100.000	-3.43E-02	6.74E-02	1.87E-01	6.23E-02	6.73E-02
U-3/4	4763.02	4771.38	51.834	51.000	49.080	1.920	1.3856	100.000	9.51E-01	3.26E-01	1.57E-01	4.92E-02	2.75E-01
U-235	4391.00	4495.97	41.764	7.000	6.280	0.720	0.8485	99.700	1.22E-01	1.12E-01	1.19E-01	3.02E-02	1.09E-01
U-238	4184.73	4199.65	43.332	51.000	50.040	0.960	0.9798	100.000	9.70E-01	3.28E-01	1.28E-01	3.48E-02	2.75E-01



NOTES:

* Results are a compilation of S0405240006_UU and T0405240006_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.007 +/-0.000)

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effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

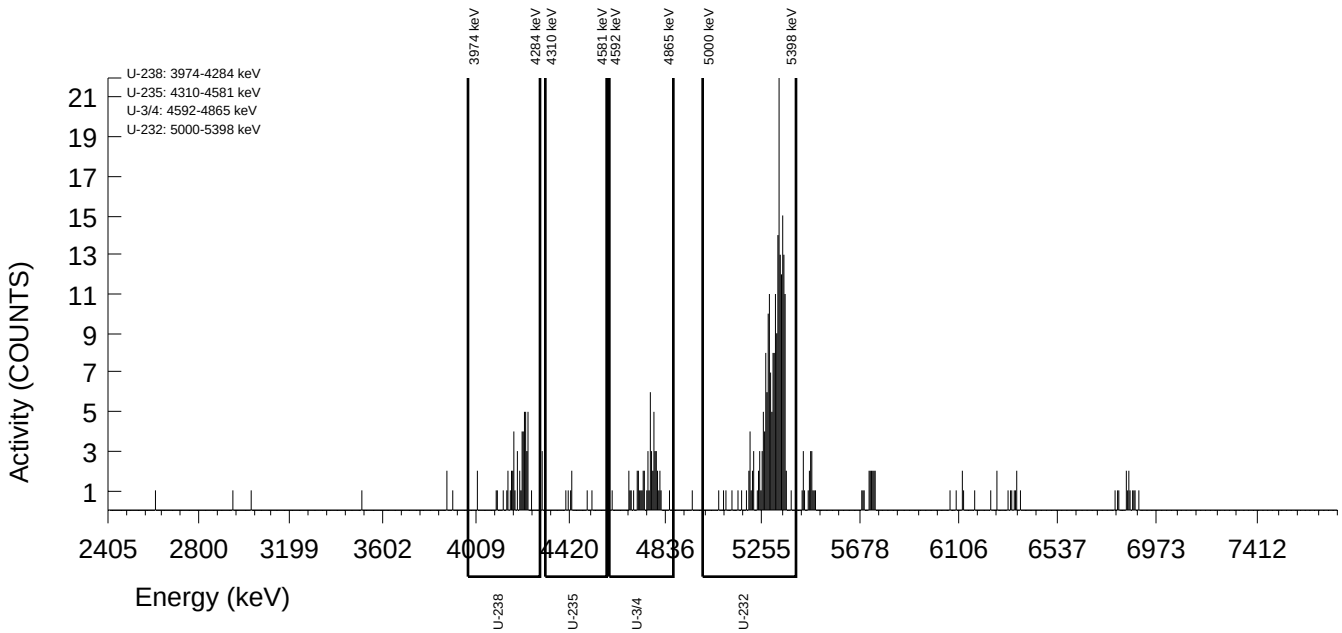
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 010	LIB FILE : U236
SAMPLE ID : S0405240006_UU	DETECTOR S/N : 72529	BKG FILE : B010.CNF;1839
SAMPLE QTY : 0.500 G +/-0.200 %	AVERAGE %EFFICIENCY : 29.8601	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5768	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:31	EFF FILE : W010.CNF;511
% YIELD : 65.4 +/-7.636 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.0415E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5301.76	32.415	224.000	216.320	7.680	2.7713	100.000	4.19E+00	8.64E-01	2.55E-01	9.84E-02	5.72E-01
U-3/4	4763.02	4757.30	22.592	51.000	49.080	1.920	1.3856	100.000	9.44E-01	3.10E-01	1.55E-01	4.88E-02	2.73E-01
U-235	4391.00	4441.08	7.367	7.000	6.280	0.720	0.8485	99.700	1.21E-01	1.10E-01	1.18E-01	3.00E-02	1.08E-01
U-238	4184.73	4189.72	65.076	51.000	50.040	0.960	0.9798	100.000	9.62E-01	3.10E-01	1.27E-01	3.45E-02	2.73E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

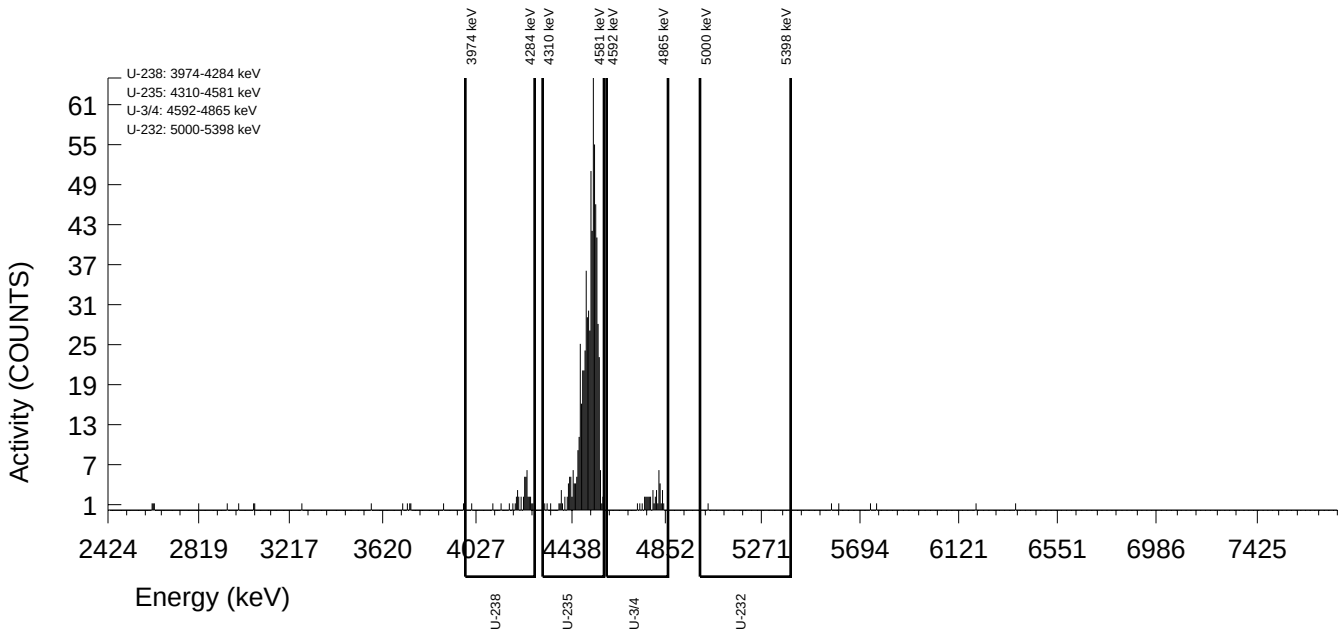
BATCH NUMBER : 1596443	CHAMBER : 121	LIB FILE : U236
SAMPLE ID : T0405240007_UU	DETECTOR S/N : 75545	BKG FILE : B121.CNF;1156
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 26.2144	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5077	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:10	EFF FILE : W121.CNF;322
CORRECTED % YIELD : 78.8 +/-8.273 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.514 G +/-0.195 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 1.0372E+01 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4517.41	4459.51	650.61	6.28	92.971	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5035.14	5314.39	-2.12	273.28	79.400	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5035.14	4.909	1.000	-2.120	3.120	1.7664	100.000	-3.20E-02	4.96E-02	1.43E-01	4.88E-02	4.96E-02
U-3/4	4763.02	4798.42	9.491	46.000	43.360	2.640	1.6248	100.000	6.61E-01	2.34E-01	1.37E-01	4.54E-02	2.06E-01
U-235	4391.00	4517.41	48.823	7.000	6.280	0.720	0.8485	99.700	9.60E-02	8.75E-02	9.34E-02	2.38E-02	8.60E-02
U-238	4184.73	4217.74	16.773	39.000	37.080	1.920	1.3856	100.000	5.65E-01	2.12E-01	1.23E-01	3.87E-02	1.90E-01



NOTES:

* Results are a compilation of S0405240007_UU and T0405240007_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.010 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

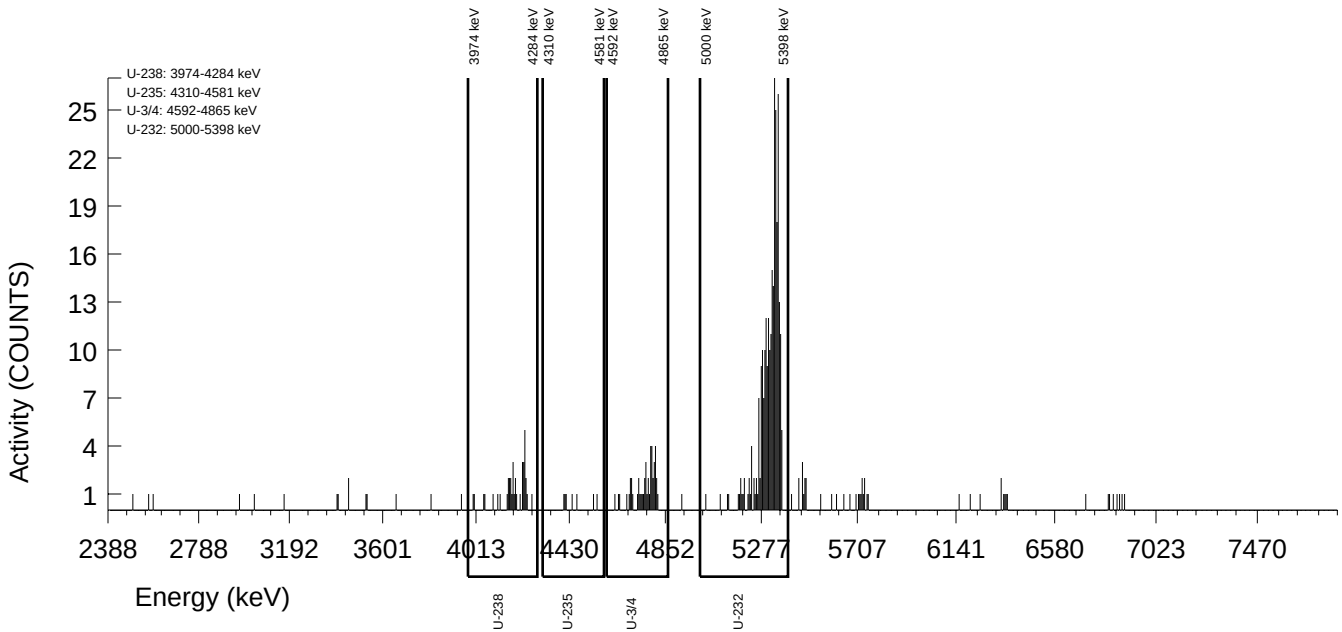
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 011	LIB FILE : U236
SAMPLE ID : S0405240007_UU	DETECTOR S/N : 72531	BKG FILE : B011.CNF;1831
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 31.0555	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5992	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:31	EFF FILE : W011.CNF;511
% YIELD : 79.4 +/-6.904 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.6945E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5314.39	31.487	280.000	273.280	6.720	2.5923	100.000	4.17E+00	7.72E-01	1.91E-01	7.24E-02	5.02E-01
U-3/4	4763.02	4760.12	49.692	46.000	43.360	2.640	1.6248	100.000	6.56E-01	2.25E-01	1.35E-01	4.50E-02	2.05E-01
U-235	4391.00	4459.51	144.105	7.000	6.280	0.720	0.8485	99.700	9.53E-02	8.64E-02	9.27E-02	2.36E-02	8.53E-02
U-238	4184.73	4172.38	55.075	39.000	37.080	1.920	1.3856	100.000	5.61E-01	2.05E-01	1.22E-01	3.84E-02	1.89E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

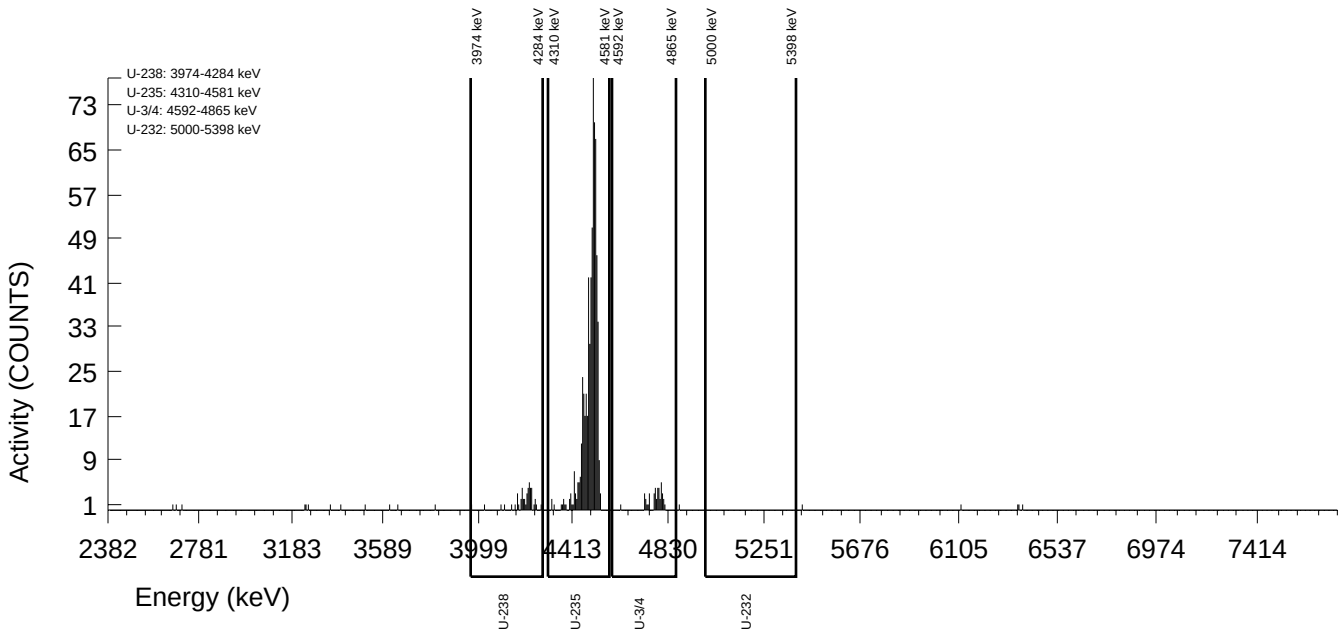
BATCH NUMBER : 1596443	CHAMBER : 122	LIB FILE : U236
SAMPLE ID : T0405240008_UU	DETECTOR S/N : 75546	BKG FILE : B122.CNF;1168
SAMPLE QTY : 0.516 G +/-0.194 %	AVERAGE %EFFICIENCY : 25.9617	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5030	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:12	EFF FILE : W122.CNF;334
CORRECTED % YIELD : 93.3 +/-8.068 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.517 G +/-0.193 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.9785E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4494.46	4408.61	619.88	9.56	89.442	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5198.57	5313.24	-0.48	305.80	94.049	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5198.57	0.000	0.000	-0.480	0.480	0.6928	100.000	-7.56E-03	3.35E-02	8.72E-02	2.00E-02	3.34E-02
U-3/4	4763.02	4776.86	77.684	53.000	52.040	0.960	0.9798	100.000	6.91E-01	2.22E-01	8.75E-02	2.38E-02	1.92E-01
U-235	4391.00	4494.46	38.198	11.000	9.560	1.440	1.2000	99.700	1.27E-01	9.43E-02	9.85E-02	2.93E-02	9.20E-02
U-238	4184.73	4200.96	62.189	57.000	56.280	0.720	0.8485	100.000	7.48E-01	2.33E-01	8.11E-02	2.06E-02	1.99E-01



NOTES:

* Results are a compilation of S0405240008_UU and T0405240008_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

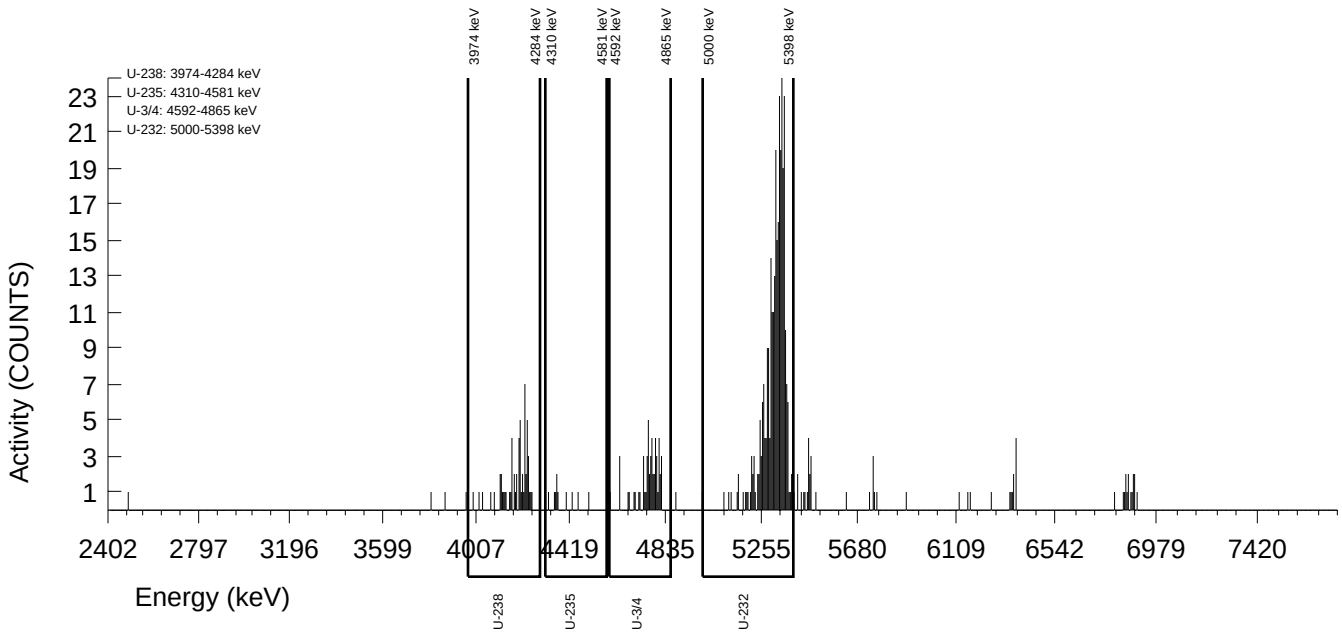
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 012	LIB FILE : U236
SAMPLE ID : S0405240008_UU	DETECTOR S/N : 80054	BKG FILE : B012.CNF;1835
SAMPLE QTY : 0.516 G +/-0.194 %	AVERAGE %EFFICIENCY : 29.3381	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5668	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:31	EFF FILE : W012.CNF;494
% YIELD : 94.0 +/-6.602 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 4.3761E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5313.24	59.142	313.000	305.800	7.200	2.6833	100.000	4.06E+00	7.17E-01	1.70E-01	6.53E-02	4.63E-01
U-3/4	4763.02	4760.45	173.474	53.000	52.040	0.960	0.9798	100.000	6.86E-01	2.12E-01	8.69E-02	2.37E-02	1.90E-01
U-235	4391.00	4408.61	9.819	11.000	9.560	1.440	1.2000	99.700	1.26E-01	9.28E-02	9.78E-02	2.91E-02	9.13E-02
U-238	4184.73	4182.44	68.326	57.000	56.280	0.720	0.8485	100.000	7.42E-01	2.21E-01	8.05E-02	2.05E-02	1.97E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

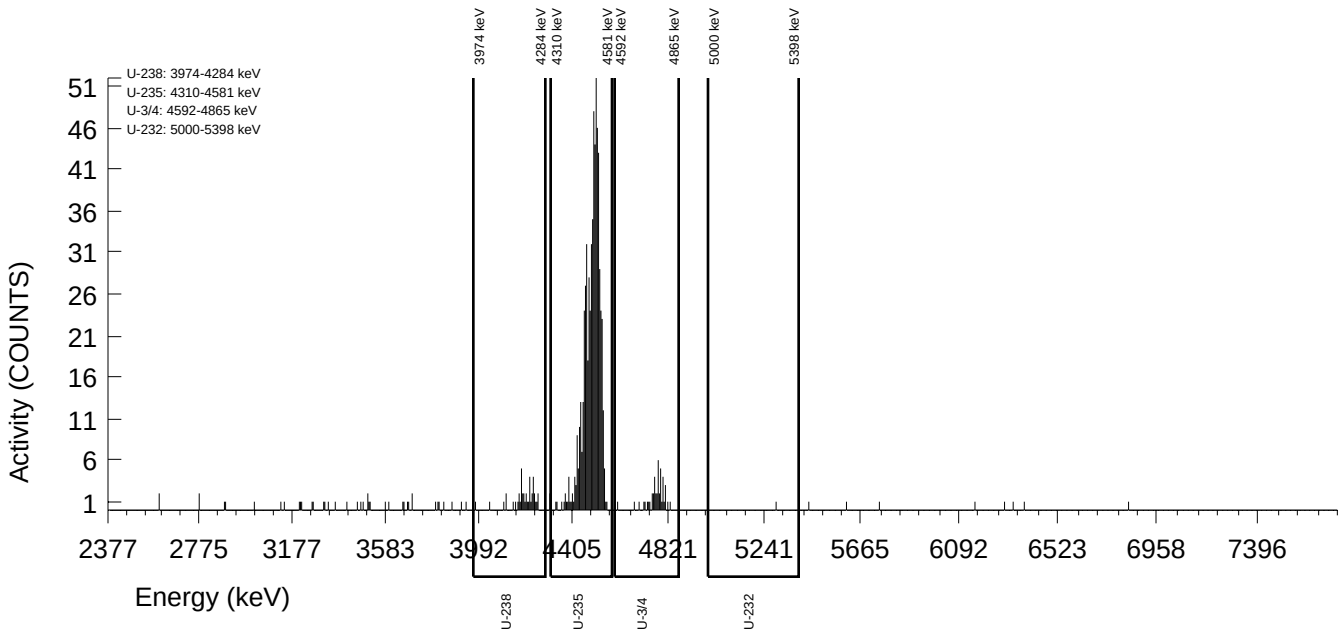
BATCH NUMBER : 1596443	CHAMBER : 124	LIB FILE : U236
SAMPLE ID : T0405240009_UU	DETECTOR S/N : 80053	BKG FILE : B124.CNF;1156
SAMPLE QTY : 0.507 G +/-0.197 %	AVERAGE %EFFICIENCY : 24.5380	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4761	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:15	EFF FILE : W124.CNF;300
CORRECTED % YIELD : 66.7 +/-8.427 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.509 G +/-0.196 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 1.0560E+01 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4489.61	4432.70	620.02	8.76	94.653	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5293.87	5308.28	-0.44	261.04	67.241	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5293.87	4.955	1.000	-0.440	1.440	1.2000	100.000	-7.04E-03	4.87E-02	1.18E-01	3.52E-02	4.86E-02
U-3/4	4763.02	4769.59	38.810	39.000	38.040	0.960	0.9798	100.000	6.02E-01	2.22E-01	1.04E-01	2.84E-02	1.97E-01
U-235	4391.00	4489.61	64.079	9.000	8.760	0.240	0.4899	99.700	1.39E-01	1.02E-01	7.62E-02	1.43E-02	9.90E-02
U-238	4184.73	4193.03	56.358	52.000	51.520	0.480	0.6928	100.000	8.16E-01	2.65E-01	8.77E-02	2.01E-02	2.26E-01



NOTES:

* Results are a compilation of S0405240009_UU and T0405240009_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

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effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

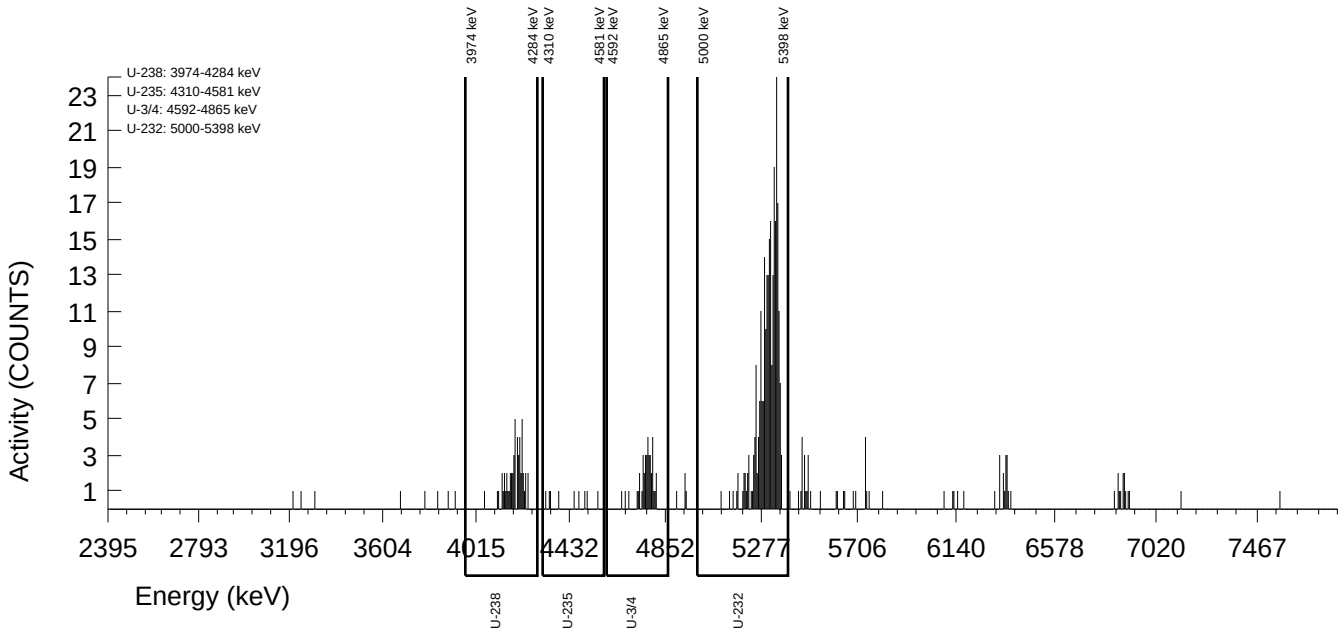
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 013	LIB FILE : U236
SAMPLE ID : S0405240009_UU	DETECTOR S/N : 78790	BKG FILE : B013.CNF;1811
SAMPLE QTY : 0.507 G +/-0.197 %	AVERAGE %EFFICIENCY : 35.0288	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6744	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W013.CNF;513
% YIELD : 67.2 +/-7.037 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.1287E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5308.28	59.863	268.000	261.040	6.960	2.6382	100.000	4.13E+00	7.81E-01	2.01E-01	7.65E-02	5.11E-01
U-3/4	4763.02	4769.44	45.414	39.000	38.040	0.960	0.9798	100.000	5.98E-01	2.13E-01	1.04E-01	2.82E-02	1.96E-01
U-235	4391.00	4432.70	222.939	9.000	8.760	0.240	0.4899	99.700	1.38E-01	1.00E-01	7.56E-02	1.41E-02	9.83E-02
U-238	4184.73	4189.35	41.285	52.000	51.520	0.480	0.6928	100.000	8.10E-01	2.53E-01	8.70E-02	1.99E-02	2.25E-01



Alpha Spectroscopy Software Version 3.5.3
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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

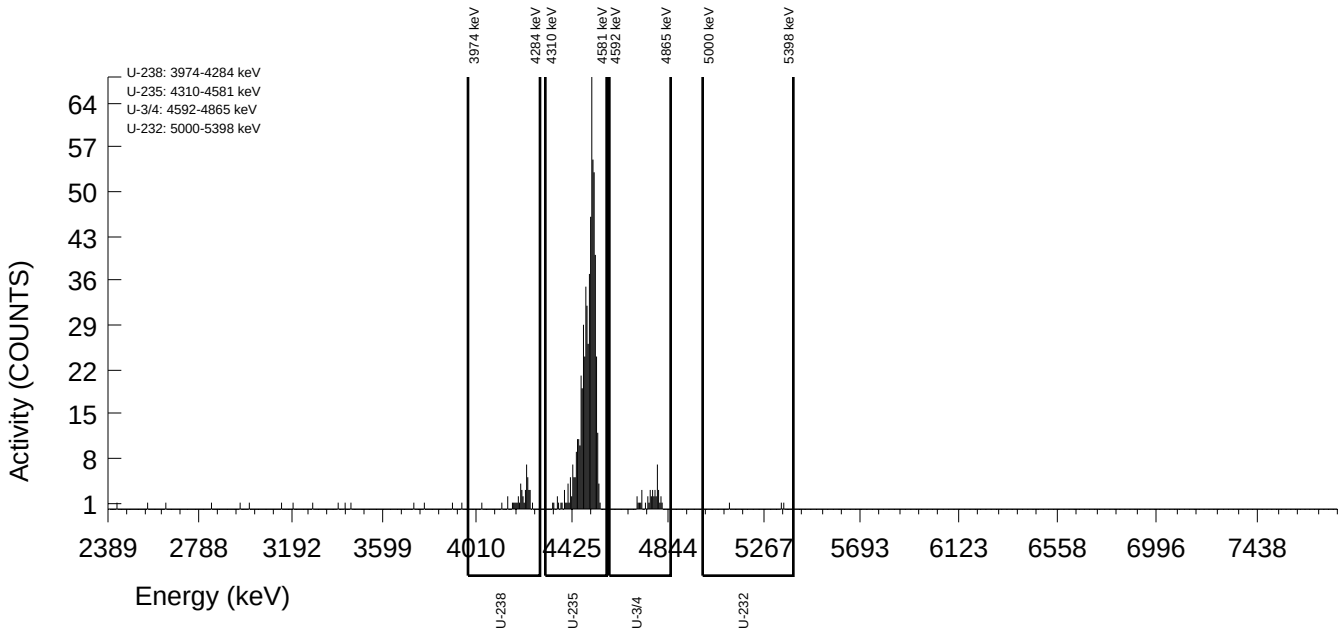
BATCH NUMBER : 1596443	CHAMBER : 126	LIB FILE : U236
SAMPLE ID : T0405240010_UU	DETECTOR S/N : 75548	BKG FILE : B126.CNF;1160
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 25.0653	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4861	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:18	EFF FILE : W126.CNF;338
CORRECTED % YIELD : 73.6 +/-8.357 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.506 G +/-0.198 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 1.0028E+01 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4496.70	4456.81	601.46	6.76	89.888	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5273.62	5312.20	2.28	271.24	74.872	1.0168

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5273.62	228.629	3.000	2.280	0.720	0.8485	100.000	3.78E-02	6.72E-02	1.01E-01	2.58E-02	6.69E-02
U-3/4	4763.02	4777.48	7.828	38.000	37.280	0.720	0.8485	100.000	5.72E-01	2.12E-01	9.38E-02	2.39E-02	1.88E-01
U-235	4391.00	4496.70	42.077	7.000	6.760	0.240	0.4899	99.700	1.04E-01	8.77E-02	7.38E-02	1.38E-02	8.60E-02
U-238	4184.73	4208.11	34.377	51.000	50.040	0.960	0.9798	100.000	7.68E-01	2.53E-01	1.01E-01	2.75E-02	2.18E-01



NOTES:

* Results are a compilation of S0405240010_UU and T0405240010_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

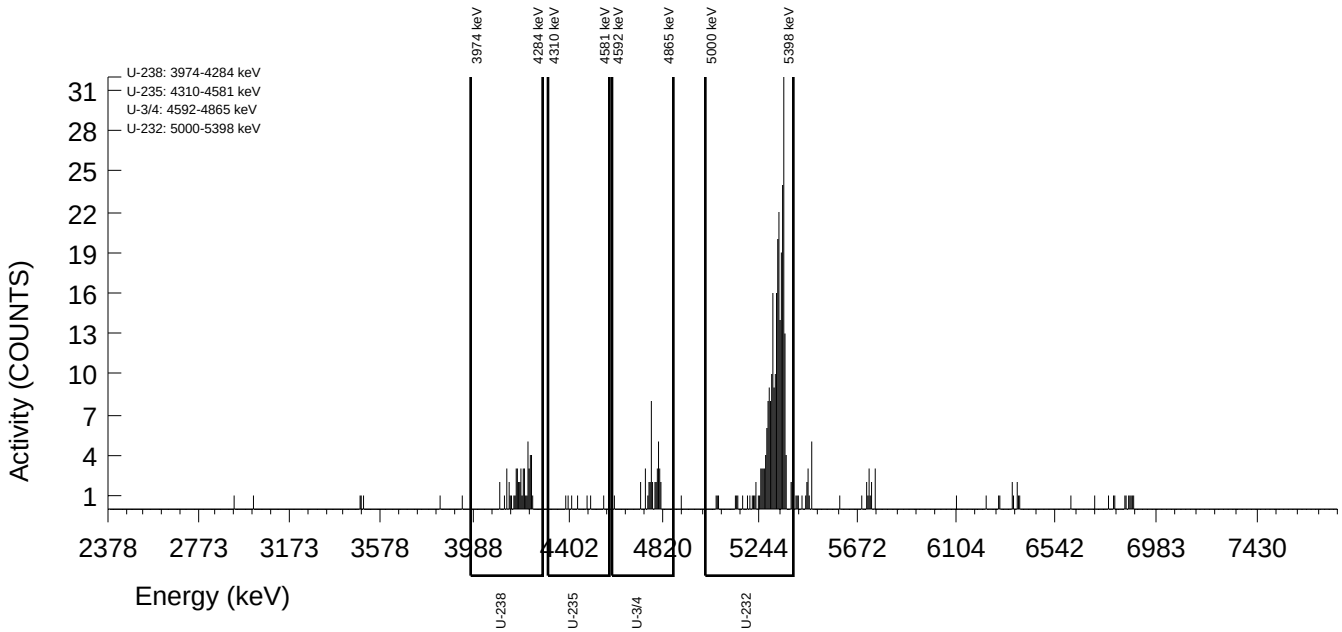
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 014	LIB FILE : U236
SAMPLE ID : S0405240010_UU	DETECTOR S/N : 83289	BKG FILE : B014.CNF;1812
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 32.6875	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6302	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W014.CNF;523
% YIELD : 74.9 +/-6.913 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.4838E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5312.20	33.626	277.000	271.240	5.760	2.4000	100.000	4.13E+00	7.65E-01	1.79E-01	6.69E-02	4.98E-01
U-3/4	4763.02	4771.32	35.221	38.000	37.280	0.720	0.8485	100.000	5.63E-01	2.02E-01	9.22E-02	2.35E-02	1.85E-01
U-235	4391.00	4456.81	162.182	7.000	6.760	0.240	0.4899	99.700	1.02E-01	8.58E-02	7.26E-02	1.36E-02	8.45E-02
U-238	4184.73	4193.42	106.483	51.000	50.040	0.960	0.9798	100.000	7.55E-01	2.39E-01	9.95E-02	2.71E-02	2.14E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

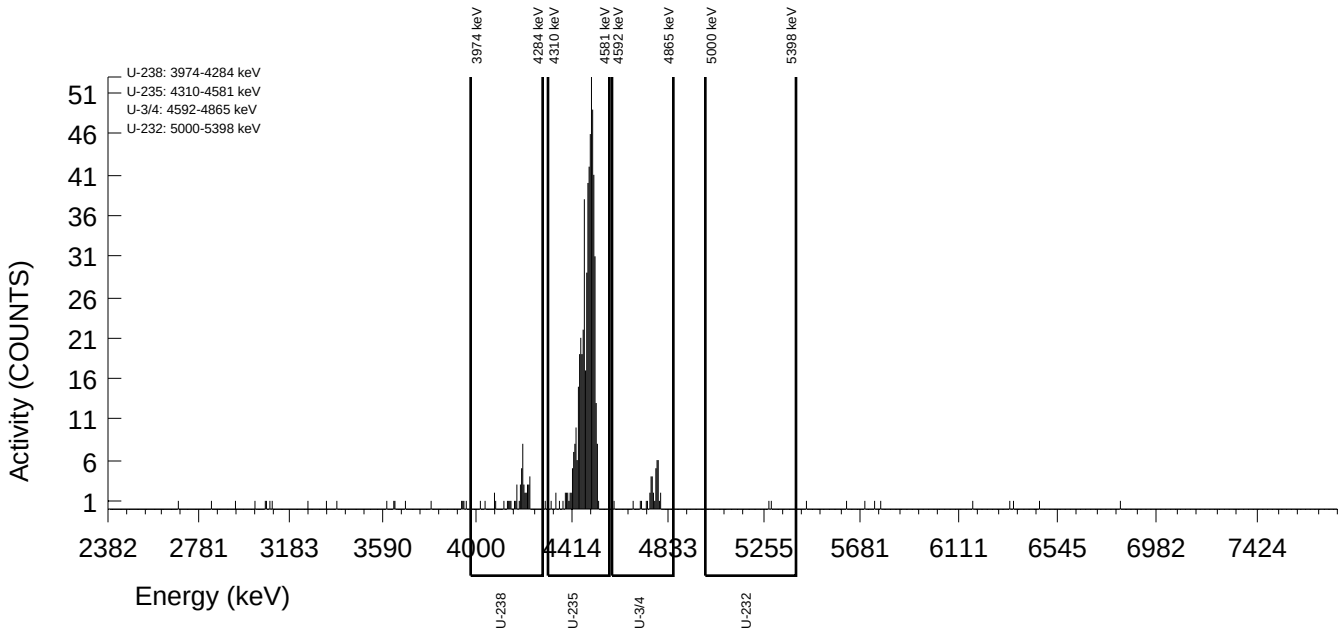
BATCH NUMBER : 1596443	CHAMBER : 127	LIB FILE : U236
SAMPLE ID : T0405240011_UU	DETECTOR S/N : 78770	BKG FILE : B127.CNF;1163
SAMPLE QTY : 0.510 G +/-0.196 %	AVERAGE %EFFICIENCY : 26.6218	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5155	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:20	EFF FILE : W127.CNF;322
CORRECTED % YIELD : 72.7 +/-8.425 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.511 G +/-0.196 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 8.6048E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4483.59	4477.25	548.13	9.28	77.128	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5286.59	5308.48	1.76	272.96	73.810	1.0153

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5286.59	14.875	2.000	1.760	0.240	0.4899	100.000	3.17E-02	6.26E-02	8.64E-02	1.62E-02	6.24E-02
U-3/4	4763.02	4770.86	35.203	52.000	50.080	1.920	1.3856	100.000	7.60E-01	2.53E-01	1.23E-01	3.85E-02	2.18E-01
U-235	4391.00	4483.59	49.427	10.000	9.280	0.720	0.8485	99.700	1.41E-01	1.03E-01	9.30E-02	2.37E-02	1.00E-01
U-238	4184.73	4182.68	11.404	63.000	62.280	0.720	0.8485	100.000	9.45E-01	2.87E-01	9.27E-02	2.36E-02	2.38E-01



NOTES:

* Results are a compilation of S0405240011_UU and T0405240011_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

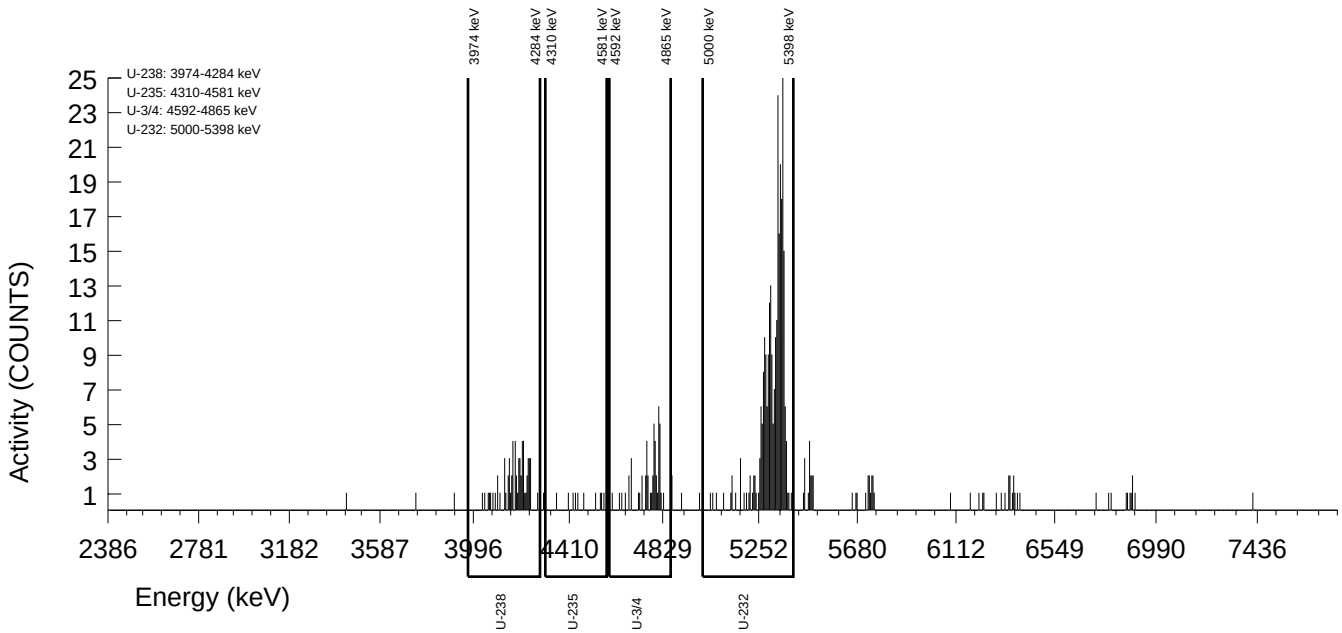
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 015	LIB FILE : U236
SAMPLE ID : S0405240011_UU	DETECTOR S/N : 80055	BKG FILE : B015.CNF;1831
SAMPLE QTY : 0.510 G +/-0.196 %	AVERAGE %EFFICIENCY : 33.3682	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6430	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W015.CNF;530
% YIELD : 73.8 +/-6.886 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.4344E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5308.48	57.914	278.000	272.960	5.040	2.2450	100.000	4.11E+00	7.59E-01	1.69E-01	6.19E-02	4.94E-01
U-3/4	4763.02	4765.38	59.007	52.000	50.080	1.920	1.3856	100.000	7.48E-01	2.39E-01	1.21E-01	3.79E-02	2.14E-01
U-235	4391.00	4477.25	201.608	10.000	9.280	0.720	0.8485	99.700	1.39E-01	1.00E-01	9.16E-02	2.33E-02	9.84E-02
U-238	4184.73	4174.30	111.458	63.000	62.280	0.720	0.8485	100.000	9.31E-01	2.69E-01	9.13E-02	2.32E-02	2.35E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

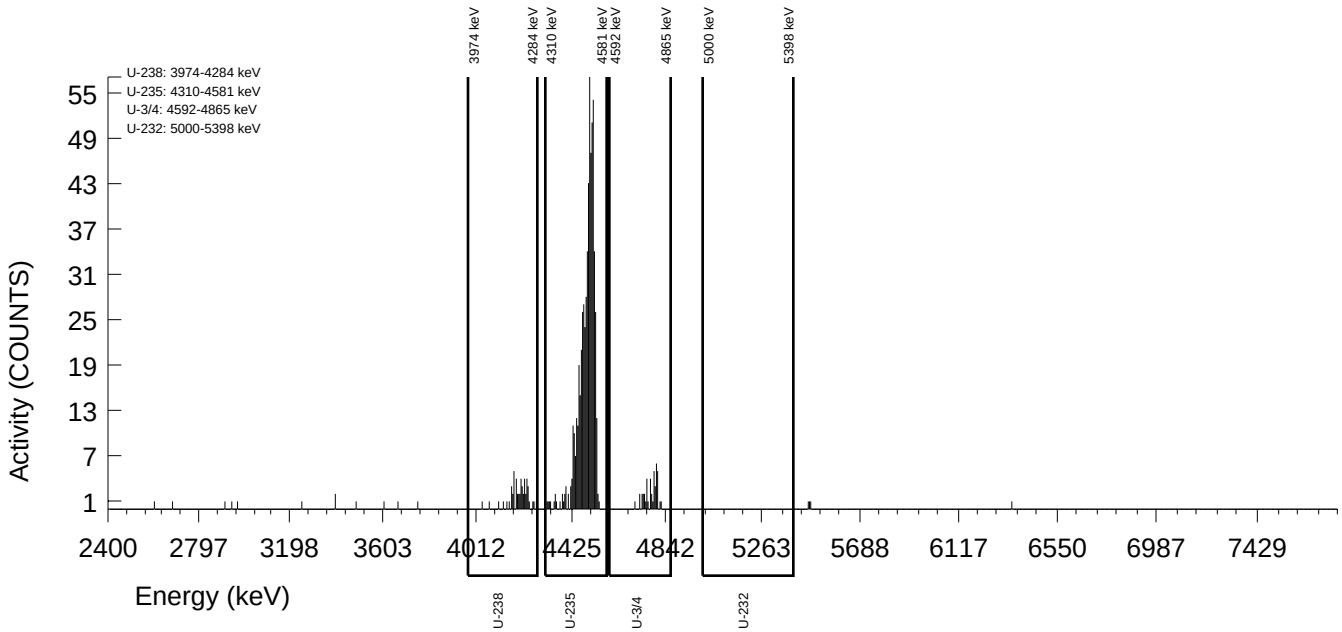
BATCH NUMBER : 1596443	CHAMBER : 128	LIB FILE : U236
SAMPLE ID : T0405240012_UU	DETECTOR S/N : 75549	BKG FILE : B128.CNF;1167
SAMPLE QTY : 0.501 G +/-0.200 %	AVERAGE %EFFICIENCY : 26.0039	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5038	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:23	EFF FILE : W128.CNF;324
CORRECTED % YIELD : 73.8 +/-8.376 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.515 G +/-0.194 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.5092E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4494.21	4428.98	591.68	6.32	85.235	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5198.54	5305.18	-1.20	275.40	74.358	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5198.54	0.000	0.000	-1.200	1.200	1.0954	100.000	-1.99E-02	3.78E-02	1.16E-01	3.32E-02	3.77E-02
U-3/4	4763.02	4776.40	48.031	62.000	60.320	1.680	1.2961	100.000	9.16E-01	2.83E-01	1.18E-01	3.61E-02	2.37E-01
U-235	4391.00	4494.21	37.524	8.000	6.320	1.680	1.2961	99.700	9.63E-02	9.33E-02	1.18E-01	3.62E-02	9.19E-02
U-238	4184.73	4196.77	71.141	46.000	45.040	0.960	0.9798	100.000	6.84E-01	2.35E-01	1.00E-01	2.73E-02	2.05E-01



NOTES:

* Results are a compilation of S0405240012_UU and T0405240012_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

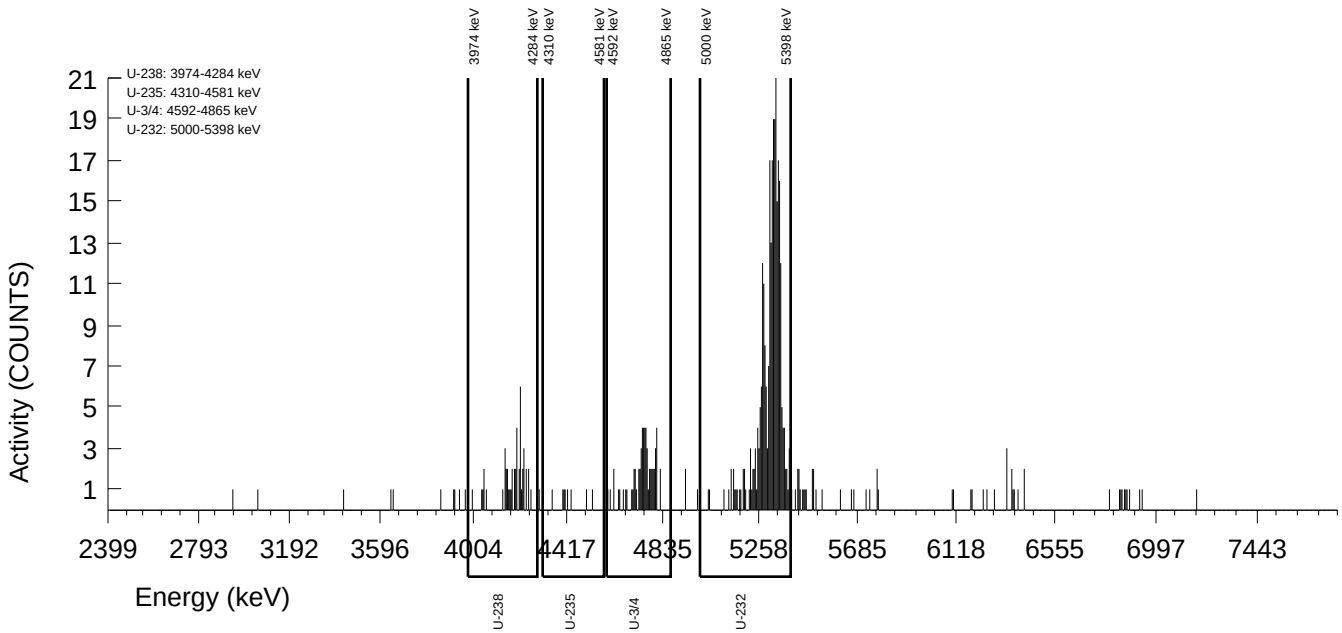
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 016	LIB FILE : U236
SAMPLE ID : S0405240012_UU	DETECTOR S/N : 78774	BKG FILE : B016.CNF;1807
SAMPLE QTY : 0.501 G +/-0.200 %	AVERAGE %EFFICIENCY : 33.4185	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6439	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W016.CNF;494
% YIELD : 74.4 +/-6.915 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.4599E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5305.18	75.700	285.000	275.400	9.600	3.0984	100.000	4.18E+00	7.76E-01	2.18E-01	8.62E-02	5.06E-01
U-3/4	4763.02	4744.75	70.980	62.000	60.320	1.680	1.2961	100.000	9.09E-01	2.68E-01	1.17E-01	3.58E-02	2.35E-01
U-235	4391.00	4428.98	171.330	8.000	6.320	1.680	1.2961	99.700	9.56E-02	9.21E-02	1.17E-01	3.59E-02	9.12E-02
U-238	4184.73	4173.87	20.070	46.000	45.040	0.960	0.9798	100.000	6.79E-01	2.25E-01	9.93E-02	2.71E-02	2.03E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

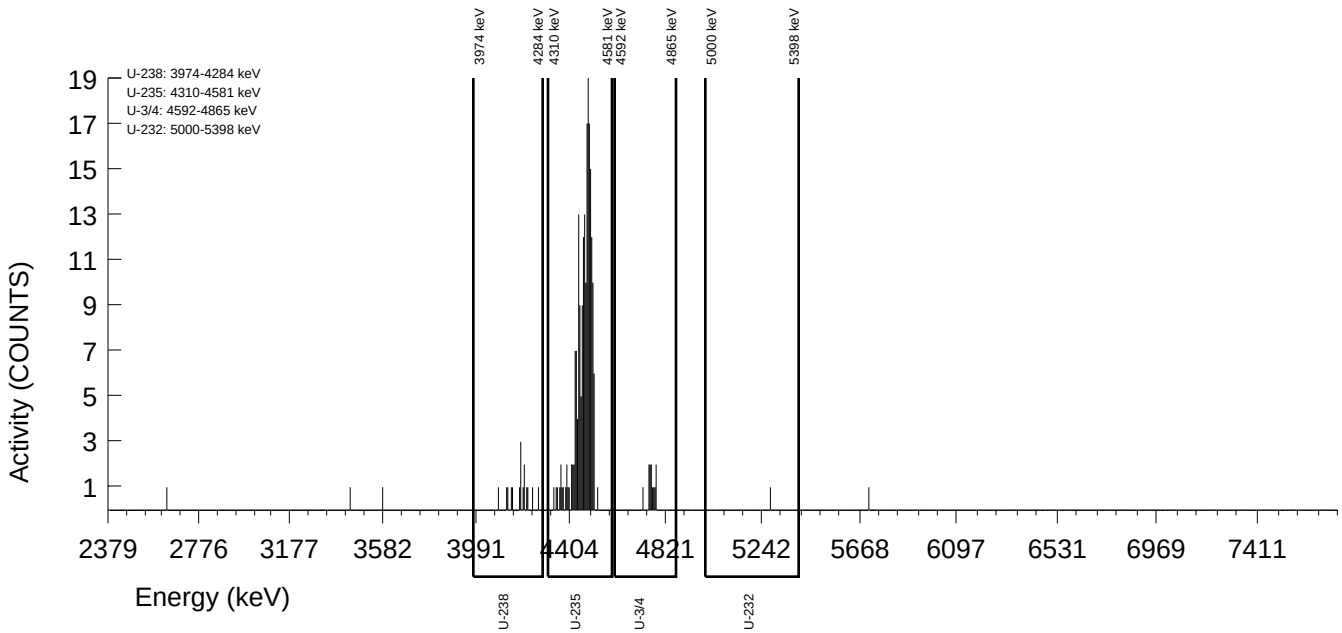
BATCH NUMBER : 1596443	CHAMBER : 129	LIB FILE : U236
SAMPLE ID : T0405240013_UU	DETECTOR S/N : 76227	BKG FILE : B129.CNF;1166
SAMPLE QTY : 0.511 G +/-0.196 %	AVERAGE %EFFICIENCY : 26.3145	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5097	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:25	EFF FILE : W129.CNF;343
CORRECTED % YIELD : 19.0 +/-15.408 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.503 G +/-0.199 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 3.2582E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4462.75	4445.43	205.15	-0.48	29.204	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5279.45	5303.99	-0.68	64.20	19.140	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5279.45	4.932	1.000	-0.680	1.680	1.2961	100.000	-3.33E-02	1.51E-01	3.79E-01	1.16E-01	1.50E-01
U-3/4	4763.02	4758.64	34.524	9.000	8.040	0.960	0.9798	100.000	5.14E-01	4.31E-01	4.21E-01	1.15E-01	4.02E-01
U-235	4391.00	4462.75	61.719	0.000	-0.480	0.480	0.6928	99.700	-3.08E-02	1.37E-01	3.55E-01	8.13E-02	1.36E-01
U-238	4184.73	4181.92	19.728	15.000	13.560	1.440	1.2000	100.000	8.66E-01	5.72E-01	4.73E-01	1.40E-01	5.07E-01



NOTES:

* Results are a compilation of S0405240013_UU and T0405240013_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.003 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

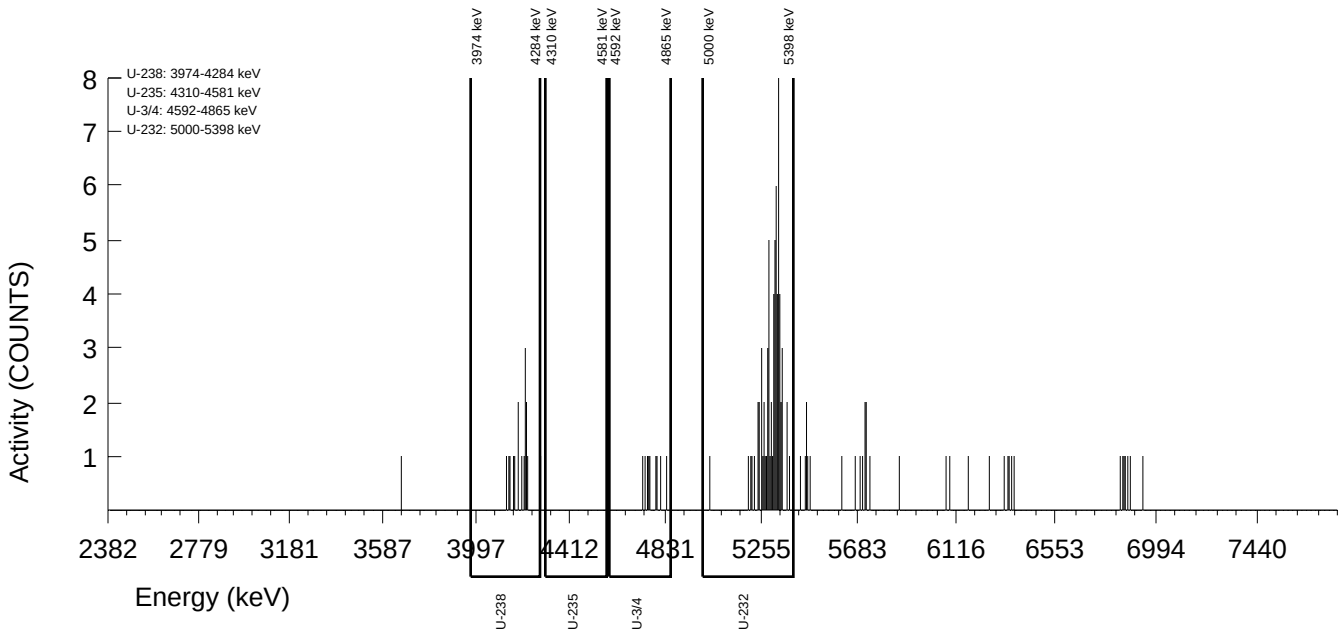
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 017	LIB FILE : U236
SAMPLE ID : S0405240013_UU	DETECTOR S/N : 78791	BKG FILE : B017.CNF;2653
SAMPLE QTY : 0.511 G +/-0.196 %	AVERAGE %EFFICIENCY : 30.2659	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5843	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W017.CNF;1450
% YIELD : 19.1 +/-13.512 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 8.9057E-01 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5303.99	46.871	69.000	64.200	4.800	2.1909	100.000	4.10E+00	1.52E+00	7.04E-01	2.56E-01	1.06E+00
U-3/4	4763.02	4780.28	103.610	9.000	8.040	0.960	0.9798	100.000	5.10E-01	4.21E-01	4.18E-01	1.14E-01	3.99E-01
U-235	4391.00	4445.43	0.000	0.000	-0.480	0.480	0.6928	99.700	-3.05E-02	1.36E-01	3.52E-01	8.07E-02	1.35E-01
U-238	4184.73	4193.94	38.237	15.000	13.560	1.440	1.2000	100.000	8.60E-01	5.53E-01	4.69E-01	1.39E-01	5.03E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

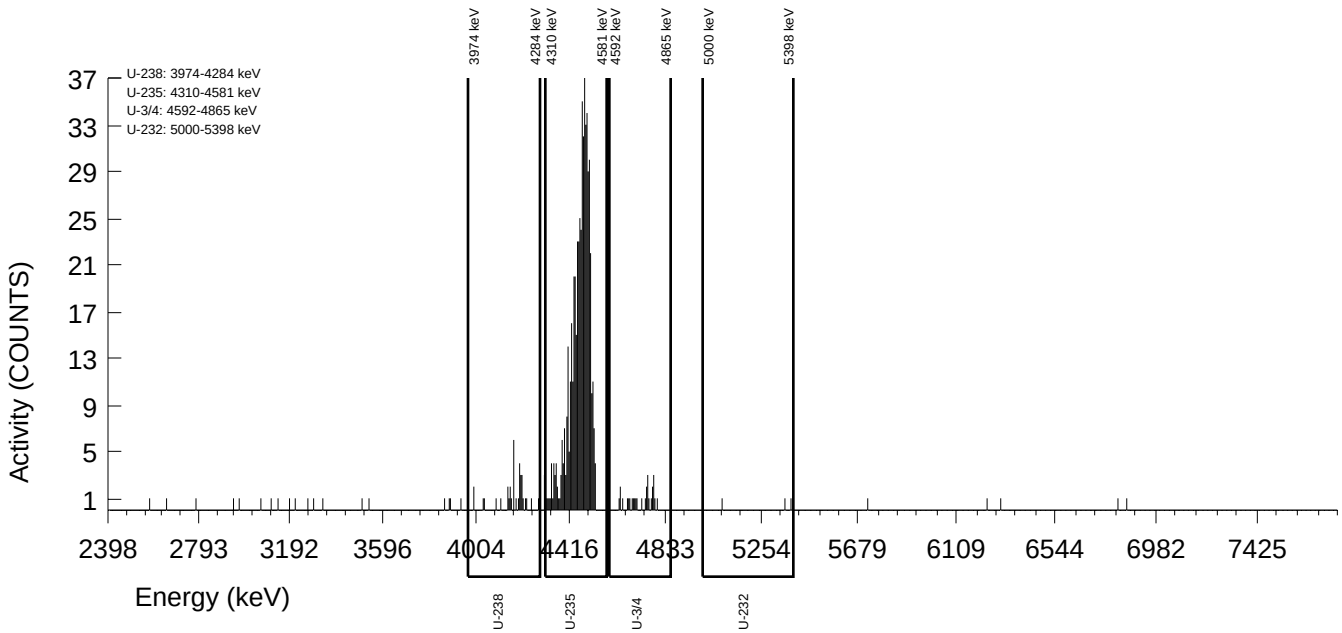
BATCH NUMBER : 1596443	CHAMBER : 130	LIB FILE : U236
SAMPLE ID : T0405240014_UU	DETECTOR S/N : 76228	BKG FILE : B130.CNF;1163
SAMPLE QTY : 0.505 G +/-0.198 %	AVERAGE %EFFICIENCY : 26.6411	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5158	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:27	EFF FILE : W130.CNF;349
CORRECTED % YIELD : 73.9 +/-8.564 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.500 G +/-0.200 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 8.5173E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4461.94	4480.03	542.95	7.28	76.345	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5276.96	5301.37	1.56	260.52	75.030	1.0146

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5276.96	284.660	3.000	1.560	1.440	1.2000	100.000	2.90E-02	7.66E-02	1.38E-01	4.09E-02	7.65E-02
U-3/4	4763.02	4729.45	143.557	53.000	51.320	1.680	1.2961	100.000	8.23E-01	2.72E-01	1.24E-01	3.81E-02	2.32E-01
U-235	4391.00	4461.94	70.961	8.000	7.280	0.720	0.8485	99.700	1.17E-01	9.79E-02	9.83E-02	2.50E-02	9.58E-02
U-238	4184.73	4171.26	31.902	41.000	39.320	1.680	1.2961	100.000	6.31E-01	2.32E-01	1.24E-01	3.81E-02	2.05E-01



NOTES:

* Results are a compilation of S0405240014_UU and T0405240014_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

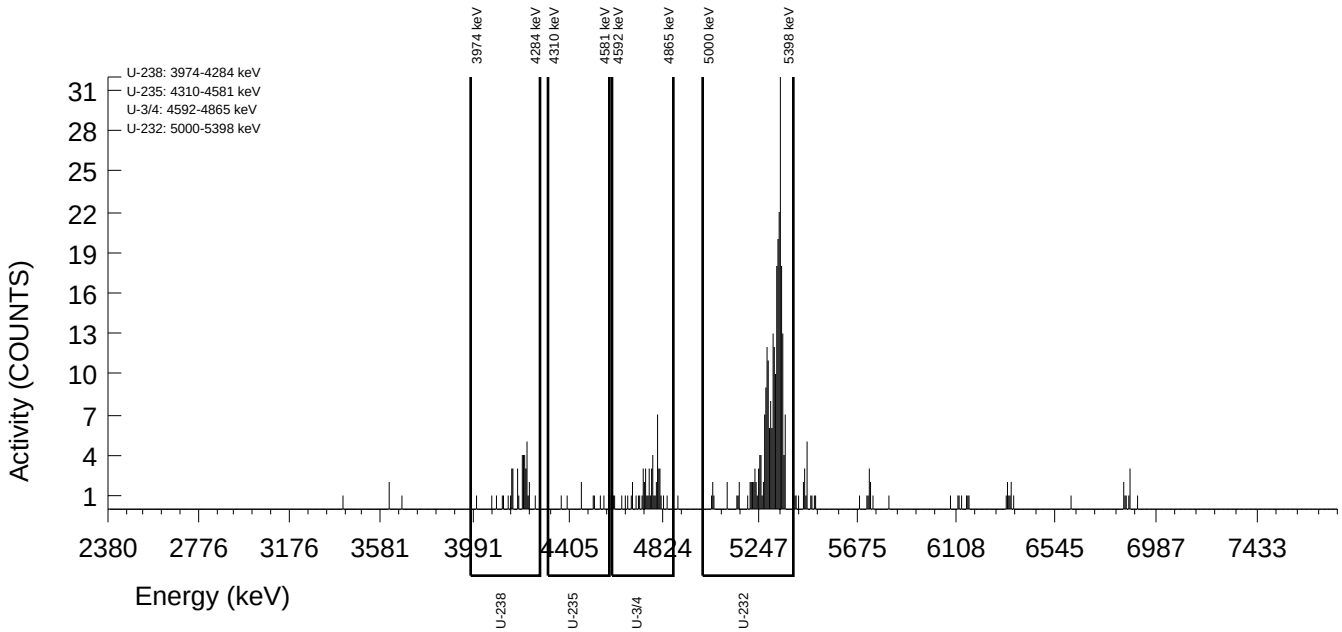
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 018	LIB FILE : U236
SAMPLE ID : S0405240014_UU	DETECTOR S/N : 78782	BKG FILE : B018.CNF;1808
SAMPLE QTY : 0.505 G +/-0.198 %	AVERAGE %EFFICIENCY : 31.3297	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6044	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:32	EFF FILE : W018.CNF;484
% YIELD : 75.0 +/-7.038 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.4912E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5301.37	22.866	267.000	260.520	6.480	2.5456	100.000	4.15E+00	7.85E-01	1.96E-01	7.43E-02	5.13E-01
U-3/4	4763.02	4755.35	26.432	53.000	51.320	1.680	1.2961	100.000	8.11E-01	2.56E-01	1.23E-01	3.75E-02	2.29E-01
U-235	4391.00	4480.03	4.918	8.000	7.280	0.720	0.8485	99.700	1.15E-01	9.59E-02	9.69E-02	2.46E-02	9.44E-02
U-238	4184.73	4185.08	68.231	41.000	39.320	1.680	1.2961	100.000	6.22E-01	2.21E-01	1.23E-01	3.75E-02	2.02E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

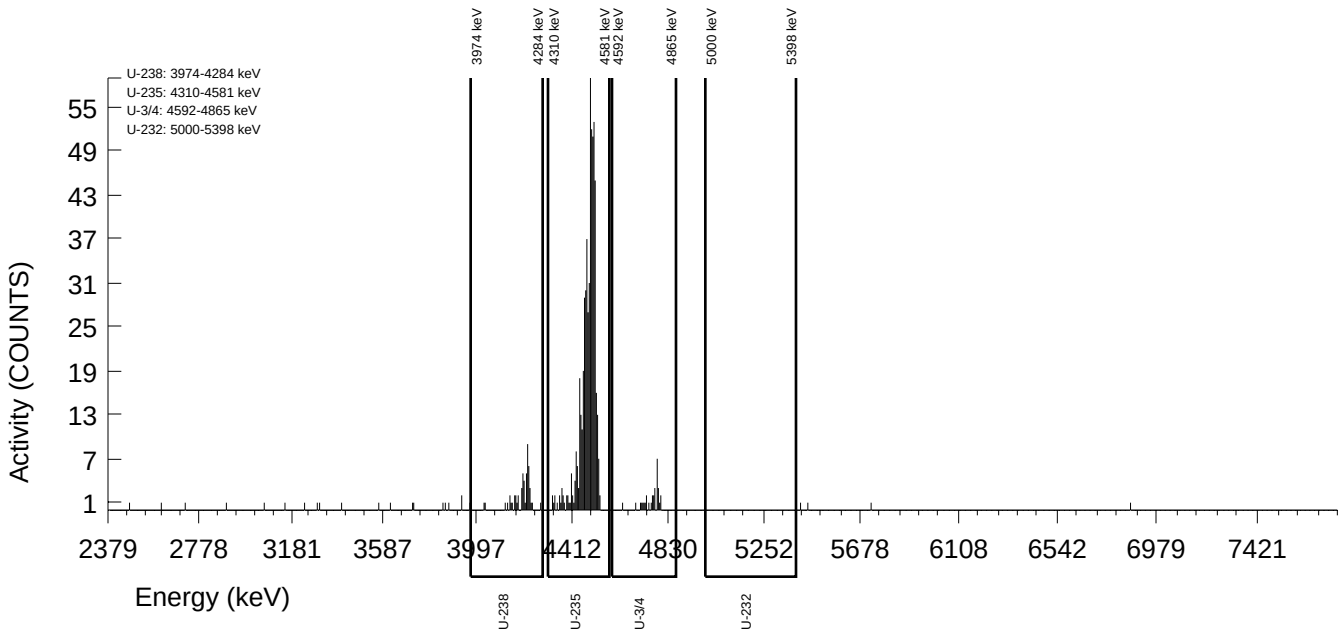
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SAMPLE ID : T0405240015_UU	DETECTOR S/N : 80008	BKG FILE : B131.CNF;1158
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 25.5970	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4961	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:30	EFF FILE : W131.CNF;319
CORRECTED % YIELD : 73.8 +/-8.538 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.512 G +/-0.195 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.1365E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4485.24	4439.68	559.60	4.52	81.894	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5395.37	5286.76	-0.20	256.12	74.399	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5395.37	0.000	1.000	-0.200	1.200	1.0954	100.000	-3.52E-03	5.30E-02	1.24E-01	3.54E-02	5.29E-02
U-3/4	4763.02	4763.27	6.820	61.000	59.560	1.440	1.2000	100.000	9.59E-01	2.99E-01	1.19E-01	3.54E-02	2.49E-01
U-235	4391.00	4485.24	44.808	5.000	4.520	0.480	0.6928	99.700	7.30E-02	7.97E-02	8.95E-02	2.05E-02	7.87E-02
U-238	4184.73	4195.02	28.518	62.000	61.280	0.720	0.8485	100.000	9.87E-01	3.03E-01	9.84E-02	2.50E-02	2.51E-01



NOTES:

* Results are a compilation of S0405240015_UU and T0405240015_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

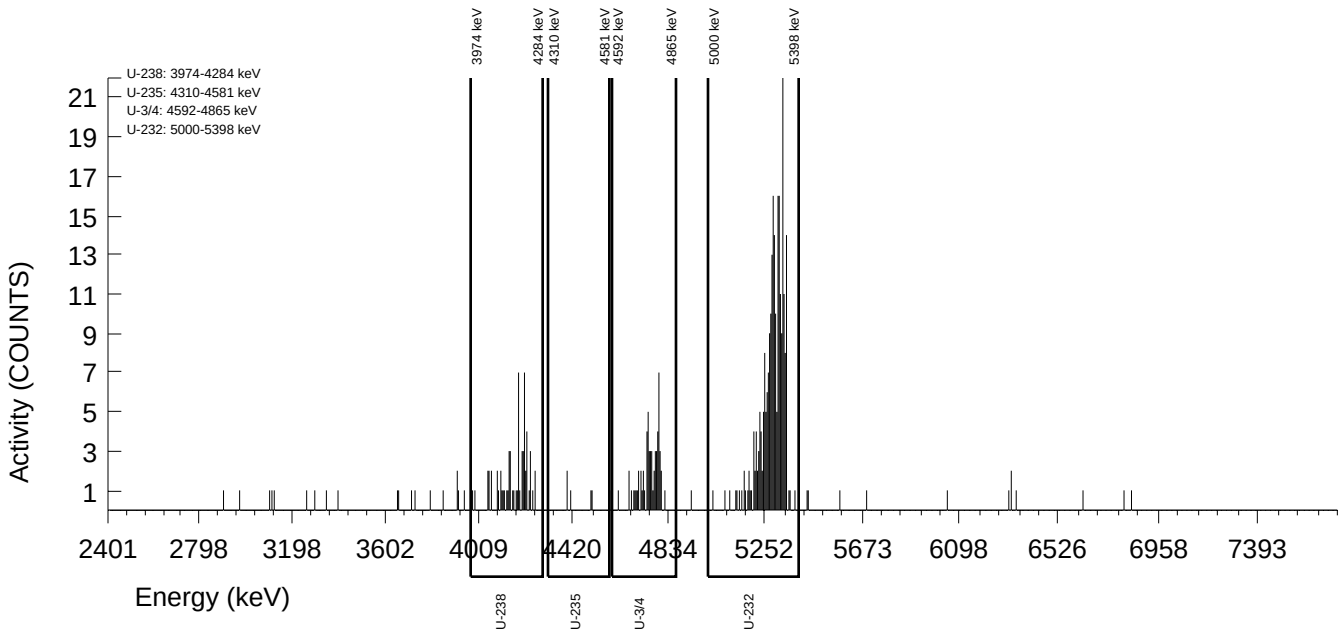
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 020	LIB FILE : U236
SAMPLE ID : S0405240015_UU	DETECTOR S/N : 78787	BKG FILE : B020.CNF;1829
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 31.0619	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5993	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:34	EFF FILE : W020.CNF;560
% YIELD : 74.4 +/-7.040 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.4618E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5286.76	63.614	259.000	256.120	2.880	1.6971	100.000	4.13E+00	7.80E-01	1.48E-01	5.01E-02	5.10E-01
U-3/4	4763.02	4754.03	54.325	61.000	59.560	1.440	1.2000	100.000	9.52E-01	2.83E-01	1.18E-01	3.51E-02	2.48E-01
U-235	4391.00	4439.68	4.939	5.000	4.520	0.480	0.6928	99.700	7.25E-02	7.88E-02	8.88E-02	2.04E-02	7.81E-02
U-238	4184.73	4163.08	38.069	62.000	61.280	0.720	0.8485	100.000	9.80E-01	2.86E-01	9.77E-02	2.48E-02	2.49E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

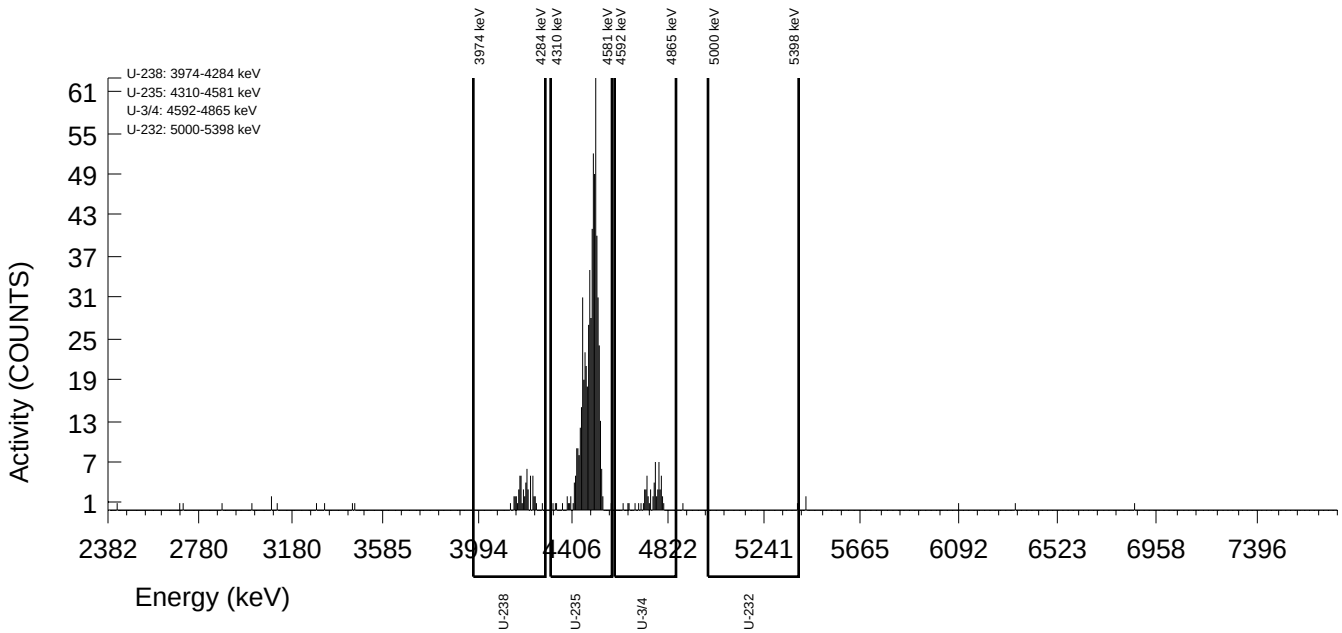
BATCH NUMBER : 1596443	CHAMBER : 132	LIB FILE : U236
SAMPLE ID : T0405240016_UU	DETECTOR S/N : 67579	BKG FILE : B132.CNF;1154
SAMPLE QTY : 0.509 G +/-0.196 %	AVERAGE %EFFICIENCY : 26.0712	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5050	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:32	EFF FILE : W132.CNF;324
CORRECTED % YIELD : 72.0 +/-8.493 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.506 G +/-0.198 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.4846E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4486.40	4453.74	591.68	4.28	85.015	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5389.18	5299.37	-0.20	255.64	72.517	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5389.18	4.940	1.000	-0.200	1.200	1.0954	100.000	-3.37E-03	5.07E-02	1.18E-01	3.38E-02	5.06E-02
U-3/4	4763.02	4755.32	65.455	67.000	65.800	1.200	1.0954	100.000	1.06E+00	3.18E-01	1.13E-01	3.23E-02	2.61E-01
U-235	4391.00	4486.40	36.467	5.000	4.280	0.720	0.8485	99.700	6.91E-02	7.99E-02	9.87E-02	2.51E-02	7.90E-02
U-238	4184.73	4201.29	62.573	68.000	68.000	0.000	0.0000	100.000	1.10E+00	3.22E-01	4.83E-02	0.00E+00	2.62E-01



NOTES:

* Results are a compilation of S0405240016_UU and T0405240016_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.009 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

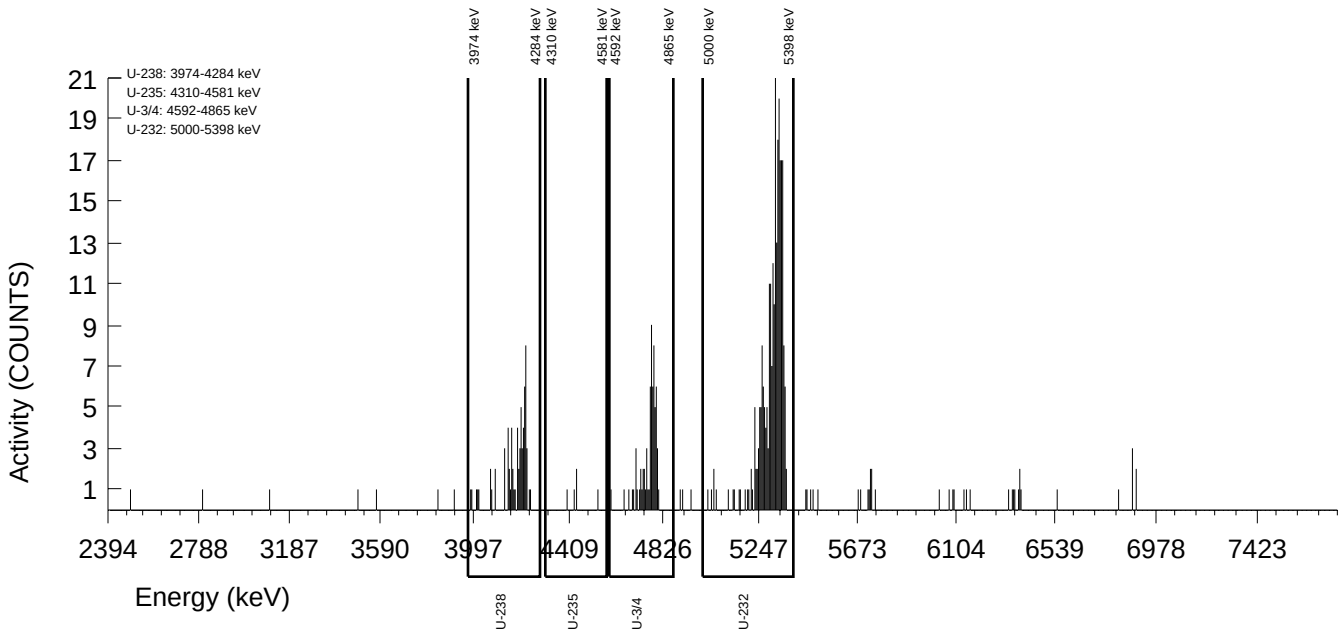
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 021	LIB FILE : U236
SAMPLE ID : S0405240016_UU	DETECTOR S/N : 795159	BKG FILE : B021.CNF;1831
SAMPLE QTY : 0.509 G +/-0.196 %	AVERAGE %EFFICIENCY : 31.8082	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6134	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:34	EFF FILE : W021.CNF;537
% YIELD : 72.5 +/-7.052 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 3.3742E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5299.37	57.657	259.000	255.640	3.360	1.8330	100.000	4.12E+00	7.80E-01	1.56E-01	5.41E-02	5.10E-01
U-3/4	4763.02	4760.58	28.377	67.000	65.800	1.200	1.0954	100.000	1.05E+00	3.00E-01	1.12E-01	3.21E-02	2.59E-01
U-235	4391.00	4453.74	4.893	5.000	4.280	0.720	0.8485	99.700	6.86E-02	7.91E-02	9.79E-02	2.49E-02	7.84E-02
U-238	4184.73	4170.95	25.930	68.000	68.000	0.000	0.0000	100.000	1.09E+00	3.03E-01	4.80E-02	0.00E+00	2.60E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

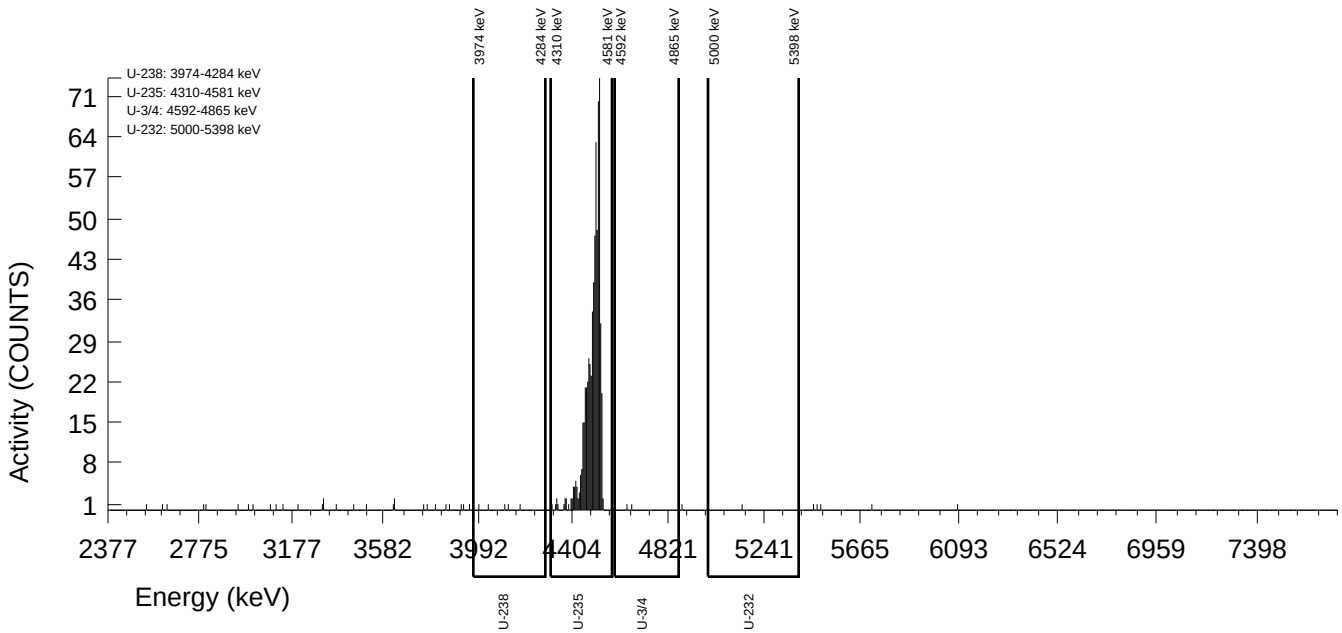
BATCH NUMBER : 1596443	CHAMBER : 003	LIB FILE : U236
SAMPLE ID : T1203621839_UU	DETECTOR S/N : 79453	BKG FILE : B003.CNF;1839
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 27.6246	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5344	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W003.CNF;535
CORRECTED % YIELD : 80.0 +/-8.310 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016
SECONDARY QTY : 0.517 G +/-0.193 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.7049E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4494.27	4403.85	641.49	5.52	86.989	N/A
TRACER 2	1564-I	U-232	4.6182 dpm	5146.45	5316.99	-0.68	264.04	79.956	1.0001

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5146.45	4.954	1.000	-0.680	1.680	1.2961	100.000	-1.03E-02	4.65E-02	1.17E-01	3.59E-02	4.65E-02
U-3/4	4763.02	4653.99	24.772	9.000	8.760	0.240	0.4899	100.000	1.33E-01	9.72E-02	7.28E-02	1.36E-02	9.46E-02
U-235	4391.00	4494.27	31.119	6.000	5.520	0.480	0.6928	99.700	8.40E-02	8.12E-02	8.43E-02	1.93E-02	7.99E-02
U-238	4184.73	4089.30	178.360	7.000	6.760	0.240	0.4899	100.000	1.03E-01	8.65E-02	7.28E-02	1.36E-02	8.48E-02



NOTES:

* Results are a compilation of S1203621839_UU and T1203621839_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.010 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

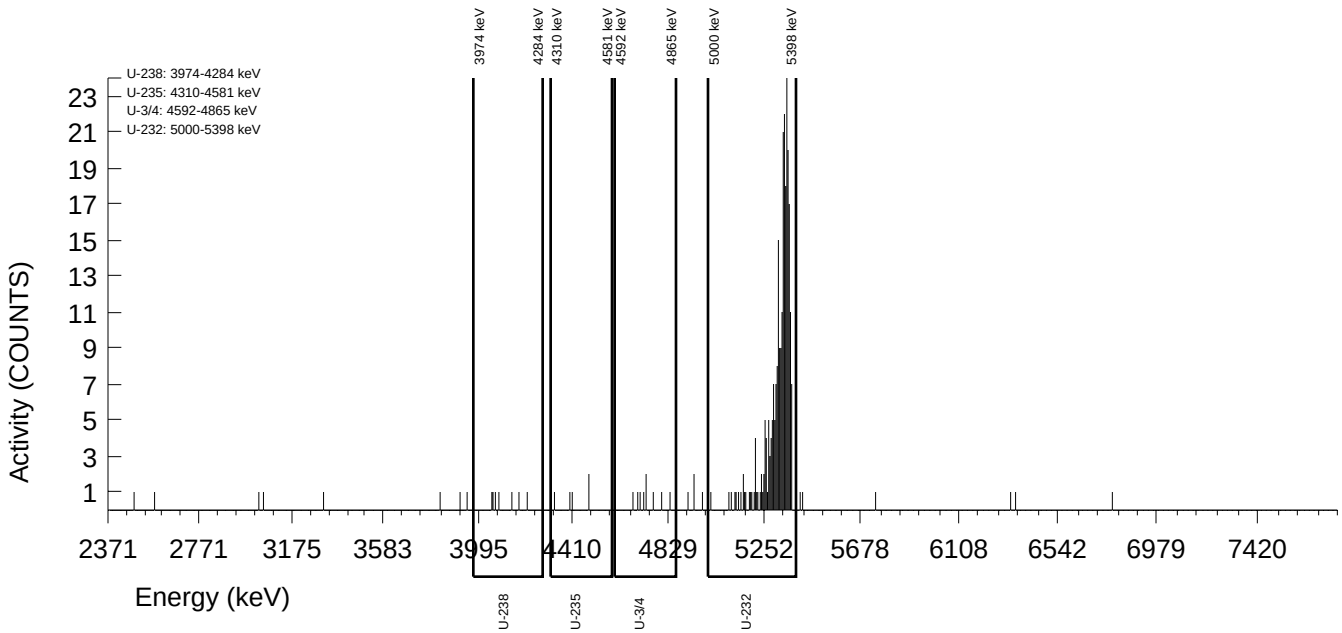
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 001	LIB FILE : U236
SAMPLE ID : S1203621839_UU	DETECTOR S/N : 79451	BKG FILE : B001.CNF;1856
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 29.7966	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5755	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:30	EFF FILE : W001.CNF;565
% YIELD : 80.0 +/-6.929 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6182E+00 dpm
RESULTS : 3.6925E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5316.99	51.116	265.000	264.040	0.960	0.9798	100.000	4.01E+00	7.45E-01	1.00E-01	2.72E-02	4.86E-01
U-3/4	4763.02	4742.45	4.981	9.000	8.760	0.240	0.4899	100.000	1.33E-01	9.65E-02	7.28E-02	1.36E-02	9.46E-02
U-235	4391.00	4403.85	4.981	6.000	5.520	0.480	0.6928	99.700	8.40E-02	8.08E-02	8.43E-02	1.93E-02	7.99E-02
U-238	4184.73	4115.91	154.417	7.000	6.760	0.240	0.4899	100.000	1.03E-01	8.60E-02	7.28E-02	1.36E-02	8.48E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

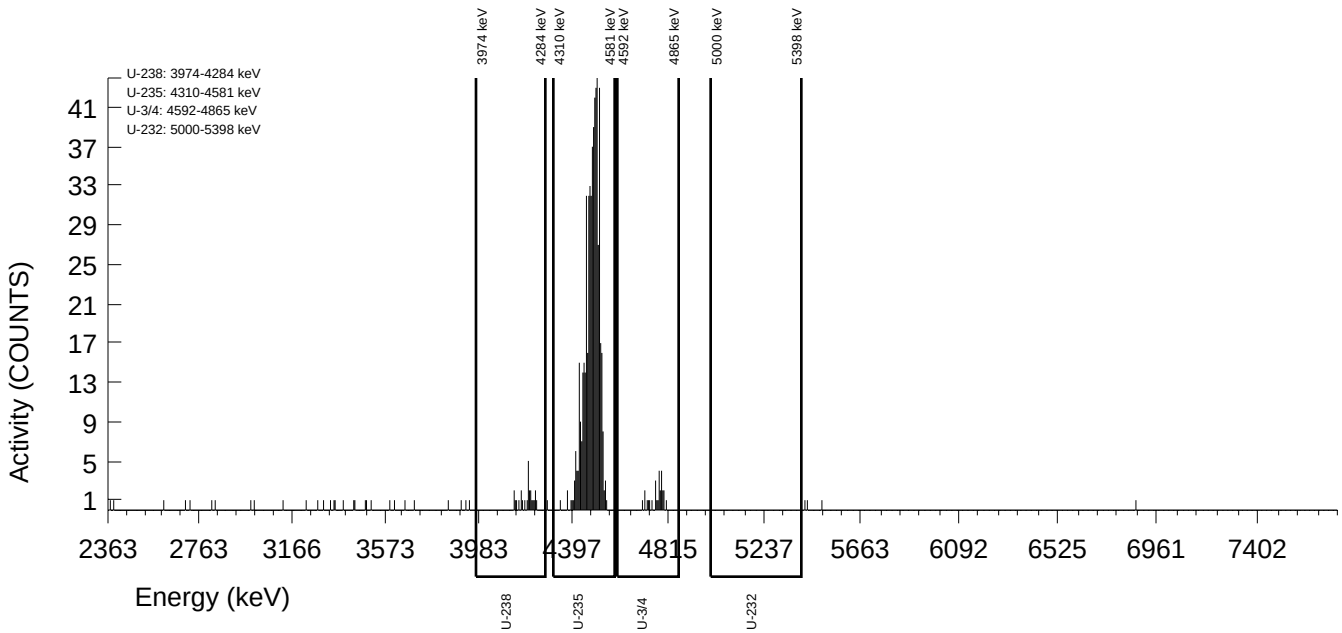
BATCH NUMBER : 1596443	CHAMBER : 133	LIB FILE : U236
SAMPLE ID : T1203621840_UU	DETECTOR S/N : 76229	BKG FILE : B133.CNF;1151
SAMPLE QTY : 0.502 G +/-0.199 %	AVERAGE %EFFICIENCY : 25.5293	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4948	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:34	EFF FILE : W133.CNF;359
CORRECTED % YIELD : 56.2 +/-9.113 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.503 G +/-0.199 %		

TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.1723E+00 dpm

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4484.02	4445.56	560.30	3.52	82.215	N/A
TRACER 2	1564-I	U-232	4.6530 dpm	5198.57	5293.79	-2.16	207.72	56.631	1.0076

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5198.57	0.000	0.000	-2.160	2.160	1.4697	100.000	-3.87E-02	4.42E-02	1.50E-01	4.82E-02	4.41E-02
U-3/4	4763.02	4762.10	31.468	22.000	21.280	0.720	0.8485	100.000	4.28E-01	2.05E-01	1.23E-01	3.12E-02	1.90E-01
U-235	4391.00	4484.02	61.429	4.000	3.520	0.480	0.6928	99.700	7.10E-02	9.08E-02	1.12E-01	2.56E-02	8.99E-02
U-238	4184.73	4197.74	7.246	28.000	27.760	0.240	0.4899	100.000	5.58E-01	2.36E-01	9.64E-02	1.80E-02	2.13E-01



NOTES:

* Results are a compilation of S1203621840_UU and T1203621840_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.008 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

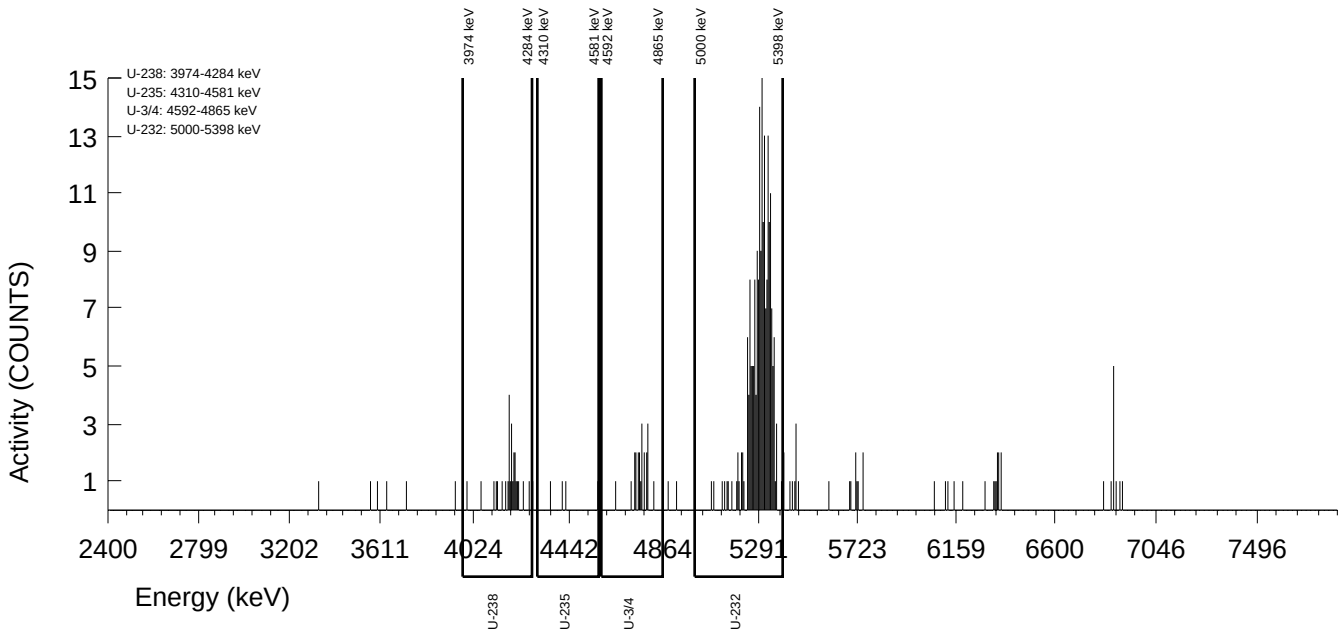
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 022	LIB FILE : U236
SAMPLE ID : S1203621840_UU	DETECTOR S/N : 72530	BKG FILE : B022.CNF;1829
SAMPLE QTY : 0.502 G +/-0.199 %	AVERAGE %EFFICIENCY : 33.0959	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6378	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:34	EFF FILE : W022.CNF;528
% YIELD : 56.6 +/-7.727 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER
ID : 1564-I
NUCLIDE : U-232
NOMINAL : 4.6530E+00 dpm
RESULTS : 2.6351E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5293.79	89.256	213.000	207.720	5.280	2.2978	100.000	4.18E+00	8.71E-01	2.30E-01	8.46E-02	5.78E-01
U-3/4	4763.02	4762.08	58.264	22.000	21.280	0.720	0.8485	100.000	4.24E-01	2.00E-01	1.22E-01	3.10E-02	1.88E-01
U-235	4391.00	4445.56	203.305	4.000	3.520	0.480	0.6928	99.700	7.04E-02	8.99E-02	1.11E-01	2.54E-02	8.92E-02
U-238	4184.73	4182.41	15.702	28.000	27.760	0.240	0.4899	100.000	5.54E-01	2.28E-01	9.56E-02	1.79E-02	2.11E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 134	LIB FILE : U236
SAMPLE ID : T1203621841_UU	DETECTOR S/N : 76230	BKG FILE : B134.CNF;1147
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 25.7389	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.4988	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:36	EFF FILE : W134.CNF;336
CORRECTED % YIELD : 34.8 +/-10.489 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 08-Sep-2016
SECONDARY QTY : 0.517 G +/-0.193 %		

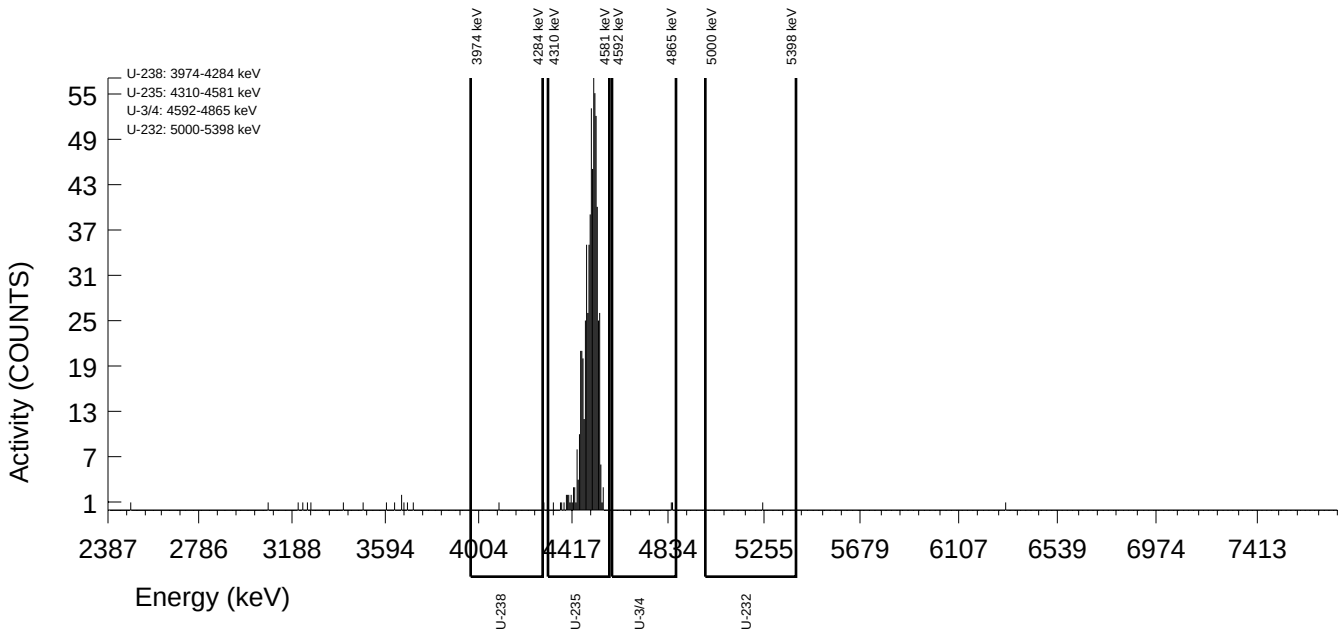
TRACER
ID : 1570-E
NUCLIDE : U-235
NOMINAL : 1.1123E+01 dpm
RESULTS : 9.7032E+00 dpm

LCS
ID 1600-E
NUCLIDE U-238
NOMINAL (pCi/G) 5.1896E+00
% RECOVERY 118.398

TRACER CORRECTION	ID	NUCLIDE	NOMINAL	PEAK ENERGY 1	PEAK ENERGY 2	PEAK NET 1	PEAK NET 2	RECOVERY	YIELD CORR.
TRACER 1	1570-E	U-235	11.1230 dpm	4496.26	4445.78	597.60	22.80	86.974	N/A
TRACER 2	1564-I	U-232	4.6182 dpm	5249.67	5279.32	0.52	133.20	34.861	1.0022

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5249.67	4.960	1.000	0.520	0.480	0.6928	100.000	8.43E-03	4.70E-02	8.98E-02	2.06E-02	4.69E-02
U-3/4	4763.02	4852.59	9.920	211.000	210.040	0.960	0.9798	100.000	6.33E+00	1.58E+00	1.99E-01	5.41E-02	8.61E-01
U-235	4391.00	4496.26	51.669	24.000	22.800	1.200	1.0954	99.700	6.90E-01	3.31E-01	2.12E-01	6.07E-02	2.98E-01
U-238	4184.73	4096.57	4.960	204.000	203.760	0.240	0.4899	100.000	6.14E+00	1.54E+00	1.45E-01	2.71E-02	8.46E-01



NOTES:

* Results are a compilation of S1203621841_UU and T1203621841_UU.

* The following nuclide results were quantified from the U-235 traced sample:
U-232

* Correction made to the following net area due to tracer impurity:
U-238 (0.010 +/-0.000)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

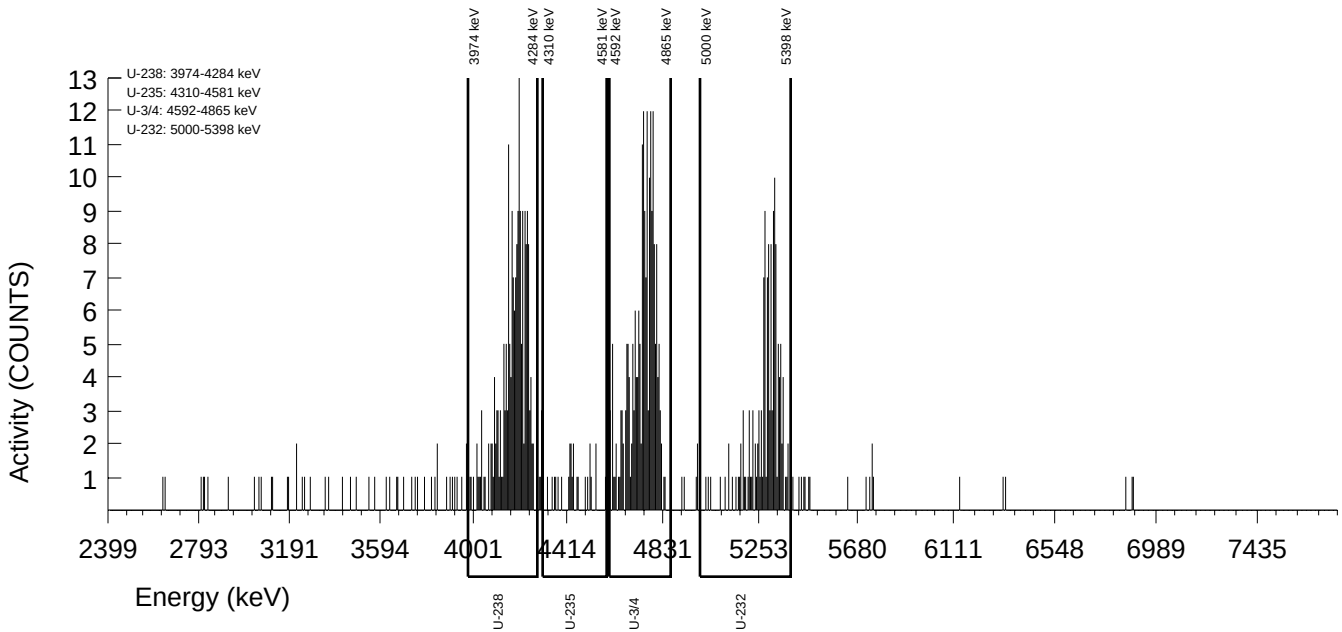
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596443	CHAMBER : 024	LIB FILE : U236
SAMPLE ID : S1203621841_UU	DETECTOR S/N : 76542	BKG FILE : B024.CNF;1822
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 34.4760	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.6639	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:04:34	EFF FILE : W024.CNF;517
% YIELD : 34.9 +/-9.425 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 27-Aug-2016

TRACER		LCS	
ID	: 1564-I	ID	1600-E
NUCLIDE	: U-232	NUCLIDE	U-238
NOMINAL	: 4.6182E+00 dpm	NOMINAL (pCi/G)	5.1896E+00
RESULTS	: 1.6099E+00 dpm	% RECOVERY	118.142

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
U-232	5302.10	5279.32	52.587	138.000	133.200	4.800	2.1909	100.000	4.01E+00	1.03E+00	3.32E-01	1.21E-01	6.98E-01
U-3/4	4763.02	4742.72	63.795	211.000	210.040	0.960	0.9798	100.000	6.32E+00	1.47E+00	1.98E-01	5.40E-02	8.59E-01
U-235	4391.00	4445.78	114.831	24.000	22.800	1.200	1.0954	99.700	6.88E-01	3.25E-01	2.12E-01	6.06E-02	2.98E-01
U-238	4184.73	4173.59	87.284	204.000	203.760	0.240	0.4899	100.000	6.13E+00	1.43E+00	1.44E-01	2.70E-02	8.45E-01



Batch# 1596438 Product: Th Date: 9/20/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.		✓	DGN# 1599408
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DGN# 1599408
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DGN# 1599408
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.)	✓		

Primary Review Performed By: [signature] 9/20/16

Secondary Review Performed By: [signature] 9/21/16

10/4

MJW C

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
20-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	DOE EML HASL-300, Th-01-RC Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596438	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621828 were logged in and analyzed outside of the holding time.	1. Reporting results.

Originator's Name:

Jessica Downey 20-SEP-16

Data Validator/Group Leader:

Melanie Aycock 21-SEP-16

Thorium (Ac-227 Tracer) Queue Sheet

07-SEP-16

Batch #: 1596438 Analyst: MXS2 First Client Due Date: 04-OCT-16 Internal Due Date: 30-SEP-16

Tracer Isotope: Ac-227 Tracer Code: 0387-B-402 Expiration Date: 5-31-17 Vol: 0.1 Ac-227 Separation Date/Time: 9-14-16/21:05

LCS Isotope: Th-230, Th-232 LCS Code: 1242-H Expiration Date: 2-11-17 Vol: 0.1

Spike Isotope: Th-230, Th-232 Spike Code: — Expiration Date: — Vol: —

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840027 Balance ID: 161076002 Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l / f)	Th Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.122	26 26
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.106	29 28
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.115	30 29
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.121	38 30
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.109	40 33
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.107	41 34
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.116	42 38
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.106	161 40
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.110	162 41
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.109	163 42
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.111	166 199
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.112	167 200
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.102	169 201
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.113	170 202
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.115	175 203
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.119	176 204
1203621827-1	MB for batch 1596438	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.122	28 28 ~~205~~
1203621828-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.113	177 205
1203621829-1	LCS for batch 1596438	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.122	178

Choose SOP Used: GL-RAD-A-038

GL-RAD-A-032 ✓

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

Data Reviewed By: 9/20/16

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

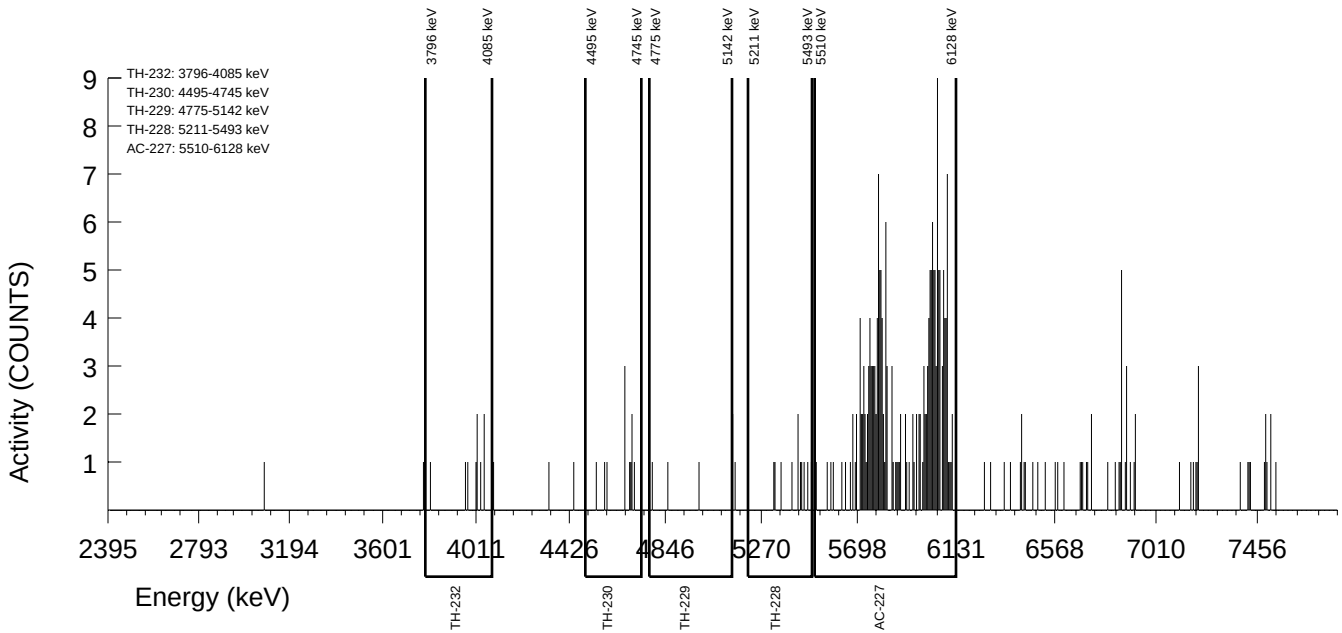
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 026	LIB FILE : AC
SAMPLE ID : S0405240001_TH	DETECTOR S/N : 80017	BKG FILE : B026.CNF;1838
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 32.6942	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6303	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:23	EFF FILE : W026.CNF;495
% YIELD : 72.4 +/-8.229 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.3531E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5905.59	282.645	200.000	184.640	15.360	3.9192	100.000	1.44E+01	3.25E+00	1.36E+00	5.61E-01	2.19E+00
TH-228	5363.00	5420.99	4.937	11.000	8.470	0.960	0.9798	99.940	7.28E-01	6.07E-01	7.27E-01	2.35E-01	5.90E-01
TH-229	4900.00	4884.34	197.481	3.000	1.800	1.200	1.0954	99.469	1.18E-01	2.68E-01	4.59E-01	1.31E-01	2.67E-01
TH-230	4671.39	4659.19	33.325	11.000	9.800	1.200	1.0954	99.700	6.39E-01	4.62E-01	4.57E-01	1.31E-01	4.49E-01
TH-232	3972.00	3996.20	37.028	9.000	8.520	0.480	0.6928	100.000	5.54E-01	4.17E-01	3.60E-01	8.25E-02	4.07E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.570 +/-0.010)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

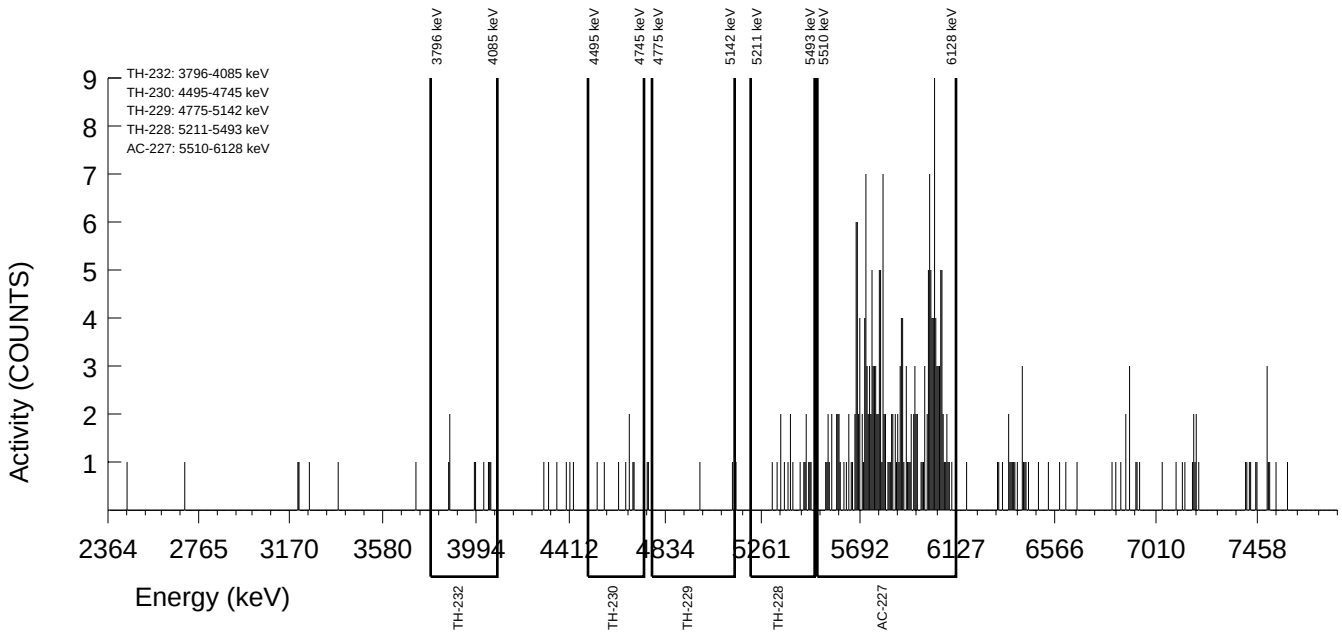
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 028	LIB FILE : AC
SAMPLE ID : S0405240002_TH	DETECTOR S/N : 78792	BKG FILE : B028.CNF;1842
SAMPLE QTY : 0.106 G +/-0.943 %	AVERAGE %EFFICIENCY : 29.2888	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5659	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:23	EFF FILE : W028.CNF;507
% YIELD : 86.5 +/-8.100 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.8122E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5854.45	351.721	220.000	197.680	22.320	4.7244	100.000	1.66E+01	3.68E+00	1.71E+00	7.27E-01	2.48E+00
TH-228	5363.00	5407.80	109.692	17.000	13.399	1.920	1.3856	99.940	1.24E+00	8.12E-01	8.89E-01	3.06E-01	7.79E-01
TH-229	4900.00	5060.12	139.608	2.000	-0.880	2.880	1.6971	99.469	-6.19E-02	2.67E-01	6.48E-01	2.19E-01	2.67E-01
TH-230	4671.39	4640.10	4.986	8.000	6.800	1.200	1.0954	99.700	4.77E-01	4.27E-01	4.92E-01	1.41E-01	4.20E-01
TH-232	3972.00	3979.06	7.479	9.000	8.280	0.720	0.8485	100.000	5.79E-01	4.48E-01	4.27E-01	1.09E-01	4.38E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.681 +/-0.011)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

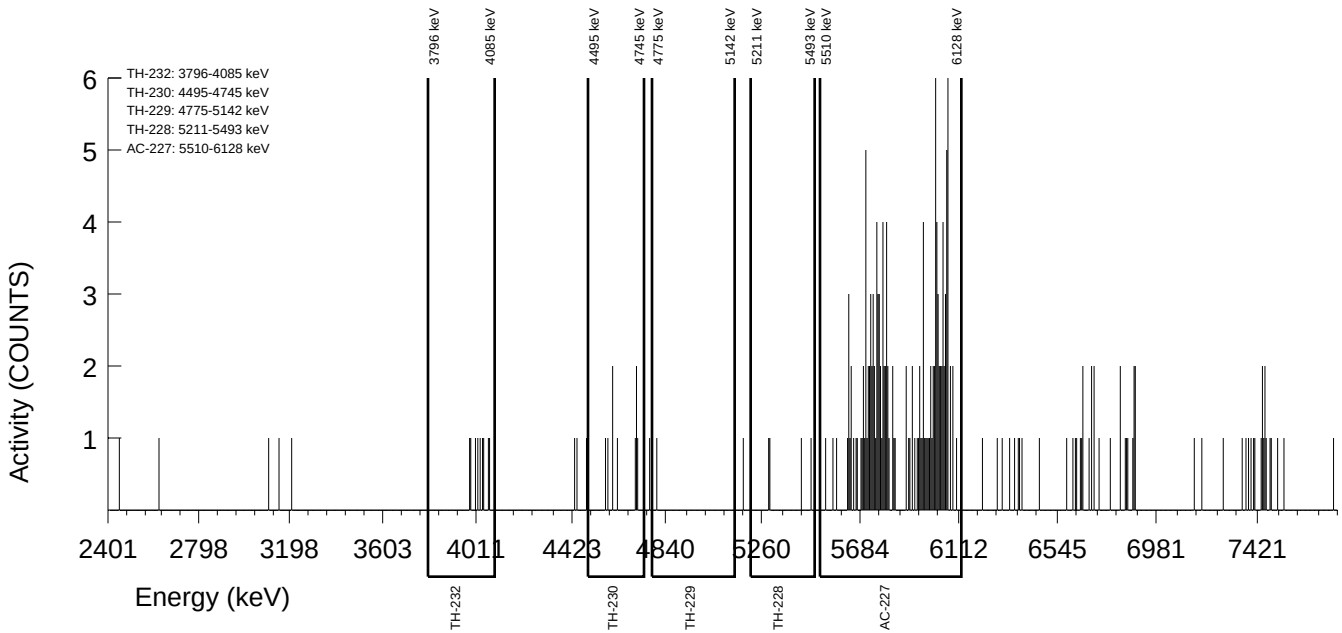
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 029	LIB FILE : AC
SAMPLE ID : S0405240003_TH	DETECTOR S/N : 33454	BKG FILE : B029.CNF;1830
SAMPLE QTY : 0.115 G +/-0.870 %	AVERAGE %EFFICIENCY : 30.7100	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5928	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:23	EFF FILE : W029.CNF;544
% YIELD : 52.3 +/-10.147 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 1.6998E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5875.55	335.307	144.000	125.280	18.720	4.3267	100.000	1.53E+01	4.27E+00	2.30E+00	9.68E-01	2.93E+00
TH-228	5363.00	5369.62	177.516	4.000	2.455	0.480	0.6928	99.940	3.30E-01	6.06E-01	9.72E-01	2.85E-01	5.99E-01
TH-229	4900.00	4797.87	4.931	1.000	-1.400	2.400	1.5492	99.469	-1.43E-01	3.26E-01	8.87E-01	2.90E-01	3.25E-01
TH-230	4671.39	4647.80	106.016	9.000	6.840	2.160	1.4697	99.700	6.98E-01	6.65E-01	8.55E-01	2.75E-01	6.50E-01
TH-232	3972.00	4024.69	88.758	9.000	8.280	0.720	0.8485	100.000	8.42E-01	6.60E-01	6.21E-01	1.58E-01	6.37E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.065 +/-0.007)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

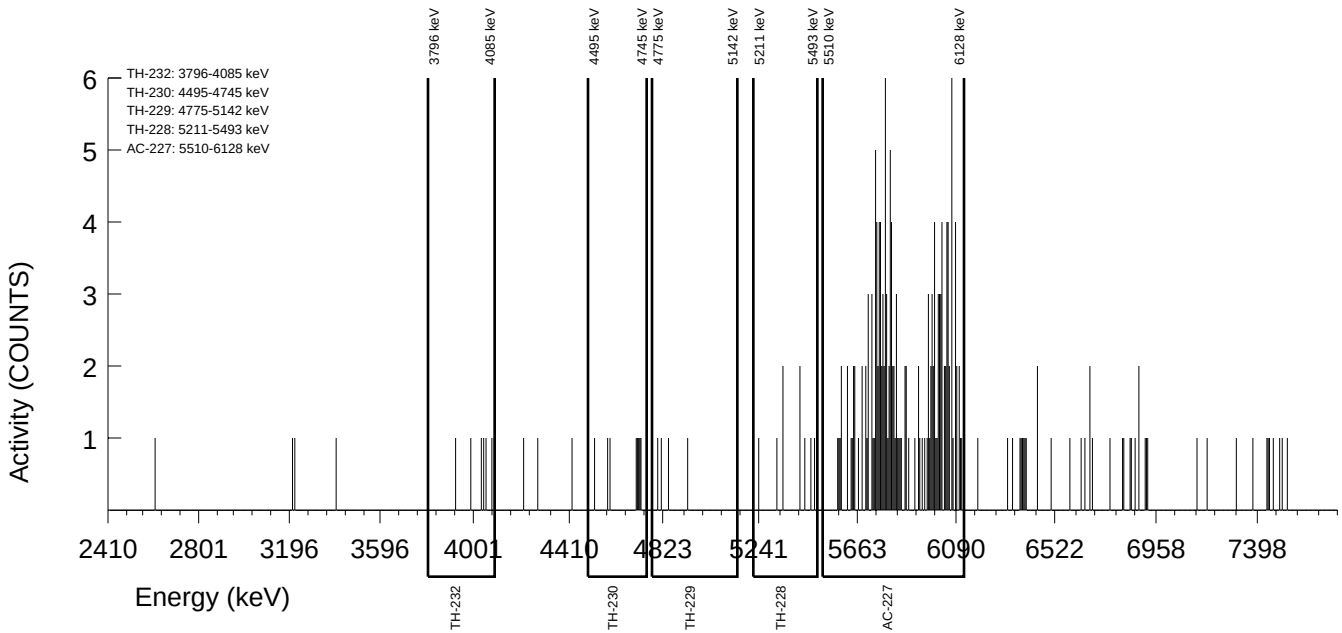
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 030	LIB FILE : AC
SAMPLE ID : S0405240004_TH	DETECTOR S/N : 33447	BKG FILE : B030.CNF;1827
SAMPLE QTY : 0.121 G +/-0.826 %	AVERAGE %EFFICIENCY : 35.1534	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6768	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:23	EFF FILE : W030.CNF;496
% YIELD : 54.1 +/-9.024 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 1.7594E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5872.96	320.615	159.000	148.440	10.560	3.2496	100.000	1.45E+01	3.60E+00	1.46E+00	5.83E-01	2.45E+00
TH-228	5363.00	5381.76	72.867	9.000	6.298	1.440	1.2000	99.940	6.79E-01	6.97E-01	9.42E-01	3.09E-01	6.81E-01
TH-229	4900.00	4845.04	126.303	4.000	2.080	1.920	1.3856	99.469	1.71E-01	3.79E-01	6.62E-01	2.08E-01	3.78E-01
TH-230	4671.39	4657.69	194.312	8.000	6.800	1.200	1.0954	99.700	5.56E-01	5.00E-01	5.74E-01	1.64E-01	4.90E-01
TH-232	3972.00	4027.49	0.000	7.000	6.040	0.960	0.9798	100.000	4.93E-01	4.69E-01	5.37E-01	1.46E-01	4.60E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.262 +/-0.008)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

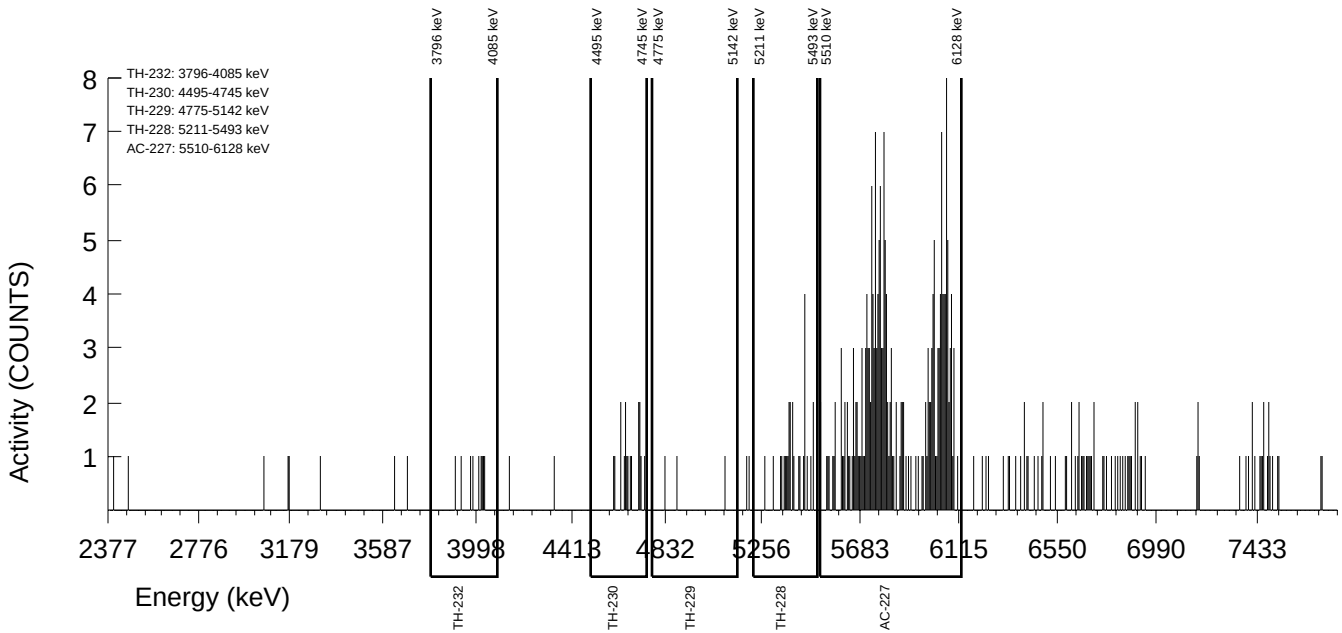
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 033	LIB FILE : AC
SAMPLE ID : S0405240005_TH	DETECTOR S/N : 83293	BKG FILE : B033.CNF;1823
SAMPLE QTY : 0.109 G +/-0.917 %	AVERAGE %EFFICIENCY : 32.6568	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6295	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:24	EFF FILE : W033.CNF;546
% YIELD : 78.3 +/-7.988 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.5457E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5853.31	311.899	218.000	199.520	18.480	4.2988	100.000	1.61E+01	3.53E+00	1.52E+00	6.37E-01	2.37E+00
TH-228	5363.00	5395.54	5.791	26.000	22.864	1.440	1.2000	99.940	2.03E+00	9.79E-01	8.13E-01	2.73E-01	9.13E-01
TH-229	4900.00	4932.64	253.159	3.000	1.320	1.680	1.2961	99.469	8.94E-02	2.81E-01	5.25E-01	1.61E-01	2.80E-01
TH-230	4671.39	4671.95	86.868	17.000	16.520	0.480	0.6928	99.700	1.12E+00	5.93E-01	3.74E-01	8.57E-02	5.65E-01
TH-232	3972.00	3989.18	129.061	9.000	9.000	0.000	0.0000	100.000	6.06E-01	4.30E-01	2.02E-01	0.00E+00	4.19E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.696 +/-0.011)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

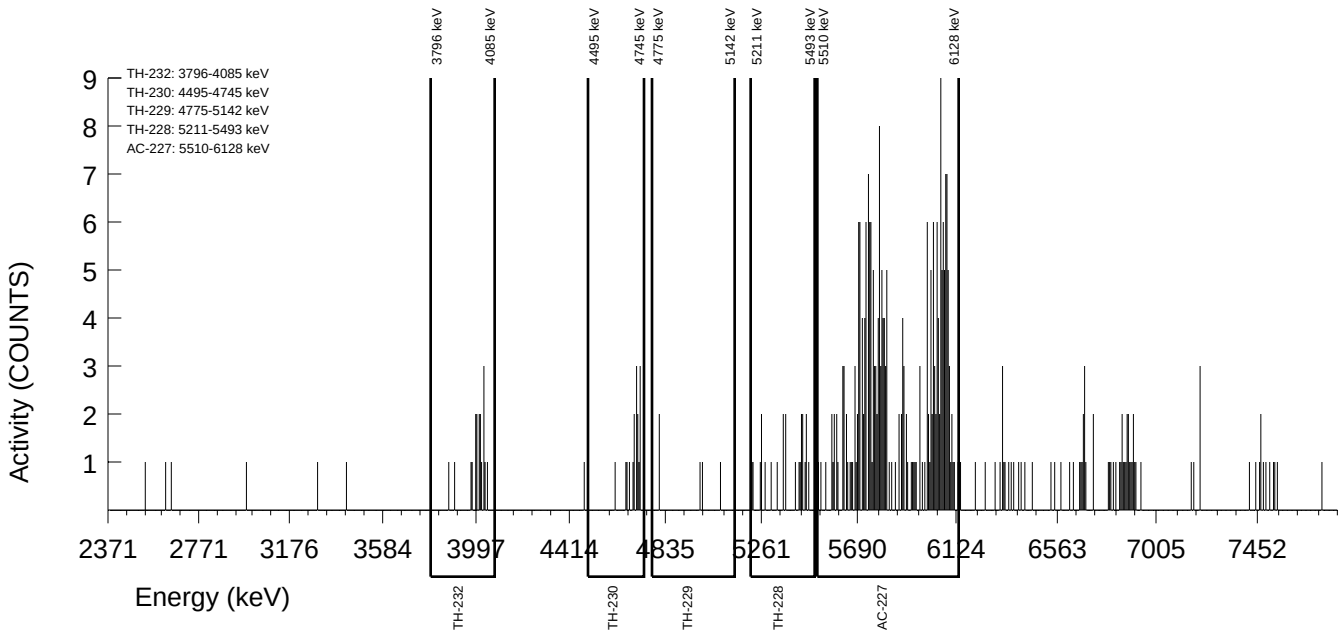
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 034	LIB FILE : AC
SAMPLE ID : S0405240006_TH	DETECTOR S/N : 61586	BKG FILE : B034.CNF;1836
SAMPLE QTY : 0.107 G +/-0.935 %	AVERAGE %EFFICIENCY : 32.5970	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6285	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:24	EFF FILE : W034.CNF;481
% YIELD : 90.0 +/-7.440 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.9261E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5866.01	366.141	245.000	228.920	16.080	4.0100	100.000	1.65E+01	3.35E+00	1.27E+00	5.28E-01	2.23E+00
TH-228	5363.00	5367.29	191.463	23.000	20.094	0.960	0.9798	99.940	1.59E+00	8.08E-01	6.97E-01	2.30E-01	7.63E-01
TH-229	4900.00	4910.26	4.973	6.000	4.560	1.440	1.2000	99.469	2.74E-01	3.23E-01	4.45E-01	1.32E-01	3.21E-01
TH-230	4671.39	4696.86	29.838	16.000	15.520	0.480	0.6928	99.700	9.31E-01	5.07E-01	3.32E-01	7.61E-02	4.87E-01
TH-232	3972.00	4000.41	39.784	18.000	17.760	0.240	0.4899	100.000	1.06E+00	5.37E-01	2.87E-01	5.37E-02	5.13E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.946 +/-0.013)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

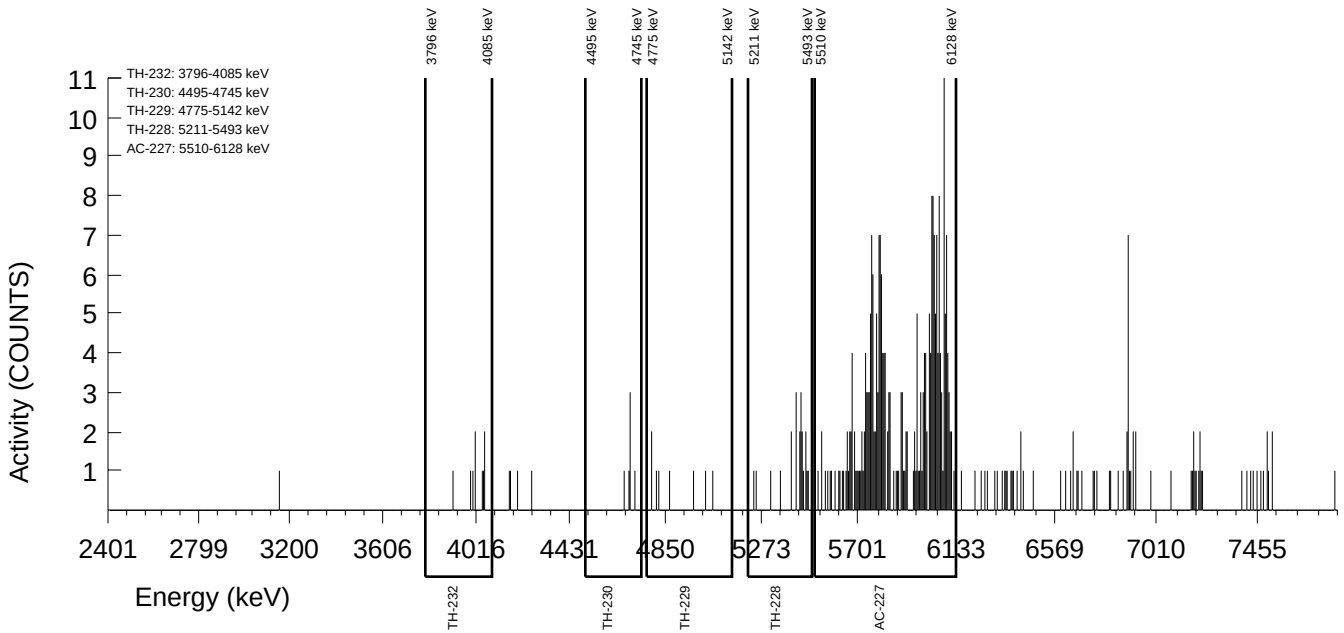
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 038	LIB FILE : AC
SAMPLE ID : S0405240007_TH	DETECTOR S/N : 72532	BKG FILE : B038.CNF;1824
SAMPLE QTY : 0.116 G +/-0.862 %	AVERAGE %EFFICIENCY : 35.8983	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6908	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:25	EFF FILE : W038.CNF;499
% YIELD : 88.6 +/-7.156 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.8831E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5893.19	307.387	264.000	248.400	15.600	3.9497	100.000	1.52E+01	2.96E+00	1.07E+00	4.42E-01	1.96E+00
TH-228	5363.00	5417.33	62.959	21.000	17.448	1.440	1.2000	99.940	1.17E+00	6.52E-01	6.38E-01	2.18E-01	6.23E-01
TH-229	4900.00	4894.70	4.938	8.000	7.520	0.480	0.6928	99.469	3.84E-01	3.09E-01	2.83E-01	6.49E-02	3.03E-01
TH-230	4671.39	4695.80	6.172	6.000	5.520	0.480	0.6928	99.700	2.81E-01	2.71E-01	2.82E-01	6.47E-02	2.68E-01
TH-232	3972.00	4018.62	44.441	9.000	8.280	0.720	0.8485	100.000	4.21E-01	3.25E-01	3.11E-01	7.90E-02	3.19E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (2.112 +/-0.014)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

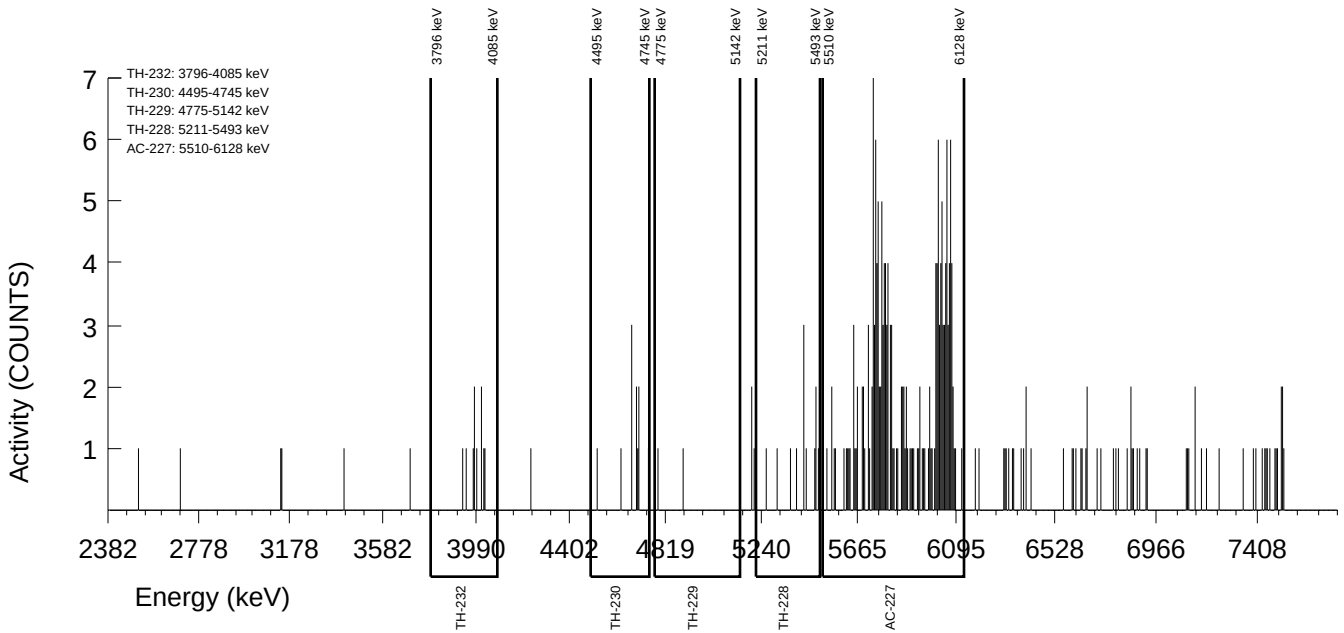
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 040	LIB FILE : AC
SAMPLE ID : S0405240008_TH	DETECTOR S/N : 78773	BKG FILE : B040.CNF;1827
SAMPLE QTY : 0.106 G +/-0.943 %	AVERAGE %EFFICIENCY : 32.4791	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6262	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:25	EFF FILE : W040.CNF;485
% YIELD : 67.9 +/-8.380 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.2086E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5865.64	319.348	182.000	172.160	9.840	3.1369	100.000	1.66E+01	3.81E+00	1.40E+00	5.54E-01	2.57E+00
TH-228	5363.00	5413.49	52.856	12.000	8.136	2.400	1.5492	99.940	8.63E-01	7.87E-01	1.05E+00	3.68E-01	7.67E-01
TH-229	4900.00	4842.56	108.170	2.000	0.800	1.200	1.0954	99.469	6.46E-02	2.90E-01	5.66E-01	1.62E-01	2.89E-01
TH-230	4671.39	4673.13	33.189	11.000	10.520	0.480	0.6928	99.700	8.47E-01	5.69E-01	4.46E-01	1.02E-01	5.51E-01
TH-232	3972.00	3991.34	36.876	10.000	9.760	0.240	0.4899	100.000	7.84E-01	5.41E-01	3.85E-01	7.20E-02	5.25E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.464 +/-0.010)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

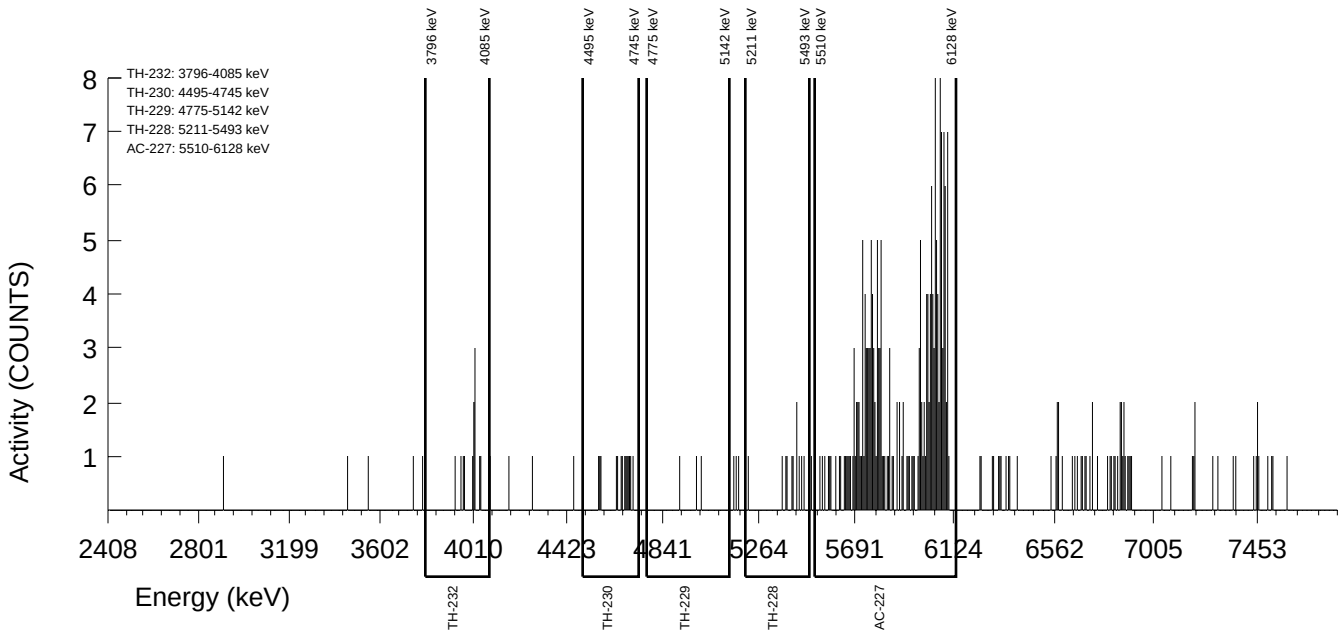
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 041	LIB FILE : AC
SAMPLE ID : S0405240009_TH	DETECTOR S/N : 78205	BKG FILE : B041.CNF;1823
SAMPLE QTY : 0.110 G +/-0.909 %	AVERAGE %EFFICIENCY : 34.2140	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6590	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:25	EFF FILE : W041.CNF;529
% YIELD : 73.1 +/-7.917 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.3772E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5899.87	340.319	206.000	195.200	10.800	3.2863	100.000	1.60E+01	3.47E+00	1.23E+00	4.93E-01	2.33E+00
TH-228	5363.00	5410.11	4.879	12.000	8.900	1.440	1.2000	99.940	8.02E-01	6.65E-01	8.21E-01	2.75E-01	6.47E-01
TH-229	4900.00	4975.87	92.703	3.000	2.040	0.960	0.9798	99.469	1.40E-01	2.79E-01	4.52E-01	1.23E-01	2.78E-01
TH-230	4671.39	4656.20	146.374	14.000	13.040	0.960	0.9798	99.700	8.92E-01	5.44E-01	4.51E-01	1.23E-01	5.24E-01
TH-232	3972.00	4008.44	9.758	13.000	13.000	0.000	0.0000	100.000	8.87E-01	5.21E-01	2.05E-01	0.00E+00	5.01E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.660 +/-0.011)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

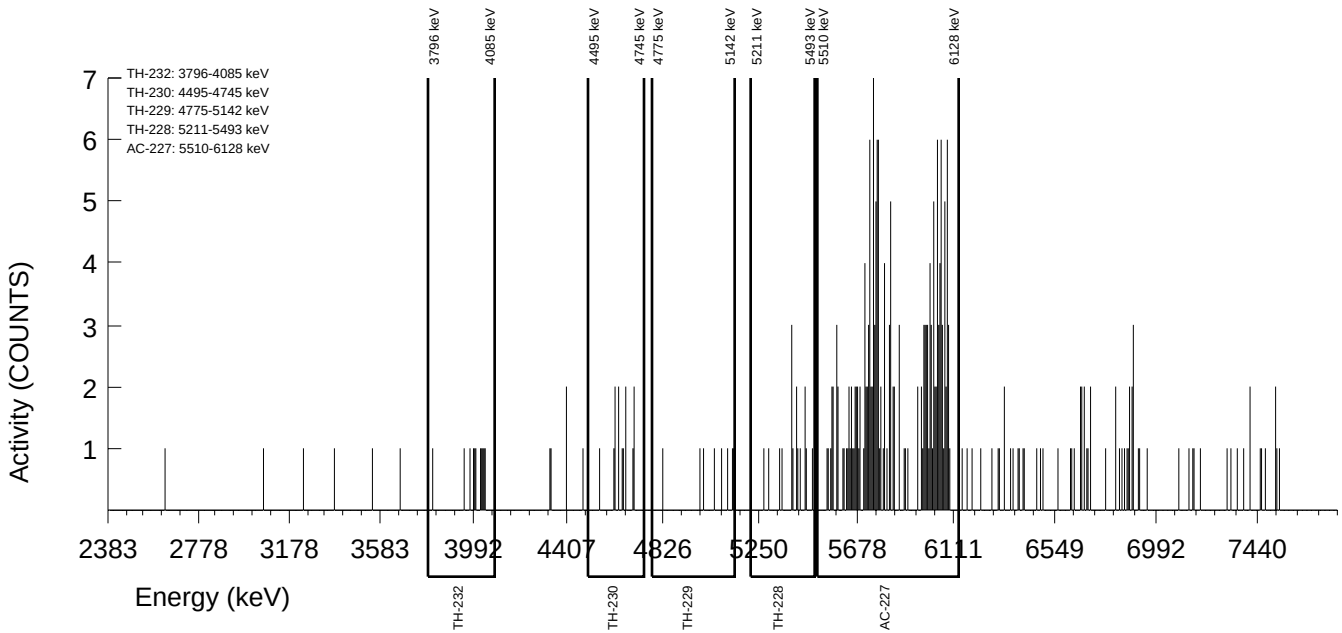
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 042	LIB FILE : AC
SAMPLE ID : S0405240010_TH	DETECTOR S/N : 78793	BKG FILE : B042.CNF;1821
SAMPLE QTY : 0.109 G +/-0.917 %	AVERAGE %EFFICIENCY : 33.3976	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6435	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:49:25	EFF FILE : W042.CNF;490
% YIELD : 65.6 +/-8.461 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2523E+00 dpm
RESULTS : 2.1334E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.58	5855.18	333.923	183.000	171.000	12.000	3.4641	100.000	1.61E+01	3.75E+00	1.48E+00	5.99E-01	2.53E+00
TH-228	5363.00	5397.69	58.928	16.000	13.346	1.200	1.0954	99.940	1.39E+00	8.87E-01	8.97E-01	2.93E-01	8.48E-01
TH-229	4900.00	5042.39	294.638	8.000	6.800	1.200	1.0954	99.469	5.37E-01	4.82E-01	5.54E-01	1.59E-01	4.74E-01
TH-230	4671.39	4643.89	85.936	13.000	11.800	1.200	1.0954	99.700	9.30E-01	6.06E-01	5.53E-01	1.58E-01	5.85E-01
TH-232	3972.00	3991.06	225.889	11.000	10.760	0.240	0.4899	100.000	8.46E-01	5.55E-01	3.77E-01	7.05E-02	5.36E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9587E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.454 +/-0.009)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

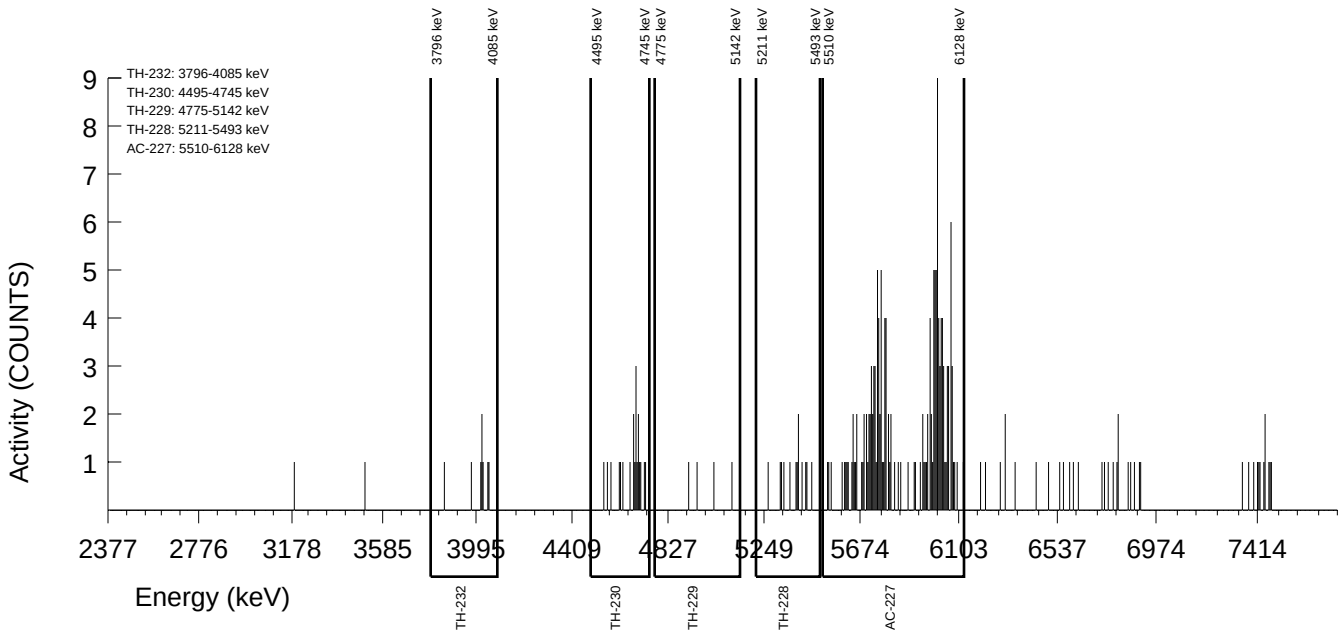
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 199	LIB FILE : AC
SAMPLE ID : S0405240011_TH	DETECTOR S/N : 78896	BKG FILE : B199.CNF;799
SAMPLE QTY : 0.111 G +/-0.901 %	AVERAGE %EFFICIENCY : 26.2038	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5077	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:42	EFF FILE : W199.CNF;222
% YIELD : 74.0 +/-8.669 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 2.4061E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5878.72	300.797	153.000	151.320	1.680	1.2961	100.000	1.59E+01	3.77E+00	8.12E-01	2.49E-01	2.55E+00
TH-228	5363.00	5382.48	7.442	13.000	11.475	0.240	0.4899	99.940	1.32E+00	8.87E-01	8.23E-01	2.38E-01	8.48E-01
TH-229	4900.00	5005.76	183.579	4.000	2.560	1.440	1.2000	99.469	2.24E-01	4.01E-01	6.49E-01	1.93E-01	4.00E-01
TH-230	4671.39	4666.45	23.568	20.000	20.000	0.000	0.0000	99.700	1.75E+00	8.44E-01	2.62E-01	0.00E+00	7.87E-01
TH-232	3972.00	3996.31	9.923	8.000	7.760	0.240	0.4899	100.000	6.77E-01	5.30E-01	4.18E-01	7.83E-02	5.16E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9523E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.285 +/-0.008)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

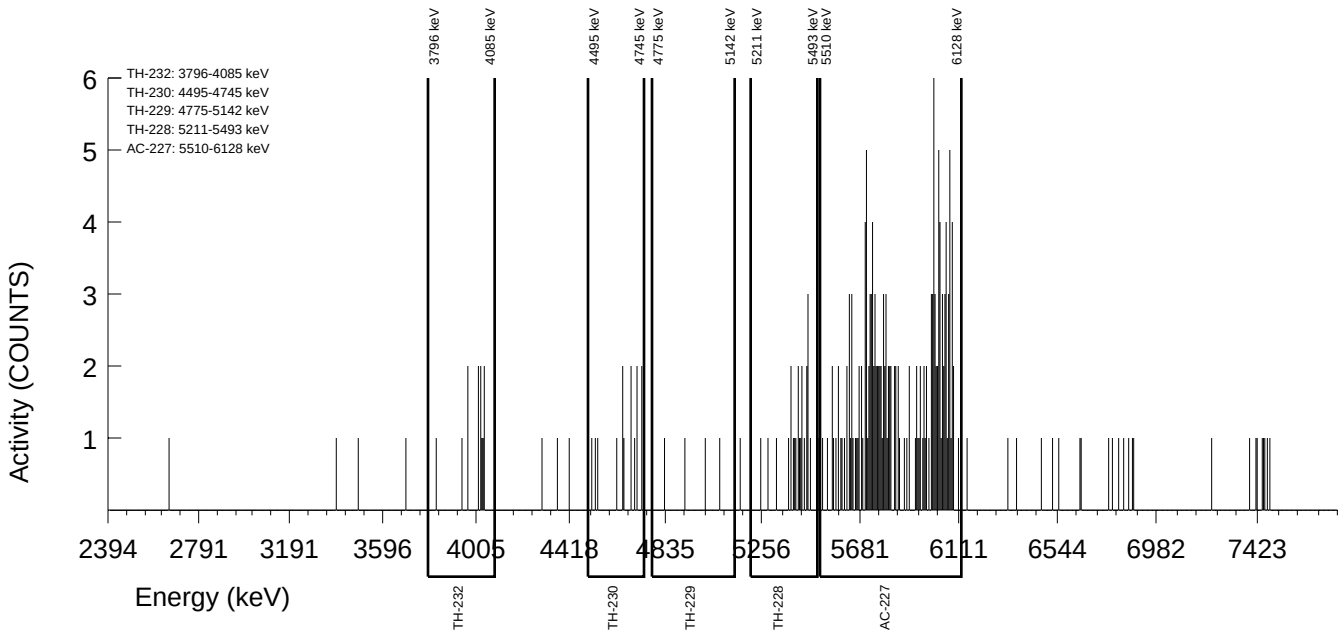
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 200	LIB FILE : AC
SAMPLE ID : S0405240012_TH	DETECTOR S/N : 78900	BKG FILE : B200.CNF;799
SAMPLE QTY : 0.112 G +/-0.893 %	AVERAGE %EFFICIENCY : 27.0654	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5238	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:44	EFF FILE : W200.CNF;230
% YIELD : 76.1 +/-8.509 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 2.4736E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5859.19	353.737	165.000	160.680	4.320	2.0785	100.000	1.57E+01	3.67E+00	1.04E+00	3.72E-01	2.48E+00
TH-228	5363.00	5408.90	72.719	23.000	20.675	0.960	0.9798	99.940	2.22E+00	1.12E+00	8.88E-01	2.83E-01	1.04E+00
TH-229	4900.00	4956.73	231.716	4.000	3.280	0.720	0.8485	99.469	2.68E-01	3.70E-01	5.00E-01	1.27E-01	3.67E-01
TH-230	4671.39	4648.81	83.812	14.000	13.040	0.960	0.9798	99.700	1.06E+00	6.52E-01	5.38E-01	1.47E-01	6.26E-01
TH-232	3972.00	3994.92	73.952	12.000	12.000	0.000	0.0000	100.000	9.77E-01	6.01E-01	2.44E-01	0.00E+00	5.77E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9523E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.365 +/-0.009)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

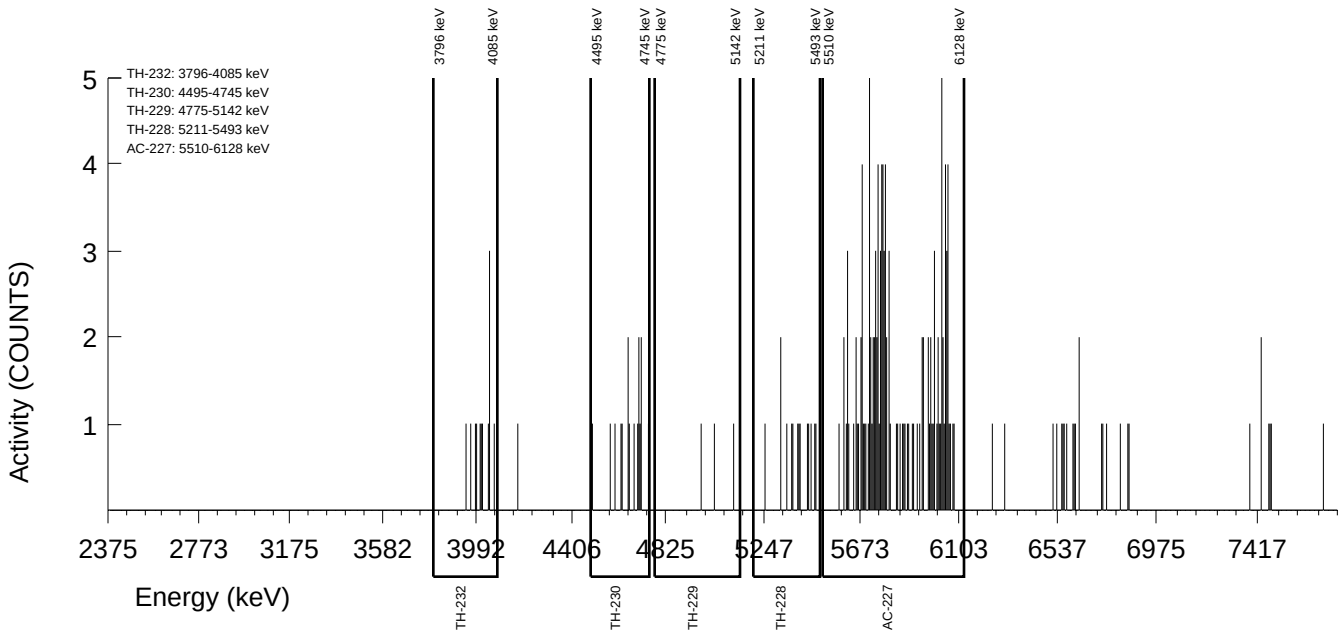
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 201	LIB FILE : AC
SAMPLE ID : S0405240013_TH	DETECTOR S/N : 78902	BKG FILE : B201.CNF;799
SAMPLE QTY : 0.102 G +/-0.980 %	AVERAGE %EFFICIENCY : 26.2326	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5081	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:47	EFF FILE : W201.CNF;224
% YIELD : 58.8 +/-9.683 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 1.9117E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5841.33	409.972	123.000	120.360	2.640	1.6248	100.000	1.73E+01	4.59E+00	1.28E+00	4.27E-01	3.14E+00
TH-228	5363.00	5395.85	4.954	14.000	12.018	0.960	0.9798	99.940	1.89E+00	1.27E+00	1.24E+00	3.86E-01	1.21E+00
TH-229	4900.00	5043.96	138.722	3.000	1.320	1.680	1.2961	99.469	1.58E-01	4.98E-01	9.30E-01	2.85E-01	4.97E-01
TH-230	4671.39	4661.36	59.452	16.000	14.800	1.200	1.0954	99.700	1.77E+00	1.04E+00	8.39E-01	2.40E-01	9.77E-01
TH-232	3972.00	4015.68	6.193	12.000	12.000	0.000	0.0000	100.000	1.43E+00	8.90E-01	3.58E-01	0.00E+00	8.45E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9523E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.022 +/-0.007)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

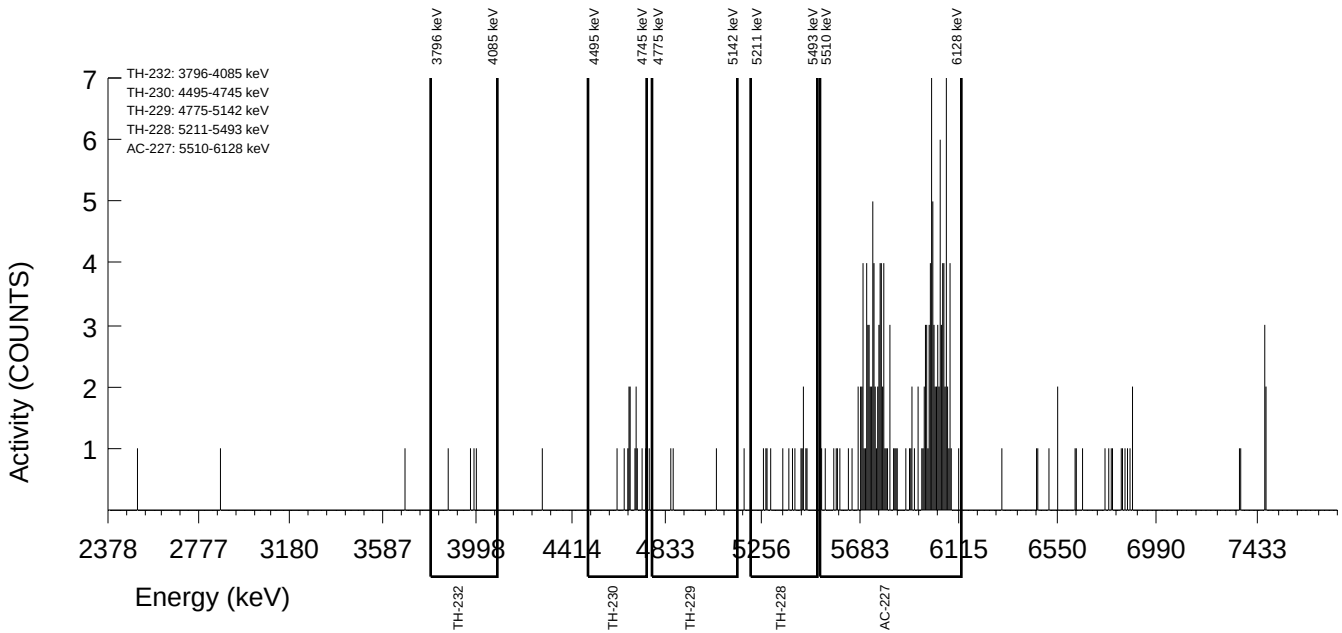
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 202	LIB FILE : AC
SAMPLE ID : S0405240014_TH	DETECTOR S/N : 78903	BKG FILE : B202.CNF;797
SAMPLE QTY : 0.113 G +/-0.885 %	AVERAGE %EFFICIENCY : 27.2753	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5278	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:50	EFF FILE : W202.CNF;226
% YIELD : 74.7 +/-8.480 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 2.4302E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5882.21	354.229	161.000	159.080	1.920	1.3856	100.000	1.56E+01	3.62E+00	7.91E-01	2.48E-01	2.45E+00
TH-228	5363.00	5374.66	7.440	14.000	11.929	0.720	0.8485	99.940	1.28E+00	8.59E-01	8.54E-01	2.65E-01	8.23E-01
TH-229	4900.00	4924.12	193.441	3.000	1.080	1.920	1.3856	99.469	8.85E-02	3.42E-01	6.62E-01	2.08E-01	3.41E-01
TH-230	4671.39	4684.36	39.680	13.000	11.800	1.200	1.0954	99.700	9.65E-01	6.29E-01	5.73E-01	1.64E-01	6.07E-01
TH-232	3972.00	3958.41	124.001	4.000	3.520	0.480	0.6928	100.000	2.87E-01	3.67E-01	4.51E-01	1.03E-01	3.63E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9524E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.351 +/-0.009)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

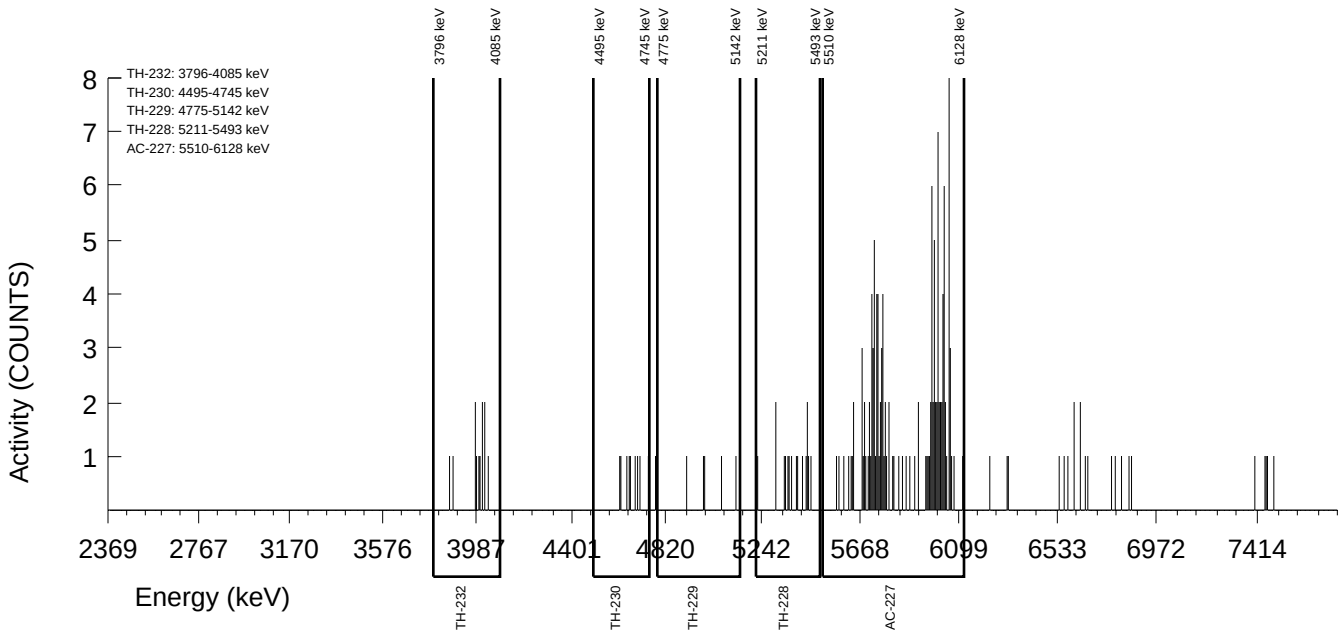
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 203	LIB FILE : AC
SAMPLE ID : S0405240015_TH	DETECTOR S/N : 78905	BKG FILE : B203.CNF;799
SAMPLE QTY : 0.115 G +/-0.870 %	AVERAGE %EFFICIENCY : 25.9071	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5020	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:52	EFF FILE : W203.CNF;229
% YIELD : 62.6 +/-9.407 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 2.0355E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5879.69	308.731	128.000	126.560	1.440	1.2000	100.000	1.53E+01	3.95E+00	8.94E-01	2.66E-01	2.70E+00
TH-228	5363.00	5374.78	136.278	16.000	14.685	0.240	0.4899	99.940	1.95E+00	1.15E+00	9.11E-01	2.56E-01	1.08E+00
TH-229	4900.00	5013.34	208.134	5.000	4.760	0.240	0.4899	99.469	4.82E-01	4.99E-01	4.85E-01	9.08E-02	4.91E-01
TH-230	4671.39	4669.11	123.889	9.000	8.520	0.480	0.6928	99.700	8.60E-01	6.52E-01	5.59E-01	1.28E-01	6.31E-01
TH-232	3972.00	3984.03	44.600	12.000	11.760	0.240	0.4899	100.000	1.18E+00	7.49E-01	4.83E-01	9.03E-02	7.14E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9524E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.075 +/-0.007)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

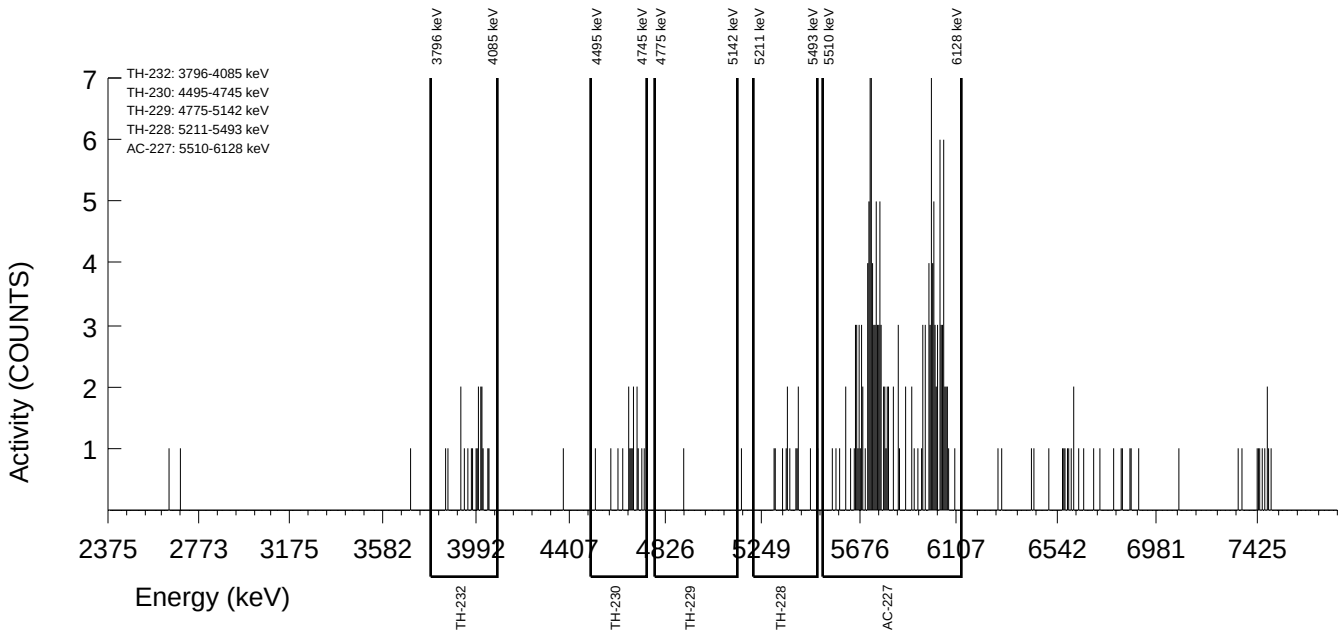
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 204	LIB FILE : AC
SAMPLE ID : S0405240016_TH	DETECTOR S/N : 78907	BKG FILE : B204.CNF;799
SAMPLE QTY : 0.119 G +/-0.840 %	AVERAGE %EFFICIENCY : 26.4724	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5128	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:54	EFF FILE : W204.CNF;228
% YIELD : 77.8 +/-8.418 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 2.5309E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5850.84	310.696	162.000	160.800	1.200	1.0954	100.000	1.48E+01	3.41E+00	6.45E-01	1.85E-01	2.30E+00
TH-228	5363.00	5382.12	51.989	13.000	11.154	0.480	0.6928	99.940	1.13E+00	7.77E-01	7.69E-01	2.33E-01	7.46E-01
TH-229	4900.00	4904.82	4.951	1.000	0.760	0.240	0.4899	99.469	5.85E-02	2.20E-01	3.69E-01	6.91E-02	2.19E-01
TH-230	4671.39	4664.06	42.086	16.000	15.520	0.480	0.6928	99.700	1.19E+00	6.56E-01	4.25E-01	9.75E-02	6.24E-01
TH-232	3972.00	3978.85	96.551	19.000	18.520	0.480	0.6928	100.000	1.42E+00	7.16E-01	4.24E-01	9.72E-02	6.74E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9524E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.366 +/-0.009)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

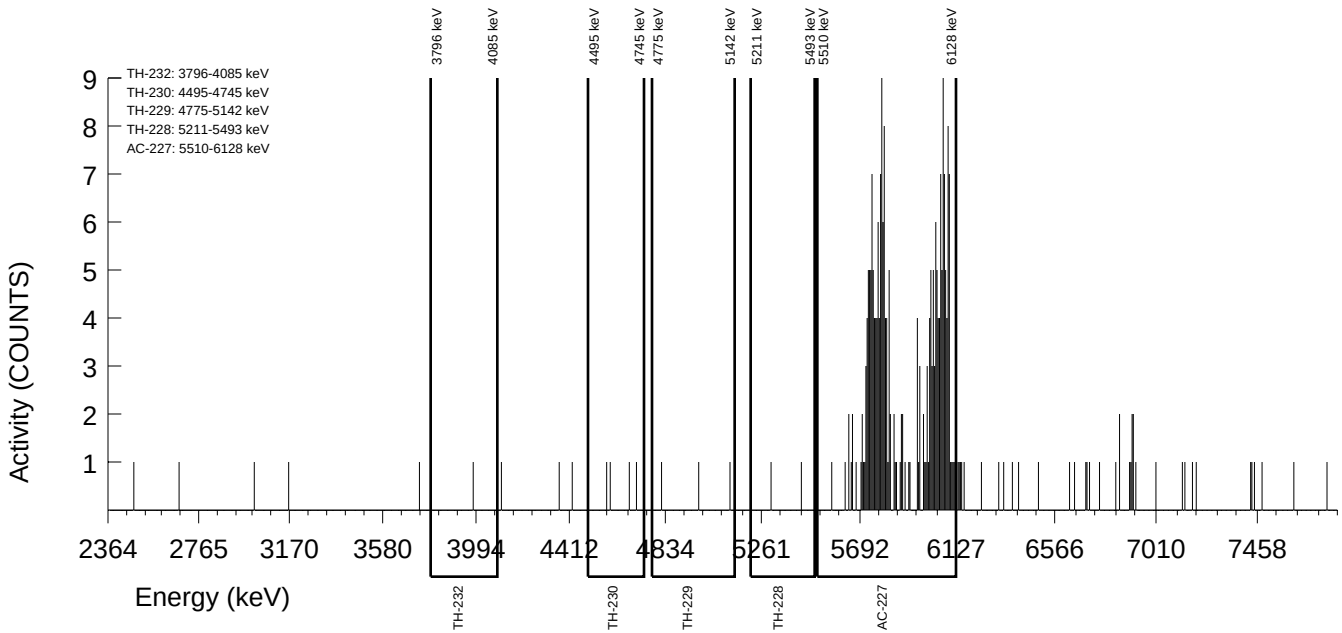
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 028	LIB FILE : AC
SAMPLE ID : S1203621827_TH	DETECTOR S/N : 78792	BKG FILE : B028.CNF;1840
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 29.2888	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5659	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:06:10	EFF FILE : W028.CNF;507
% YIELD : 90.8 +/-8.406 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 29-Aug-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.1121E+00 dpm
RESULTS : 2.8259E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5875.27	5901.37	333.647	238.000	198.640	39.360	6.2738	100.000	1.18E+01	2.71E+00	1.54E+00	6.81E-01	1.83E+00
TH-228	5363.00	5370.65	129.636	2.000	-2.853	4.560	2.1354	99.940	-1.66E-01	2.32E-01	6.40E-01	2.33E-01	2.32E-01
TH-229	4900.00	4973.96	289.188	3.000	1.080	1.920	1.3856	99.469	6.28E-02	2.43E-01	4.70E-01	1.48E-01	2.42E-01
TH-230	4671.39	4636.79	129.636	4.000	2.560	1.440	1.2000	99.700	1.49E-01	2.66E-01	4.29E-01	1.28E-01	2.64E-01
TH-232	3972.00	3983.10	4.986	1.000	0.040	0.960	0.9798	100.000	2.31E-03	1.72E-01	3.81E-01	1.04E-01	1.71E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 1.1566E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (0.293 +/-0.002)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

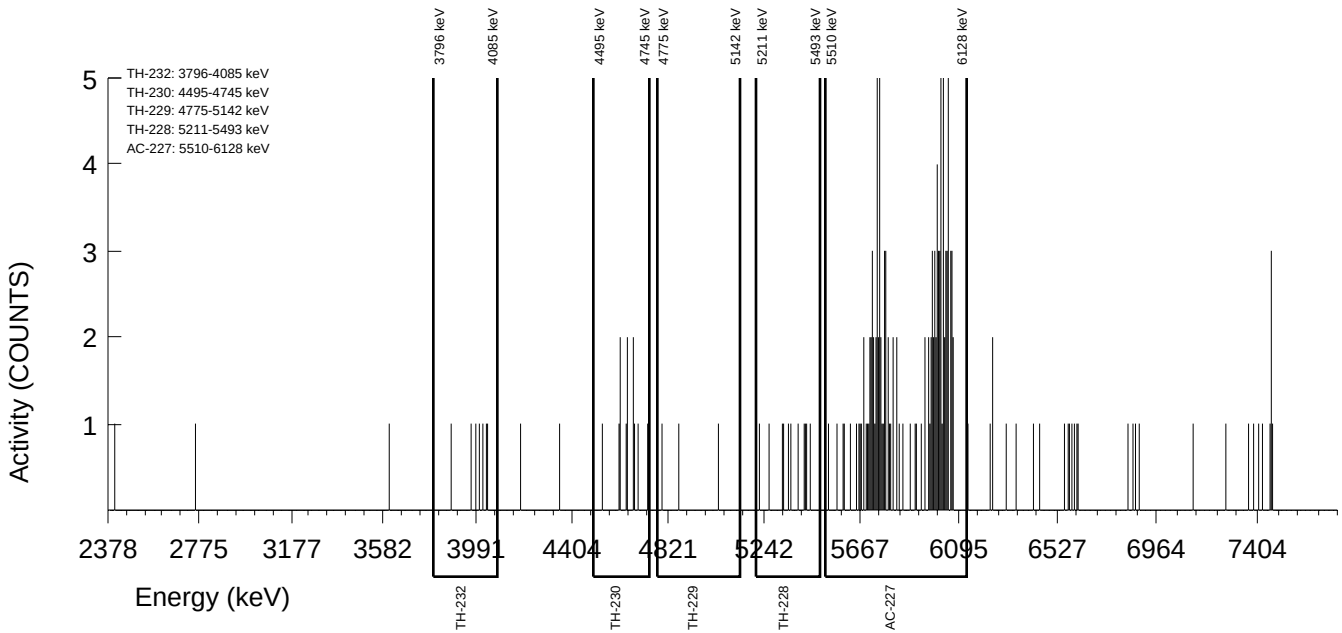
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 205	LIB FILE : AC
SAMPLE ID : S1203621828_TH	DETECTOR S/N : 78908	BKG FILE : B205.CNF;801
SAMPLE QTY : 0.113 G +/-0.885 %	AVERAGE %EFFICIENCY : 26.6171	BKG DATE : 16-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5154	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 19-Sep-2016 17:40:56	EFF FILE : W205.CNF;223
% YIELD : 57.7 +/-9.640 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER
ID : 0387-B-402
NUCLIDE : AC-227
NOMINAL : 3.2522E+00 dpm
RESULTS : 1.8754E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5844.61	5878.05	326.393	121.000	119.800	1.200	1.0954	100.000	1.56E+01	4.13E+00	9.12E-01	2.61E-01	2.82E+00
TH-228	5363.00	5363.21	212.650	11.000	9.022	0.960	0.9798	99.940	1.29E+00	1.02E+00	1.13E+00	3.49E-01	9.82E-01
TH-229	4900.00	4906.87	237.377	3.000	2.520	0.480	0.6928	99.469	2.74E-01	4.39E-01	6.03E-01	1.38E-01	4.36E-01
TH-230	4671.39	4649.28	64.289	12.000	11.760	0.240	0.4899	99.700	1.28E+00	8.09E-01	5.20E-01	9.74E-02	7.70E-01
TH-232	3972.00	3988.44	158.251	7.000	6.520	0.480	0.6928	100.000	7.06E-01	6.22E-01	5.99E-01	1.37E-01	6.06E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 6.9524E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (1.018 +/-0.007)

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

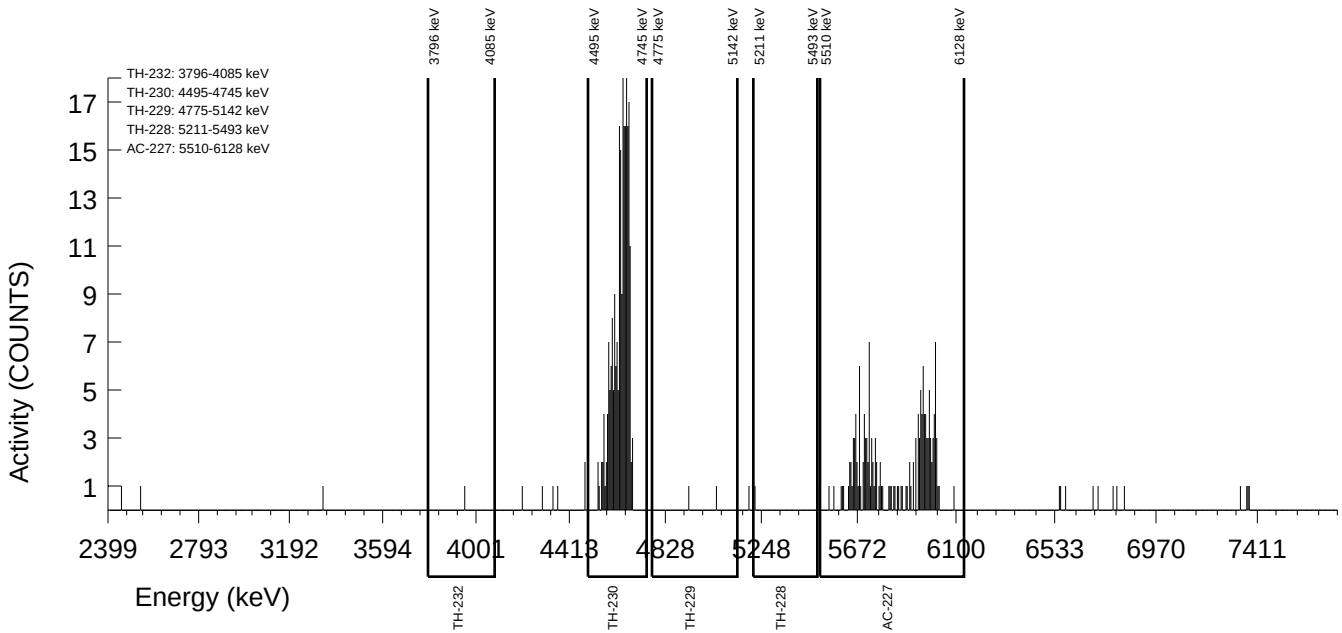
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596438	CHAMBER : 178	LIB FILE : AC
SAMPLE ID : S1203621829_TH	DETECTOR S/N : 74436	BKG FILE : B178.CNF;870
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 27.7549	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5369	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:07:06	EFF FILE : W178.CNF;243
% YIELD : 74.3 +/-8.548 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 13-Sep-2016
AC-227 SEP. : 14-Sep-2016 21:05:00		

TRACER		LCS	
ID	: 0387-B-402	ID	1242-H
NUCLIDE	: AC-227	NUCLIDE	TH-230
NOMINAL	: 3.1122E+00 dpm	NOMINAL (pCi/G)	1.7156E+01
RESULTS	: 2.3119E+00 dpm	% RECOVERY	101.538

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AC-227	5875.27	5835.58	325.248	154.000	154.000	0.000	0.0000	100.000	1.18E+01	2.76E+00	2.29E-01	0.00E+00	1.87E+00
TH-228	5363.00	5221.61	4.900	1.000	0.292	0.480	0.6928	99.940	2.19E-02	2.17E-01	4.48E-01	1.12E-01	2.16E-01
TH-229	4900.00	4992.94	117.604	2.000	1.520	0.480	0.6928	99.469	1.14E-01	2.63E-01	4.15E-01	9.52E-02	2.62E-01
TH-230	4671.39	4634.92	48.309	233.000	232.760	0.240	0.4899	99.700	1.74E+01	3.75E+00	3.59E-01	6.72E-02	2.24E+00
TH-232	3972.00	3955.29	4.900	1.000	0.760	0.240	0.4899	100.000	5.67E-02	2.13E-01	3.58E-01	6.70E-02	2.13E-01



NOTES:

* Ac-227 results are decay corrected to separation date/time.

* Ac-227 Tracer nominal includes 1.1577E-01 dpm ingrowth from Ra-223.

* Ac-227 Library Energy adjusted to compensate for ingrowth from Ra-223.

* Corrections were made to Th-228 net area due to Ra-223 ingrowth from tracer. (0.228 +/-0.001)

Batch# 1596446 Product: NP Date: 9/16/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.		✓	DGN# 1558509
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DGN# 1558509
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DGN# 1558509
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.)	✓		

Primary Review Performed By: [signature] 9/16/16

Secondary Review Performed By: [signature] 9/16/16

10/4

MJWC

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
16-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	ASTM C 1475-00 Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596446	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621846 were analyzed outside of the holding time.	1. Reporting results.

Originator's Name:

Jessica Downey 16-SEP-16

Data Validator/Group Leader:

Scott Moreland 16-SEP-16

Neptunium Queue Sheet

07-SEP-16

Batch #: 1596446 Analyst: MXS2 First Client Due Date:04-OCT-16 Internal Due Date30-SEP-16 Routine #: 3

Tracer Isotope: Am-243 (Np-239) Tracer Code: 445-902-III Expiration Date: 9-30-16 Vol: 0.1 REF #: 92-85

LCS Isotope: Np-237 LCS Code: 0518-5 Expiration Date: 7-18-17 Vol: 0.1 BKG #: 91

Spike Isotope: Np-237 Spike Code: — Expiration Date: — Vol: — Np Separation Date/Time: 9-14-16 / 21:09

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840027 Balance ID: 161076002 Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/(Dry) Aliquot (g/l/f)	GFPC	Np Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.122	4	65
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.106	22	66
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.115	23	67
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.121	24	68
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.109	25	69
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.107	26	70
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.116	27	210
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.106	28	212
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.110	29	217
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.109	30	218
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.111	31	219
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.112	32	220
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.102	33	199
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.113	34	200
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.115	35	201
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.119	36	202
1203621845-1	MB for batch 1596446	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.122	37	203
1203621846-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.113	38	205
1203621847-1	LCS for batch 1596446	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.122	39	206

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

Data Reviewed By: 9/16/16

BKG	2			Bkg Upper Limit (CPM)=	2.000000			Reference	Tracer
Ref Std Np-239 Beta Cts=	3159	Efficiency=	0.4909	Efficiency Error=	0.0178		S/N=	445-96-2-GG	445-96-2-III
Ref Std Np-239 Beta Cts=	3188	Efficiency=	0.4953	Efficiency Error=	0.0177		DPM=	429.006	446.154
Ref Std Np-239 Beta Cts=	3173	Efficiency=	0.4930	Efficiency Error=	0.0178		Exp. Date=	9/30/2009	9/30/2016
Ref Std Np-239 Beta Cts=	3121	Efficiency=	0.4851	Efficiency Error=	0.0179		Reference Limits (CPM)		
Average Counts=	**3160**	Avg Efficiency=	**0.4911**	Avg Efficiency Error=	**0.0178**		Lower	201	Filename :
Am-243 Correction Factor=	1.15						Upper	220	NP237Yields.xls
Half-life of Np-239 (days)=	2.356								File type :
Sample ID	Net Beta Cts	Count time	Count Date/Time	Separation Date/Time	Decay Corr Counts	% NP Yield	Delta T (min)	Gross Counts	Excel
405240001.1	2647	15	9/15/2016 10:42	9/14/2016 21:09	3130.11	95.24%	813.0	2649	Version # :
405240002.1	2445	15	9/15/2016 10:57	9/14/2016 21:09	2900.33	88.25%	828.4	2447	1.2.2
405240003.1	1623	15	9/15/2016 11:12	9/14/2016 21:09	1931.30	58.76%	843.7	1625	
405240004.1	1801	15	9/15/2016 11:28	9/14/2016 21:09	2149.84	65.41%	859.1	1803	
405240005.1	2460	15	9/15/2016 11:43	9/14/2016 21:09	2945.71	89.63%	874.4	2462	
405240006.1	2551	15	9/15/2016 11:58	9/14/2016 21:09	3064.27	93.24%	889.8	2553	
405240007.1	2298	15	9/15/2016 12:14	9/14/2016 21:09	2769.03	84.25%	905.1	2300	
405240008.1	2834	15	9/15/2016 12:29	9/14/2016 21:09	3425.63	104.23%	920.5	2836	
405240009.1	2425	15	9/15/2016 12:44	9/14/2016 21:09	2940.45	89.47%	935.8	2427	
405240010.1	2679	15	9/15/2016 13:00	9/14/2016 21:09	3258.64	99.15%	951.2	2681	
405240011.1	2660	15	9/15/2016 13:15	9/14/2016 21:09	3245.70	98.76%	966.5	2662	
405240012.1	2653	15	9/15/2016 13:30	9/14/2016 21:09	3247.32	98.81%	981.9	2655	
405240013.1	1860	15	9/15/2016 13:46	9/14/2016 21:09	2283.83	69.49%	997.2	1862	
405240014.1	2425	15	9/15/2016 14:01	9/14/2016 21:09	2986.92	90.88%	1012.6	2427	
405240015.1	1338	15	9/15/2016 14:16	9/14/2016 21:09	1653.22	50.30%	1027.9	1340	
405240016.1	859	15	9/15/2016 14:32	9/14/2016 21:09	1064.71	32.40%	1043.3	861	
1203621845.1	2440	15	9/15/2016 14:47	9/14/2016 21:09	3033.81	92.31%	1058.6	2442	
1203621846.1	1375	15	9/15/2016 15:02	9/14/2016 21:09	1715.00	52.18%	1074.0	1377	
1203621847.1	2590	15	9/15/2016 15:18	9/14/2016 21:09	3240.56	98.60%	1089.3	2592	
BKG	0	15	9/15/2016 7:39	9/14/2016 21:09	0.00	0.00%	630.2		

Sample ID	Carrier	Alpha	Beta	Count time	Voltage	Date/Time
REF	92	2005	3635	15	1545	9/15/16 7:54
REF	93	2028	3668	15	1545	9/15/16 8:09
REF	94	2063	3651	15	1545	9/15/16 8:25
REF	95	1983	3592	15	1545	9/15/16 8:40
405240001.1	21	101	2649	15	1545	9/15/16 10:42
405240002.1	22	111	2447	15	1545	9/15/16 10:57
405240003.1	23	62	1625	15	1545	9/15/16 11:12
405240004.1	24	80	1803	15	1545	9/15/16 11:28
405240005.1	25	102	2462	15	1545	9/15/16 11:43
405240006.1	26	88	2553	15	1545	9/15/16 11:58
405240007.1	27	95	2300	15	1545	9/15/16 12:14
405240008.1	28	118	2836	15	1545	9/15/16 12:29
405240009.1	29	94	2427	15	1545	9/15/16 12:44
405240010.1	30	116	2681	15	1545	9/15/16 13:00
405240011.1	31	118	2662	15	1545	9/15/16 13:15
405240012.1	32	111	2655	15	1545	9/15/16 13:30
405240013.1	33	82	1862	15	1545	9/15/16 13:46
405240014.1	34	98	2427	15	1545	9/15/16 14:01
405240015.1	35	63	1340	15	1545	9/15/16 14:16
405240016.1	36	33	861	15	1545	9/15/16 14:32
1203621845.1	37	127	2442	15	1545	9/15/16 14:47
1203621846.1	38	59	1377	15	1545	9/15/16 15:02
1203621847.1	39	173	2592	15	1545	9/15/16 15:18
BKG	91	4	2	15	1545	9/15/16 7:39

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effective date: 02-Mar-2015

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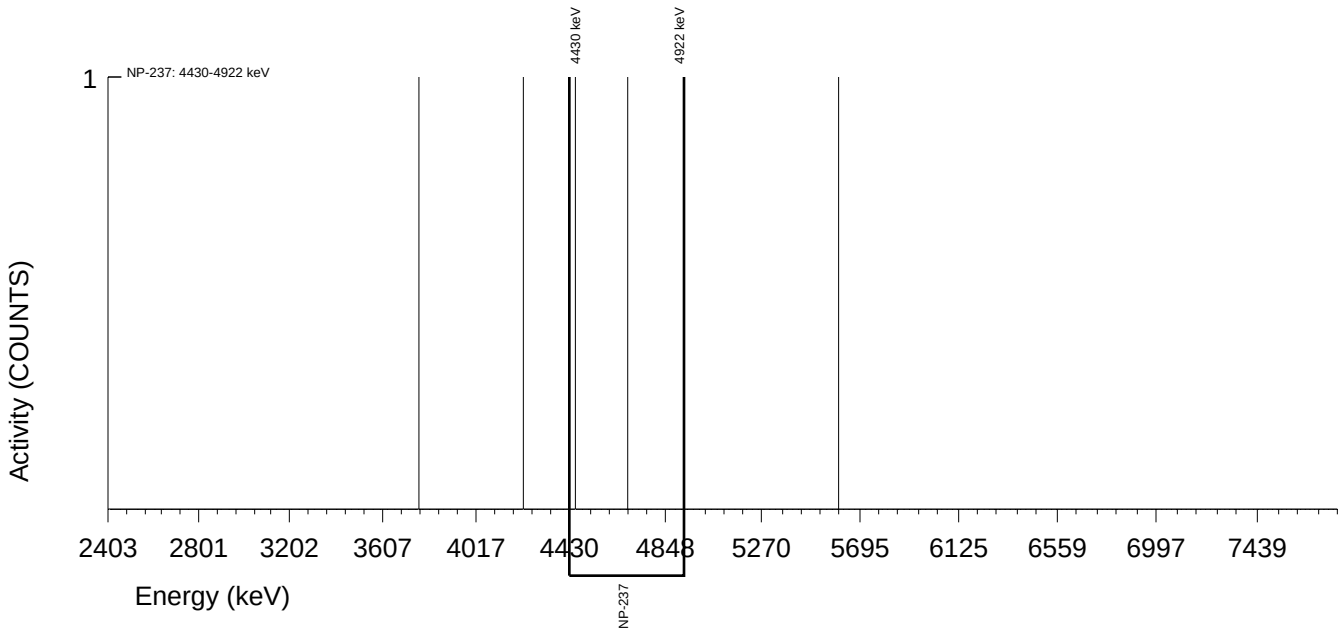
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 065	LIB FILE : NP
SAMPLE ID : S0405240001_NP	DETECTOR S/N : 72194	BKG FILE : B065.CNF;2656
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 28.4758	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5506	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W065.CNF;489
% YIELD : 95.2 +/-5.134 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.2492E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4565.62	222.260	2.000	1.040	0.960	0.9798	100.000	5.90E-02	2.02E-01	3.74E-01	1.02E-01	2.02E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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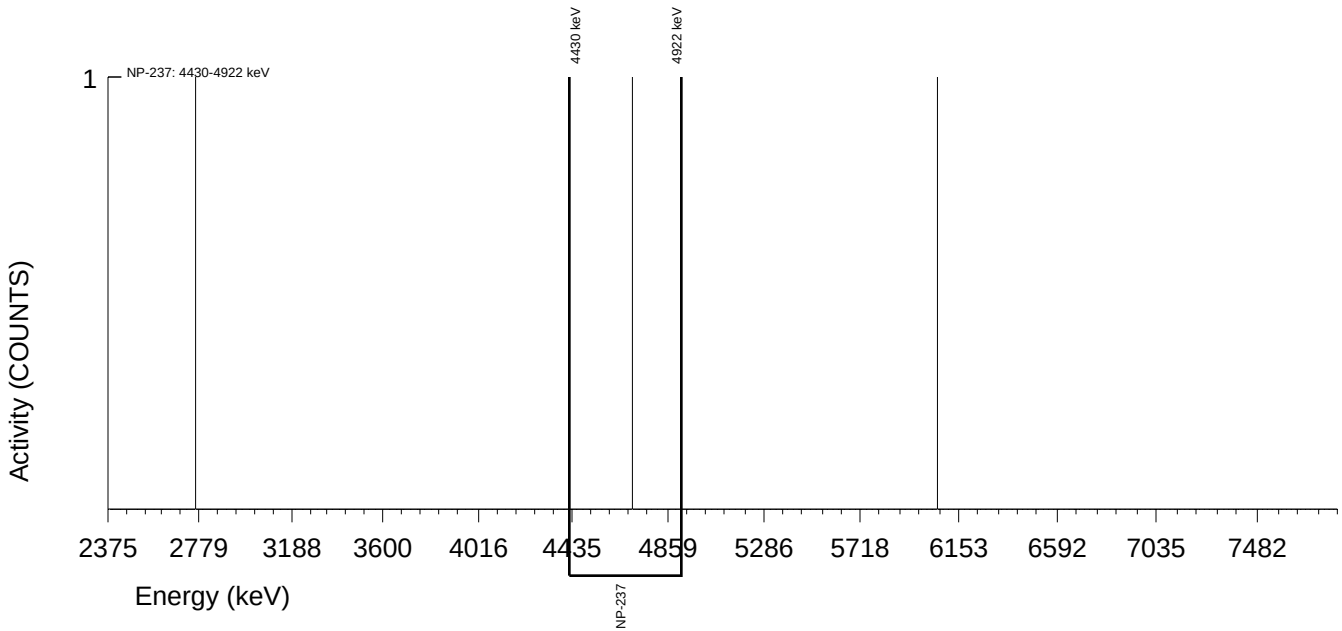
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 066	LIB FILE : NP
SAMPLE ID : S0405240002_NP	DETECTOR S/N : 46-089C1	BKG FILE : B066.CNF;1811
SAMPLE QTY : 0.106 G +/-0.943 %	AVERAGE %EFFICIENCY : 25.6702	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4975	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W066.CNF;487
% YIELD : 88.2 +/-5.165 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 3.9373E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4704.97	5.029	1.000	-0.440	1.440	1.2000	100.000	-3.44E-02	2.38E-01	5.78E-01	1.72E-01	2.37E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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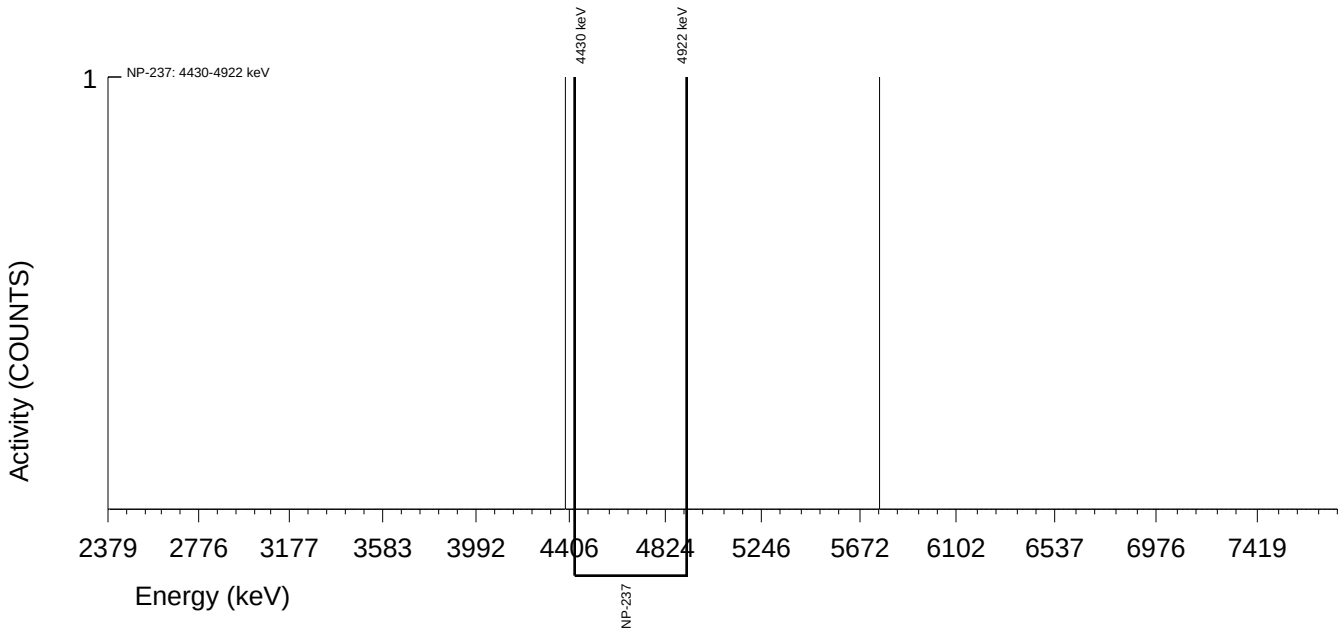
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 067	LIB FILE : NP
SAMPLE ID : S0405240003_NP	DETECTOR S/N : 78780	BKG FILE : B067.CNF;1811
SAMPLE QTY : 0.115 G +/-0.870 %	AVERAGE %EFFICIENCY : 29.1959	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5641	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W067.CNF;476
% YIELD : 58.8 +/-5.363 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 2.6218E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.27	0.000	0.000	-0.240	0.240	0.4899	100.000	-2.28E-02	1.97E-01	4.56E-01	8.54E-02	1.97E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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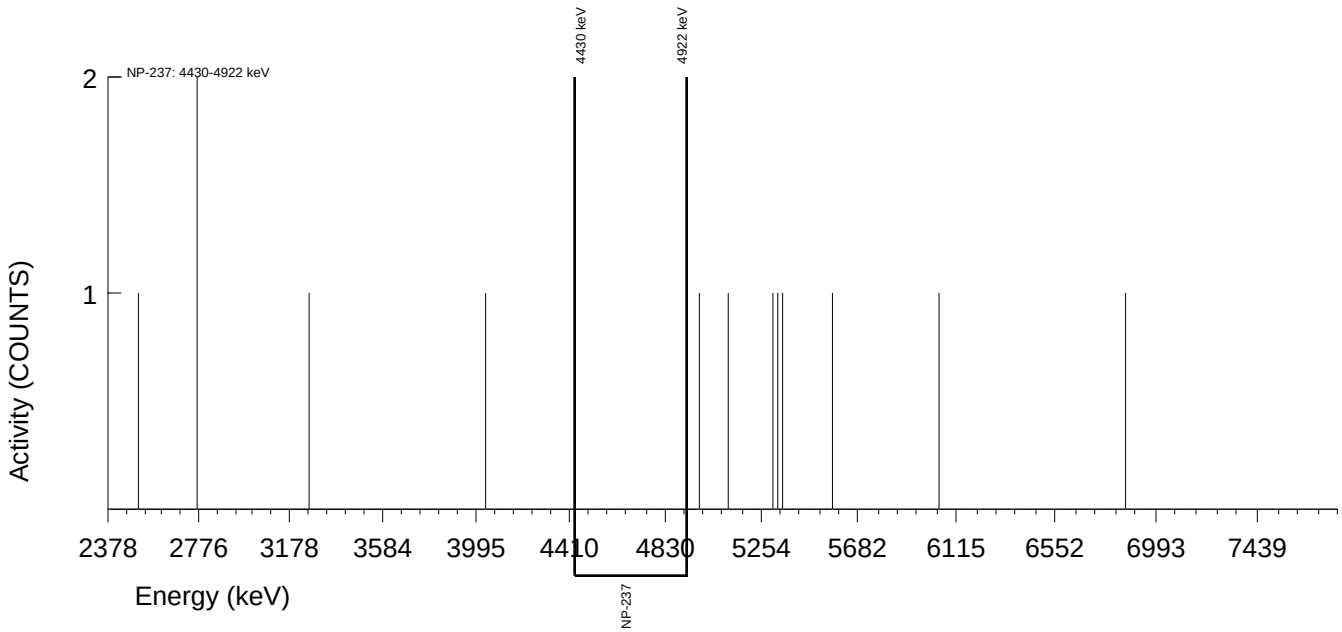
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 068	LIB FILE : NP
SAMPLE ID : S0405240004_NP	DETECTOR S/N : 78794	BKG FILE : B068.CNF;1802
SAMPLE QTY : 0.121 G +/-0.826 %	AVERAGE %EFFICIENCY : 27.7658	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5371	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W068.CNF;453
% YIELD : 65.4 +/-5.305 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 2.9185E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.25	0.000	0.000	-1.200	1.200	1.0954	100.000	-1.02E-01	1.94E-01	5.99E-01	1.71E-01	1.94E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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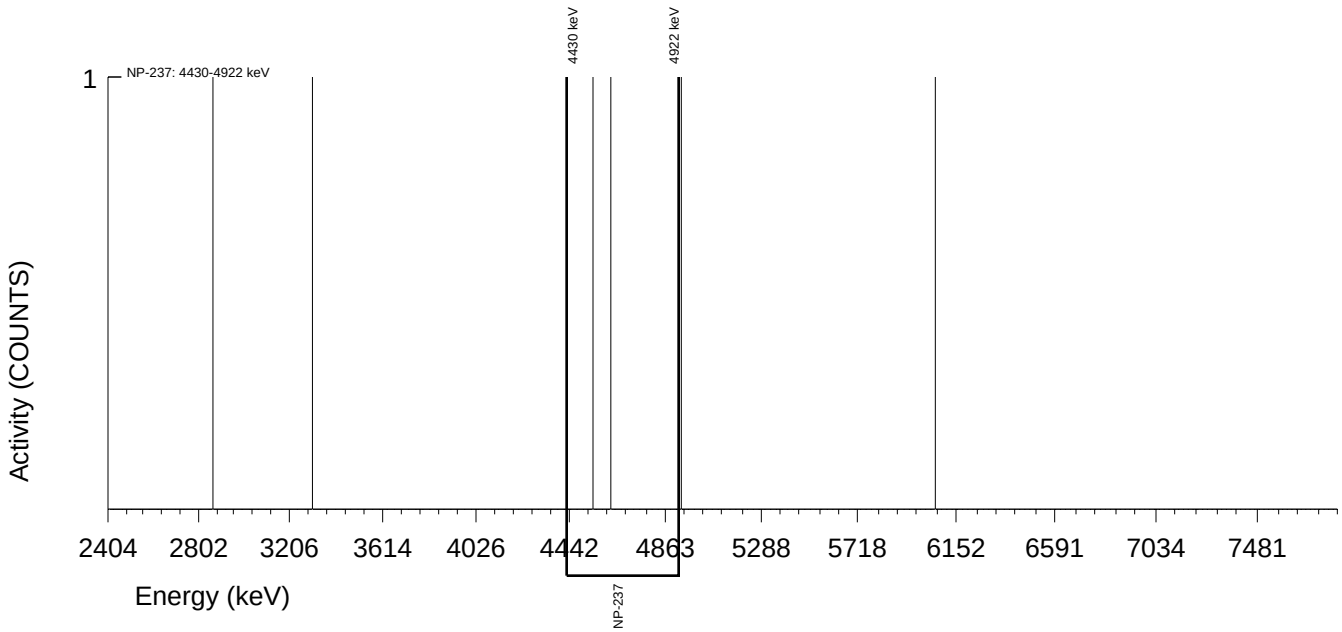
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 069	LIB FILE : NP
SAMPLE ID : S0405240005_NP	DETECTOR S/N : 78795	BKG FILE : B069.CNF;1817
SAMPLE QTY : 0.109 G +/-0.917 %	AVERAGE %EFFICIENCY : 32.9662	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6355	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W069.CNF;495
% YIELD : 89.6 +/-5.162 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 3.9989E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4534.80	0.000	3.000	0.600	2.400	1.5492	100.000	3.50E-02	2.46E-01	5.06E-01	1.65E-01	2.46E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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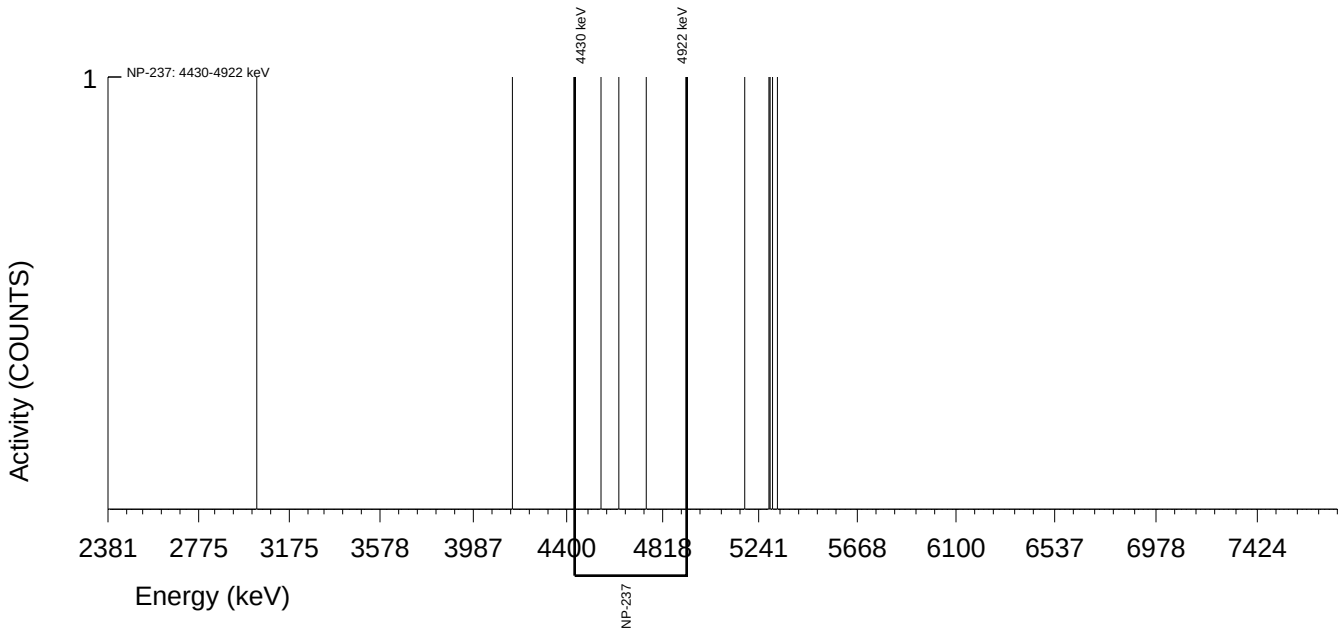
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 070	LIB FILE : NP
SAMPLE ID : S0405240006_NP	DETECTOR S/N : 78262	BKG FILE : B070.CNF;1819
SAMPLE QTY : 0.107 G +/-0.935 %	AVERAGE %EFFICIENCY : 31.2964	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6038	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:40	EFF FILE : W070.CNF;500
% YIELD : 93.2 +/-5.148 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 03-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.1599E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4638.04	191.100	3.000	1.080	1.920	1.3856	100.000	6.49E-02	2.51E-01	4.85E-01	1.53E-01	2.50E-01



Alpha Spectroscopy Software Version 3.5.3
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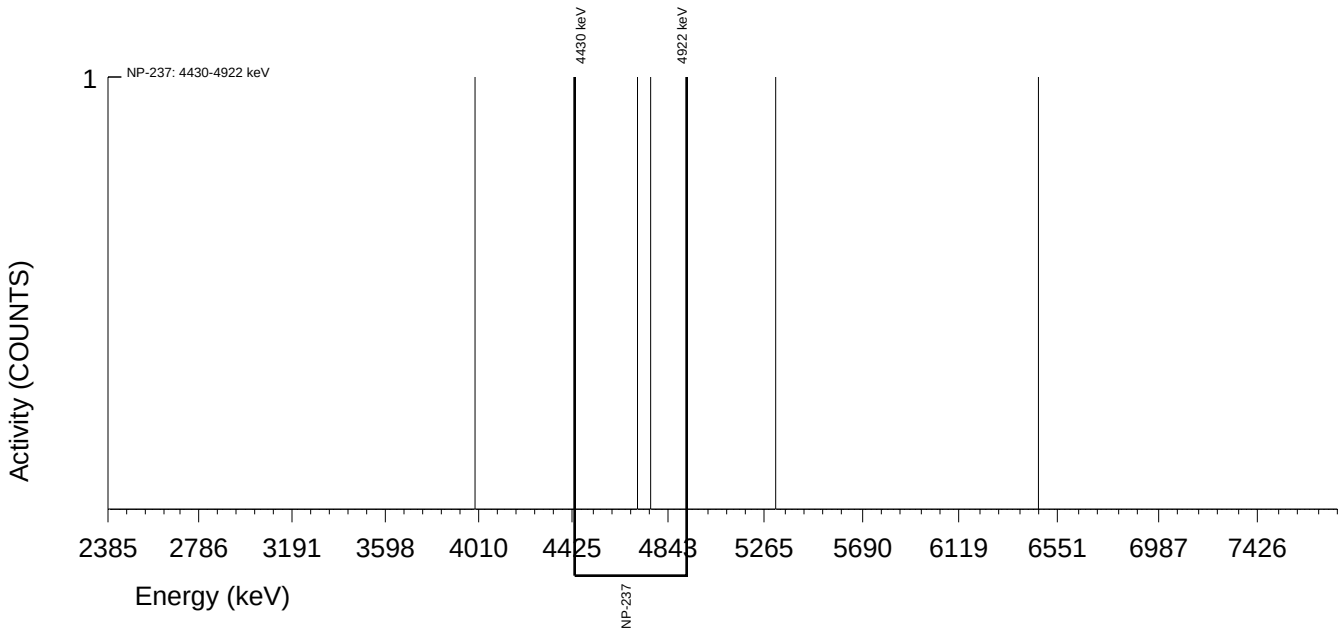
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 210	LIB FILE : NP
SAMPLE ID : S0405240007_NP	DETECTOR S/N : 87898	BKG FILE : B210.CNF;451
SAMPLE QTY : 0.116 G +/-0.862 %	AVERAGE %EFFICIENCY : 25.1240	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4873	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:03	EFF FILE : W210.CNF;124
% YIELD : 84.3 +/-5.190 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 3.7591E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4735.43	59.864	2.000	0.560	1.440	1.2000	100.000	4.28E-02	2.76E-01	5.65E-01	1.68E-01	2.76E-01



Alpha Spectroscopy Software Version 3.5.3
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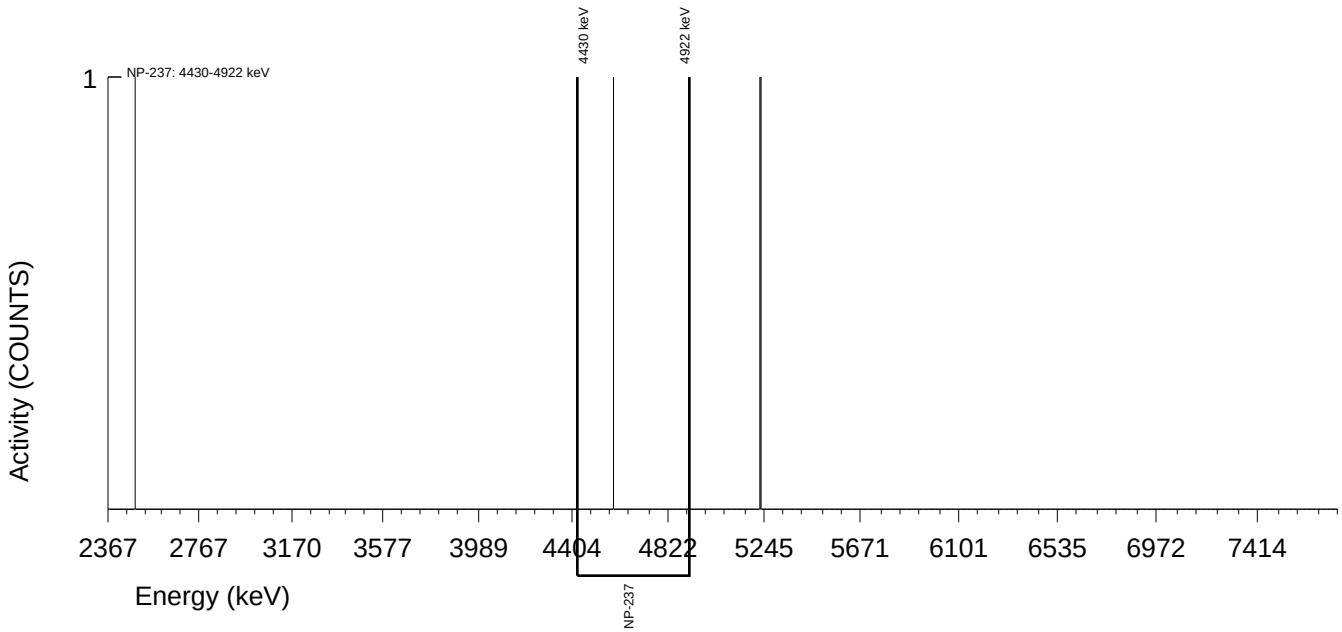
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 212	LIB FILE : NP
SAMPLE ID : S0405240008_NP	DETECTOR S/N : 87900	BKG FILE : B212.CNF;451
SAMPLE QTY : 0.106 G +/-0.943 %	AVERAGE %EFFICIENCY : 26.2172	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5078	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:05	EFF FILE : W212.CNF;117
% YIELD : 104 +/-5.110 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.6504E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4586.22	4.973	1.000	0.520	0.480	0.6928	100.000	3.37E-02	1.87E-01	3.59E-01	8.22E-02	1.87E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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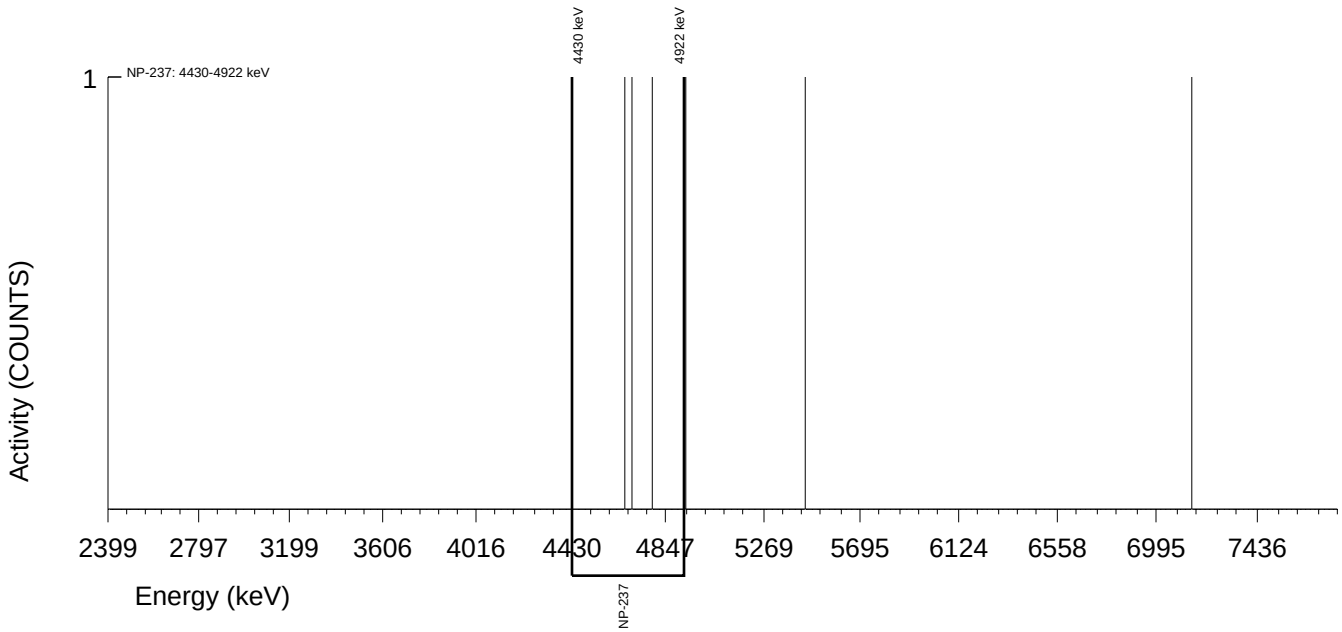
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 217	LIB FILE : NP
SAMPLE ID : S0405240009_NP	DETECTOR S/N : 87905	BKG FILE : B217.CNF;451
SAMPLE QTY : 0.110 G +/-0.909 %	AVERAGE %EFFICIENCY : 26.2347	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5081	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:08	EFF FILE : W217.CNF;124
% YIELD : 89.5 +/-5.168 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 3.9918E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4714.70	118.913	3.000	0.120	2.880	1.6971	100.000	8.72E-03	3.11E-01	6.70E-01	2.26E-01	3.10E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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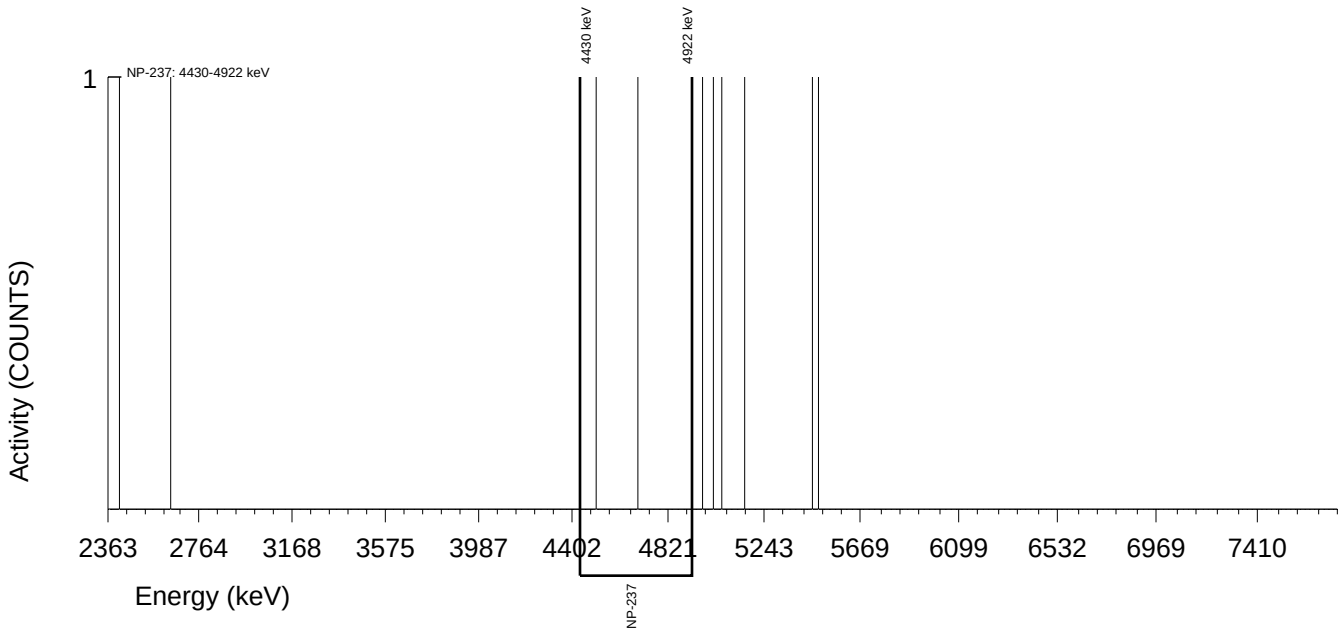
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 218	LIB FILE : NP
SAMPLE ID : S0405240010_NP	DETECTOR S/N : 87906	BKG FILE : B218.CNF;455
SAMPLE QTY : 0.109 G +/-0.917 %	AVERAGE %EFFICIENCY : 25.7659	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4993	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:10	EFF FILE : W218.CNF;124
% YIELD : 99.2 +/-5.130 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.4237E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4597.65	179.302	2.000	0.560	1.440	1.2000	100.000	3.77E-02	2.44E-01	4.99E-01	1.48E-01	2.44E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

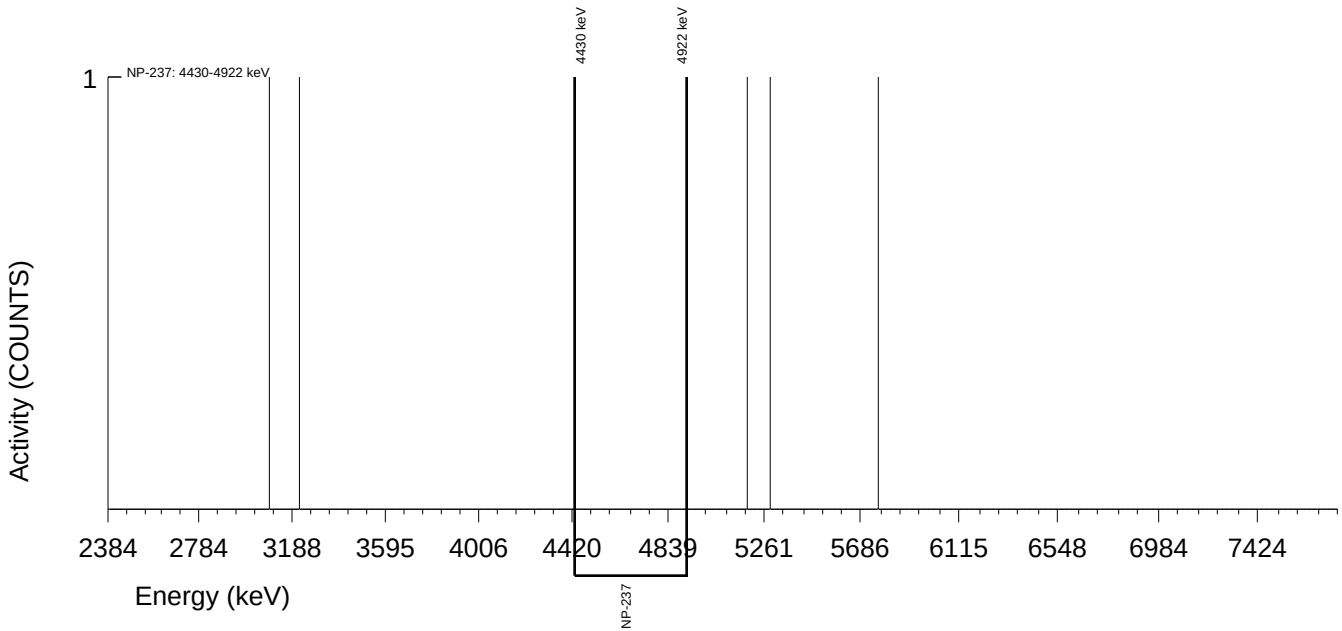
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 219	LIB FILE : NP
SAMPLE ID : S0405240011_NP	DETECTOR S/N : 87907	BKG FILE : B219.CNF;455
SAMPLE QTY : 0.111 G +/-0.901 %	AVERAGE %EFFICIENCY : 25.7573	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4991	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:11	EFF FILE : W219.CNF;130
% YIELD : 98.8 +/-5.133 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.4062E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.37	0.000	0.000	-0.720	0.720	0.8485	100.000	-4.79E-02	1.45E-01	4.06E-01	1.03E-01	1.45E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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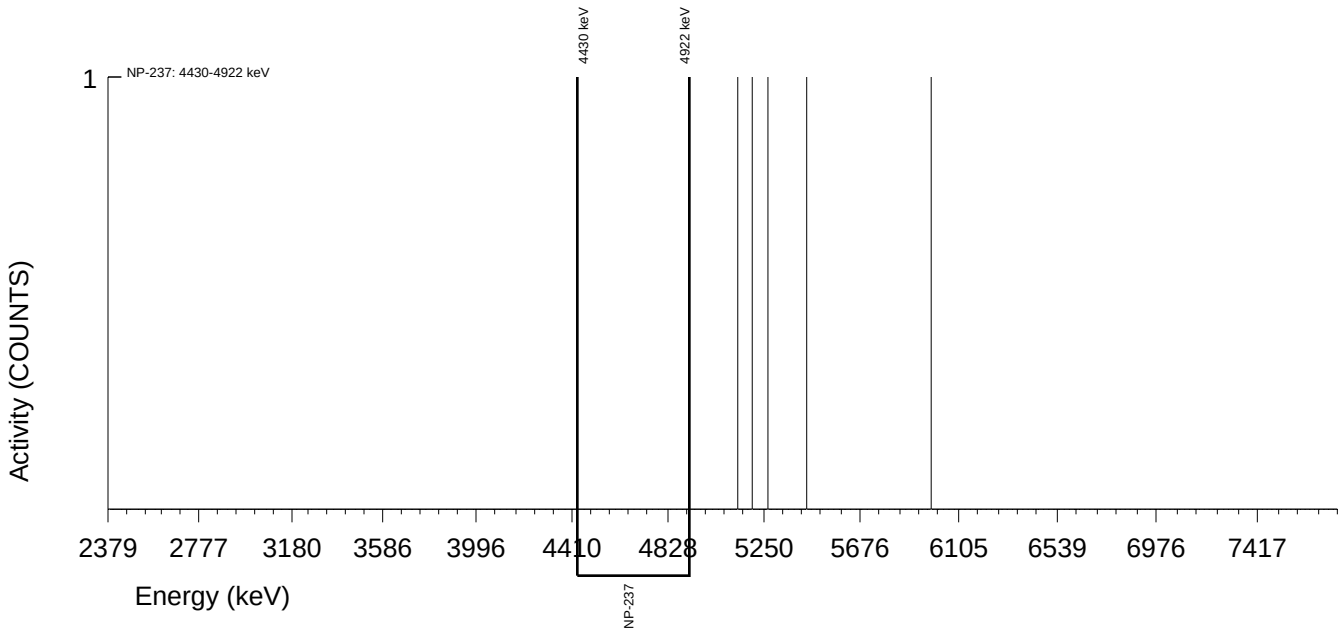
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 220	LIB FILE : NP
SAMPLE ID : S0405240012_NP	DETECTOR S/N : 87908	BKG FILE : B220.CNF;454
SAMPLE QTY : 0.112 G +/-0.893 %	AVERAGE %EFFICIENCY : 24.0483	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4670	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 16:21:15	EFF FILE : W220.CNF;140
% YIELD : 98.8 +/-5.134 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.4084E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.33	0.000	0.000	-0.720	0.720	0.8485	100.000	-5.08E-02	1.54E-01	4.31E-01	1.10E-01	1.53E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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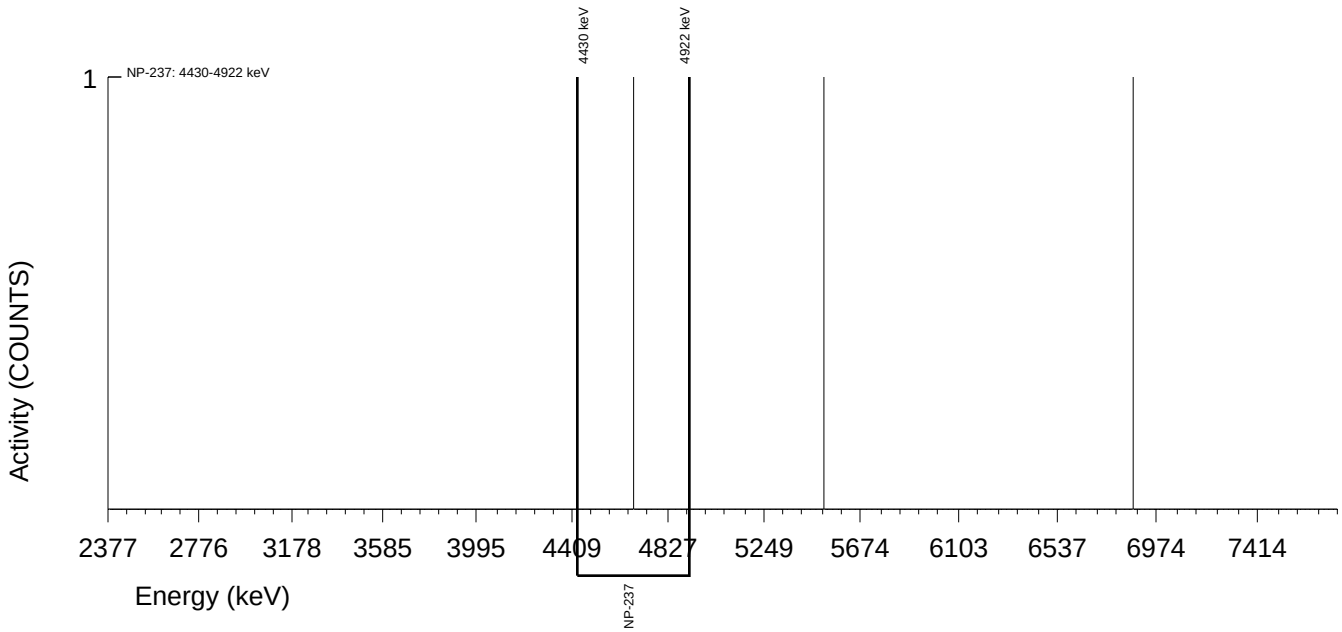
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 199	LIB FILE : NP
SAMPLE ID : S0405240013_NP	DETECTOR S/N : 78896	BKG FILE : B199.CNF;797
SAMPLE QTY : 0.102 G +/-0.980 %	AVERAGE %EFFICIENCY : 26.2038	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5077	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:12	EFF FILE : W199.CNF;222
% YIELD : 69.5 +/-5.289 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 3.1004E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4680.31	4.962	1.000	0.040	0.960	0.9798	100.000	4.04E-03	3.00E-01	6.66E-01	1.81E-01	3.00E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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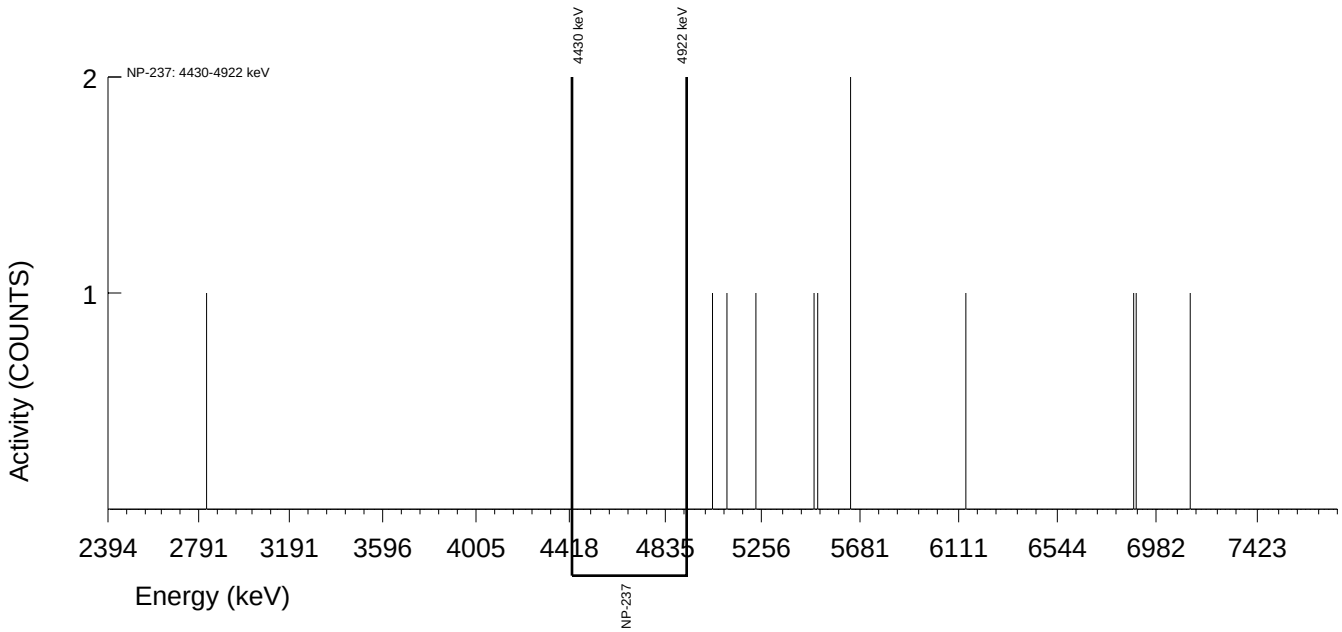
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 200	LIB FILE : NP
SAMPLE ID : S0405240014_NP	DETECTOR S/N : 78900	BKG FILE : B200.CNF;797
SAMPLE QTY : 0.113 G +/-0.885 %	AVERAGE %EFFICIENCY : 27.0654	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5238	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:14	EFF FILE : W200.CNF;230
% YIELD : 90.9 +/-5.168 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.0549E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.29	0.000	0.000	-2.400	2.400	1.5492	100.000	-1.62E-01	1.69E-01	5.86E-01	1.92E-01	1.69E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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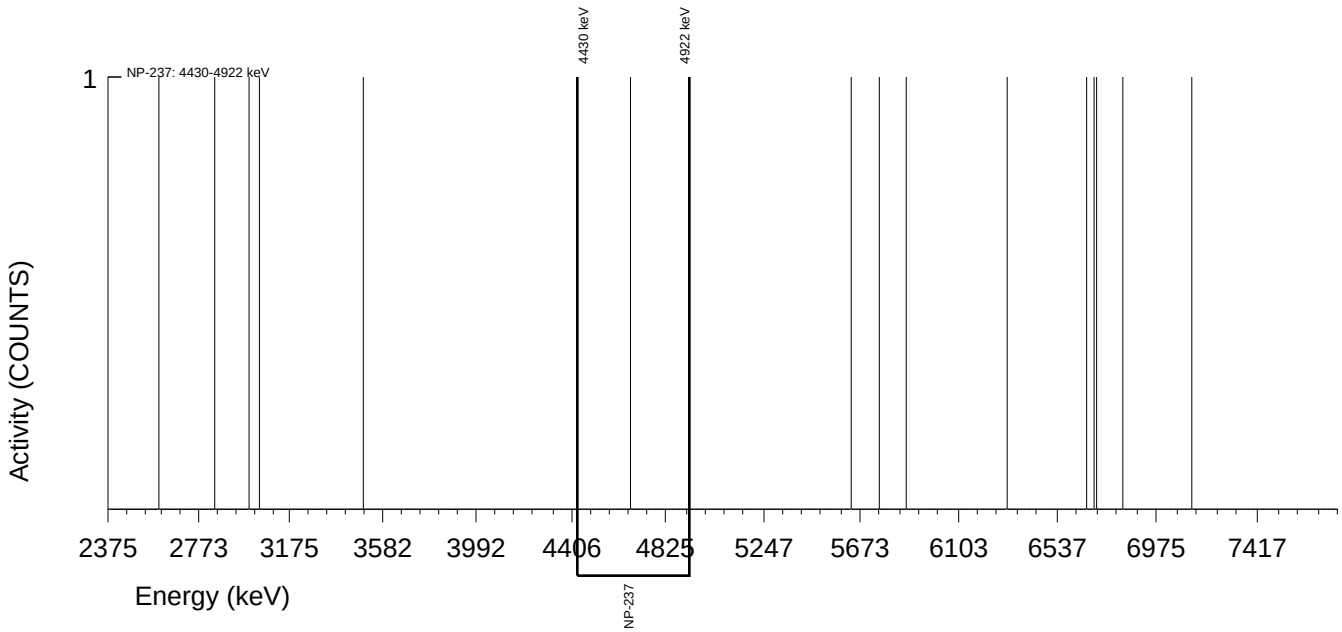
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 201	LIB FILE : NP
SAMPLE ID : S0405240015_NP	DETECTOR S/N : 78902	BKG FILE : B201.CNF;797
SAMPLE QTY : 0.115 G +/-0.870 %	AVERAGE %EFFICIENCY : 26.2326	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5081	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:16	EFF FILE : W201.CNF;224
% YIELD : 50.3 +/-5.485 %	ELAPSED LIVE TIME(SEC) : 30300.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 2.2443E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4667.25	4.954	1.000	-1.525	2.525	1.5890	100.000	-8.96E-02	2.17E-01	5.53E-01	1.88E-01	2.16E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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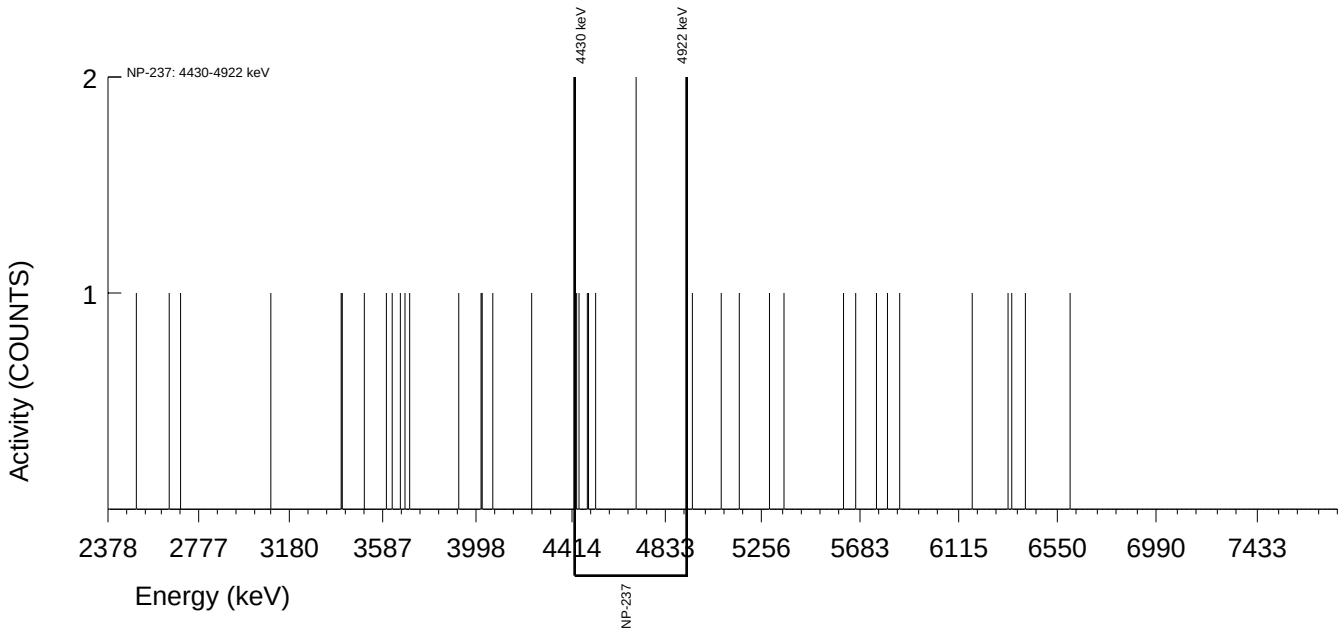
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 202	LIB FILE : NP
SAMPLE ID : S0405240016_NP	DETECTOR S/N : 78903	BKG FILE : B202.CNF;795
SAMPLE QTY : 0.119 G +/-0.840 %	AVERAGE %EFFICIENCY : 27.2753	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5278	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:19	EFF FILE : W202.CNF;226
% YIELD : 32.4 +/-5.856 %	ELAPSED LIVE TIME(SEC) : 30300.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 1.4454E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4541.88	4.960	7.000	3.465	3.535	1.8802	100.000	2.94E-01	5.28E-01	8.98E-01	3.22E-01	5.27E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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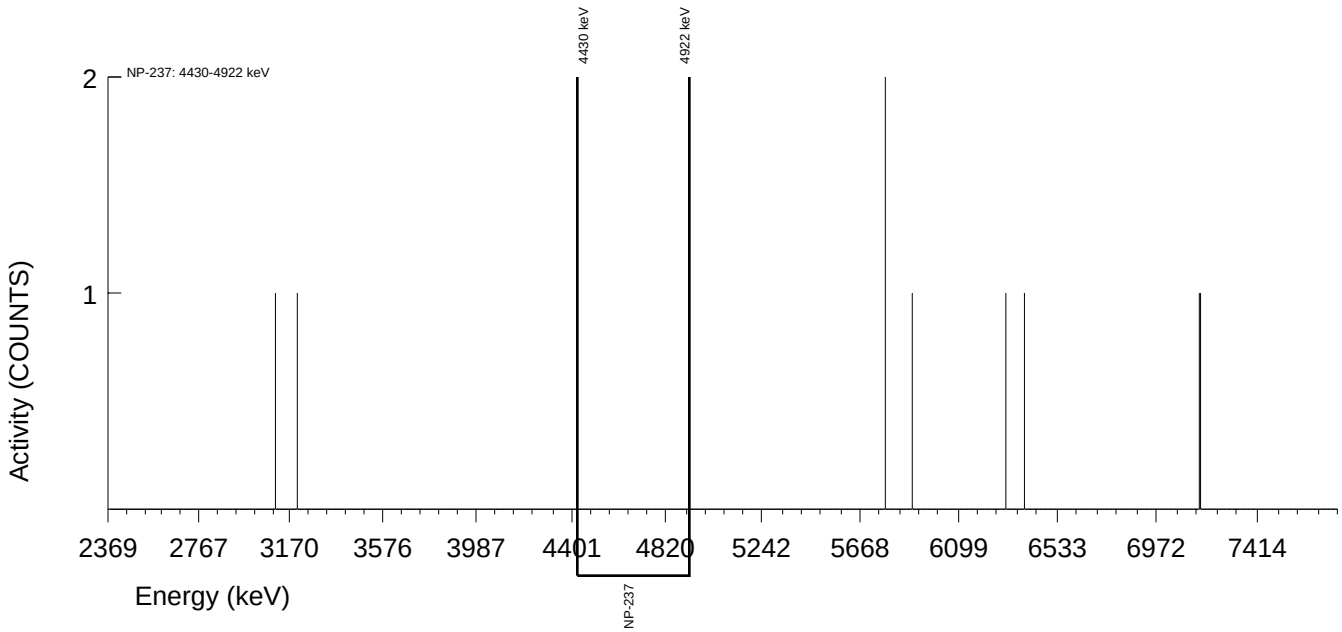
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 203	LIB FILE : NP
SAMPLE ID : S1203621845_NP	DETECTOR S/N : 78905	BKG FILE : B203.CNF;797
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 25.9071	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5020	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:22	EFF FILE : W203.CNF;229
% YIELD : 92.3 +/-5.166 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 4.1185E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4675.31	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	1.30E-01	1.93E-01	0.00E+00	1.30E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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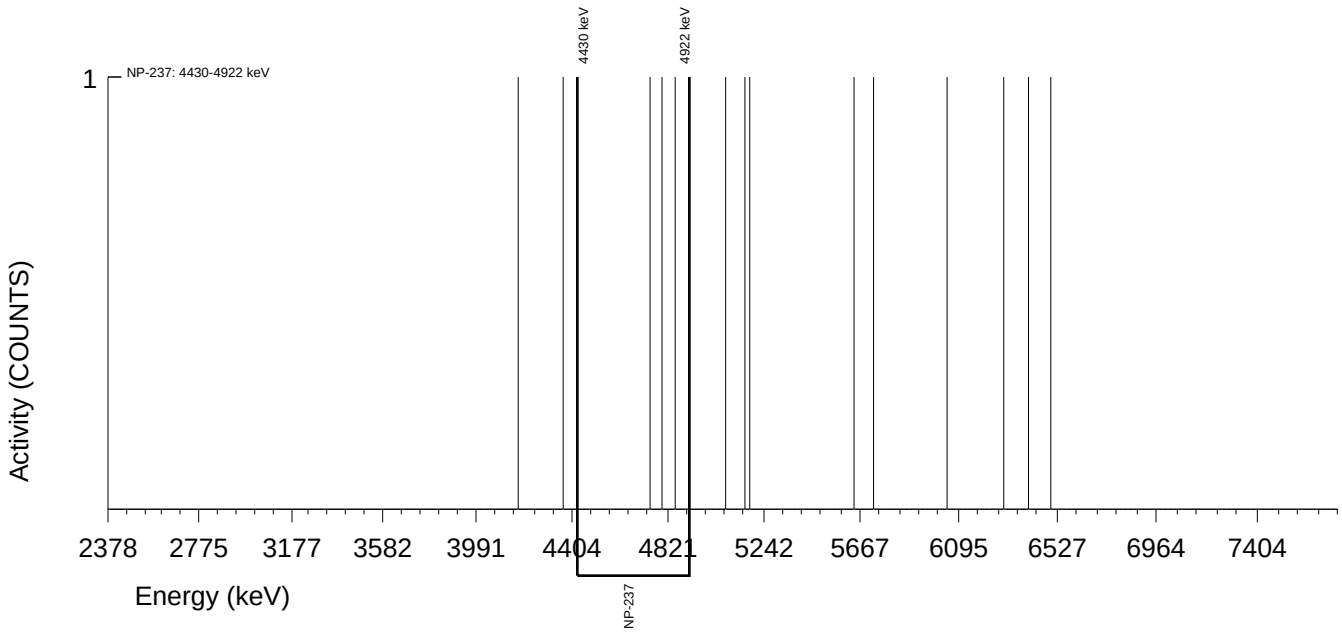
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 205	LIB FILE : NP
SAMPLE ID : S1203621846_NP	DETECTOR S/N : 78908	BKG FILE : B205.CNF;799
SAMPLE QTY : 0.113 G +/-0.885 %	AVERAGE %EFFICIENCY : 26.6171	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5154	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:24	EFF FILE : W205.CNF;223
% YIELD : 52.2 +/-5.466 %	ELAPSED LIVE TIME(SEC) : 30300.00	CAL DATE : 15-Sep-2016

TRACER
ID : 445-96-2-III
NUCLIDE : AM-243 BETA %EFF. : 49.10851
NOMINAL : 4.4615E+02 dpm
RESULTS : 2.3282E+02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4802.09	108.798	3.000	1.485	1.515	1.2309	100.000	8.44E-02	2.50E-01	4.53E-01	1.41E-01	2.50E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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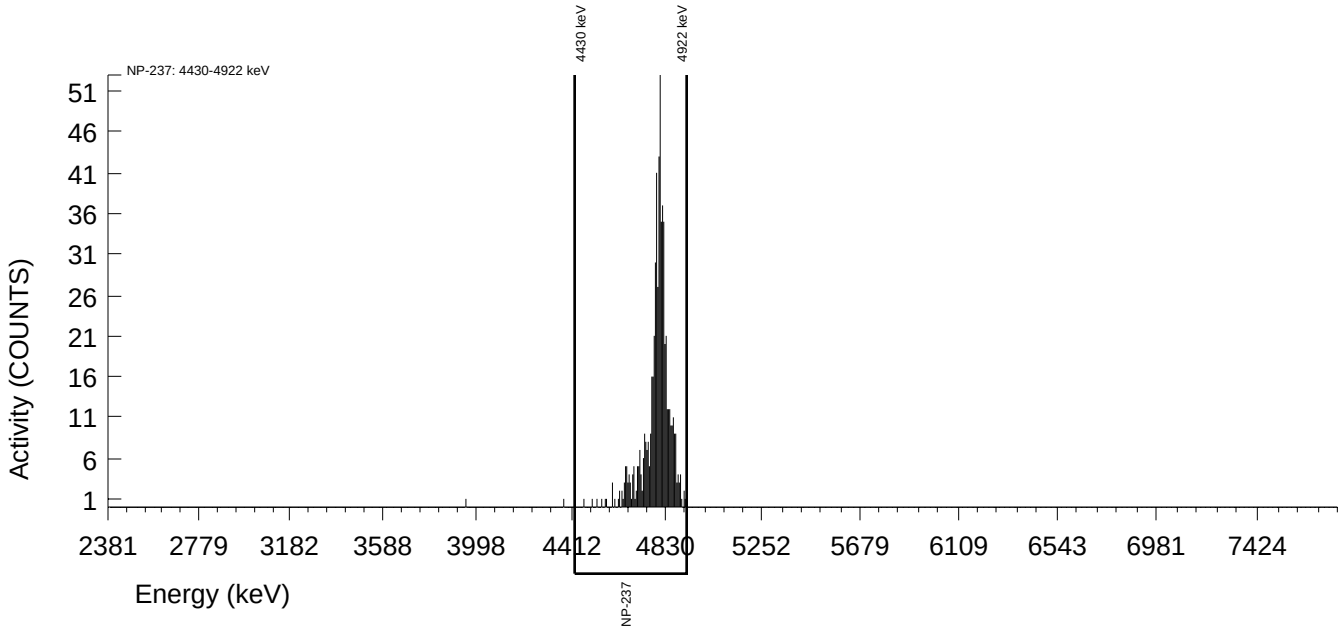
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-032

BATCH NUMBER : 1596446	CHAMBER : 206	LIB FILE : NP
SAMPLE ID : S1203621847_NP	DETECTOR S/N : 78909	BKG FILE : B206.CNF;796
SAMPLE QTY : 0.122 G +/-0.820 %	AVERAGE %EFFICIENCY : 25.8407	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5007	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 17:20:26	EFF FILE : W206.CNF;226
% YIELD : 98.6 +/-5.142 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 15-Sep-2016

TRACER		LCS	
ID : 445-96-2-III		ID	0518-S
NUCLIDE : AM-243	BETA %EFF. : 49.10851	NUCLIDE	NP-237
NOMINAL : 4.4615E+02 dpm		NOMINAL (pCi/G)	3.6602E+01
RESULTS : 4.3992E+02 dpm		% RECOVERY	102.943

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
NP-237	4788.00	4789.35	39.380	625.000	624.040	0.960	0.9798	100.000	3.77E+01	5.06E+00	3.98E-01	1.08E-01	2.96E+00



Batch# 1596447 Product: Ra Date: 9/16/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			ND
Samples have been blank corrected (if required). Blank correction reported included (if required).			ND
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.		✓	DER# 1558545
Sample was correctly preserved if required.		N/A	
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.			ND
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER# 1558545
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER# 1558545
Aliquot Correction completed if required.			ND
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

Primary Review Performed By: [signature] 9/16/16

Secondary Review Performed By: [signature] 9/16/16

10/4

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
16-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	DOE EML HASL-300, Pu-11-RC Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596447	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Other

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621849 were logged in and analyzed out of holding. 2. Samples 405240001, 405240005, and 405240015 do not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer.	1. Reporting results. 2. The samples do meet the tracer yield requirement, the detection limits, and their tracer peaks are within the Pu-242 region of interest. Reporting results

Originator's Name:

Melanie Aycock 16-SEP-16

Data Validator/Group Leader:

Plutonium Queue Sheet

07-SEP-16

Batch #: 1596447 Analyst: MXS2 First Client Due Date:04-OCT-16 Internal Due Date:30-SEP-16

Tracer Isotope(s): ~~Pu-242~~/Pu-236 Tracer Code: 1770-A Expiration Date: 8-3-17 Vol: 0.1 Analyzed Sequentially with:

LCS Isotope(s): Pu-239/Pu-238 LCS Code: 0338-MM Expiration Date: 7-20-17 Vol: 0.1 U: 1596443

Spike Isotope(s): Pu-239/Pu-238 Spike Code: Expiration Date: Vol: Am: 1596445

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840027 Balance ID: 161076662 Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/(Dry) Aliquot (g) l / f)	Pu Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.506	70
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.503	71 ma aliste
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.508	72 231
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.519	73
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.514	74
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.500	75
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.503	78
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.516	80
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.507	81
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.508	82
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.510	83
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.501	84
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.511	85
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.505	86
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.508	88
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.509	89
1203621848-1	MB for batch 1596447	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.519	90
1203621849-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.502	91
1203621850-1	LCS for batch 1596447	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.519	92

Choose SOP Used: ~~GL-RAD-A-011~~, GL-RAD-A-036, GL-RAD-A-053 Solid Sample Dissolution by: LEACH or DIGESTION (Circle One)

Data Reviewed By: 9/15/16

GEL Laboratories LLC, , Radiochemistry Division

Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

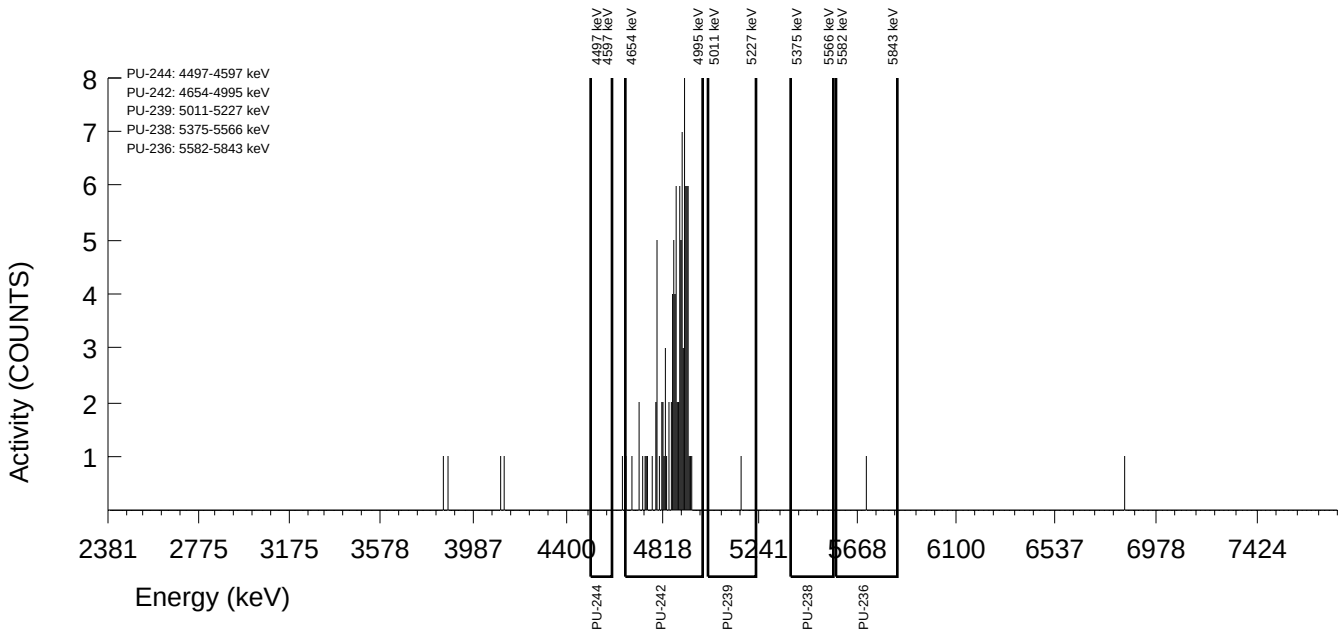
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 070	LIB FILE : PU
SAMPLE ID : S0405240001_PU	DETECTOR S/N : 78262	BKG FILE : B070.CNF;1819
SAMPLE QTY : 0.506 G +/-0.198 %	AVERAGE %EFFICIENCY : 31.2964	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6038	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:52	EFF FILE : W070.CNF;500
% YIELD : 57.1 +/-10.163 %	ELAPSED LIVE TIME(SEC) : 7835.90	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.5041E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5710.90	4.900	1.000	0.739	0.261	0.5111	100.000	3.38E-02	1.29E-01	2.19E-01	4.09E-02	1.28E-01
PU-238	5486.00	5470.34	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.63E-02	1.15E-01	0.00E+00	7.59E-02
PU-239	5155.00	5160.99	4.900	1.000	0.478	0.522	0.7228	99.900	1.82E-02	1.08E-01	2.11E-01	4.82E-02	1.08E-01
PU-242	4890.00	4866.71	130.993	103.000	102.347	0.653	0.8081	100.000	3.90E+00	1.10E+00	2.22E-01	5.39E-02	7.62E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.58E-02	1.14E-01	0.00E+00	7.54E-02



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effective date: 02-Mar-2015

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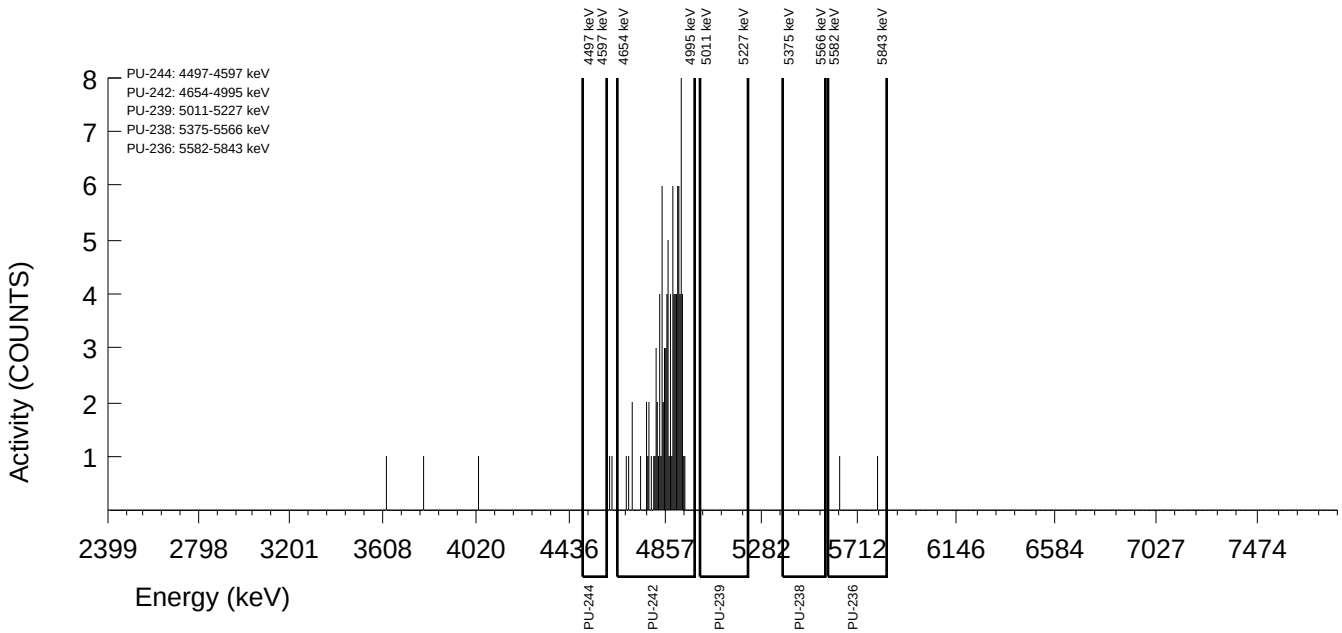
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 071	LIB FILE : PU
SAMPLE ID : S0405240002_PU	DETECTOR S/N : 80020	BKG FILE : B071.CNF;1812
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 32.1394	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6198	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:53	EFF FILE : W071.CNF;464
% YIELD : 54.2 +/-10.290 %	ELAPSED LIVE TIME(SEC) : 7868.40	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.3746E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5714.38	158.509	2.000	1.607	0.393	0.6272	100.000	7.57E-02	1.62E-01	2.45E-01	5.17E-02	1.62E-01
PU-238	5486.00	5470.34	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.85E-02	1.18E-01	0.00E+00	7.81E-02
PU-239	5155.00	5118.68	0.000	0.000	-0.393	0.393	0.6272	99.900	-1.54E-02	8.00E-02	2.04E-01	4.31E-02	7.96E-02
PU-242	4890.00	4872.52	86.189	101.000	100.082	0.918	0.9581	100.000	3.93E+00	1.12E+00	2.49E-01	6.57E-02	7.77E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.80E-02	1.18E-01	0.00E+00	7.76E-02



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effective date: 02-Mar-2015

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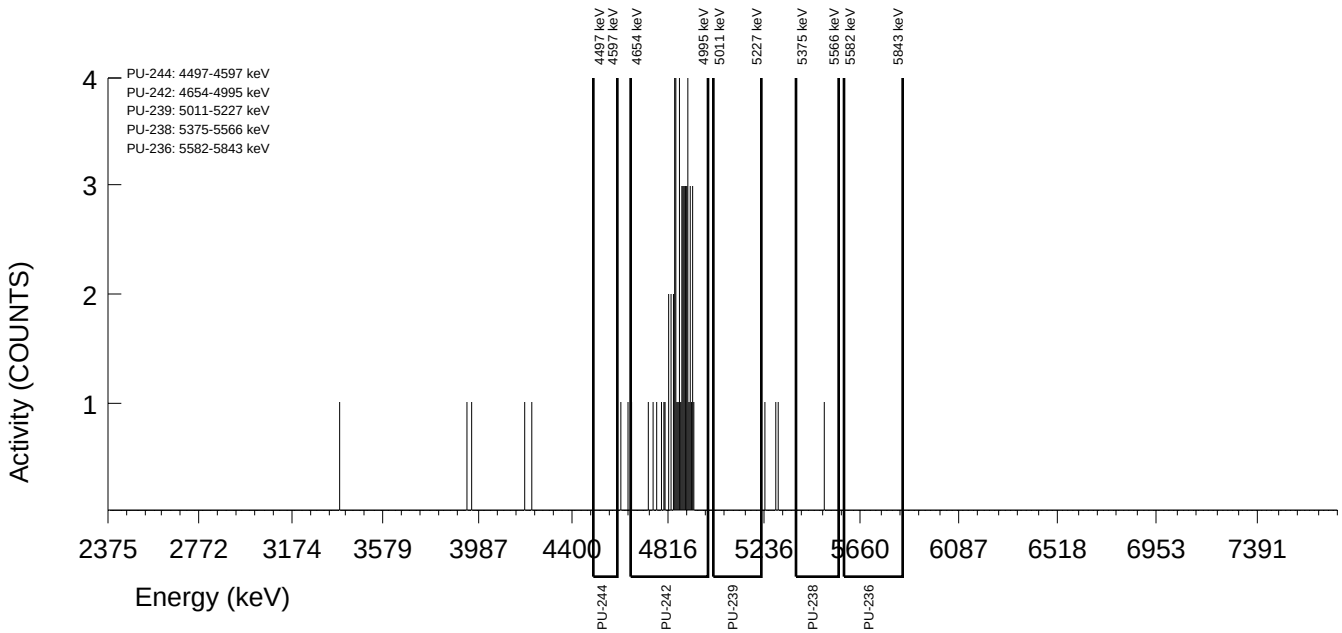
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 231	LIB FILE : PU
SAMPLE ID : S0405240003_PU	DETECTOR S/N : 87919	BKG FILE : B231.CNF;419
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 22.4877	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4374	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:51:11	EFF FILE : W231.CNF;107
% YIELD : 48.1 +/-13.540 %	ELAPSED LIVE TIME(SEC) : 7200.00	CAL DATE : 16-Aug-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.1078E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.28	0.000	0.000	-0.120	0.120	0.3464	100.000	-9.85E-03	1.65E-01	3.45E-01	4.95E-02	1.63E-01
PU-238	5486.00	5500.38	4.947	1.000	0.520	0.480	0.6928	99.900	3.58E-02	1.95E-01	3.72E-01	8.30E-02	1.94E-01
PU-239	5155.00	5118.70	0.000	0.000	-0.240	0.240	0.4899	99.900	-1.64E-02	1.38E-01	3.22E-01	5.83E-02	1.37E-01
PU-242	4890.00	4860.89	81.621	57.000	56.880	0.120	0.3464	100.000	3.89E+00	1.46E+00	2.87E-01	4.12E-02	1.02E+00
PU-244	4589.00	4546.97	0.000	0.000	-0.120	0.120	0.3464	99.900	-8.21E-03	1.37E-01	2.88E-01	4.12E-02	1.36E-01



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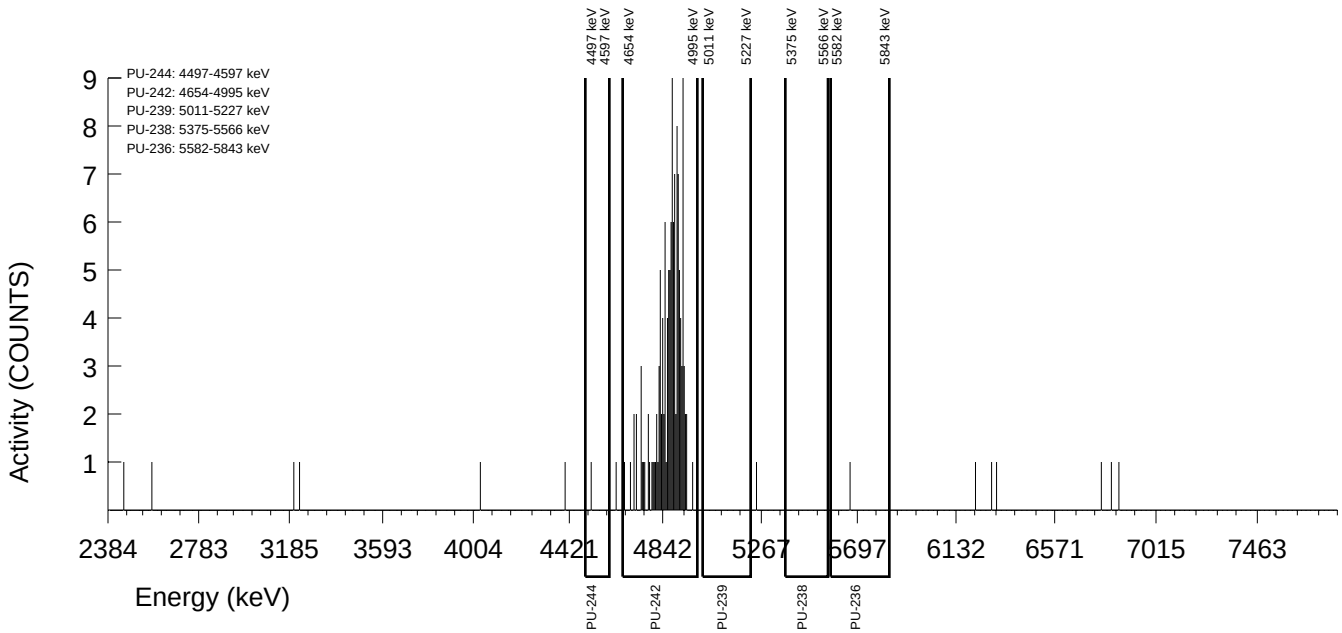
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 073	LIB FILE : PU
SAMPLE ID : S0405240004_PU	DETECTOR S/N : 78775	BKG FILE : B073.CNF;1818
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 33.5965	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6474	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:53	EFF FILE : W073.CNF;495
% YIELD : 68.5 +/-8.970 %	ELAPSED LIVE TIME(SEC) : 7875.59	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0011E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5664.77	4.947	1.000	0.212	0.788	0.8874	100.000	7.33E-03	9.87E-02	2.11E-01	5.36E-02	9.85E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.131	0.131	0.3623	99.900	-3.80E-03	5.79E-02	1.24E-01	1.83E-02	5.77E-02
PU-239	5155.00	5118.68	0.000	0.000	-0.788	0.788	0.8874	99.900	-2.27E-02	5.99E-02	1.76E-01	4.47E-02	5.97E-02
PU-242	4890.00	4863.00	98.944	133.000	132.344	0.656	0.8101	100.000	3.80E+00	9.45E-01	1.68E-01	4.07E-02	6.52E-01
PU-244	4589.00	4520.26	4.947	1.000	0.737	0.263	0.5124	99.900	2.12E-02	8.09E-02	1.38E-01	2.58E-02	8.08E-02



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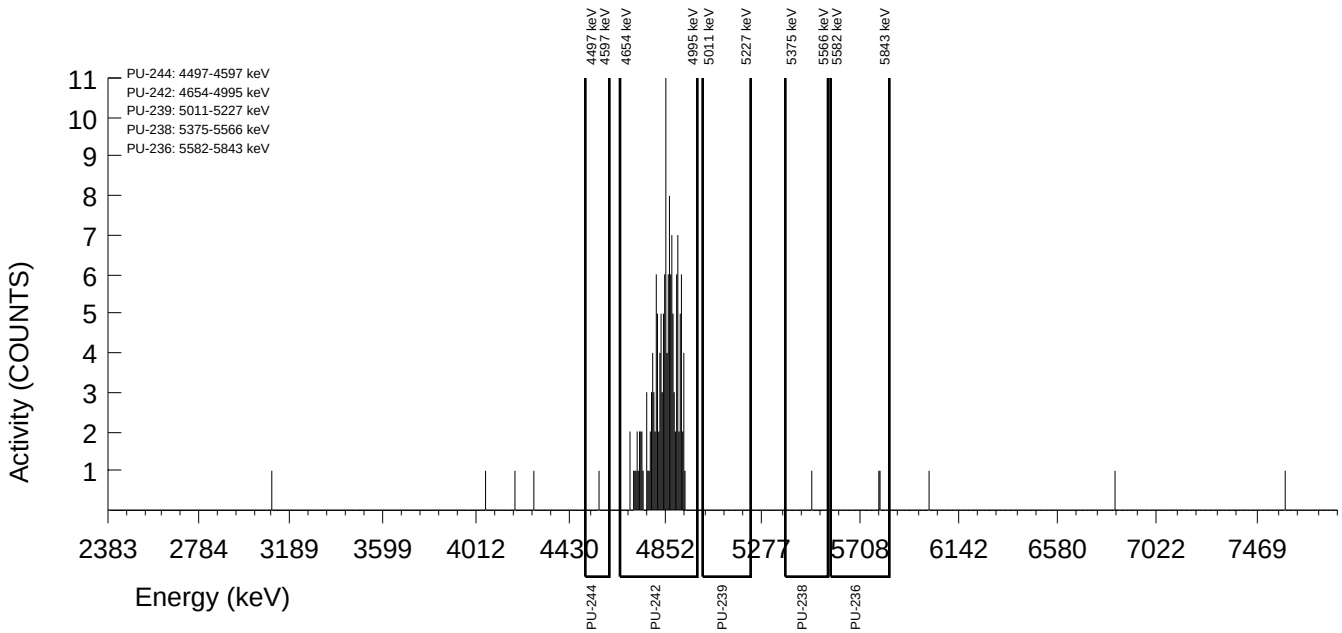
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 074	LIB FILE : PU
SAMPLE ID : S0405240005_PU	DETECTOR S/N : 83296	BKG FILE : B074.CNF;1836
SAMPLE QTY : 0.514 G +/-0.195 %	AVERAGE %EFFICIENCY : 30.3767	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5864	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:53	EFF FILE : W074.CNF;511
% YIELD : 88.2 +/-8.341 %	ELAPSED LIVE TIME(SEC) : 7879.69	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.8656E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5796.71	9.976	2.000	0.555	1.445	1.2019	100.000	1.66E-02	1.05E-01	2.16E-01	6.29E-02	1.05E-01
PU-238	5486.00	5497.35	4.988	1.000	0.475	0.525	0.7248	99.900	1.19E-02	7.11E-02	1.39E-01	3.18E-02	7.10E-02
PU-239	5155.00	5118.69	0.000	0.000	-0.394	0.394	0.6277	99.900	-9.82E-03	5.07E-02	1.30E-01	2.74E-02	5.05E-02
PU-242	4890.00	4845.05	105.997	155.000	154.212	0.788	0.8877	100.000	3.84E+00	8.88E-01	1.52E-01	3.87E-02	6.10E-01
PU-244	4589.00	4576.96	0.000	2.000	1.606	0.394	0.6277	99.900	4.00E-02	8.59E-02	1.30E-01	2.74E-02	8.56E-02



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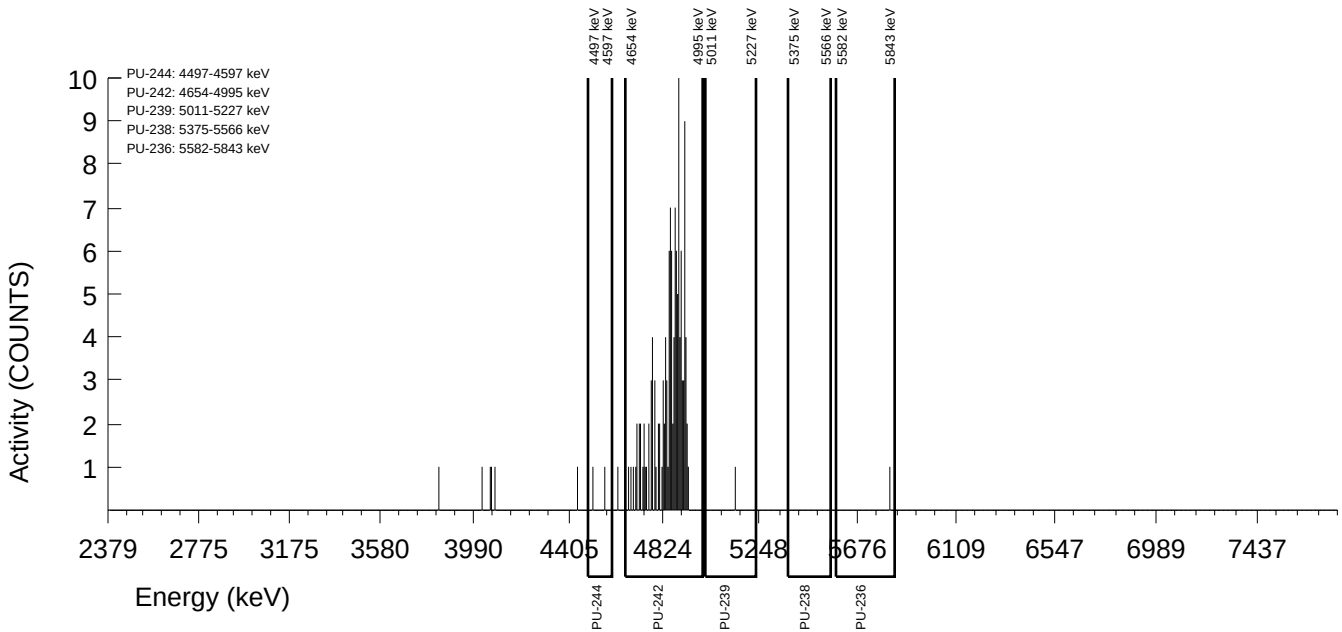
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 075	LIB FILE : PU
SAMPLE ID : S0405240006_PU	DETECTOR S/N : 80010	BKG FILE : B075.CNF;1819
SAMPLE QTY : 0.500 G +/-0.200 %	AVERAGE %EFFICIENCY : 32.3452	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6238	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:53	EFF FILE : W075.CNF;478
% YIELD : 69.2 +/-9.140 %	ELAPSED LIVE TIME(SEC) : 7885.98	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0320E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5821.65	4.917	1.000	0.211	0.789	0.8880	100.000	7.78E-03	1.05E-01	2.25E-01	5.72E-02	1.05E-01
PU-238	5486.00	5470.34	0.000	0.000	-0.263	0.263	0.5127	99.900	-8.11E-03	6.23E-02	1.48E-01	2.77E-02	6.20E-02
PU-239	5155.00	5141.14	4.917	1.000	0.080	0.920	0.9592	99.900	2.45E-03	8.81E-02	1.95E-01	5.15E-02	8.79E-02
PU-242	4890.00	4848.80	68.842	131.000	128.897	2.103	1.4501	100.000	3.95E+00	1.00E+00	2.47E-01	7.77E-02	6.91E-01
PU-244	4589.00	4540.31	54.090	2.000	1.869	0.131	0.3625	99.900	5.73E-02	1.05E-01	1.31E-01	1.95E-02	1.05E-01



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effective date: 02-Mar-2015

GEL Laboratories LLC
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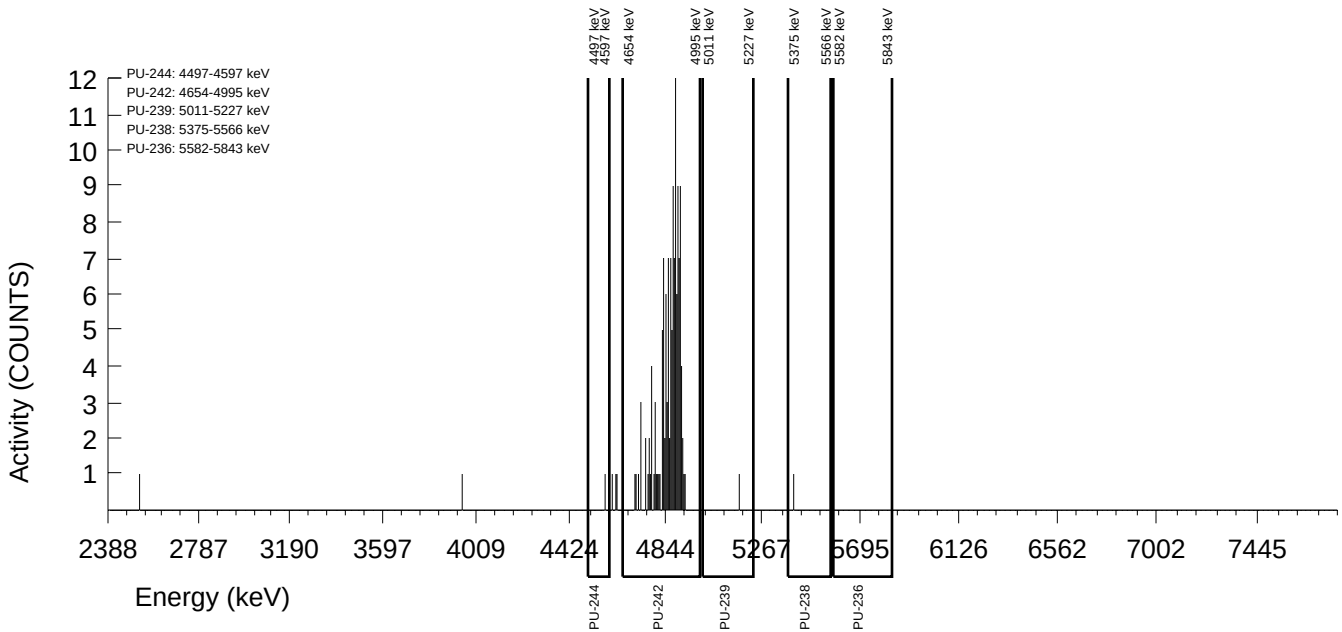
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 078	LIB FILE : PU
SAMPLE ID : S0405240007_PU	DETECTOR S/N : 38633	BKG FILE : B078.CNF;1724
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 33.4433	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6444	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:54	EFF FILE : W078.CNF;447
% YIELD : 69.0 +/-8.880 %	ELAPSED LIVE TIME(SEC) : 7993.74	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0239E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.27	0.000	0.000	-0.266	0.266	0.5162	100.000	-9.32E-03	7.06E-02	1.68E-01	3.16E-02	7.04E-02
PU-238	5486.00	5405.58	4.964	1.000	0.867	0.133	0.3650	99.900	2.54E-02	8.22E-02	1.26E-01	1.88E-02	8.20E-02
PU-239	5155.00	5166.13	4.964	1.000	0.734	0.266	0.5162	99.900	2.14E-02	8.21E-02	1.40E-01	2.64E-02	8.19E-02
PU-242	4890.00	4857.08	74.949	135.000	134.734	0.266	0.5162	100.000	3.93E+00	9.66E-01	1.40E-01	2.63E-02	6.66E-01
PU-244	4589.00	4575.72	4.964	1.000	1.000	0.000	0.0000	99.900	2.92E-02	8.14E-02	8.75E-02	0.00E+00	8.12E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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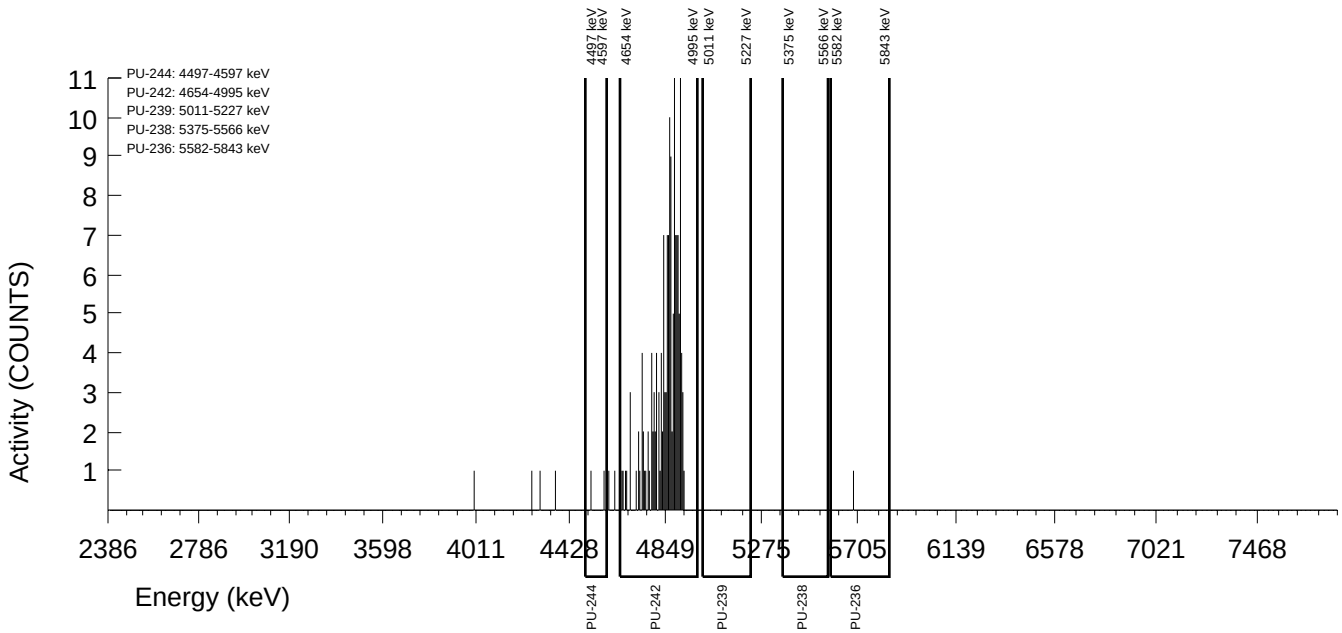
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 080	LIB FILE : PU
SAMPLE ID : S0405240008_PU	DETECTOR S/N : 78197	BKG FILE : B080.CNF;1726
SAMPLE QTY : 0.516 G +/-0.194 %	AVERAGE %EFFICIENCY : 34.4422	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6633	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:54	EFF FILE : W080.CNF;446
% YIELD : 77.0 +/-8.322 %	ELAPSED LIVE TIME(SEC) : 7999.20	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.3770E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5683.10	4.969	1.000	0.600	0.400	0.6324	100.000	1.78E-02	8.37E-02	1.55E-01	3.28E-02	8.36E-02
PU-238	5486.00	5470.35	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	4.93E-02	7.45E-02	0.00E+00	4.91E-02
PU-239	5155.00	5018.80	4.969	1.000	0.467	0.533	0.7303	99.900	1.15E-02	7.01E-02	1.37E-01	3.16E-02	7.00E-02
PU-242	4890.00	4852.88	74.955	156.000	155.067	0.933	0.9660	100.000	3.83E+00	8.82E-01	1.58E-01	4.17E-02	6.06E-01
PU-244	4589.00	4551.03	59.623	2.000	1.733	0.267	0.5164	99.900	4.28E-02	8.49E-02	1.19E-01	2.23E-02	8.46E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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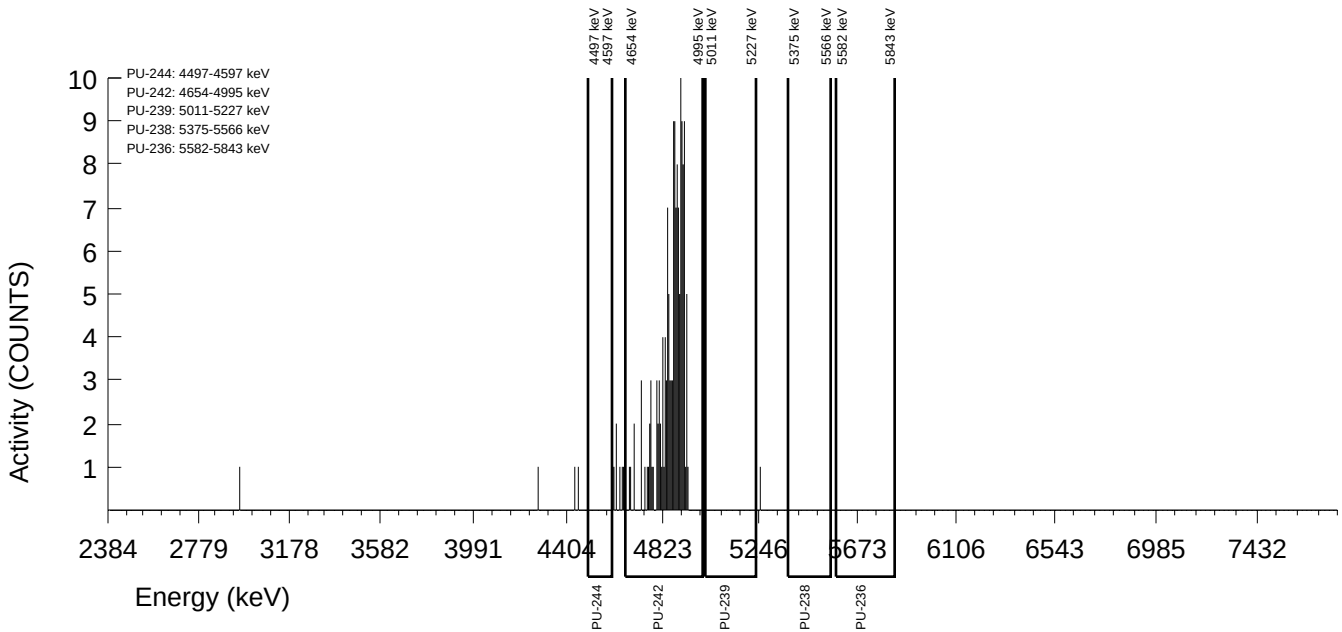
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 081	LIB FILE : PU
SAMPLE ID : S0405240009_PU	DETECTOR S/N : 79996	BKG FILE : B081.CNF;1732
SAMPLE QTY : 0.507 G +/-0.197 %	AVERAGE %EFFICIENCY : 33.0506	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6369	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:54	EFF FILE : W081.CNF;446
% YIELD : 77.1 +/-8.450 %	ELAPSED LIVE TIME(SEC) : 8031.35	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.3815E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.23	0.000	0.000	-0.535	0.535	0.7317	100.000	-1.67E-02	6.42E-02	1.74E-01	4.01E-02	6.39E-02
PU-238	5486.00	5470.33	0.000	0.000	-0.268	0.268	0.5174	99.900	-7.02E-03	5.29E-02	1.26E-01	2.38E-02	5.27E-02
PU-239	5155.00	5118.67	0.000	0.000	-0.402	0.402	0.6337	99.900	-1.05E-02	5.31E-02	1.36E-01	2.89E-02	5.29E-02
PU-242	4890.00	4858.92	73.517	150.000	149.598	0.402	0.6337	100.000	3.89E+00	9.12E-01	1.36E-01	2.89E-02	6.27E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.17E-02	7.82E-02	0.00E+00	5.15E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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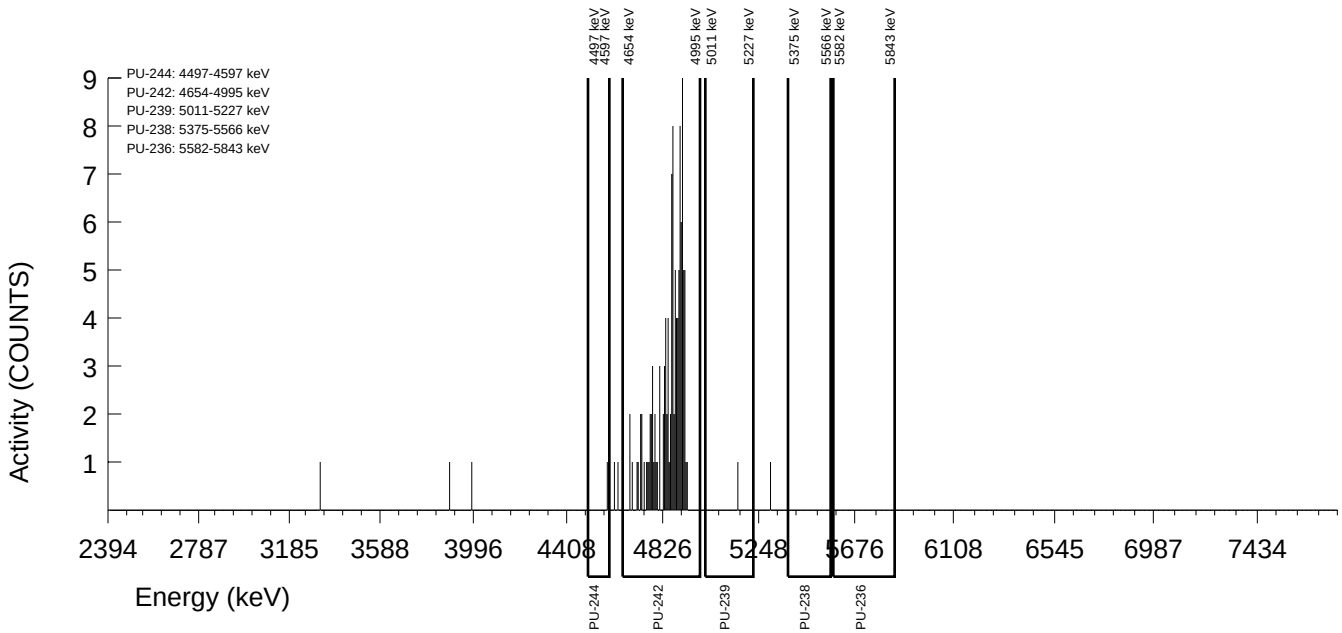
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 082	LIB FILE : PU
SAMPLE ID : S0405240010_PU	DETECTOR S/N : 79997	BKG FILE : B082.CNF;1722
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 31.9848	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6168	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:54	EFF FILE : W082.CNF;423
% YIELD : 60.6 +/-9.728 %	ELAPSED LIVE TIME(SEC) : 8036.95	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.6544E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.23	0.000	0.000	-0.804	0.804	0.8965	100.000	-3.30E-02	8.57E-02	2.52E-01	6.44E-02	8.53E-02
PU-238	5486.00	5470.33	0.000	0.000	-0.402	0.402	0.6339	99.900	-1.38E-02	7.02E-02	1.80E-01	3.82E-02	6.98E-02
PU-239	5155.00	5158.16	4.883	1.000	-0.206	1.206	1.0980	99.900	-7.03E-03	9.92E-02	2.34E-01	6.58E-02	9.90E-02
PU-242	4890.00	4857.52	56.763	116.000	113.723	2.277	1.5090	100.000	3.89E+00	1.05E+00	2.83E-01	9.03E-02	7.26E-01
PU-244	4589.00	4585.16	4.883	1.000	0.866	0.134	0.3660	99.900	2.96E-02	9.59E-02	1.46E-01	2.19E-02	9.57E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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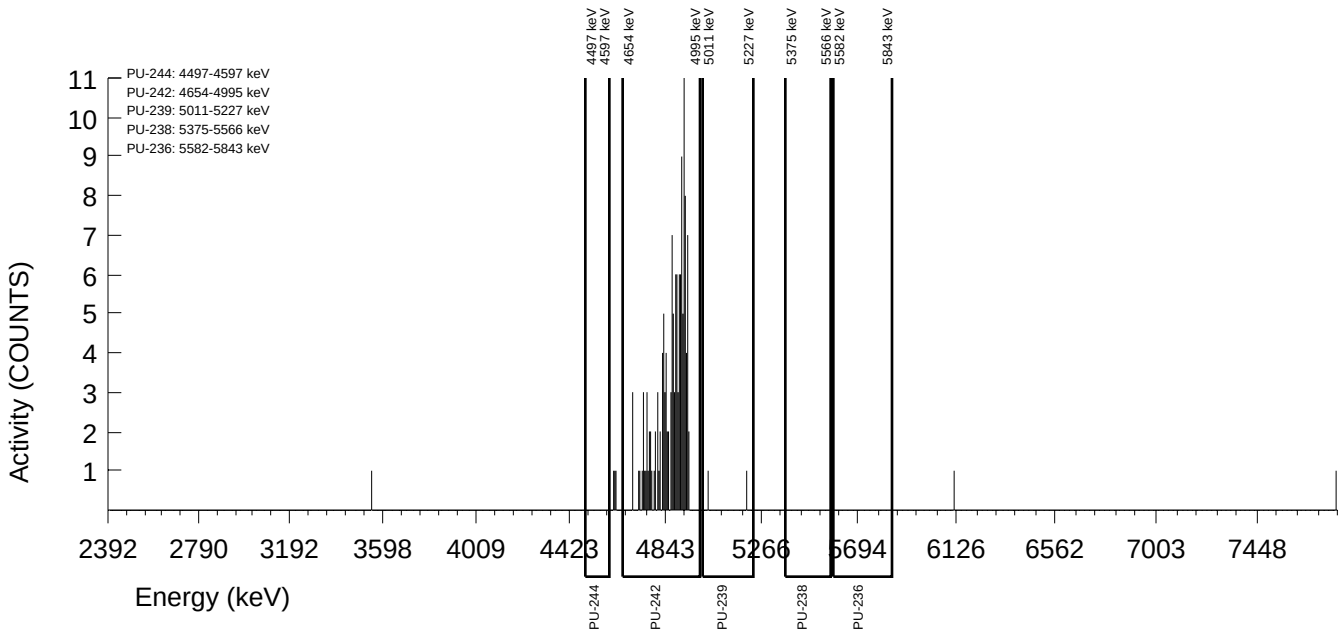
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 083	LIB FILE : PU
SAMPLE ID : S0405240011_PU	DETECTOR S/N : 78785	BKG FILE : B083.CNF;1738
SAMPLE QTY : 0.510 G +/-0.196 %	AVERAGE %EFFICIENCY : 35.3477	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6805	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W083.CNF;485
% YIELD : 66.3 +/-8.777 %	ELAPSED LIVE TIME(SEC) : 8108.65	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.9081E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.270	0.270	0.5199	100.000	-9.04E-03	6.76E-02	1.61E-01	3.05E-02	6.74E-02
PU-238	5486.00	5470.35	0.000	0.000	-0.676	0.676	0.8220	99.900	-1.90E-02	5.81E-02	1.65E-01	4.04E-02	5.79E-02
PU-239	5155.00	5117.33	163.129	2.000	0.649	1.351	1.1625	99.900	1.81E-02	9.79E-02	1.97E-01	5.68E-02	9.78E-02
PU-242	4890.00	4871.39	67.600	140.000	138.919	1.081	1.0398	100.000	3.87E+00	9.41E-01	1.85E-01	5.08E-02	6.49E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.54E-02	8.37E-02	0.00E+00	5.52E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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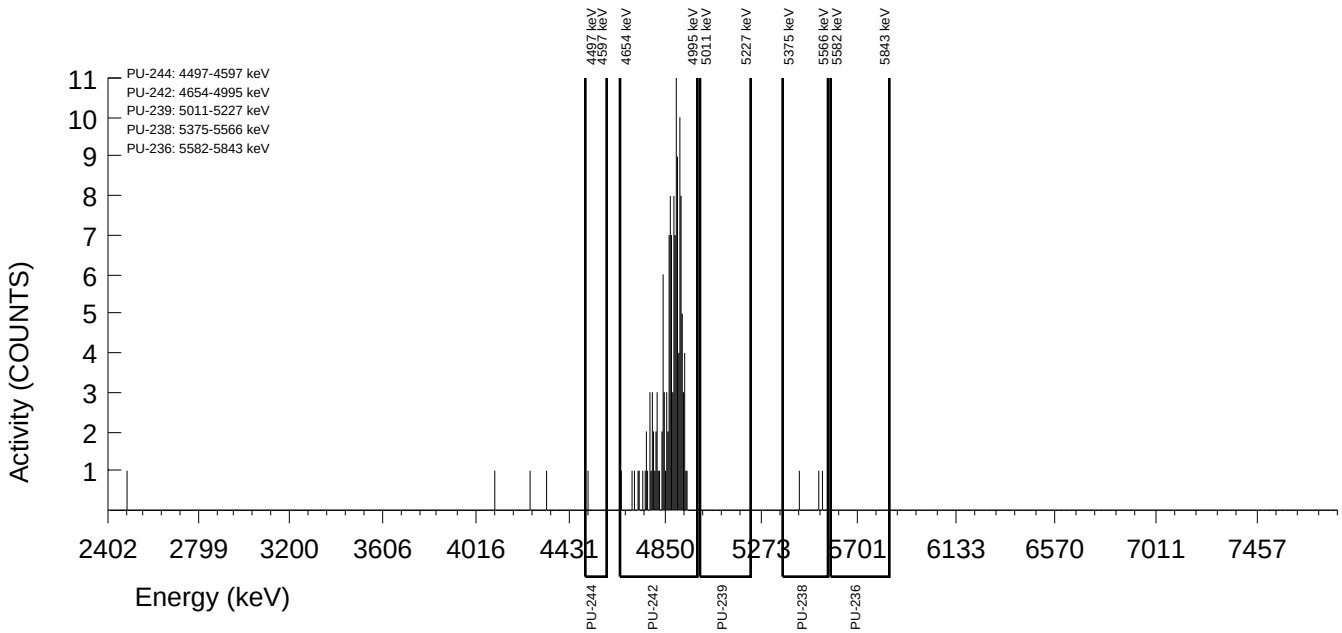
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 084	LIB FILE : PU
SAMPLE ID : S0405240012_PU	DETECTOR S/N : 78265	BKG FILE : B084.CNF;1727
SAMPLE QTY : 0.501 G +/-0.200 %	AVERAGE %EFFICIENCY : 34.7248	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6686	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W084.CNF;476
% YIELD : 67.3 +/-8.804 %	ELAPSED LIVE TIME(SEC) : 8113.37	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.9499E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.811	0.811	0.9007	100.000	-2.77E-02	7.14E-02	2.10E-01	5.39E-02	7.11E-02
PU-238	5486.00	5506.25	98.663	3.000	2.594	0.406	0.6369	99.900	7.43E-02	1.14E-01	1.50E-01	3.20E-02	1.13E-01
PU-239	5155.00	5118.68	0.000	0.000	-0.676	0.676	0.8223	99.900	-1.93E-02	5.90E-02	1.68E-01	4.10E-02	5.88E-02
PU-242	4890.00	4873.65	78.725	140.000	138.513	1.487	1.2196	100.000	3.94E+00	9.61E-01	2.07E-01	6.08E-02	6.63E-01
PU-244	4589.00	4514.17	4.933	1.000	0.865	0.135	0.3677	99.900	2.46E-02	7.98E-02	1.22E-01	1.84E-02	7.97E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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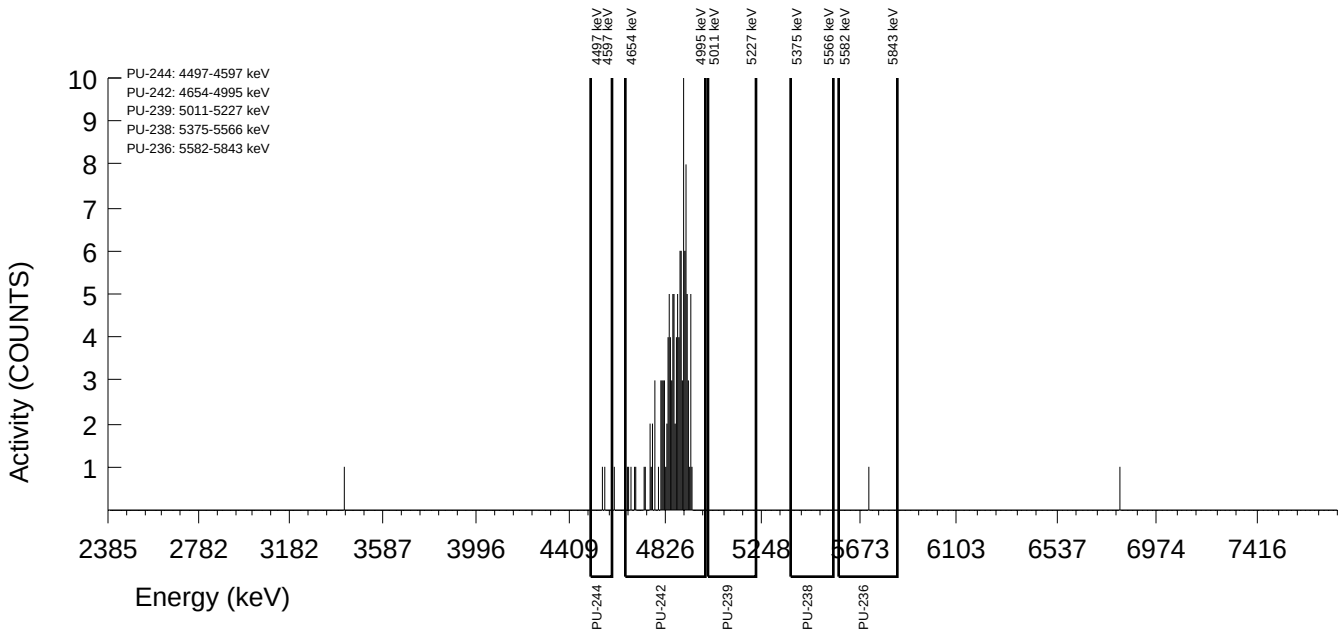
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 085	LIB FILE : PU
SAMPLE ID : S0405240013_PU	DETECTOR S/N : 78776	BKG FILE : B085.CNF;1730
SAMPLE QTY : 0.511 G +/-0.196 %	AVERAGE %EFFICIENCY : 32.9780	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6356	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W085.CNF;479
% YIELD : 63.8 +/-9.251 %	ELAPSED LIVE TIME(SEC) : 8117.88	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.7966E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5715.95	4.931	1.000	0.865	0.135	0.3678	100.000	3.21E-02	1.04E-01	1.59E-01	2.40E-02	1.04E-01
PU-238	5486.00	5470.35	0.000	0.000	-0.271	0.271	0.5202	99.900	-8.44E-03	6.30E-02	1.50E-01	2.84E-02	6.28E-02
PU-239	5155.00	5118.69	0.000	0.000	-1.218	1.218	1.1035	99.900	-3.77E-02	6.63E-02	2.13E-01	5.99E-02	6.61E-02
PU-242	4890.00	4861.07	32.051	126.000	124.782	1.218	1.1035	100.000	3.86E+00	9.90E-01	2.13E-01	5.99E-02	6.84E-01
PU-244	4589.00	4554.70	14.793	2.000	1.729	0.271	0.5202	99.900	5.36E-02	1.07E-01	1.50E-01	2.83E-02	1.06E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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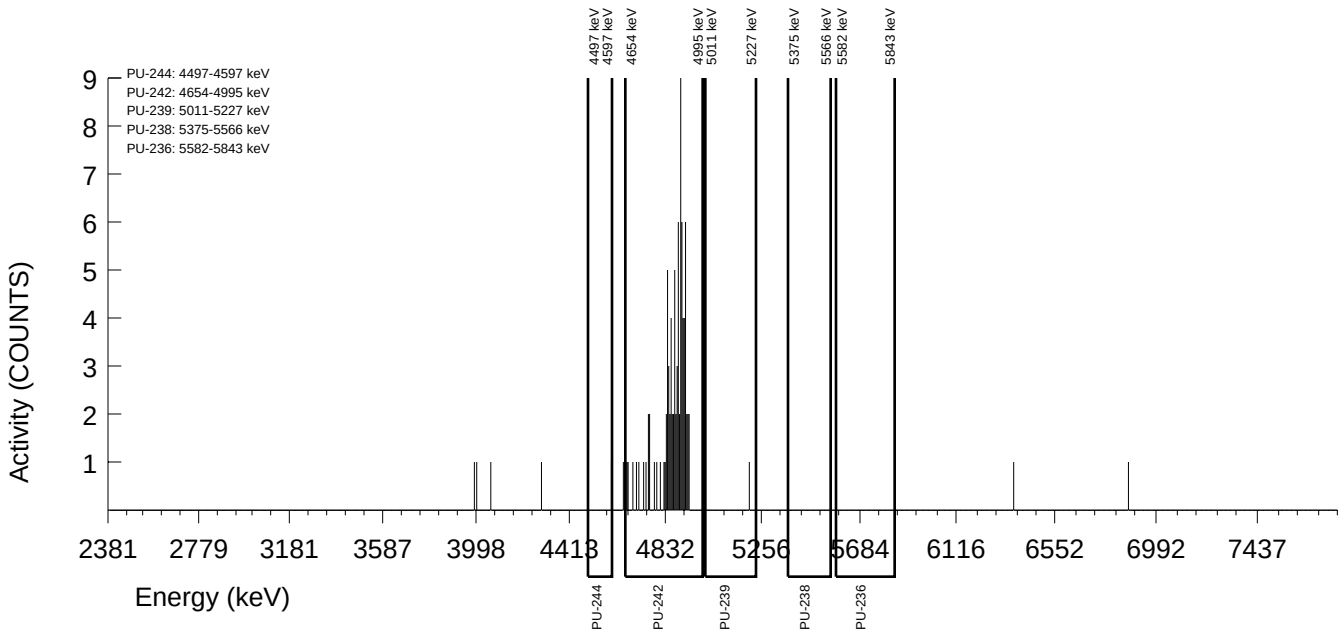
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 086	LIB FILE : PU
SAMPLE ID : S0405240014_PU	DETECTOR S/N : 78198	BKG FILE : B086.CNF;1731
SAMPLE QTY : 0.505 G +/-0.198 %	AVERAGE %EFFICIENCY : 31.1951	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6019	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W086.CNF;455
% YIELD : 48.0 +/-10.936 %	ELAPSED LIVE TIME(SEC) : 8122.21	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.1024E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.26	0.000	0.000	-0.271	0.271	0.5203	100.000	-1.43E-02	1.07E-01	2.55E-01	4.82E-02	1.06E-01
PU-238	5486.00	5470.35	0.000	0.000	-0.812	0.812	0.9012	99.900	-3.60E-02	9.28E-02	2.73E-01	7.01E-02	9.23E-02
PU-239	5155.00	5202.78	4.948	1.000	-0.218	1.218	1.1038	99.900	-9.62E-03	1.28E-01	3.03E-01	8.53E-02	1.28E-01
PU-242	4890.00	4862.66	76.899	90.000	88.782	1.218	1.1038	100.000	3.91E+00	1.18E+00	3.03E-01	8.52E-02	8.24E-01
PU-244	4589.00	4596.09	0.000	1.000	0.865	0.135	0.3679	99.900	3.81E-02	1.24E-01	1.89E-01	2.84E-02	1.23E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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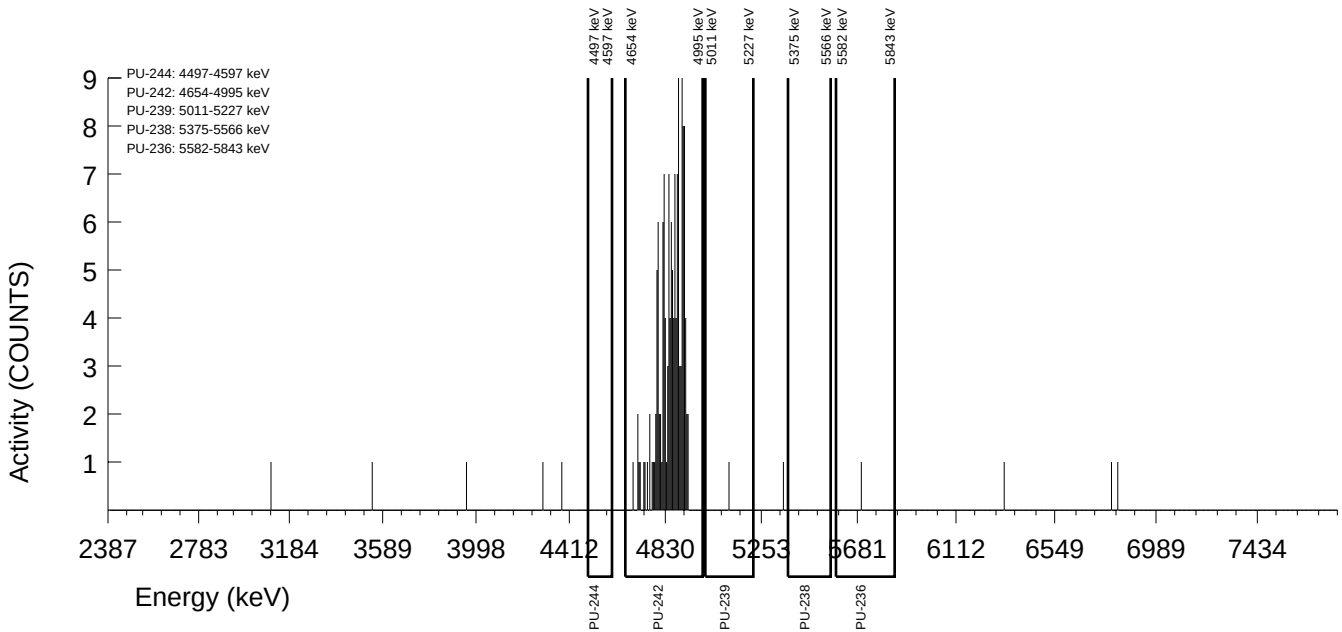
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 088	LIB FILE : PU
SAMPLE ID : S0405240015_PU	DETECTOR S/N : 83291	BKG FILE : B088.CNF;1726
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 31.2191	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6024	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W088.CNF;463
% YIELD : 77.6 +/-8.630 %	ELAPSED LIVE TIME(SEC) : 8128.86	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.4026E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5696.65	4.923	1.000	0.594	0.406	0.6375	100.000	1.92E-02	9.17E-02	1.70E-01	3.62E-02	9.15E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.542	0.542	0.7362	99.900	-1.47E-02	5.59E-02	1.52E-01	3.51E-02	5.57E-02
PU-239	5155.00	5115.33	4.923	1.000	0.594	0.406	0.6375	99.900	1.60E-02	7.64E-02	1.42E-01	3.02E-02	7.63E-02
PU-242	4890.00	4857.46	118.351	145.000	143.916	1.084	1.0411	100.000	3.89E+00	9.29E-01	1.80E-01	4.93E-02	6.40E-01
PU-244	4589.00	4546.97	0.000	0.000	-0.135	0.135	0.3681	99.900	-3.66E-03	5.42E-02	1.16E-01	1.74E-02	5.39E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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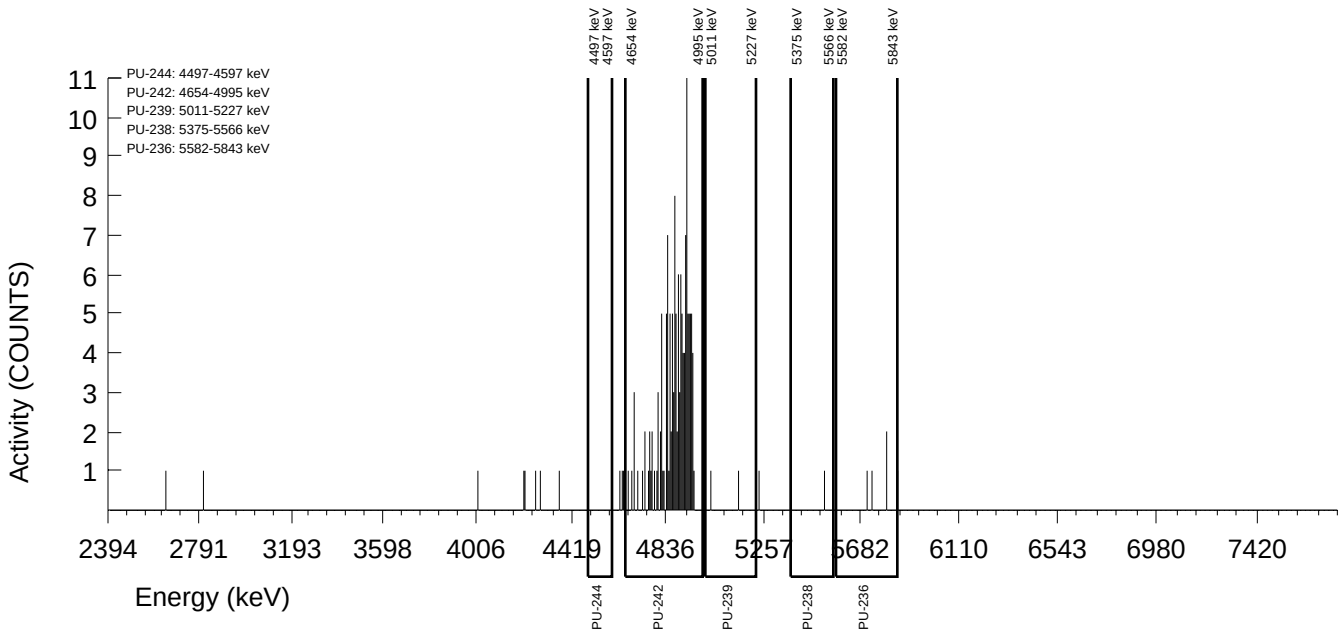
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 089	LIB FILE : PU
SAMPLE ID : S0405240016_PU	DETECTOR S/N : 79988	BKG FILE : B089.CNF;1431
SAMPLE QTY : 0.509 G +/-0.196 %	AVERAGE %EFFICIENCY : 29.2461	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5651	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:56	EFF FILE : W089.CNF;384
% YIELD : 80.4 +/-8.847 %	ELAPSED LIVE TIME(SEC) : 8148.32	CAL DATE : 06-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.5230E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5761.83	4.938	4.000	-0.210	4.210	2.0518	100.000	-6.99E-03	1.54E-01	3.39E-01	1.20E-01	1.54E-01
PU-238	5486.00	5527.32	4.938	1.000	0.457	0.543	0.7370	99.900	1.28E-02	7.93E-02	1.56E-01	3.61E-02	7.91E-02
PU-239	5155.00	5090.85	118.522	2.000	0.506	1.494	1.2222	99.900	1.40E-02	9.77E-02	2.02E-01	5.95E-02	9.76E-02
PU-242	4890.00	4869.82	87.245	144.000	139.926	4.074	2.0185	100.000	3.88E+00	9.51E-01	2.79E-01	9.81E-02	6.56E-01
PU-244	4589.00	4546.97	0.000	0.000	-0.543	0.543	0.7370	99.900	-1.51E-02	5.71E-02	1.55E-01	3.59E-02	5.68E-02



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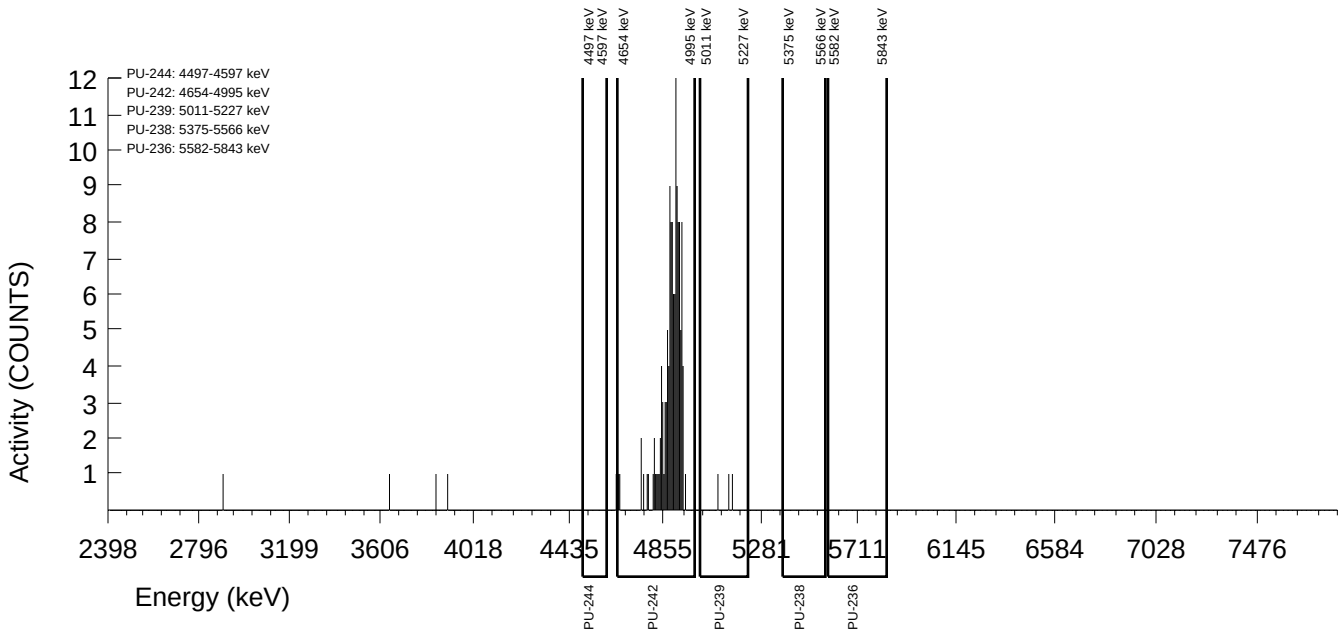
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 090	LIB FILE : PU
SAMPLE ID : S1203621848_PU	DETECTOR S/N : 78263	BKG FILE : B090.CNF;1436
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 33.4344	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.6443	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:56	EFF FILE : W090.CNF;374
% YIELD : 65.6 +/-9.010 %	ELAPSED LIVE TIME(SEC) : 8159.55	CAL DATE : 06-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.8751E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.544	0.544	0.7375	100.000	-1.59E-02	5.99E-02	1.63E-01	3.77E-02	5.97E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.408	0.408	0.6387	99.900	-1.19E-02	5.94E-02	1.53E-01	3.26E-02	5.92E-02
PU-239	5155.00	5131.42	64.329	3.000	2.864	0.136	0.3688	99.900	8.34E-02	1.16E-01	1.25E-01	1.88E-02	1.15E-01
PU-242	4890.00	4886.17	54.927	131.000	130.728	0.272	0.5215	100.000	3.80E+00	9.50E-01	1.41E-01	2.66E-02	6.55E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.79E-02	8.74E-02	0.00E+00	5.76E-02



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effective date: 02-Mar-2015

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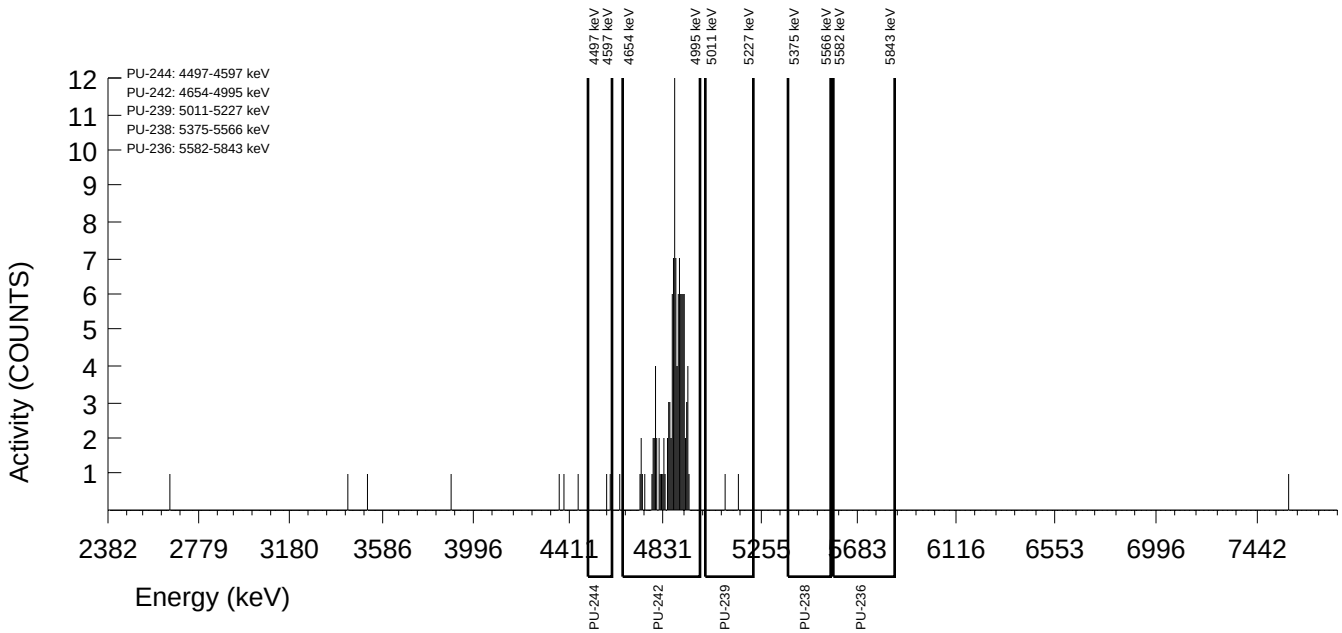
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 091	LIB FILE : PU
SAMPLE ID : S1203621849_PU	DETECTOR S/N : 78259	BKG FILE : B091.CNF;1434
SAMPLE QTY : 0.502 G +/-0.199 %	AVERAGE %EFFICIENCY : 34.7245	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6687	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:56	EFF FILE : W091.CNF;363
% YIELD : 56.2 +/-9.549 %	ELAPSED LIVE TIME(SEC) : 8163.48	CAL DATE : 06-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.4620E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.272	0.272	0.5216	100.000	-1.10E-02	8.21E-02	1.96E-01	3.71E-02	8.18E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.408	0.408	0.6389	99.900	-1.39E-02	6.95E-02	1.78E-01	3.81E-02	6.92E-02
PU-239	5155.00	5129.55	59.161	2.000	1.728	0.272	0.5216	99.900	5.85E-02	1.16E-01	1.63E-01	3.10E-02	1.16E-01
PU-242	4890.00	4871.42	34.510	117.000	116.320	0.680	0.8248	100.000	3.93E+00	1.04E+00	1.99E-01	4.89E-02	7.20E-01
PU-244	4589.00	4586.32	19.720	2.000	1.456	0.544	0.7377	99.900	4.93E-02	1.17E-01	1.89E-01	4.38E-02	1.17E-01



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effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

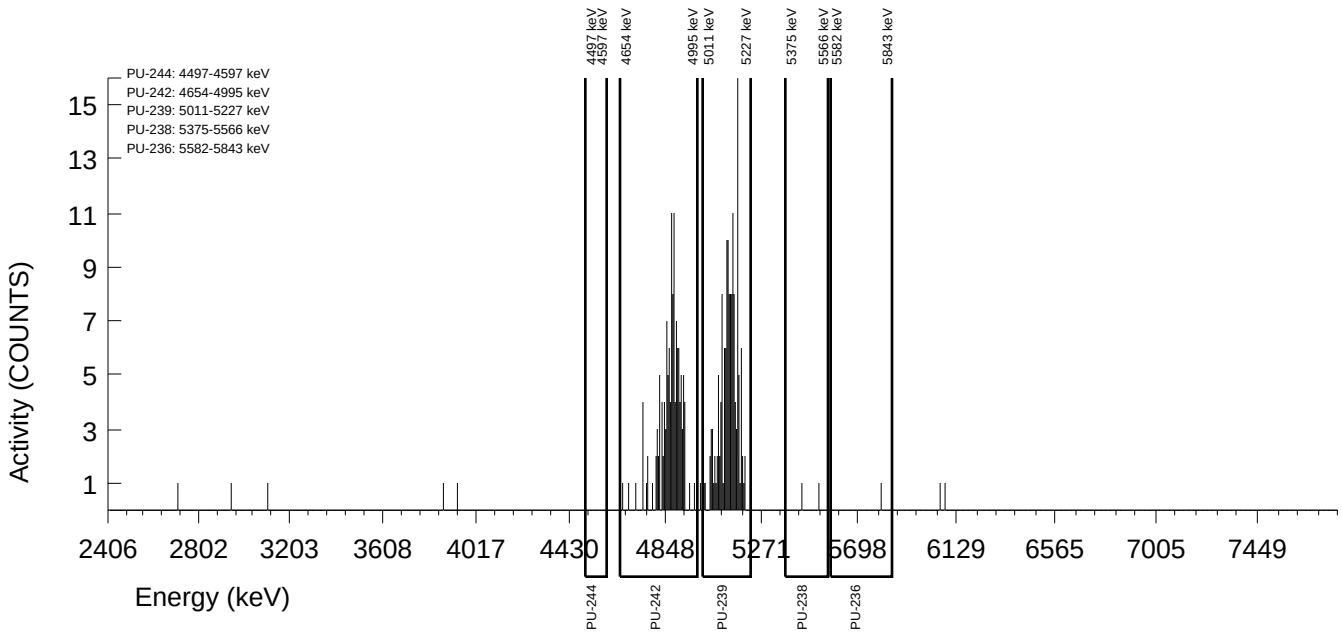
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596447	CHAMBER : 092	LIB FILE : PU
SAMPLE ID : S1203621850_PU	DETECTOR S/N : 80063	BKG FILE : B092.CNF;1438
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 30.3421	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5858	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:56	EFF FILE : W092.CNF;414
% YIELD : 73.3 +/-8.987 %	ELAPSED LIVE TIME(SEC) : 8167.44	CAL DATE : 06-Sep-2016

TRACER		LCS	
ID	: 1770-A	ID	0338-MM
NUCLIDE	: PU-242	NUCLIDE	PU-239
NOMINAL	: 4.3831E+00 dpm	NOMINAL (pCi/G)	3.8075E+00
RESULTS	: 3.2114E+00 dpm	% RECOVERY	114.100

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5799.77	4.922	1.000	0.047	0.953	0.9761	100.000	1.35E-03	8.27E-02	1.85E-01	4.92E-02	8.25E-02
PU-238	5486.00	5489.11	73.830	2.000	1.592	0.408	0.6390	99.900	4.57E-02	9.90E-02	1.50E-01	3.22E-02	9.87E-02
PU-239	5155.00	5132.57	50.339	152.000	151.319	0.681	0.8250	99.900	4.34E+00	1.05E+00	1.69E-01	4.15E-02	6.96E-01
PU-242	4890.00	4872.19	52.296	134.000	132.639	1.361	1.1667	100.000	3.80E+00	9.47E-01	2.03E-01	5.87E-02	6.54E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.70E-02	8.61E-02	0.00E+00	5.68E-02



Radiochemistry Batch Checklist

16-Sep-2016

Batch# 1596145 Product: Am Date: 9/16/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			ND
Samples have been blank corrected (if required). Blank correction reported included (if required).			ND
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.		✓	DER# 1558740
Sample was correctly preserved if required.			ND
Smears Taken for Radioactive batches.			ND
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.			ND
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			ND
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER# 1558740
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER# 1558740
Aliquot Correction completed if required.			ND
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

Primary Review Performed By: [signature] 9/16/16

Secondary Review Performed By: [signature] 9/16/16

10/4

DATA EXCEPTION REPORT

Mo.Day Yr. 16-SEP-16	**Division:** Radiochemistry	**Quality Criteria:** Specifications	**Type:** Process
Instrument Type: ALPHA SPECTROMETER	**Test / Method:** DOE EML HASL-300, Am-05-RC Modified	**Matrix Type:** Solid	**Client Code:** MJWC
Batch ID: 1596445	**Sample Numbers:** See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621843 were logged in and analyzed out of holding.	1. Reporting results.

Originator's Name:

Melanie Aycock 16-SEP-16

Data Validator/Group Leader:

Scott Moreland 16-SEP-16

Am/Cm Queue Sheet

07-SEP-16

Batch #: 1596445 Analyst: MXS2 First Client Due Date: 04-OCT-16 Internal Due Date: 30-SEP-16 Comments:

Tracer(s): Am243/Cm244 Tracer Code: 1752-C Expiration Date: 5-26-17 Vol: 0.1

LCS Isotope(s): Am241/Cm244 LCS Code(s): 0533-CC / 1216-G Expiration Date: 4-21-17 / 9-30-16 Vol(s): 0.1 / 0.1

Spike Isotope(s): Am241/Cm244 Spike Code(s): — / — Expiration Date: — / — Vol(s): — / —

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840027 Balance ID: 1610766 Witness: NA

Analyzed Sequentially with
U: 1596443
Pu: 1596447

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g / l / f)	Am/Cm Det #
405240001-1	HO.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.506	96
405240002-1	HO.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.503	97
405240003-1	HO.1.5	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.508	99
405240004-1	HO.1.6	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.519	103
405240005-1	HO.2.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.514	~~104~~ 96
405240006-1	HO.2.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.500	105
405240007-1	HO.3.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.503	106
405240008-1	HO.3.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.516	107
405240009-1	HO.4.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.507	~~108~~ 97
405240010-1	HO.4.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.508	~~109~~ 99
405240011-1	HO.5.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.510	110
405240012-1	HO.5.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.501	~~111~~ 105
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.511	~~210~~ 107
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.505	212 110
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.508	216
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.509	~~217~~ 241
1203621842-1	MB for batch 1596445	MB		1 pCi/g	SOIL	QC ACCOUNT		17	17	0.519	95
1203621843-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.502	218
1203621844-1	LCS for batch 1596445	LCS		1 pCi/g	SOIL	QC ACCOUNT		19	19	0.519	221

Choose SOP Used: GL-RAD-A-011 / GL-RAD-A-036

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

Data Reviewed By: [signature] 9/6/16

GEL Laboratories LLC, Radiochemistry Division

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effective date: 02-Mar-2015

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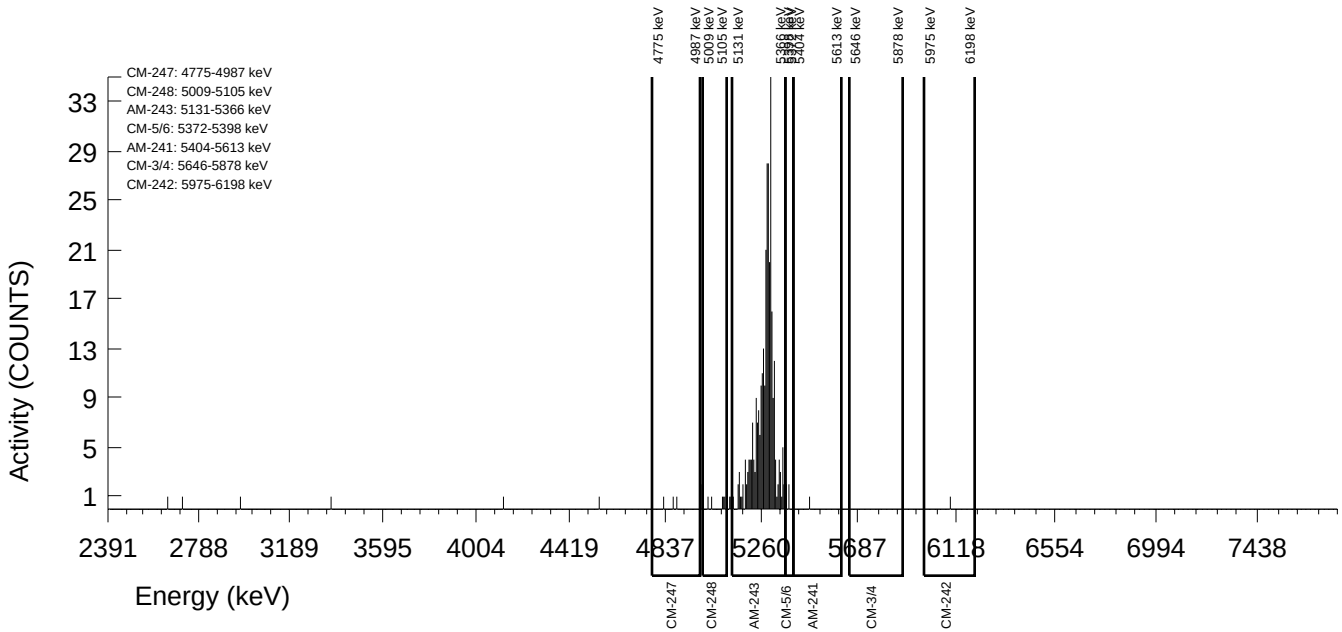
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 096	LIB FILE : AM
SAMPLE ID : S0405240001_AM	DETECTOR S/N : 80016	BKG FILE : B096.CNF;1395
SAMPLE QTY : 0.506 G +/-0.198 %	AVERAGE %EFFICIENCY : 32.5188	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6269	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:01	EFF FILE : W096.CNF;357
% YIELD : 84.3 +/-6.288 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.9993E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5472.73	4.934	1.000	0.280	0.720	0.8485	98.525	3.85E-03	4.03E-02	8.40E-02	2.14E-02	4.02E-02
AM-243	5269.50	5277.40	25.850	313.000	312.040	0.960	0.9798	99.980	4.22E+00	7.20E-01	8.92E-02	2.43E-02	4.70E-01
CM-242	6102.00	6091.10	4.934	1.000	1.000	0.000	0.0000	100.000	4.37E-02	1.23E-01	1.31E-01	0.00E+00	1.23E-01
CM-3/4	5795.02	5761.60	0.000	0.000	-1.200	1.200	1.0954	100.000	-1.67E-02	3.17E-02	9.77E-02	2.79E-02	3.17E-02
CM-5/6	5386.00	5376.75	0.000	4.000	3.760	0.240	0.4899	86.090	5.91E-02	7.01E-02	7.54E-02	1.41E-02	6.97E-02
CM-247	4946.00	4865.02	59.206	3.000	1.800	1.200	1.0954	79.300	3.07E-02	6.98E-02	1.20E-01	3.42E-02	6.97E-02
CM-248	5078.60	5071.07	74.007	5.000	5.000	0.000	0.0000	91.000	7.43E-02	7.24E-02	4.46E-02	0.00E+00	7.17E-02



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effective date: 02-Mar-2015

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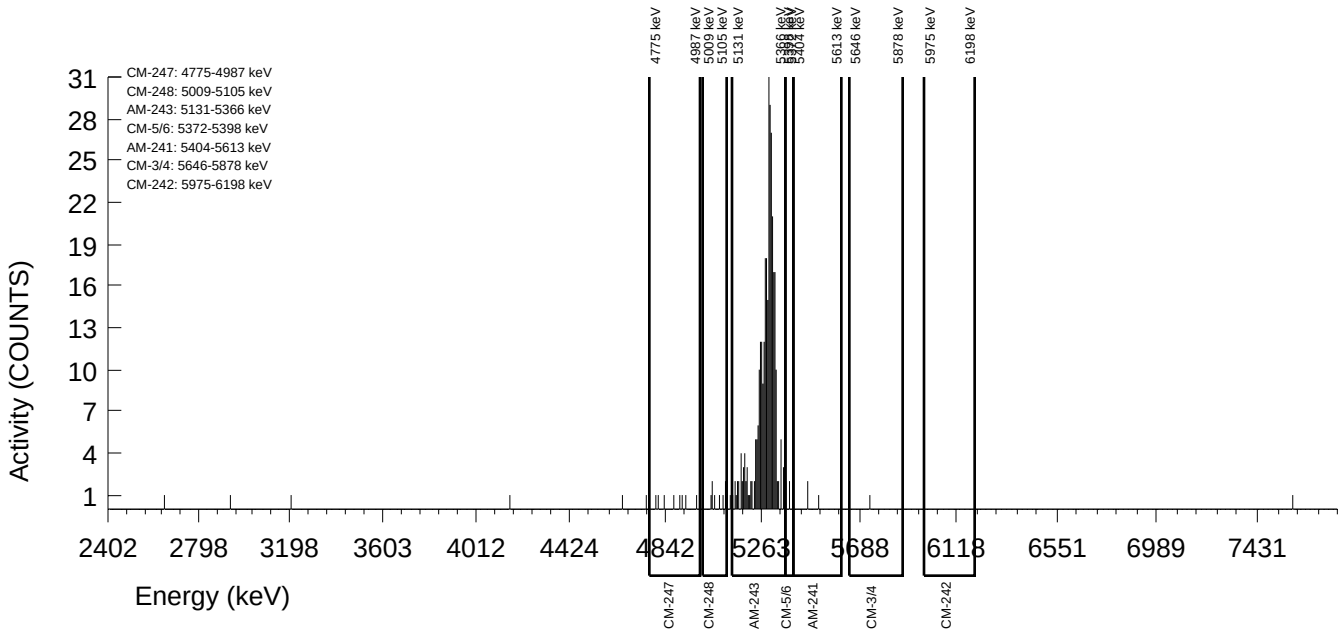
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 097	LIB FILE : AM
SAMPLE ID : S0405240002_AM	DETECTOR S/N : 83288	BKG FILE : B097.CNF;1392
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 35.3557	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6805	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:01	EFF FILE : W097.CNF;381
% YIELD : 80.4 +/-6.190 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.8137E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5480.20	4.926	3.000	2.520	0.480	0.6928	98.525	3.36E-02	5.36E-02	7.39E-02	1.69E-02	5.34E-02
AM-243	5269.50	5281.98	42.515	324.000	323.520	0.480	0.6928	99.980	4.25E+00	7.12E-01	7.27E-02	1.67E-02	4.64E-01
CM-242	6102.00	6086.57	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	8.56E-02	1.27E-01	0.00E+00	8.54E-02
CM-3/4	5795.02	5736.21	4.926	1.000	0.280	0.720	0.8485	100.000	3.78E-03	3.96E-02	8.25E-02	2.10E-02	3.96E-02
CM-5/6	5386.00	5389.90	4.926	3.000	2.760	0.240	0.4899	86.090	4.21E-02	6.09E-02	7.31E-02	1.37E-02	6.06E-02
CM-247	4946.00	4881.49	172.406	8.000	7.520	0.480	0.6928	79.300	1.24E-01	9.95E-02	9.17E-02	2.10E-02	9.83E-02
CM-248	5078.60	5071.35	0.000	8.000	7.280	0.720	0.8485	91.000	1.05E-01	8.69E-02	8.81E-02	2.24E-02	8.59E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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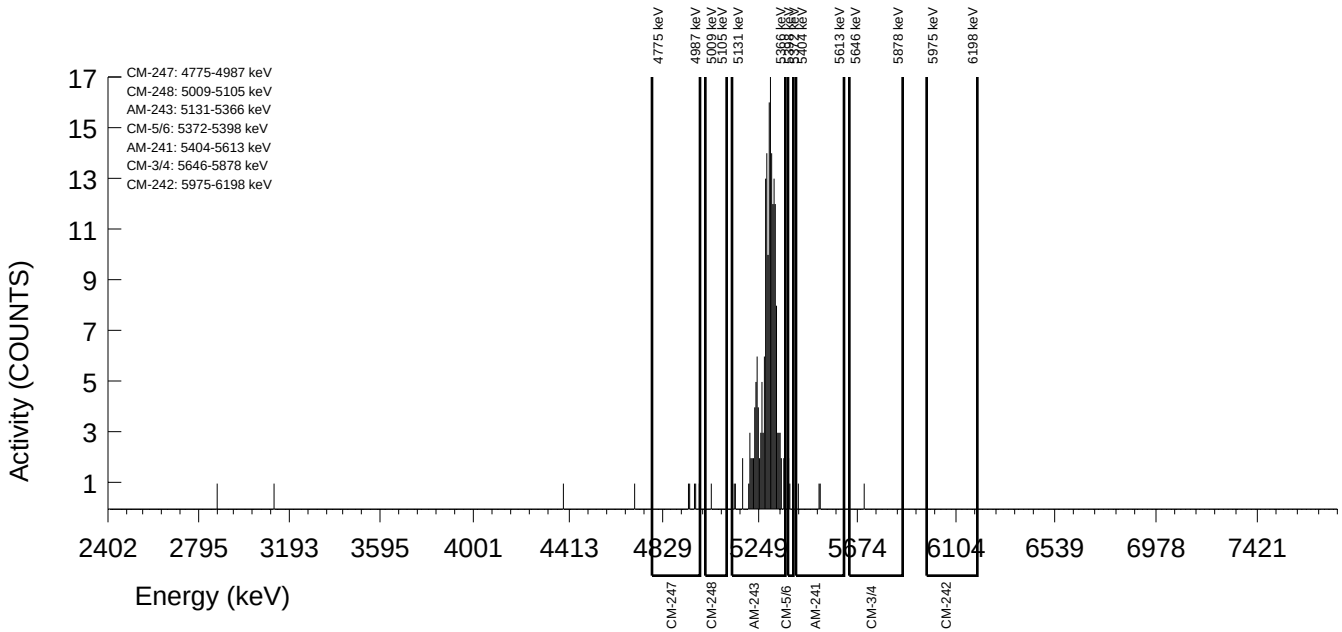
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 099	LIB FILE : AM
SAMPLE ID : S0405240003_AM	DETECTOR S/N : 80059	BKG FILE : B099.CNF;1395
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 35.6284	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6858	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:01	EFF FILE : W099.CNF;383
% YIELD : 48.3 +/-7.691 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 2.2937E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5480.72	92.738	3.000	2.520	0.480	0.6928	98.525	5.49E-02	8.77E-02	1.21E-01	2.77E-02	8.73E-02
AM-243	5269.50	5285.56	46.456	198.000	196.080	1.920	1.3856	99.980	4.21E+00	8.83E-01	1.73E-01	5.45E-02	5.94E-01
CM-242	6102.00	6086.56	0.000	0.000	-0.240	0.240	0.4899	100.000	-1.66E-02	1.44E-01	3.32E-01	6.22E-02	1.43E-01
CM-3/4	5795.02	5706.49	4.881	1.000	-0.200	1.200	1.0954	100.000	-4.42E-03	6.64E-02	1.55E-01	4.43E-02	6.63E-02
CM-5/6	5386.00	5378.05	7.321	3.000	2.520	0.480	0.6928	86.090	6.28E-02	1.00E-01	1.38E-01	3.16E-02	9.98E-02
CM-247	4946.00	4960.61	0.000	5.000	4.040	0.960	0.9798	79.300	1.09E-01	1.34E-01	1.78E-01	4.85E-02	1.33E-01
CM-248	5078.60	5038.34	4.881	1.000	0.280	0.720	0.8485	91.000	6.60E-03	6.91E-02	1.44E-01	3.66E-02	6.90E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

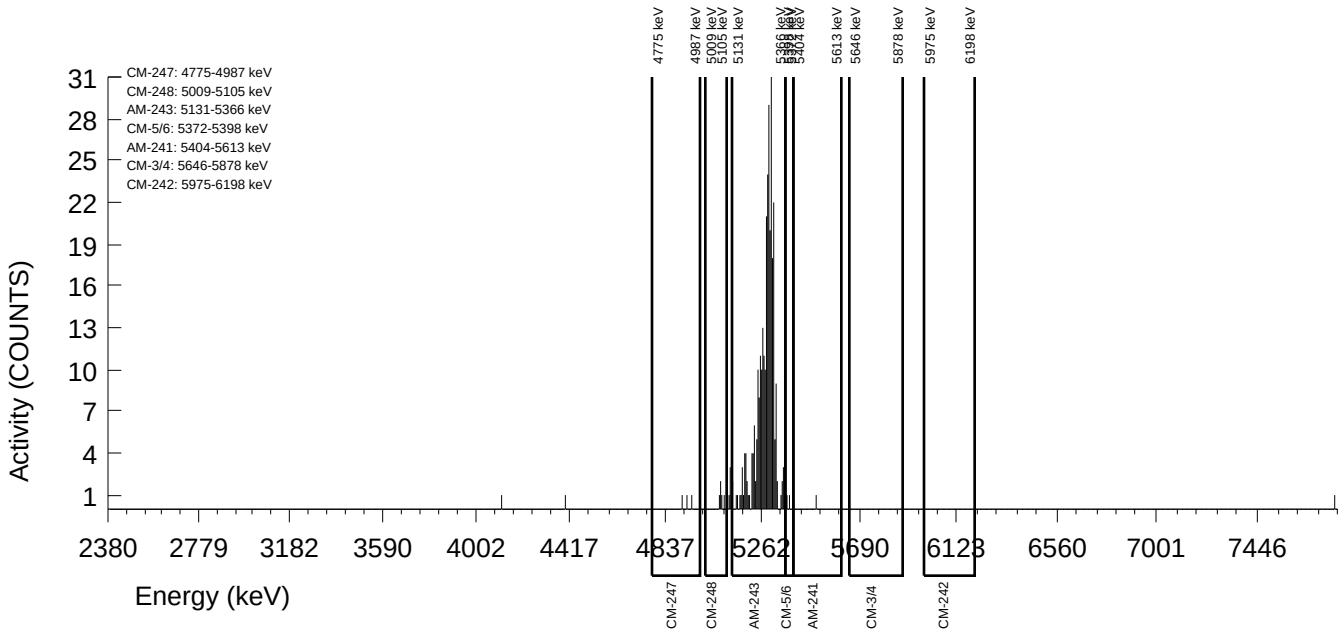
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 103	LIB FILE : AM
SAMPLE ID : S0405240004_AM	DETECTOR S/N : 79461	BKG FILE : B103.CNF;1410
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 33.8848	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6527	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:05	EFF FILE : W103.CNF;395
% YIELD : 79.4 +/-6.334 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.7672E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5502.27	4.962	1.000	0.280	0.720	0.8485	98.525	3.82E-03	4.00E-02	8.34E-02	2.12E-02	4.00E-02
AM-243	5269.50	5279.41	34.150	307.000	306.280	0.720	0.8485	99.980	4.12E+00	7.07E-01	8.21E-02	2.09E-02	4.63E-01
CM-242	6102.00	6086.57	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	8.77E-02	1.30E-01	0.00E+00	8.75E-02
CM-3/4	5795.02	5761.60	0.000	0.000	-0.480	0.480	0.6928	100.000	-6.64E-03	2.94E-02	7.66E-02	1.76E-02	2.94E-02
CM-5/6	5386.00	5379.18	0.000	2.000	2.000	0.000	0.0000	86.090	3.12E-02	5.37E-02	4.68E-02	0.00E+00	5.35E-02
CM-247	4946.00	4932.58	44.658	3.000	2.760	0.240	0.4899	79.300	4.68E-02	6.77E-02	8.13E-02	1.52E-02	6.74E-02
CM-248	5078.60	5084.12	9.924	5.000	4.280	0.720	0.8485	91.000	6.32E-02	7.27E-02	9.02E-02	2.30E-02	7.23E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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ALPHA SPECTROSCOPY REPORT

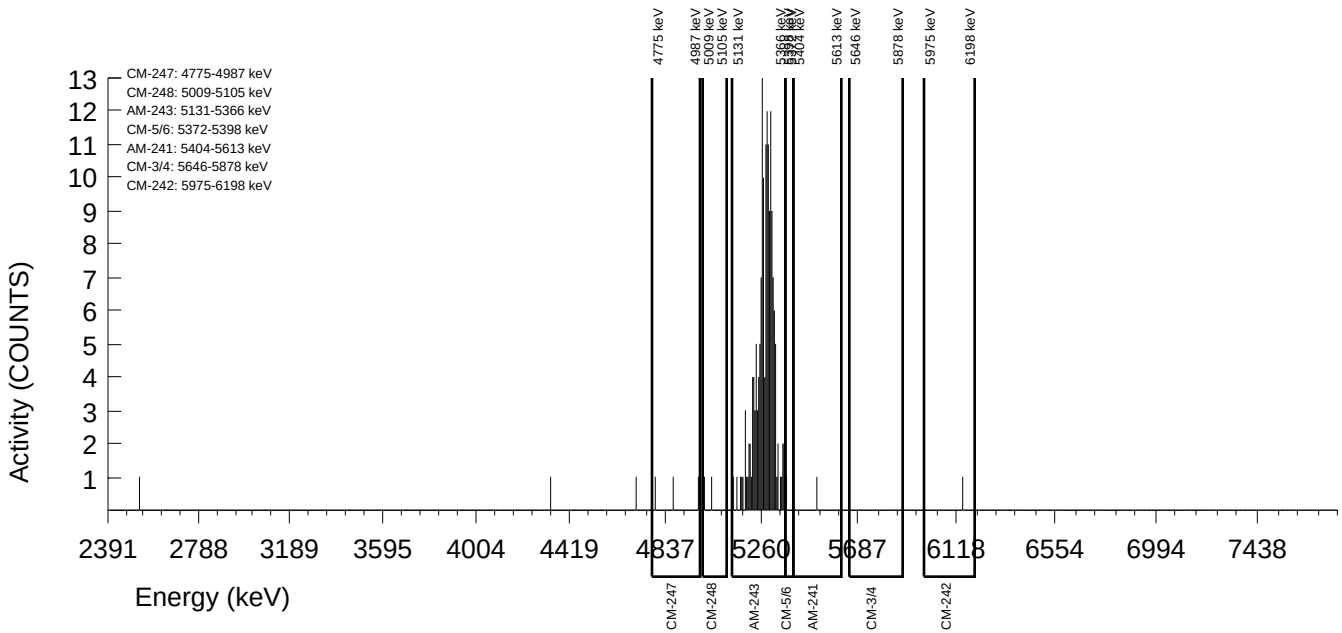
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 096	LIB FILE : AM
SAMPLE ID : S0405240005_AM	DETECTOR S/N : 80016	BKG FILE : B096.CNF;1395
SAMPLE QTY : 0.514 G +/-0.195 %	AVERAGE %EFFICIENCY : 32.5188	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6269	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:04	EFF FILE : W096.CNF;357
% YIELD : 91.6 +/-8.173 %	ELAPSED LIVE TIME(SEC) : 7199.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.3453E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5504.77	4.934	1.000	0.640	0.360	0.6000	98.525	1.59E-02	7.02E-02	1.27E-01	2.60E-02	7.01E-02
AM-243	5269.50	5276.32	53.039	170.000	169.520	0.480	0.6928	99.980	4.16E+00	9.29E-01	1.33E-01	2.96E-02	6.29E-01
CM-242	6102.00	6145.29	4.934	1.000	1.000	0.000	0.0000	100.000	7.95E-02	2.22E-01	2.39E-01	0.00E+00	2.21E-01
CM-3/4	5795.02	5761.60	0.000	0.000	-0.600	0.600	0.7746	100.000	-1.51E-02	5.17E-02	1.44E-01	3.40E-02	5.16E-02
CM-5/6	5386.00	5371.42	0.000	1.000	0.880	0.120	0.3464	86.090	2.51E-02	7.97E-02	1.20E-01	1.72E-02	7.95E-02
CM-247	4946.00	4884.31	182.552	3.000	2.400	0.600	0.7746	79.300	7.42E-02	1.23E-01	1.76E-01	4.17E-02	1.23E-01
CM-248	5078.60	5026.68	0.000	2.000	2.000	0.000	0.0000	91.000	5.39E-02	9.21E-02	8.08E-02	0.00E+00	9.17E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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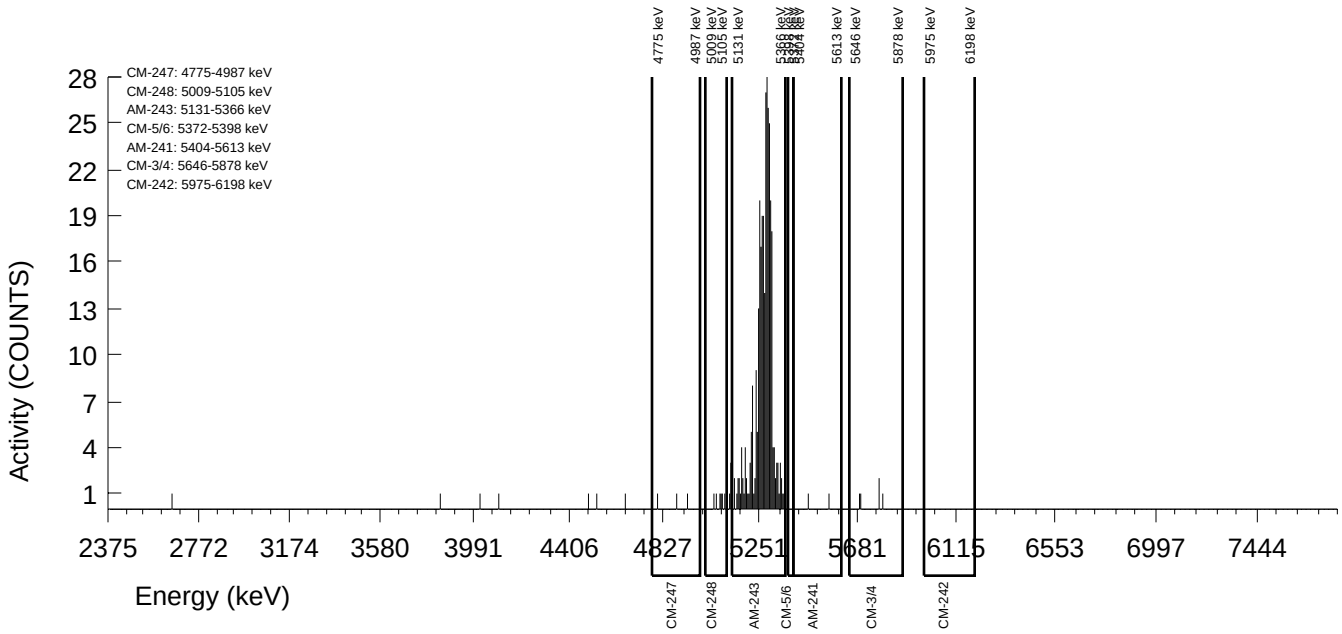
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 105	LIB FILE : AM
SAMPLE ID : S0405240006_AM	DETECTOR S/N : 78777	BKG FILE : B105.CNF;1394
SAMPLE QTY : 0.500 G +/-0.200 %	AVERAGE %EFFICIENCY : 33.6886	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6490	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:05	EFF FILE : W105.CNF;364
% YIELD : 85.2 +/-6.194 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.0410E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5511.06	88.789	2.000	1.040	0.960	0.9798	98.525	1.38E-02	4.73E-02	8.76E-02	2.39E-02	4.72E-02
AM-243	5269.50	5268.98	54.964	330.000	326.640	3.360	1.8330	99.980	4.27E+00	7.17E-01	1.27E-01	4.39E-02	4.67E-01
CM-242	6102.00	6086.56	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	8.53E-02	1.27E-01	0.00E+00	8.51E-02
CM-3/4	5795.02	5747.64	4.933	5.000	2.600	2.400	1.5492	100.000	3.50E-02	6.81E-02	1.17E-01	3.82E-02	6.80E-02
CM-5/6	5386.00	5374.27	0.000	1.000	0.280	0.720	0.8485	86.090	4.26E-03	4.45E-02	9.28E-02	2.36E-02	4.45E-02
CM-247	4946.00	4872.34	128.250	3.000	1.560	1.440	1.2000	79.300	2.57E-02	6.79E-02	1.22E-01	3.63E-02	6.78E-02
CM-248	5078.60	5065.66	83.856	7.000	6.520	0.480	0.6928	91.000	9.37E-02	8.14E-02	7.96E-02	1.82E-02	8.05E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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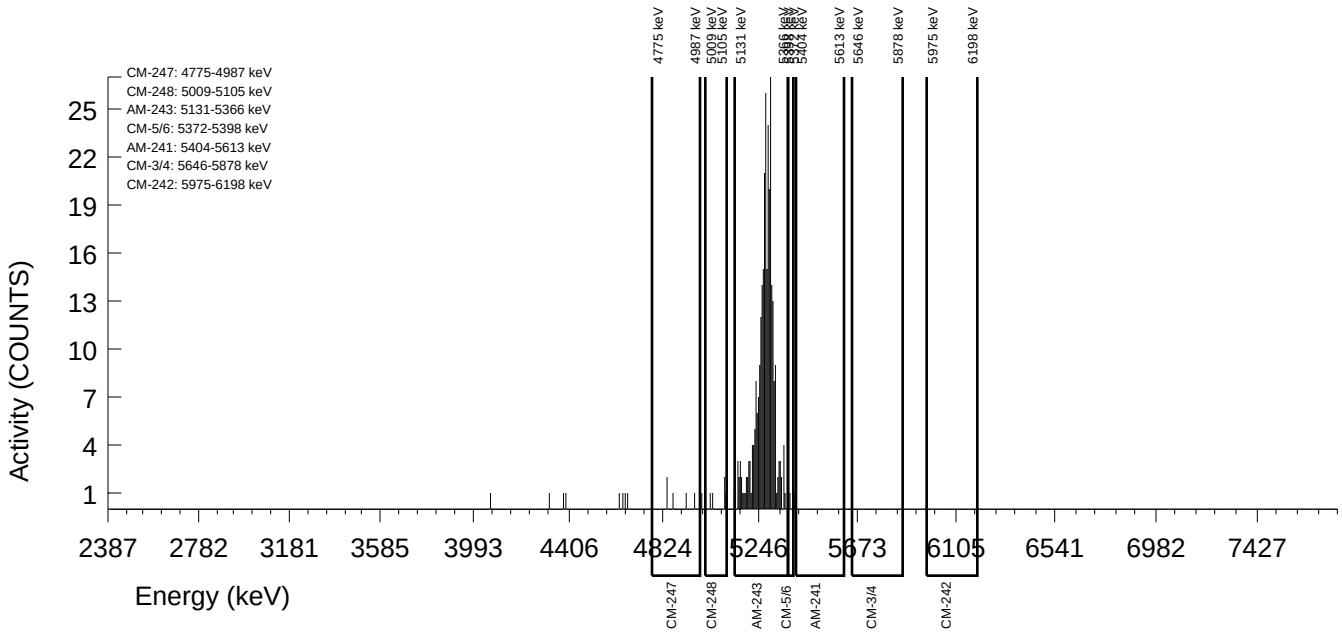
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 106	LIB FILE : AM
SAMPLE ID : S0405240007_AM	DETECTOR S/N : 80012	BKG FILE : B106.CNF;1394
SAMPLE QTY : 0.503 G +/-0.199 %	AVERAGE %EFFICIENCY : 32.6615	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6296	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:05	EFF FILE : W106.CNF;363
% YIELD : 81.1 +/-6.382 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.8481E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5508.47	0.000	0.000	-1.920	1.920	1.3856	98.525	-2.75E-02	3.46E-02	1.16E-01	3.63E-02	3.46E-02
AM-243	5269.50	5268.92	42.912	303.000	301.560	1.440	1.2000	99.980	4.25E+00	7.35E-01	1.04E-01	3.10E-02	4.82E-01
CM-242	6102.00	6086.56	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	9.19E-02	1.36E-01	0.00E+00	9.17E-02
CM-3/4	5795.02	5761.59	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	2.93E-02	4.35E-02	0.00E+00	2.92E-02
CM-5/6	5386.00	5390.00	0.000	2.000	2.000	0.000	0.0000	86.090	3.27E-02	5.62E-02	4.91E-02	0.00E+00	5.61E-02
CM-247	4946.00	4886.16	4.904	5.000	4.520	0.480	0.6928	79.300	8.03E-02	8.71E-02	9.84E-02	2.25E-02	8.65E-02
CM-248	5078.60	5070.64	7.356	5.000	4.520	0.480	0.6928	91.000	7.00E-02	7.59E-02	8.57E-02	1.96E-02	7.54E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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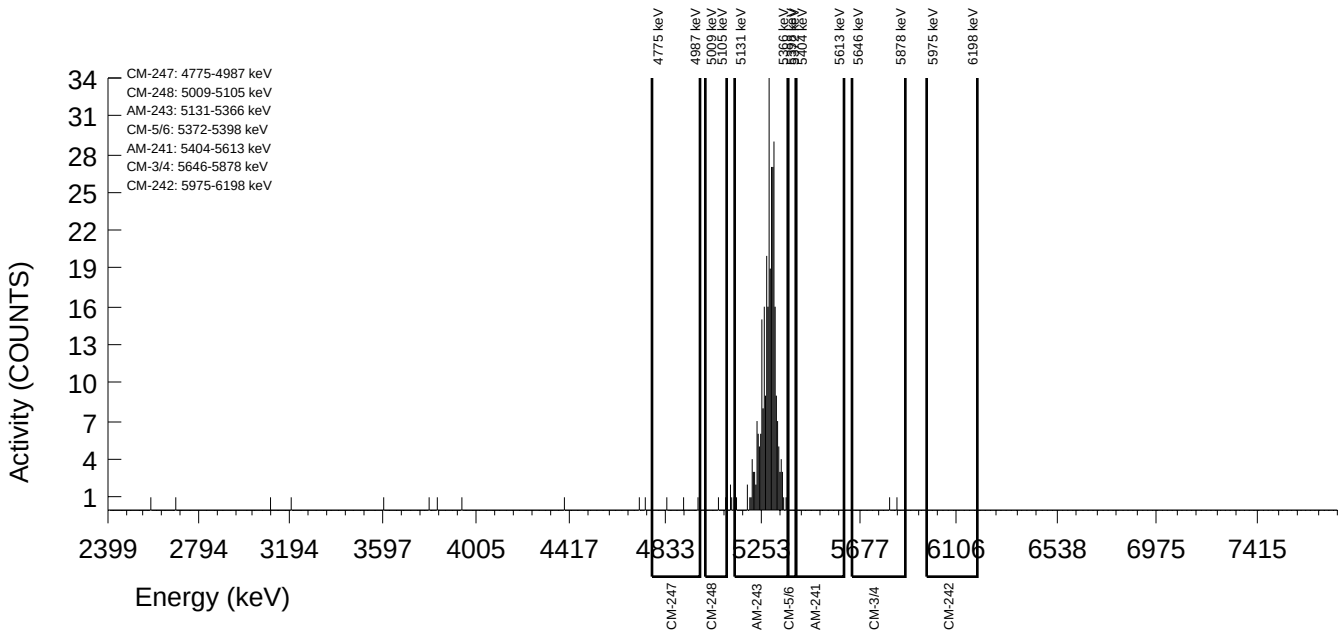
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 107	LIB FILE : AM
SAMPLE ID : S0405240008_AM	DETECTOR S/N : 67578	BKG FILE : B107.CNF;1435
SAMPLE QTY : 0.516 G +/-0.194 %	AVERAGE %EFFICIENCY : 30.7195	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5929	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:09	EFF FILE : W107.CNF;426
% YIELD : 89.2 +/-6.293 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.2303E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5508.48	0.000	0.000	-0.240	0.240	0.4899	98.525	-3.24E-03	2.80E-02	6.47E-02	1.21E-02	2.79E-02
AM-243	5269.50	5282.20	35.383	313.000	311.800	1.200	1.0954	99.980	4.14E+00	7.06E-01	9.32E-02	2.67E-02	4.62E-01
CM-242	6102.00	6086.57	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	8.66E-02	1.29E-01	0.00E+00	8.64E-02
CM-3/4	5795.02	5826.75	34.420	2.000	0.080	1.920	1.3856	100.000	1.09E-03	5.03E-02	1.10E-01	3.47E-02	5.03E-02
CM-5/6	5386.00	5369.36	0.000	3.000	2.760	0.240	0.4899	86.090	4.26E-02	6.16E-02	7.40E-02	1.38E-02	6.13E-02
CM-247	4946.00	4907.99	132.762	3.000	2.040	0.960	0.9798	79.300	3.42E-02	6.81E-02	1.10E-01	3.01E-02	6.80E-02
CM-248	5078.60	5079.33	34.420	2.000	2.000	0.000	0.0000	91.000	2.92E-02	5.02E-02	4.38E-02	0.00E+00	5.00E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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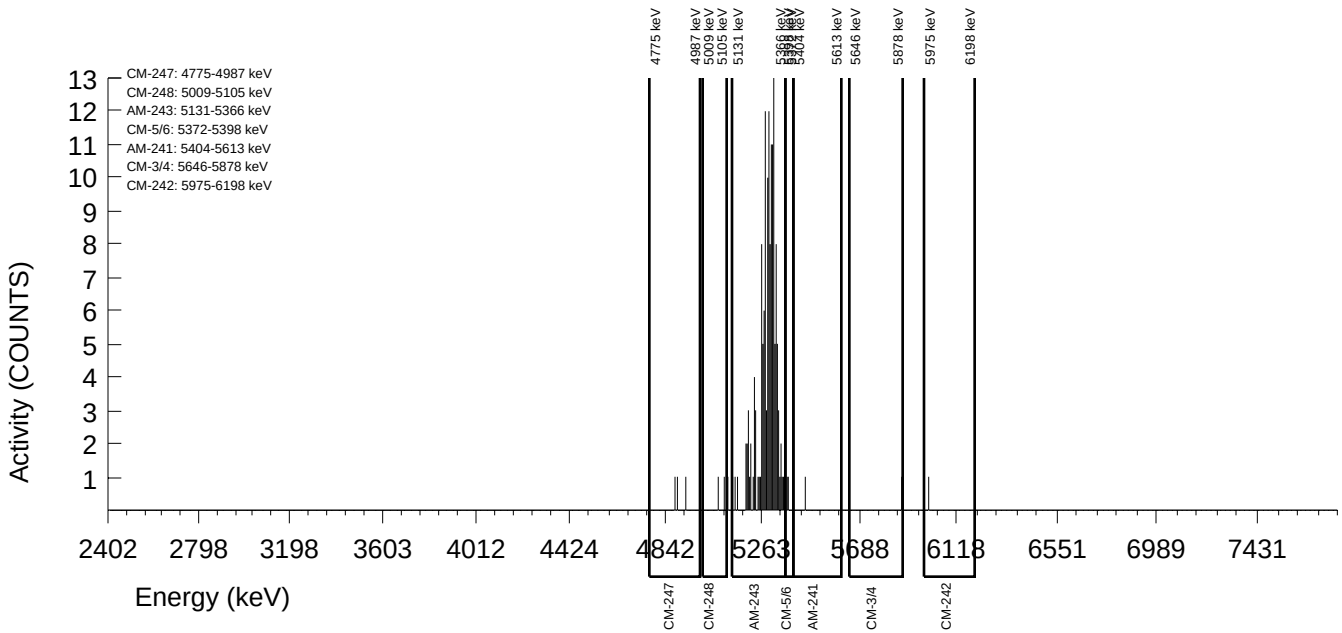
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 097	LIB FILE : AM
SAMPLE ID : S0405240009_AM	DETECTOR S/N : 83288	BKG FILE : B097.CNF;1392
SAMPLE QTY : 0.507 G +/-0.197 %	AVERAGE %EFFICIENCY : 35.3557	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6805	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:04	EFF FILE : W097.CNF;381
% YIELD : 74.4 +/-8.637 %	ELAPSED LIVE TIME(SEC) : 7199.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.5308E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5453.62	4.926	1.000	0.760	0.240	0.4899	98.525	2.17E-02	8.03E-02	1.35E-01	2.44E-02	8.01E-02
AM-243	5269.50	5287.07	62.629	150.000	149.760	0.240	0.4899	99.980	4.22E+00	9.97E-01	1.32E-01	2.40E-02	6.78E-01
CM-242	6102.00	5993.71	4.926	1.000	1.000	0.000	0.0000	100.000	9.12E-02	2.54E-01	2.74E-01	0.00E+00	2.54E-01
CM-3/4	5795.02	5875.50	0.000	1.000	0.640	0.360	0.6000	100.000	1.85E-02	8.16E-02	1.47E-01	3.03E-02	8.14E-02
CM-5/6	5386.00	5384.59	0.000	3.000	2.880	0.120	0.3464	86.090	9.41E-02	1.30E-01	1.37E-01	1.97E-02	1.29E-01
CM-247	4946.00	4902.69	49.259	3.000	2.760	0.240	0.4899	79.300	9.79E-02	1.41E-01	1.67E-01	3.03E-02	1.40E-01
CM-248	5078.60	5085.84	29.555	2.000	1.640	0.360	0.6000	91.000	5.07E-02	1.06E-01	1.57E-01	3.23E-02	1.06E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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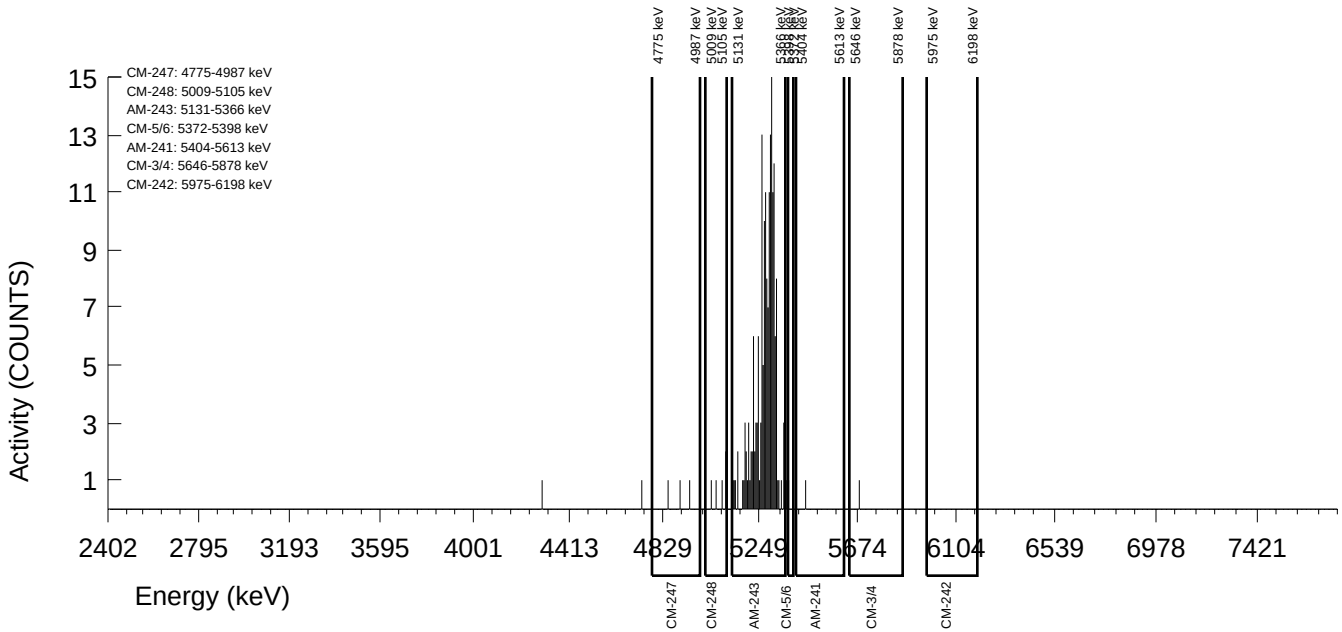
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 099	LIB FILE : AM
SAMPLE ID : S0405240010_AM	DETECTOR S/N : 80059	BKG FILE : B099.CNF;1395
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 35.6284	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6858	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:04	EFF FILE : W099.CNF;383
% YIELD : 89.8 +/-7.926 %	ELAPSED LIVE TIME(SEC) : 7199.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.2590E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5450.60	4.881	1.000	0.760	0.240	0.4899	98.525	1.78E-02	6.59E-02	1.10E-01	2.00E-02	6.58E-02
AM-243	5269.50	5274.75	61.604	183.000	182.040	0.960	0.9798	99.980	4.21E+00	9.11E-01	1.48E-01	3.94E-02	6.15E-01
CM-242	6102.00	6086.56	0.000	0.000	-0.120	0.120	0.3464	100.000	-8.99E-03	1.49E-01	3.15E-01	4.52E-02	1.49E-01
CM-3/4	5795.02	5685.10	4.881	1.000	0.400	0.600	0.7746	100.000	9.51E-03	6.74E-02	1.35E-01	3.21E-02	6.73E-02
CM-5/6	5386.00	5376.28	4.881	1.000	0.760	0.240	0.4899	86.090	2.04E-02	7.53E-02	1.26E-01	2.29E-02	7.52E-02
CM-247	4946.00	4898.40	92.738	3.000	2.520	0.480	0.6928	79.300	7.34E-02	1.16E-01	1.58E-01	3.51E-02	1.15E-01
CM-248	5078.60	5066.39	4.881	6.000	5.640	0.360	0.6000	91.000	1.43E-01	1.34E-01	1.29E-01	2.65E-02	1.32E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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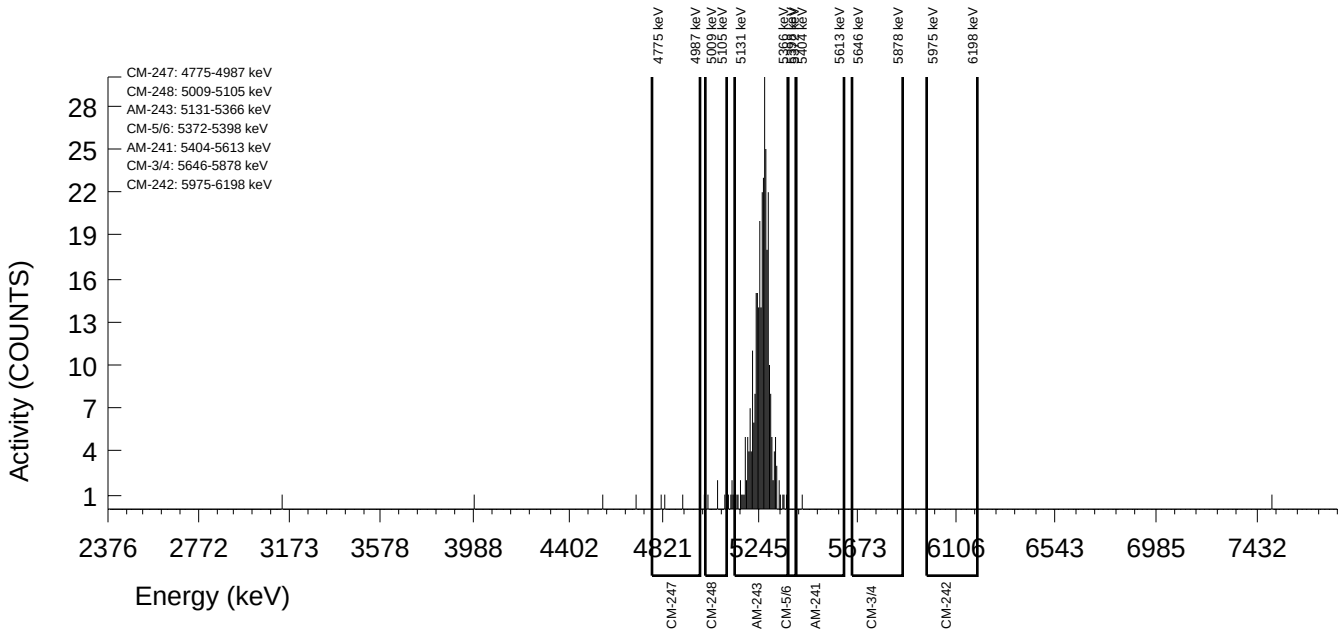
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 110	LIB FILE : AM
SAMPLE ID : S0405240011_AM	DETECTOR S/N : 83292	BKG FILE : B110.CNF;1436
SAMPLE QTY : 0.510 G +/-0.196 %	AVERAGE %EFFICIENCY : 32.3669	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6241	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:09	EFF FILE : W110.CNF;441
% YIELD : 87.0 +/-6.215 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.1272E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5431.75	4.922	1.000	0.760	0.240	0.4899	98.525	1.01E-02	3.79E-02	6.37E-02	1.19E-02	3.79E-02
AM-243	5269.50	5253.64	41.429	321.000	320.520	0.480	0.6928	99.980	4.19E+00	7.05E-01	7.24E-02	1.66E-02	4.60E-01
CM-242	6102.00	6086.56	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	8.52E-02	1.27E-01	0.00E+00	8.51E-02
CM-3/4	5795.02	5761.59	0.000	0.000	-0.720	0.720	0.8485	100.000	-9.69E-03	2.93E-02	8.22E-02	2.09E-02	2.92E-02
CM-5/6	5386.00	5385.09	0.000	0.000	-0.240	0.240	0.4899	86.090	-3.64E-03	3.15E-02	7.28E-02	1.36E-02	3.14E-02
CM-247	4946.00	4847.72	93.523	3.000	2.040	0.960	0.9798	79.300	3.36E-02	6.70E-02	1.09E-01	2.96E-02	6.69E-02
CM-248	5078.60	5066.51	4.922	5.000	4.760	0.240	0.4899	91.000	6.84E-02	7.02E-02	6.89E-02	1.29E-02	6.96E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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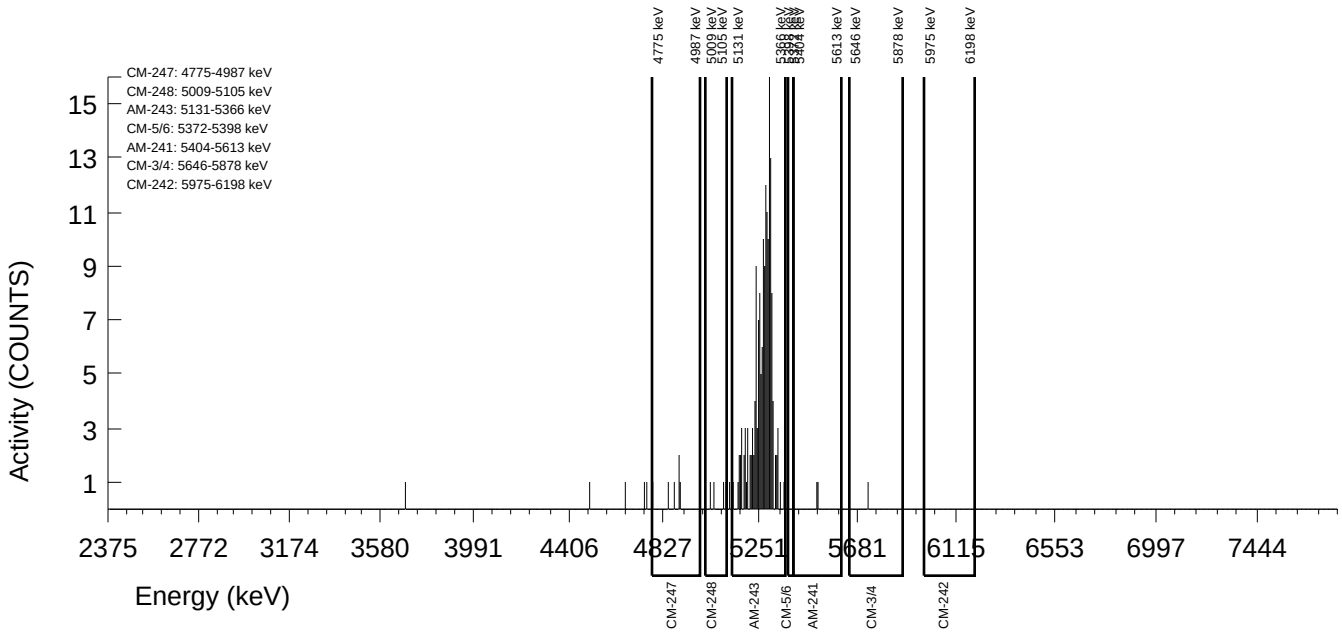
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 105	LIB FILE : AM
SAMPLE ID : S0405240012_AM	DETECTOR S/N : 78777	BKG FILE : B105.CNF;1394
SAMPLE QTY : 0.501 G +/-0.200 %	AVERAGE %EFFICIENCY : 33.6886	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6490	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:05	EFF FILE : W105.CNF;364
% YIELD : 88.8 +/-8.183 %	ELAPSED LIVE TIME(SEC) : 7199.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.2142E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5505.68	9.865	2.000	1.520	0.480	0.6928	98.525	3.87E-02	8.76E-02	1.38E-01	3.07E-02	8.74E-02
AM-243	5269.50	5263.50	65.112	172.000	170.320	1.680	1.2961	99.980	4.27E+00	9.55E-01	1.88E-01	5.65E-02	6.46E-01
CM-242	6102.00	6086.56	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	1.61E-01	2.44E-01	0.00E+00	1.60E-01
CM-3/4	5795.02	5729.27	4.933	1.000	-0.200	1.200	1.0954	100.000	-5.15E-03	7.43E-02	1.76E-01	4.92E-02	7.42E-02
CM-5/6	5386.00	5385.09	0.000	0.000	-0.360	0.360	0.6000	86.090	-1.05E-02	5.88E-02	1.48E-01	3.04E-02	5.86E-02
CM-247	4946.00	4882.41	7.399	7.000	6.280	0.720	0.8485	79.300	1.98E-01	1.79E-01	1.88E-01	4.66E-02	1.76E-01
CM-248	5078.60	5068.88	0.000	4.000	3.760	0.240	0.4899	91.000	1.03E-01	1.22E-01	1.29E-01	2.35E-02	1.21E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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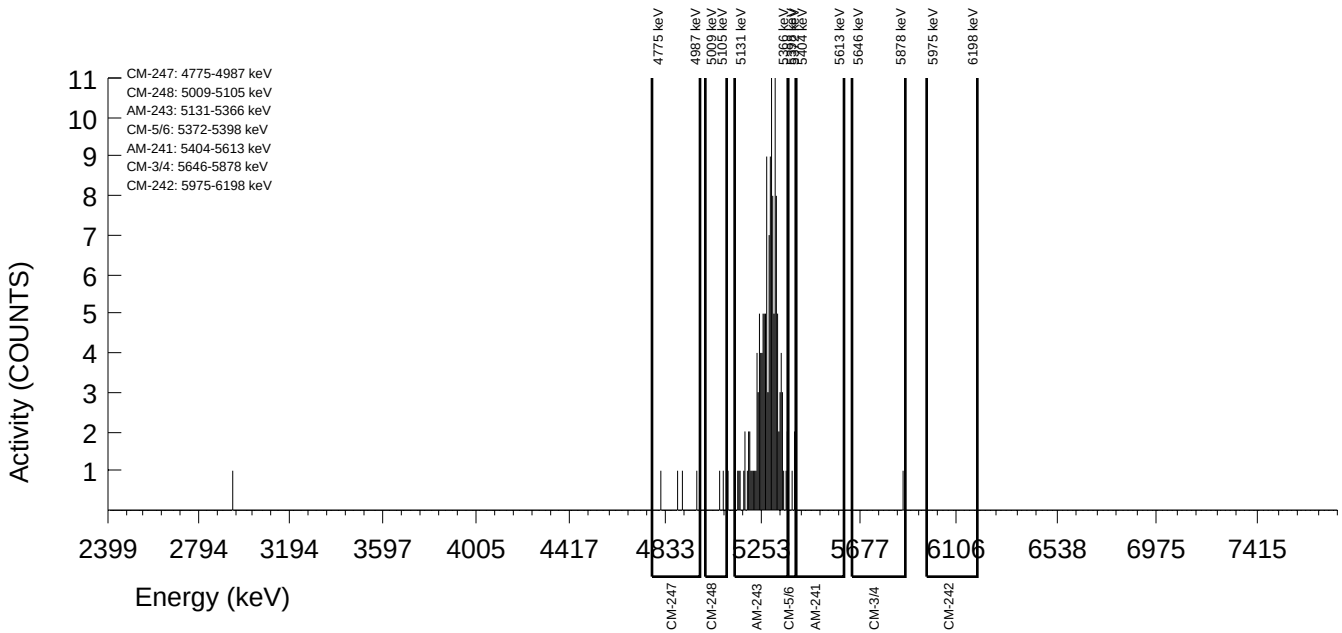
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 107	LIB FILE : AM
SAMPLE ID : S0405240013_AM	DETECTOR S/N : 67578	BKG FILE : B107.CNF;1435
SAMPLE QTY : 0.511 G +/-0.196 %	AVERAGE %EFFICIENCY : 30.7195	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5929	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:06	EFF FILE : W107.CNF;426
% YIELD : 81.4 +/-8.850 %	ELAPSED LIVE TIME(SEC) : 7200.00	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.8640E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5508.48	0.000	0.000	-0.120	0.120	0.3464	98.525	-3.58E-03	5.96E-02	1.25E-01	1.80E-02	5.93E-02
AM-243	5269.50	5279.62	47.737	143.000	142.400	0.600	0.7746	99.980	4.18E+00	1.01E+00	1.67E-01	3.96E-02	6.91E-01
CM-242	6102.00	6086.57	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	1.89E-01	2.86E-01	0.00E+00	1.88E-01
CM-3/4	5795.02	5869.53	4.917	1.000	0.040	0.960	0.9798	100.000	1.21E-03	8.66E-02	1.94E-01	5.16E-02	8.64E-02
CM-5/6	5386.00	5392.29	4.917	3.000	2.880	0.120	0.3464	86.090	9.82E-02	1.35E-01	1.43E-01	2.06E-02	1.34E-01
CM-247	4946.00	4893.16	152.431	4.000	3.520	0.480	0.6928	79.300	1.30E-01	1.65E-01	2.00E-01	4.47E-02	1.63E-01
CM-248	5078.60	5086.34	0.000	3.000	3.000	0.000	0.0000	91.000	9.68E-02	1.28E-01	9.68E-02	0.00E+00	1.27E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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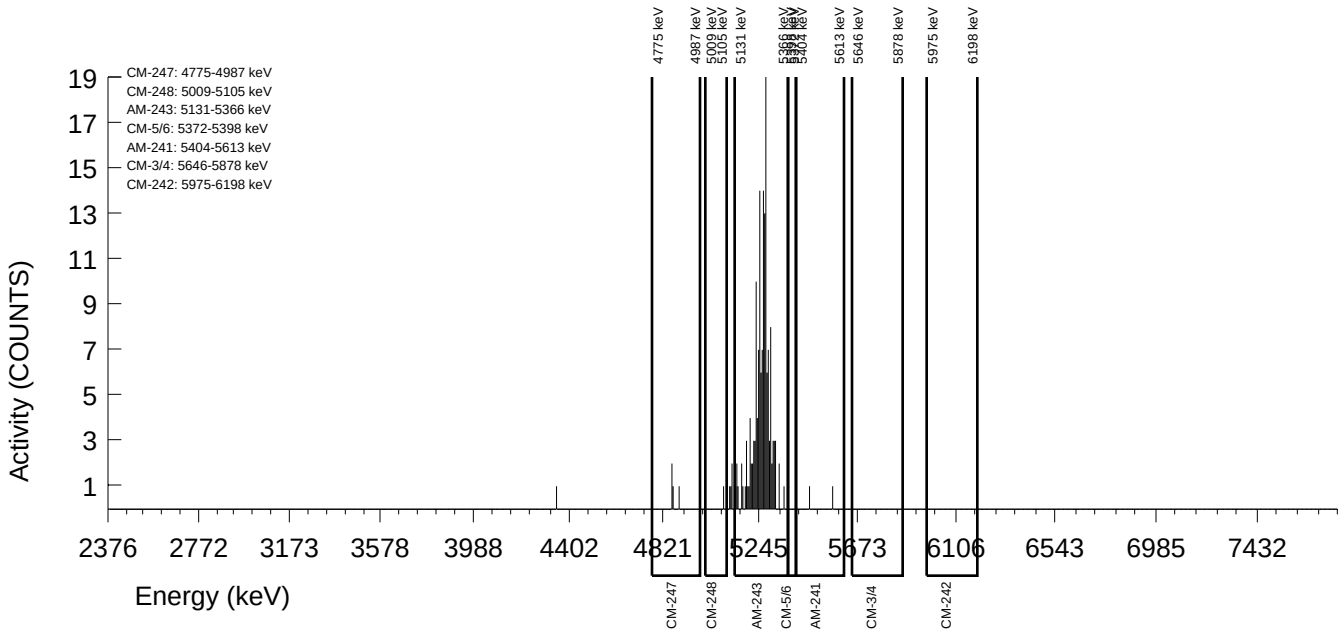
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 110	LIB FILE : AM
SAMPLE ID : S0405240014_AM	DETECTOR S/N : 83292	BKG FILE : B110.CNF;1436
SAMPLE QTY : 0.505 G +/-0.198 %	AVERAGE %EFFICIENCY : 32.3669	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6241	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:06	EFF FILE : W110.CNF;441
% YIELD : 86.2 +/-8.412 %	ELAPSED LIVE TIME(SEC) : 7200.00	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.0886E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5514.74	98.445	2.000	1.880	0.120	0.3464	98.525	5.09E-02	9.28E-02	1.14E-01	1.63E-02	9.24E-02
AM-243	5269.50	5253.56	43.327	159.000	158.760	0.240	0.4899	99.980	4.23E+00	9.74E-01	1.25E-01	2.27E-02	6.61E-01
CM-242	6102.00	6086.56	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	1.71E-01	2.59E-01	0.00E+00	1.71E-01
CM-3/4	5795.02	5761.59	0.000	0.000	-0.360	0.360	0.6000	100.000	-9.88E-03	5.55E-02	1.40E-01	2.87E-02	5.53E-02
CM-5/6	5386.00	5385.09	0.000	0.000	-0.120	0.120	0.3464	86.090	-3.71E-03	6.18E-02	1.30E-01	1.87E-02	6.15E-02
CM-247	4946.00	4867.49	7.383	4.000	3.520	0.480	0.6928	79.300	1.18E-01	1.50E-01	1.82E-01	4.05E-02	1.48E-01
CM-248	5078.60	5085.59	4.922	1.000	0.880	0.120	0.3464	91.000	2.58E-02	8.19E-02	1.23E-01	1.77E-02	8.18E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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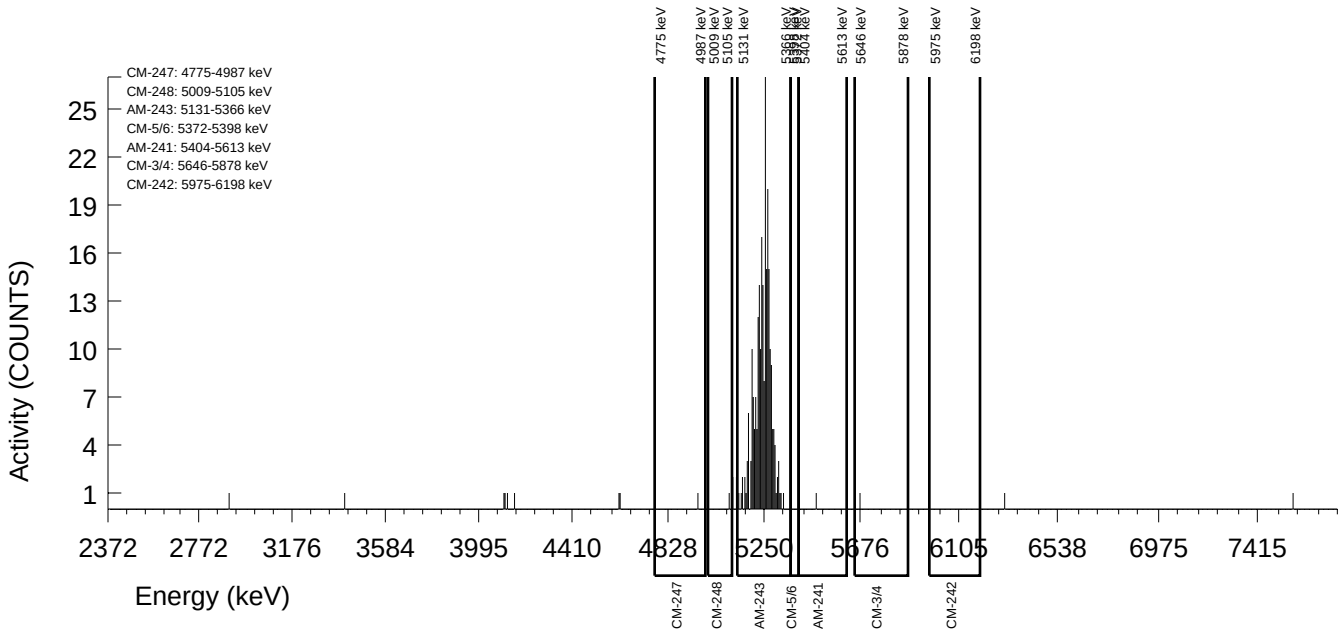
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 216	LIB FILE : AM
SAMPLE ID : S0405240015_AM	DETECTOR S/N : 87904	BKG FILE : B216.CNF;452
SAMPLE QTY : 0.508 G +/-0.197 %	AVERAGE %EFFICIENCY : 24.5587	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4765	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:06:06	EFF FILE : W216.CNF;126
% YIELD : 87.8 +/-6.965 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 4.1673E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5478.43	4.979	1.000	-0.200	1.200	1.0954	98.525	-3.48E-03	5.23E-02	1.22E-01	3.49E-02	5.22E-02
AM-243	5269.50	5244.73	42.569	247.000	245.560	1.440	1.2000	99.980	4.21E+00	7.97E-01	1.27E-01	3.77E-02	5.29E-01
CM-242	6102.00	6086.59	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	1.12E-01	1.66E-01	0.00E+00	1.11E-01
CM-3/4	5795.02	5670.42	4.979	1.000	0.760	0.240	0.4899	100.000	1.34E-02	5.03E-02	8.45E-02	1.58E-02	5.03E-02
CM-5/6	5386.00	5385.09	0.000	0.000	0.000	0.000	0.0000	86.090	0.00E+00	4.02E-02	5.97E-02	0.00E+00	4.01E-02
CM-247	4946.00	4959.52	4.979	1.000	0.040	0.960	0.9798	79.300	8.64E-04	6.41E-02	1.42E-01	3.88E-02	6.40E-02
CM-248	5078.60	5096.66	4.979	1.000	0.760	0.240	0.4899	91.000	1.43E-02	5.37E-02	9.02E-02	1.69E-02	5.36E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

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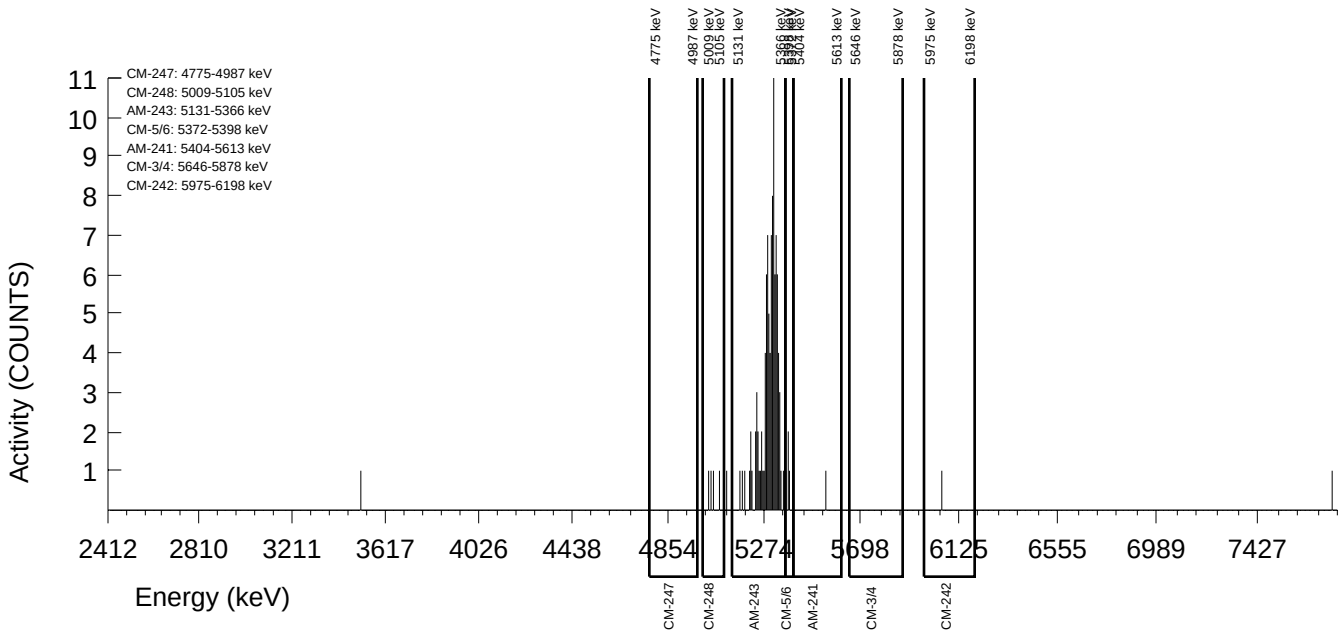
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 241	LIB FILE : AM
SAMPLE ID : S0405240016_AM	DETECTOR S/N : 87963	BKG FILE : B241.CNF;451
SAMPLE QTY : 0.509 G +/-0.196 %	AVERAGE %EFFICIENCY : 25.9181	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.5022	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 16-Sep-2016 11:29:12	EFF FILE : W241.CNF;129
% YIELD : 69.0 +/-10.335 %	ELAPSED LIVE TIME(SEC) : 7200.00	CAL DATE : 19-Aug-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.2727E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5543.60	4.953	1.000	0.880	0.120	0.3464	98.525	3.69E-02	1.17E-01	1.76E-01	2.53E-02	1.17E-01
AM-243	5269.50	5297.47	47.053	102.000	101.760	0.240	0.4899	99.980	4.20E+00	1.19E+00	1.94E-01	3.52E-02	8.21E-01
CM-242	6102.00	6049.52	4.953	1.000	1.000	0.000	0.0000	100.000	1.34E-01	3.73E-01	4.01E-01	0.00E+00	3.72E-01
CM-3/4	5795.02	5761.62	0.000	0.000	-0.360	0.360	0.6000	100.000	-1.53E-02	8.60E-02	2.16E-01	4.44E-02	8.56E-02
CM-5/6	5386.00	5378.30	7.429	4.000	3.880	0.120	0.3464	86.090	1.86E-01	2.14E-01	2.02E-01	2.89E-02	2.11E-01
CM-247	4946.00	4881.20	0.000	0.000	-0.360	0.360	0.6000	79.300	-1.87E-02	1.05E-01	2.65E-01	5.43E-02	1.05E-01
CM-248	5078.60	5051.96	49.529	4.000	3.520	0.480	0.6928	91.000	1.60E-01	2.03E-01	2.45E-01	5.47E-02	2.00E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

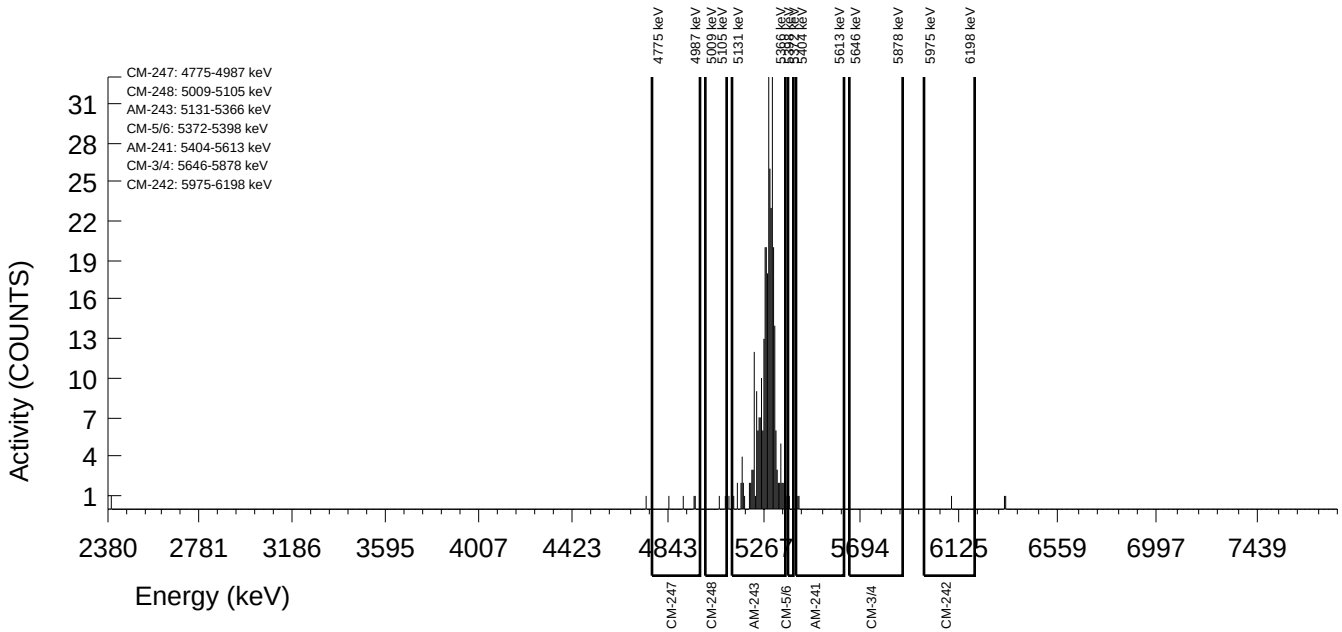
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 095	LIB FILE : AM
SAMPLE ID : S1203621842_AM	DETECTOR S/N : 38626	BKG FILE : B095.CNF;1403
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 30.4247	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.5873	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:05:01	EFF FILE : W095.CNF;408
% YIELD : 93.6 +/-6.193 %	ELAPSED LIVE TIME(SEC) : 14399.99	CAL DATE : 06-Sep-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7439E+00 dpm
RESULTS : 4.4386E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5418.28	9.986	2.000	1.520	0.480	0.6928	98.525	1.96E-02	4.51E-02	7.14E-02	1.64E-02	4.50E-02
AM-243	5269.50	5279.03	40.362	325.000	324.040	0.960	0.9798	99.980	4.12E+00	6.90E-01	8.37E-02	2.28E-02	4.50E-01
CM-242	6102.00	6092.15	4.993	1.000	0.520	0.480	0.6928	100.000	6.68E-03	3.71E-02	7.11E-02	1.63E-02	3.71E-02
CM-3/4	5795.02	5761.62	0.000	0.000	-0.720	0.720	0.8485	100.000	-9.15E-03	2.77E-02	7.76E-02	1.98E-02	2.76E-02
CM-5/6	5386.00	5375.63	0.000	2.000	2.000	0.000	0.0000	86.090	2.95E-02	5.07E-02	4.43E-02	0.00E+00	5.06E-02
CM-247	4946.00	4920.82	114.844	4.000	4.000	0.000	0.0000	79.300	6.41E-02	7.11E-02	4.81E-02	0.00E+00	7.06E-02
CM-248	5078.60	5083.42	29.959	2.000	2.000	0.000	0.0000	91.000	2.79E-02	4.80E-02	4.19E-02	0.00E+00	4.78E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

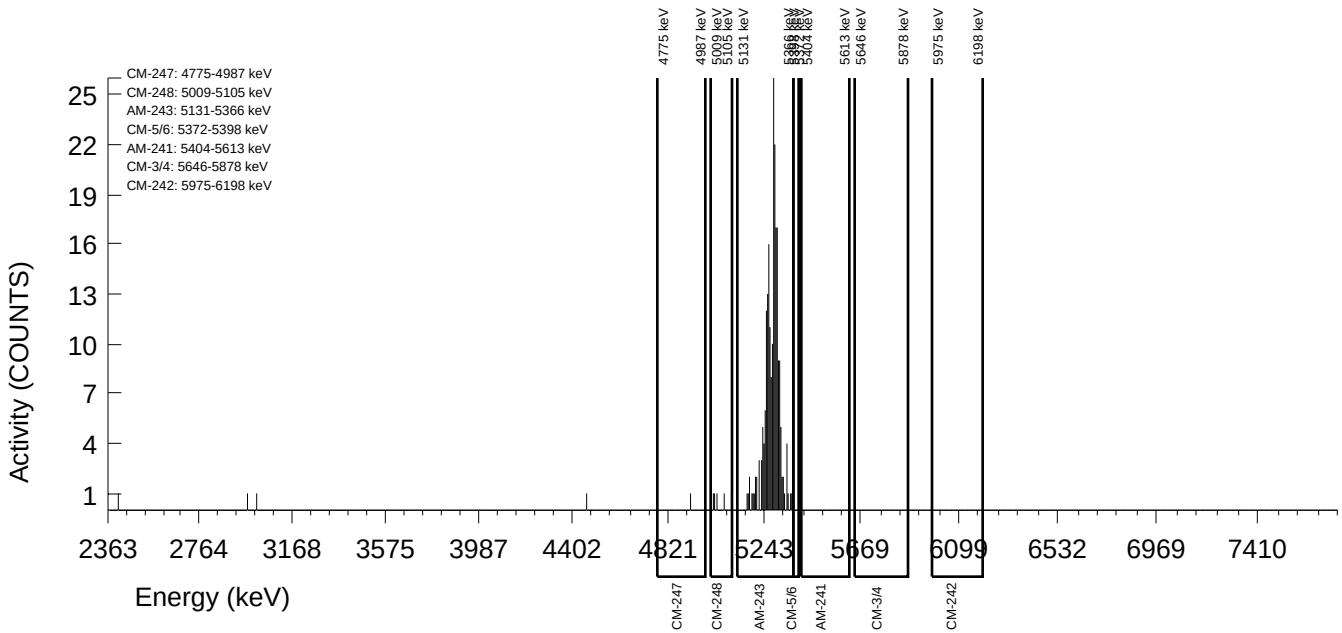
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 218	LIB FILE : AM
SAMPLE ID : S1203621843_AM	DETECTOR S/N : 87906	BKG FILE : B218.CNF;455
SAMPLE QTY : 0.502 G +/-0.199 %	AVERAGE %EFFICIENCY : 25.7659	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.4993	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:06:12	EFF FILE : W218.CNF;124
% YIELD : 74.0 +/-7.355 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 16-Aug-2016

TRACER
ID : 1752-C
NUCLIDE : AM-243
NOMINAL : 4.7442E+00 dpm
RESULTS : 3.5114E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5508.50	0.000	0.000	-0.240	0.240	0.4899	98.525	-4.78E-03	4.13E-02	9.55E-02	1.79E-02	4.12E-02
AM-243	5269.50	5278.22	42.335	219.000	217.080	1.920	1.3856	99.980	4.26E+00	8.54E-01	1.58E-01	4.98E-02	5.71E-01
CM-242	6102.00	6086.59	0.000	0.000	-0.240	0.240	0.4899	100.000	-1.52E-02	1.31E-01	3.04E-01	5.68E-02	1.31E-01
CM-3/4	5795.02	5761.62	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	4.08E-02	6.05E-02	0.00E+00	4.07E-02
CM-5/6	5386.00	5370.36	0.000	1.000	0.760	0.240	0.4899	86.090	1.73E-02	6.50E-02	1.09E-01	2.04E-02	6.49E-02
CM-247	4946.00	4920.53	4.981	1.000	0.280	0.720	0.8485	79.300	6.92E-03	7.25E-02	1.51E-01	3.84E-02	7.24E-02
CM-248	5078.60	5050.29	79.690	5.000	3.560	1.440	1.2000	91.000	7.67E-02	1.07E-01	1.59E-01	4.74E-02	1.07E-01



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

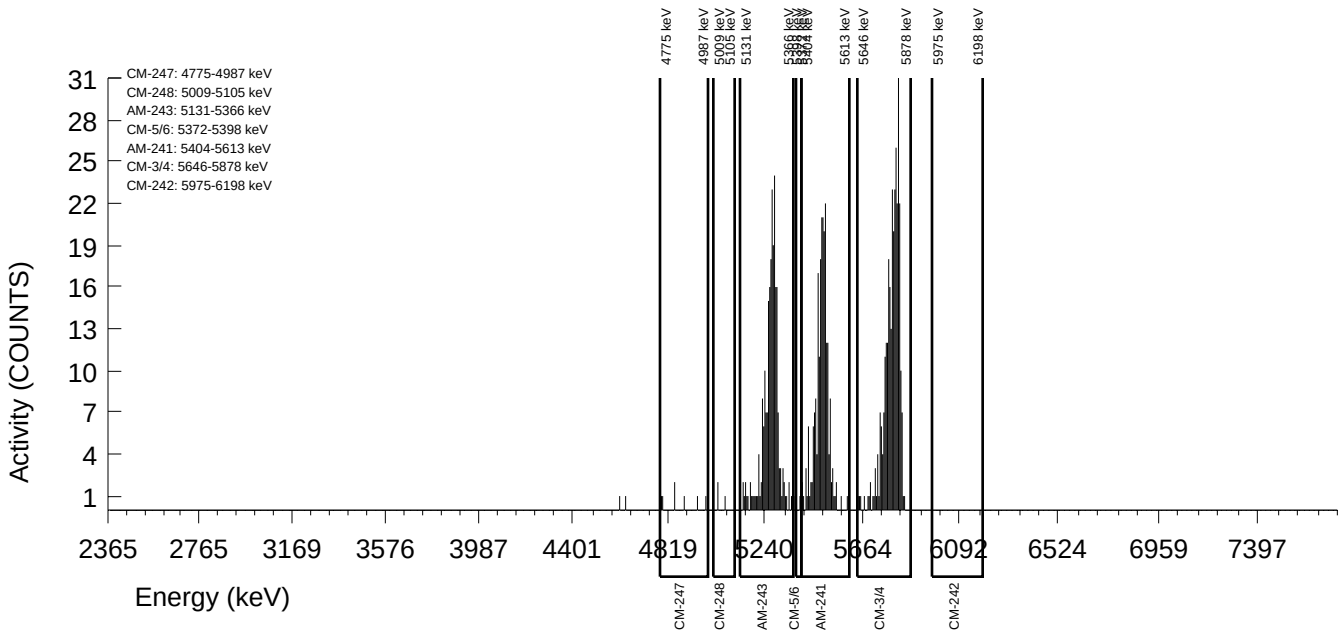
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 1596445	CHAMBER : 221	LIB FILE : AM
SAMPLE ID : S1203621844_AM	DETECTOR S/N : 87909	BKG FILE : B221.CNF;463
SAMPLE QTY : 0.519 G +/-0.193 %	AVERAGE %EFFICIENCY : 25.3216	BKG DATE : 09-Sep-2016
SAMPLE DATE : 13-Sep-2016 00:00:00	AVERAGE %EFF ERROR : 0.4910	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 11:06:14	EFF FILE : W221.CNF;126
% YIELD : 80.3 +/-7.128 %	ELAPSED LIVE TIME(SEC) : 14400.00	CAL DATE : 18-Aug-2016

TRACER		LCS		
ID : 1752-C		ID	0533-CC	1216-G
NUCLIDE : AM-243		NUCLIDE	AM-241	CM-3/4
NOMINAL : 4.7439E+00 dpm		NOMINAL (pCi/G)	3.7948E+00	5.0209E+00
RESULTS : 3.8104E+00 dpm		% RECOVERY	104.756	109.906

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
AM-241	5480.15	5489.37	42.768	221.000	220.280	0.720	0.8485	98.525	3.98E+00	7.81E-01	1.10E-01	2.81E-02	5.27E-01
AM-243	5269.50	5265.10	38.947	232.000	231.520	0.480	0.6928	99.980	4.12E+00	7.99E-01	9.85E-02	2.26E-02	5.32E-01
CM-242	6102.00	6086.60	0.000	0.000	0.000	0.000	0.0000	100.000	0.00E+00	3.63E-02	5.39E-02	0.00E+00	3.62E-02
CM-3/4	5795.02	5795.38	49.601	311.000	310.280	0.720	0.8485	100.000	5.52E+00	1.01E+00	1.09E-01	2.76E-02	6.16E-01
CM-5/6	5386.00	5391.99	0.000	4.000	3.760	0.240	0.4899	86.090	7.77E-02	9.22E-02	9.90E-02	1.85E-02	9.16E-02
CM-247	4946.00	4868.92	4.981	7.000	6.520	0.480	0.6928	79.300	1.46E-01	1.27E-01	1.24E-01	2.85E-02	1.26E-01
CM-248	5078.60	5044.63	4.981	3.000	1.560	1.440	1.2000	91.000	3.05E-02	8.05E-02	1.45E-01	4.29E-02	8.04E-02



Continuing Calibration Data

Review of Alpha Spectrometer QA results (Daily checks) 15-SEP-2016 14:30:24.77

Bank 1 through bank 29 (detectors 1 through 256)

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

	Detector	Parameter	Flag
15-SEP-2016	19	PSFWHM-5000	Below
15-SEP-2016	19	PSENERGY-5000	Above
15-SEP-2016	19	PSCENTRD-5000	Above
15-SEP-2016	19	PSCTSS-5000	Below
15-SEP-2016	36	PSFWHM-5000	Below
15-SEP-2016	36	PSCTSS-5000	Below
15-SEP-2016	37	PSFWHM-5000	Below
15-SEP-2016	37	PSENERGY-5000	Below
15-SEP-2016	37	PSCENTRD-5000	Below
15-SEP-2016	37	PSCTSS-5000	Below
15-SEP-2016	39	PSENERGY-5000	Above
15-SEP-2016	43	PSENERGY-5000	Below
15-SEP-2016	43	PSCENTRD-5000	Below
15-SEP-2016	44	PSENERGY-5000	Below
15-SEP-2016	44	PSCENTRD-5000	Below
15-SEP-2016	45	PSFWHM-5000	Below
15-SEP-2016	45	PSENERGY-5000	Below
15-SEP-2016	45	PSCENTRD-5000	Below
15-SEP-2016	45	PSCTSS-5000	Below
15-SEP-2016	46	PSENERGY-5000	Below
15-SEP-2016	46	PSCENTRD-5000	Below
15-SEP-2016	47	PSENERGY-5000	Below
15-SEP-2016	47	PSCENTRD-5000	Below
15-SEP-2016	48	PSENERGY-5000	Below
15-SEP-2016	48	PSCENTRD-5000	Below
15-SEP-2016	77	PSFWHM-5000	Below
15-SEP-2016	77	PSENERGY-5000	Below
15-SEP-2016	77	PSCENTRD-5000	Below
15-SEP-2016	77	PSCTSS-5000	Below
15-SEP-2016	79	PSFWHM-5000	Below
15-SEP-2016	79	PSCTSS-5000	Below
15-SEP-2016	94	PSFWHM-5000	Below
15-SEP-2016	94	PSCTSS-5000	Below
15-SEP-2016	98	PSENERGY-5000	Above

15-SEP-2016	98	PSCENTRD-5000	Above
15-SEP-2016	100	PSFWHM-5000	Above
15-SEP-2016	101	PSENERGY-5000	Above
15-SEP-2016	101	PSCENTRD-5000	Above
15-SEP-2016	102	PSFWHM-5000	Above
15-SEP-2016	111	PSENERGY-5000	Above
15-SEP-2016	111	PSCENTRD-5000	Above
15-SEP-2016	123	PSFWHM-5000	Above
15-SEP-2016	138	PSFWHM-5000	Above
14-SEP-2016	171	PSCTSS-5000	Below
14-SEP-2016	172	PSCTSS-5000	Below
15-SEP-2016	183	PSFWHM-5000	Below
15-SEP-2016	183	PSCENTRD-5000	Below
15-SEP-2016	183	PSCTSS-5000	Below
15-SEP-2016	186	PSFWHM-5000	Above
15-SEP-2016	192	PSENERGY-5000	Above
15-SEP-2016	198	PSFWHM-5000	Above
15-SEP-2016	198	PSCTSS-5000	Below
15-SEP-2016	227	PSENERGY-5000	Above
15-SEP-2016	237	PSENERGY-5000	Above
15-SEP-2016	237	PSCENTRD-5000	Above
15-SEP-2016	249	PSFWHM-5000	Above

The following detectors that may not have properly transfered to the QA file

171 may not have run since 15-SEP-2016
172 may not have run since 15-SEP-2016

APPROVAL DATE: 9/15/16

APPROVAL TIME: 1500

APPROVED BY: [signature]

PROCEDURE # GL-RAD-I-009

Report completed at 15-SEP-2016 14:33:42.56

Review of Alpha Spectrometer QA results (Daily checks) 16-SEP-2016 09:26:27.10

Bank 1 through bank 29 (detectors 1 through 256)

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

	Detector	Parameter	Flag
16-SEP-2016	19	PSFWHM-5000	Below
16-SEP-2016	19	PSENERGY-5000	Above
16-SEP-2016	19	PSCENTRD-5000	Above
16-SEP-2016	19	PSCTSS-5000	Below
16-SEP-2016	27	PSFWHM-5000	Above
16-SEP-2016	36	PSFWHM-5000	Below
16-SEP-2016	36	PSCTSS-5000	Below
16-SEP-2016	37	PSFWHM-5000	Below
16-SEP-2016	37	PSENERGY-5000	Below
16-SEP-2016	37	PSCENTRD-5000	Below
16-SEP-2016	37	PSCTSS-5000	Below
16-SEP-2016	39	PSENERGY-5000	Above
16-SEP-2016	43	PSENERGY-5000	Below
16-SEP-2016	43	PSCENTRD-5000	Below
16-SEP-2016	45	PSENERGY-5000	Below
16-SEP-2016	46	PSENERGY-5000	Below
16-SEP-2016	46	PSCENTRD-5000	Below
16-SEP-2016	48	PSENERGY-5000	Below
16-SEP-2016	77	PSFWHM-5000	Below
16-SEP-2016	77	PSENERGY-5000	Below
16-SEP-2016	77	PSCENTRD-5000	Below
16-SEP-2016	77	PSCTSS-5000	Below
16-SEP-2016	79	PSFWHM-5000	Below
16-SEP-2016	79	PSCTSS-5000	Below
16-SEP-2016	94	PSFWHM-5000	Below
16-SEP-2016	94	PSCTSS-5000	Below
16-SEP-2016	98	PSENERGY-5000	Above
16-SEP-2016	98	PSCENTRD-5000	Above
16-SEP-2016	100	PSFWHM-5000	Above
16-SEP-2016	101	PSENERGY-5000	Above
16-SEP-2016	101	PSCENTRD-5000	Above
16-SEP-2016	102	PSFWHM-5000	Above

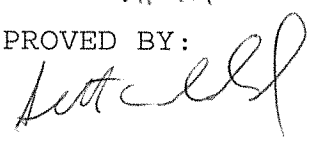
16-SEP-2016	111	PSENERGY-5000	Above
16-SEP-2016	111	PSCENTRD-5000	Above
16-SEP-2016	123	PSFWHM-5000	Above
16-SEP-2016	125	PSFWHM-5000	Above
16-SEP-2016	138	PSFWHM-5000	Above
14-SEP-2016	171	PSCTSS-5000	Below
14-SEP-2016	172	PSCTSS-5000	Below
16-SEP-2016	183	PSFWHM-5000	Below
16-SEP-2016	183	PSCENTRD-5000	Below
16-SEP-2016	183	PSCTSS-5000	Below
16-SEP-2016	192	PSENERGY-5000	Above
16-SEP-2016	193	PSFWHM-5000	Above
16-SEP-2016	198	PSFWHM-5000	Below
16-SEP-2016	198	PSCTSS-5000	Below
16-SEP-2016	227	PSENERGY-5000	Above
16-SEP-2016	237	PSFWHM-5000	Above
16-SEP-2016	237	PSENERGY-5000	Above
16-SEP-2016	237	PSCENTRD-5000	Above
16-SEP-2016	249	PSFWHM-5000	Above

The following detectors that may not have properly transfered to the QA file

171 may not have run since 16-SEP-2016
172 may not have run since 16-SEP-2016

APPROVAL DATE: 9/16/16

APPROVAL TIME: 1045

APPROVED BY: 

PROCEDURE # GL-RAD-I-009

Report completed at 16-SEP-2016 09:29:46.68

Review of Alpha Spectrometer QA results (Daily checks) 19-SEP-2016 17:27:58.24

Bank 1 through bank 29 (detectors 1 through 256)

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

	Detector	Parameter	Flag
19-SEP-2016	19	PSFWHM-5000	Below
19-SEP-2016	19	PSENERGY-5000	Above
19-SEP-2016	19	PSCENTRD-5000	Above
19-SEP-2016	19	PSCTSS-5000	Below
19-SEP-2016	22	PSENERGY-5000	Above
19-SEP-2016	25	PSFWHM-5000	Above
19-SEP-2016	37	PSFWHM-5000	Below
19-SEP-2016	37	PSENERGY-5000	Below
19-SEP-2016	37	PSCENTRD-5000	Below
19-SEP-2016	37	PSCTSS-5000	Below
19-SEP-2016	39	PSENERGY-5000	Above
19-SEP-2016	48	PSFWHM-5000	Below
19-SEP-2016	48	PSENERGY-5000	Below
19-SEP-2016	48	PSCENTRD-5000	Below
19-SEP-2016	48	PSCTSS-5000	Below
19-SEP-2016	77	PSFWHM-5000	Below
19-SEP-2016	77	PSENERGY-5000	Below
19-SEP-2016	77	PSCENTRD-5000	Below
19-SEP-2016	77	PSCTSS-5000	Below
19-SEP-2016	79	PSFWHM-5000	Below
19-SEP-2016	79	PSCTSS-5000	Below
19-SEP-2016	94	PSFWHM-5000	Below
19-SEP-2016	94	PSCTSS-5000	Below
19-SEP-2016	98	PSENERGY-5000	Above
19-SEP-2016	98	PSCENTRD-5000	Above
19-SEP-2016	100	PSFWHM-5000	Above
19-SEP-2016	101	PSENERGY-5000	Above
19-SEP-2016	101	PSCENTRD-5000	Above
19-SEP-2016	102	PSFWHM-5000	Above
19-SEP-2016	111	PSENERGY-5000	Above
19-SEP-2016	111	PSCENTRD-5000	Above
19-SEP-2016	111	PSCTSS-5000	Below
19-SEP-2016	123	PSFWHM-5000	Above

19-SEP-2016	178	PSFWHM-5000	Above
19-SEP-2016	183	PSFWHM-5000	Below
19-SEP-2016	183	PSCENTRD-5000	Below
19-SEP-2016	183	PSCTSS-5000	Below
19-SEP-2016	192	PSENERGY-5000	Above
19-SEP-2016	193	PSFWHM-5000	Above
19-SEP-2016	198	PSFWHM-5000	Below
19-SEP-2016	198	PSCTSS-5000	Below
19-SEP-2016	237	PSENERGY-5000	Above
19-SEP-2016	237	PSCENTRD-5000	Above

The following detectors that may not have properly transfered to the QA file

171 may not have run since 19-SEP-2016
172 may not have run since 19-SEP-2016

APPROVAL DATE: 9/19/16

APPROVAL TIME: 1815

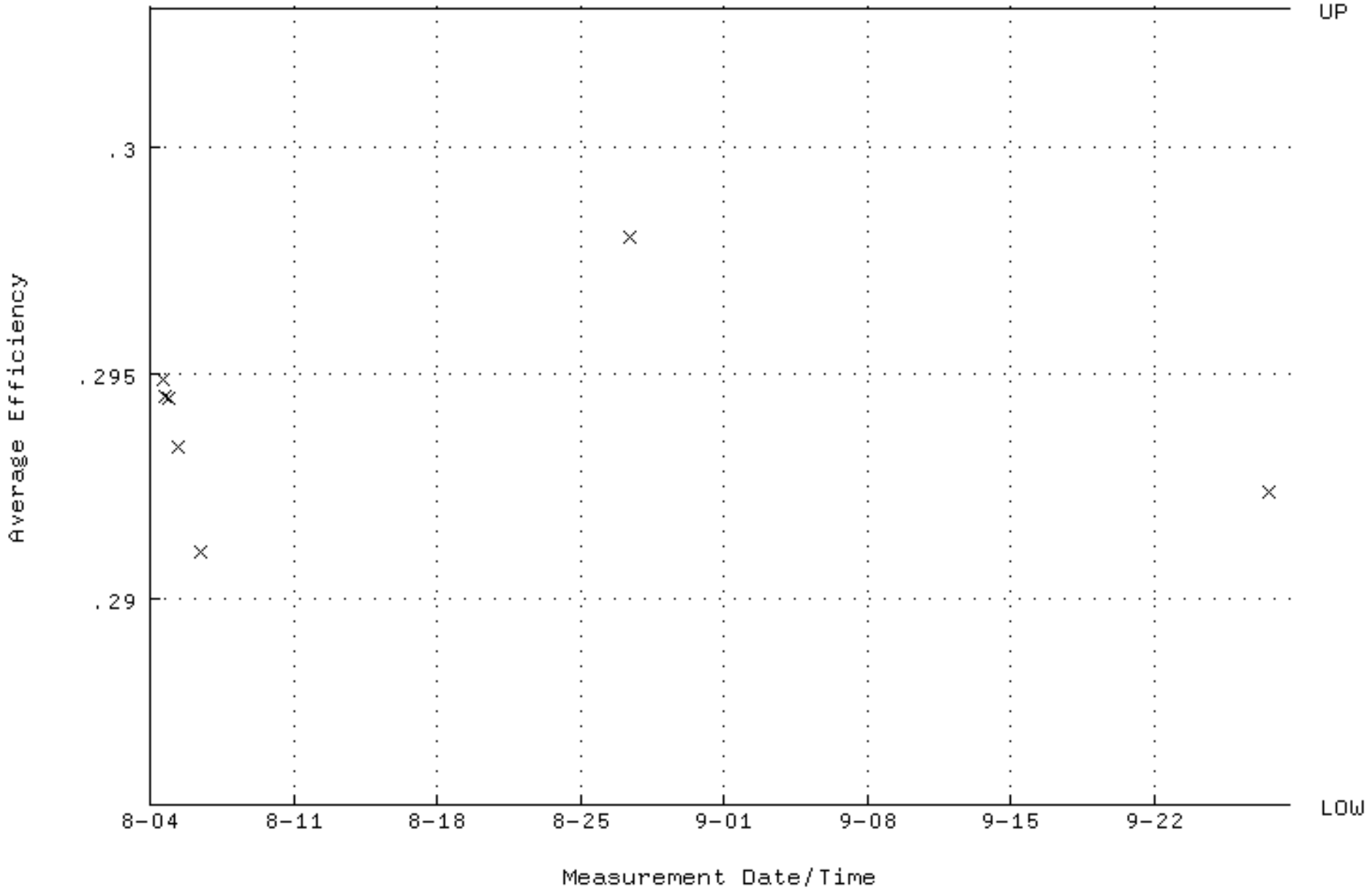
APPROVED BY: [signature]

PROCEDURE # GL-RAD-I-009

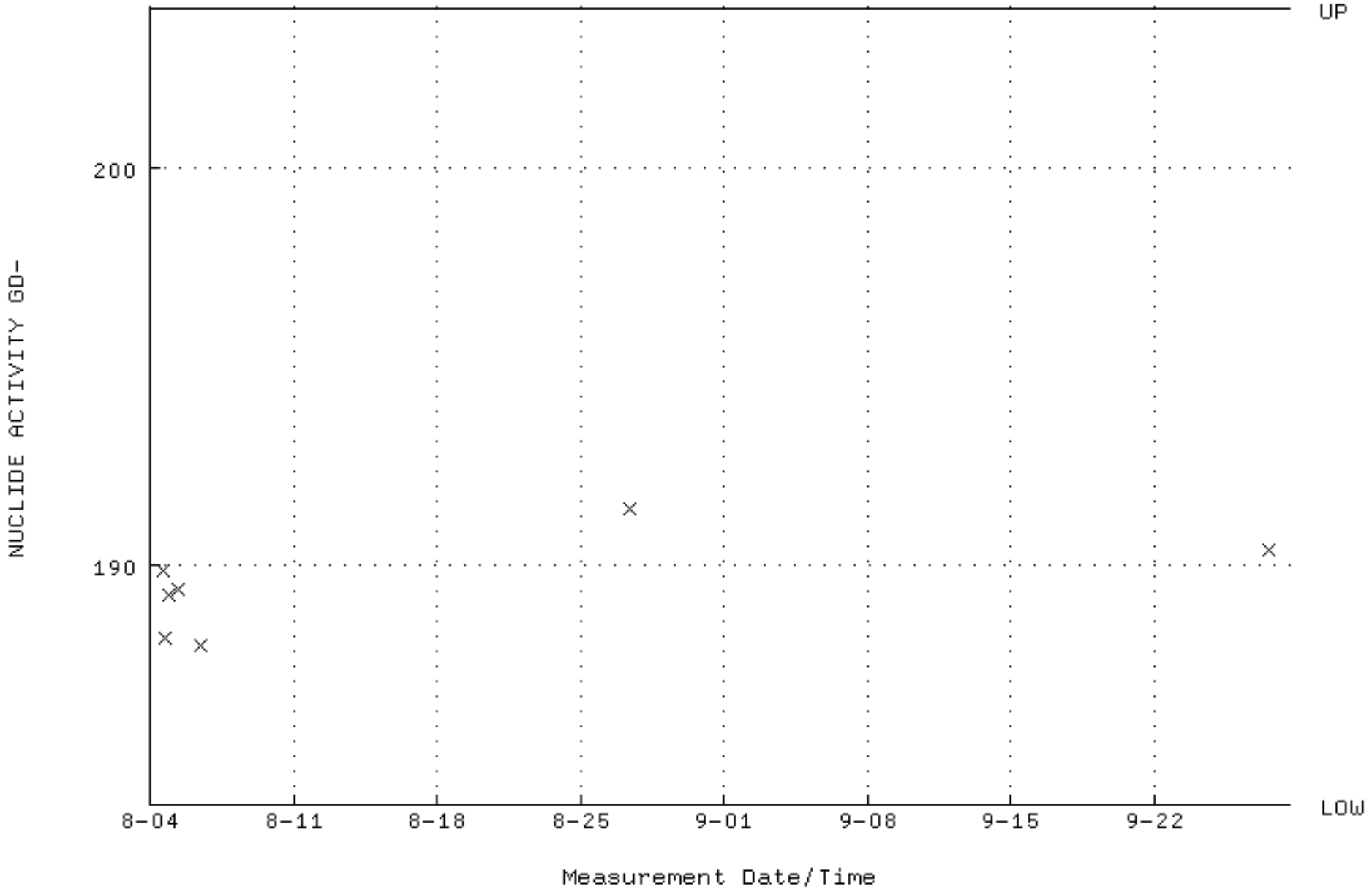
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Background and Efficiency Data

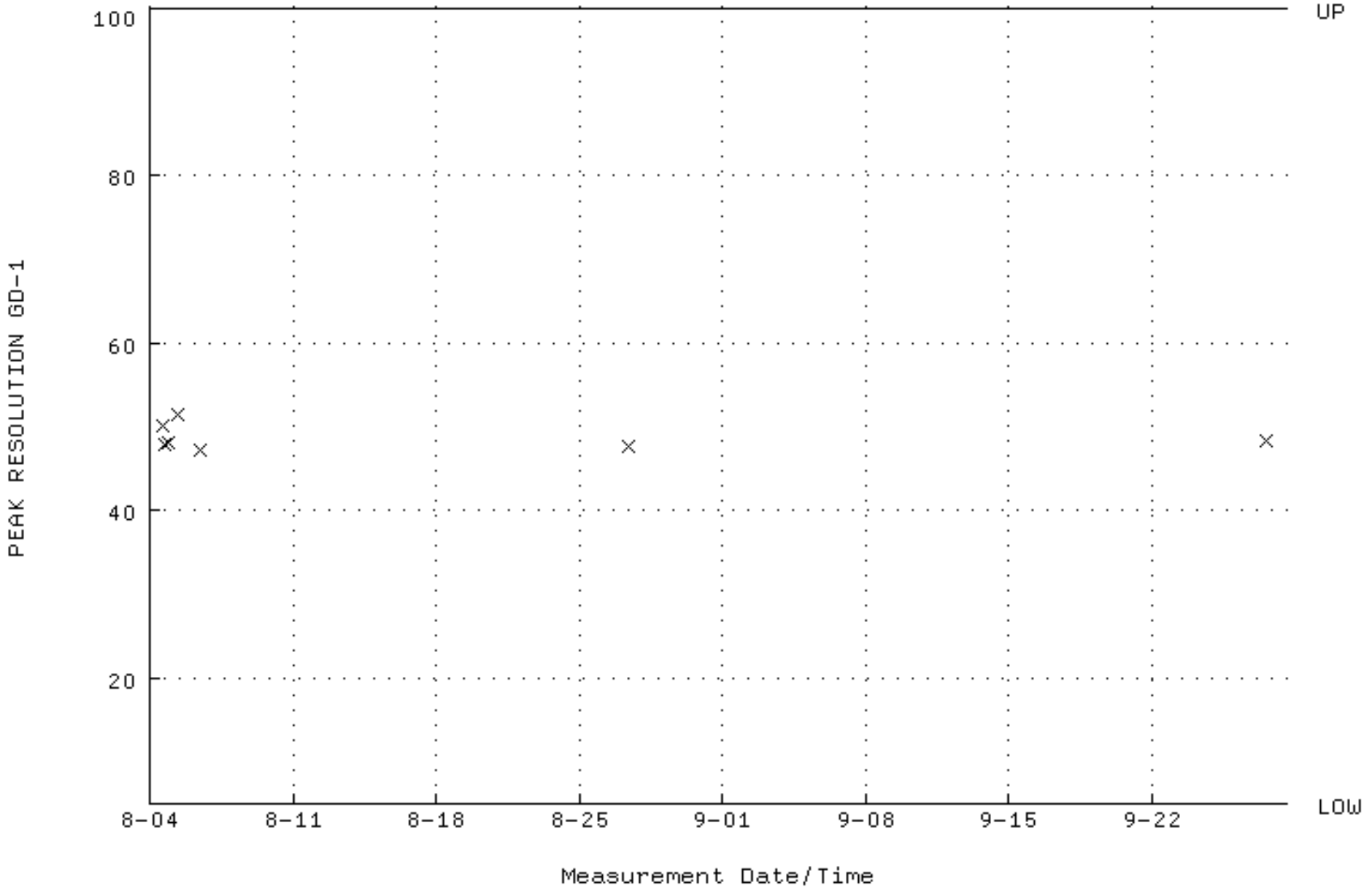
QA filename : DKA100:[ENV_ALPHA.QA.W]W001.QAF;12
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.285426 through 0.303082



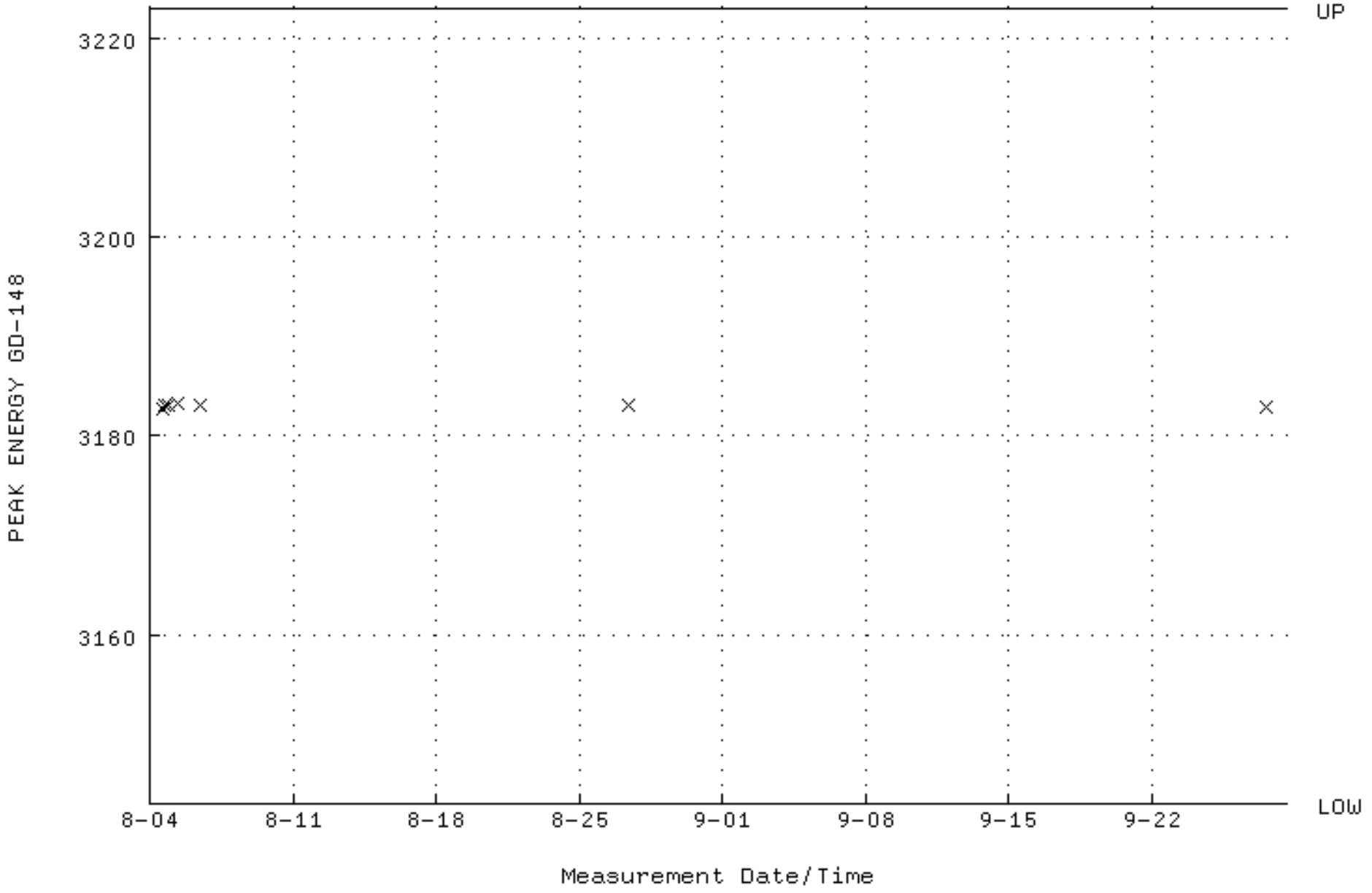
QA filename : DKA100:[ENV_ALPHA.QA.W]W001.QAF;12
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



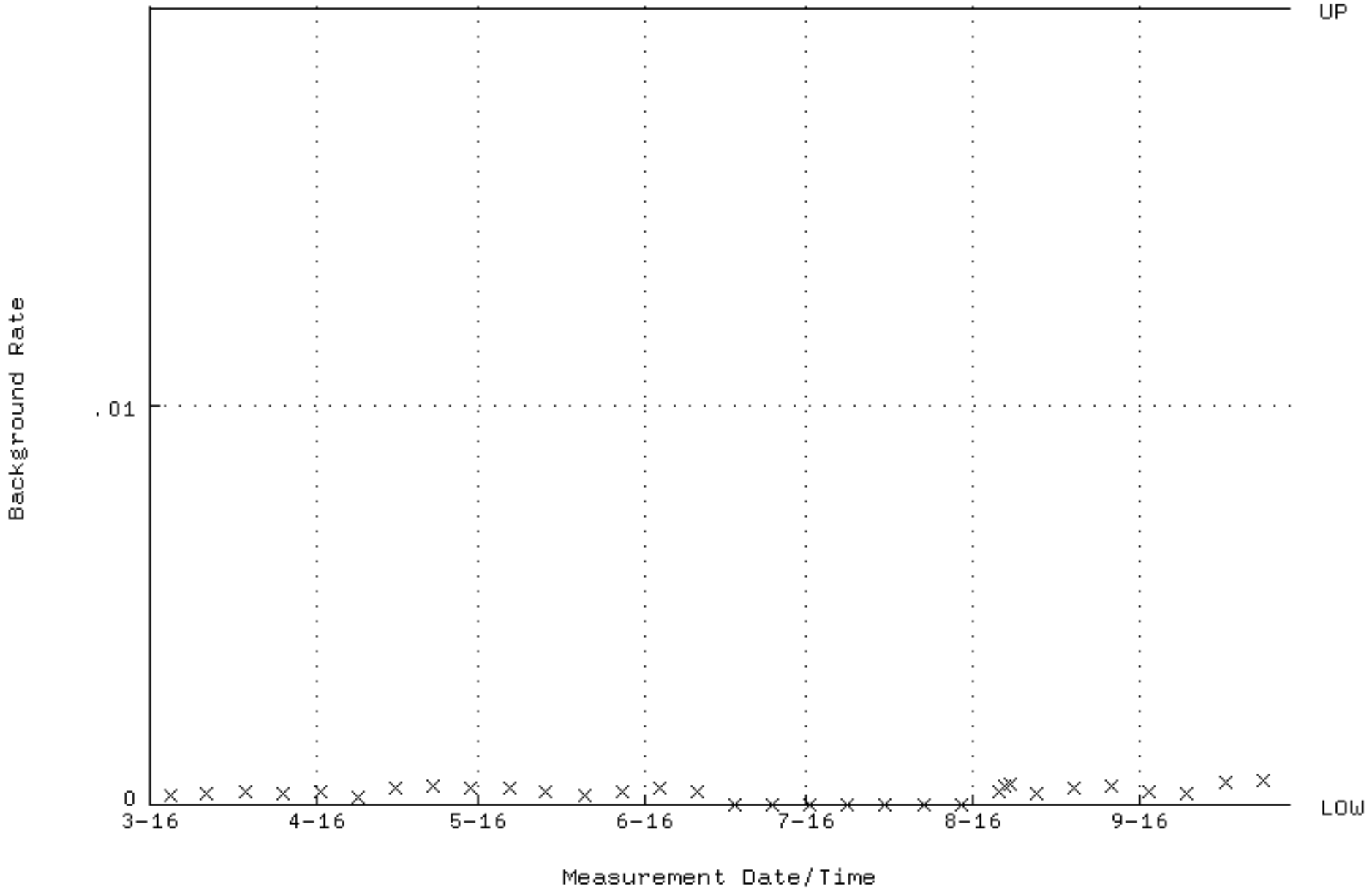
QA filename : DKA100:[ENV_ALPHA.QA.W]W001.QAF;12
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



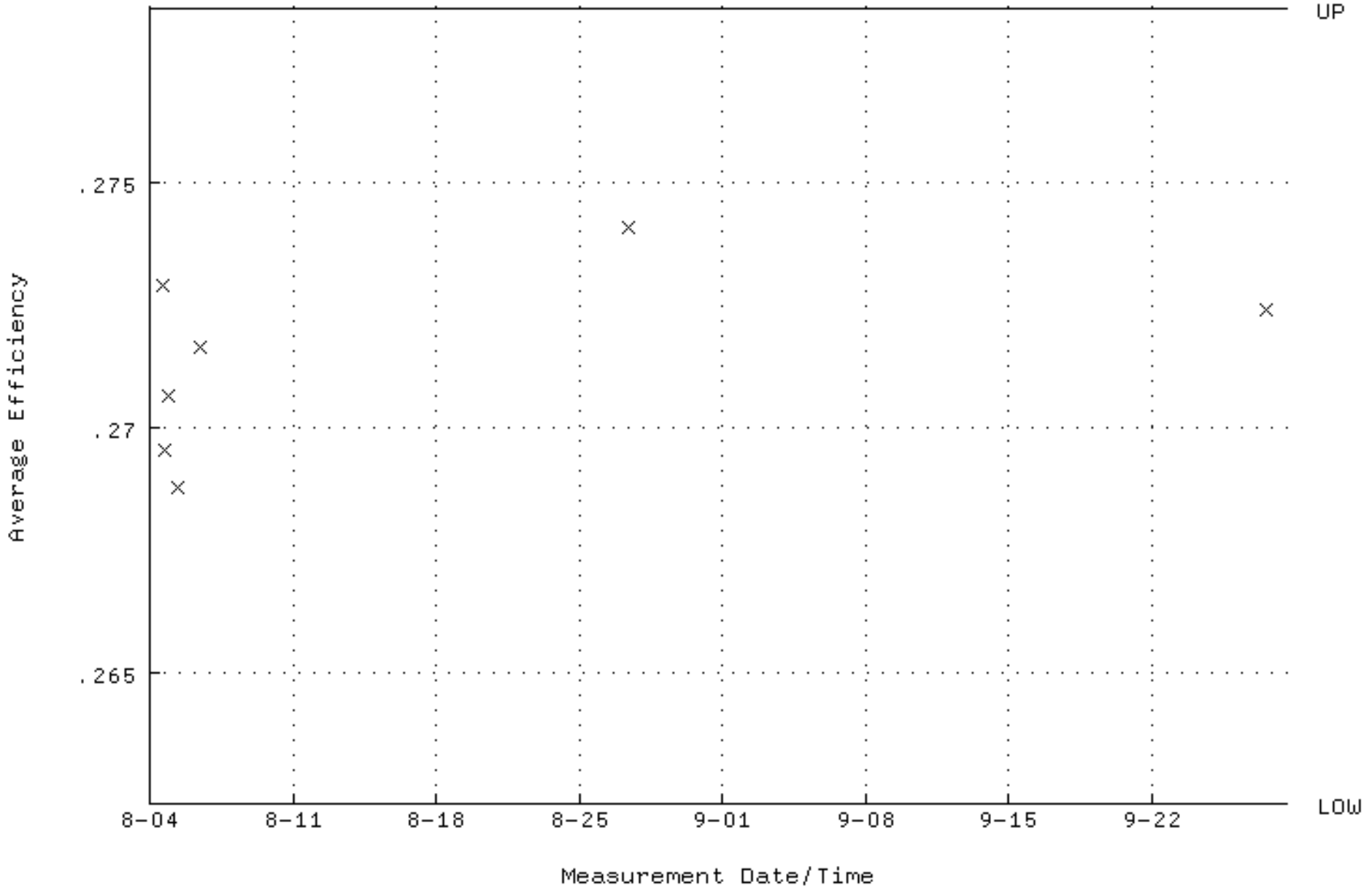
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



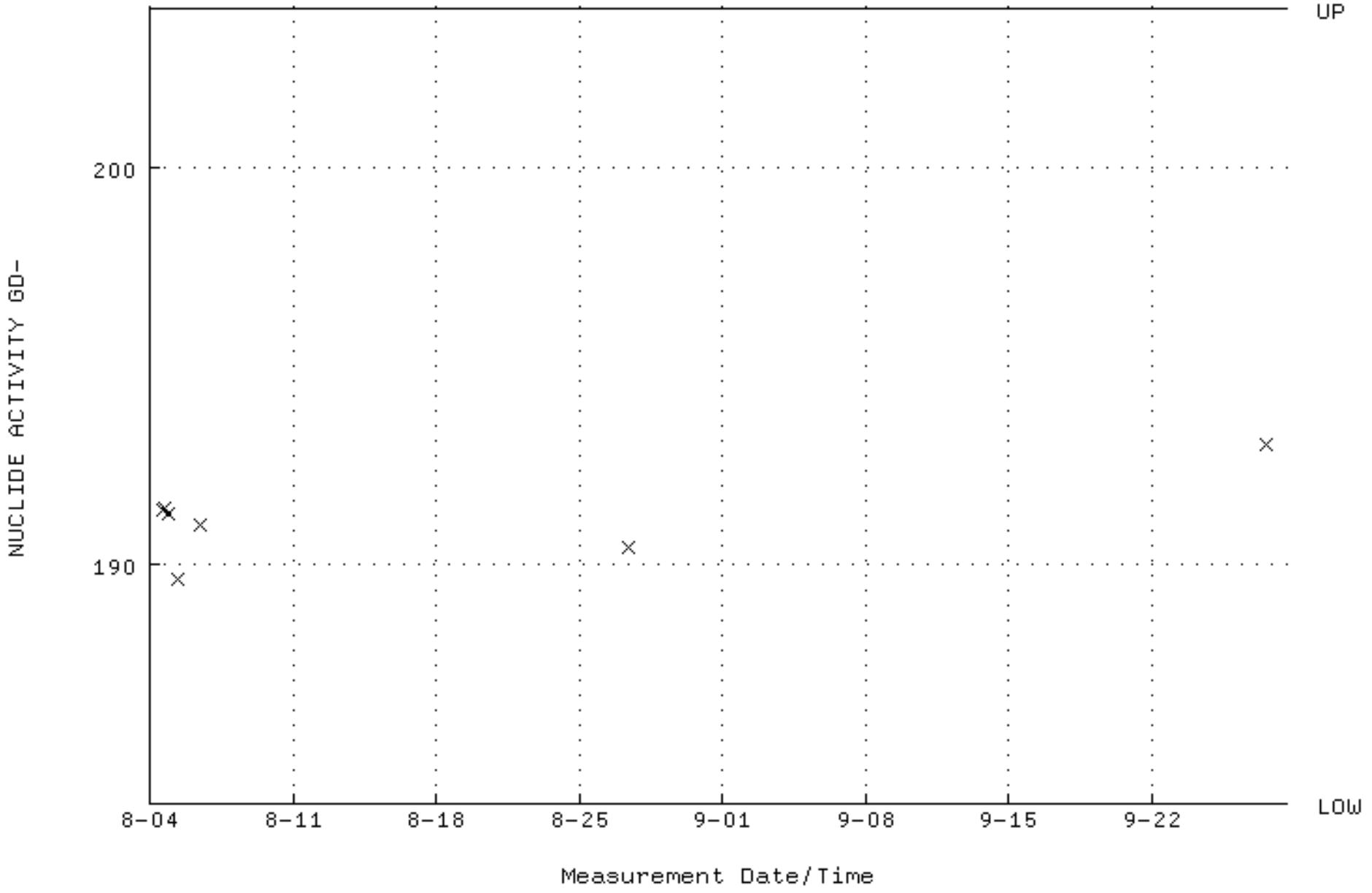
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Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



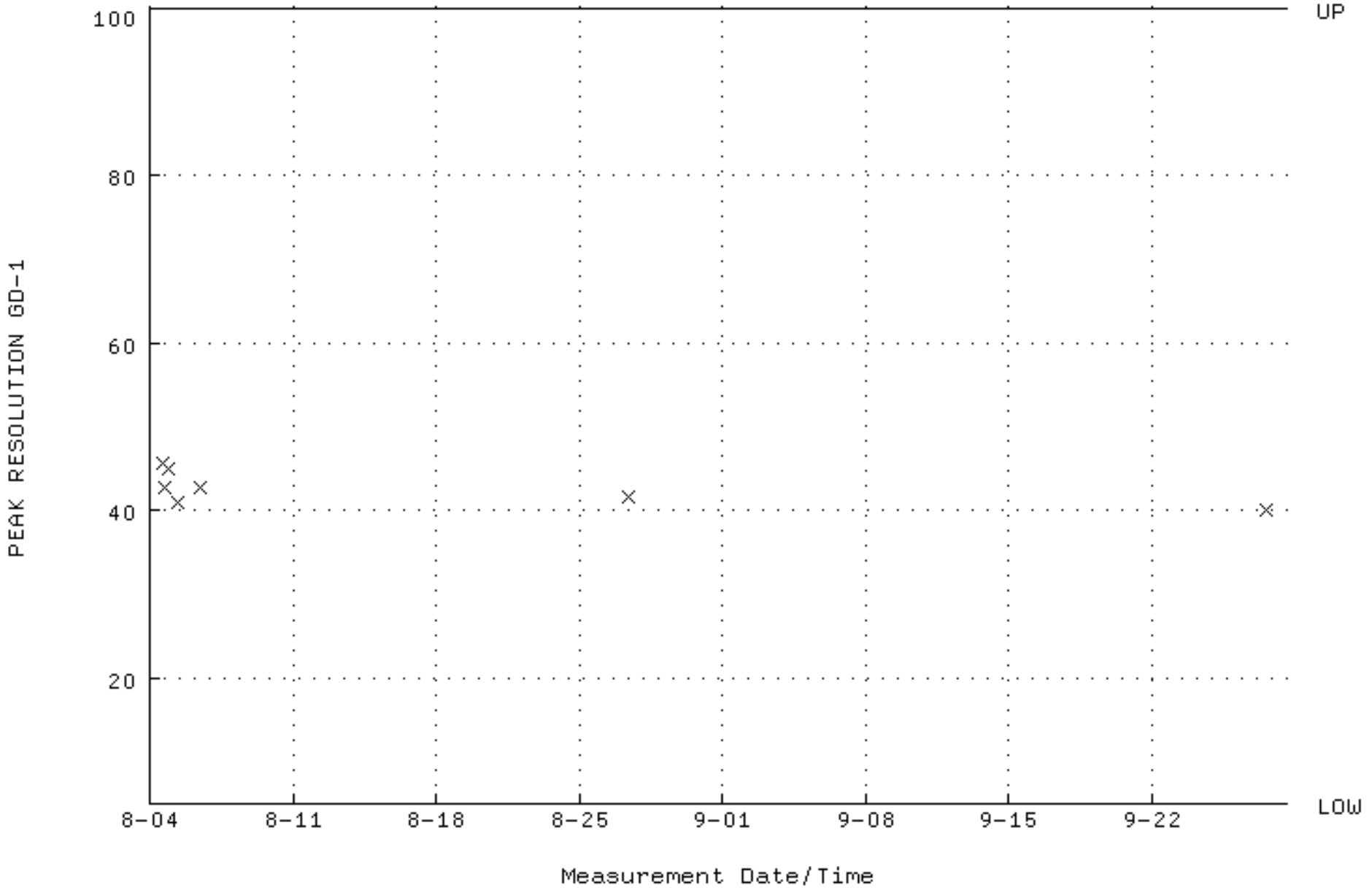
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Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.262337 through 0.278564



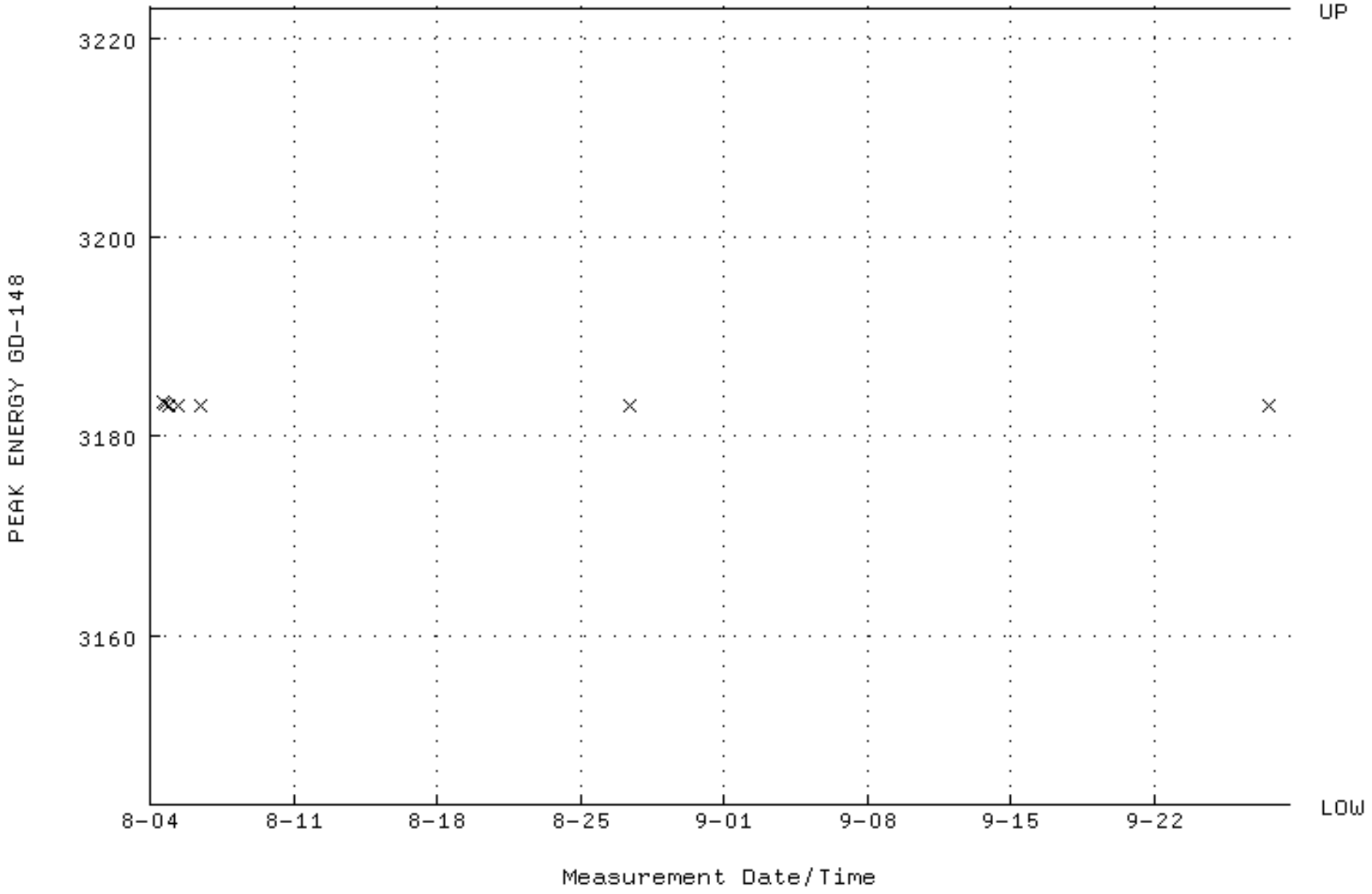
QA filename : DKA100:[ENV_ALPHA.QA.W]W002.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



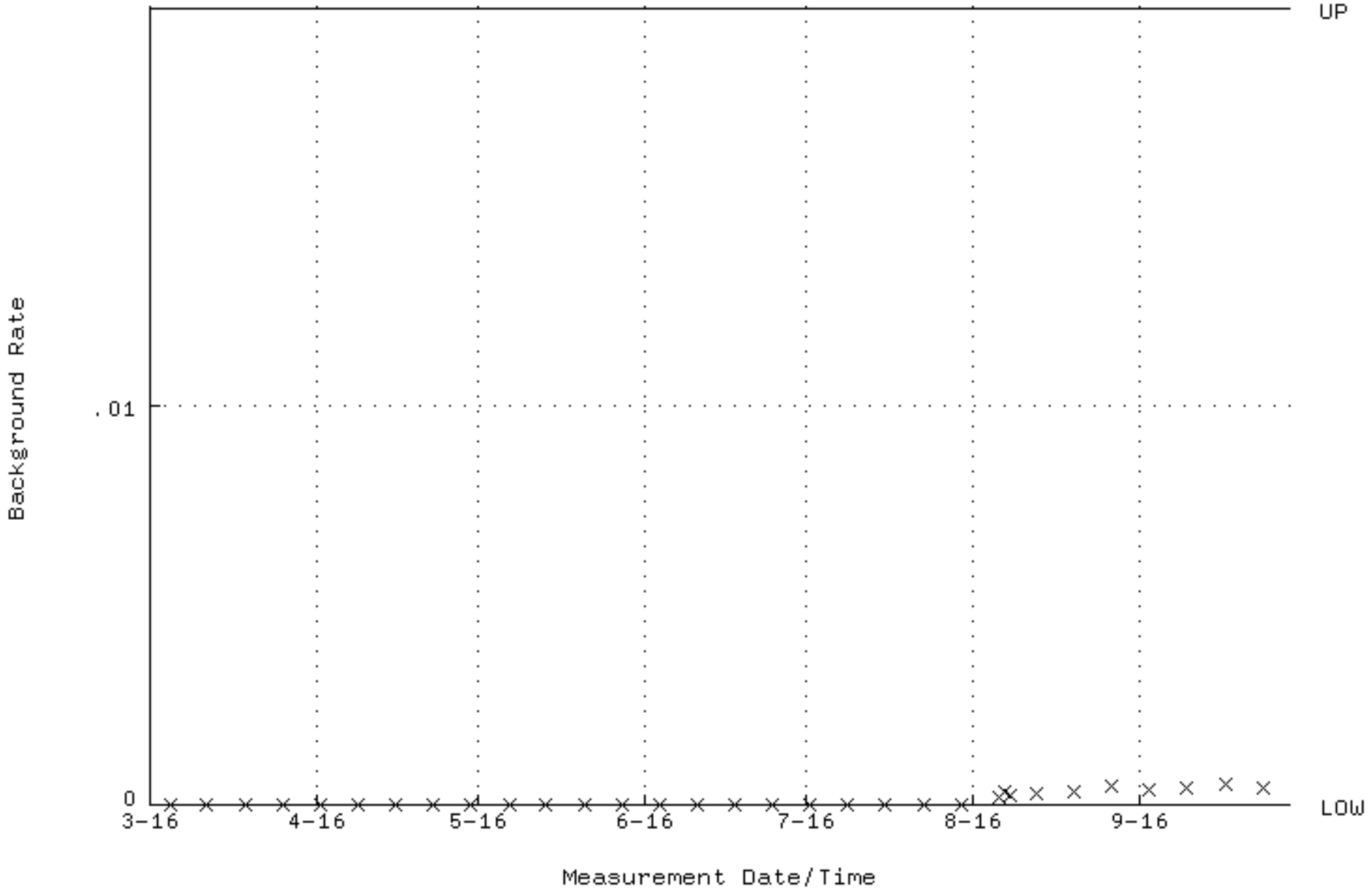
QA filename : DKA100:[ENV_ALPHA.QA.W]W002.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



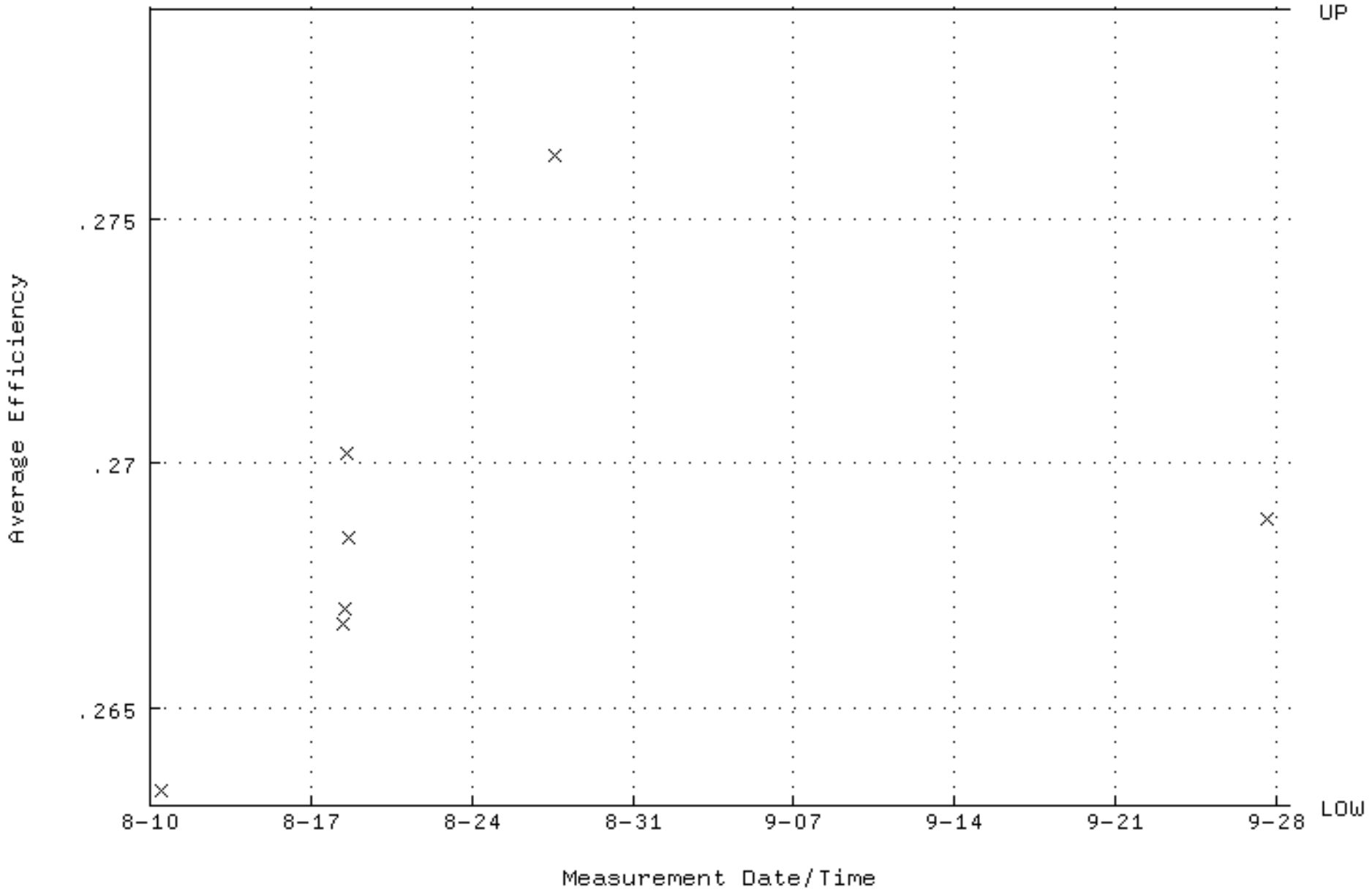
QA filename : DKA100:[ENV_ALPHA.QA.W]W002.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



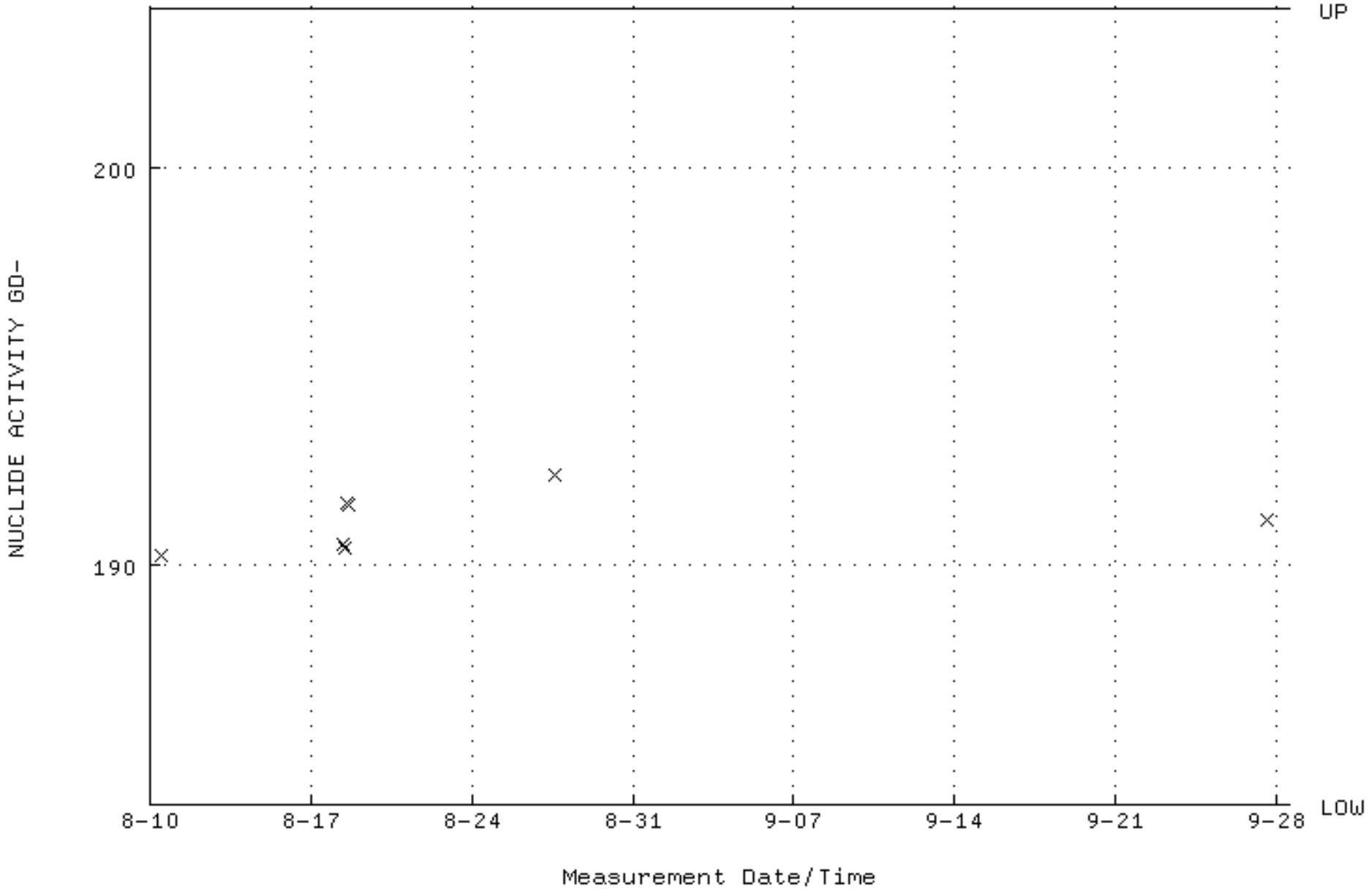
QA filename : DKA100:[ENV_ALPHA.QA.B]B002.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:27 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



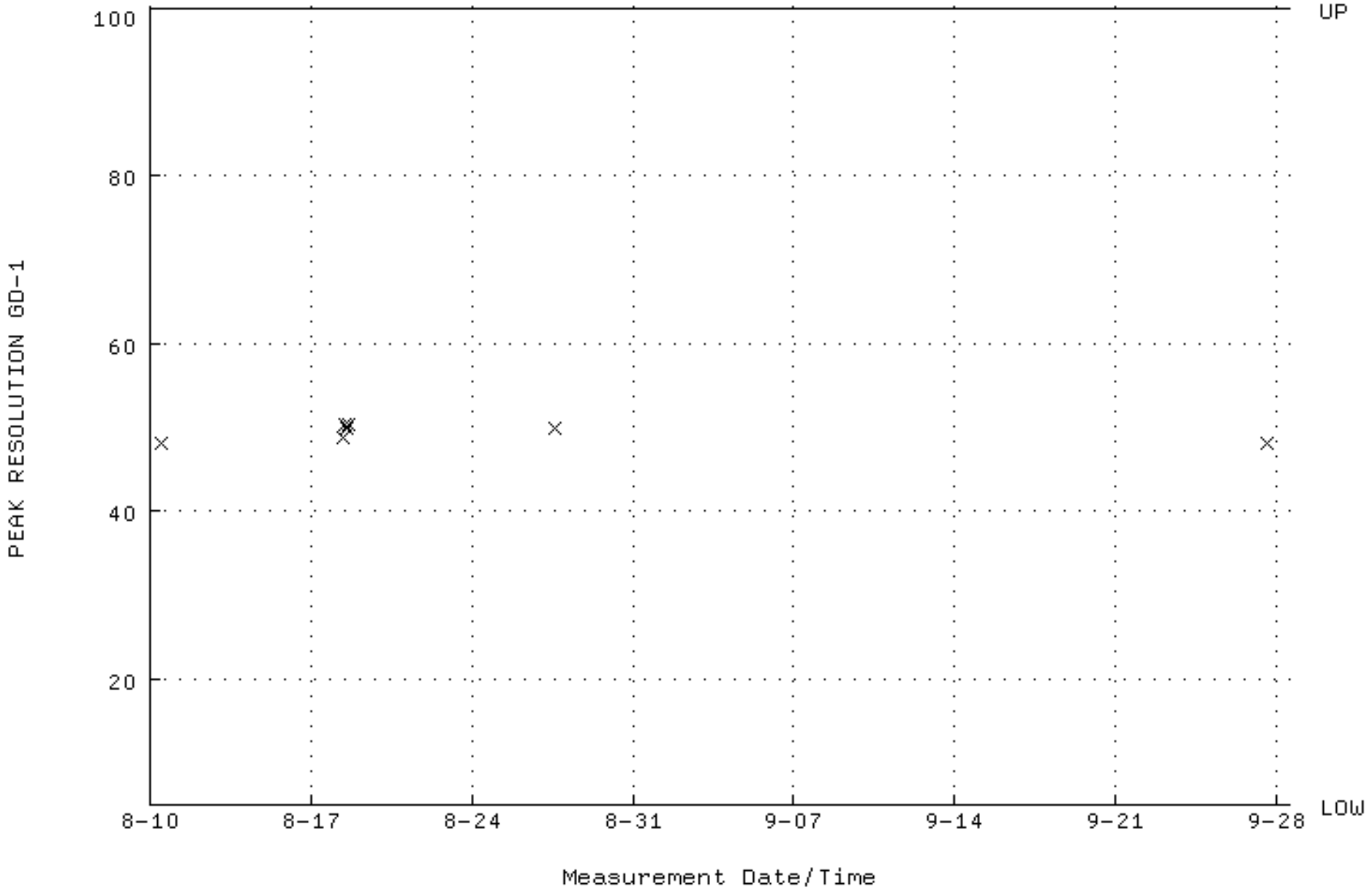
QA filename : DKA100:[ENV_ALPHA.QA.W]W003.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 10-AUG-2016 10:56:03 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.263000 through 0.279270



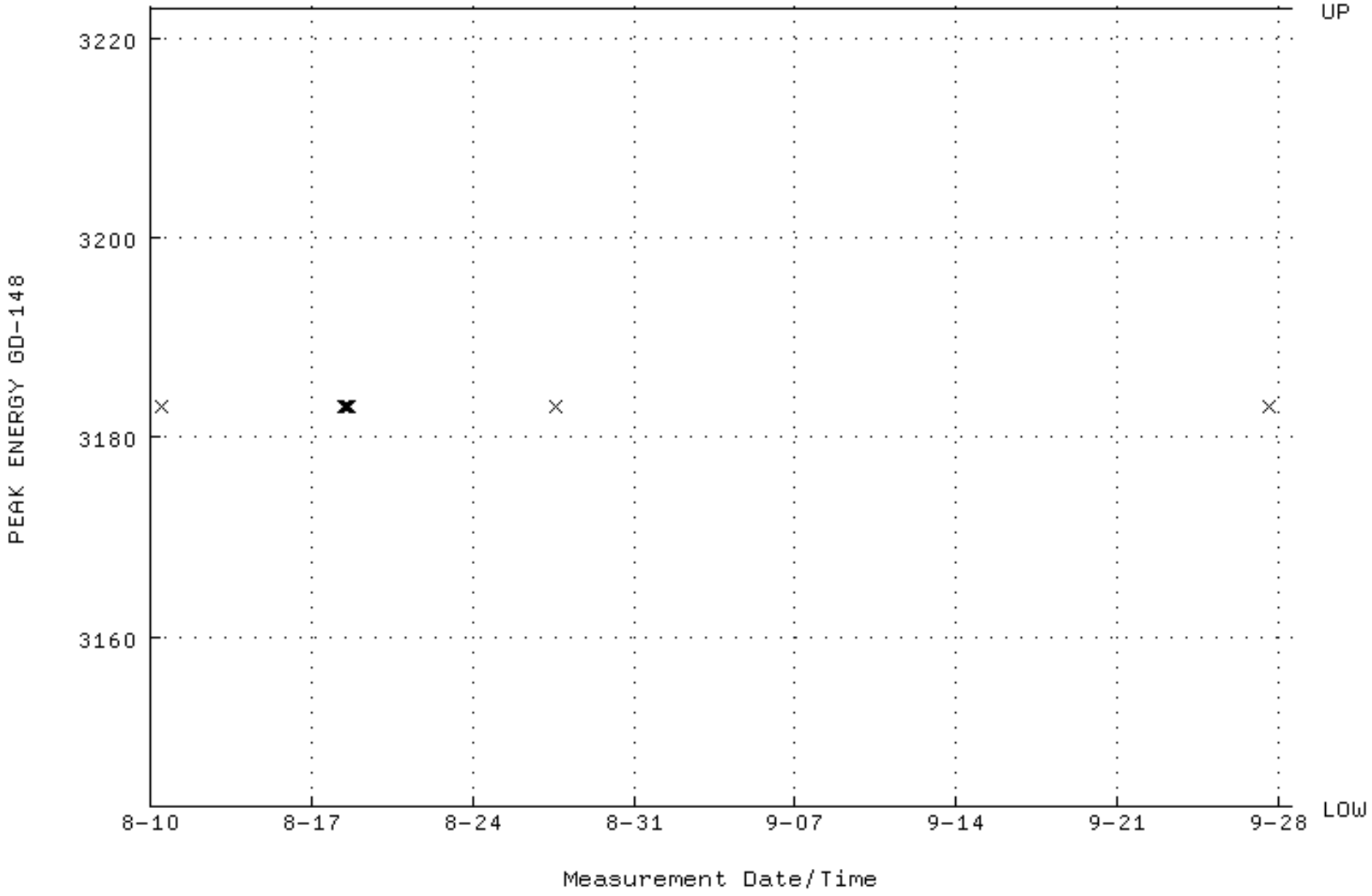
QA filename : DKA100:[ENV_ALPHA.QA.W]W003.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 10-AUG-2016 10:56:03 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



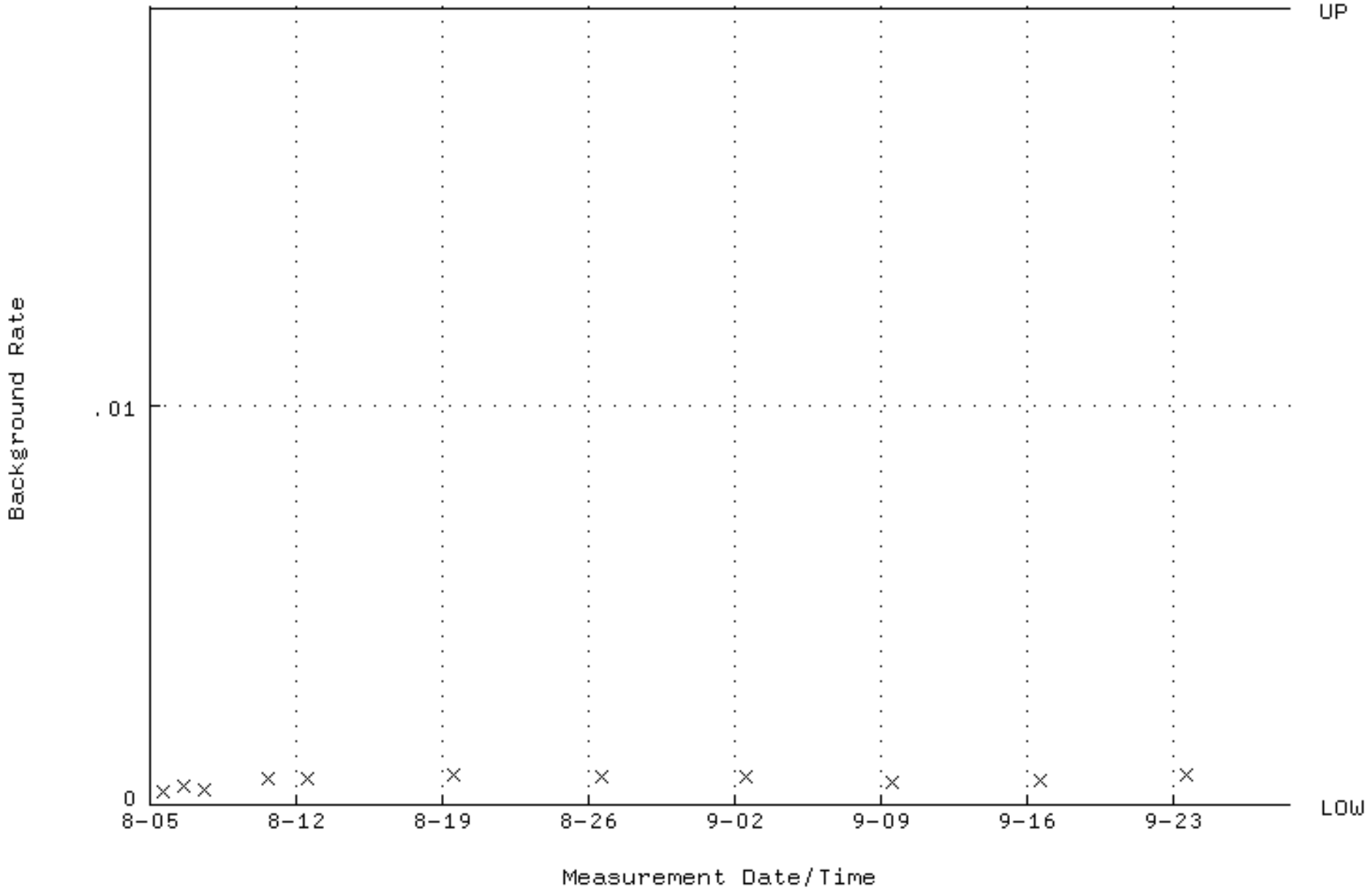
QA filename : DKA100:[ENV_ALPHA.QA.W]W003.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 10-AUG-2016 10:56:03 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



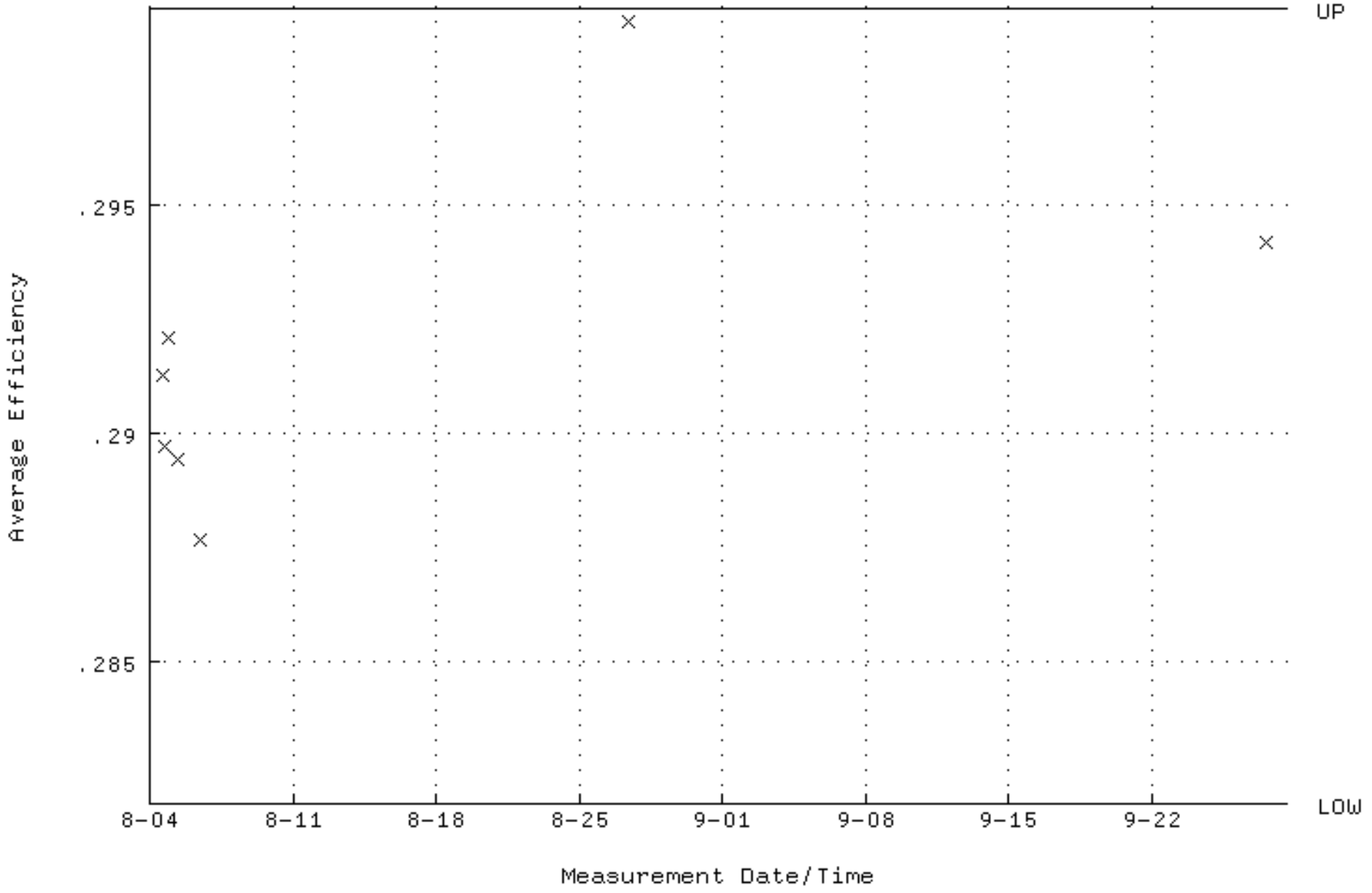
QA filename : DKA100:[ENV_ALPHA.QA.W]W003.QAF;9
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 10-AUG-2016 10:56:03 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



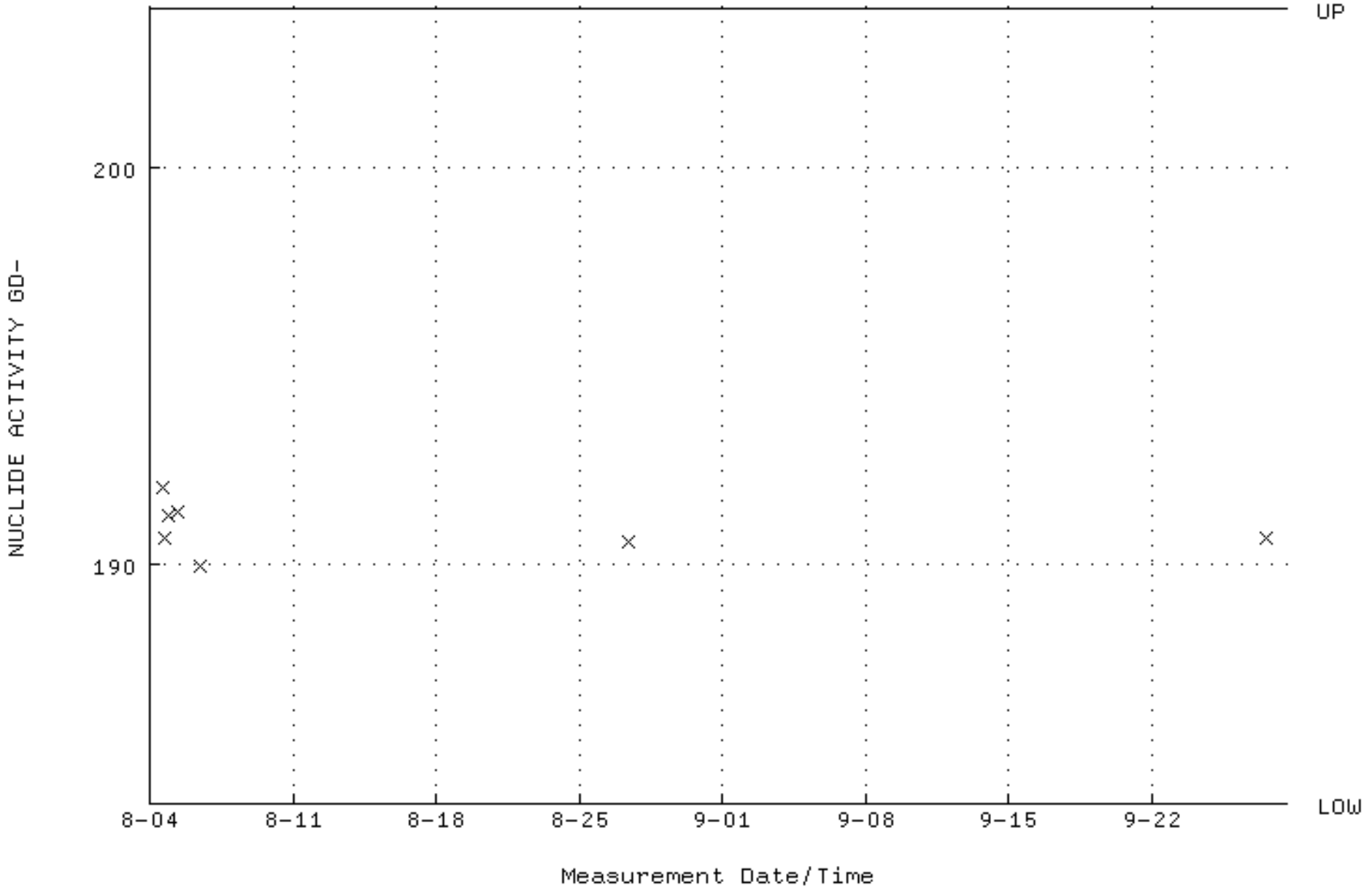
QA filename : DKA100:[ENV_ALPHA.QA.B]B003.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 5-AUG-2016 14:06:41 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



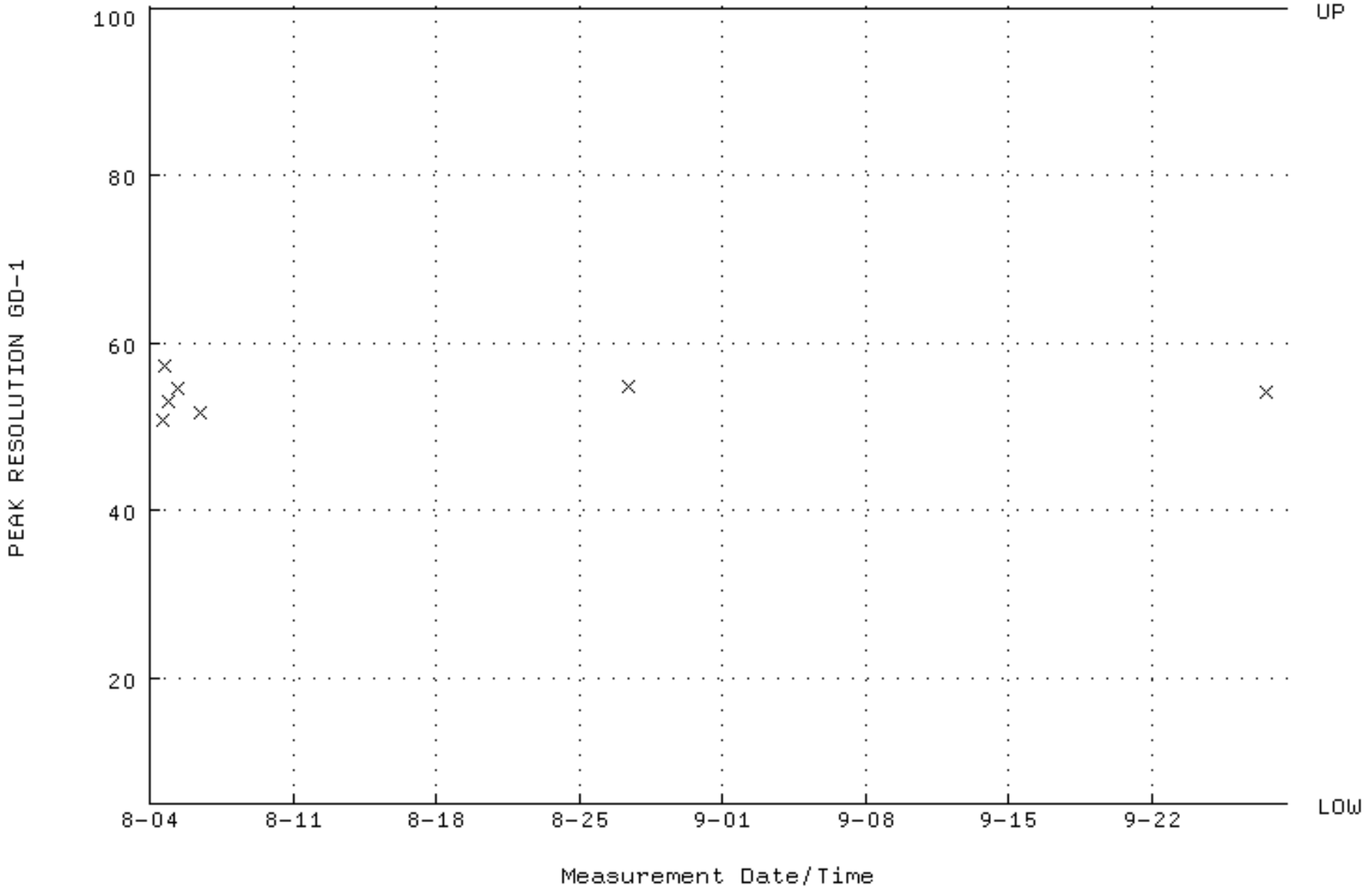
QA filename : DKA100:[ENV_ALPHA.QA.W]W004.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.281866 through 0.299302



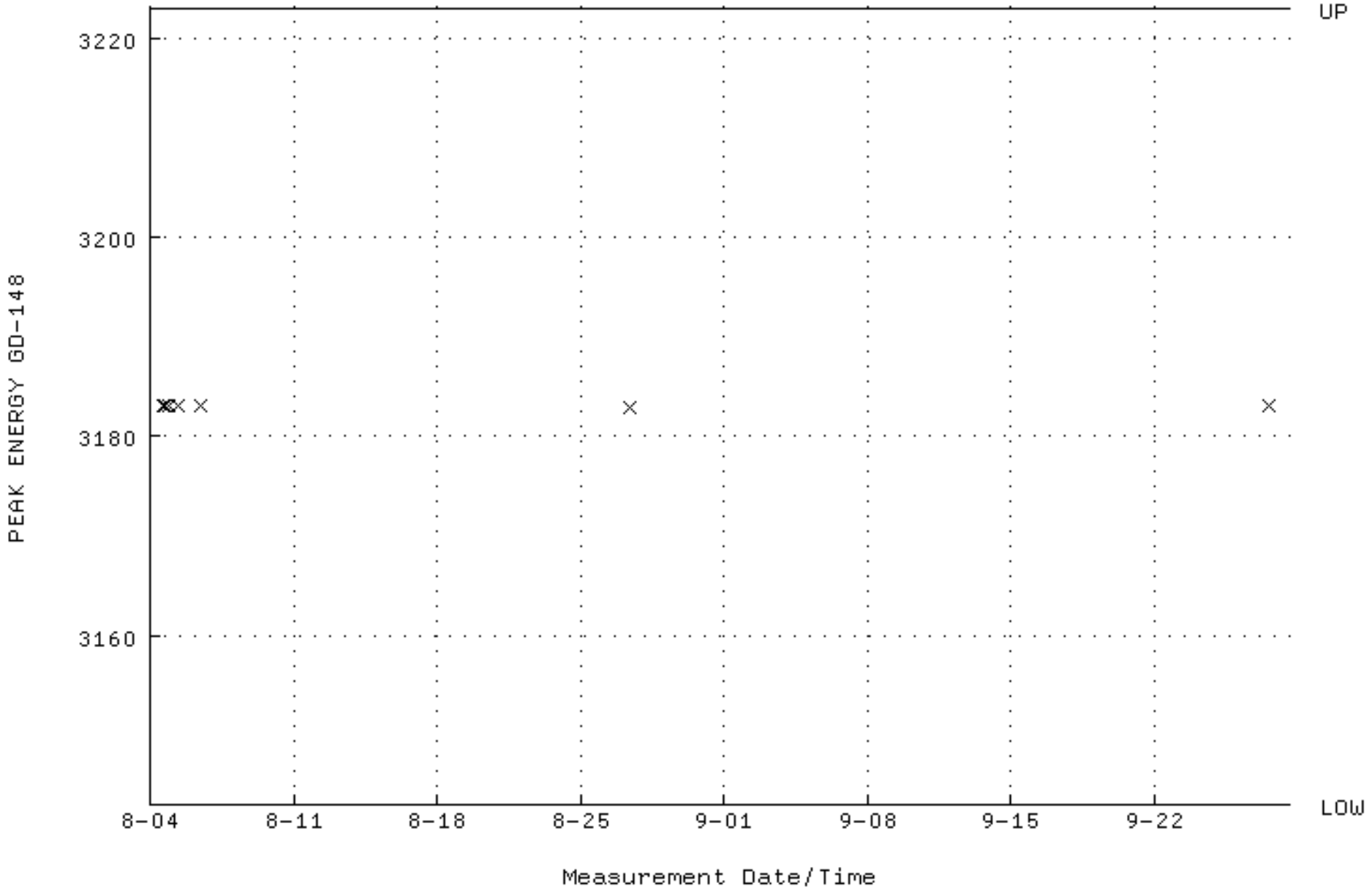
QA filename : DKA100:[ENV_ALPHA.QA.W]W004.QAF;11
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



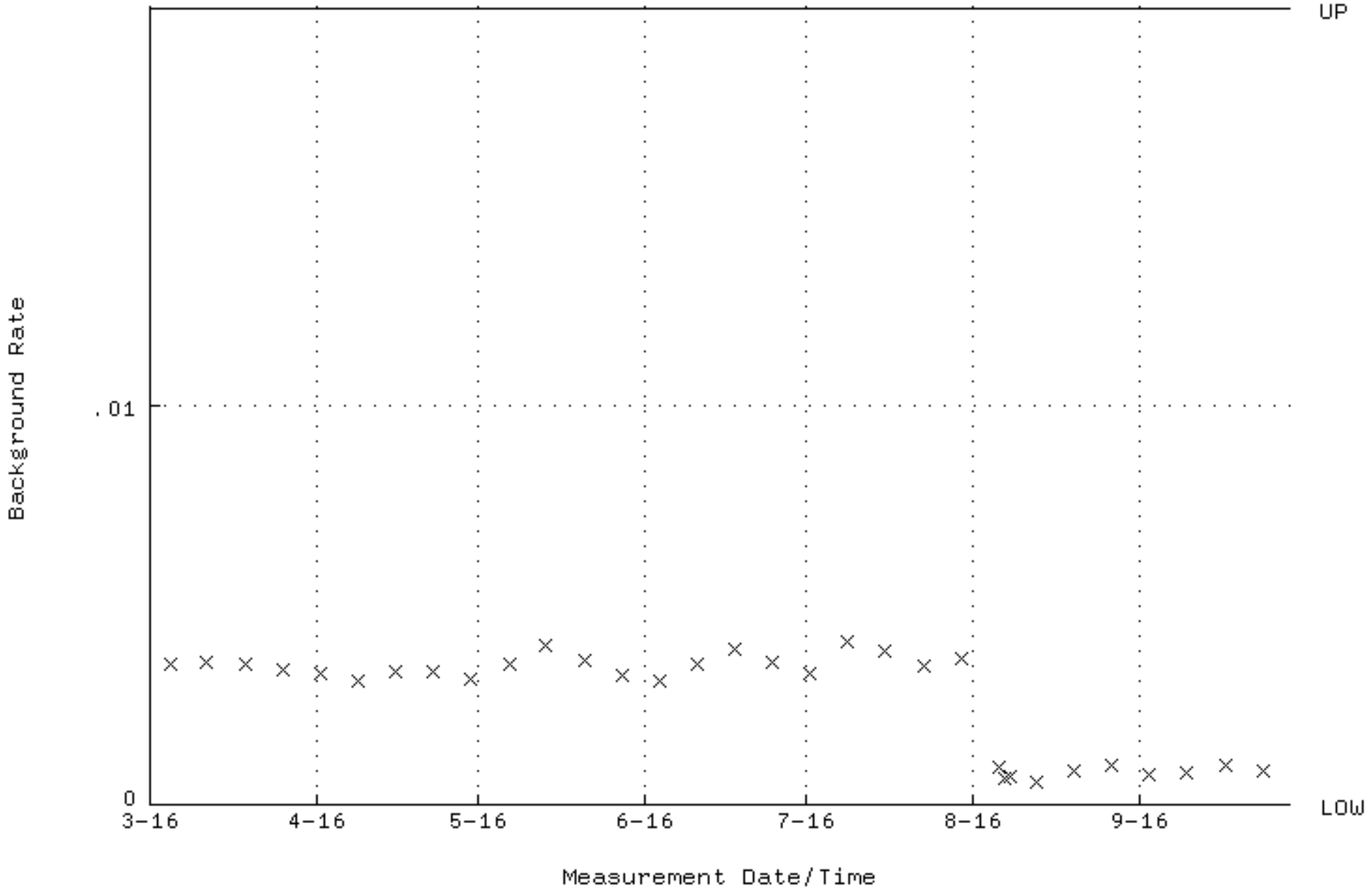
QA filename : DKA100:[ENV_ALPHA.QA.W]W004.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



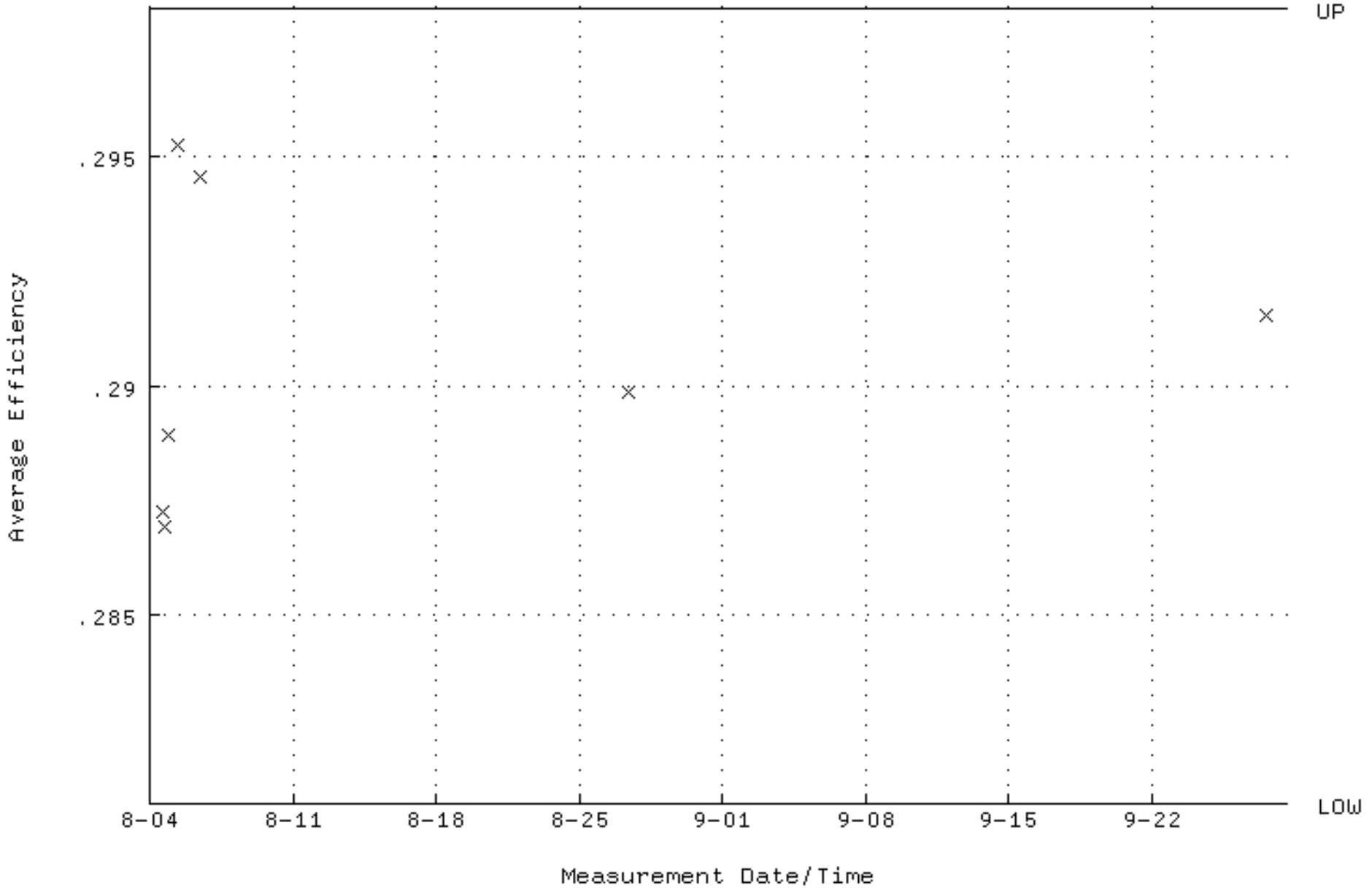
QA filename : DKA100:[ENV_ALPHA.QA.W]W004.QAF;11
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



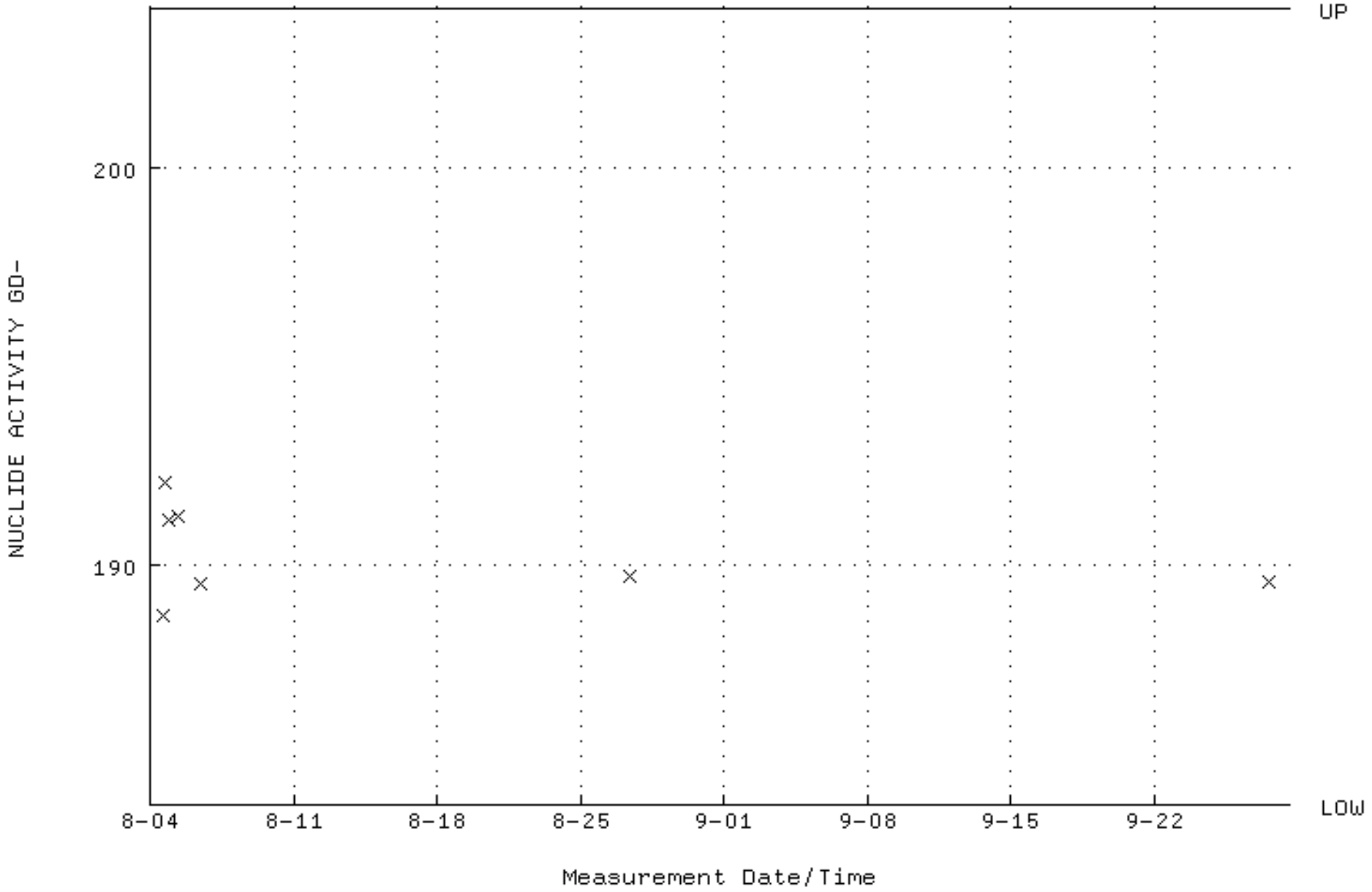
QA filename : DKA100:[ENV_ALPHA.QA.B]B004.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:27 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



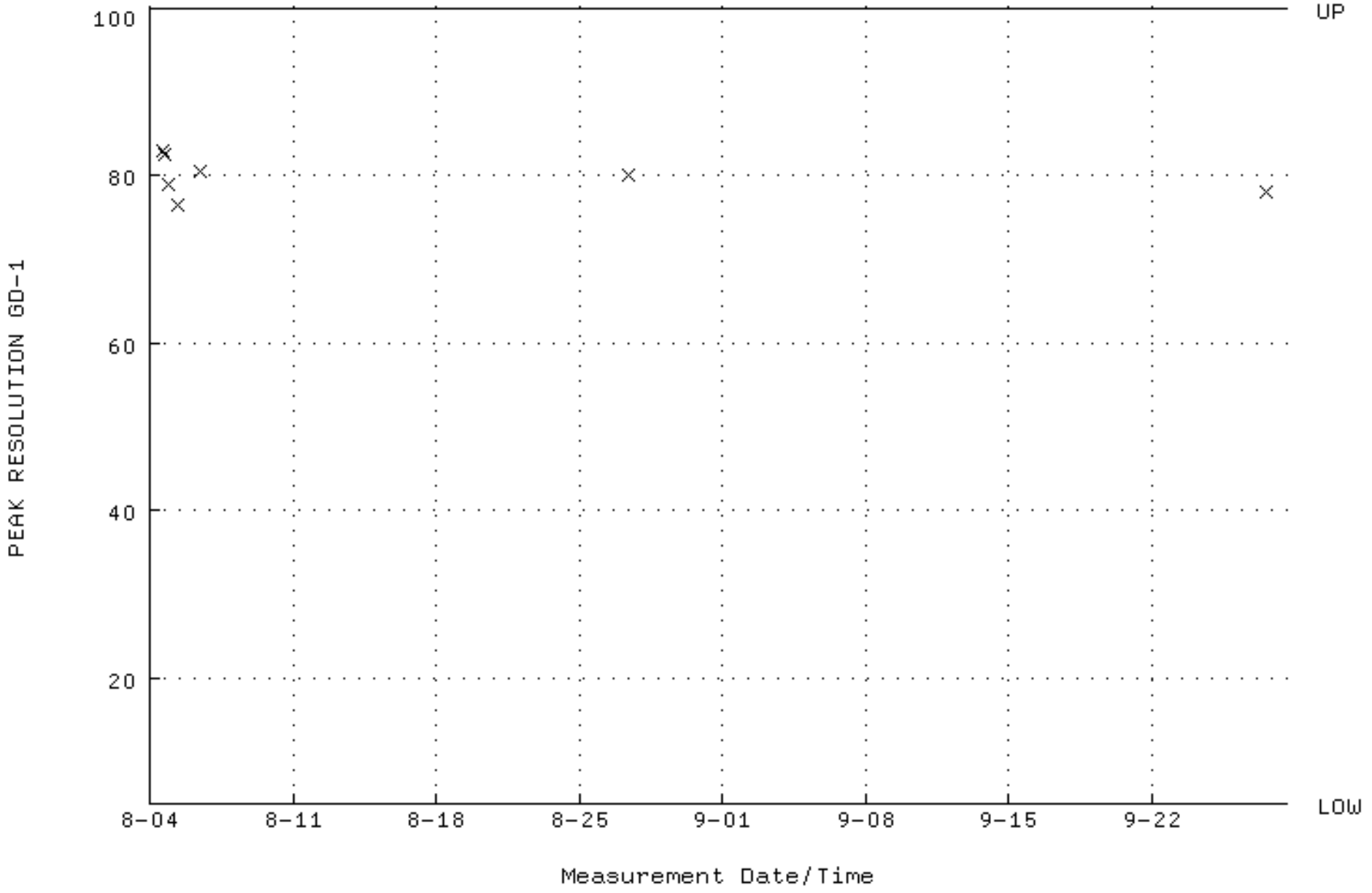
QA filename : DKA100:[ENV_ALPHA.QA.W]W005.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.280865 through 0.298239



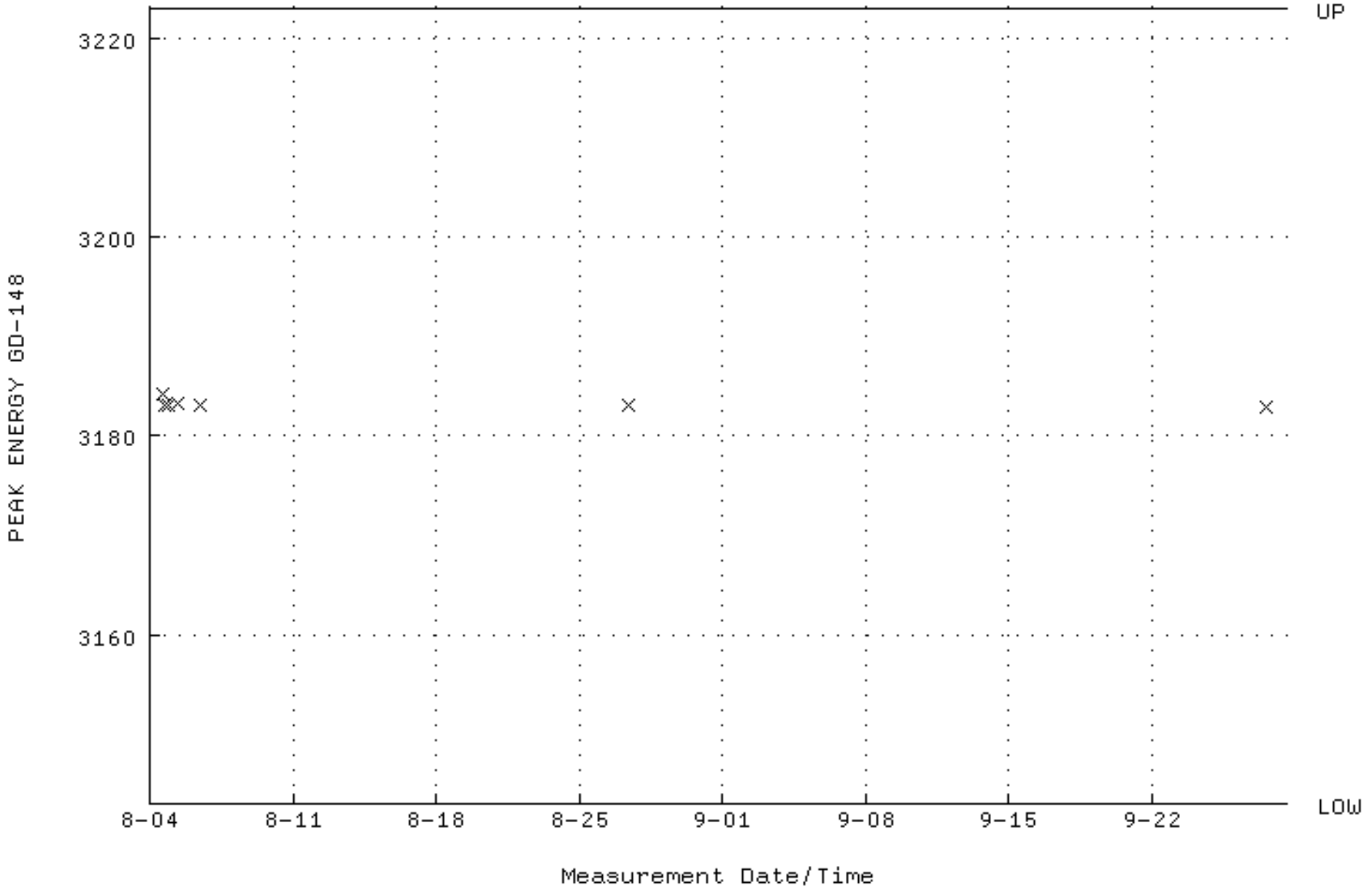
QA filename : DKA100:[ENV_ALPHA.QA.W]W005.QAF;11
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



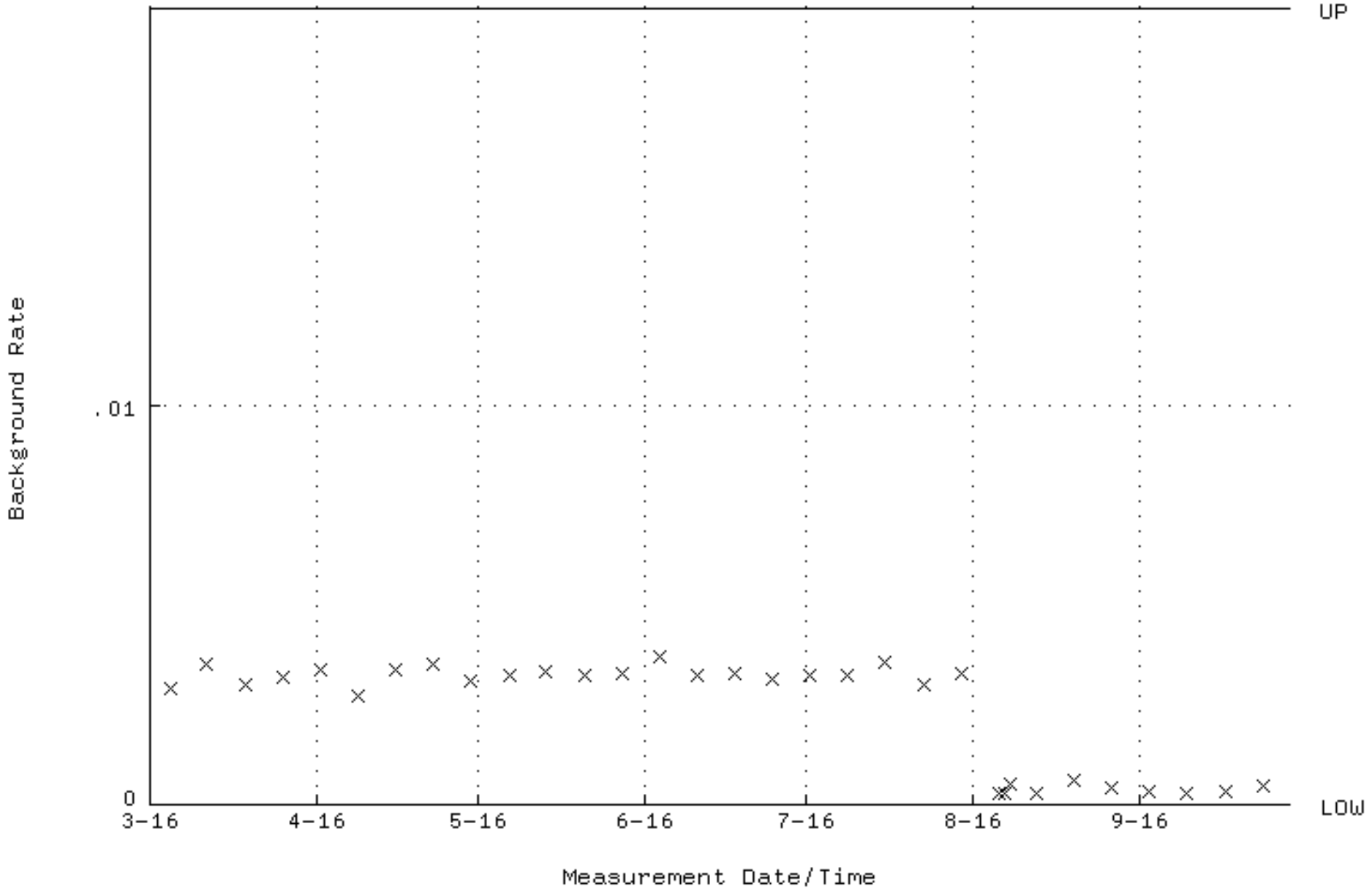
QA filename : DKA100:[ENV_ALPHA.QA.W]W005.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



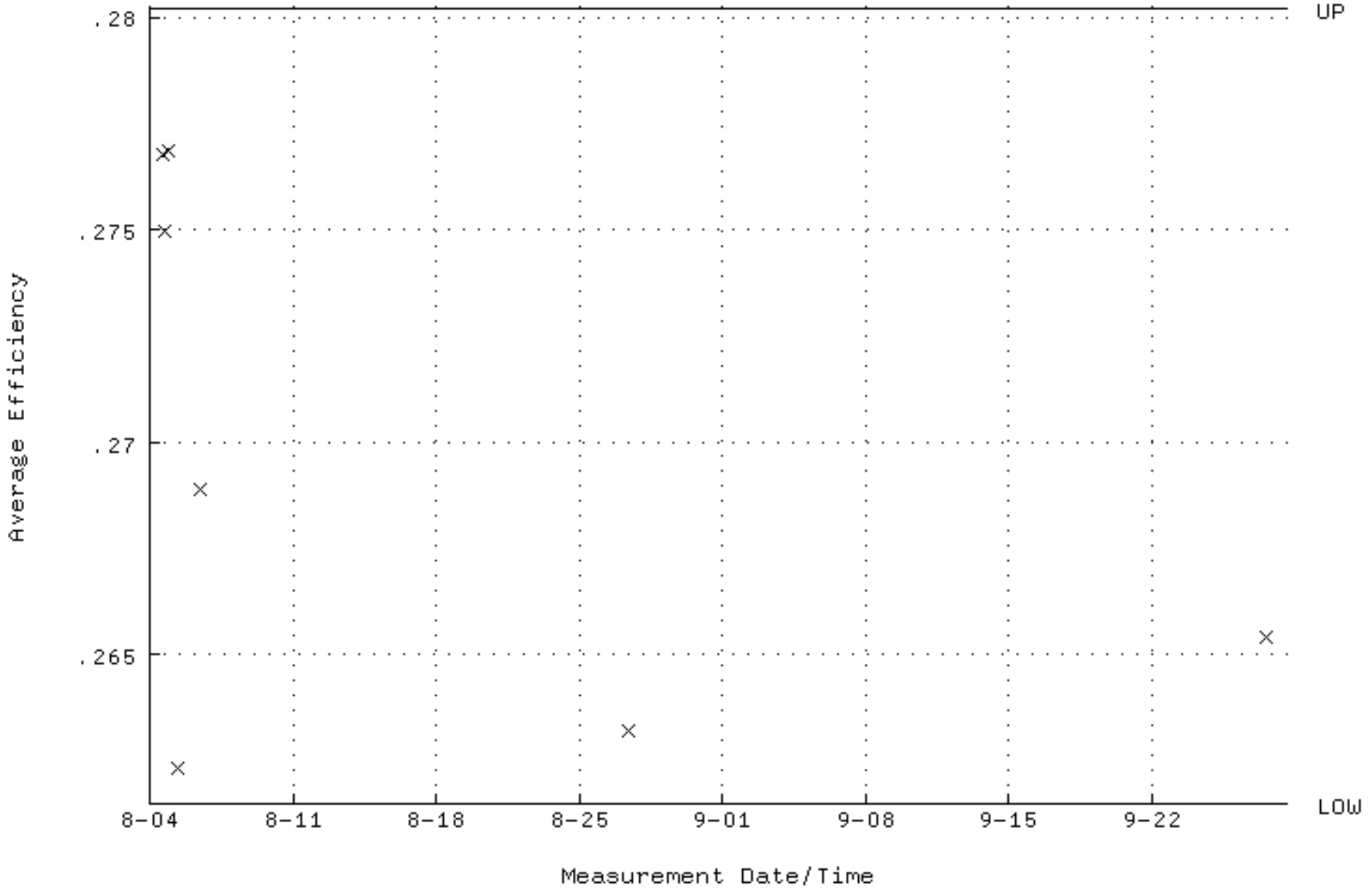
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



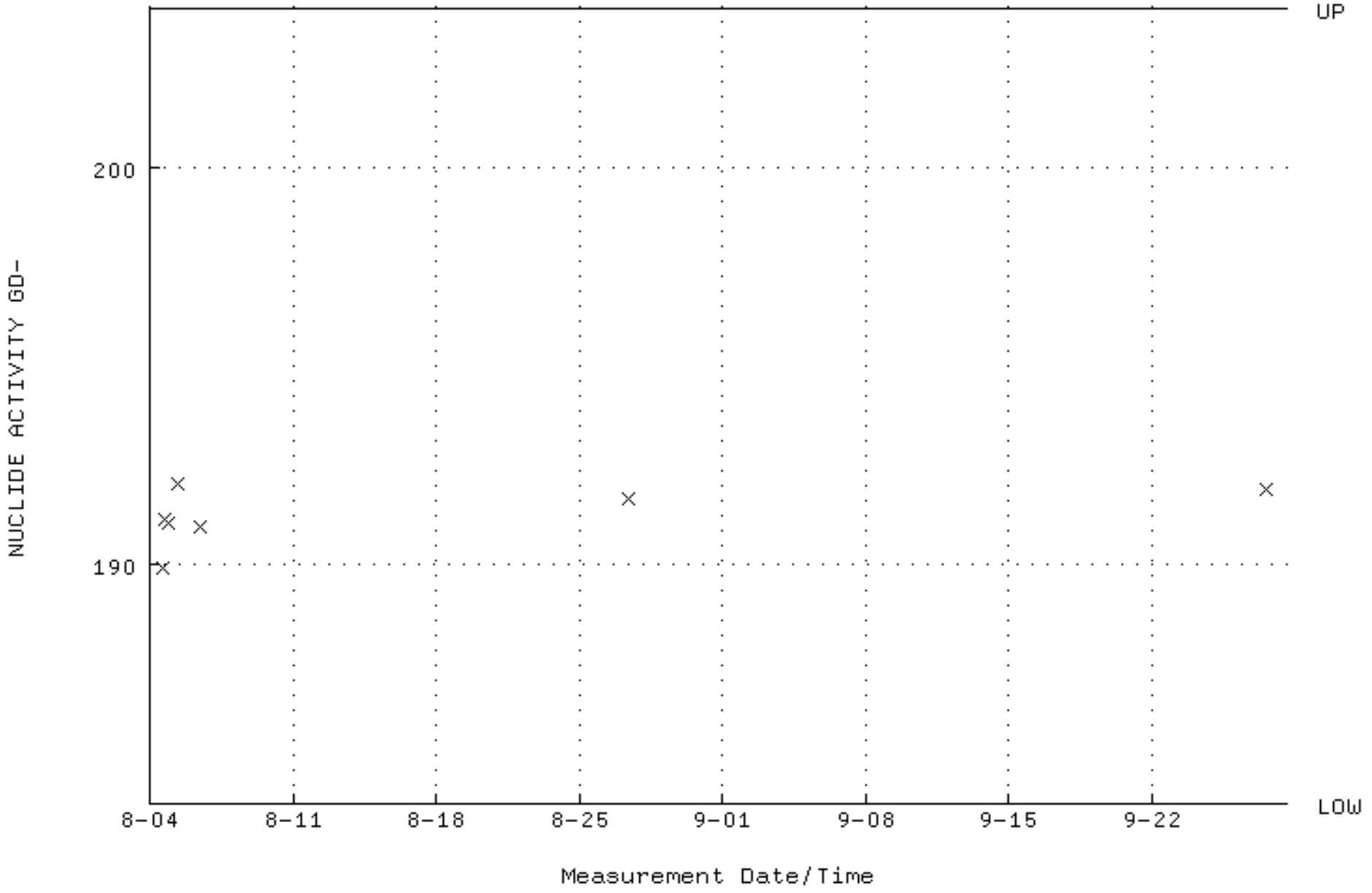
QA filename : DKA100:[ENV_ALPHA.QA.B]B005.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:27 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



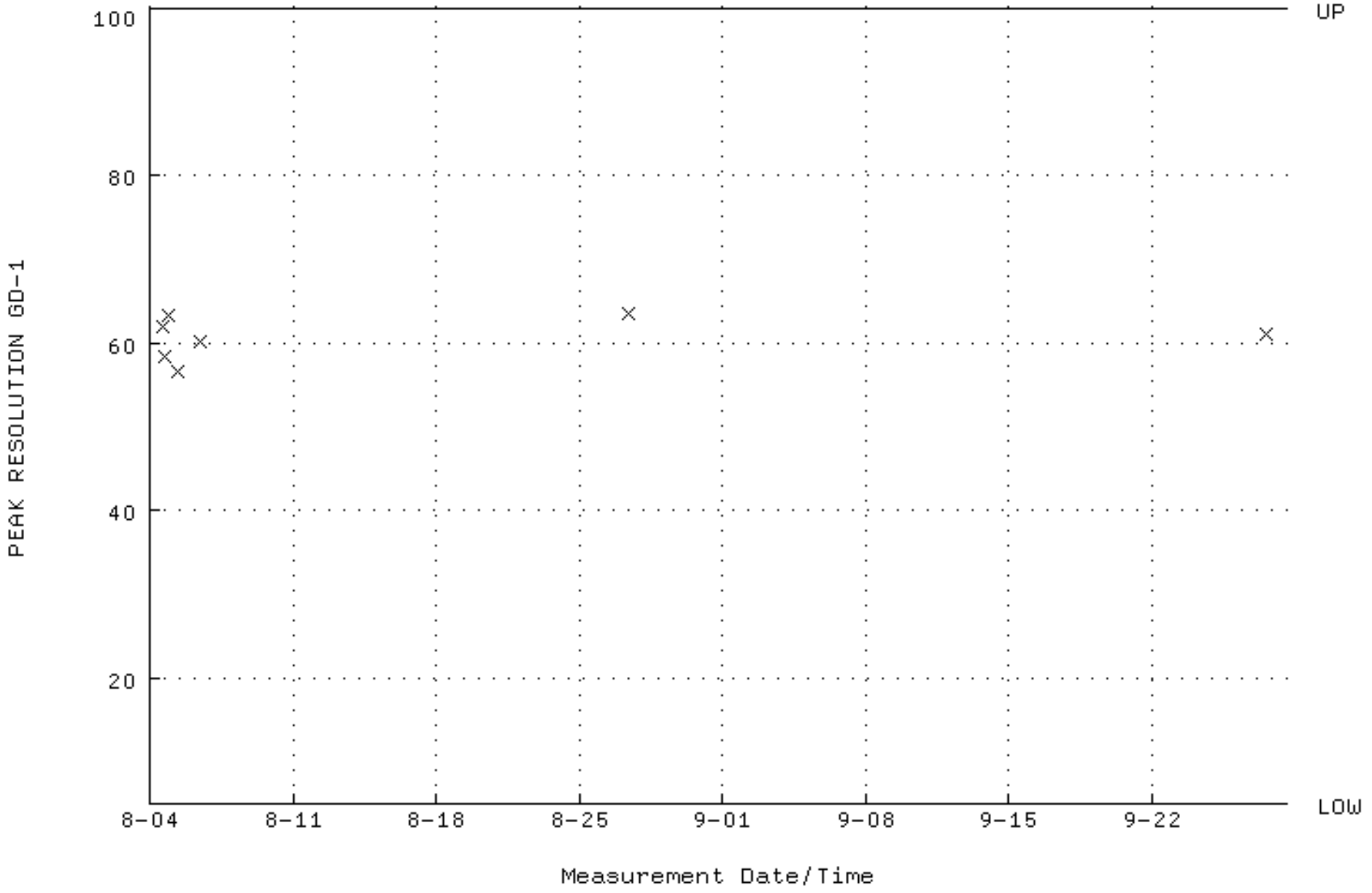
QA filename : DKA100:[ENV_ALPHA.QA.W]W006.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.261500 through 0.280200



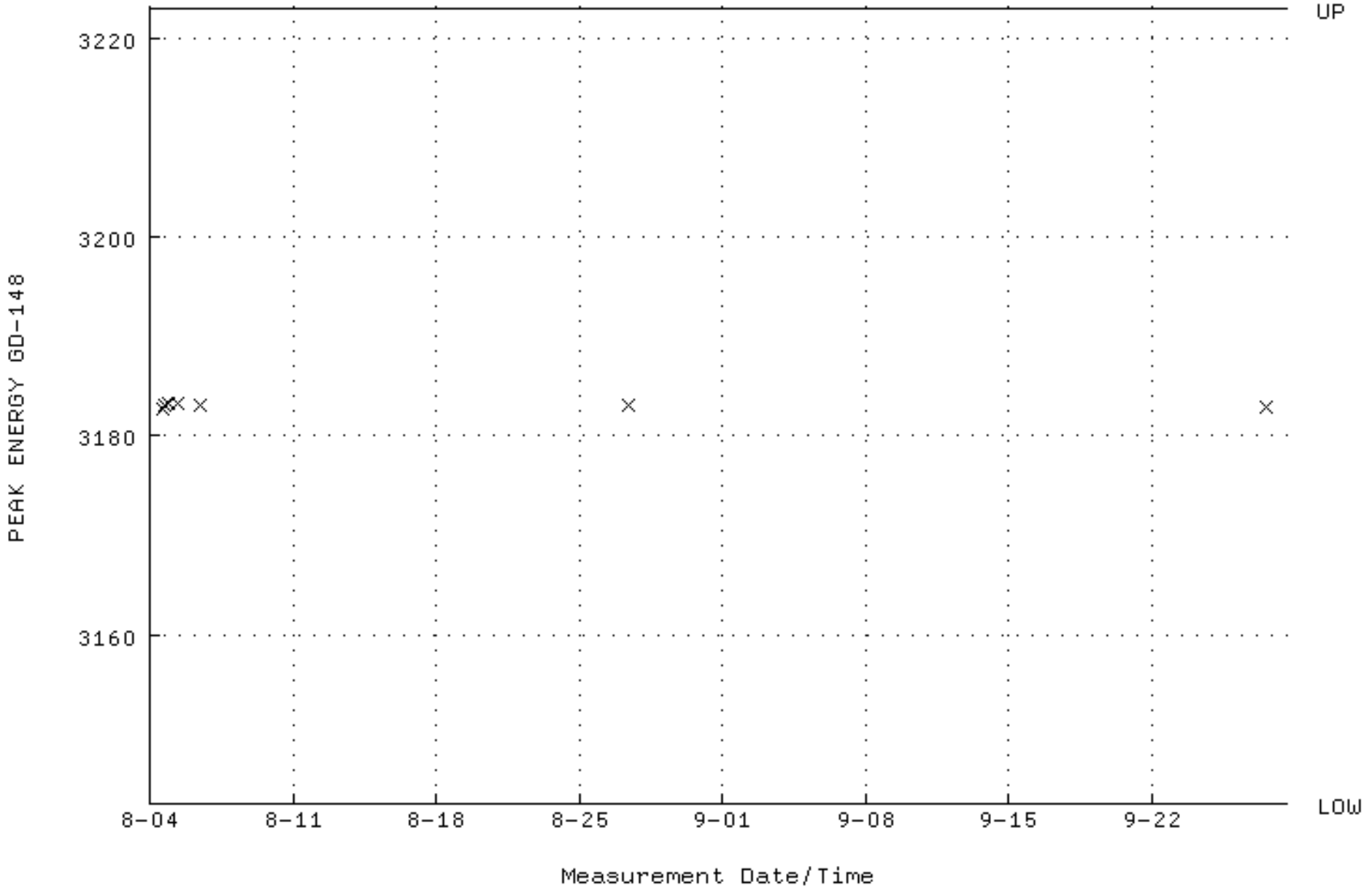
QA filename : DKA100:[ENV_ALPHA.QA.W]W006.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



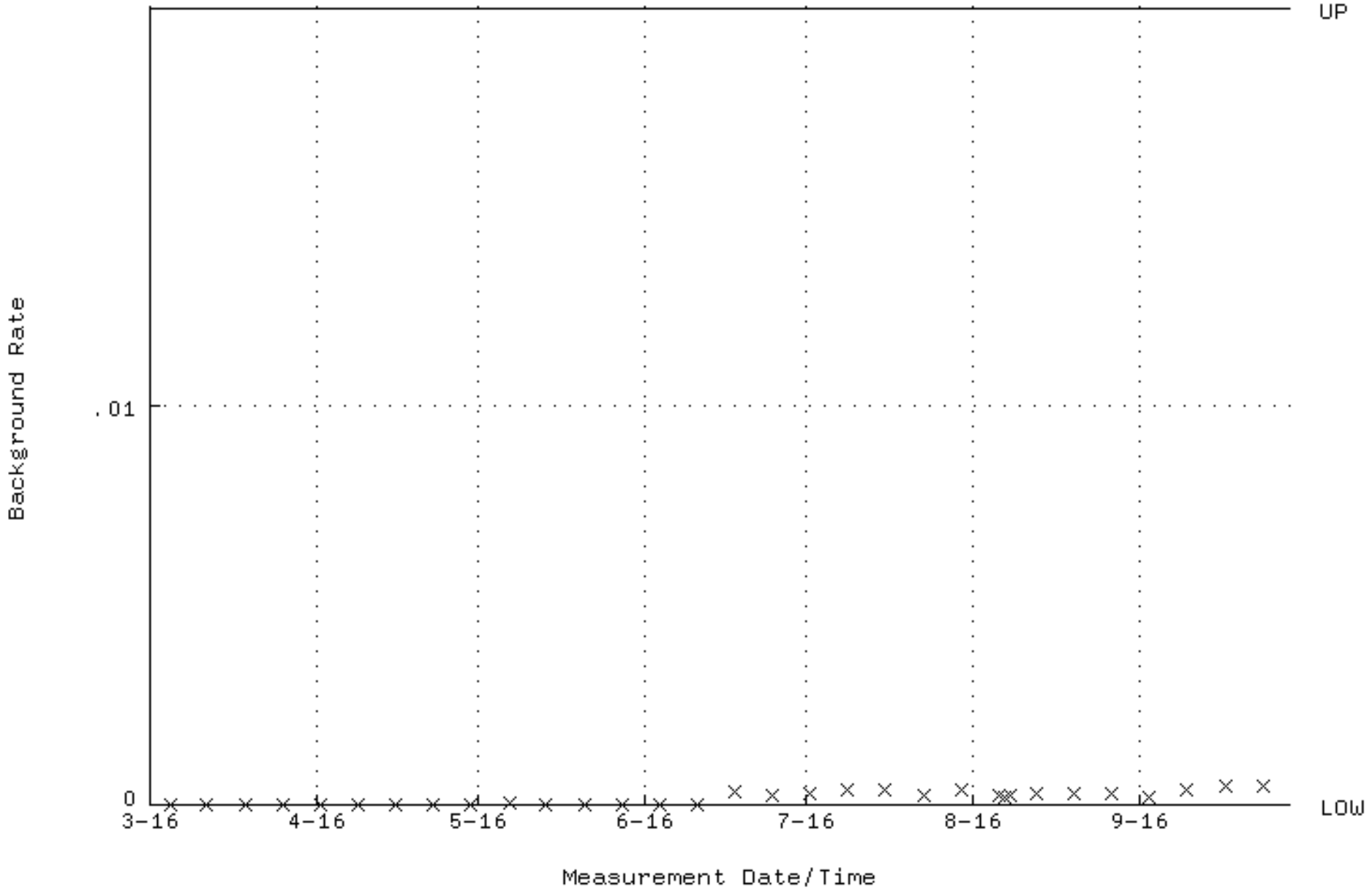
QA filename : DKA100:[ENV_ALPHA.QA.W]W006.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



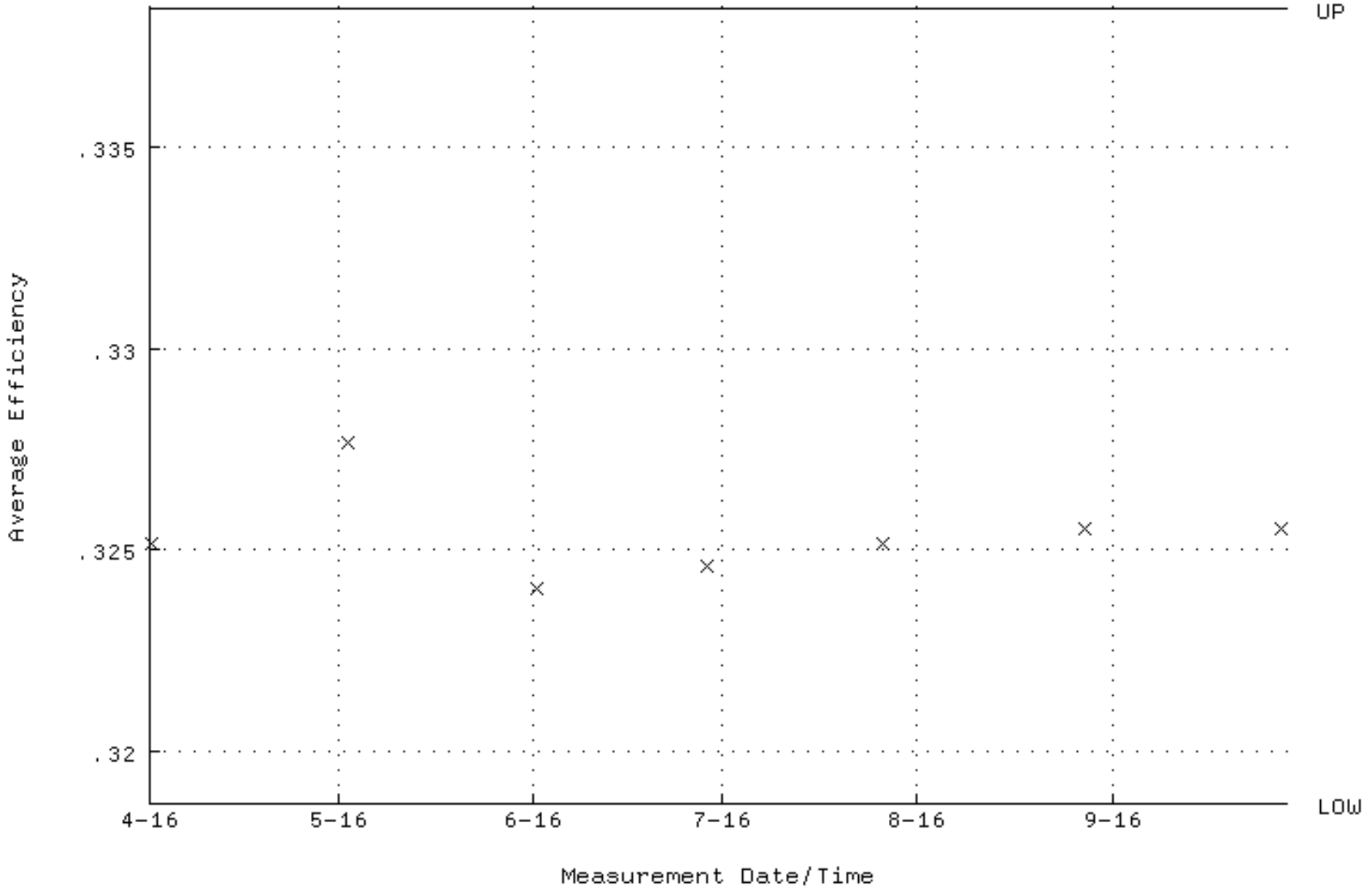
QA filename : DKA100:[ENV_ALPHA.QA.W]W006.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-AUG-2016 14:49:25 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



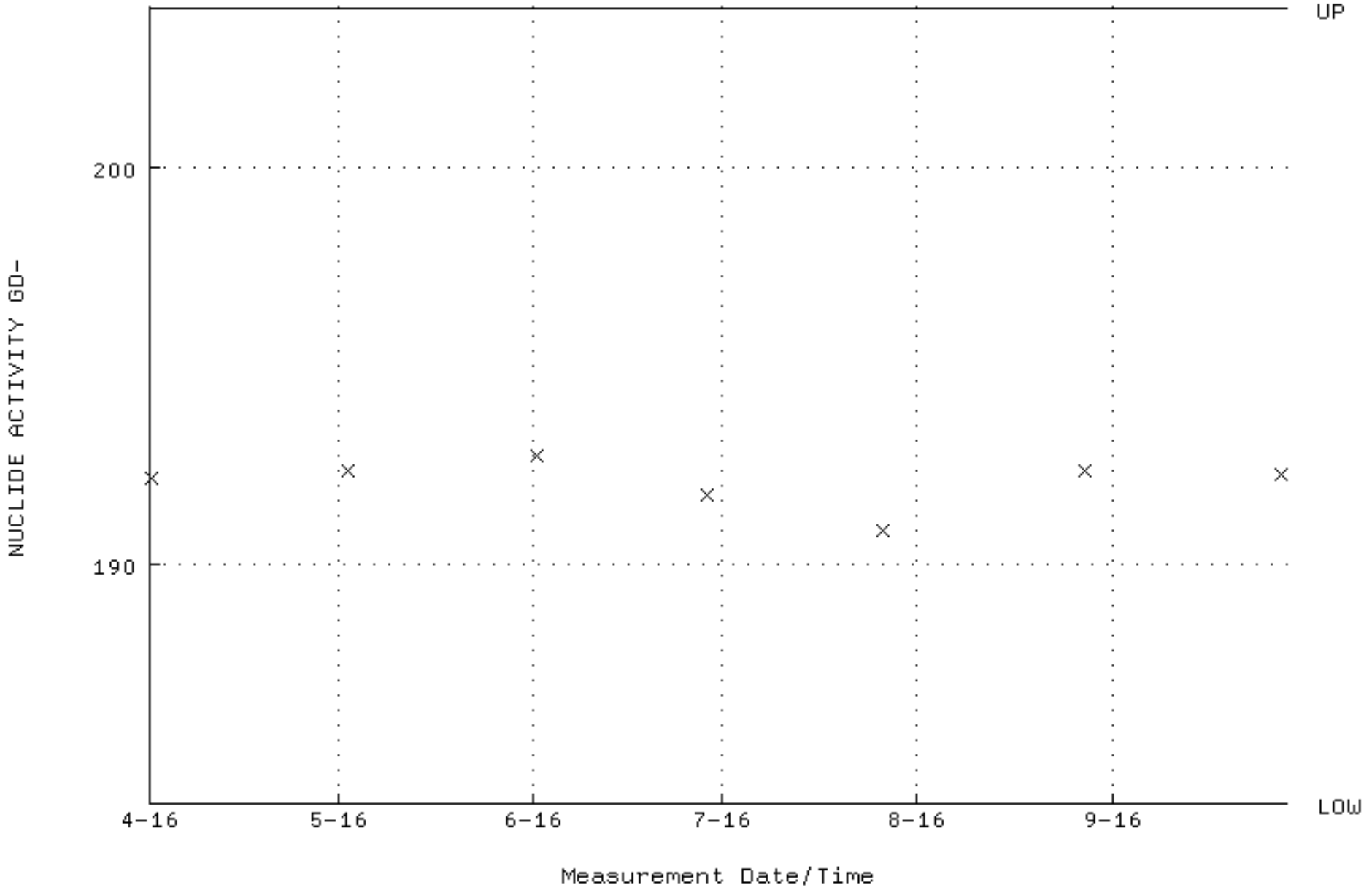
QA filename : DKA100:[ENV_ALPHA.QA.B]B006.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:27 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



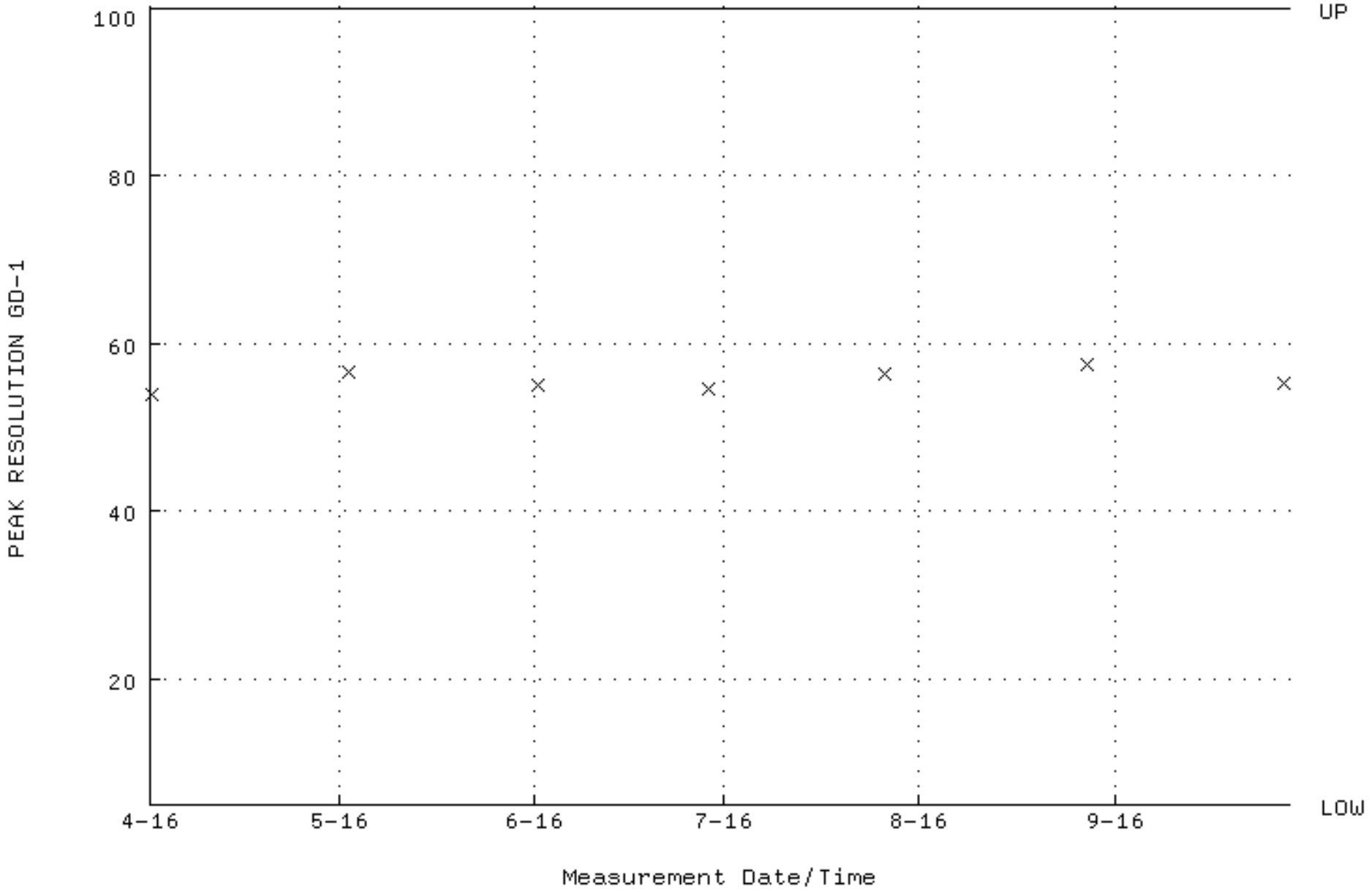
QA filename : DKA100:[ENV_ALPHA.QA.W]W008.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.318710 through 0.338420



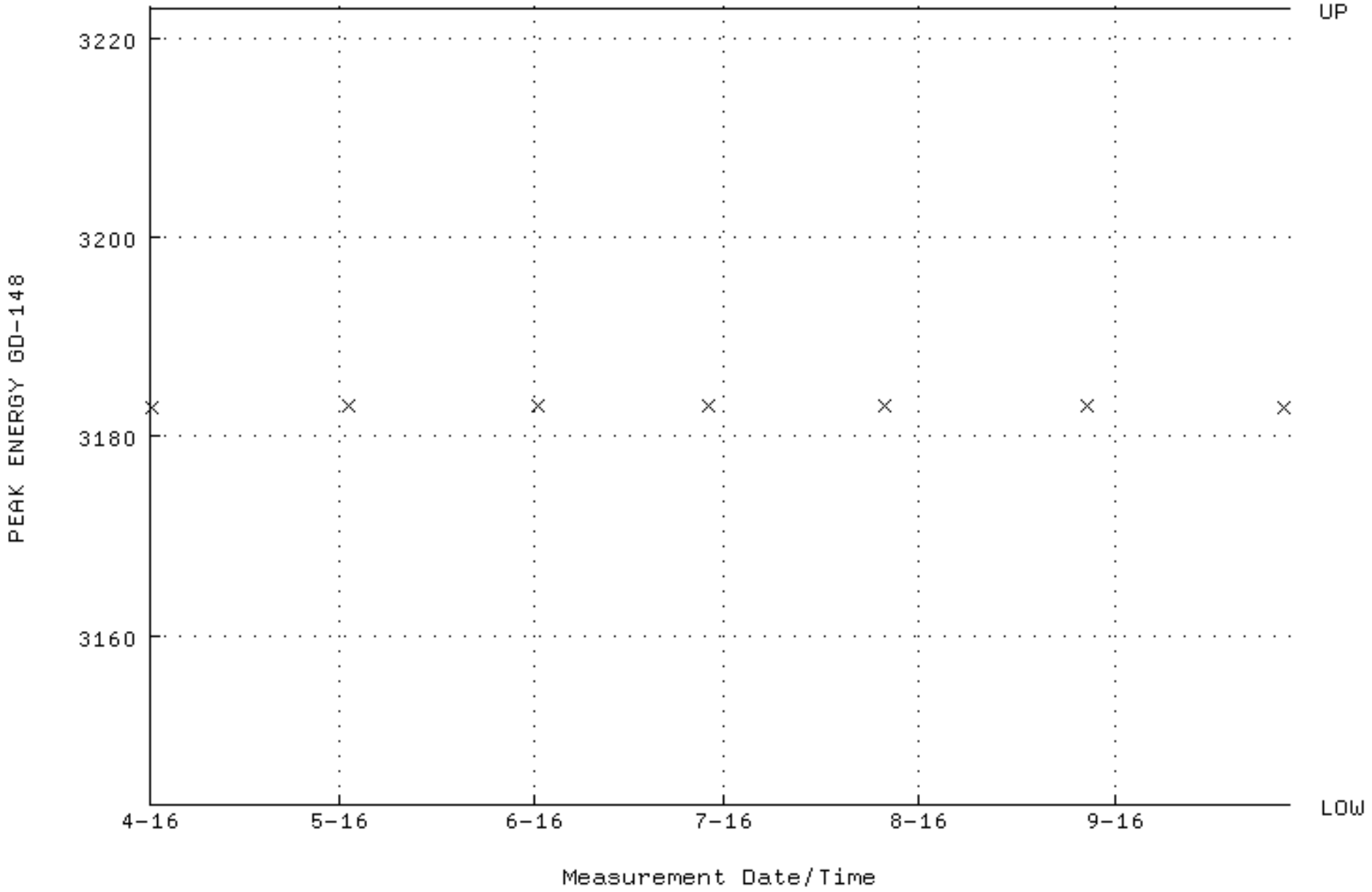
QA filename : DKA100:[ENV_ALPHA.QA.W]W008.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



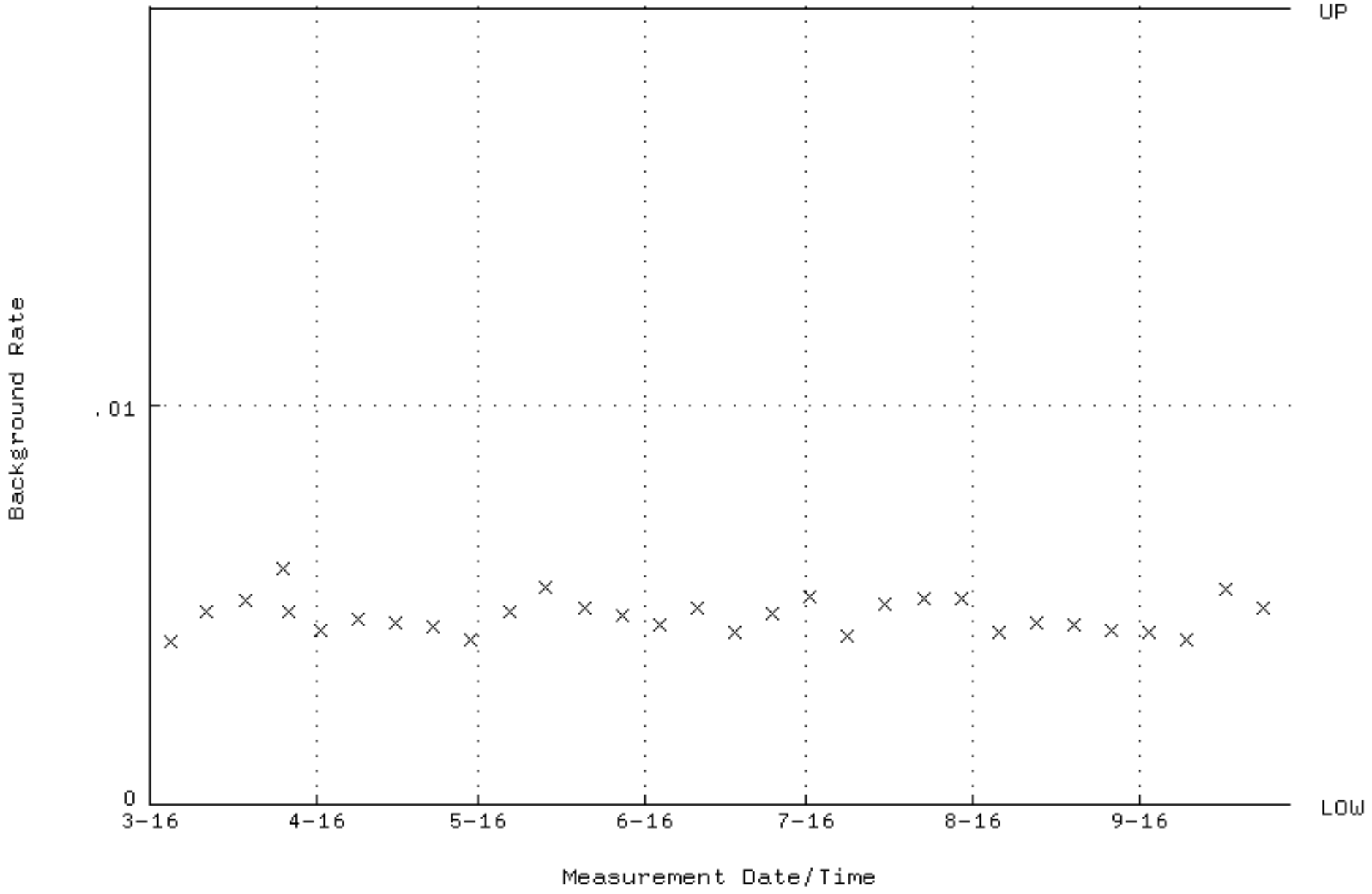
QA filename : DKA100:[ENV_ALPHA.QA.W]W008.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



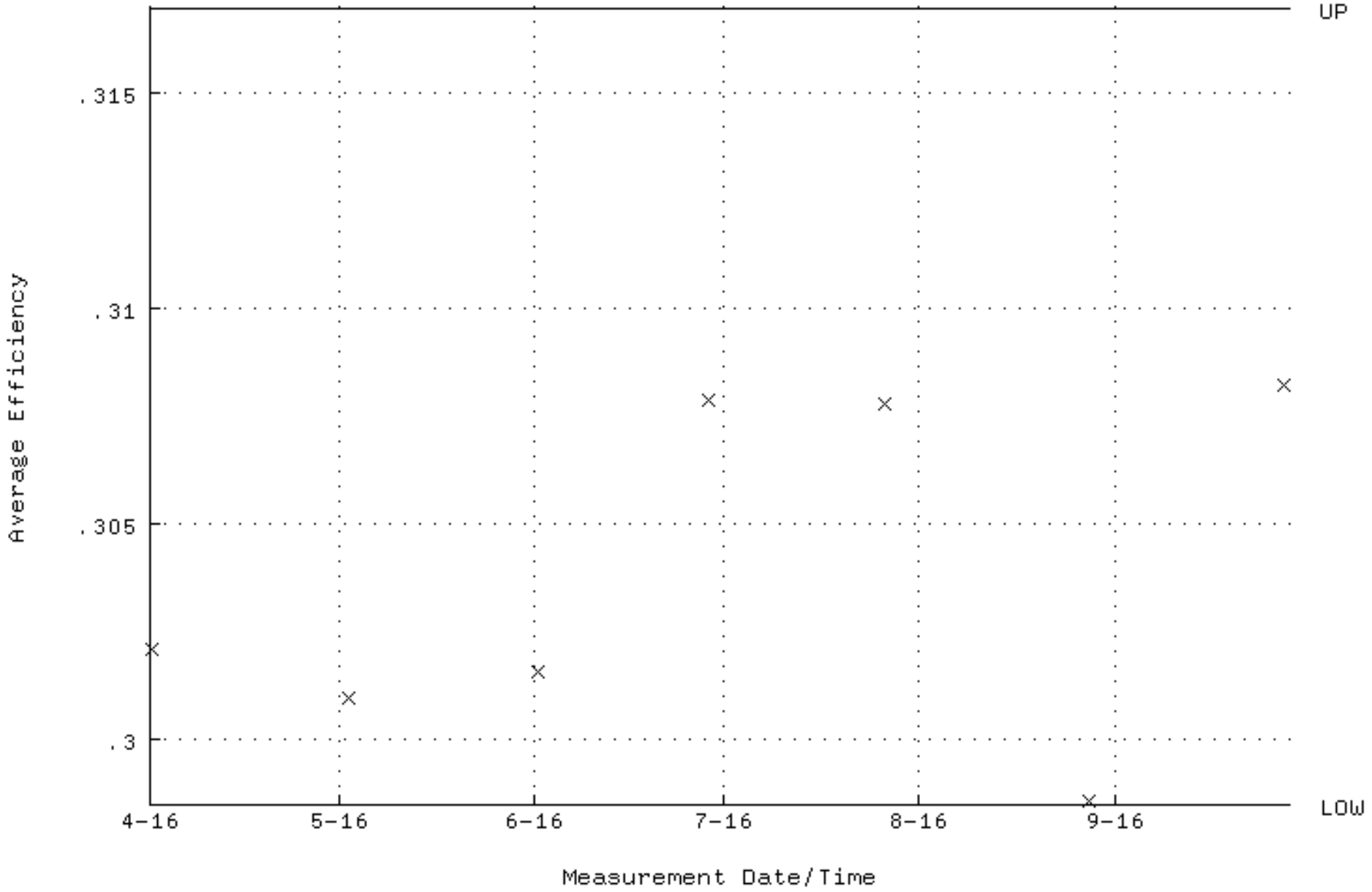
QA filename : DKA100:[ENV_ALPHA.QA.W]W008.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



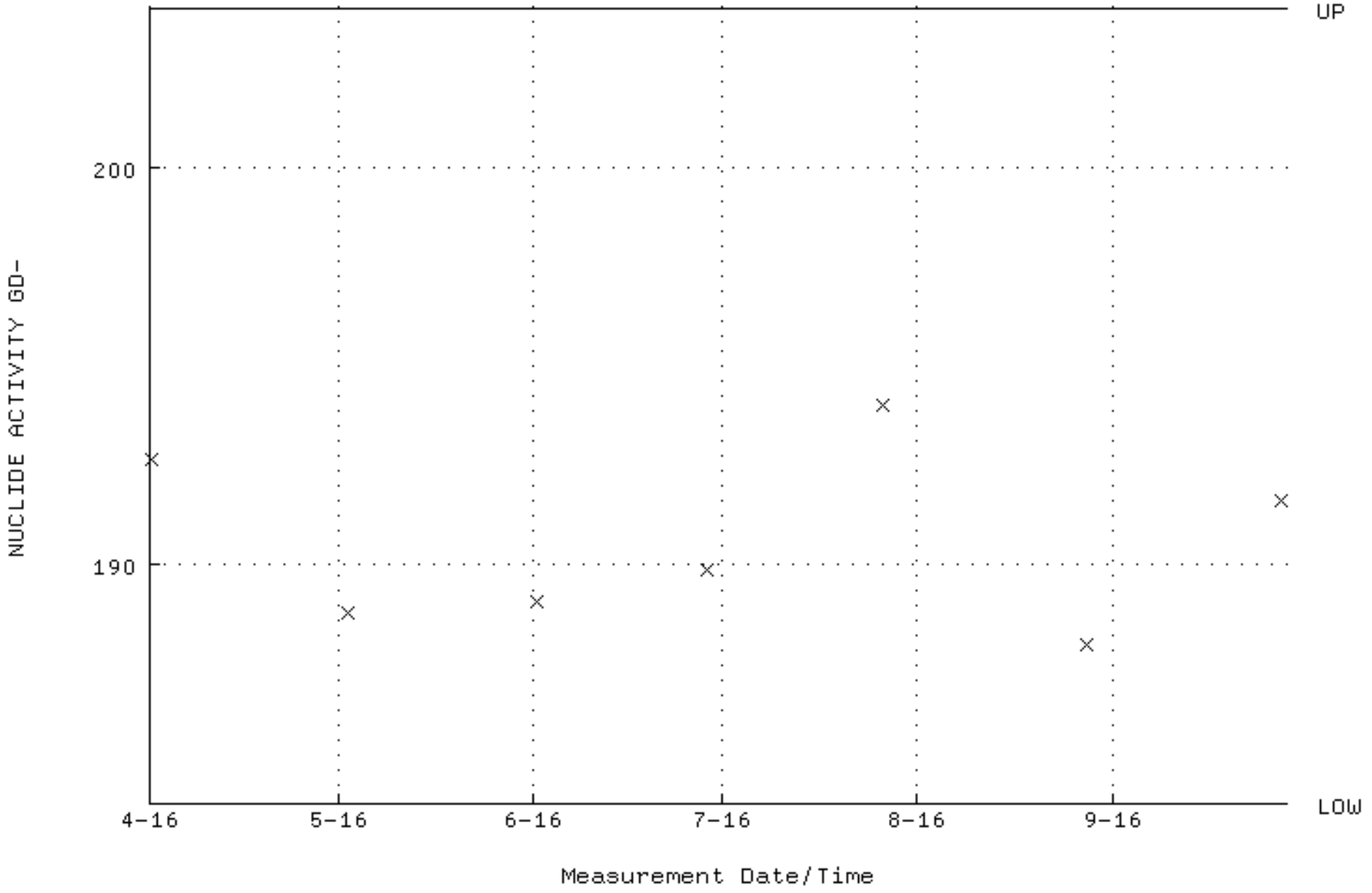
QA filename : DKA100:[ENV_ALPHA.QA.B]B008.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:28 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



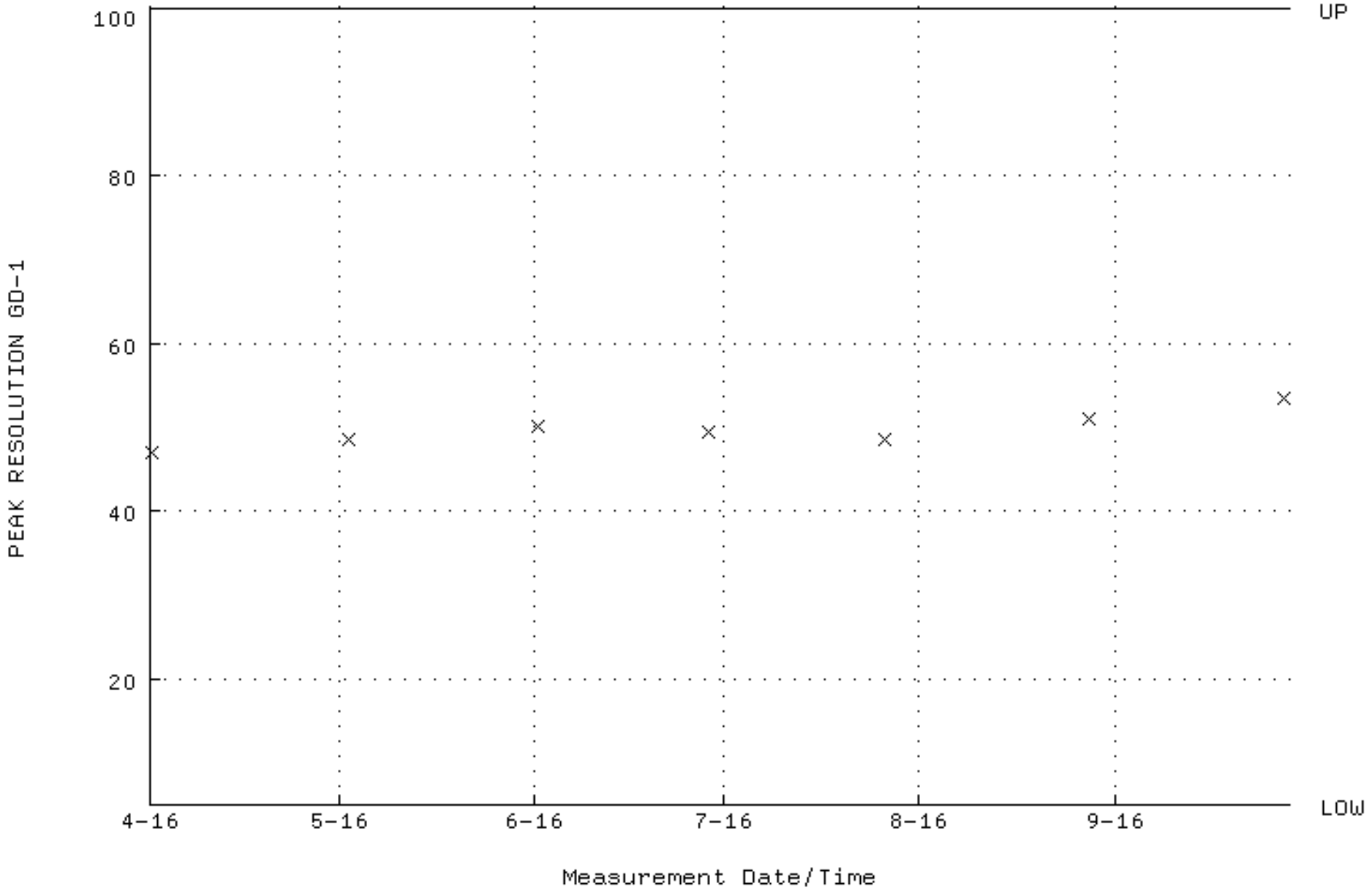
QA filename : DKA100:[ENV_ALPHA.QA.W]W010.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.298500 through 0.316960



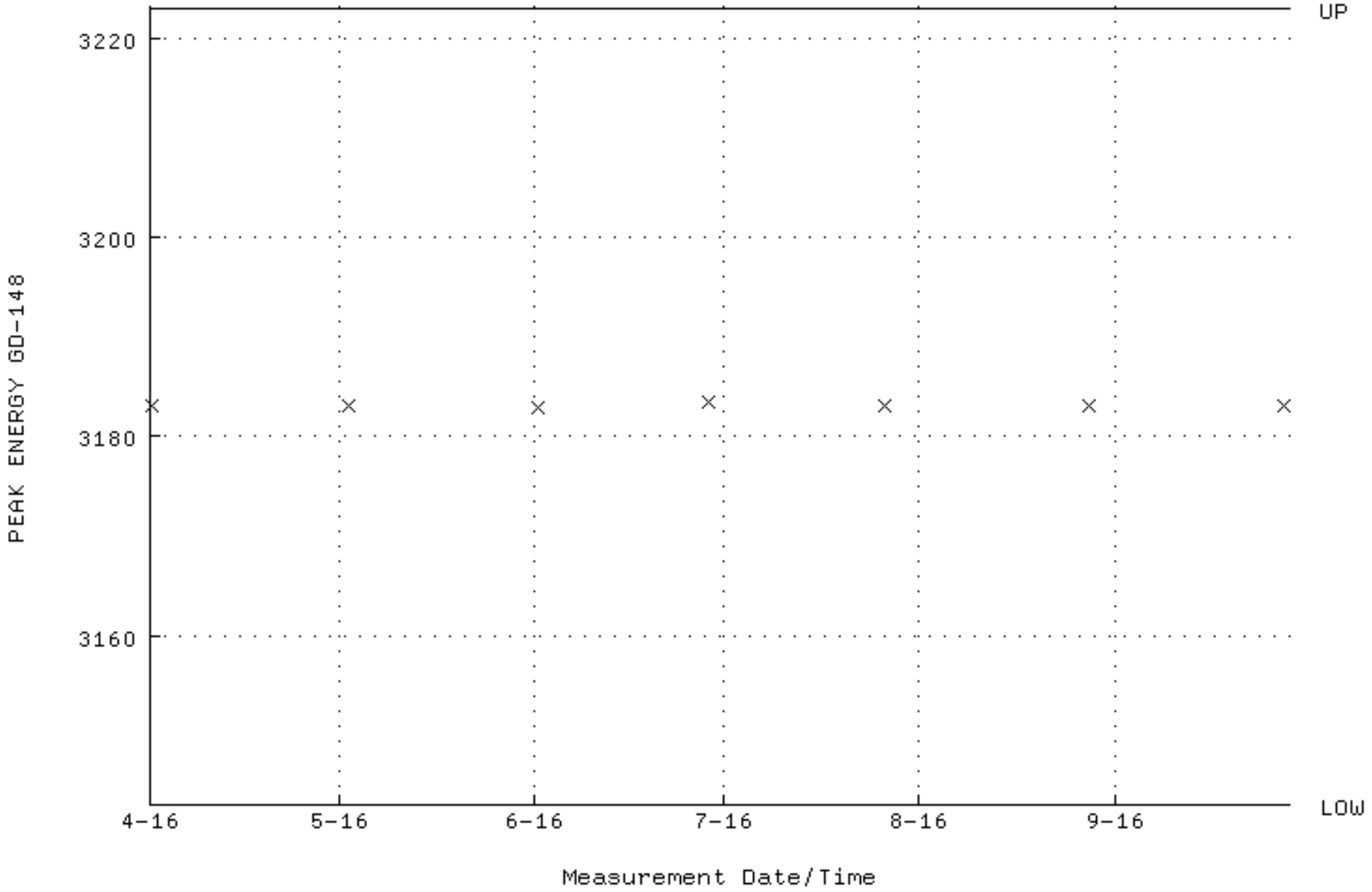
QA filename : DKA100:[ENV_ALPHA.QA.W]W010.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



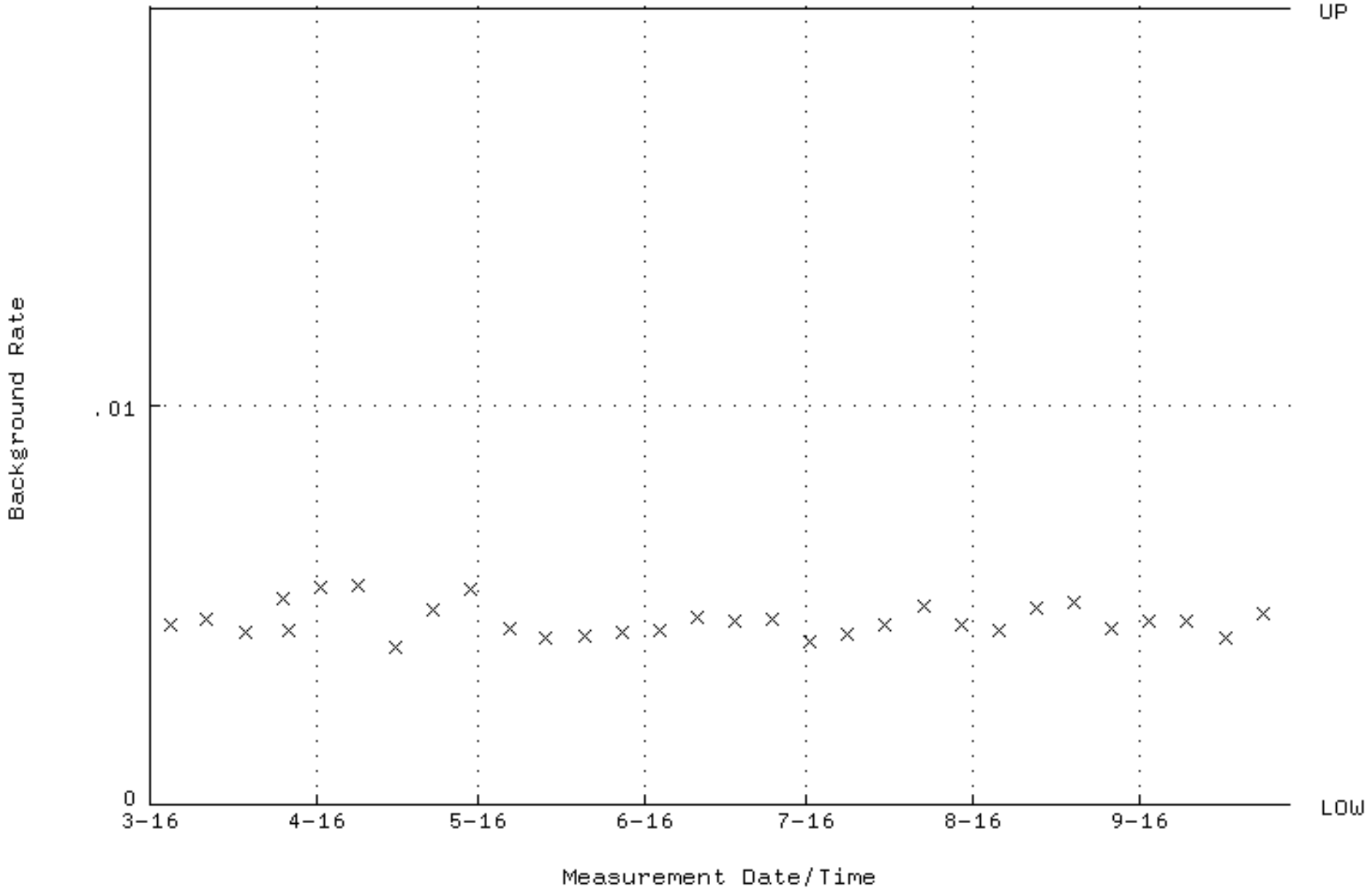
QA filename : DKA100:[ENV_ALPHA.QA.W]W010.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



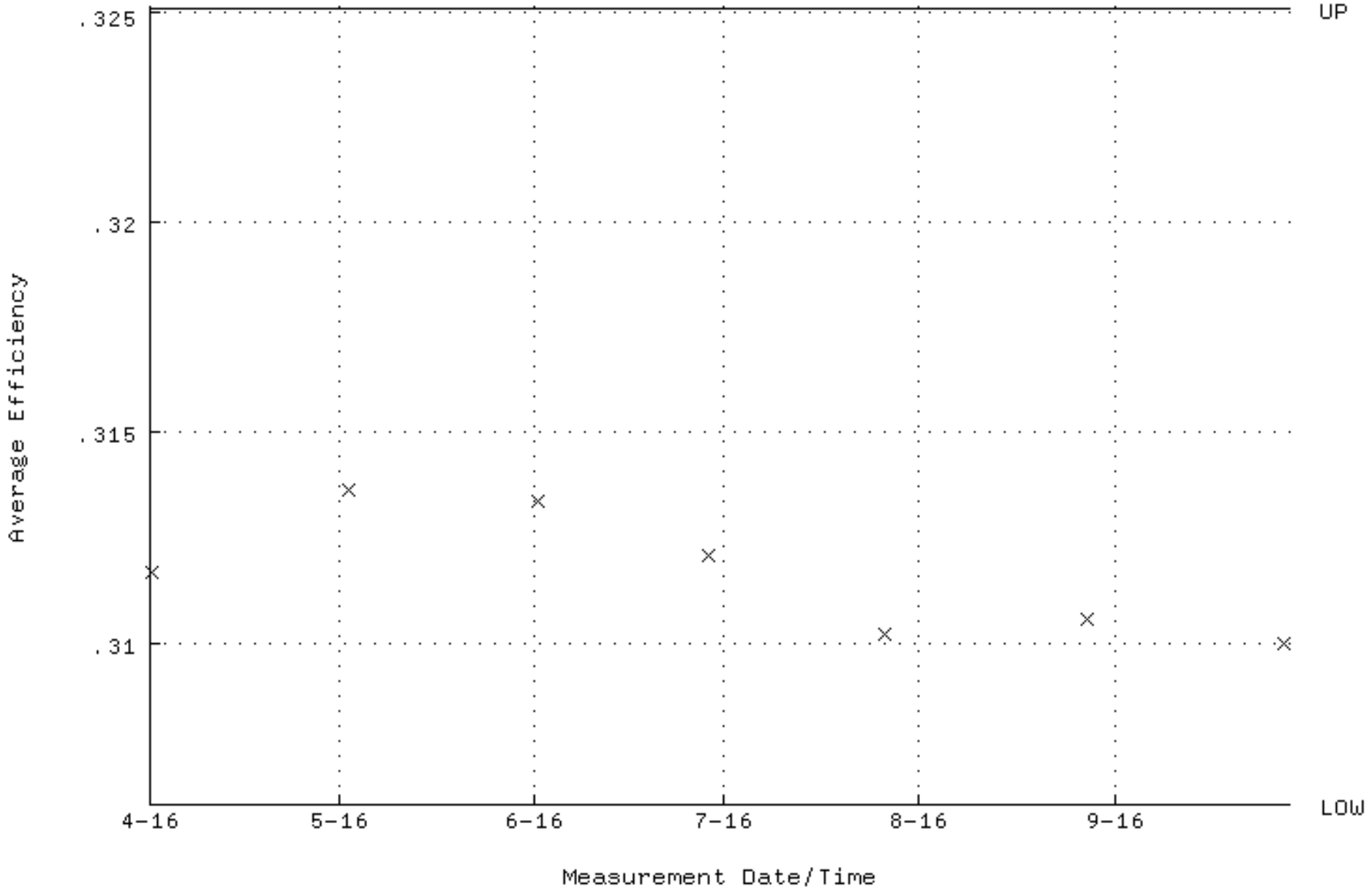
QA filename : DKA100:[ENV_ALPHA.QA.W]W010.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



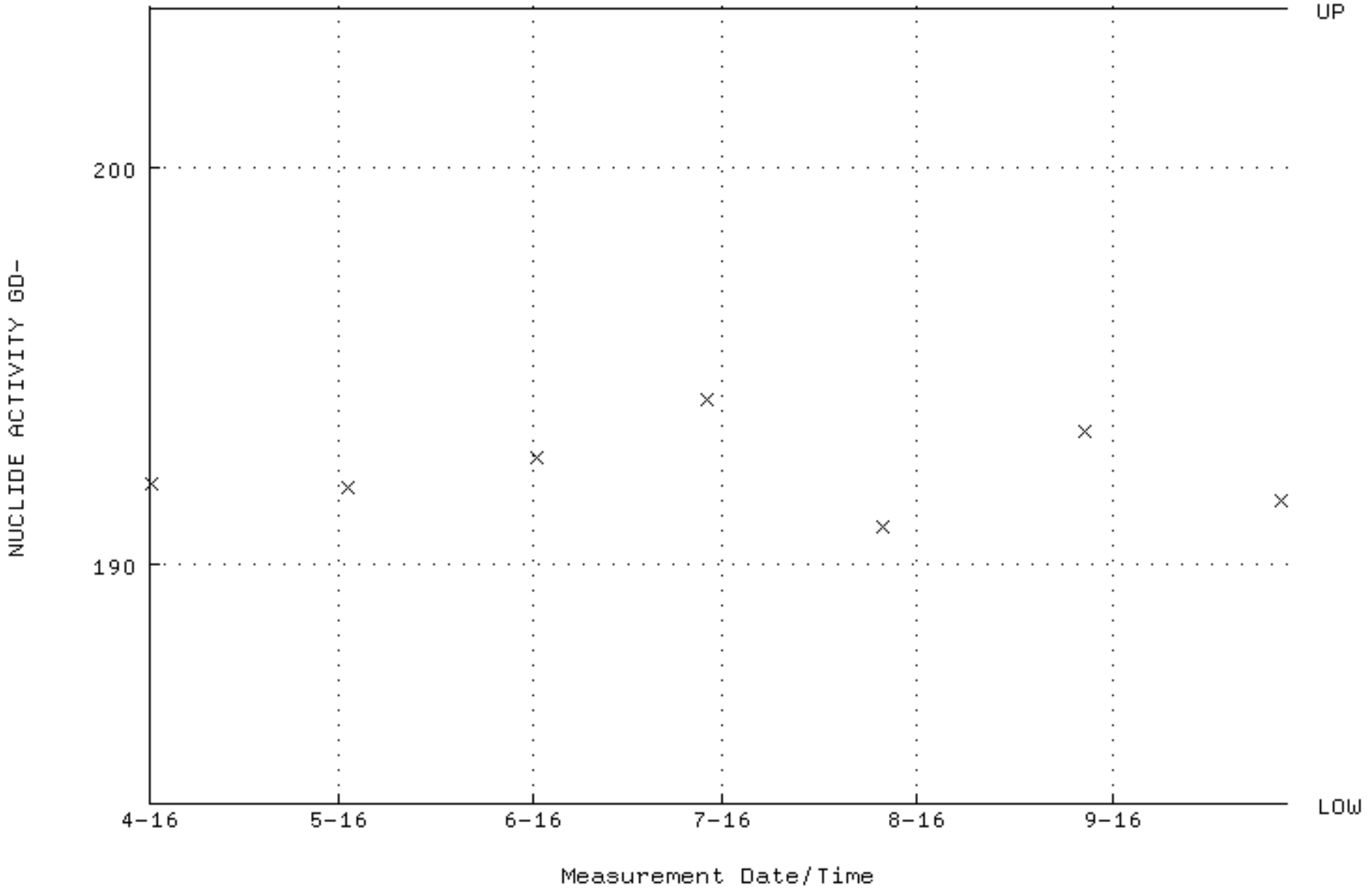
QA filename : DKA100:[ENV_ALPHA.QA.B]B010.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:28 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



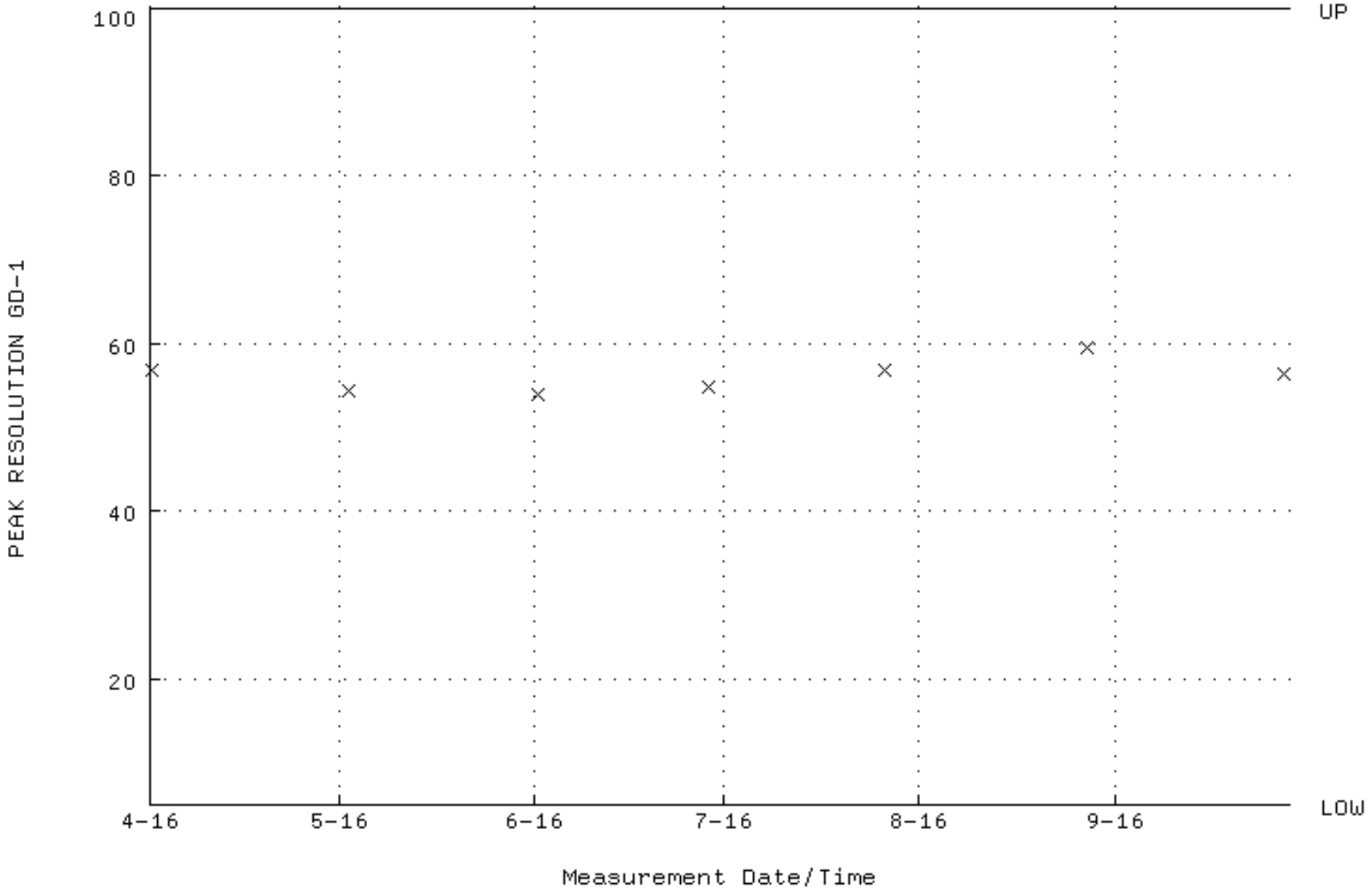
QA filename : DKA100:[ENV_ALPHA.QA.W]W011.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.306149 through 0.325087



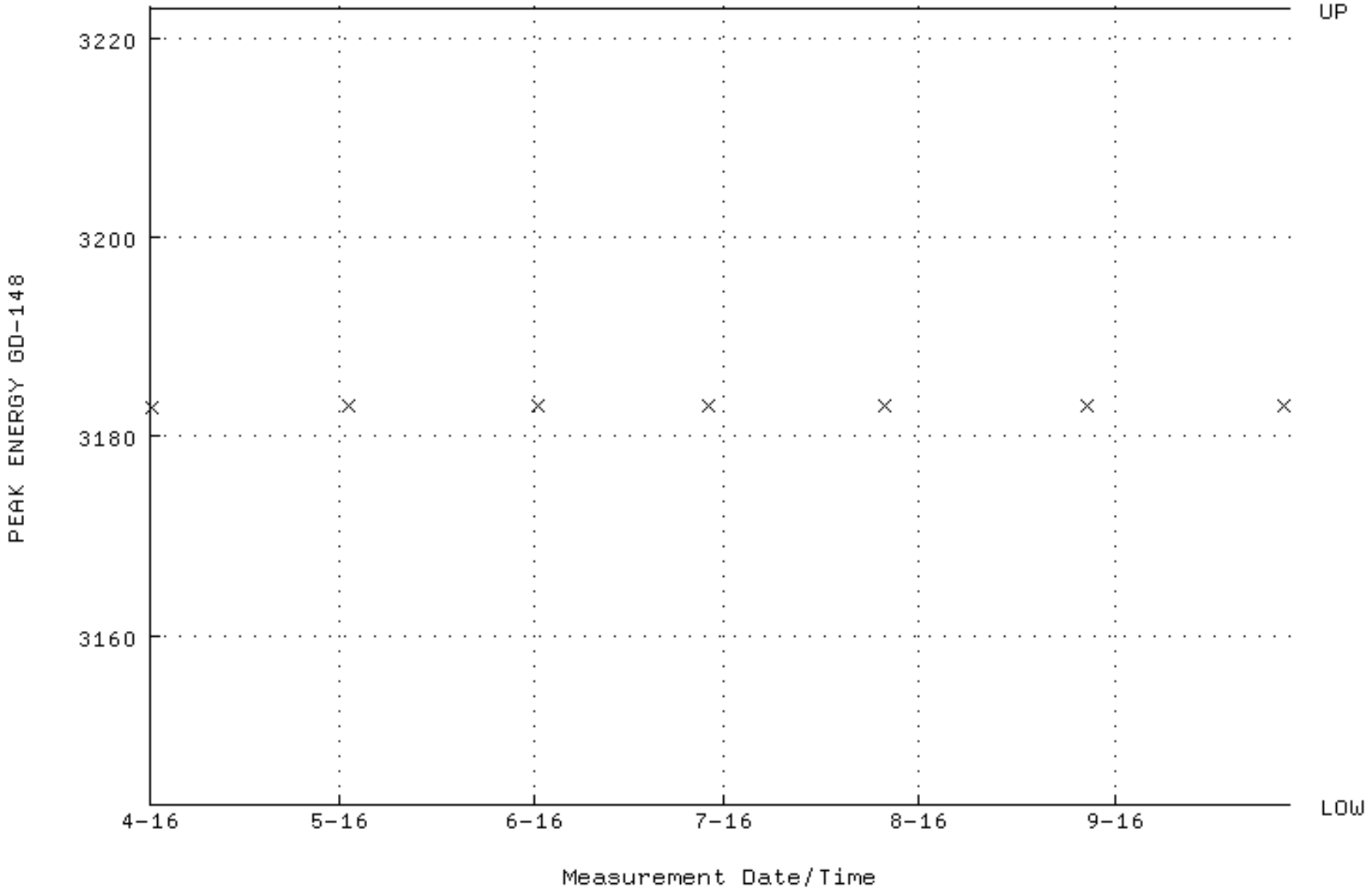
QA filename : DKA100:[ENV_ALPHA.QA.W]W011.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



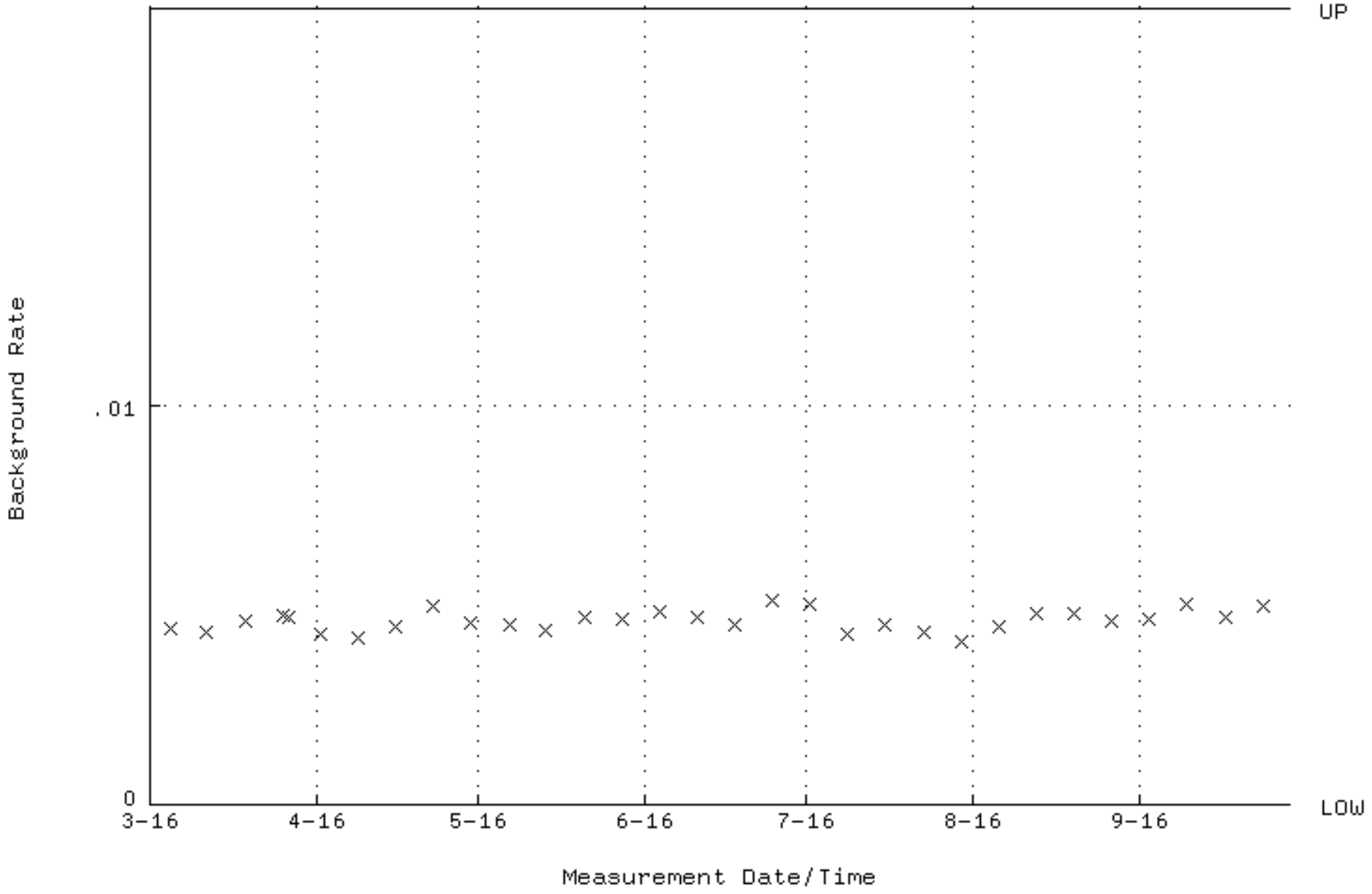
QA filename : DKA100:[ENV_ALPHA.QA.W]W011.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



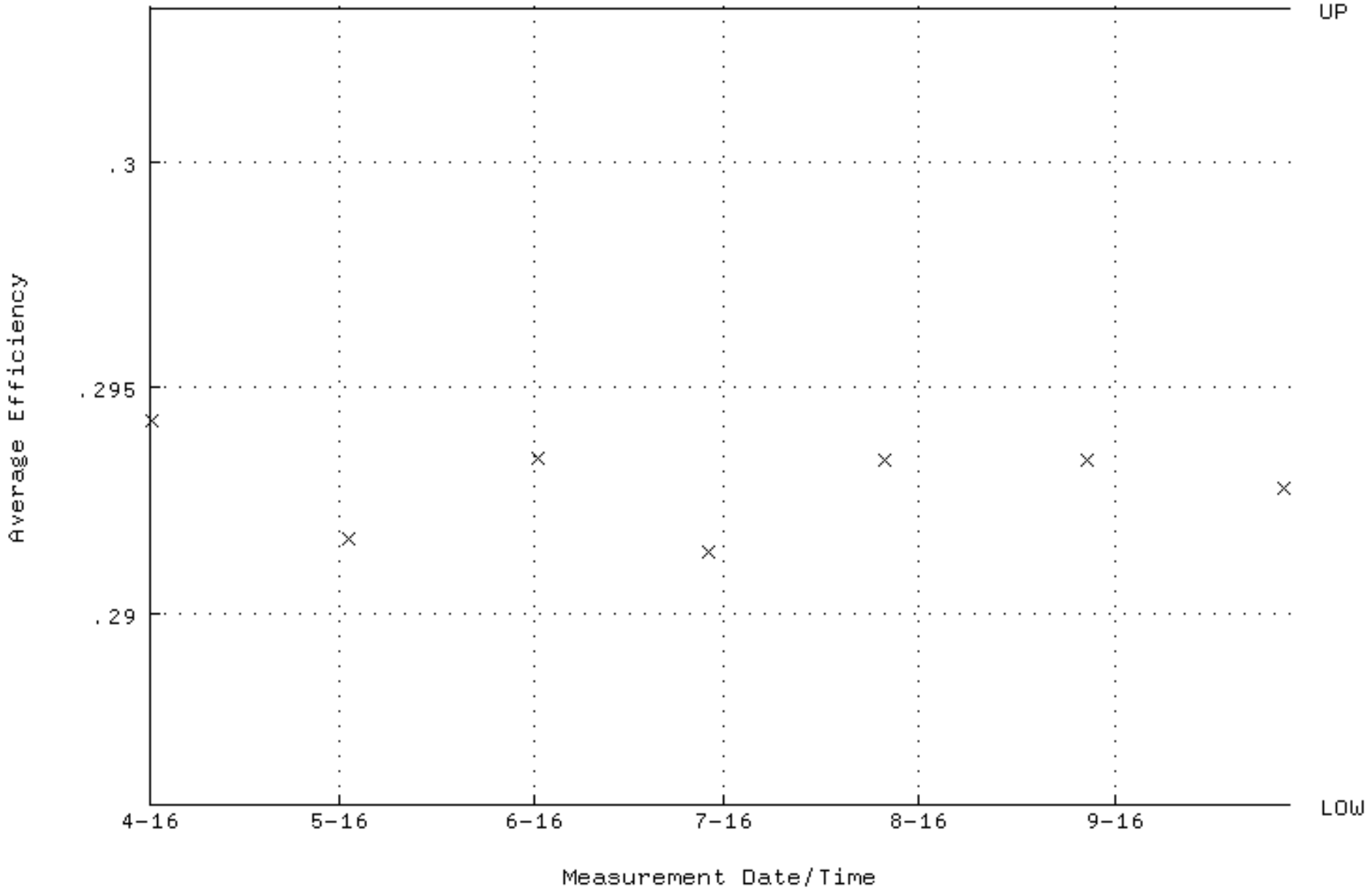
QA filename : DKA100:[ENV_ALPHA.QA.W]W011.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



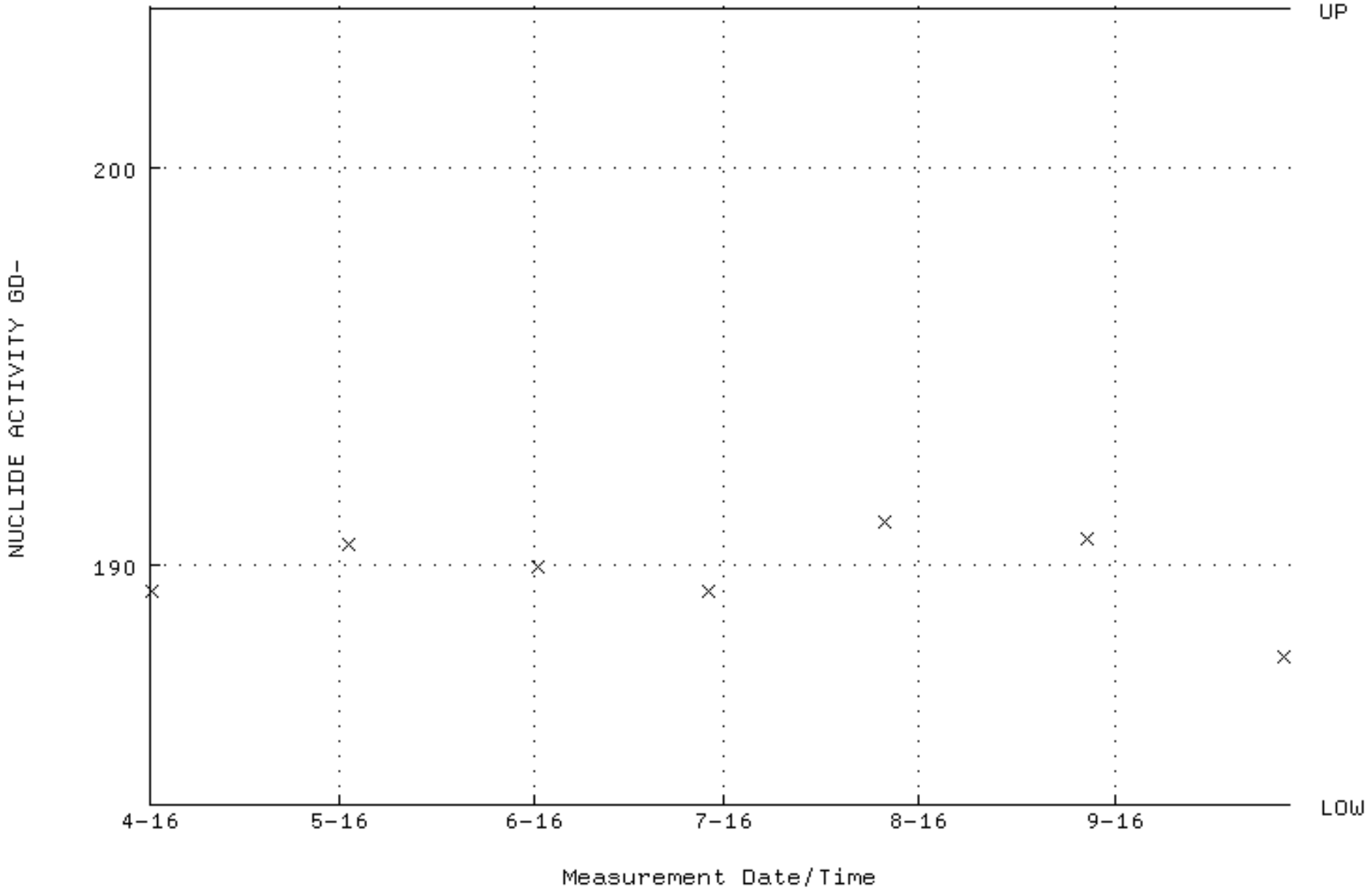
QA filename : DKA100:[ENV_ALPHA.QA.B]B011.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:28 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



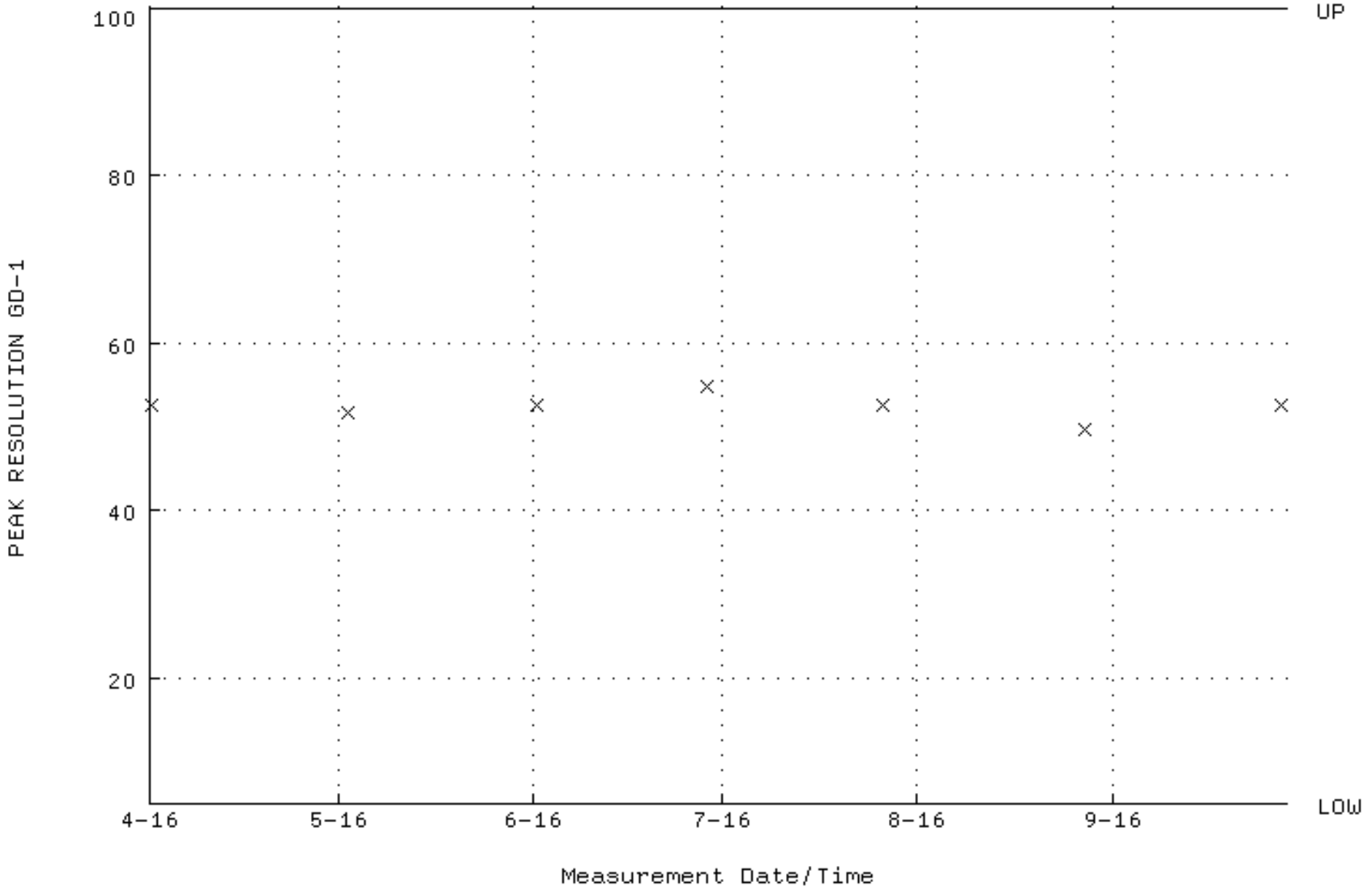
QA filename : DKA100:[ENV_ALPHA.QA.W]W012.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.285746 through 0.303420



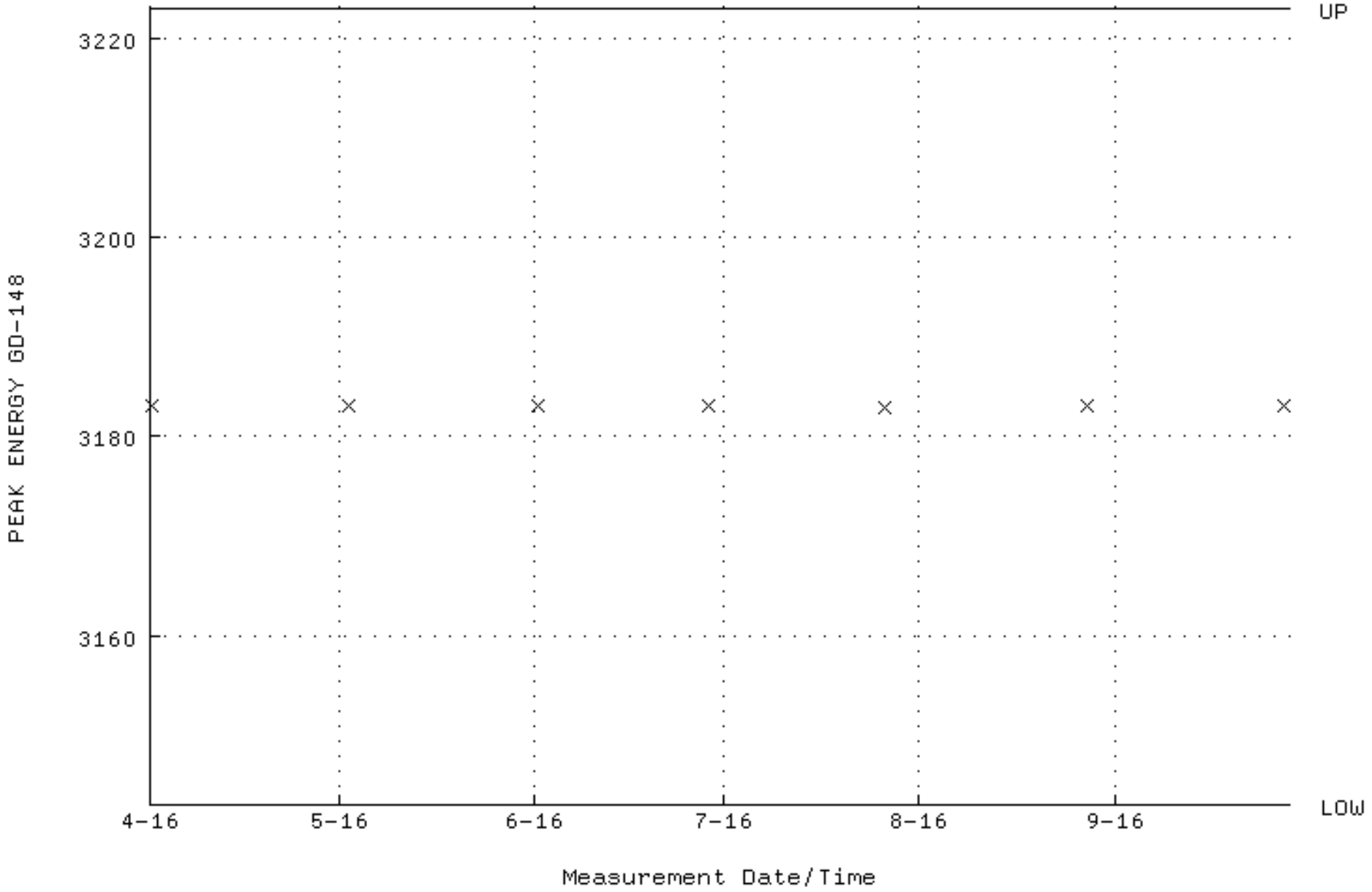
QA filename : DKA100:[ENV_ALPHA.QA.W]W012.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



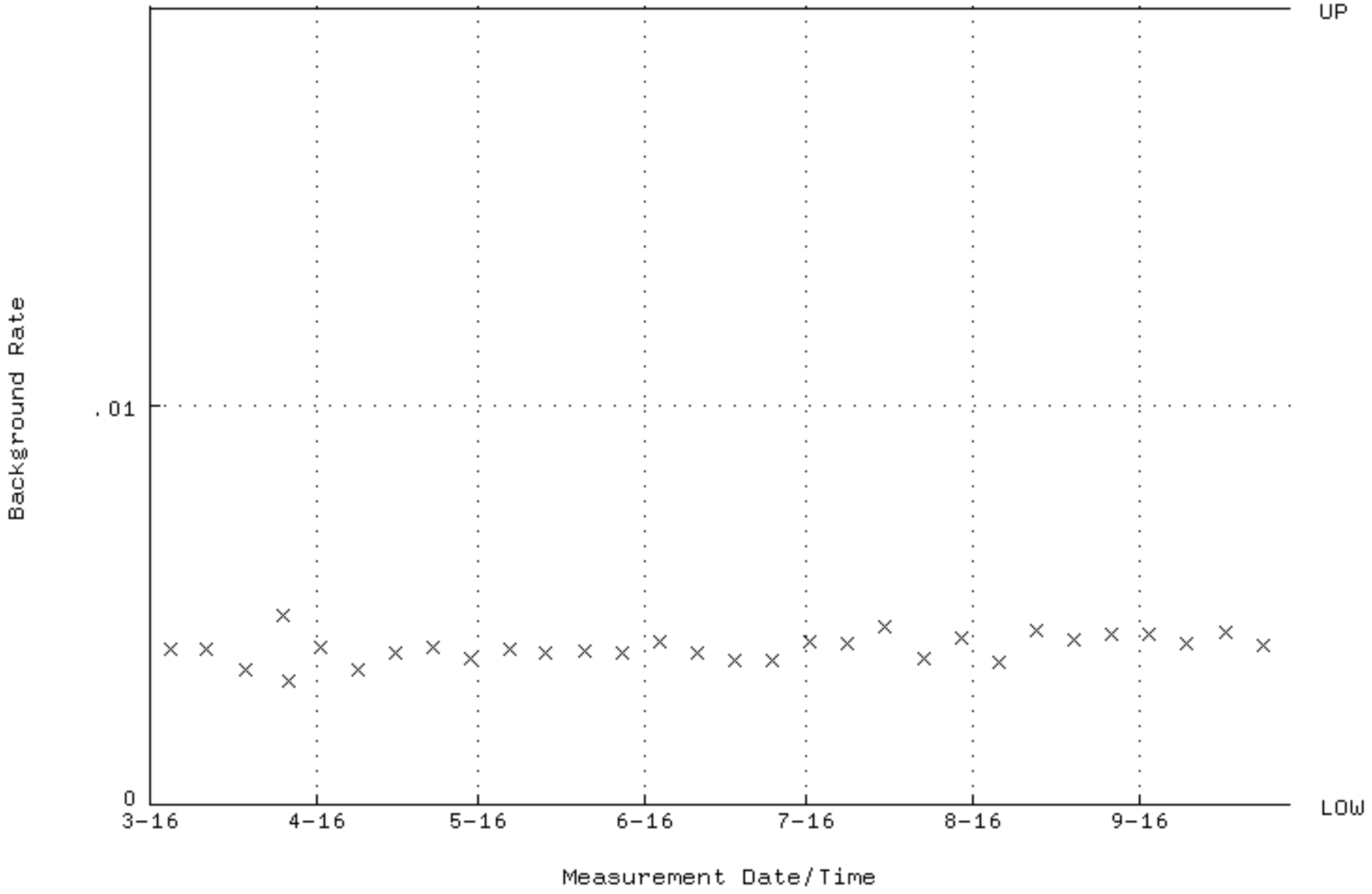
QA filename : DKA100:[ENV_ALPHA.QA.W]W012.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



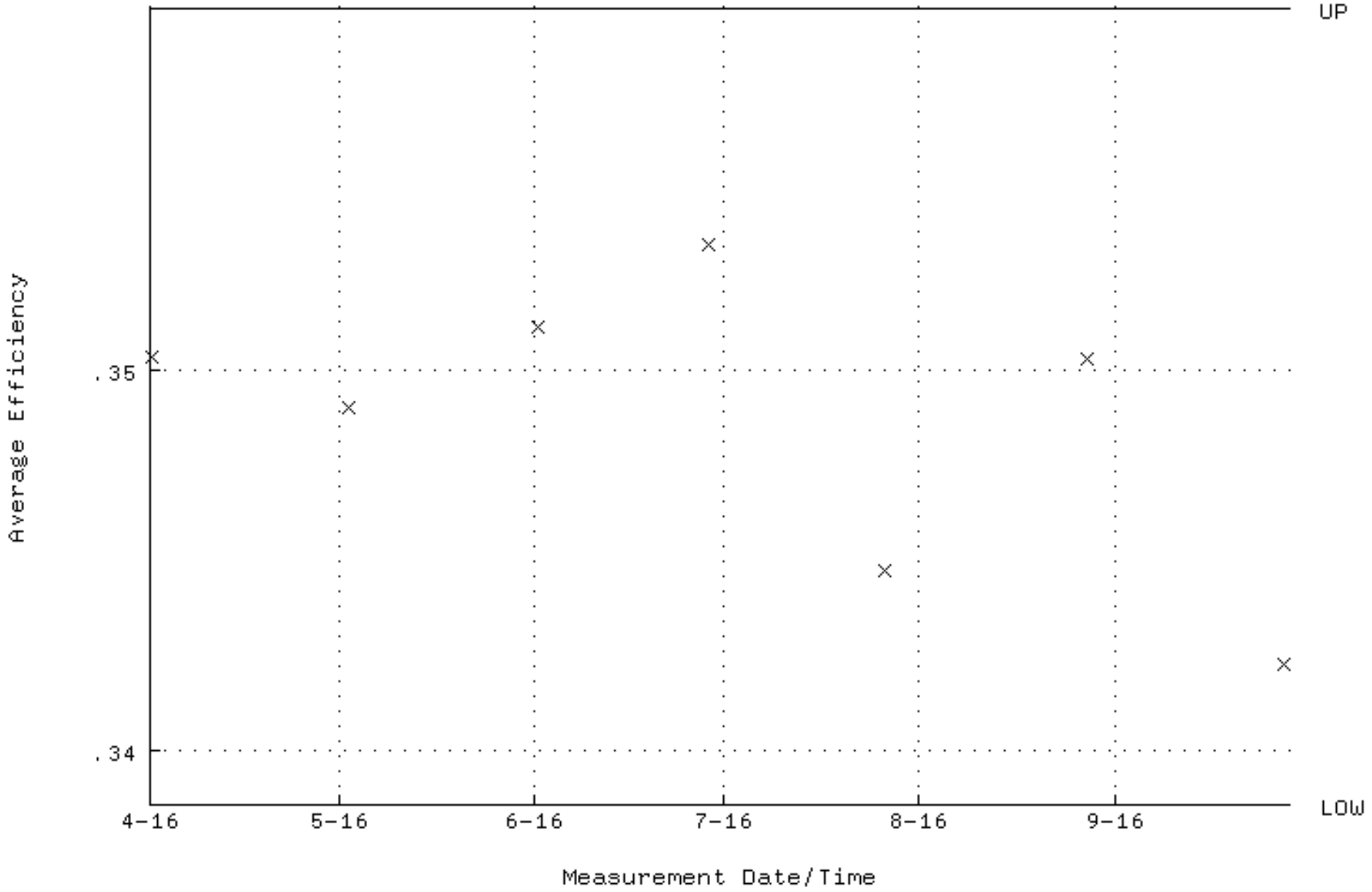
QA filename : DKA100:[ENV_ALPHA.QA.W]W012.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



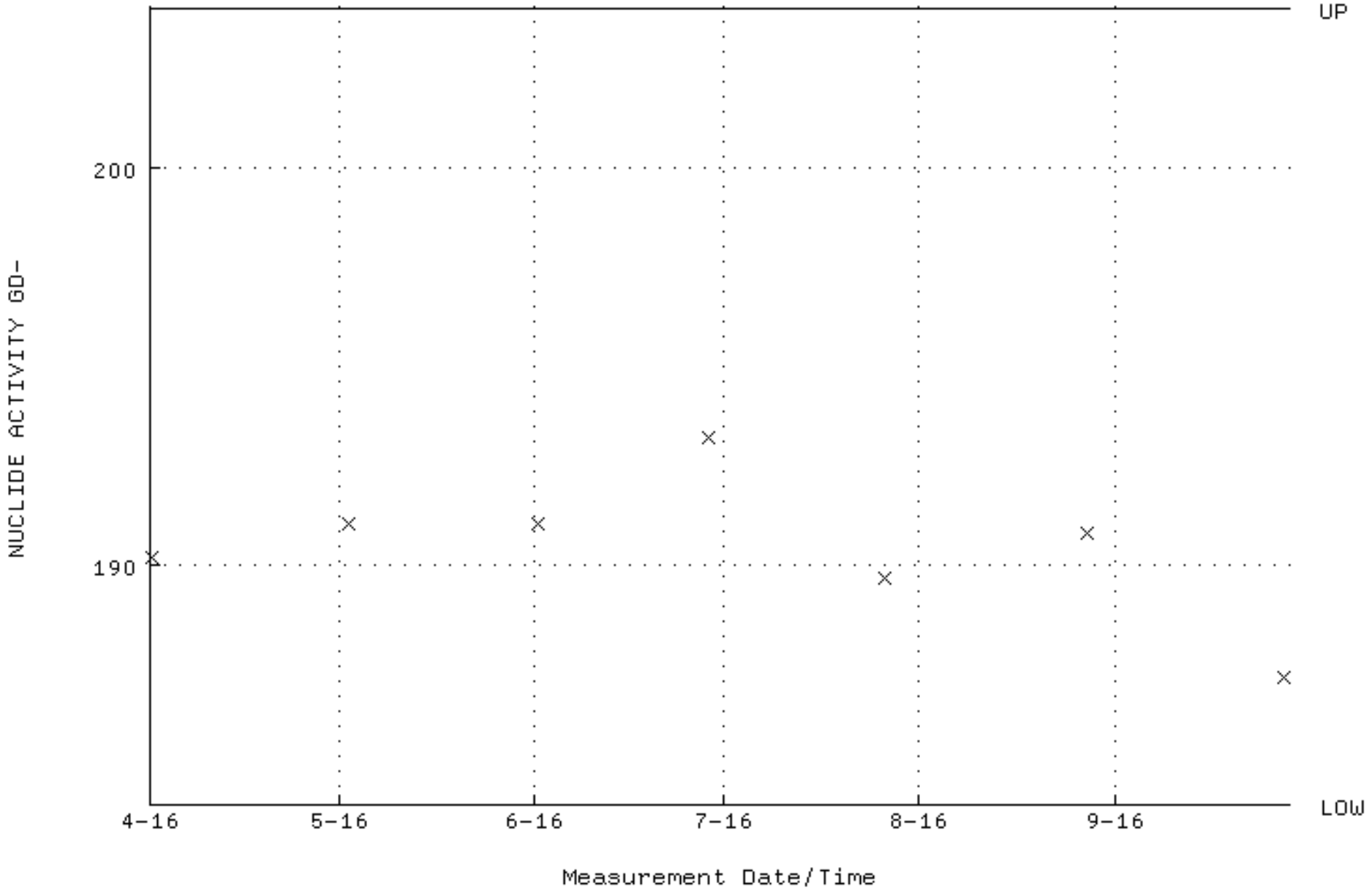
QA filename : DKA100:[ENV_ALPHA.QA.B]B012.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:28 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



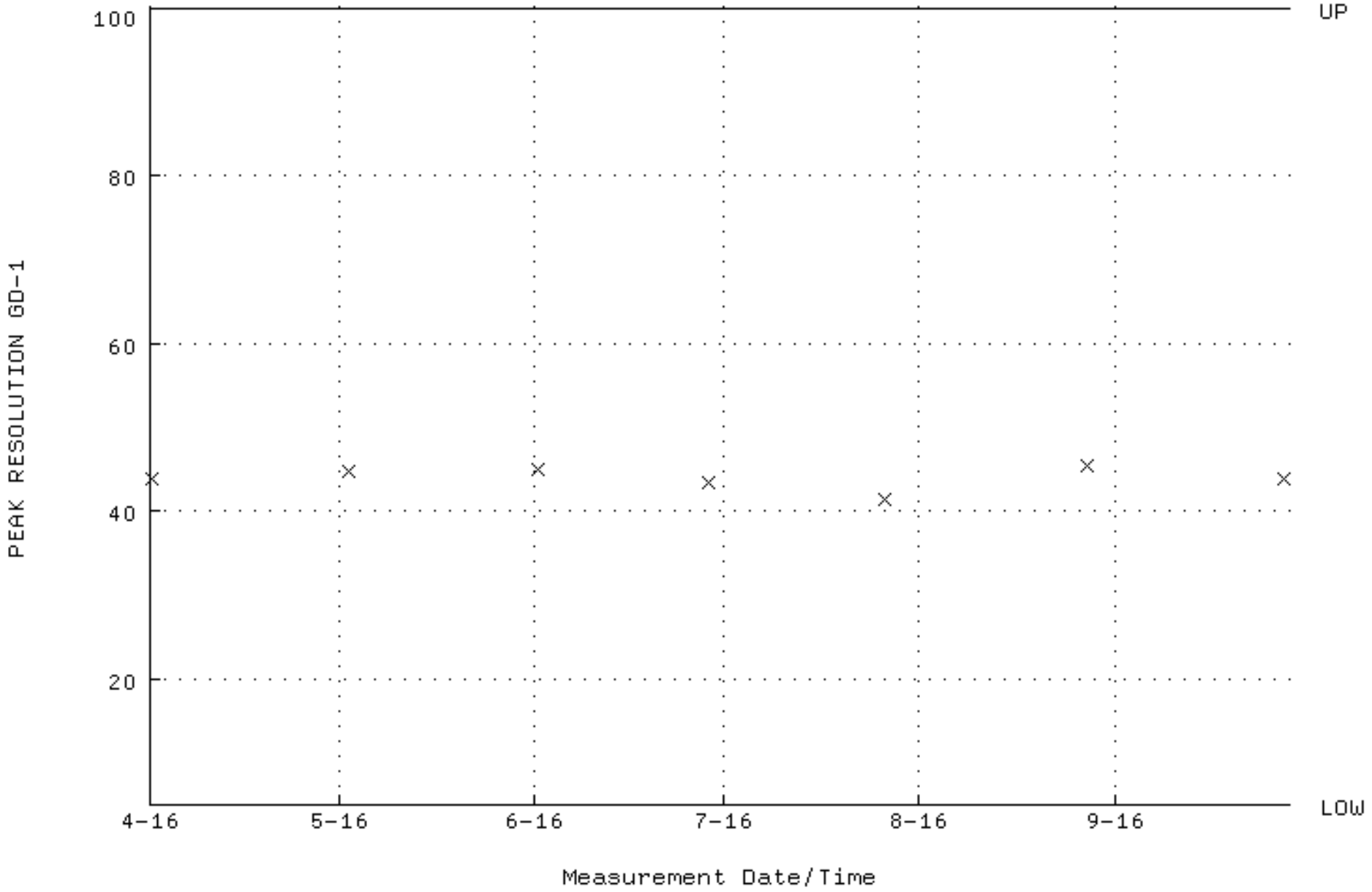
QA filename : DKA100:[ENV_ALPHA.QA.W]W013.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.338564 through 0.359506



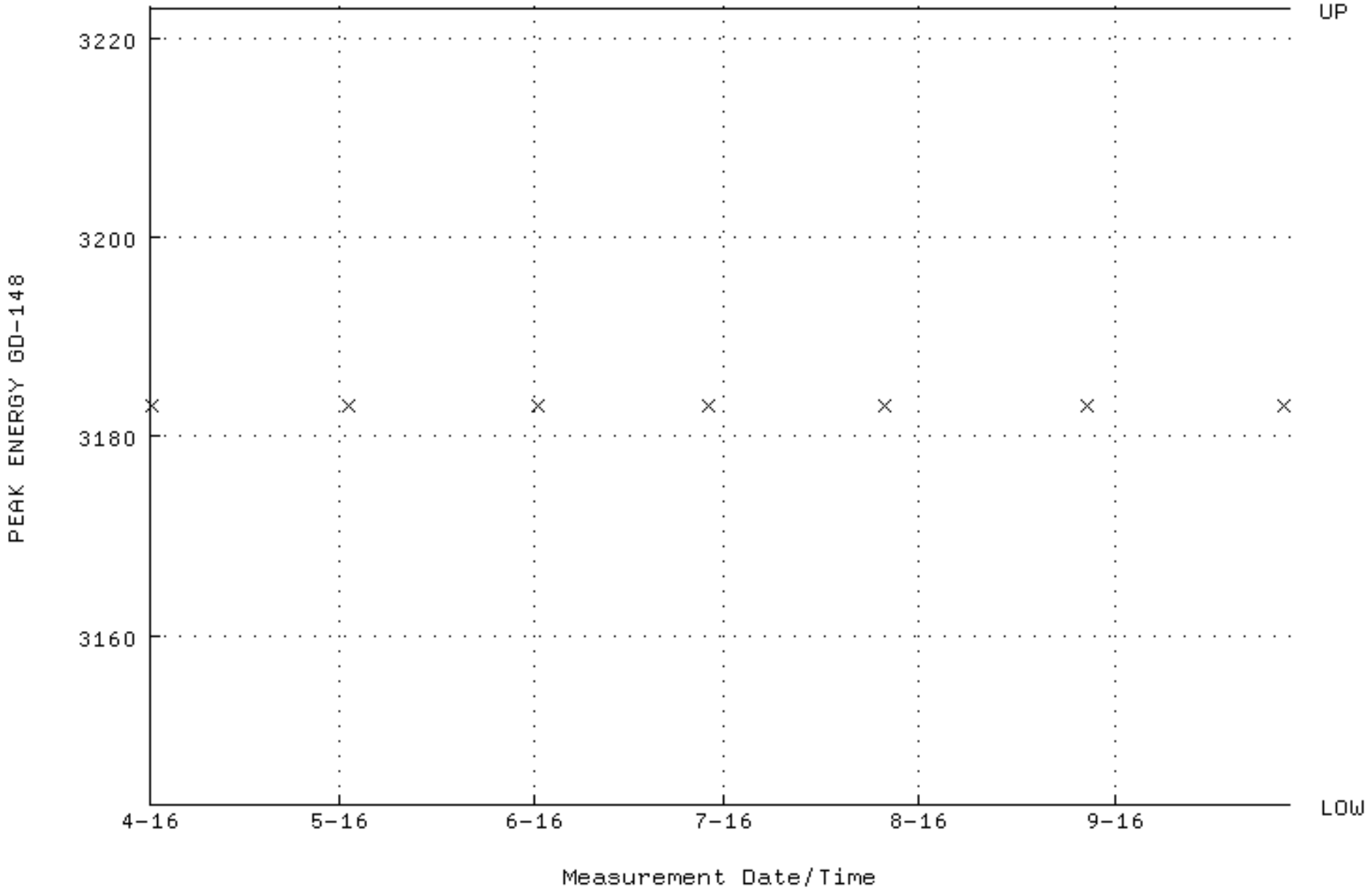
QA filename : DKA100:[ENV_ALPHA.QA.W]W013.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



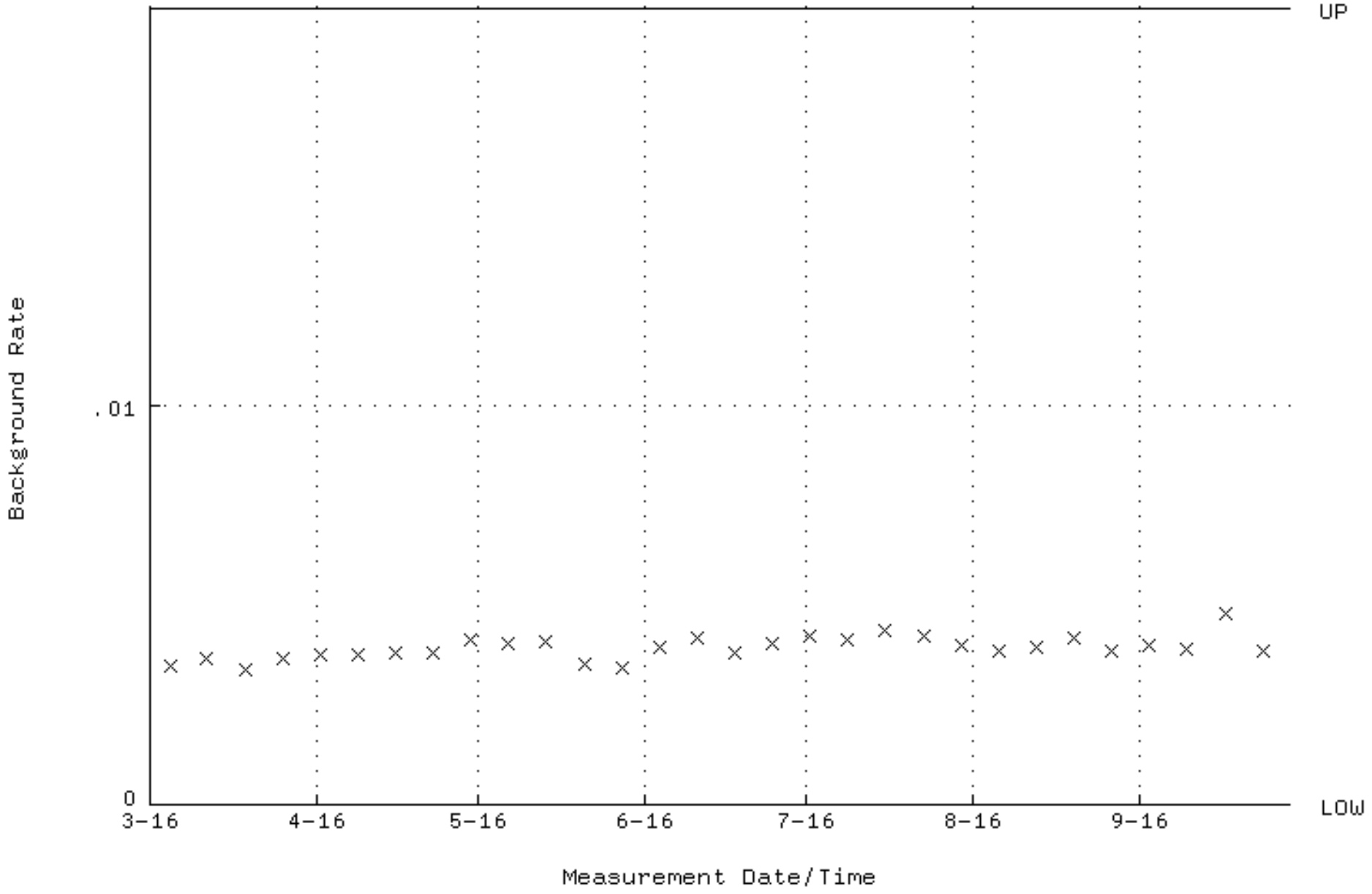
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



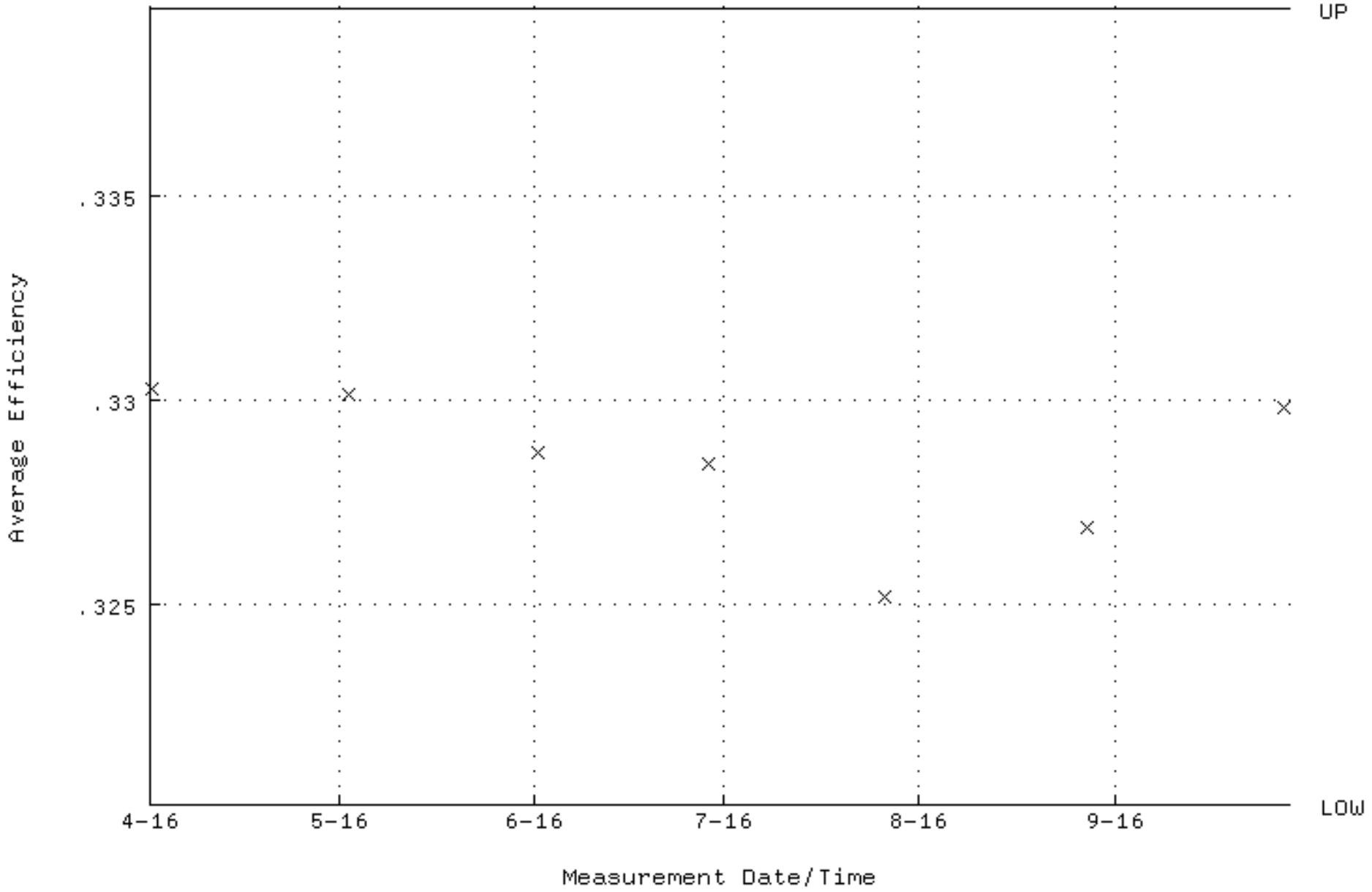
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



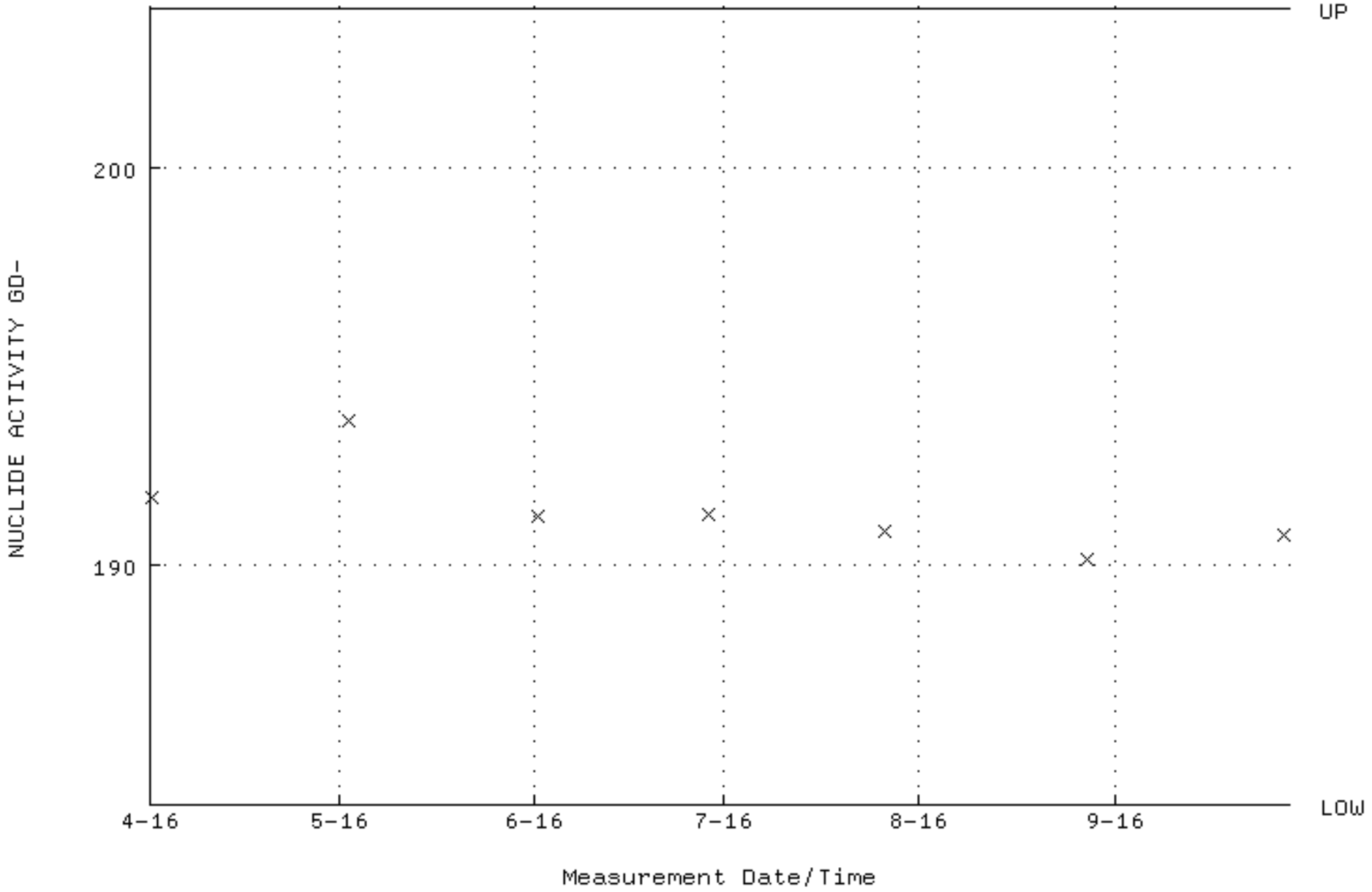
QA filename : DKA100:[ENV_ALPHA.QA.B]B013.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



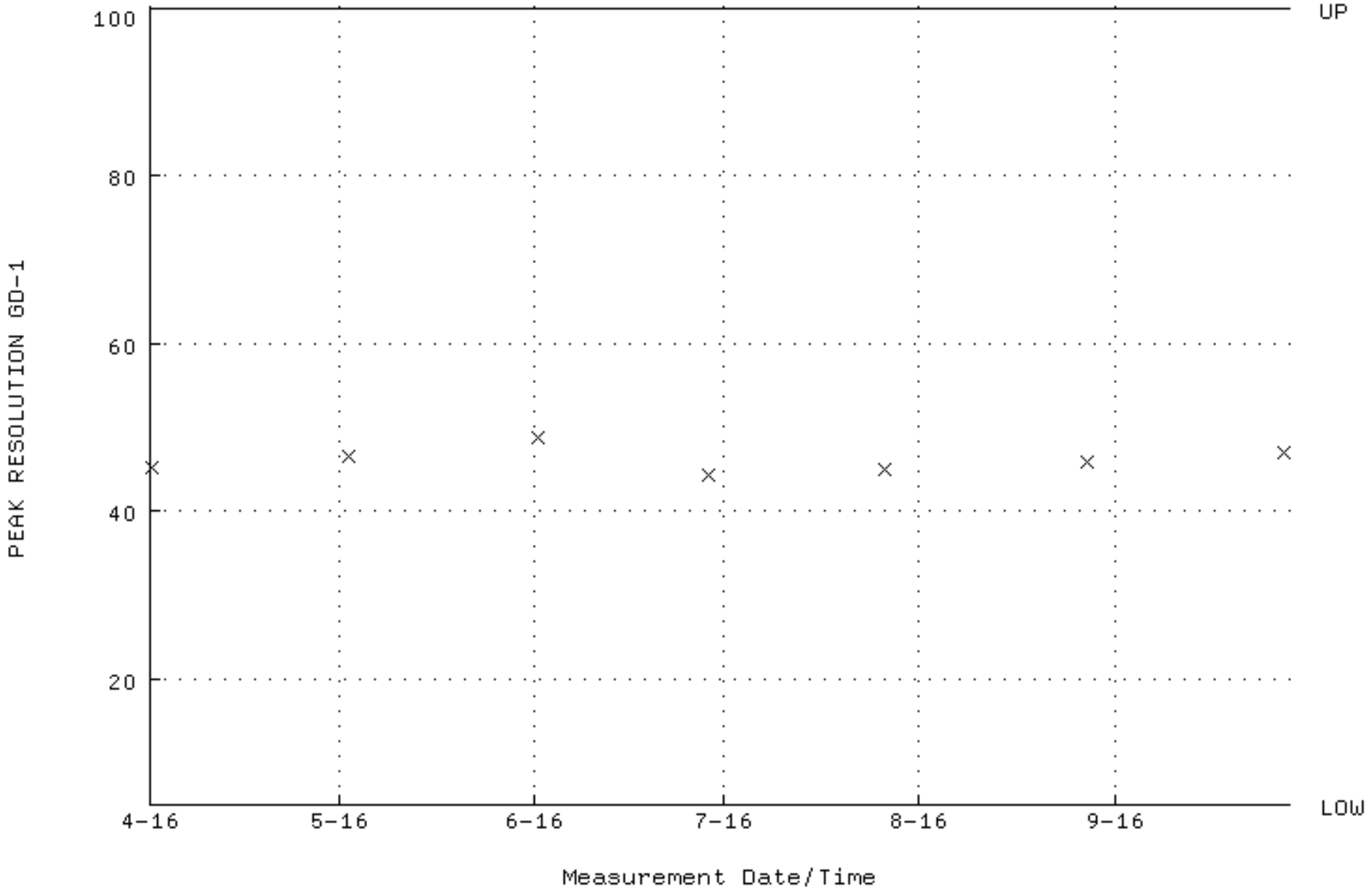
QA filename : DKA100:[ENV_ALPHA.QA.W]W014.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.320100 through 0.339600



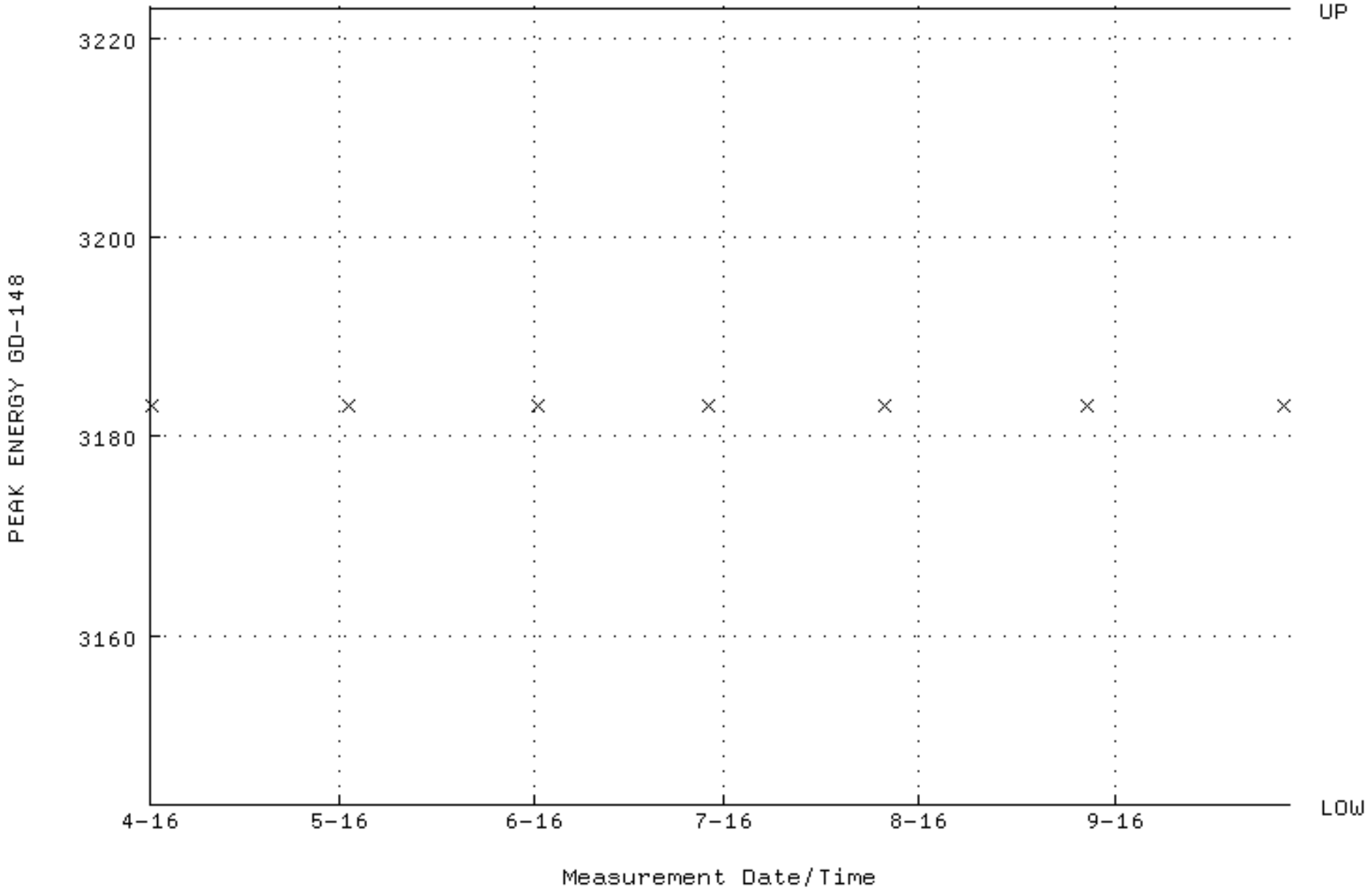
QA filename : DKA100:[ENV_ALPHA.QA.W]W014.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



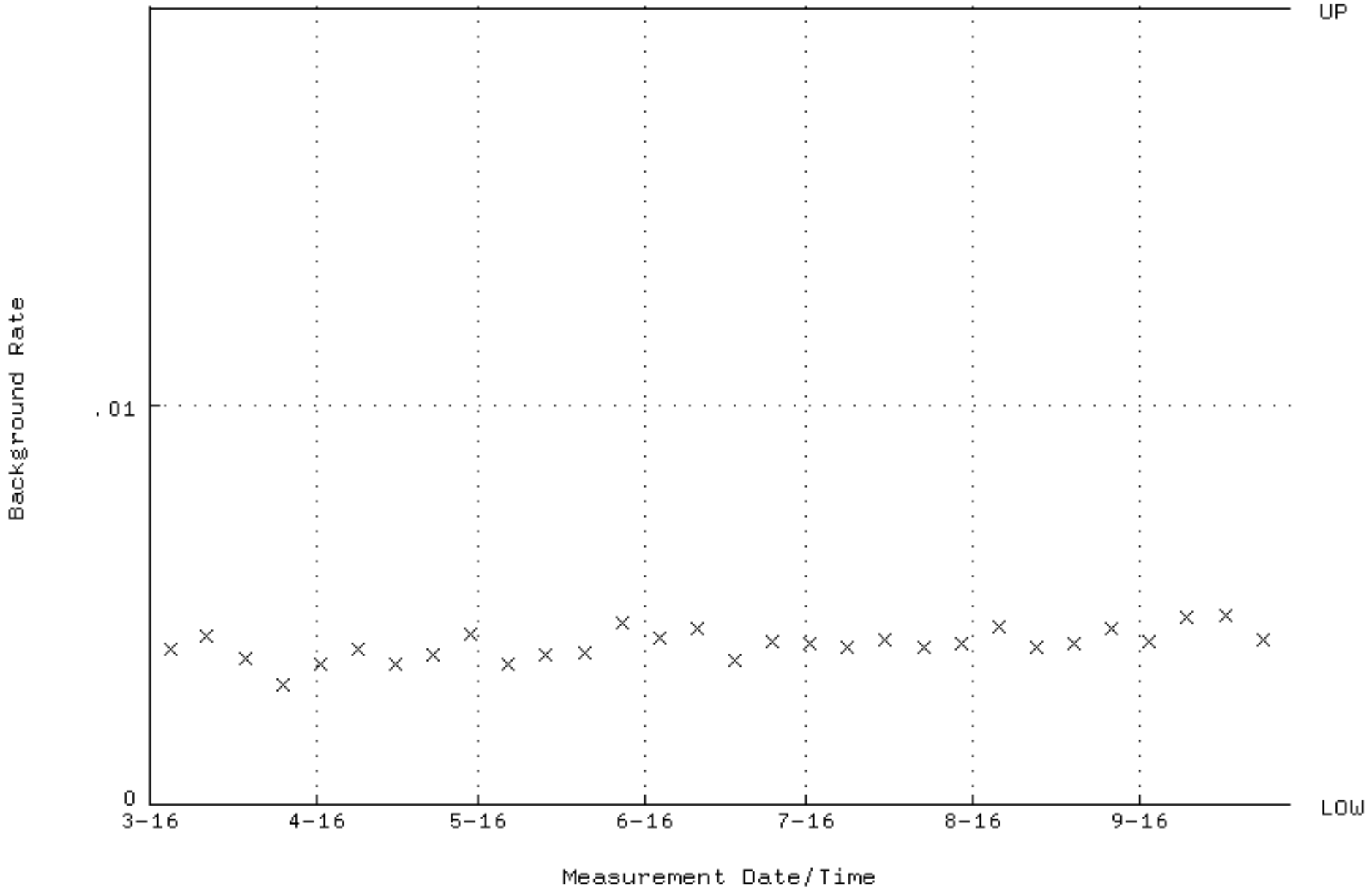
QA filename : DKA100:[ENV_ALPHA.QA.W]W014.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



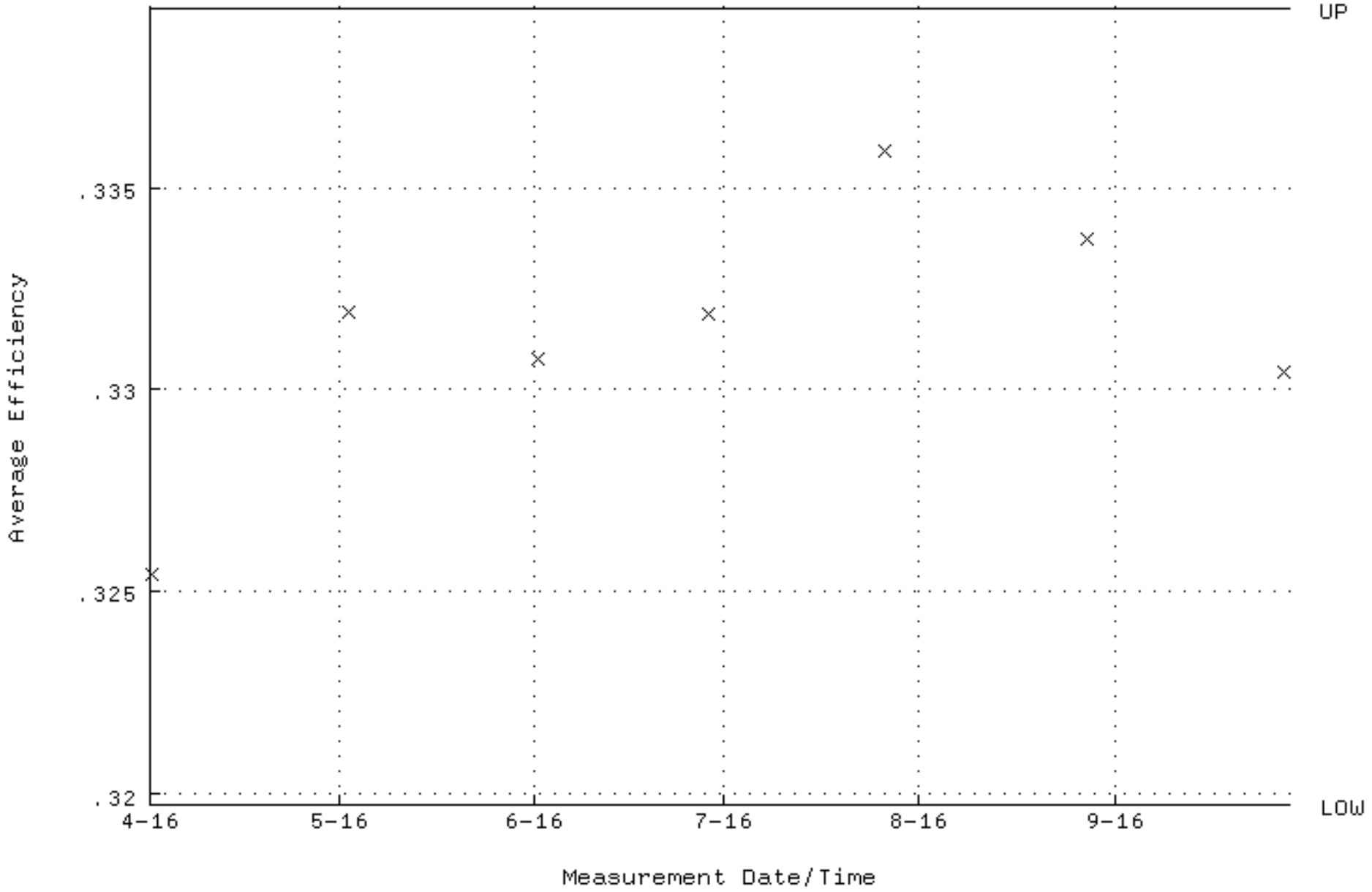
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



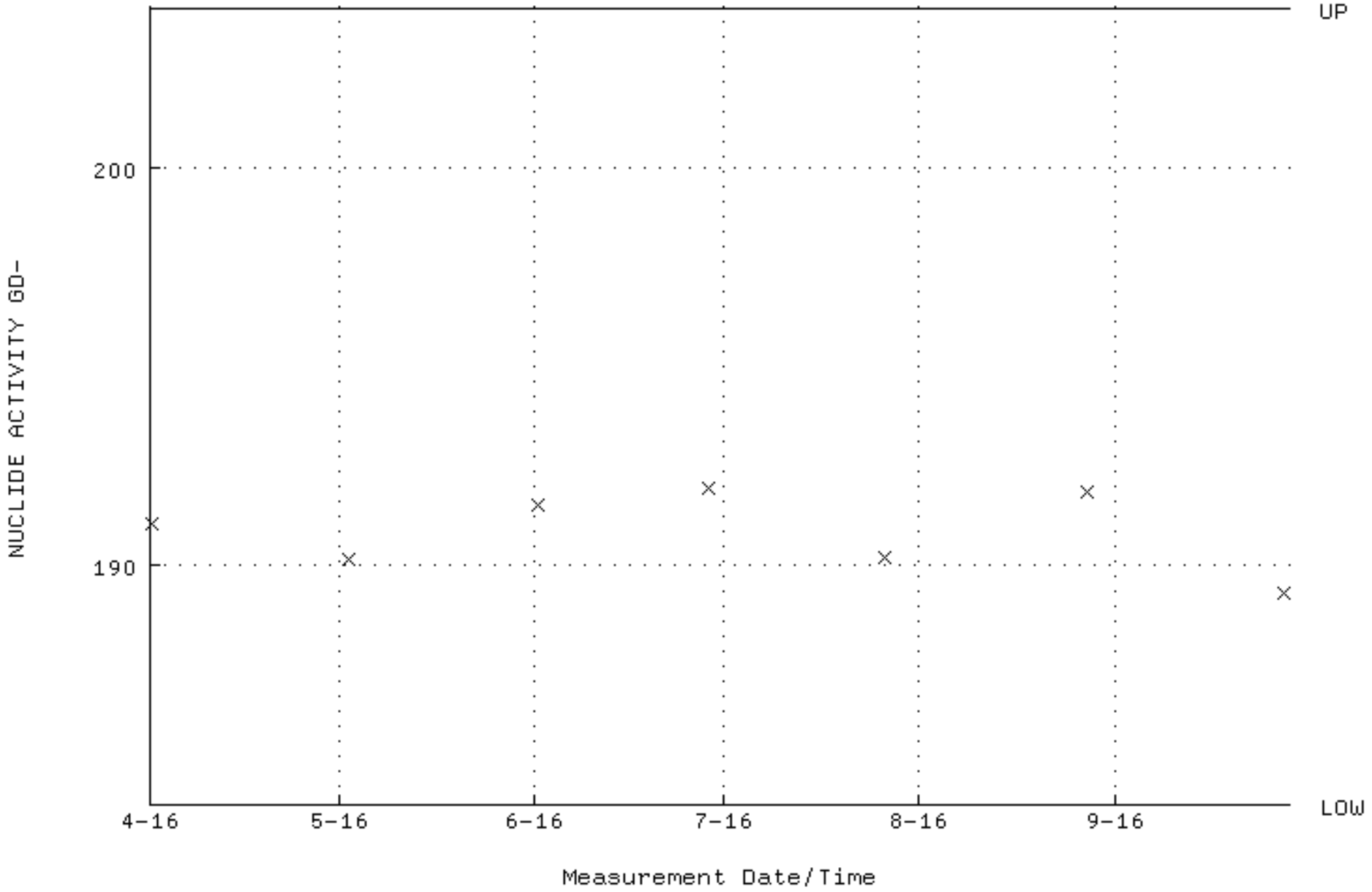
QA filename : DKA100:[ENV_ALPHA.QA.B]B014.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



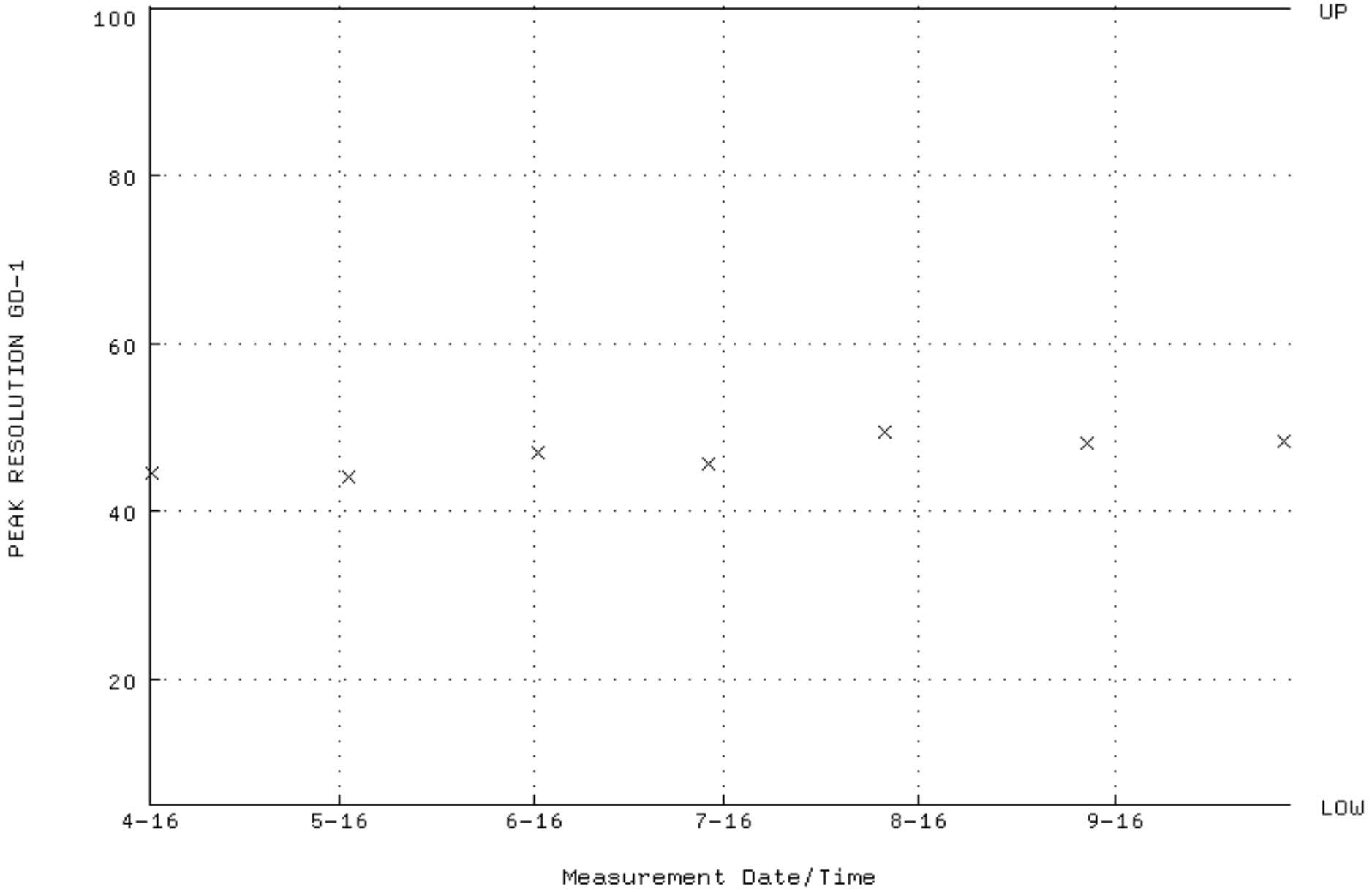
QA filename : DKA100:[ENV_ALPHA.QA.W]W015.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.319700 through 0.339450



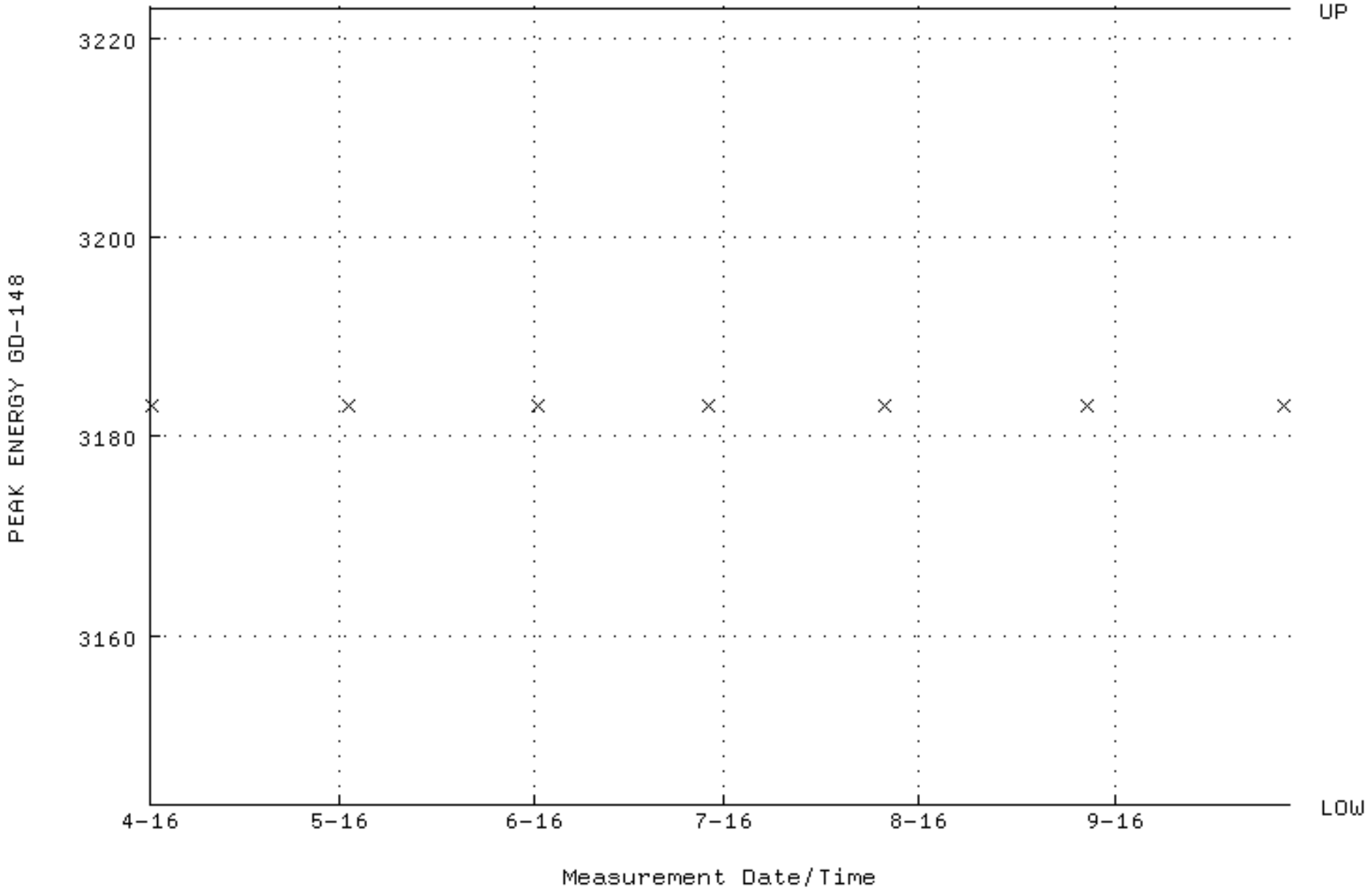
QA filename : DKA100:[ENV_ALPHA.QA.W]W015.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



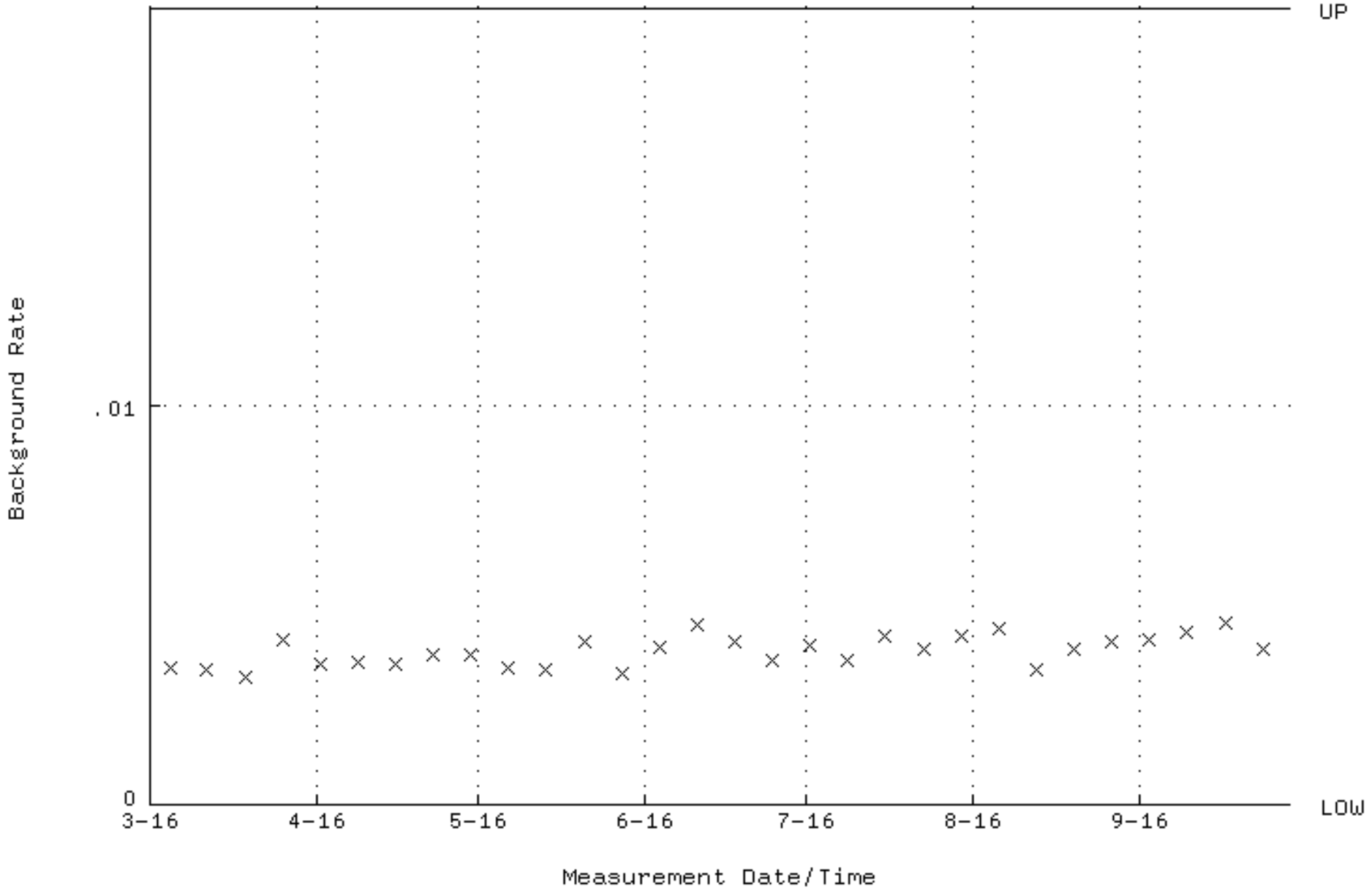
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



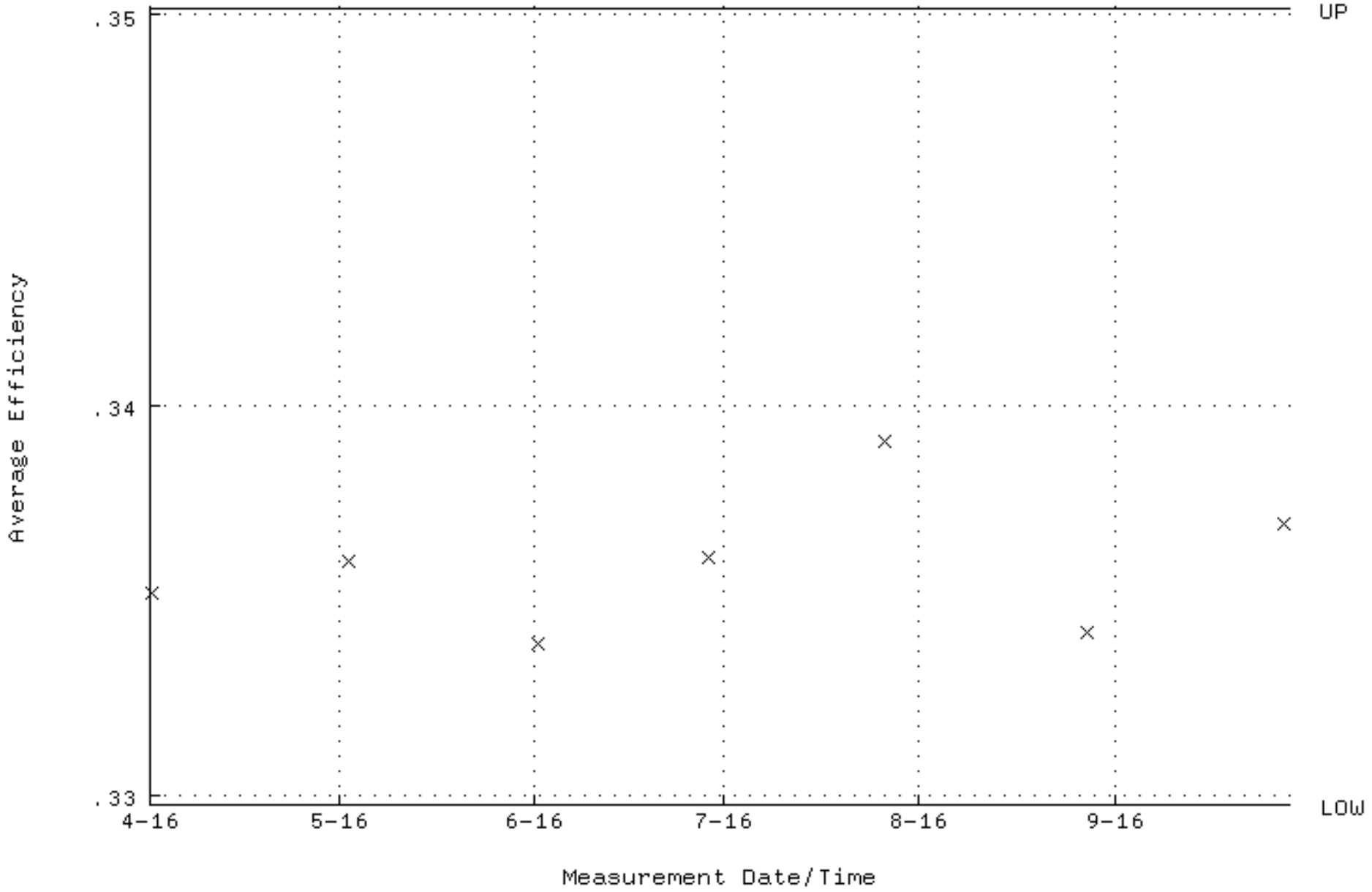
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



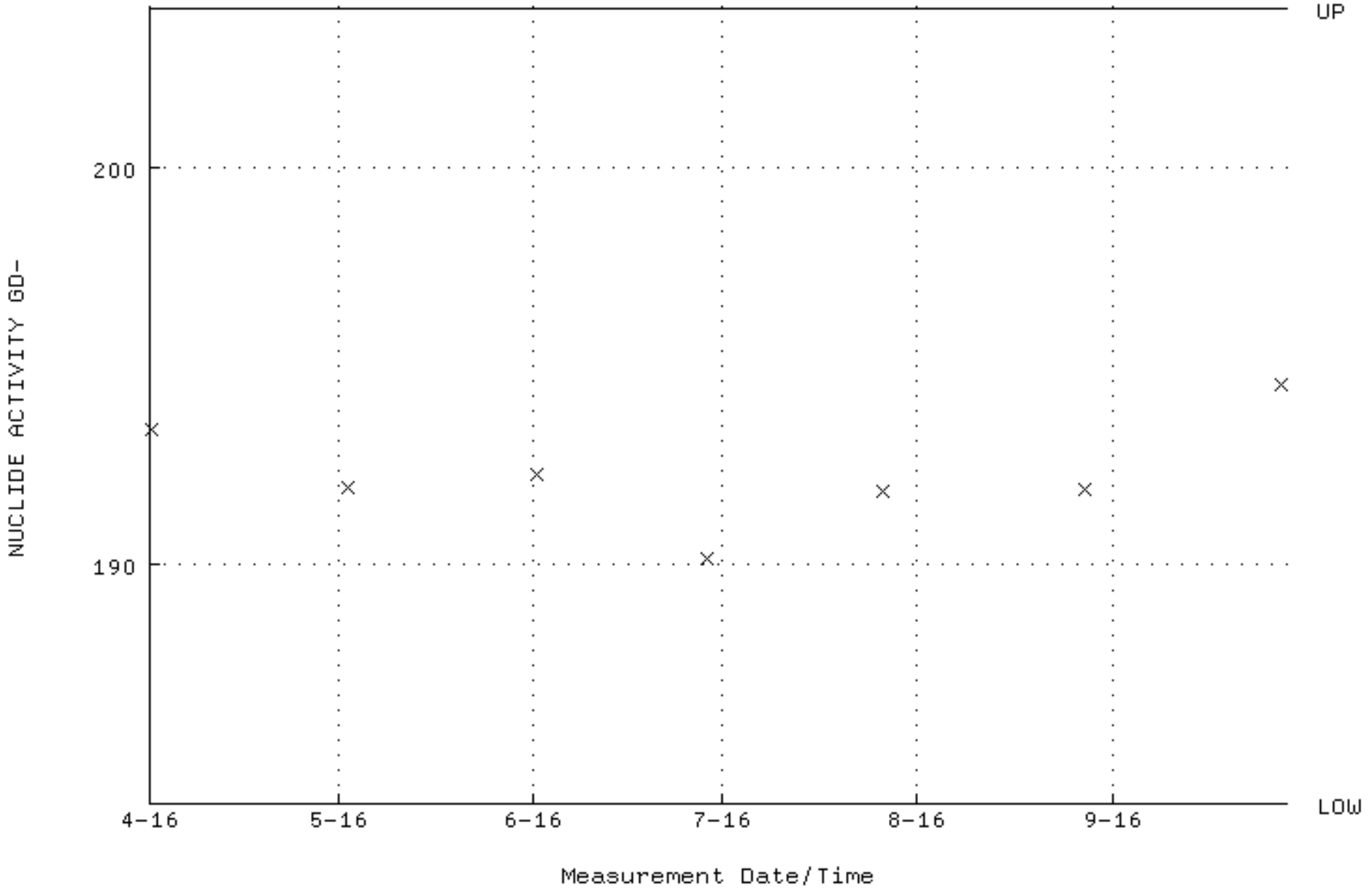
QA filename : DKA100:[ENV_ALPHA.QA.B]B015.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



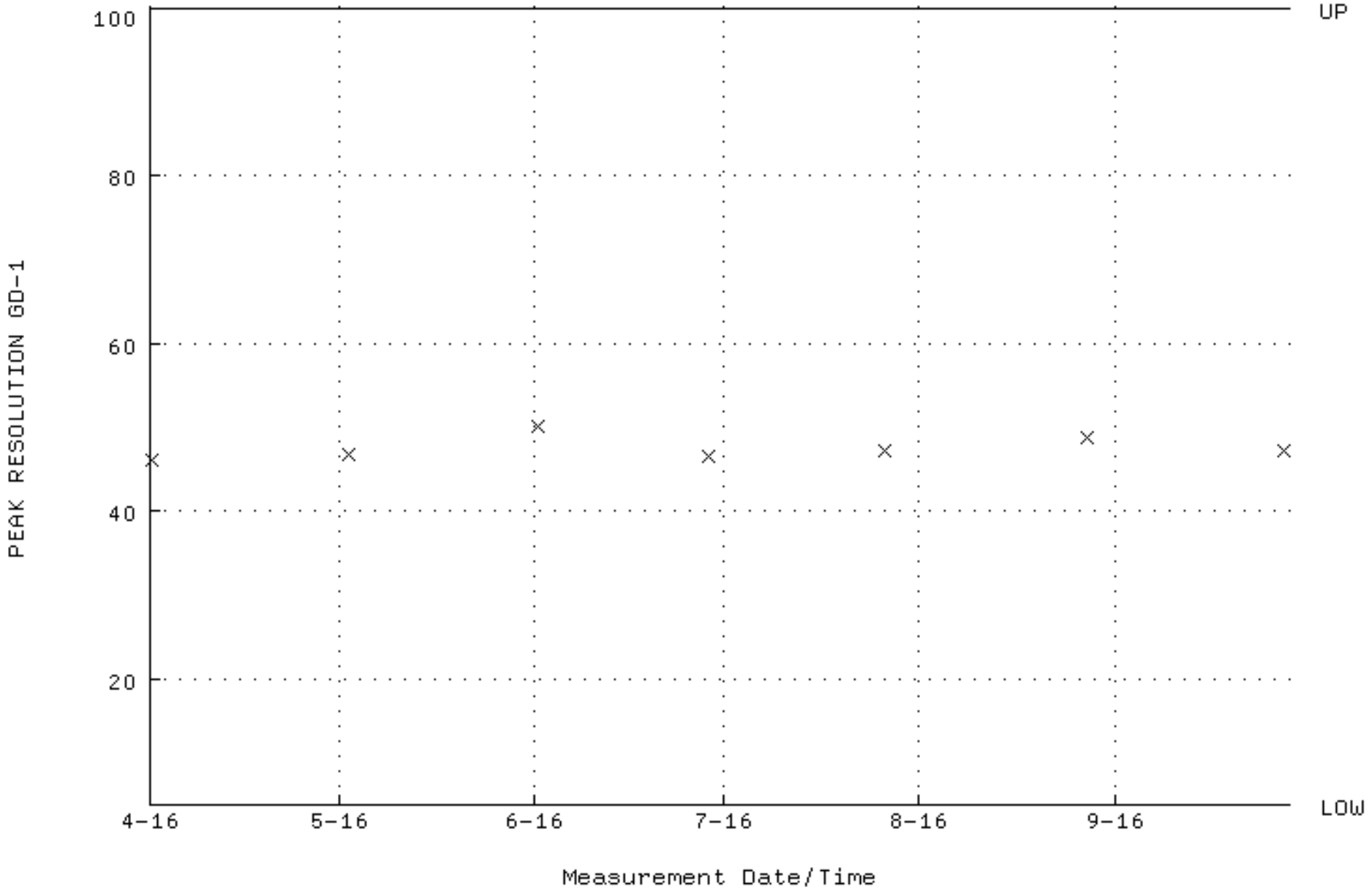
QA filename : DKA100:[ENV_ALPHA.QA.W]W016.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.329763 through 0.350160



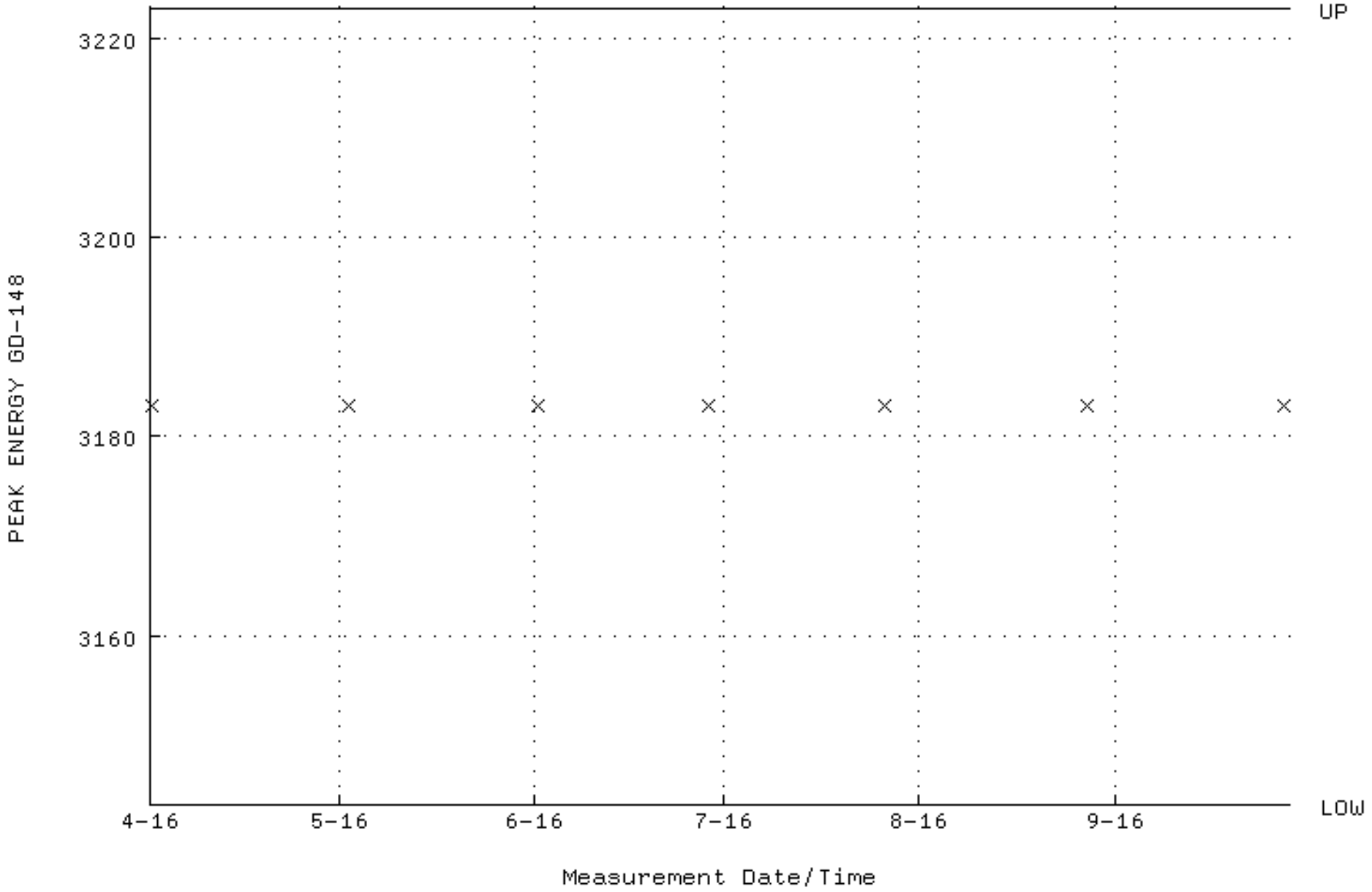
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



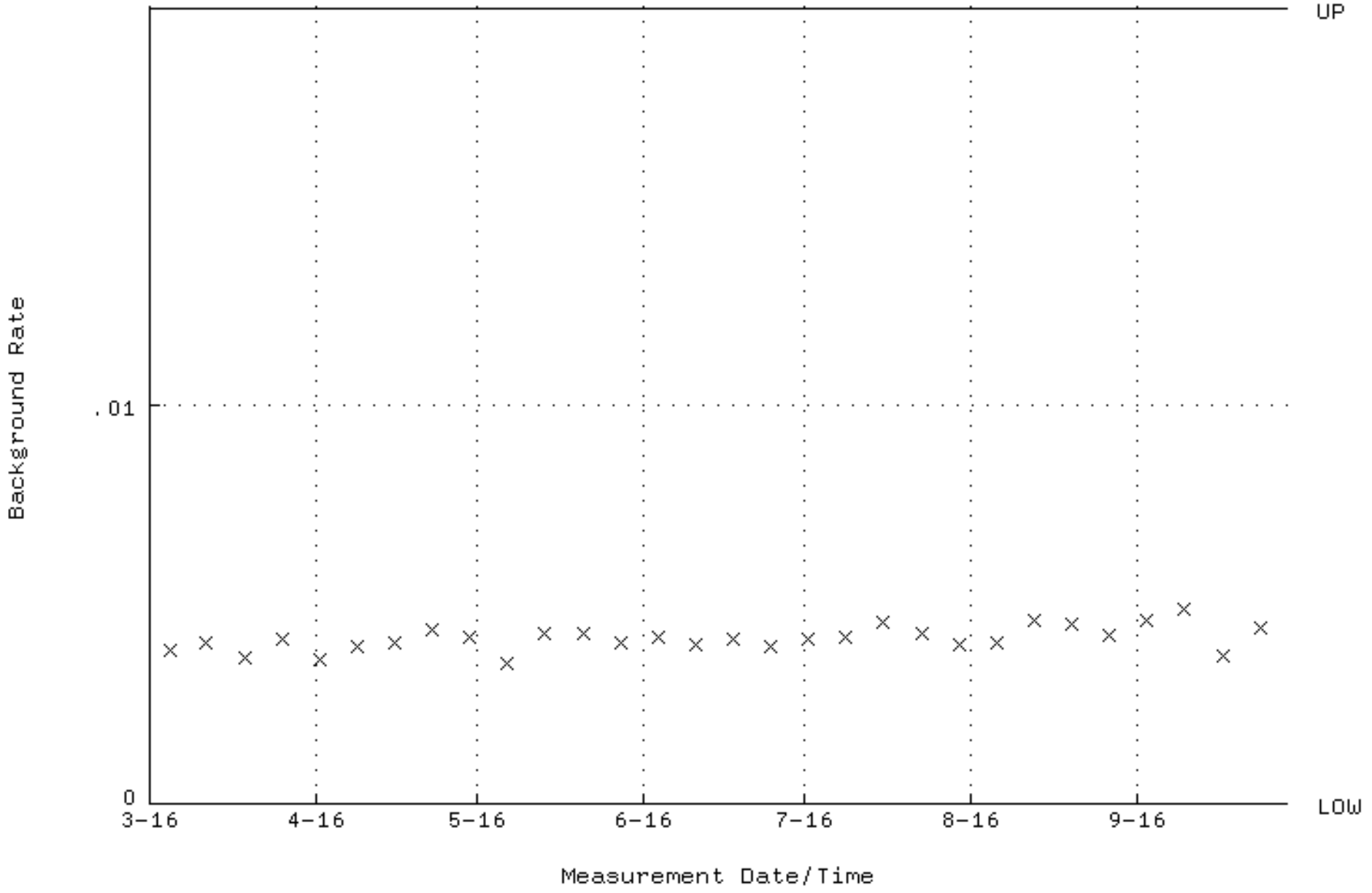
QA filename : DKA100:[ENV_ALPHA.QA.W]W016.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



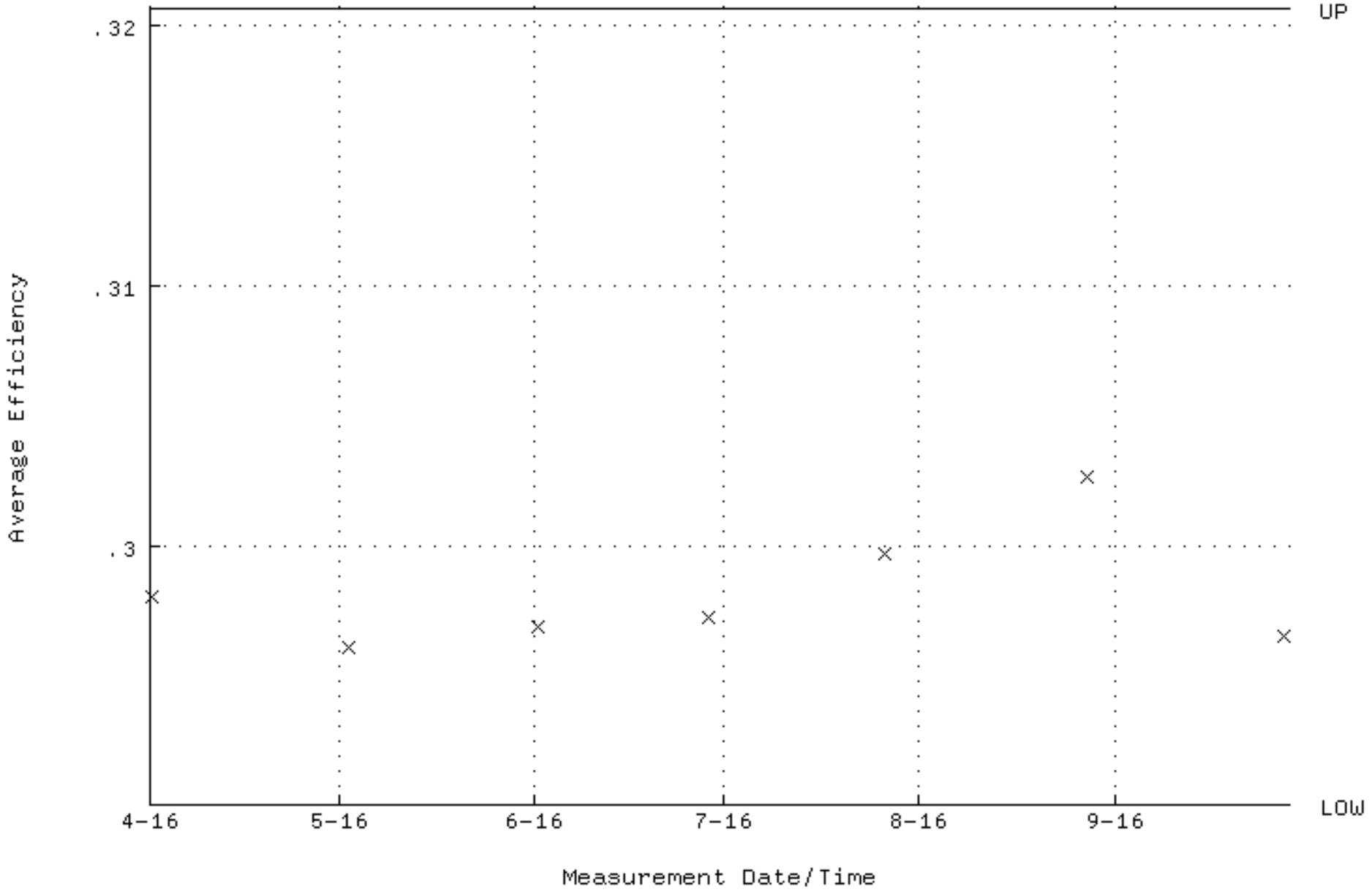
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



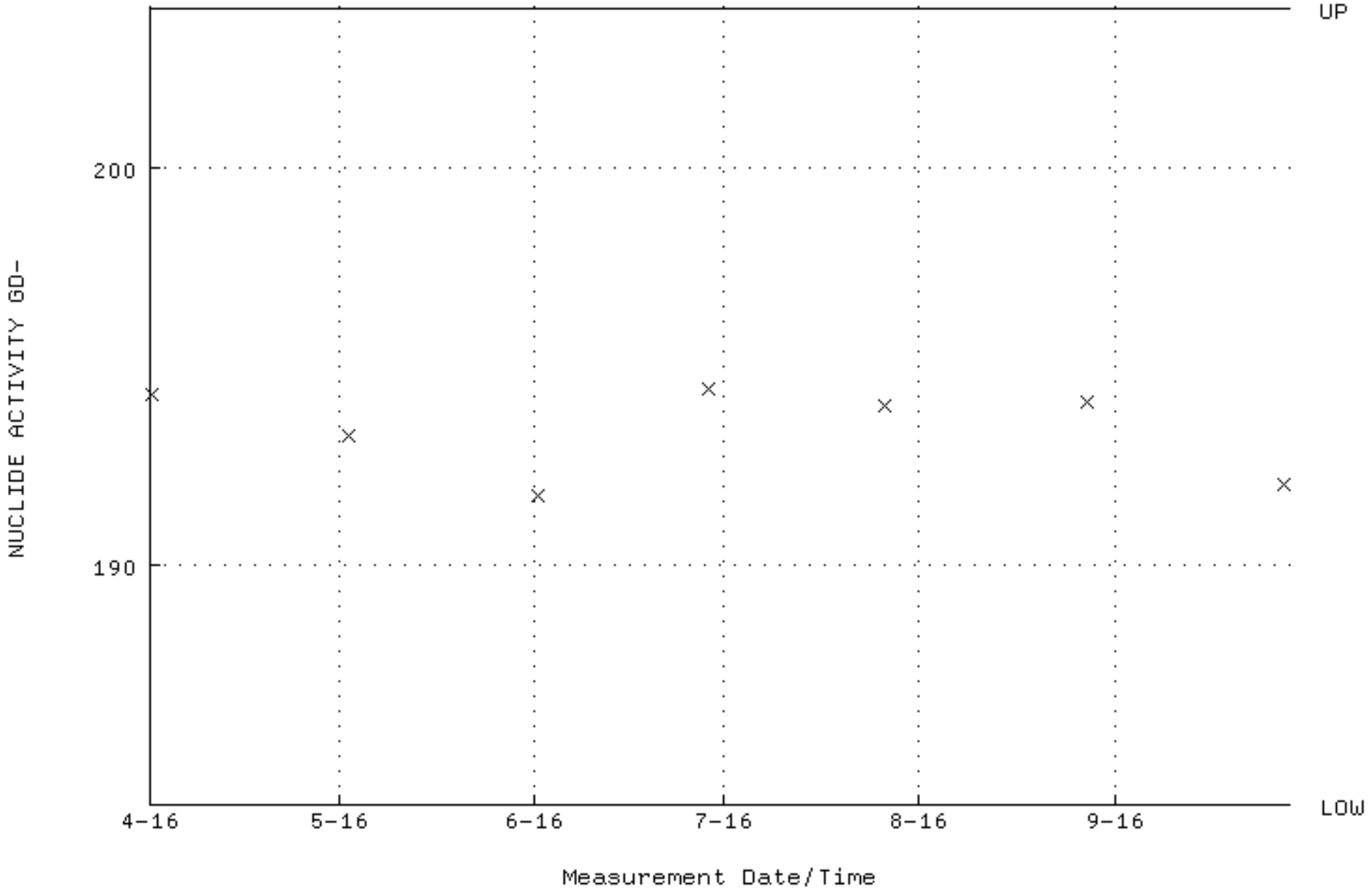
QA filename : DKA100:[ENV_ALPHA.QA.B]B016.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



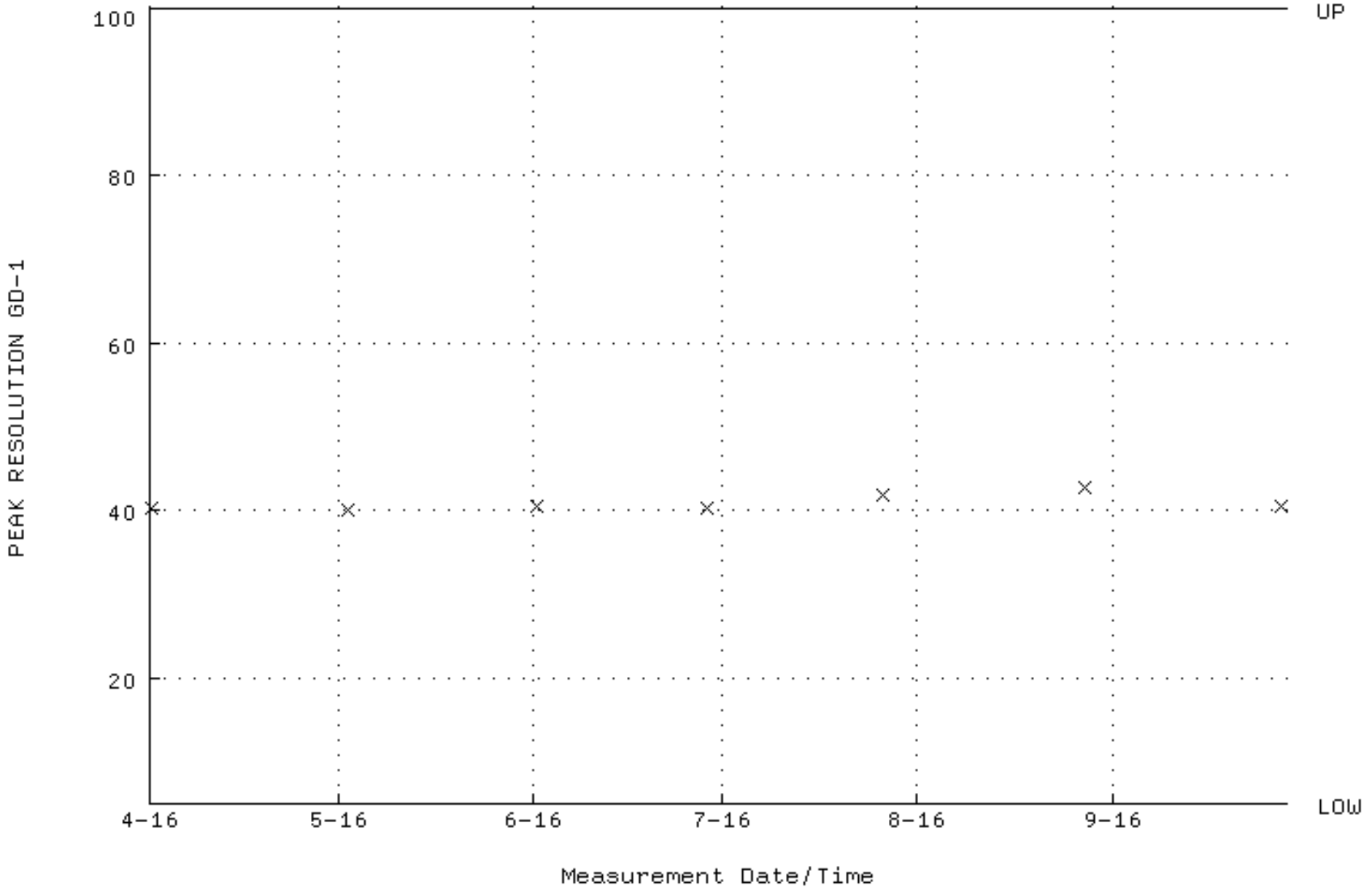
QA filename : DKA100:[ENV_ALPHA.QA.W]W017.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.290113 through 0.320651



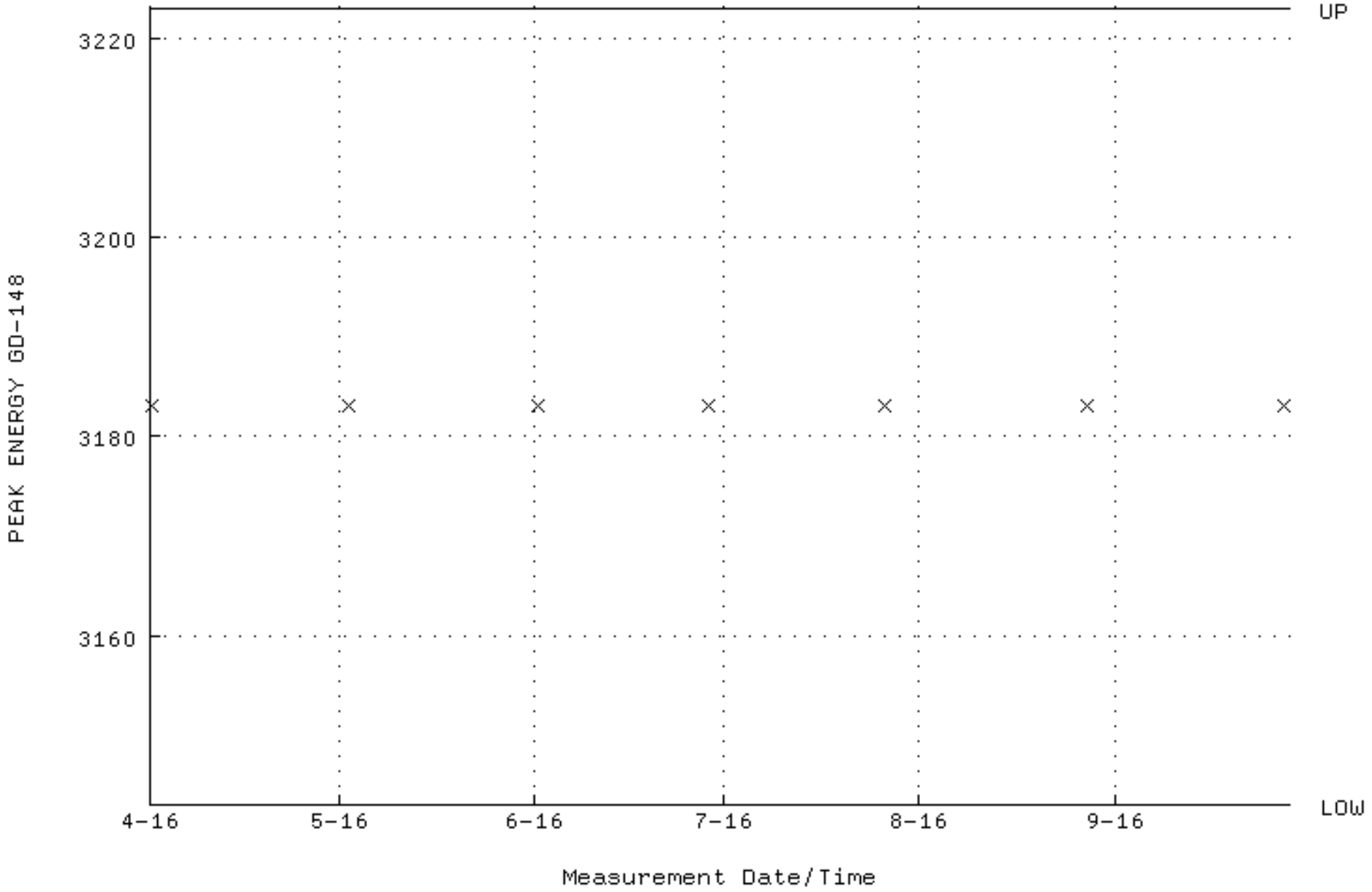
QA filename : DKA100:[ENV_ALPHA.QA.W]W017.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



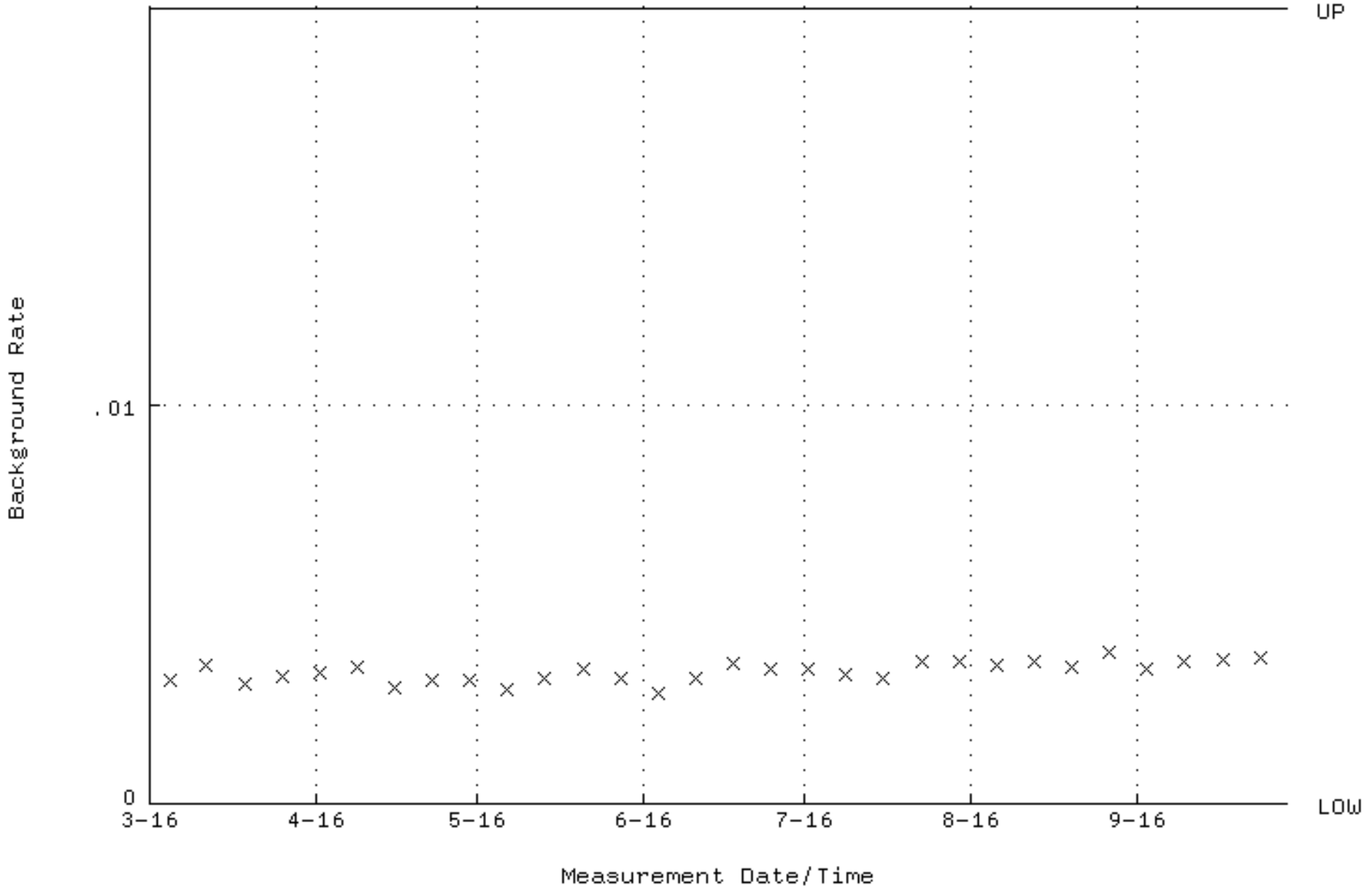
QA filename : DKA100:[ENV_ALPHA.QA.W]W017.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



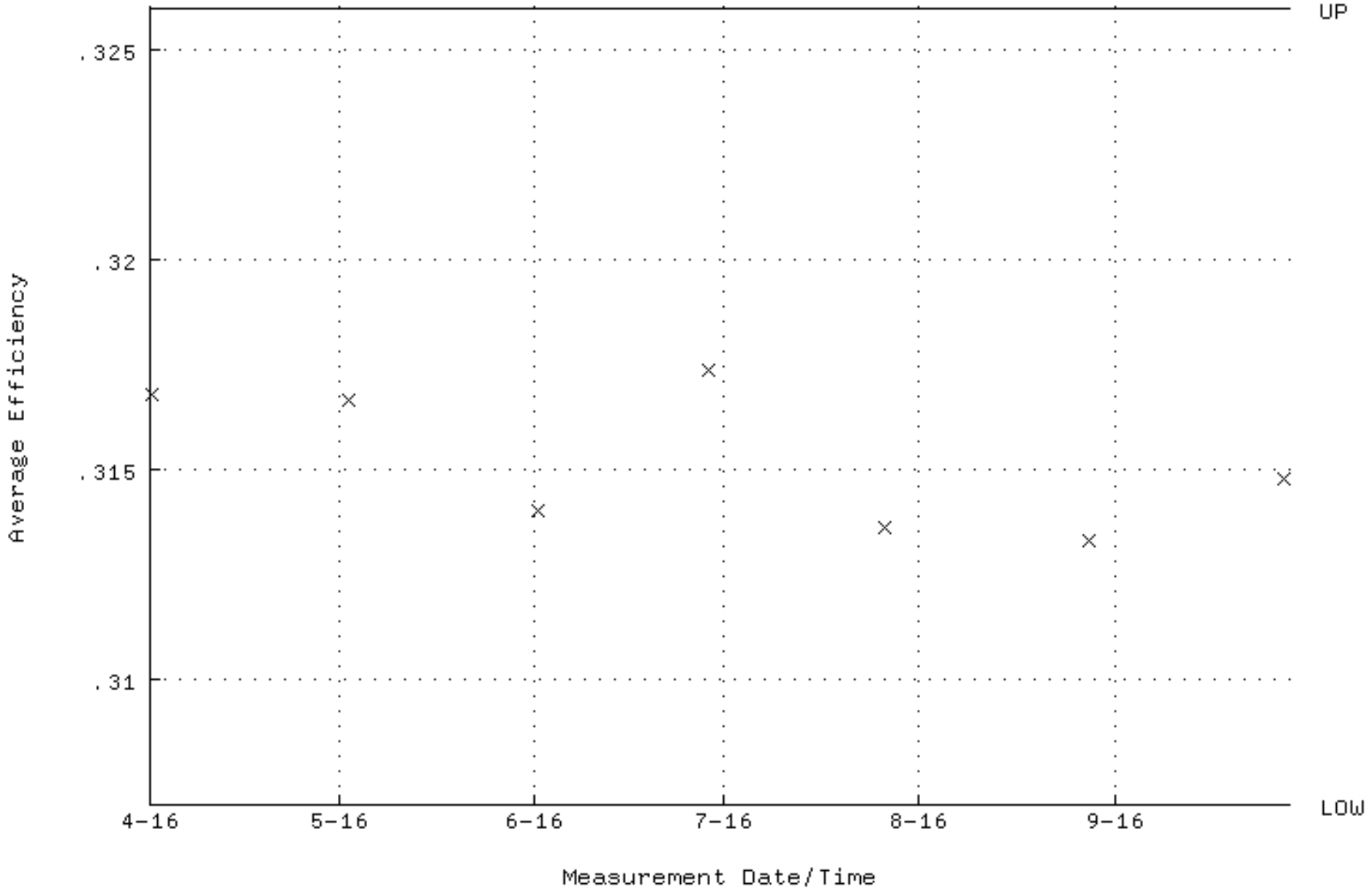
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



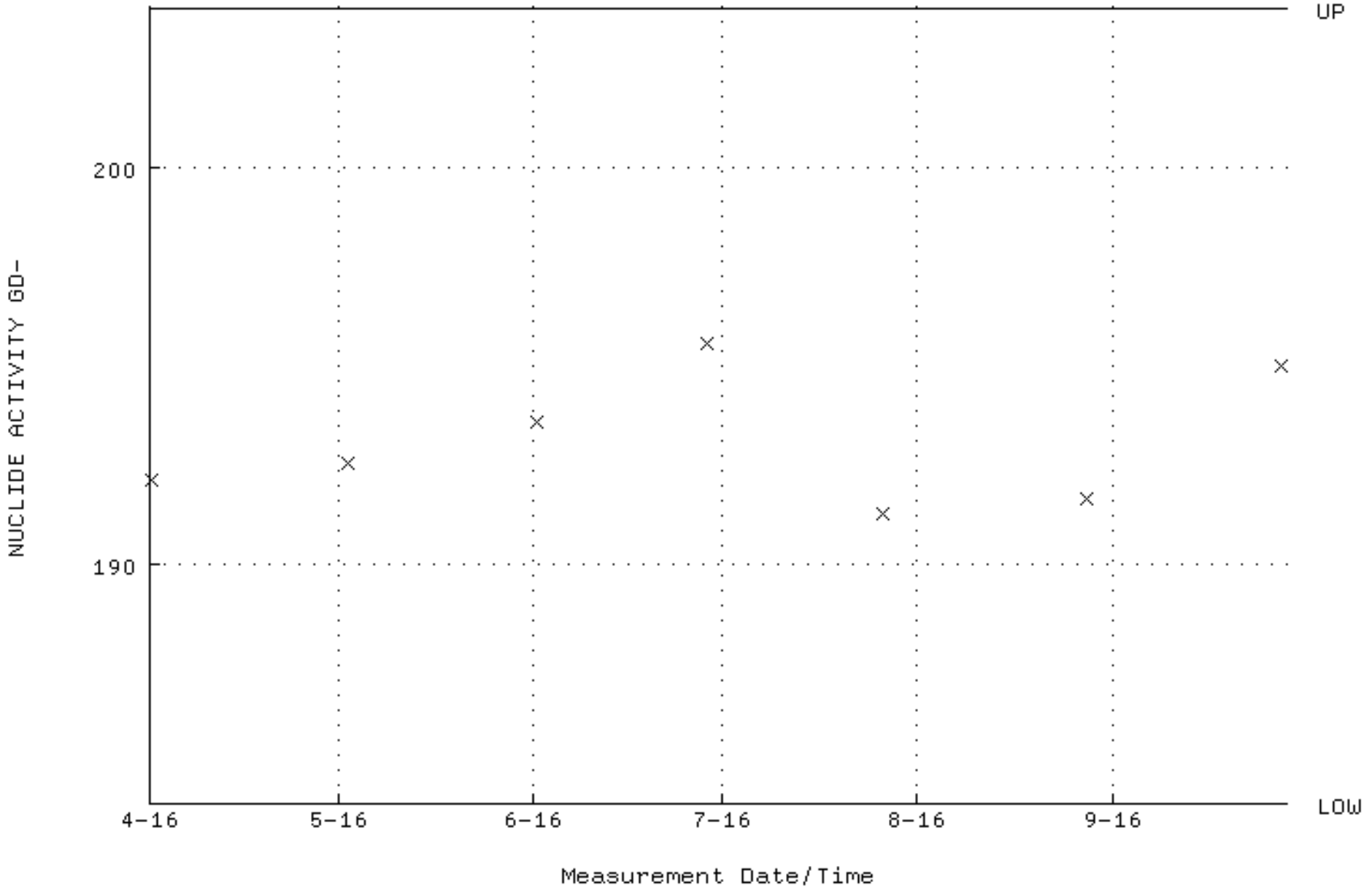
QA filename : DKA100:[ENV_ALPHA.QA.B]B017.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



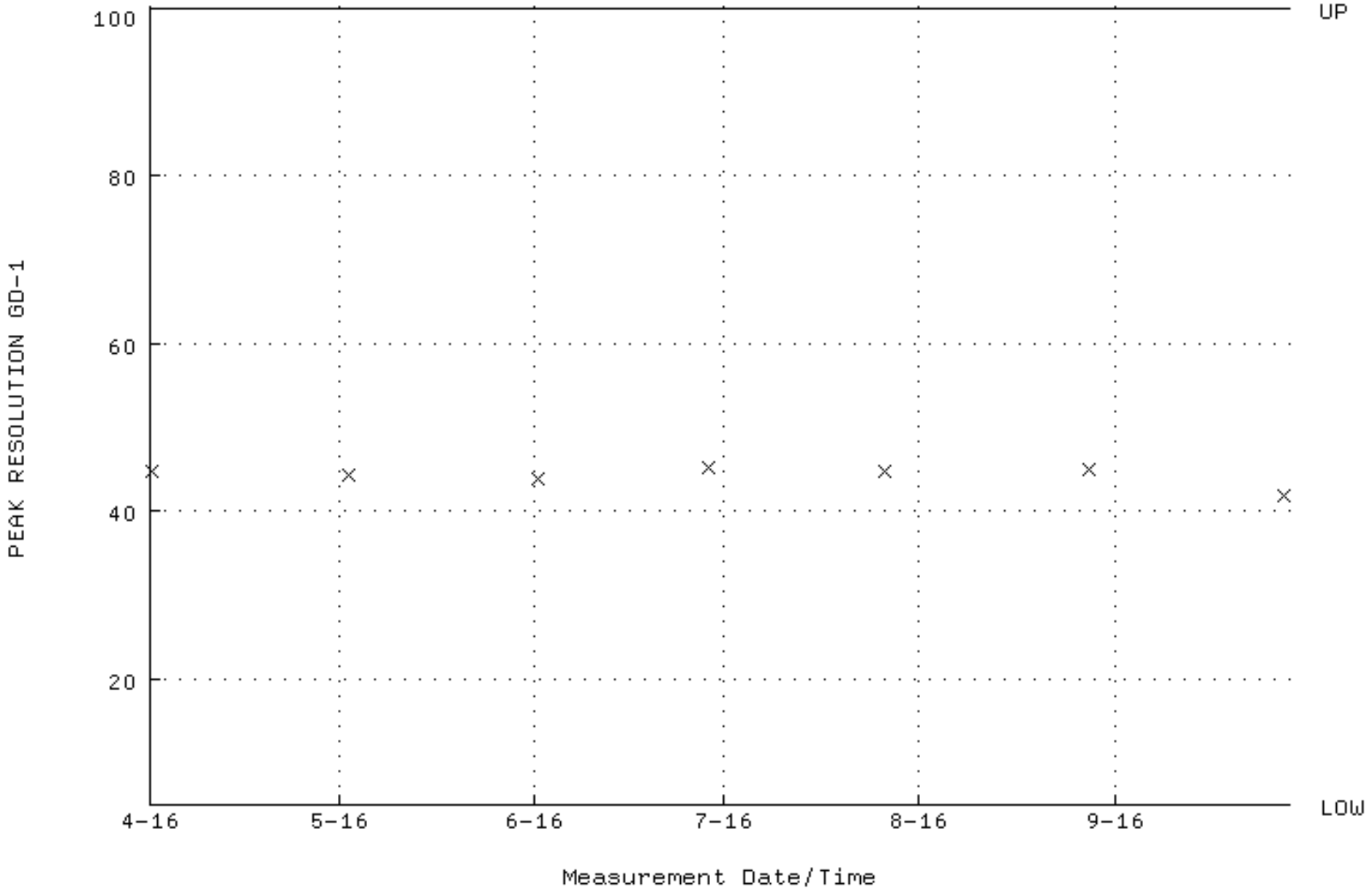
QA filename : DKA100:[ENV_ALPHA.QA.W]W018.QAF;5
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.307005 through 0.325995



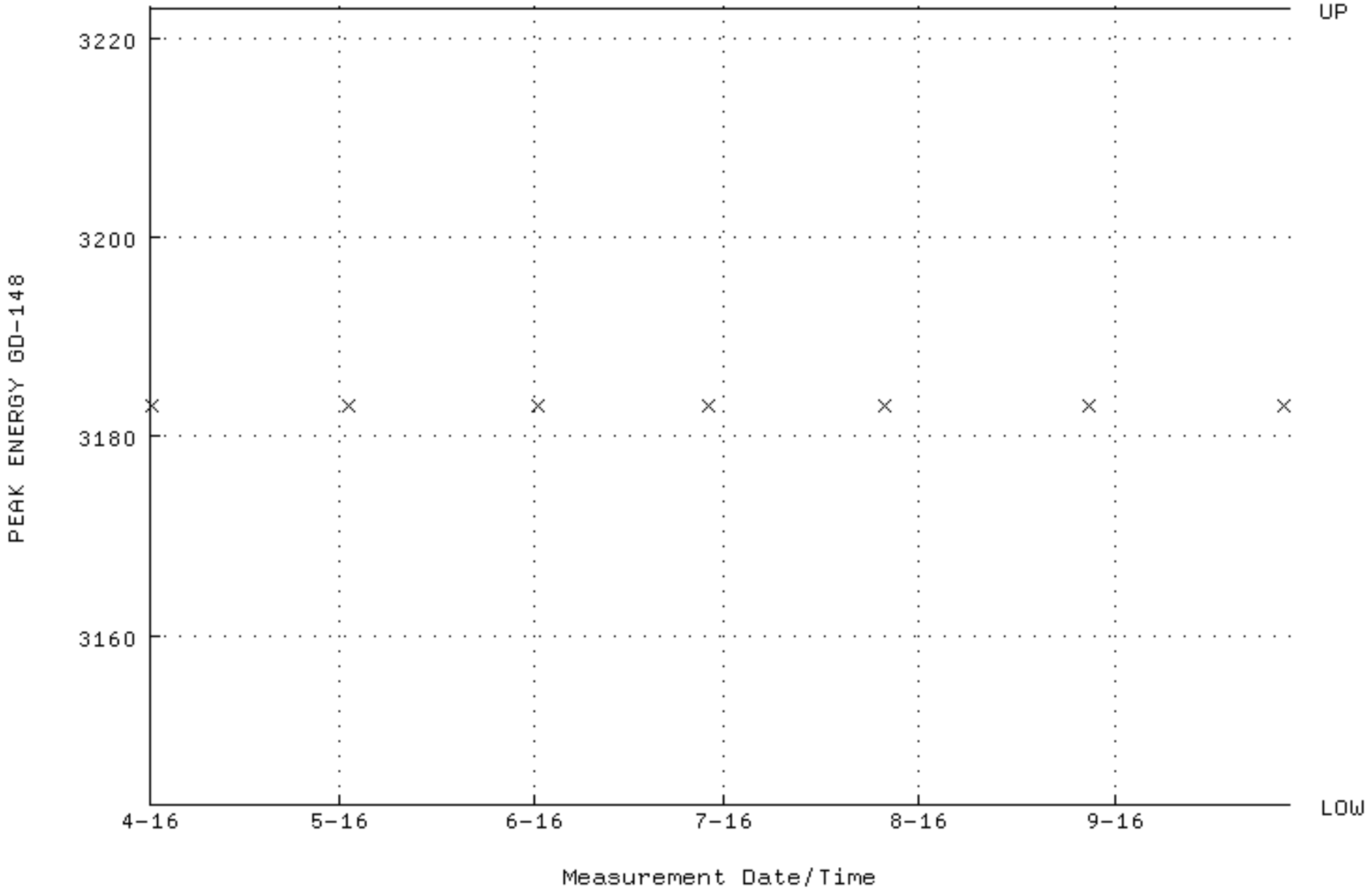
QA filename : DKA100:[ENV_ALPHA.QA.W]W018.QAF;5
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



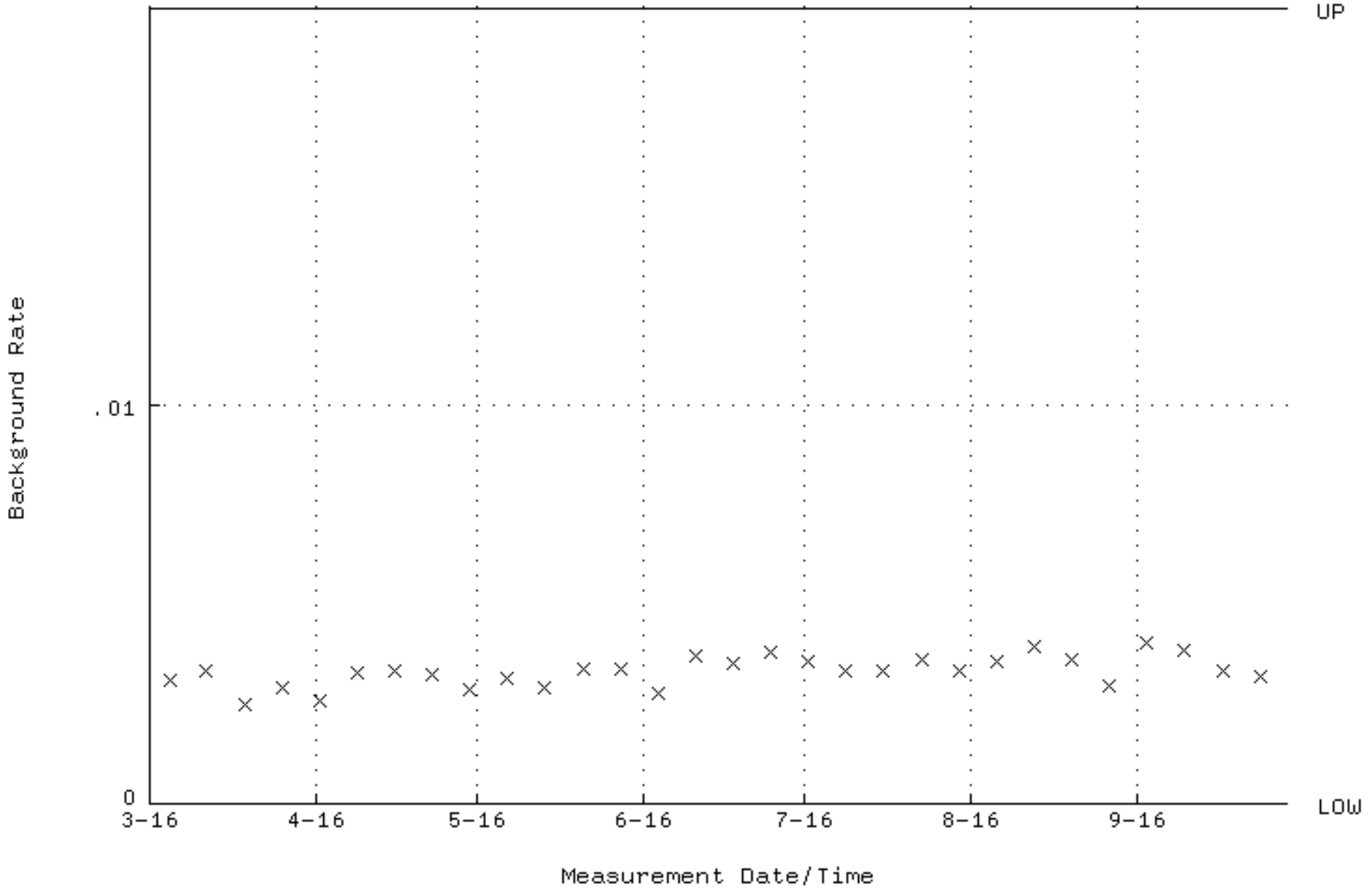
QA filename : DKA100:[ENV_ALPHA.QA.W]W018.QAF;5
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



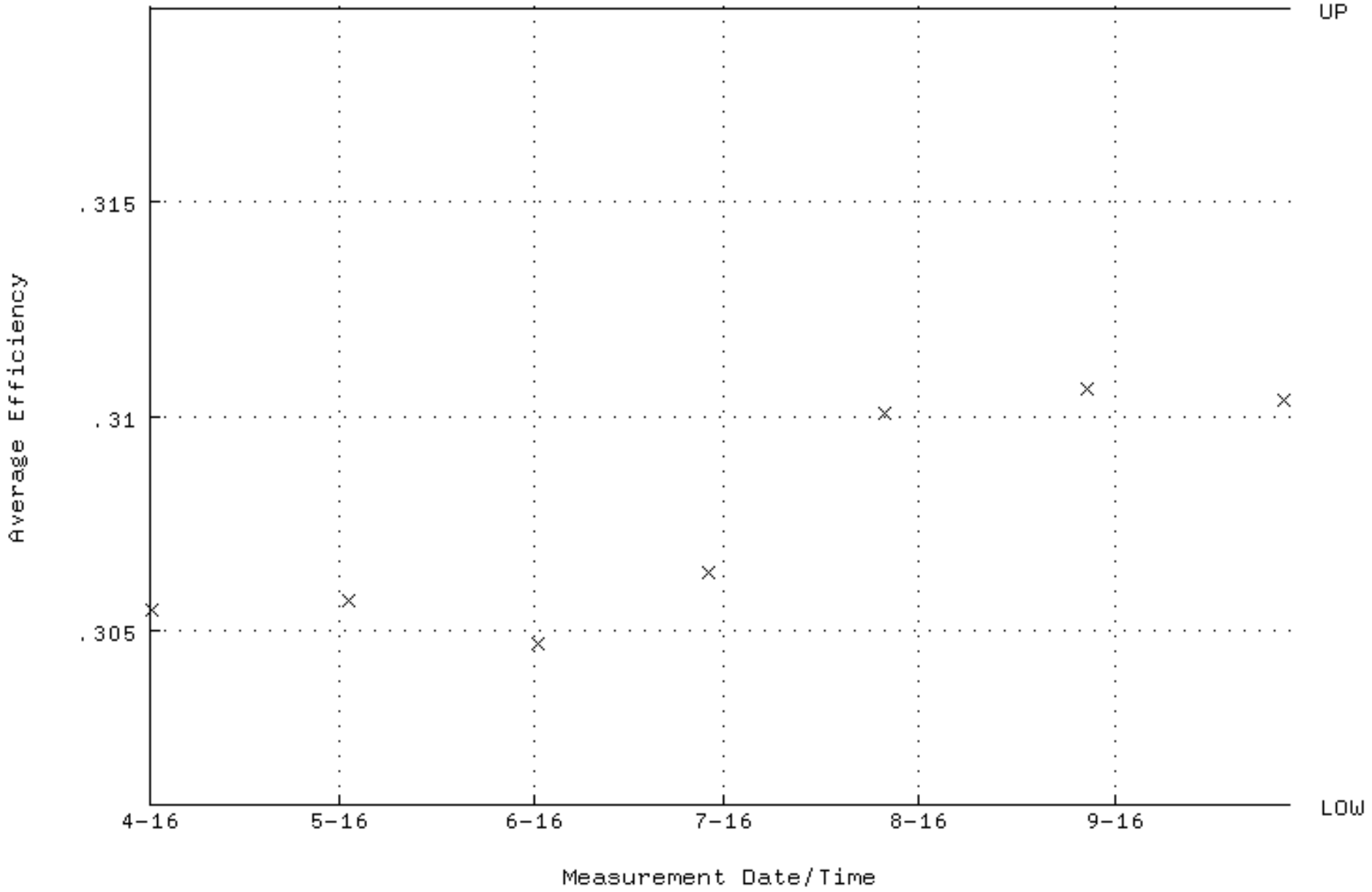
QA filename : DKA100:[ENV_ALPHA.QA.W]W018.QAF;5
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:48:19 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



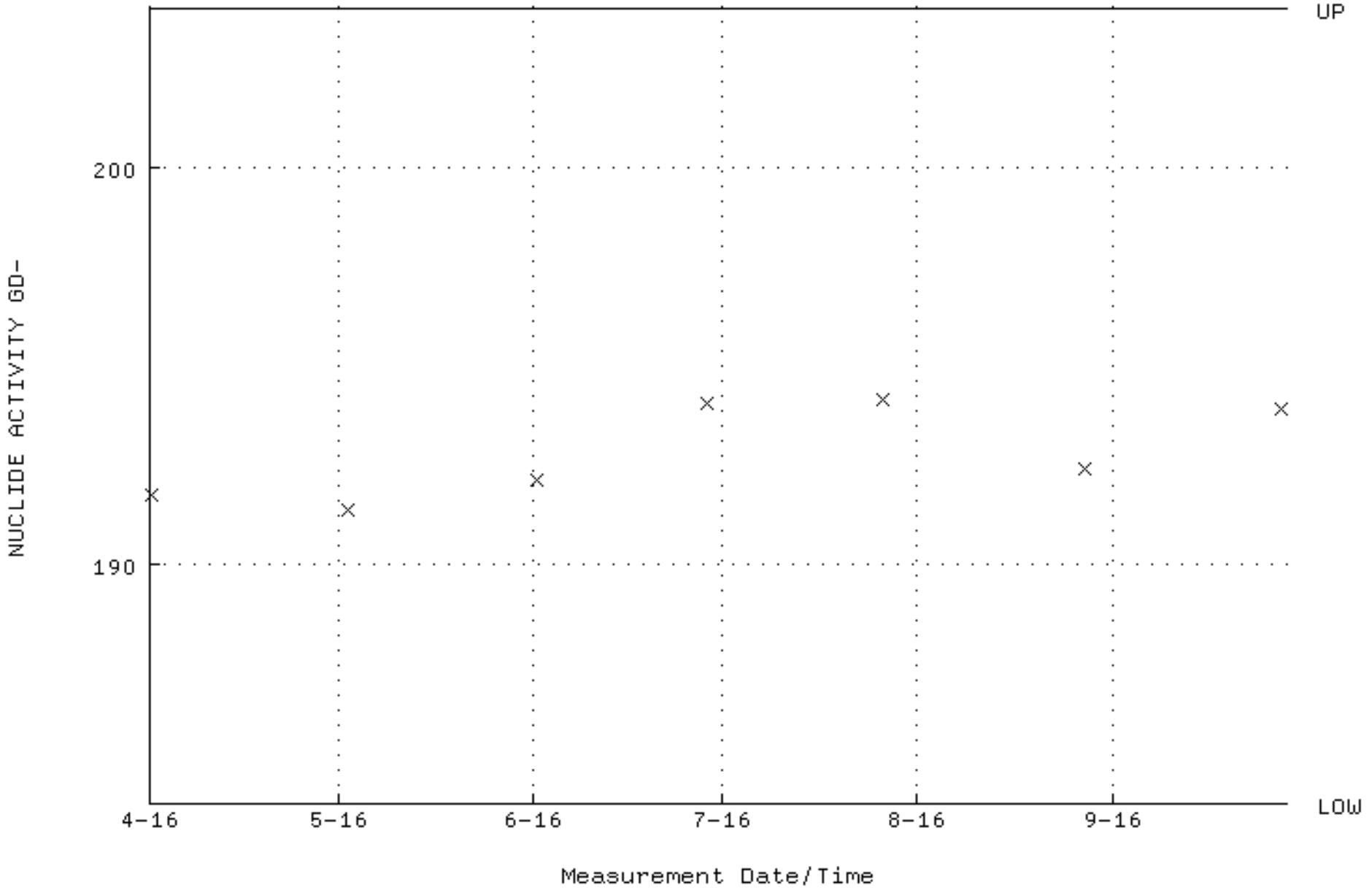
QA filename : DKA100:[ENV_ALPHA.QA.B]B018.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:29 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



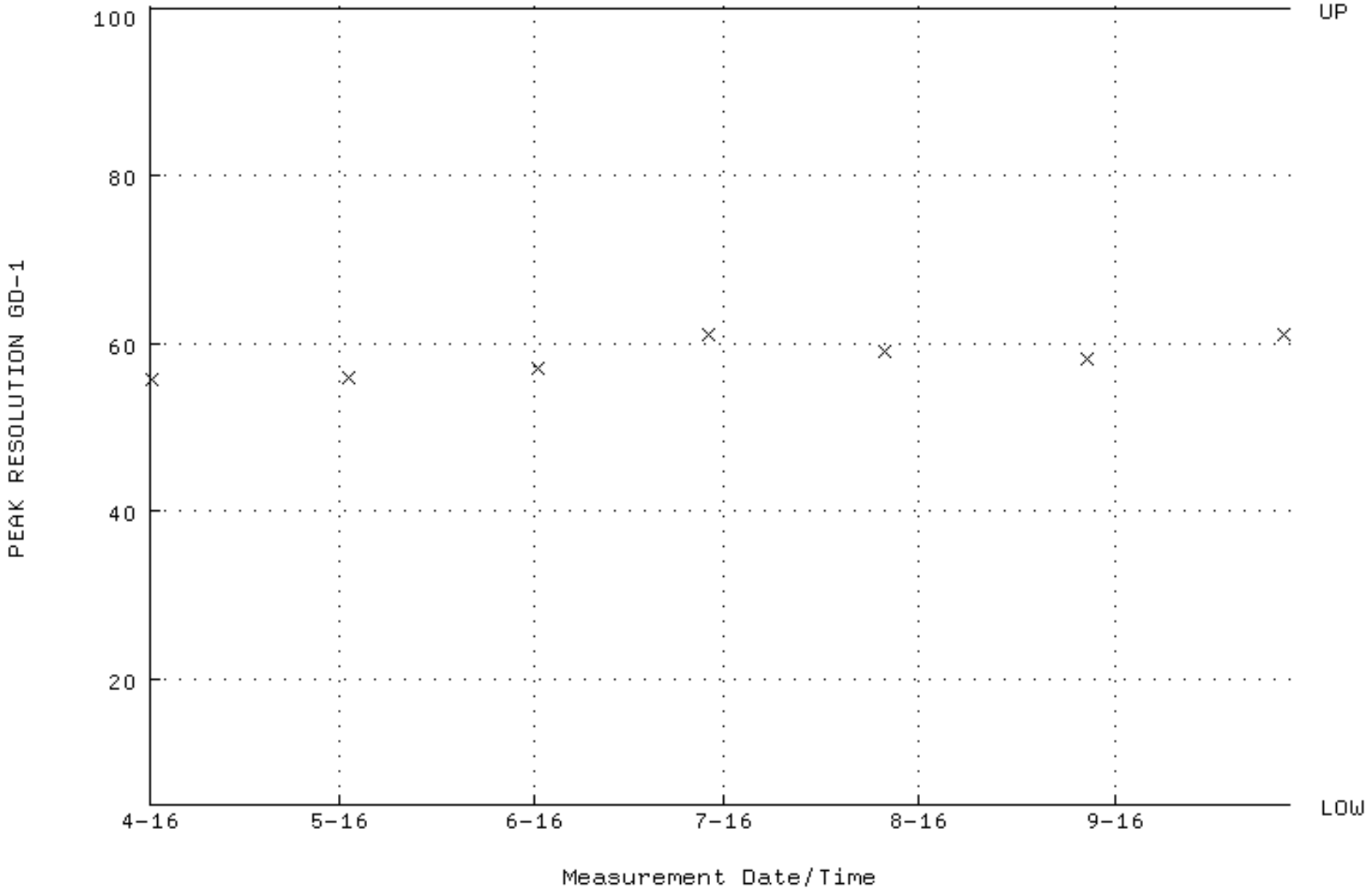
QA filename : DKA100:[ENV_ALPHA.QA.W]W020.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.300920 through 0.319530



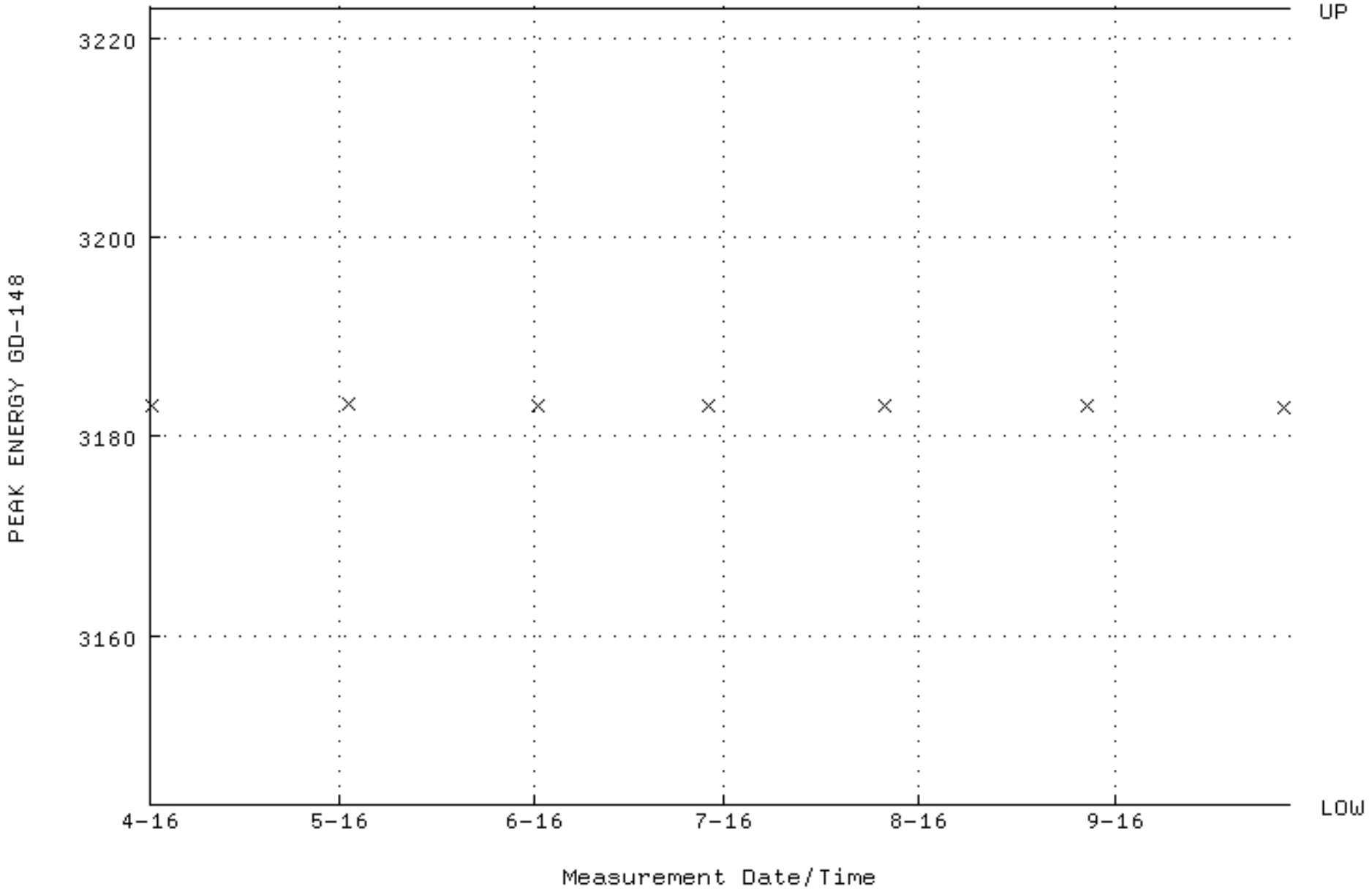
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



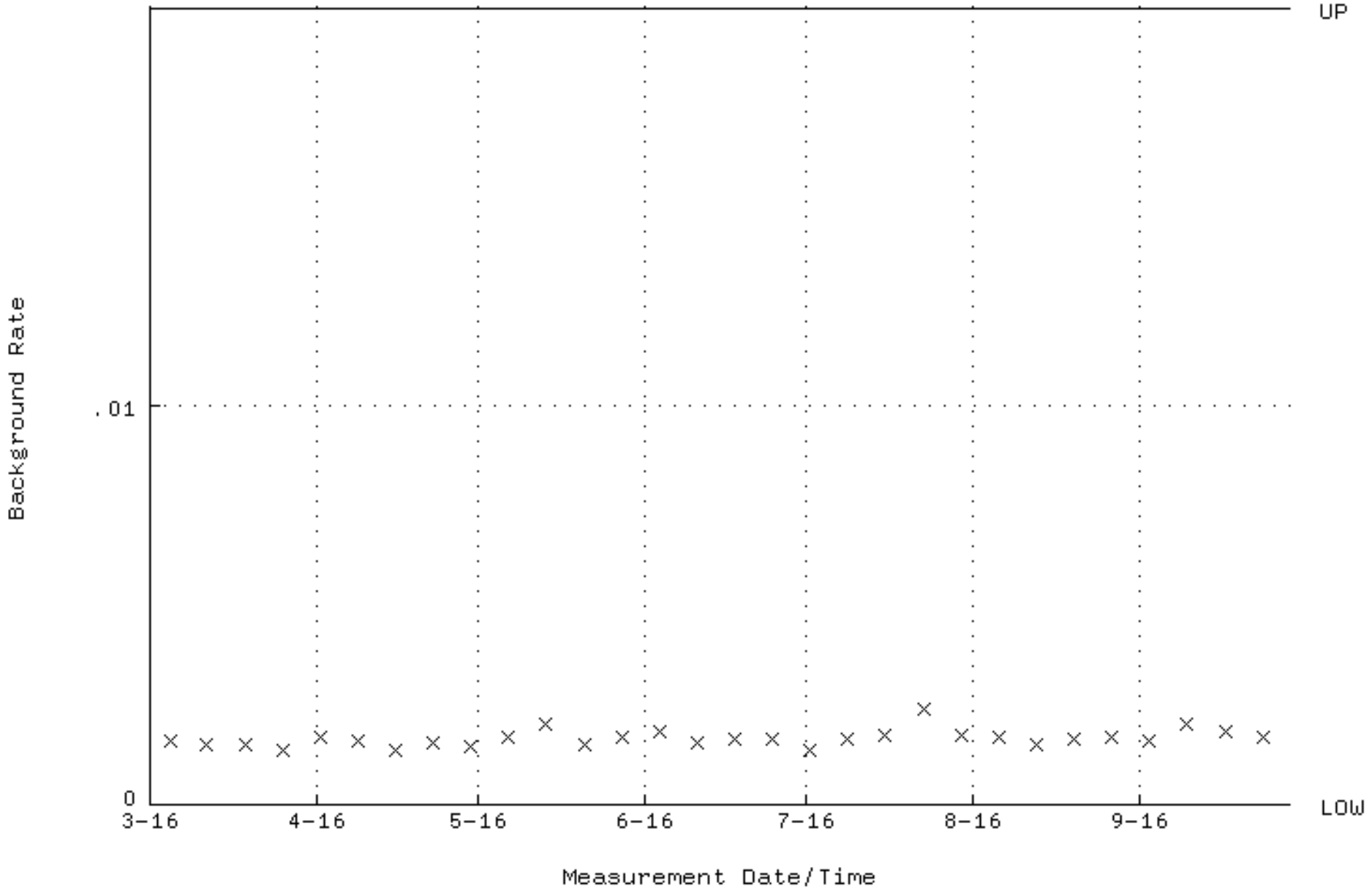
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



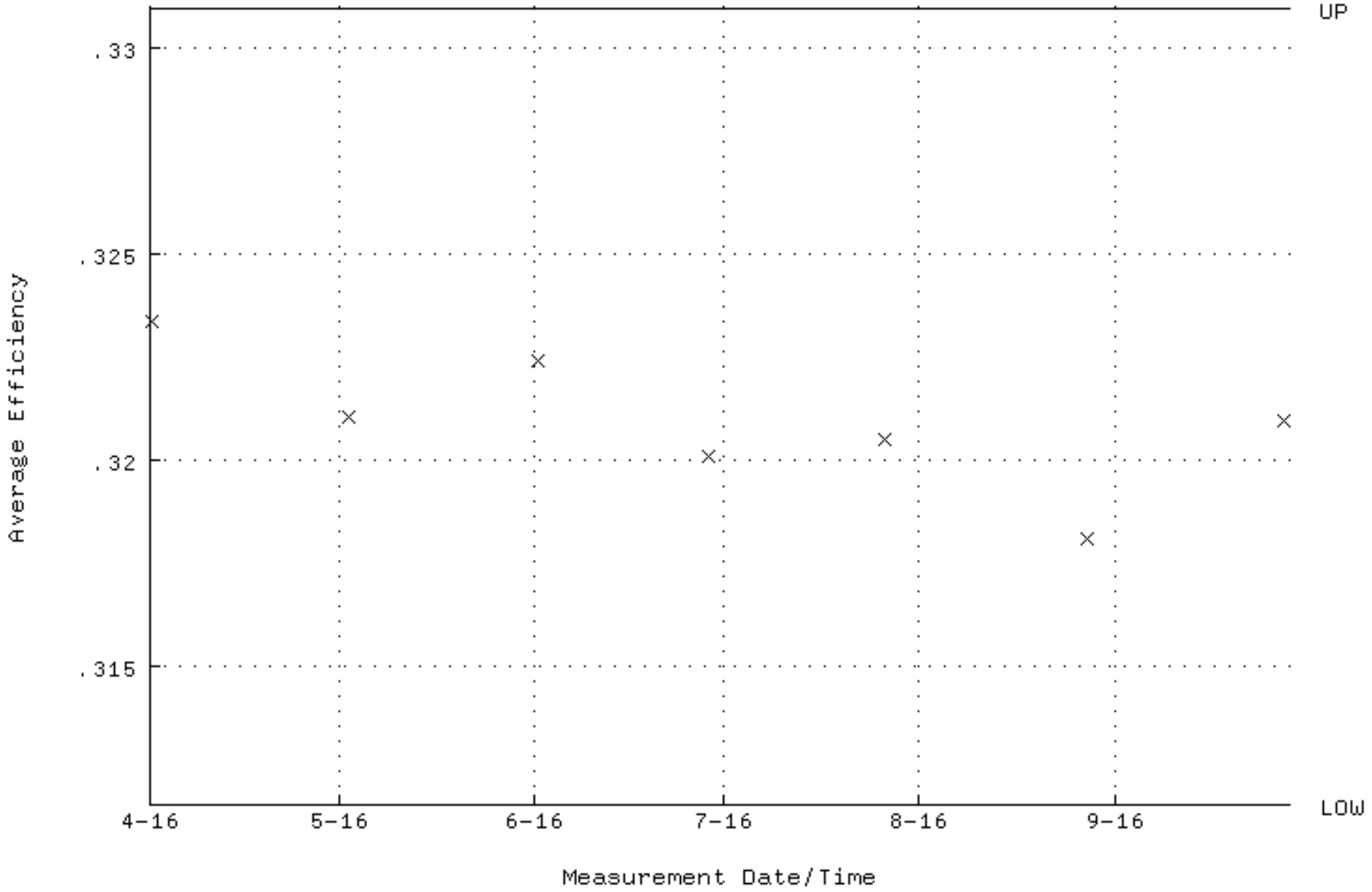
QA filename : DKA100:[ENV_ALPHA.QA.W]W020.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



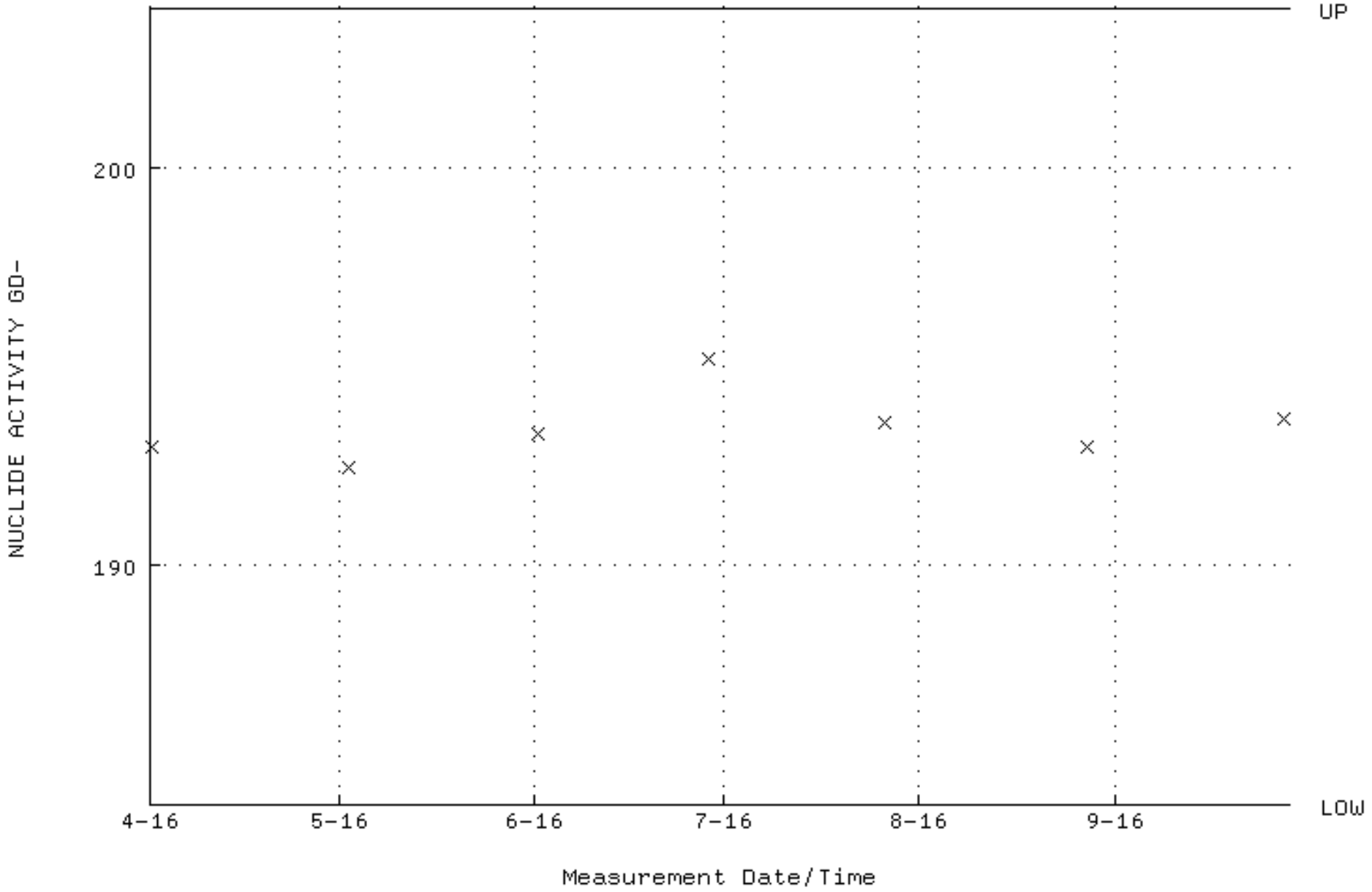
QA filename : DKA100:[ENV_ALPHA.QA.B]B020.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:30 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



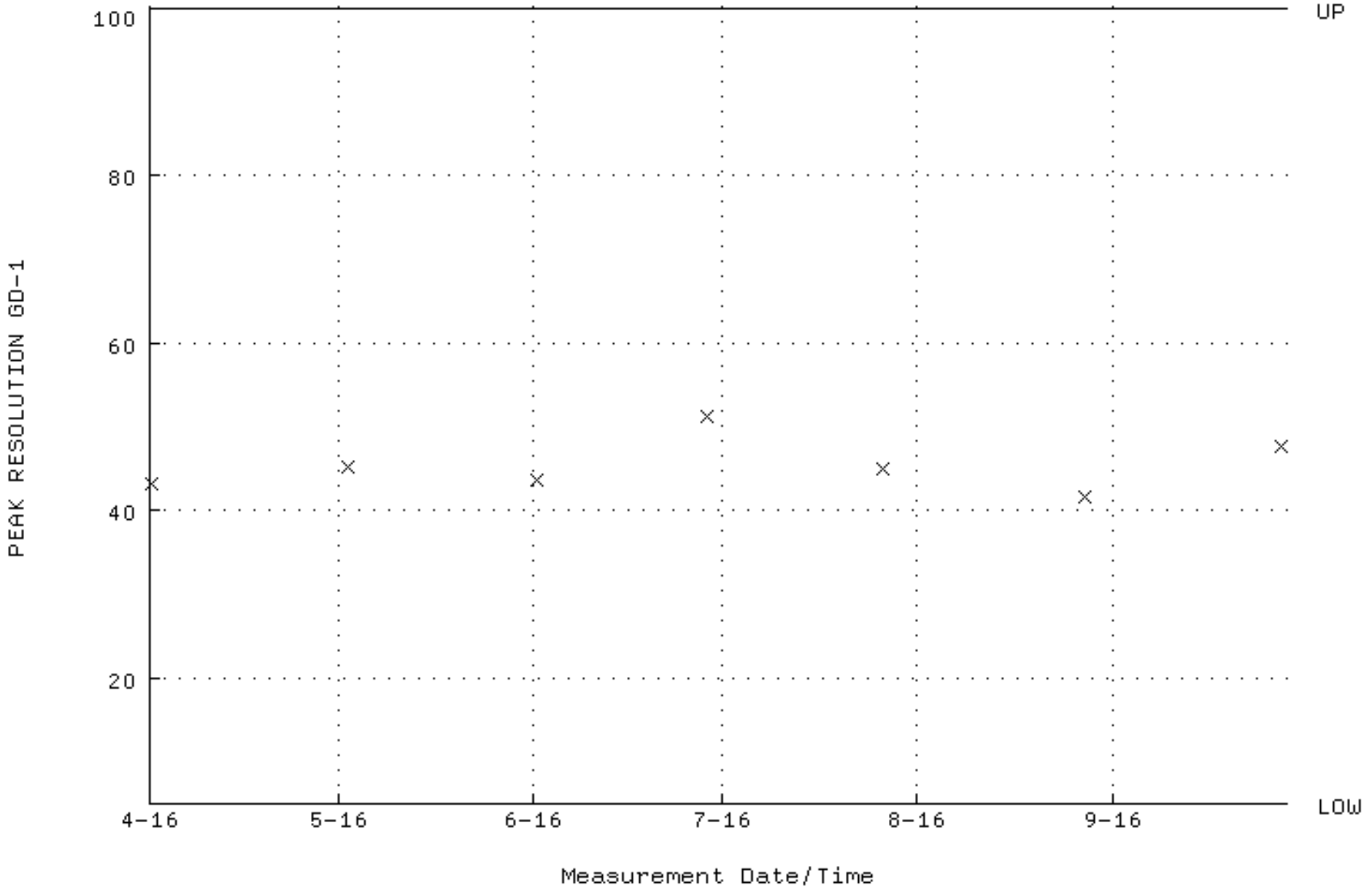
QA filename : DKA100:[ENV_ALPHA.QA.W]W021.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.311665 through 0.330943



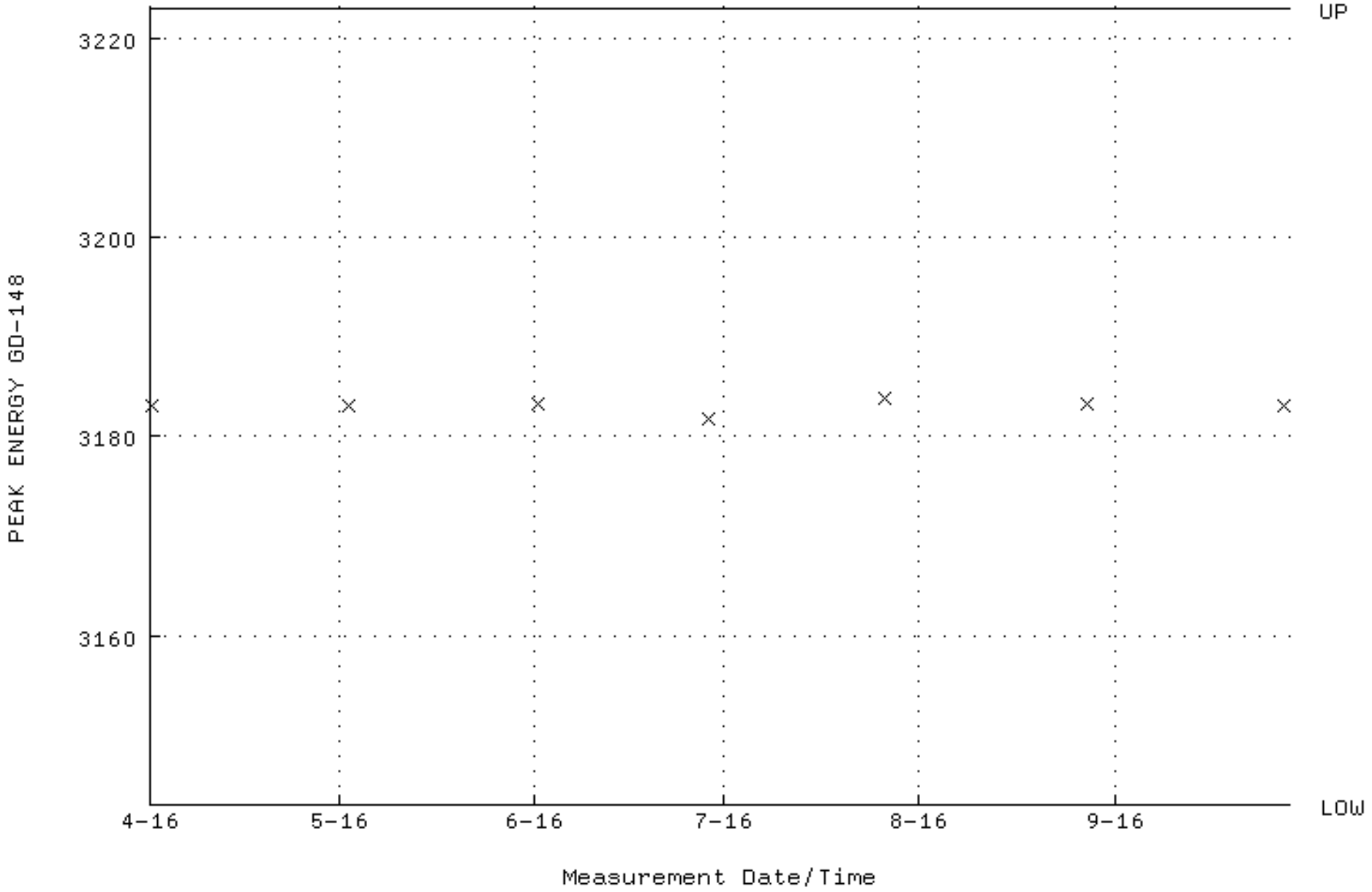
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



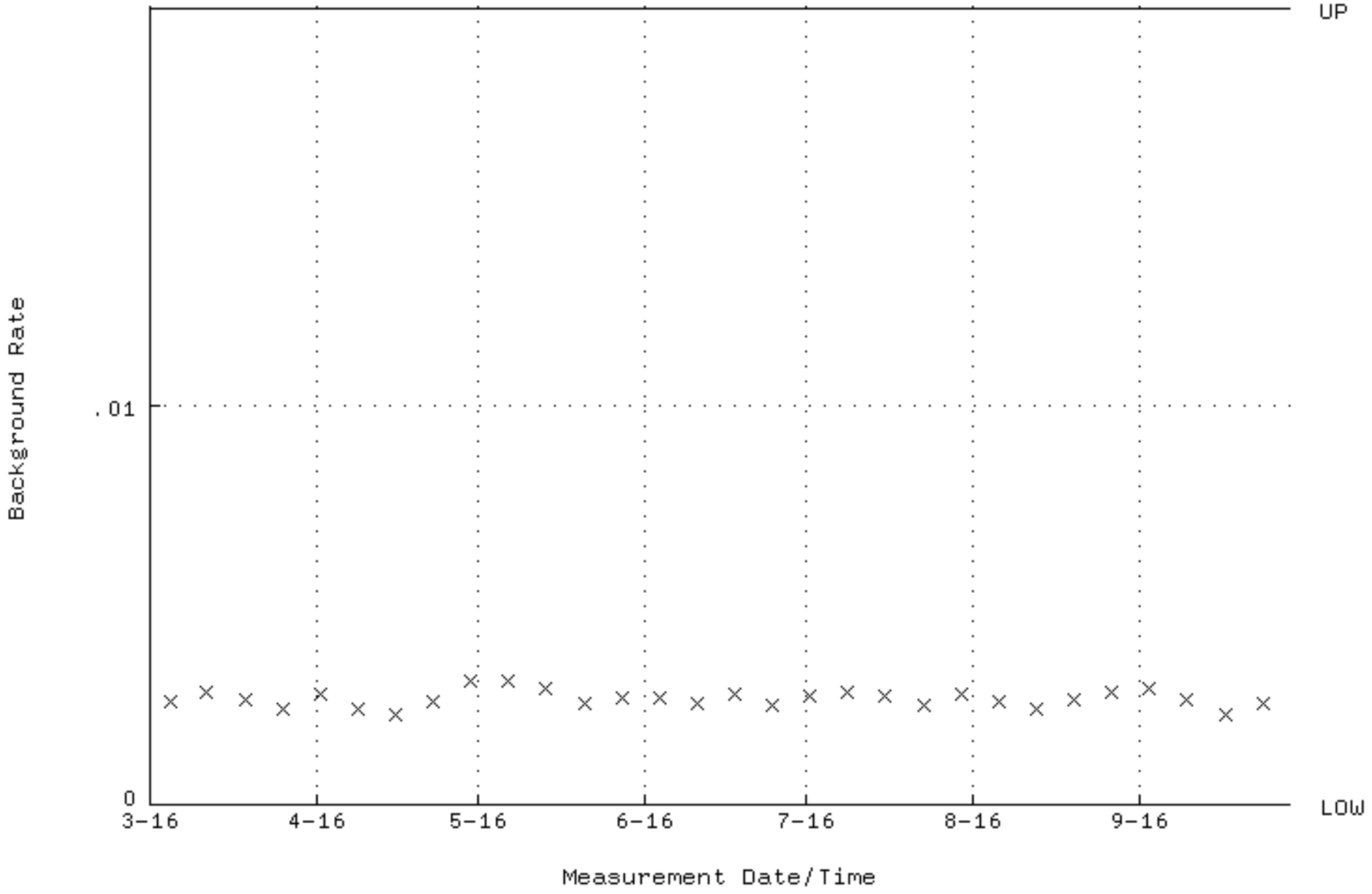
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



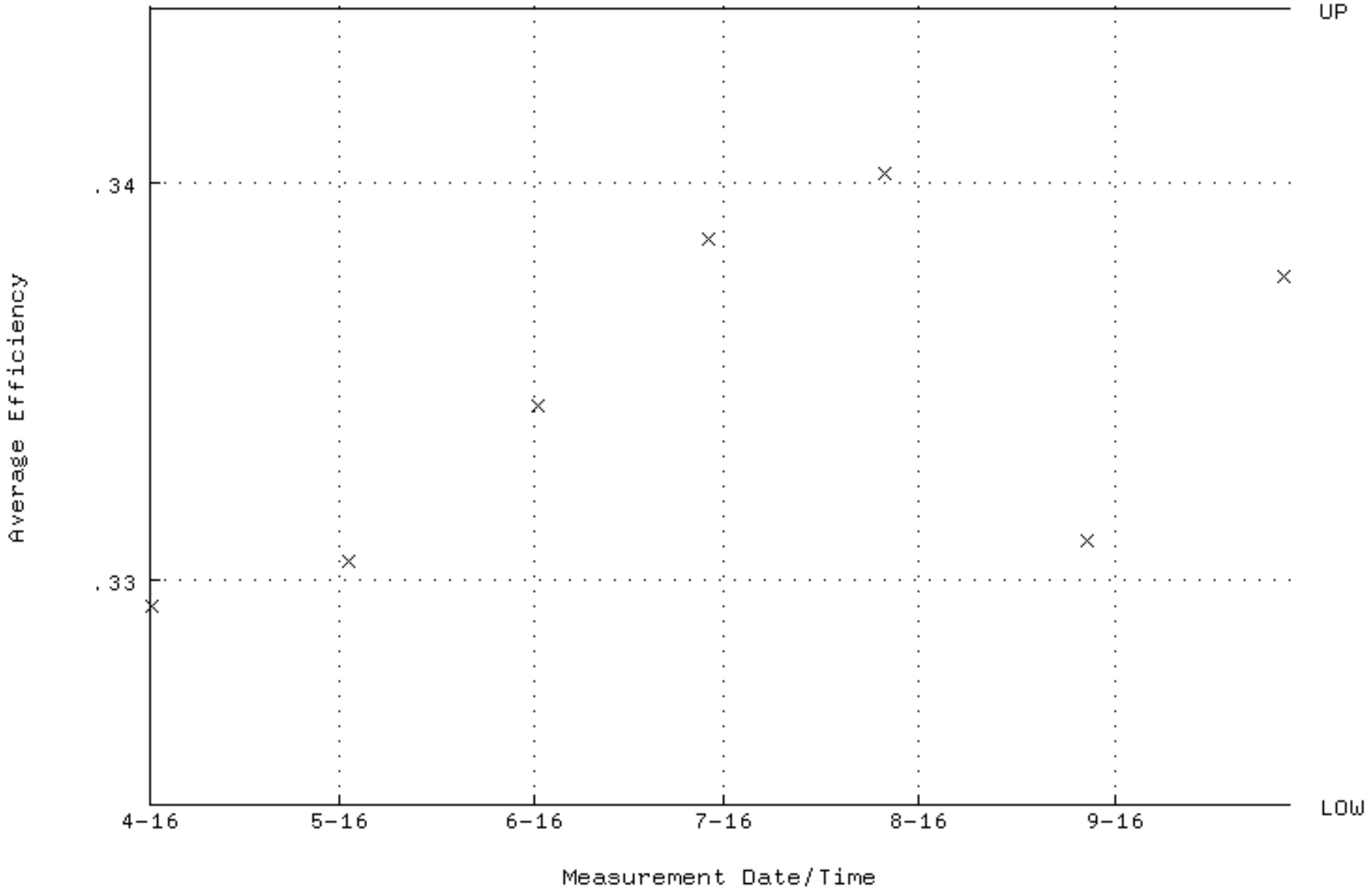
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



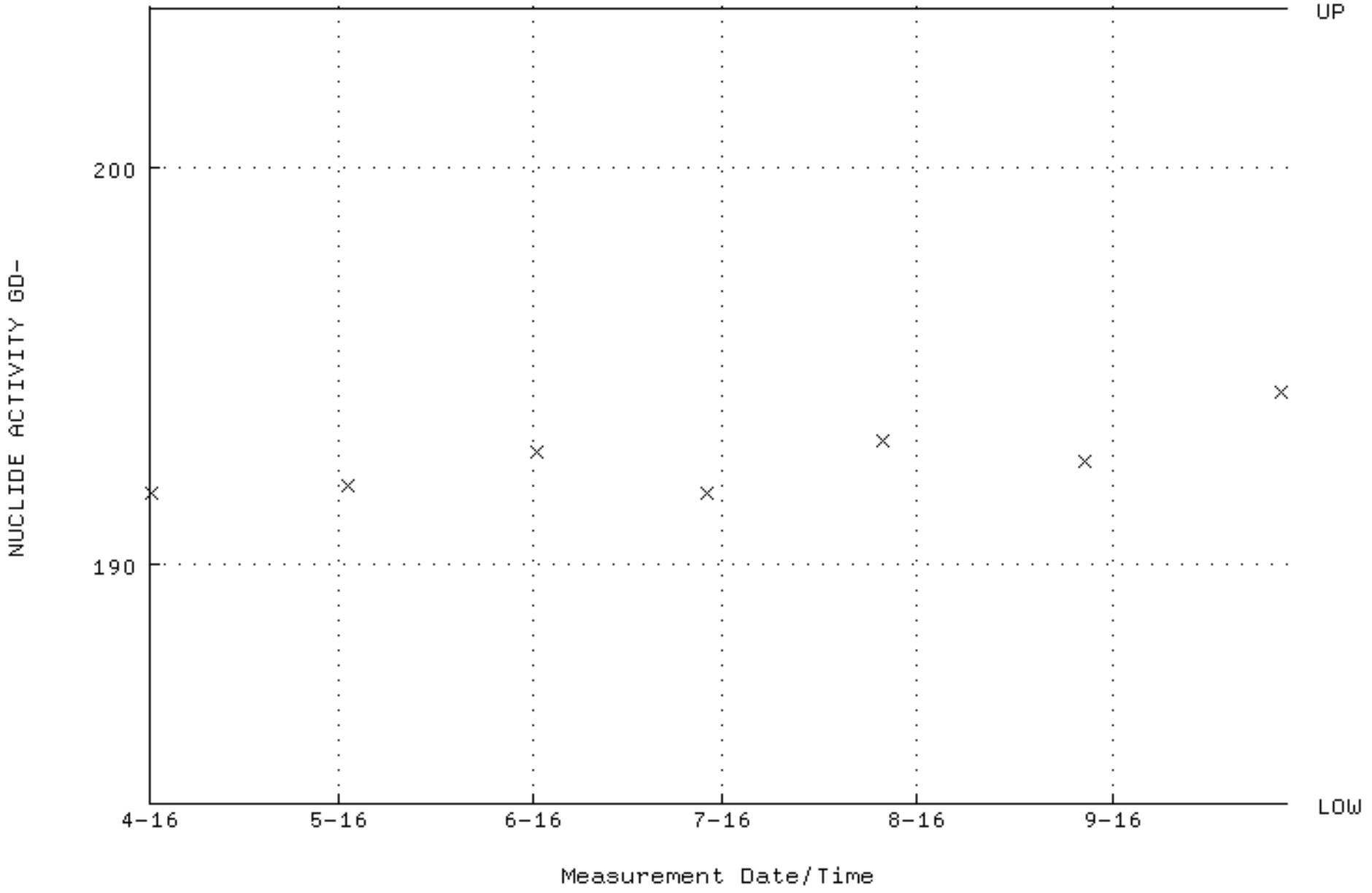
QA filename : DKA100:[ENV_ALPHA.QA.B]B021.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:30 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



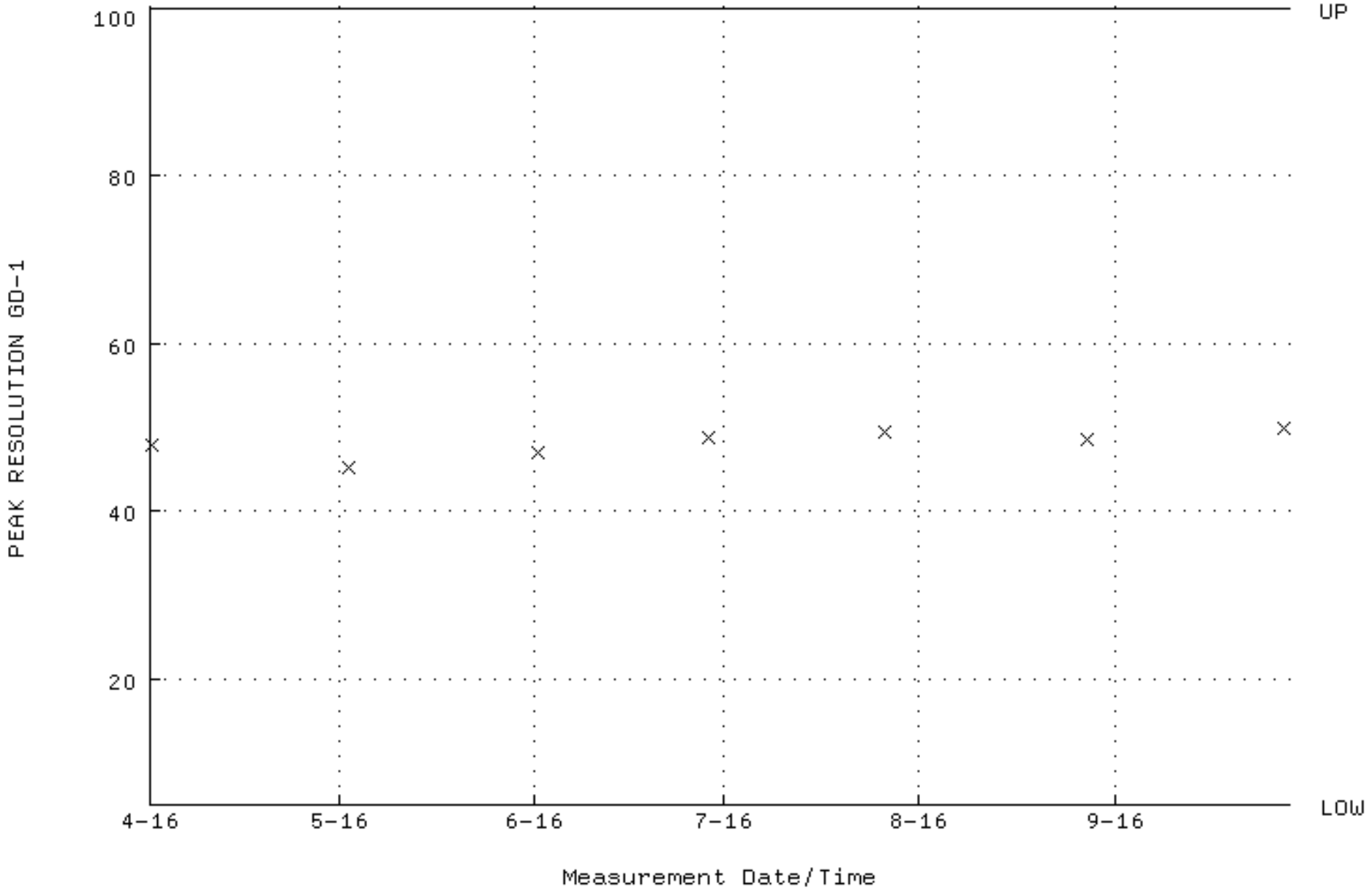
QA filename : DKA100:[ENV_ALPHA.QA.W]W022.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.324334 through 0.344396



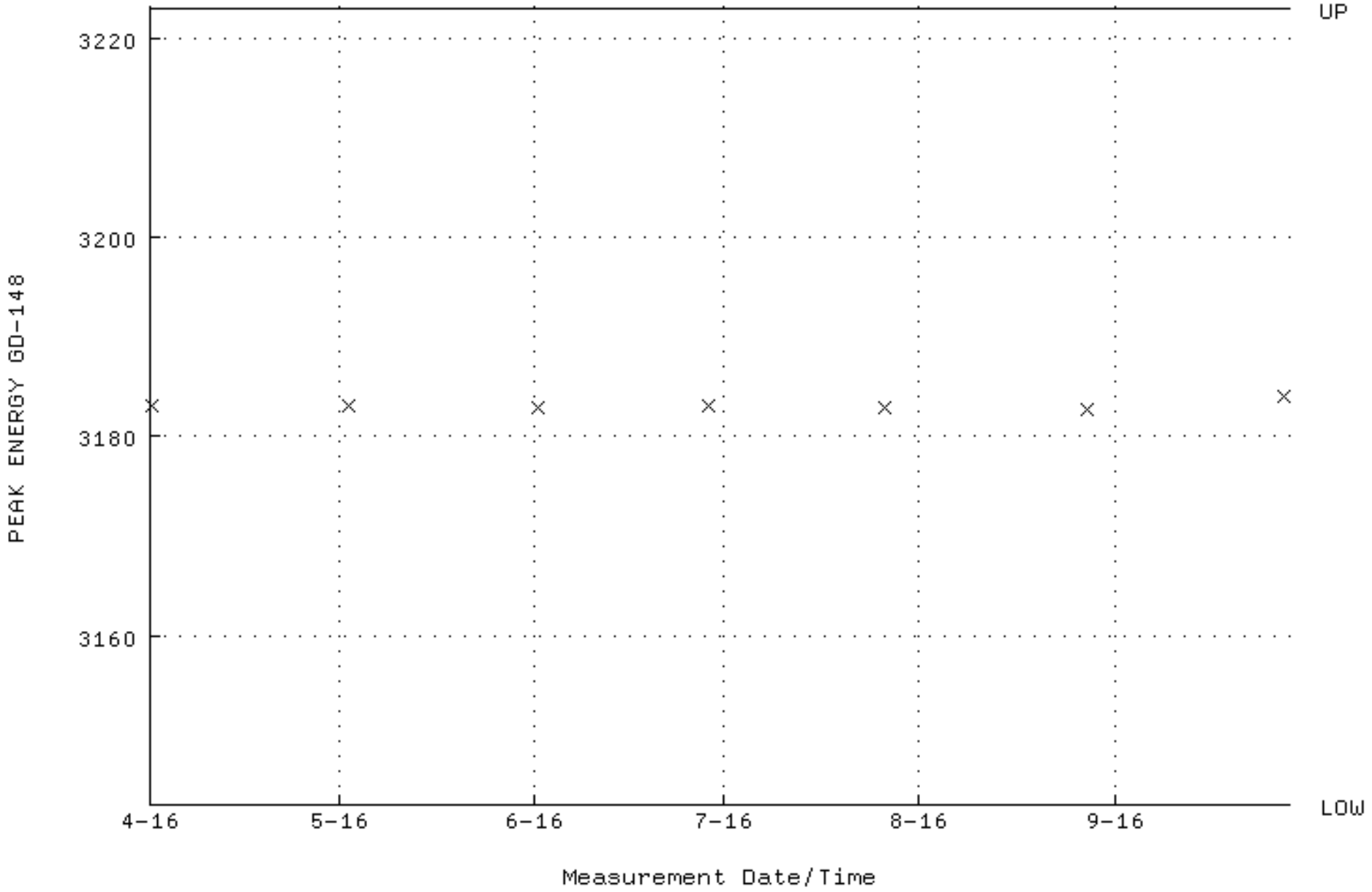
QA filename : DKA100:[ENV_ALPHA.QA.W]W022.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



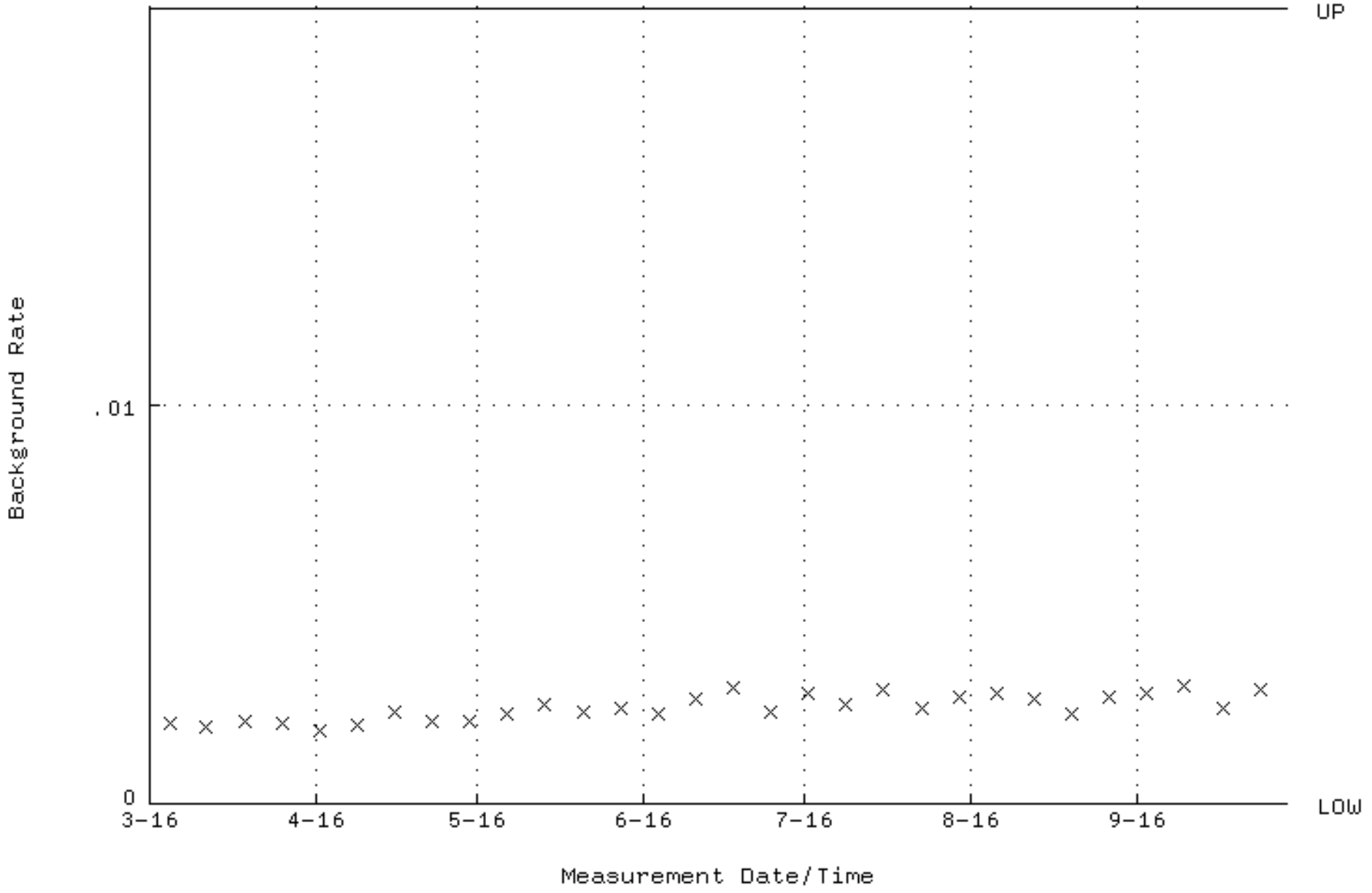
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



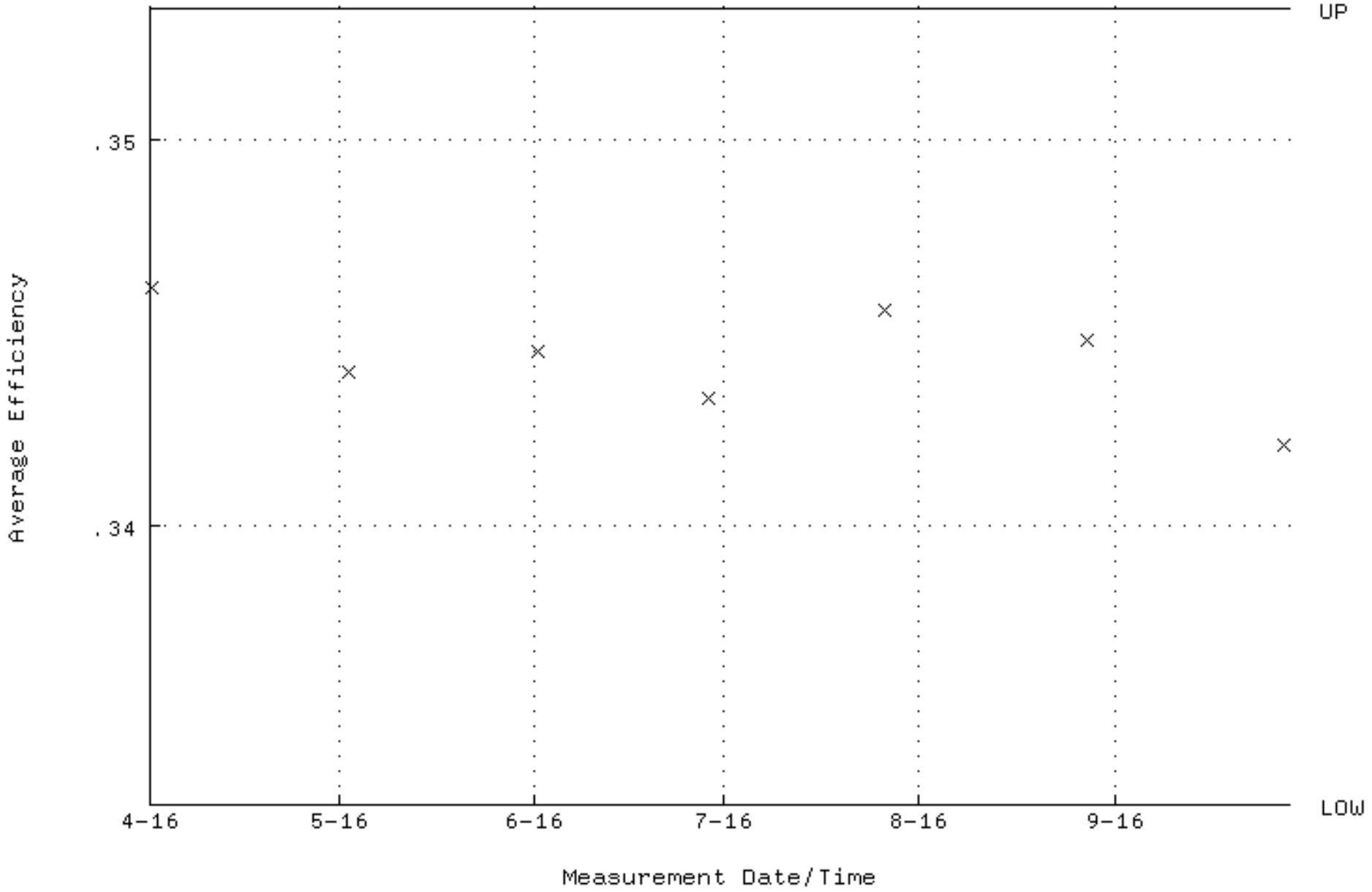
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



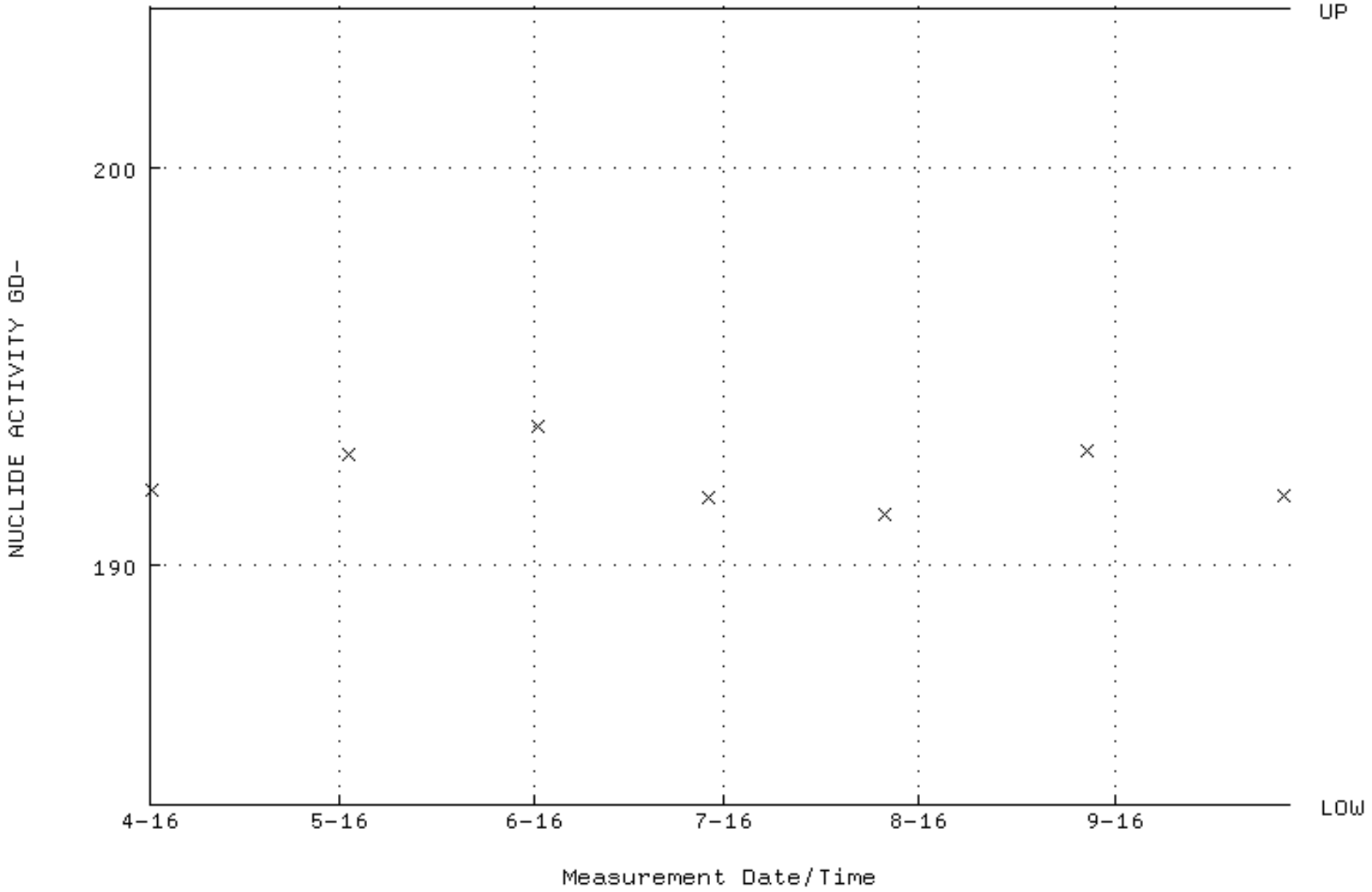
QA filename : DKA100:[ENV_ALPHA.QA.B]B022.QAF;4
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:30 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



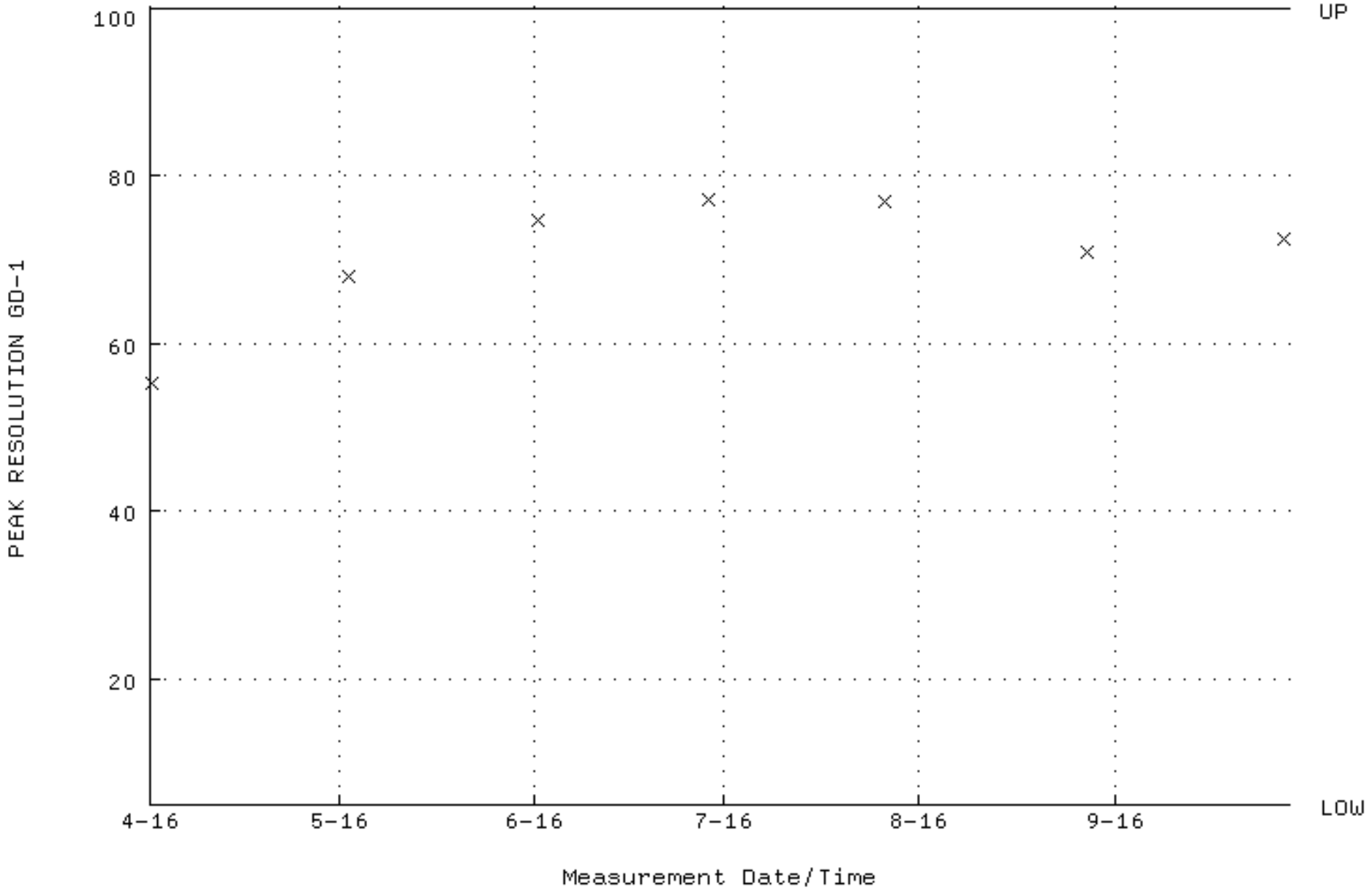
QA filename : DKA100:[ENV_ALPHA.QA.W]W024.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.332785 through 0.353369



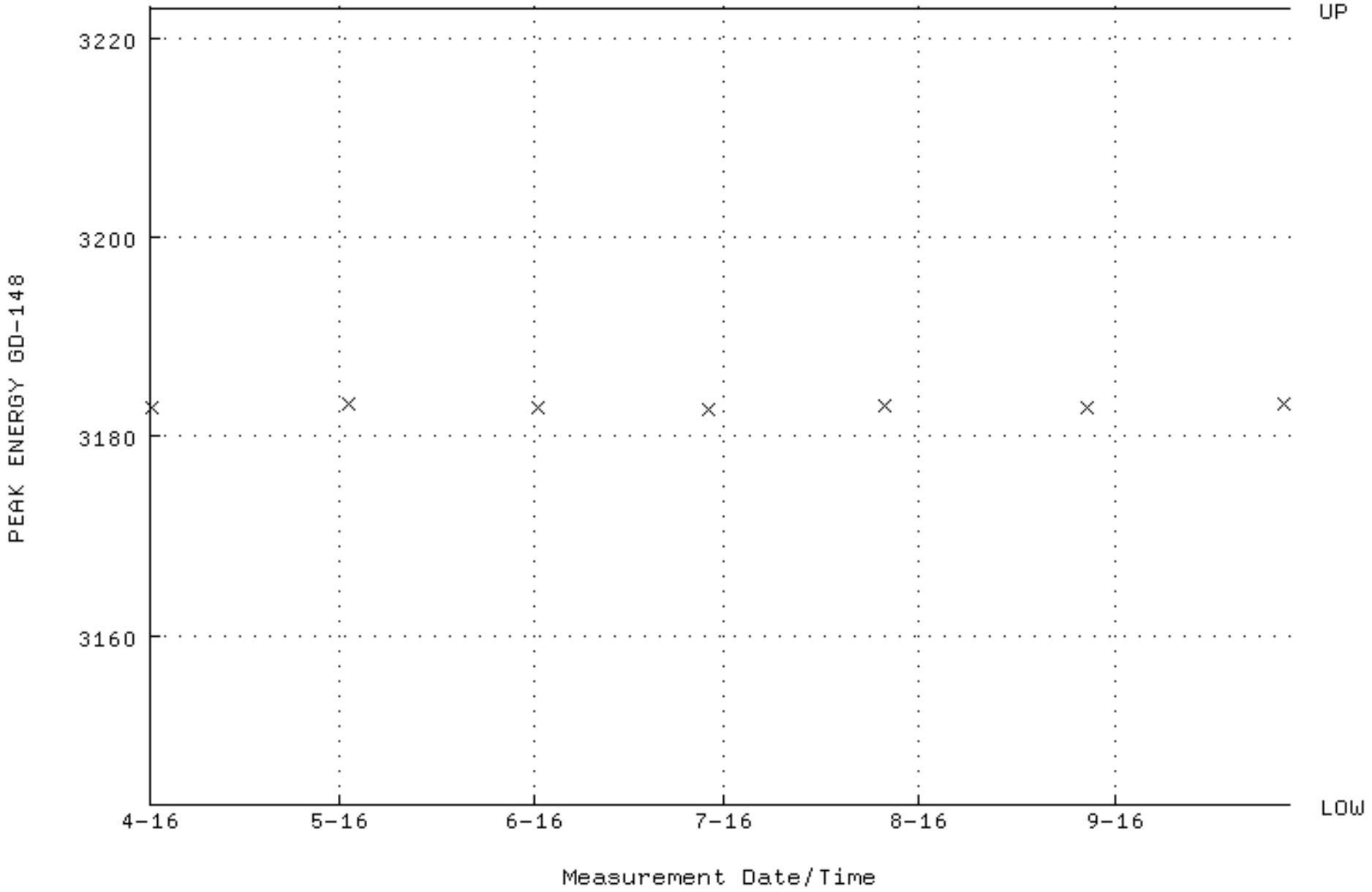
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



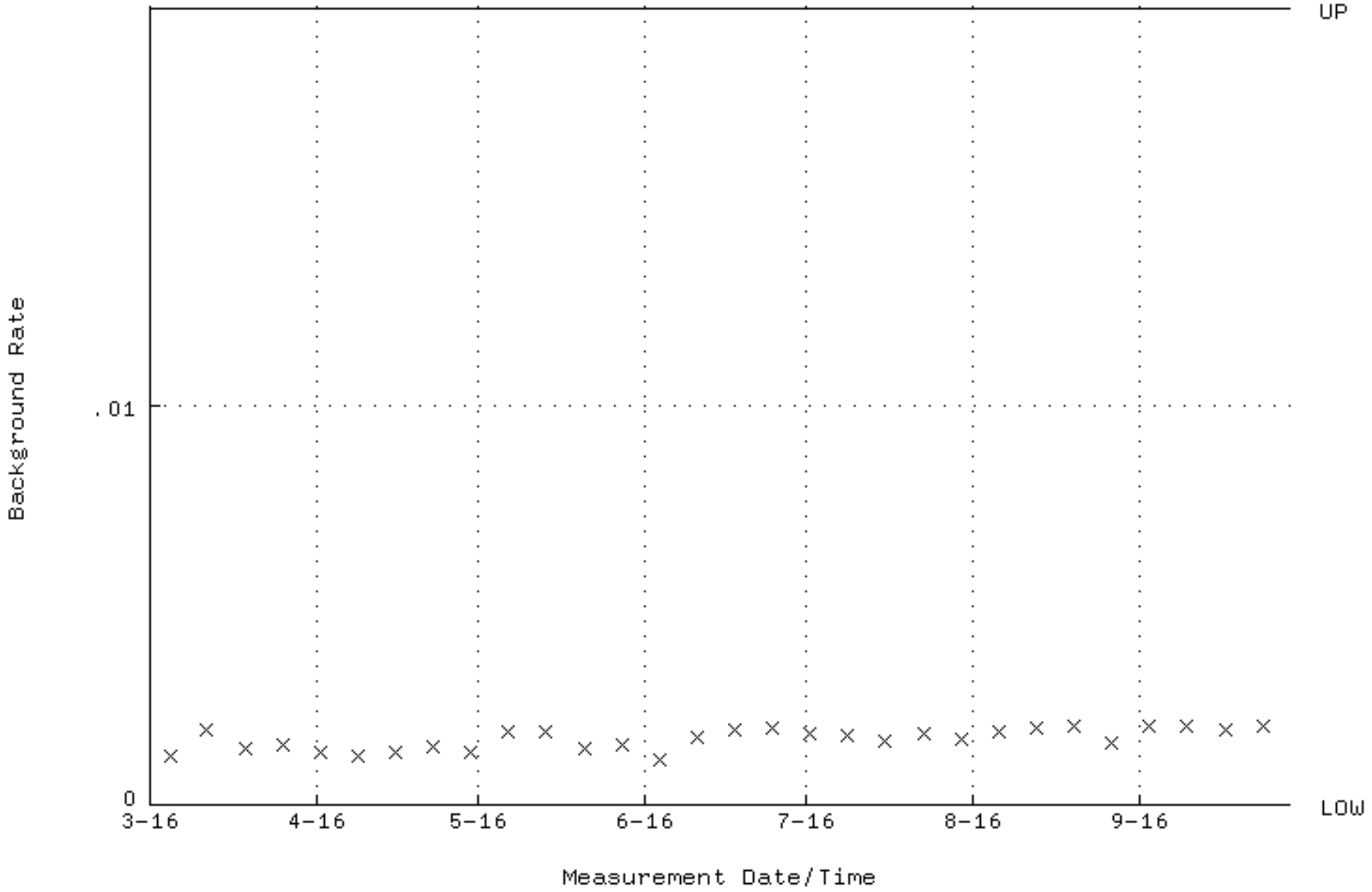
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



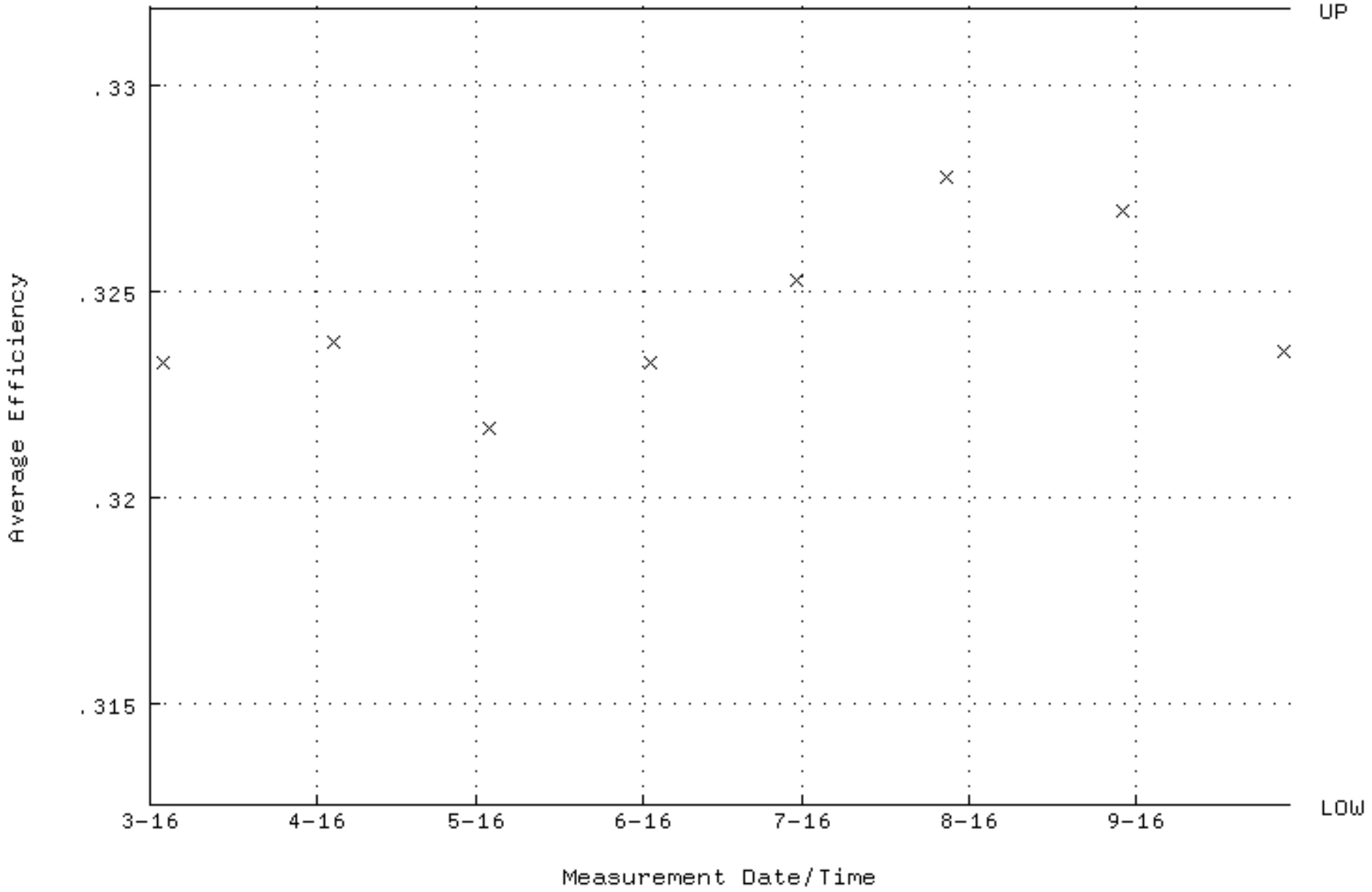
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 1-APR-2016 08:54:43 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



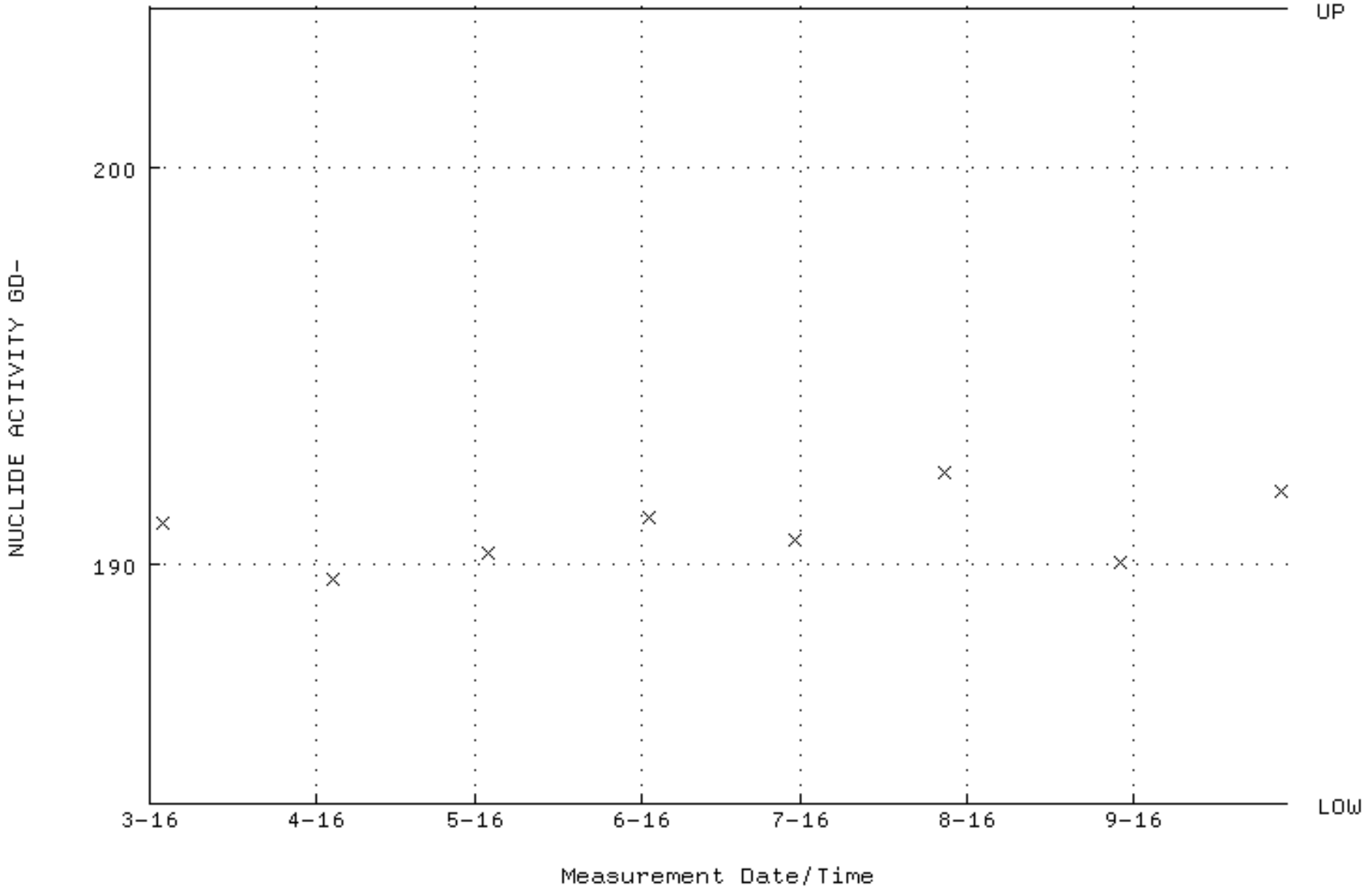
QA filename : DKA100:[ENV_ALPHA.QA.B]B024.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:29:30 through 28-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



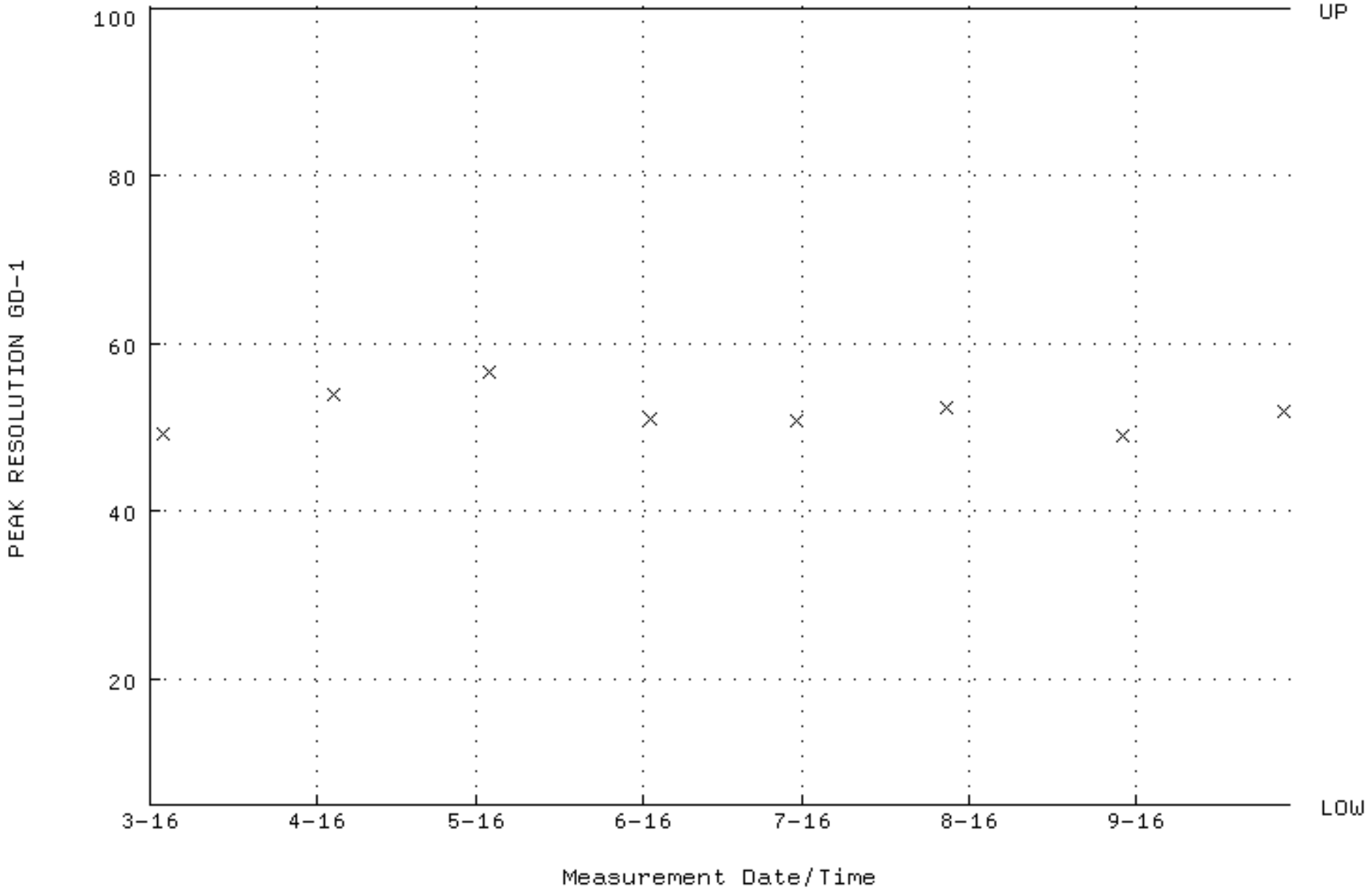
QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.312549 through 0.331881



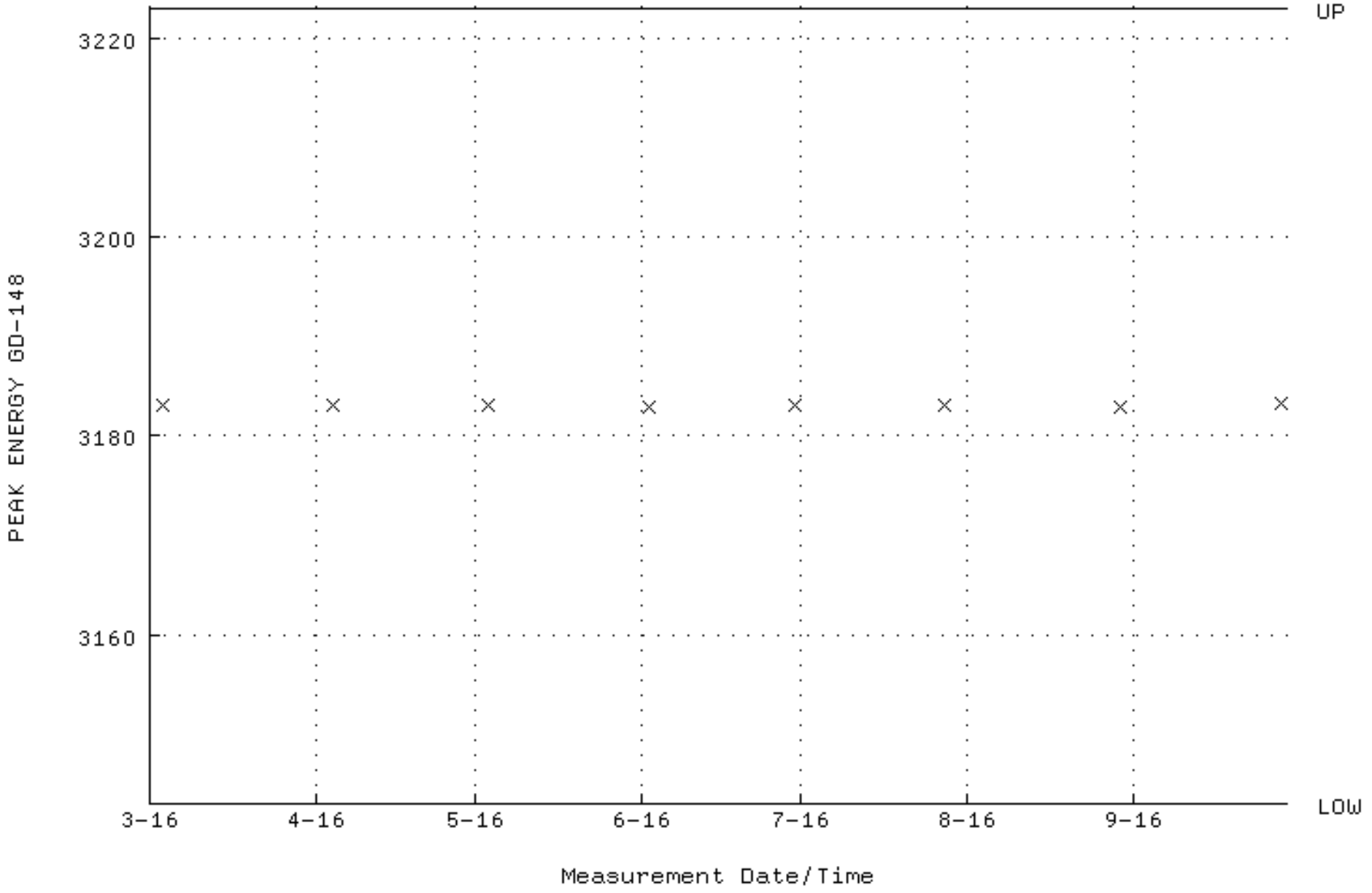
QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



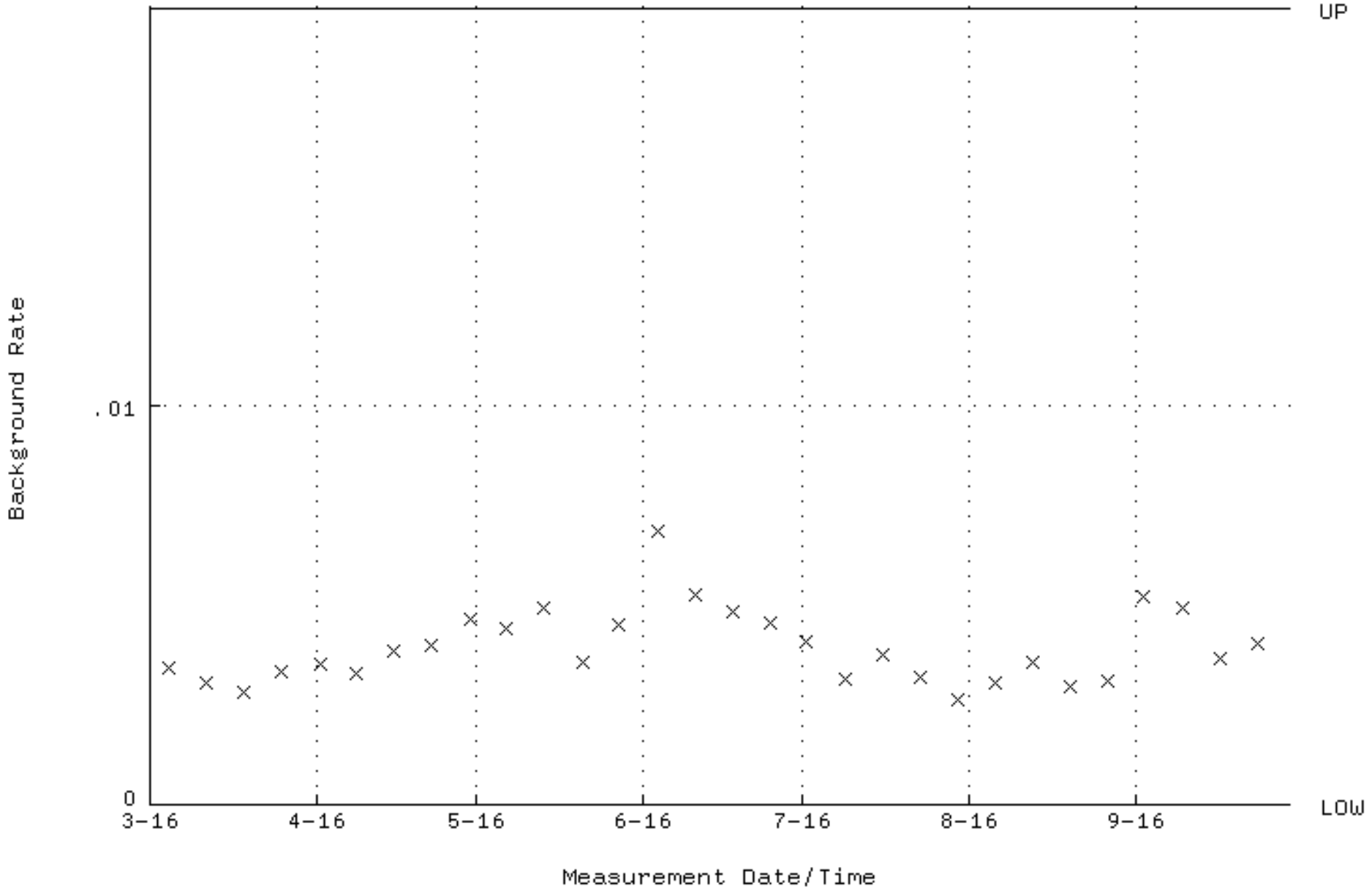
QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



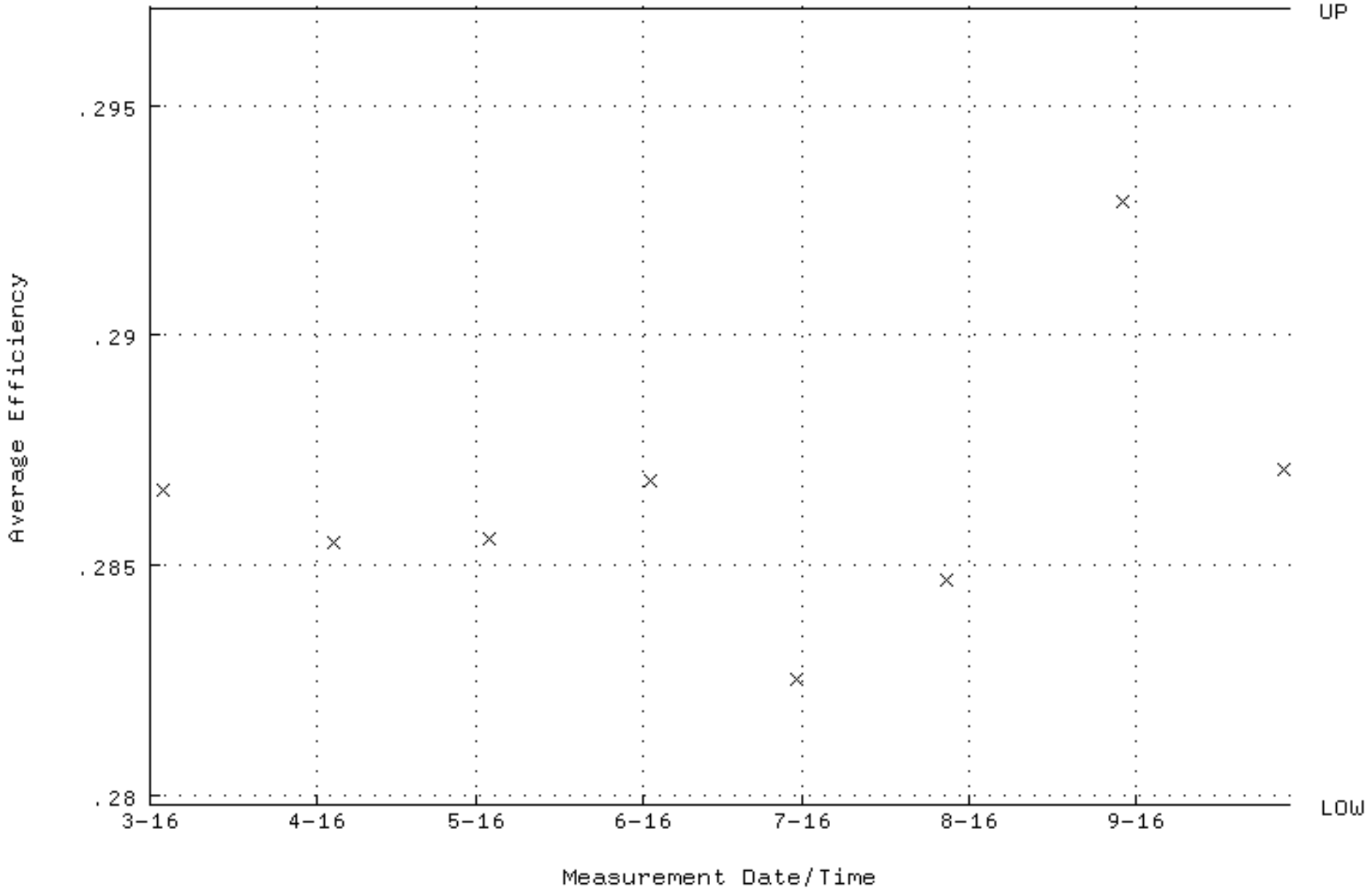
QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



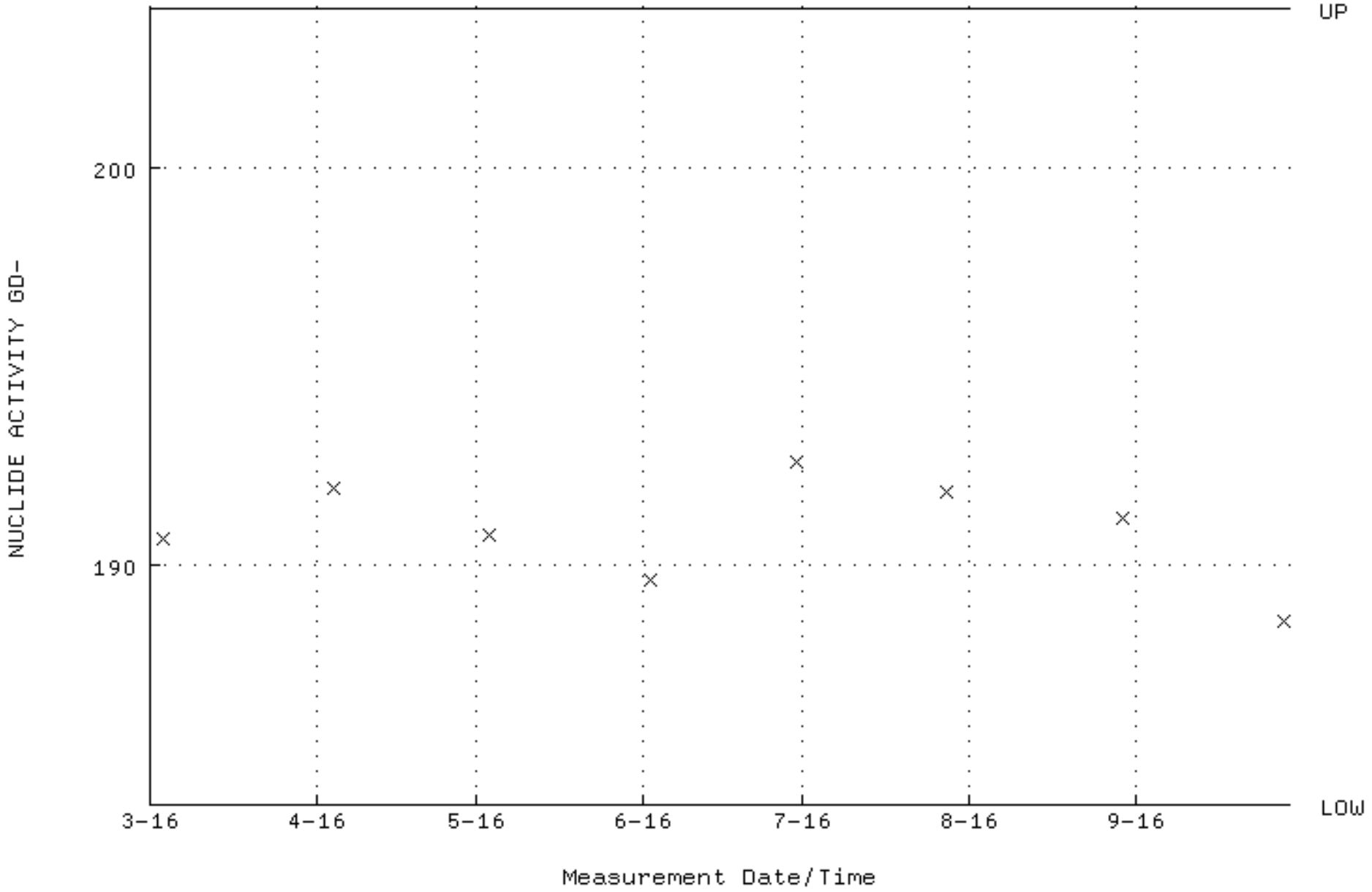
QA filename : DKA100:[ENV_ALPHA.QA.B]B026.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:26 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



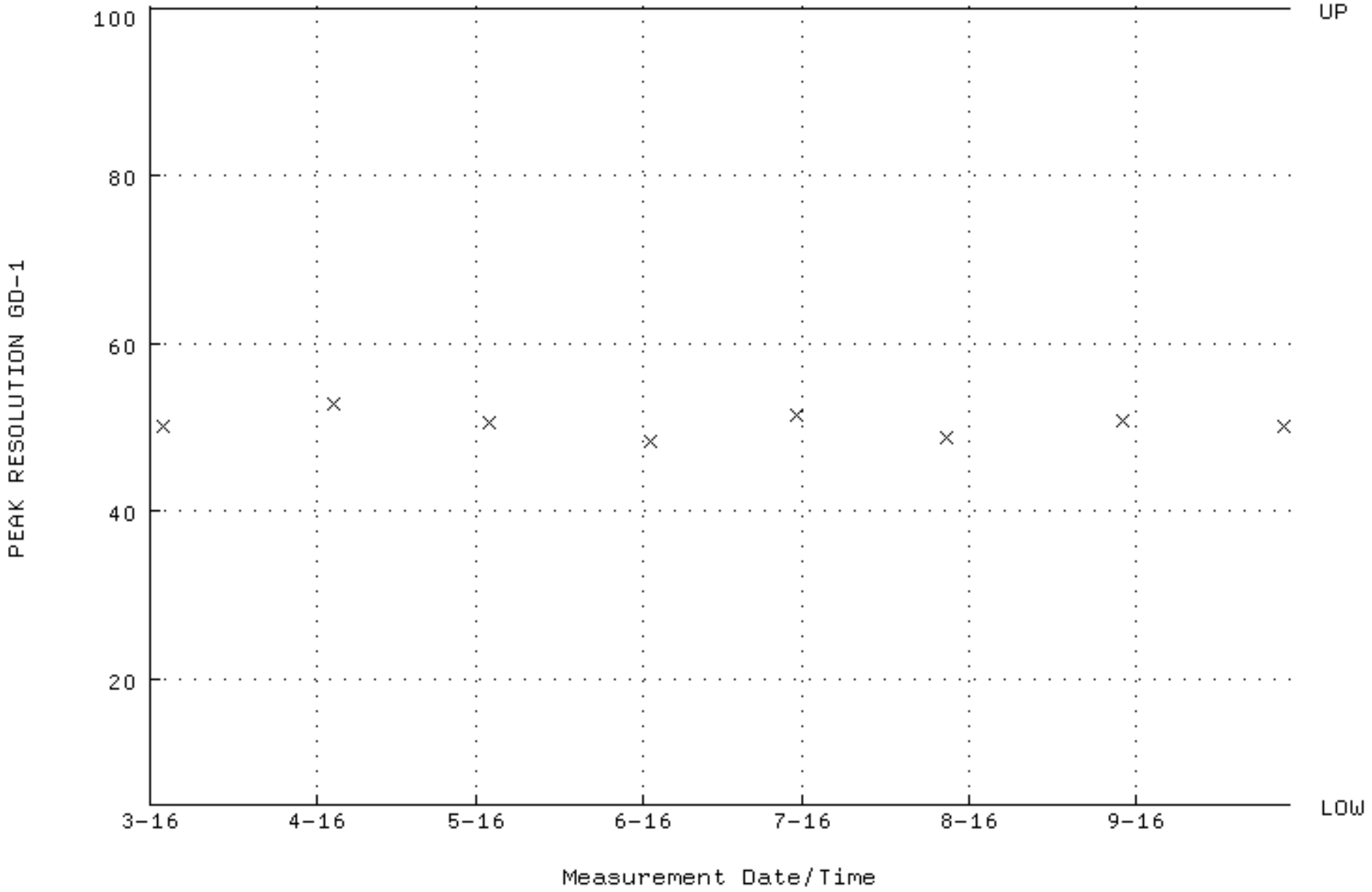
QA filename : DKA100:[ENV_ALPHA.QA.W]W028.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.279800 through 0.297100



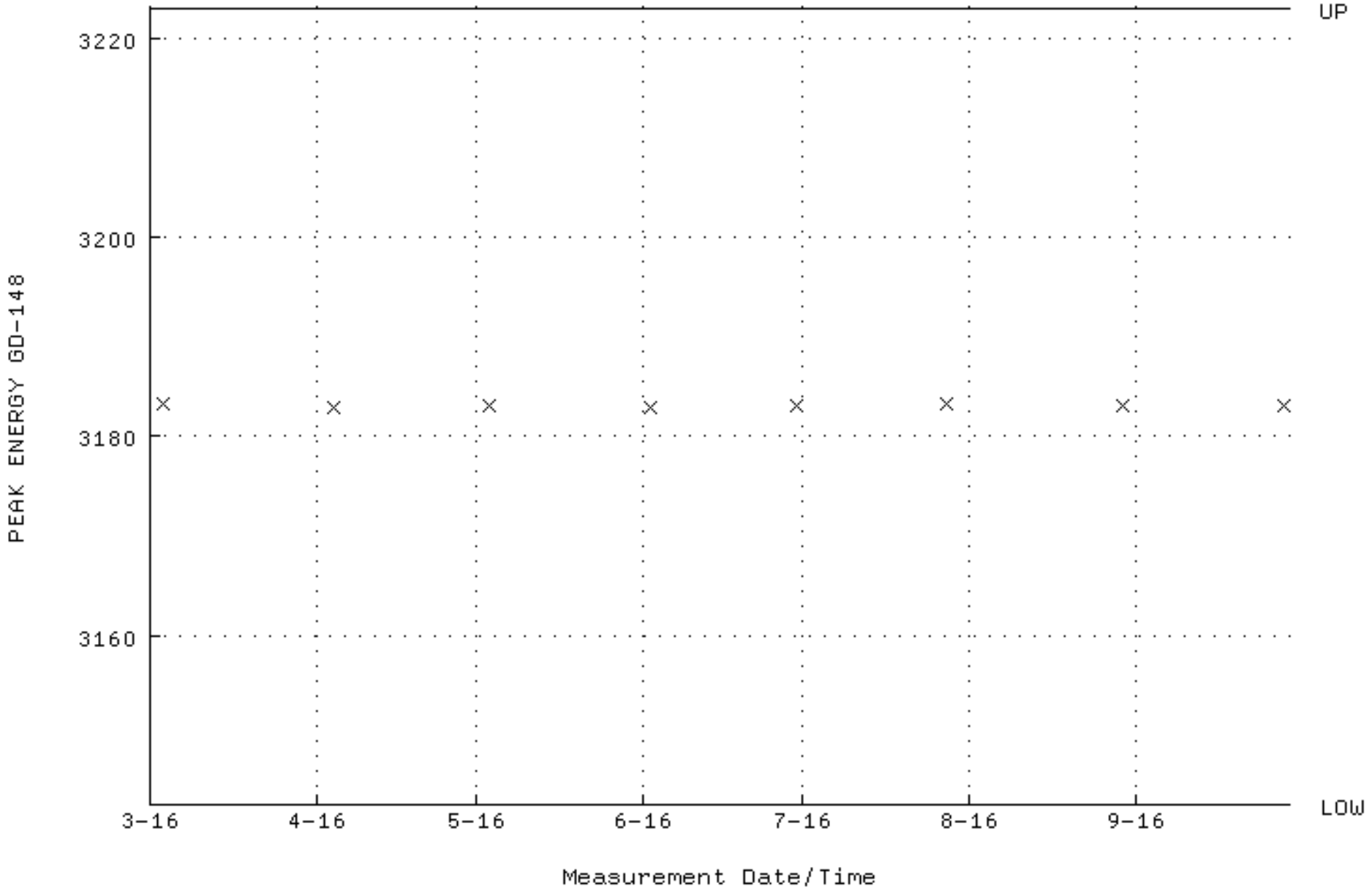
QA filename : DKA100:[ENV_ALPHA.QA.W]W028.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



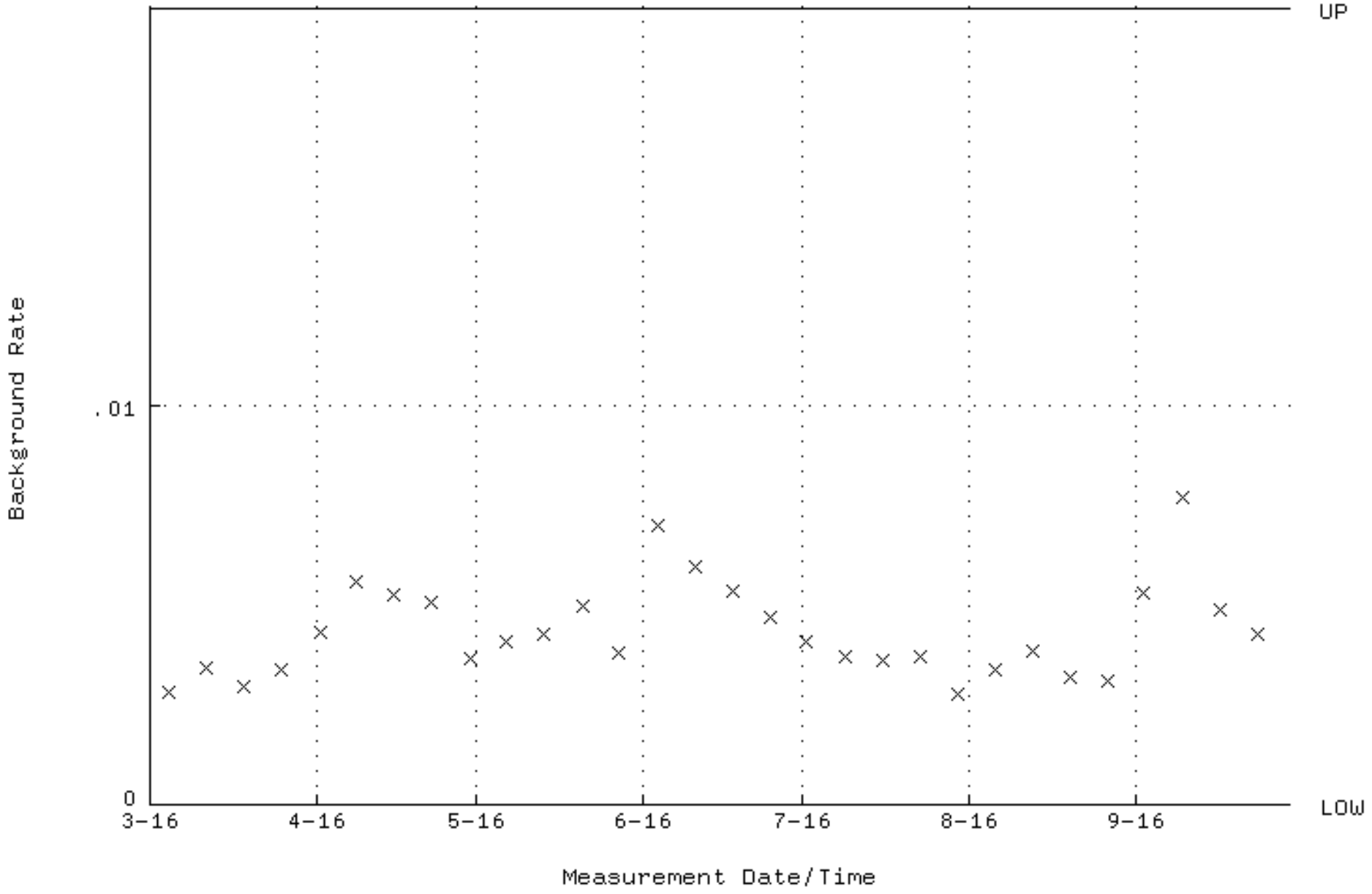
QA filename : DKA100:[ENV_ALPHA.QA.W]W028.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



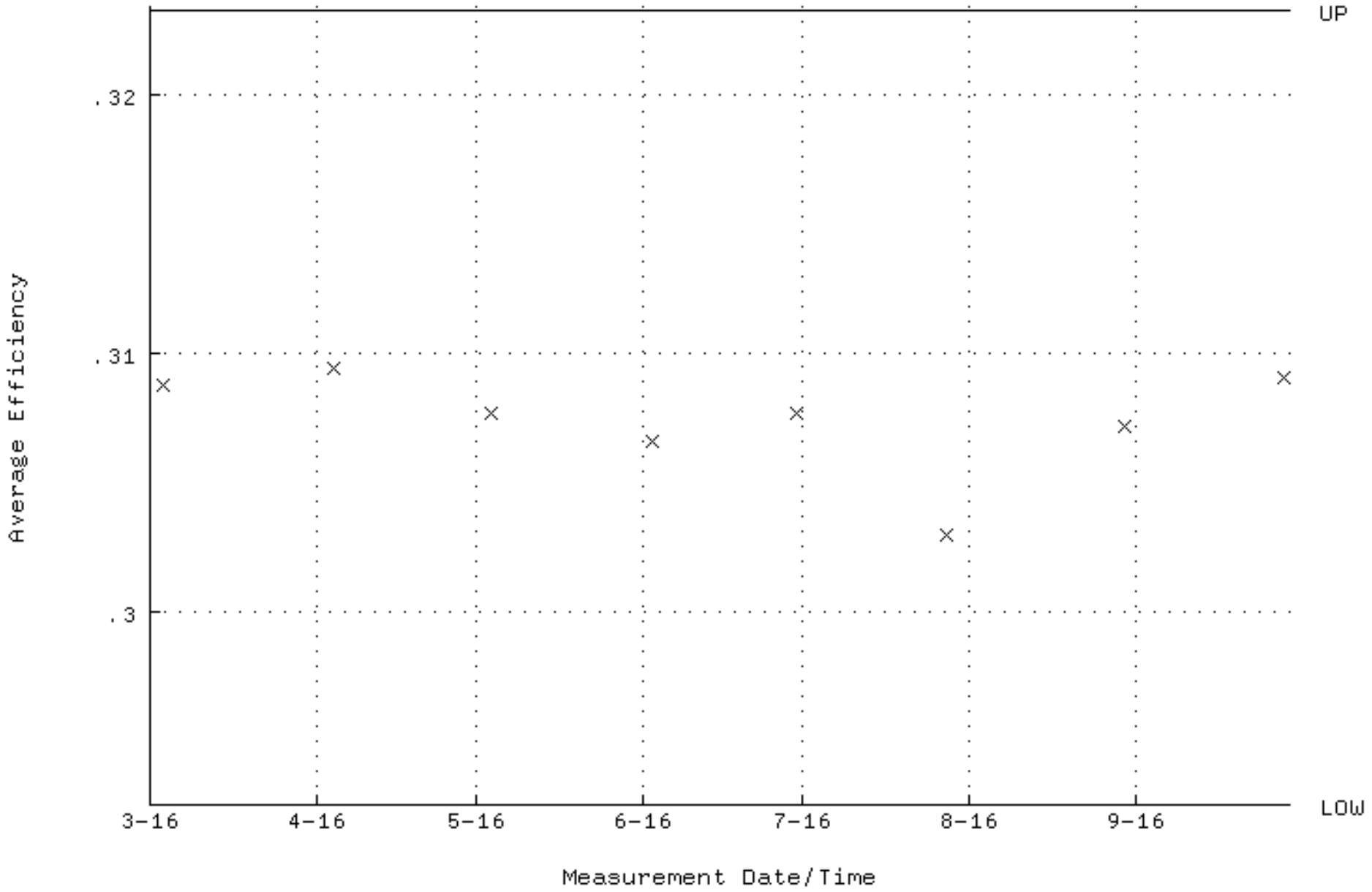
QA filename : DKA100:[ENV_ALPHA.QA.W]W028.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



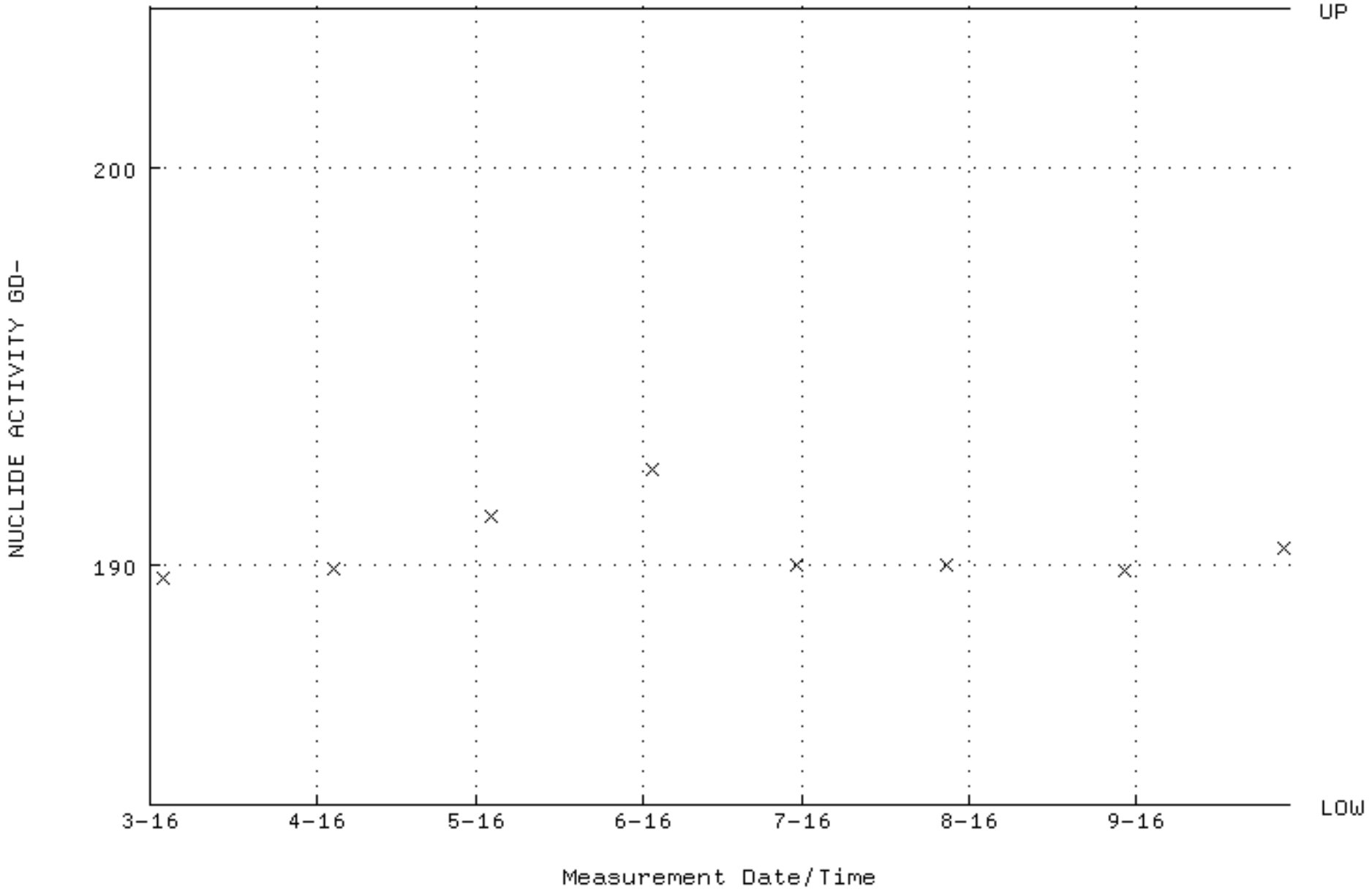
QA filename : DKA100:[ENV_ALPHA.QA.B]B028.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:26 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



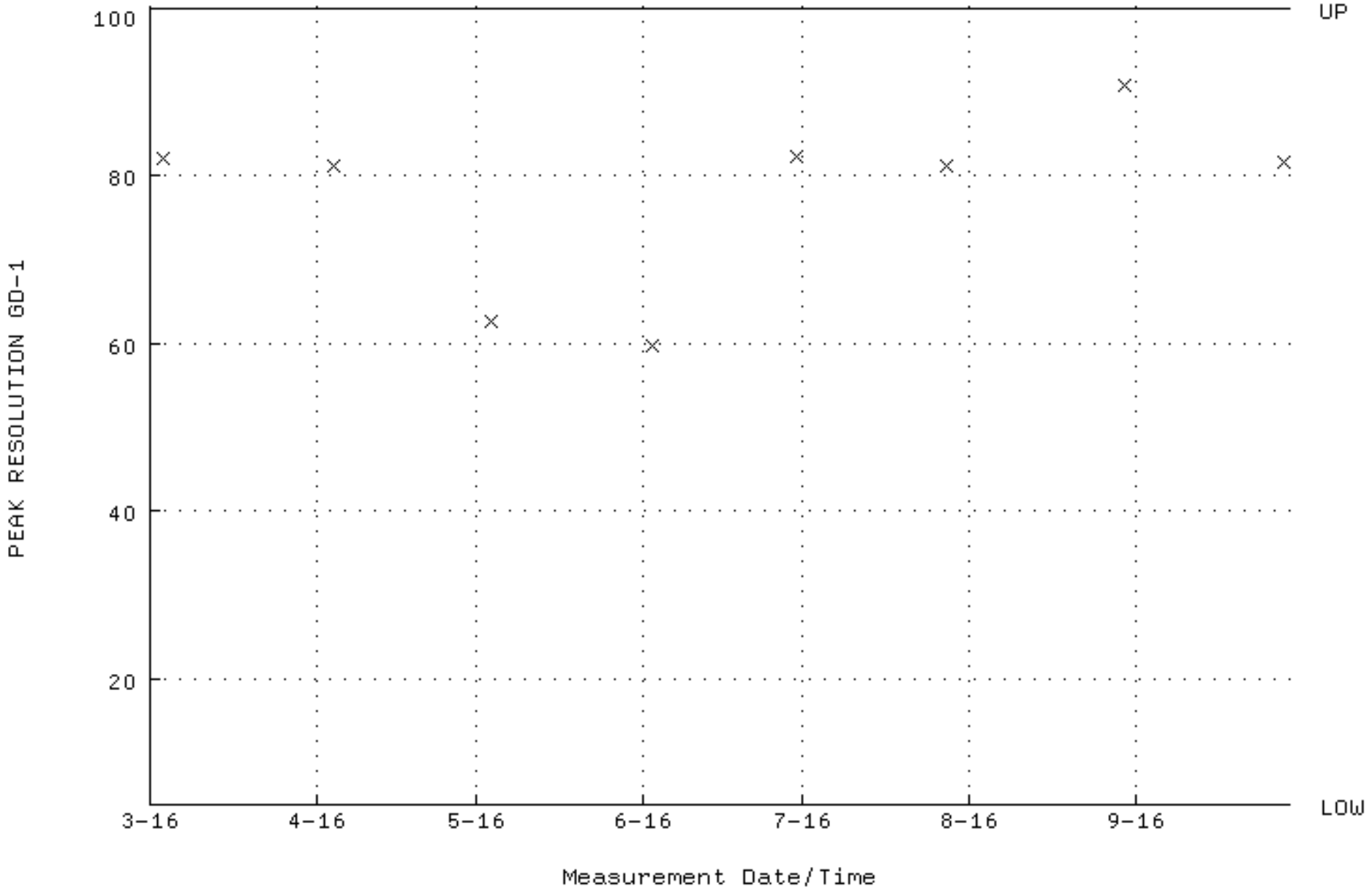
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 14:39:28 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.292500 through 0.323350



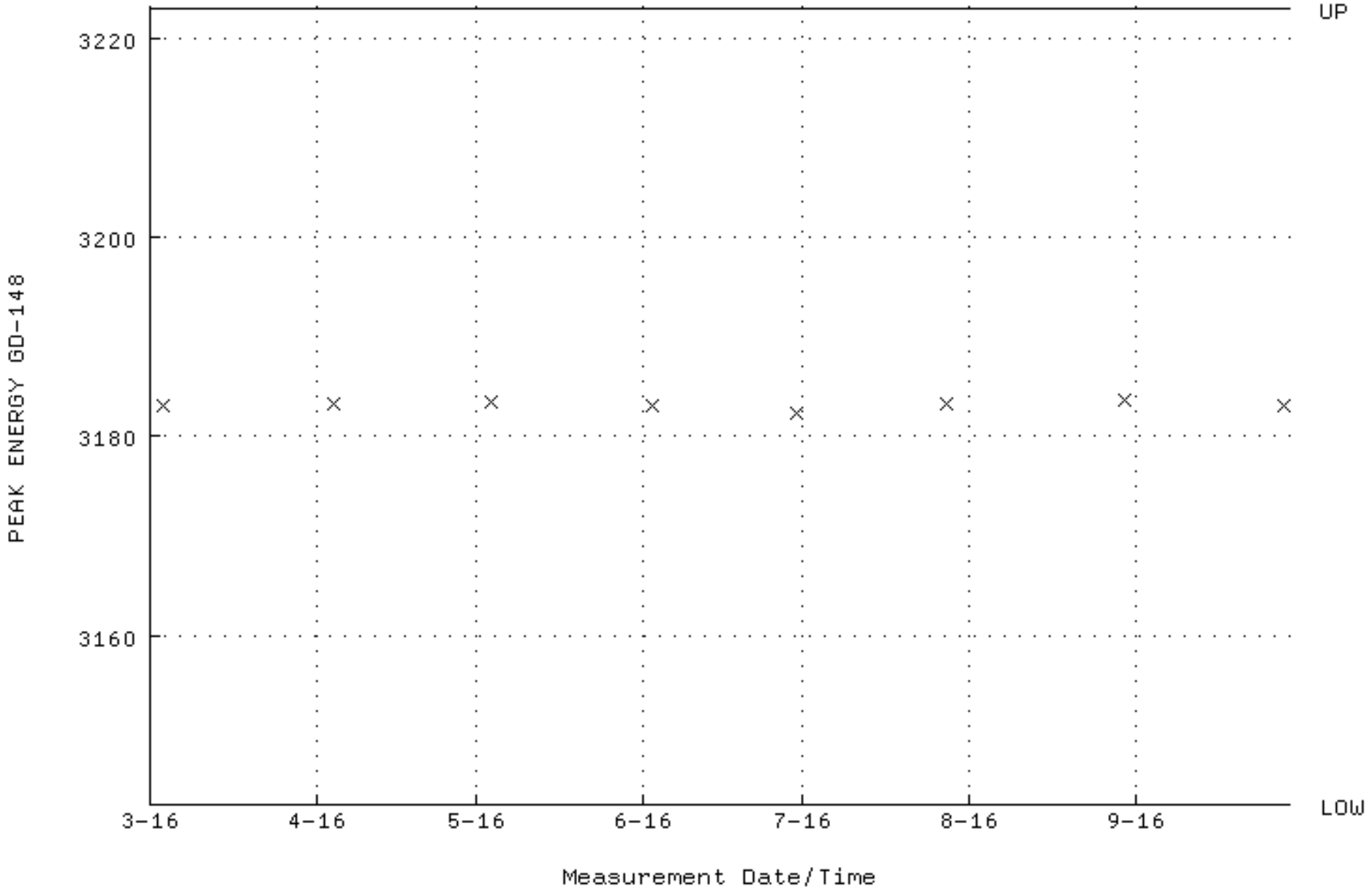
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;11
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 14:39:28 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



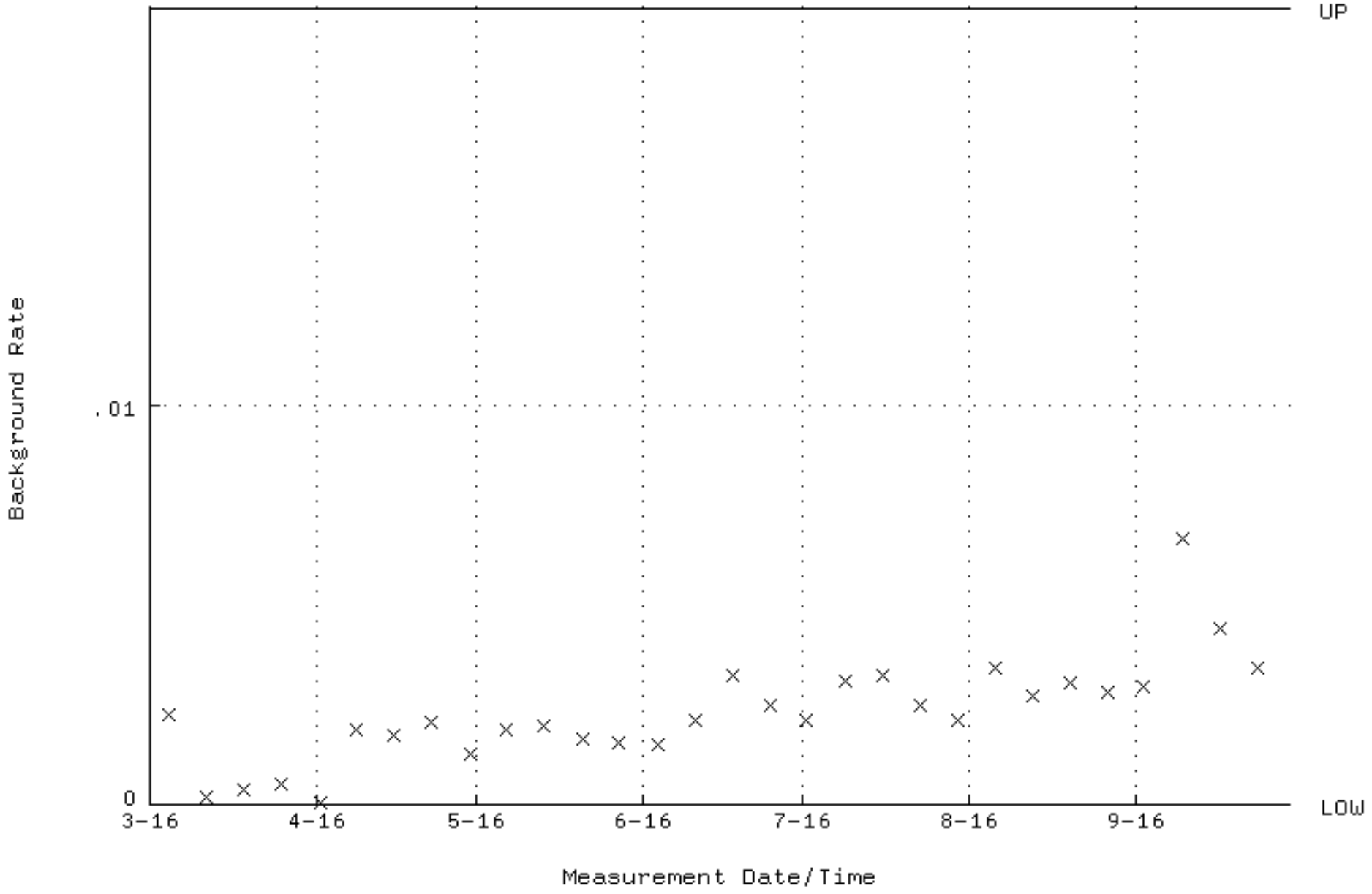
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 14:39:28 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



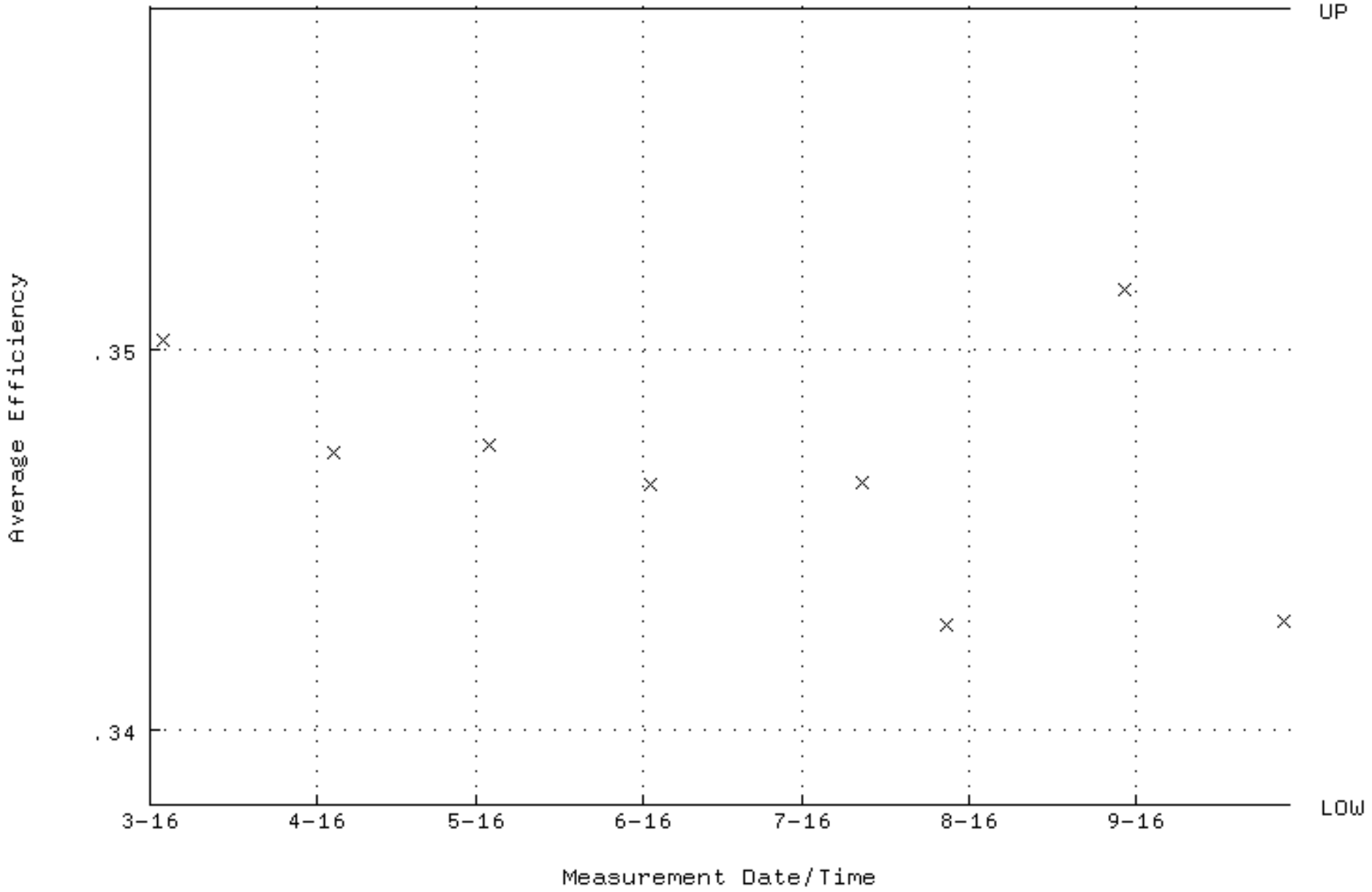
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;11
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 14:39:28 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



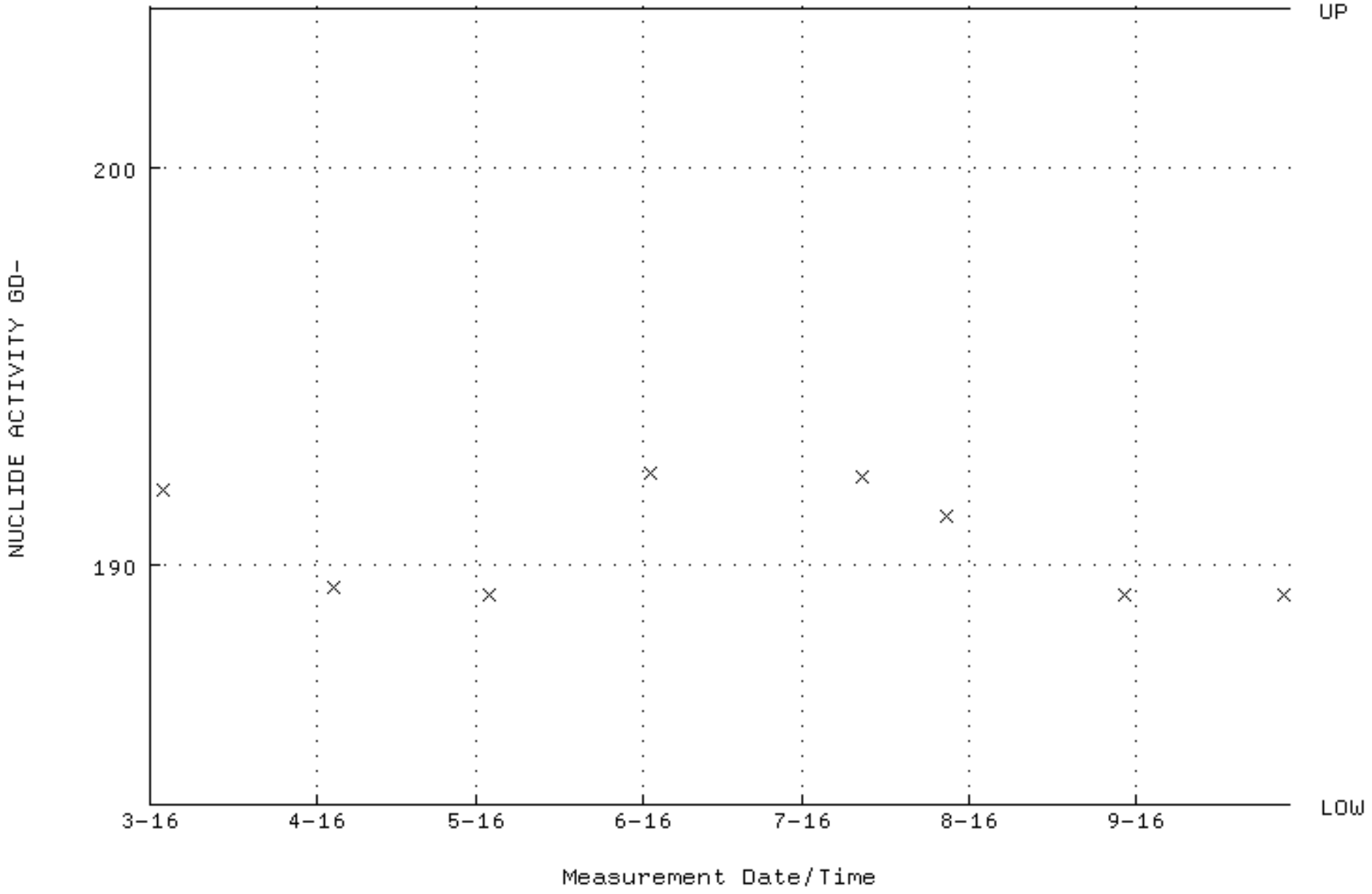
QA filename : DKA100:[ENV_ALPHA.QA.B]B029.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:26 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



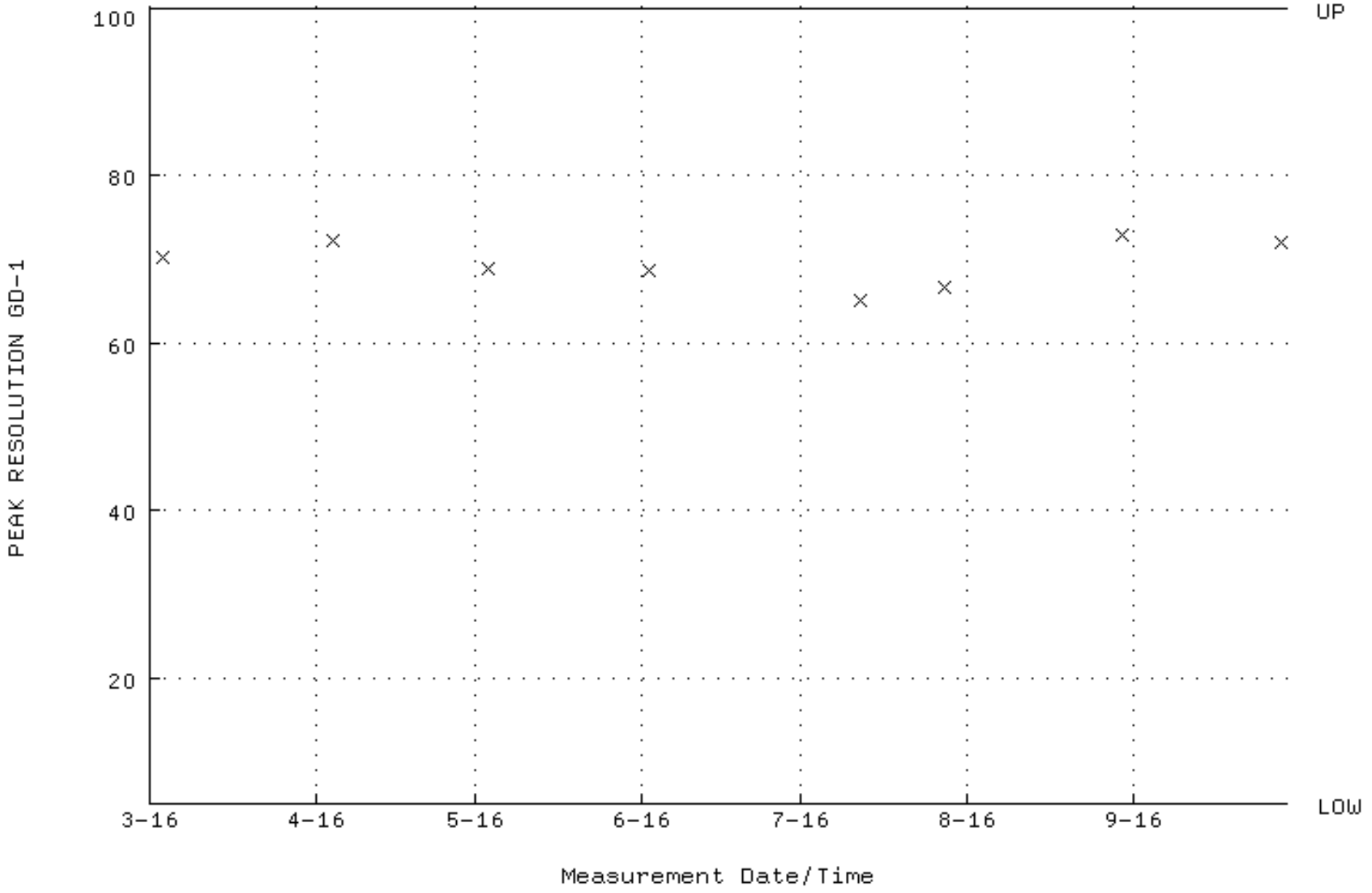
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.338030 through 0.358940



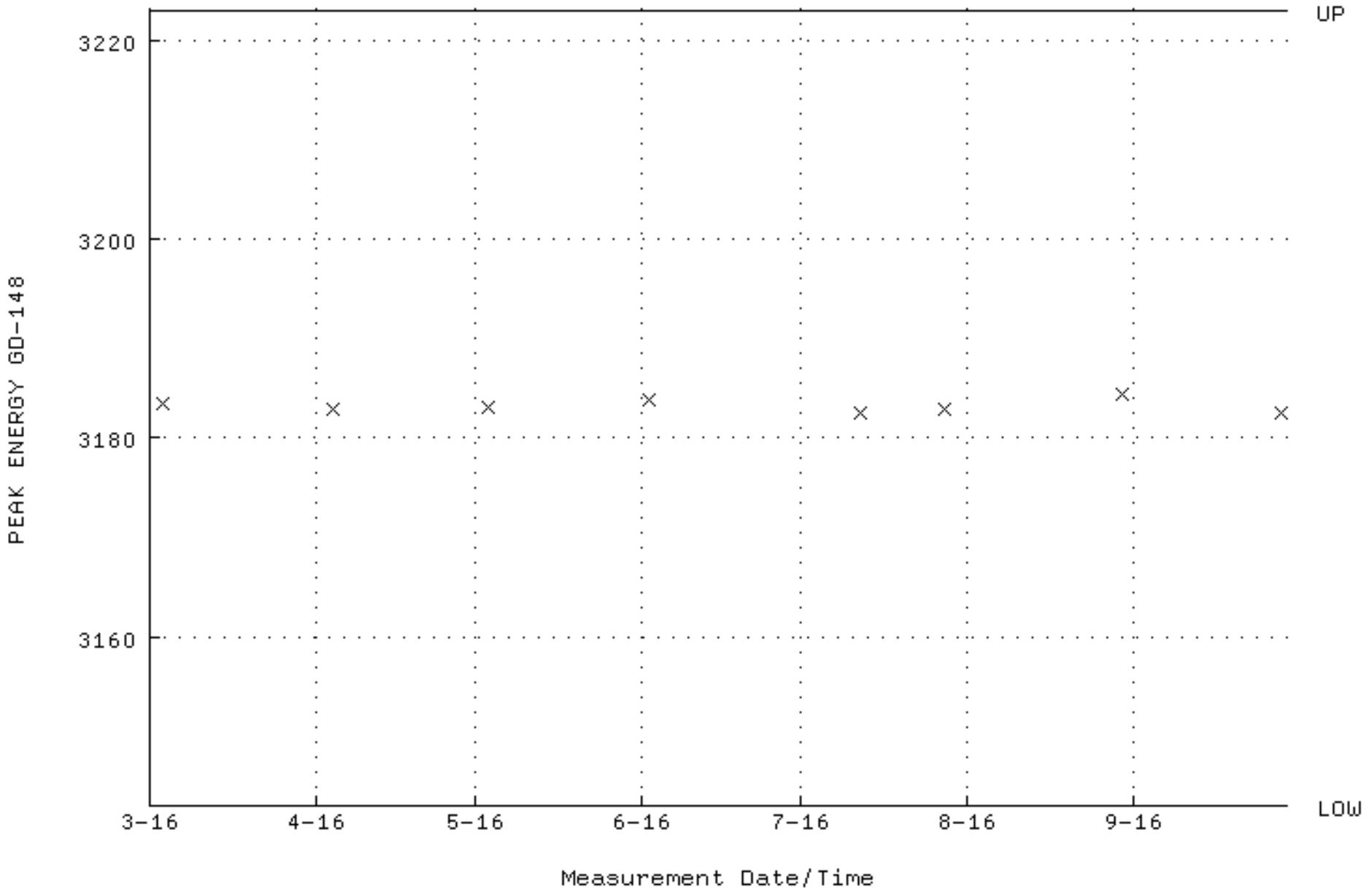
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



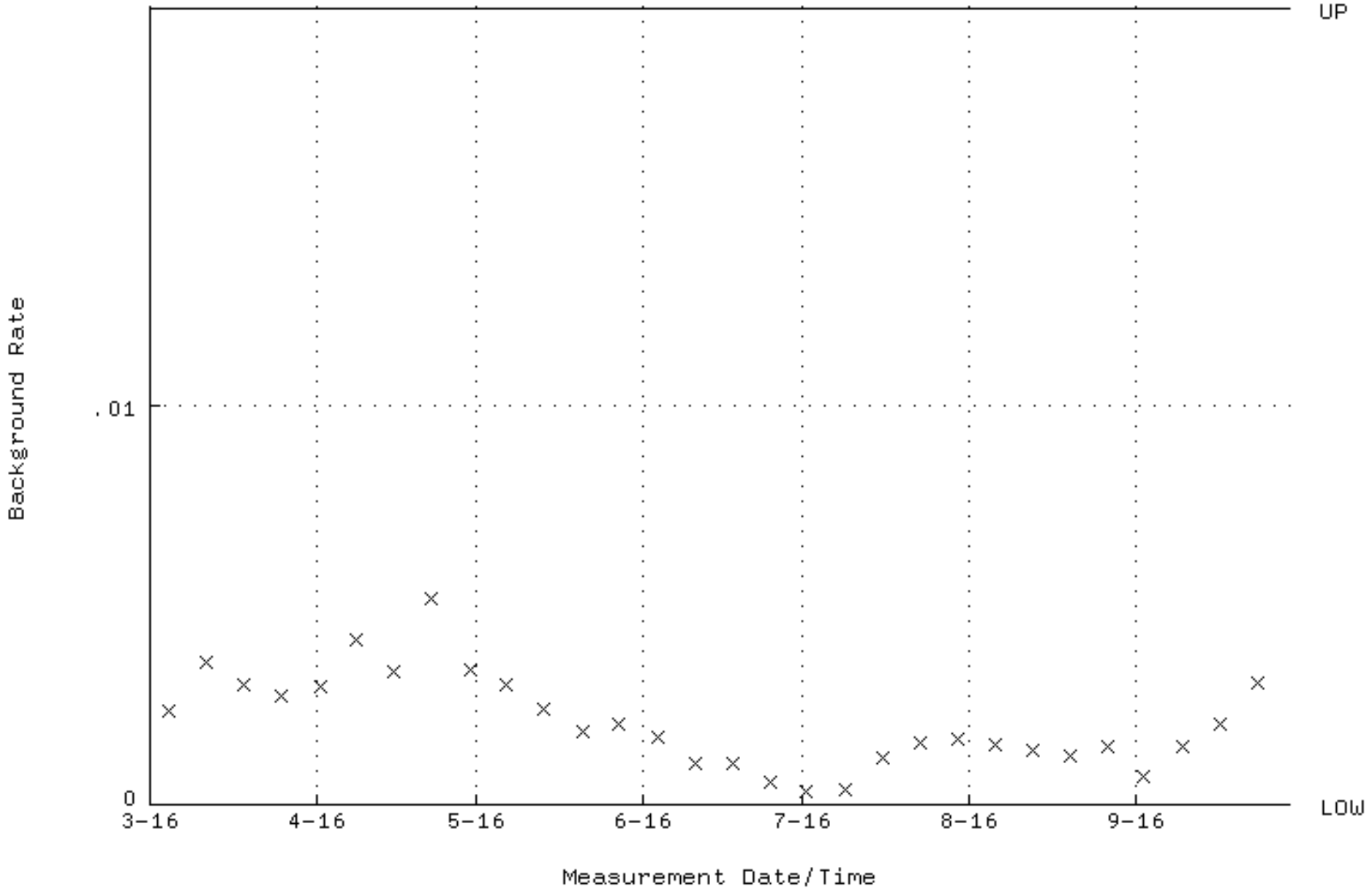
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



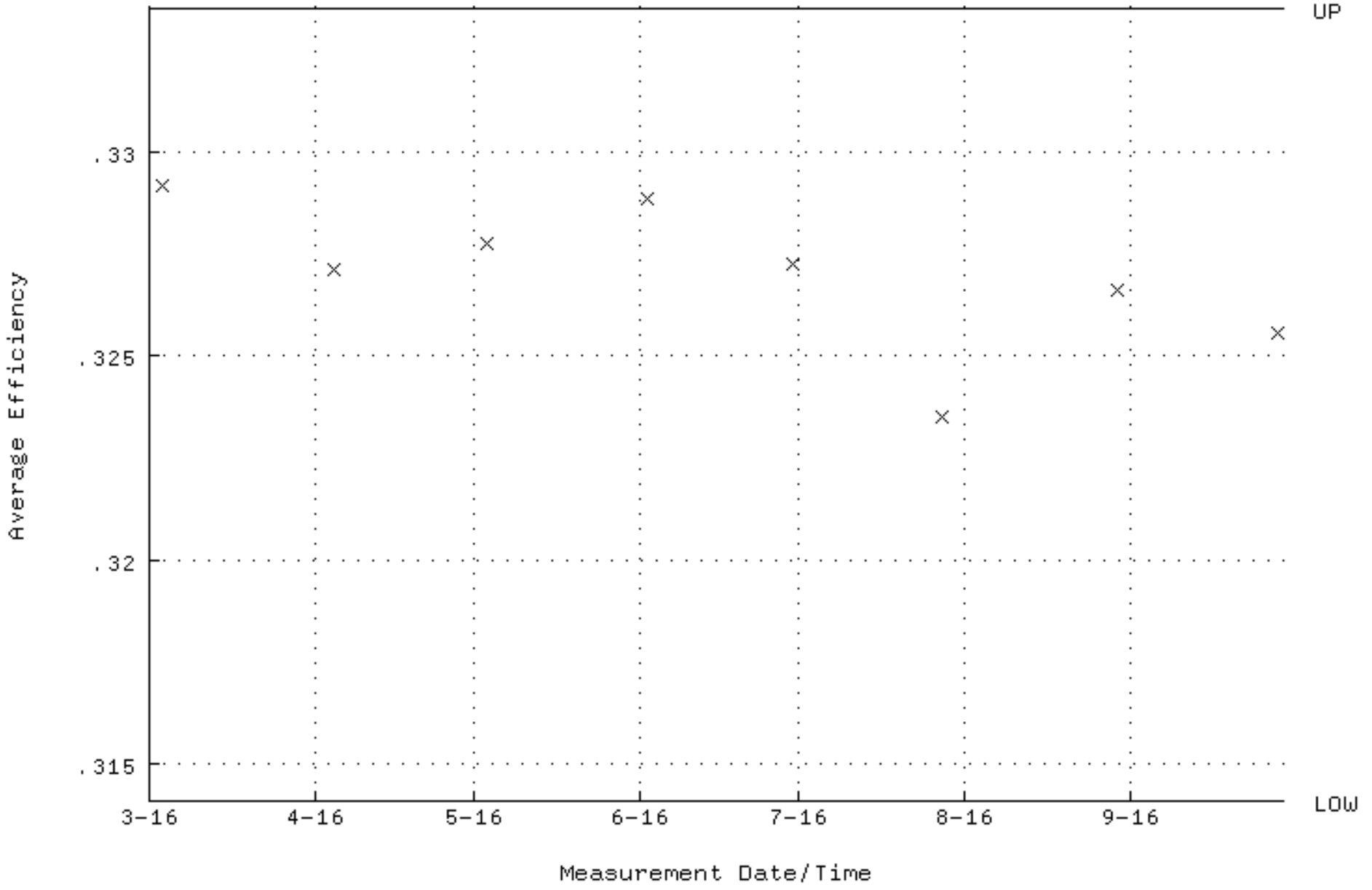
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:44 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



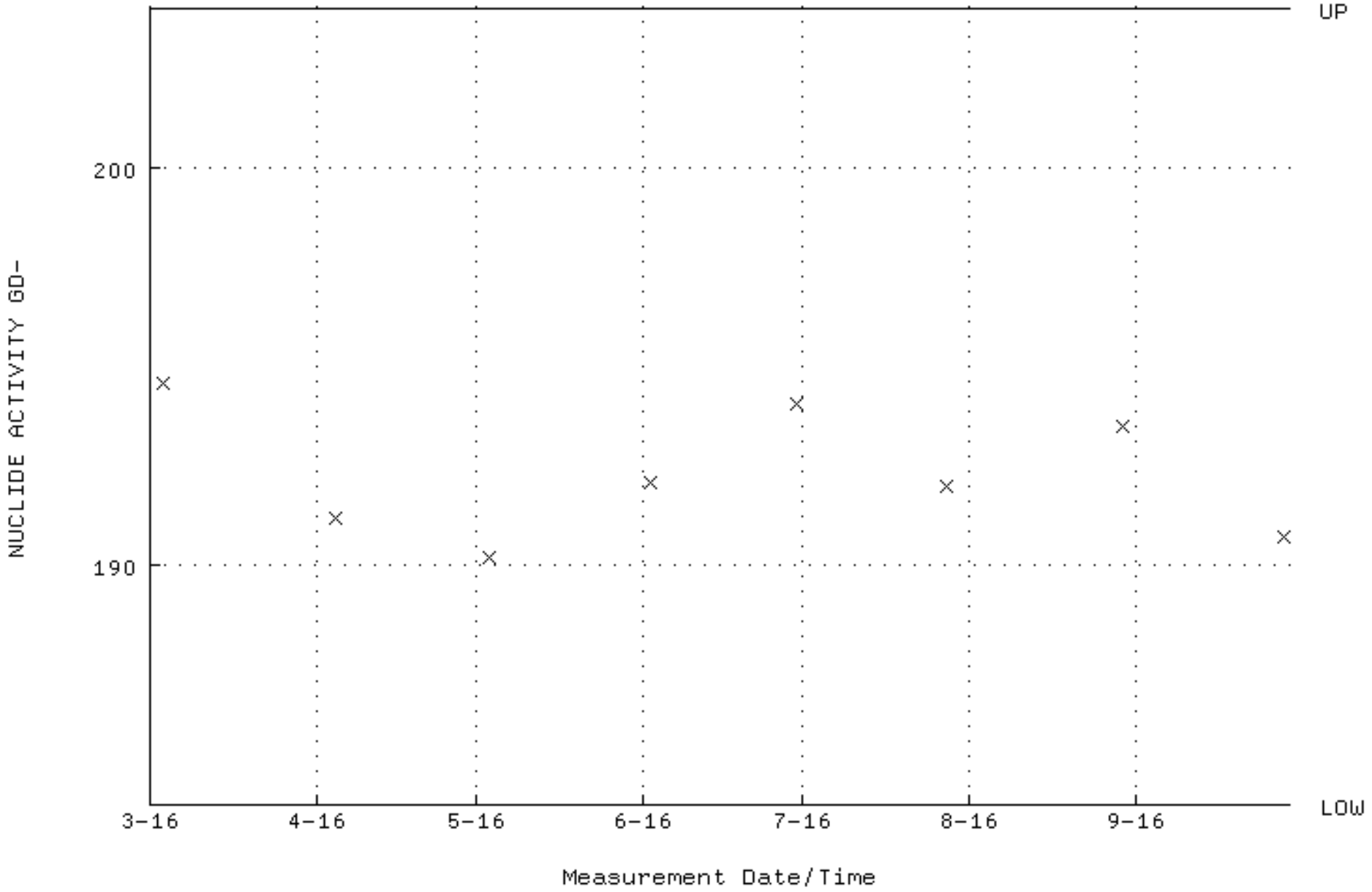
QA filename : DKA100:[ENV_ALPHA.QA.B]B030.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:26 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



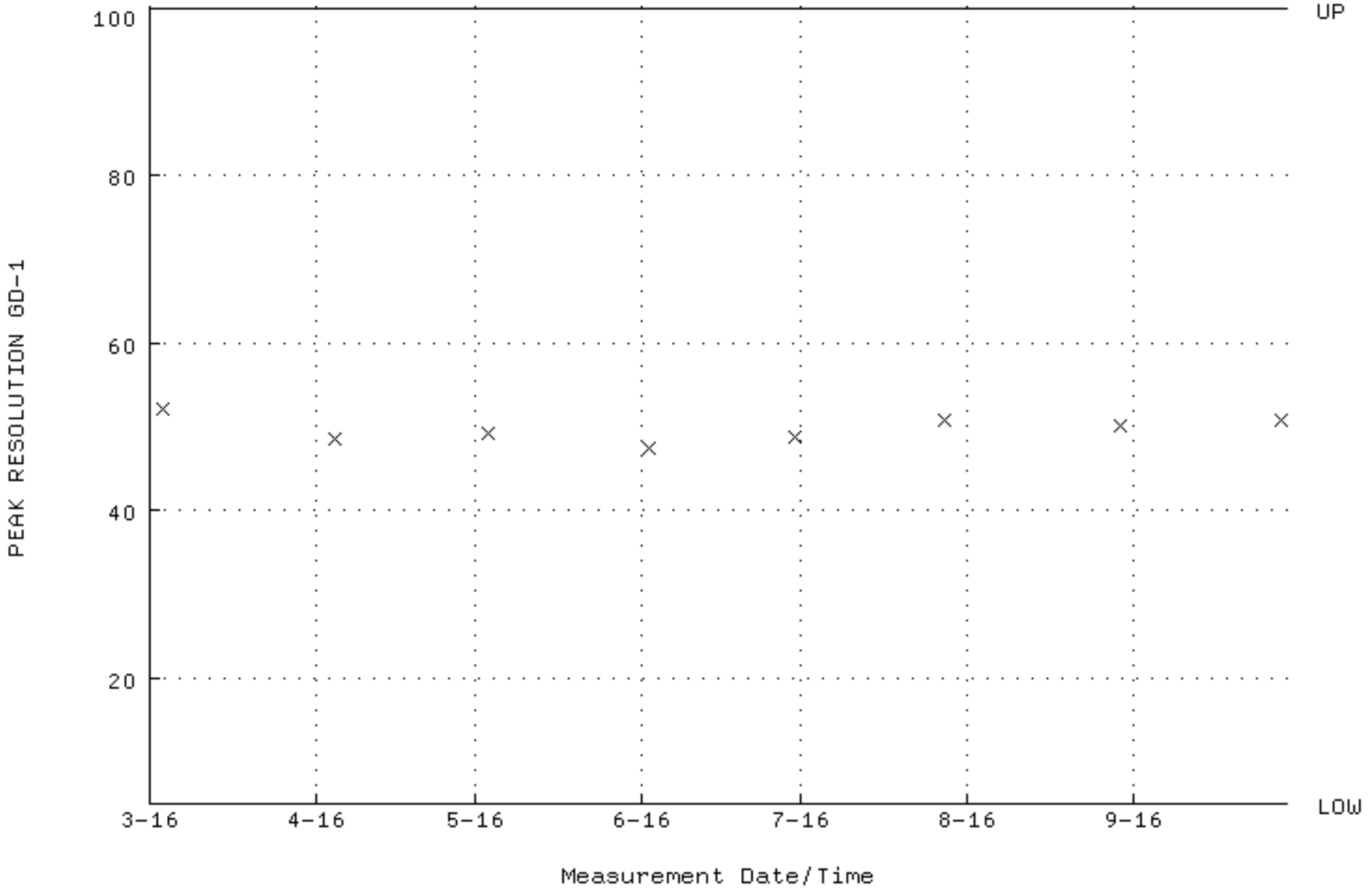
QA filename : DKA100:[ENV_ALPHA.QA.W]W033.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.314090 through 0.333520



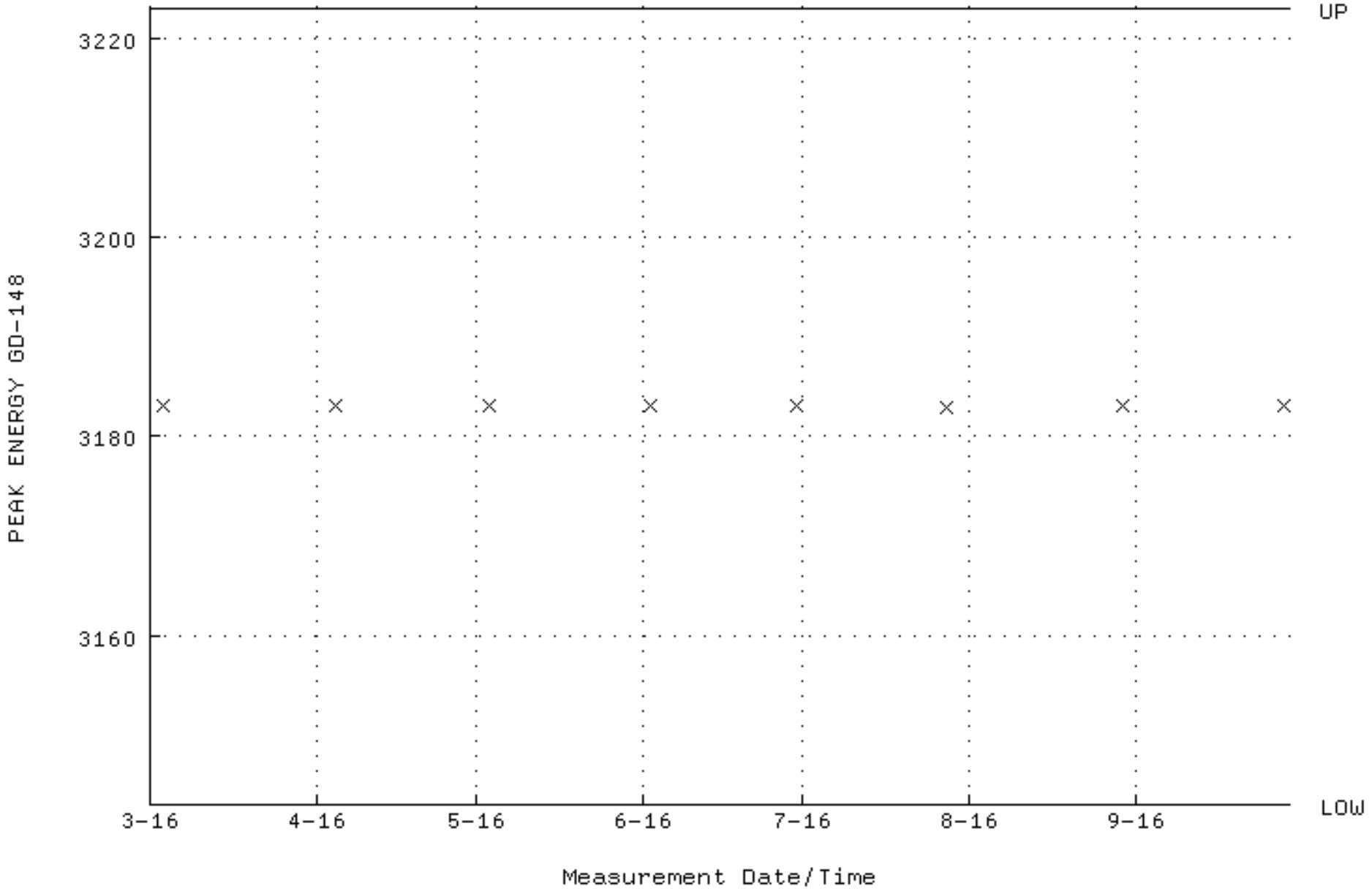
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



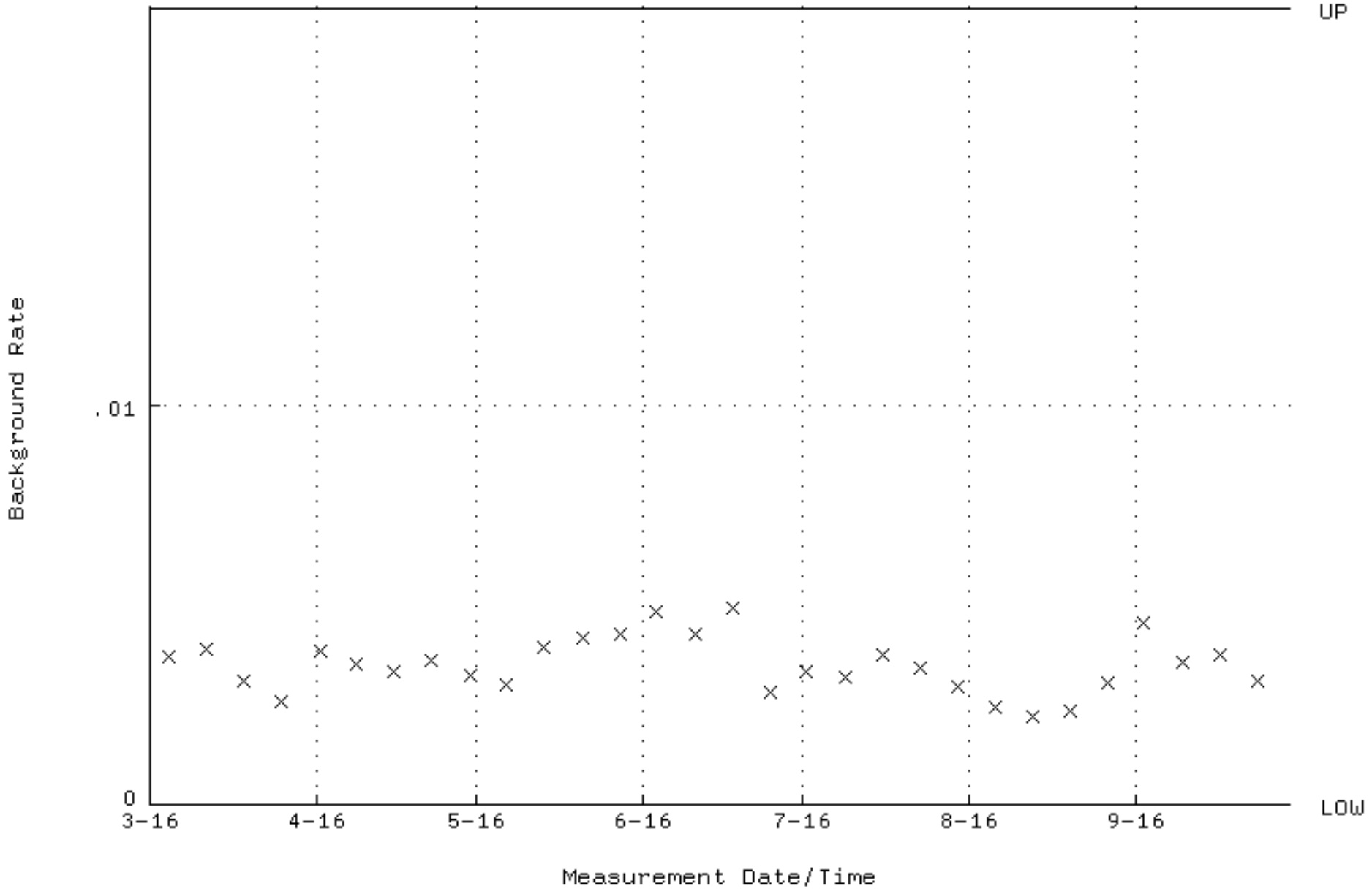
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



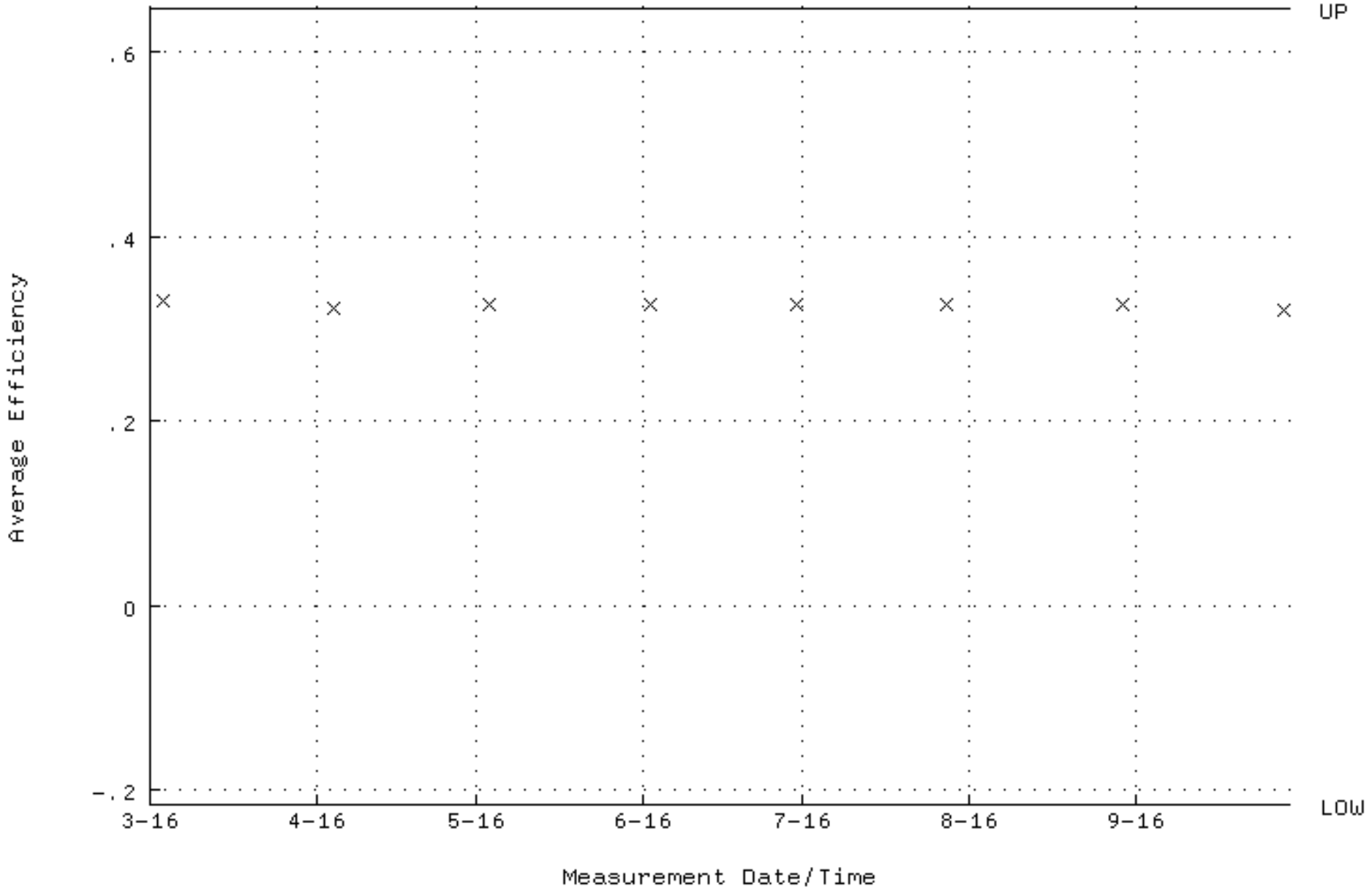
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



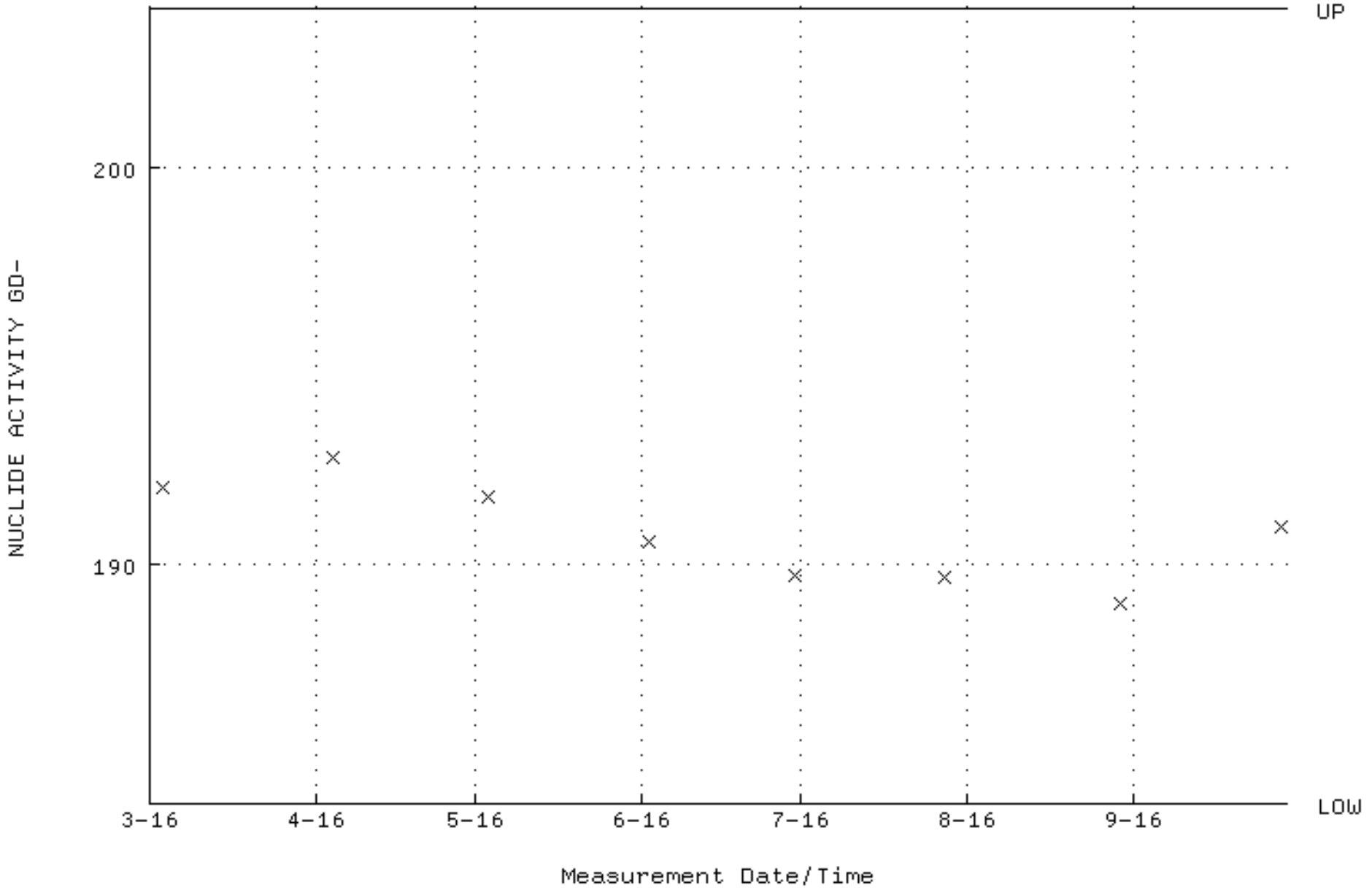
QA filename : DKA100:[ENV_ALPHA.QA.B]B033.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:34 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



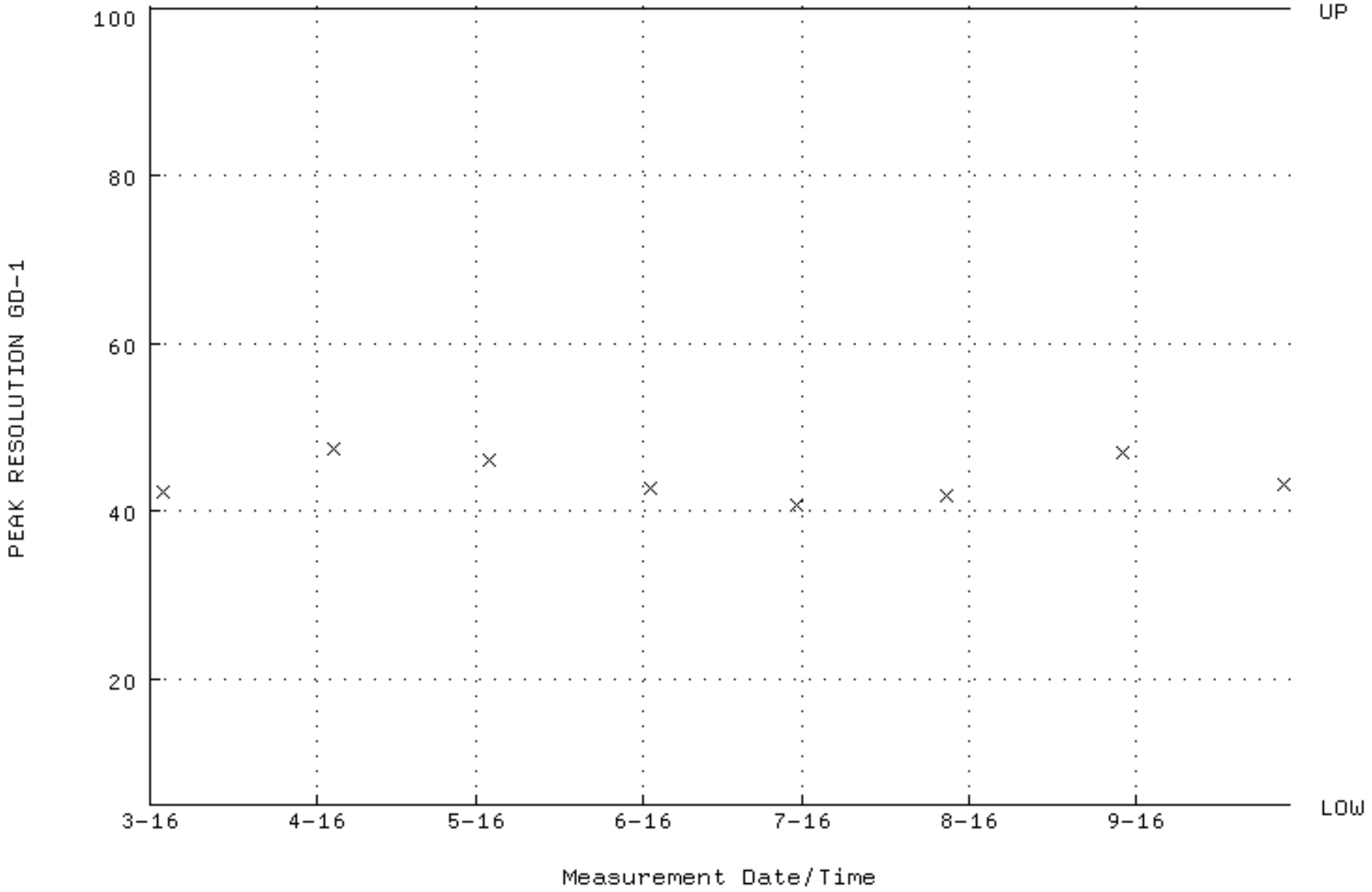
QA filename : DKA100:[ENV_ALPHA.QA.W]W034.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: -0.216325 through 0.647405



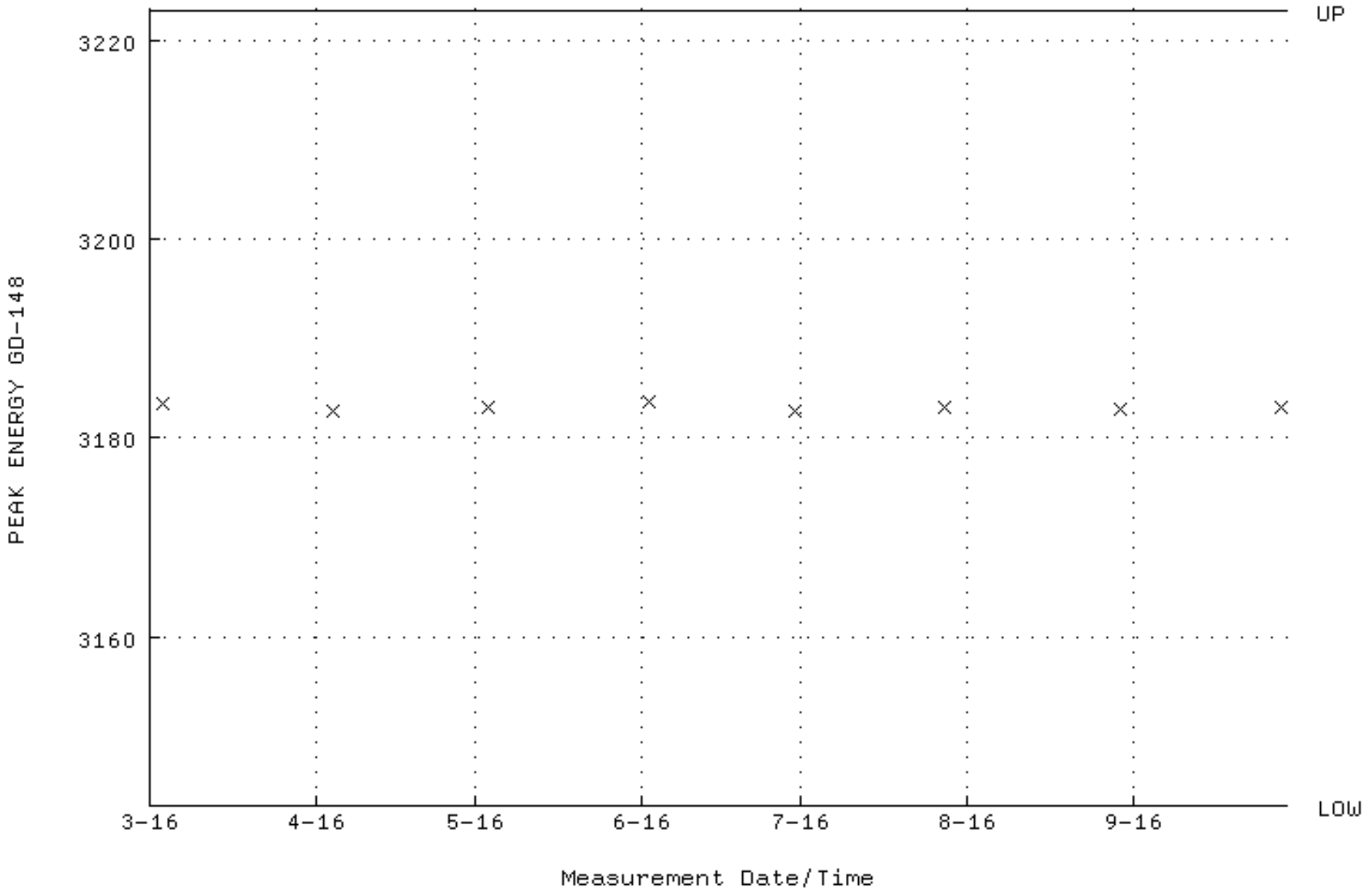
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



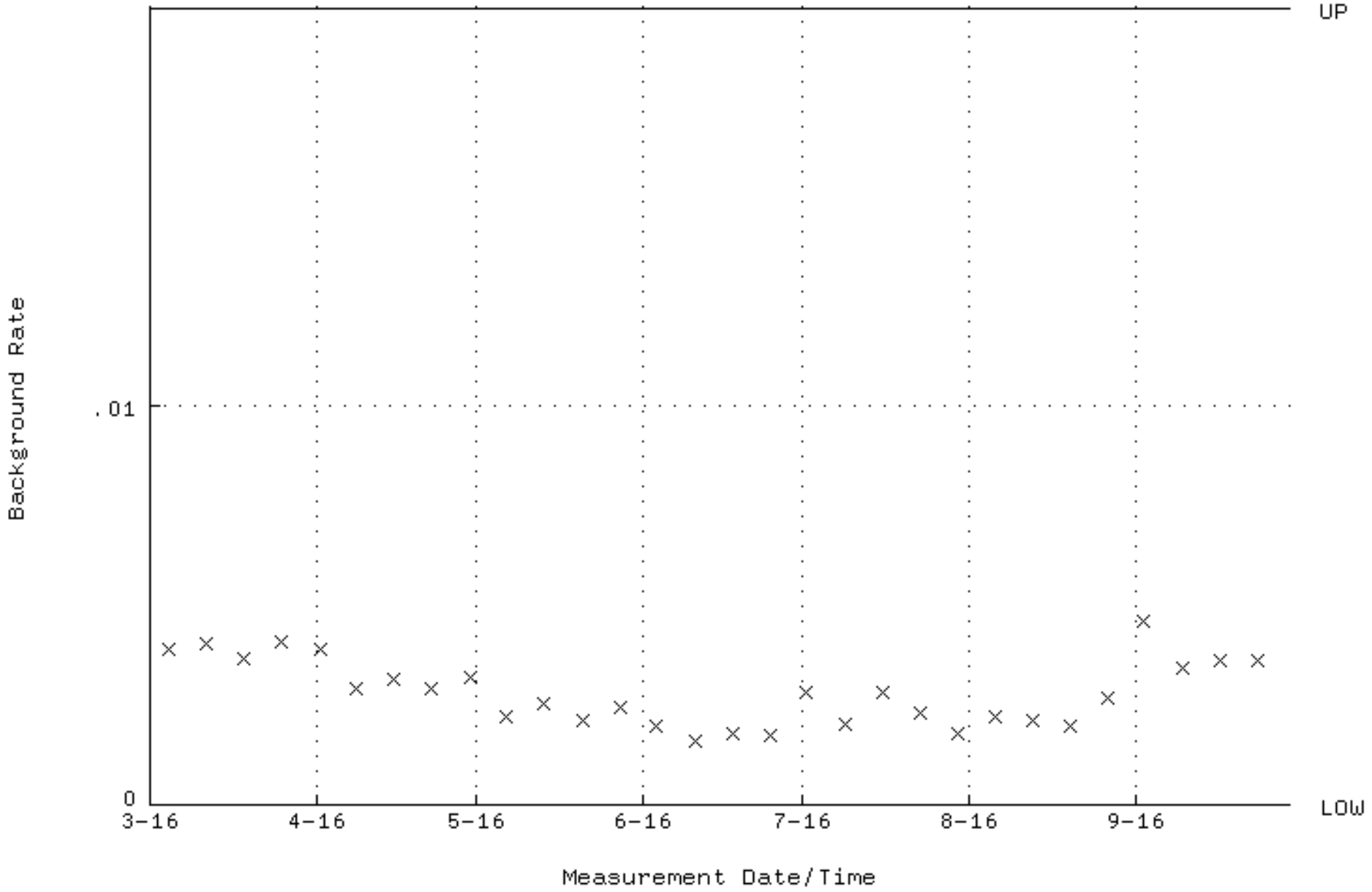
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



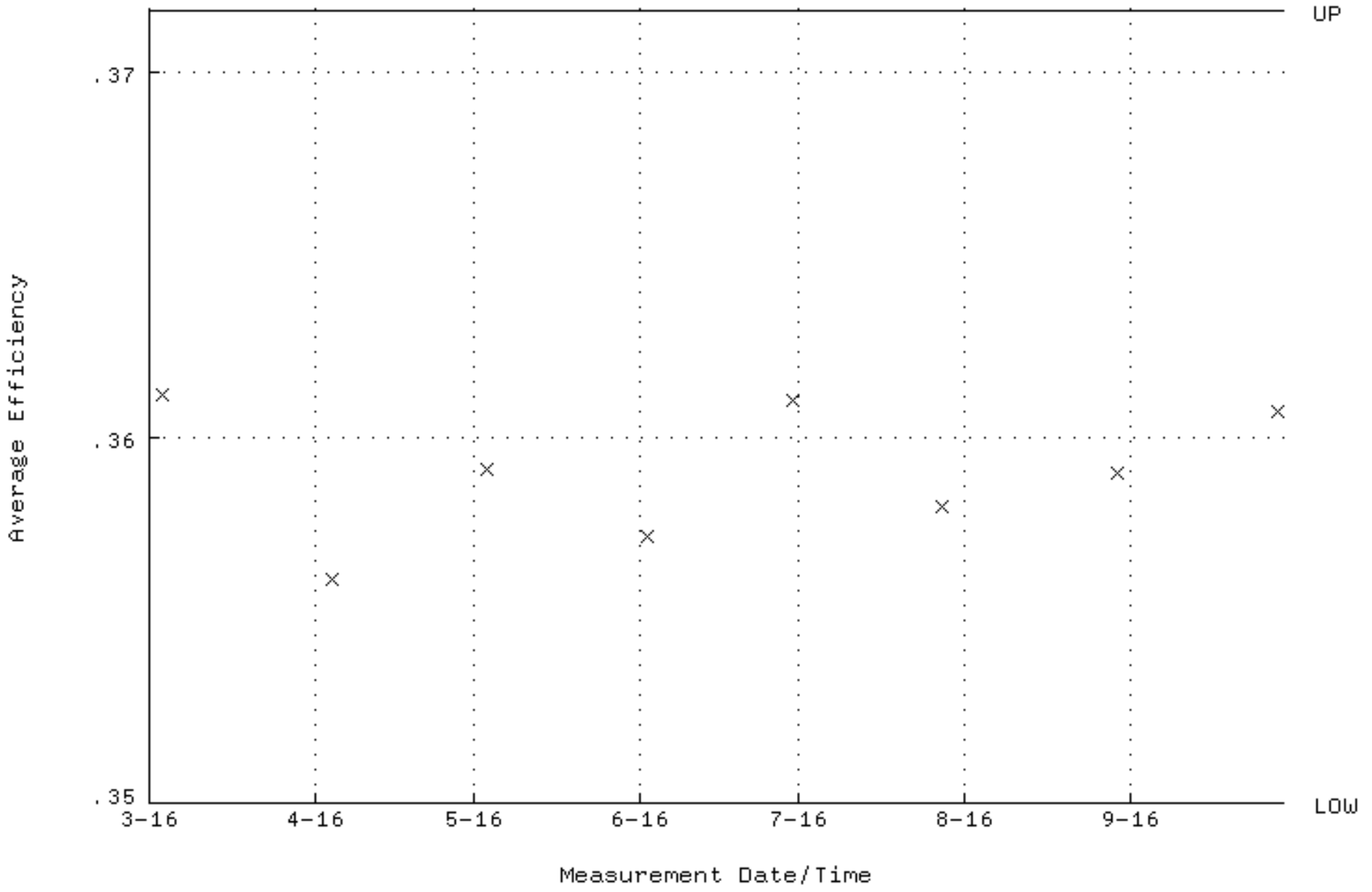
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:46 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



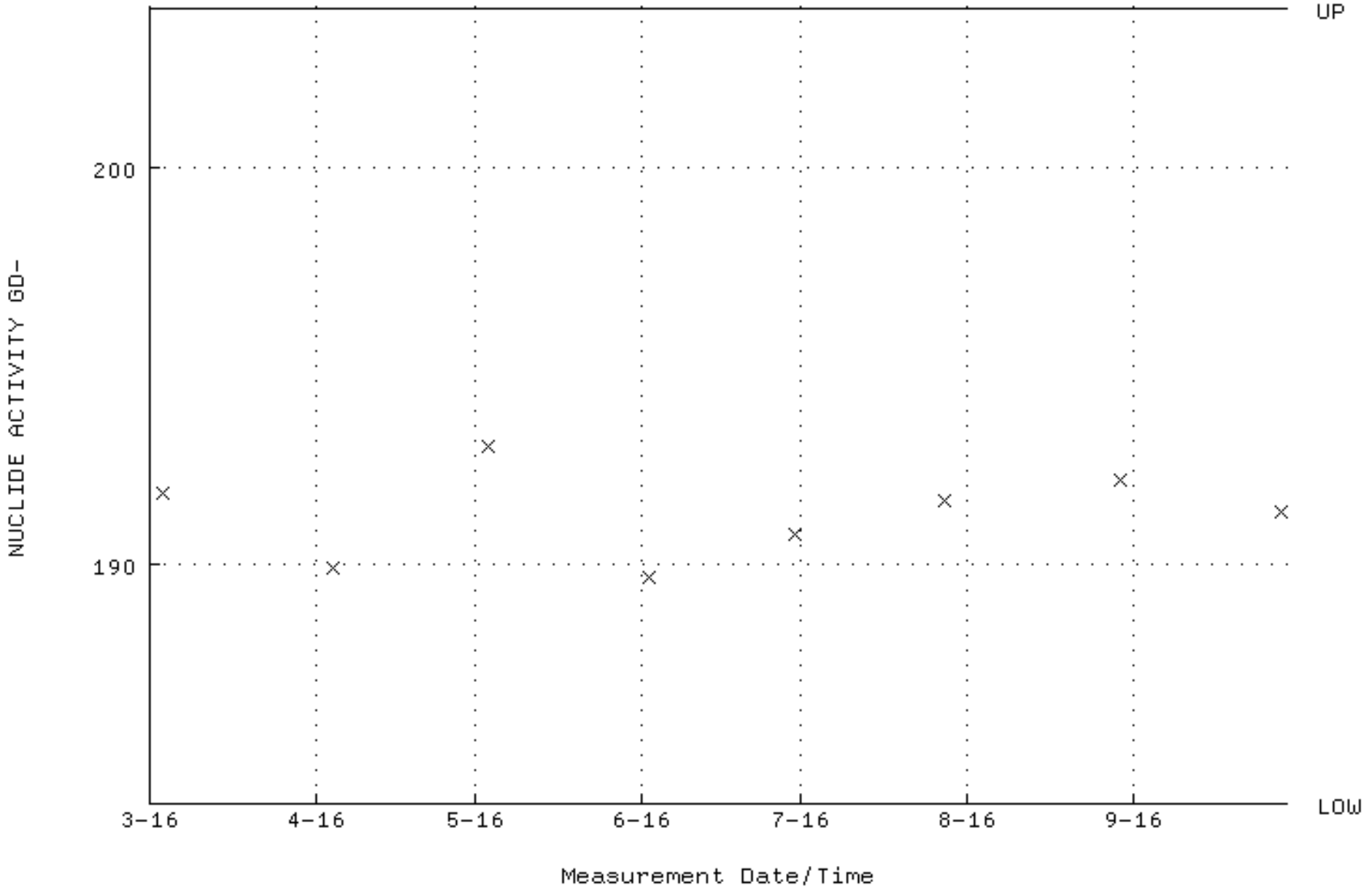
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:34 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



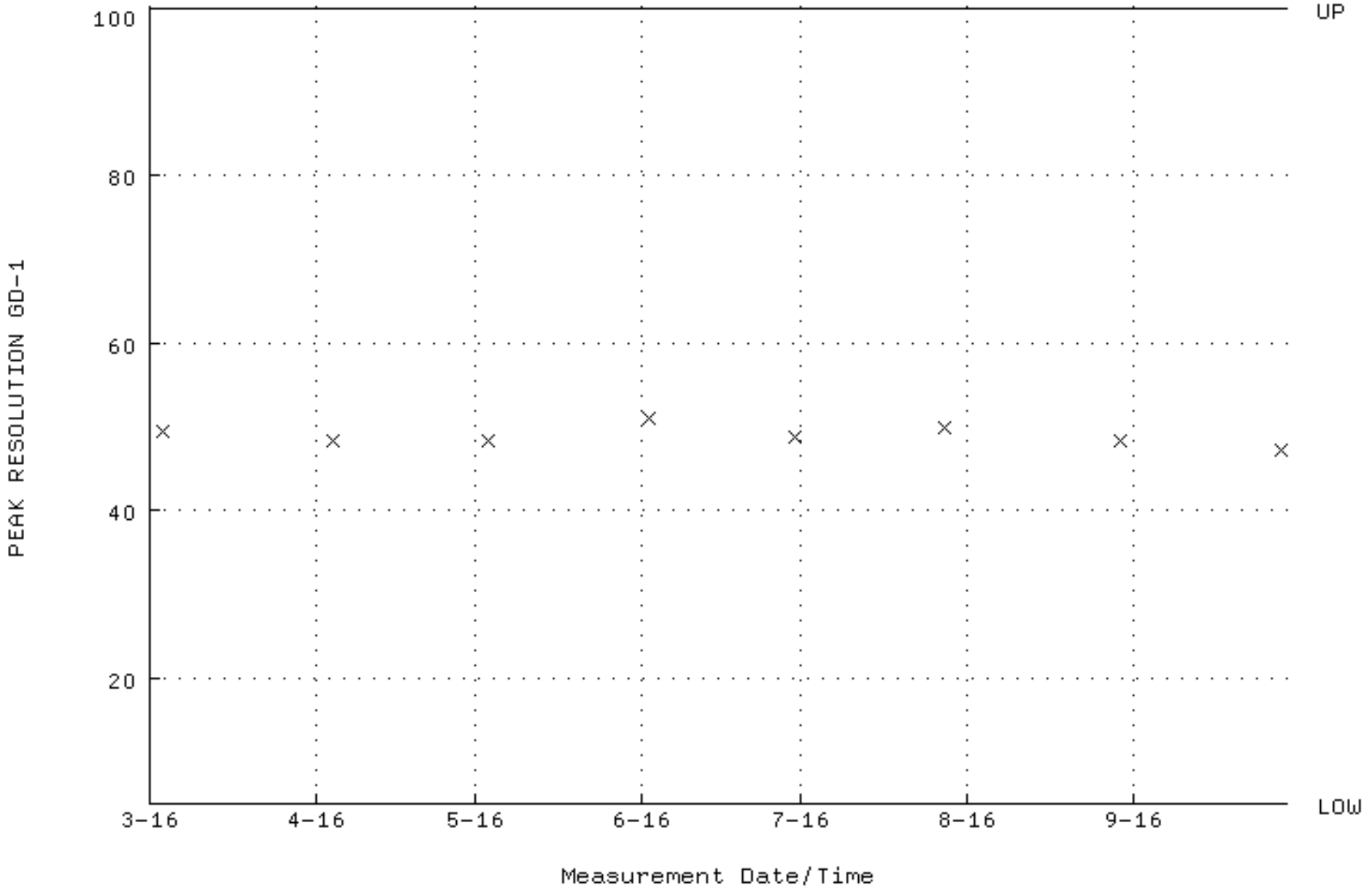
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.350000 through 0.371670



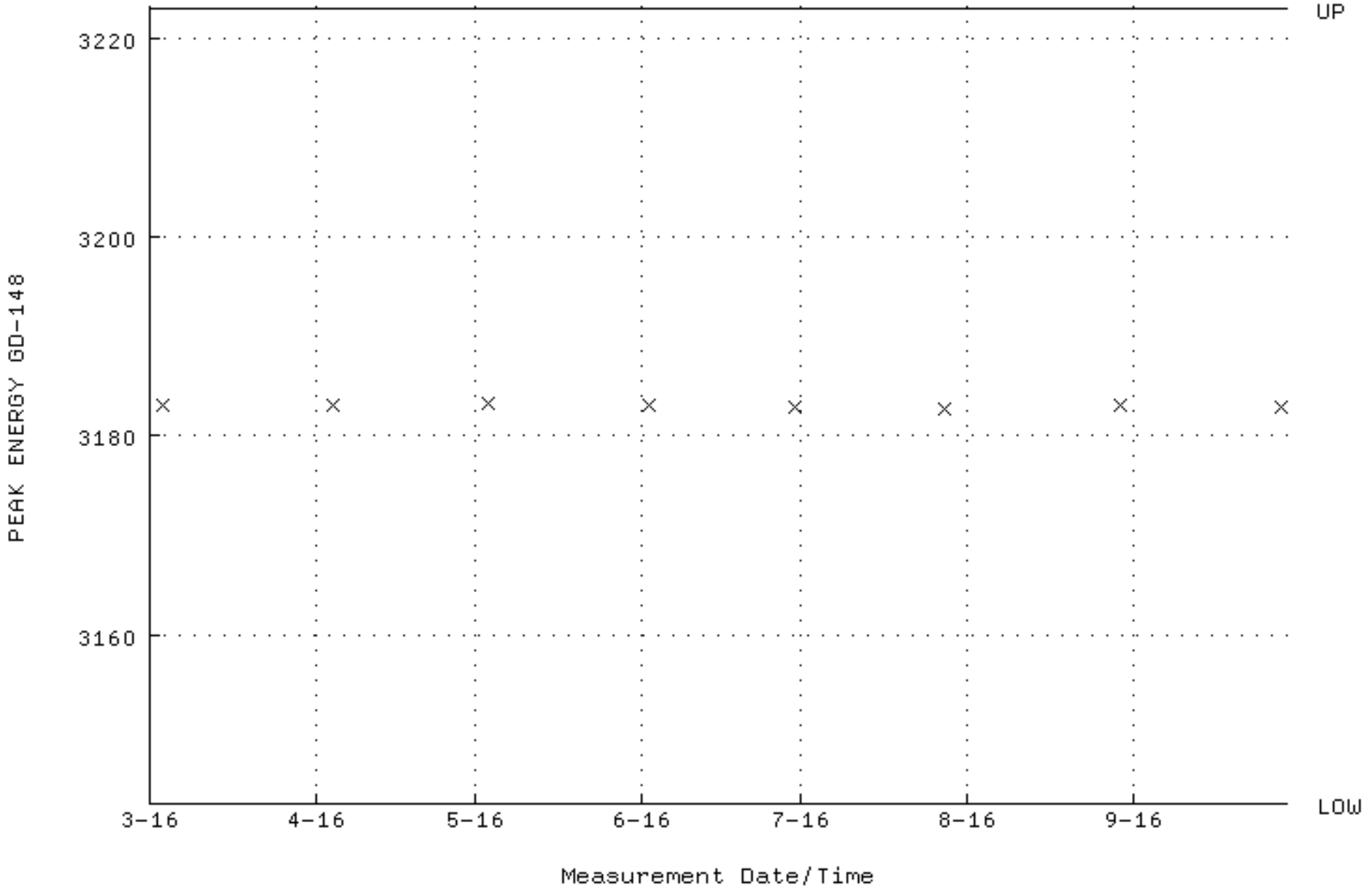
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



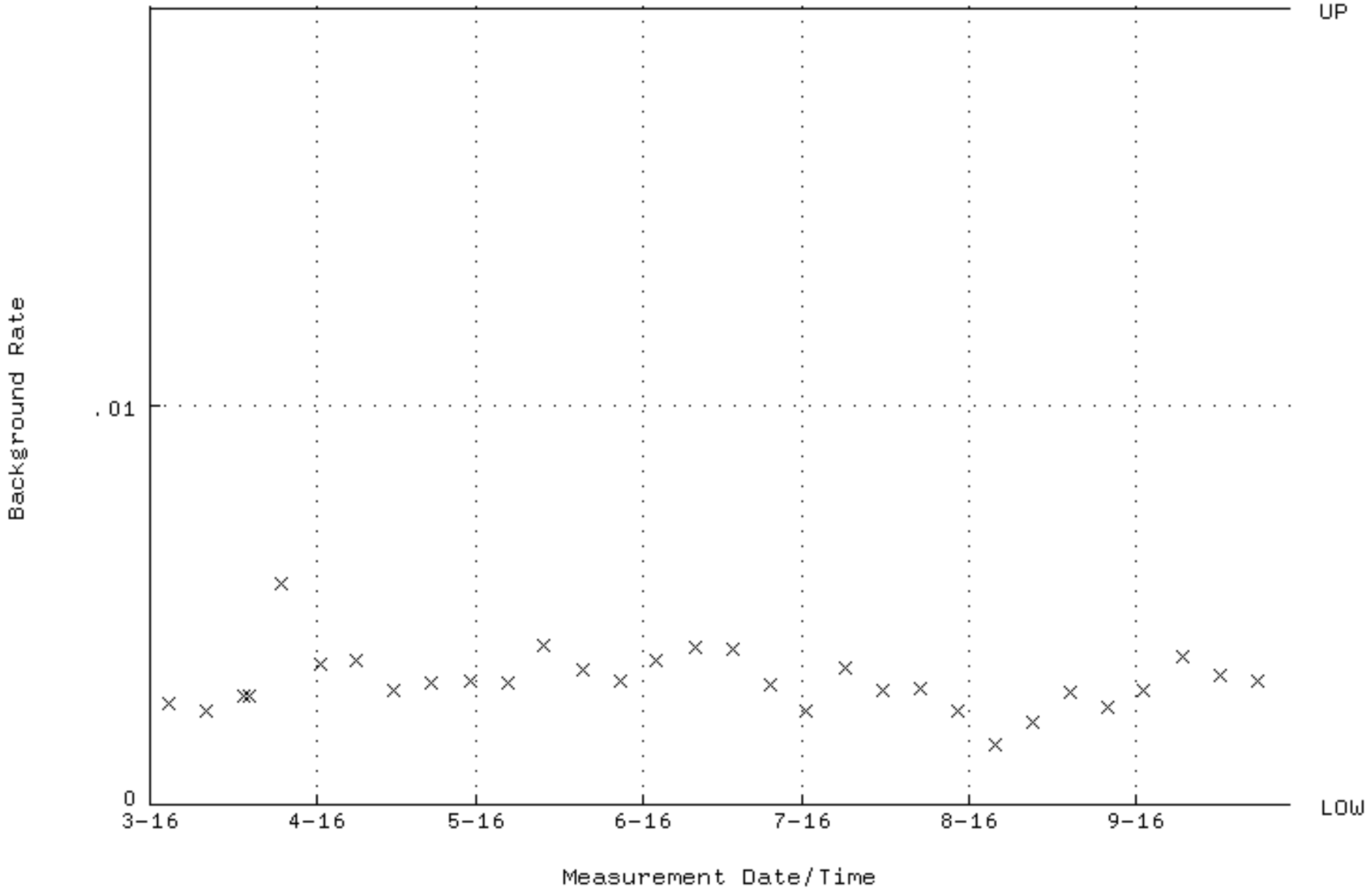
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



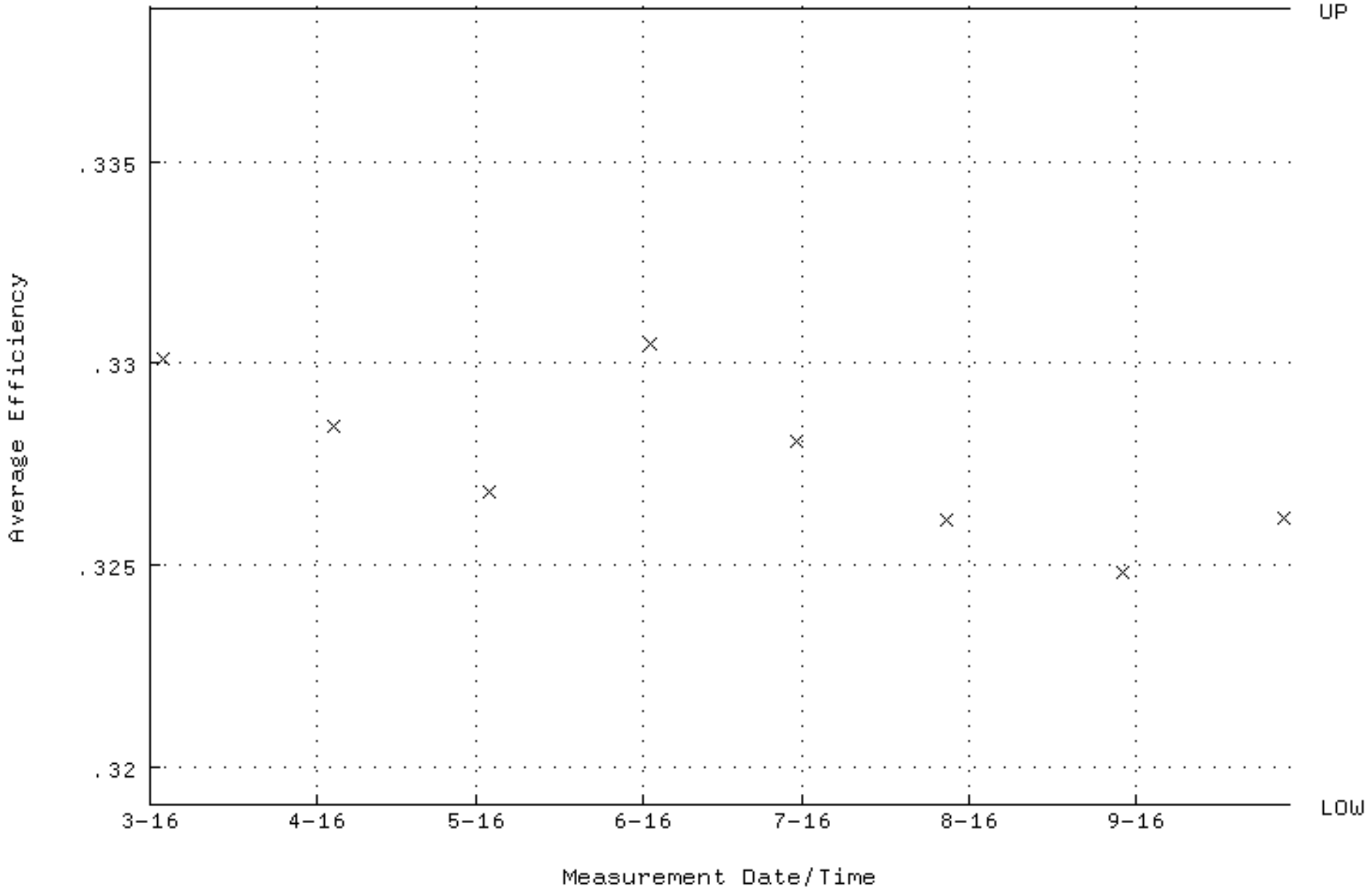
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



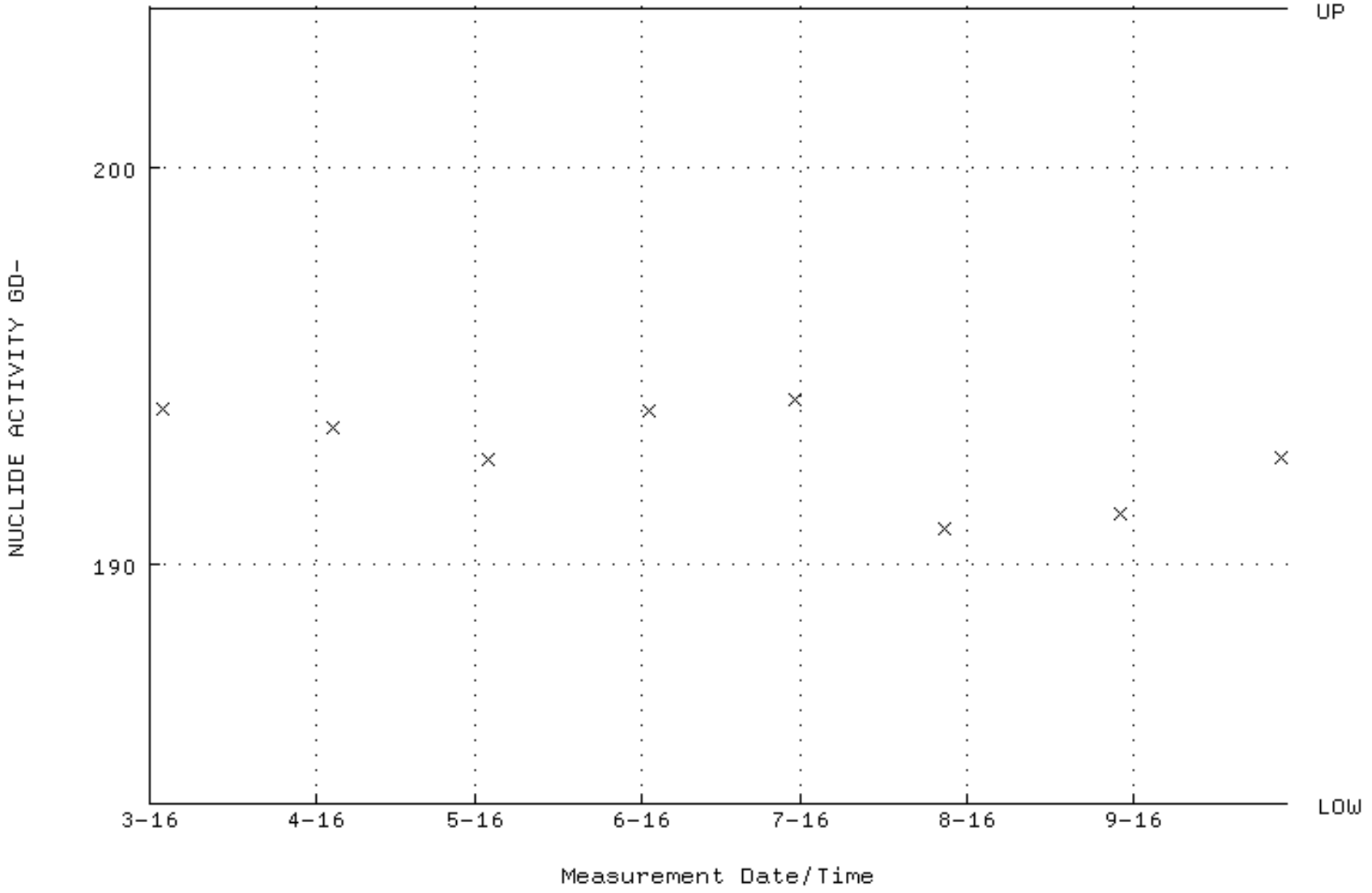
QA filename : DKA100:[ENV_ALPHA.QA.B]B038.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:42 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



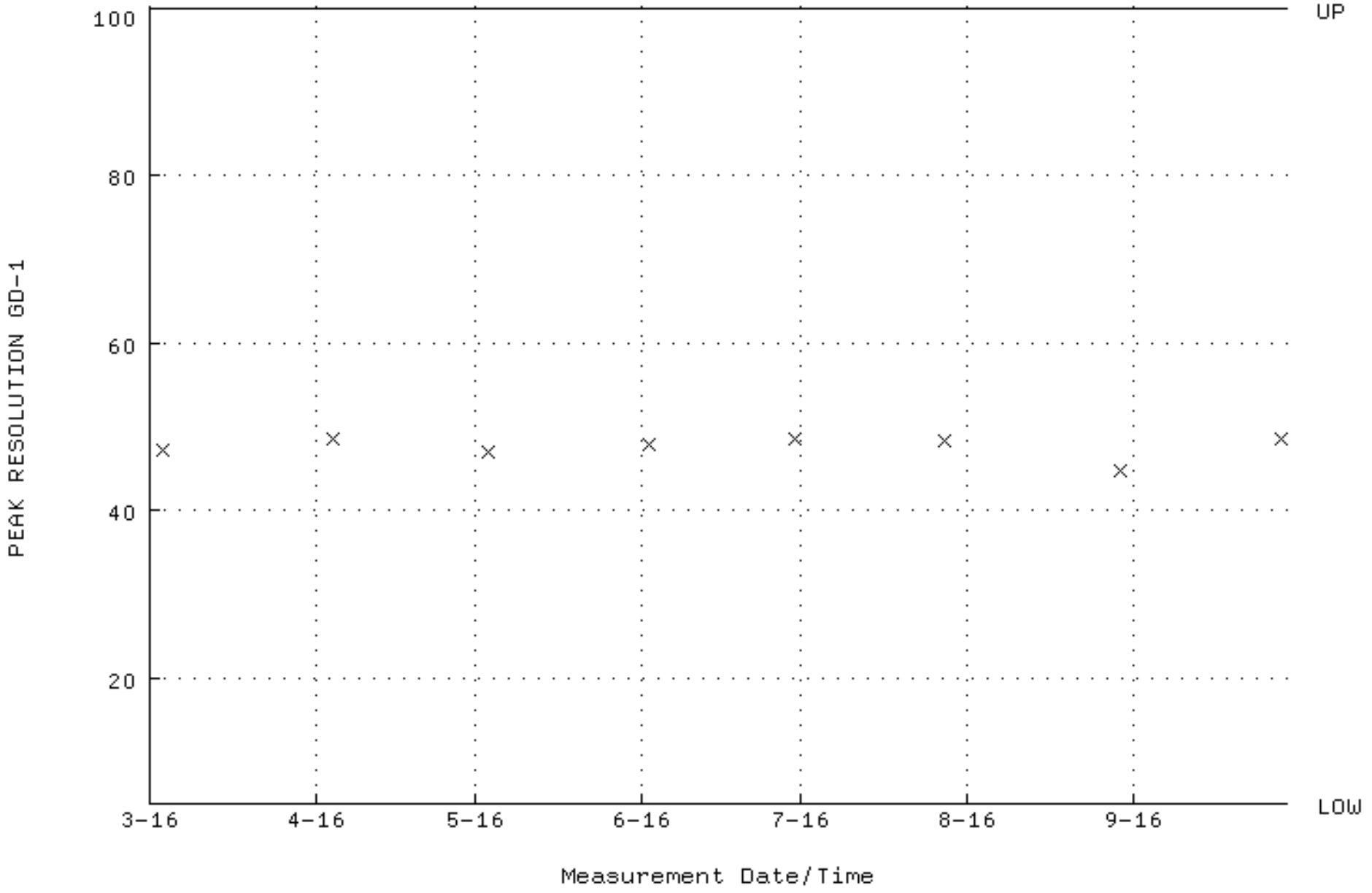
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.319060 through 0.338800



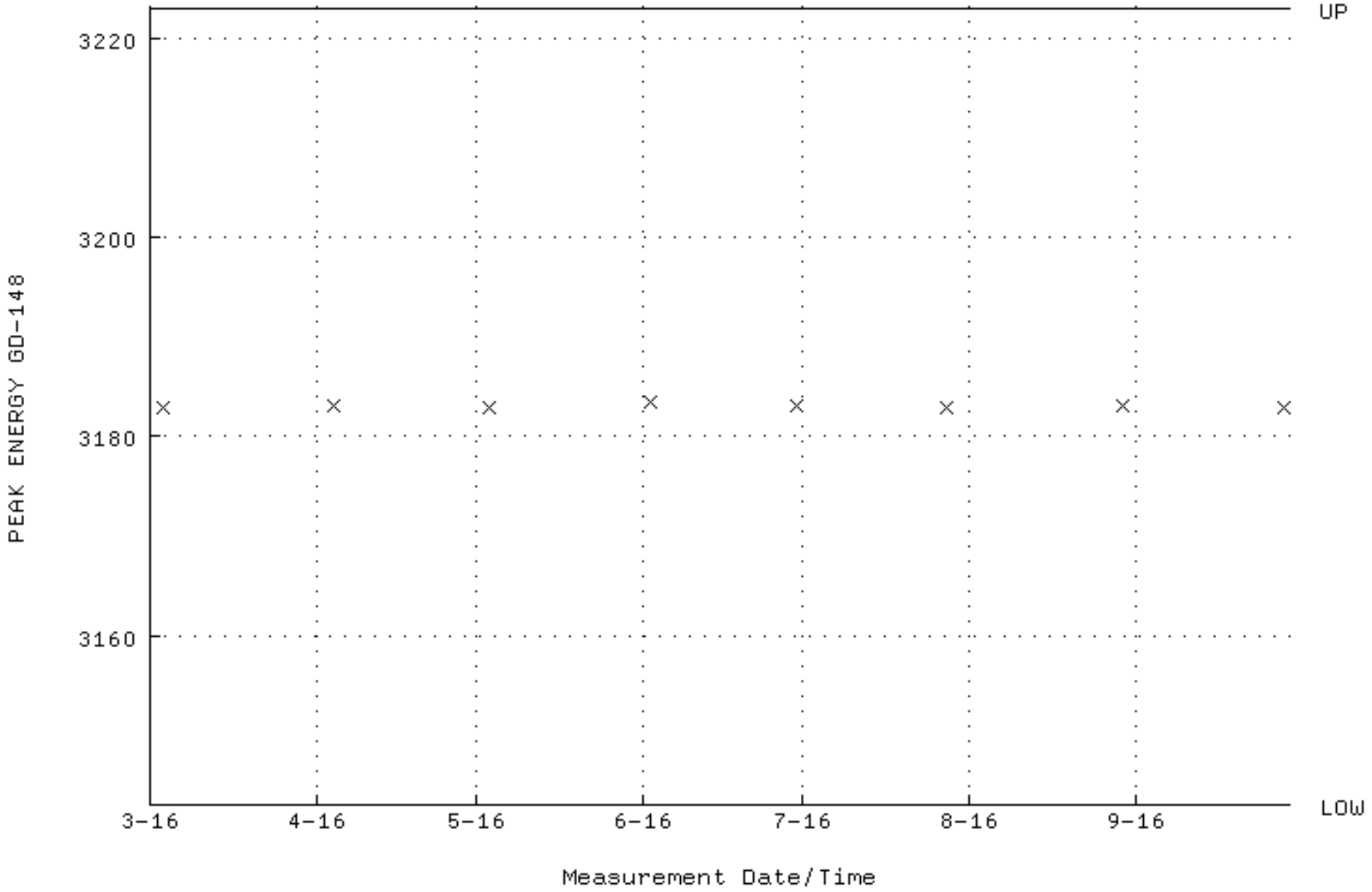
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



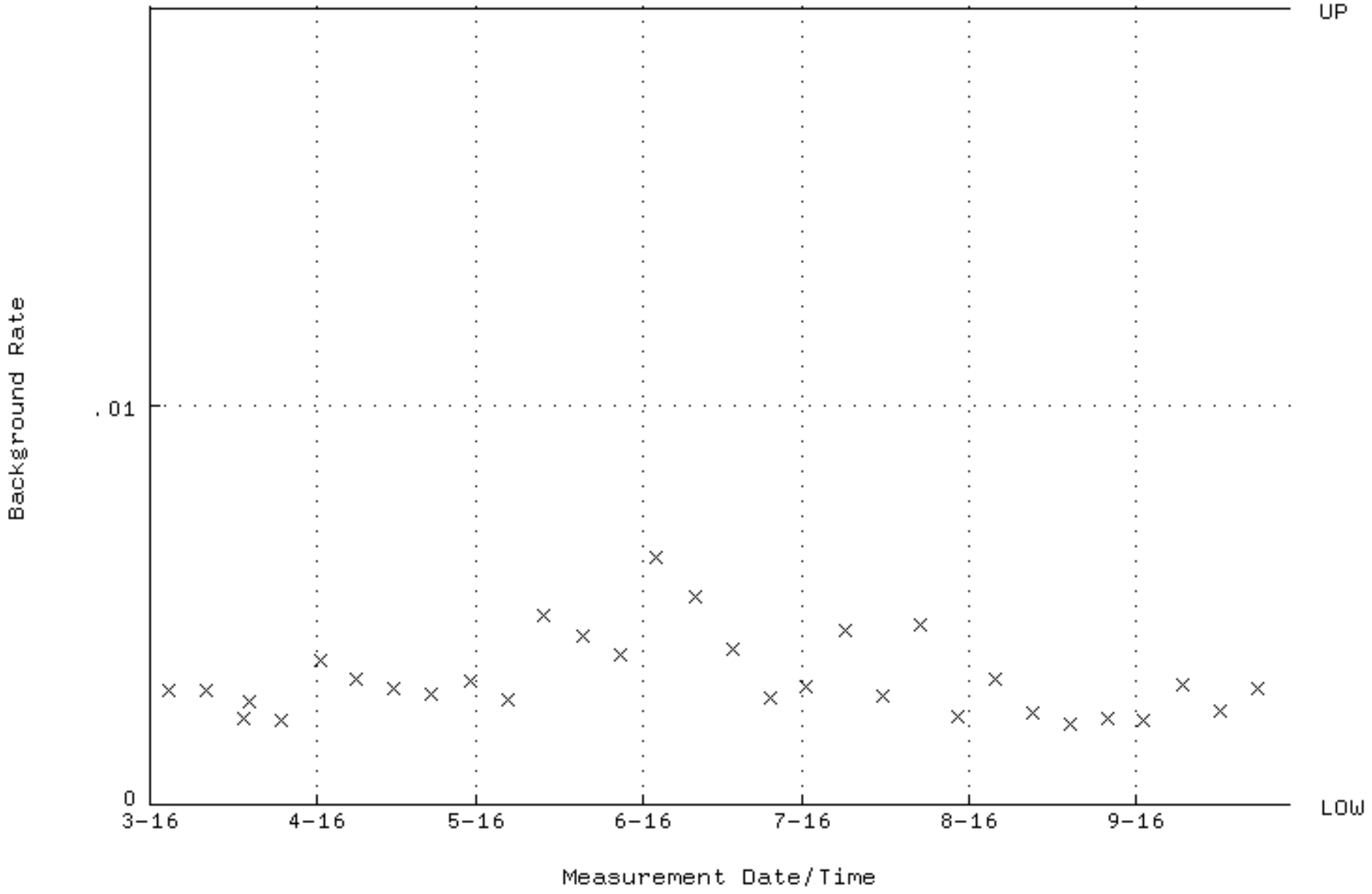
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



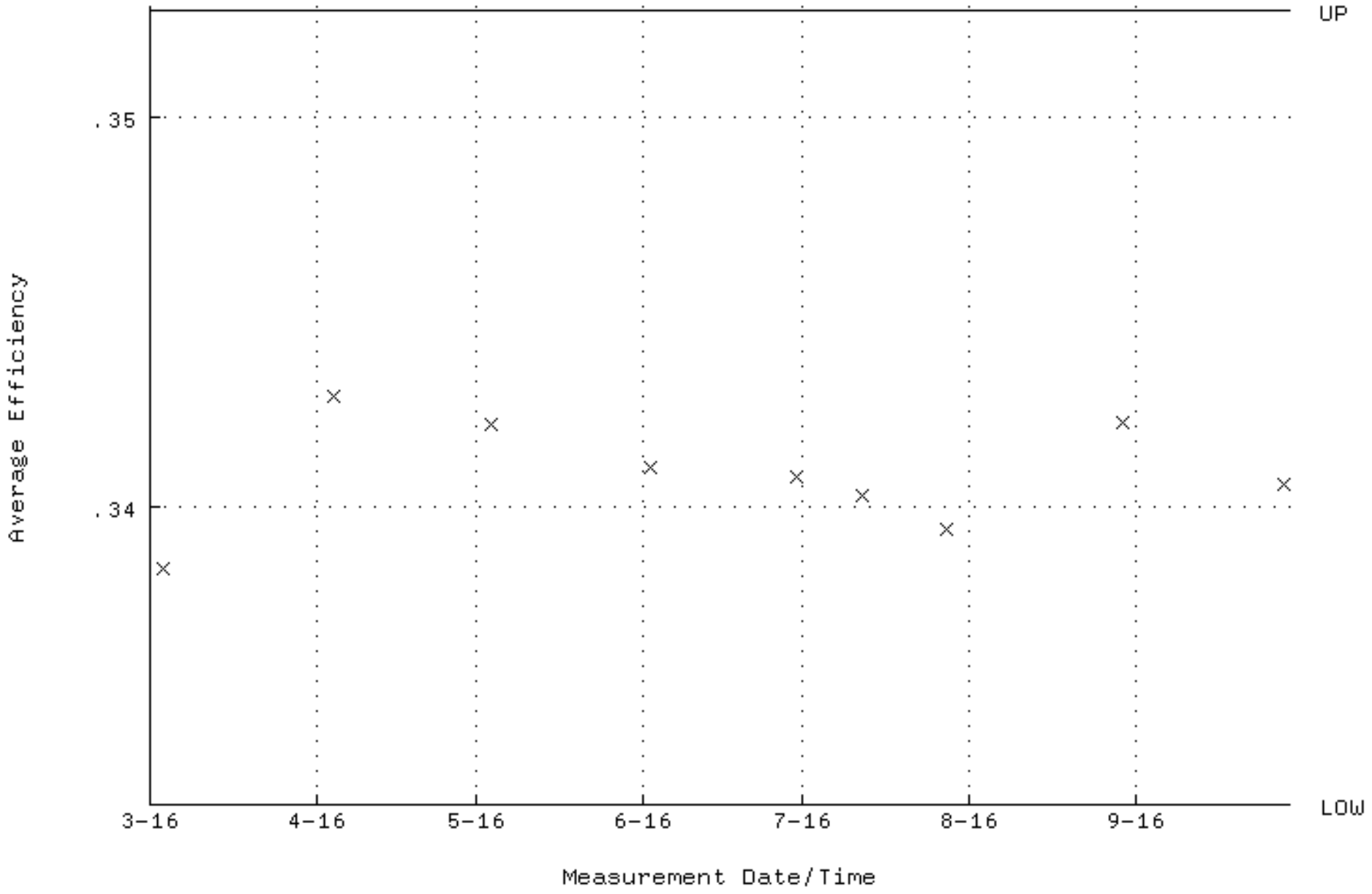
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



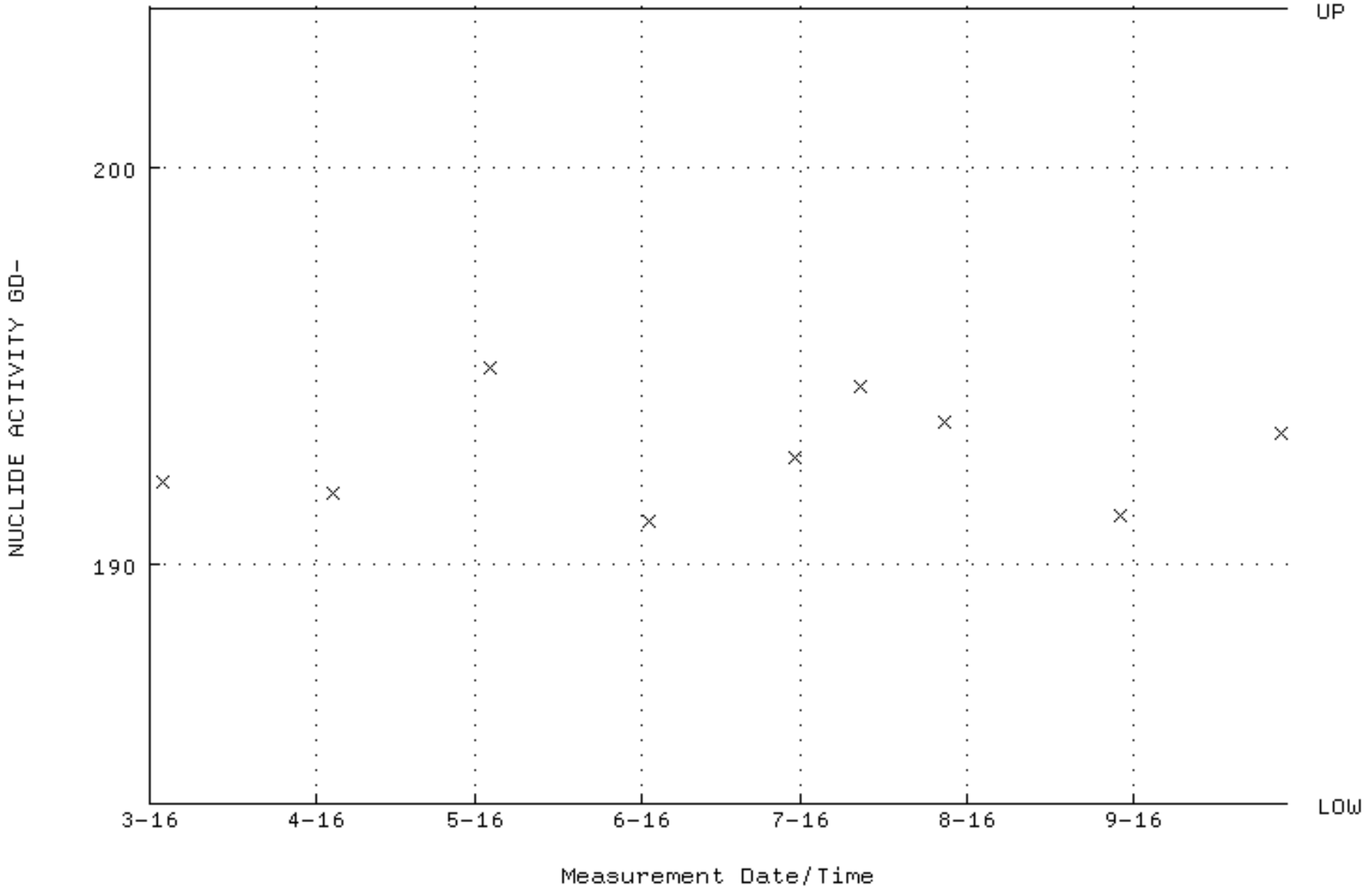
QA filename : DKA100:[ENV_ALPHA.QA.B]B040.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:42 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



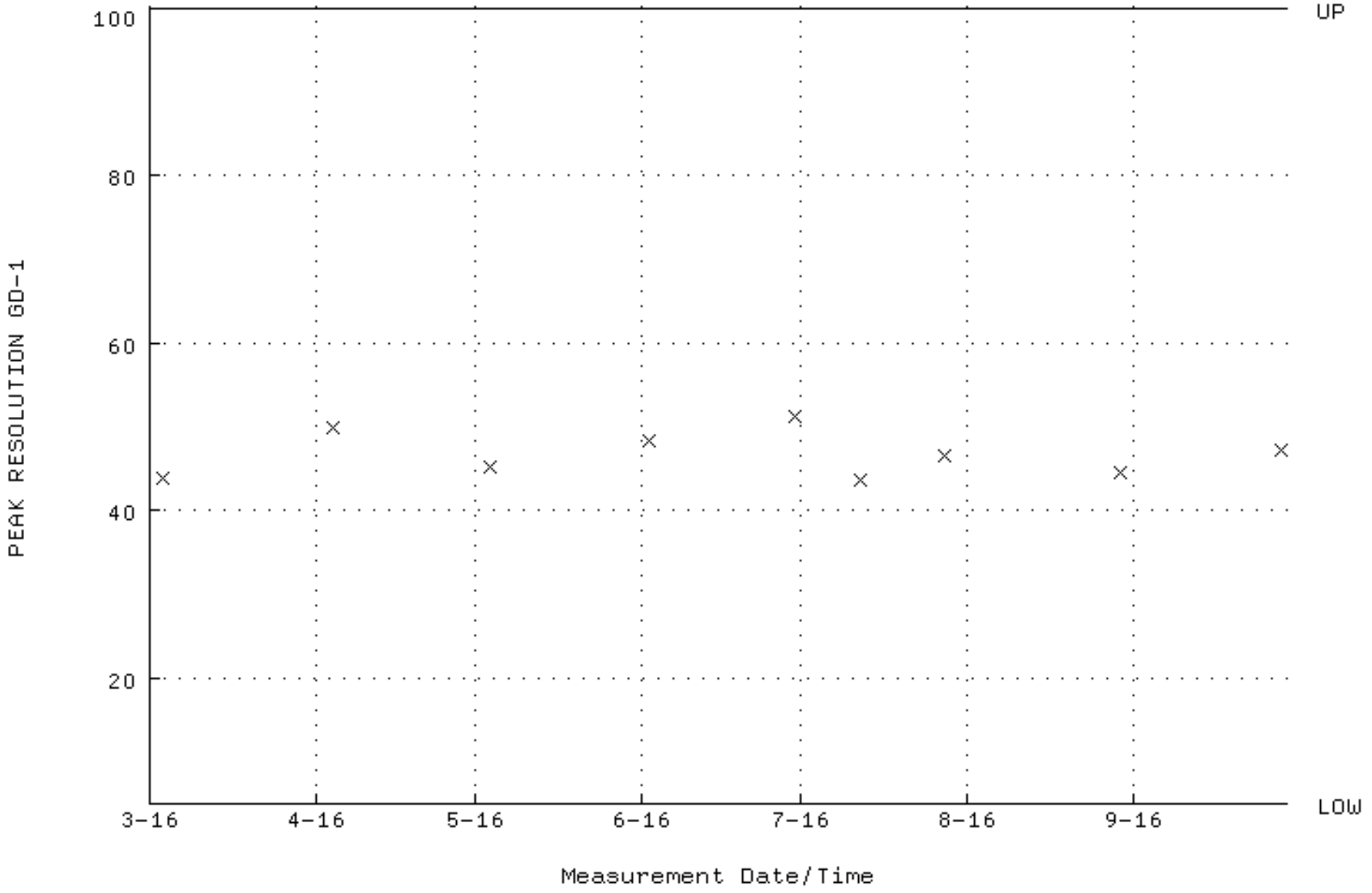
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.332337 through 0.352787



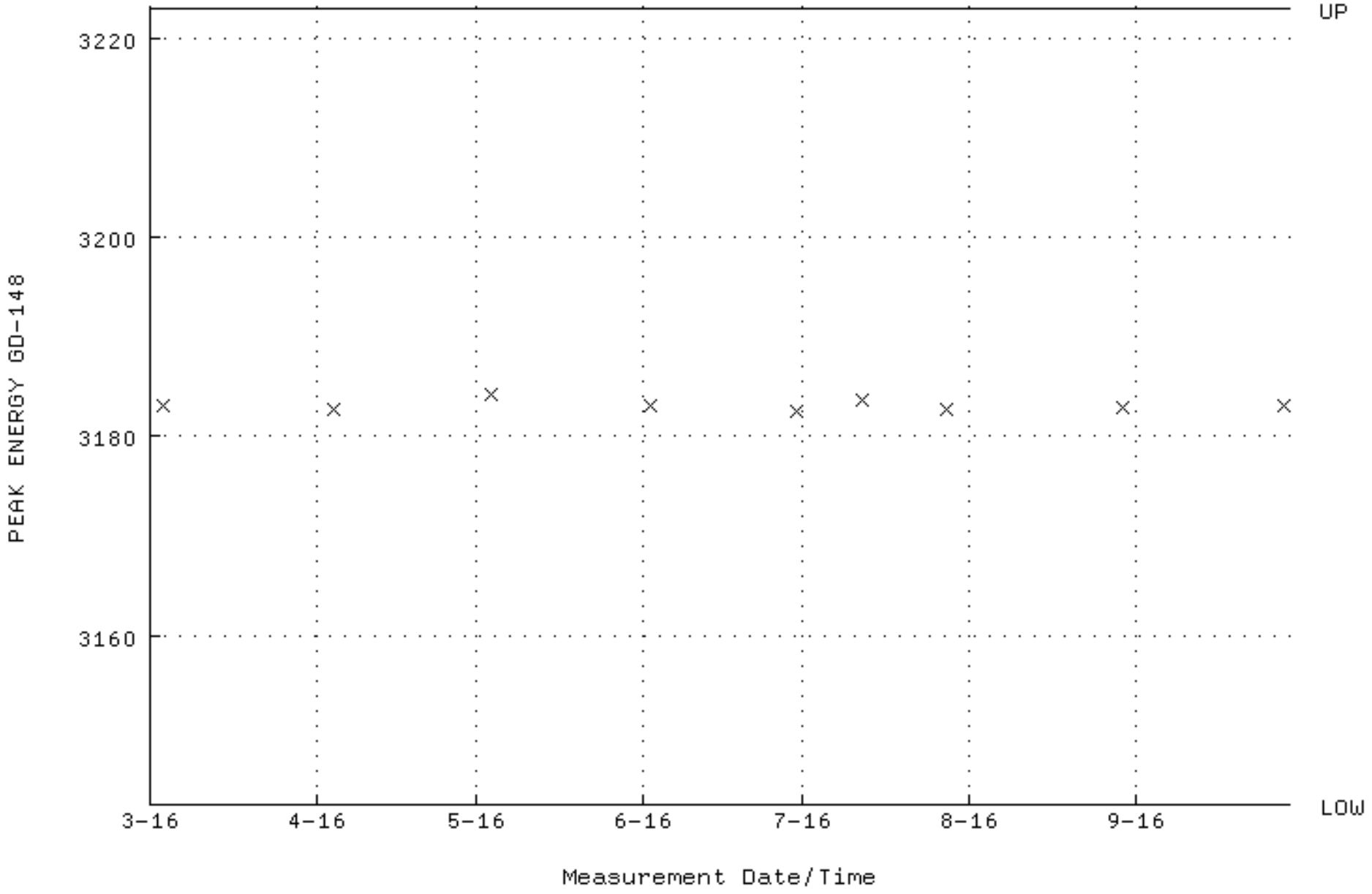
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



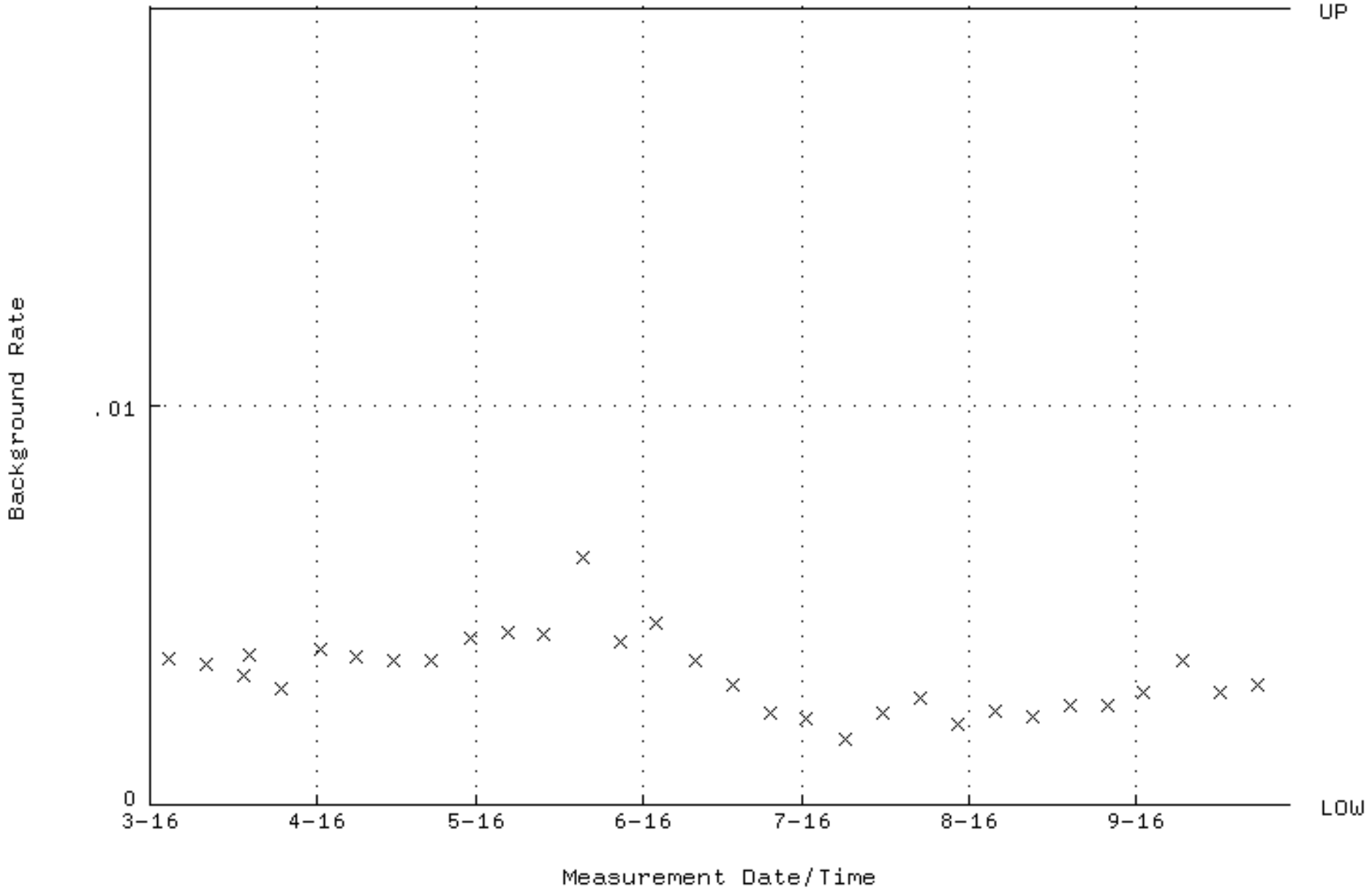
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



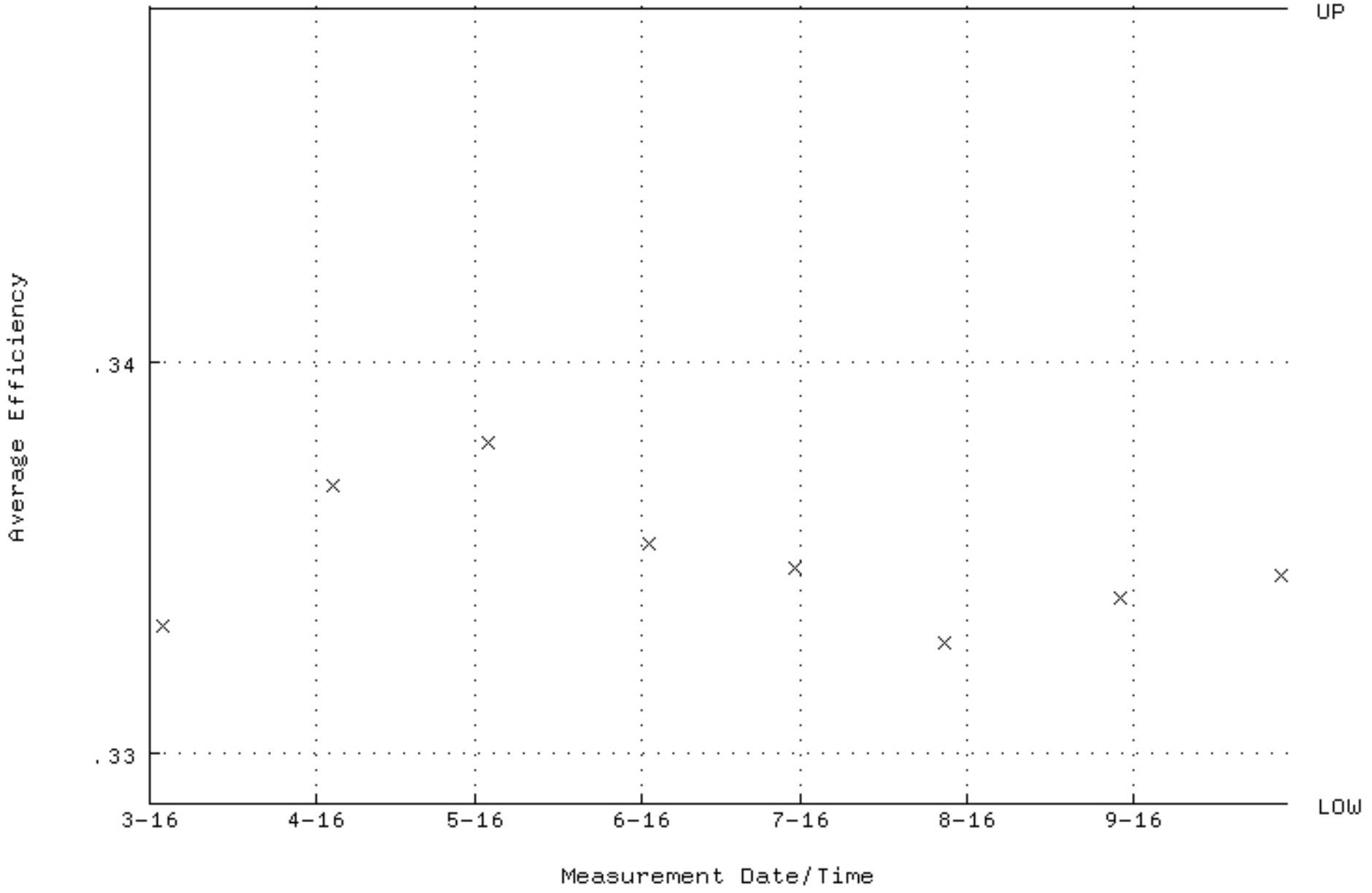
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



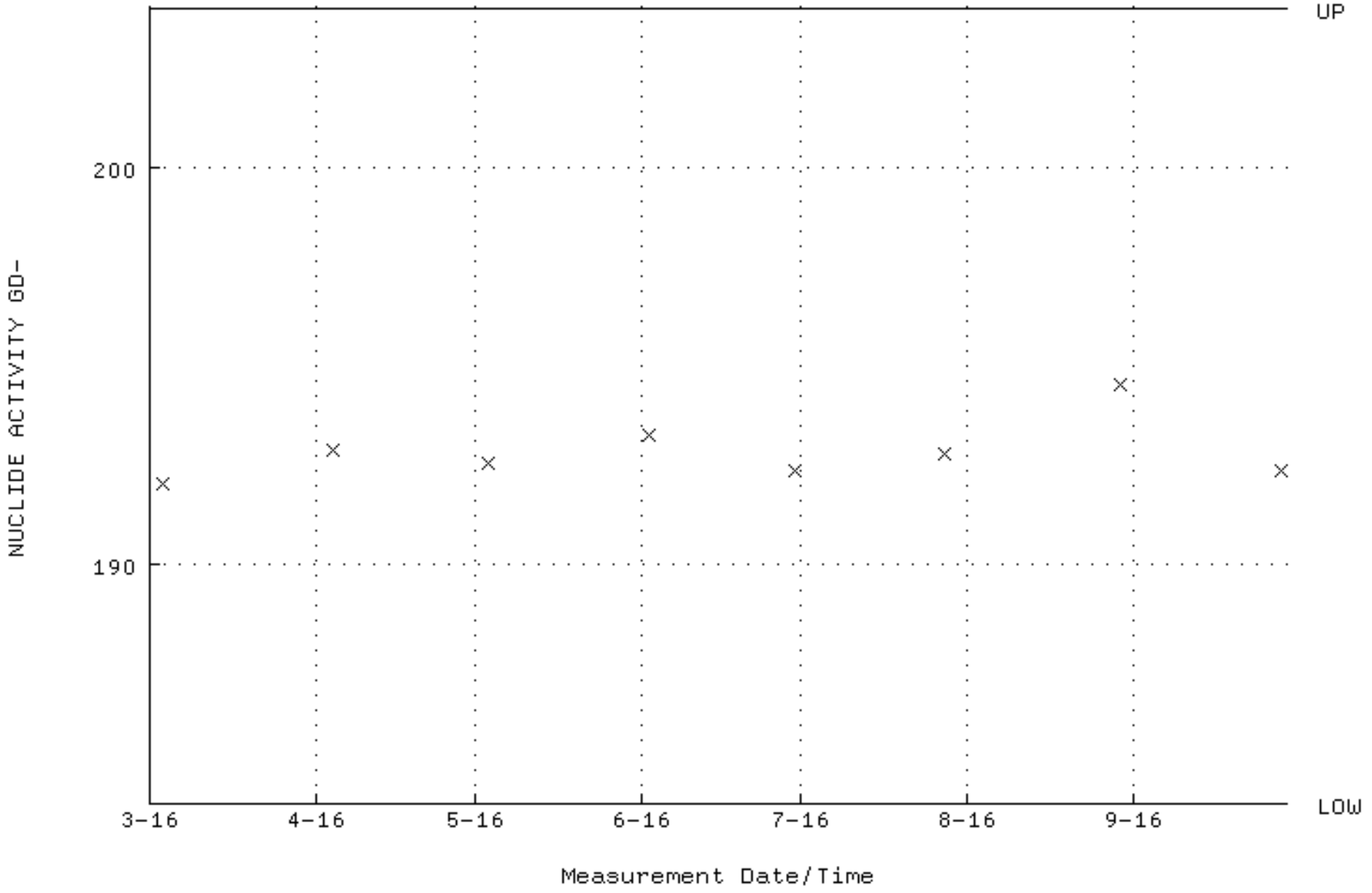
QA filename : DKA100:[ENV_ALPHA.QA.B]B041.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:42 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



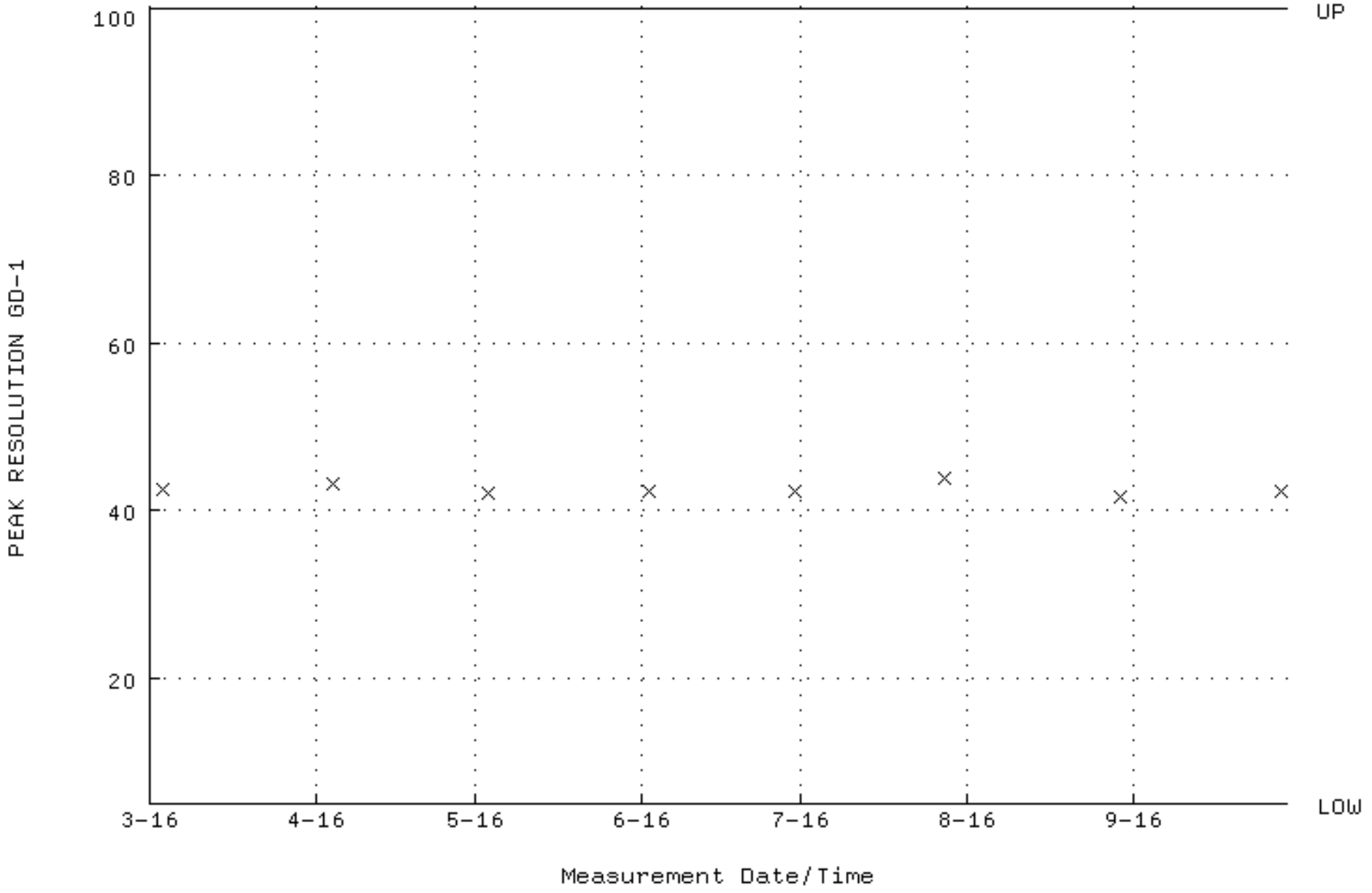
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.328730 through 0.349060



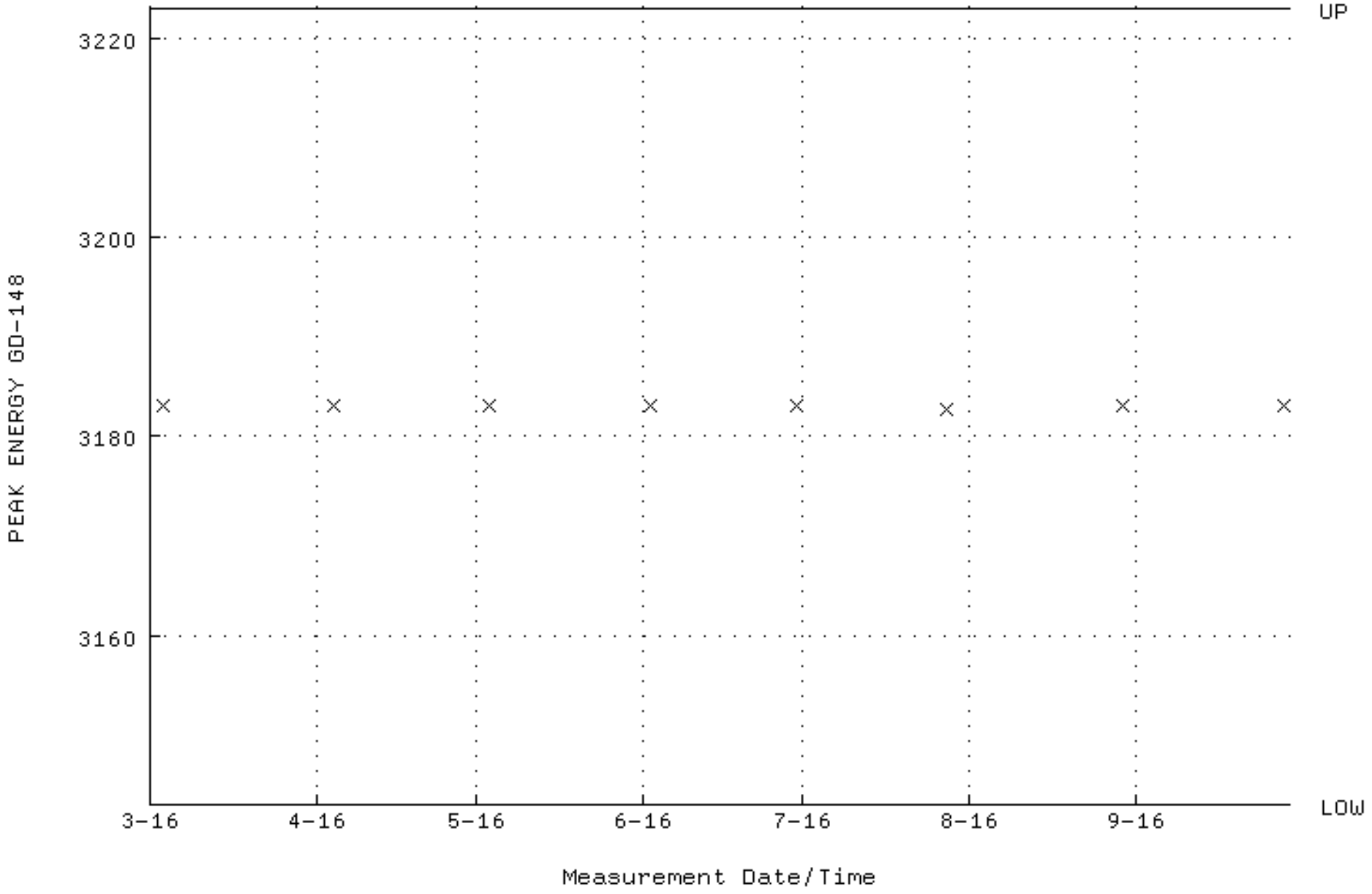
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



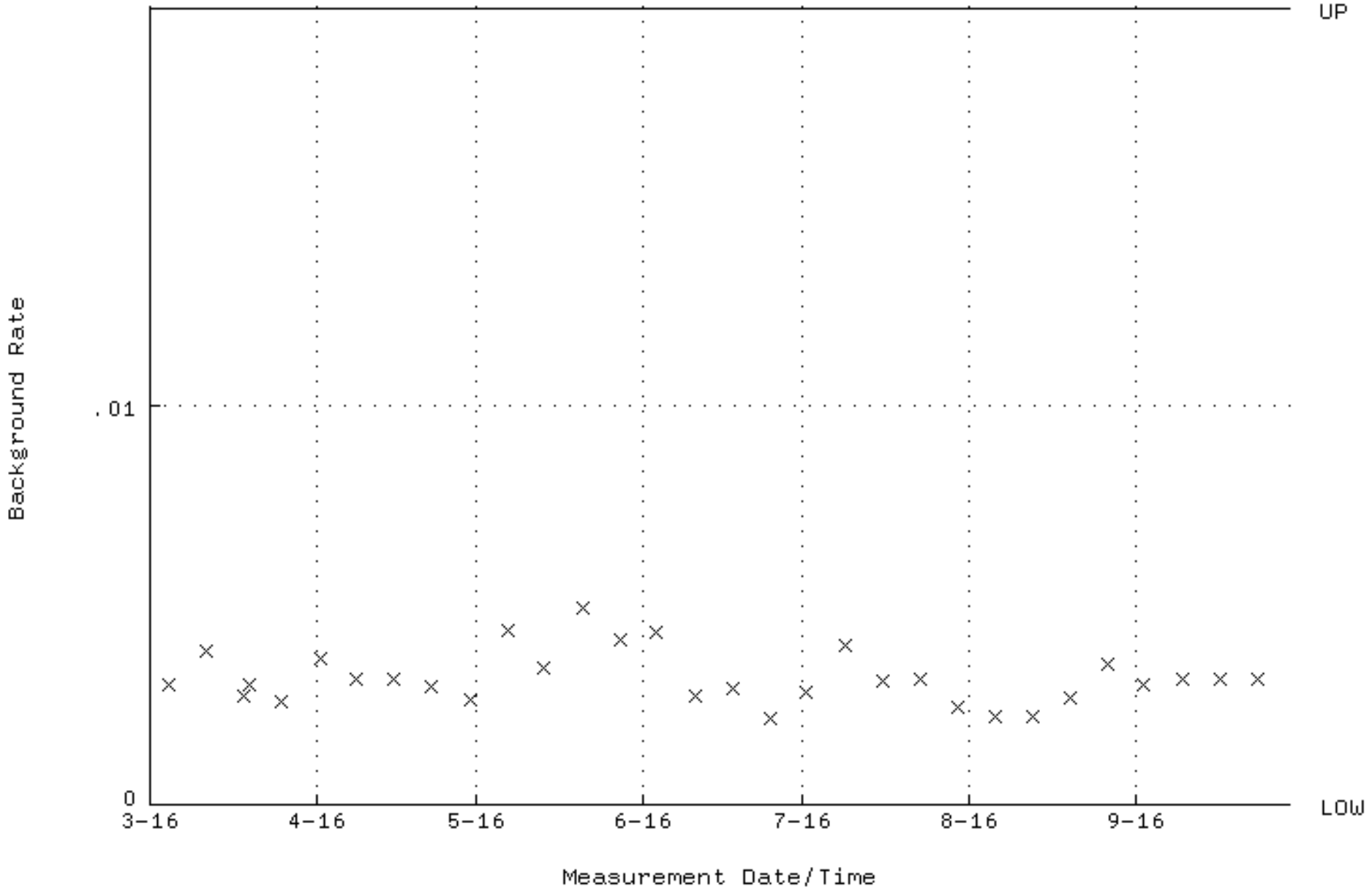
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



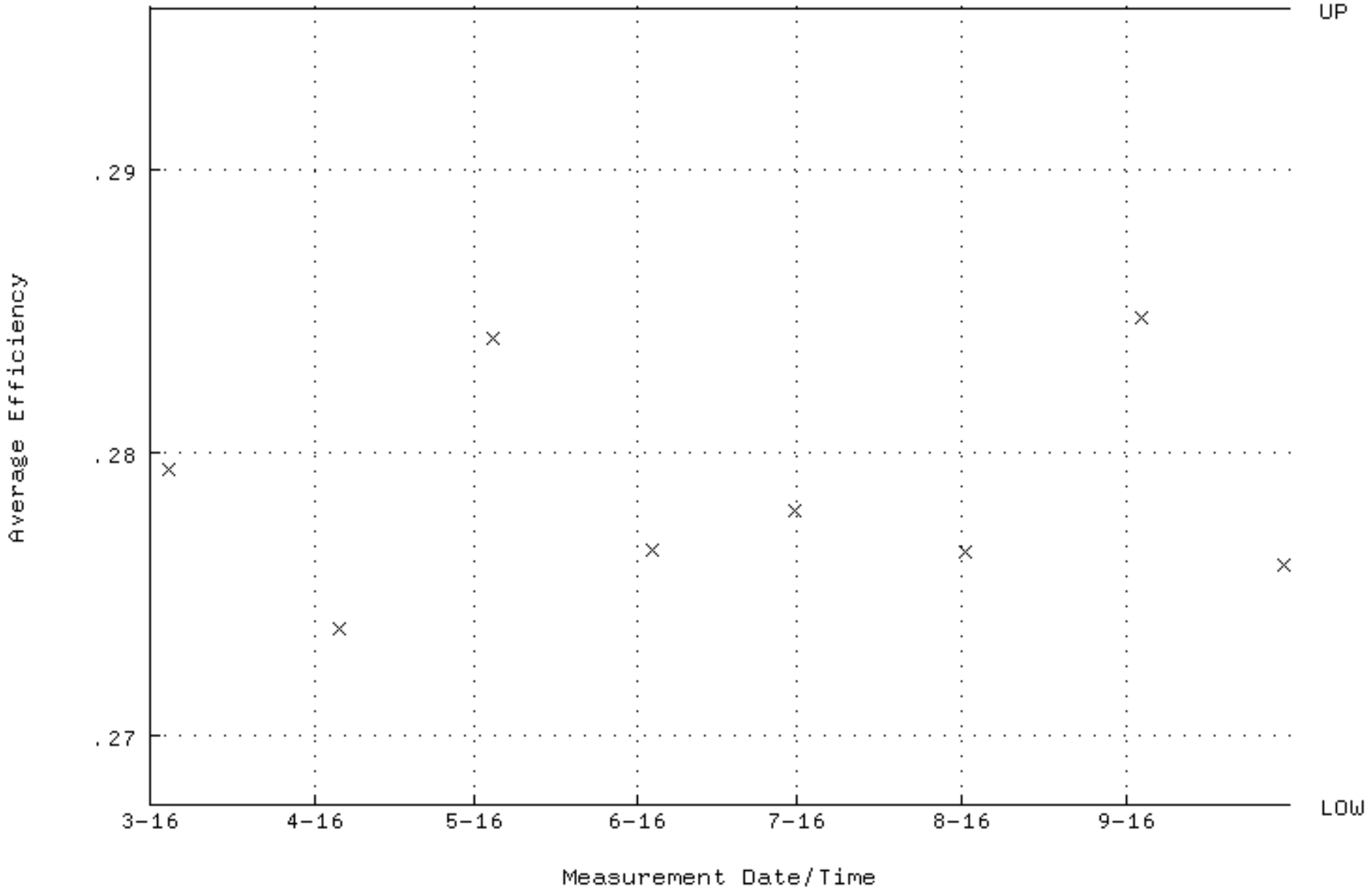
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 3-MAR-2016 08:11:48 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



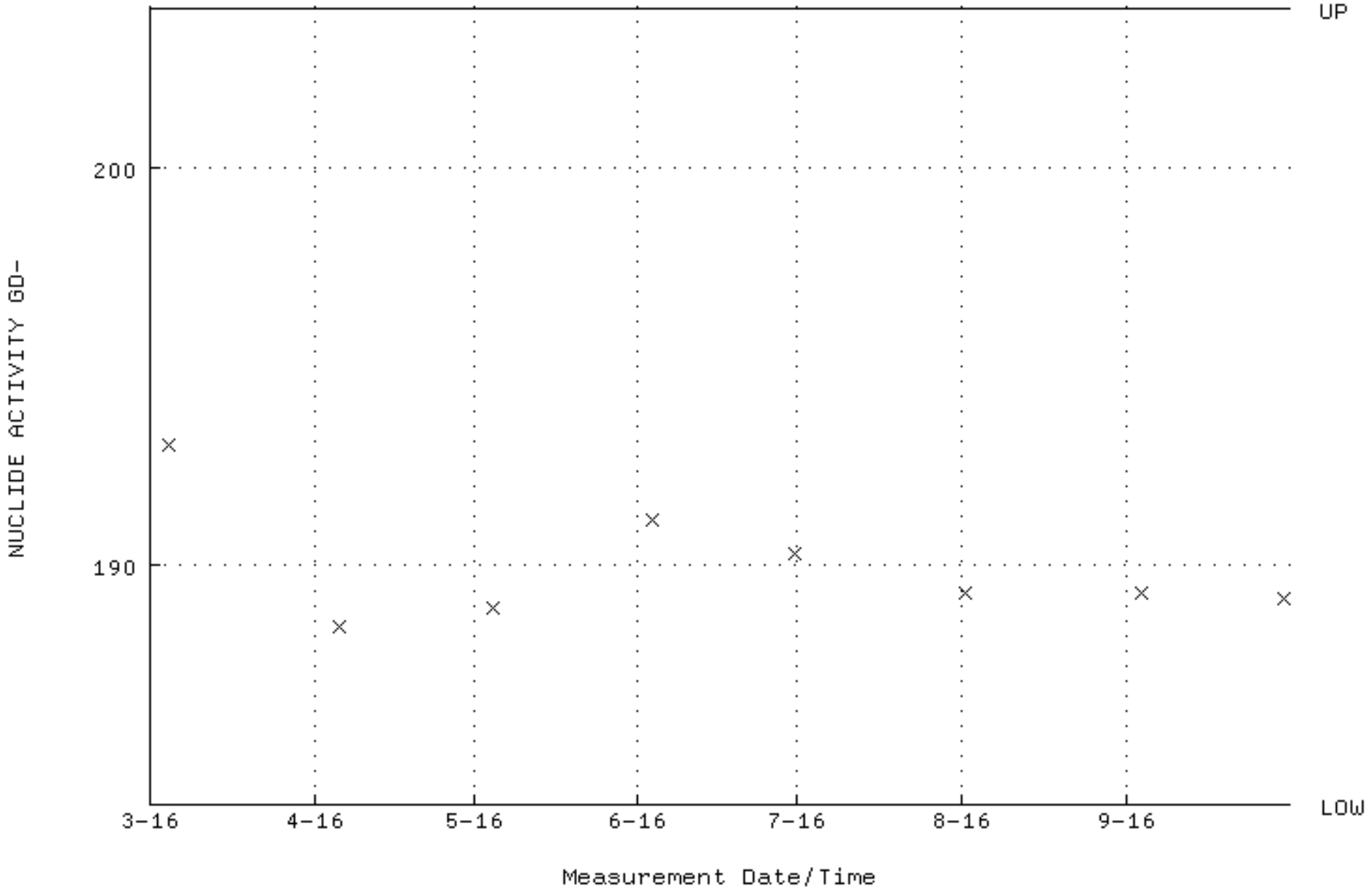
QA filename : DKA100:[ENV_ALPHA.QA.B]B042.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:49:42 through 29-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



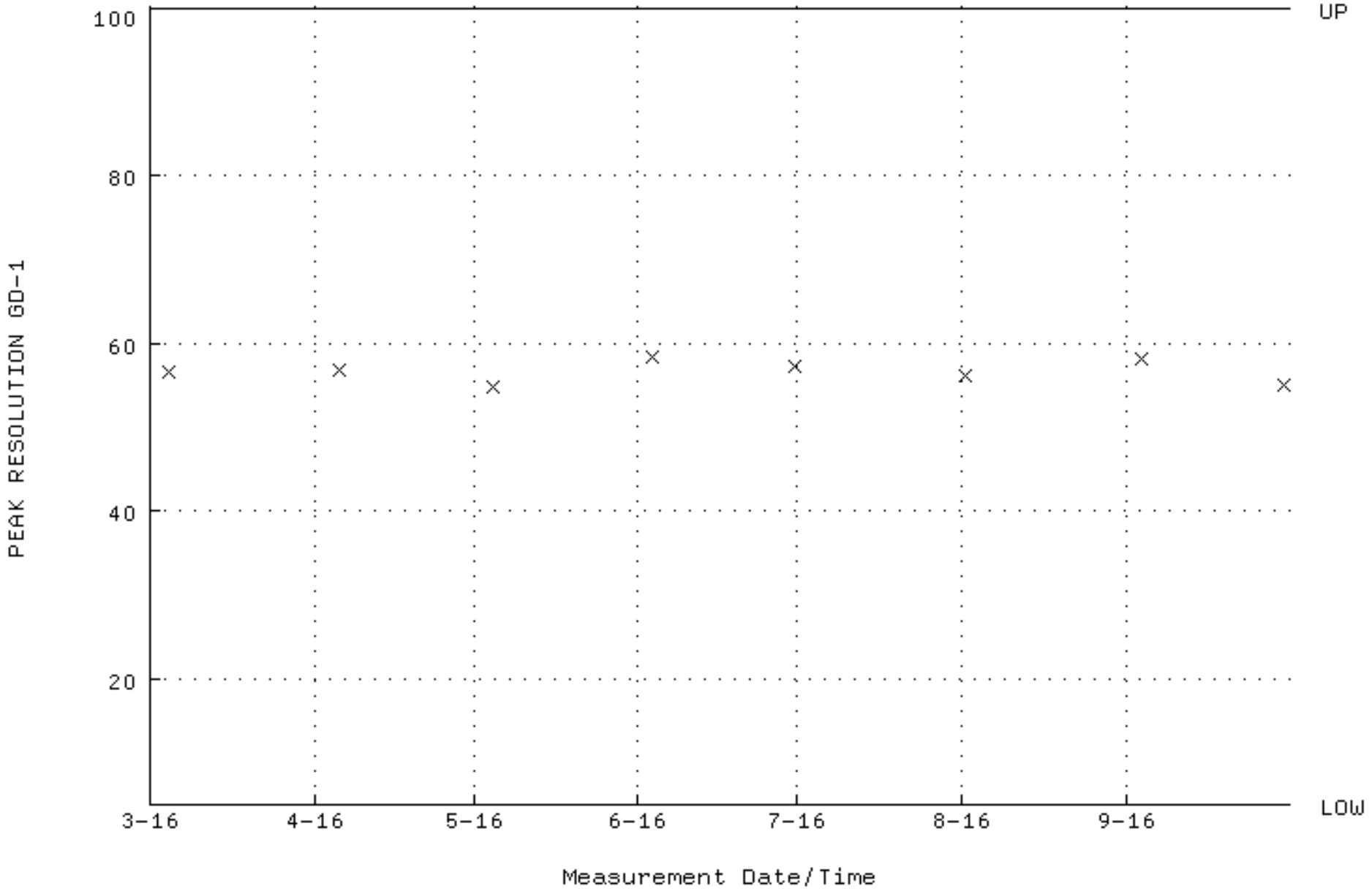
QA filename : DKA100:[ENV_ALPHA.QA.W]W065.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.267564 through 0.295728



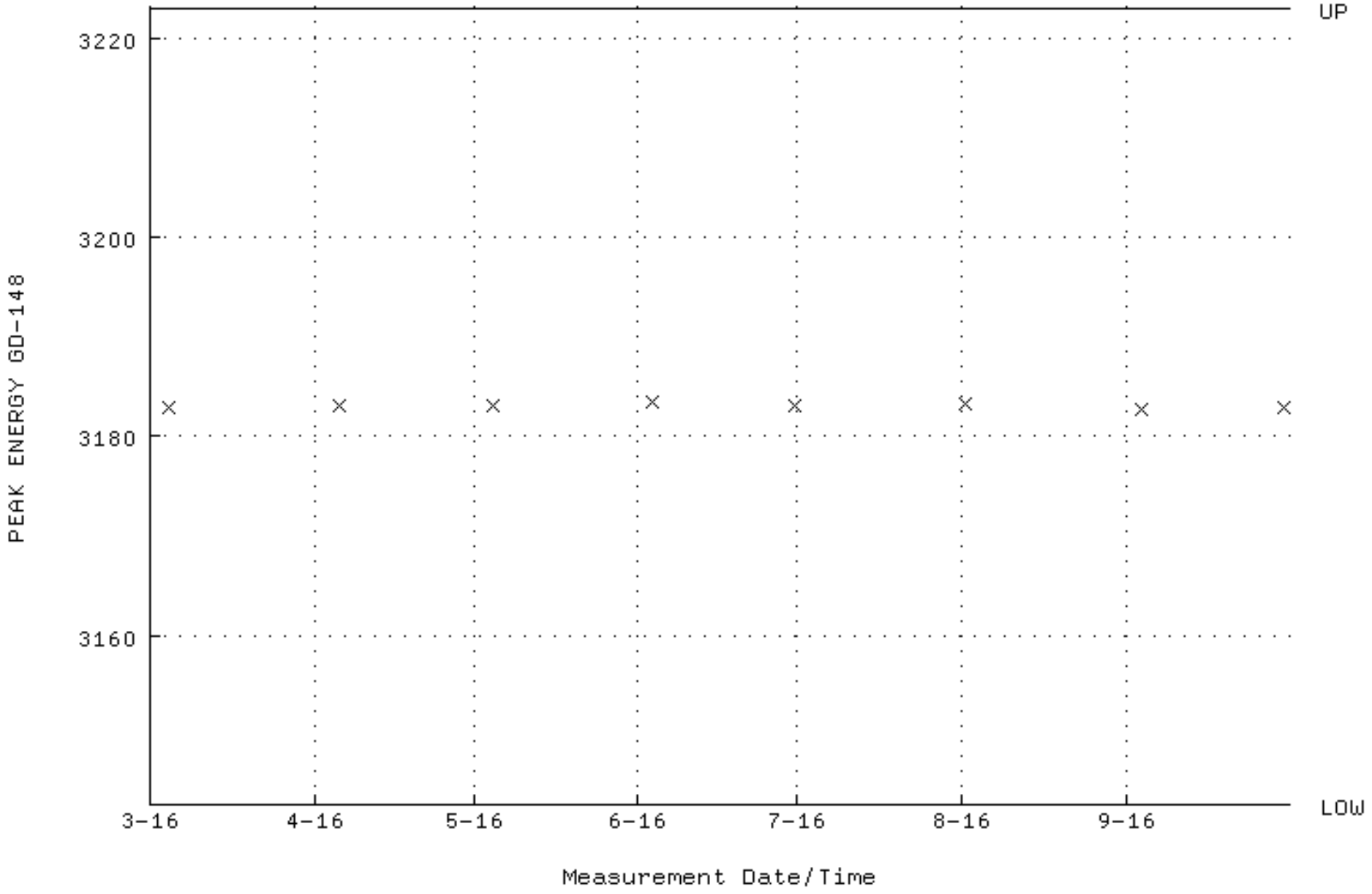
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



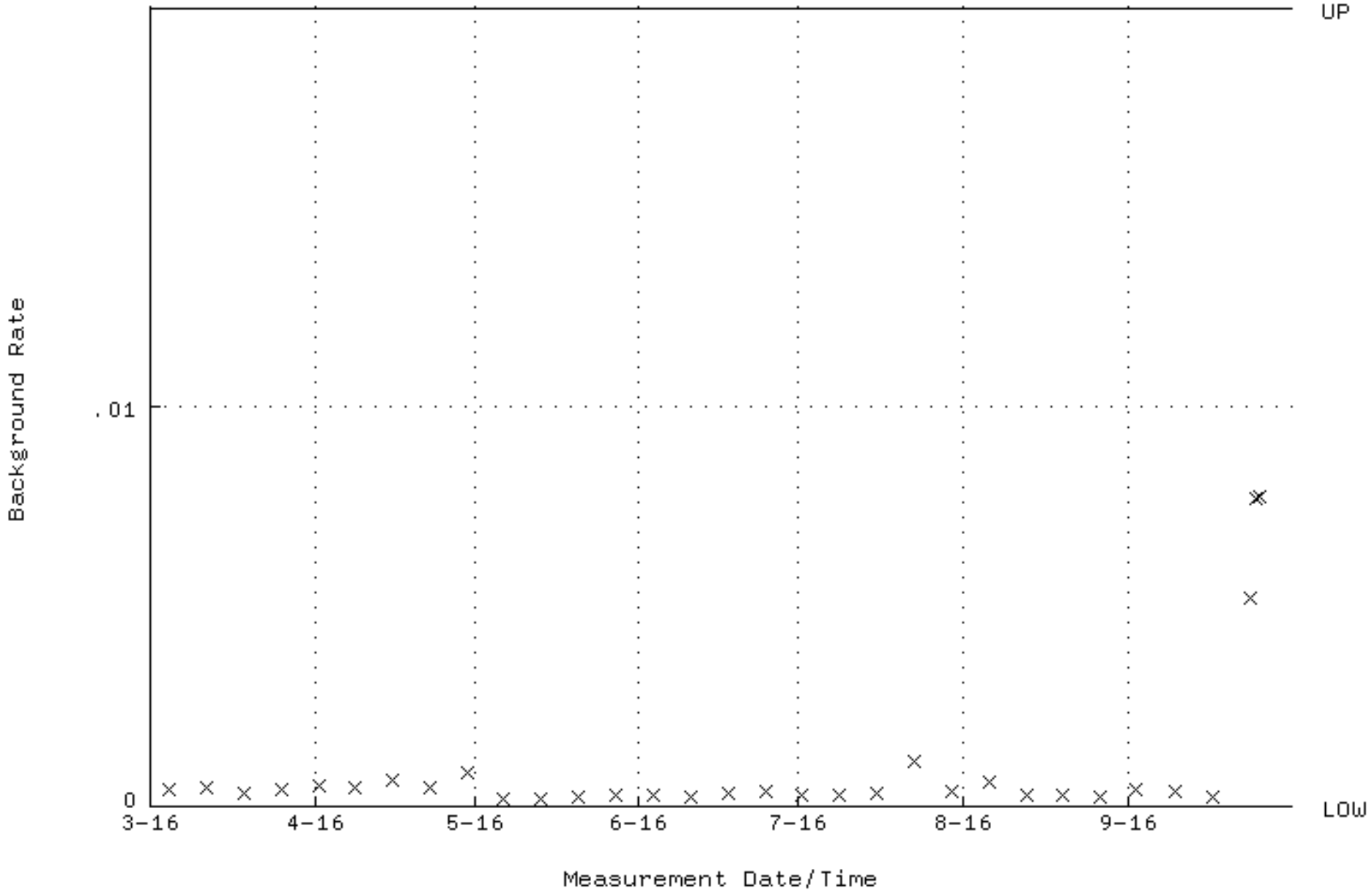
QA filename : DKA100:[ENV_ALPHA.QA.W]W065.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



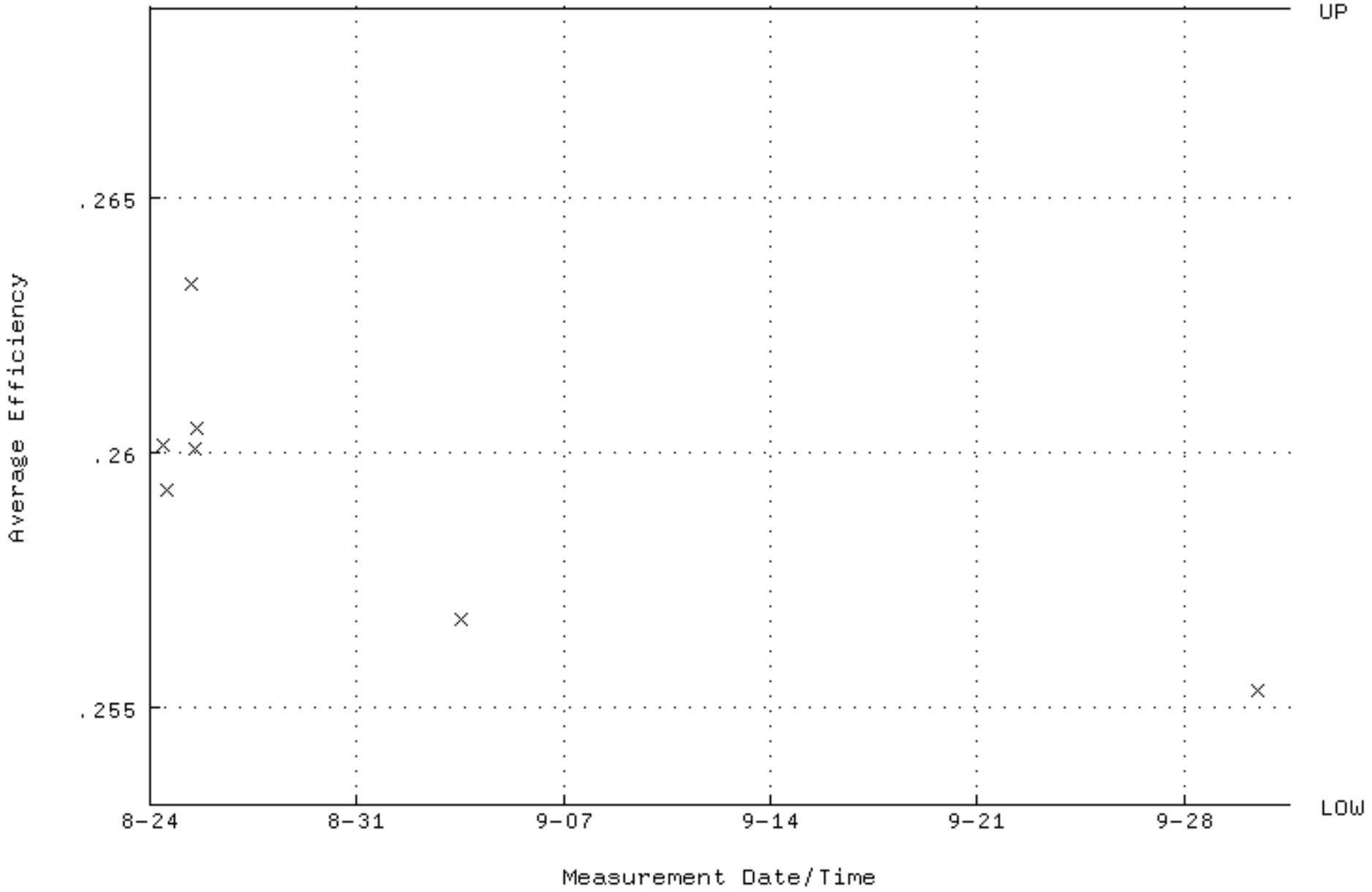
QA filename : DKA100:[ENV_ALPHA.QA.W]W065.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



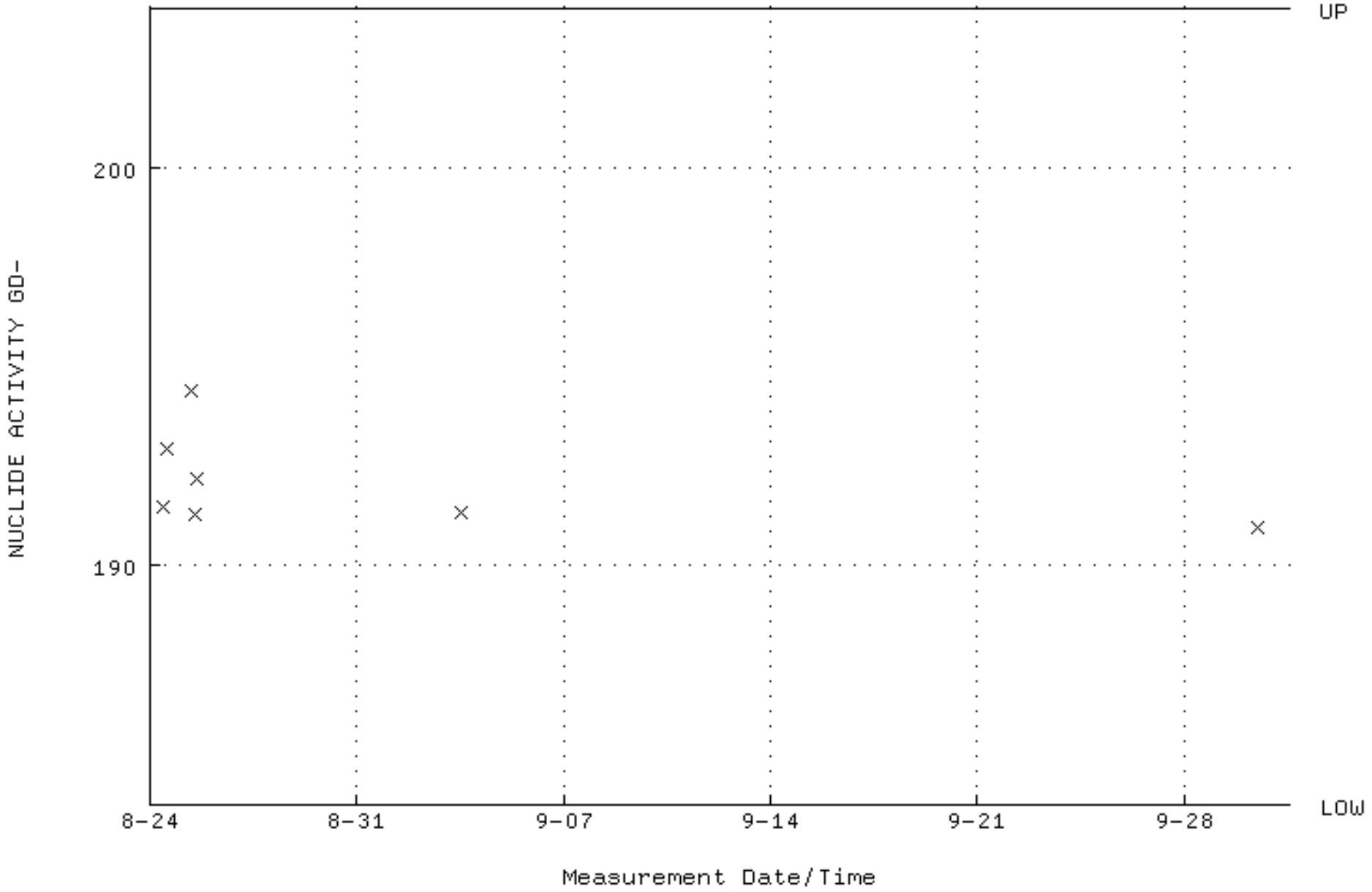
QA filename : DKA100:[ENV_ALPHA.QA.B]B065.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



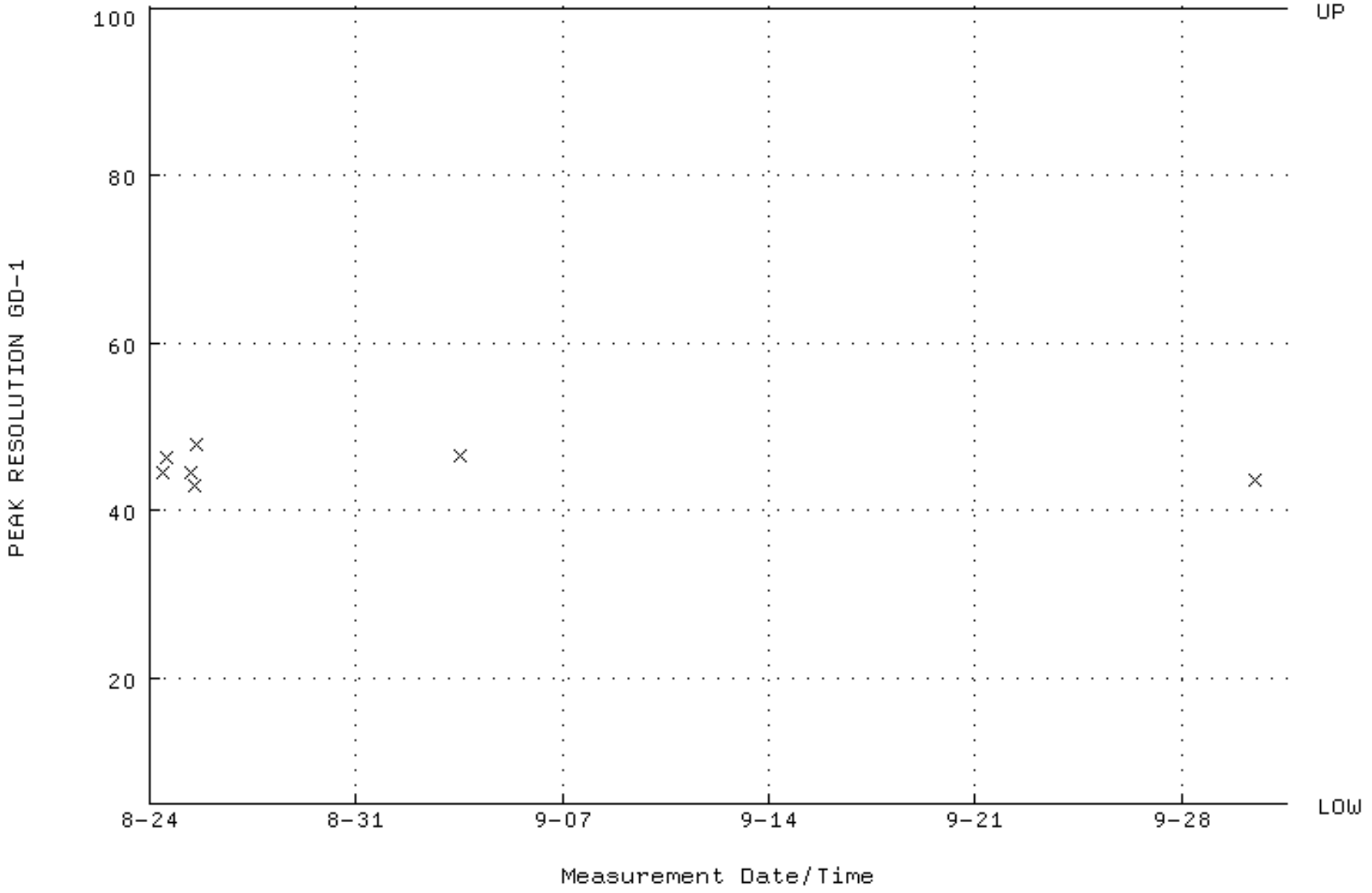
QA filename : DKA100:[ENV_ALPHA.QA.W]W066.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.253080 through 0.268734



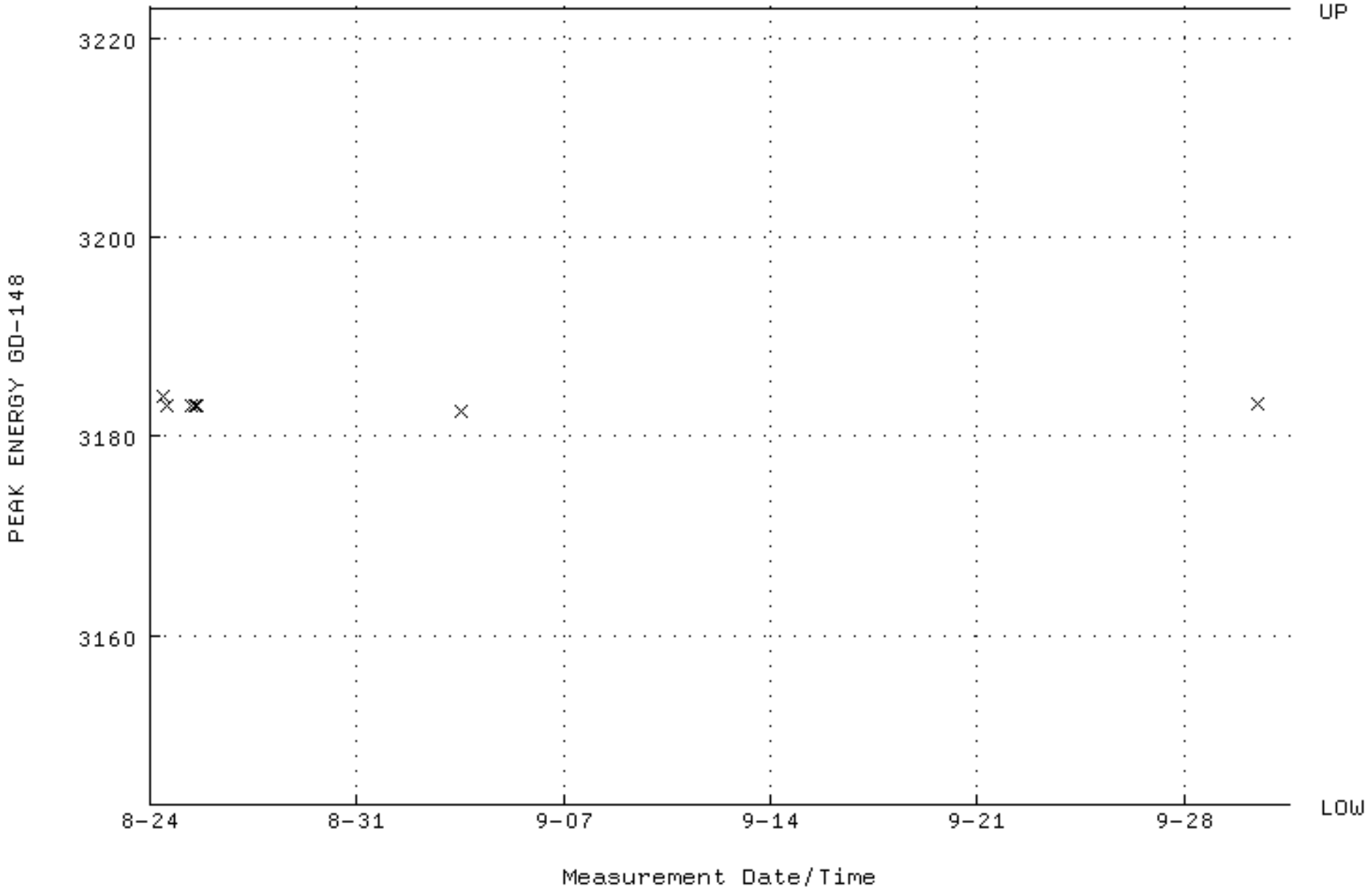
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



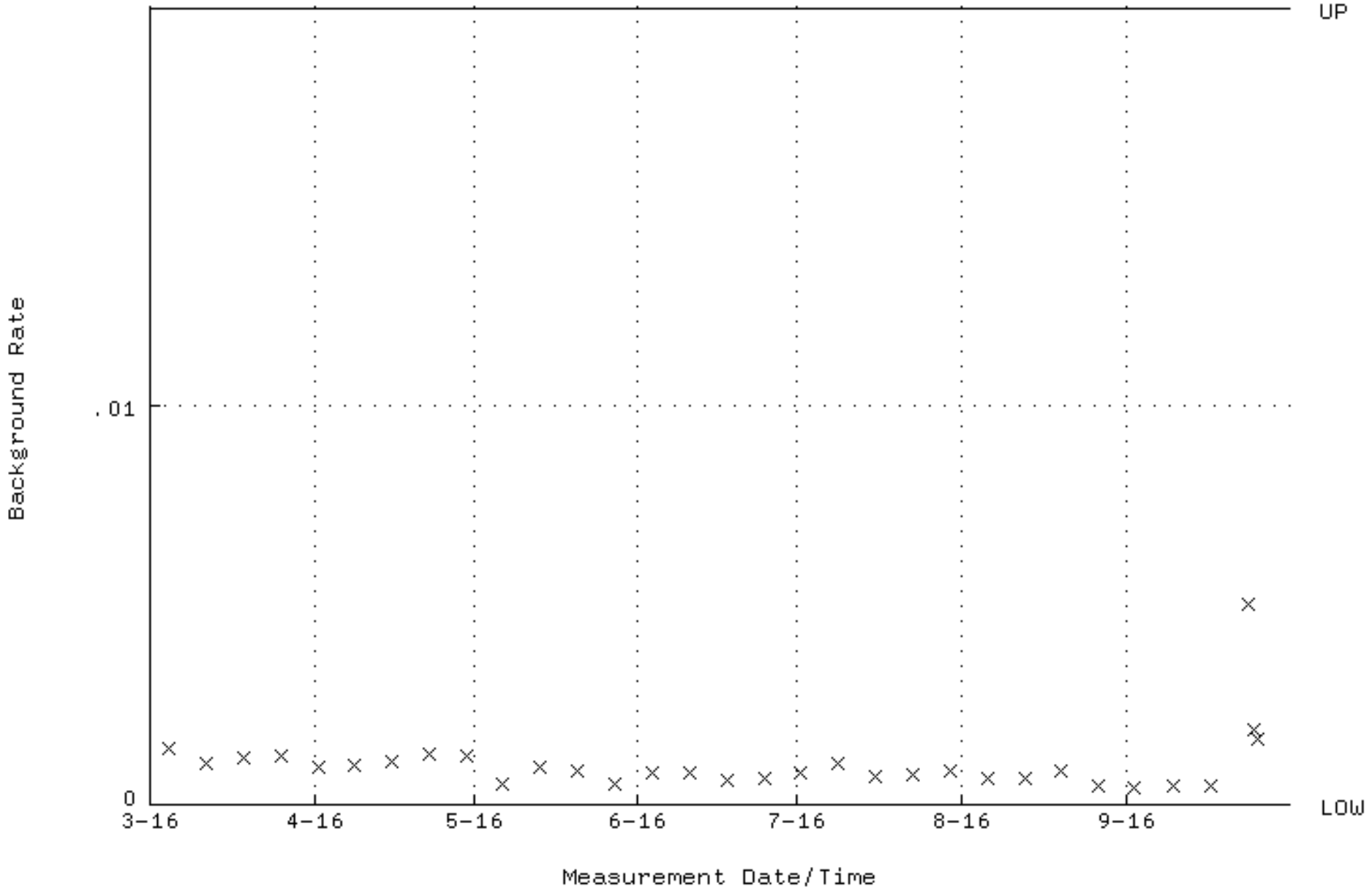
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



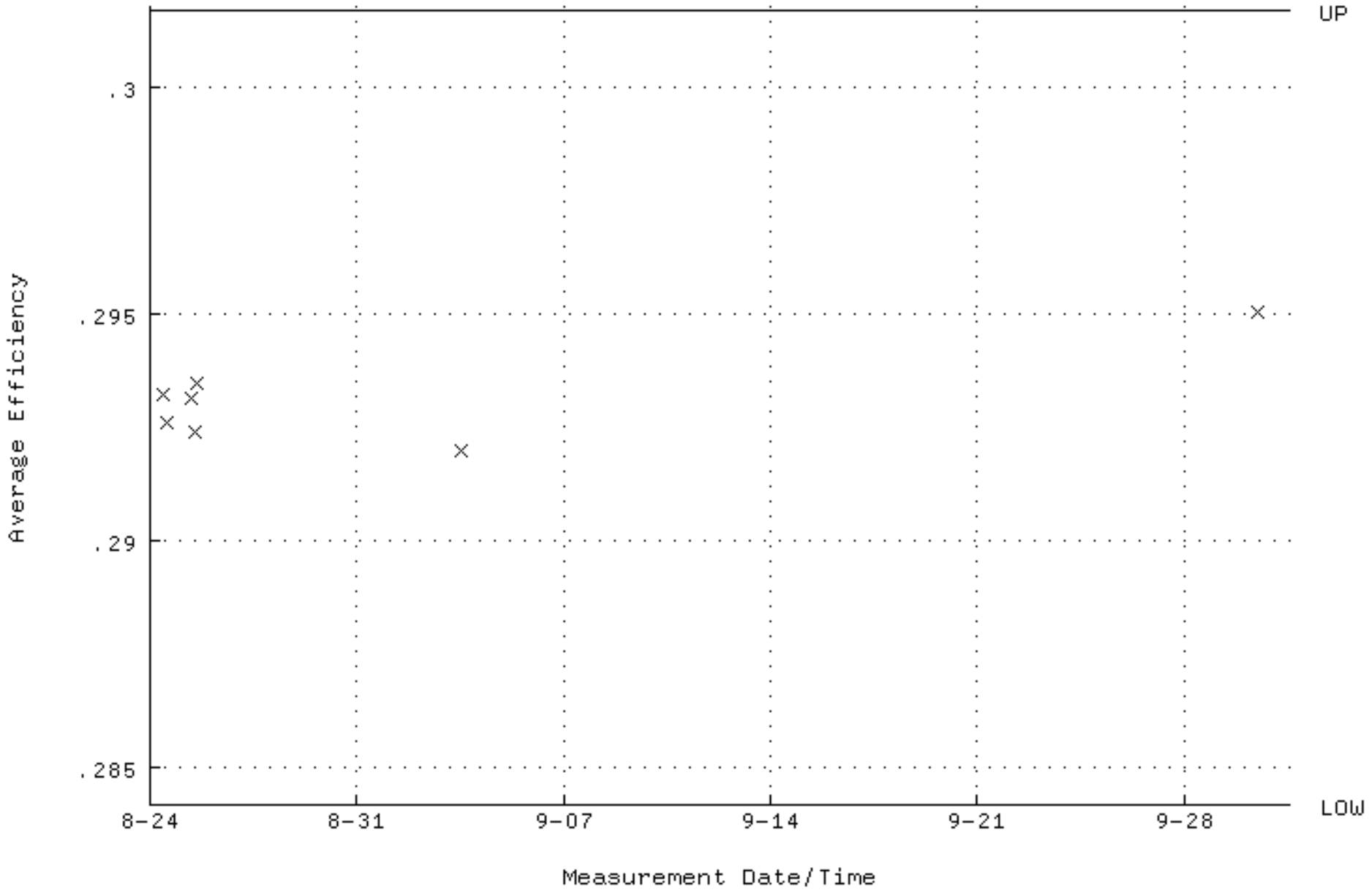
QA filename : DKA100:[ENV_ALPHA.QA.W]W066.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



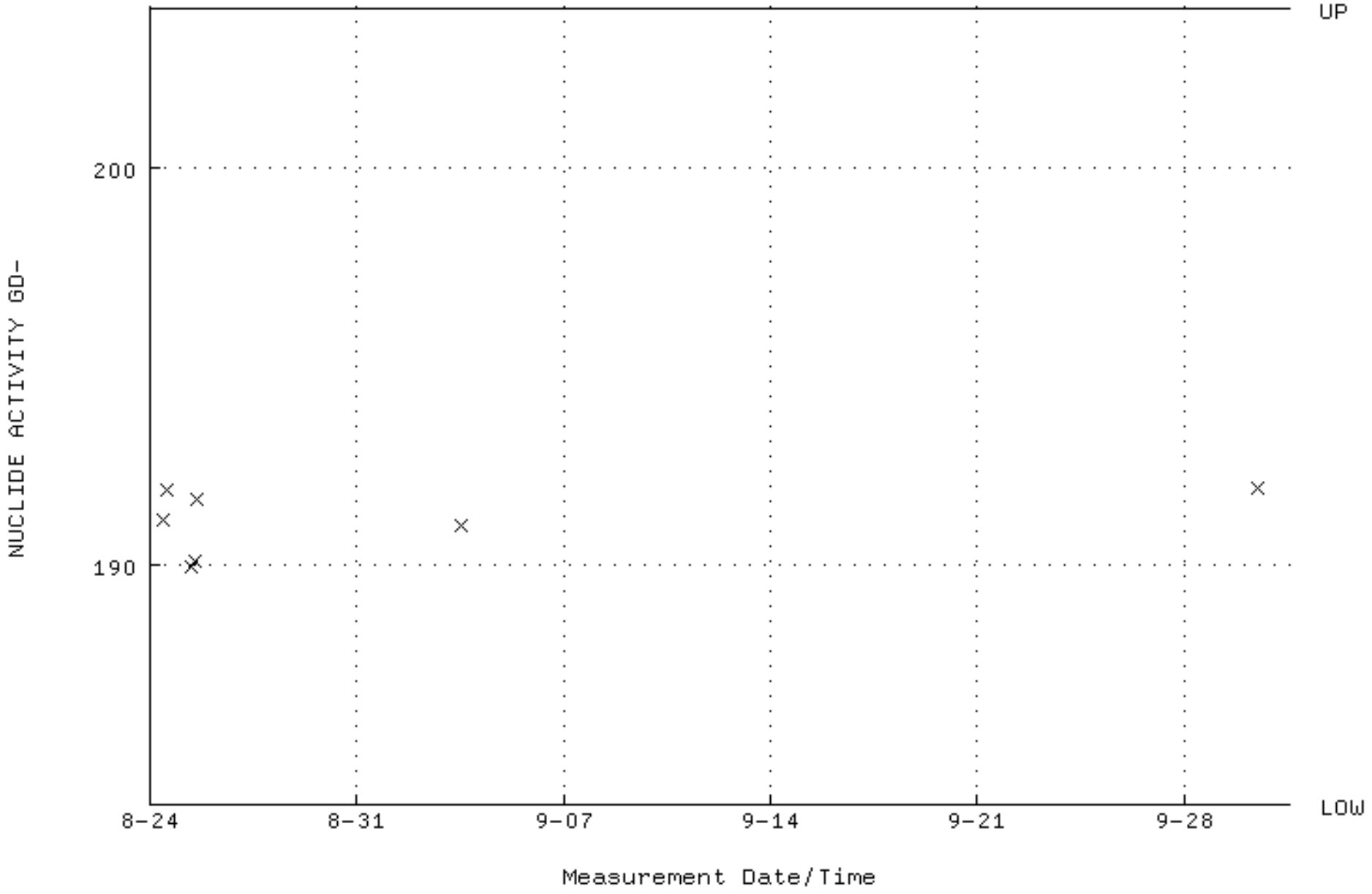
QA filename : DKA100:[ENV_ALPHA.QA.B]B066.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



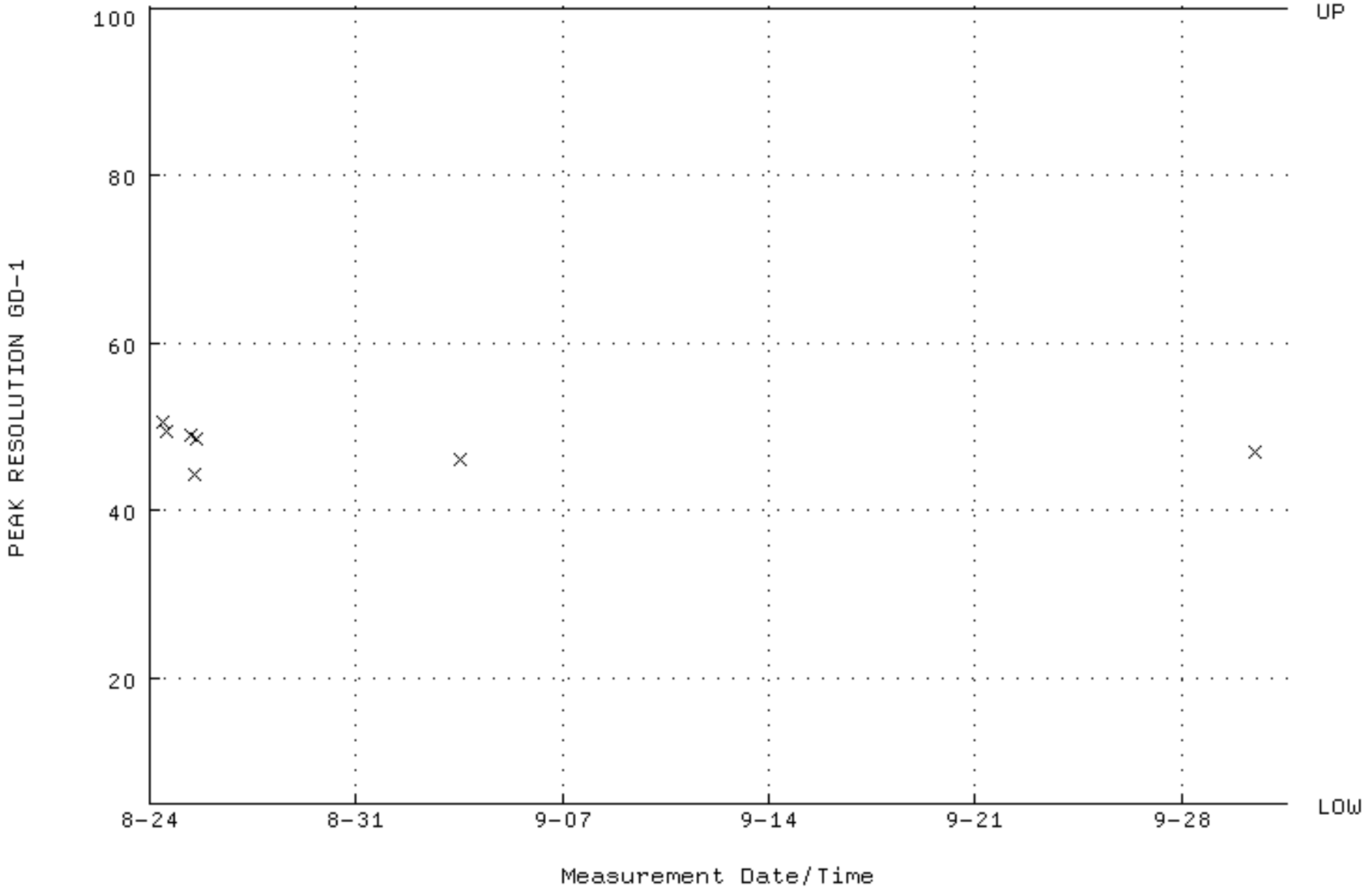
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.284161 through 0.301737



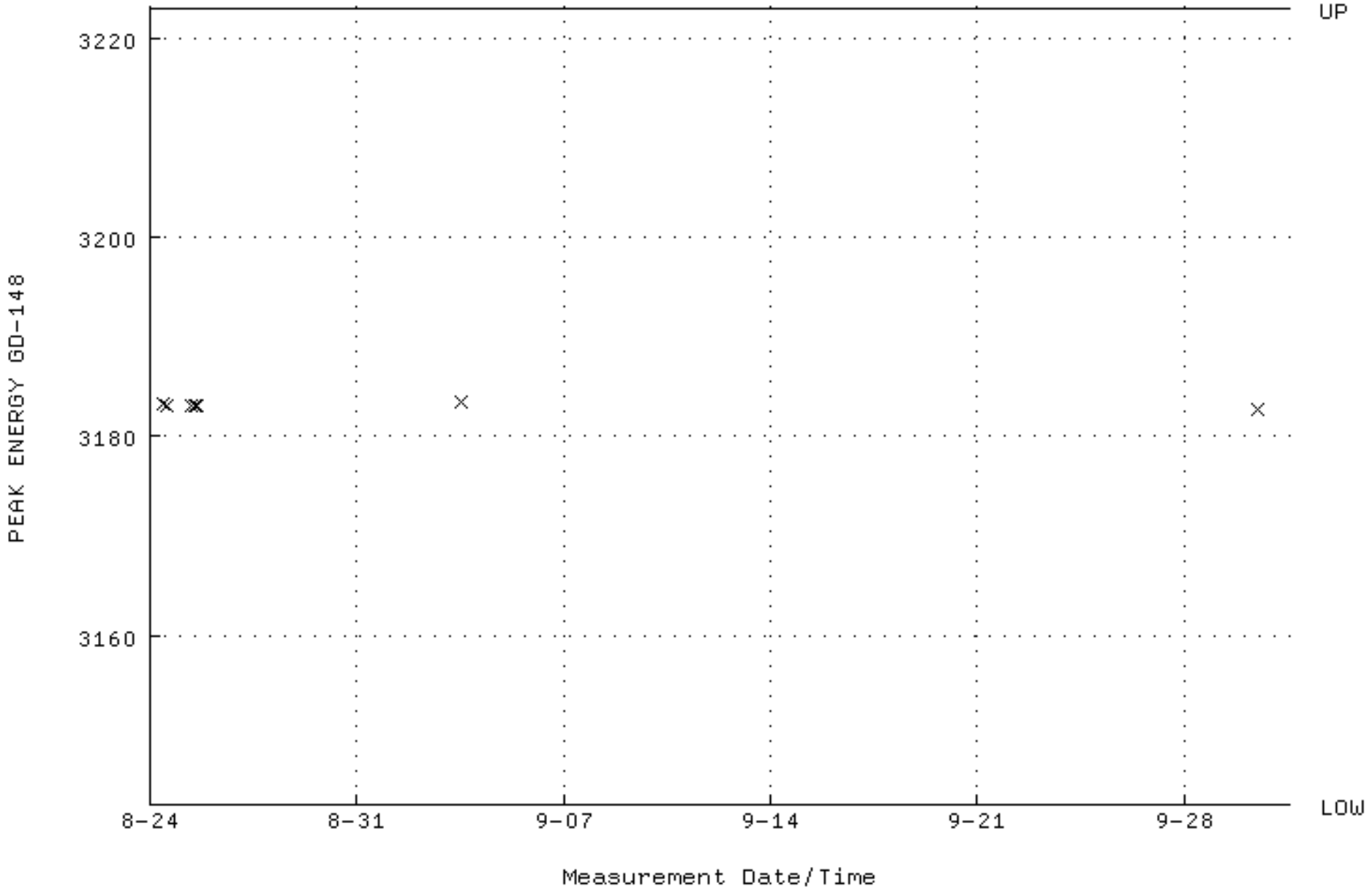
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



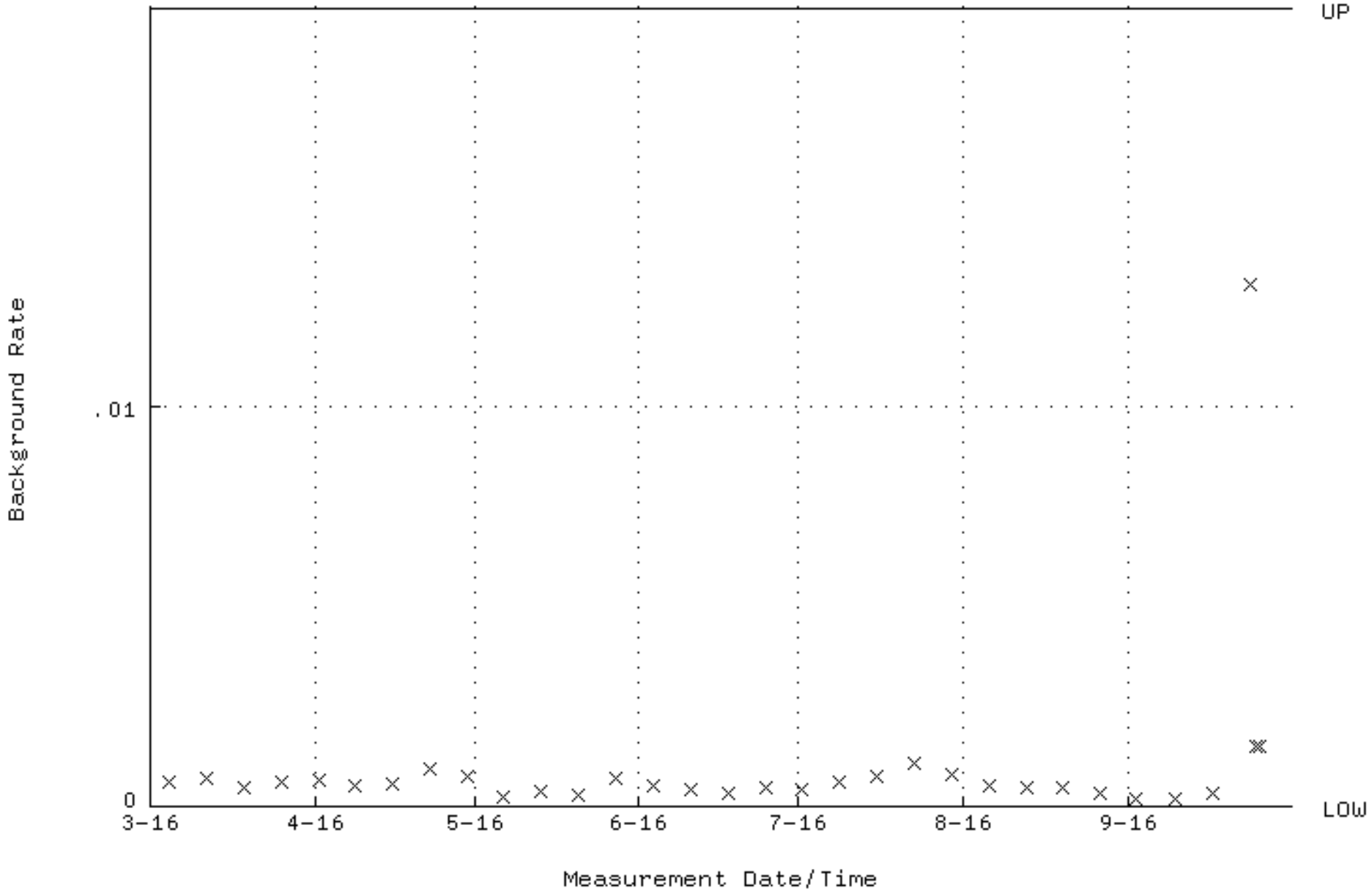
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



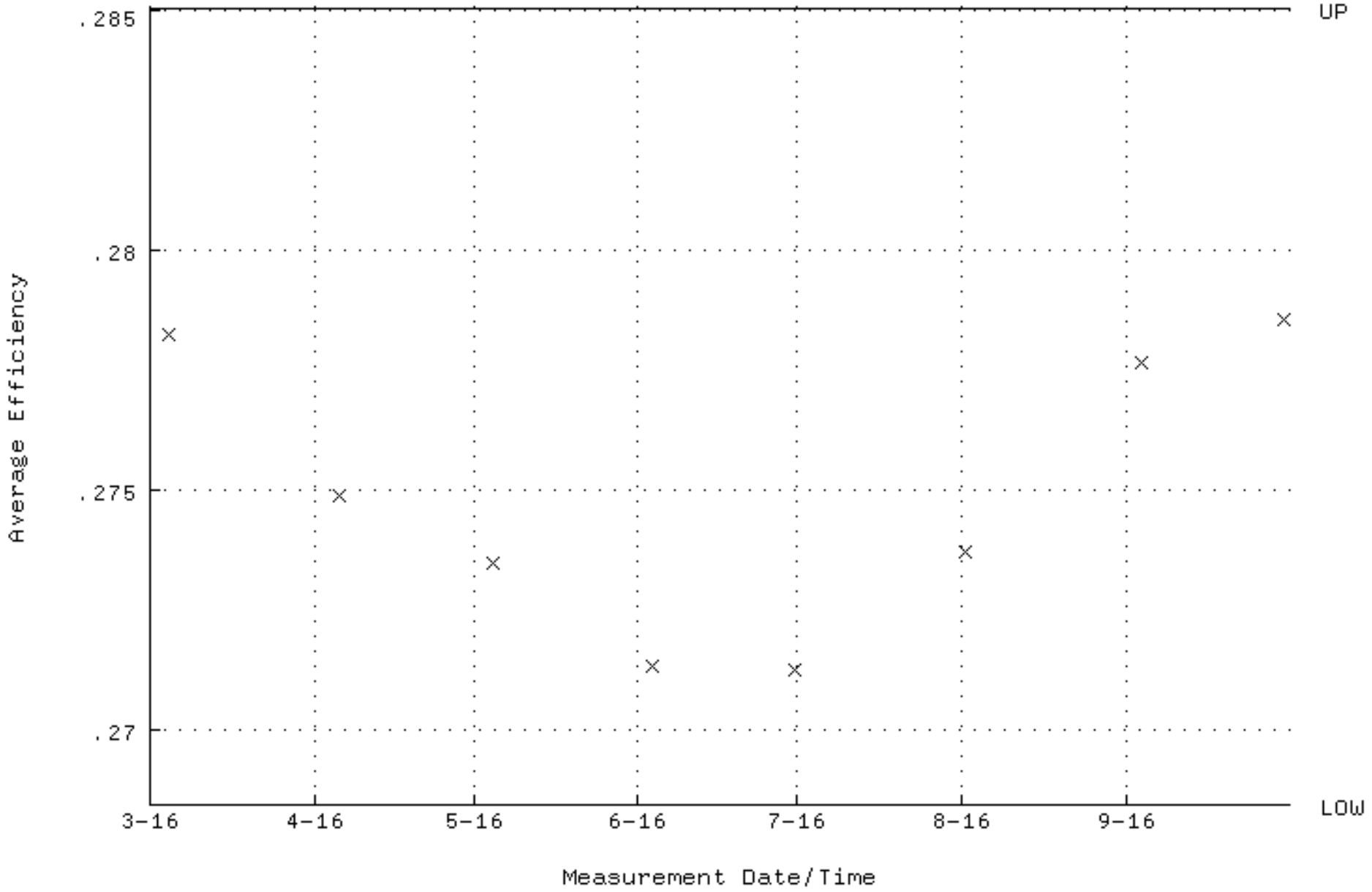
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 24-AUG-2016 10:44:17 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



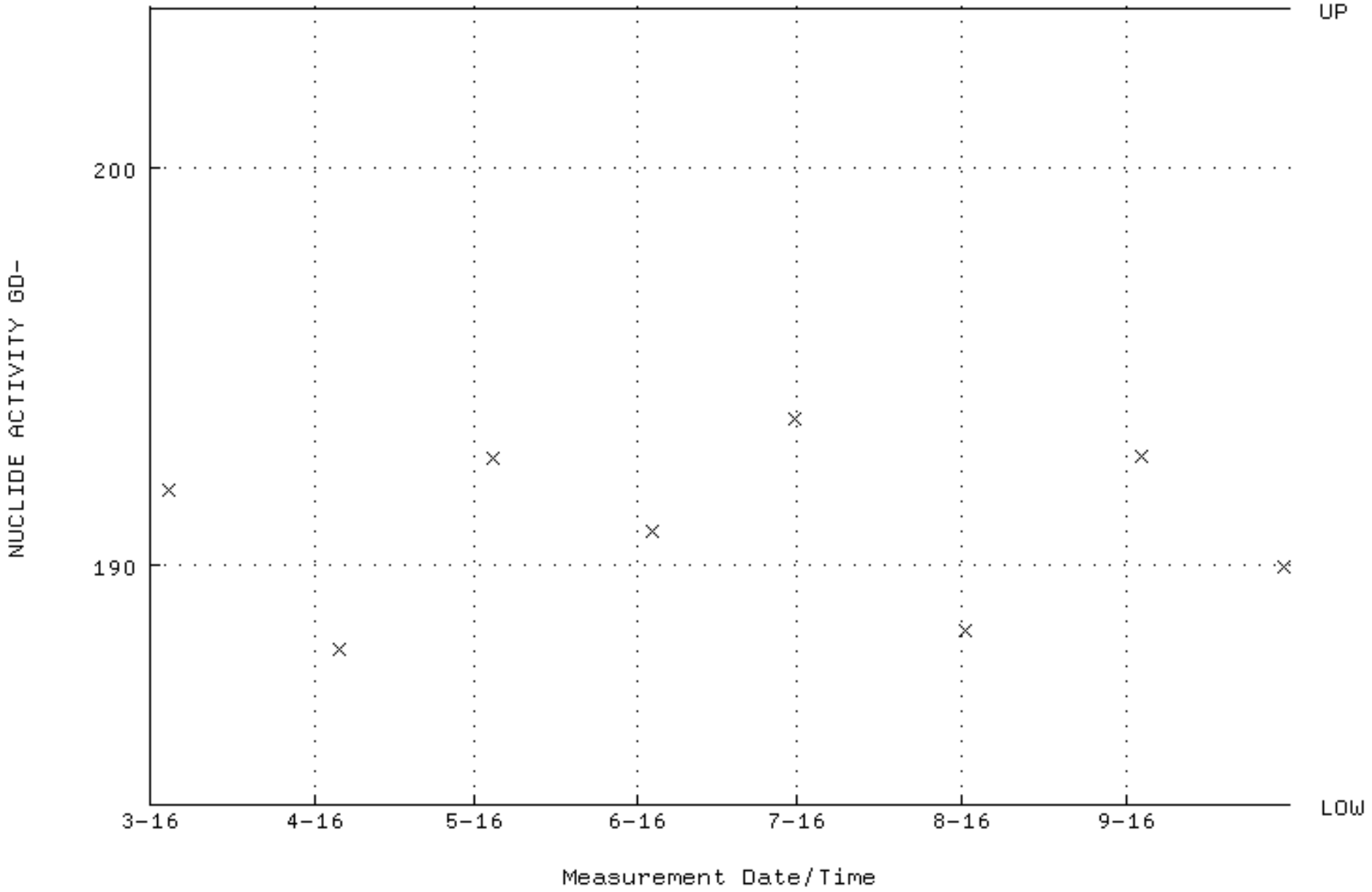
QA filename : DKA100:[ENV_ALPHA.QA.B]B067.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



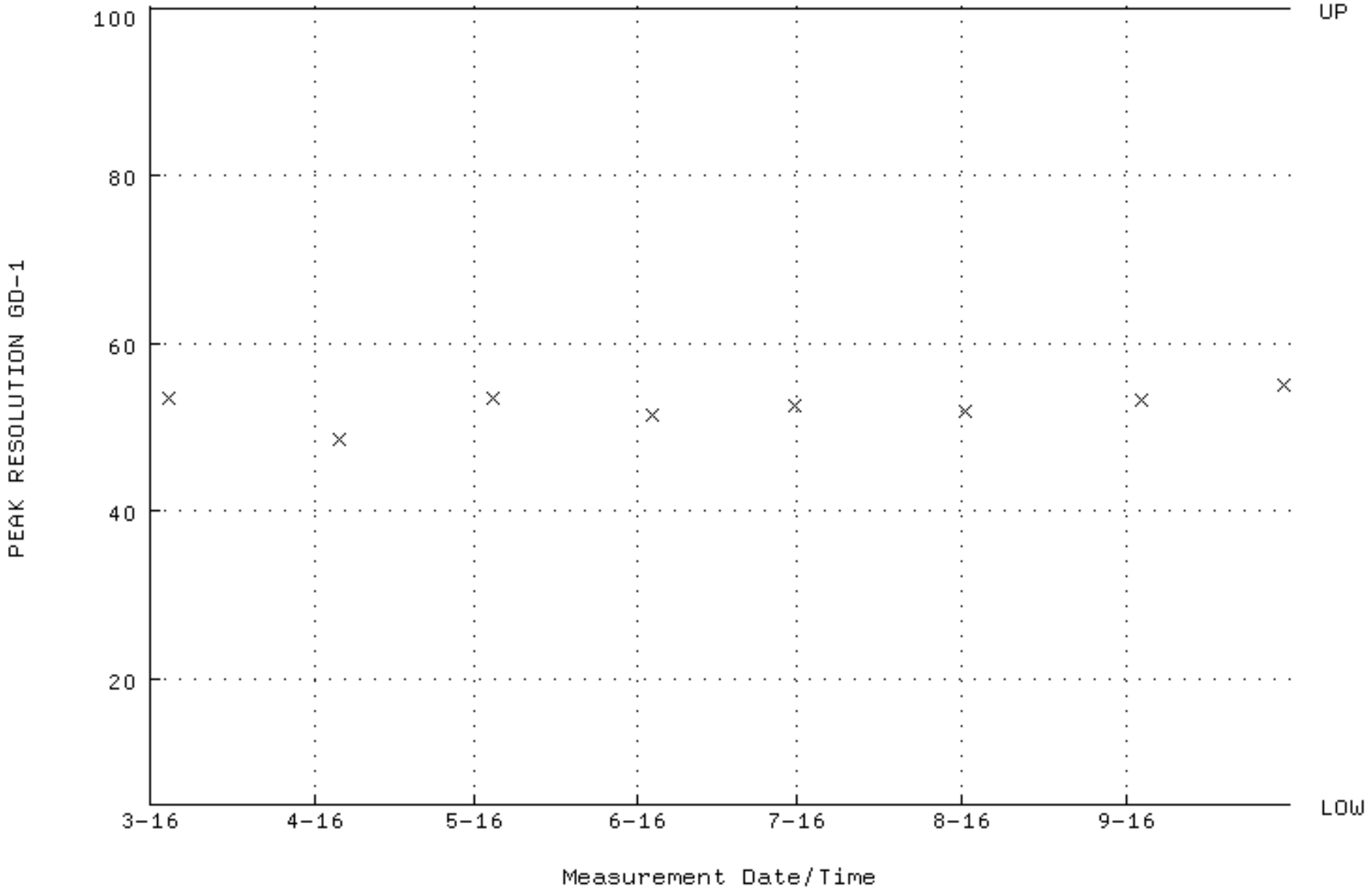
QA filename : DKA100:[ENV_ALPHA.QA.W]W068.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.268440 through 0.285050



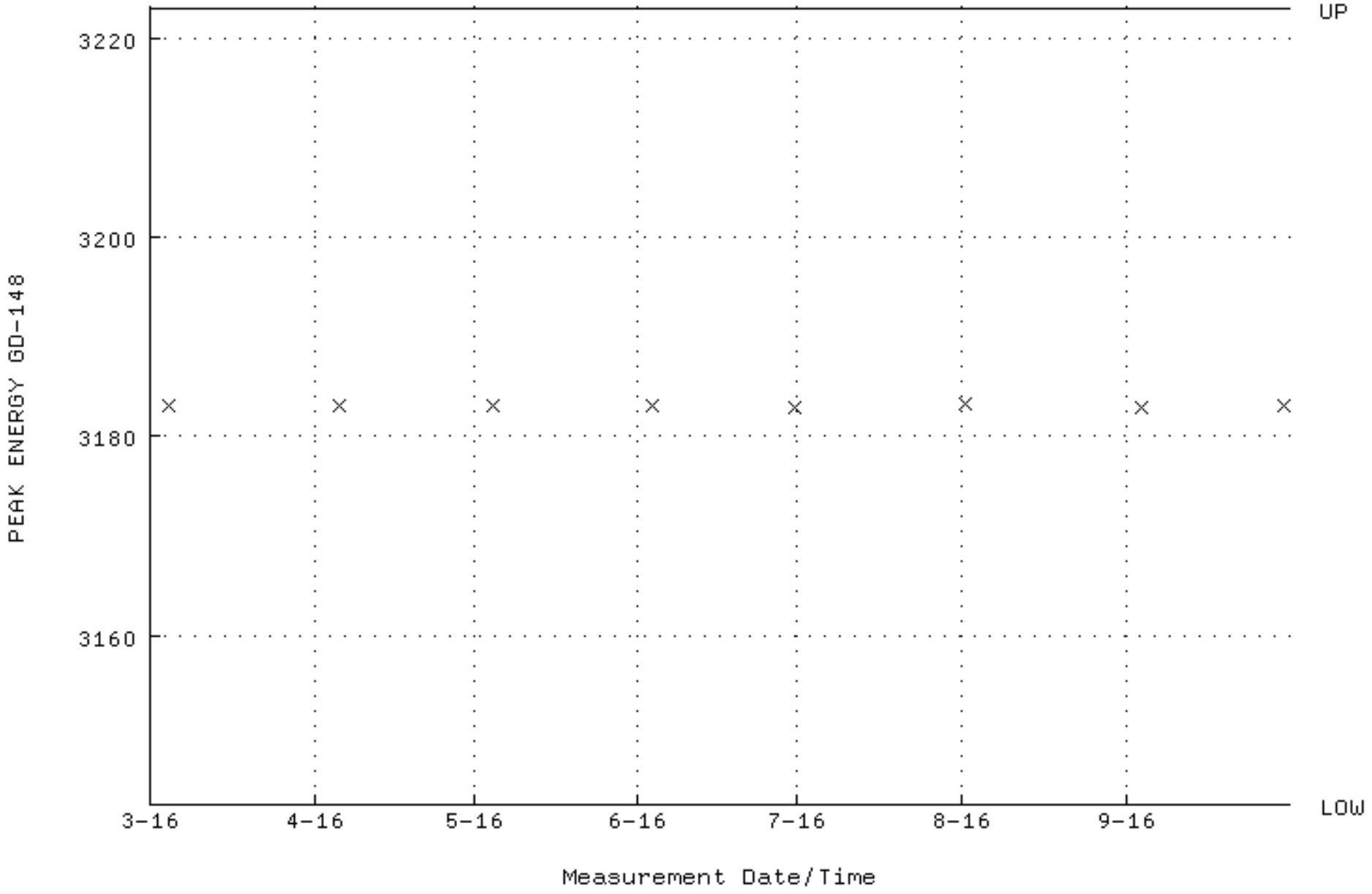
QA filename : DKA100:[ENV_ALPHA.QA.W]W068.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



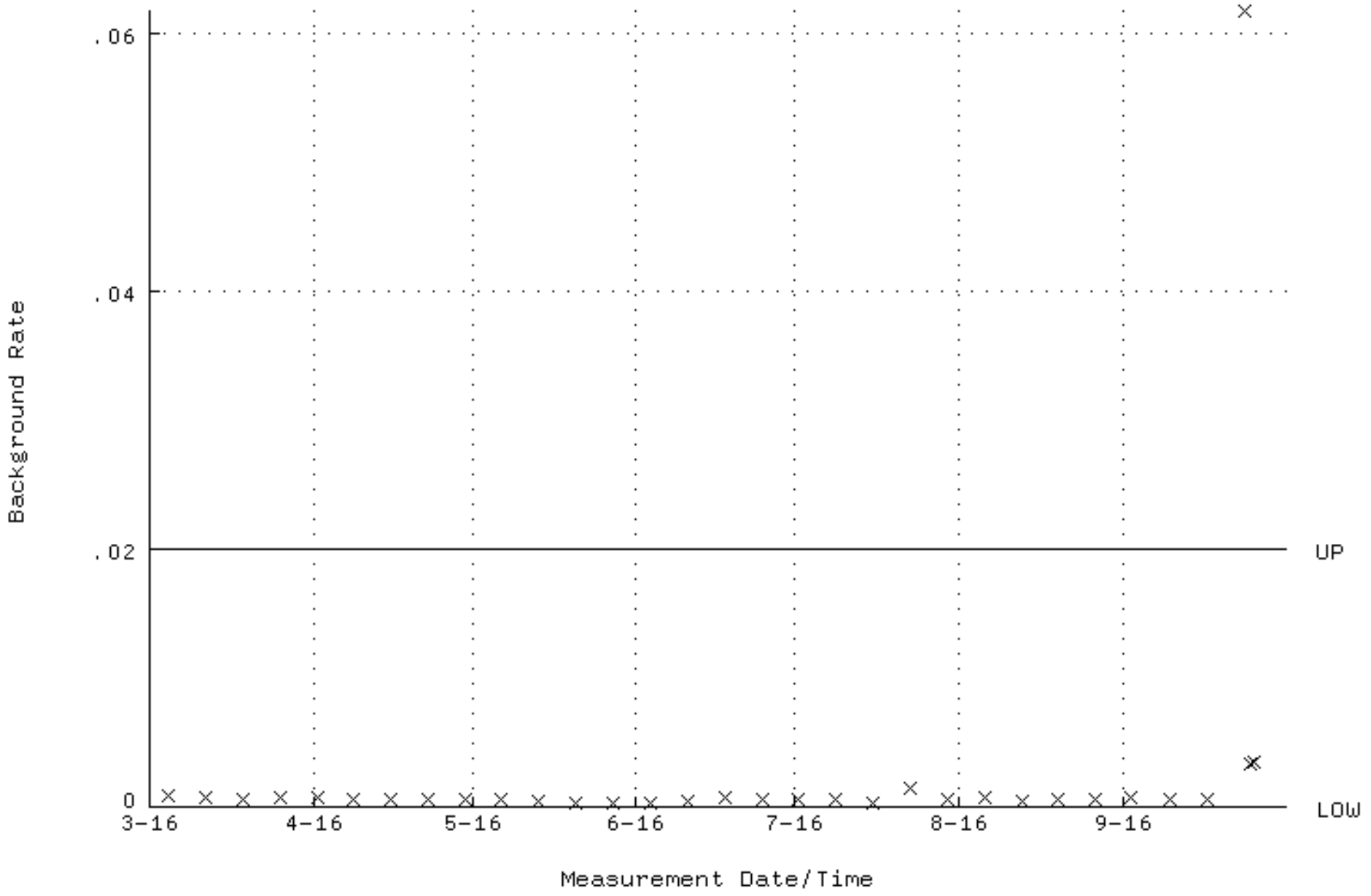
QA filename : DKA100:[ENV_ALPHA.QA.W]W068.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



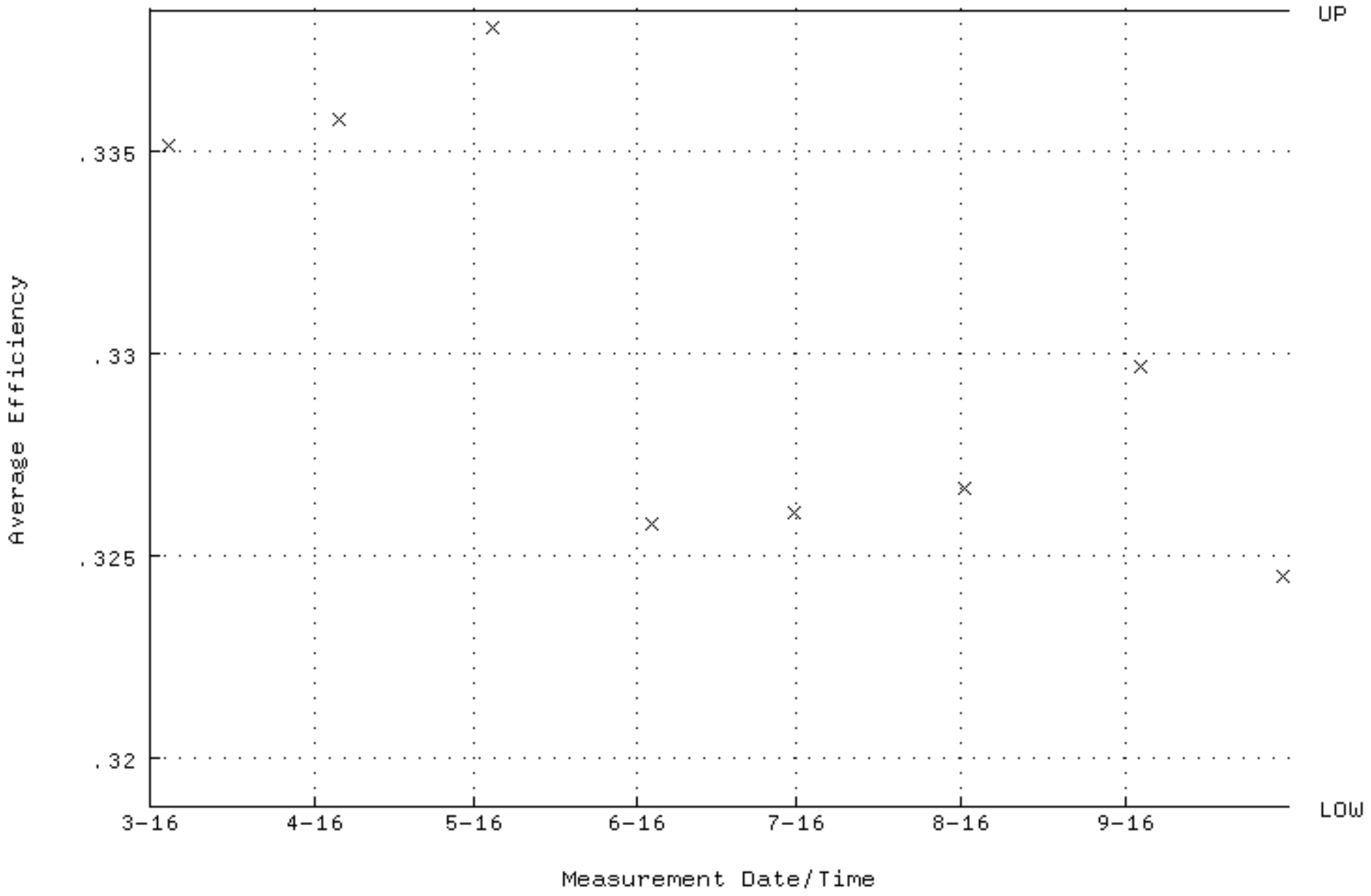
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



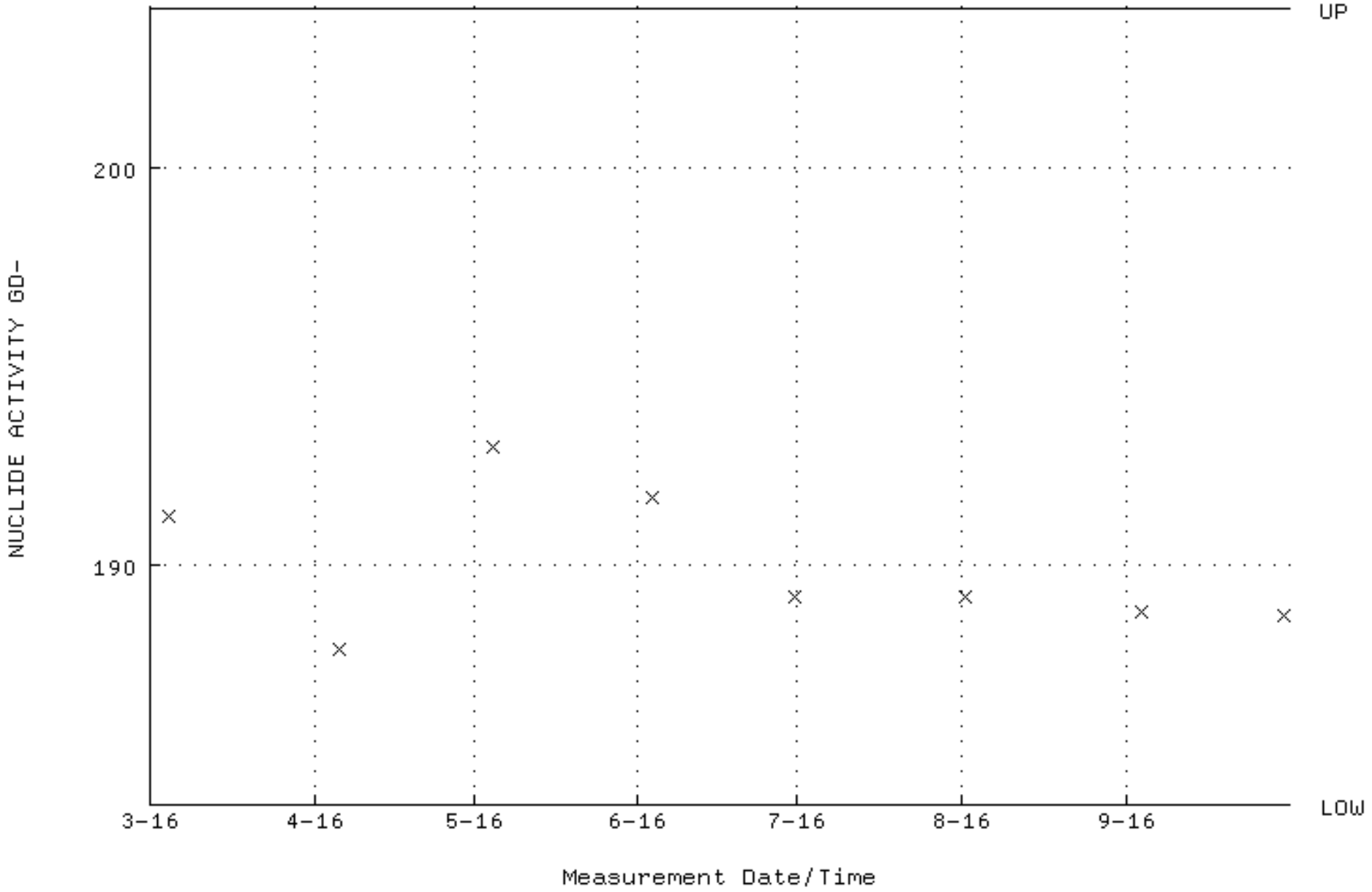
QA filename : DKA100:[ENV_ALPHA.QA.B]B068.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



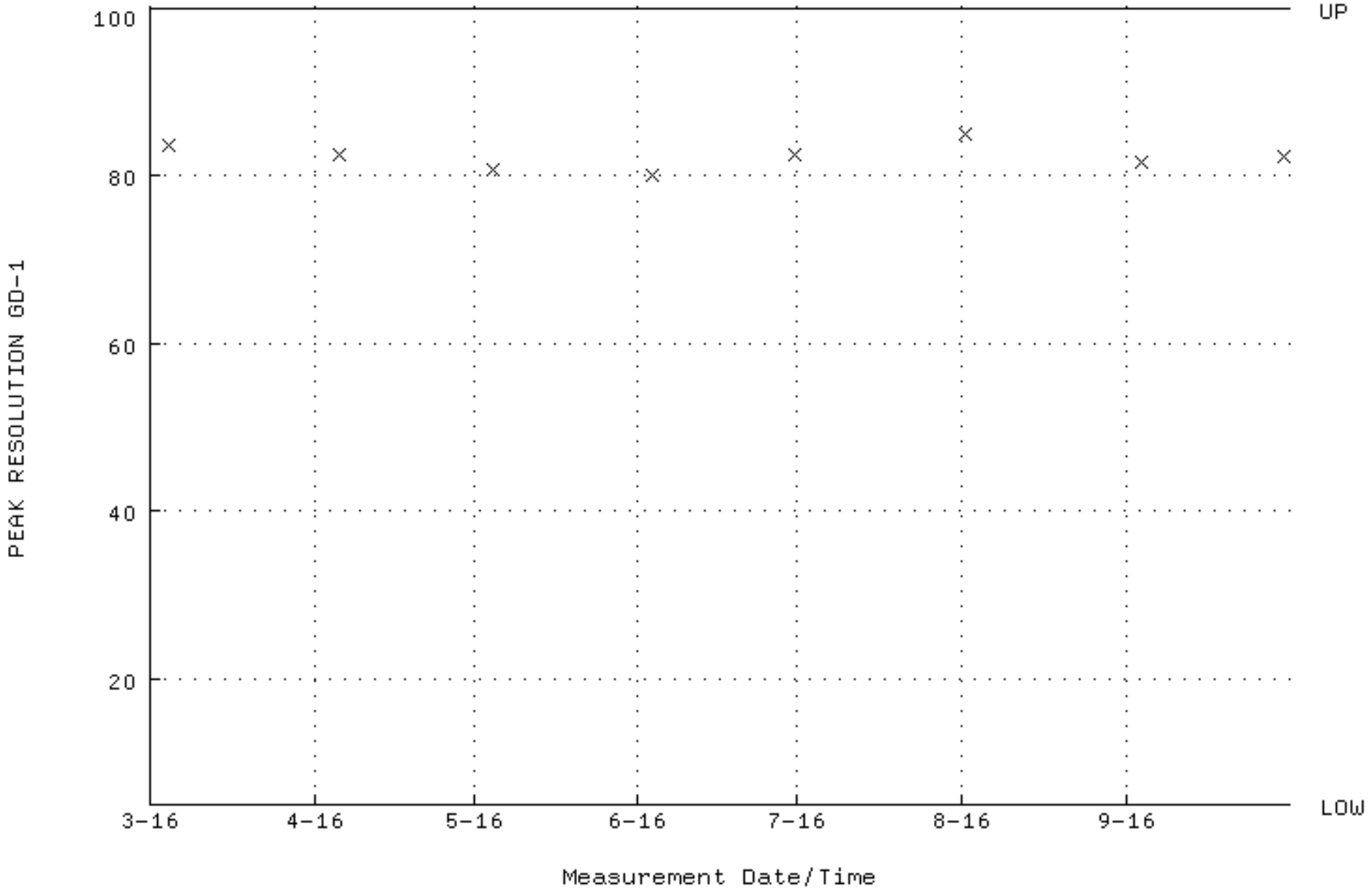
QA filename : DKA100:[ENV_ALPHA.QA.W]W069.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.318777 through 0.338495



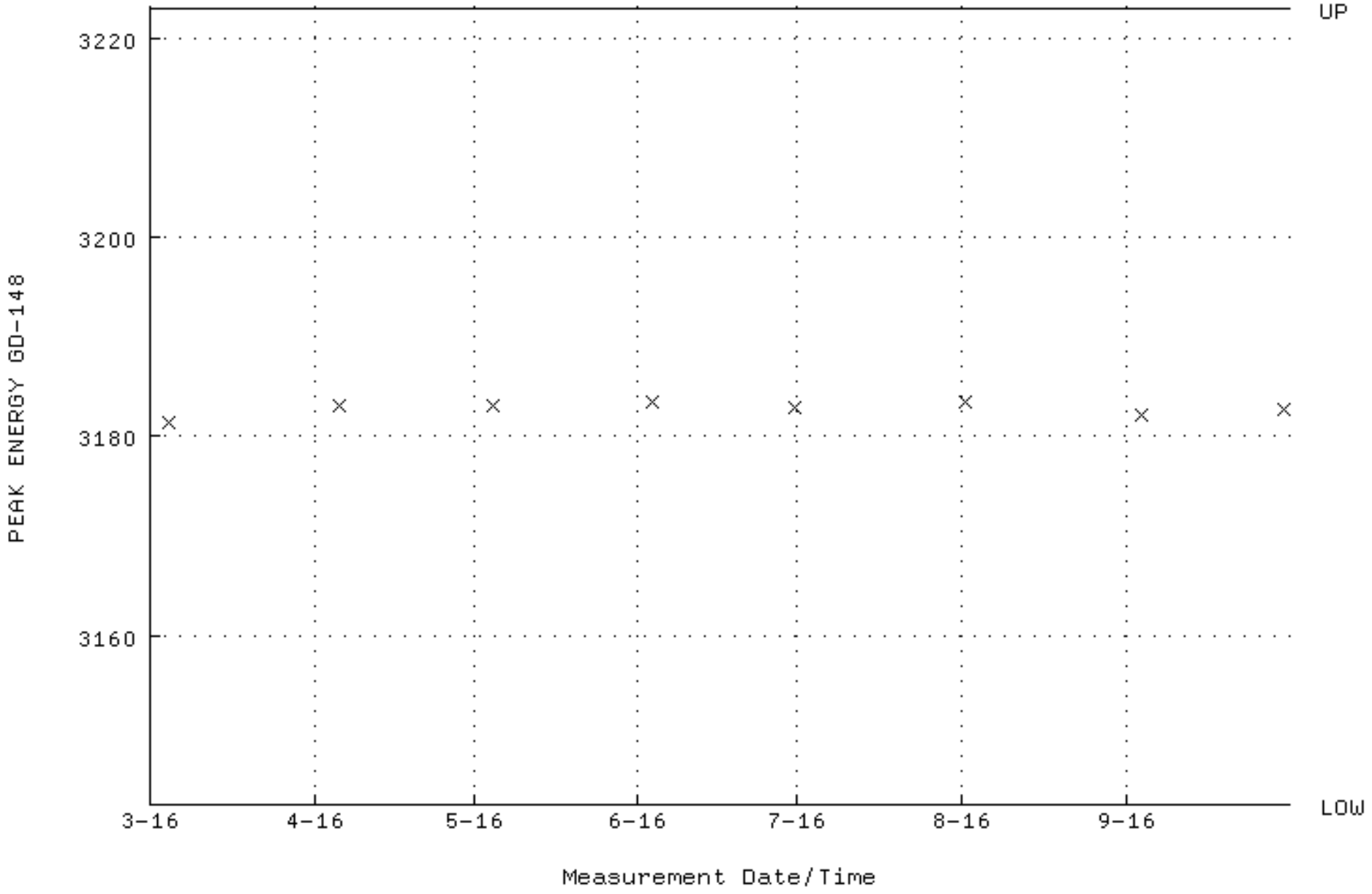
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



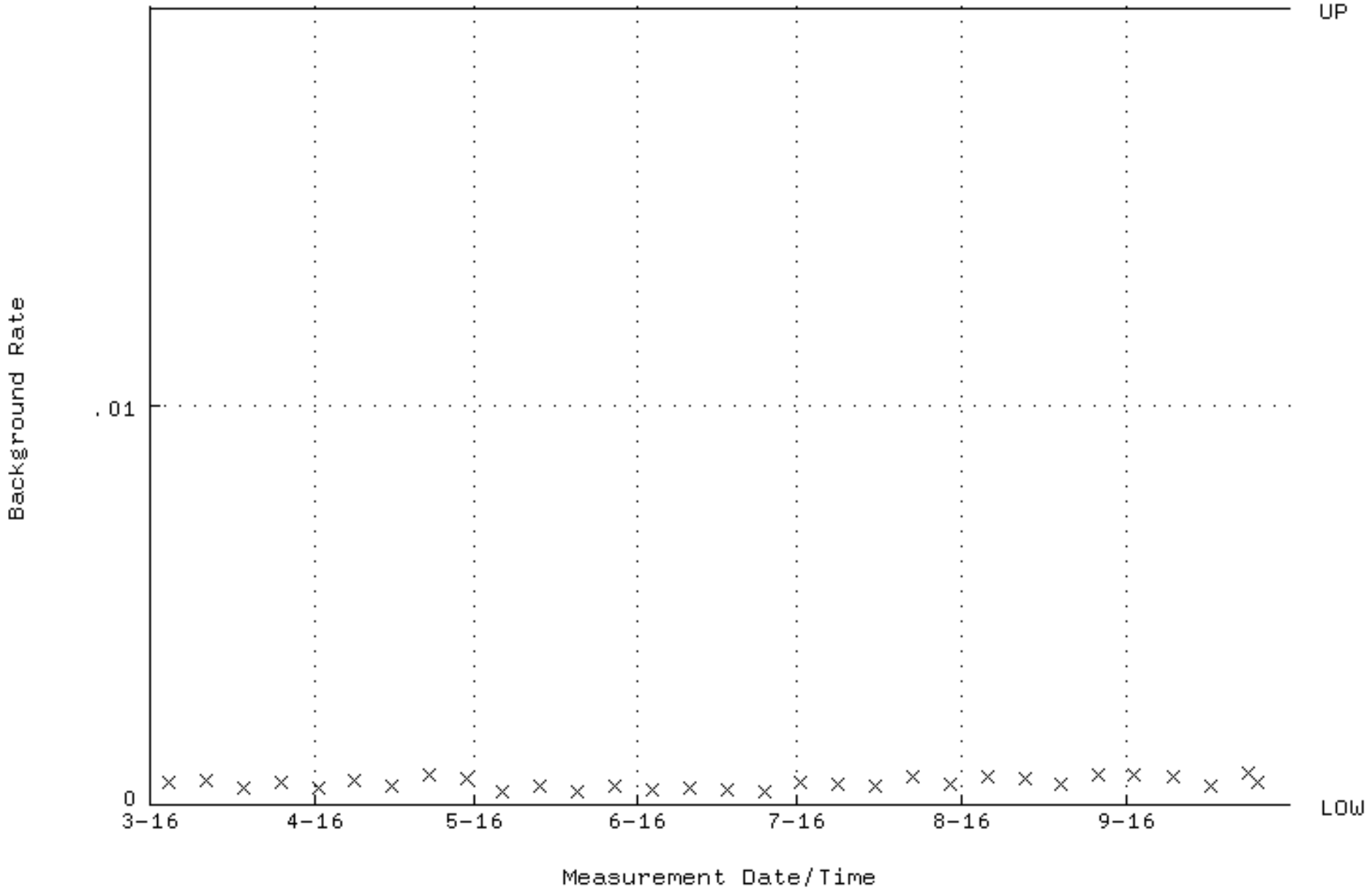
QA filename : DKA100:[ENV_ALPHA.QA.W]W069.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



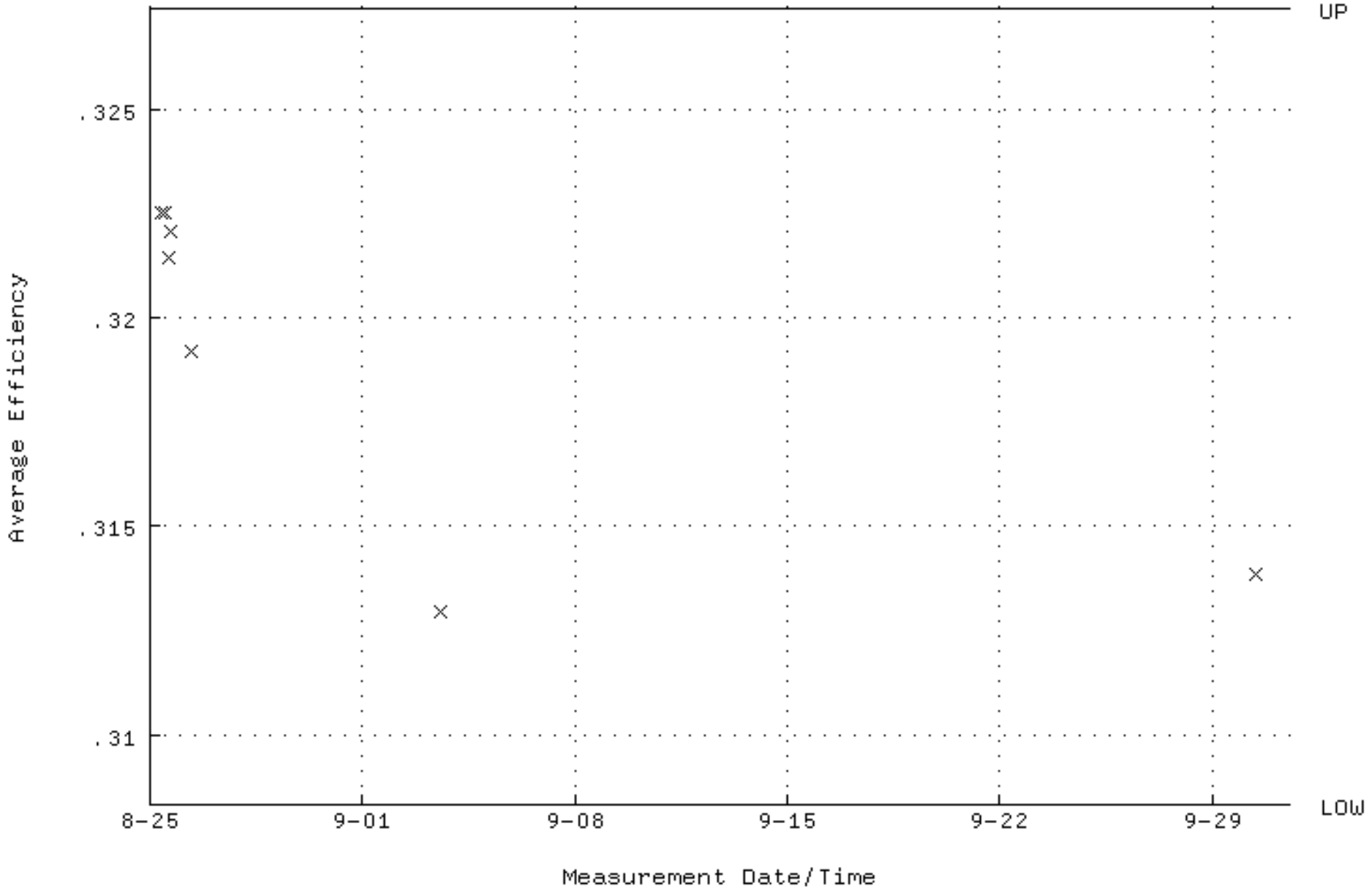
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



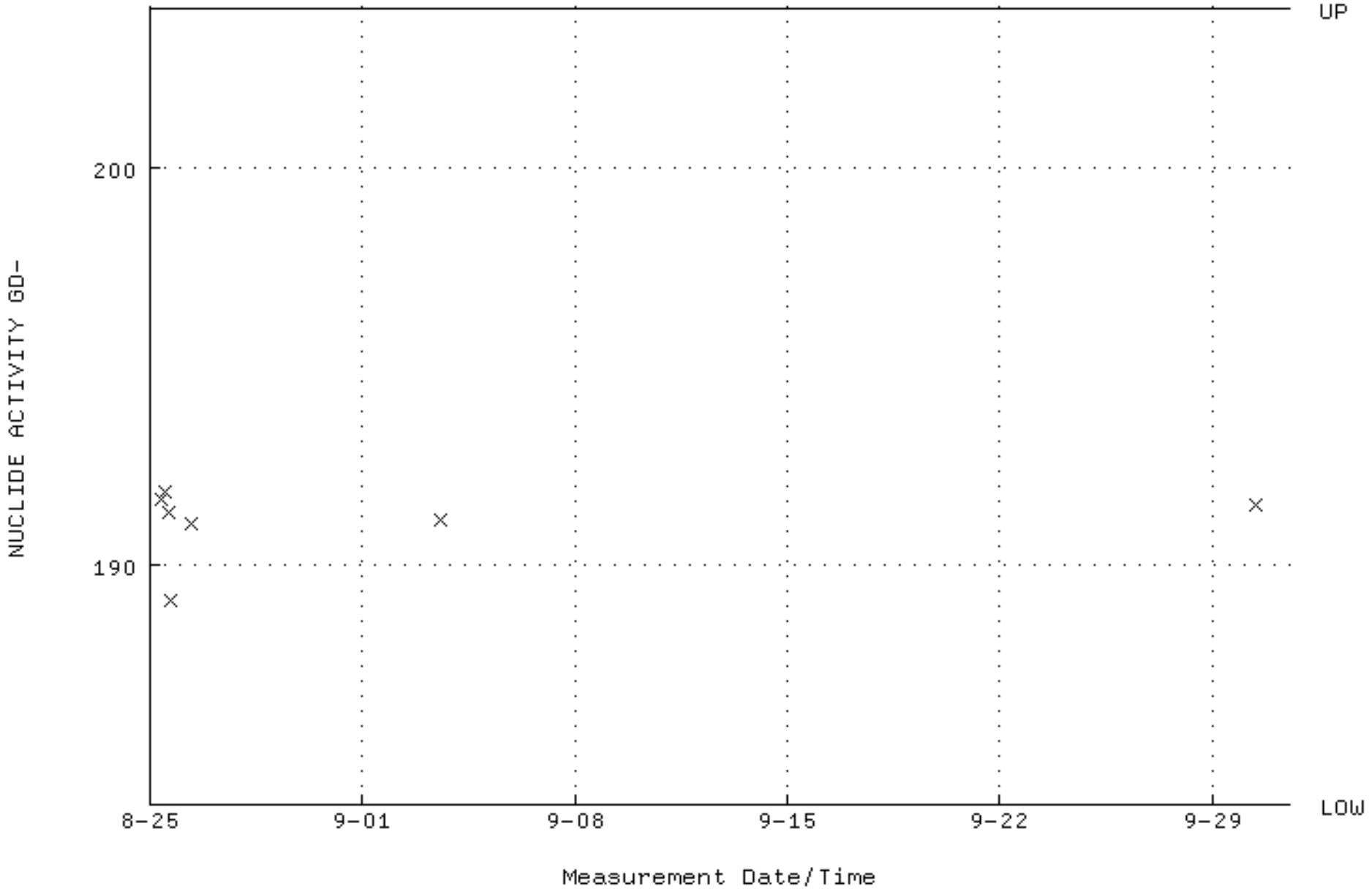
QA filename : DKA100:[ENV_ALPHA.QA.B]B069.QAF;5
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



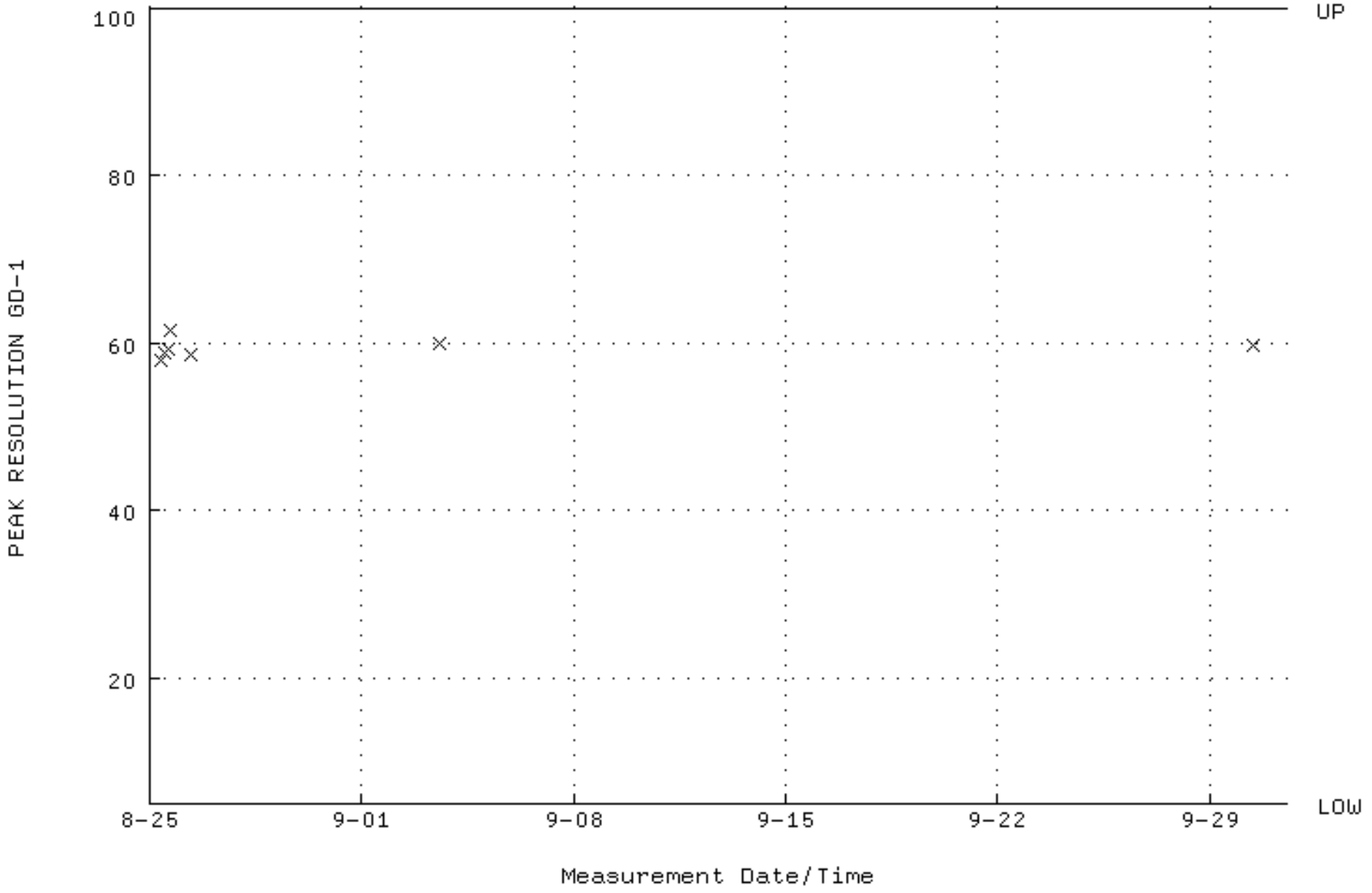
QA filename : DKA100:[ENV_ALPHA.QA.W]W070.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 25-AUG-2016 08:42:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.308333 through 0.327405



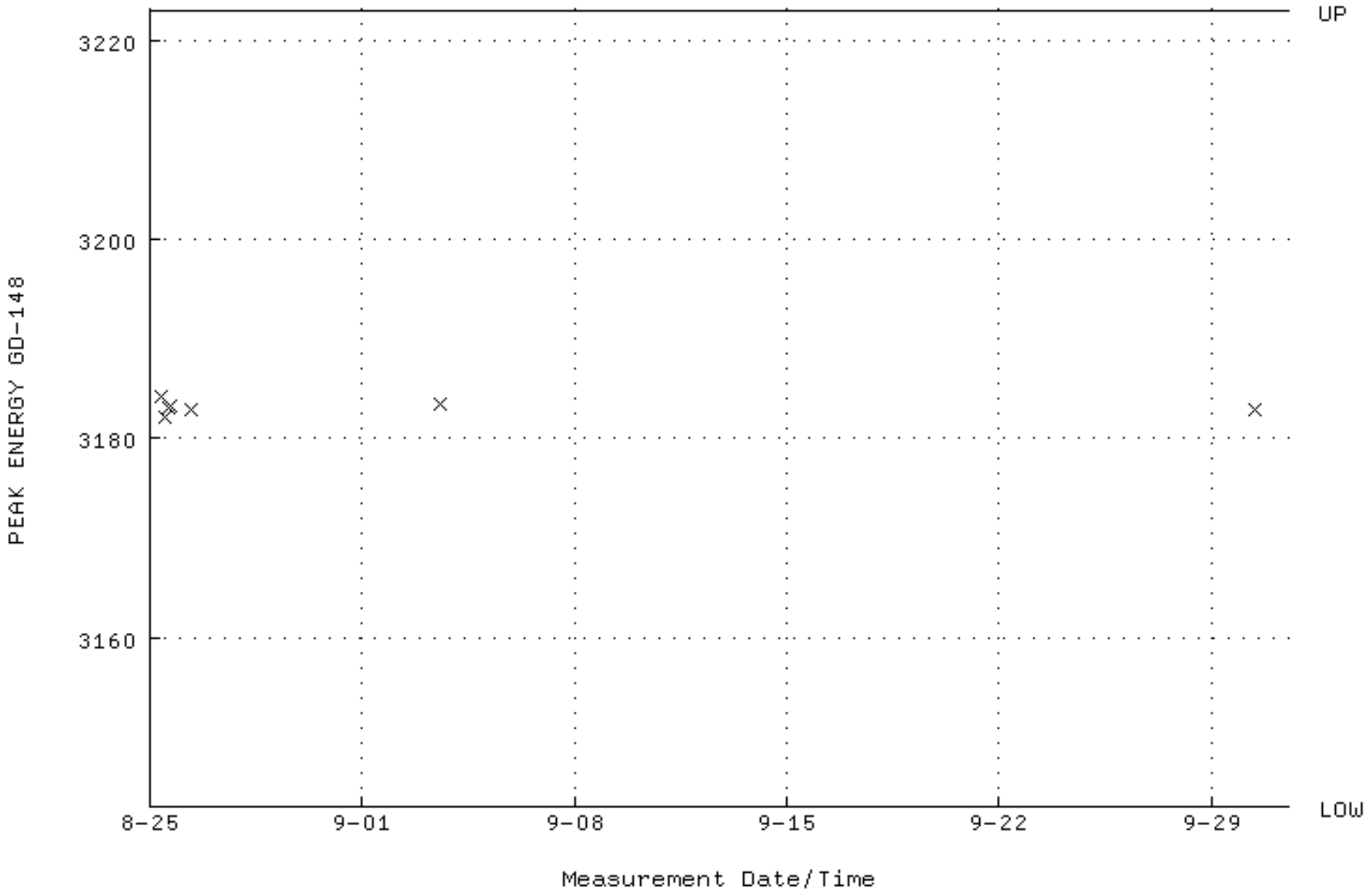
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 25-AUG-2016 08:42:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



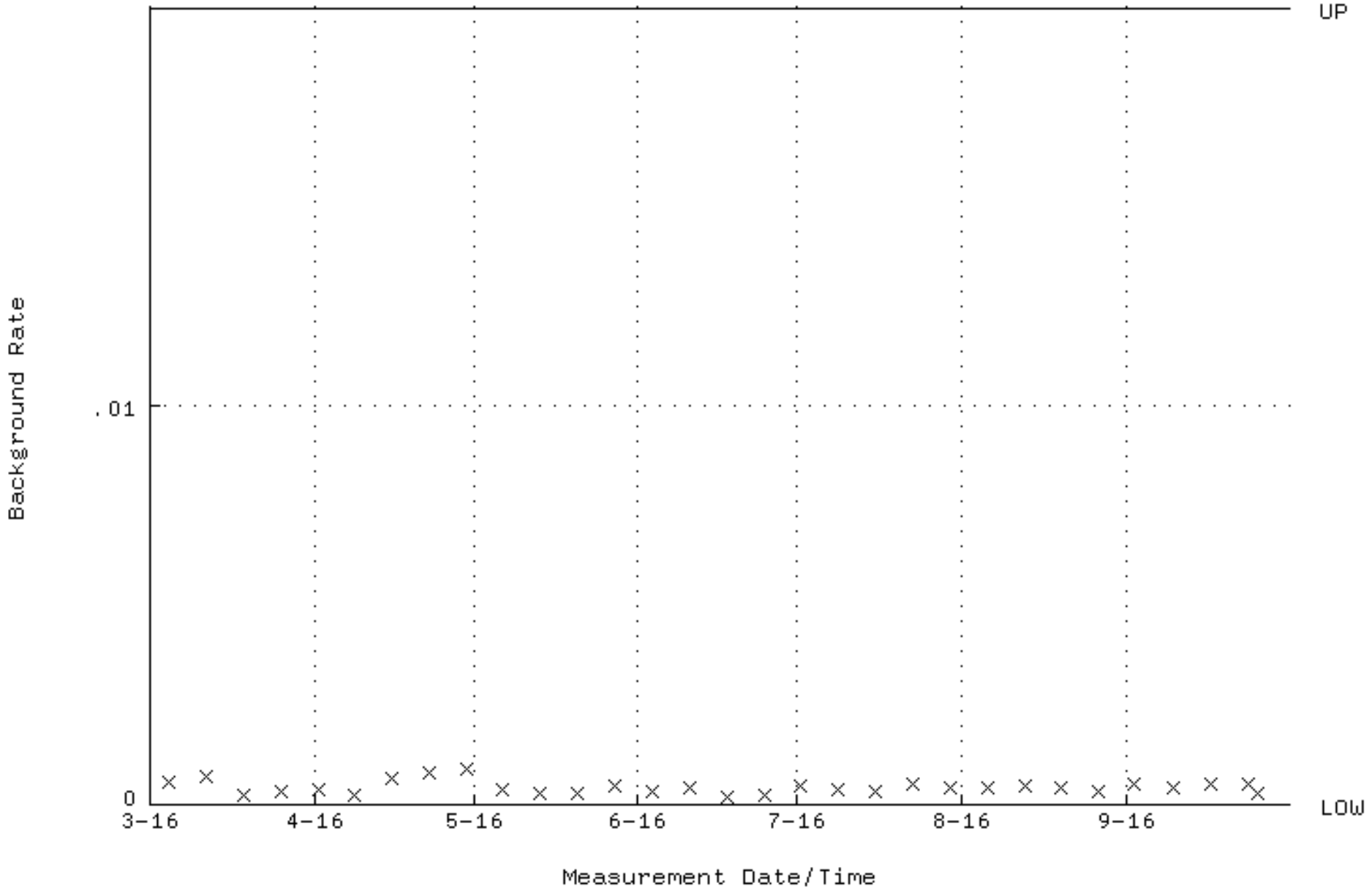
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 25-AUG-2016 08:42:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



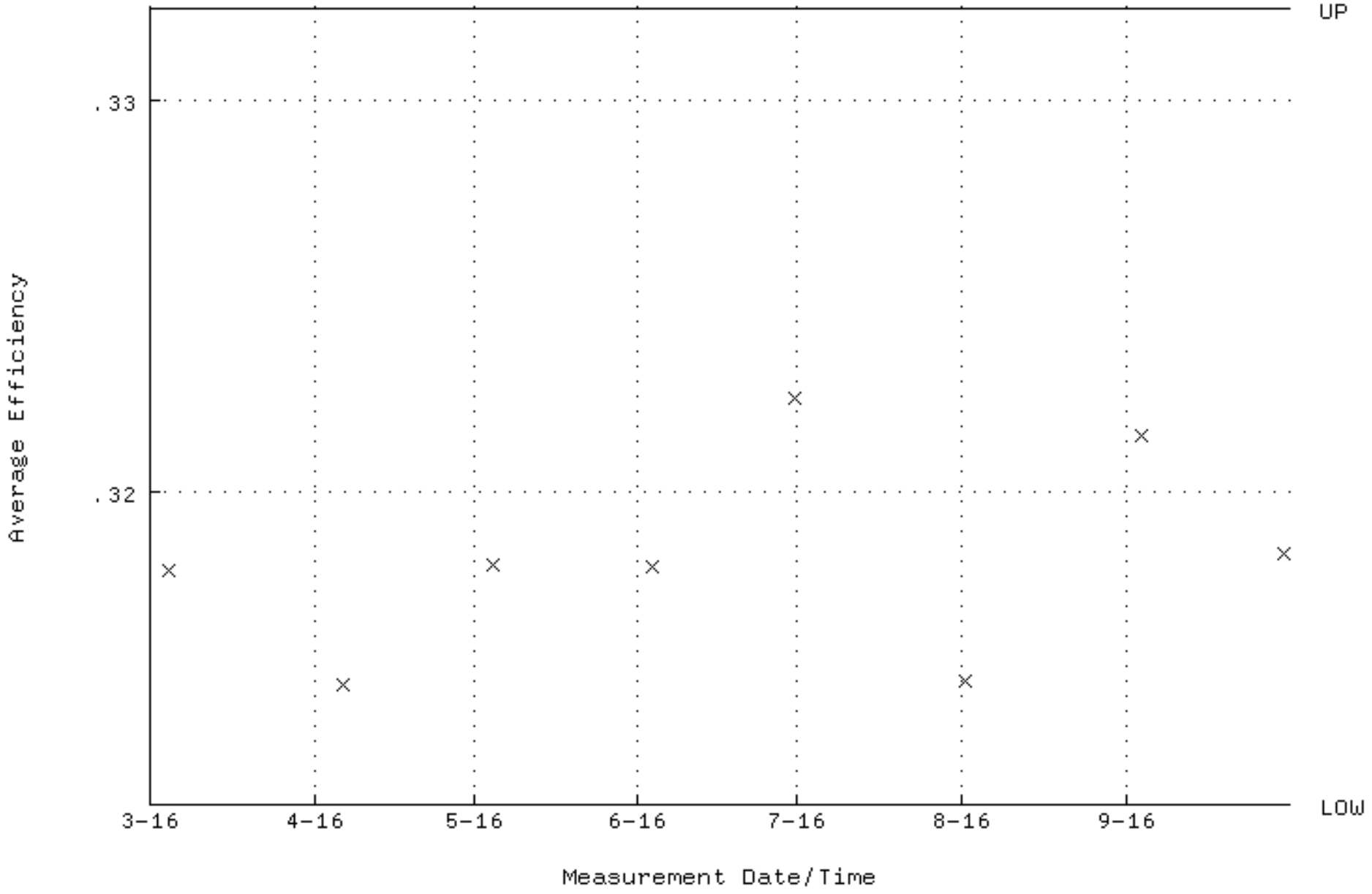
QA filename : DKA100:[ENV_ALPHA.QA.W]W070.QAF;10
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 25-AUG-2016 08:42:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



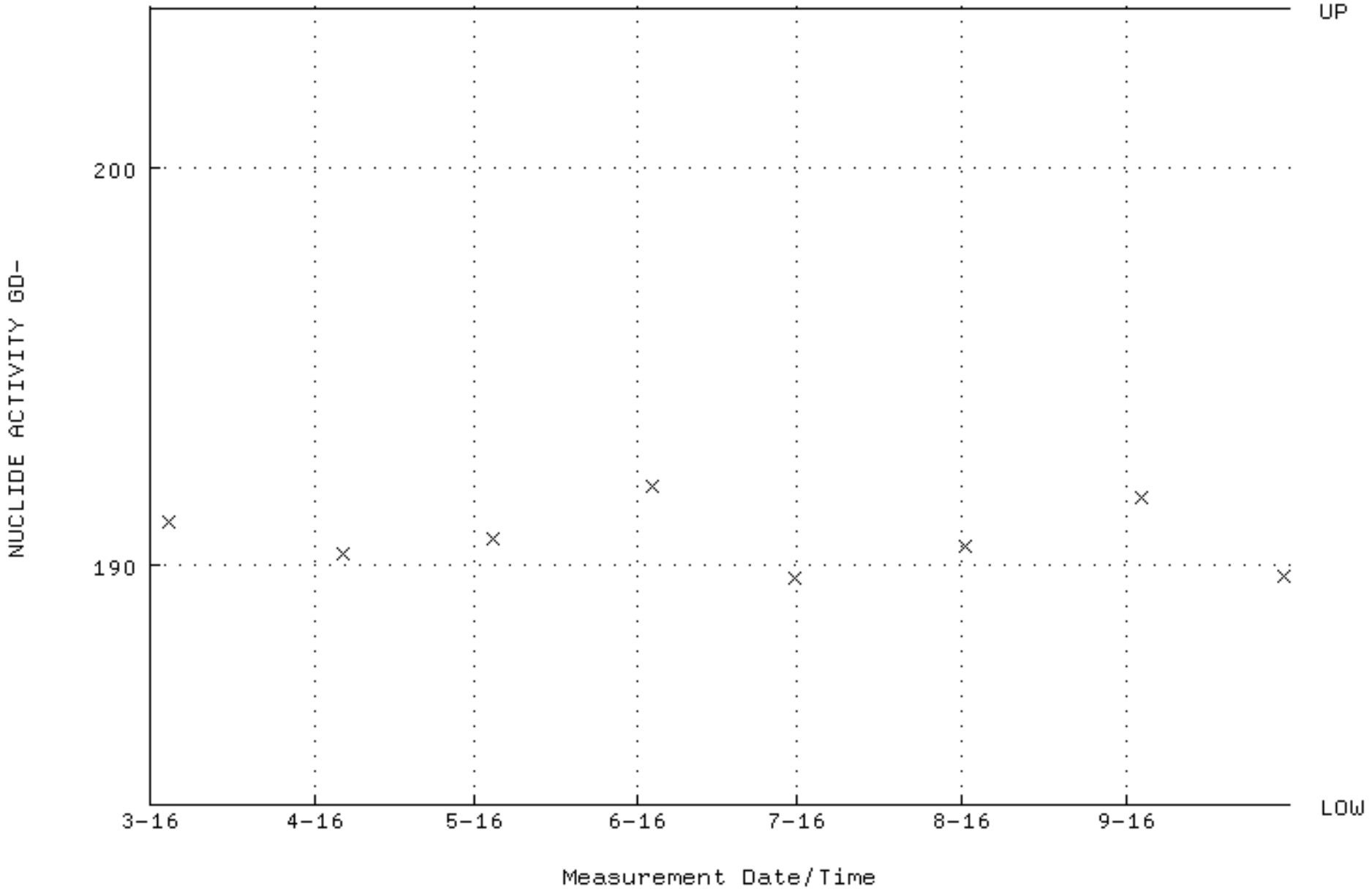
QA filename : DKA100:[ENV_ALPHA.QA.B]B070.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:36 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



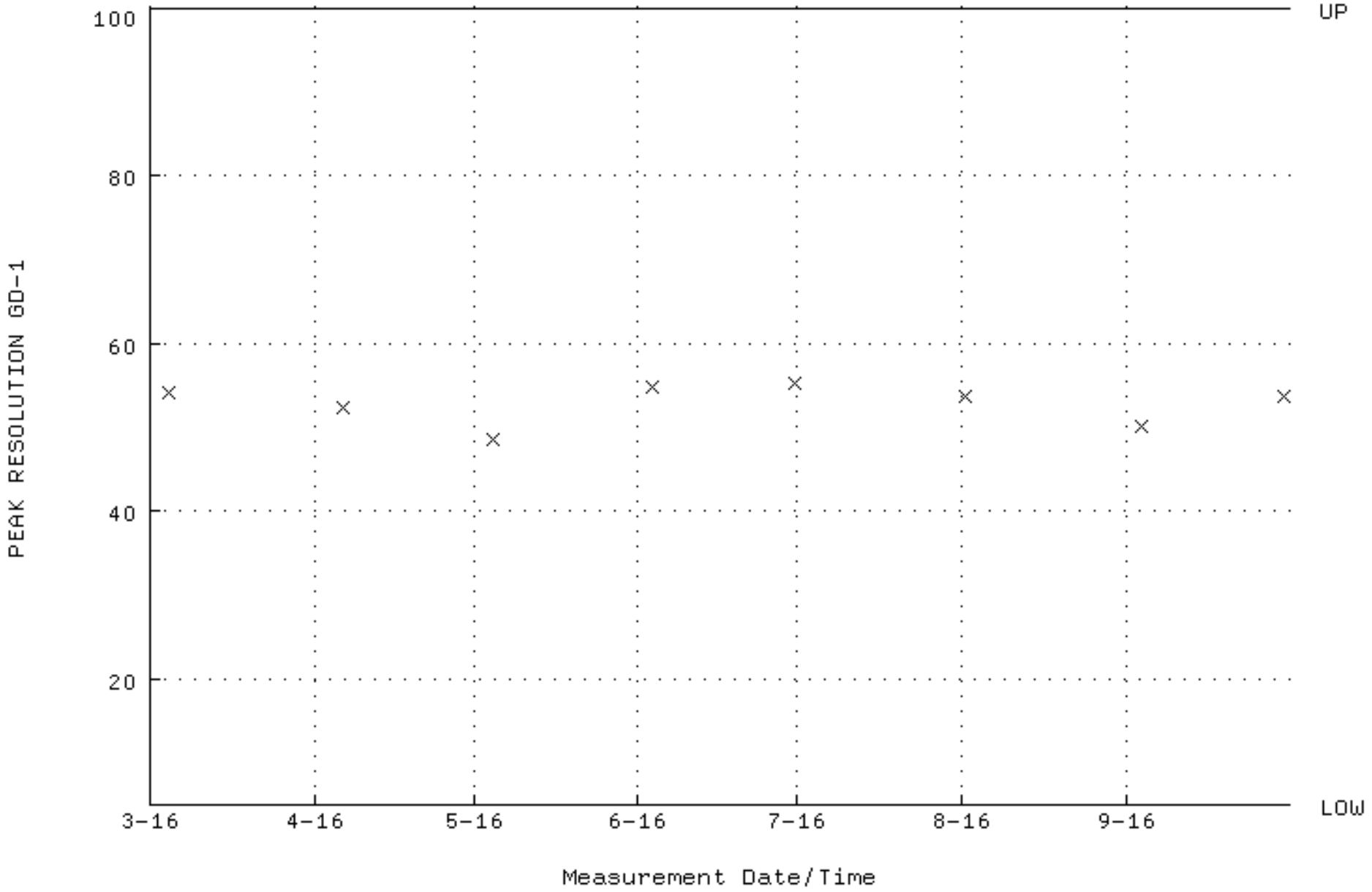
QA filename : DKA100:[ENV_ALPHA.QA.W]W071.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.312000 through 0.332340



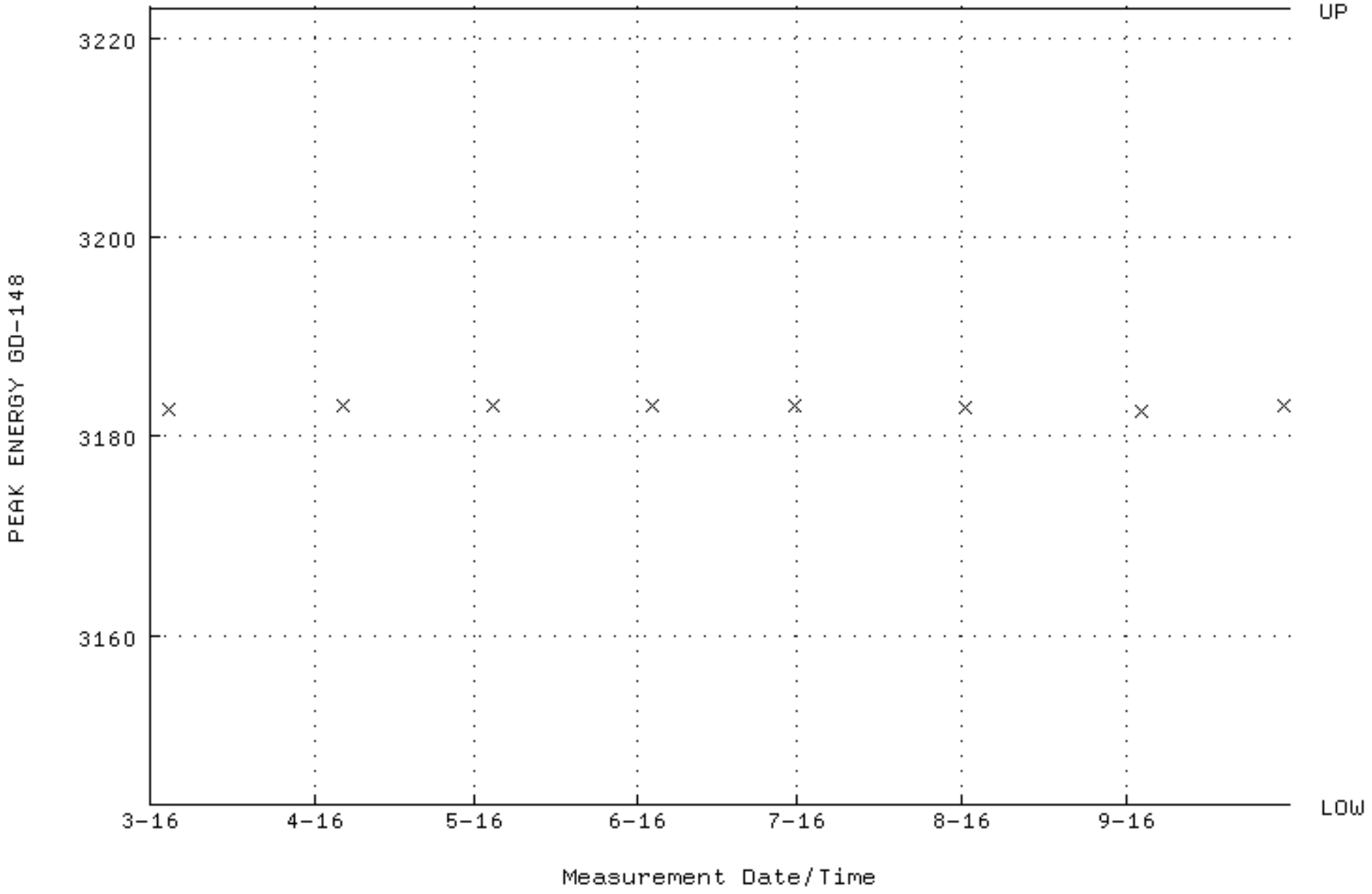
QA filename : DKA100:[ENV_ALPHA.QA.W]W071.QAF;10
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



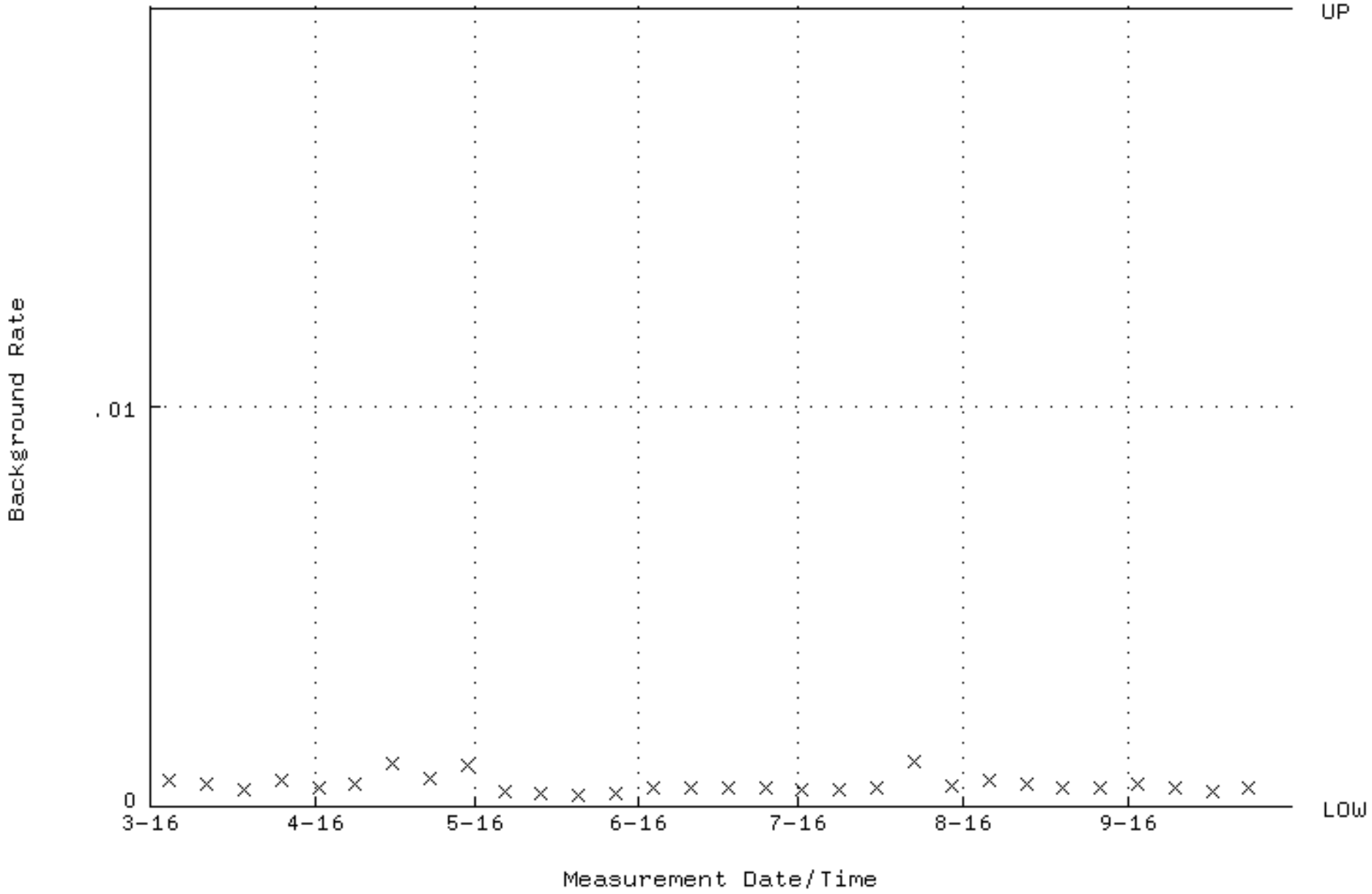
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



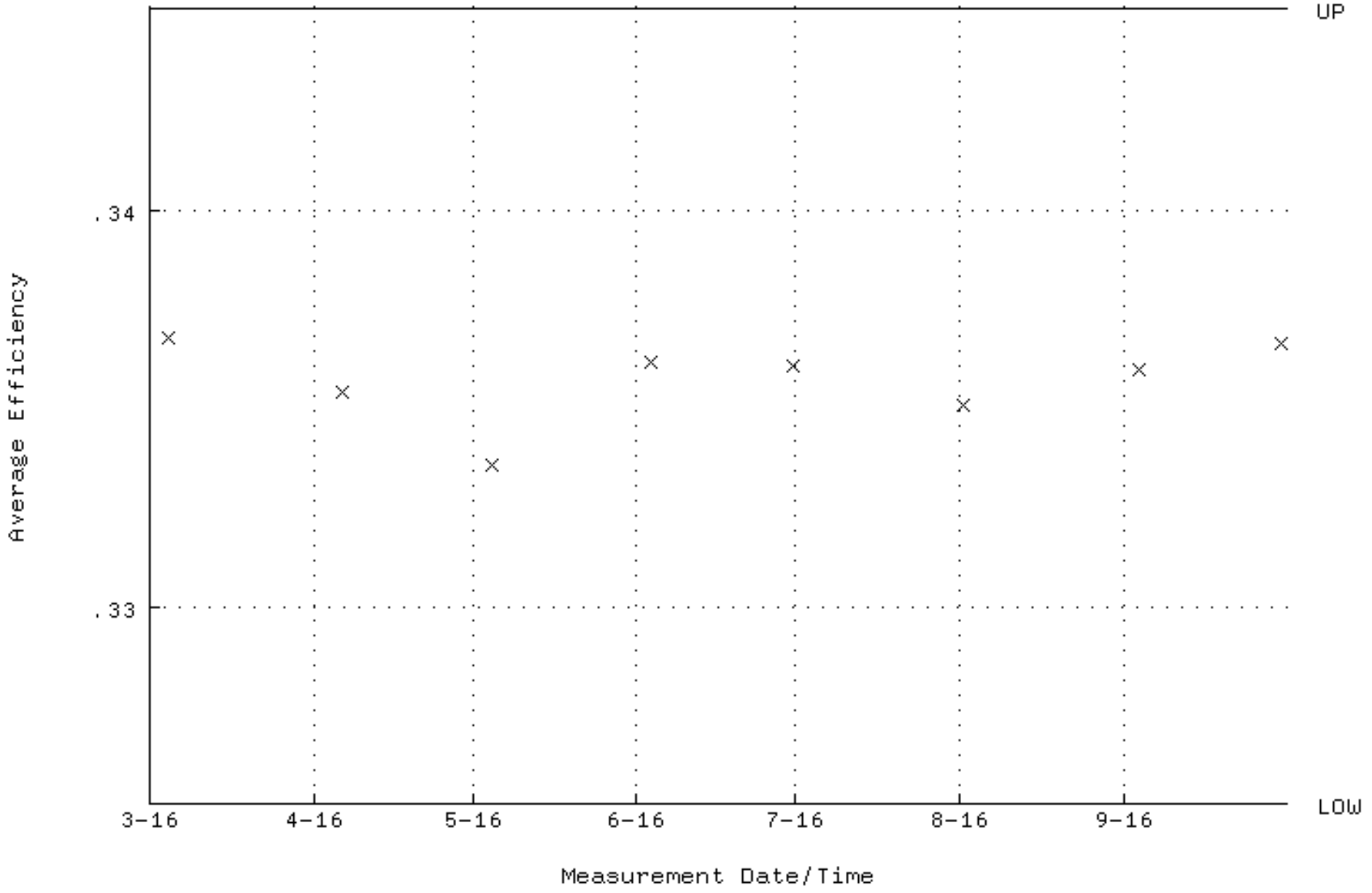
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



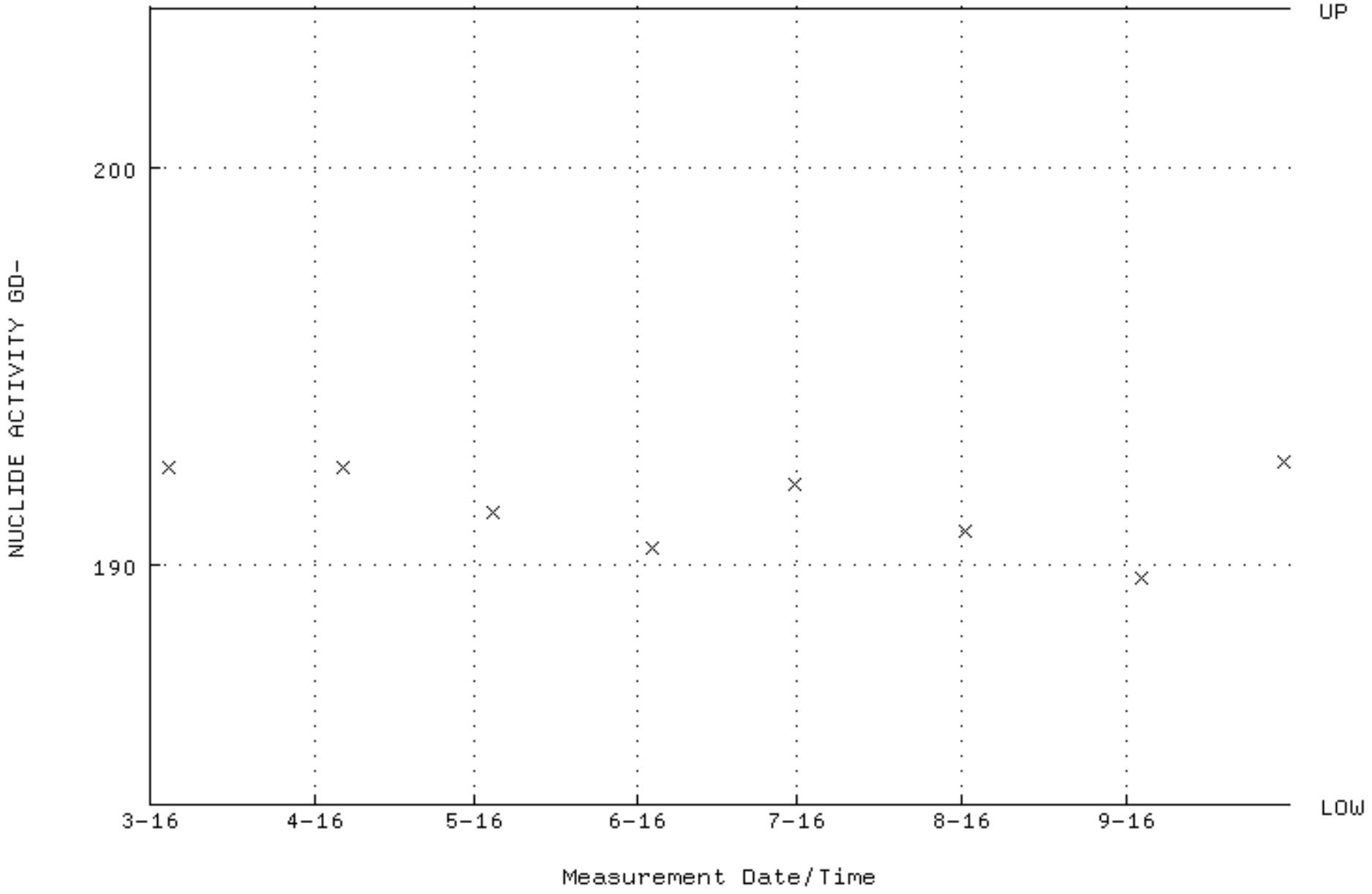
QA filename : DKA100:[ENV_ALPHA.QA.B]B071.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:38 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



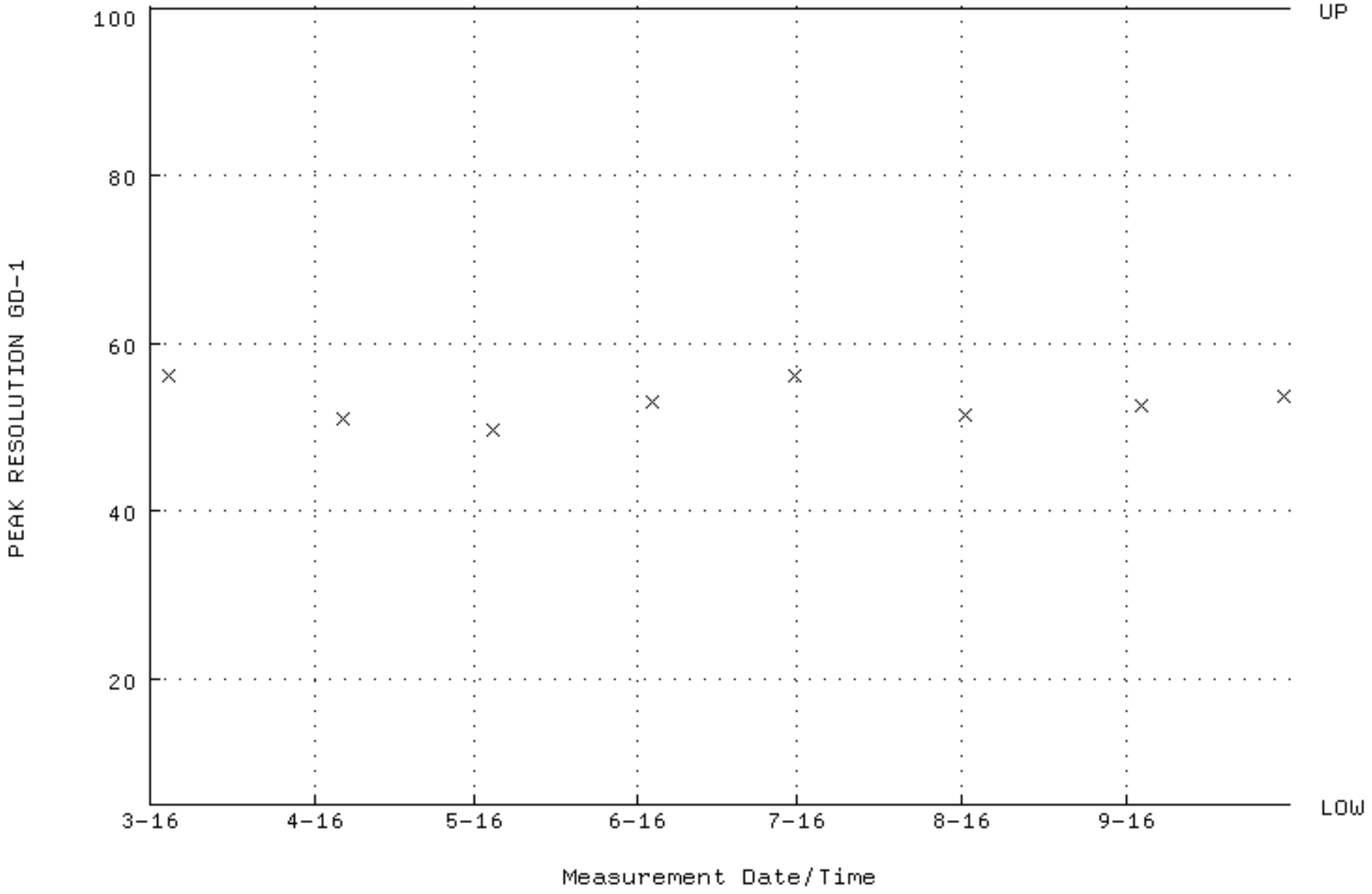
QA filename : DKA100:[ENV_ALPHA.QA.W]W073.QAF;14
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.325020 through 0.345130



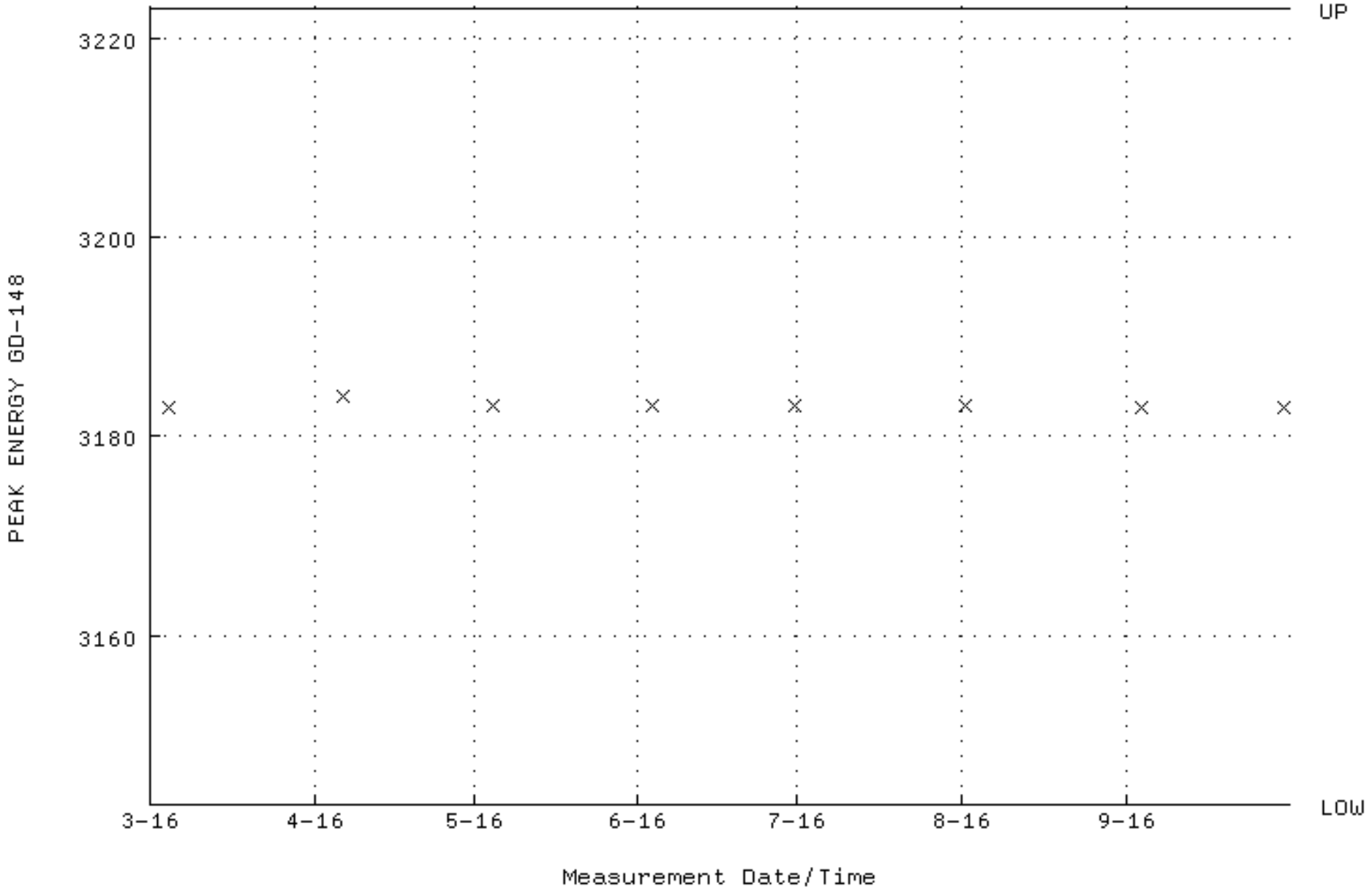
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



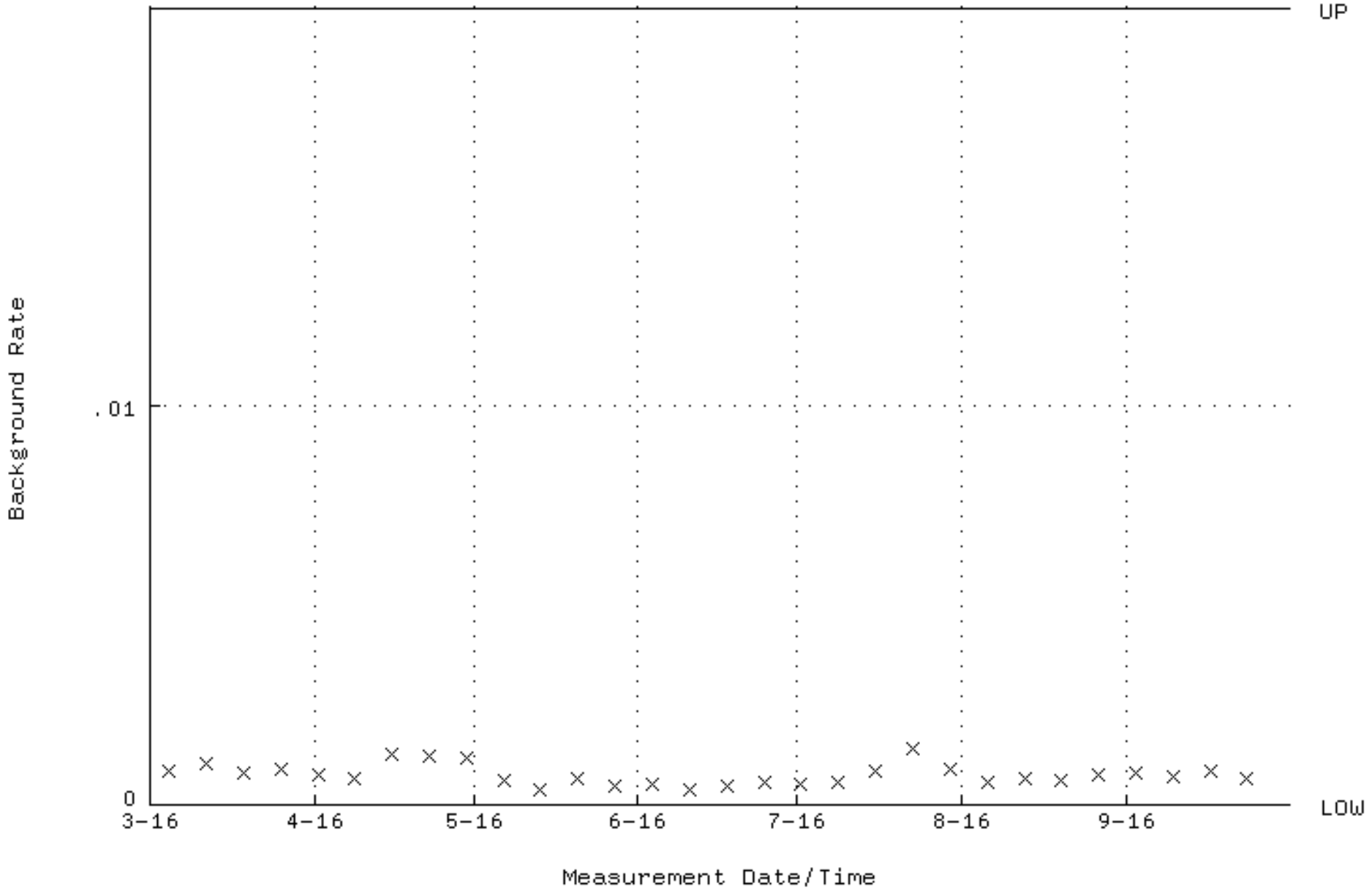
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



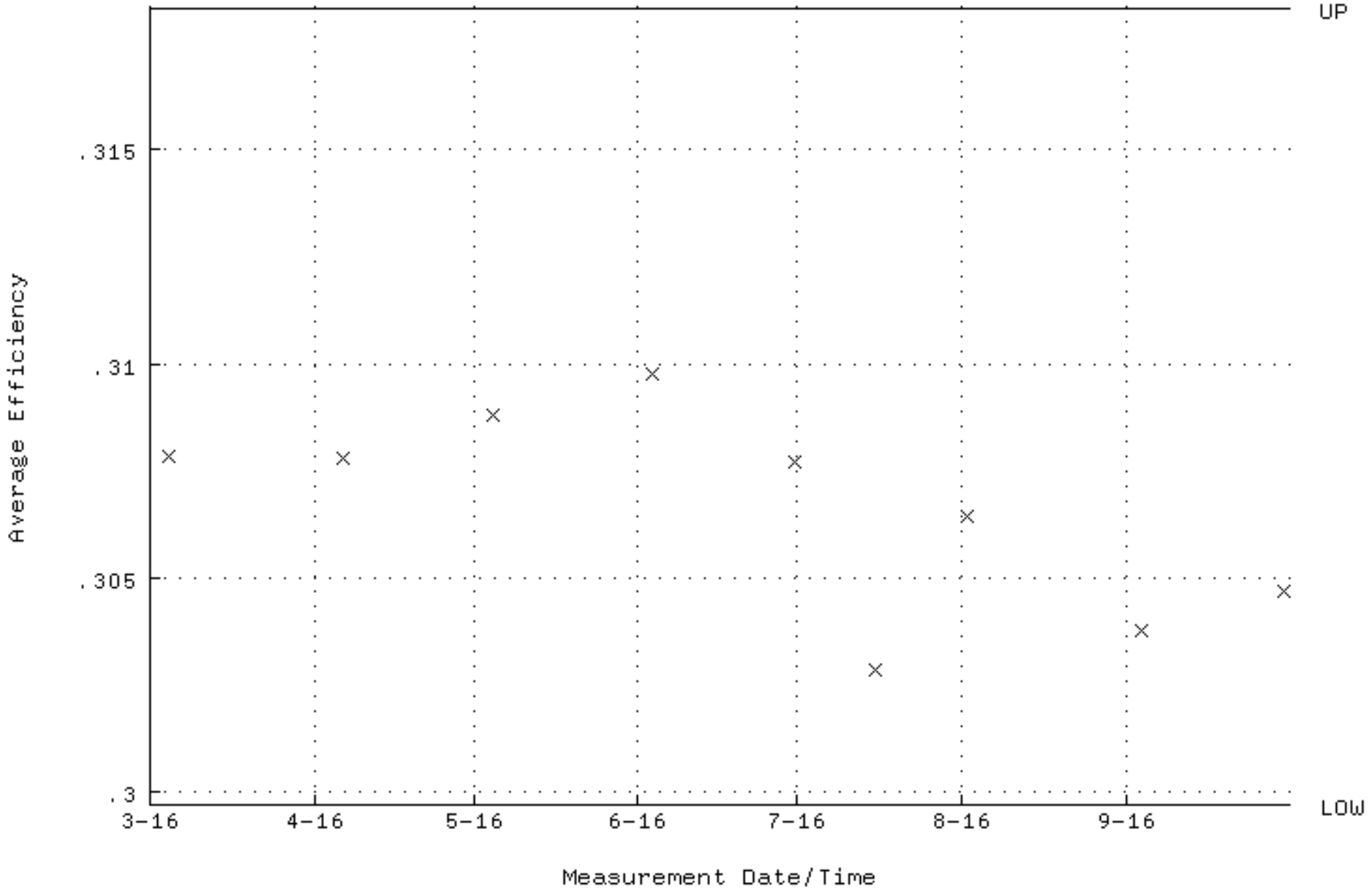
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



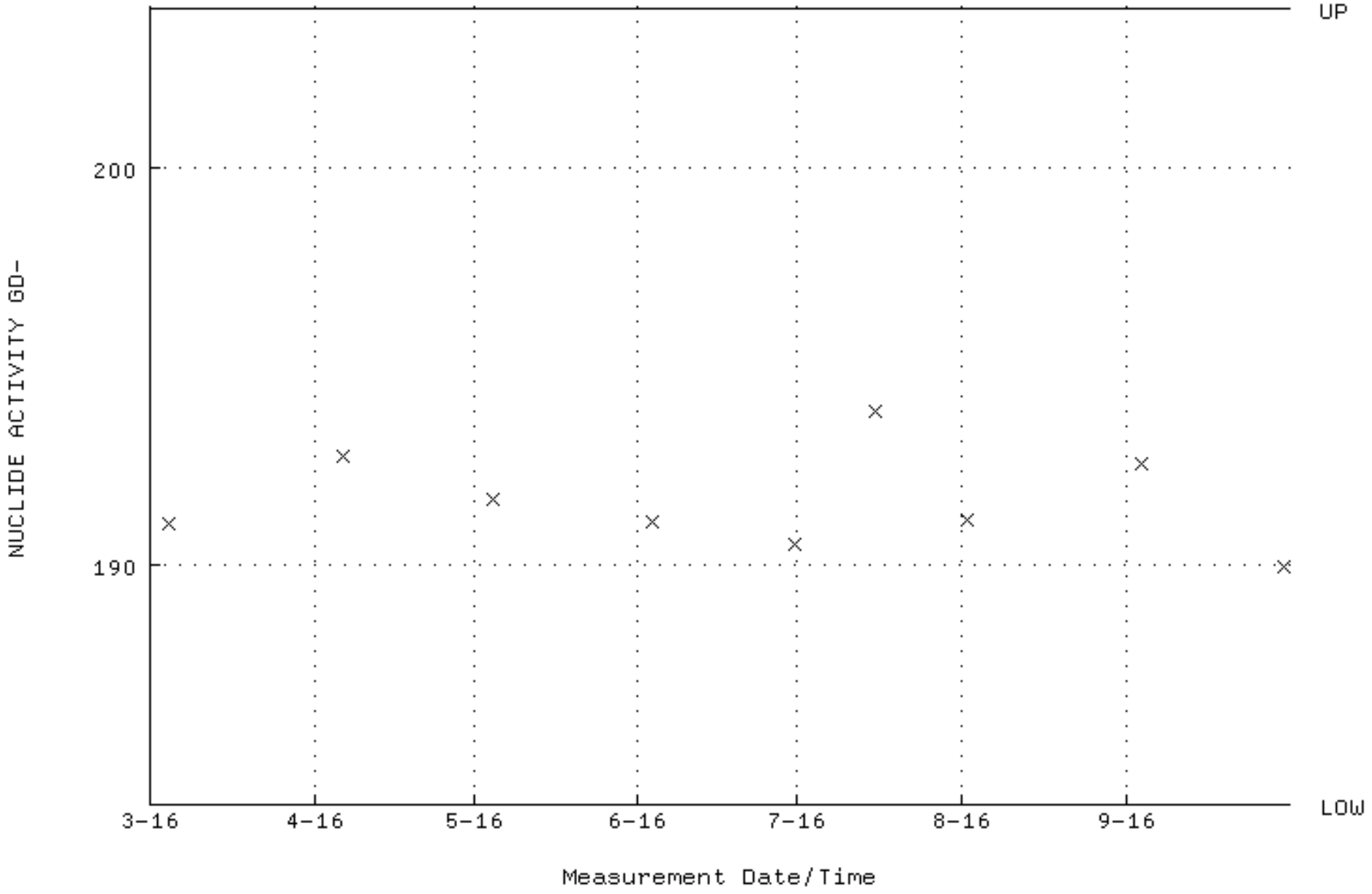
QA filename : DKA100:[ENV_ALPHA.QA.B]B073.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:38 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



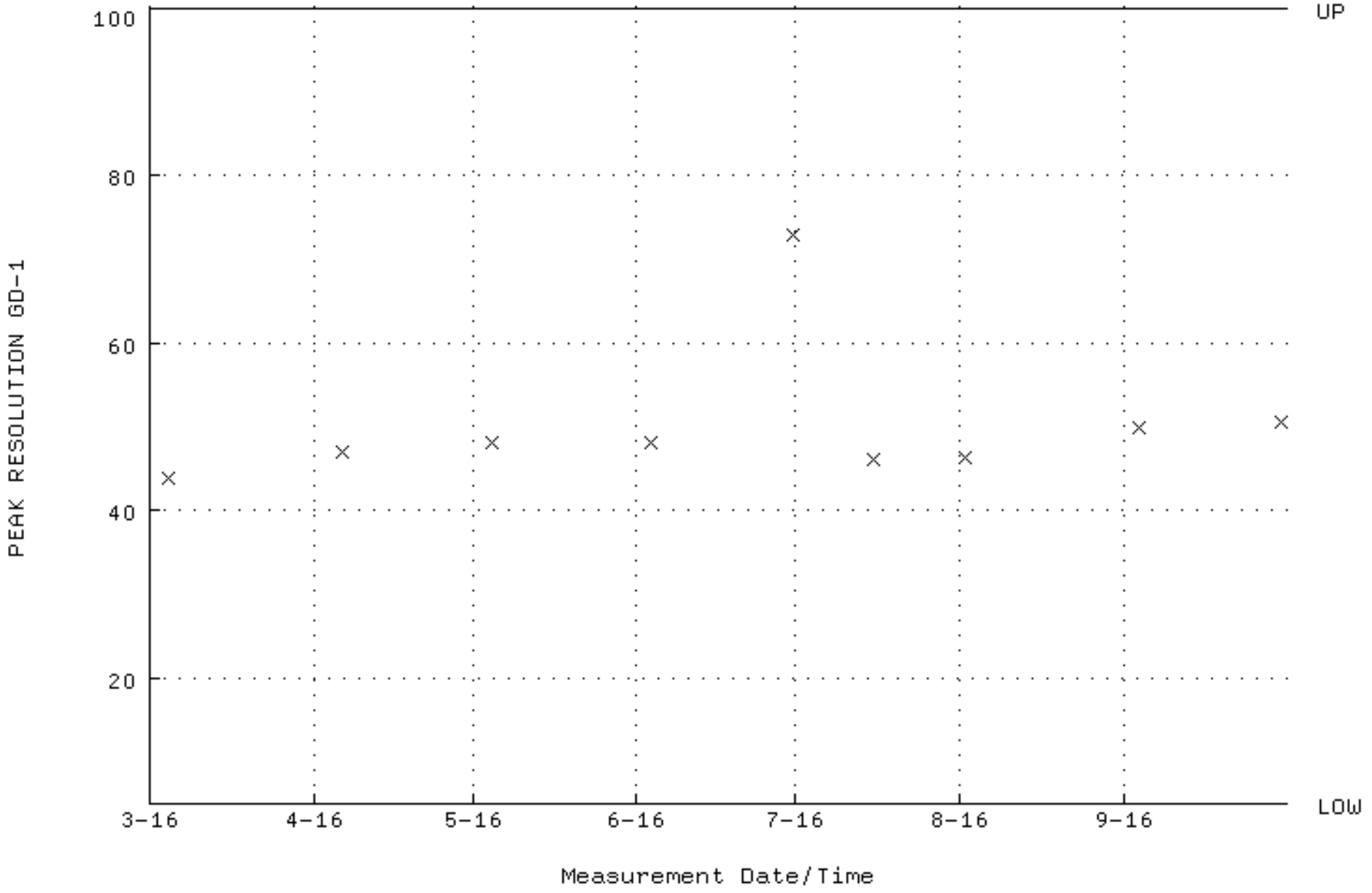
QA filename : DKA100:[ENV_ALPHA.QA.W]W074.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.299700 through 0.318290



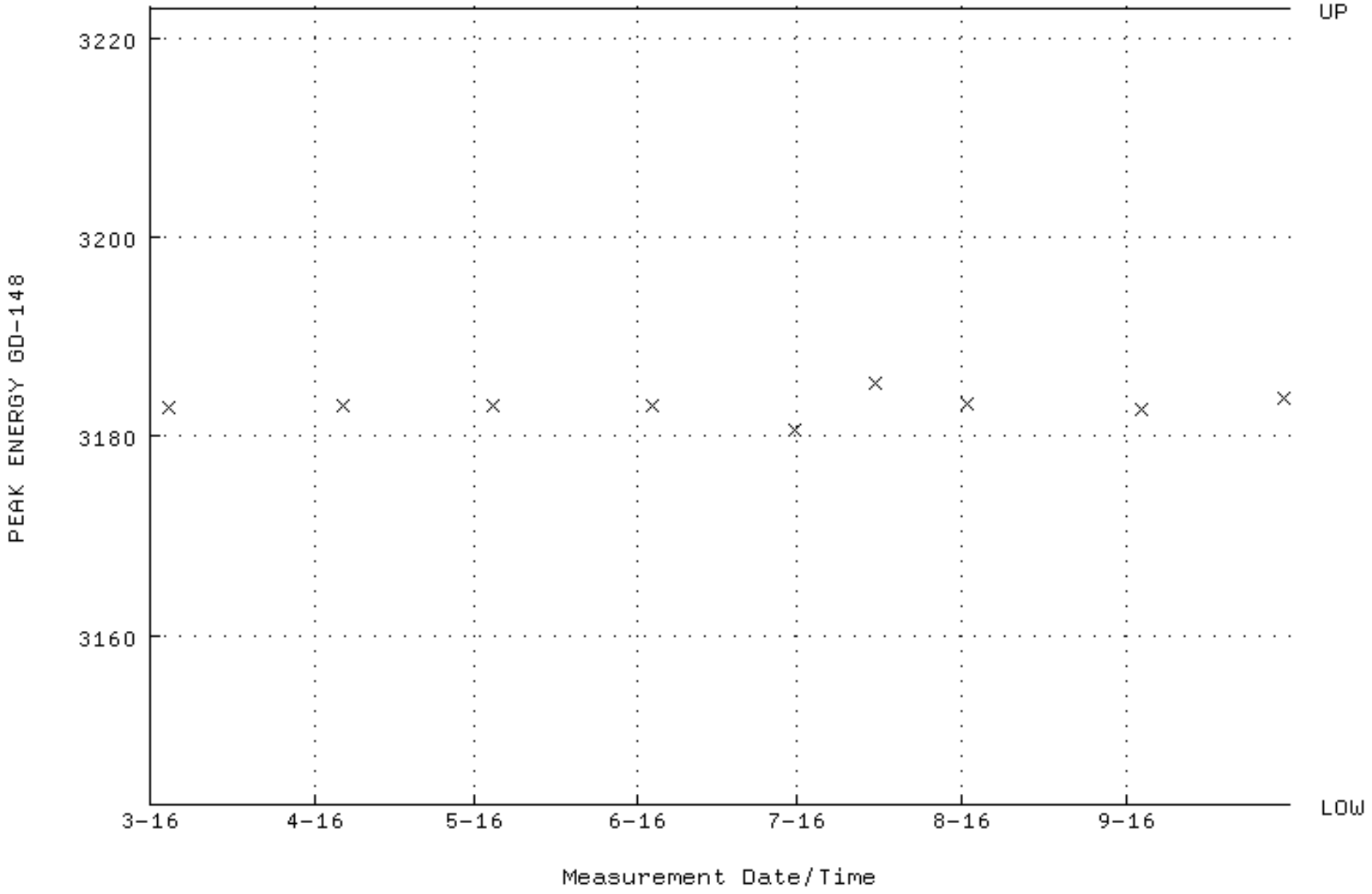
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



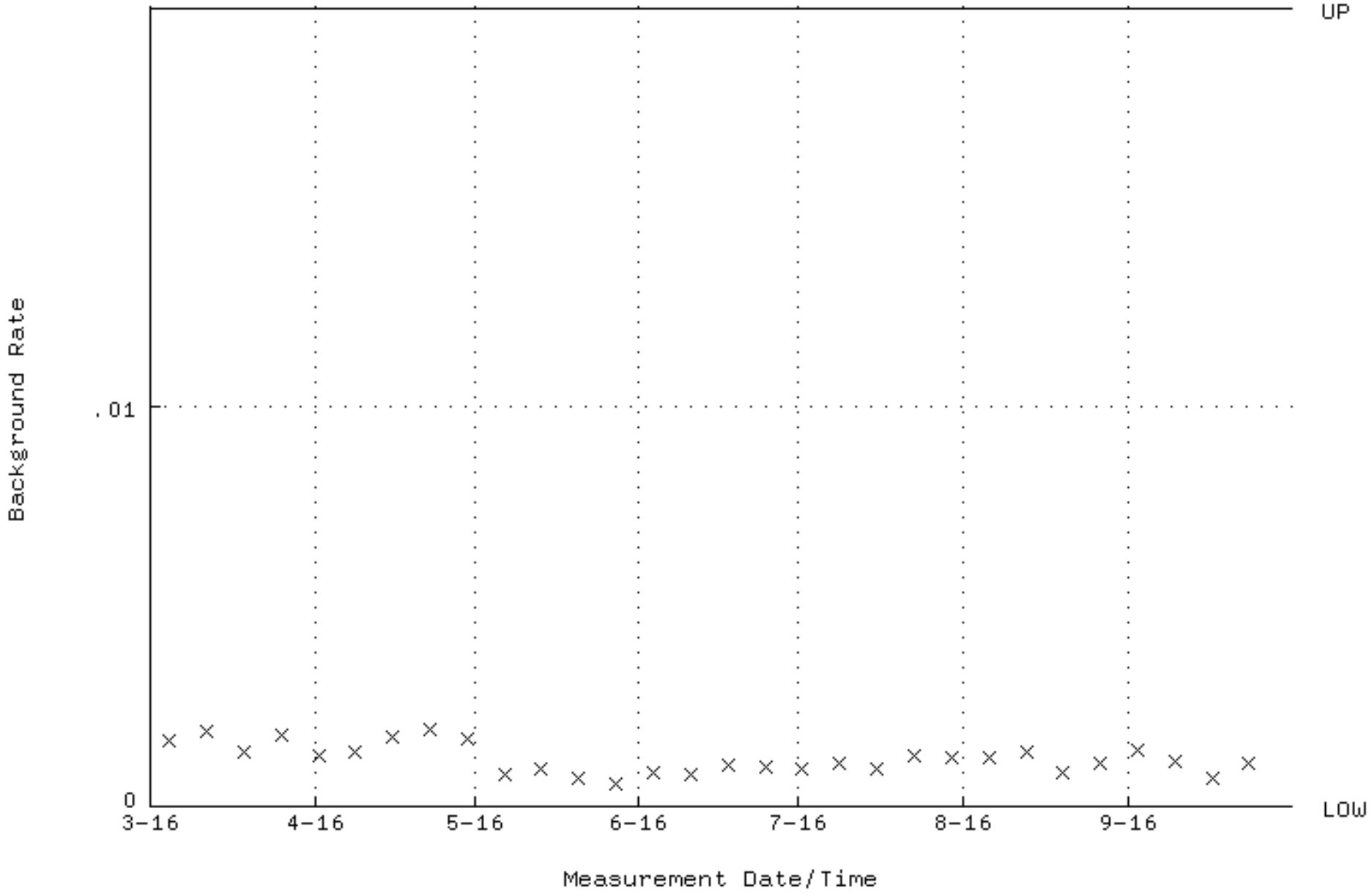
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



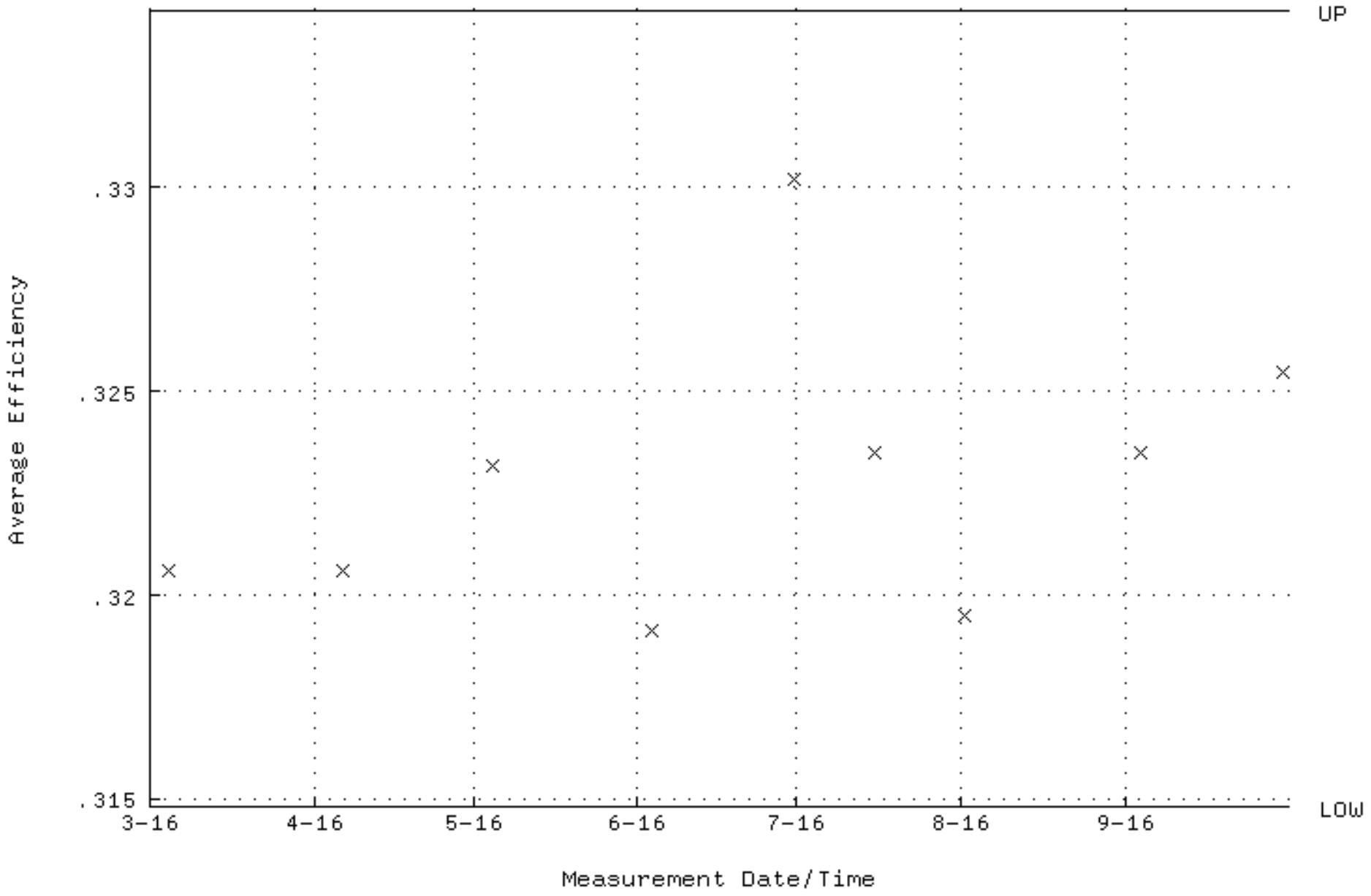
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



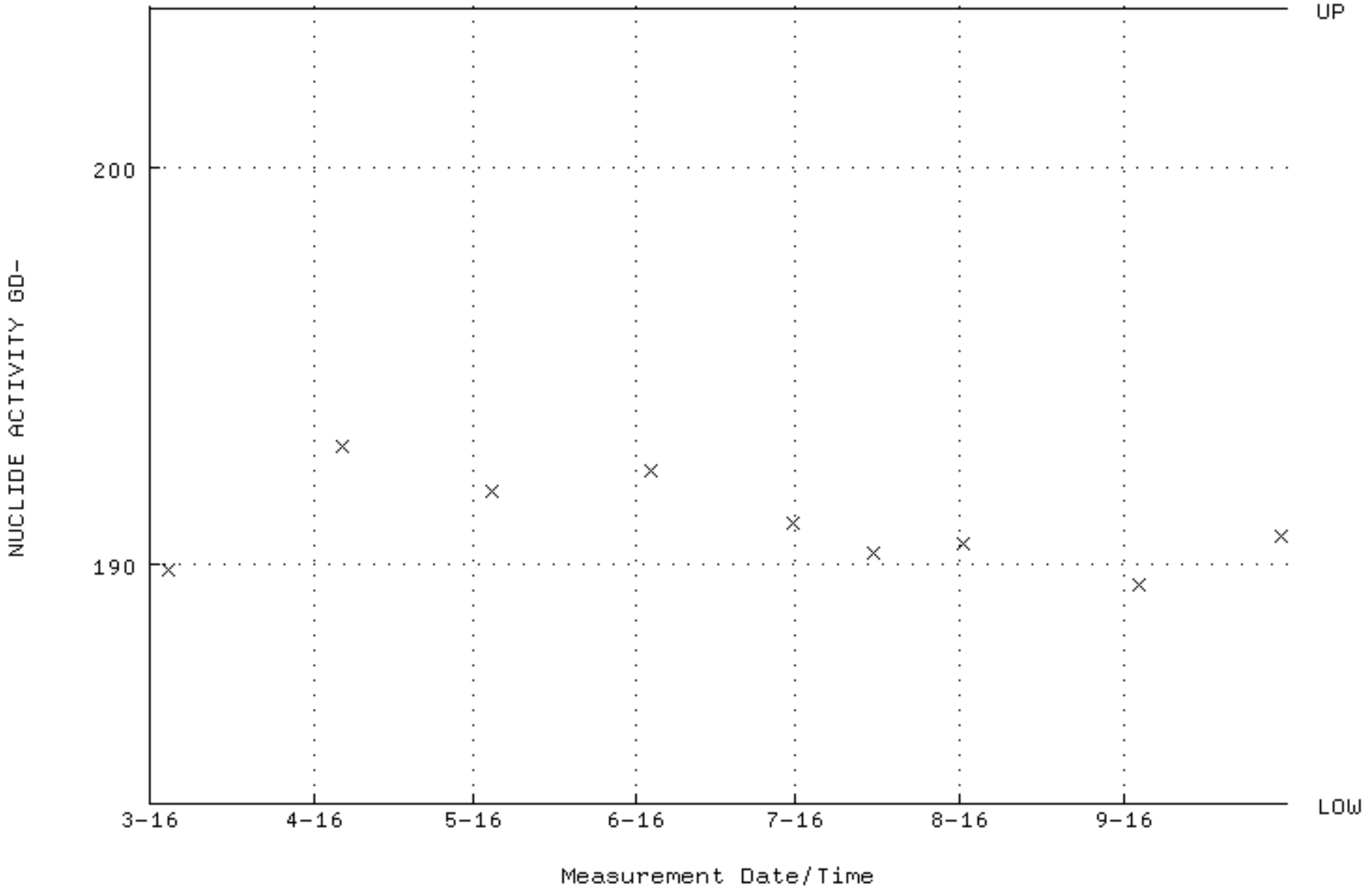
QA filename : DKA100:[ENV_ALPHA.QA.B]B074.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:38 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



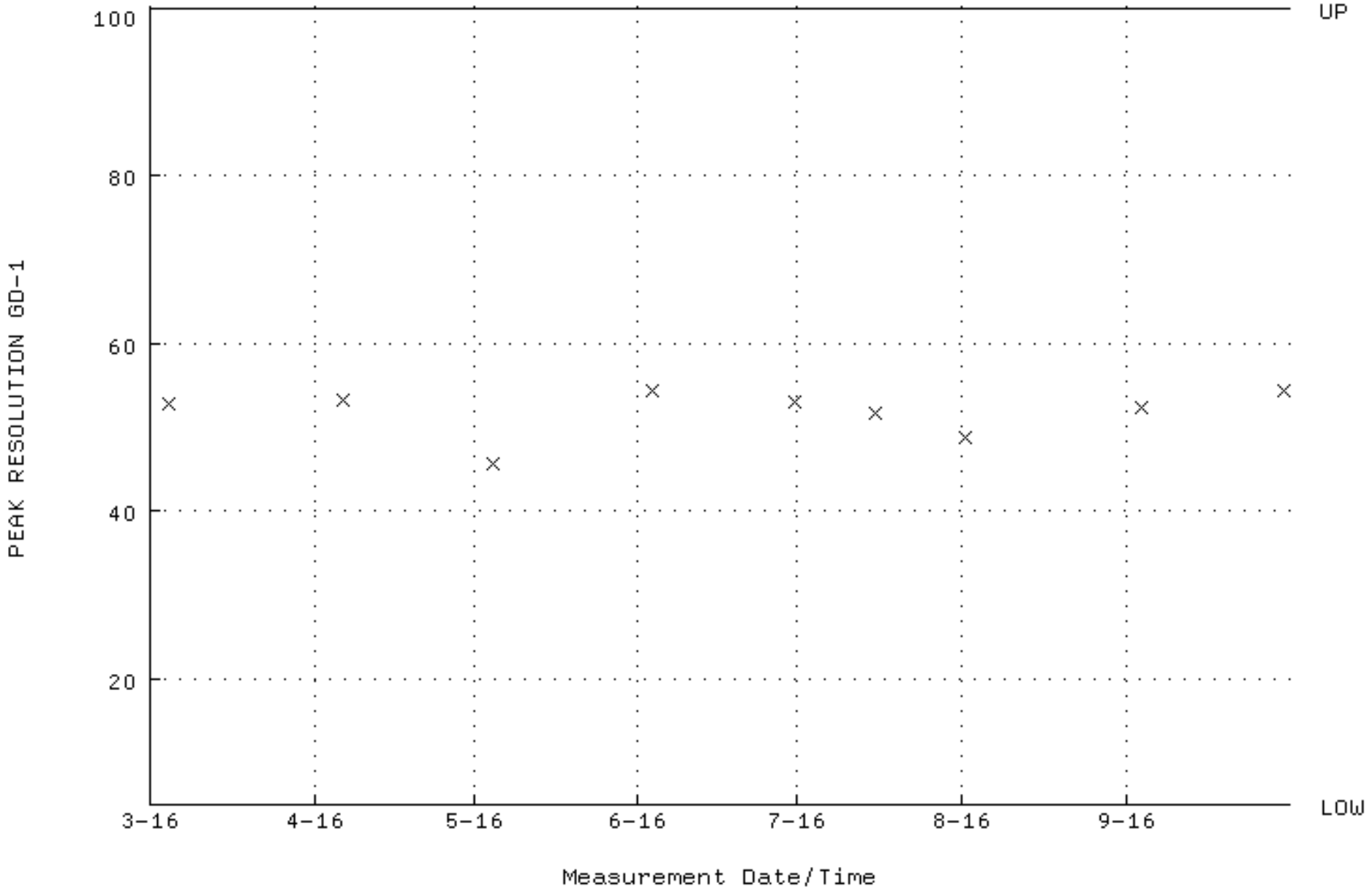
QA filename : DKA100:[ENV_ALPHA.QA.W]W075.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.314814 through 0.334287



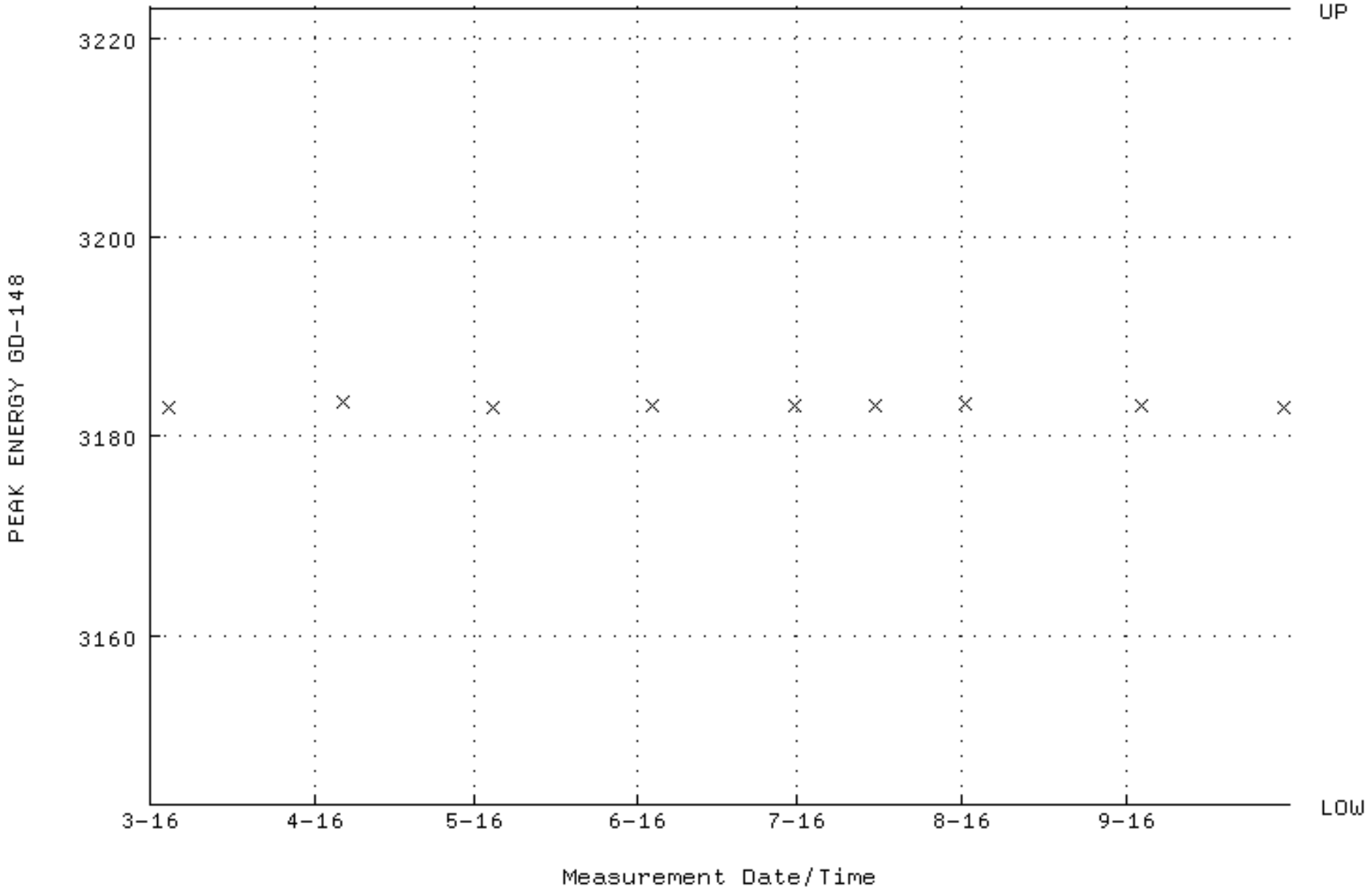
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



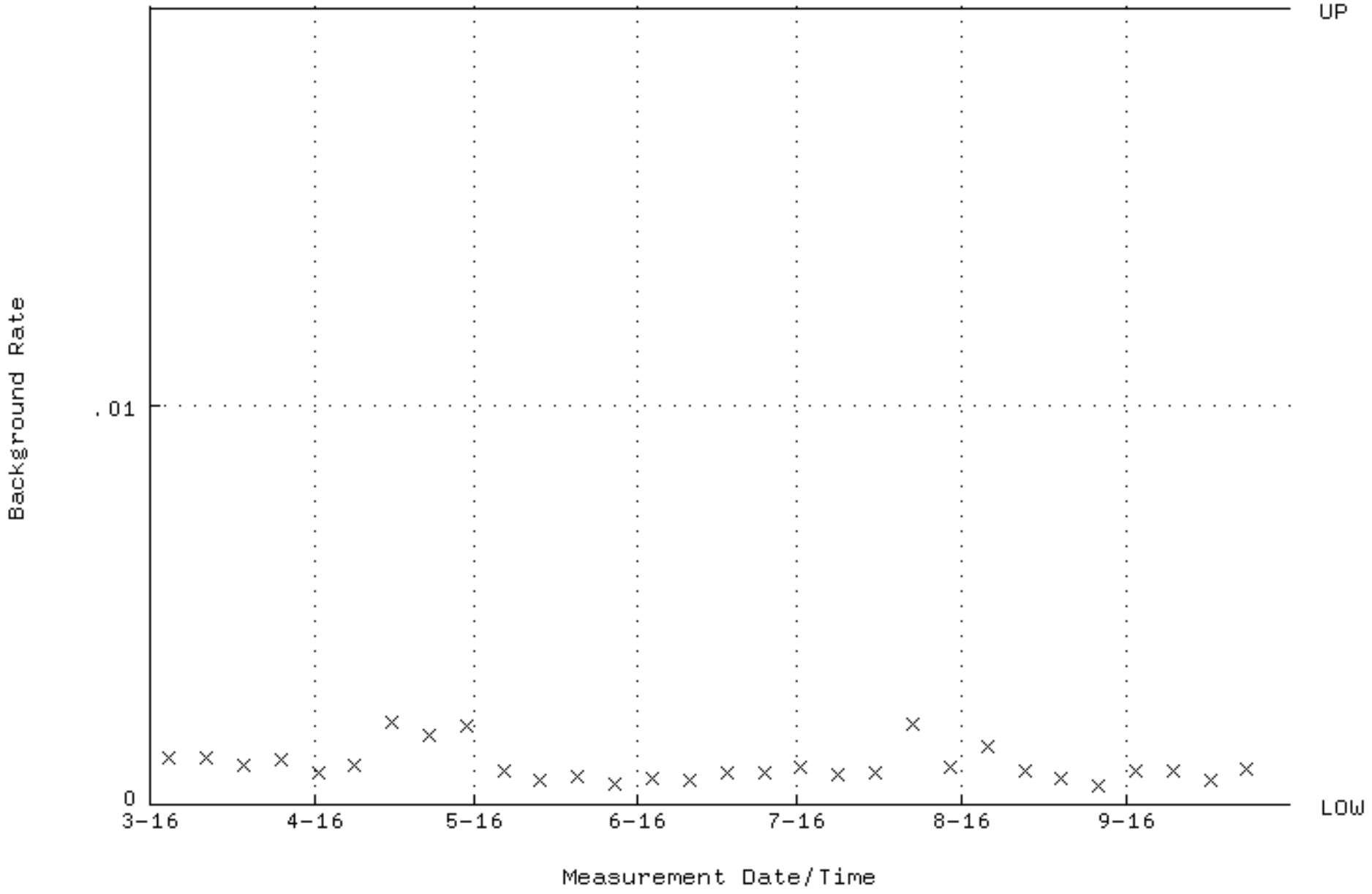
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



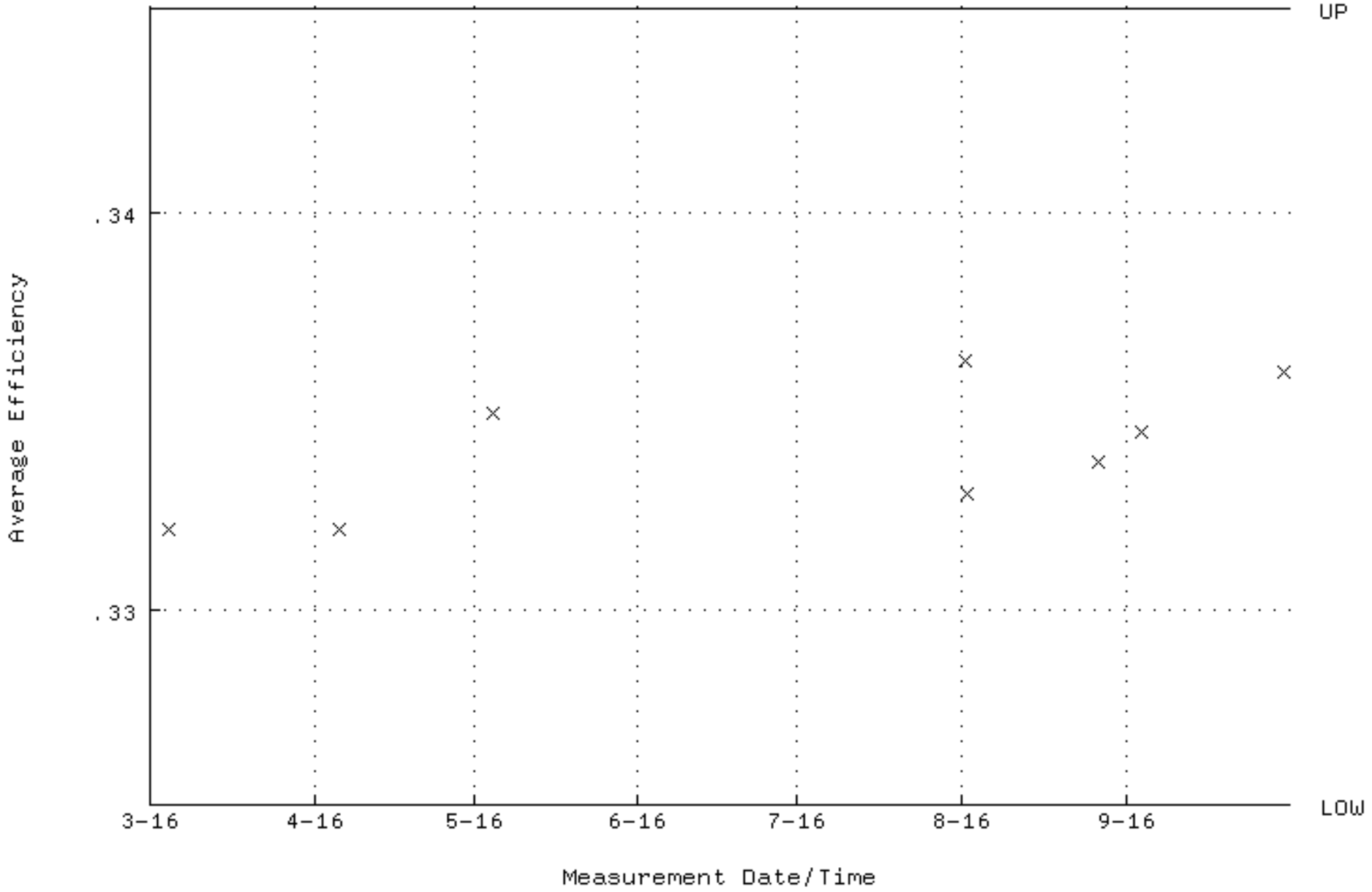
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:07 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



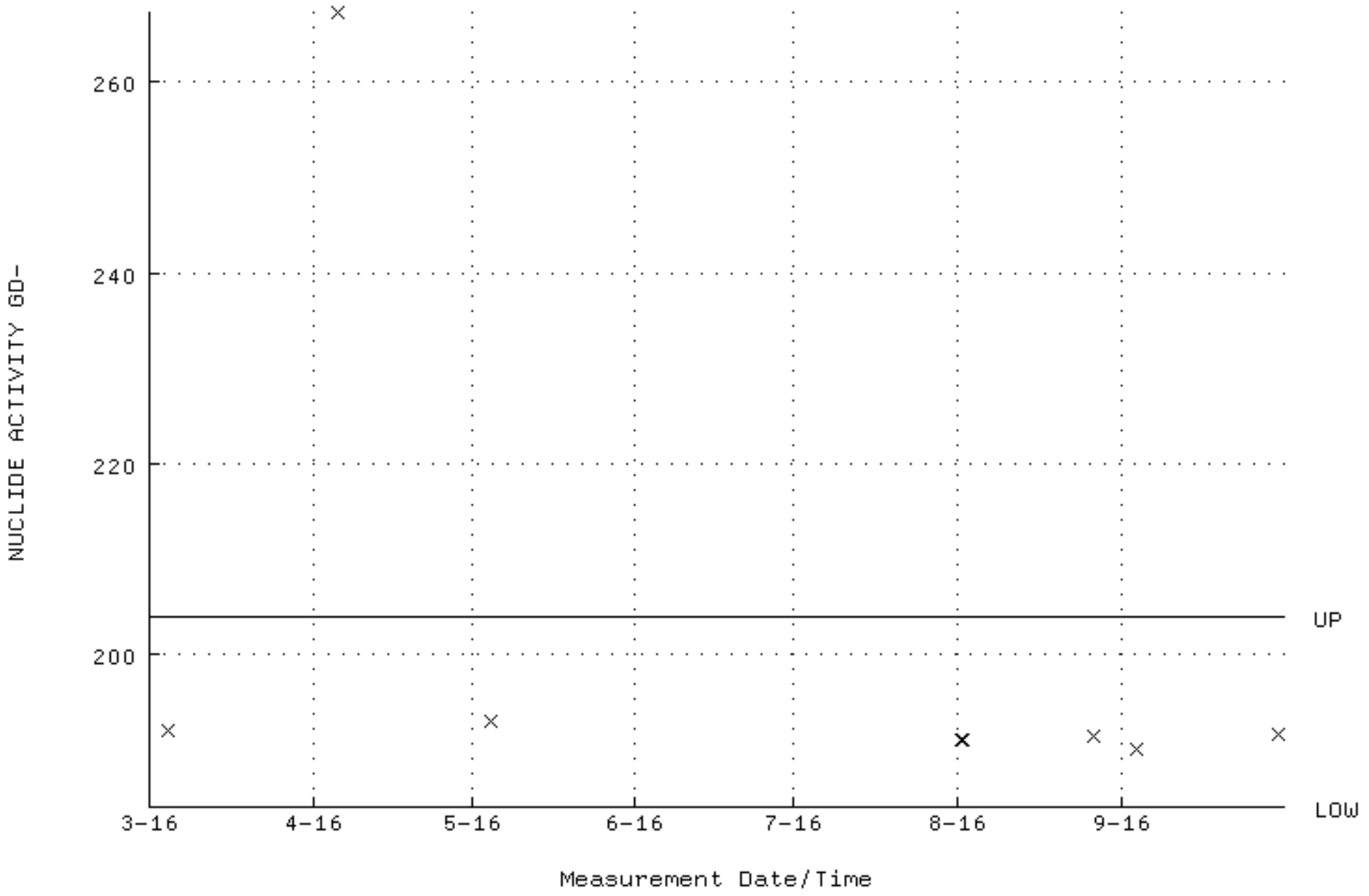
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:38 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



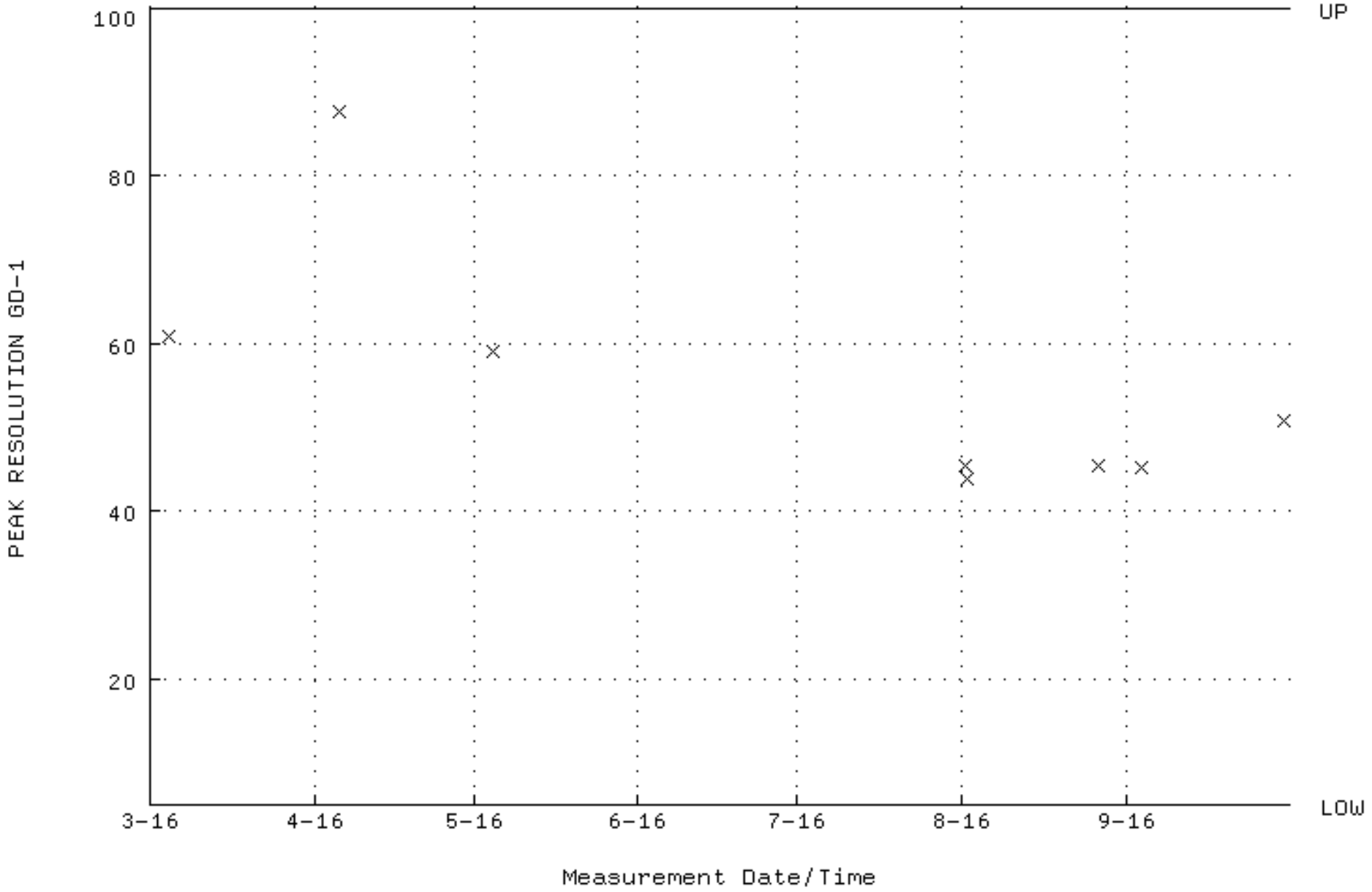
QA filename : DKA100:[ENV_ALPHA.QA.W]W078.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.325057 through 0.345163



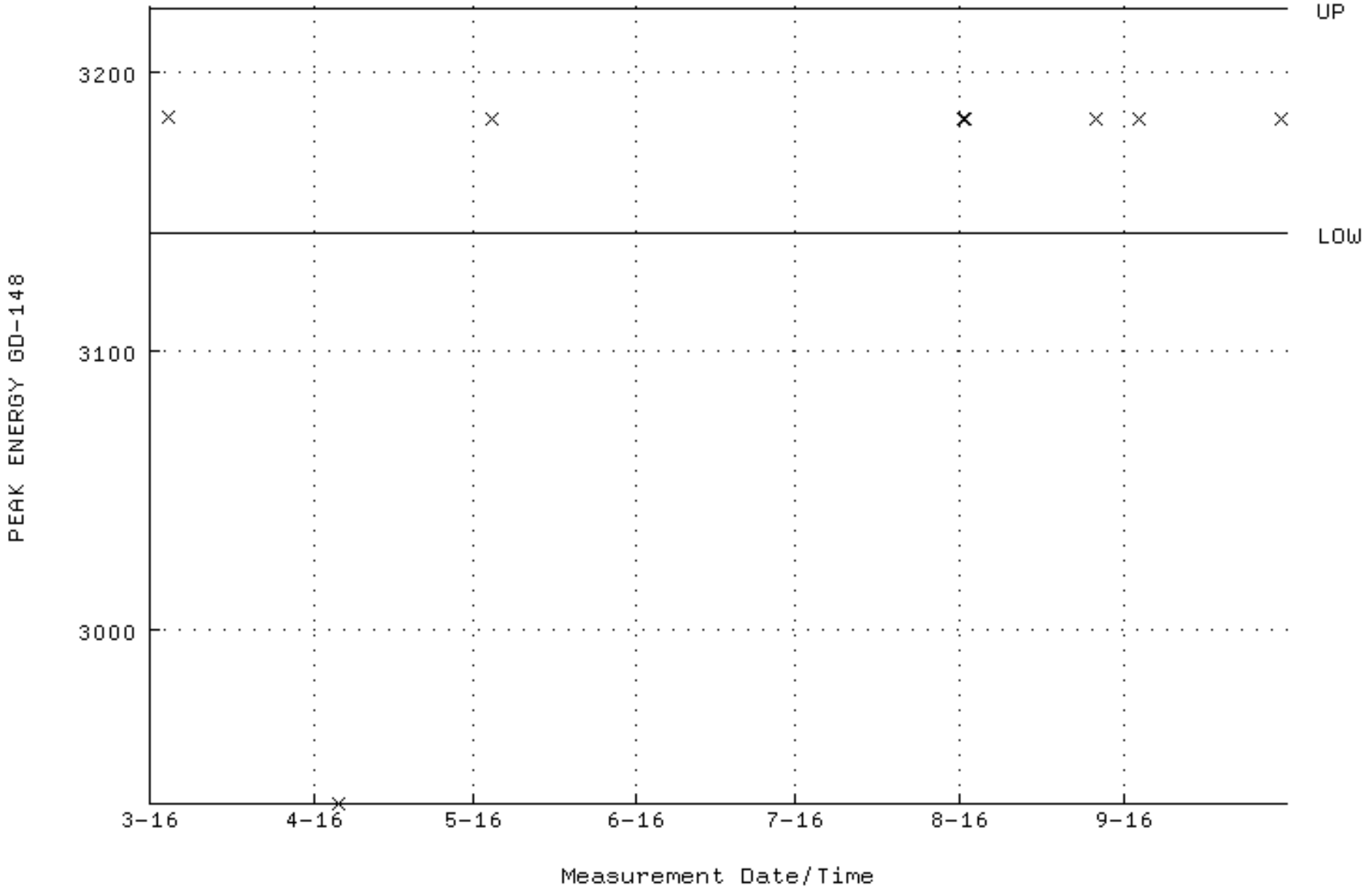
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



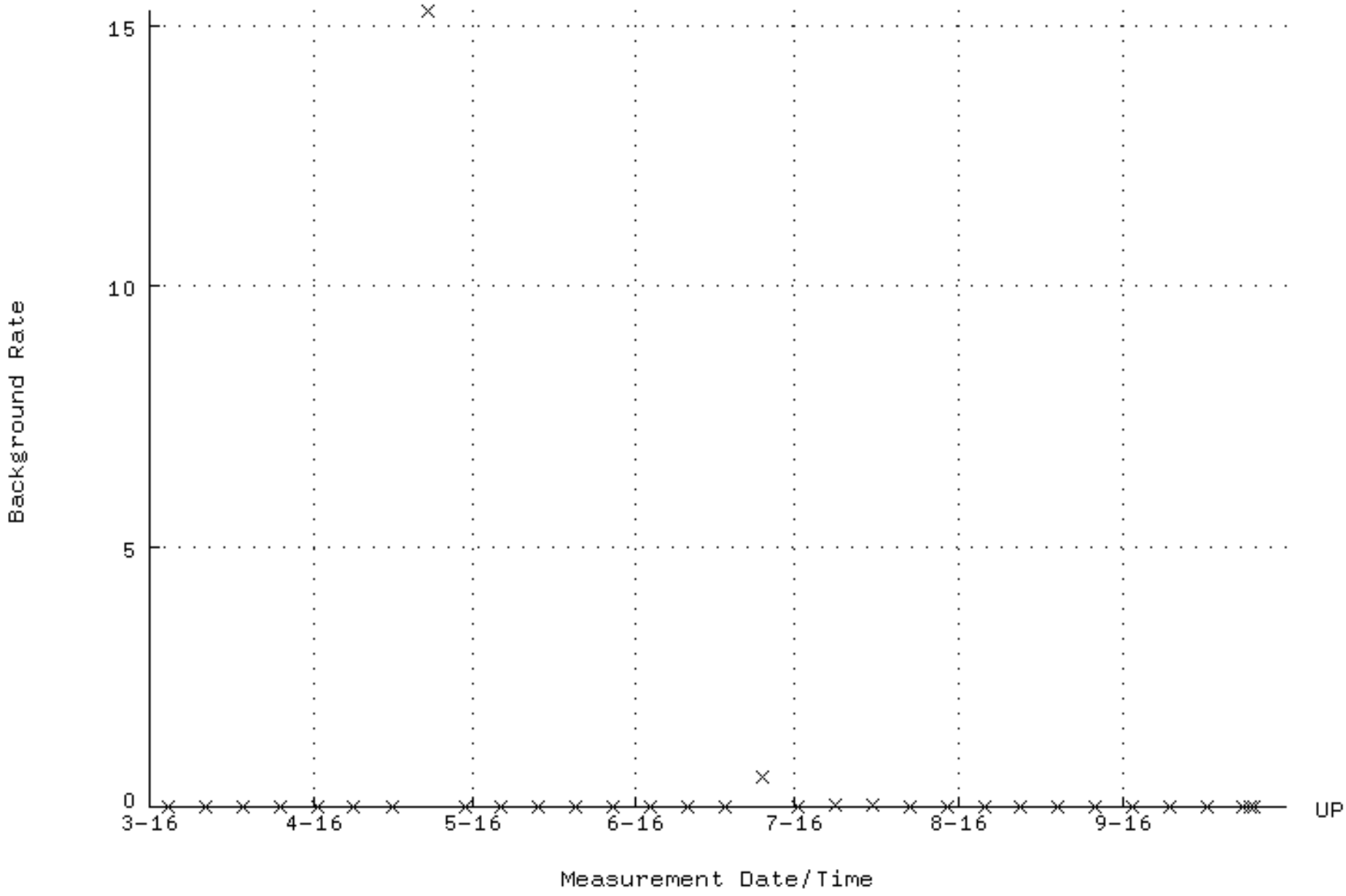
QA filename : DKA100:[ENV_ALPHA.QA.W]W078.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



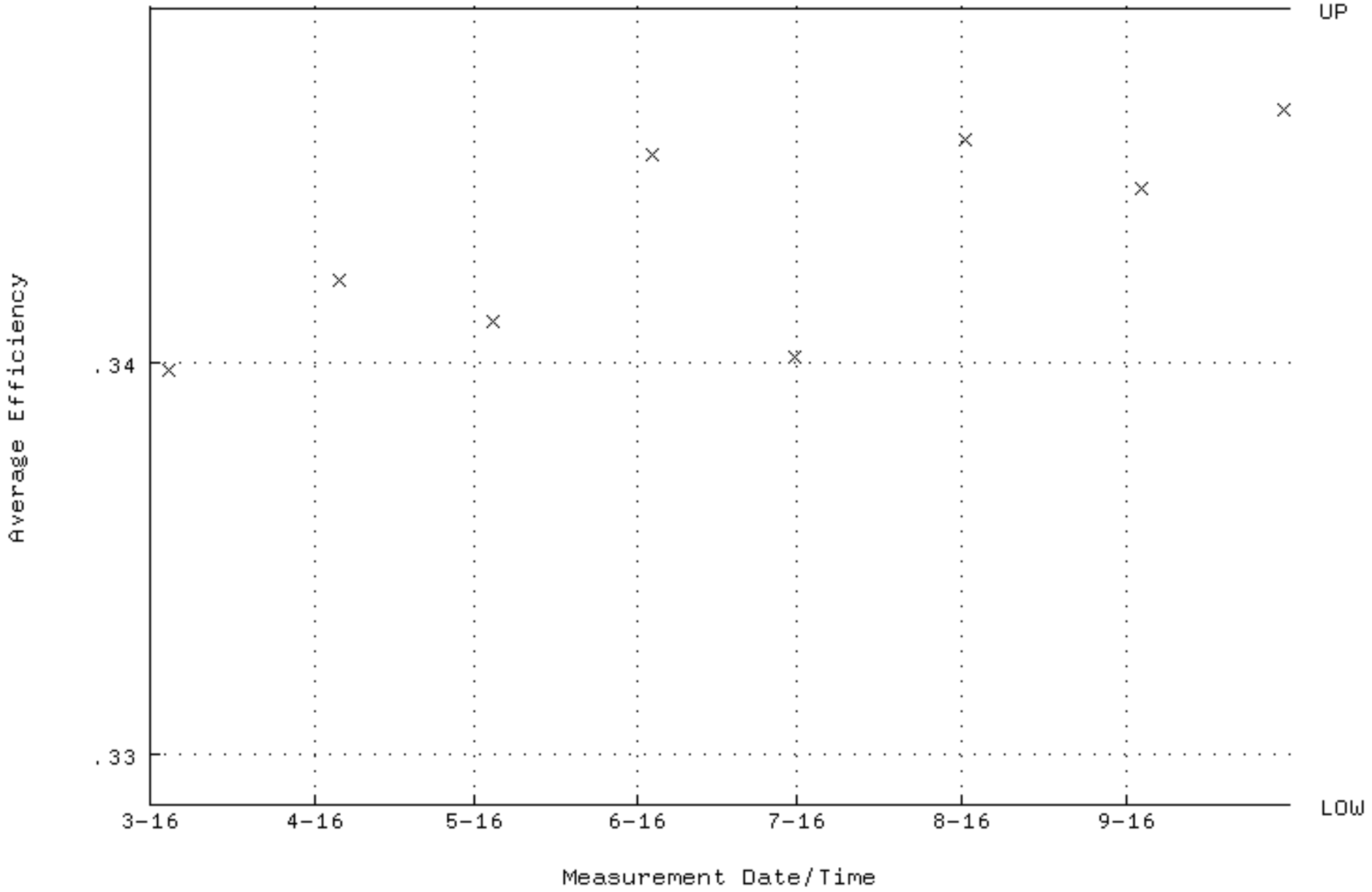
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



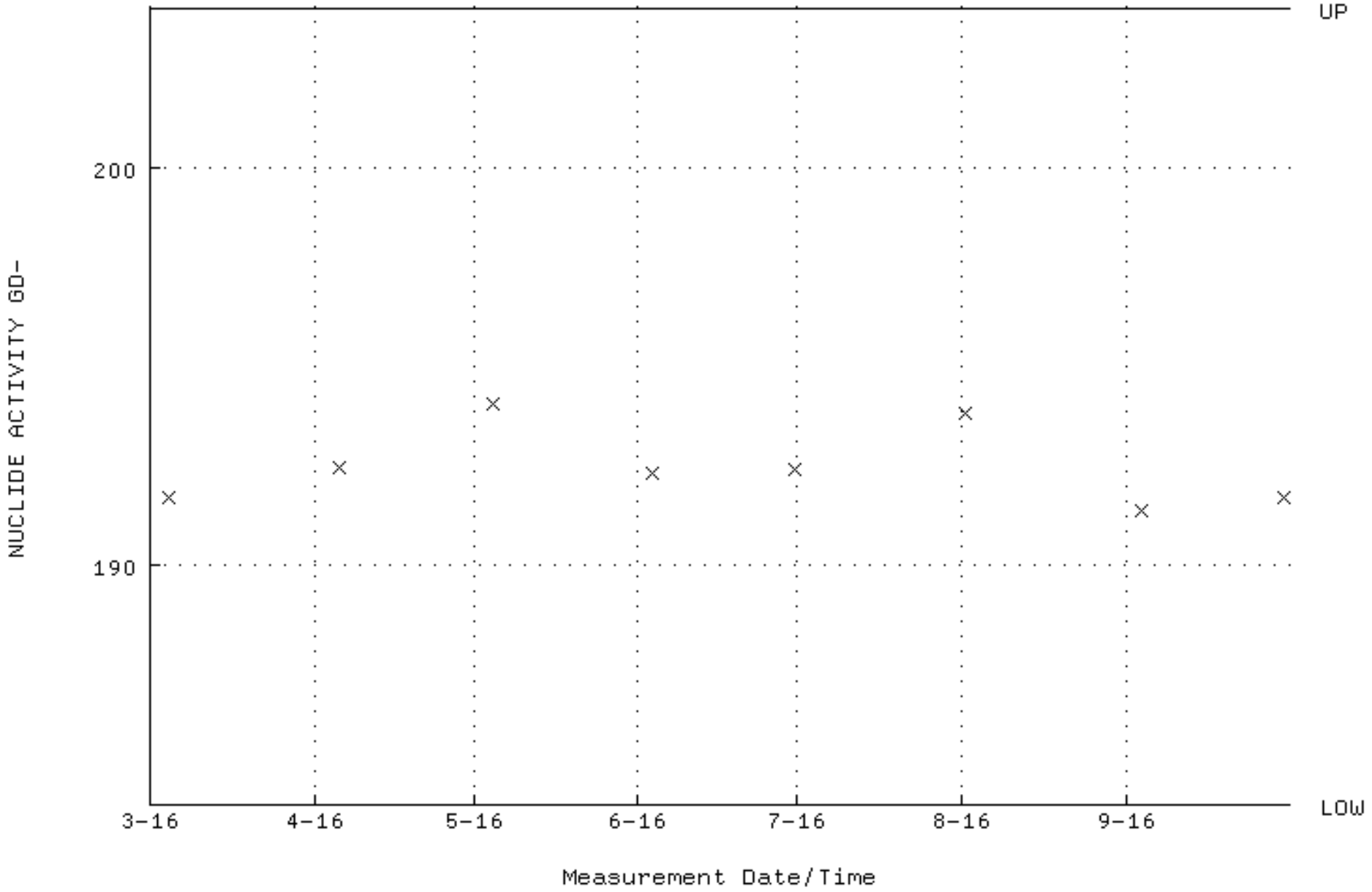
QA filename : DKA100:[ENV_ALPHA.QA.B]B078.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:42 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



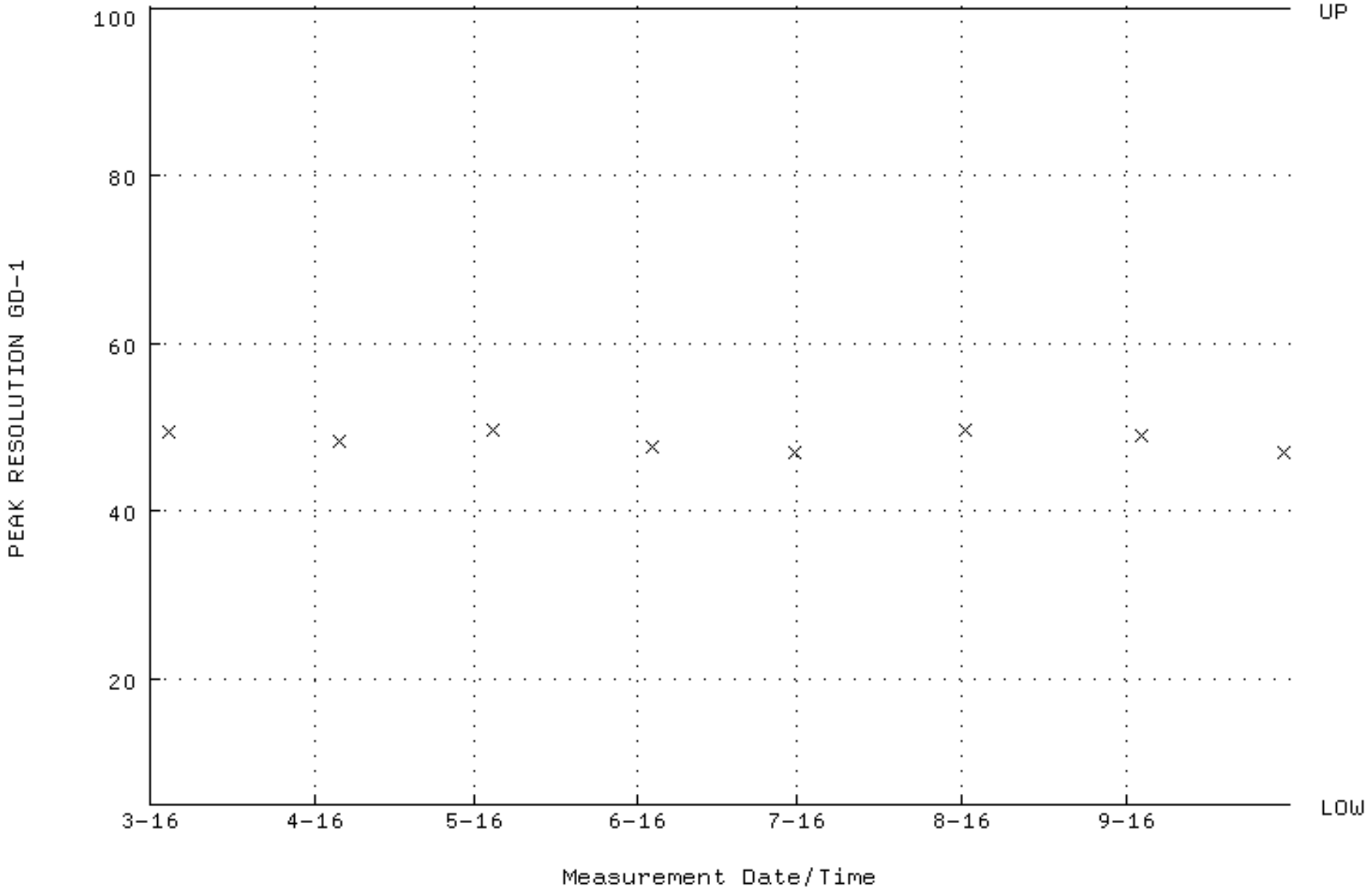
QA filename : DKA100:[ENV_ALPHA.QA.W]W080.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.328713 through 0.349050



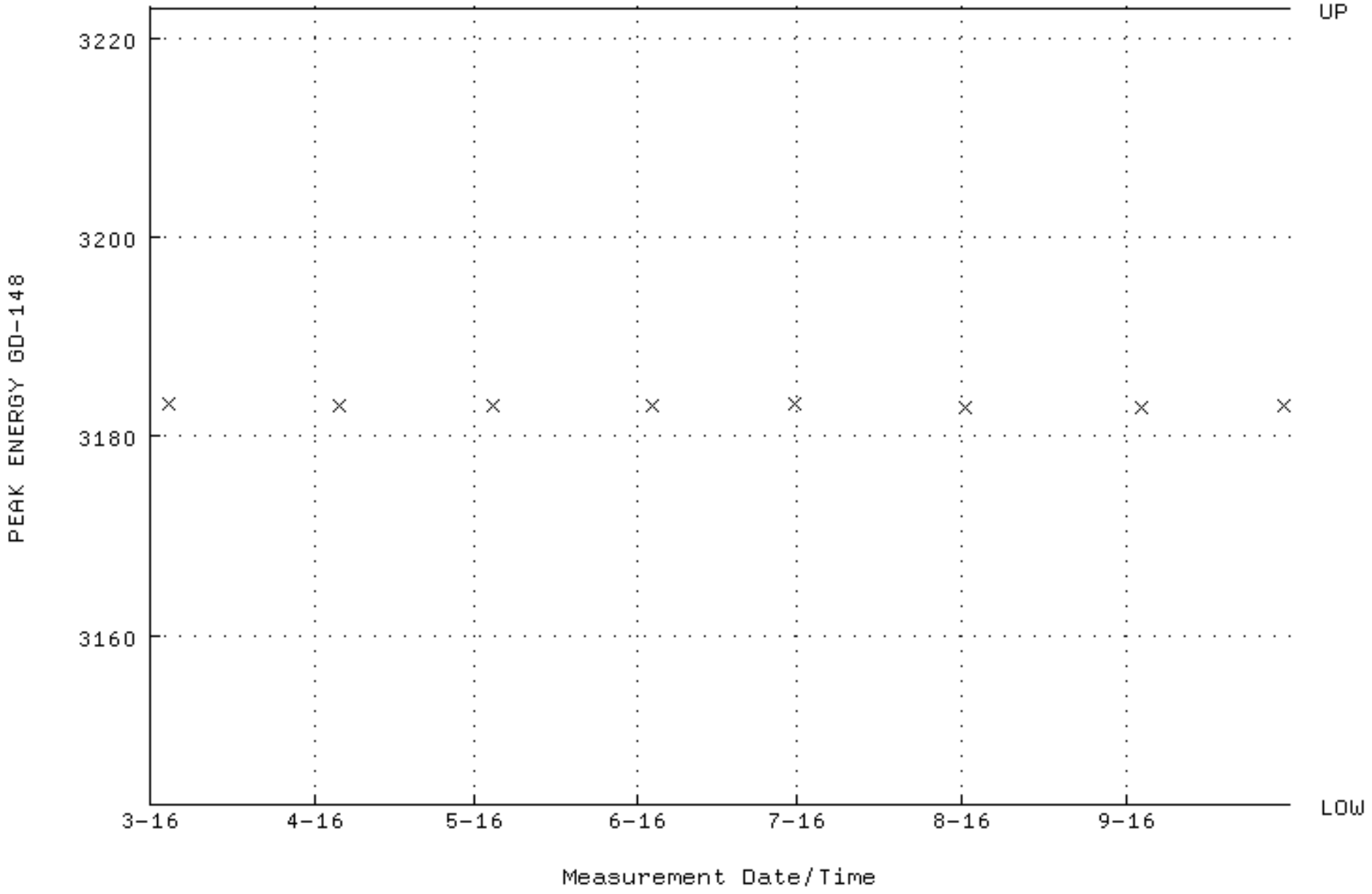
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



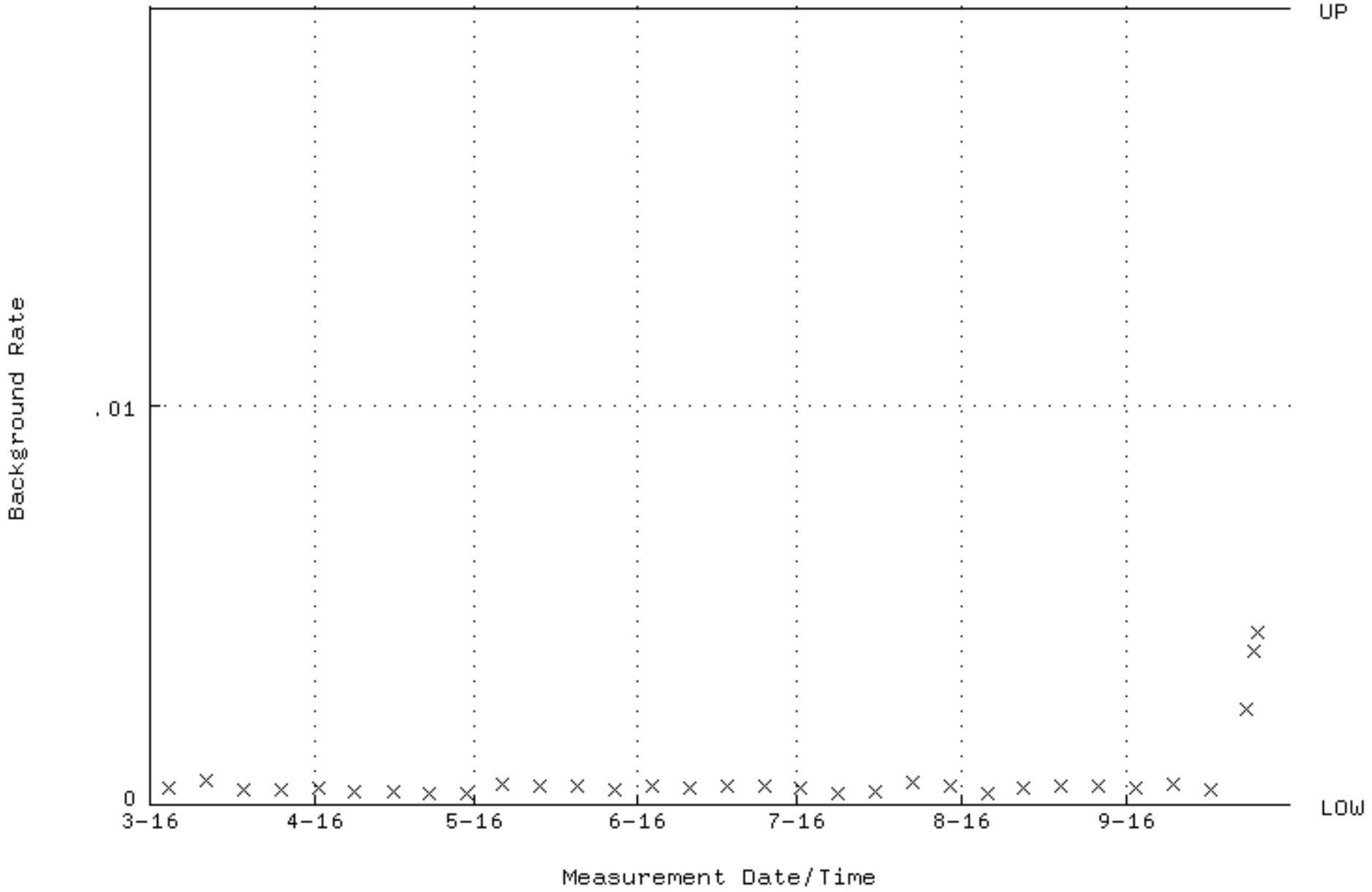
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



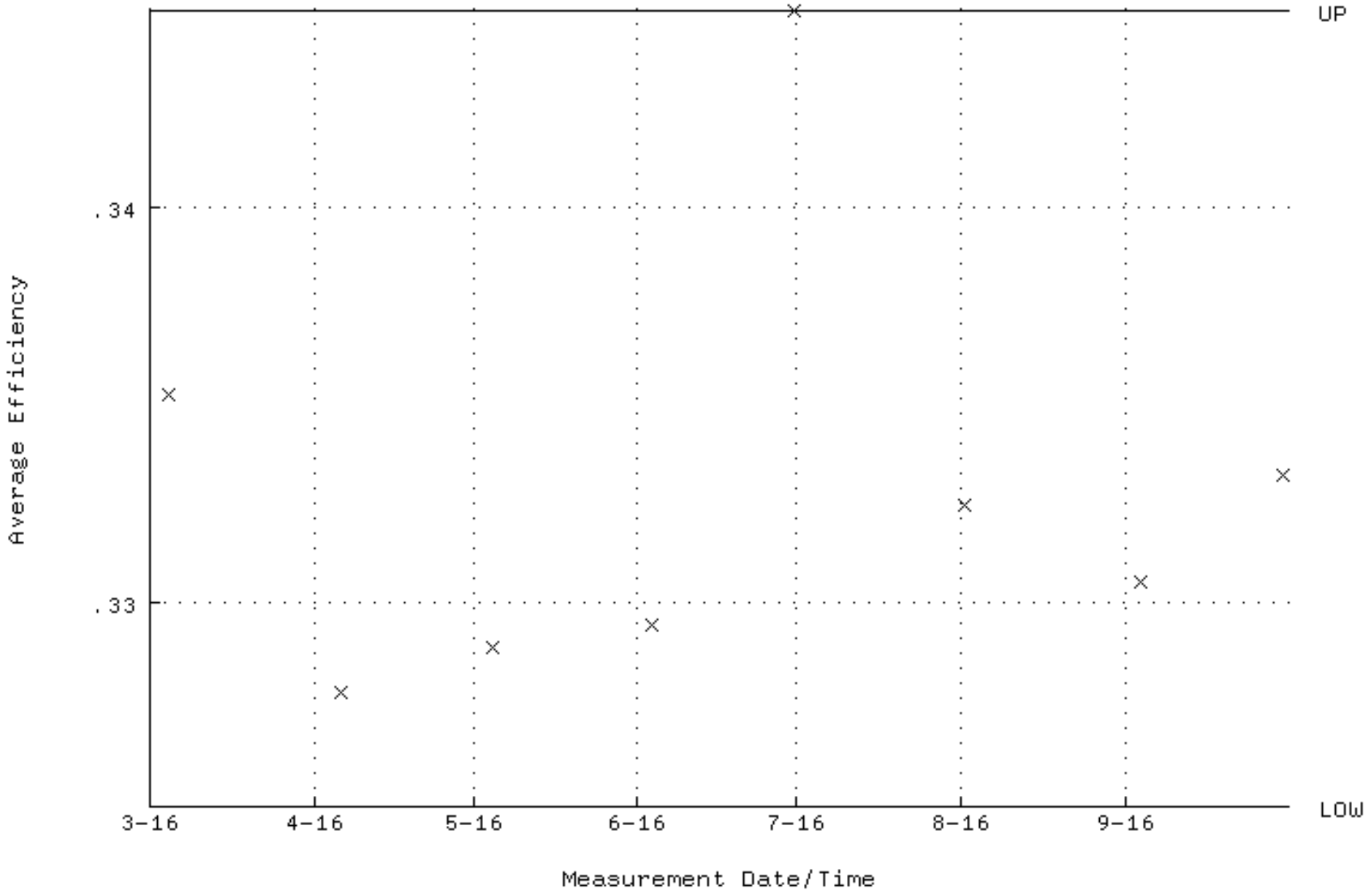
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



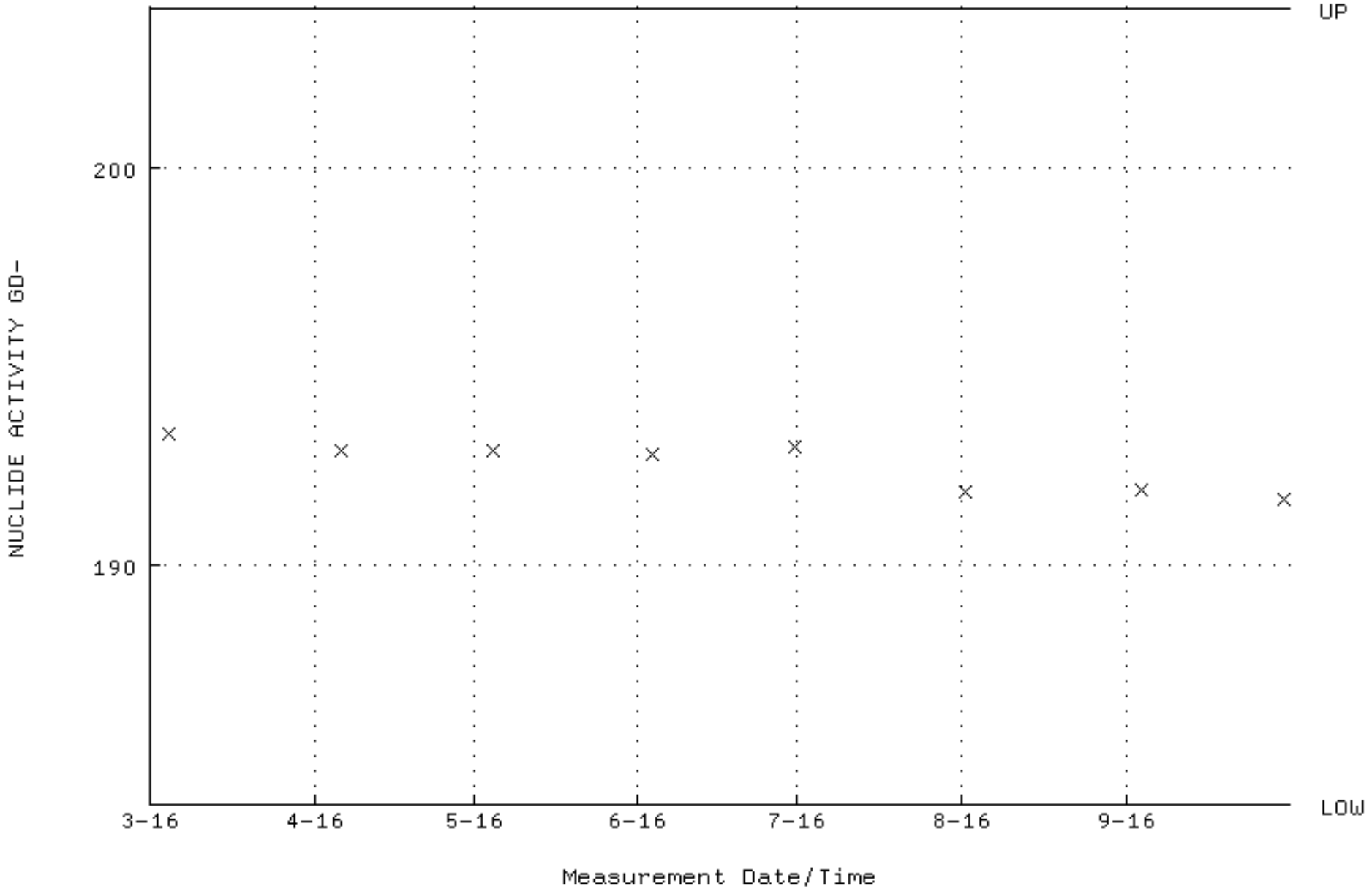
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:42 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



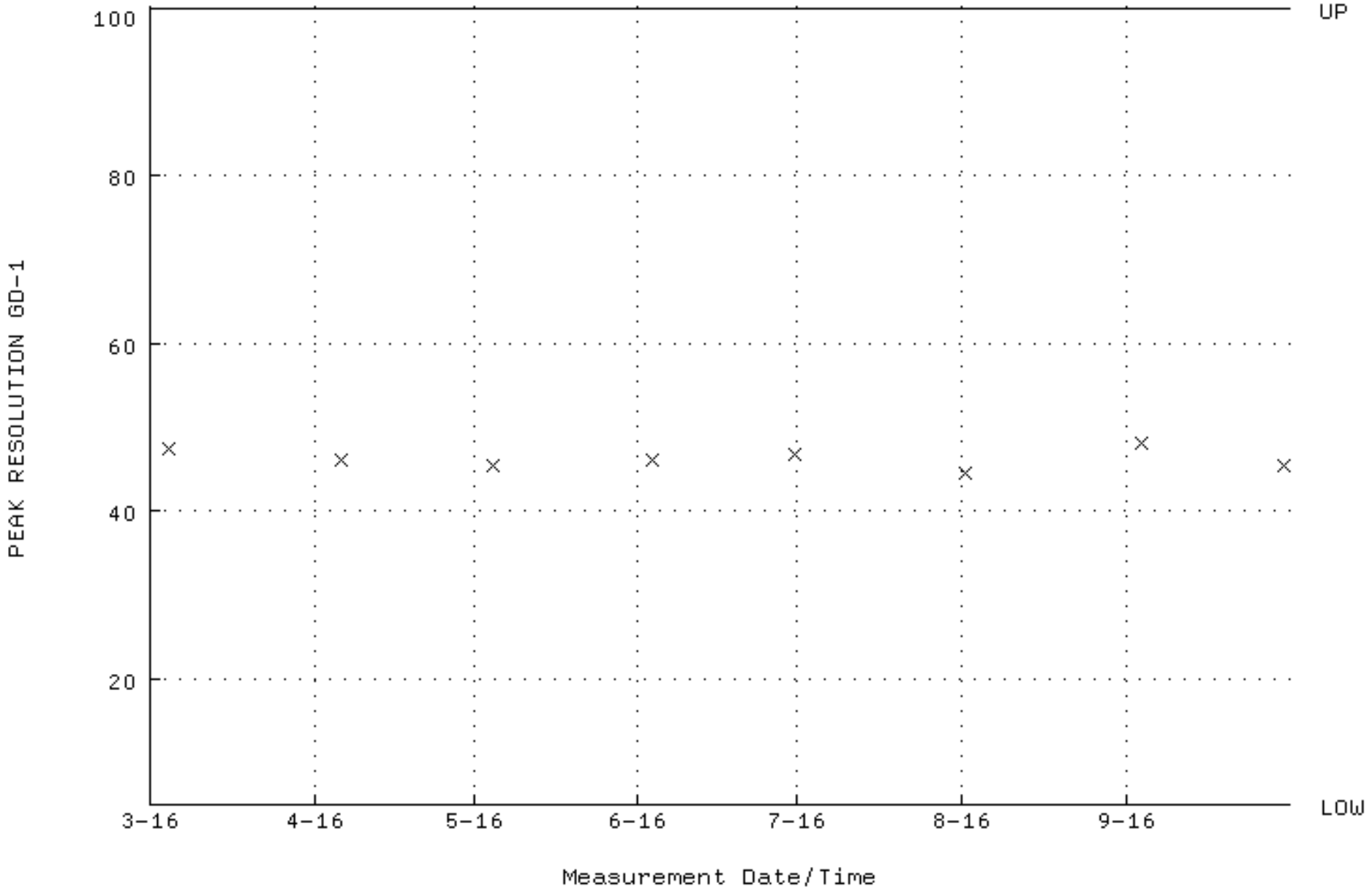
QA filename : DKA100:[ENV_ALPHA.QA.W]W081.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.324850 through 0.344947



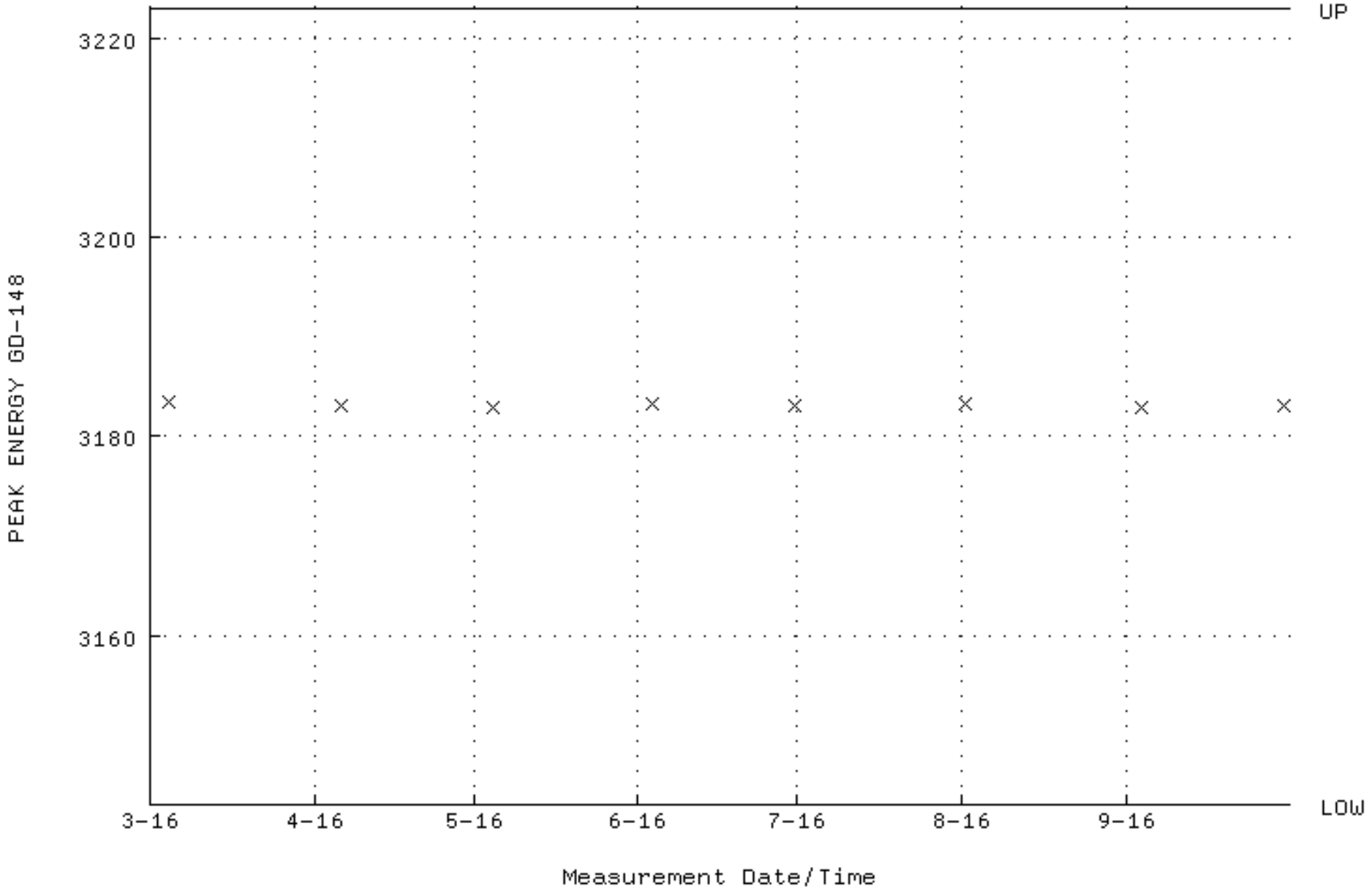
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



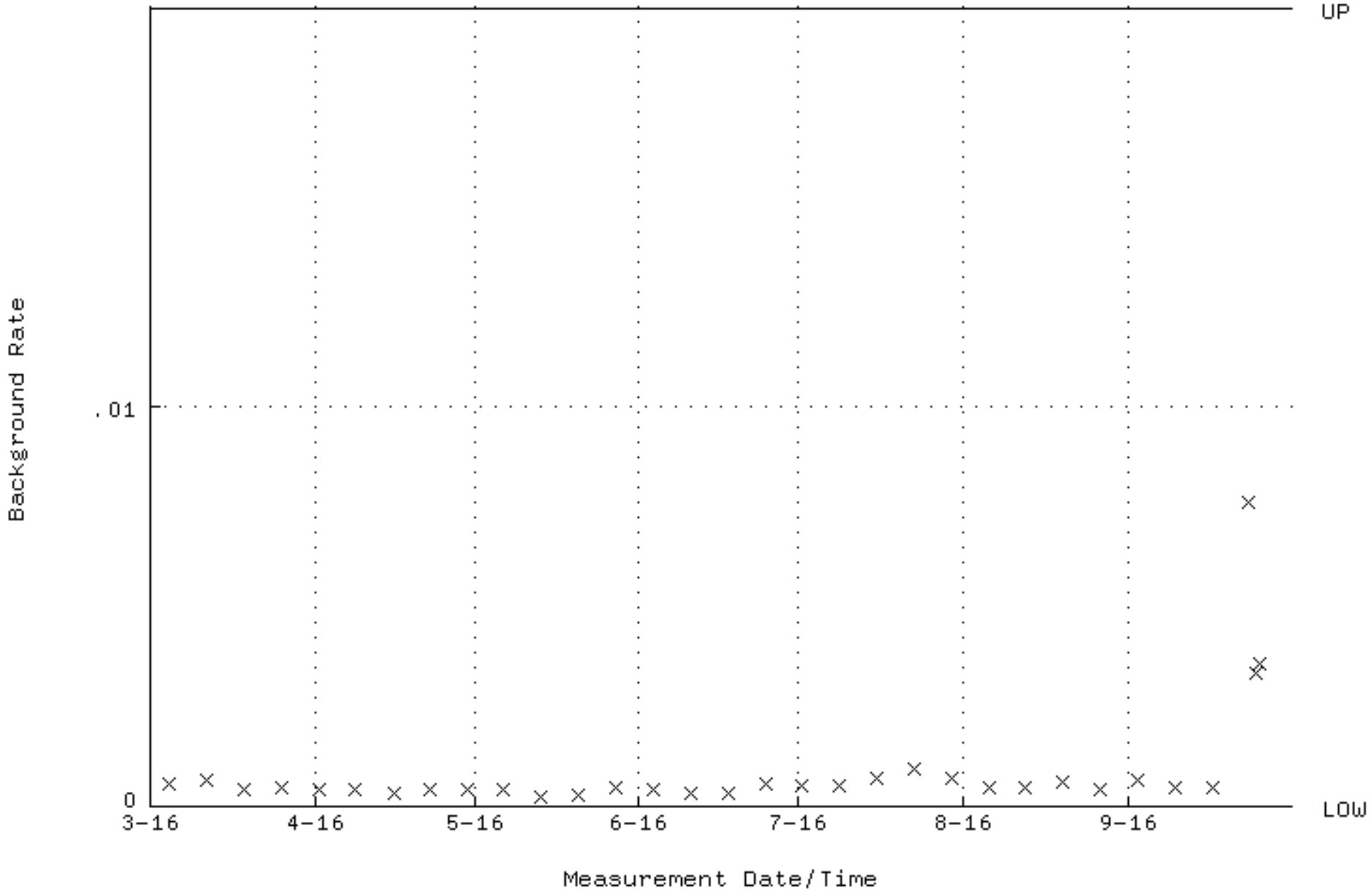
QA filename : DKA100:[ENV_ALPHA.QA.W]W081.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



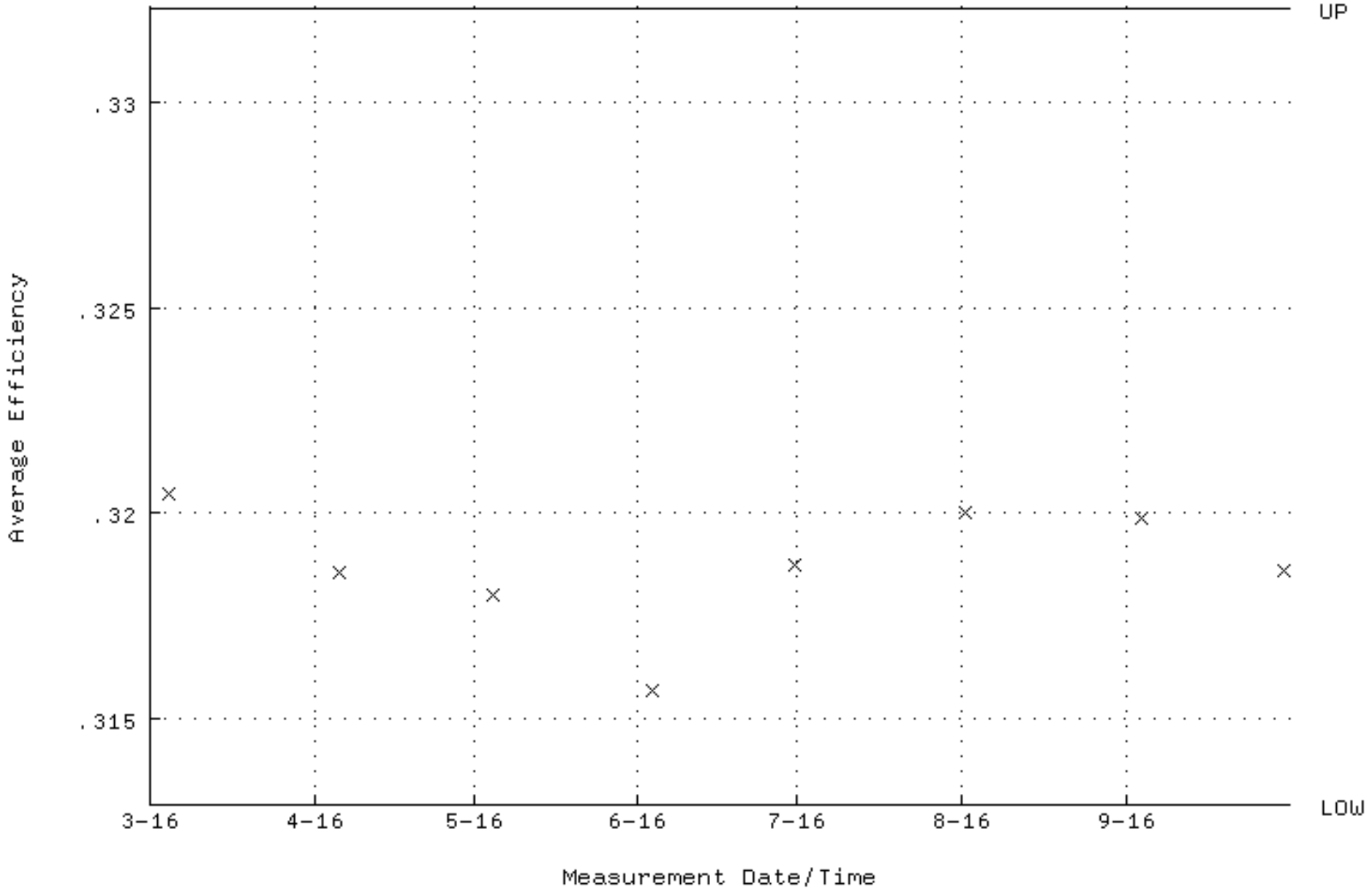
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



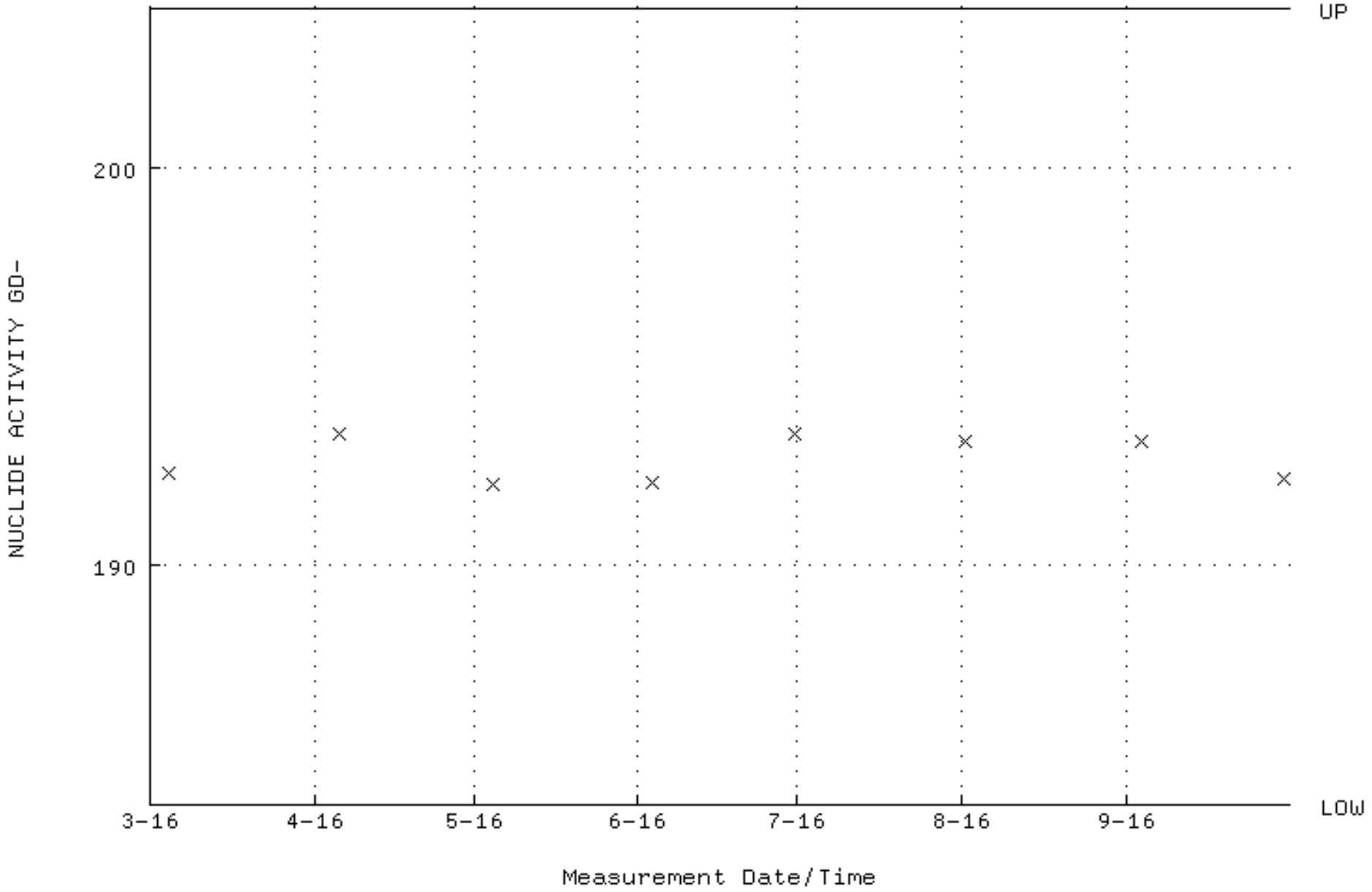
QA filename : DKA100:[ENV_ALPHA.QA.B]B081.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:42 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



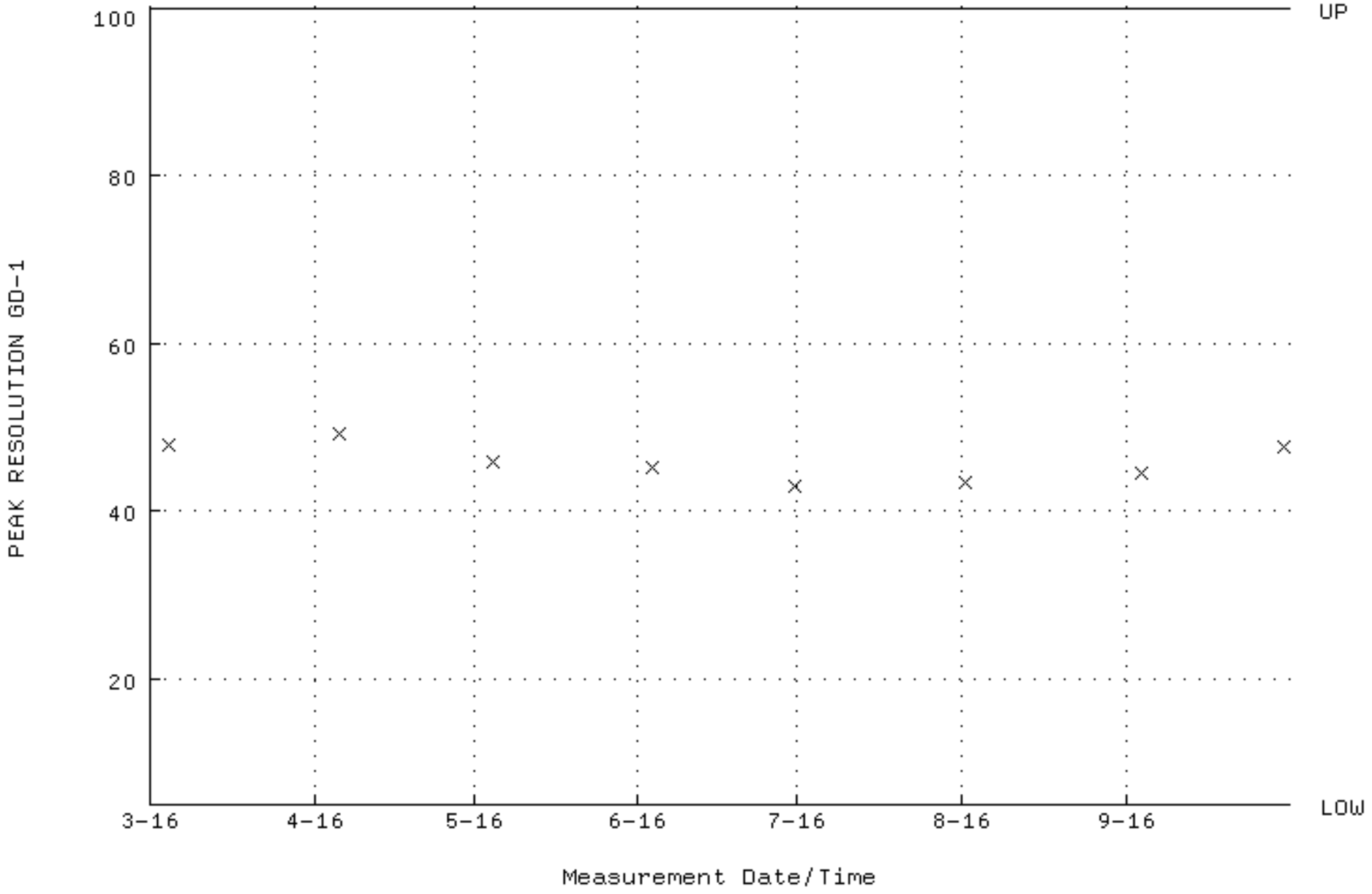
QA filename : DKA100:[ENV_ALPHA.QA.W]W082.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.312914 through 0.332270



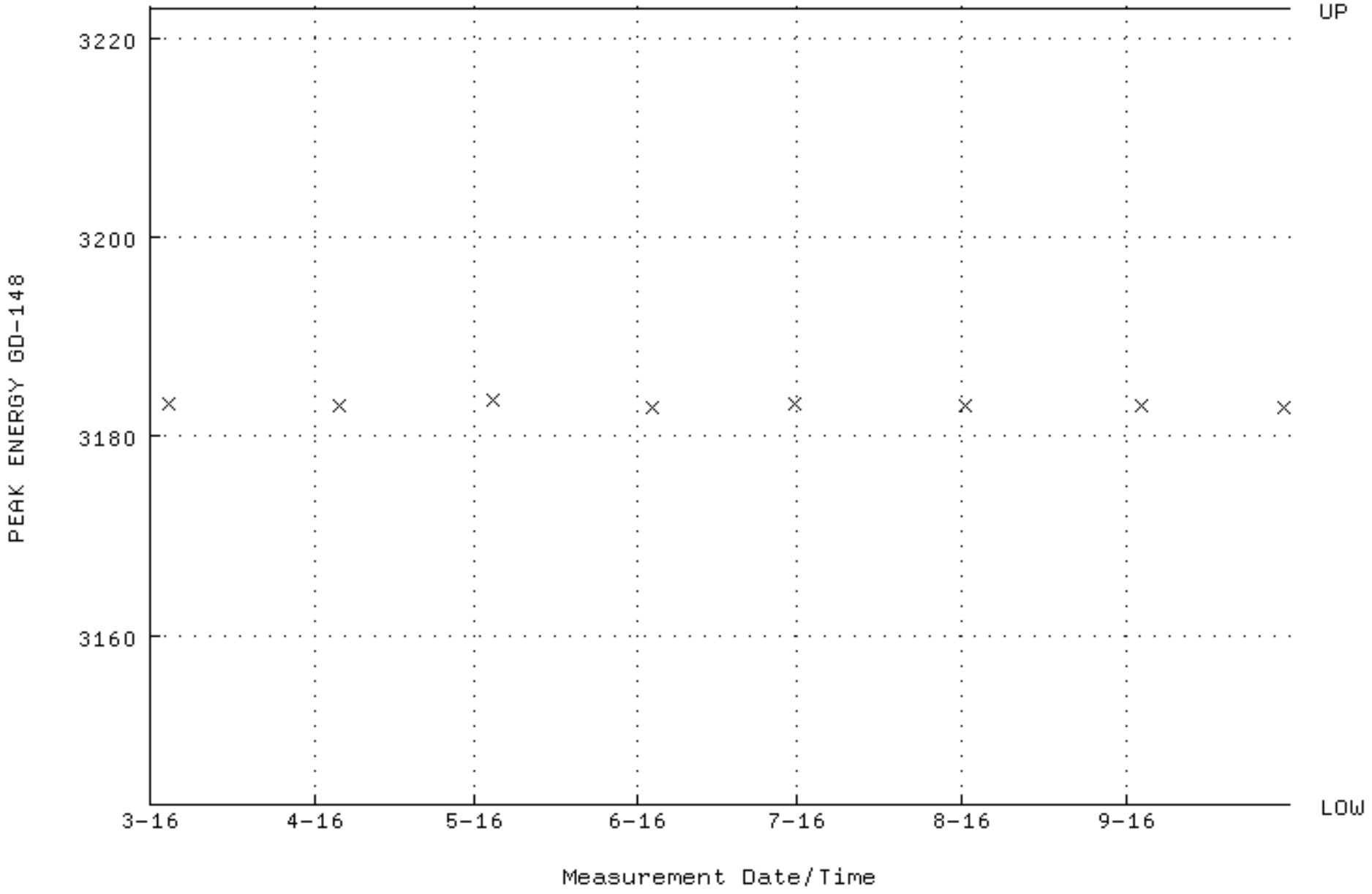
QA filename : DKA100:[ENV_ALPHA.QA.W]W082.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



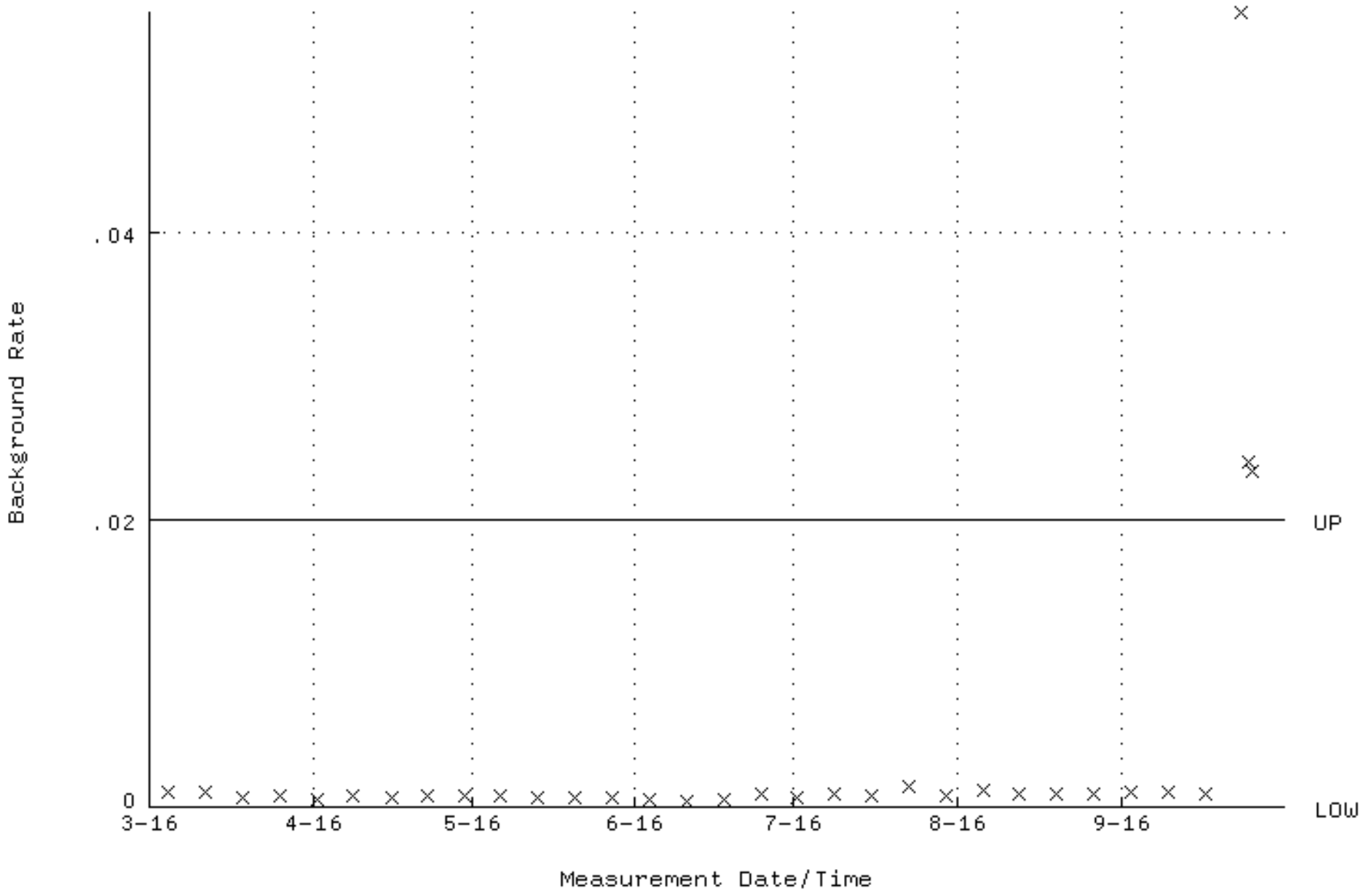
QA filename : DKA100:[ENV_ALPHA.QA.W]W082.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



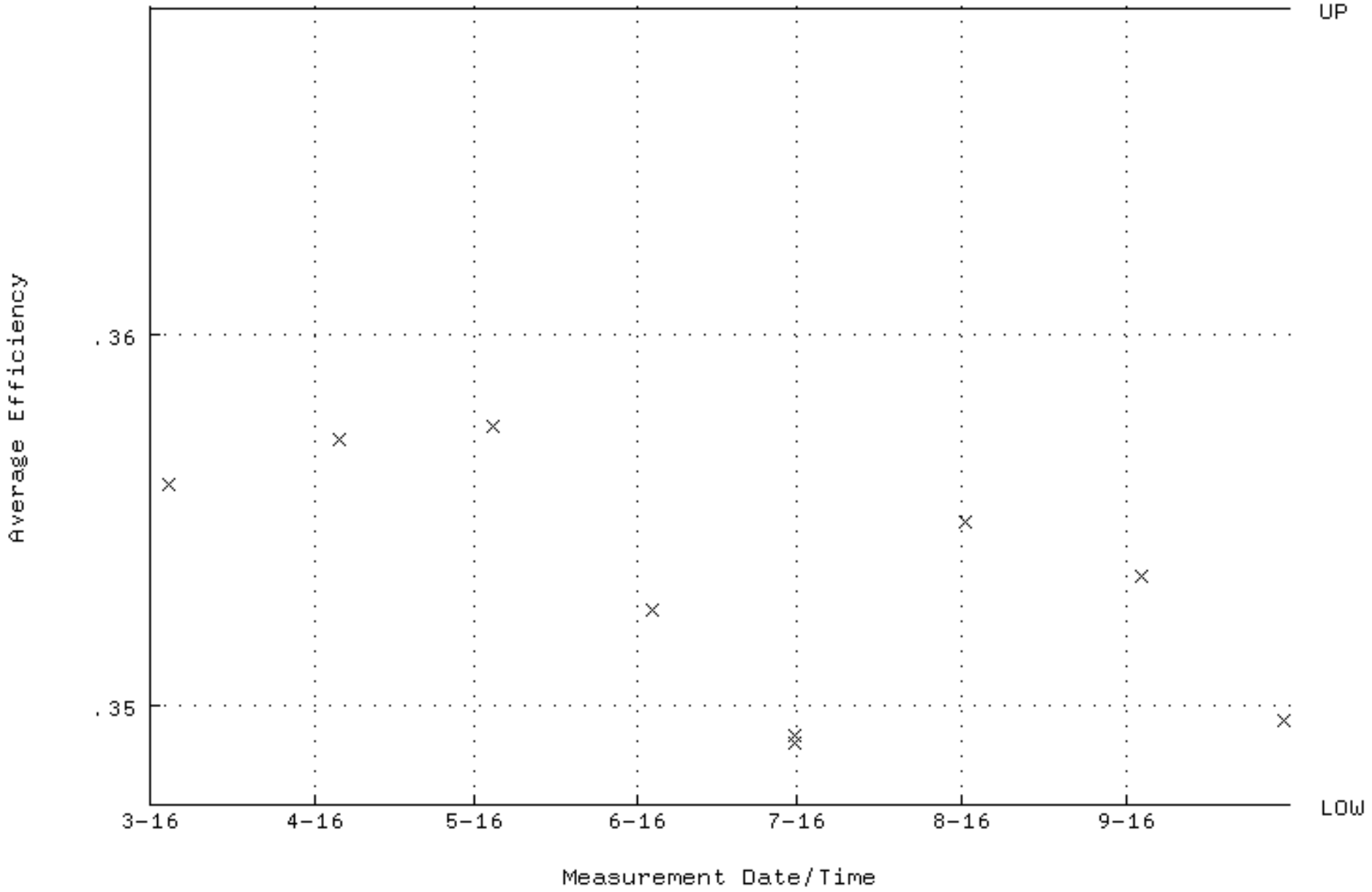
QA filename : DKA100:[ENV_ALPHA.QA.W]W082.QAF;9
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



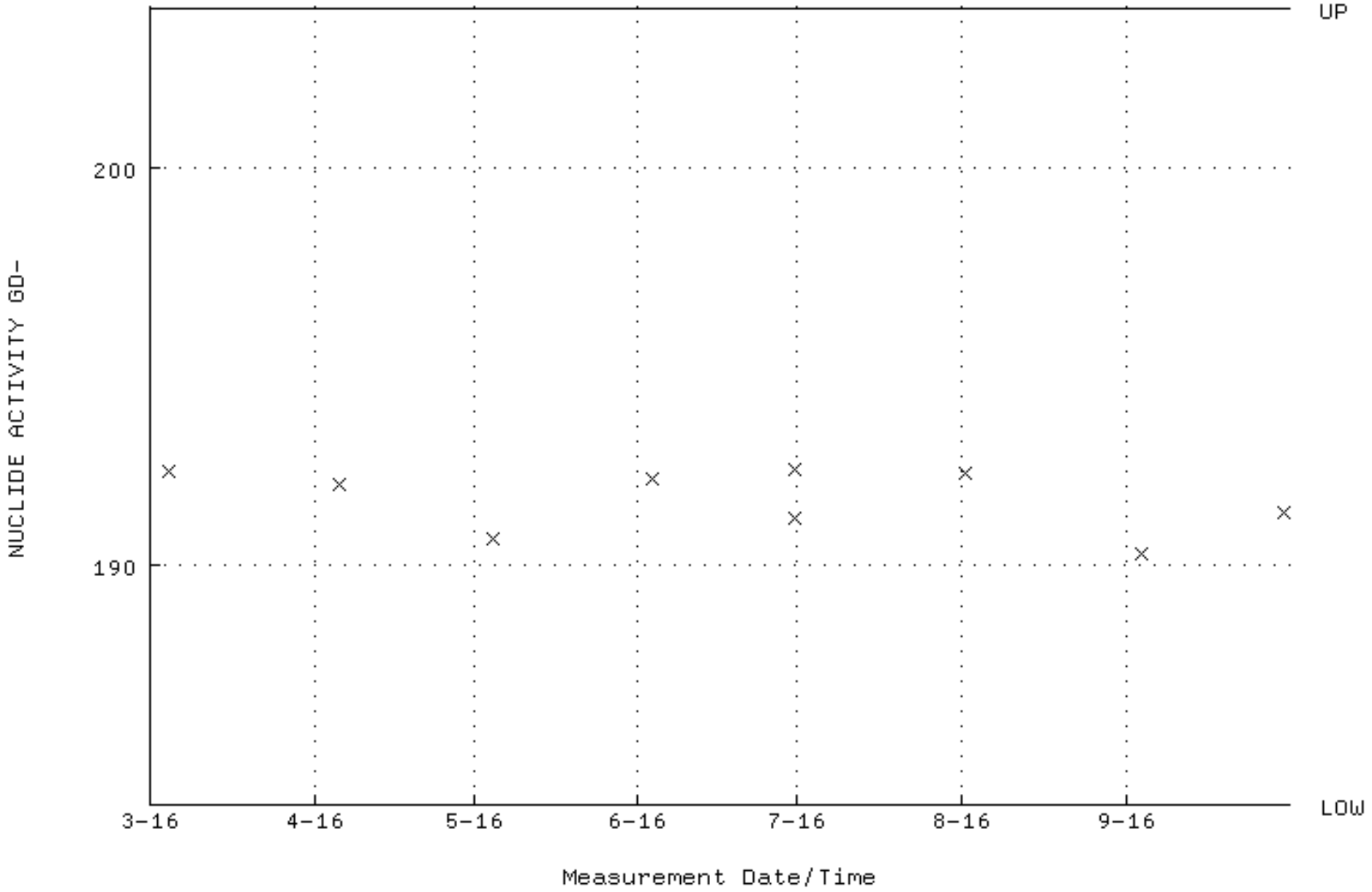
QA filename : DKA100:[ENV_ALPHA.QA.B]B082.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:42 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



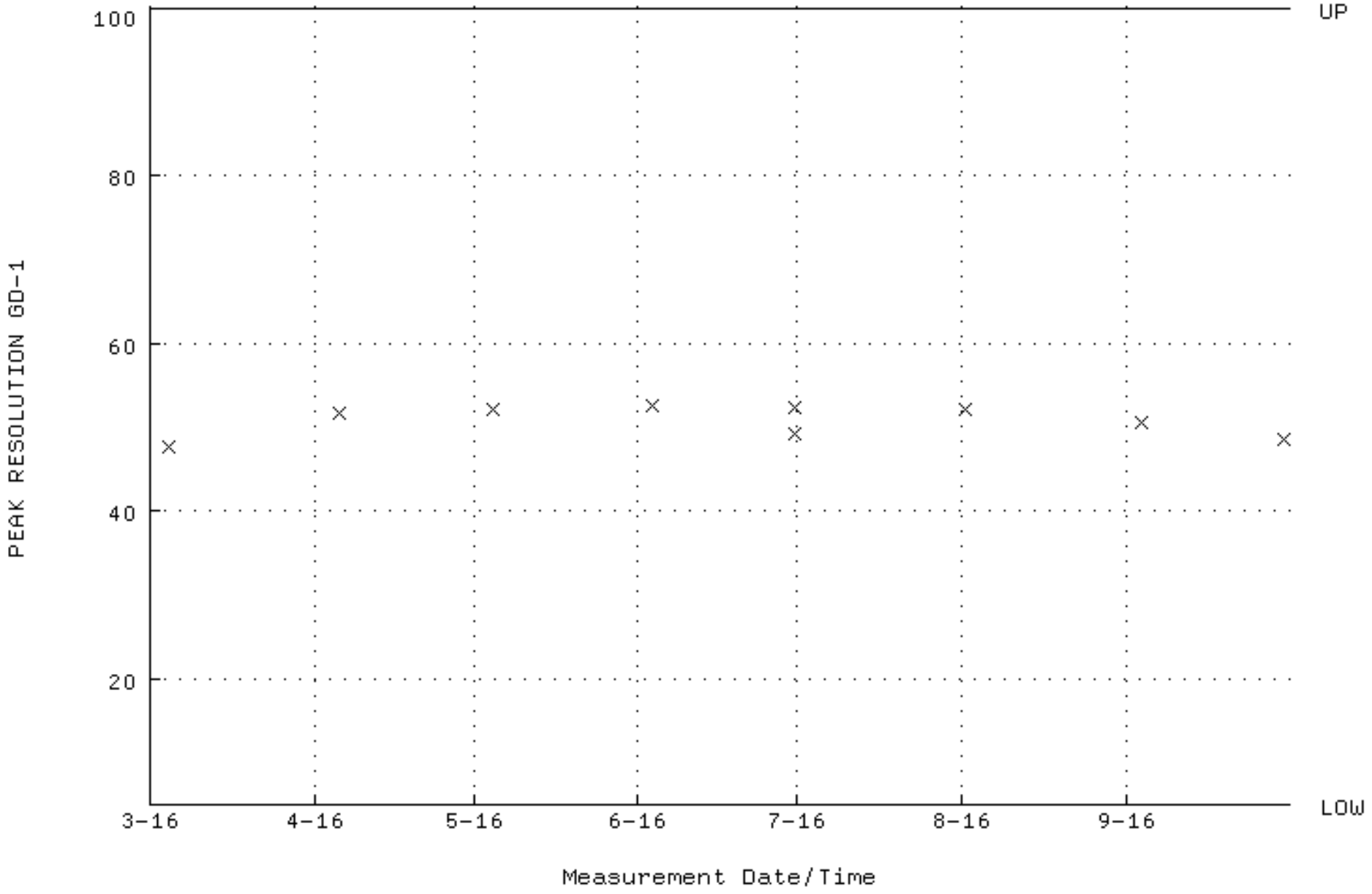
QA filename : DKA100:[ENV_ALPHA.QA.W]W083.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.347305 through 0.368790



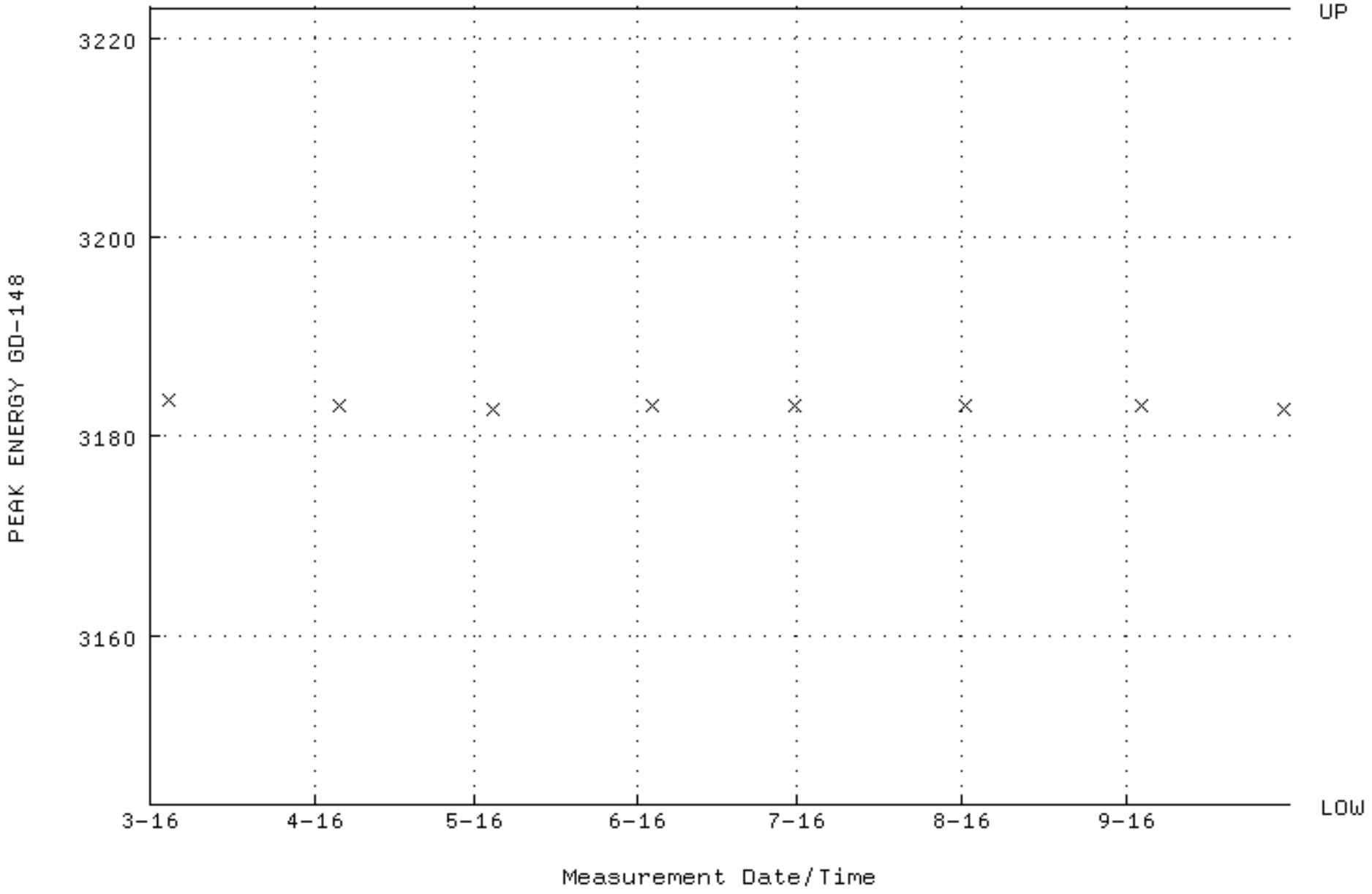
QA filename : DKA100:[ENV_ALPHA.QA.W]W083.QAF;10
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



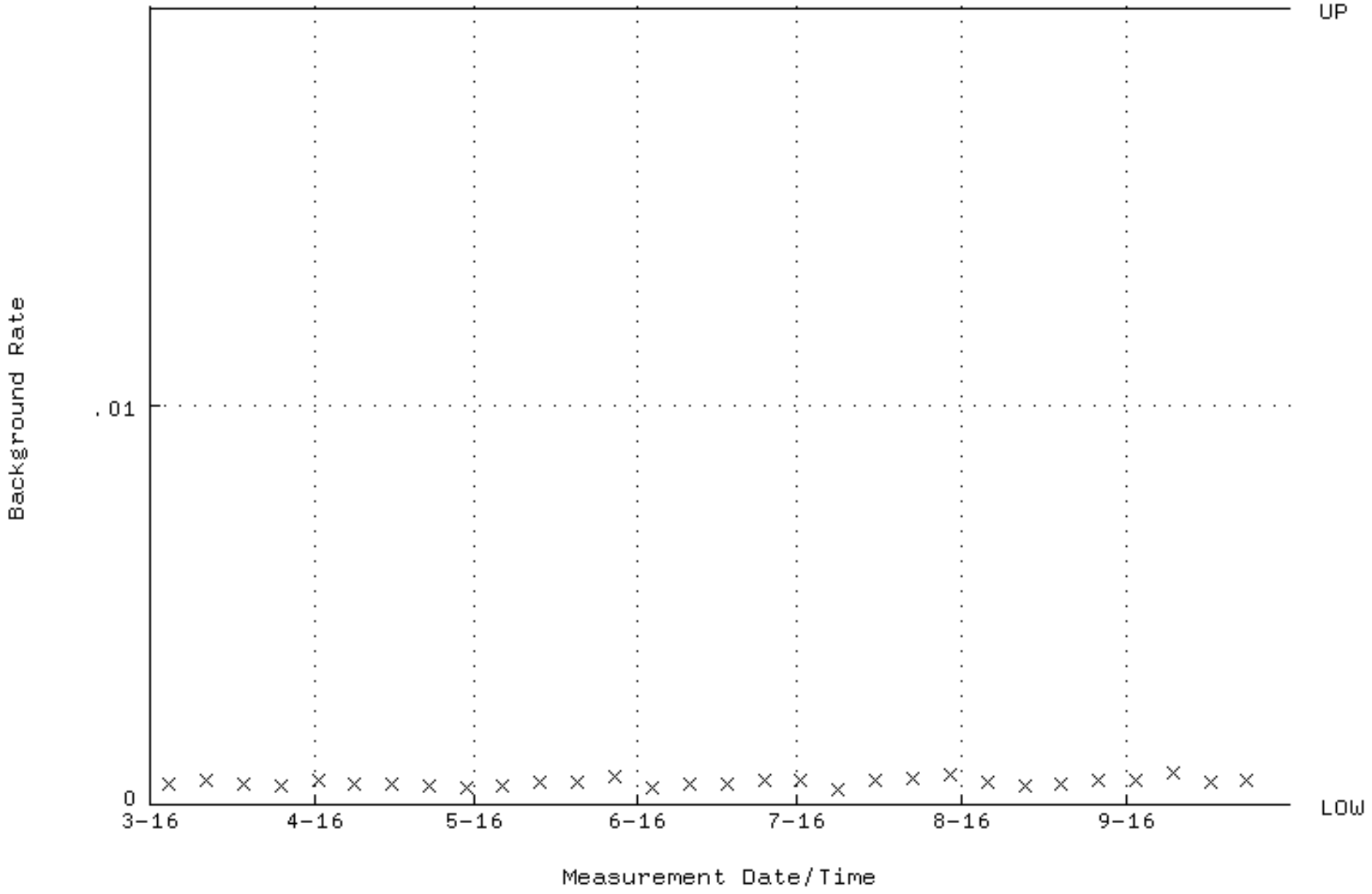
QA filename : DKA100:[ENV_ALPHA.QA.W]W083.QAF;10
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



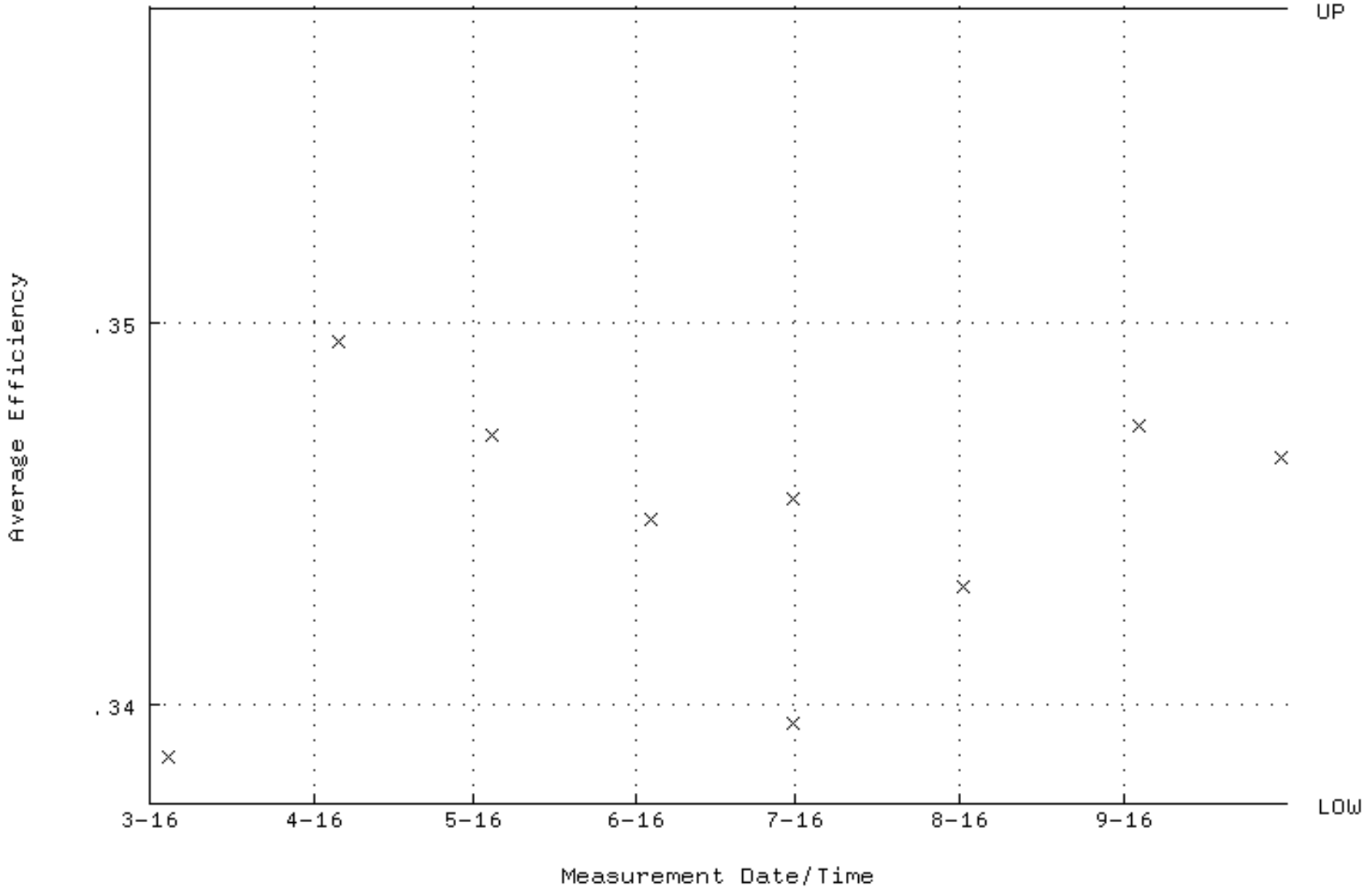
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



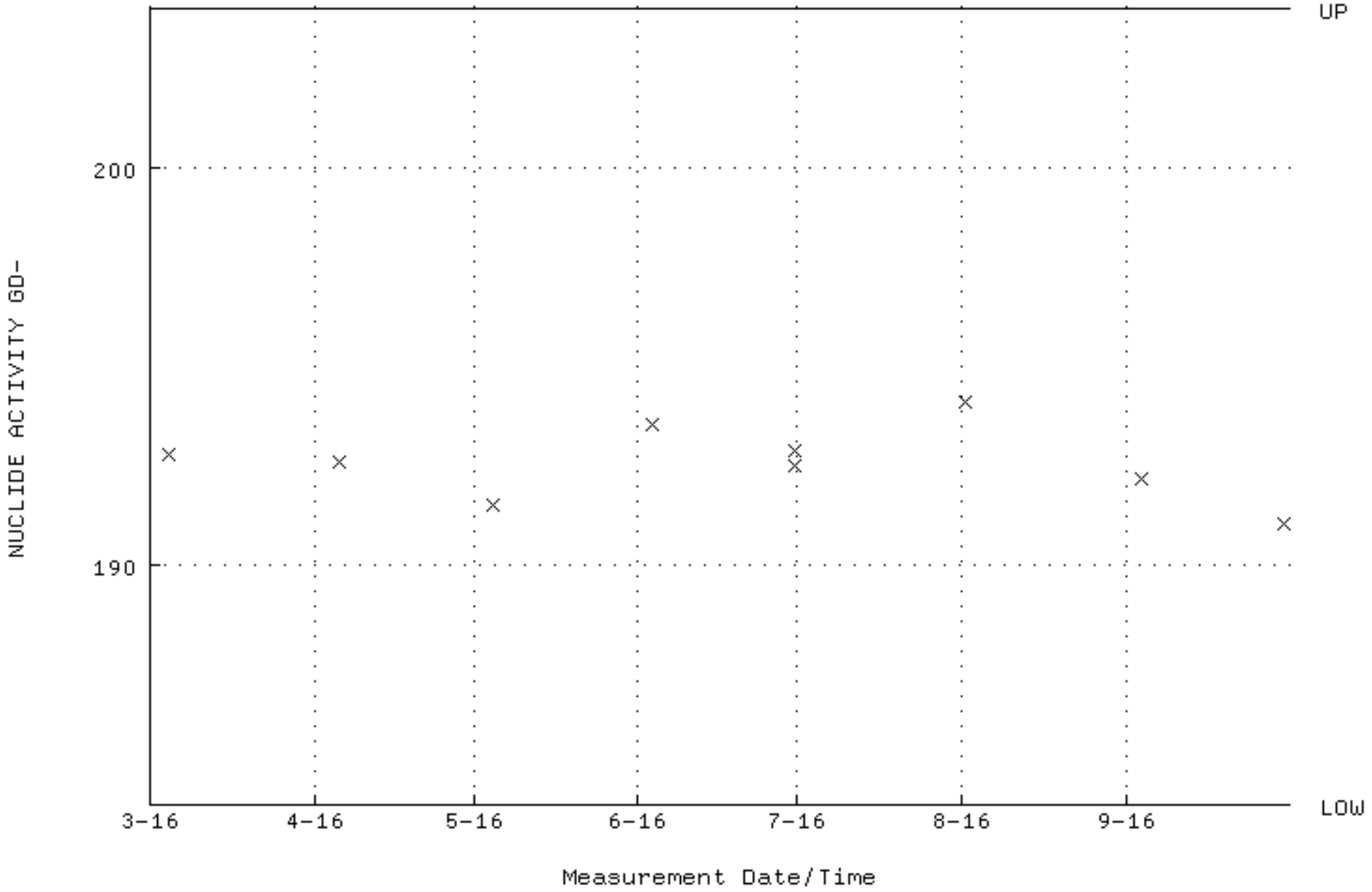
QA filename : DKA100:[ENV_ALPHA.QA.B]B083.QAF;4
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



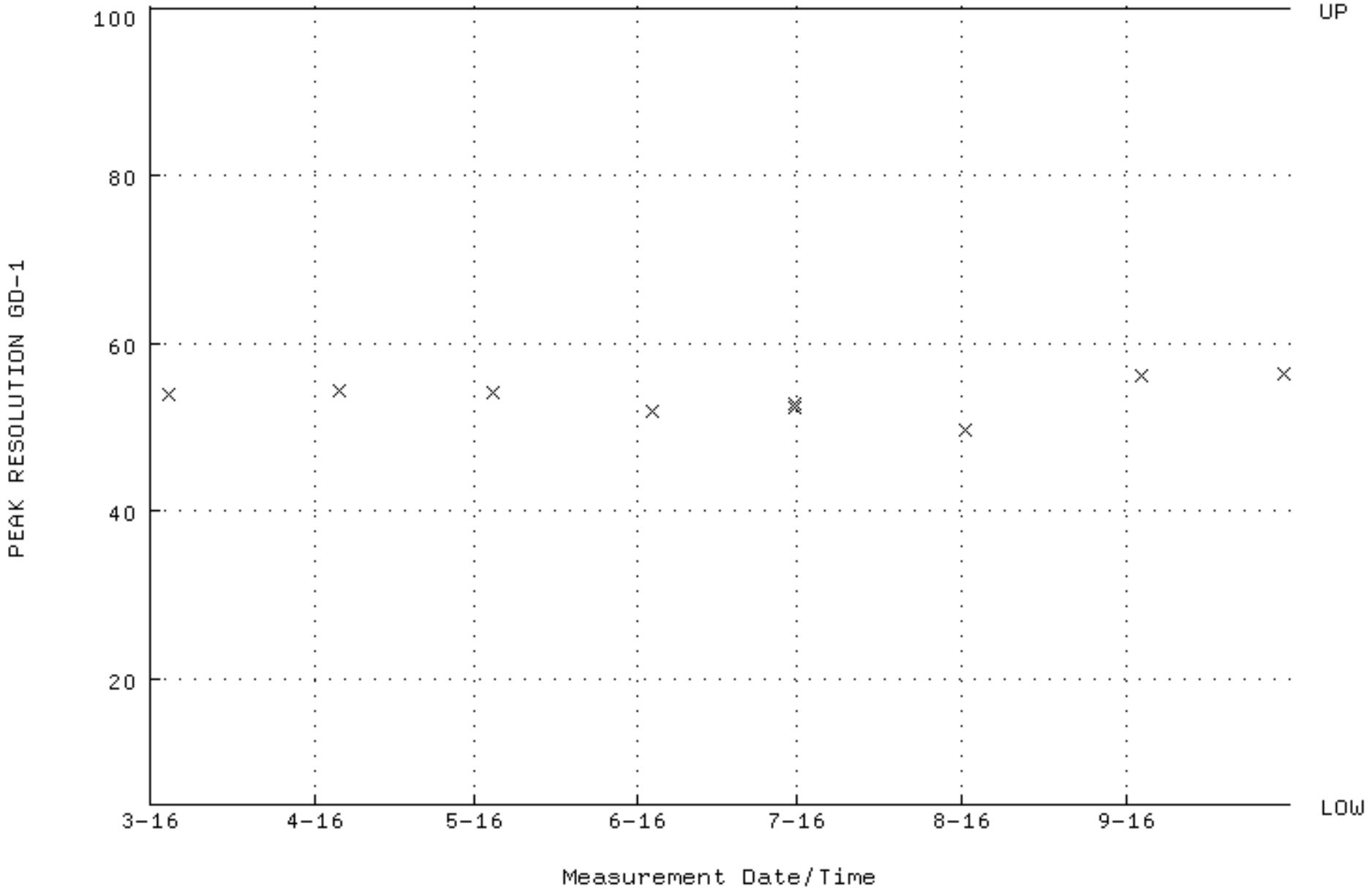
QA filename : DKA100:[ENV_ALPHA.QA.W]W084.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.337400 through 0.358200



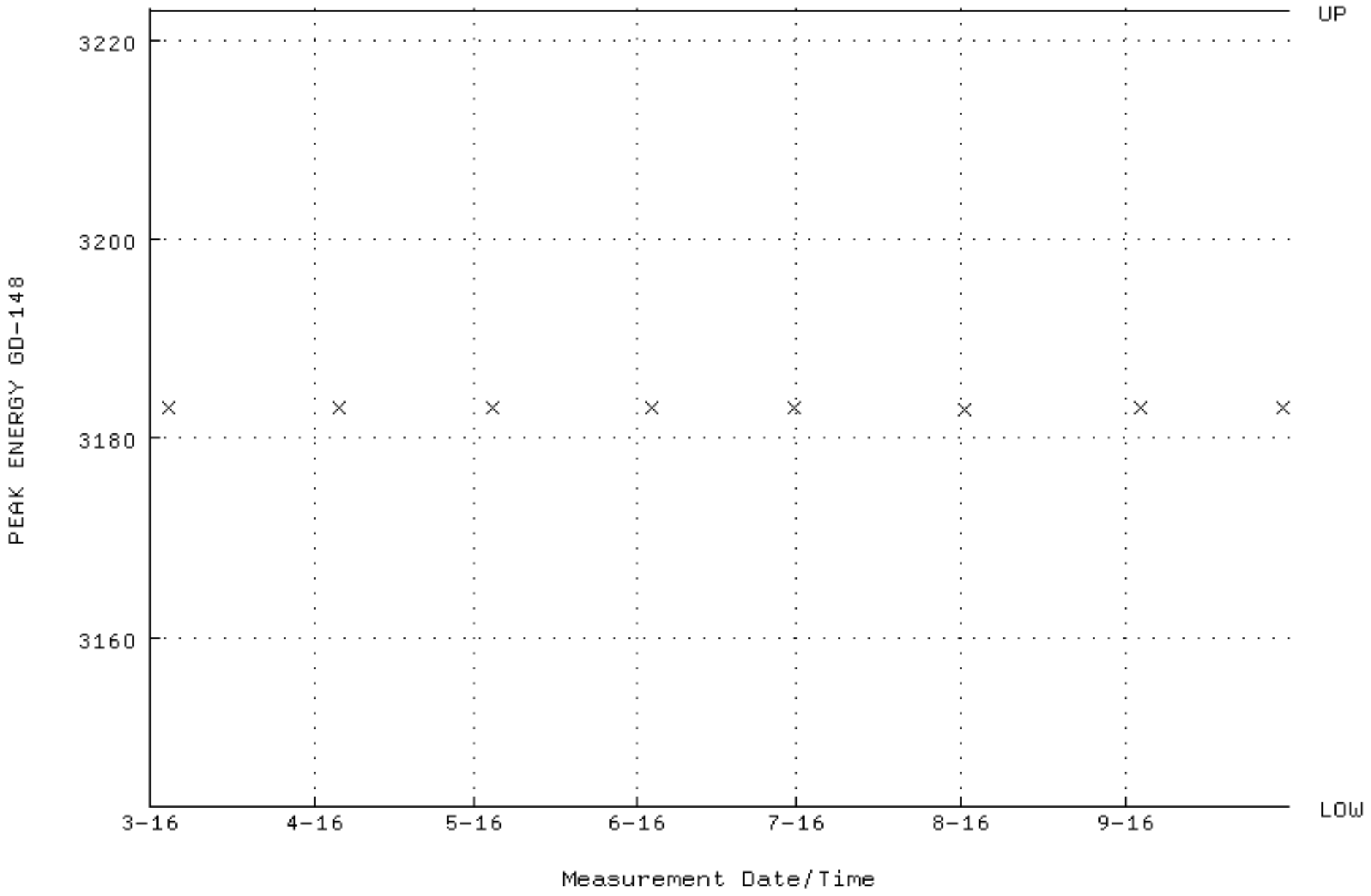
QA filename : DKA100:[ENV_ALPHA.QA.W]W084.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



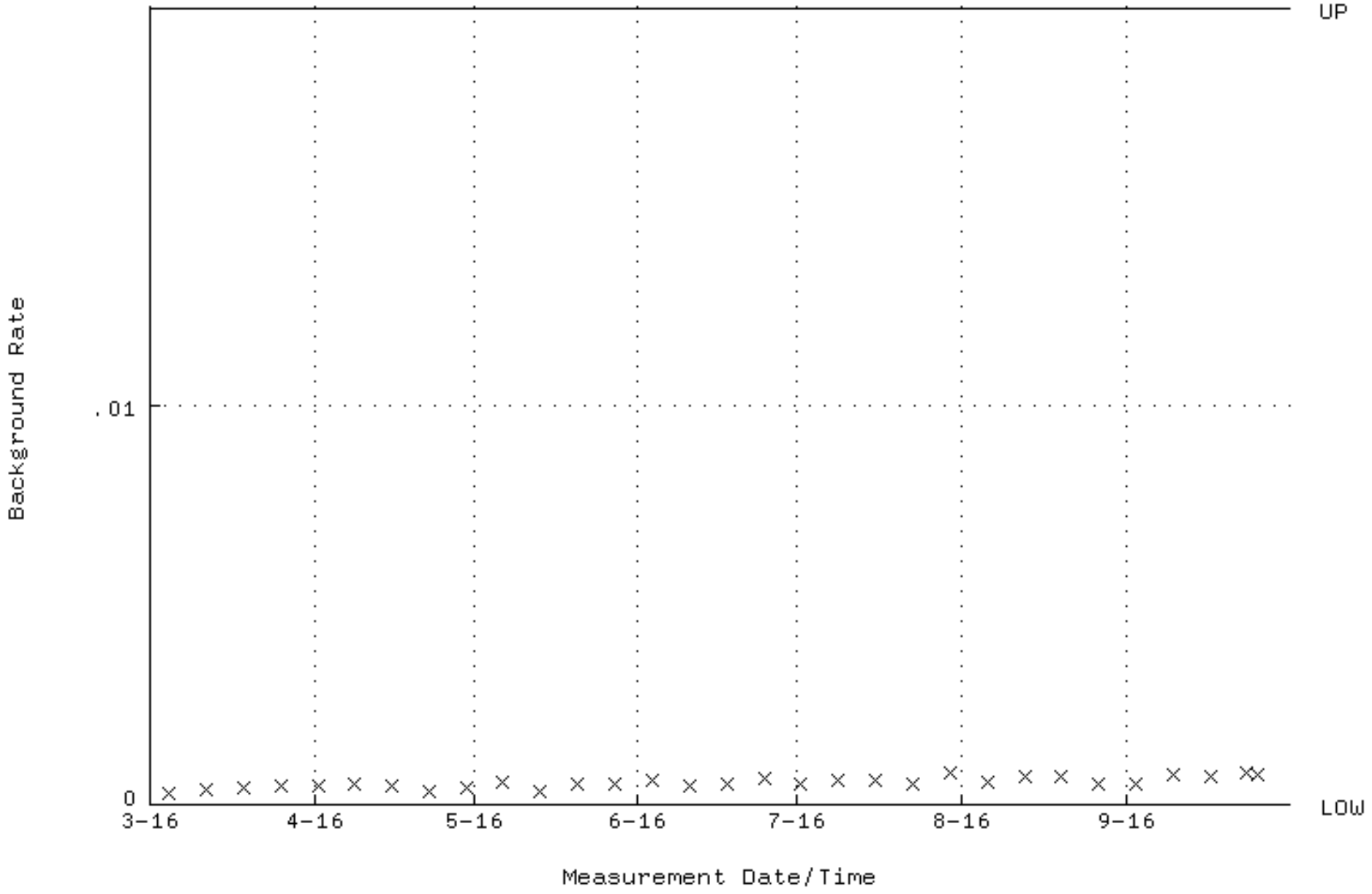
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



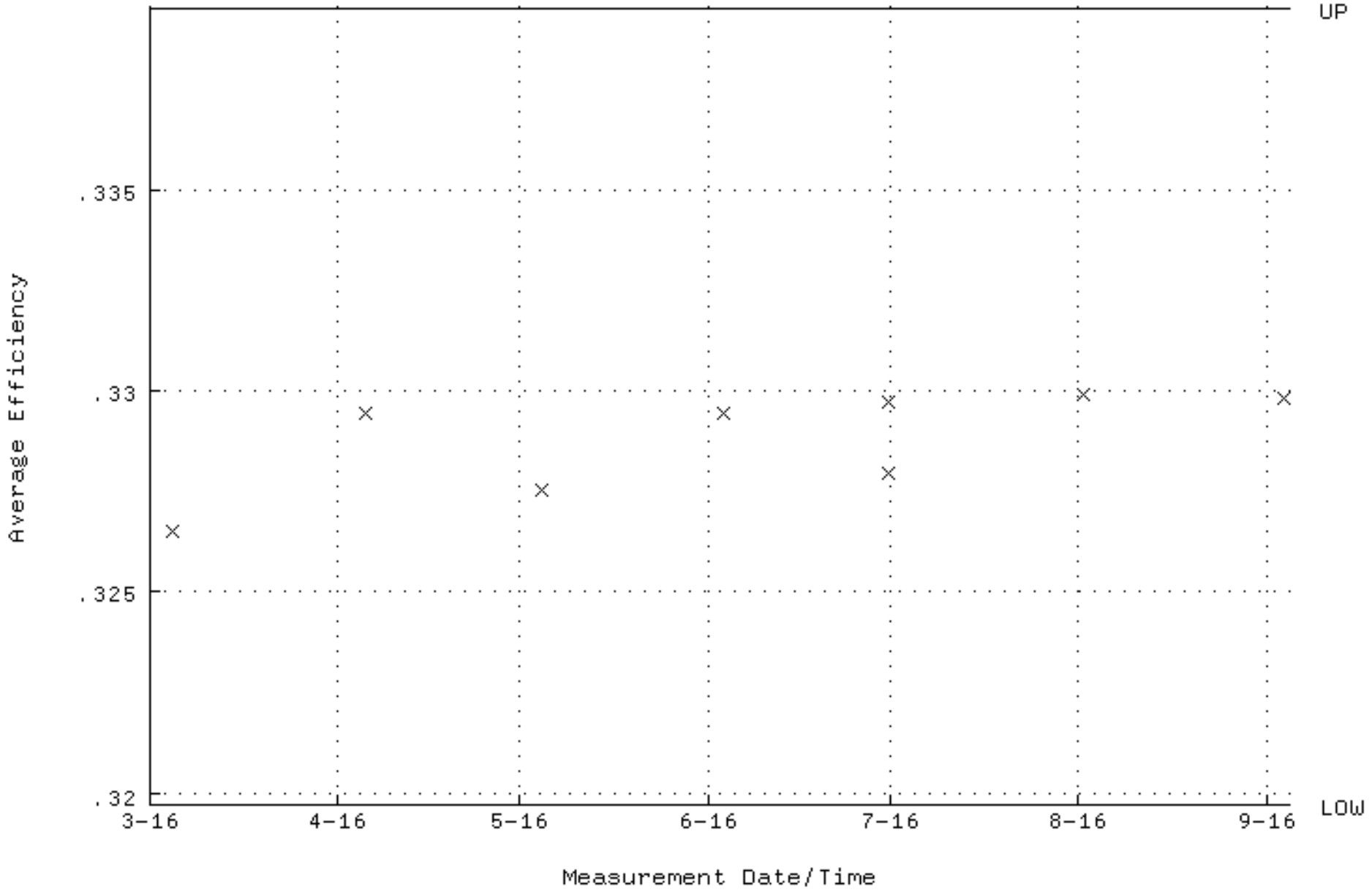
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



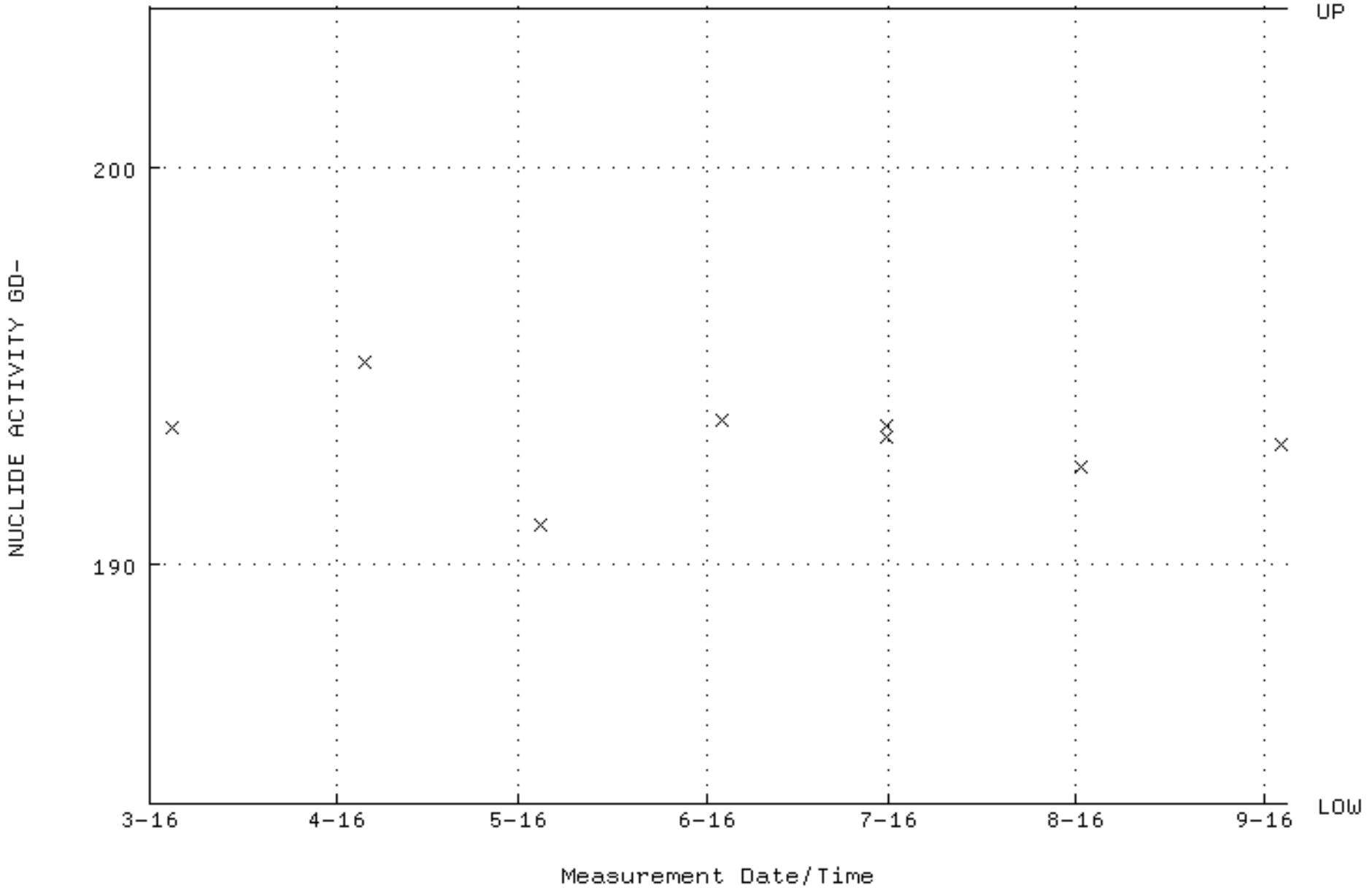
QA filename : DKA100:[ENV_ALPHA.QA.B]B084.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



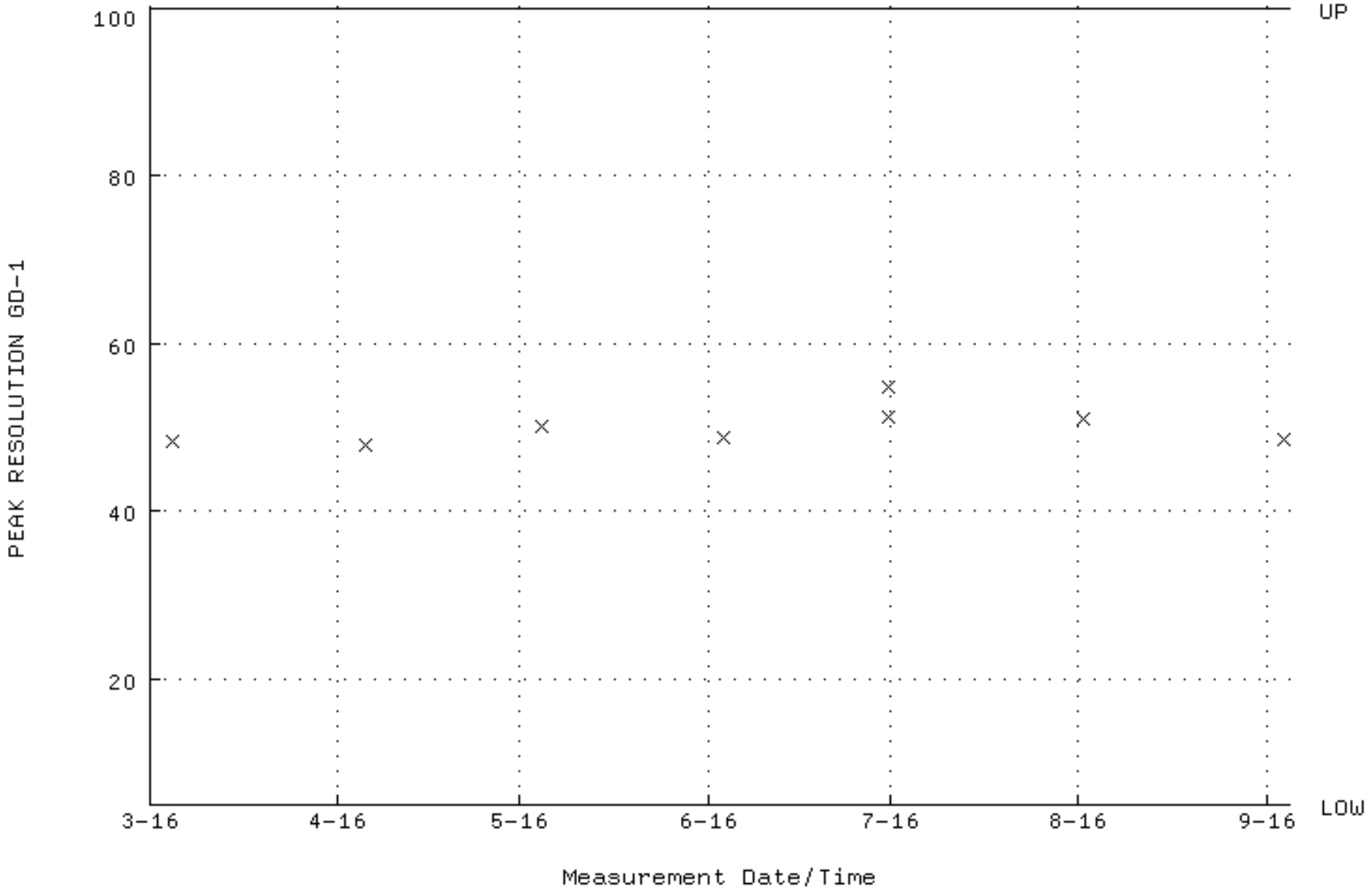
QA filename : DKA100:[ENV_ALPHA.QA.W]W085.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 0.319702 through 0.339500



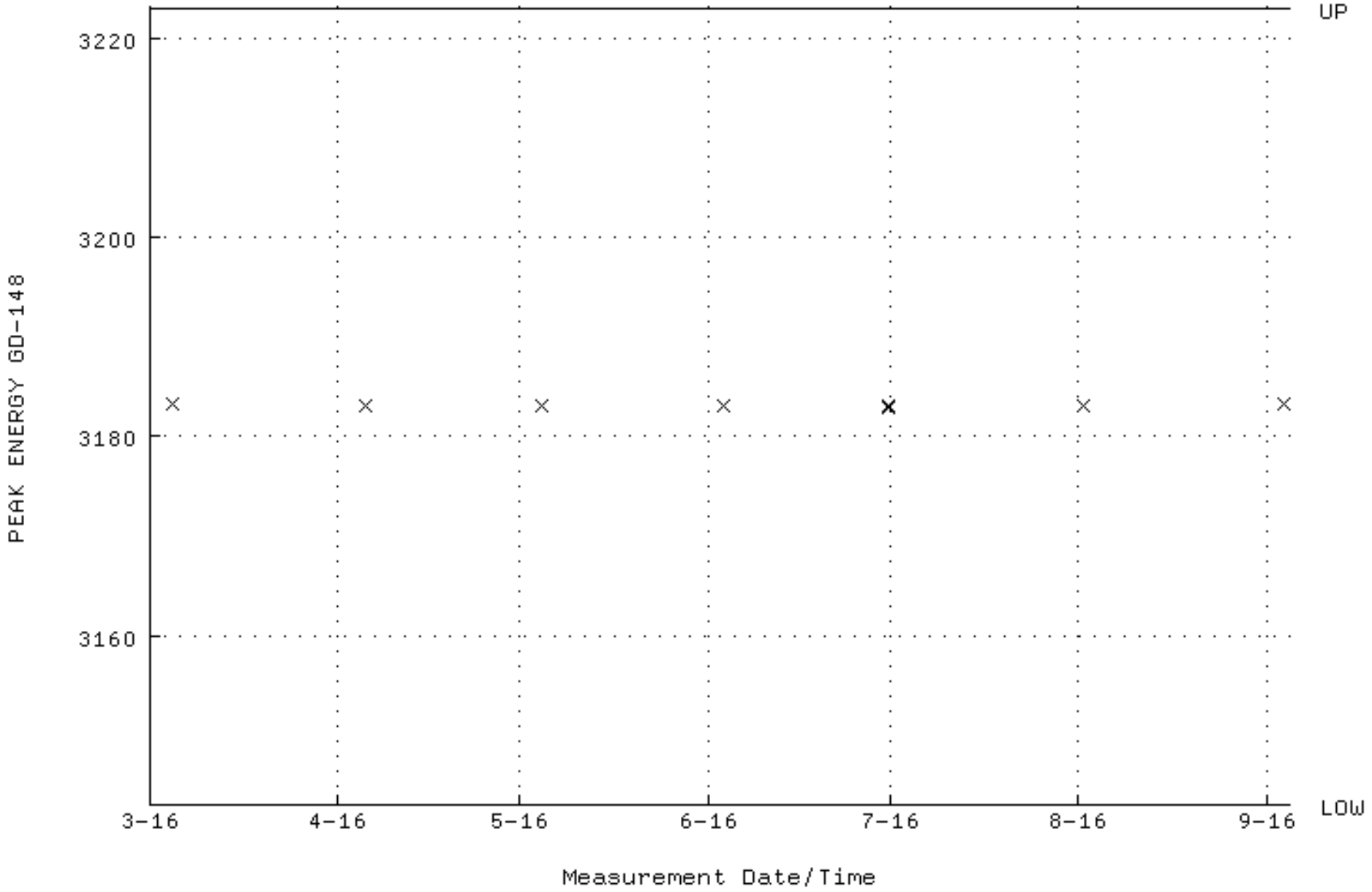
QA filename : DKA100:[ENV_ALPHA.QA.W]W085.QAF;10
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



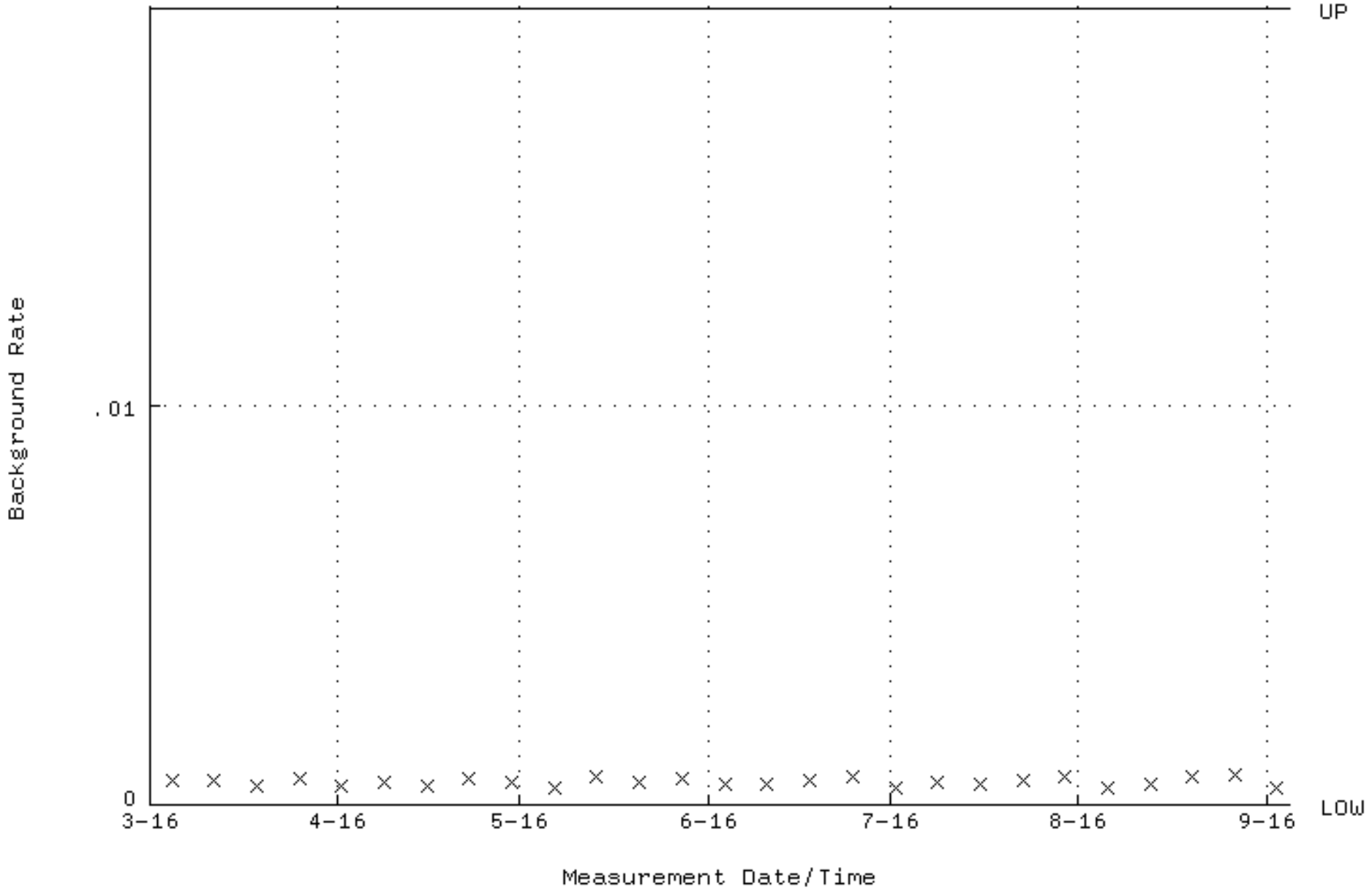
QA filename : DKA100:[ENV_ALPHA.QA.W]W085.QAF;10
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



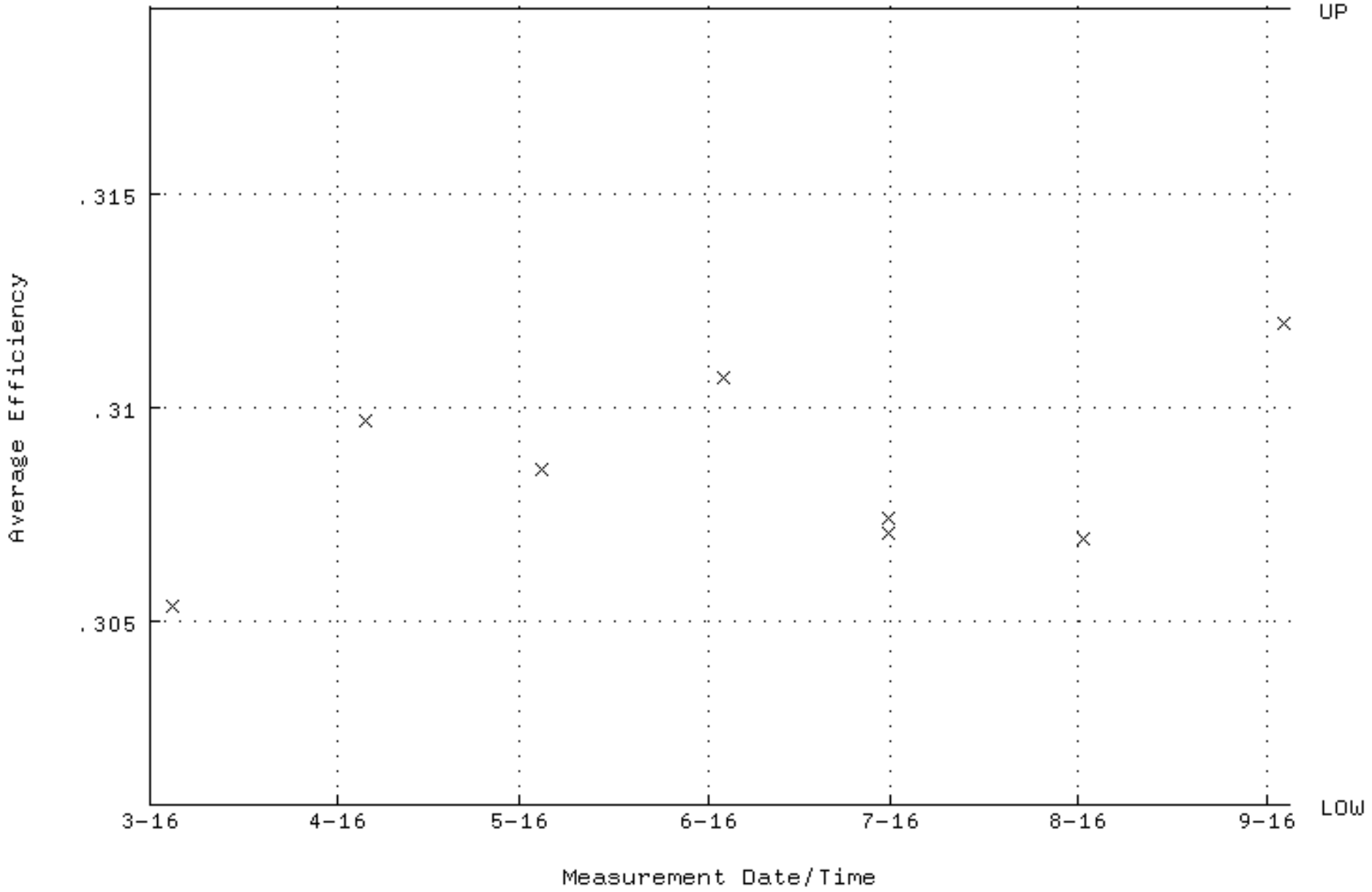
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



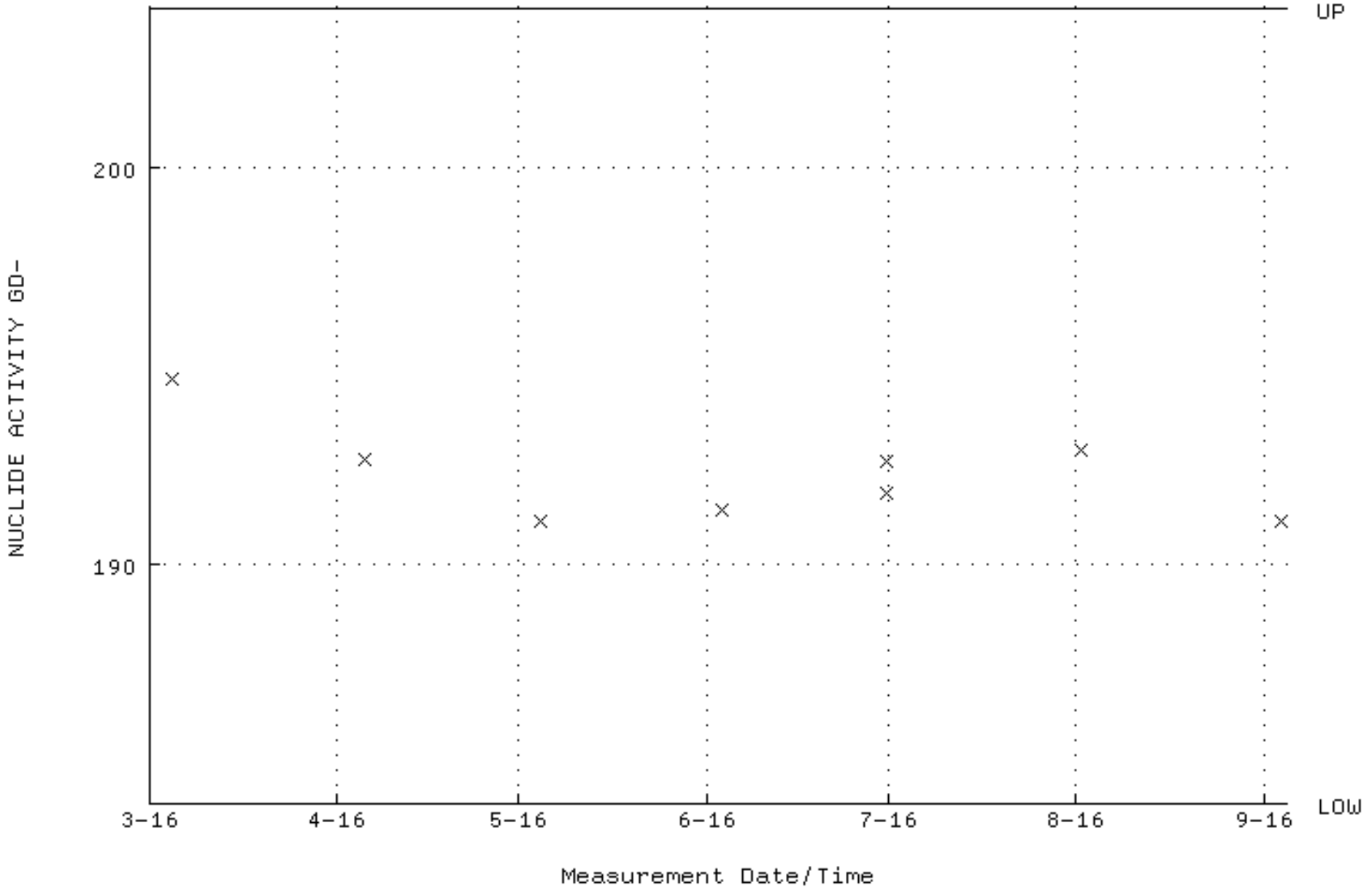
QA filename : DKA100:[ENV_ALPHA.QA.B]B085.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:44 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



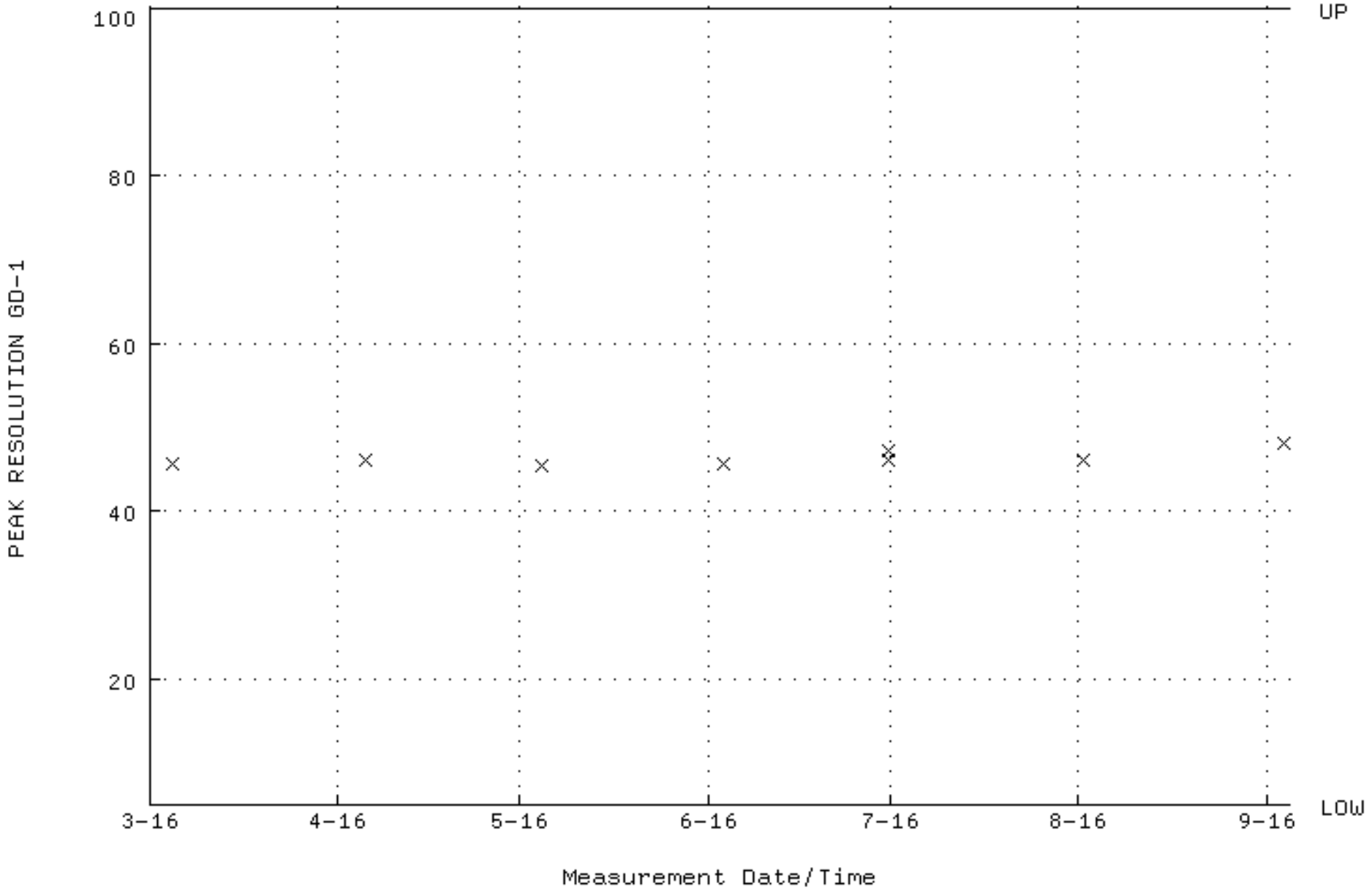
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Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 0.300722 through 0.319324



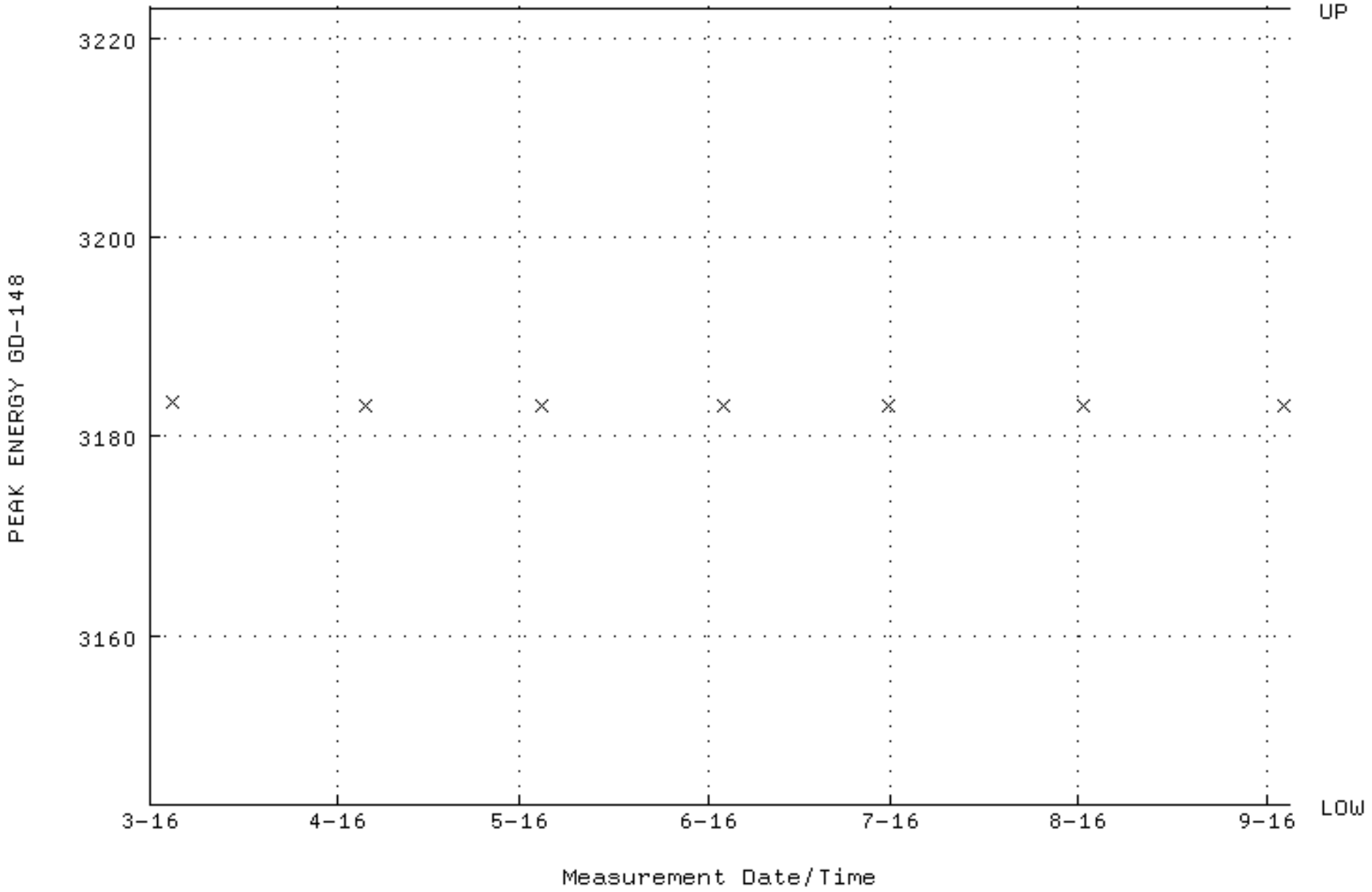
QA filename : DKA100:[ENV_ALPHA.QA.W]W086.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



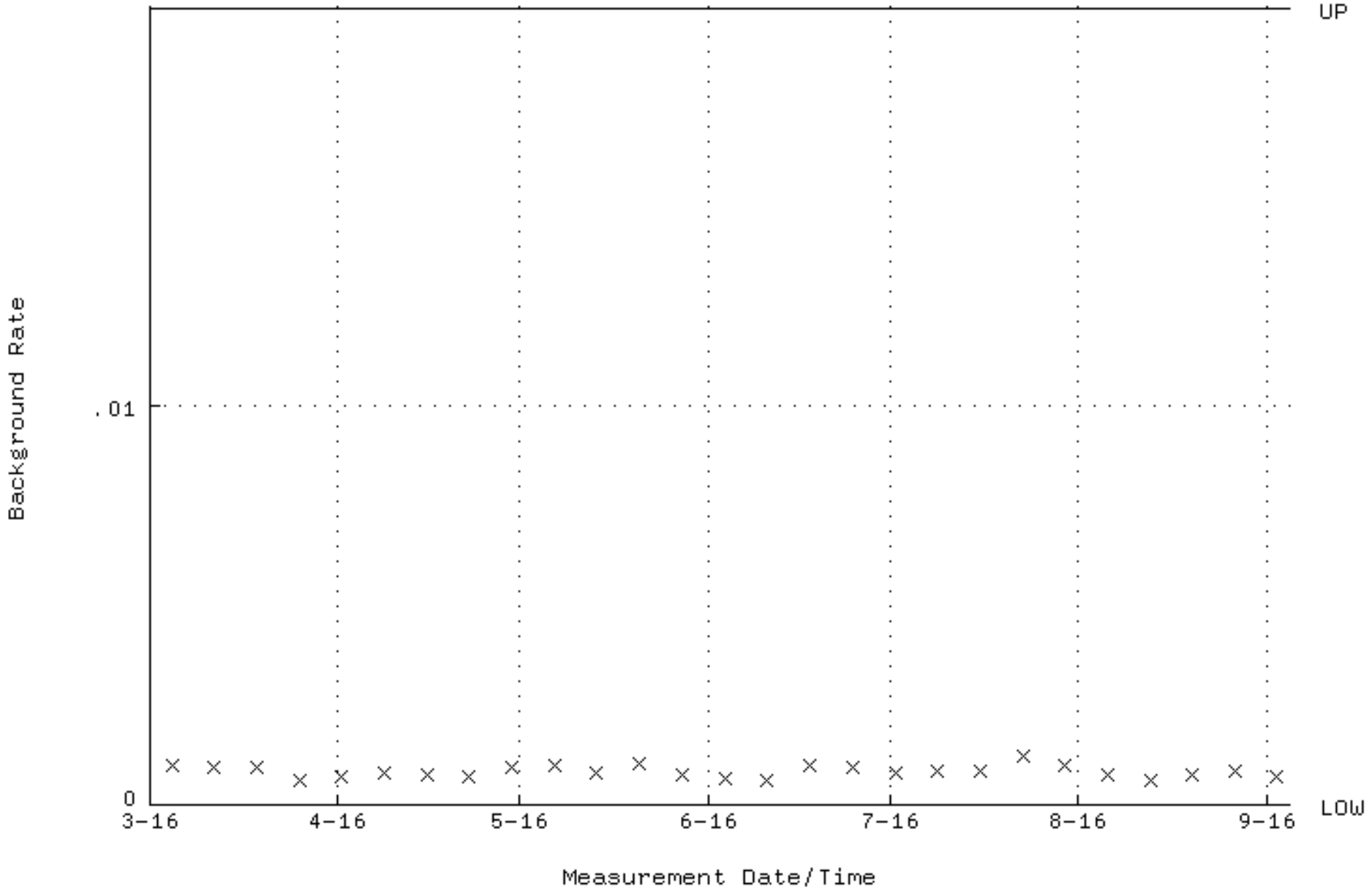
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



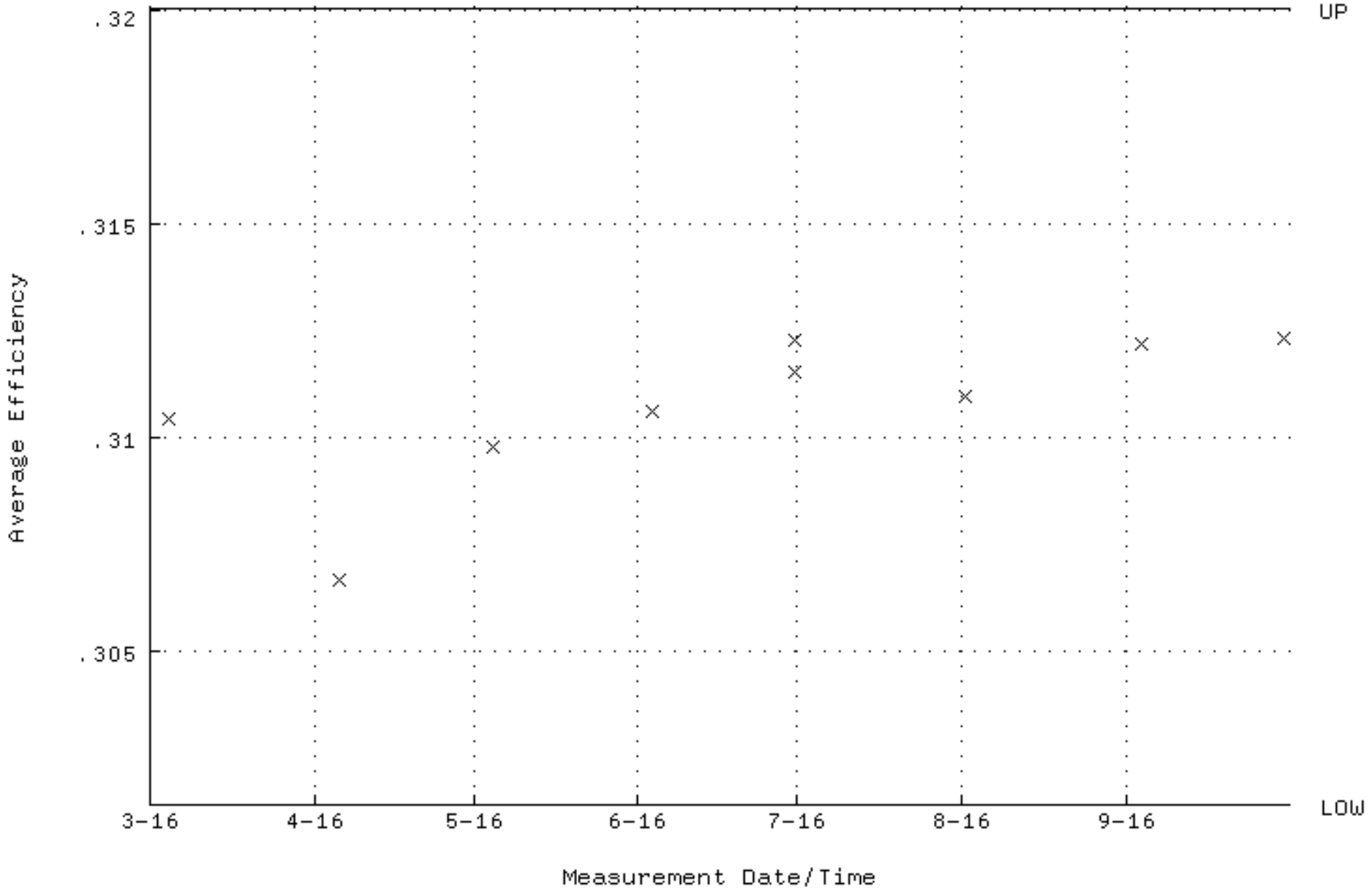
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



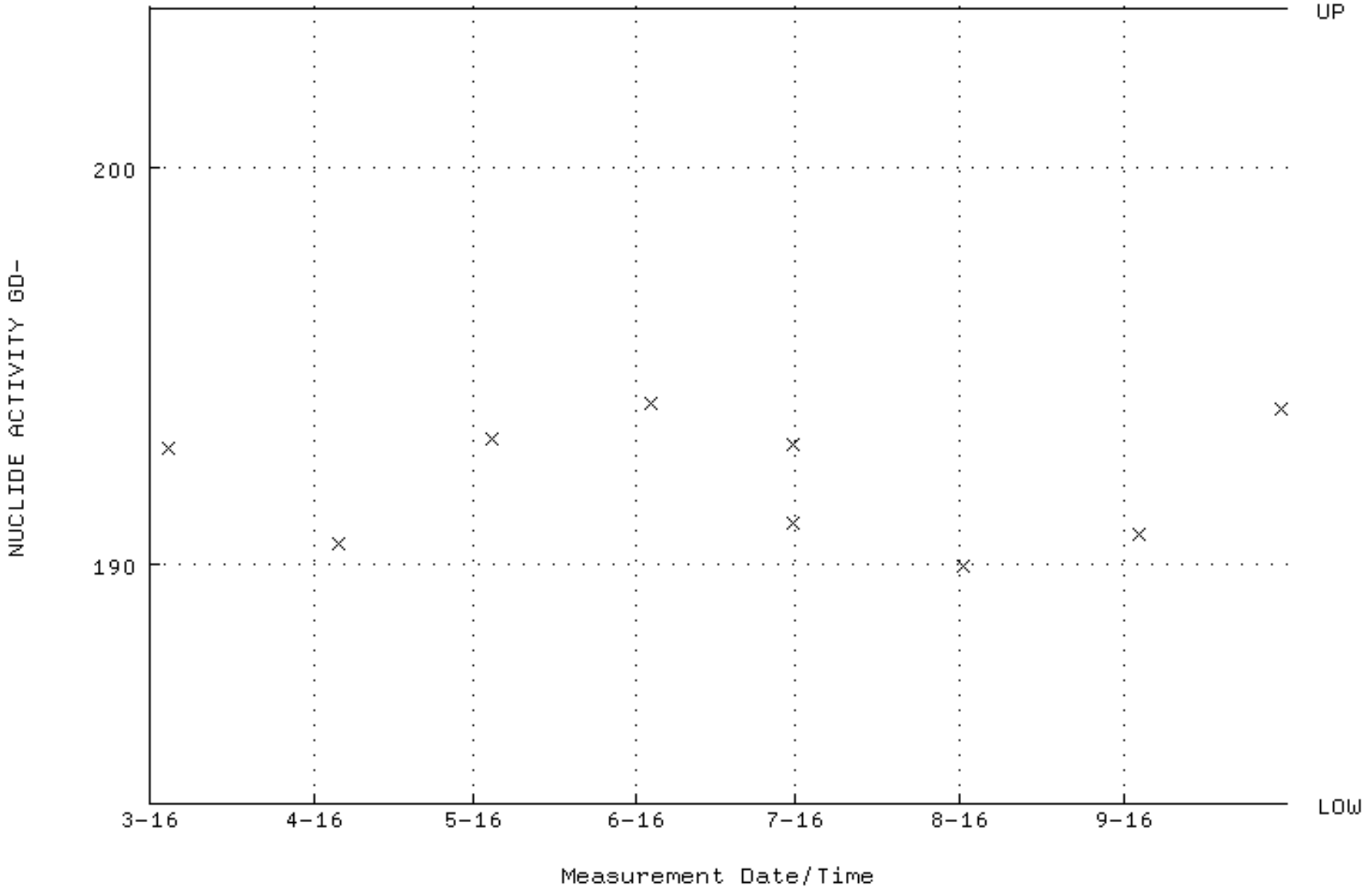
QA filename : DKA100:[ENV_ALPHA.QA.B]B086.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:44 through 4-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



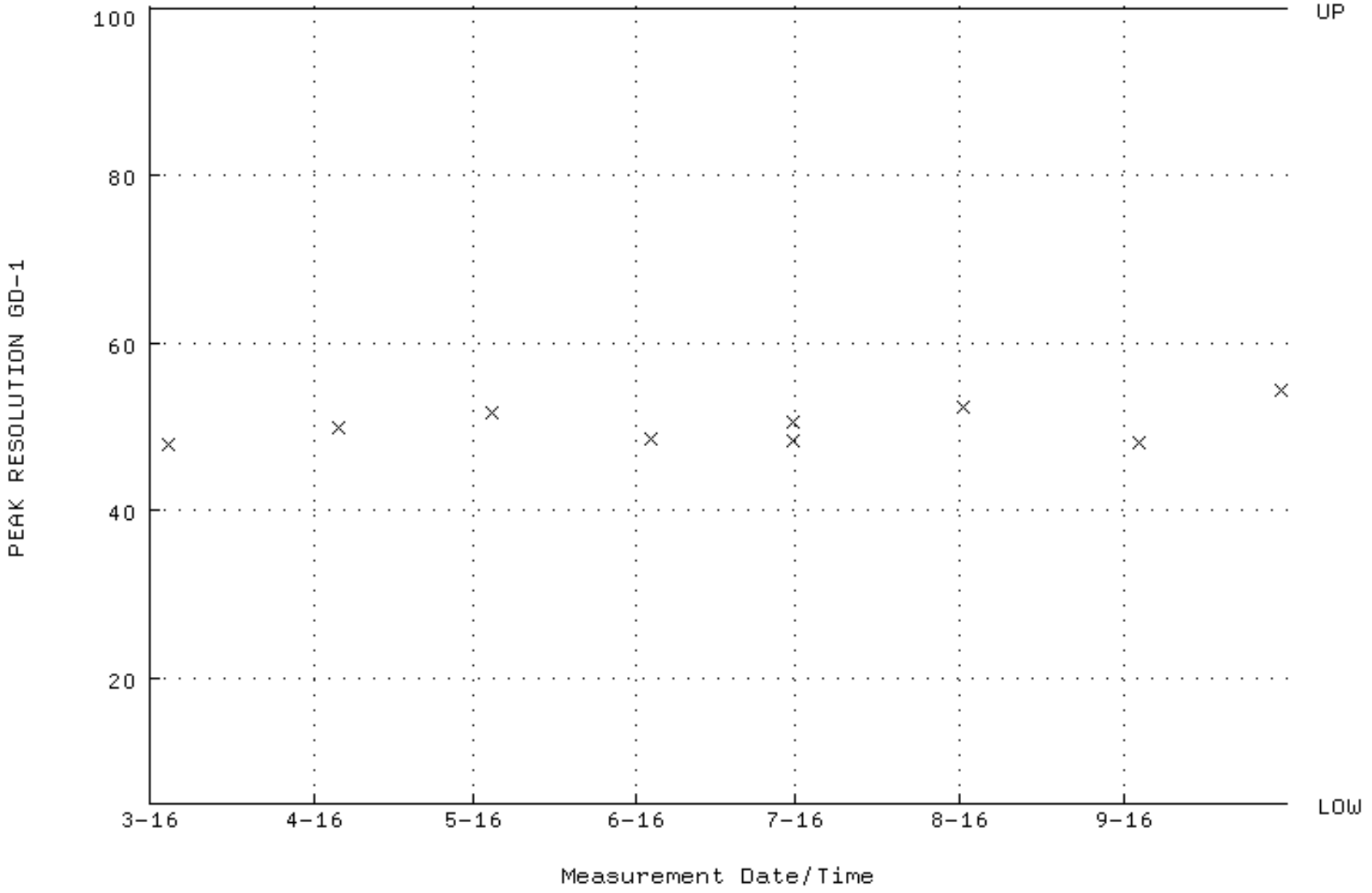
QA filename : DKA100:[ENV_ALPHA.QA.W]W088.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.301414 through 0.320060



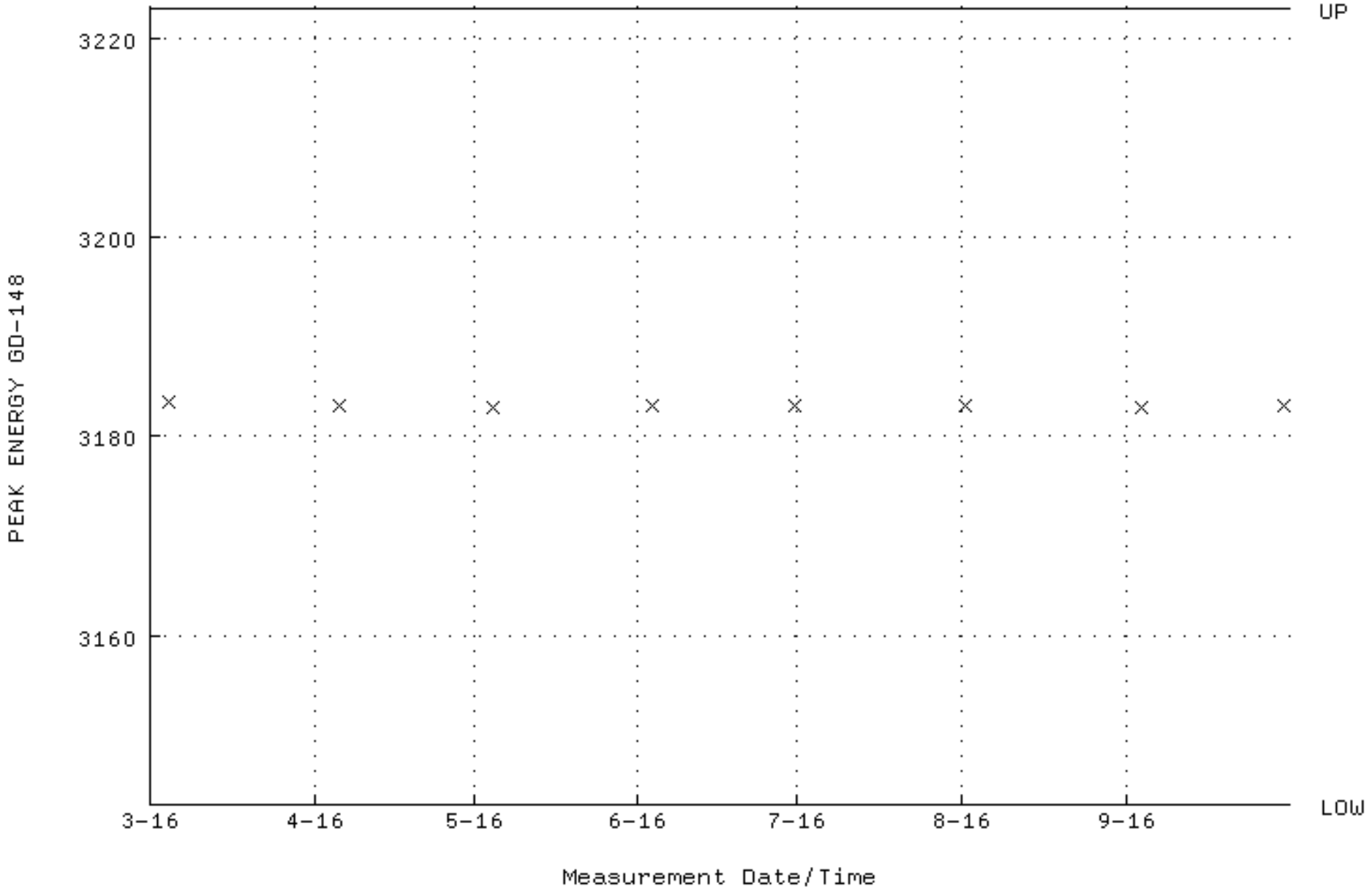
QA filename : DKA100:[ENV_ALPHA.QA.W]W088.QAF;11
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



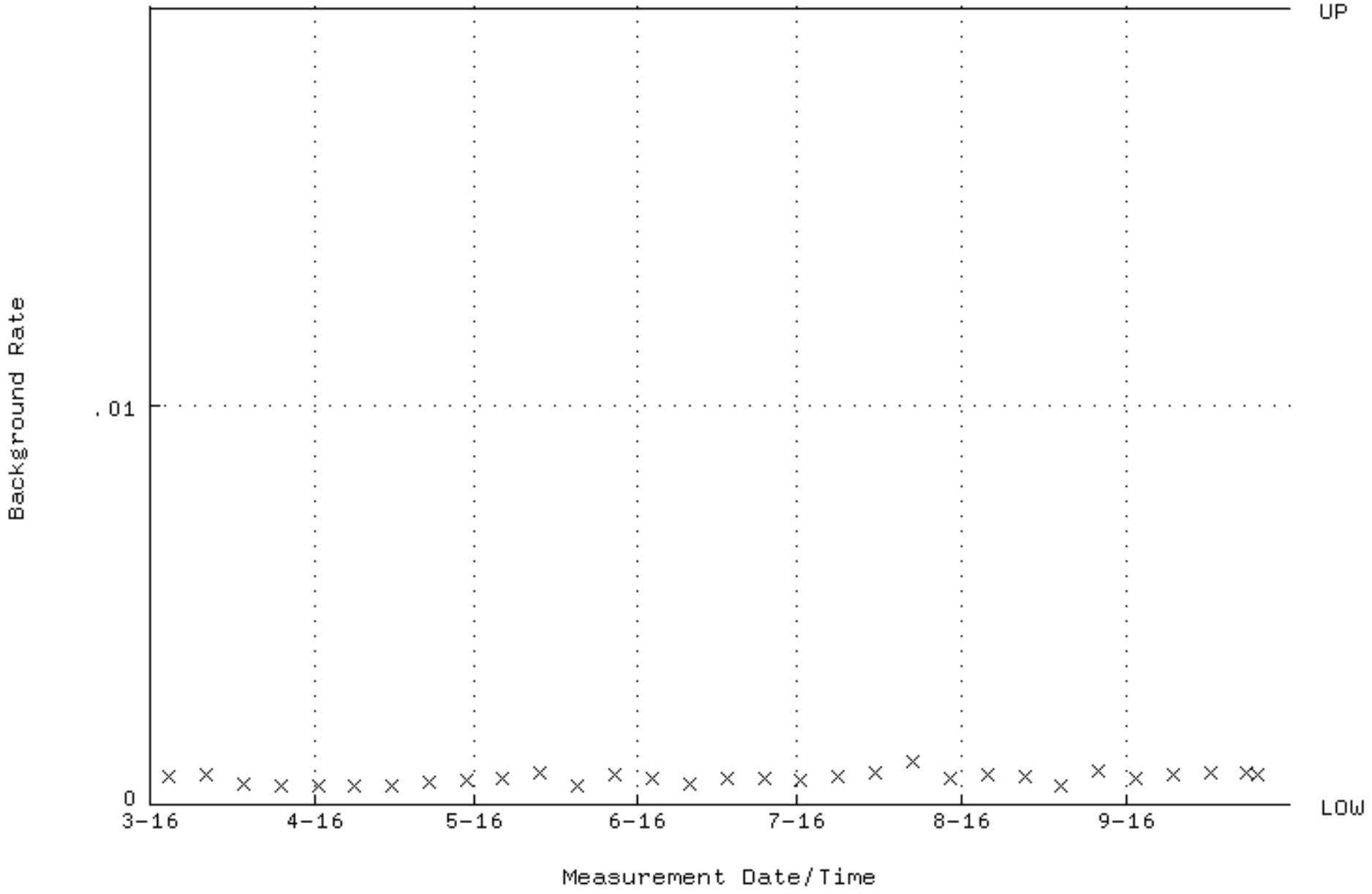
QA filename : DKA100:[ENV_ALPHA.QA.W]W088.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



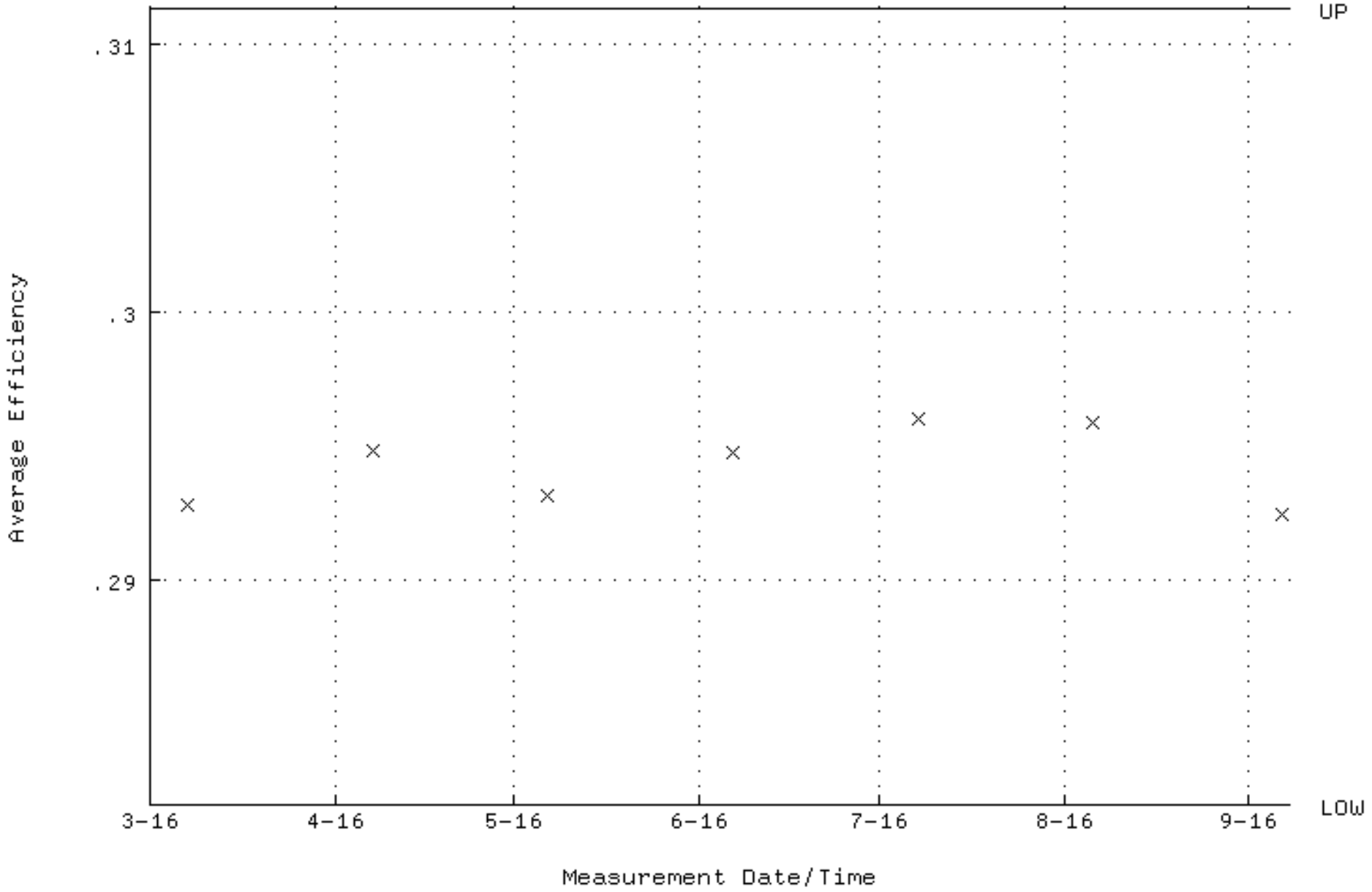
QA filename : DKA100:[ENV_ALPHA.QA.W]W088.QAF;11
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAR-2016 13:27:09 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



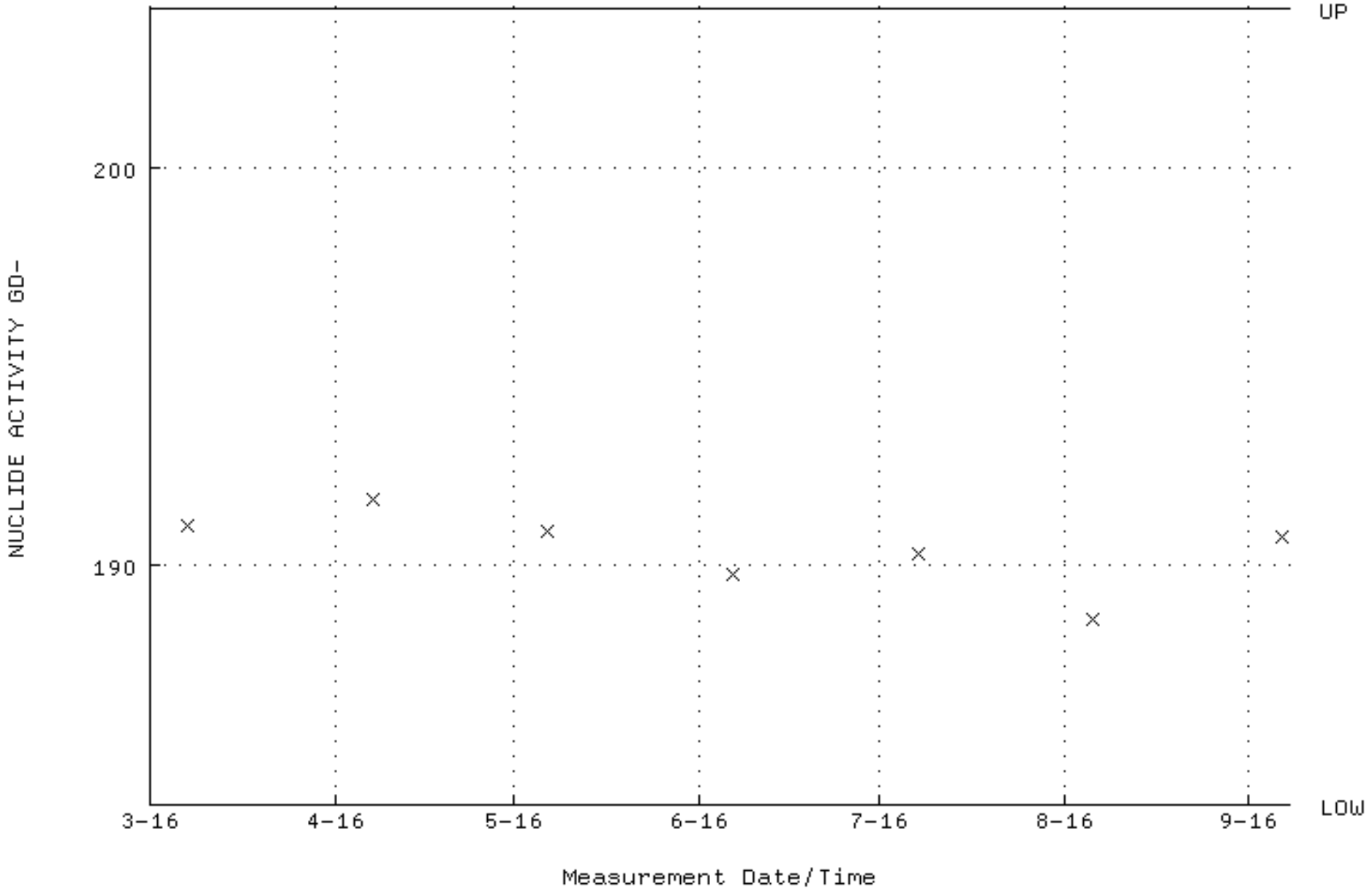
QA filename : DKA100:[ENV_ALPHA.QA.B]B088.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:21:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



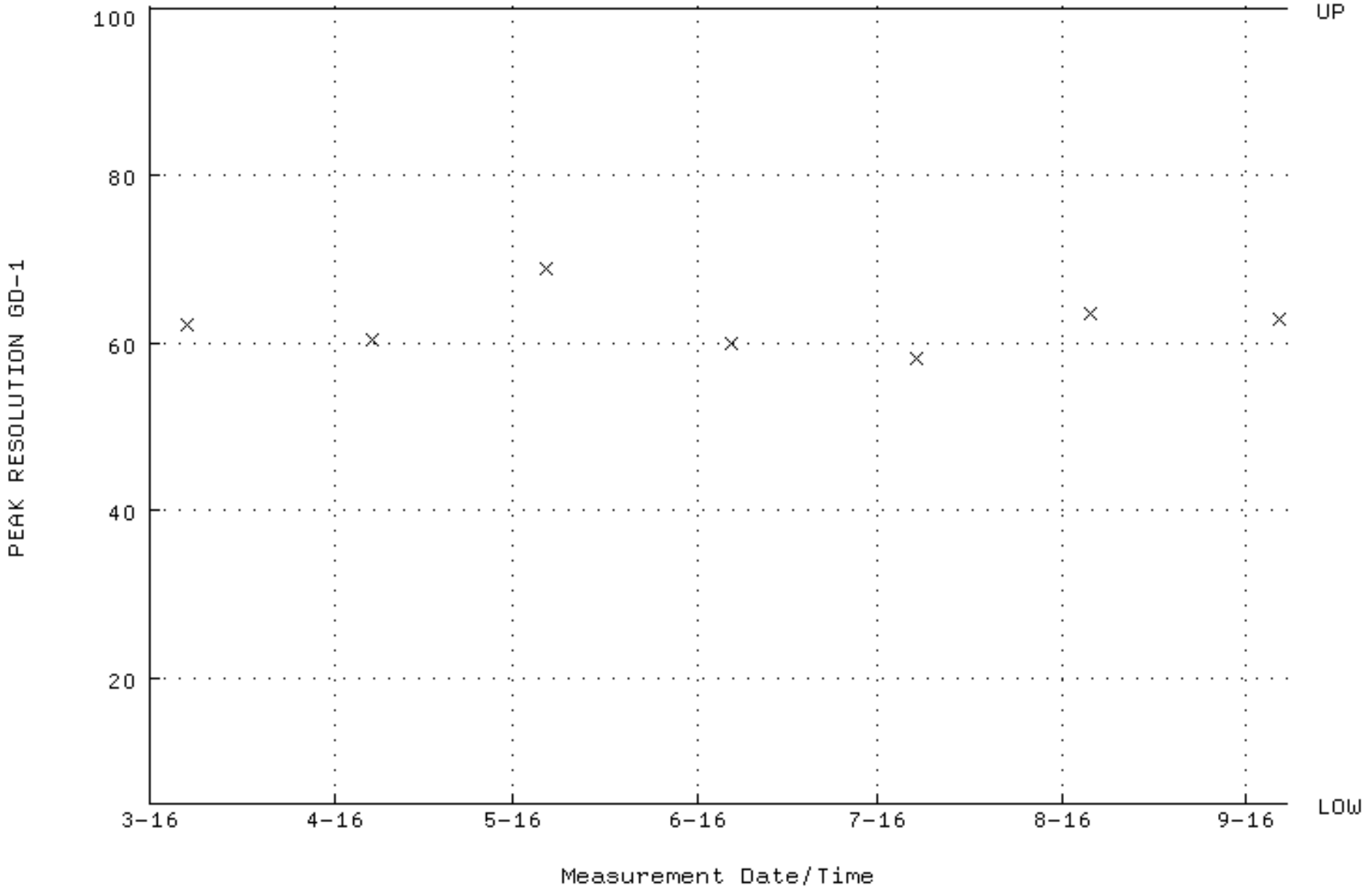
QA filename : DKA100:[ENV_ALPHA.QA.W]W089.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.281646 through 0.311292



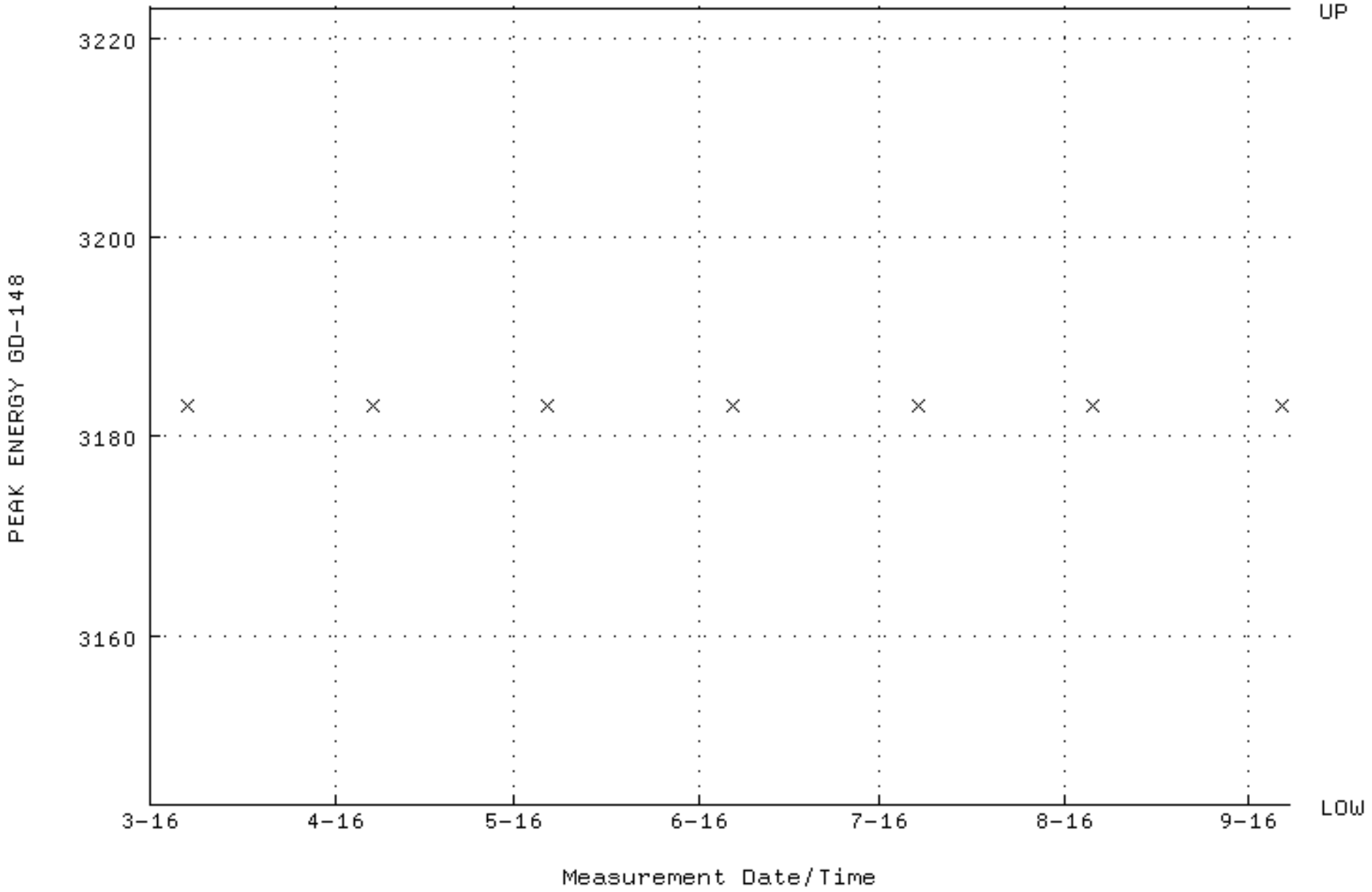
QA filename : DKA100:[ENV_ALPHA.QA.W]W089.QAF;10
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



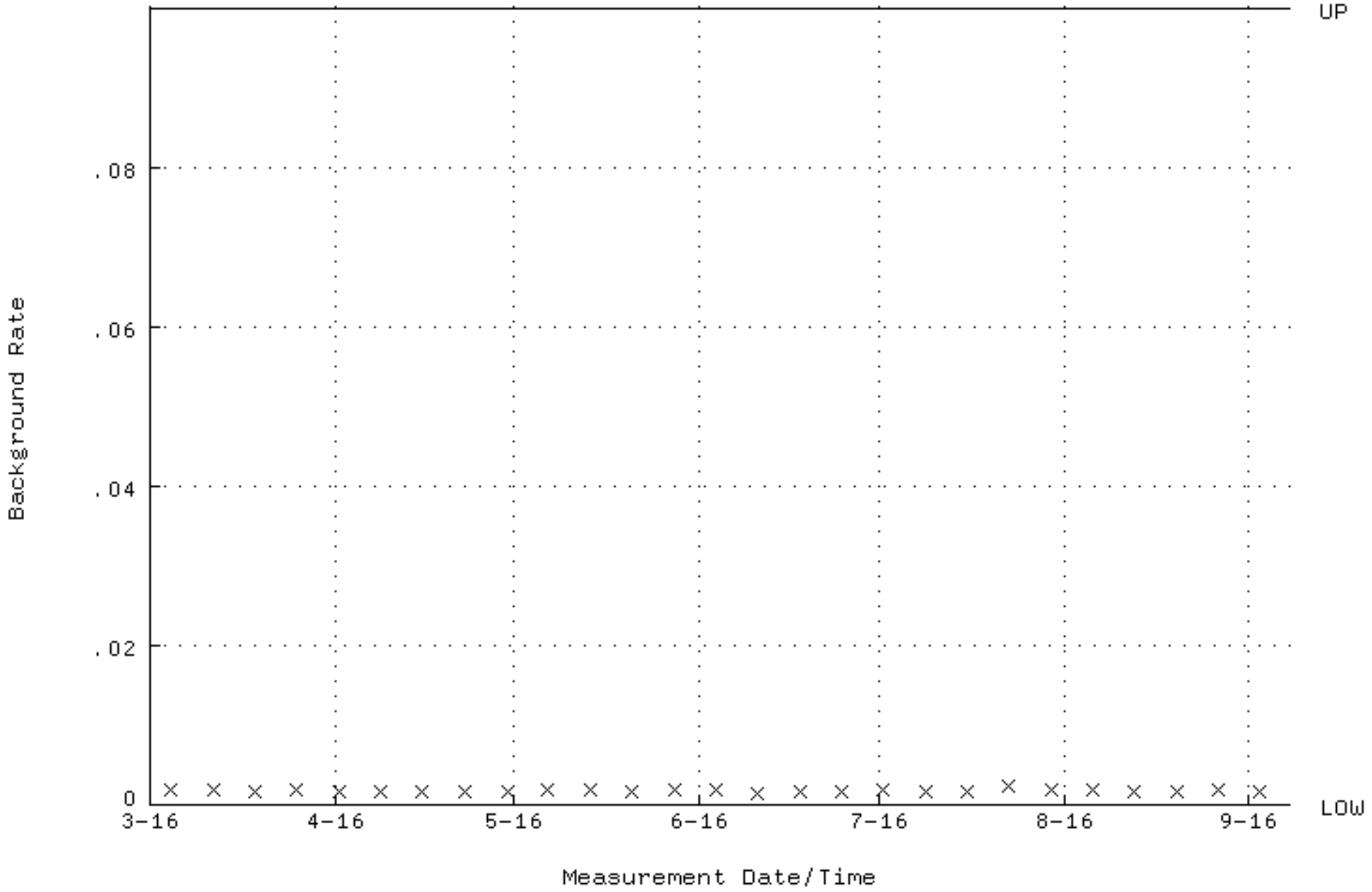
QA filename : DKA100:[ENV_ALPHA.QA.W]W089.QAF;10
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



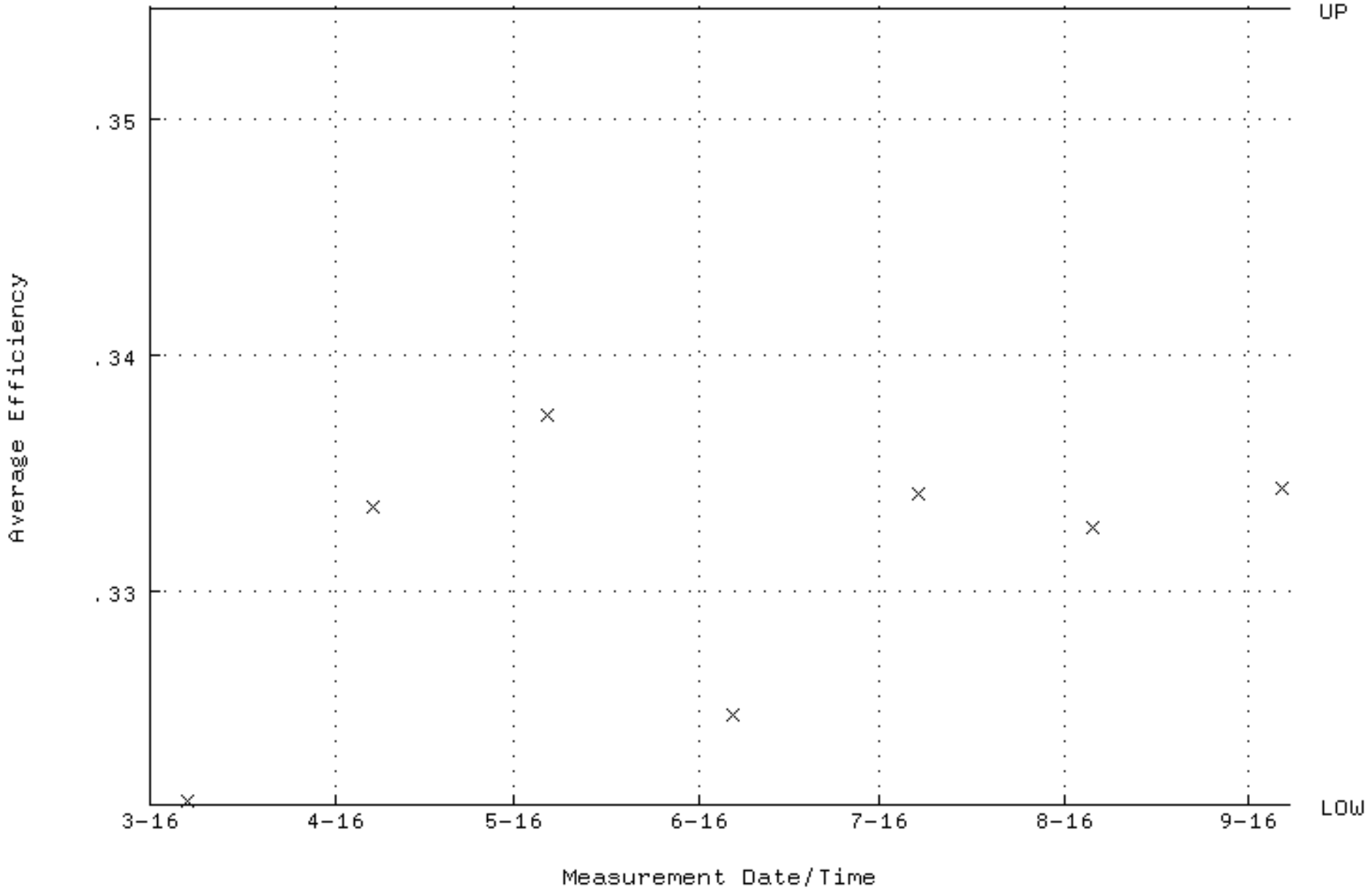
QA filename : DKA100:[ENV_ALPHA.QA.W]W089.QAF;10
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



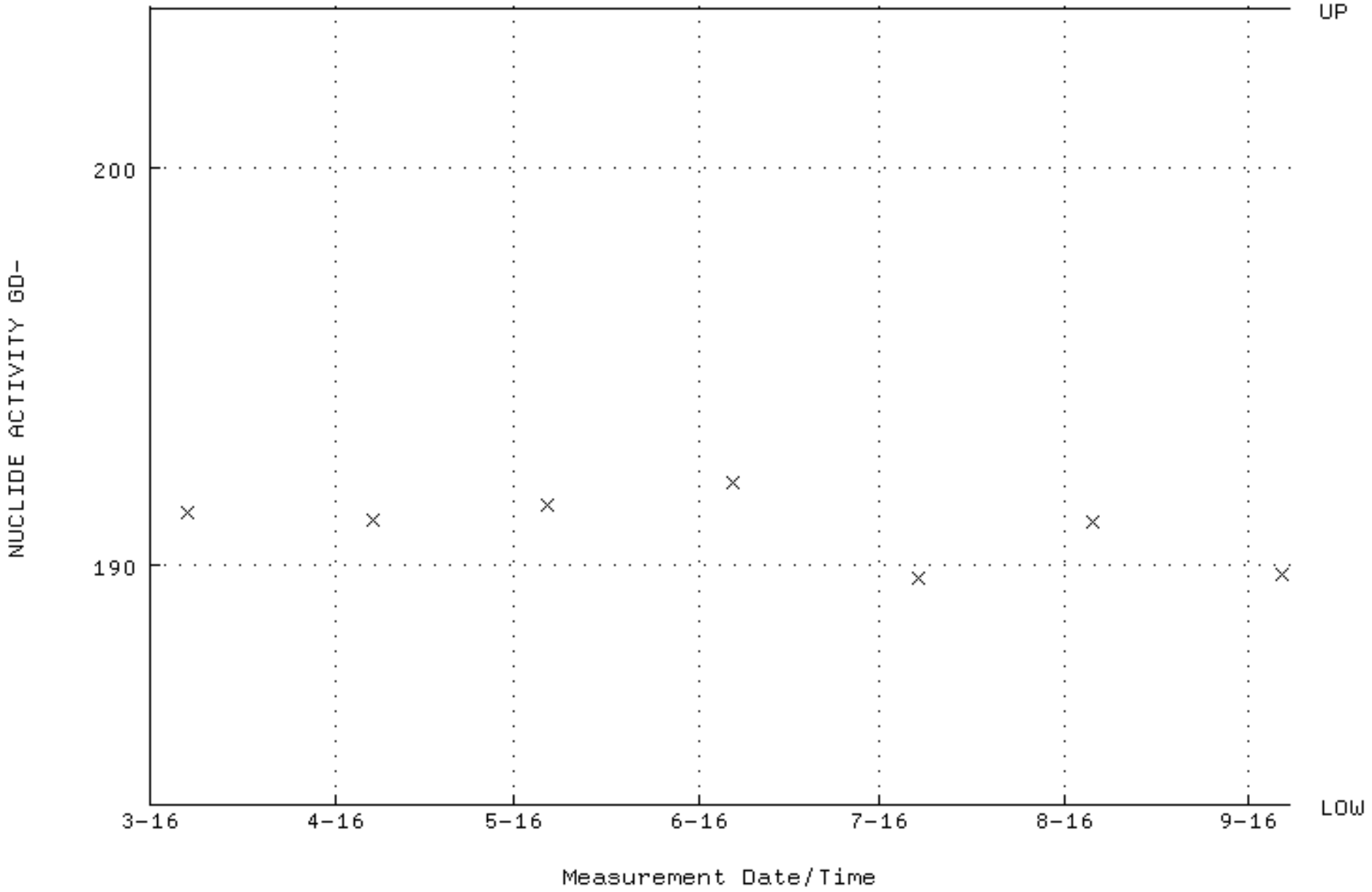
QA filename : DKA100:[ENV_ALPHA.QA.B]B089.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:34 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



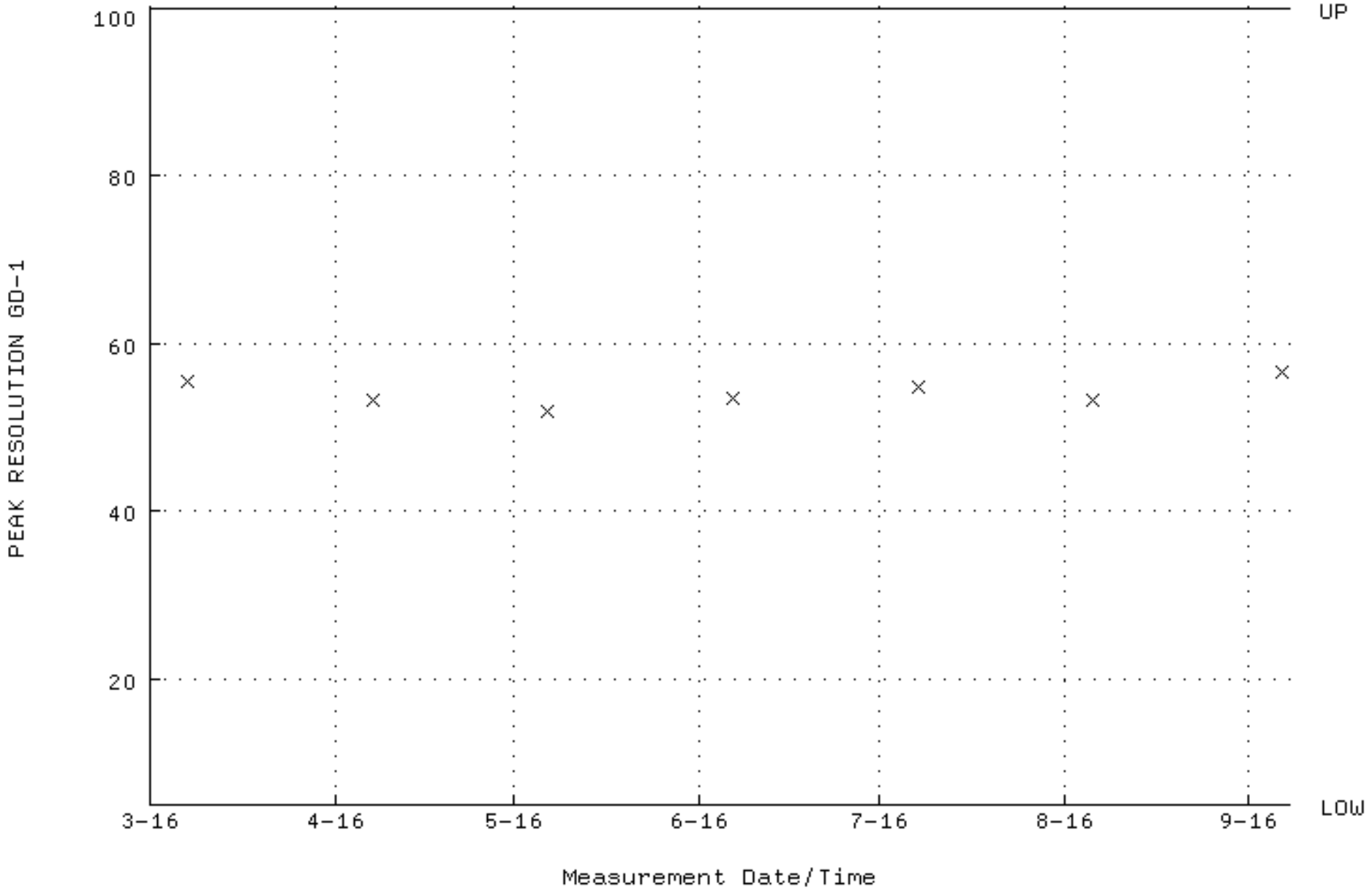
QA filename : DKA100:[ENV_ALPHA.QA.W]W090.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.320935 through 0.354717



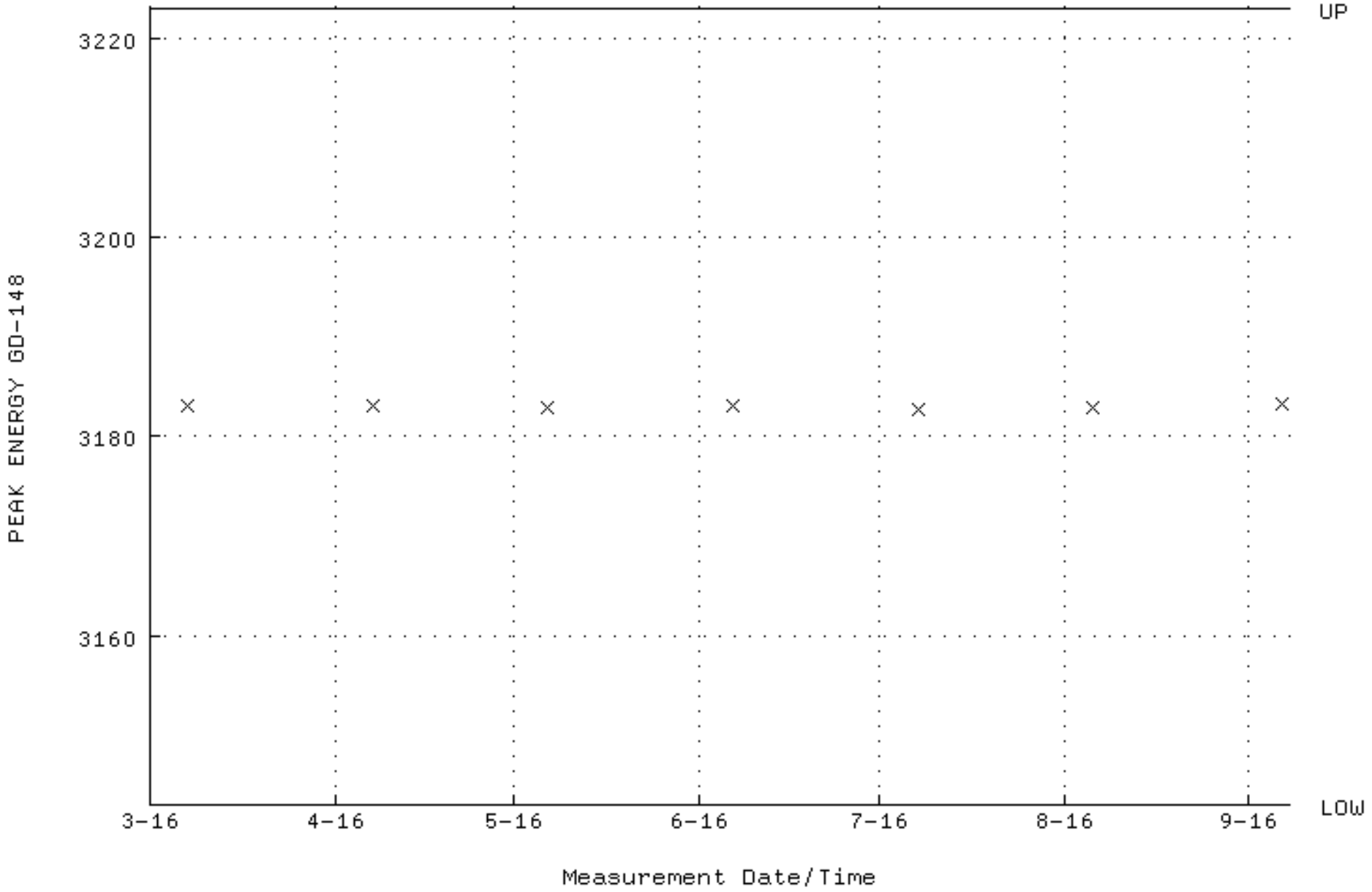
QA filename : DKA100:[ENV_ALPHA.QA.W]W090.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



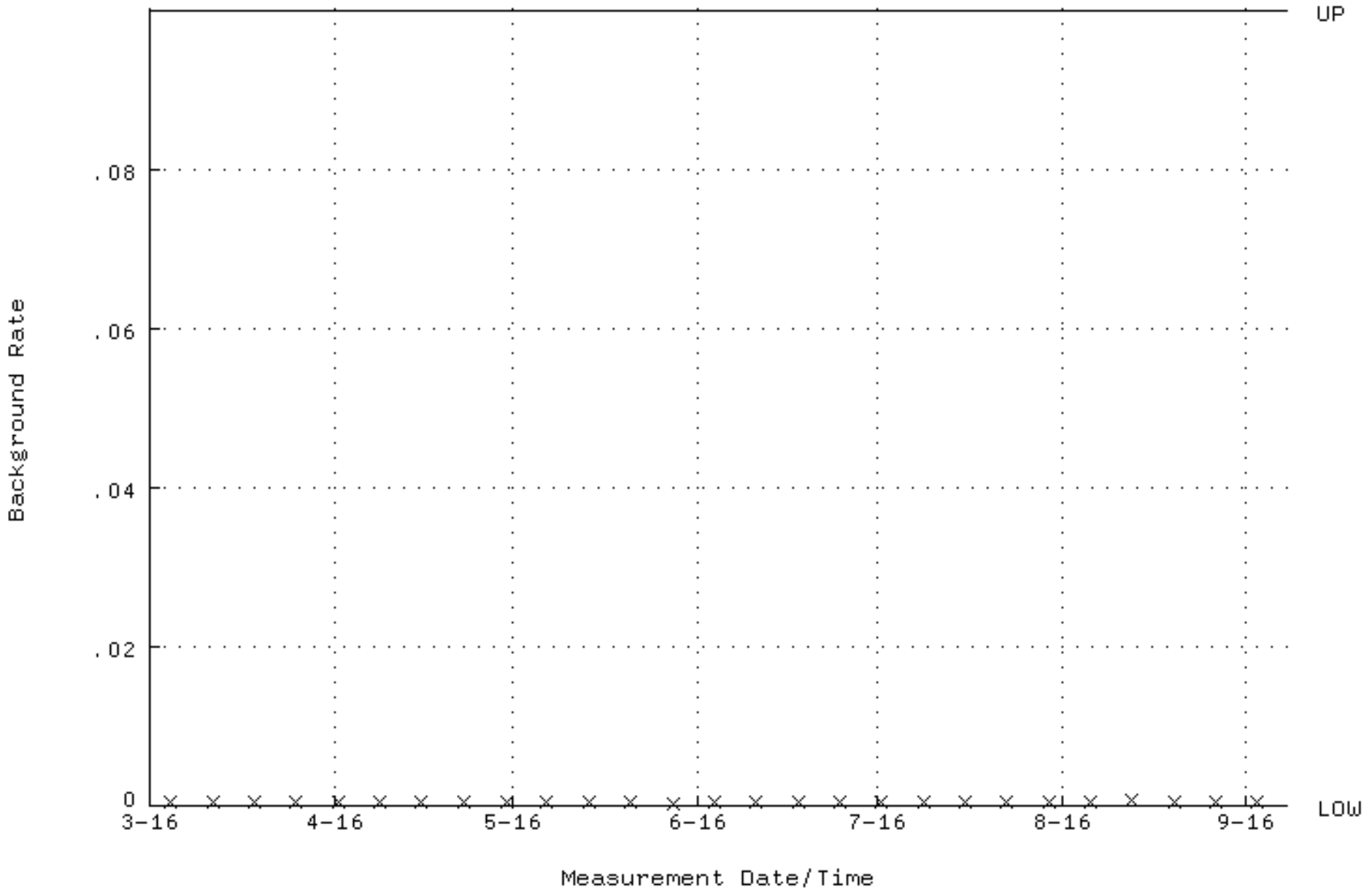
QA filename : DKA100:[ENV_ALPHA.QA.W]W090.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



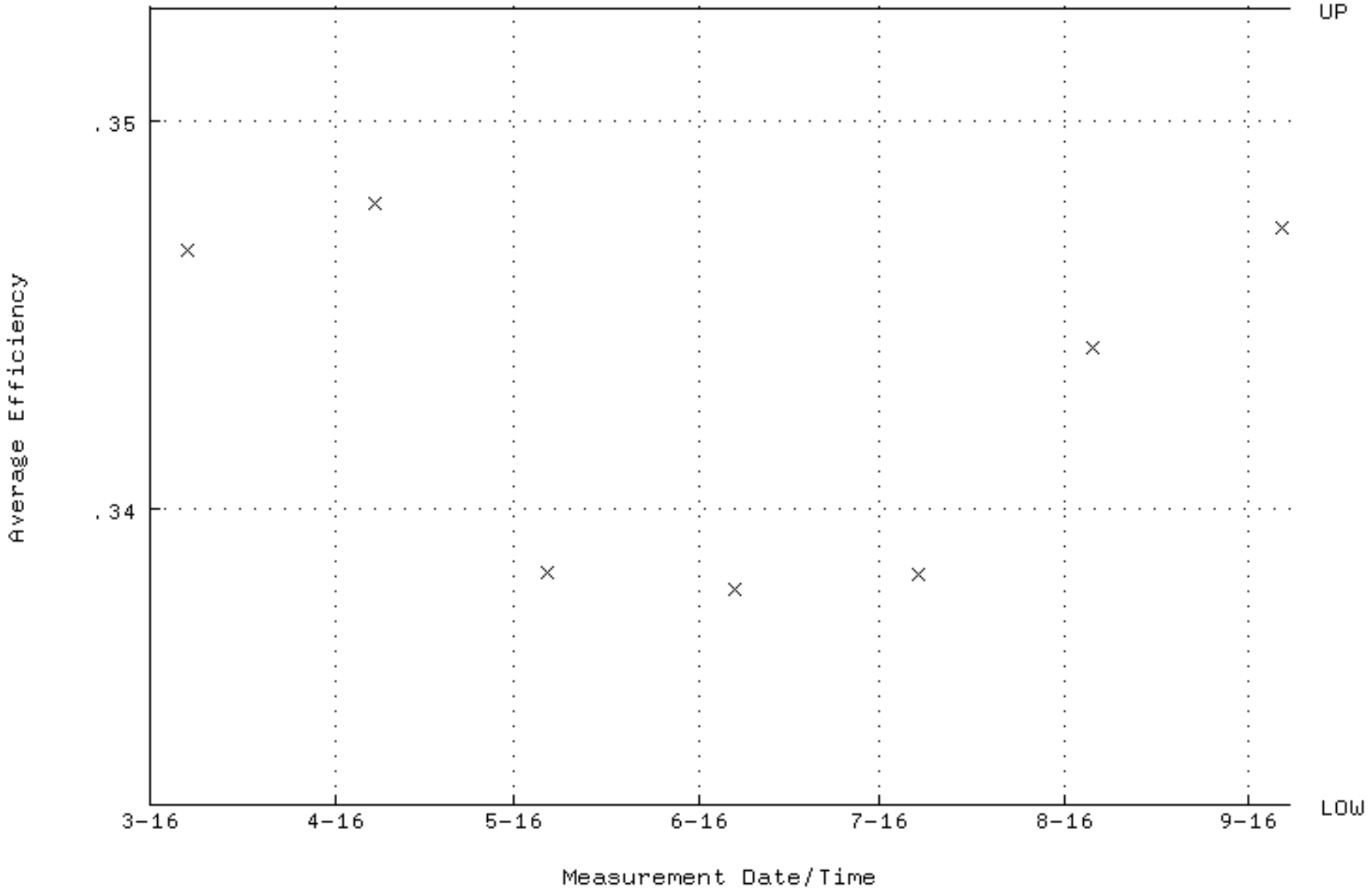
QA filename : DKA100:[ENV_ALPHA.QA.W]W090.QAF;9
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



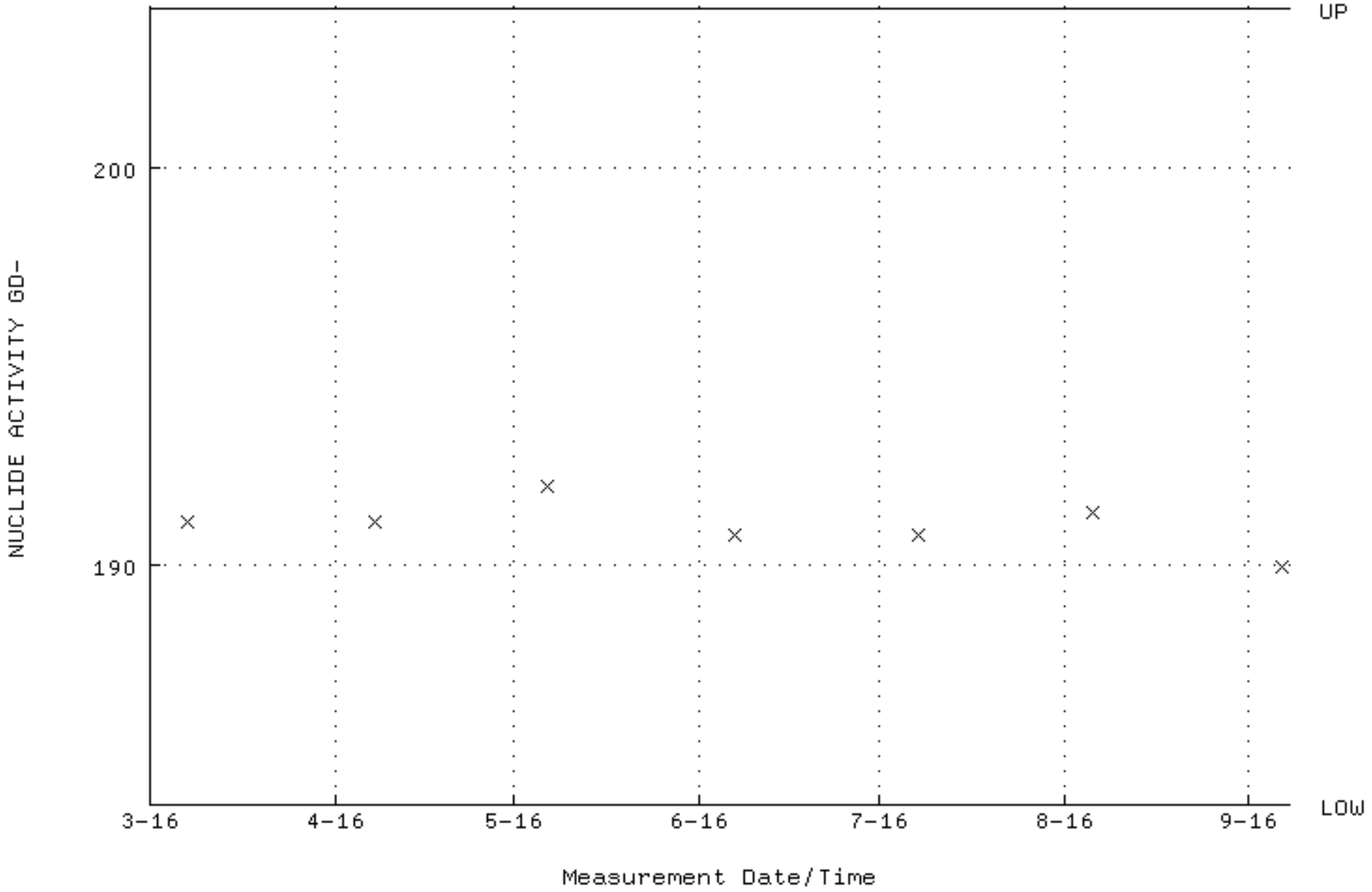
QA filename : DKA100:[ENV_ALPHA.QA.B]B090.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:34 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



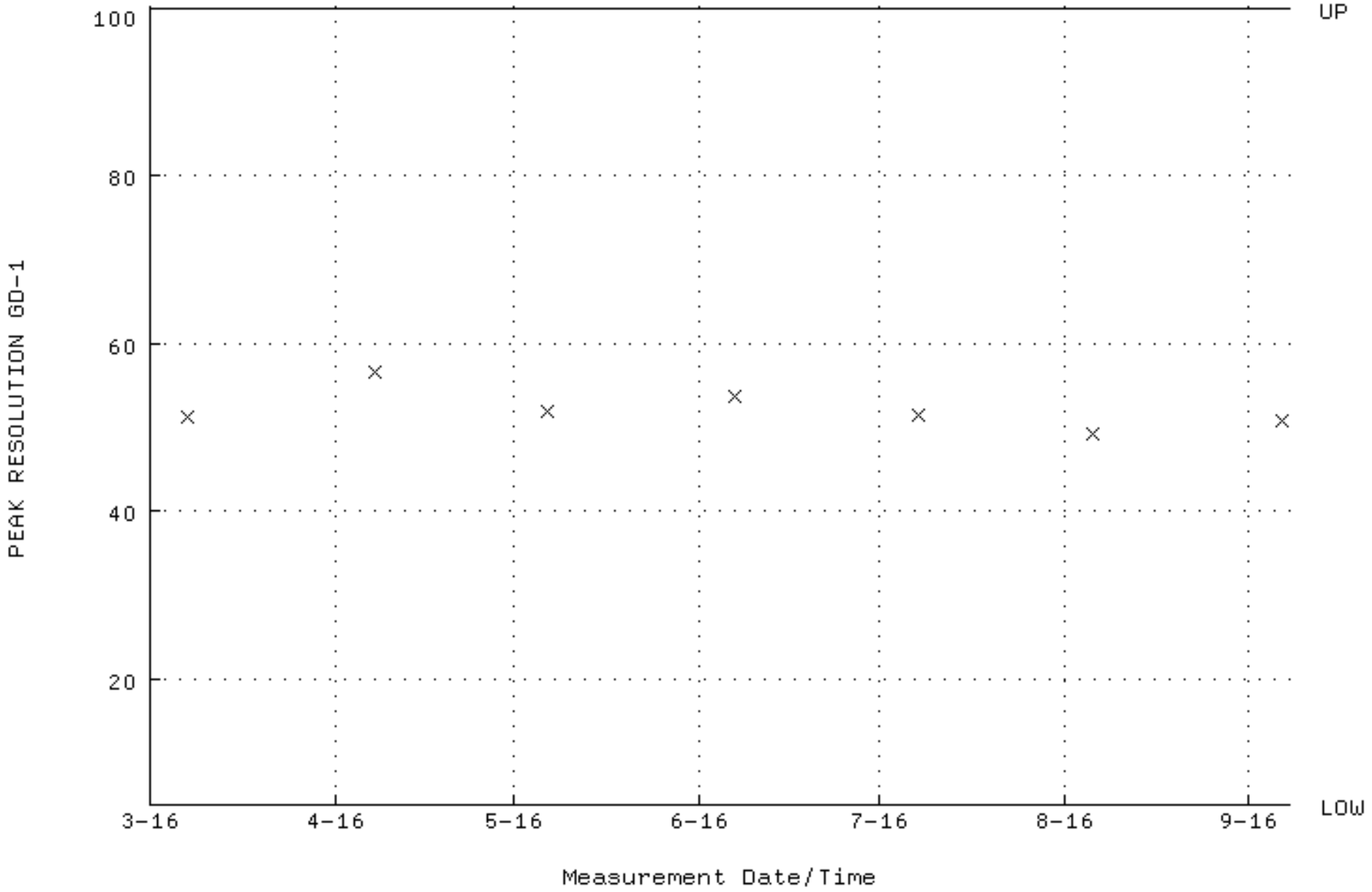
QA filename : DKA100:[ENV_ALPHA.QA.W]W091.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.332363 through 0.352921



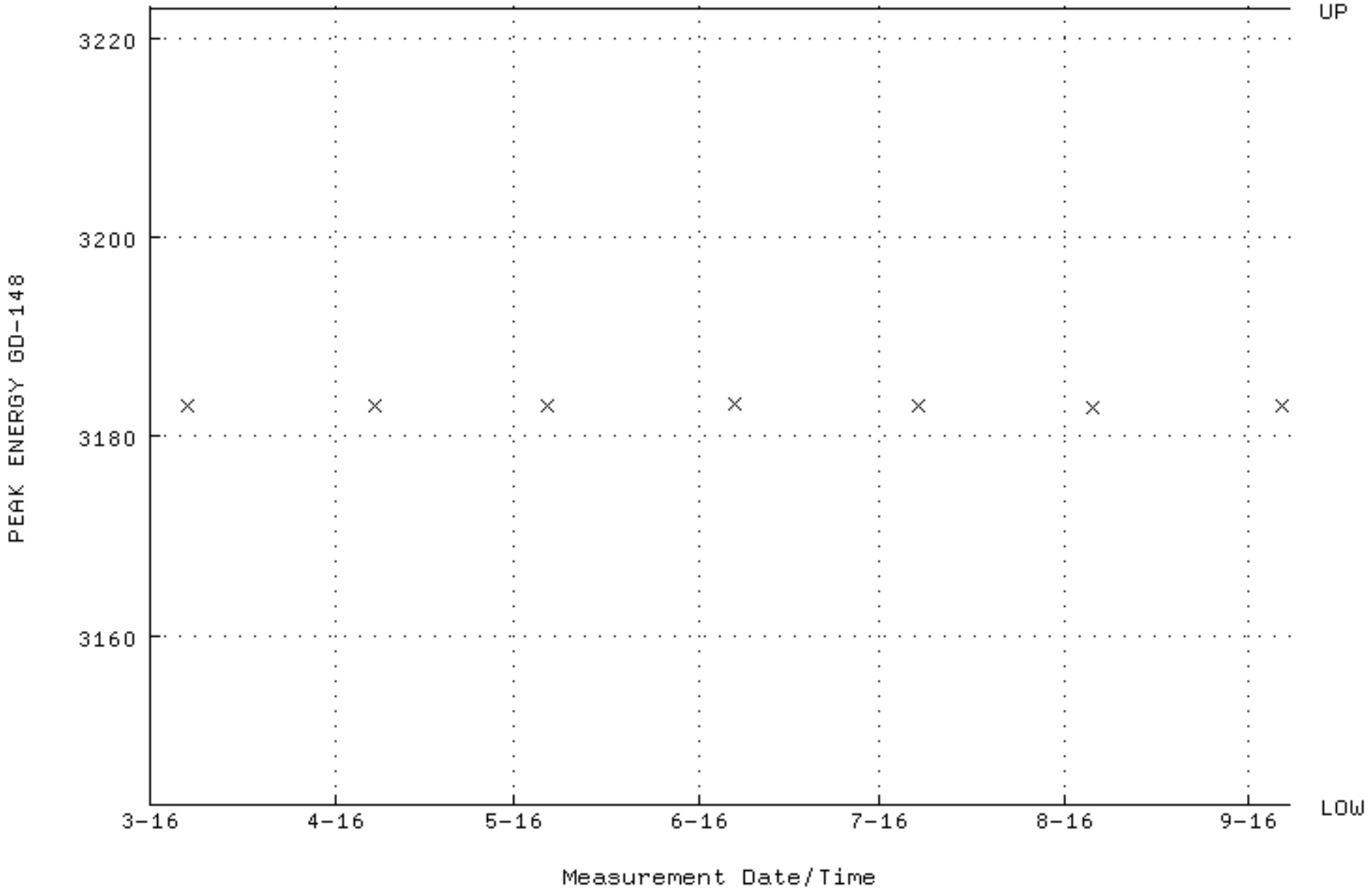
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



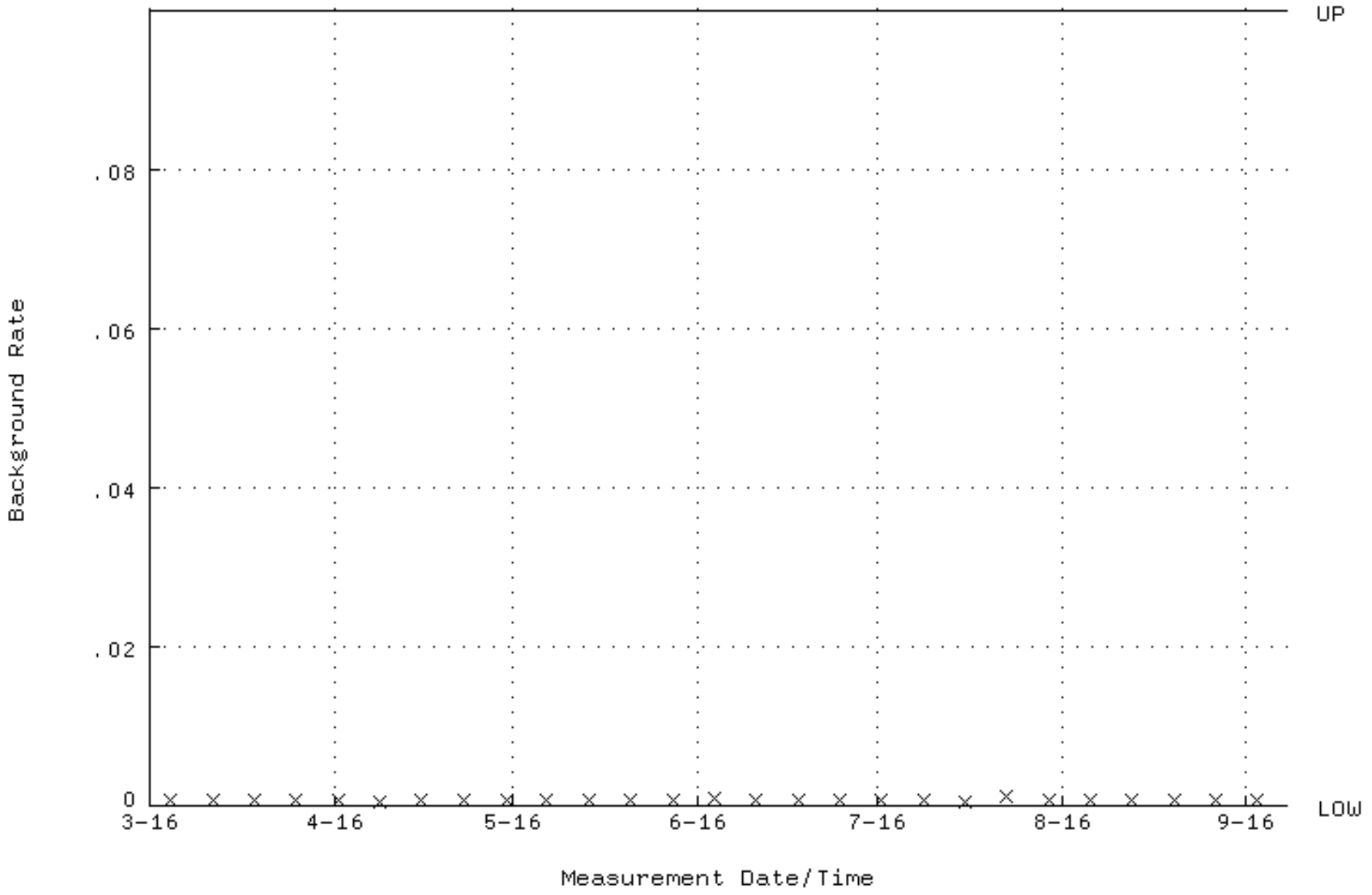
QA filename : DKA100:[ENV_ALPHA.QA.W]W091.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



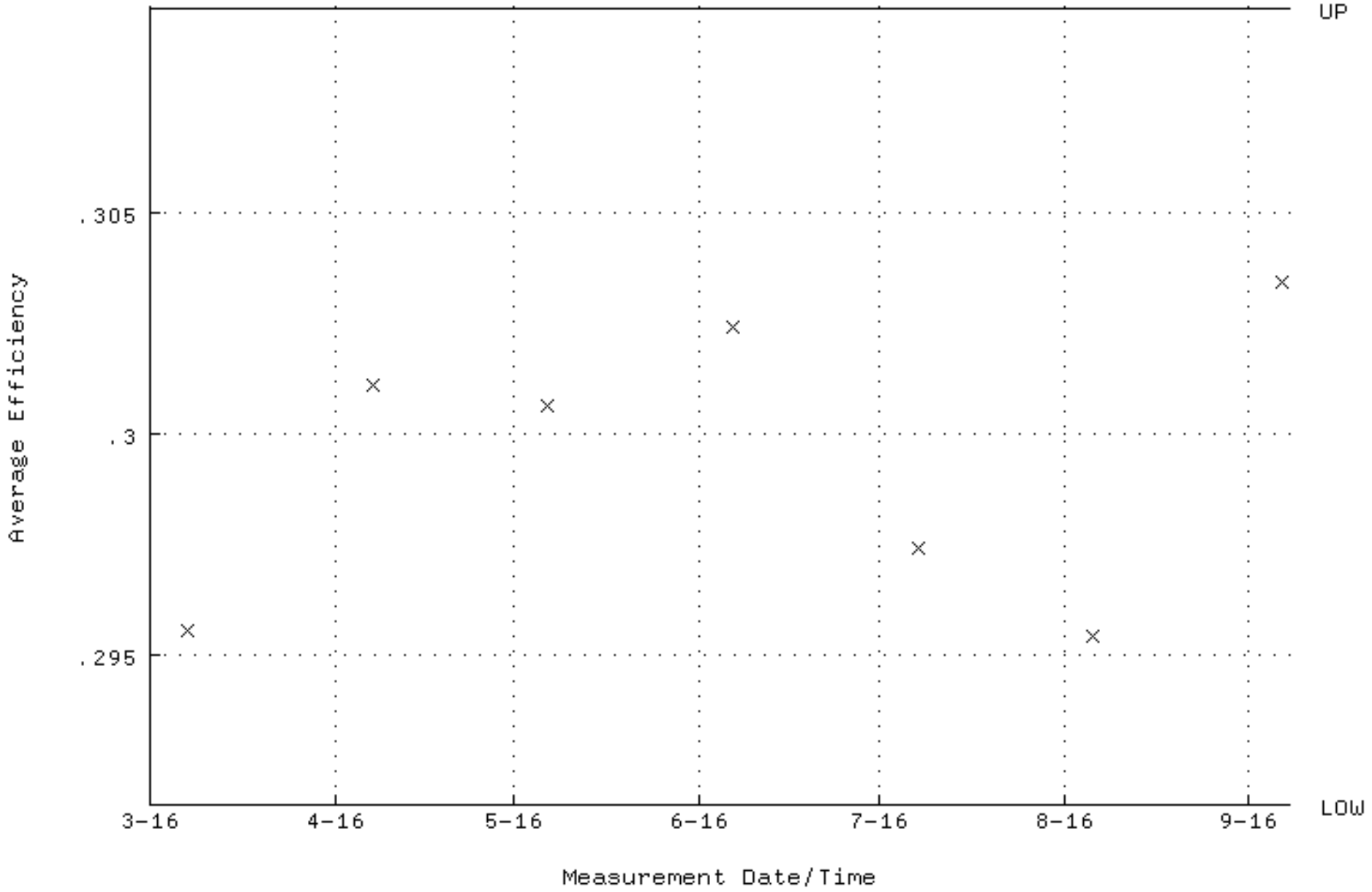
QA filename : DKA100:[ENV_ALPHA.QA.W]W091.QAF;9
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



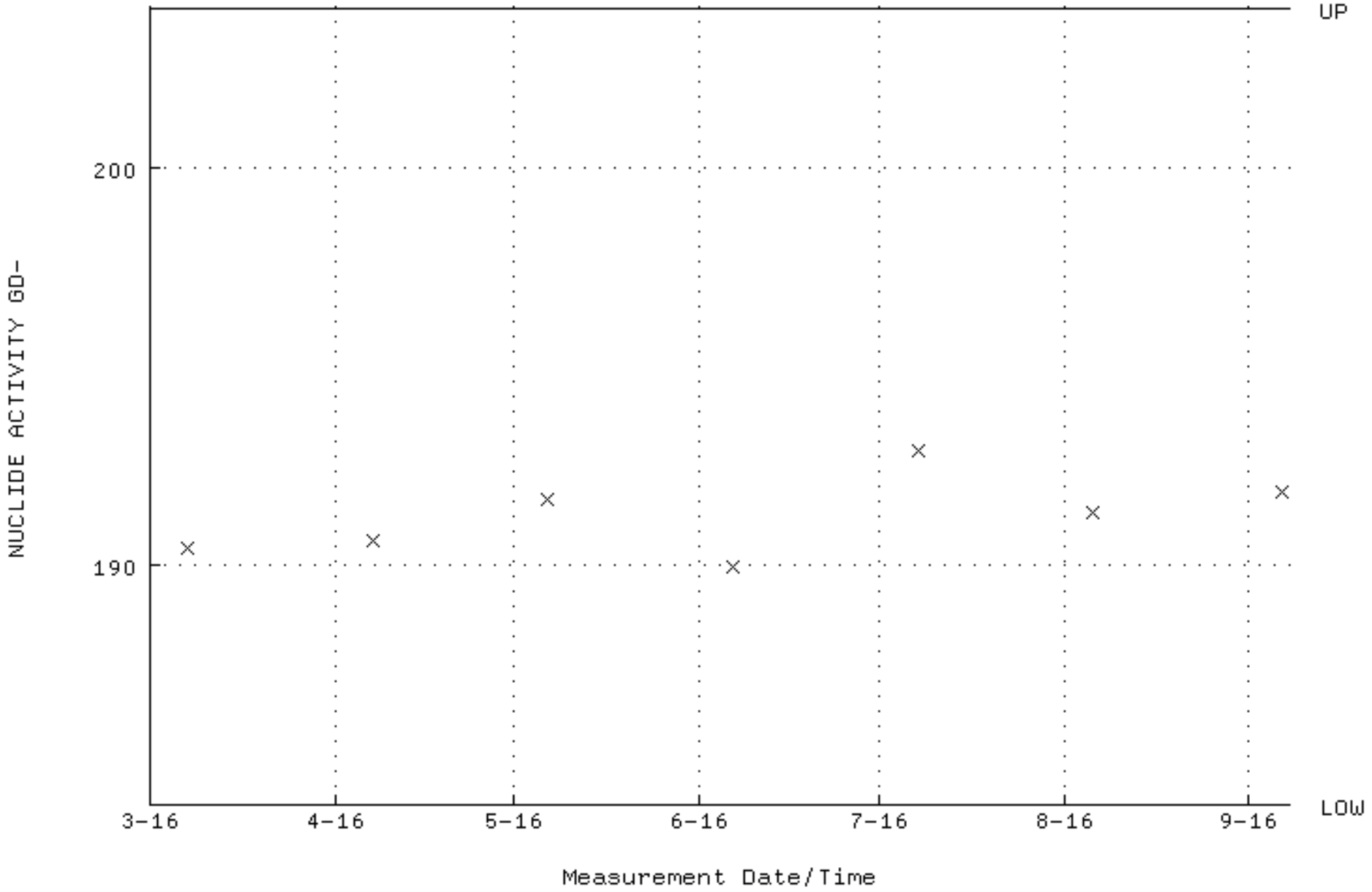
QA filename : DKA100:[ENV_ALPHA.QA.B]B091.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:34 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



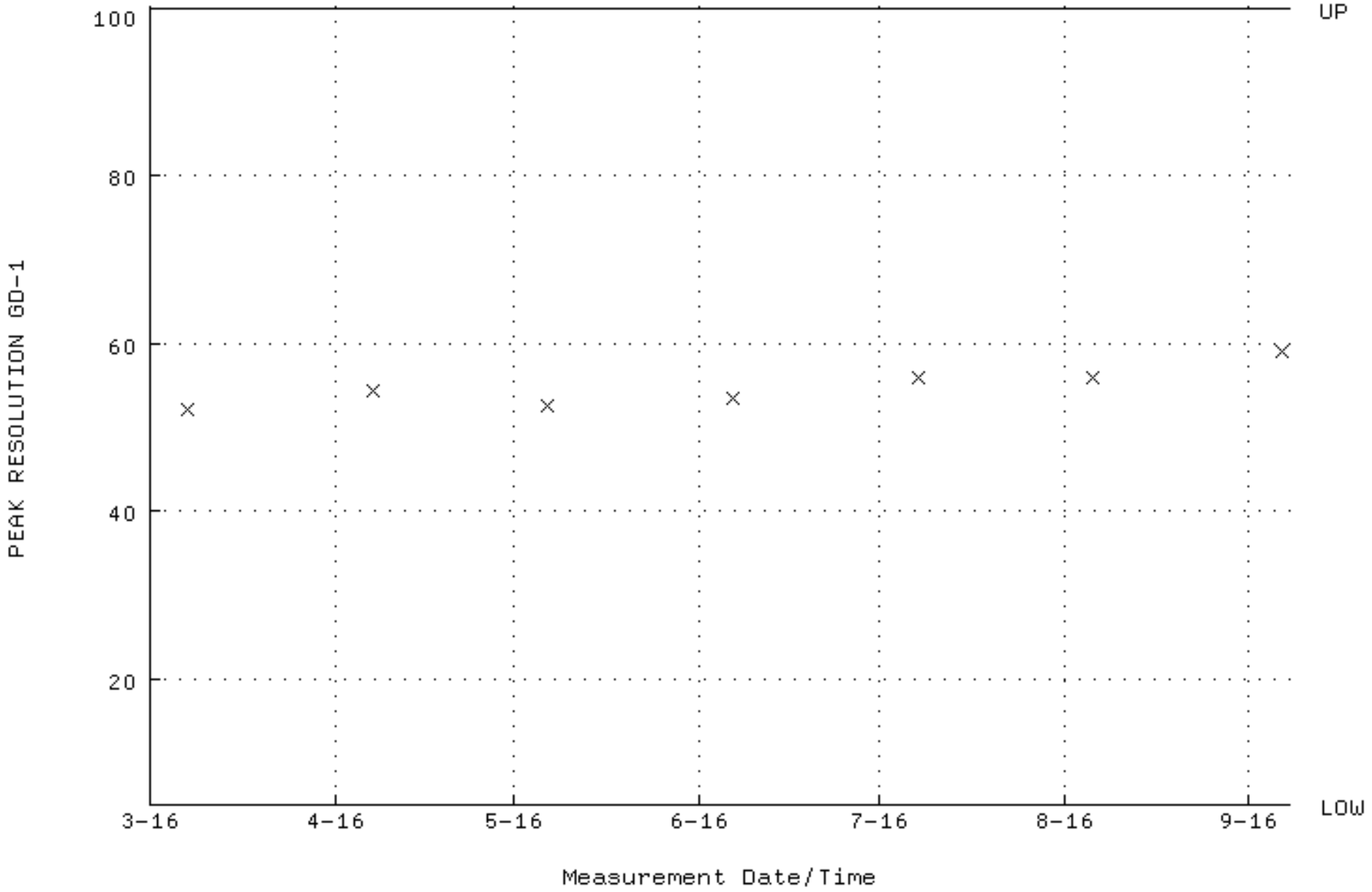
QA filename : DKA100:[ENV_ALPHA.QA.W]W092.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.291600 through 0.309620



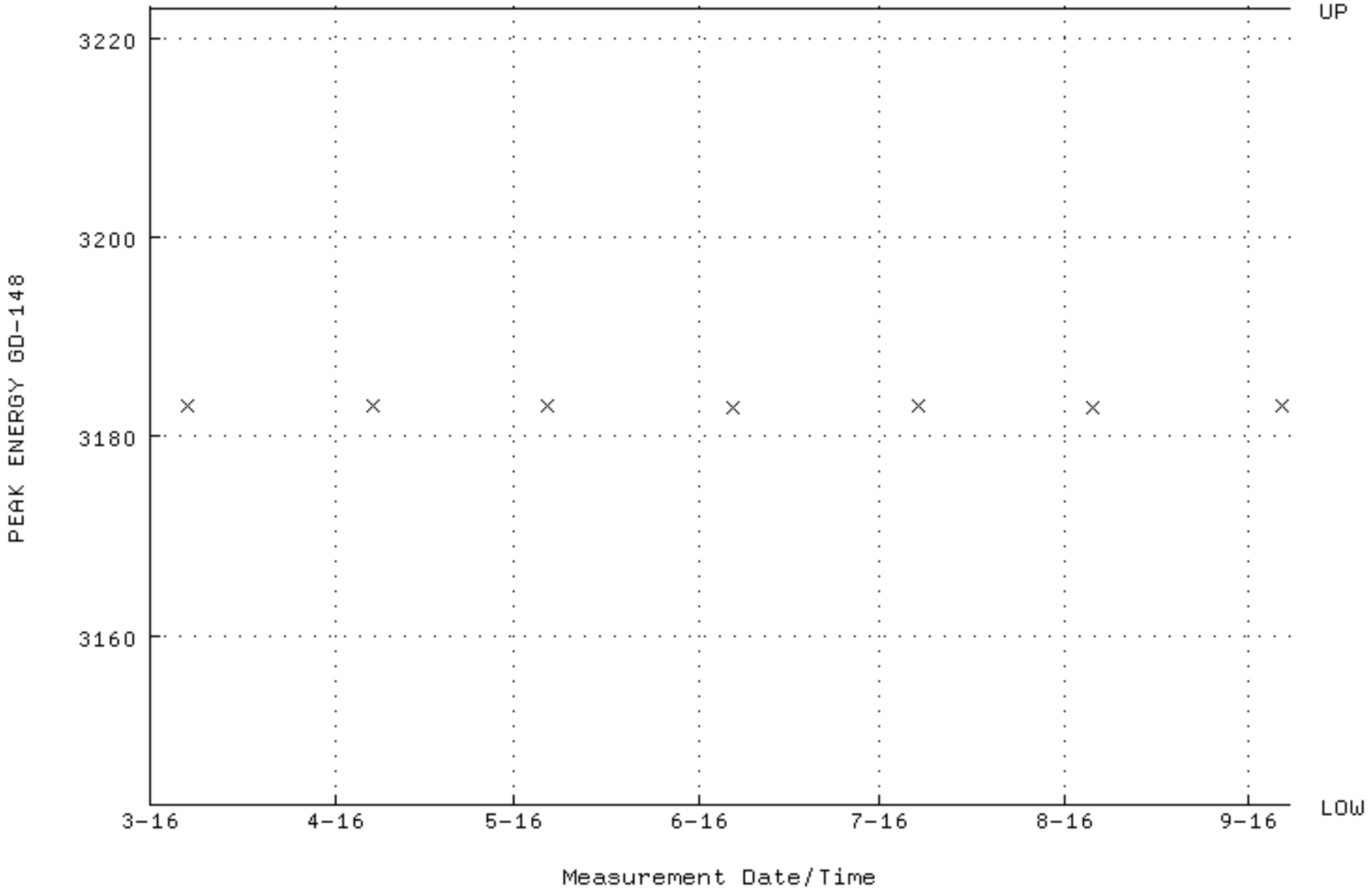
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



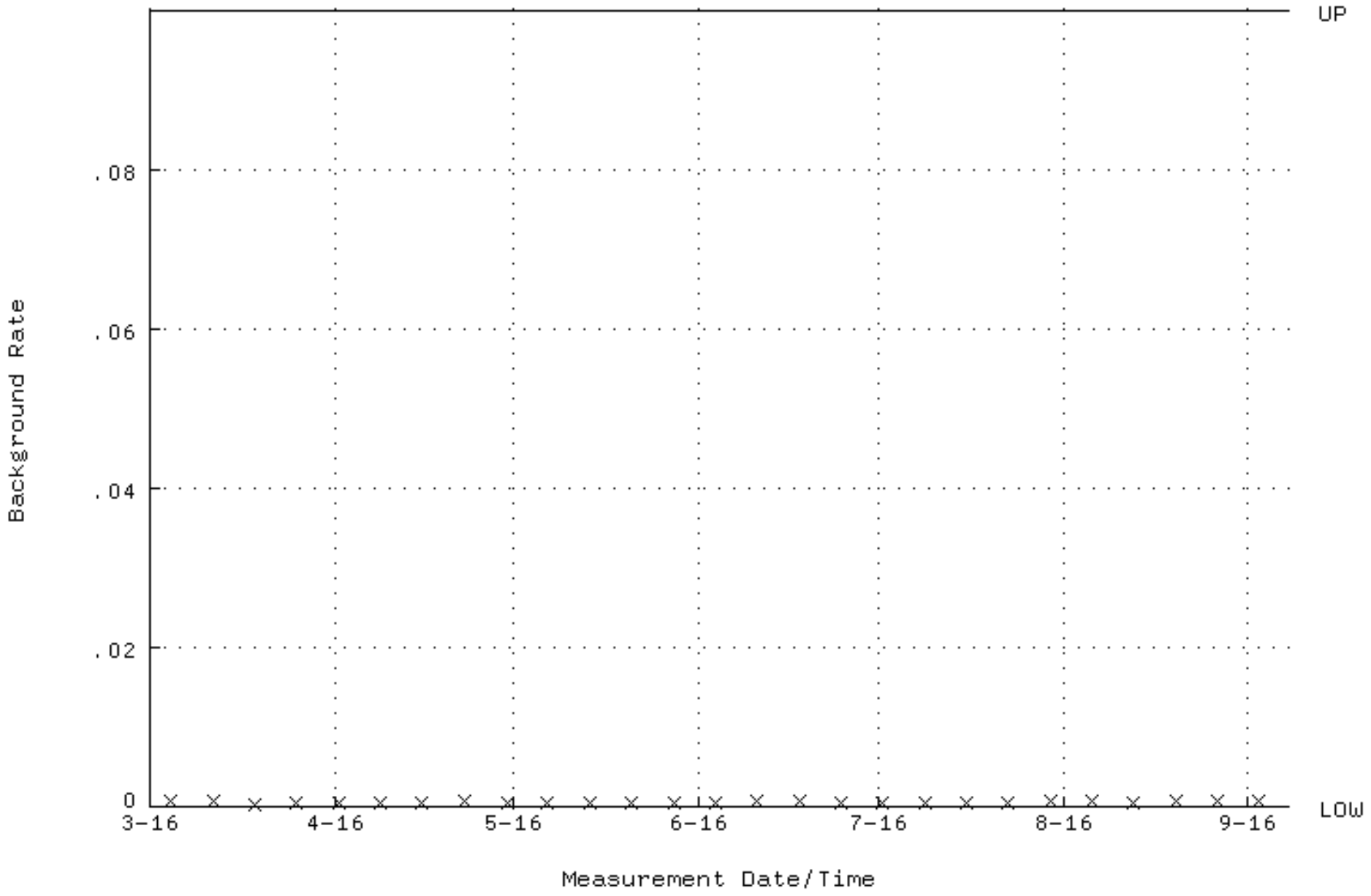
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



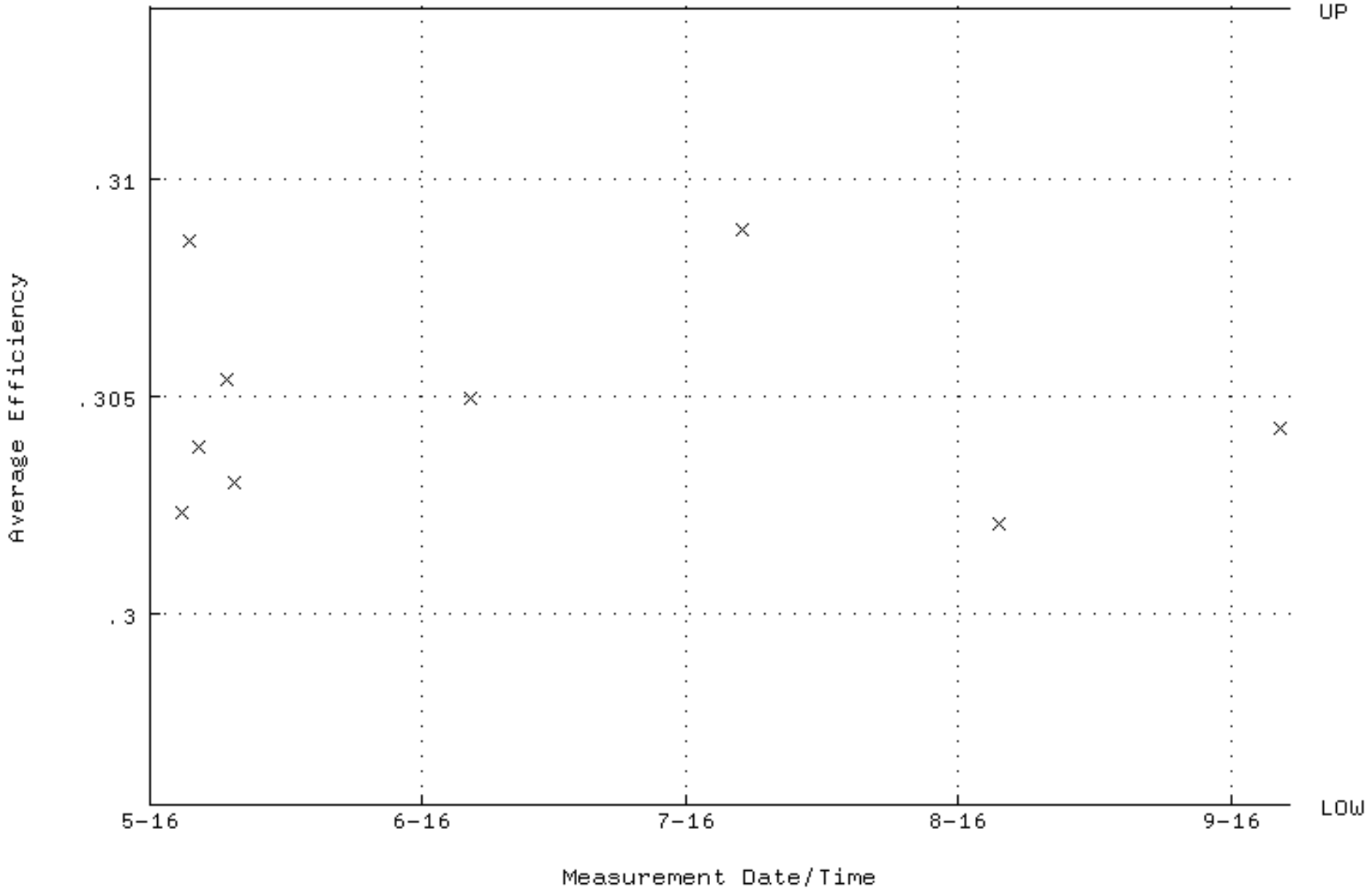
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:00 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



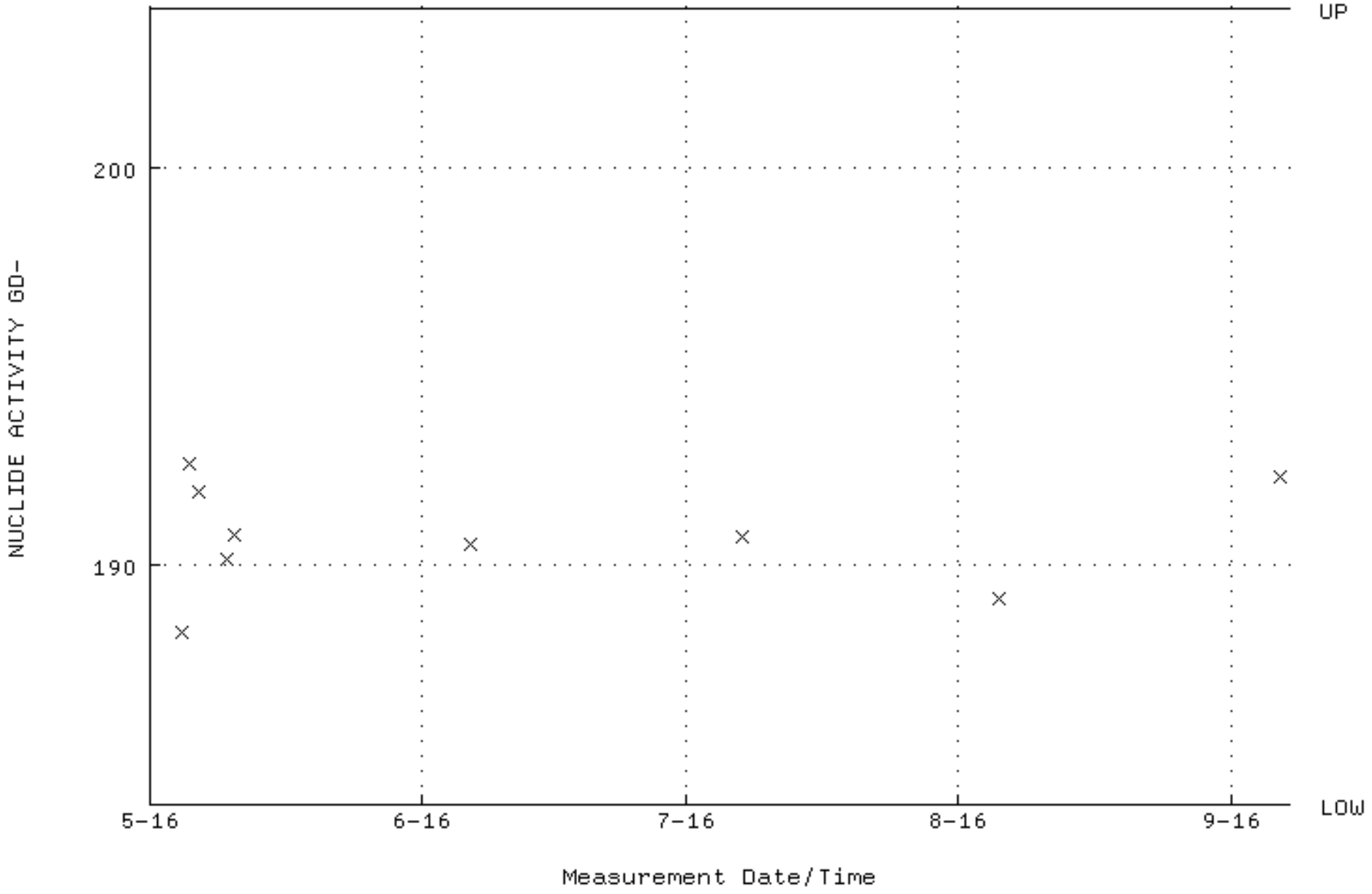
QA filename : DKA100:[ENV_ALPHA.QA.B]B092.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:34 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



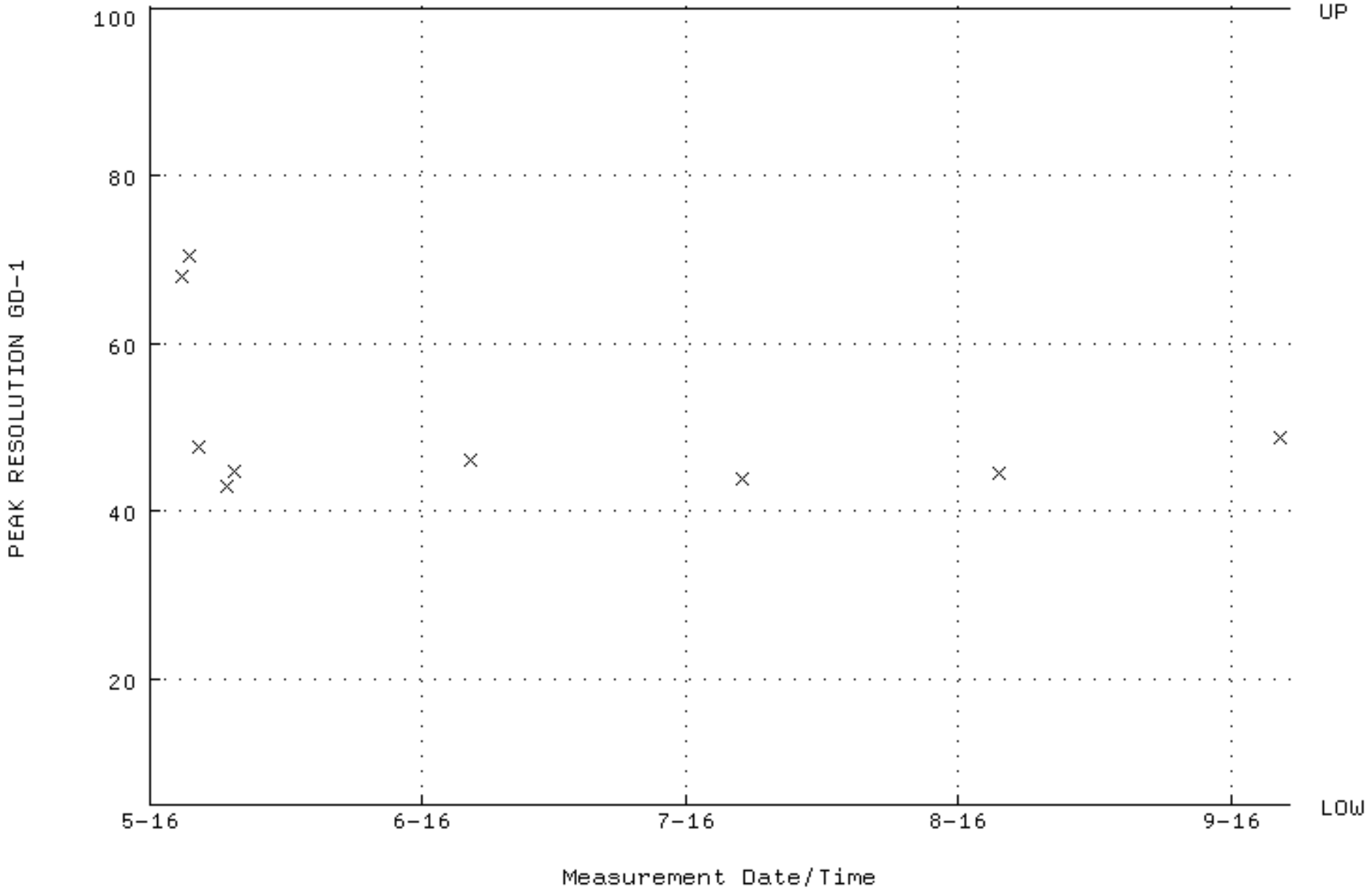
QA filename : DKA100:[ENV_ALPHA.QA.W]W095.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.295600 through 0.313900



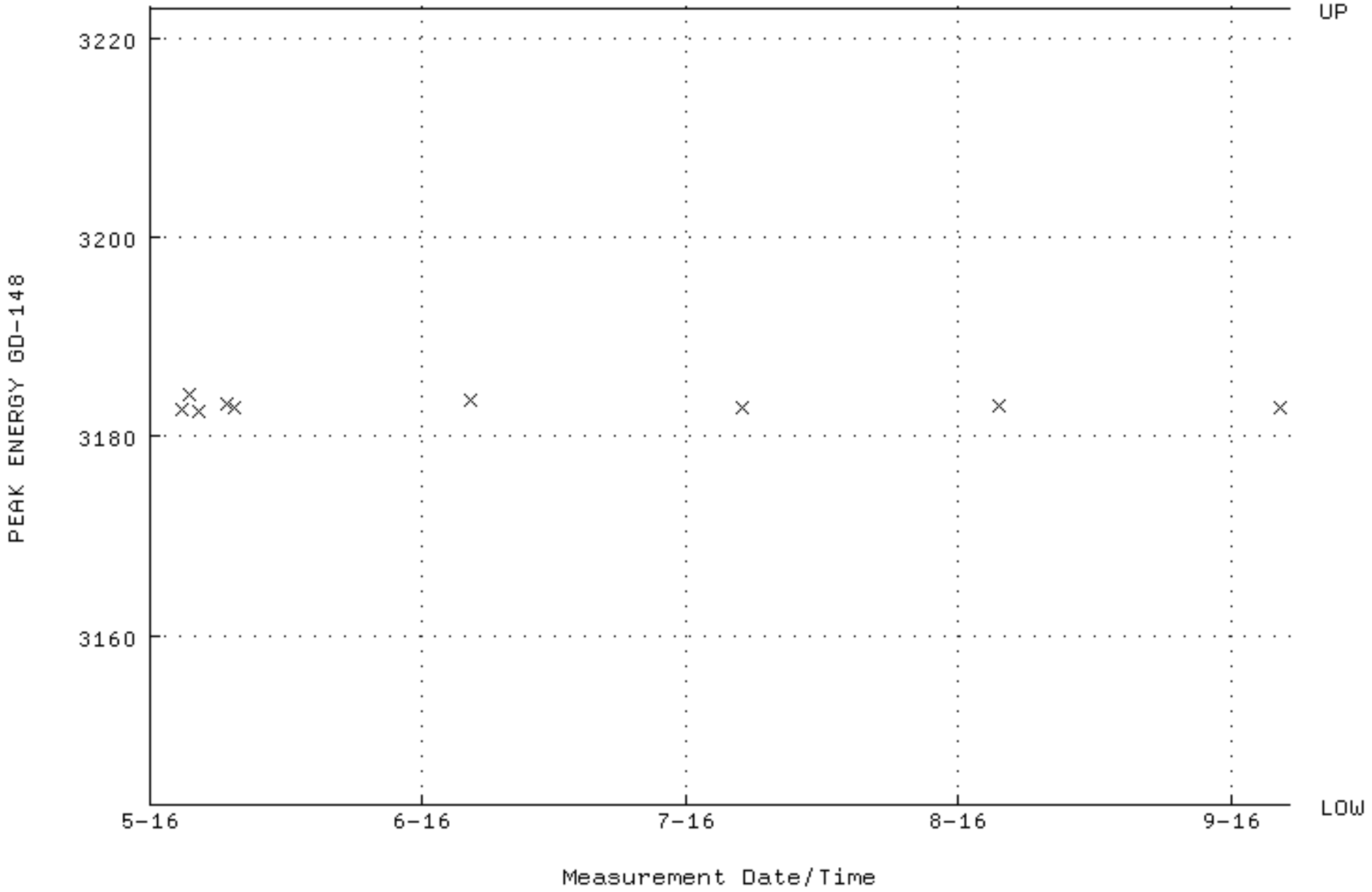
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



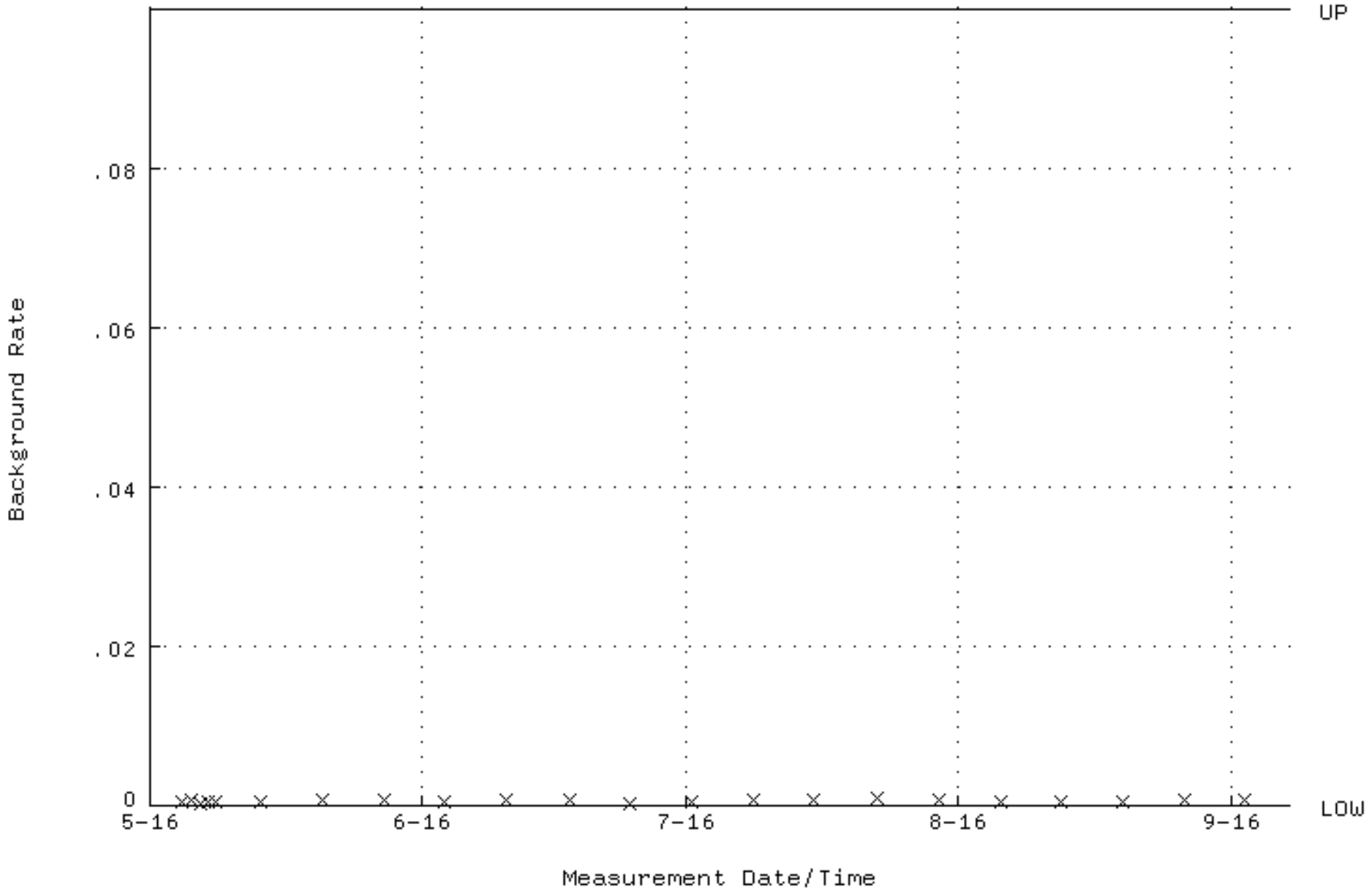
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



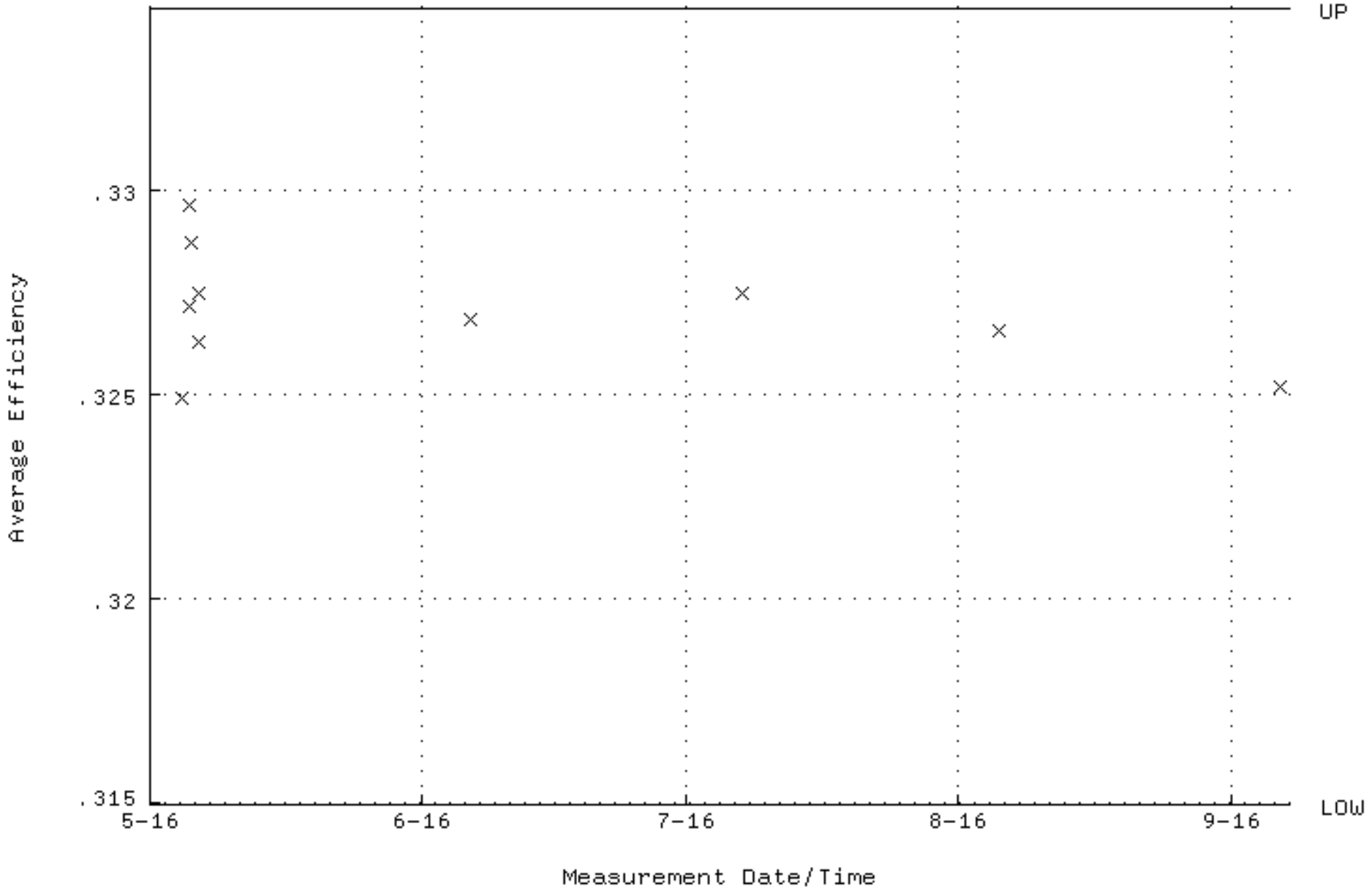
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



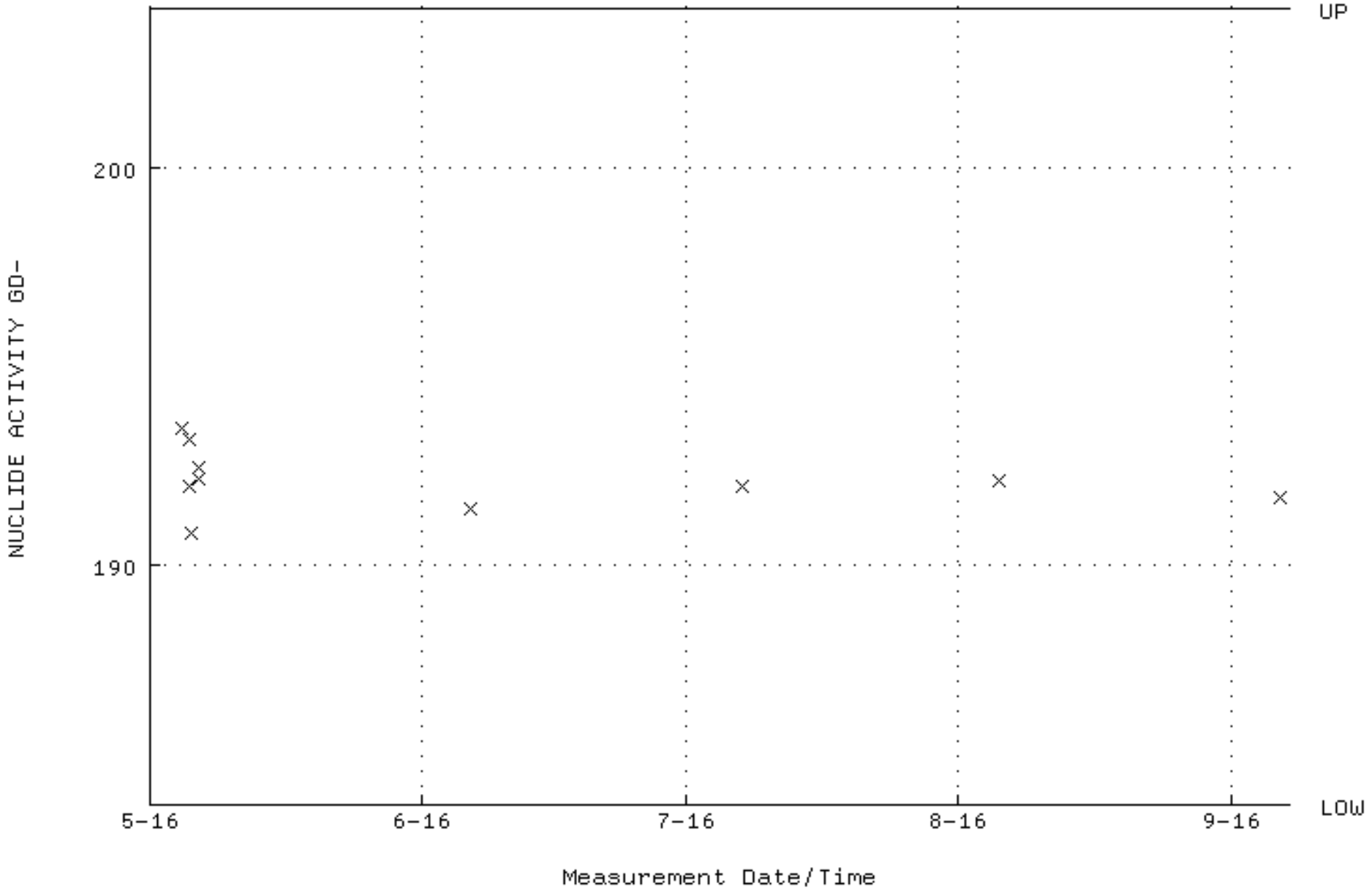
QA filename : DKA100:[ENV_ALPHA.QA.B]B095.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAY-2016 15:23:40 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



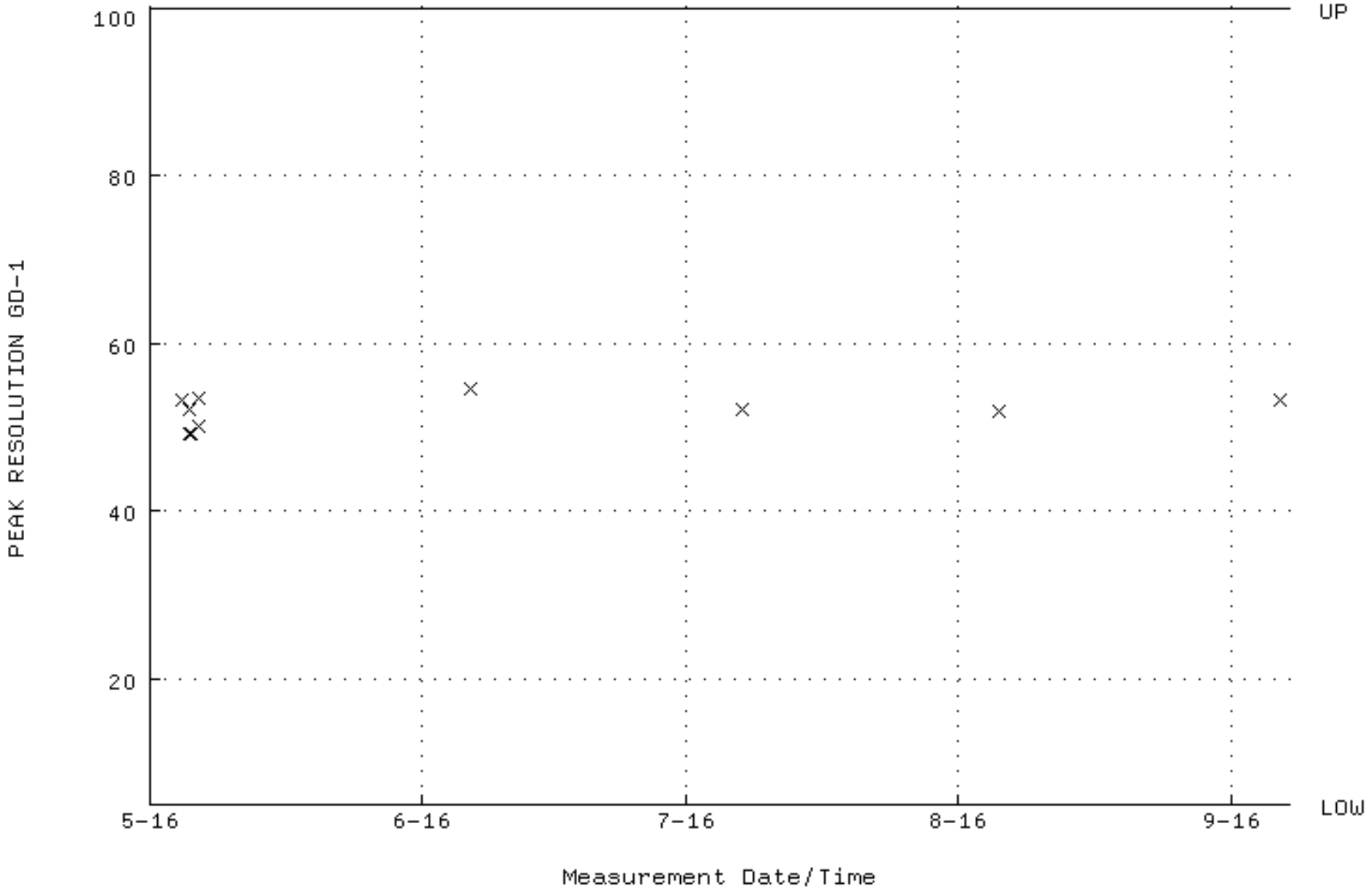
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Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.314971 through 0.334453



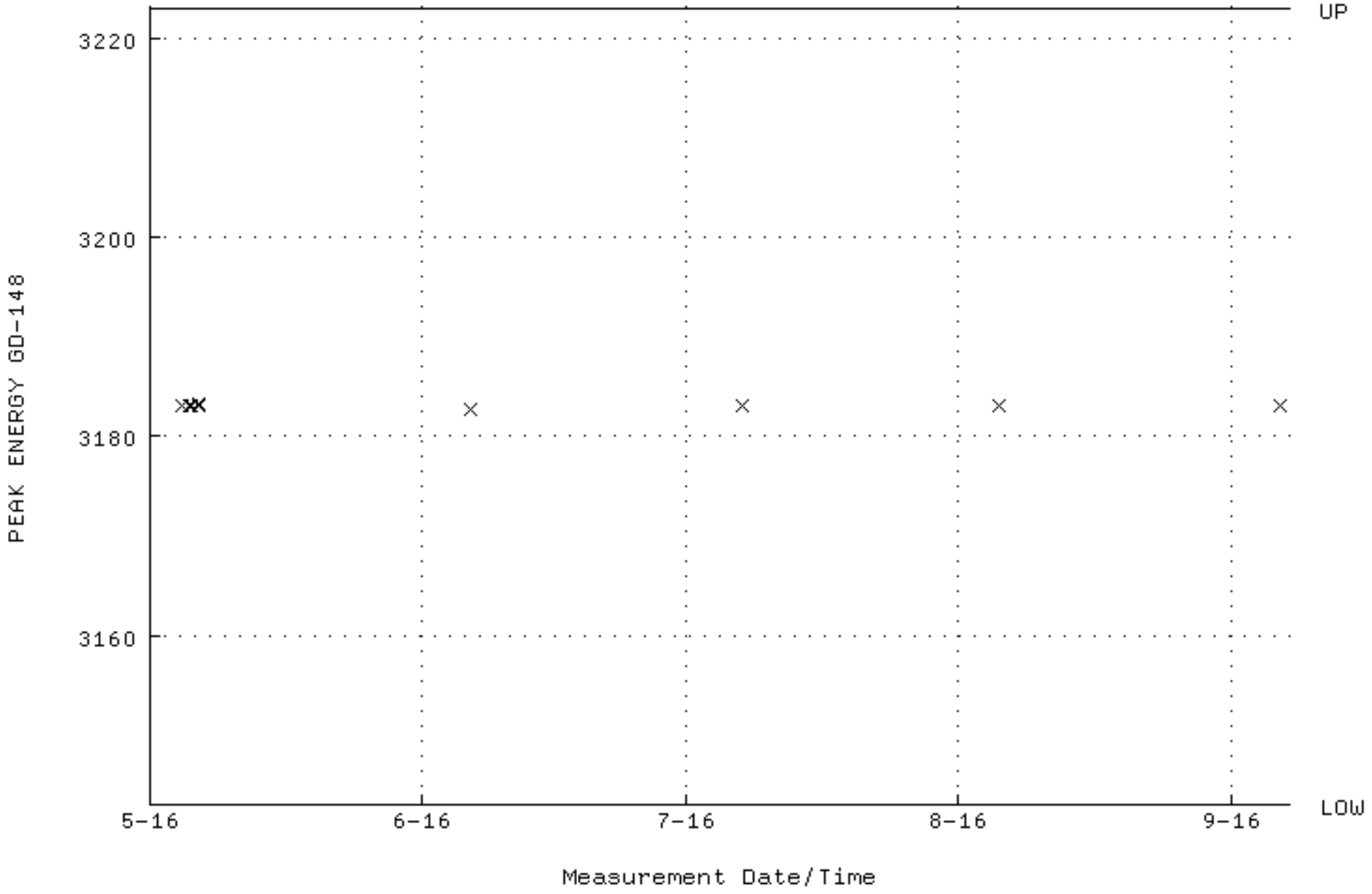
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



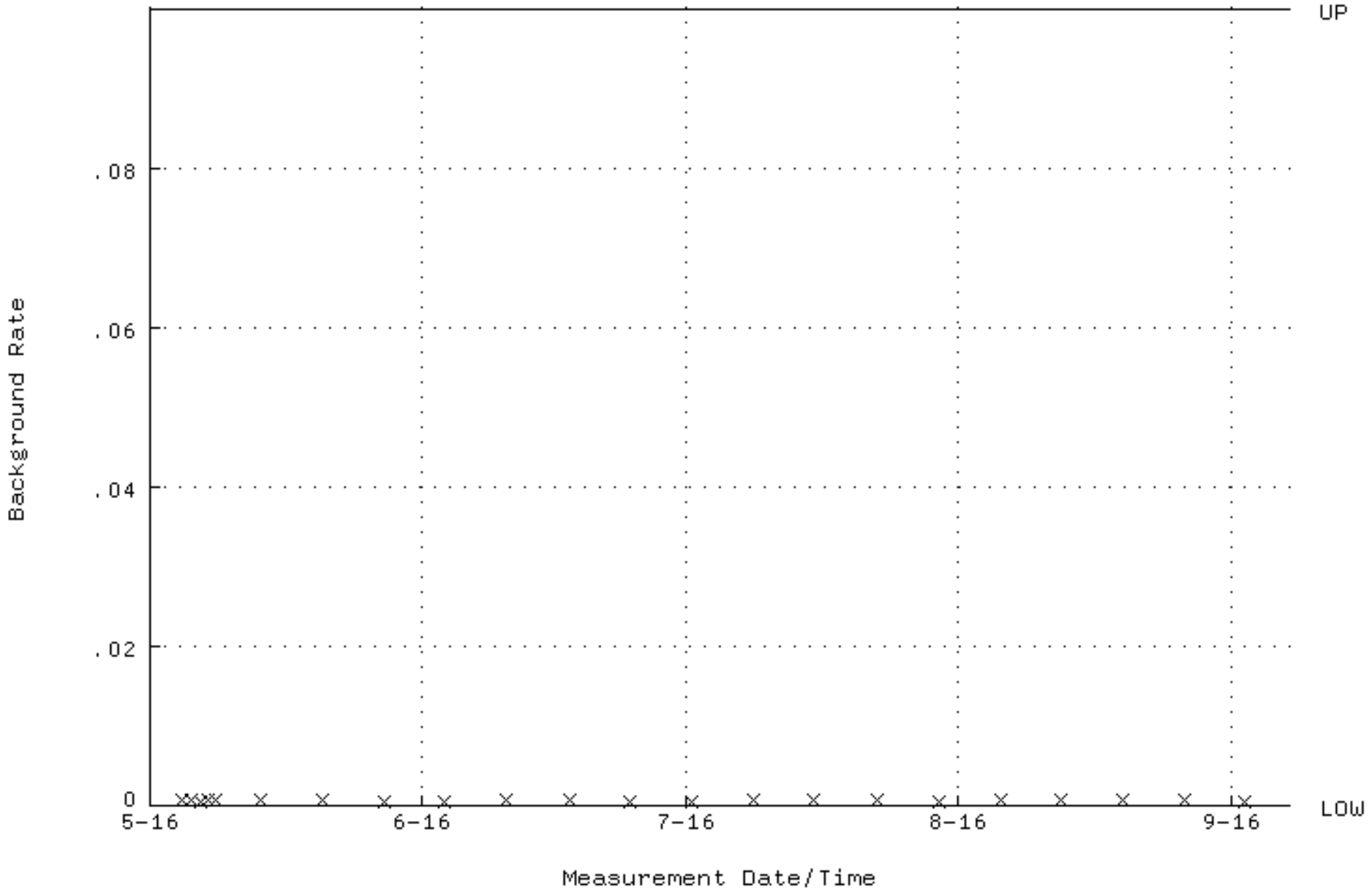
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



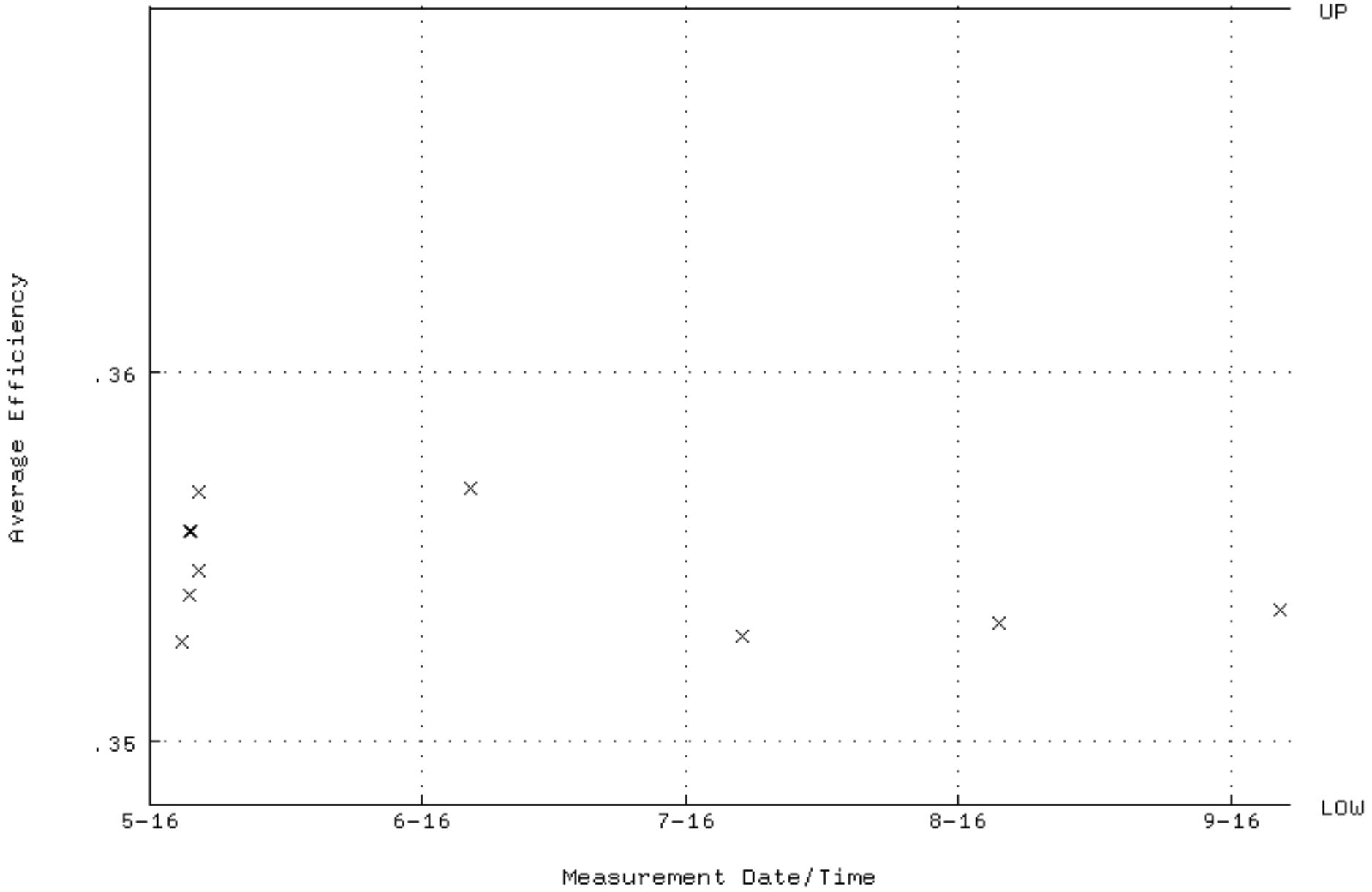
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



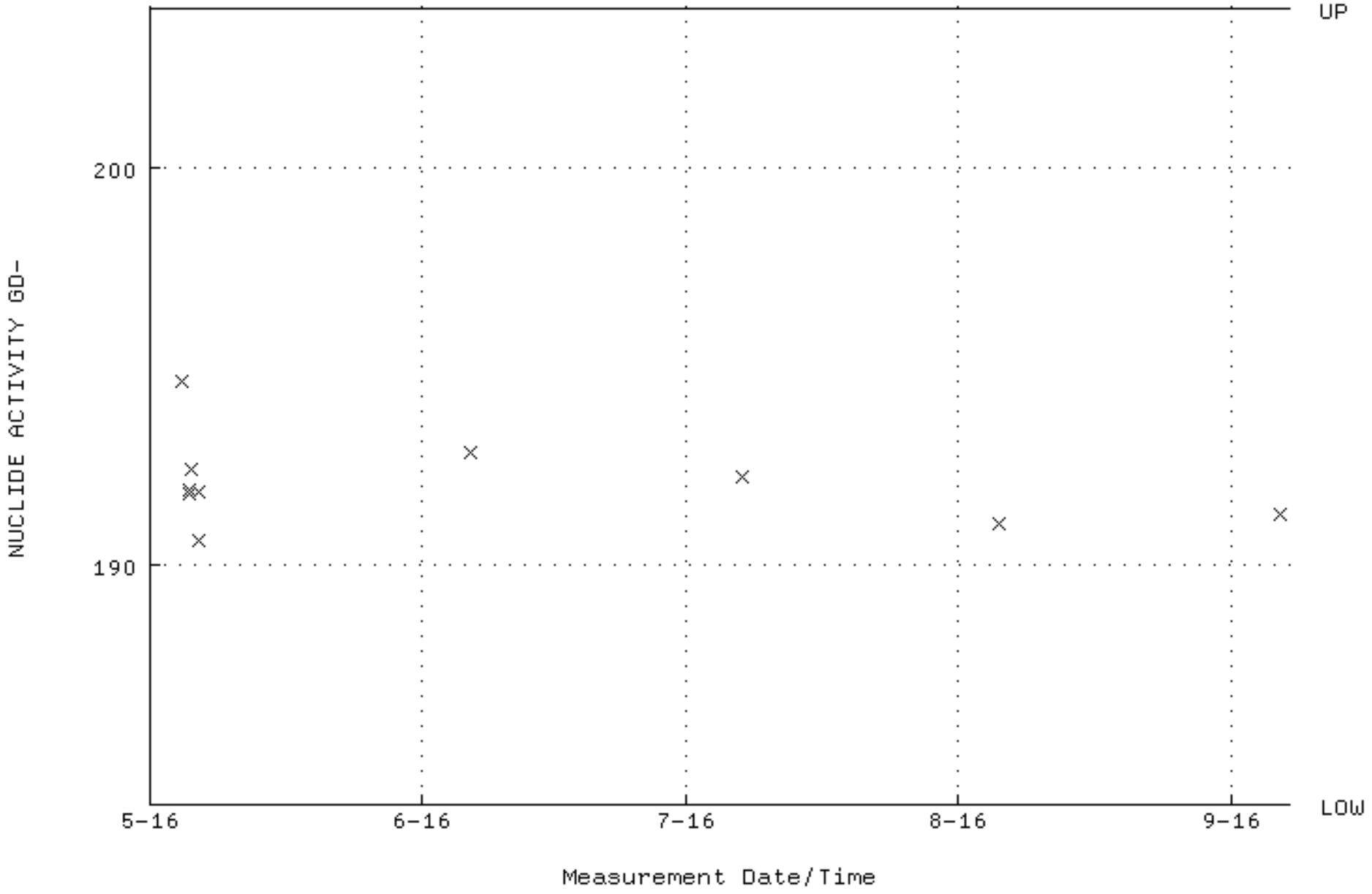
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAY-2016 15:23:40 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



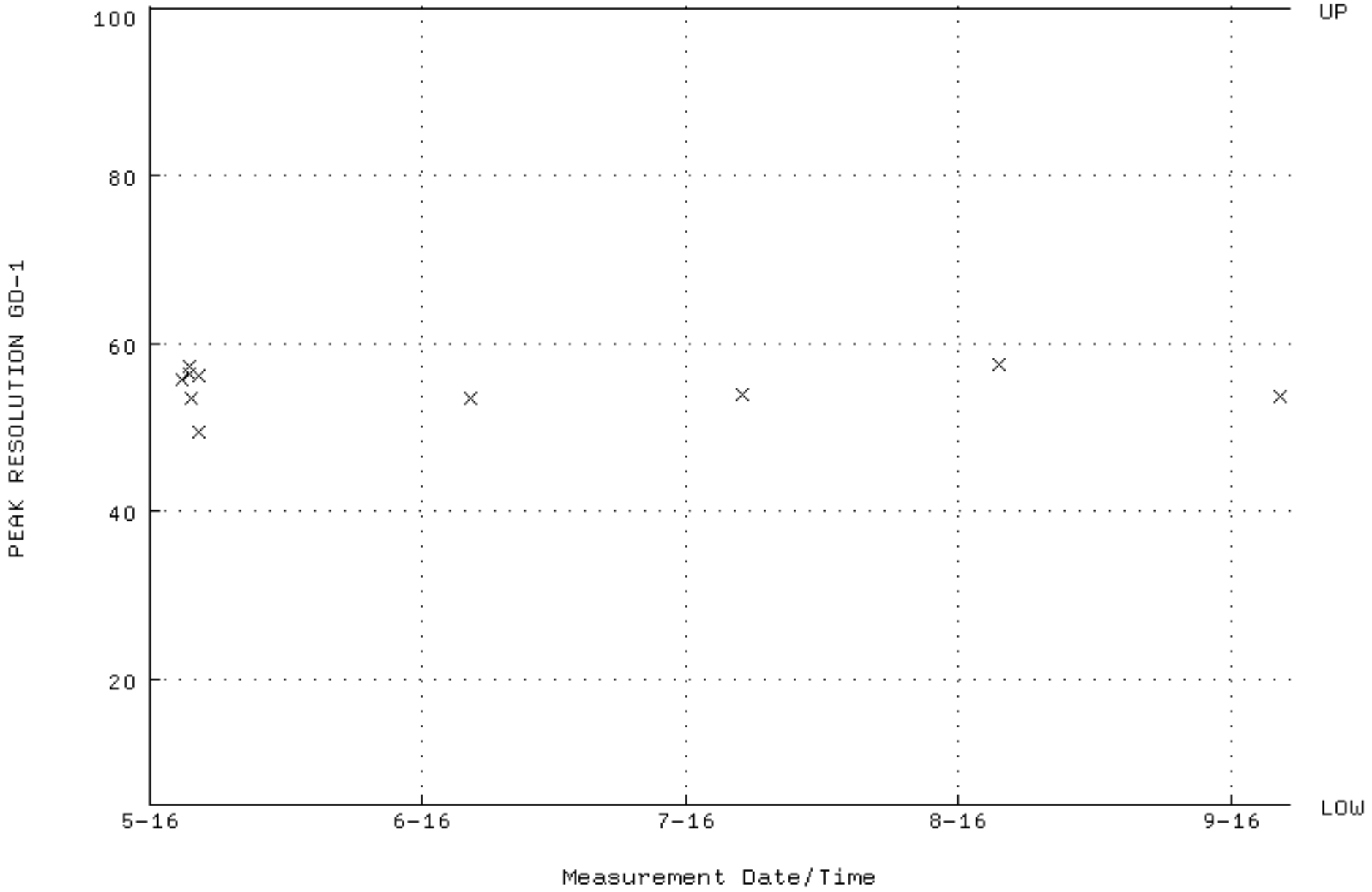
QA filename : DKA100:[ENV_ALPHA.QA.W]W097.QAF;10
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.348290 through 0.369834



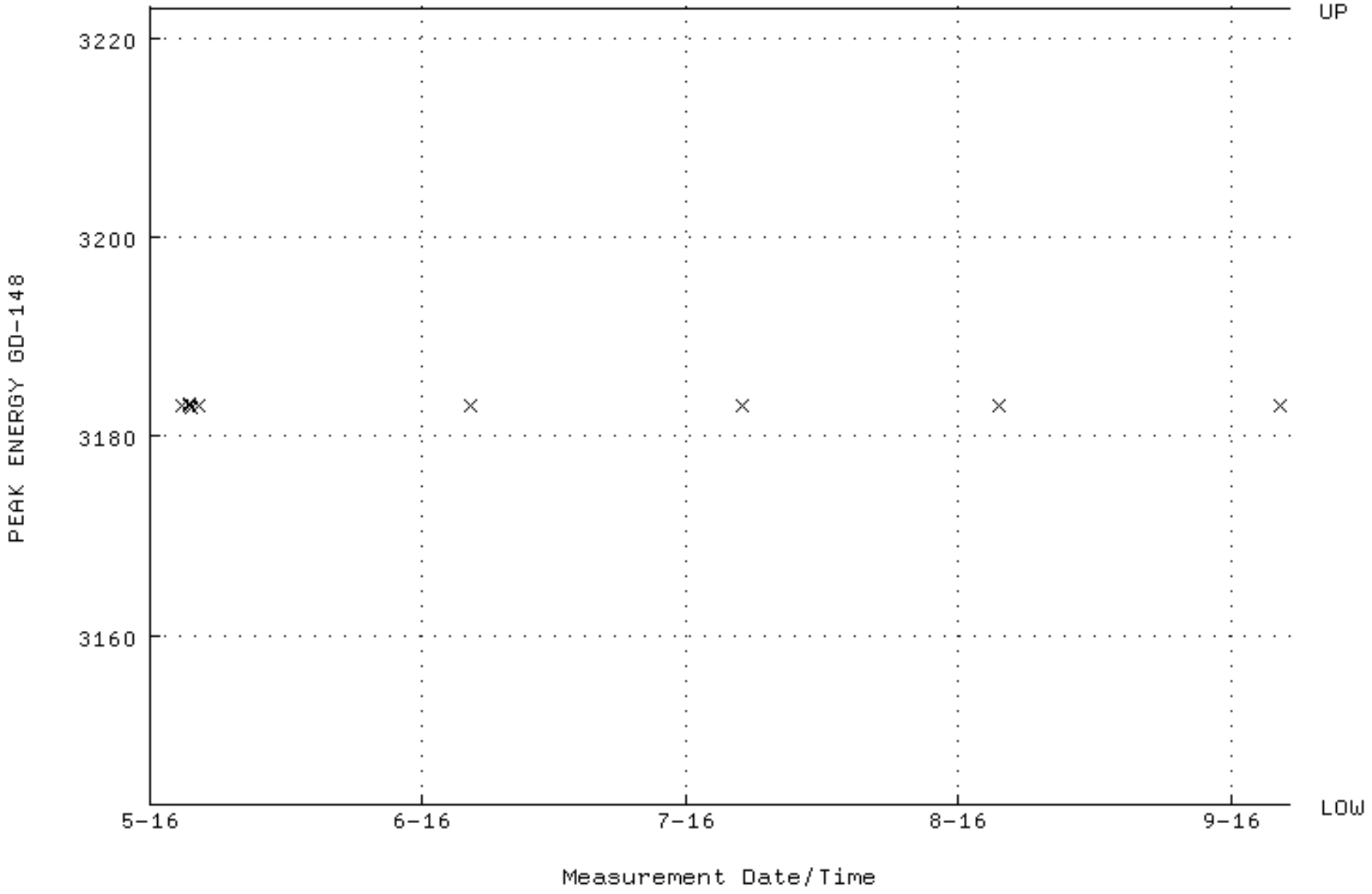
QA filename : DKA100:[ENV_ALPHA.QA.W]W097.QAF;10
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



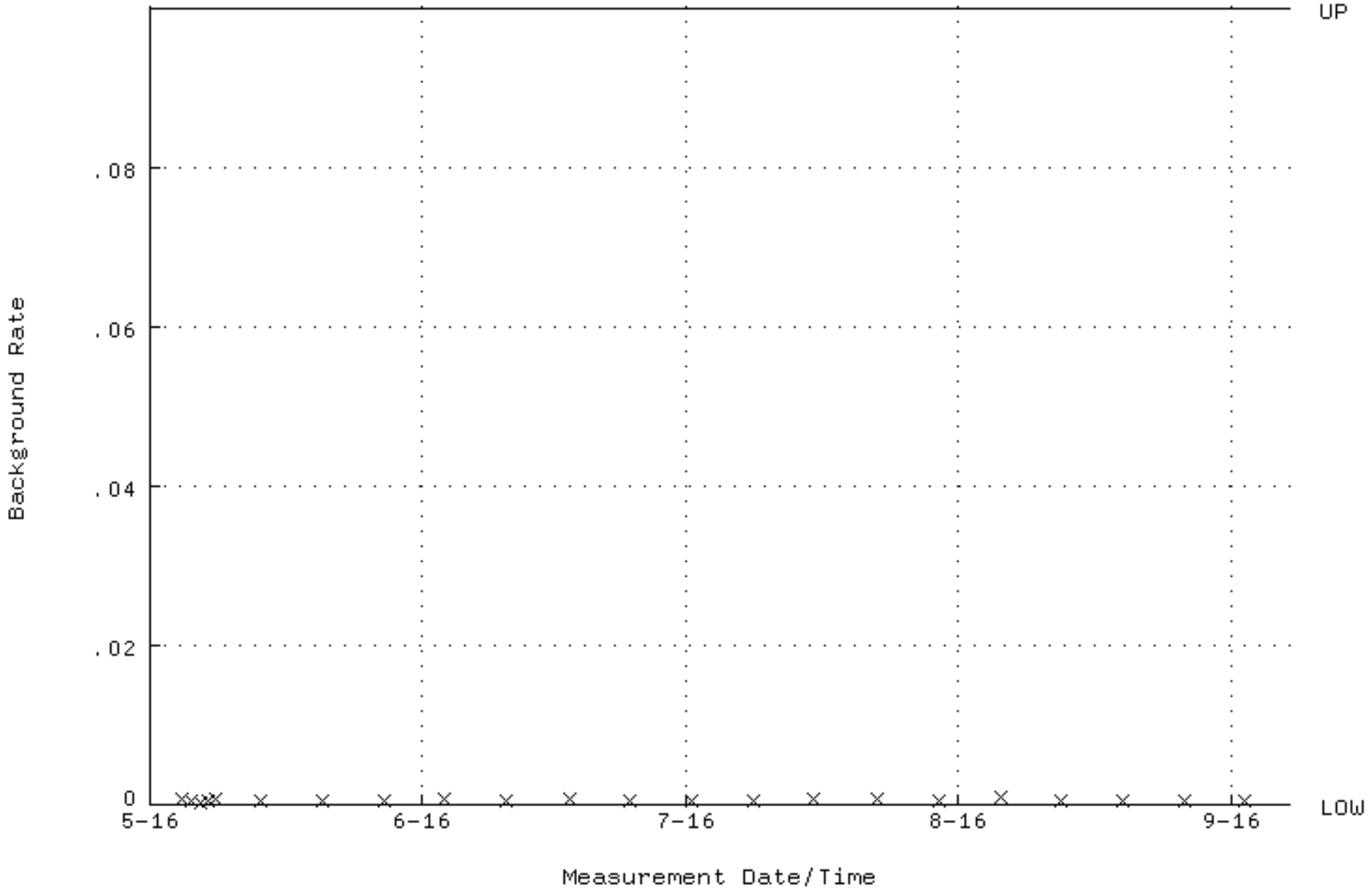
QA filename : DKA100:[ENV_ALPHA.QA.W]W097.QAF;10
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



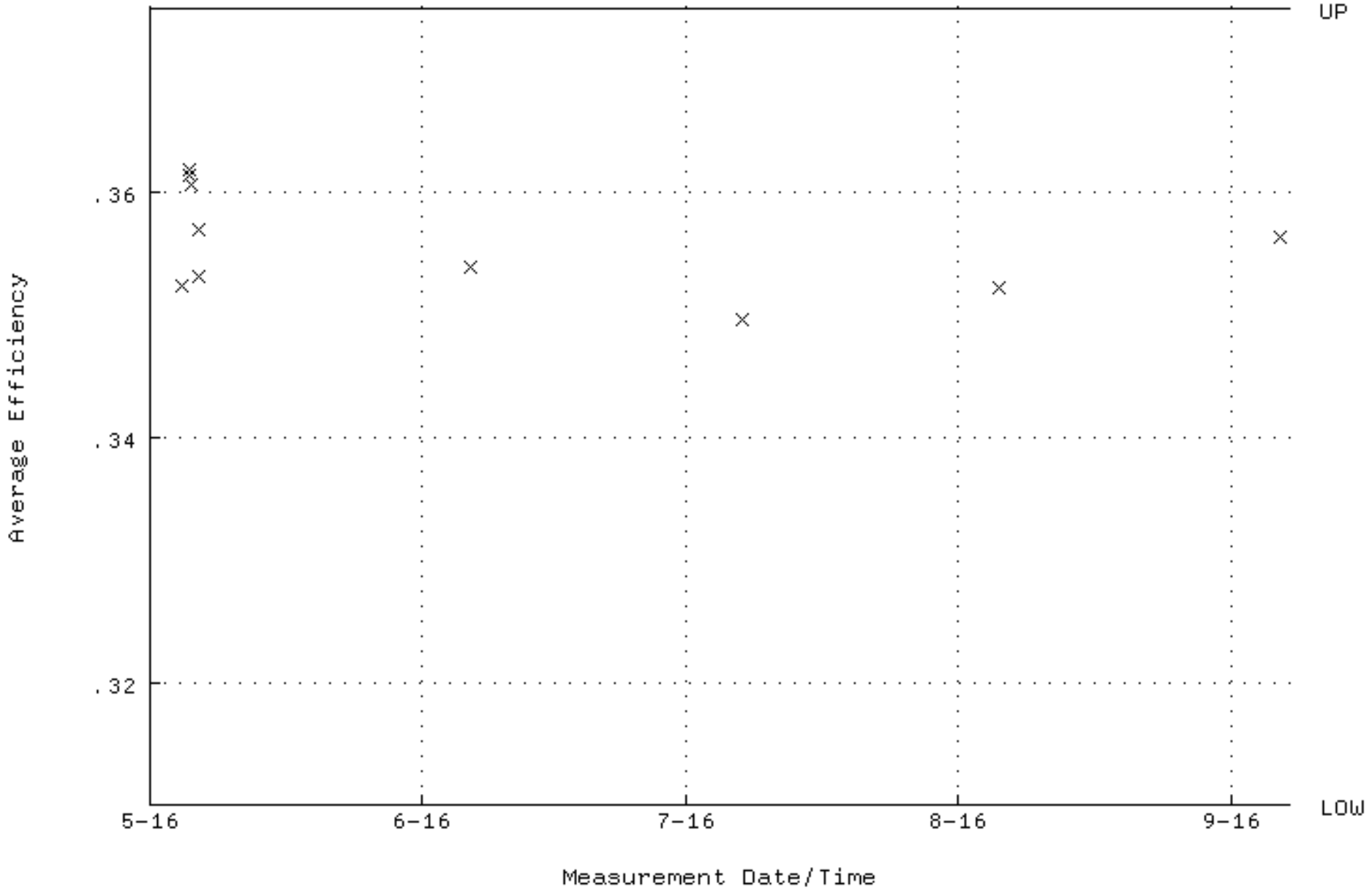
QA filename : DKA100:[ENV_ALPHA.QA.W]W097.QAF;10
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



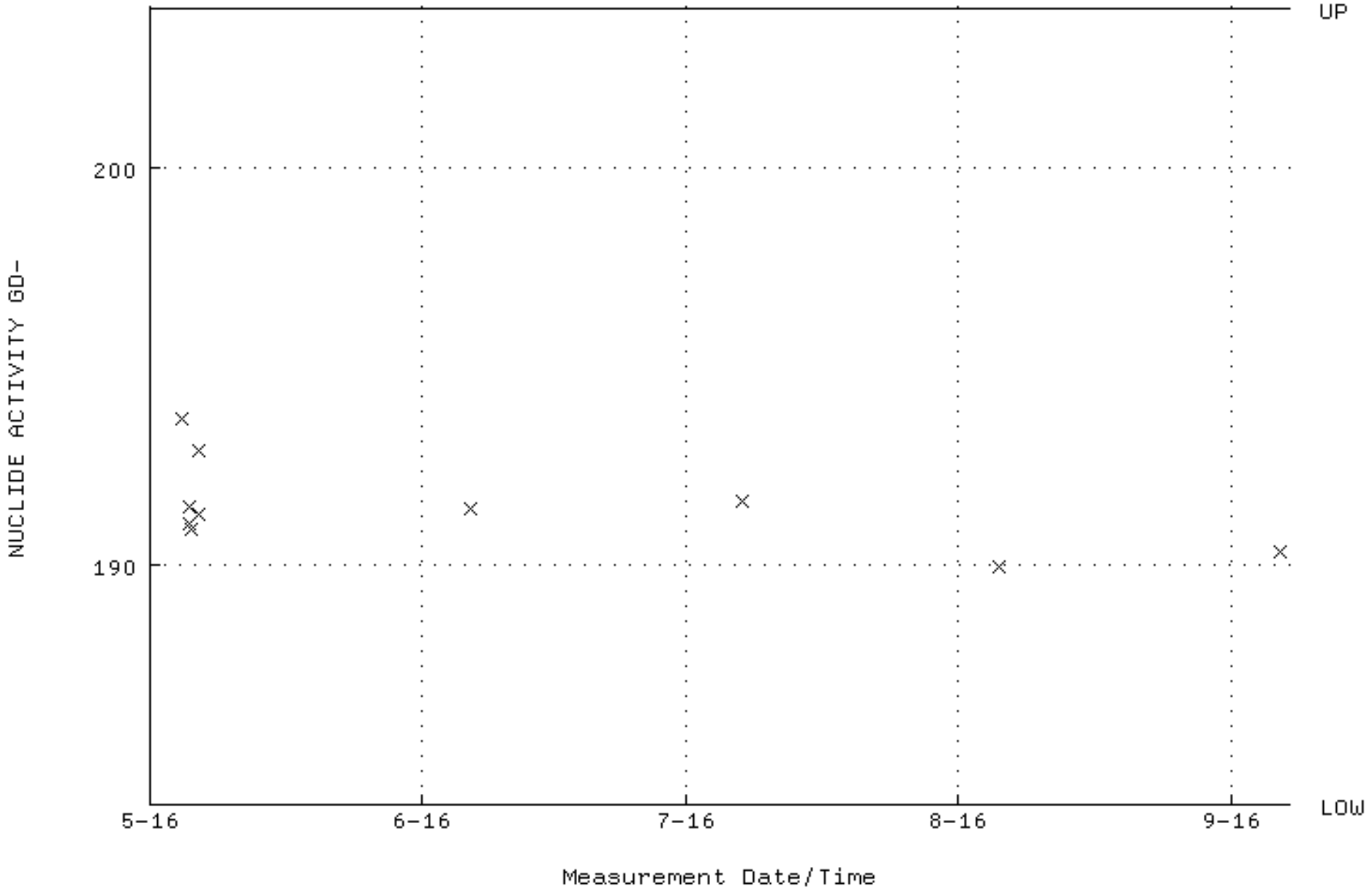
QA filename : DKA100:[ENV_ALPHA.QA.B]B097.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAY-2016 15:23:40 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



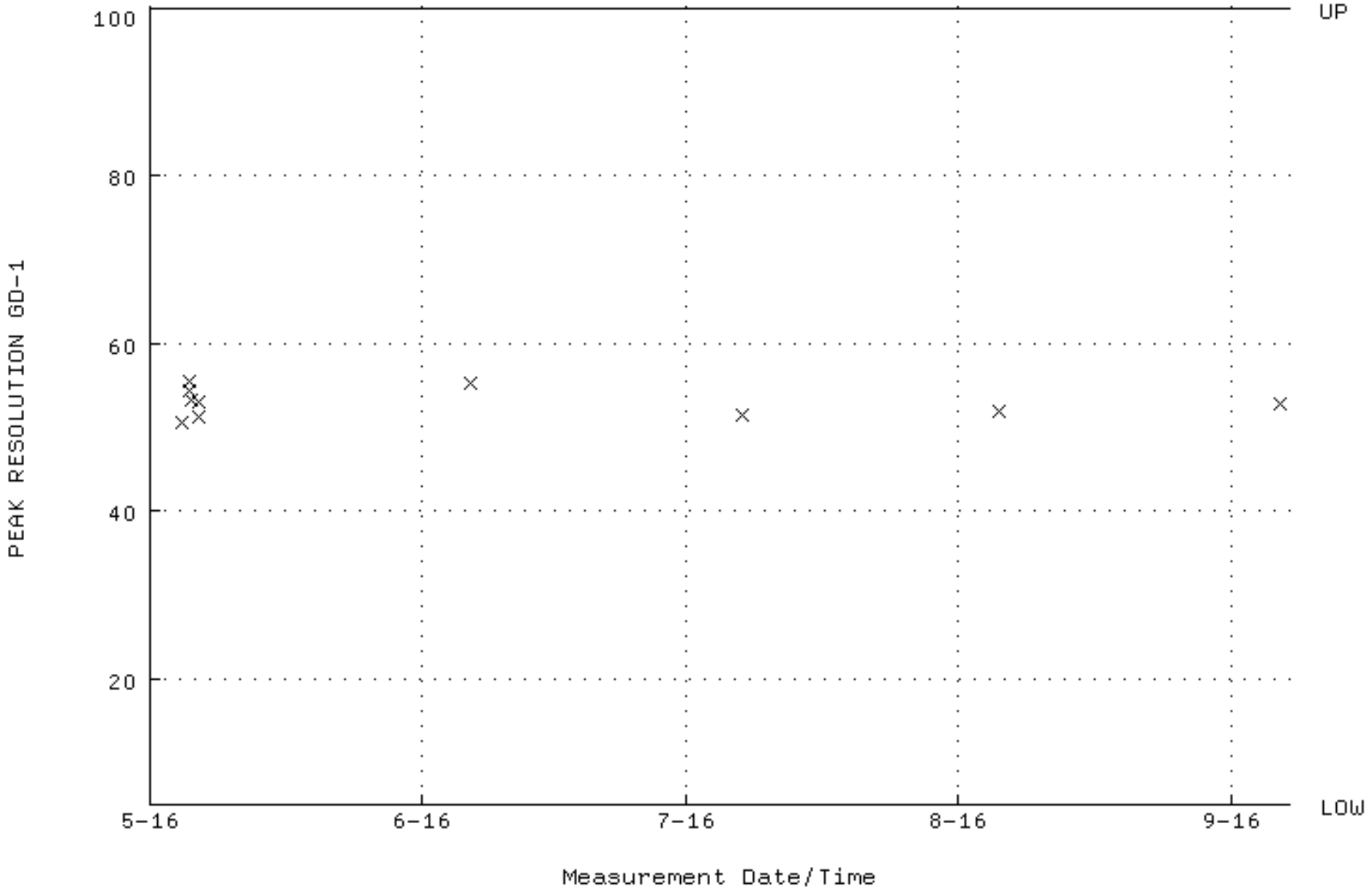
QA filename : DKA100:[ENV_ALPHA.QA.W]W099.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.310091 through 0.375000



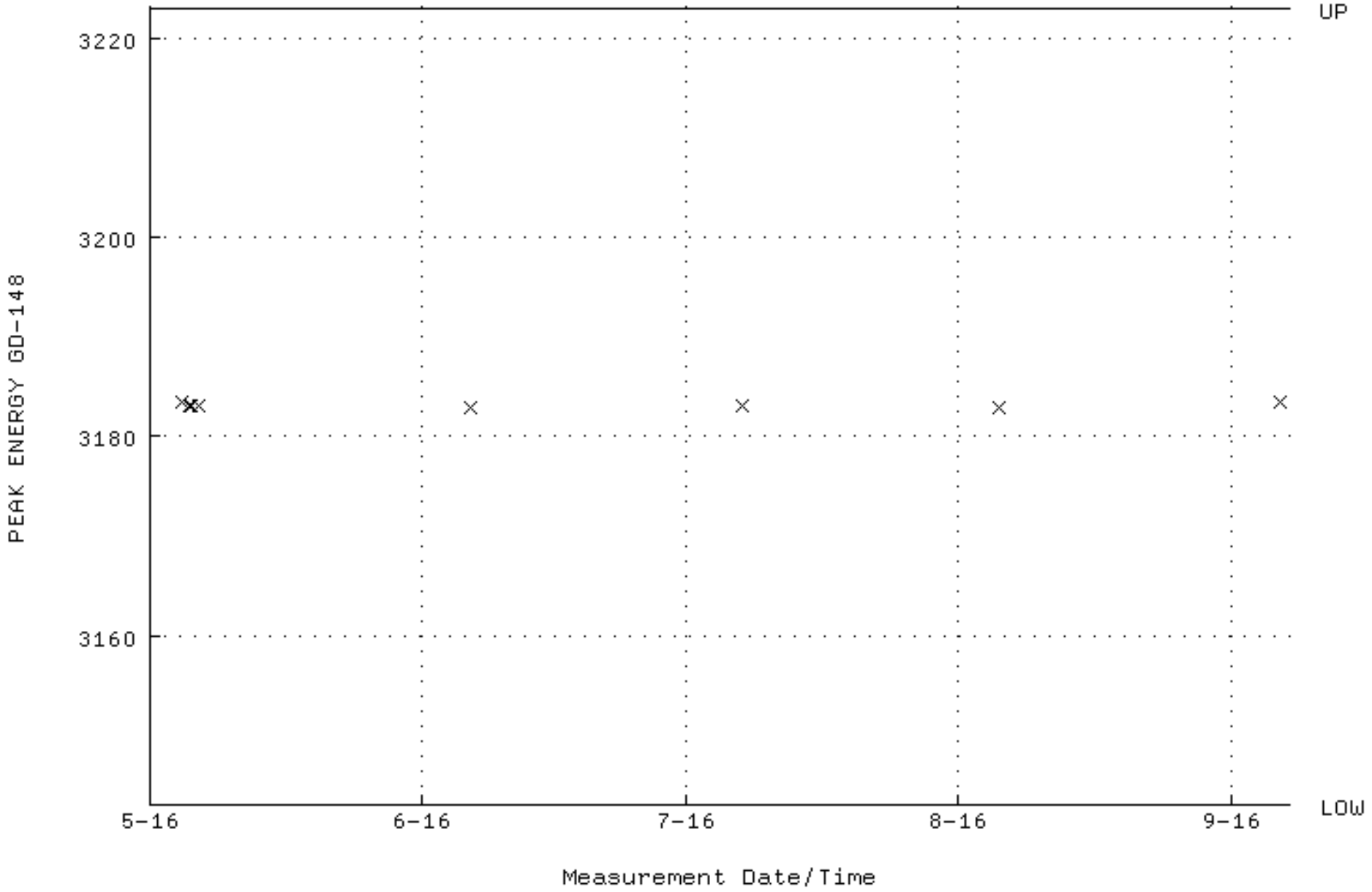
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



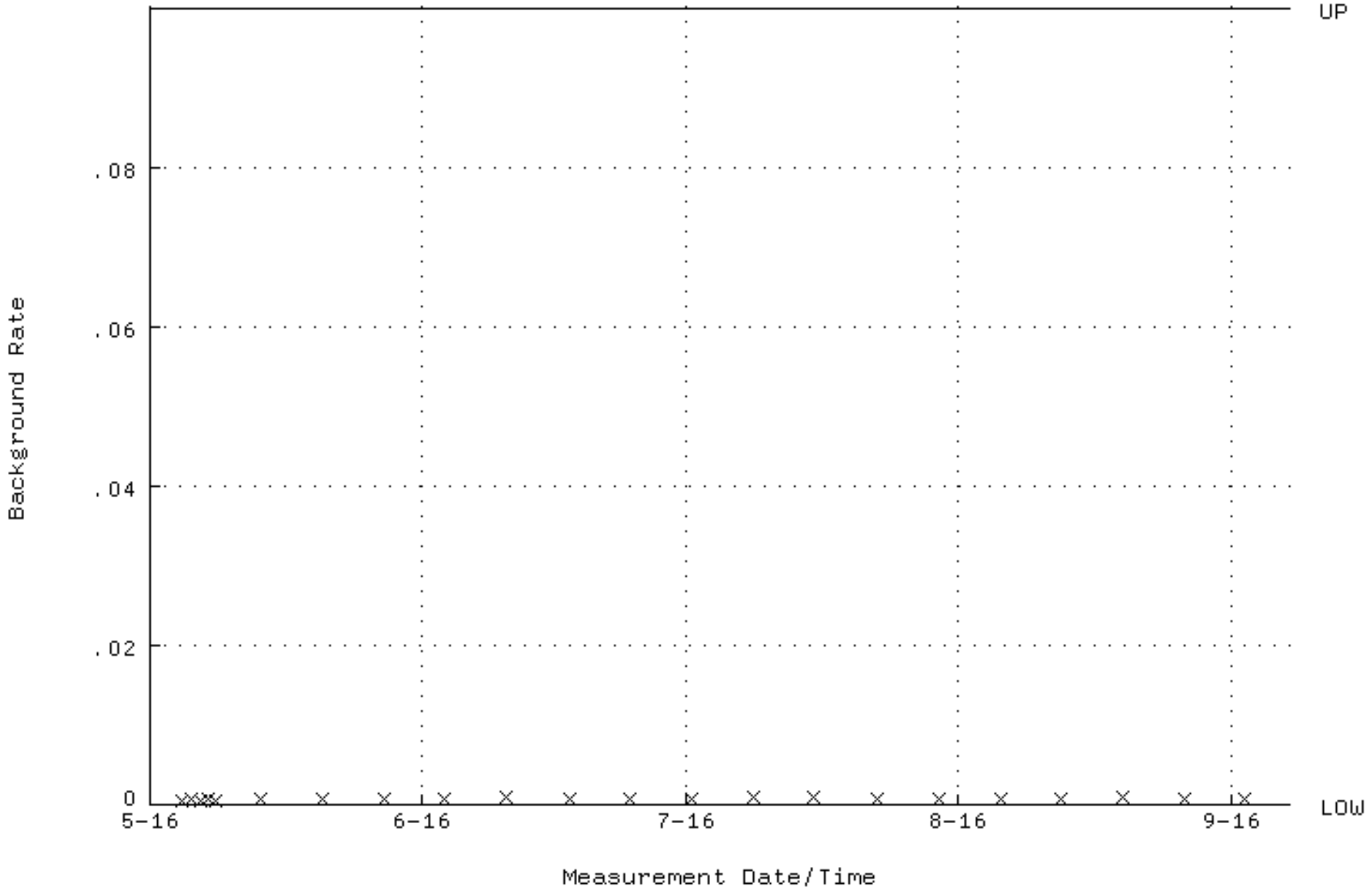
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



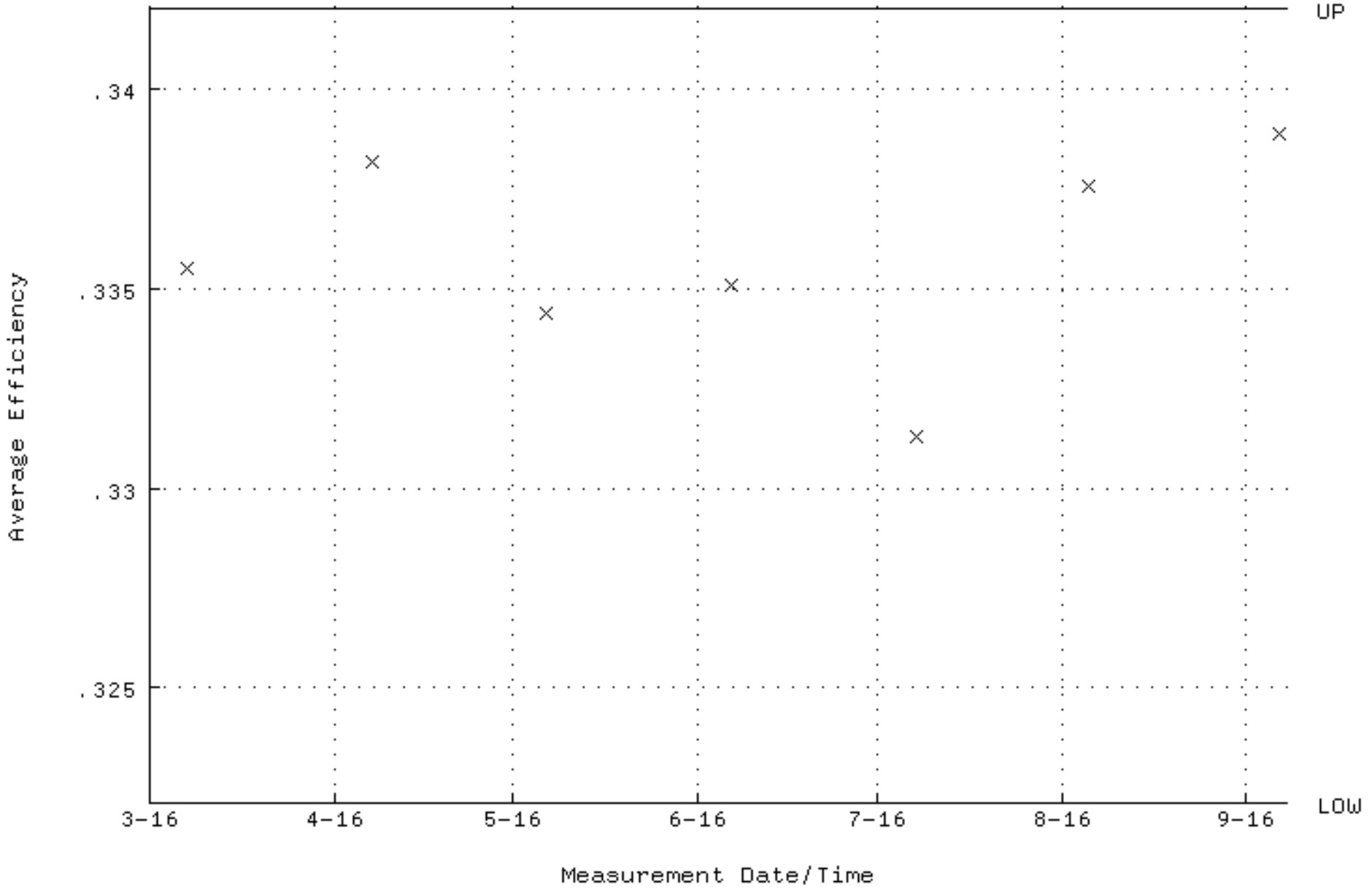
QA filename : DKA100:[ENV_ALPHA.QA.W]W099.QAF;11
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 4-MAY-2016 14:17:17 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



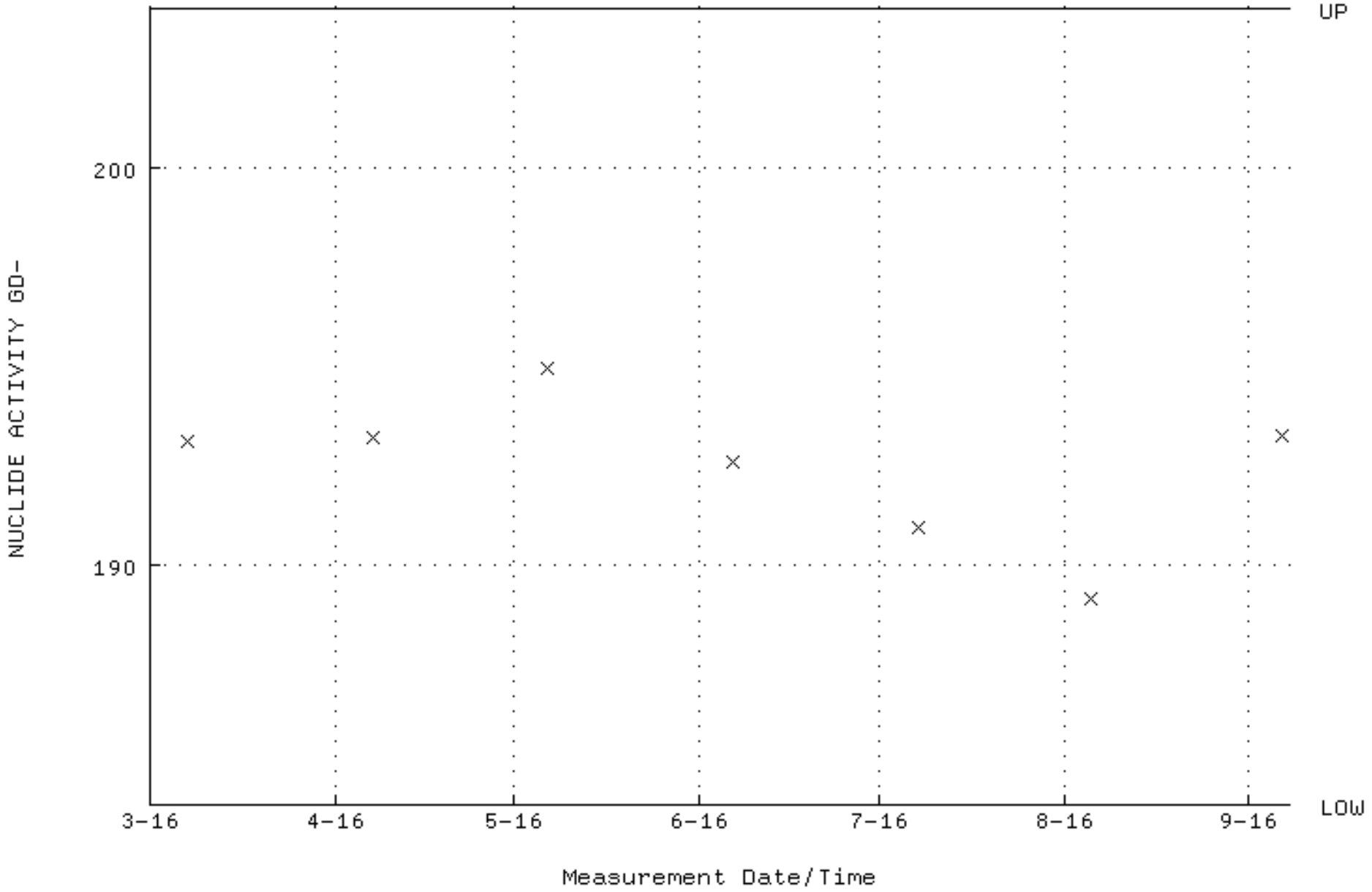
QA filename : DKA100:[ENV_ALPHA.QA.B]B099.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAY-2016 15:23:40 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



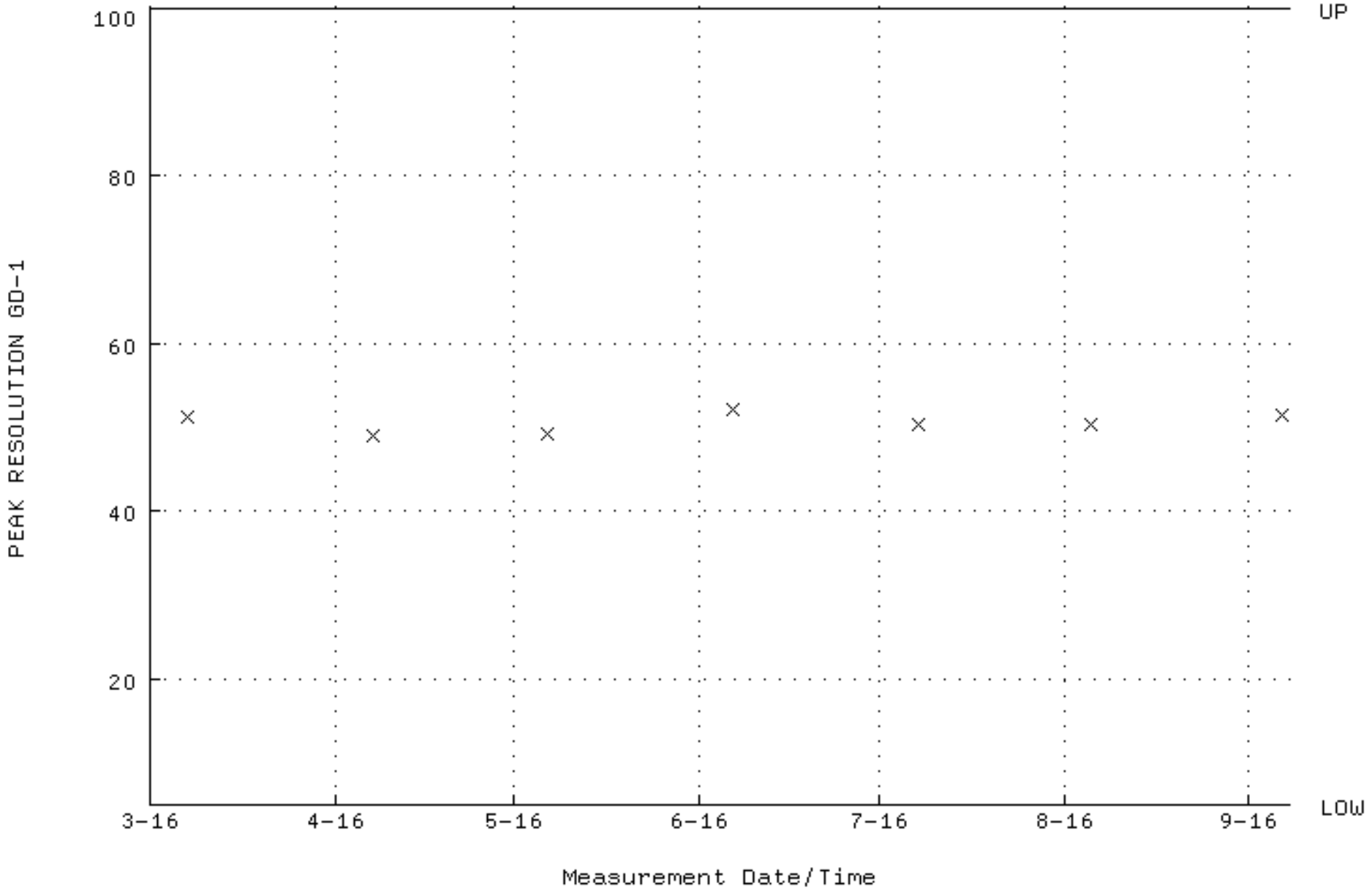
QA filename : DKA100:[ENV_ALPHA.QA.W]W103.QAF;12
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.322108 through 0.342032



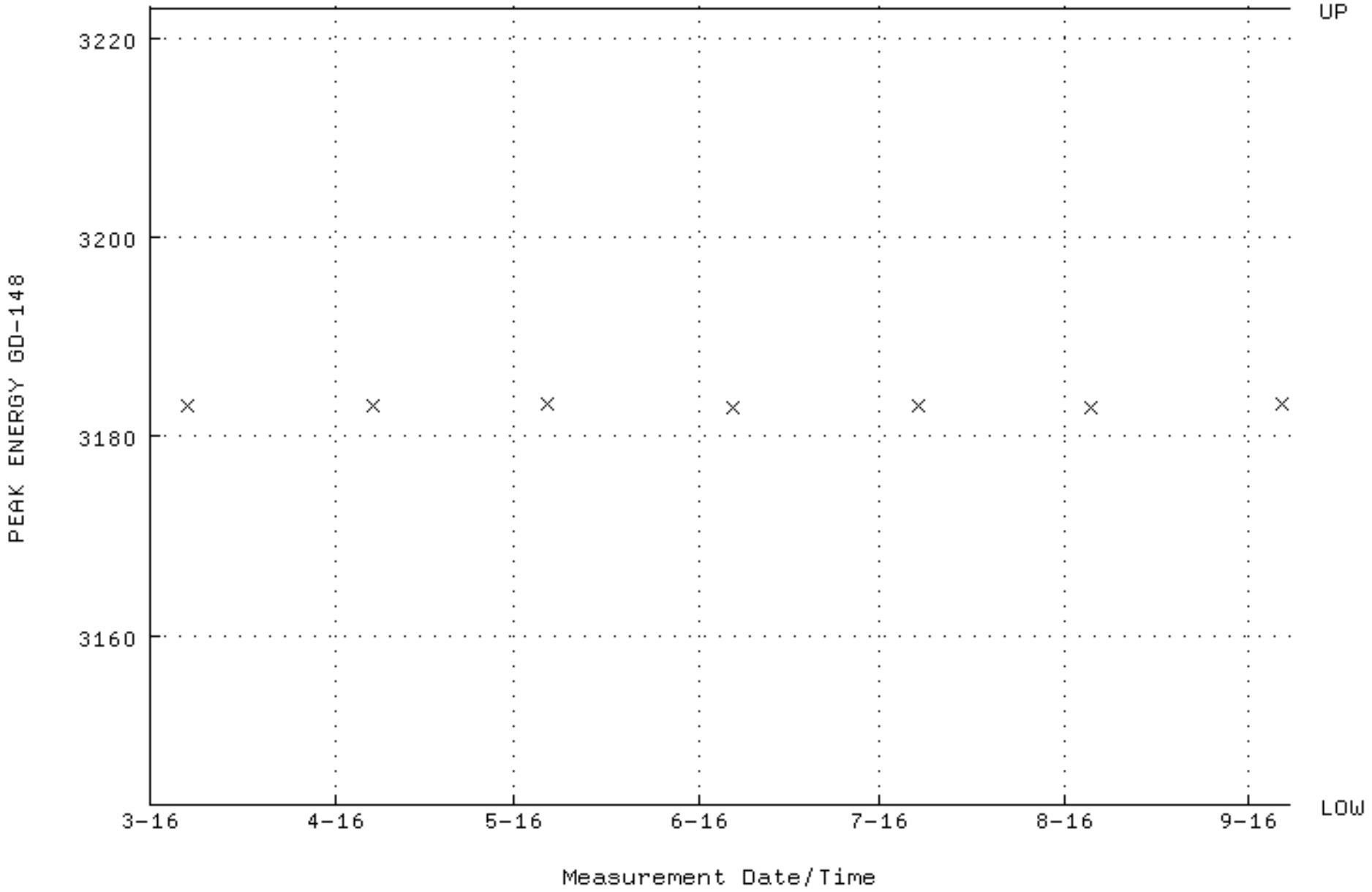
QA filename : DKA100:[ENV_ALPHA.QA.W]W103.QAF;12
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



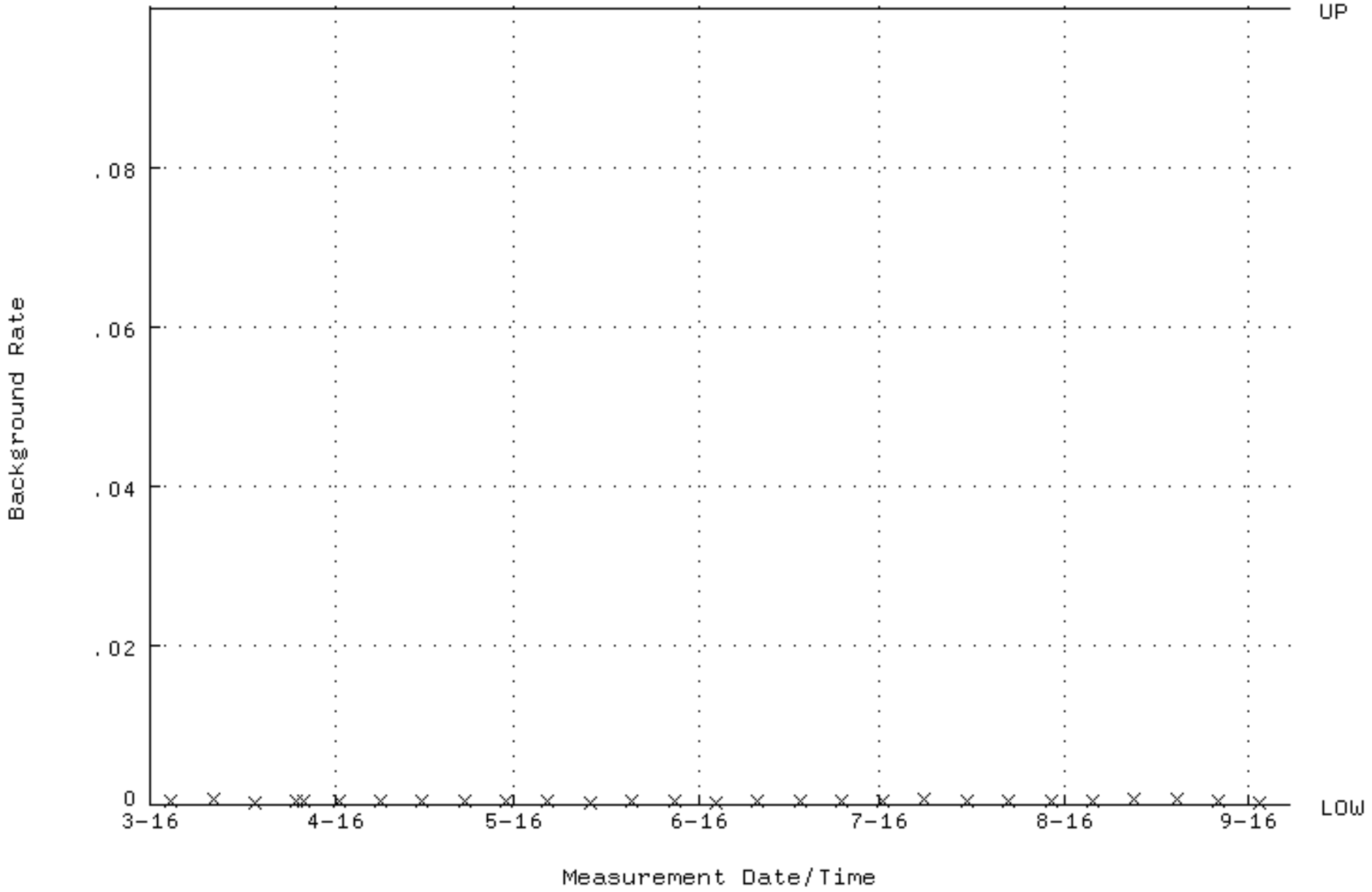
QA filename : DKA100:[ENV_ALPHA.QA.W]W103.QAF;12
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



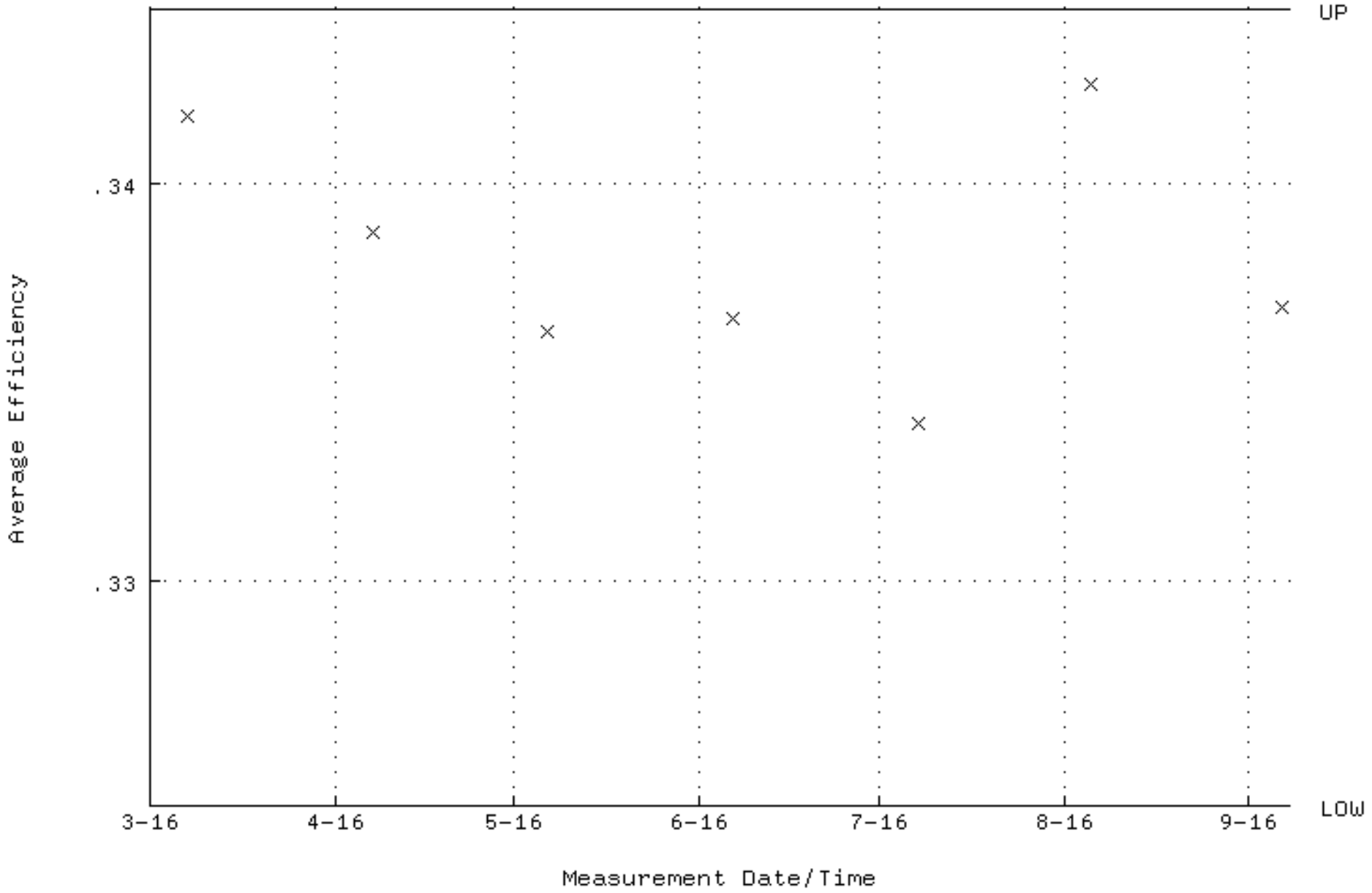
QA filename : DKA100:[ENV_ALPHA.QA.W]W103.QAF;12
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



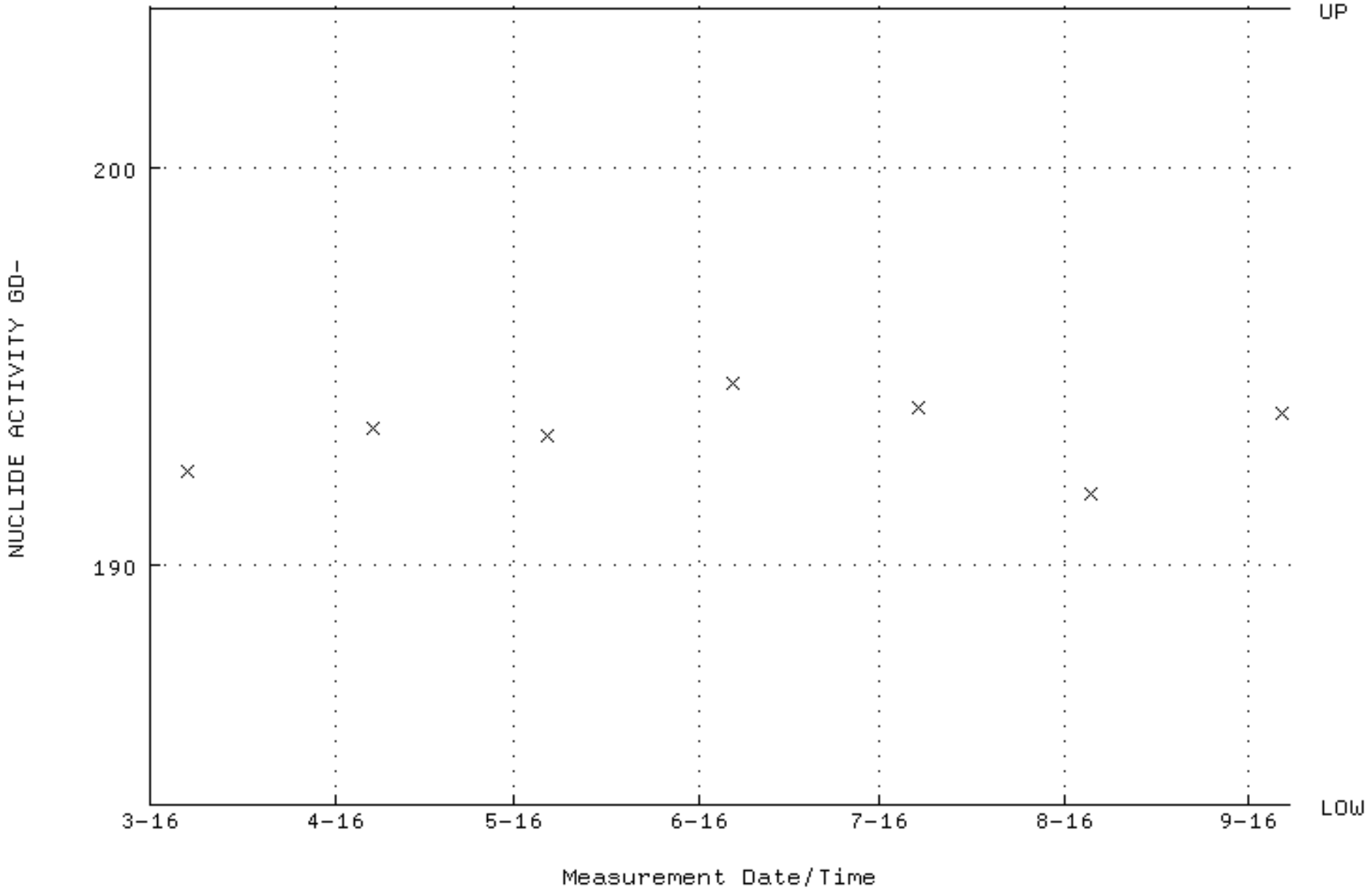
QA filename : DKA100:[ENV_ALPHA.QA.B]B103.QAF;4
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:39 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



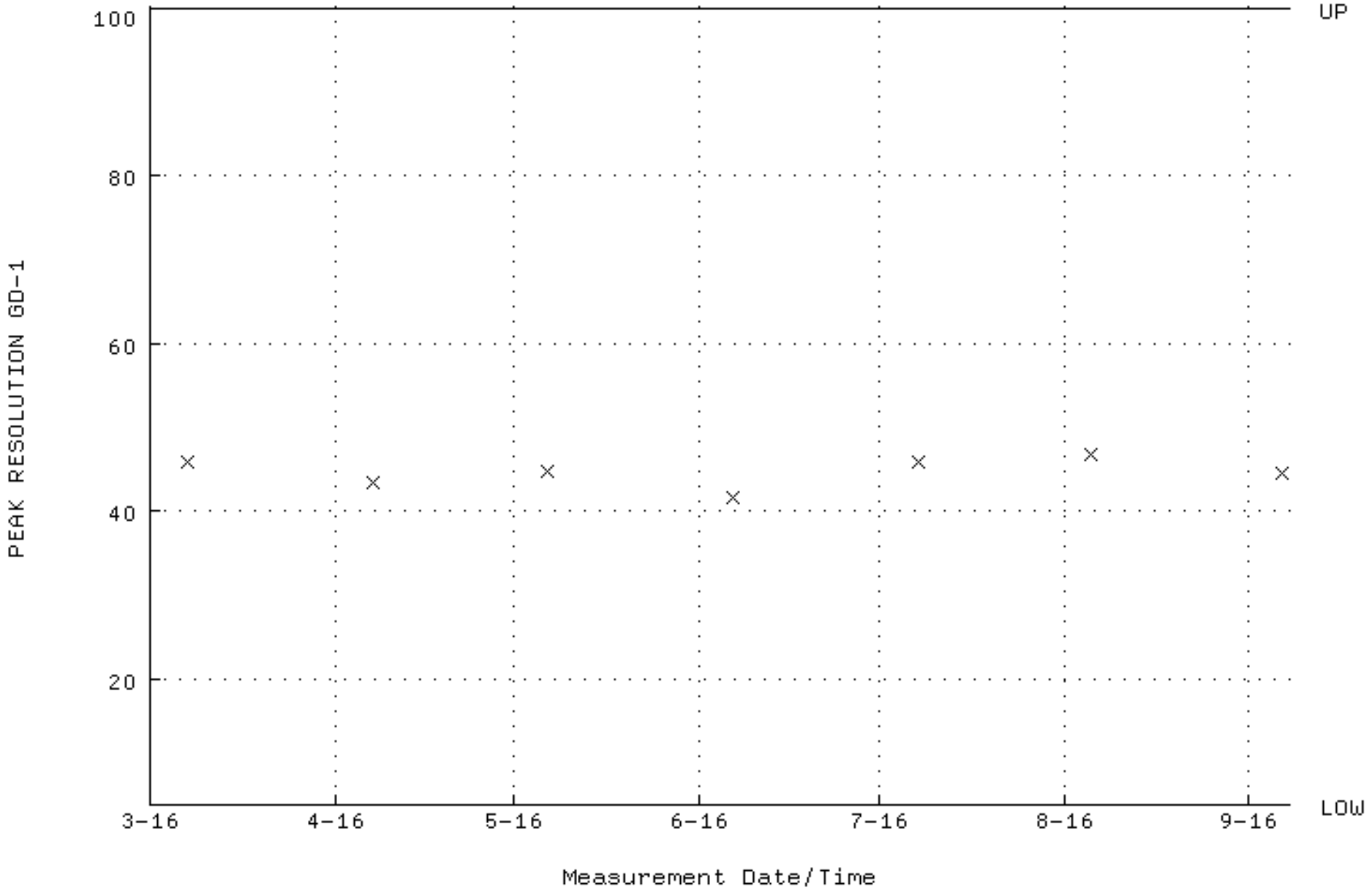
QA filename : DKA100:[ENV_ALPHA.QA.W]W105.QAF;12
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.324335 through 0.344400



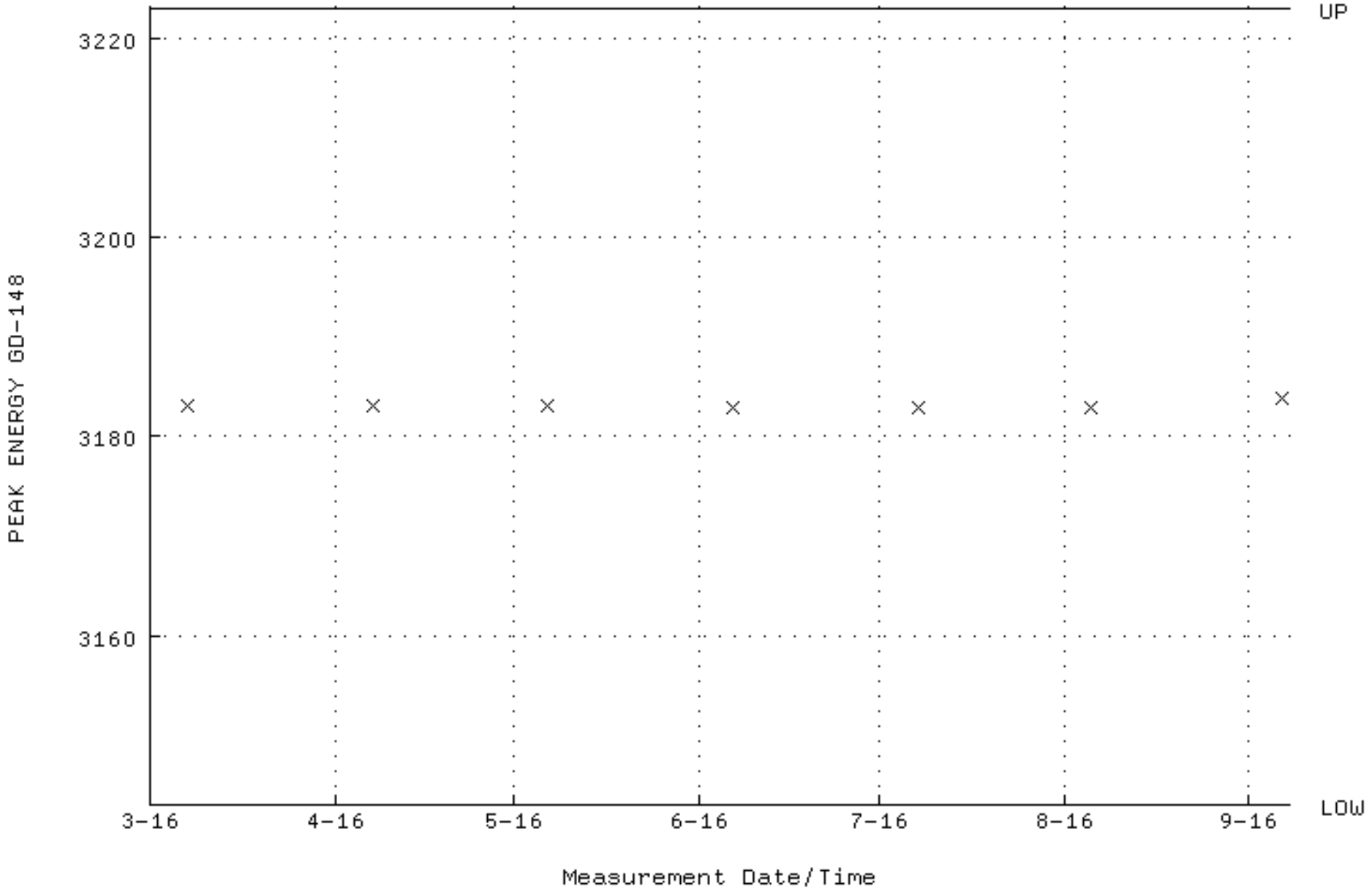
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



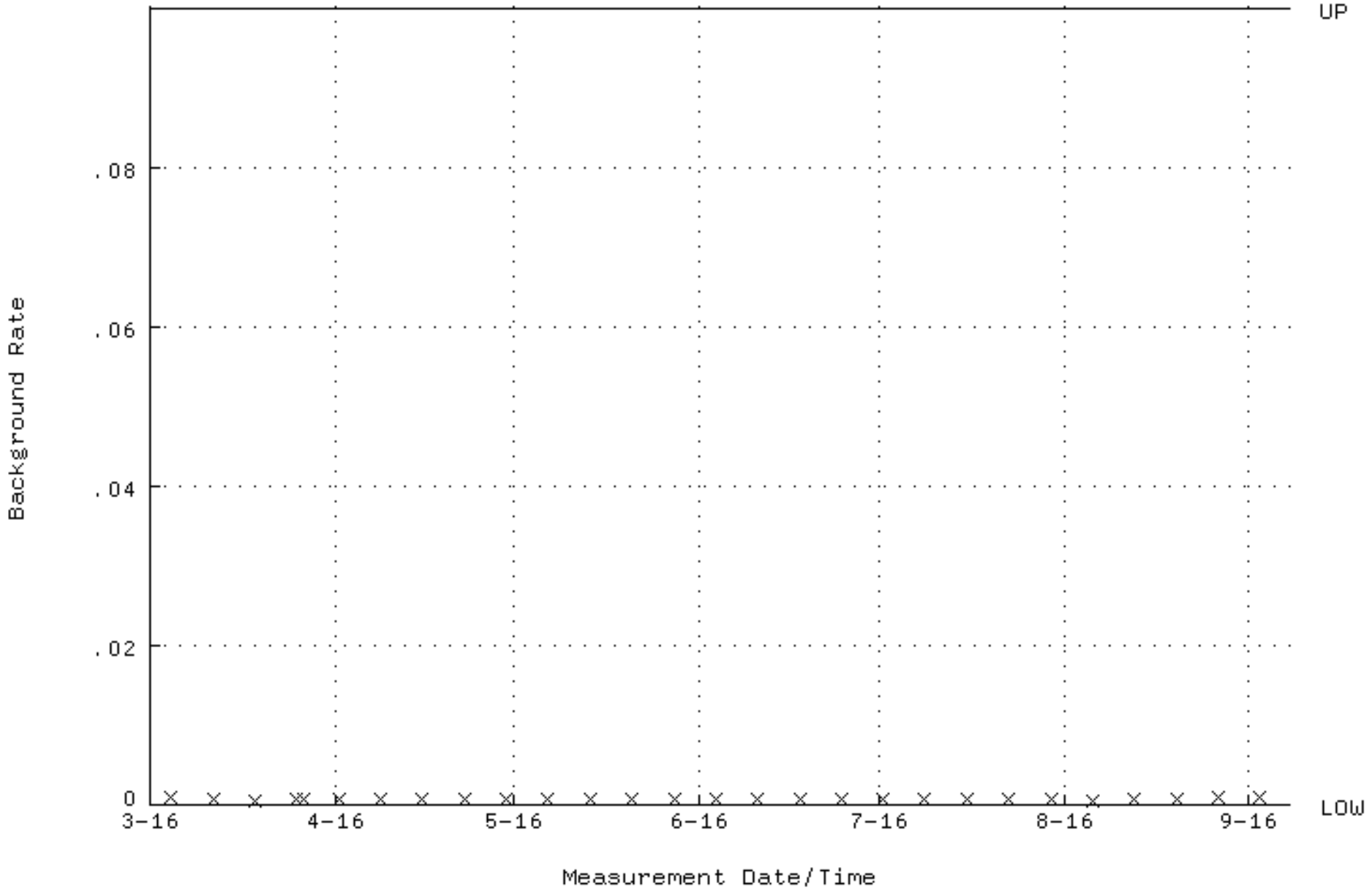
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



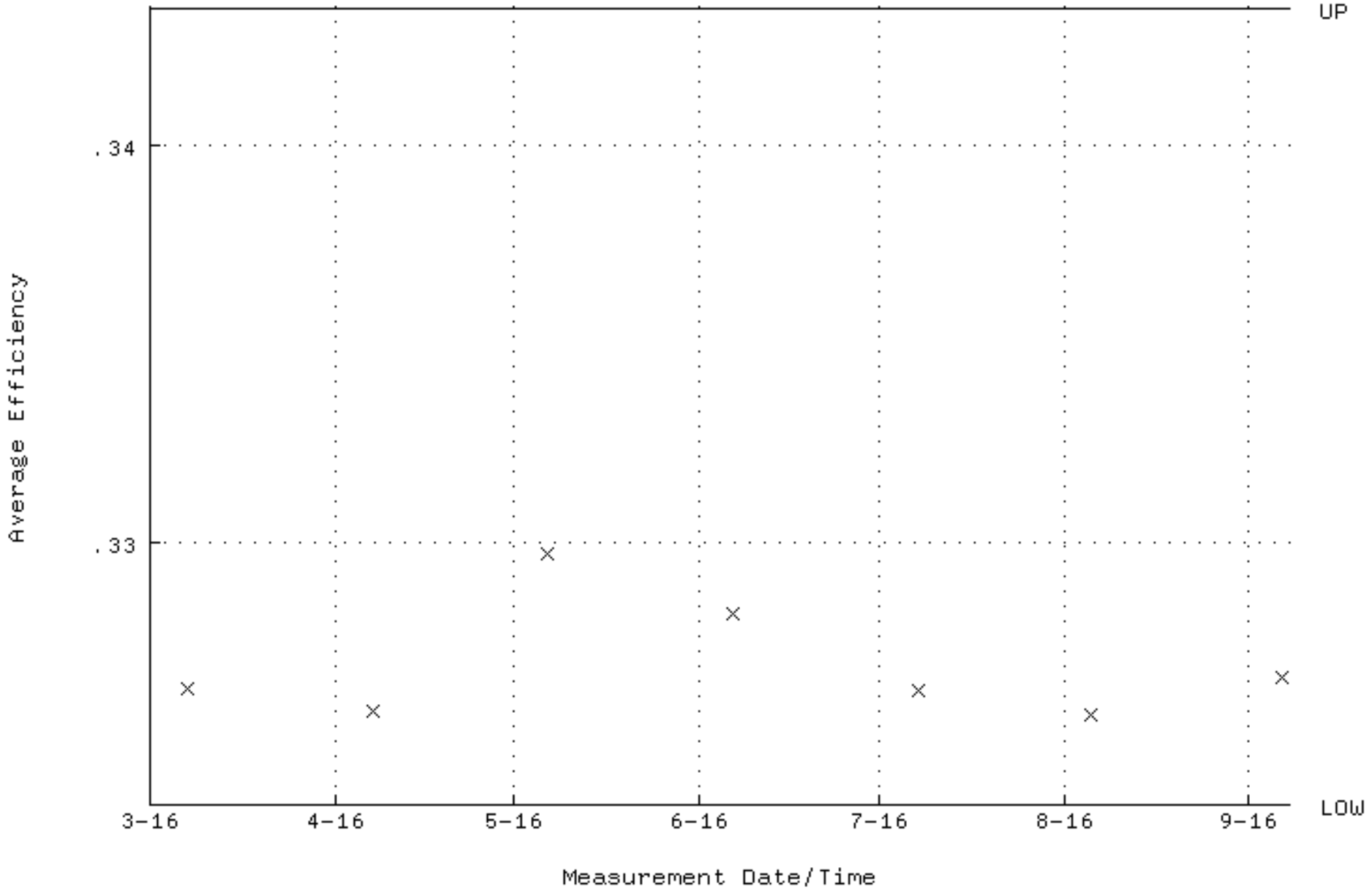
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



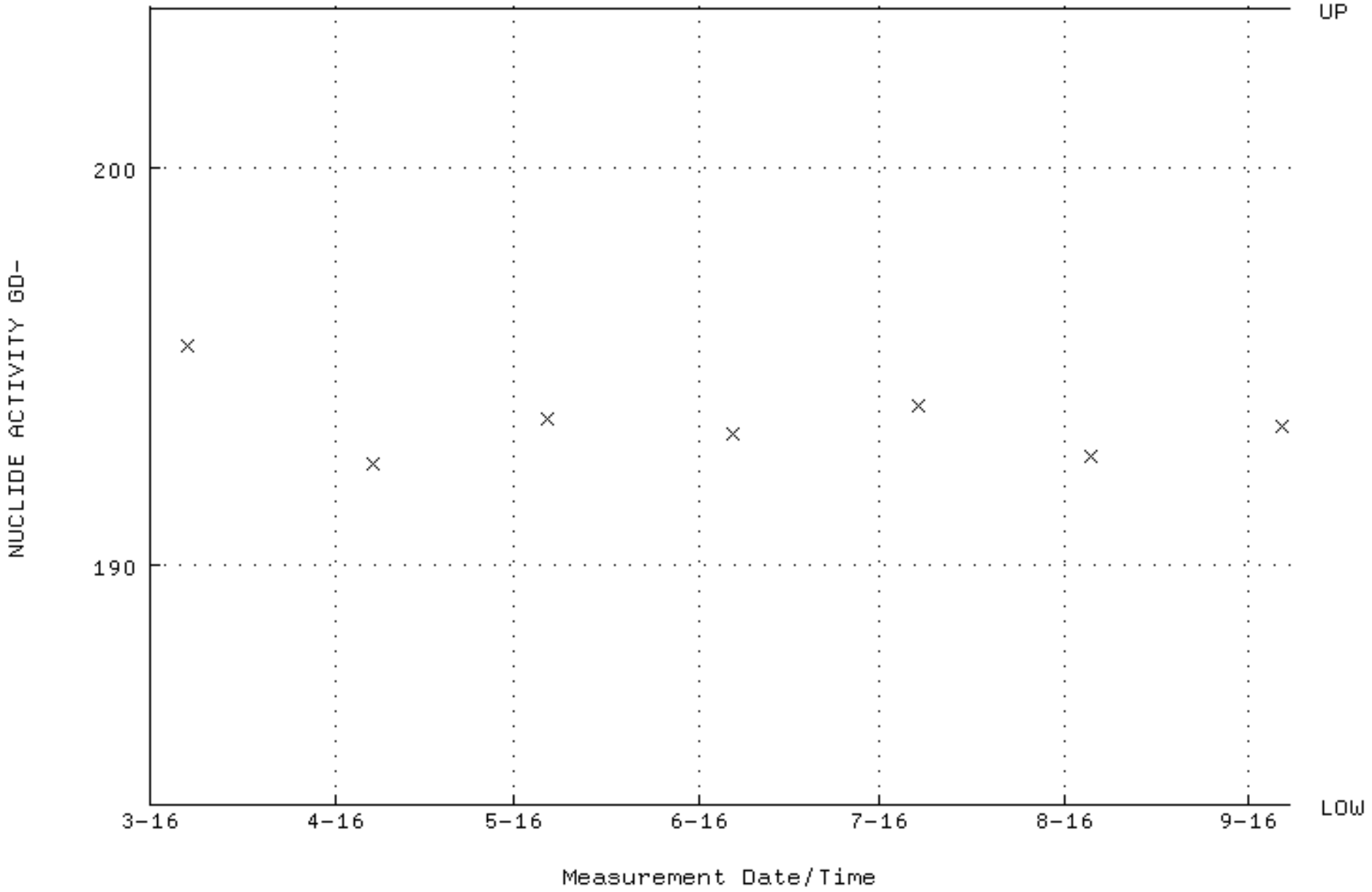
QA filename : DKA100:[ENV_ALPHA.QA.B]B105.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:39 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



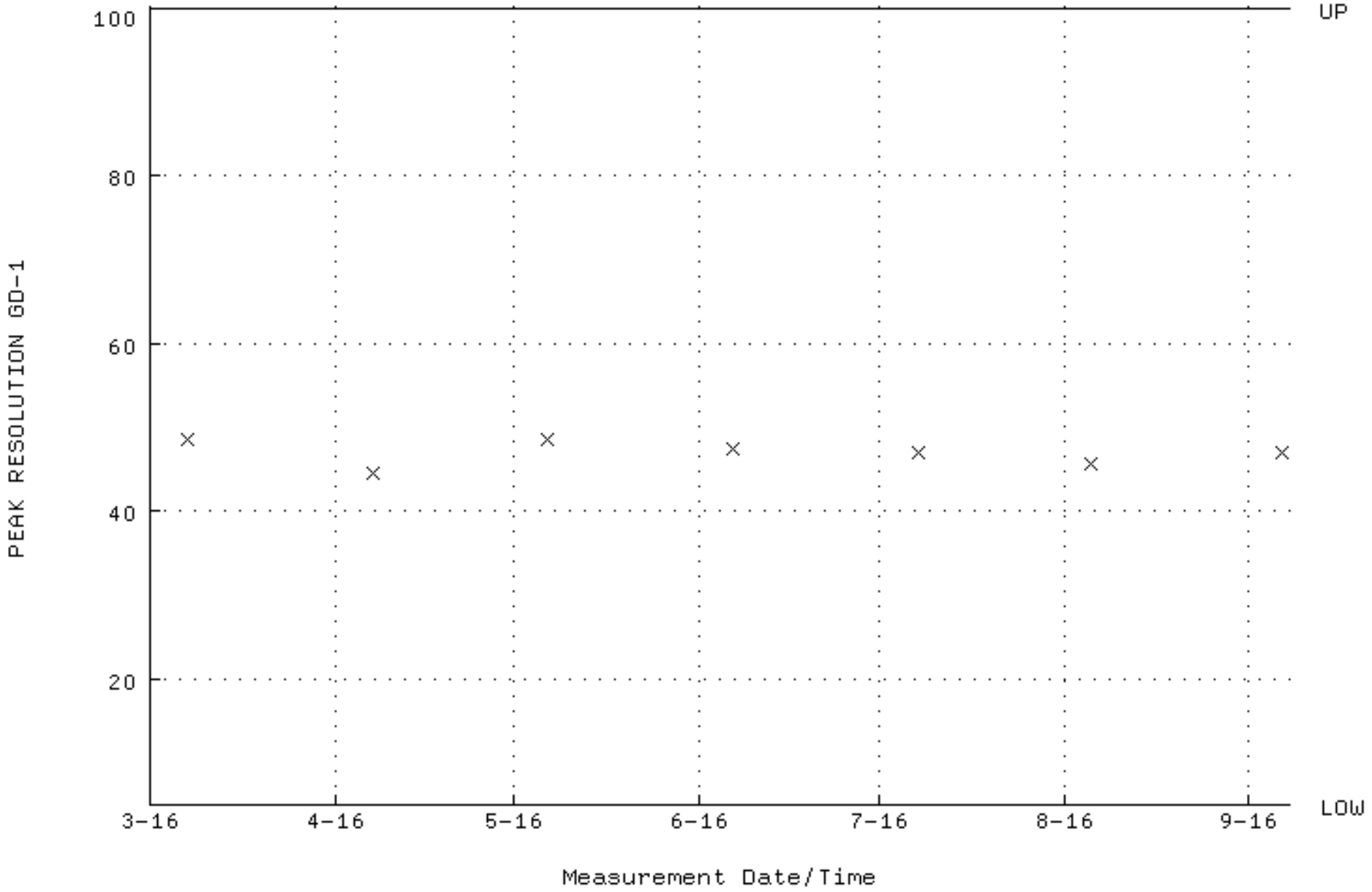
QA filename : DKA100:[ENV_ALPHA.QA.W]W106.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.323416 through 0.343420



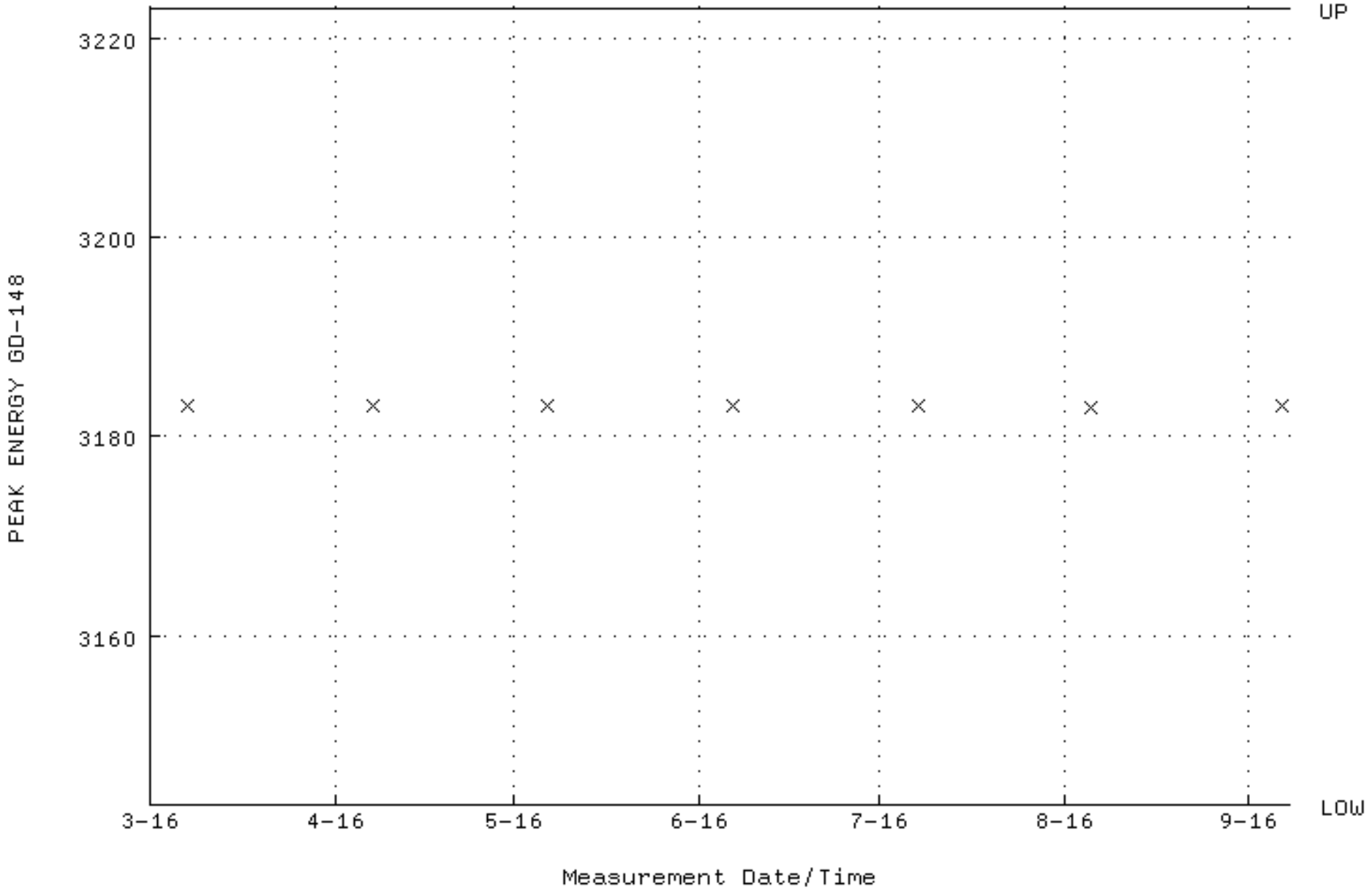
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



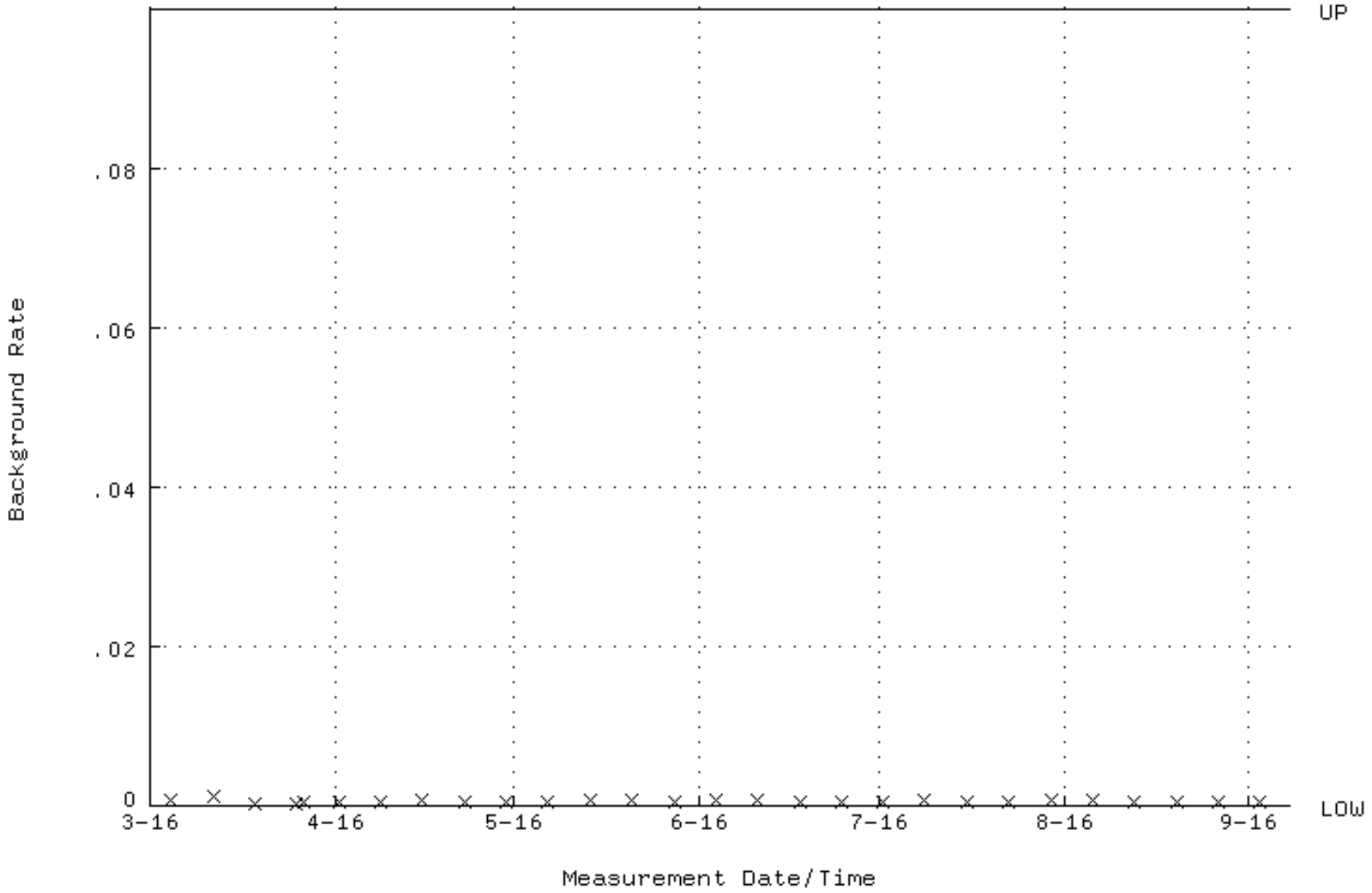
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



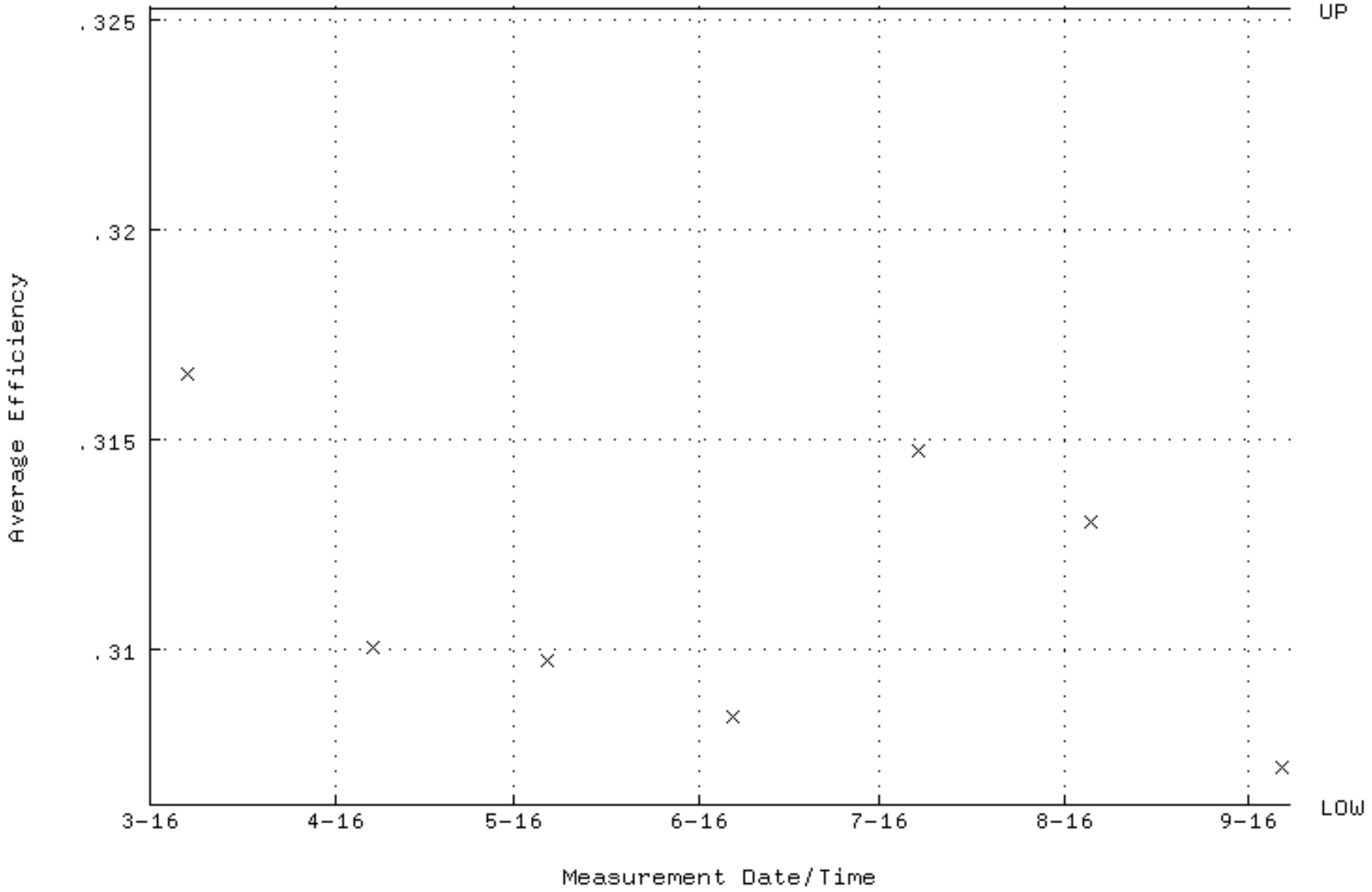
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:02 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



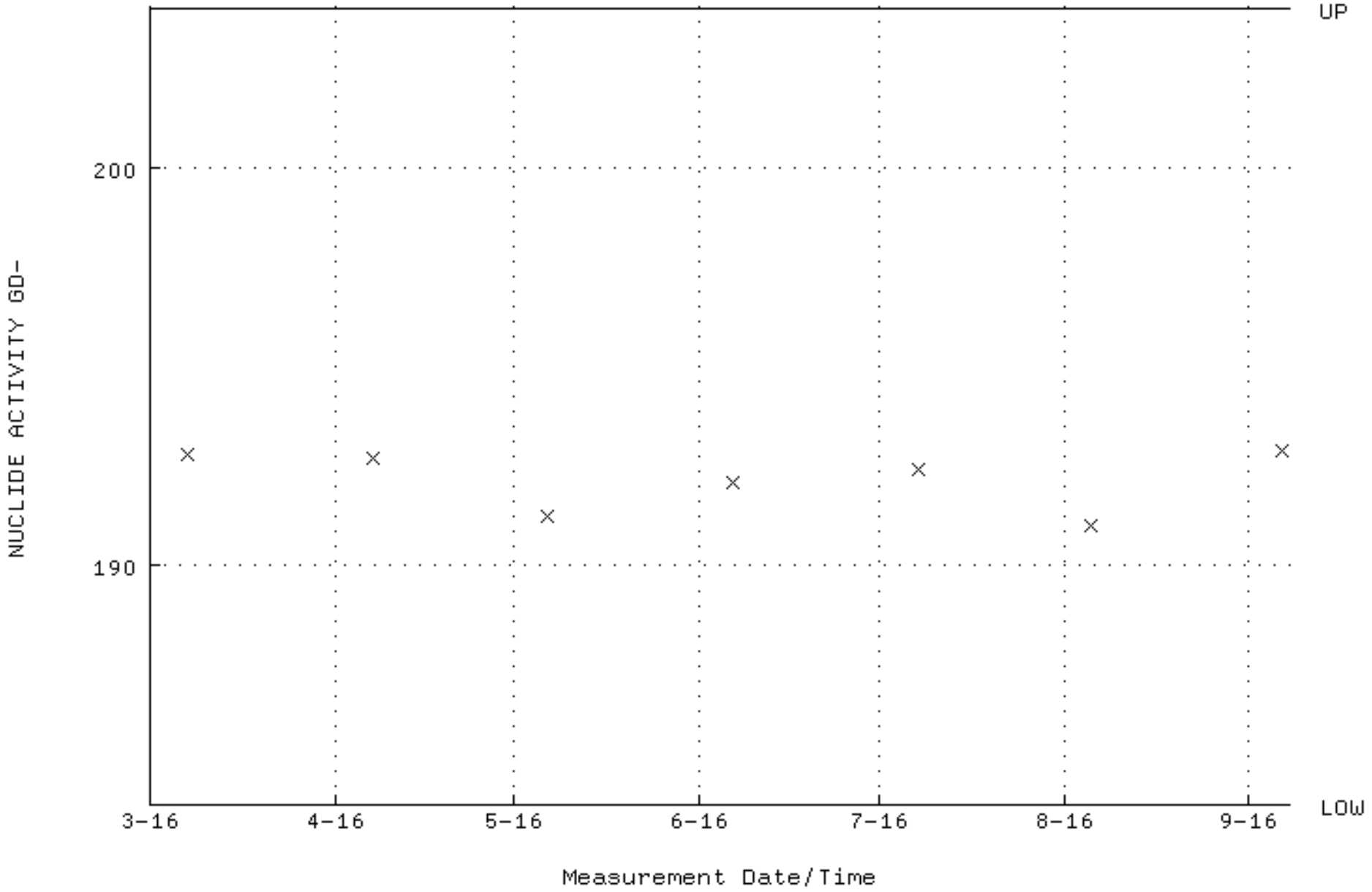
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:39 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



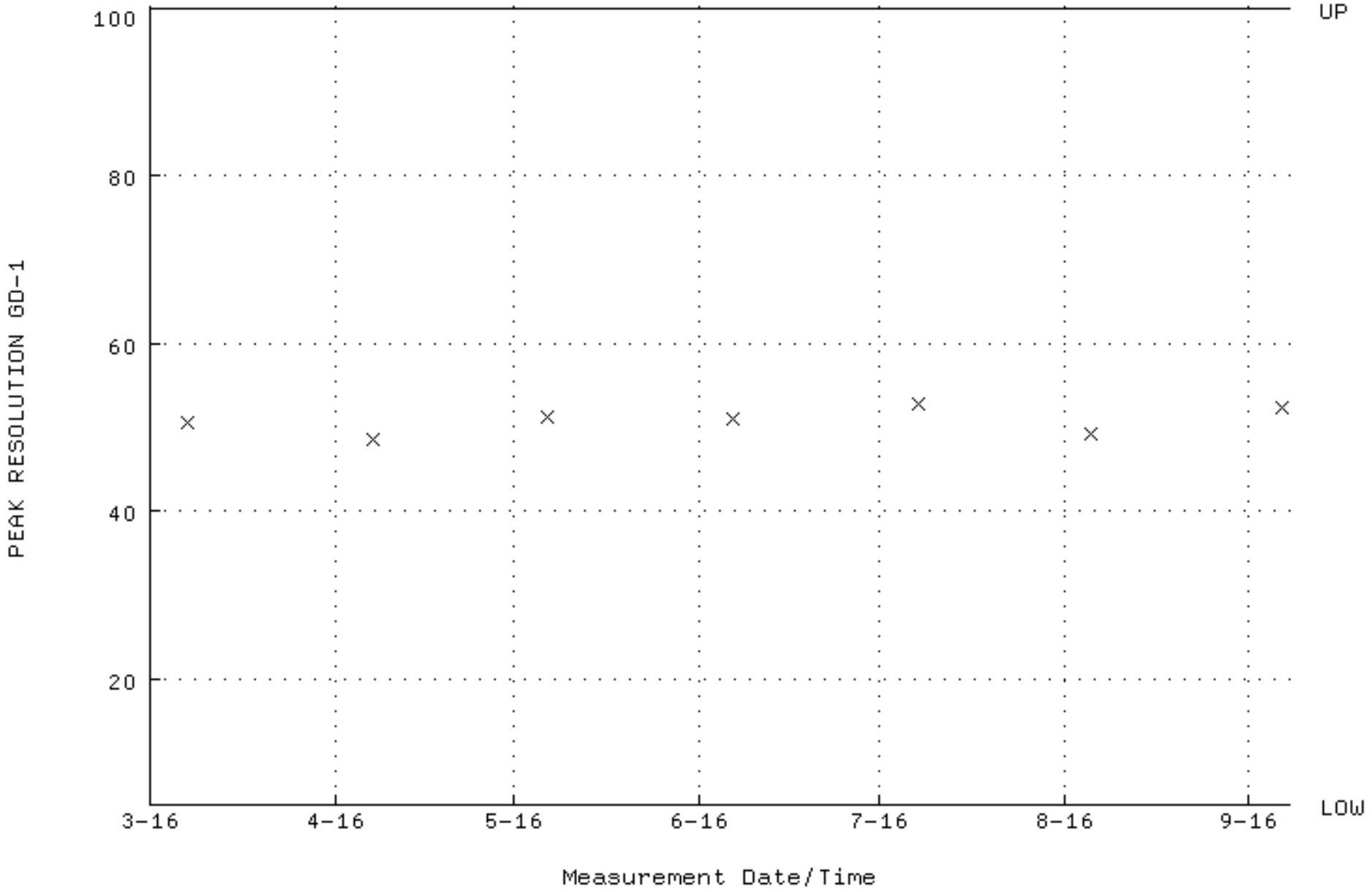
QA filename : DKA100:[ENV_ALPHA.QA.W]W107.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.306300 through 0.325260



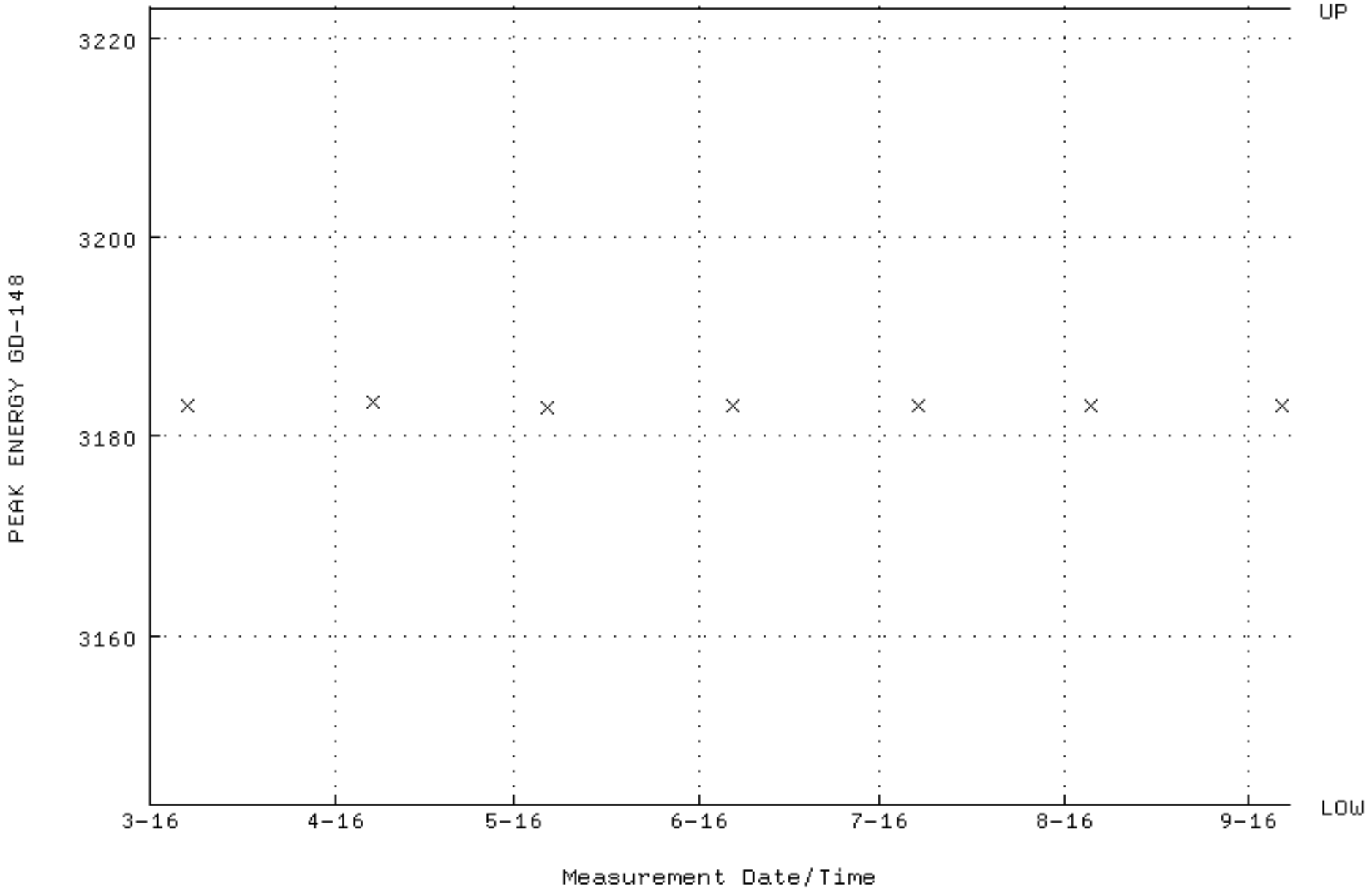
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



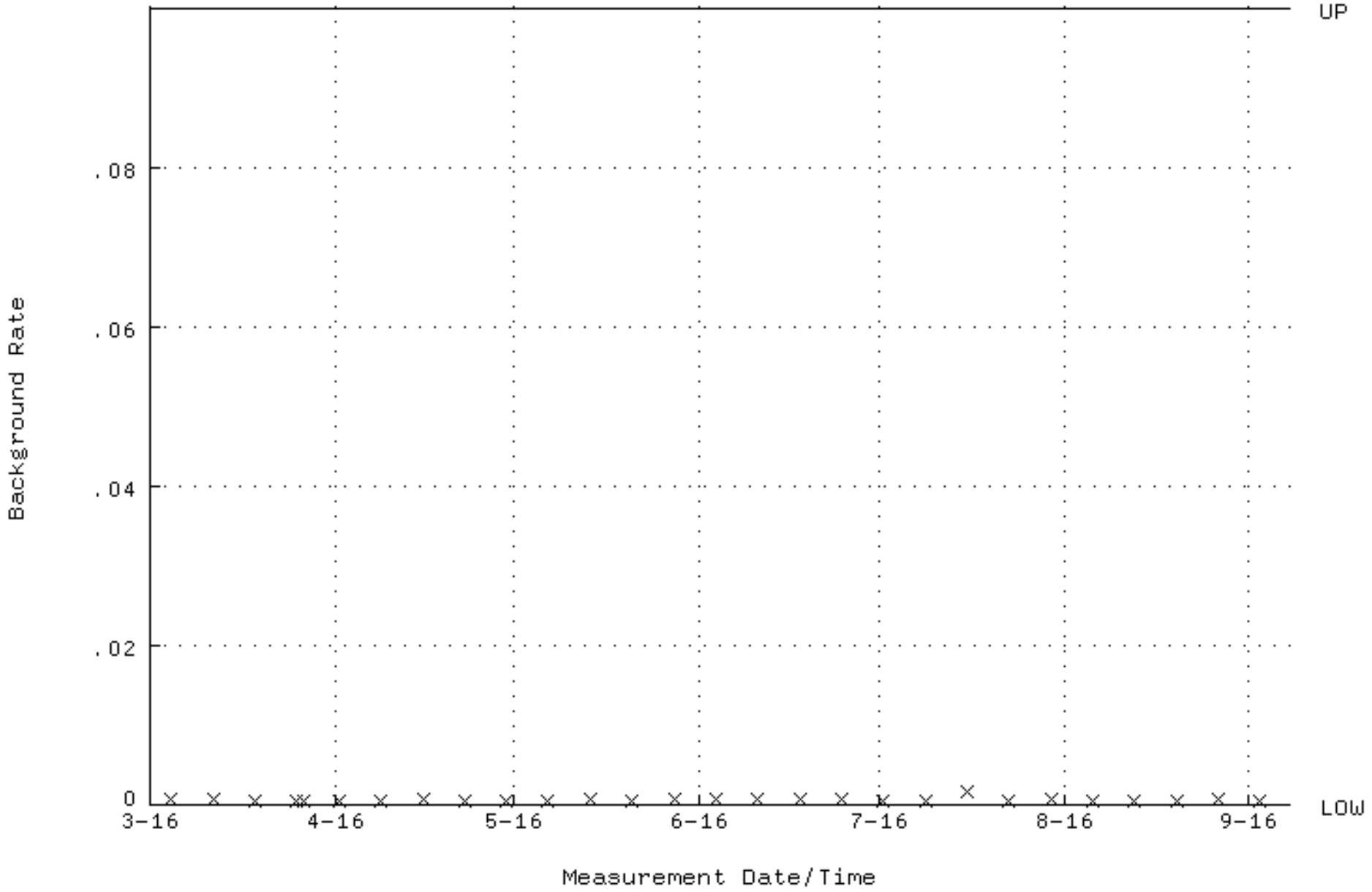
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



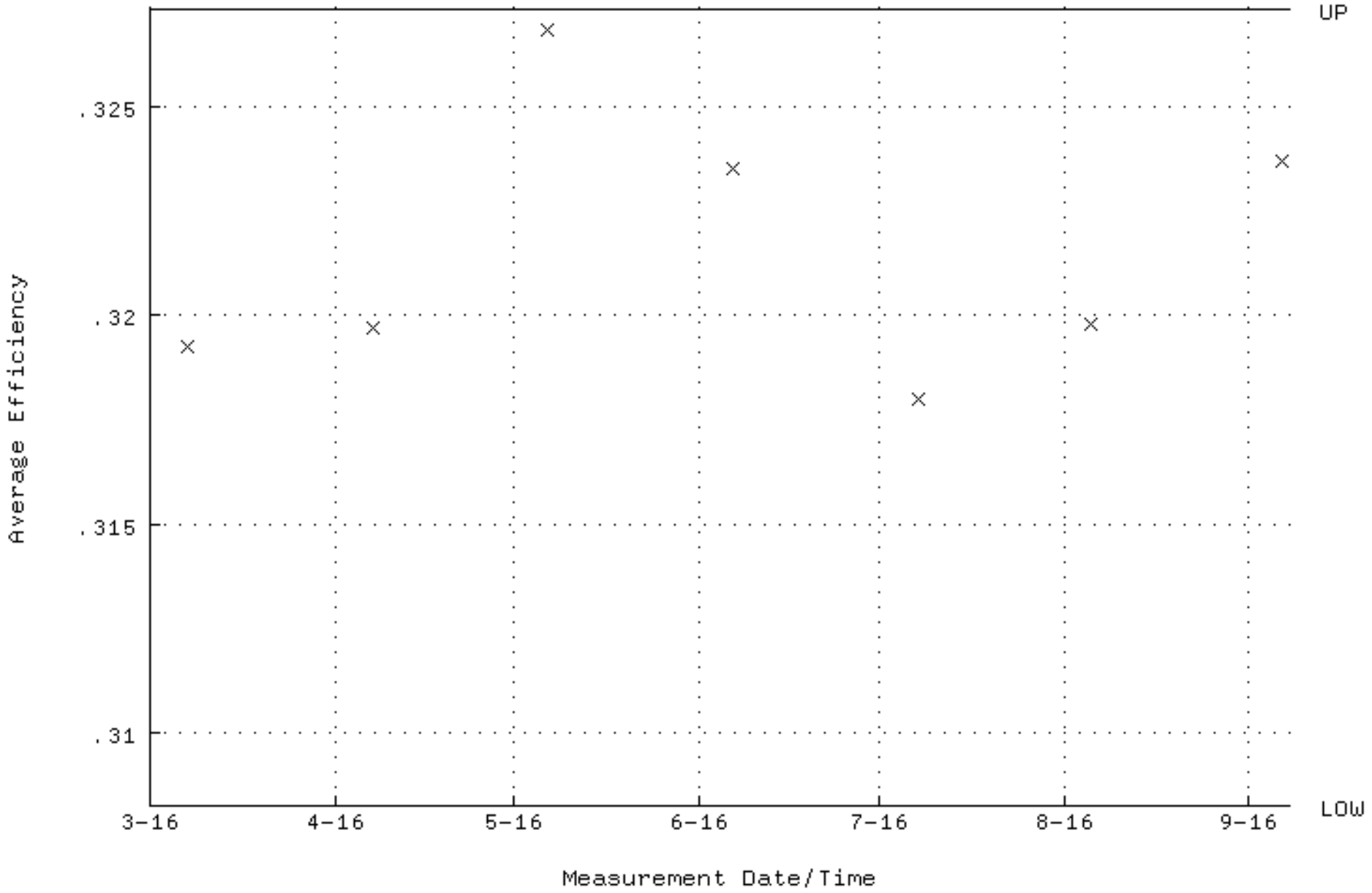
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



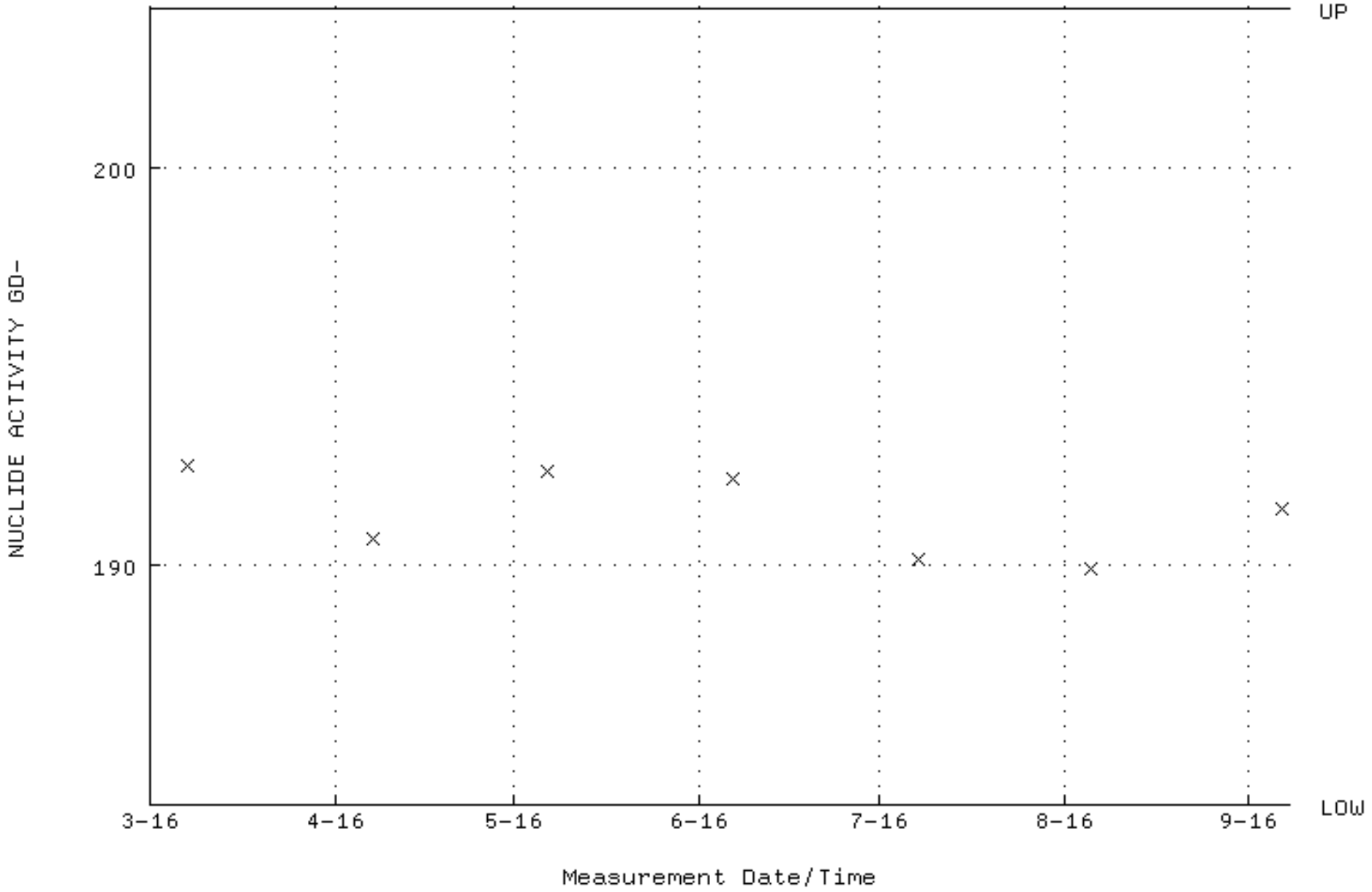
QA filename : DKA100:[ENV_ALPHA.QA.B]B107.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:41 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



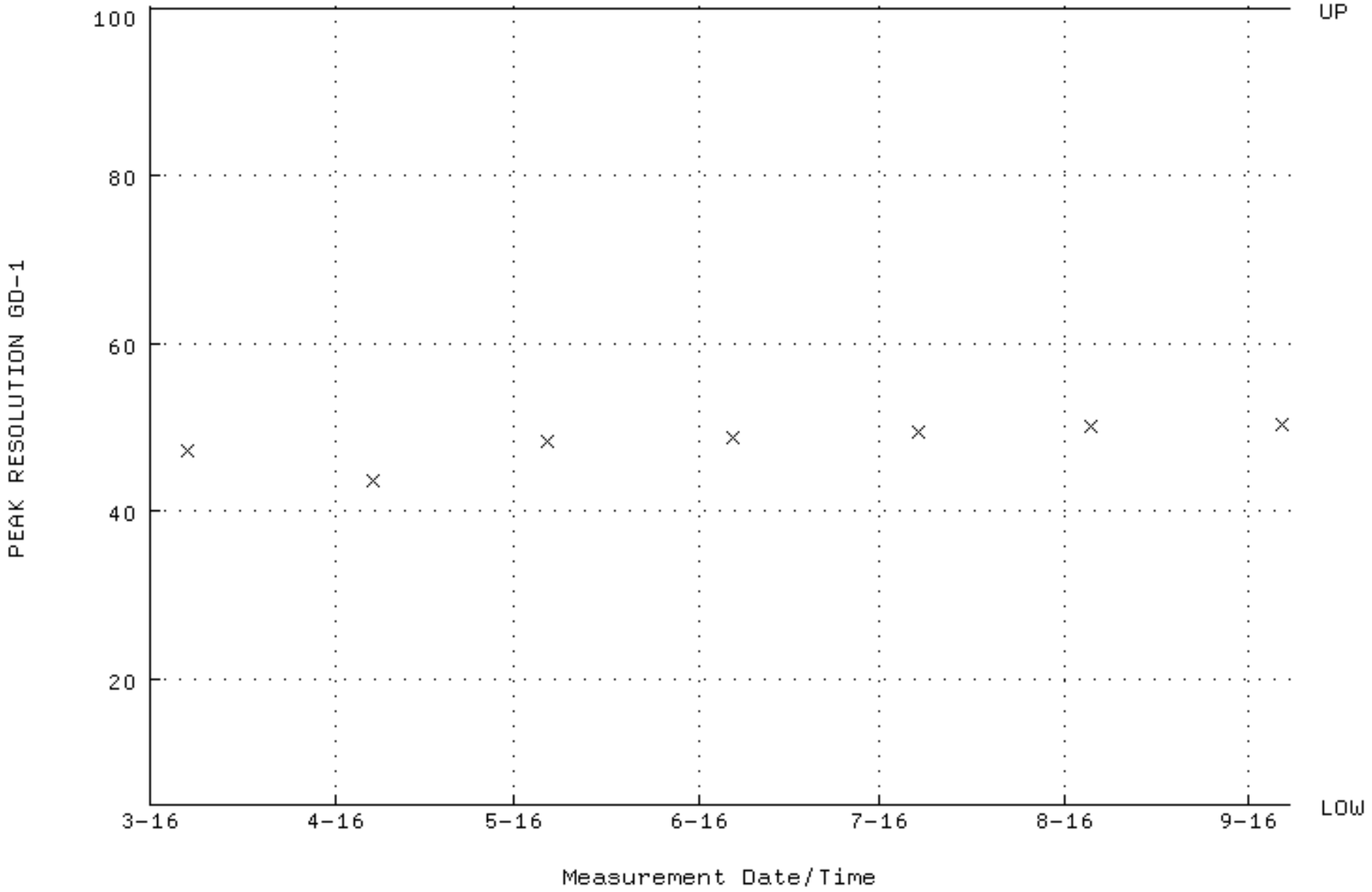
QA filename : DKA100:[ENV_ALPHA.QA.W]W110.QAF;11
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.308266 through 0.327334



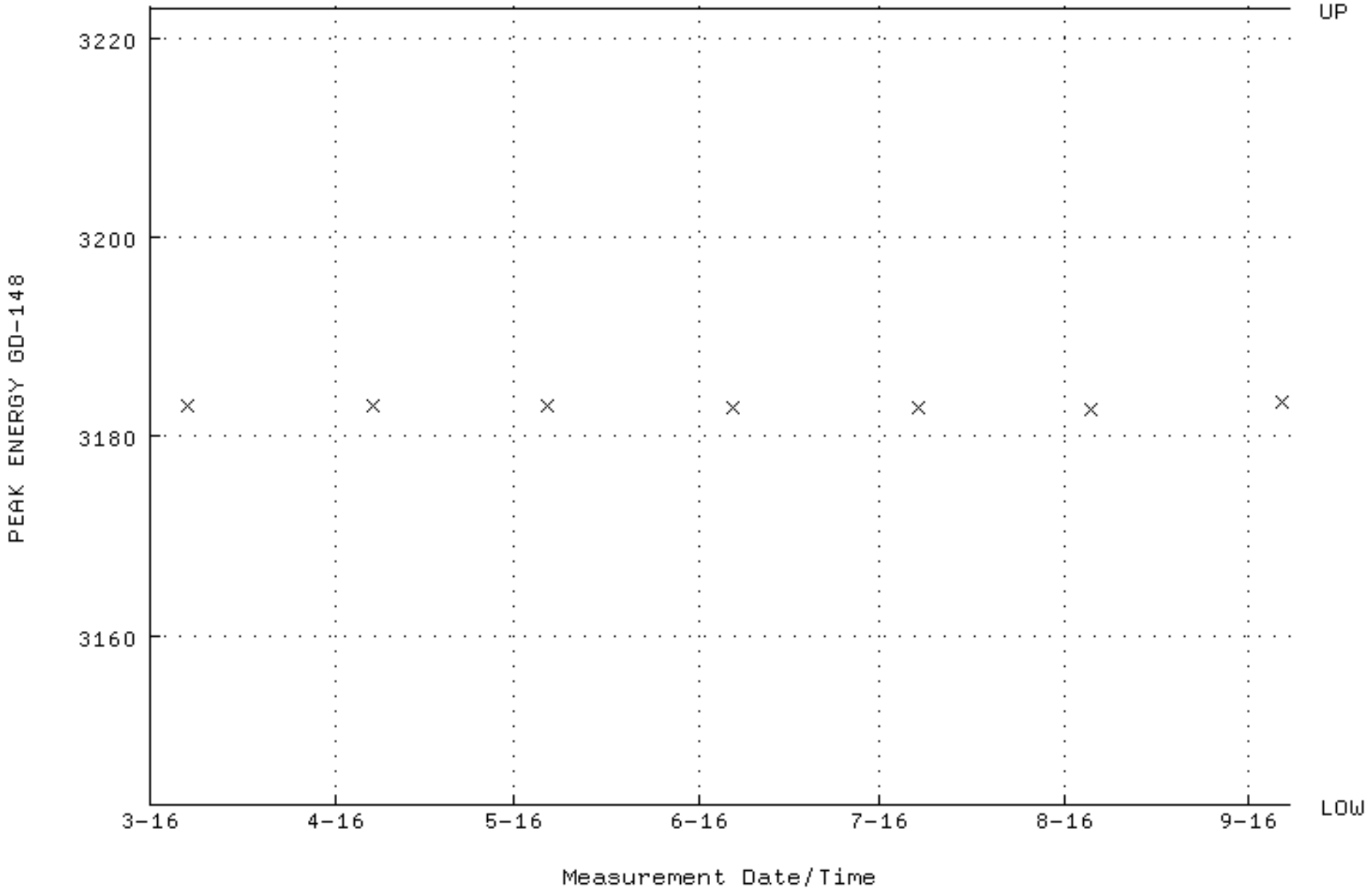
QA filename : DKA100:[ENV_ALPHA.QA.W]W110.QAF;11
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



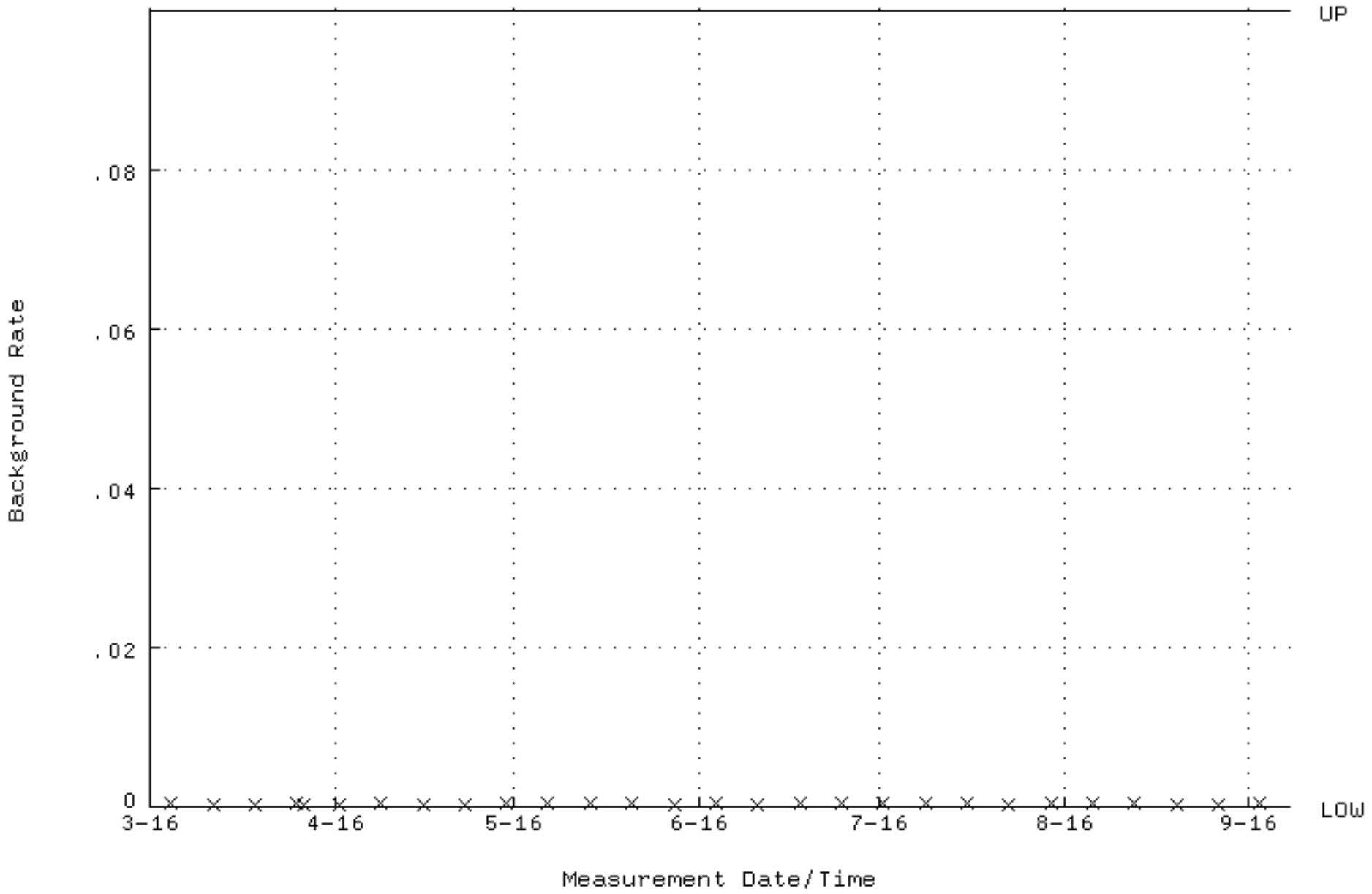
QA filename : DKA100:[ENV_ALPHA.QA.W]W110.QAF;11
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



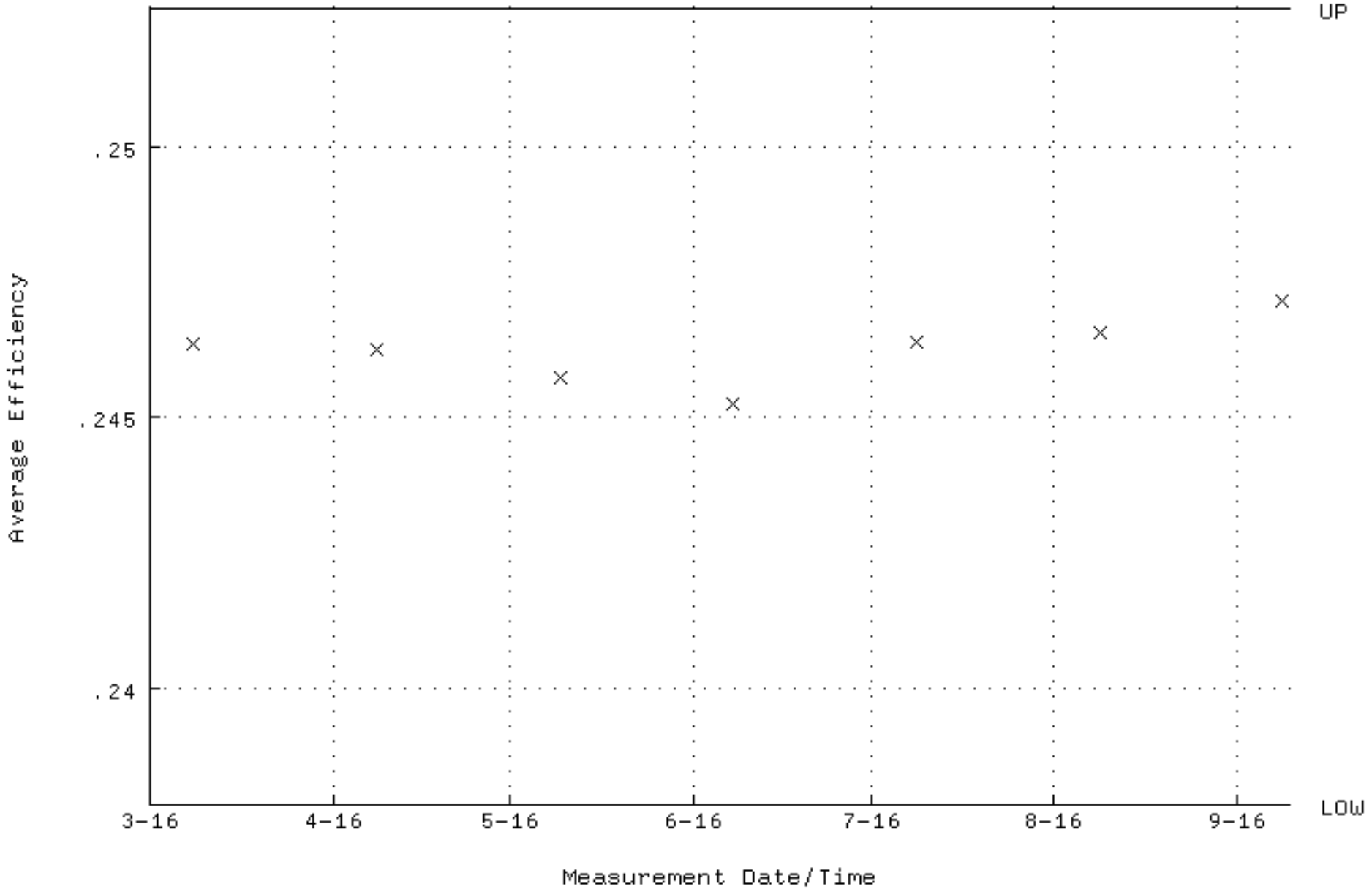
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-MAR-2016 09:54:03 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



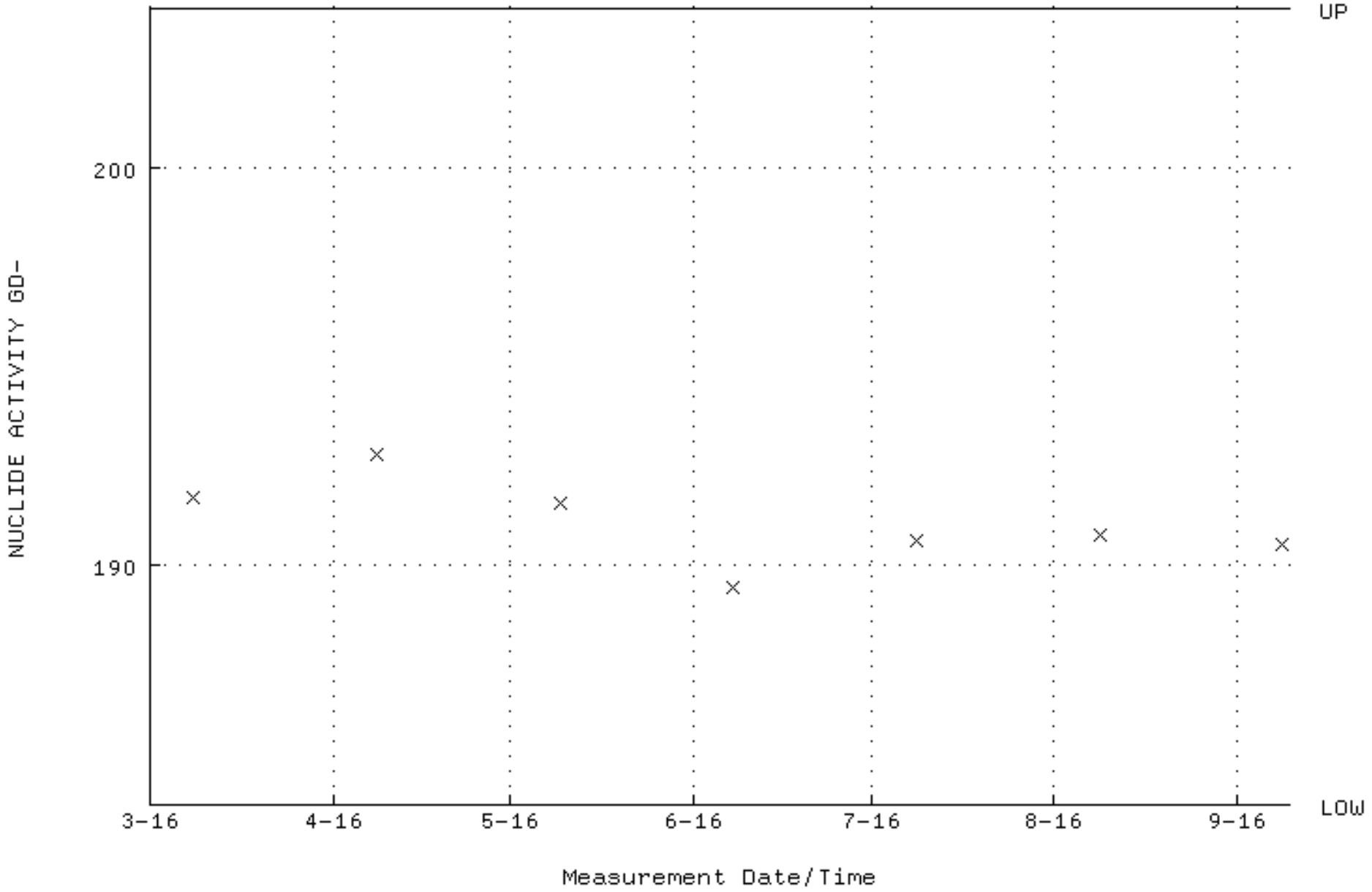
QA filename : DKA100:[ENV_ALPHA.QA.B]B110.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:51:41 through 7-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



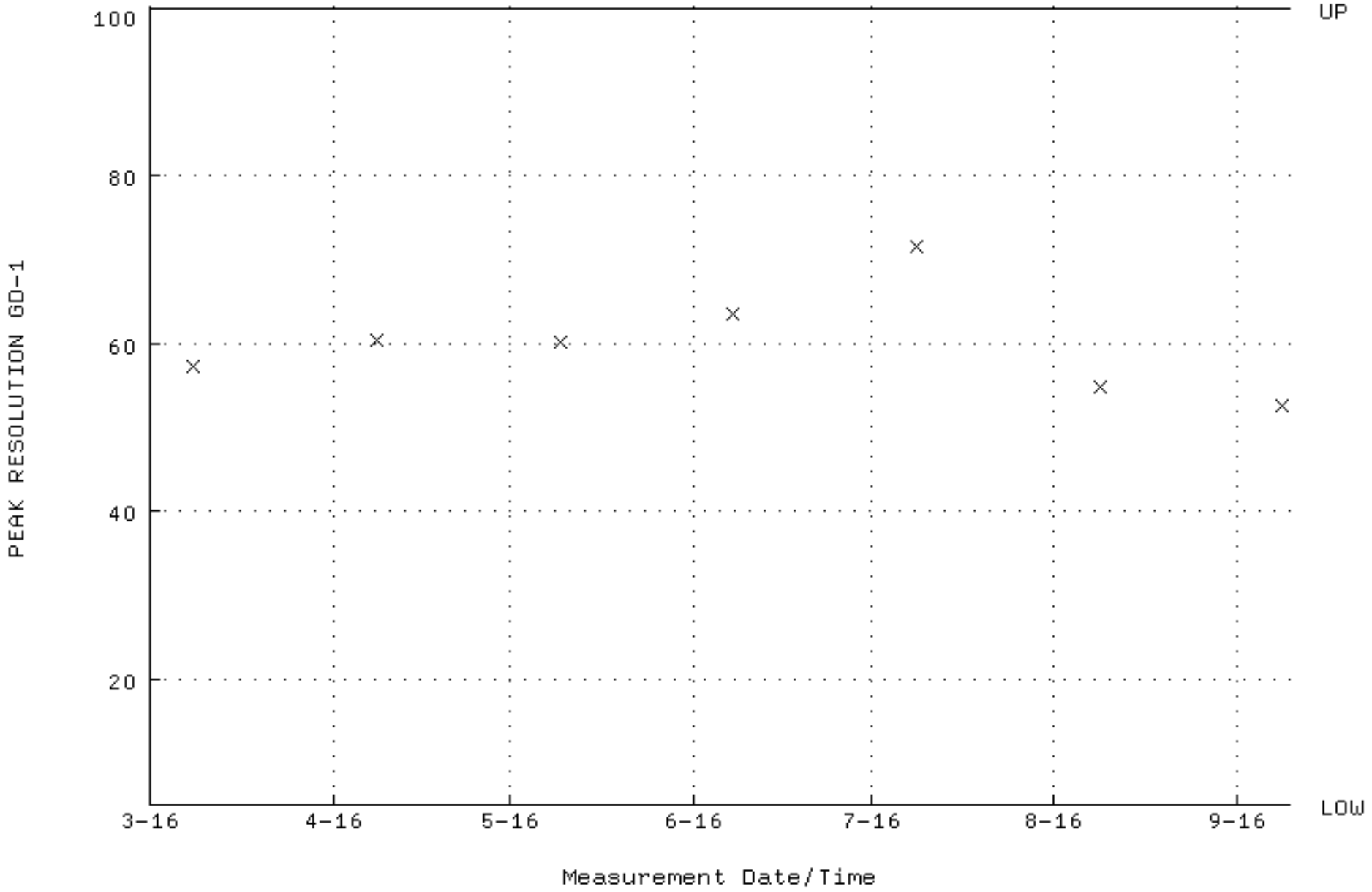
QA filename : DKA100:[ENV_ALPHA.QA.W]W113.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:15 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.237837 through 0.252549



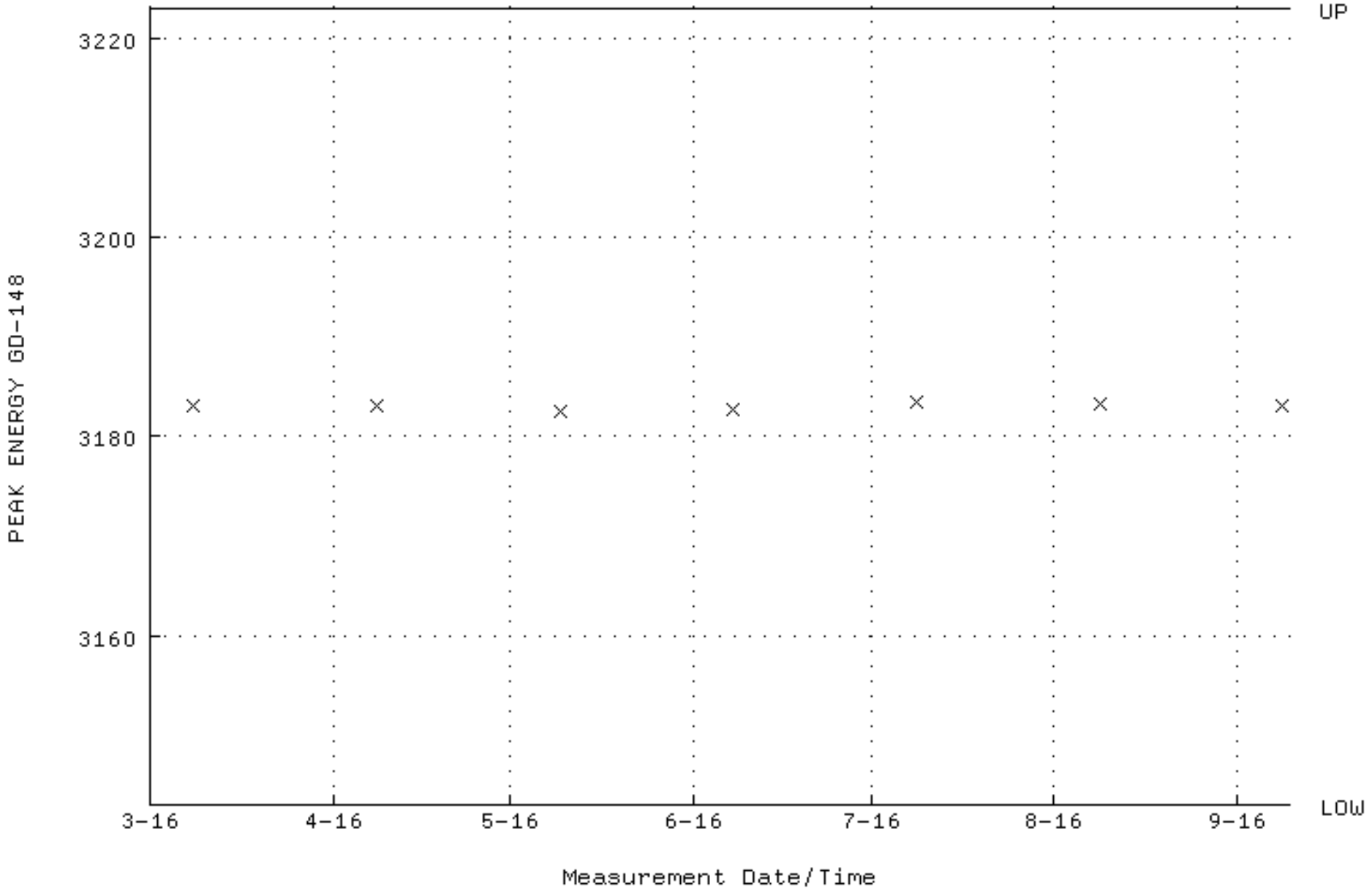
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:15 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



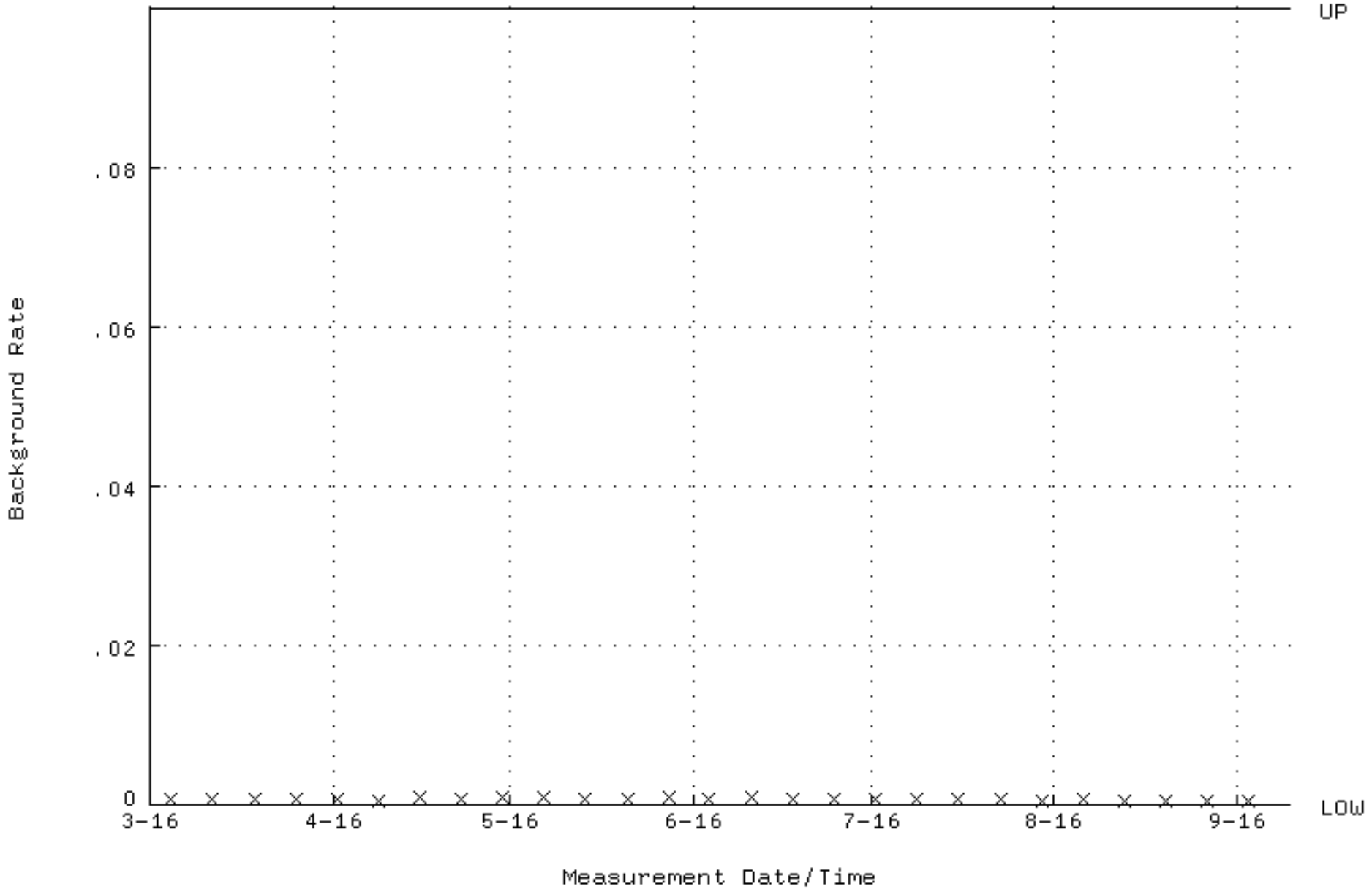
QA filename : DKA100:[ENV_ALPHA.QA.W]W113.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:15 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



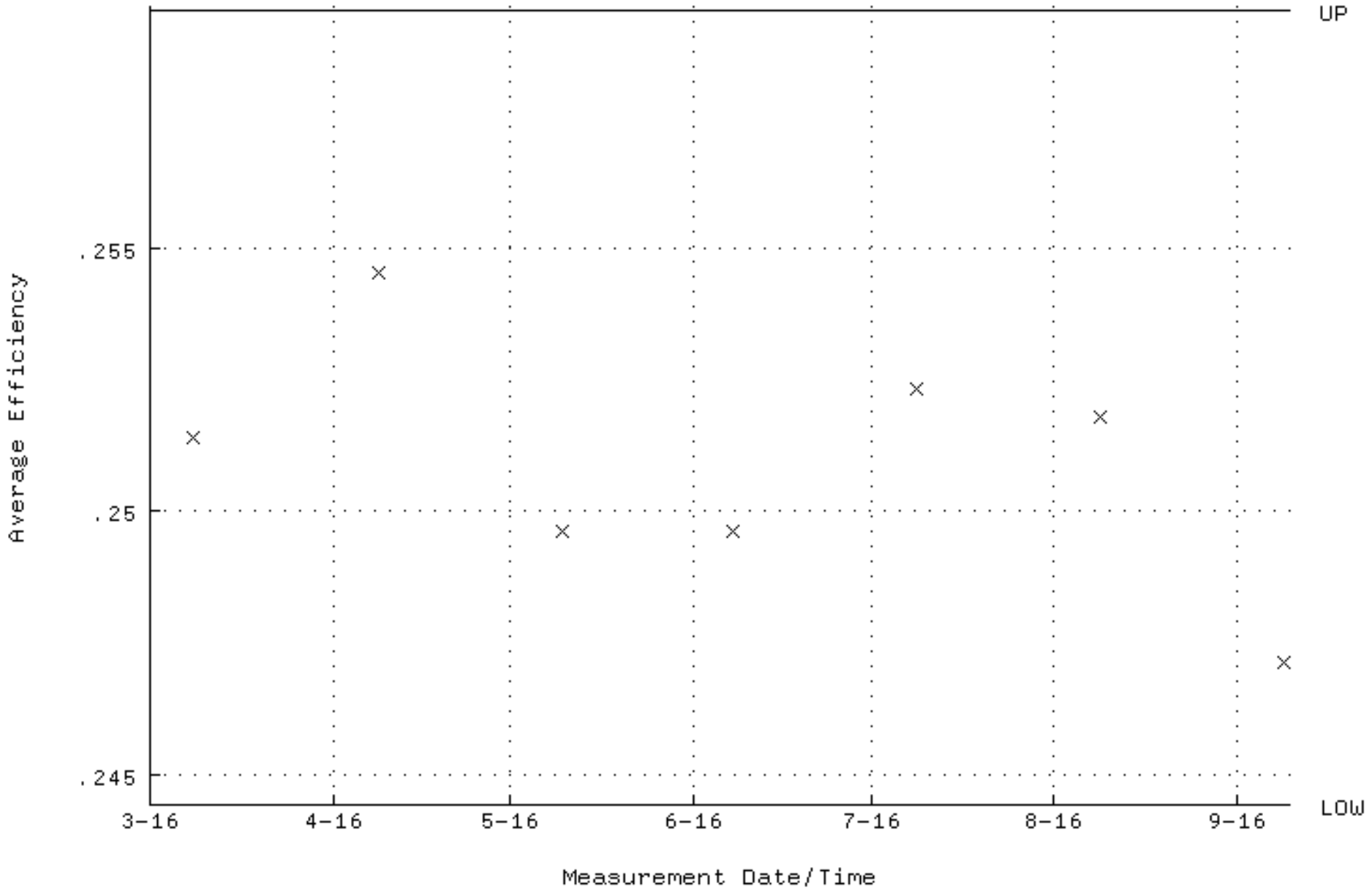
QA filename : DKA100:[ENV_ALPHA.QA.W]W113.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:15 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



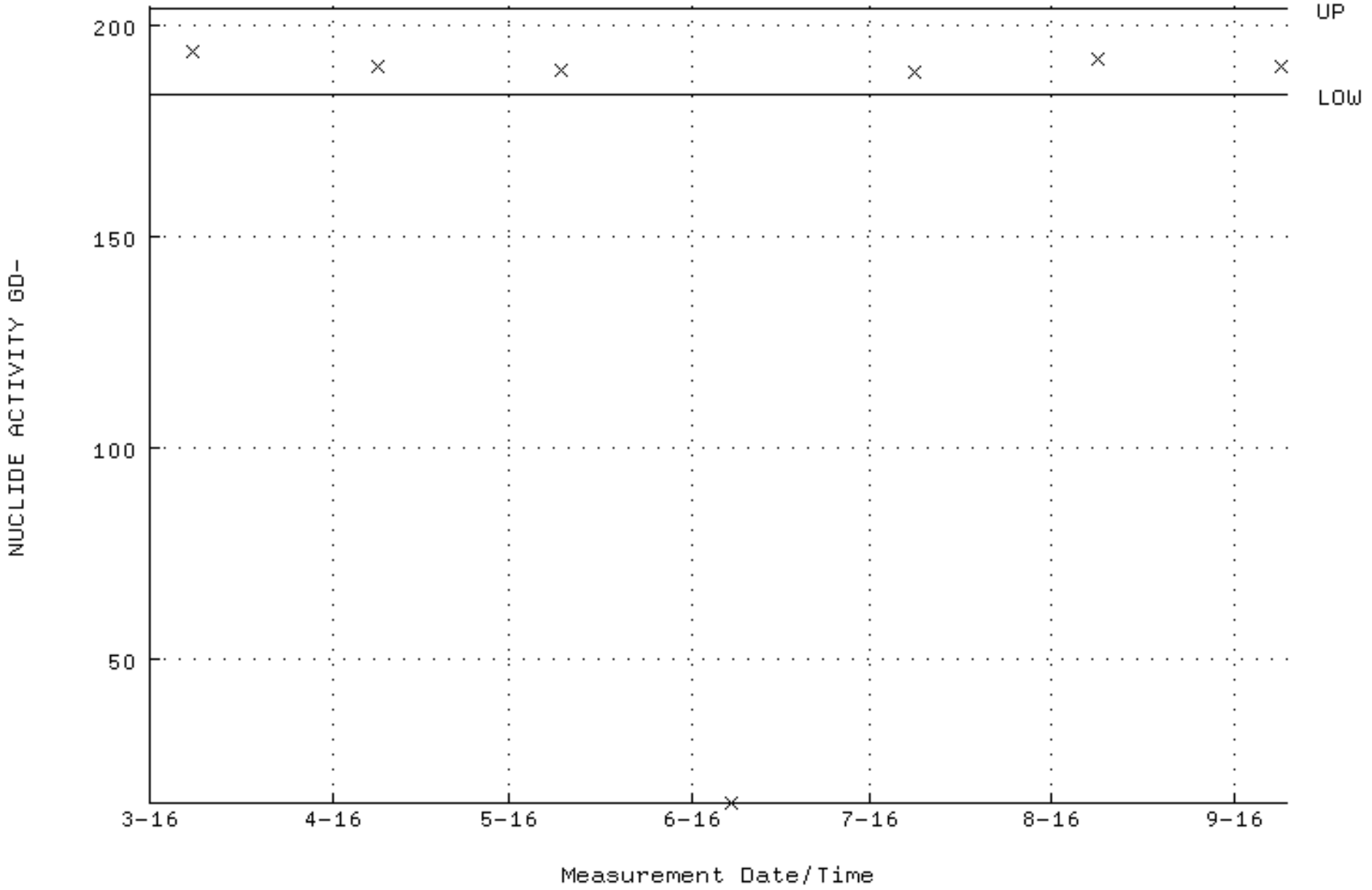
QA filename : DKA100:[ENV_ALPHA.QA.B]B113.QAF;3
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:30:40 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



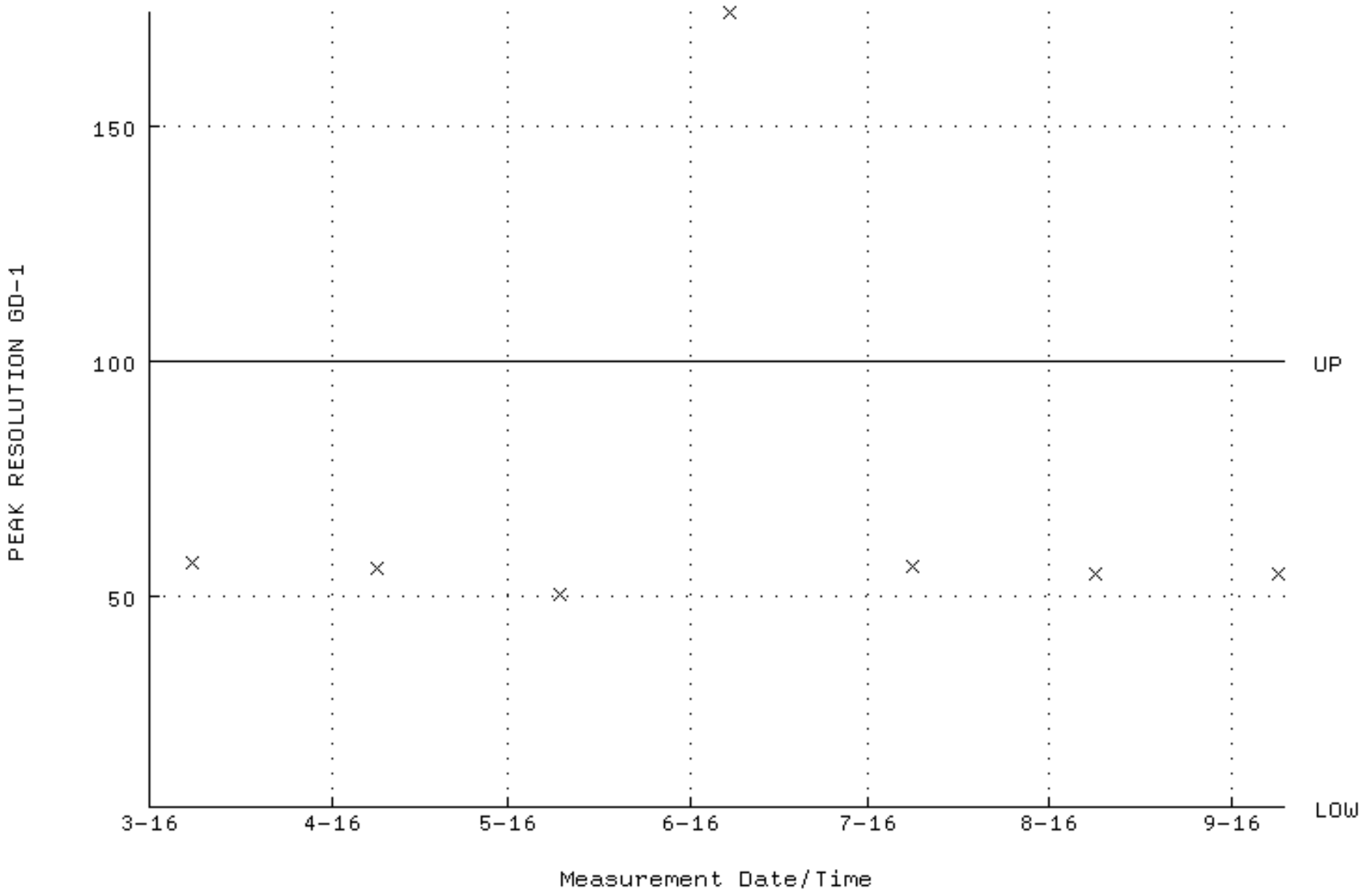
QA filename : DKA100:[ENV_ALPHA.QA.W]W114.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:20 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.244425 through 0.259545



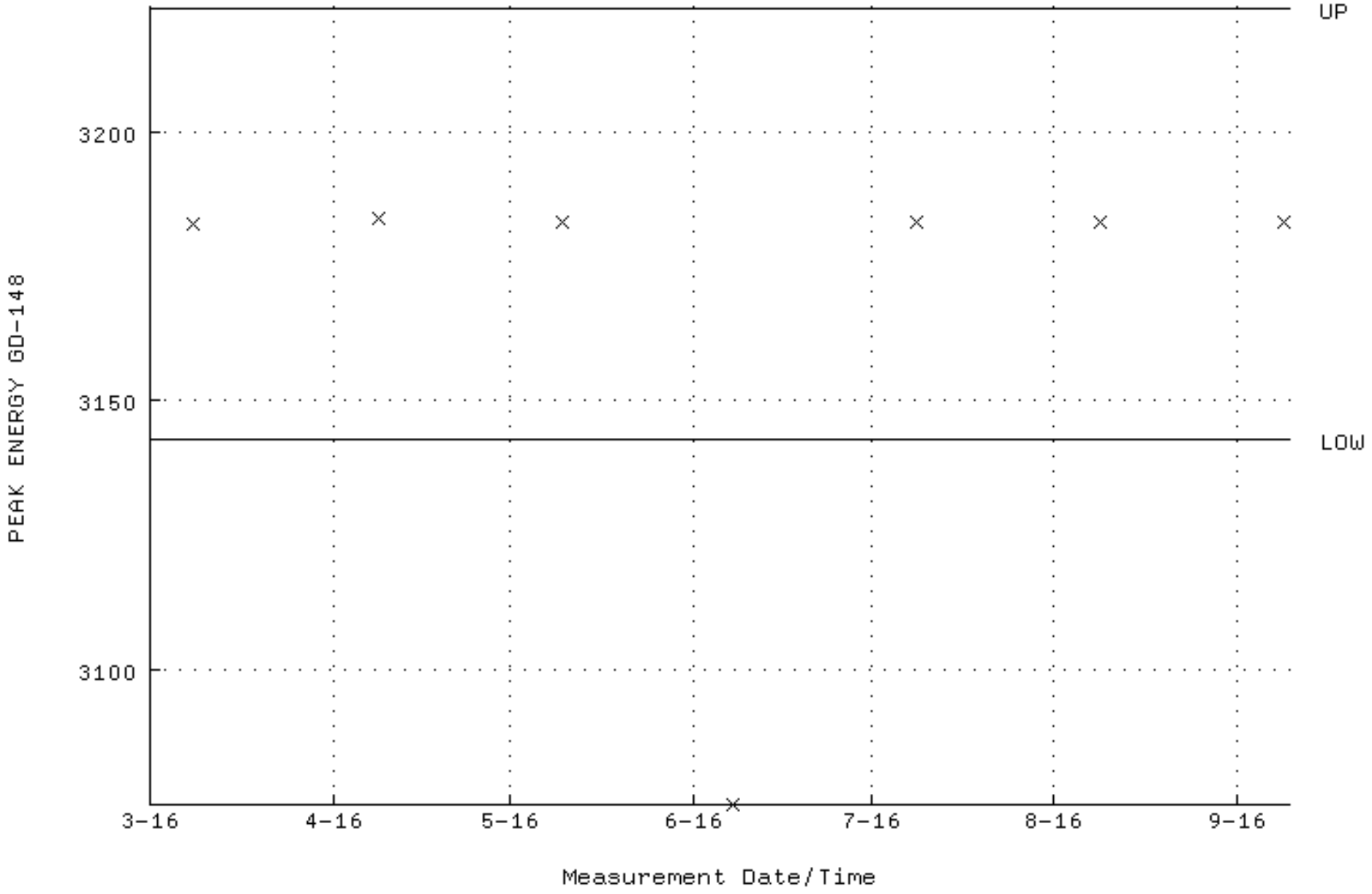
QA filename : DKA100:[ENV_ALPHA.QA.W]W114.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:20 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



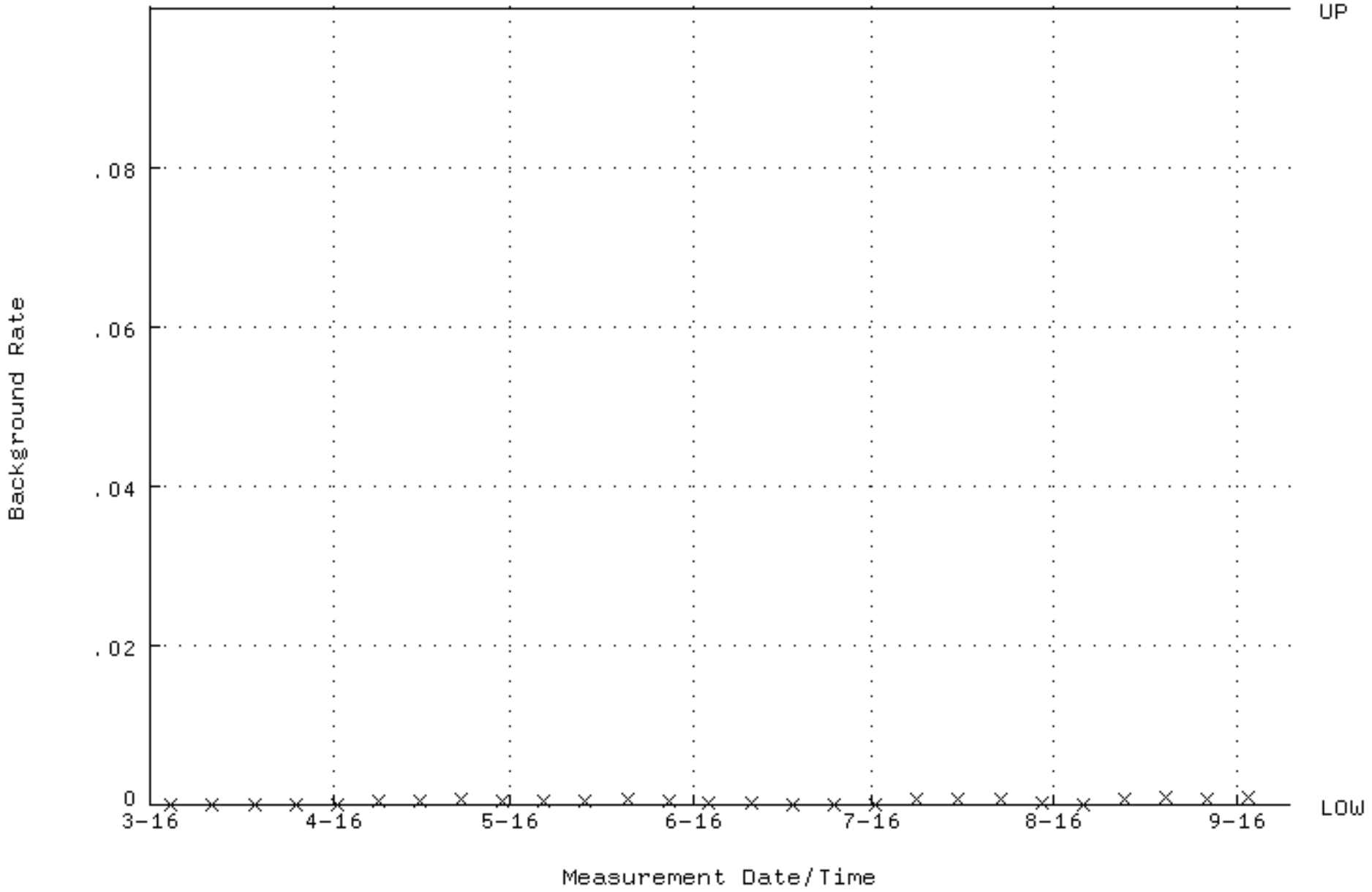
QA filename : DKA100:[ENV_ALPHA.QA.W]W114.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:20 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



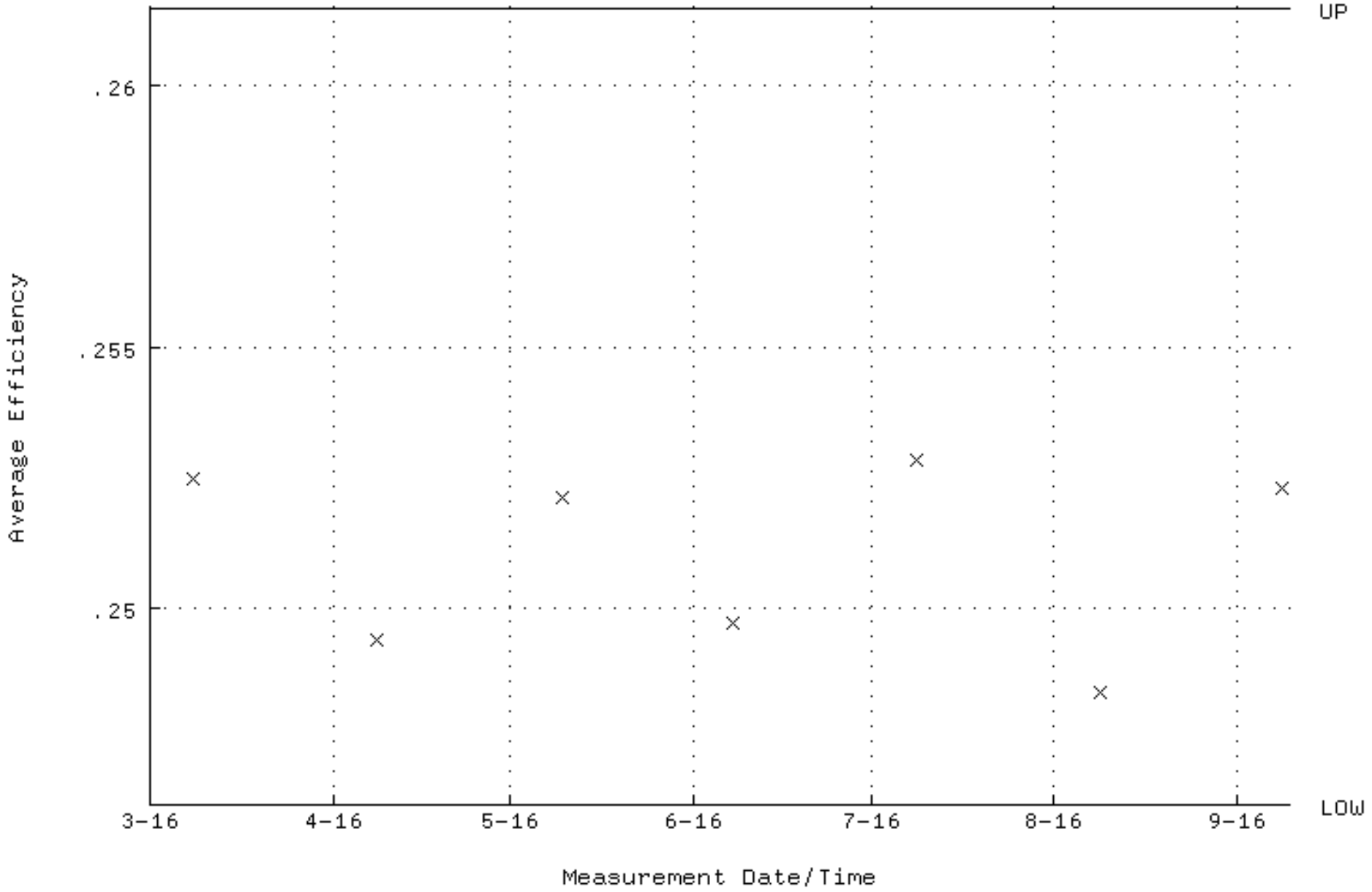
QA filename : DKA100:[ENV_ALPHA.QA.W]W114.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:20 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



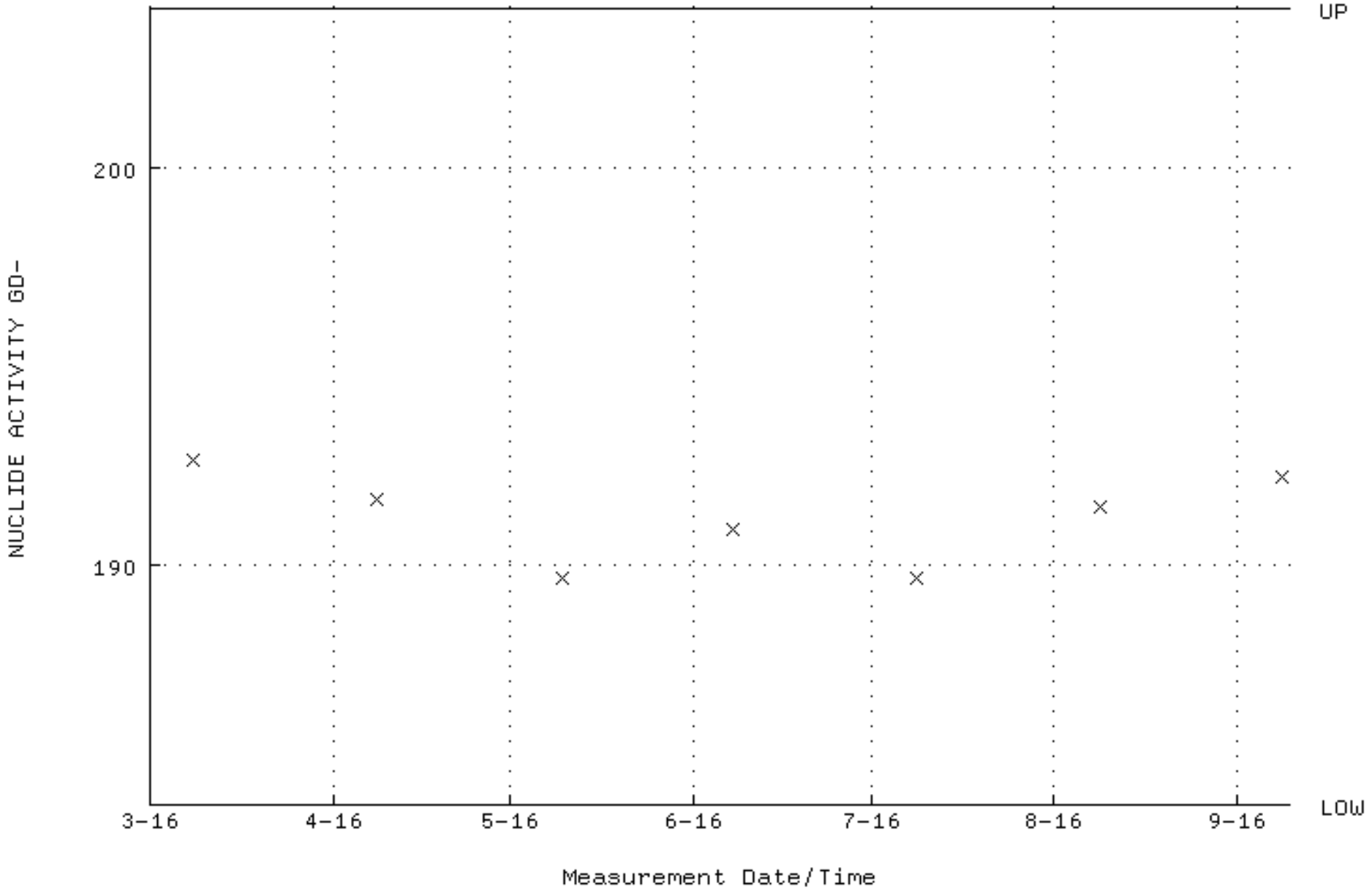
QA filename : DKA100:[ENV_ALPHA.QA.B]B114.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:30:44 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



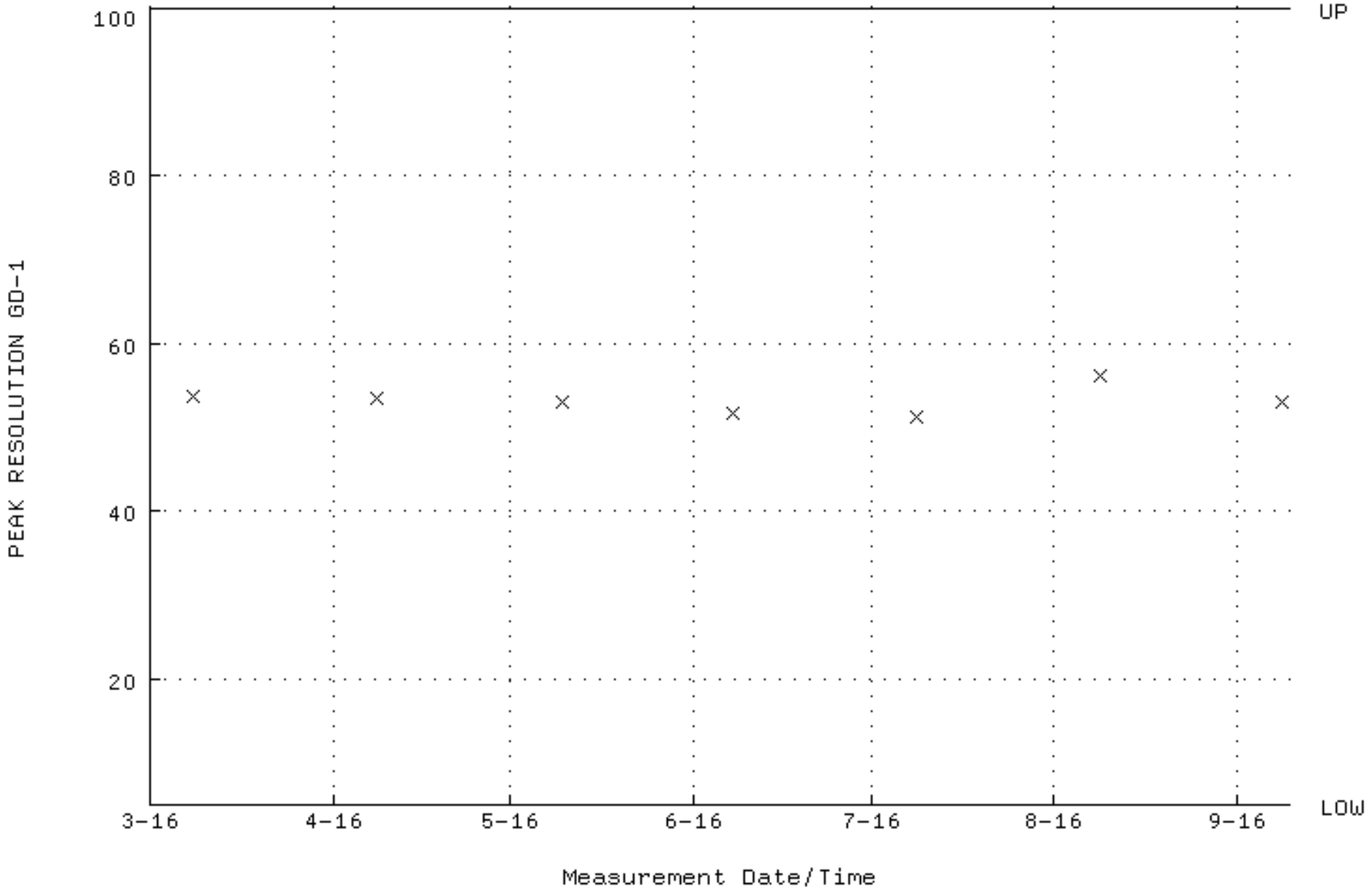
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Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.246238 through 0.261470



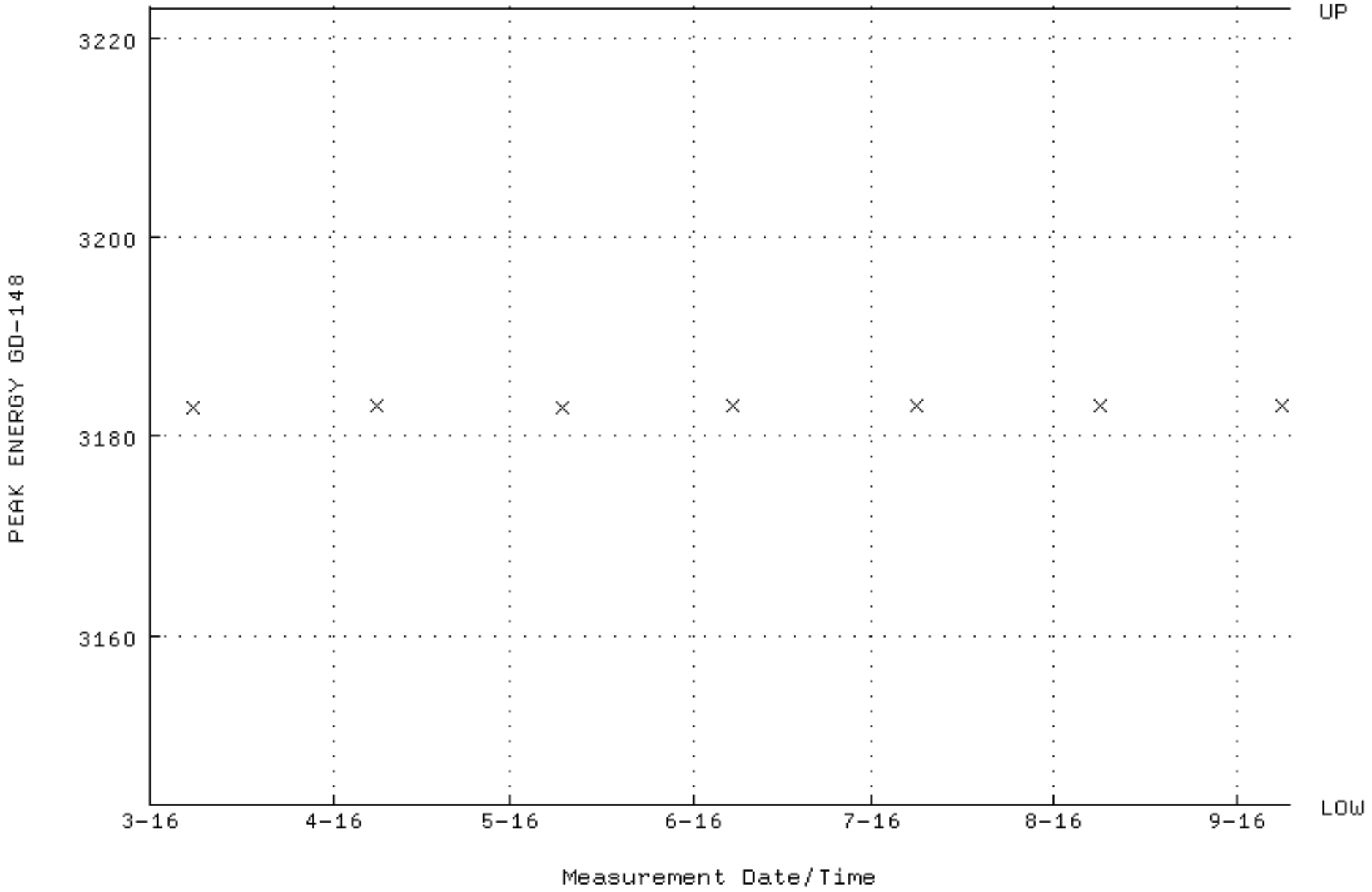
QA filename : DKA100:[ENV_ALPHA.QA.W]W115.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



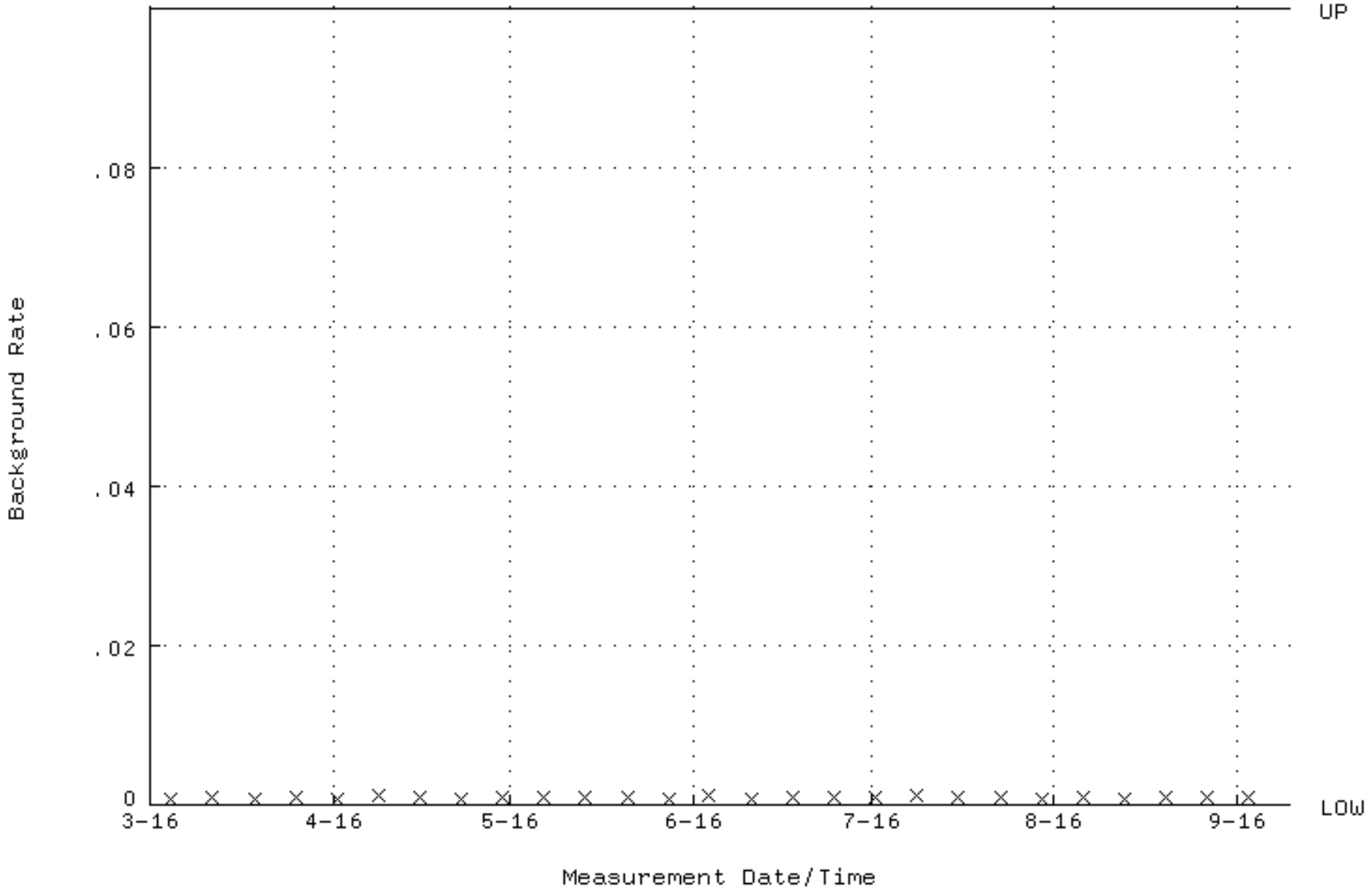
QA filename : DKA100:[ENV_ALPHA.QA.W]W115.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



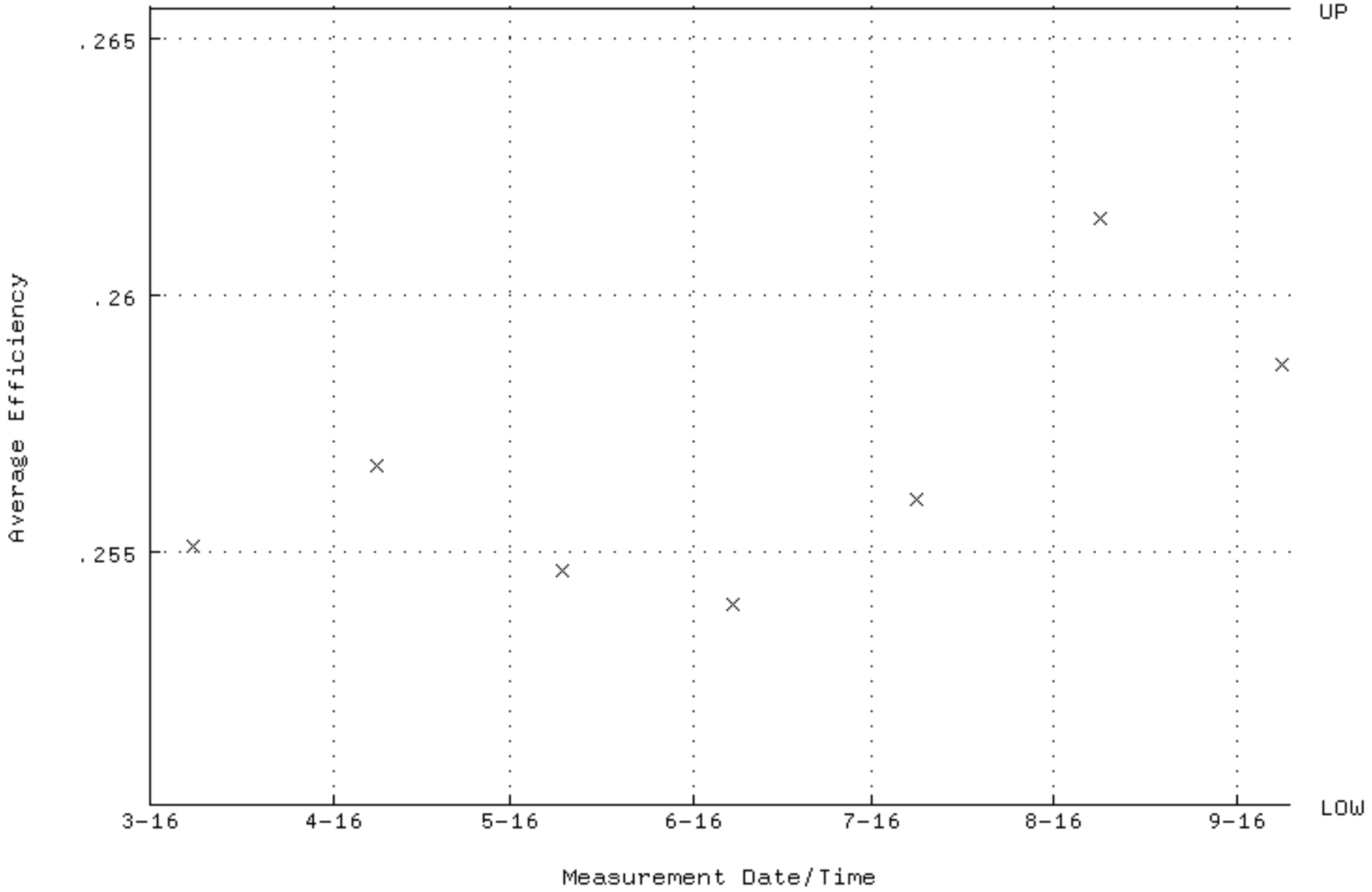
QA filename : DKA100:[ENV_ALPHA.QA.W]W115.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



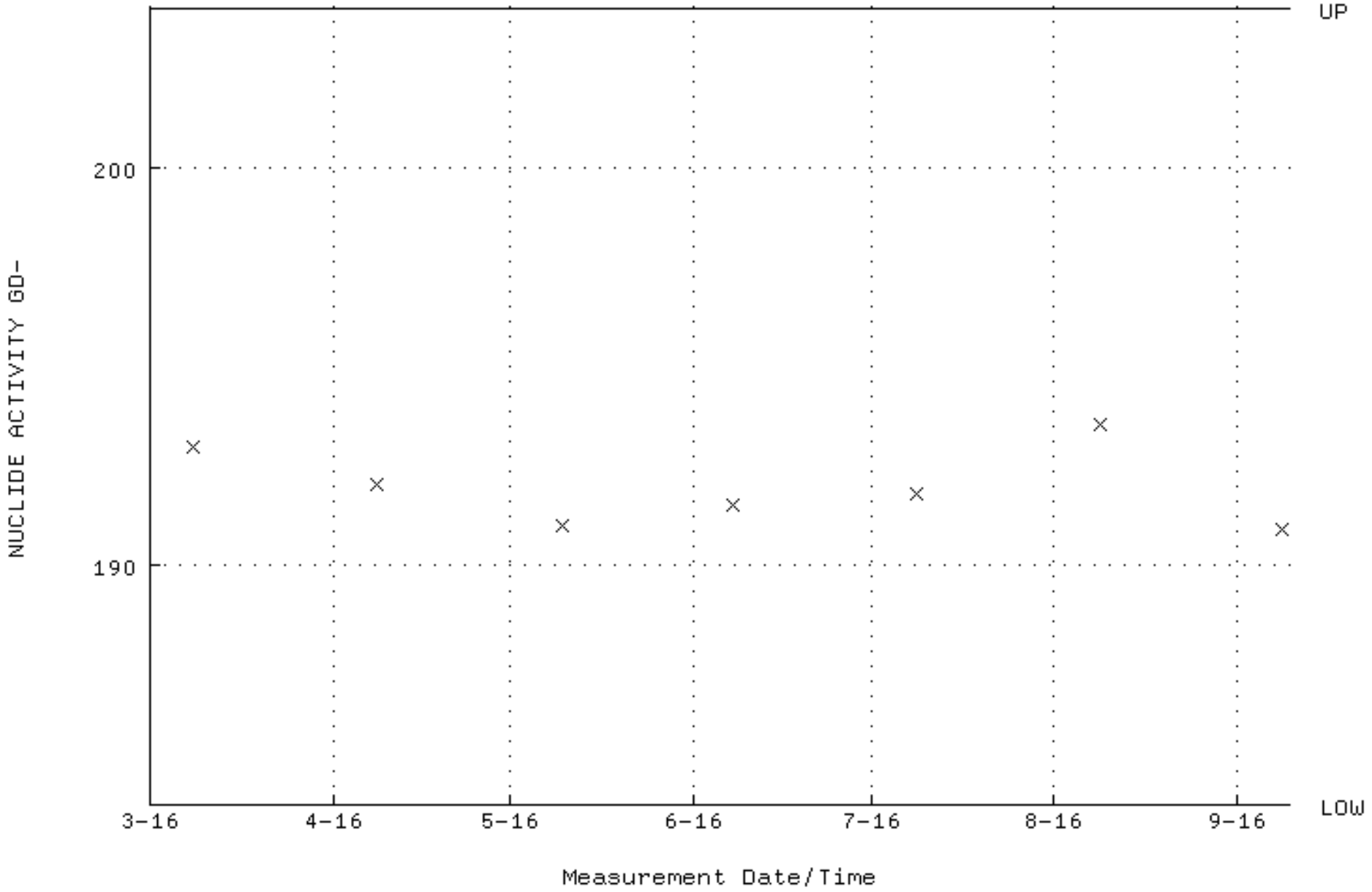
QA filename : DKA100:[ENV_ALPHA.QA.B]B115.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:30:48 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



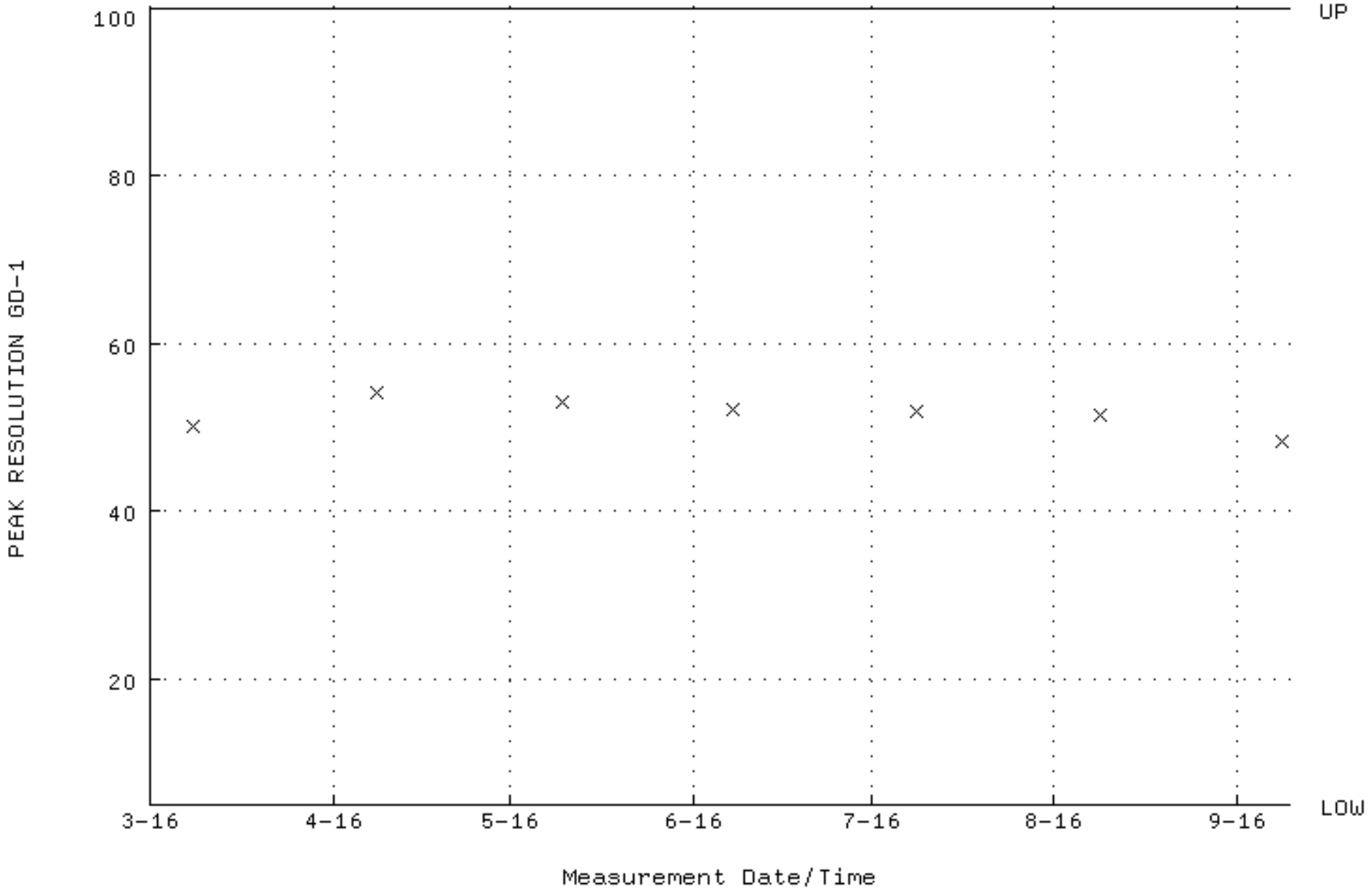
QA filename : DKA100:[ENV_ALPHA.QA.W]W116.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:27 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.250100 through 0.265570



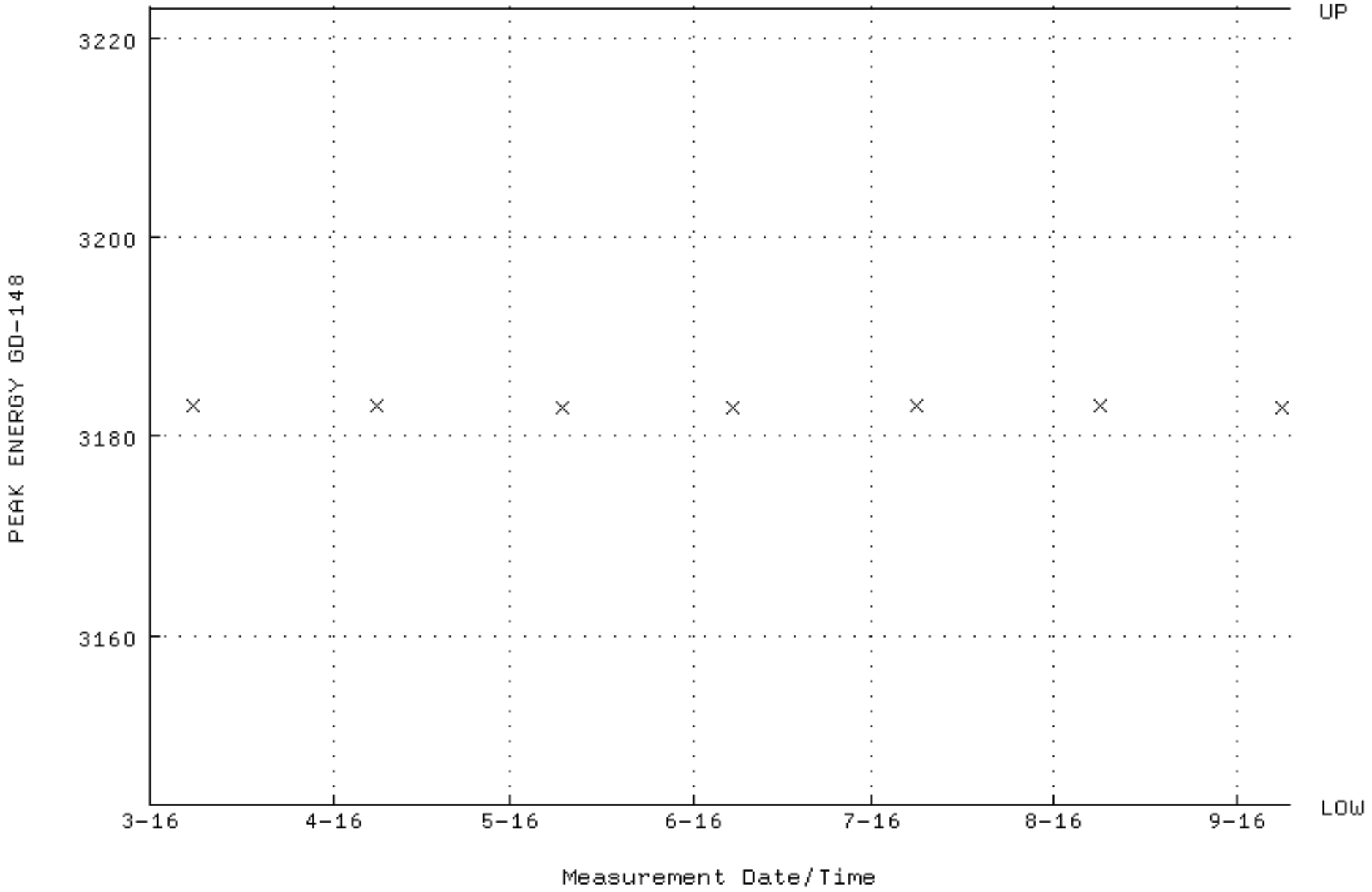
QA filename : DKA100:[ENV_ALPHA.QA.W]W116.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:27 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



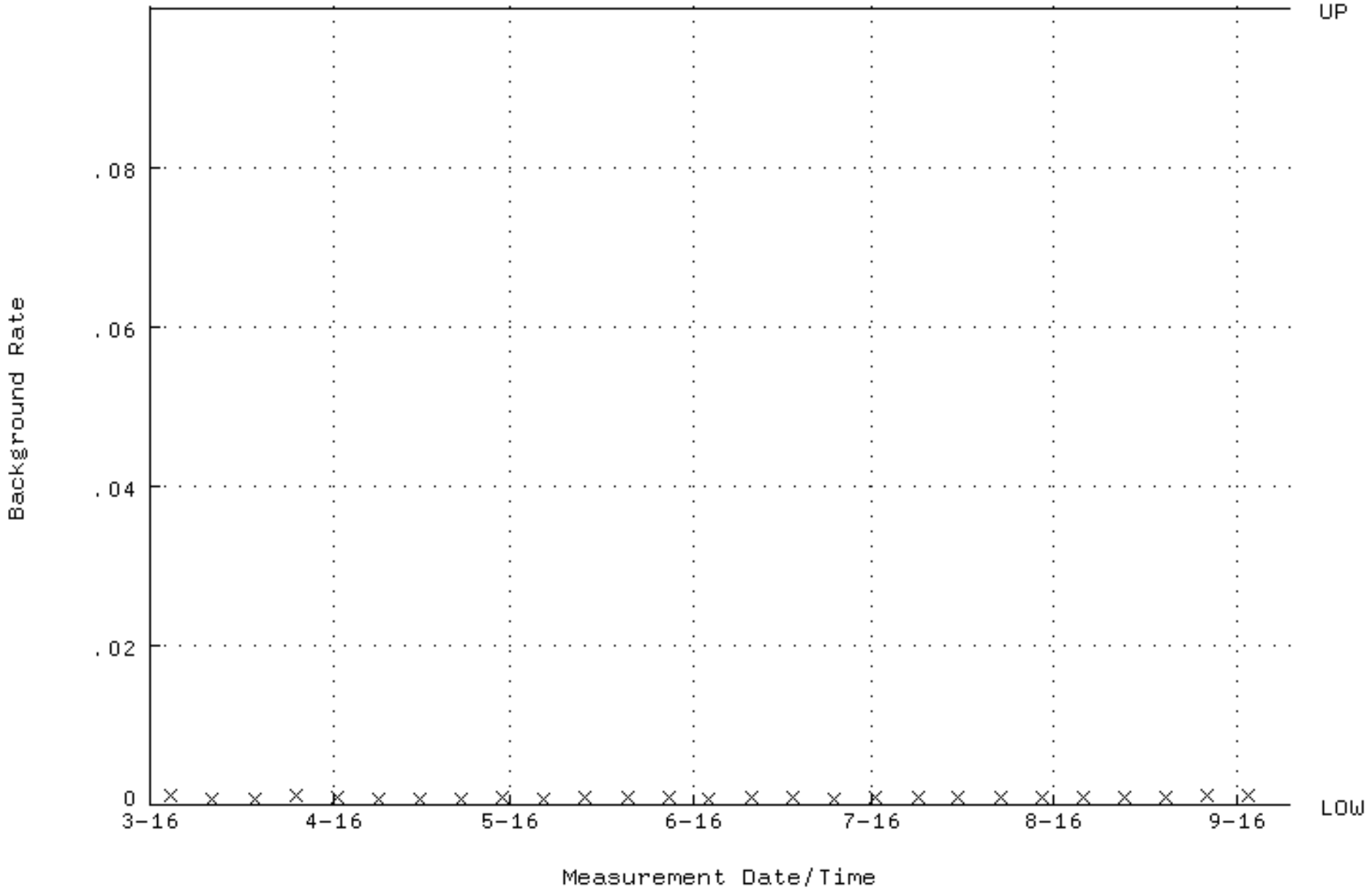
QA filename : DKA100:[ENV_ALPHA.QA.W]W116.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:27 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



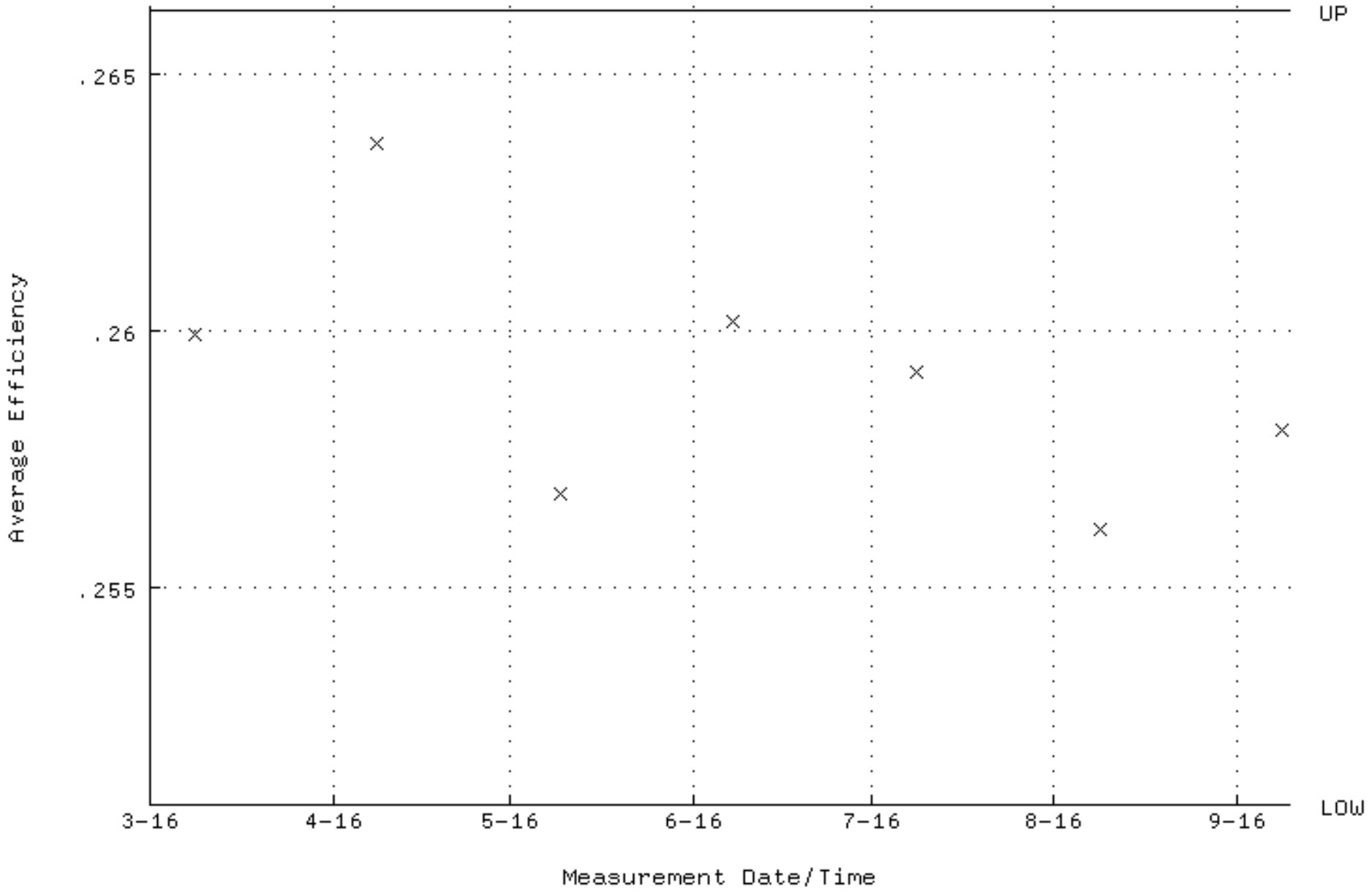
QA filename : DKA100:[ENV_ALPHA.QA.W]W116.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:27 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



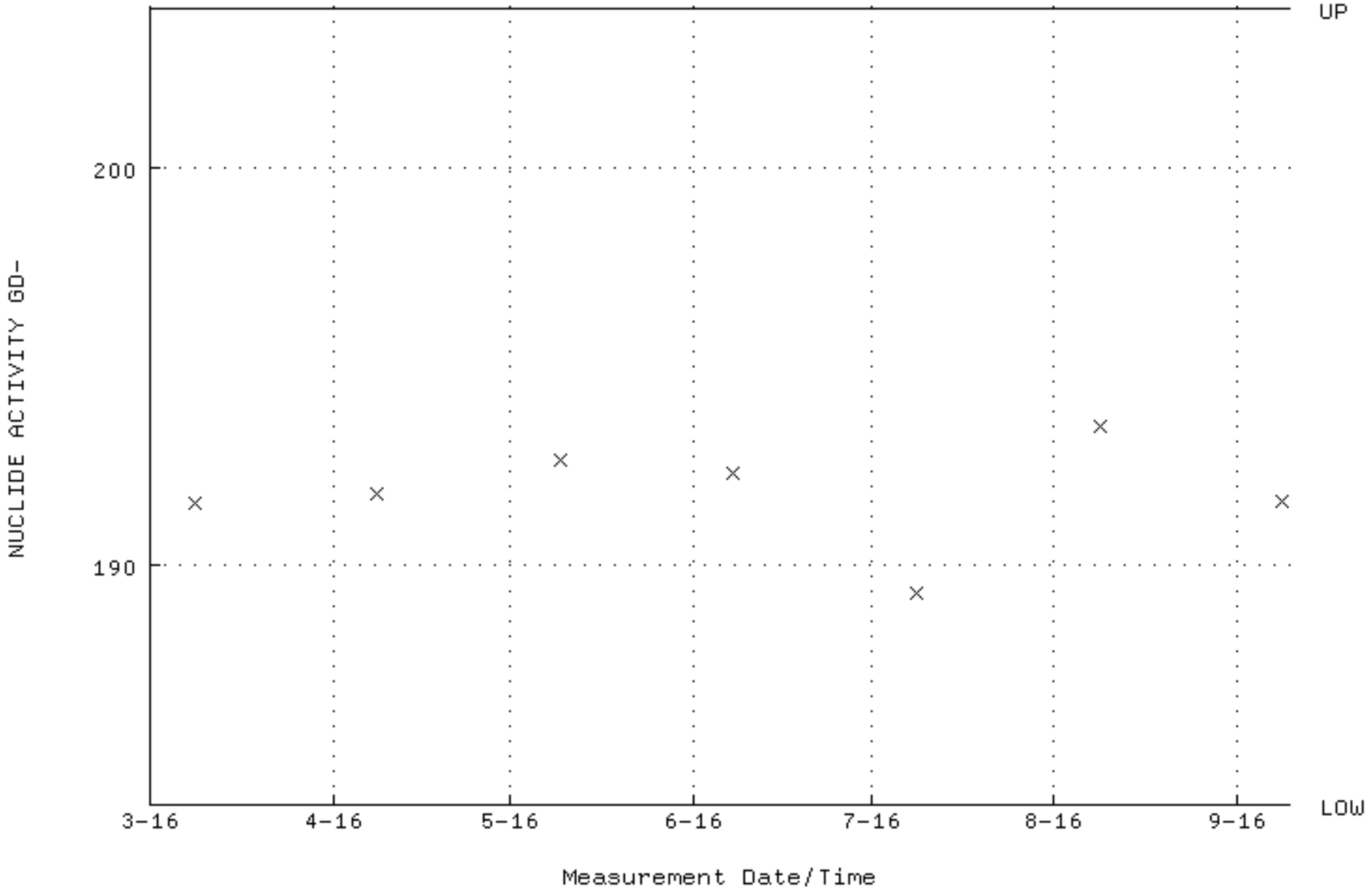
QA filename : DKA100:[ENV_ALPHA.QA.B]B116.QAF;4
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:30:52 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



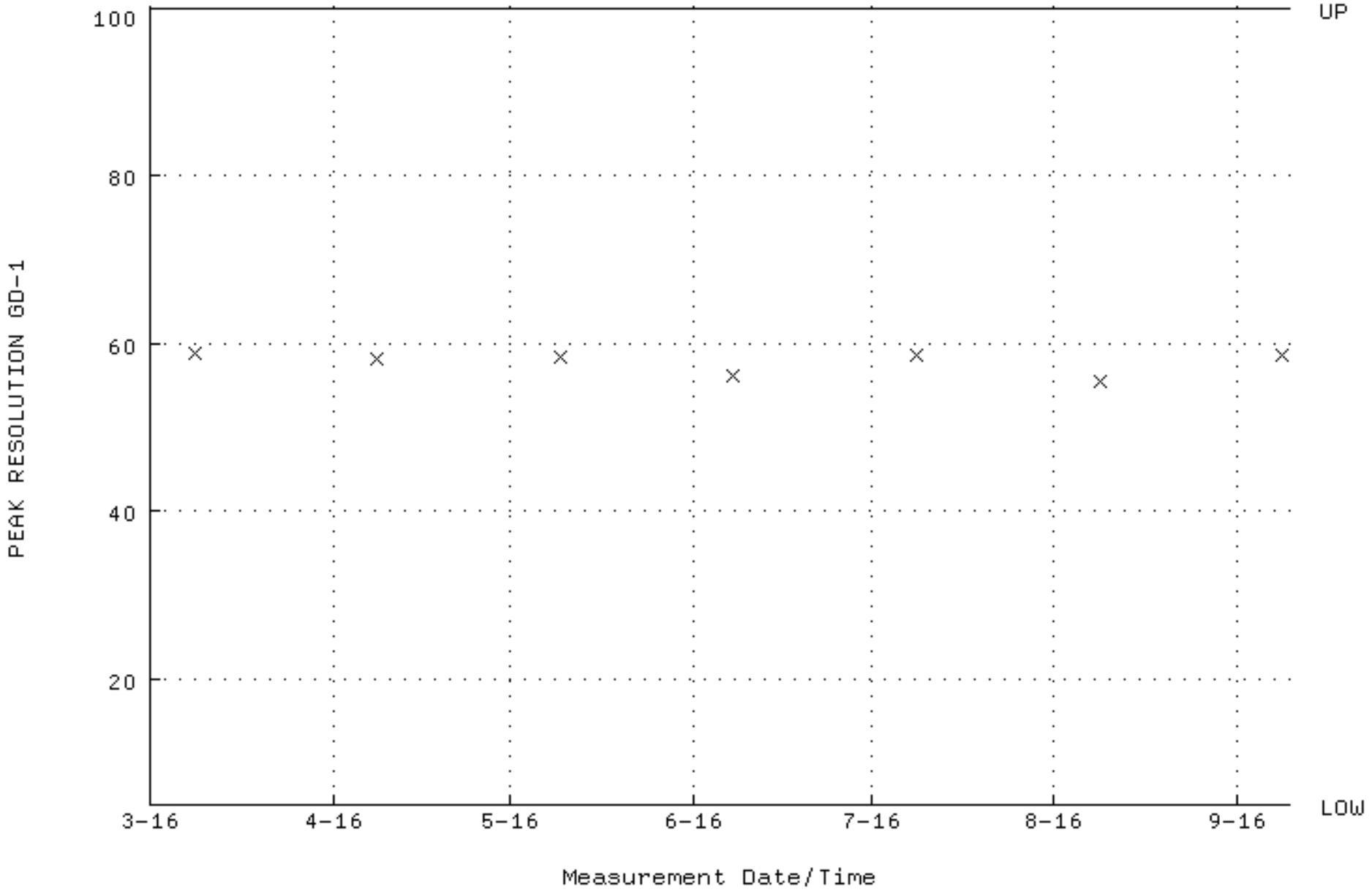
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 11:51:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.250782 through 0.266290



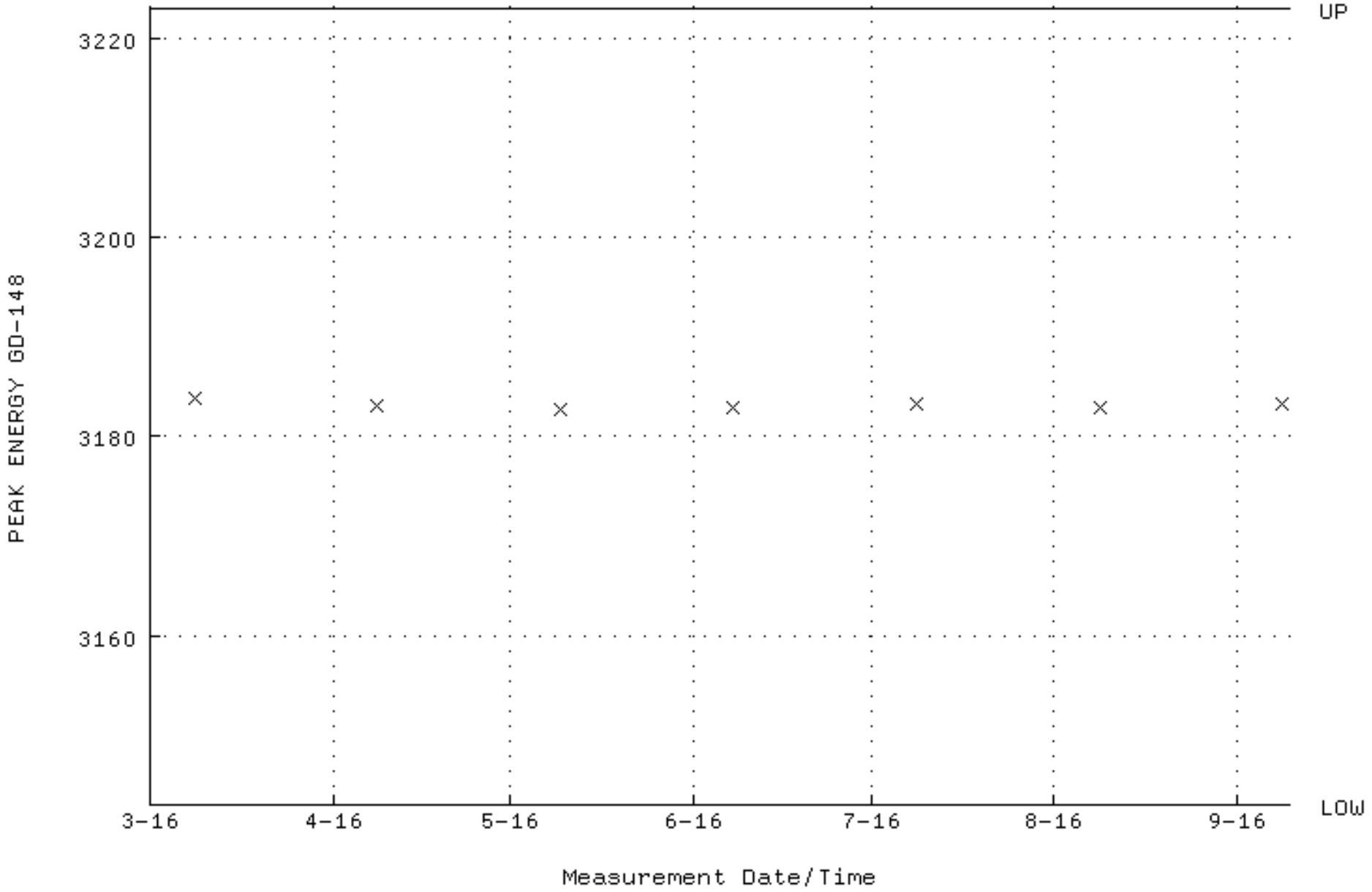
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 11:51:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



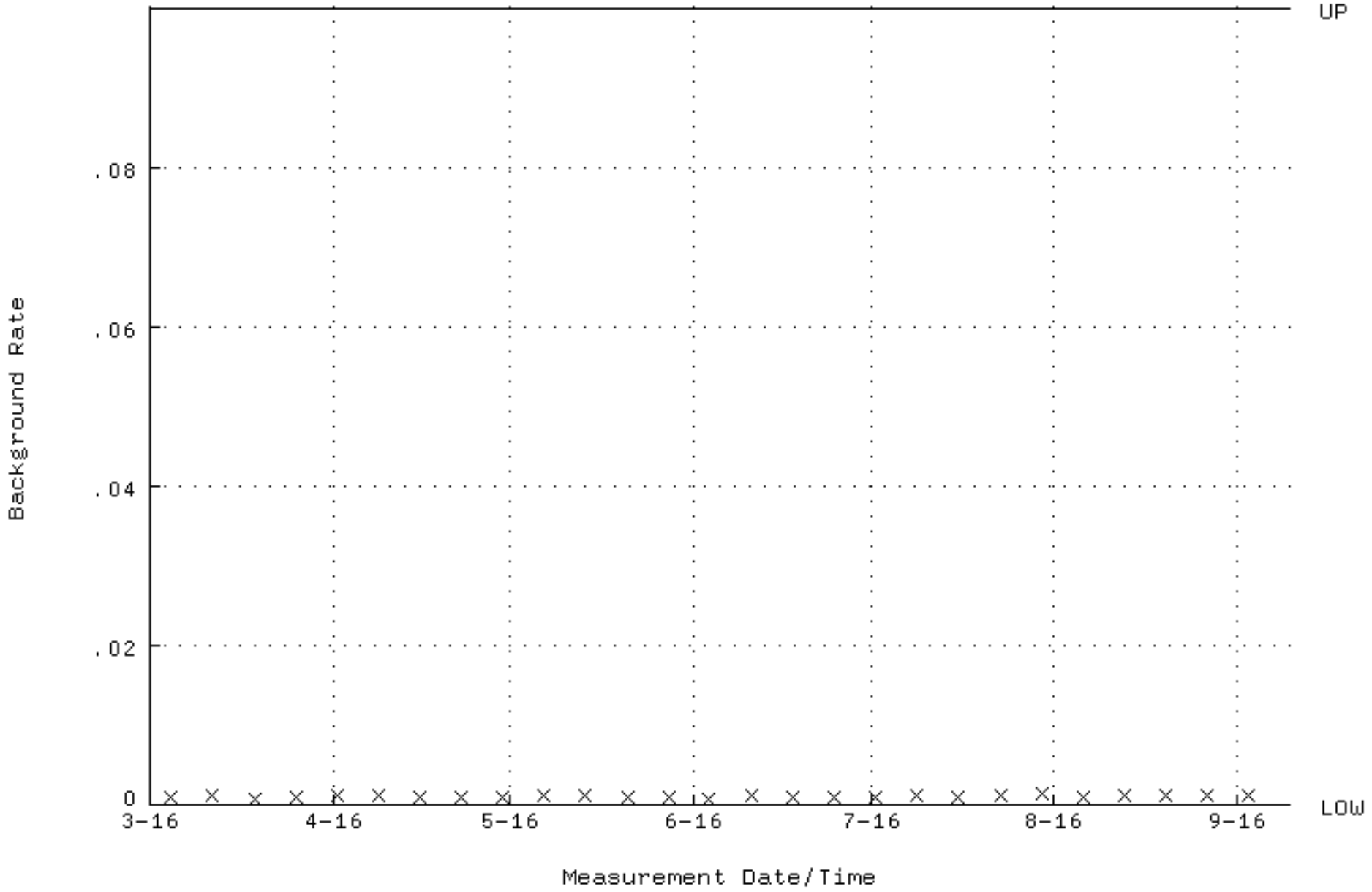
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 11:51:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



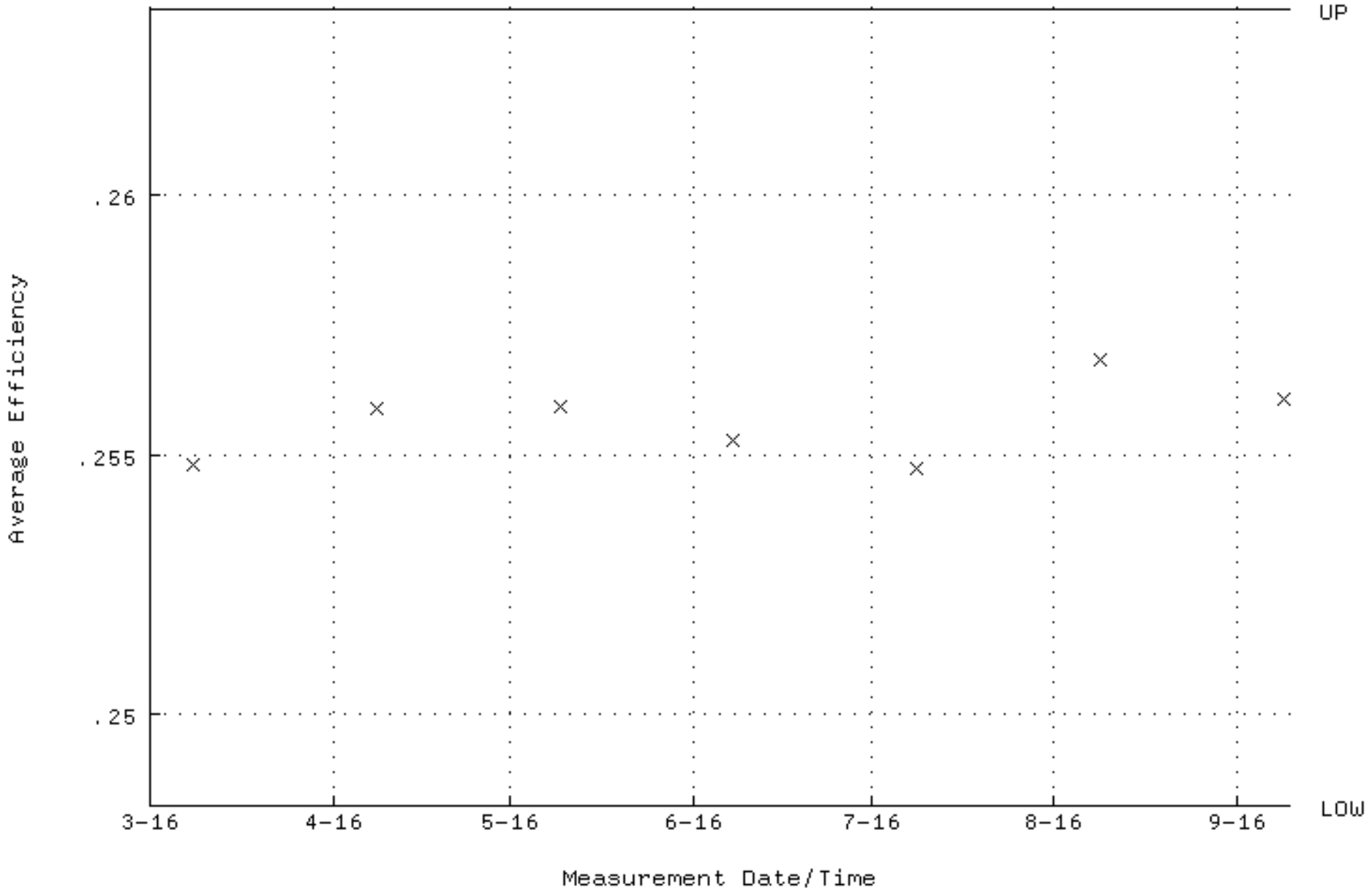
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 11:51:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



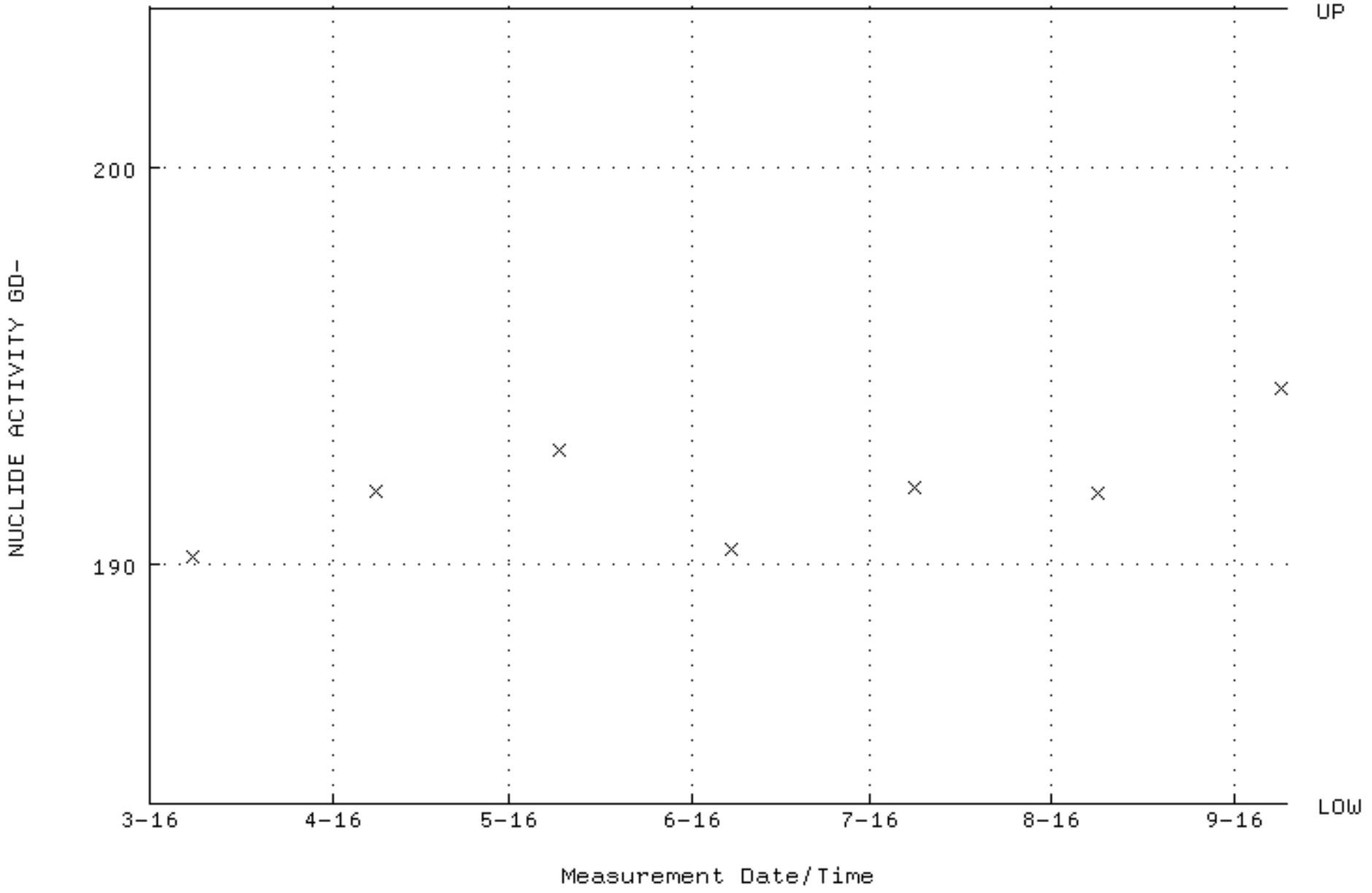
QA filename : DKA100:[ENV_ALPHA.QA.B]B117.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:30:56 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



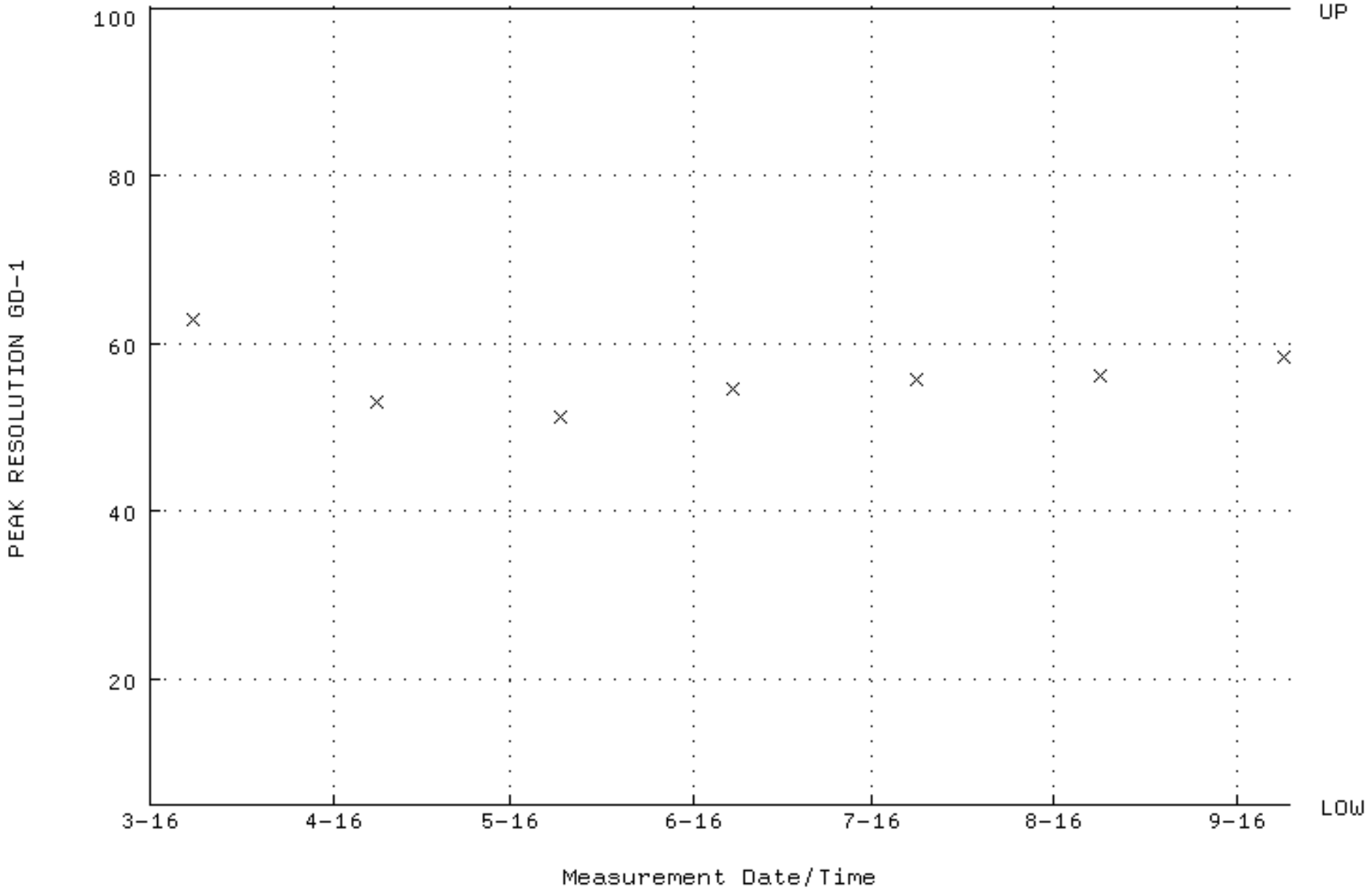
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;9
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:36 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.248236 through 0.263590



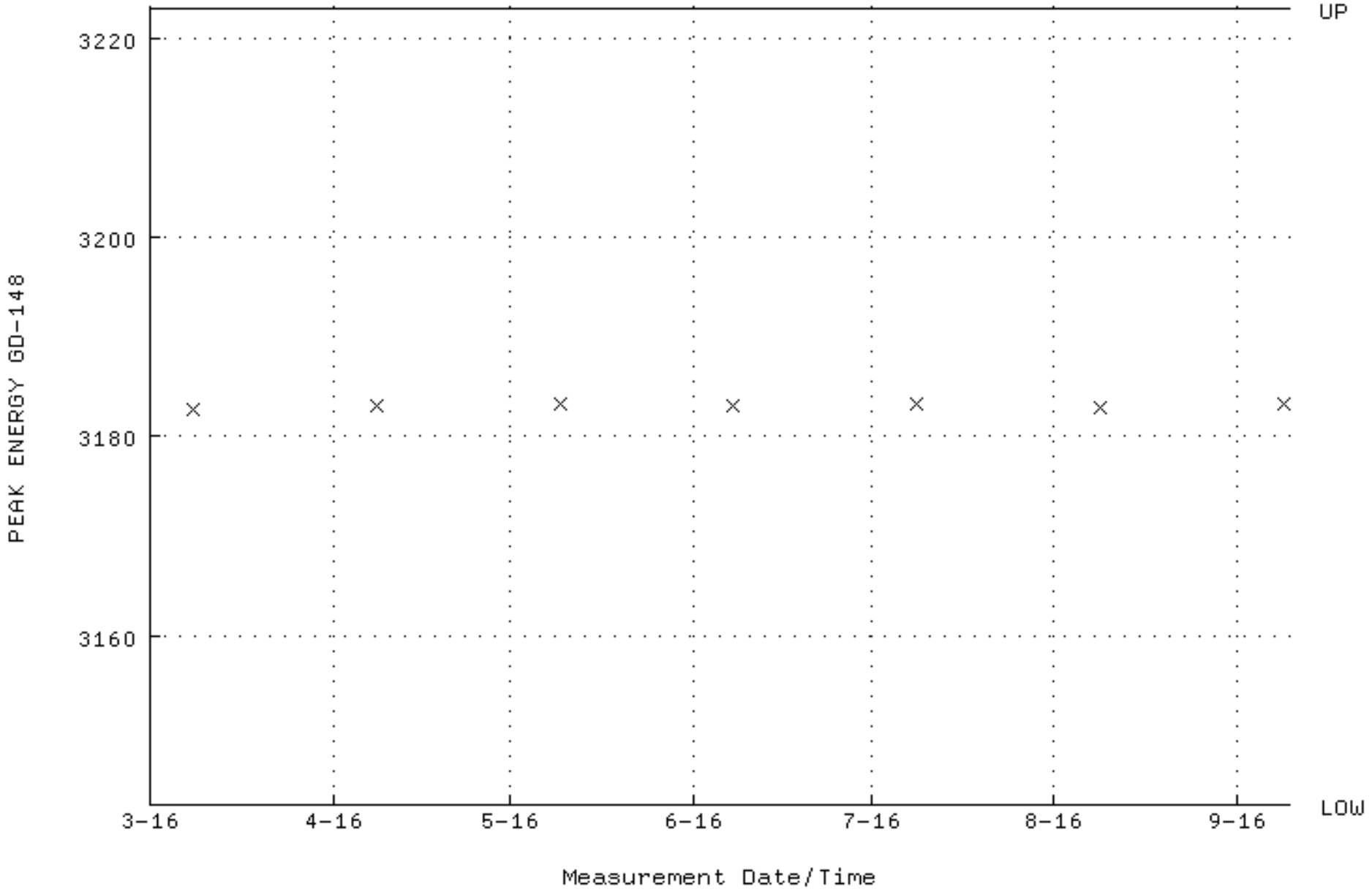
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;9
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:36 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



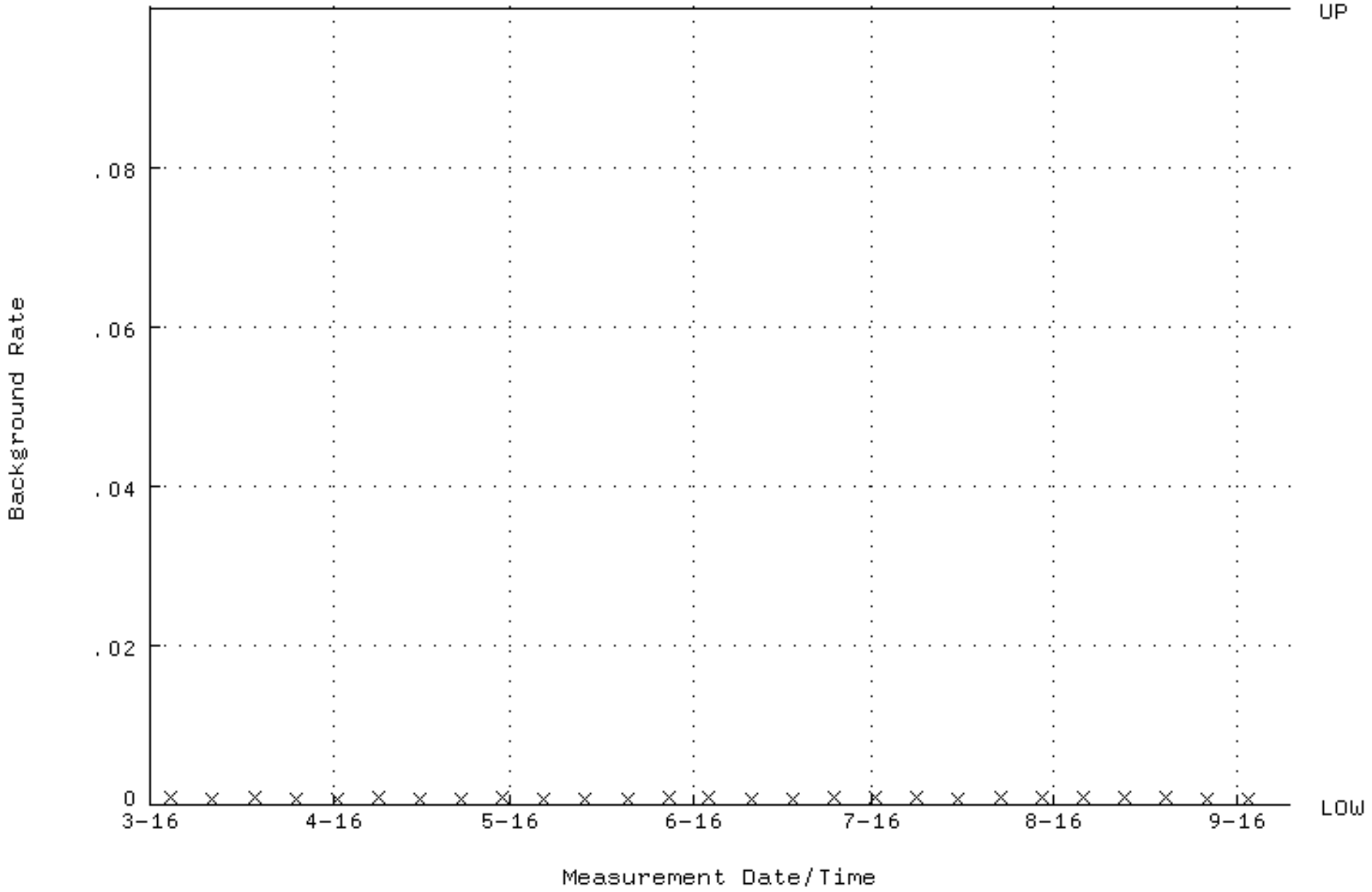
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;9
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:36 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



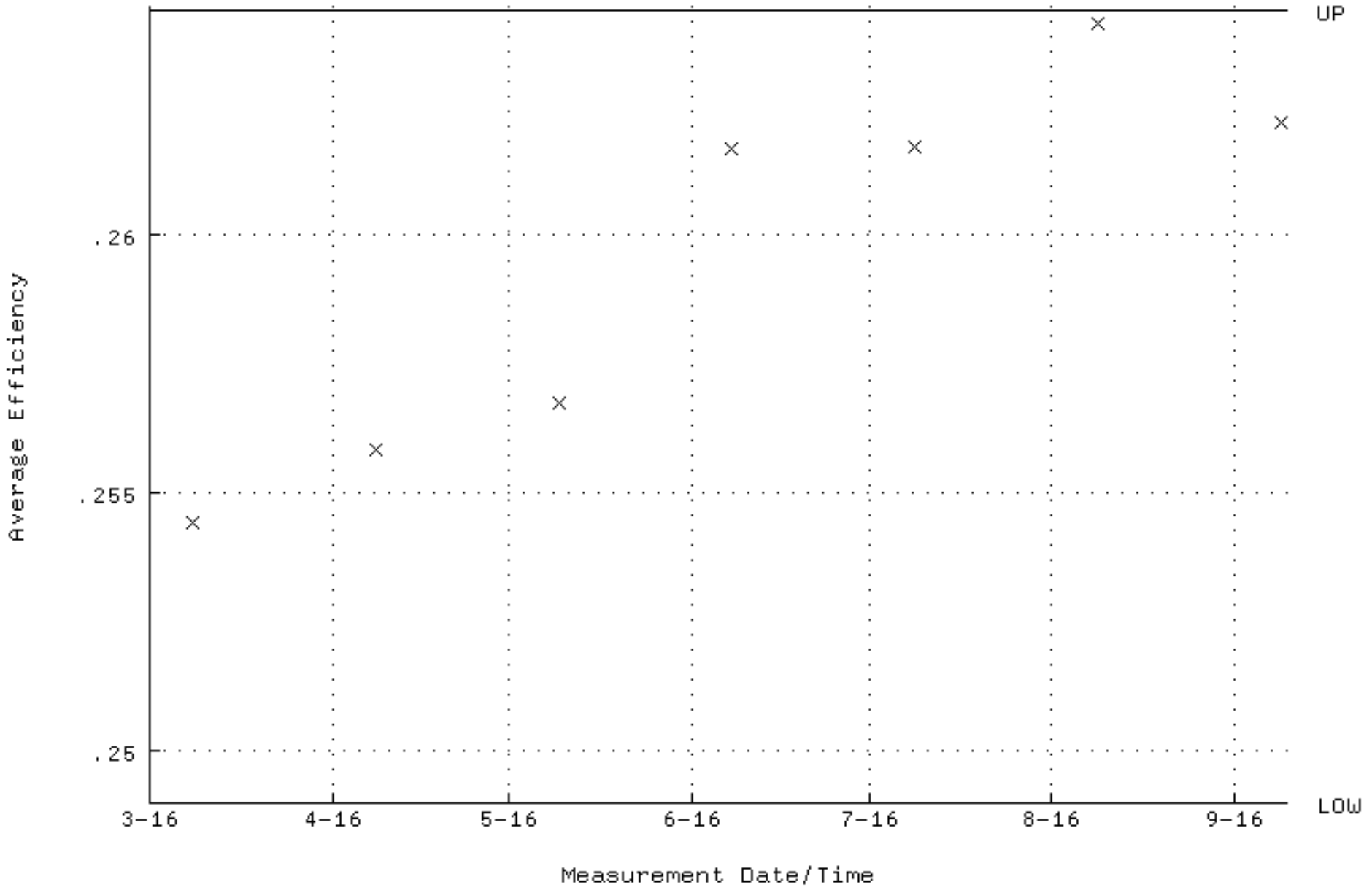
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;9
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:36 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



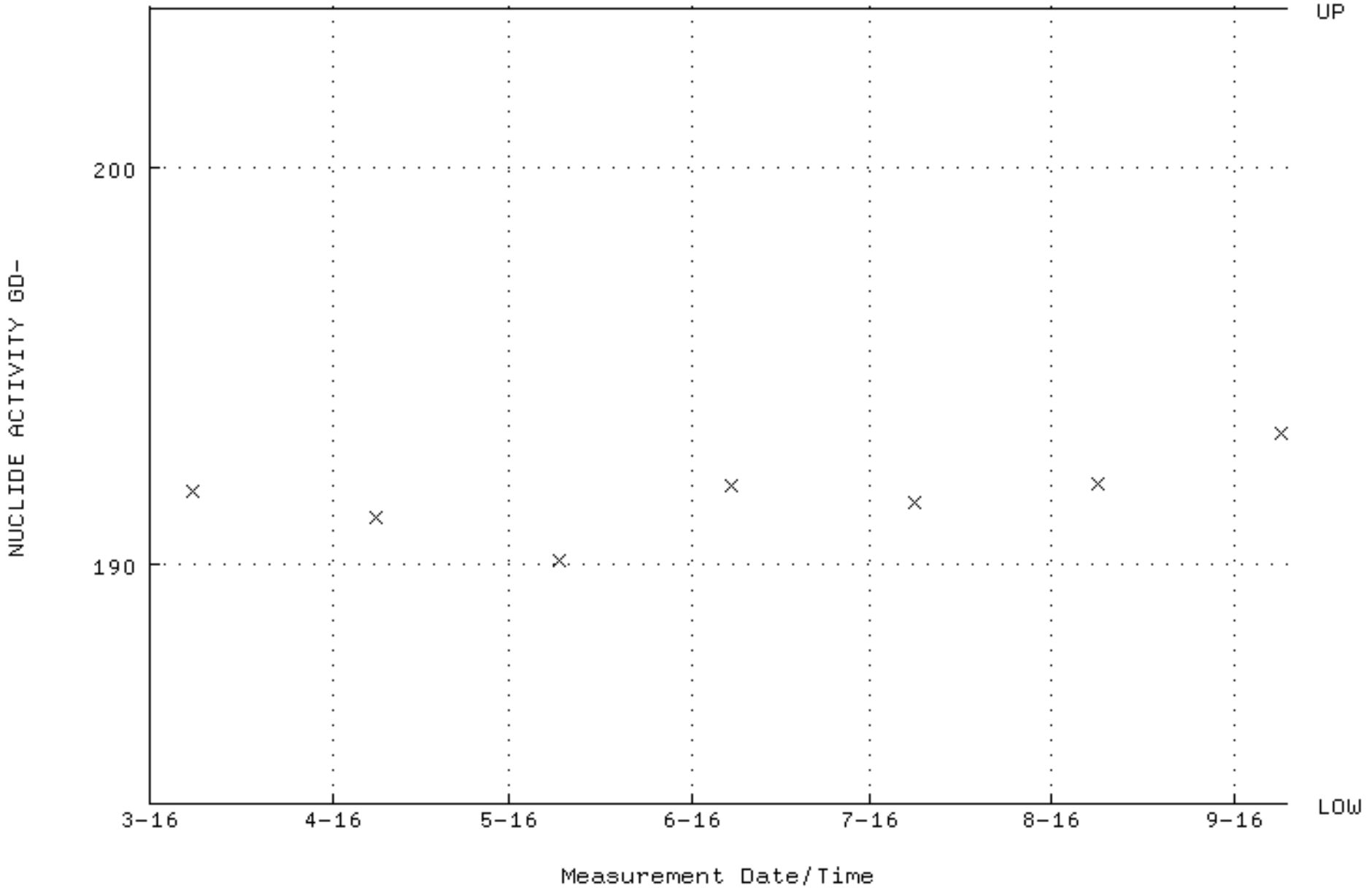
QA filename : DKA100:[ENV_ALPHA.QA.B]B118.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:31:04 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



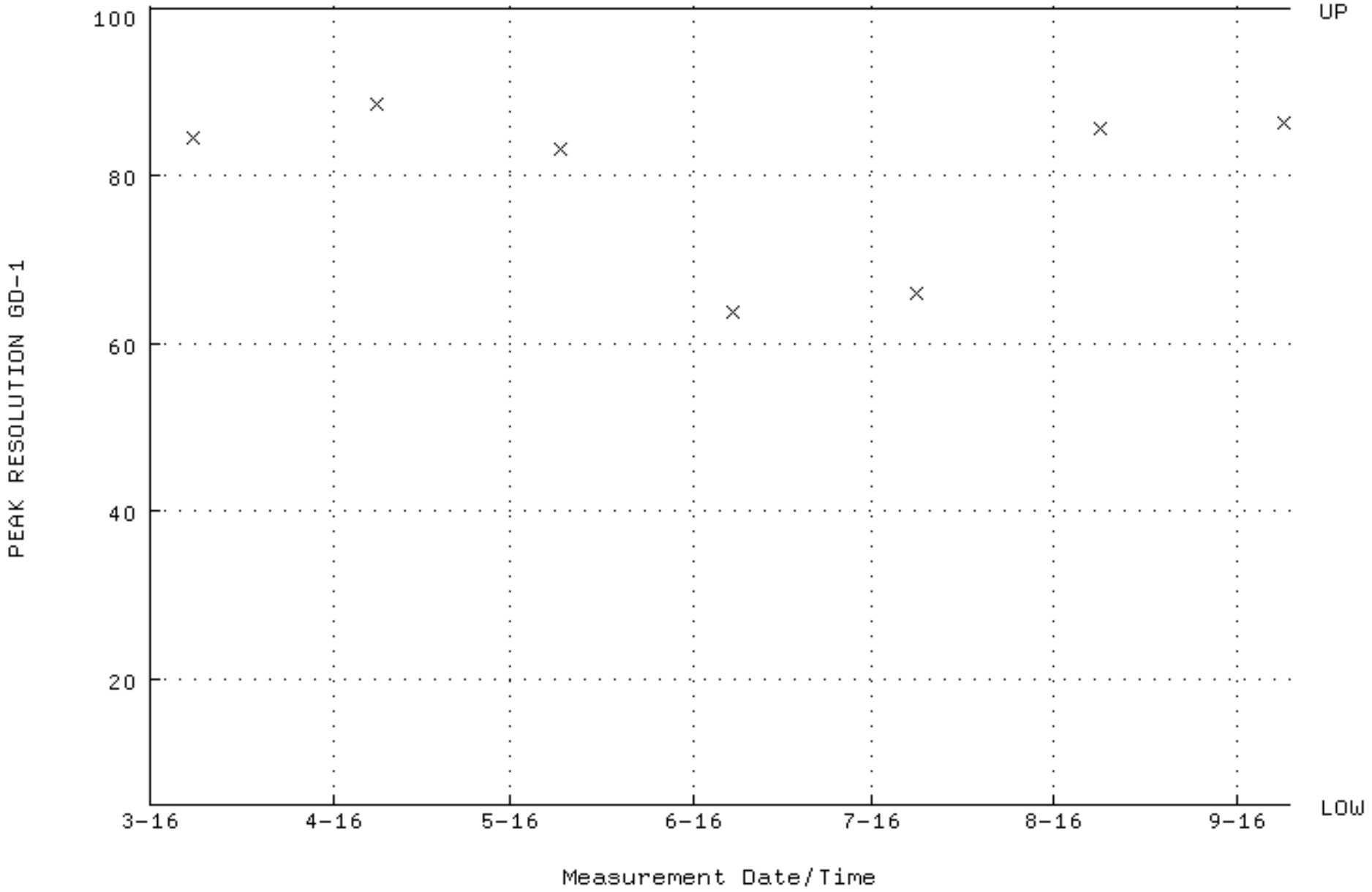
QA filename : DKA100:[ENV_ALPHA.QA.W]W121.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:48 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.248969 through 0.264369



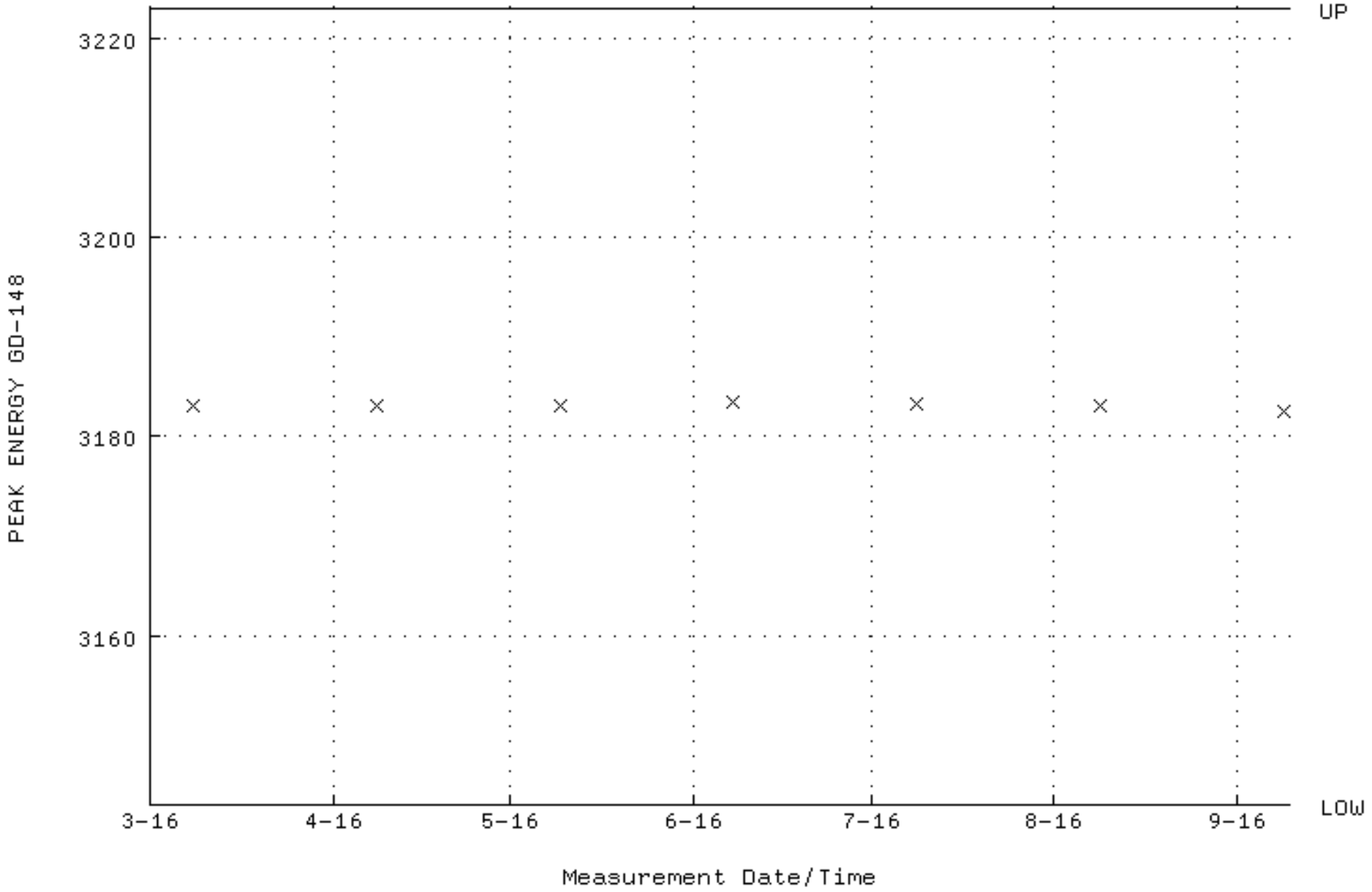
QA filename : DKA100:[ENV_ALPHA.QA.W]W121.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:48 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



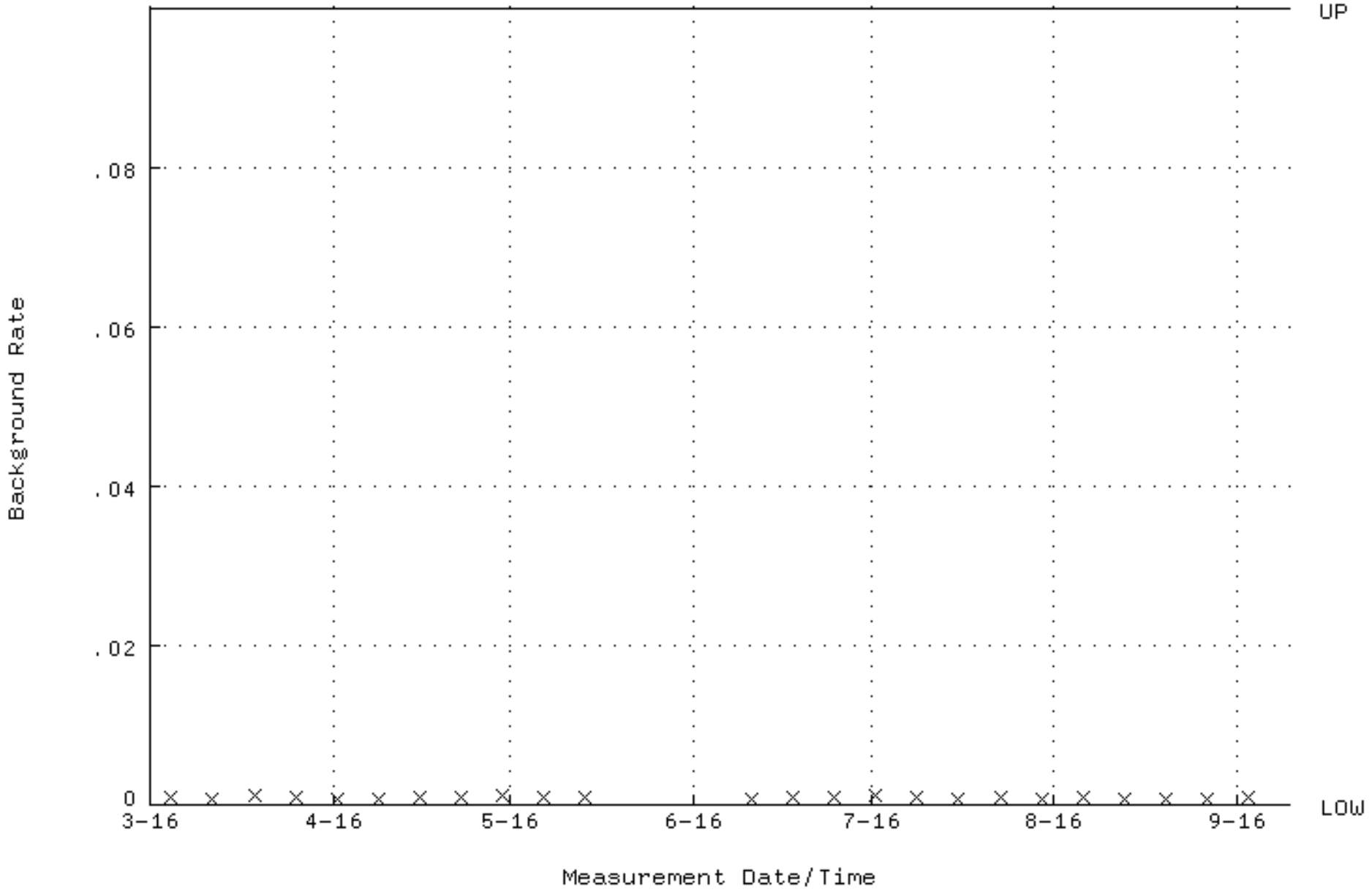
QA filename : DKA100:[ENV_ALPHA.QA.W]W121.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:48 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



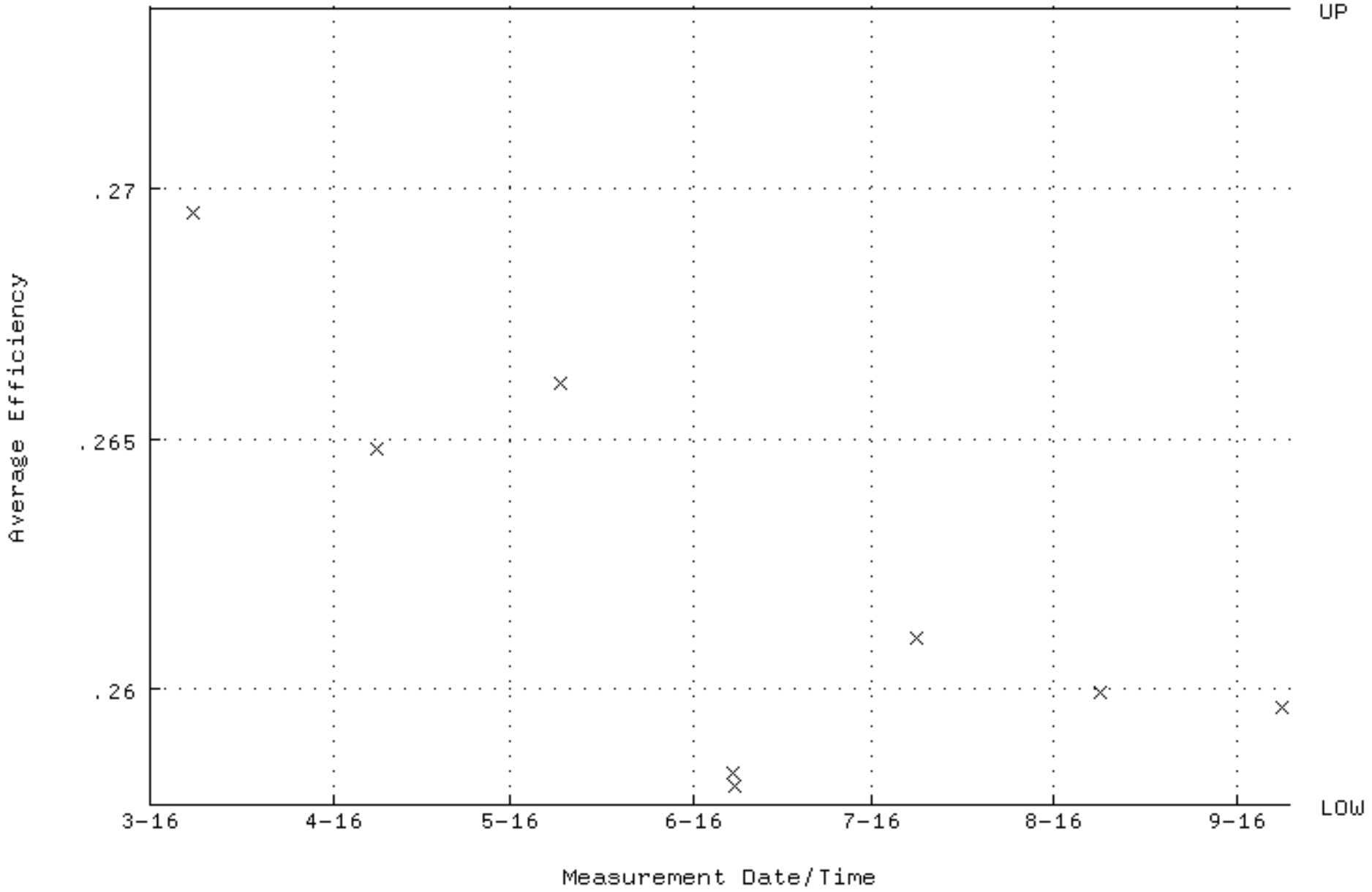
QA filename : DKA100:[ENV_ALPHA.QA.W]W121.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:48 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



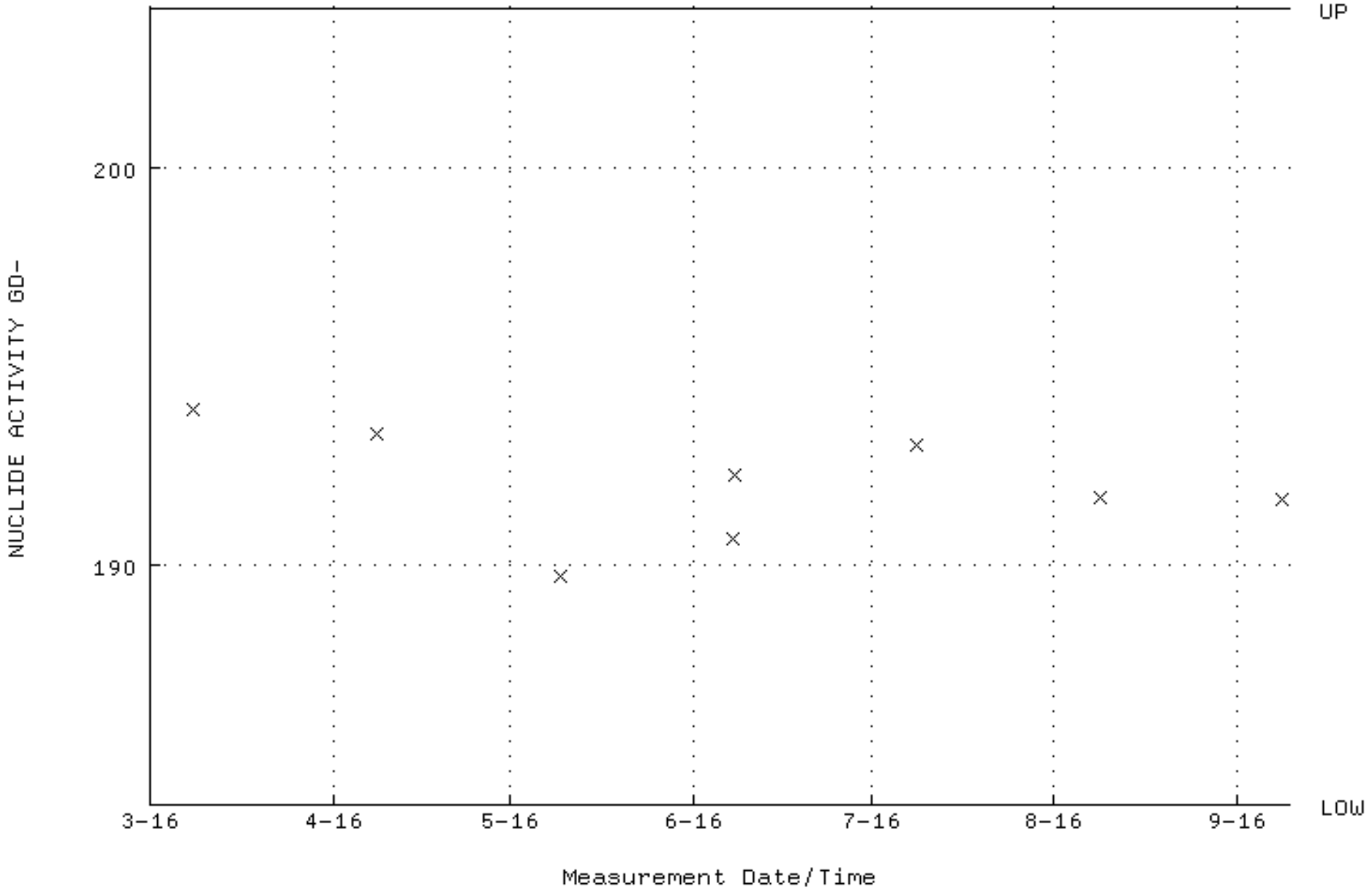
QA filename : DKA100:[ENV_ALPHA.QA.B]B121.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:31:17 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



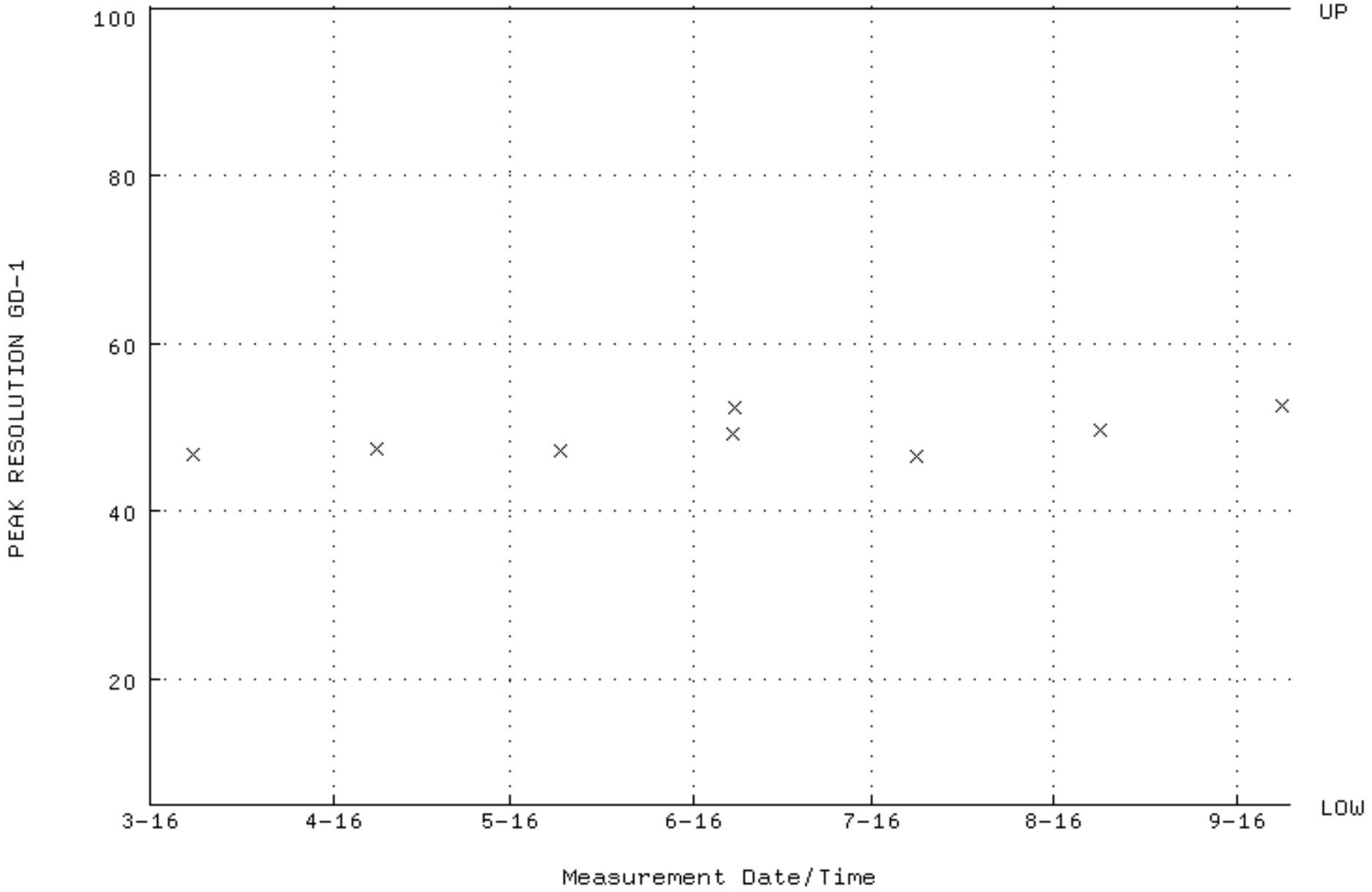
QA filename : DKA100:[ENV_ALPHA.QA.W]W122.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:21:53 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.257670 through 0.273610



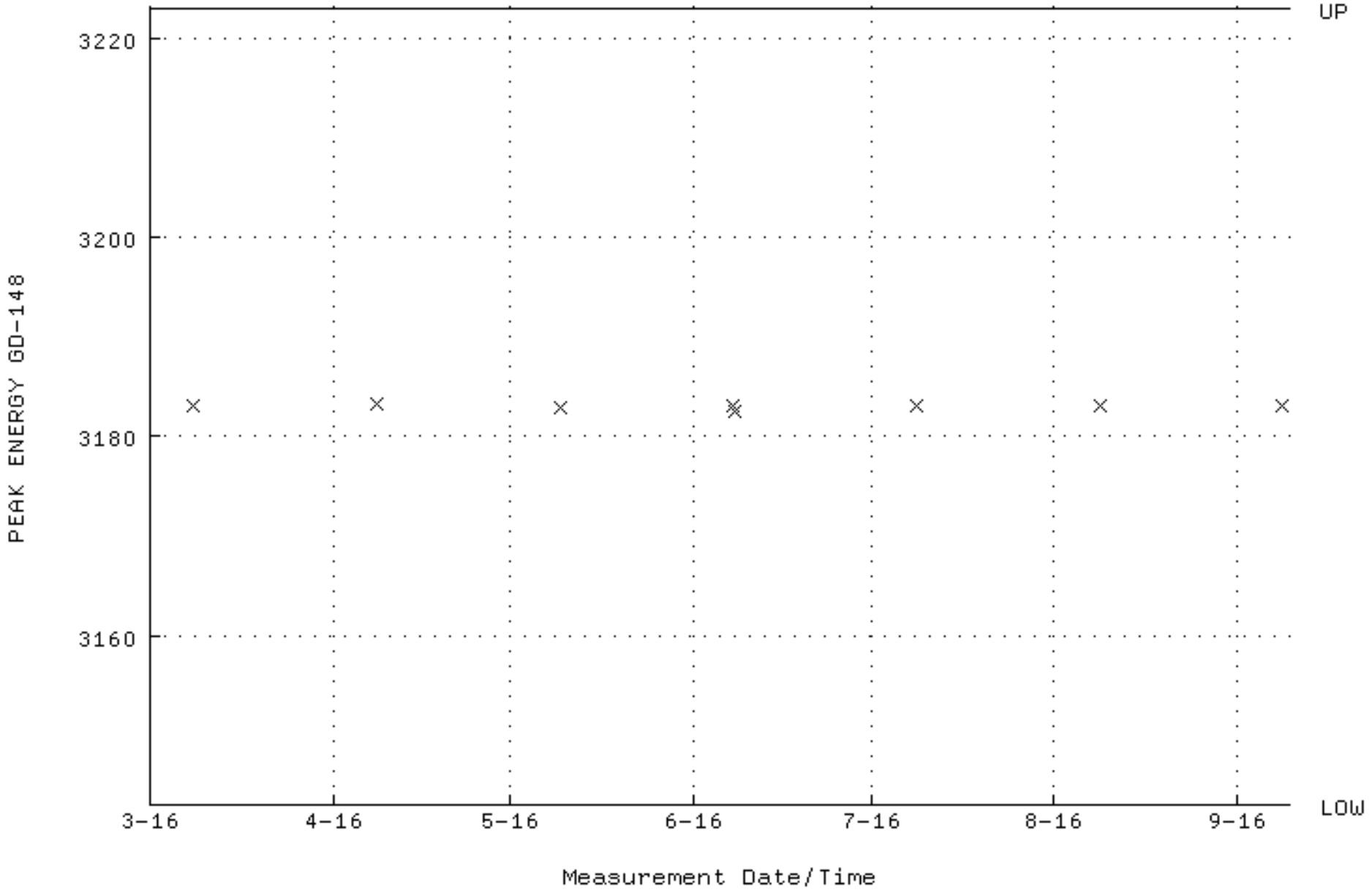
QA filename : DKA100:[ENV_ALPHA.QA.W]W122.QAF;7
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:21:53 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



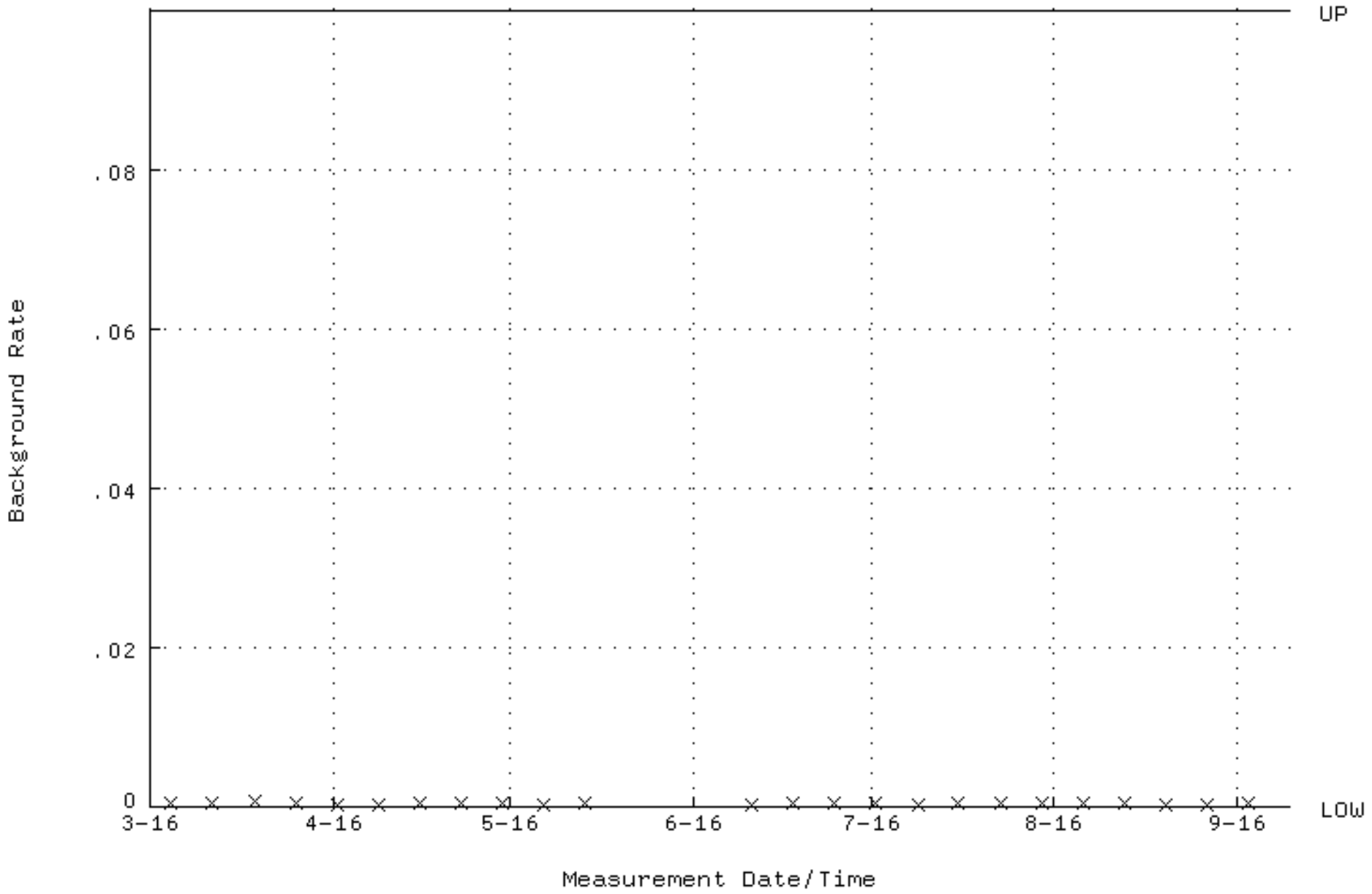
QA filename : DKA100:[ENV_ALPHA.QA.W]W122.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:21:53 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



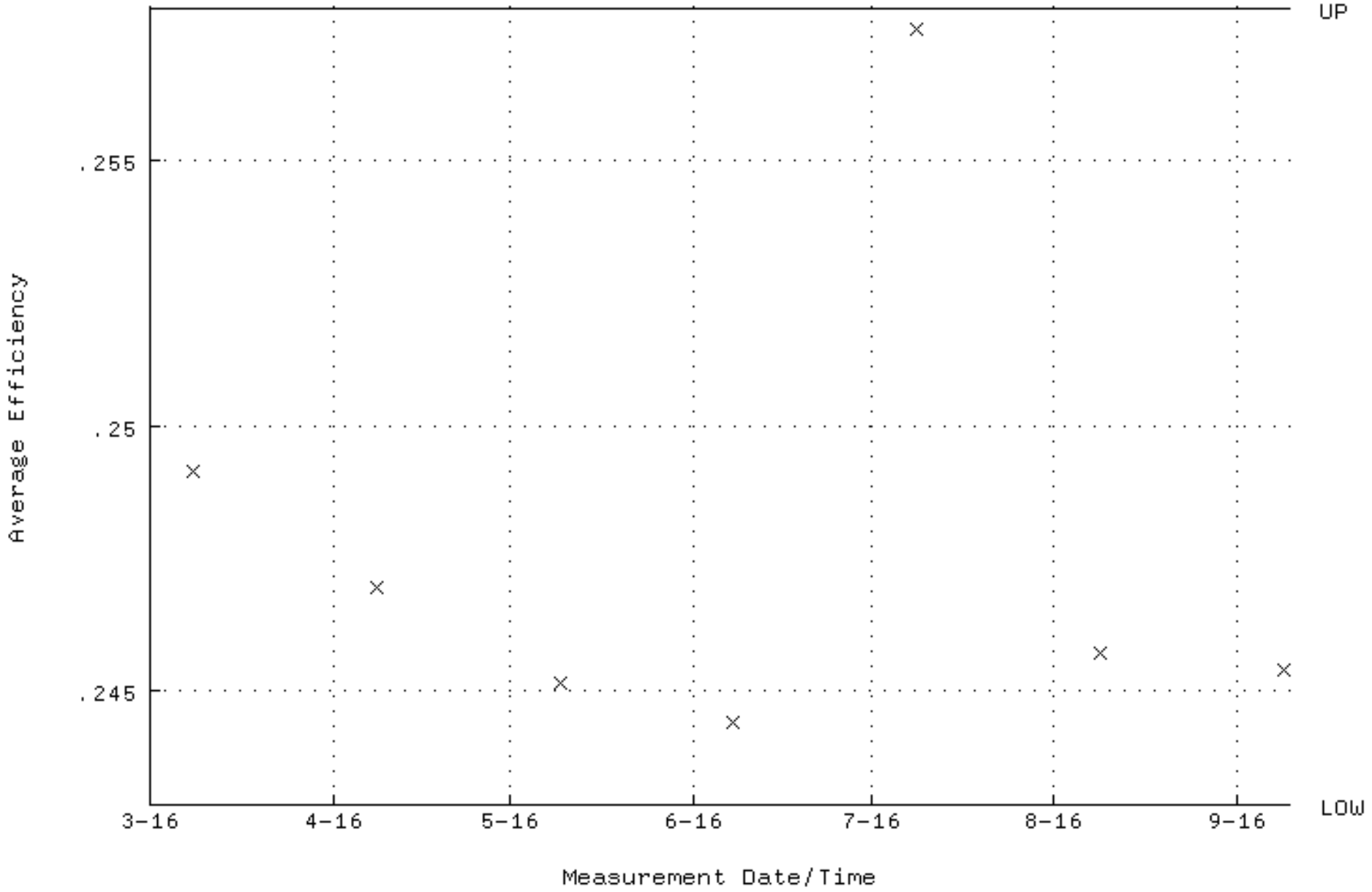
QA filename : DKA100:[ENV_ALPHA.QA.W]W122.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:21:53 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



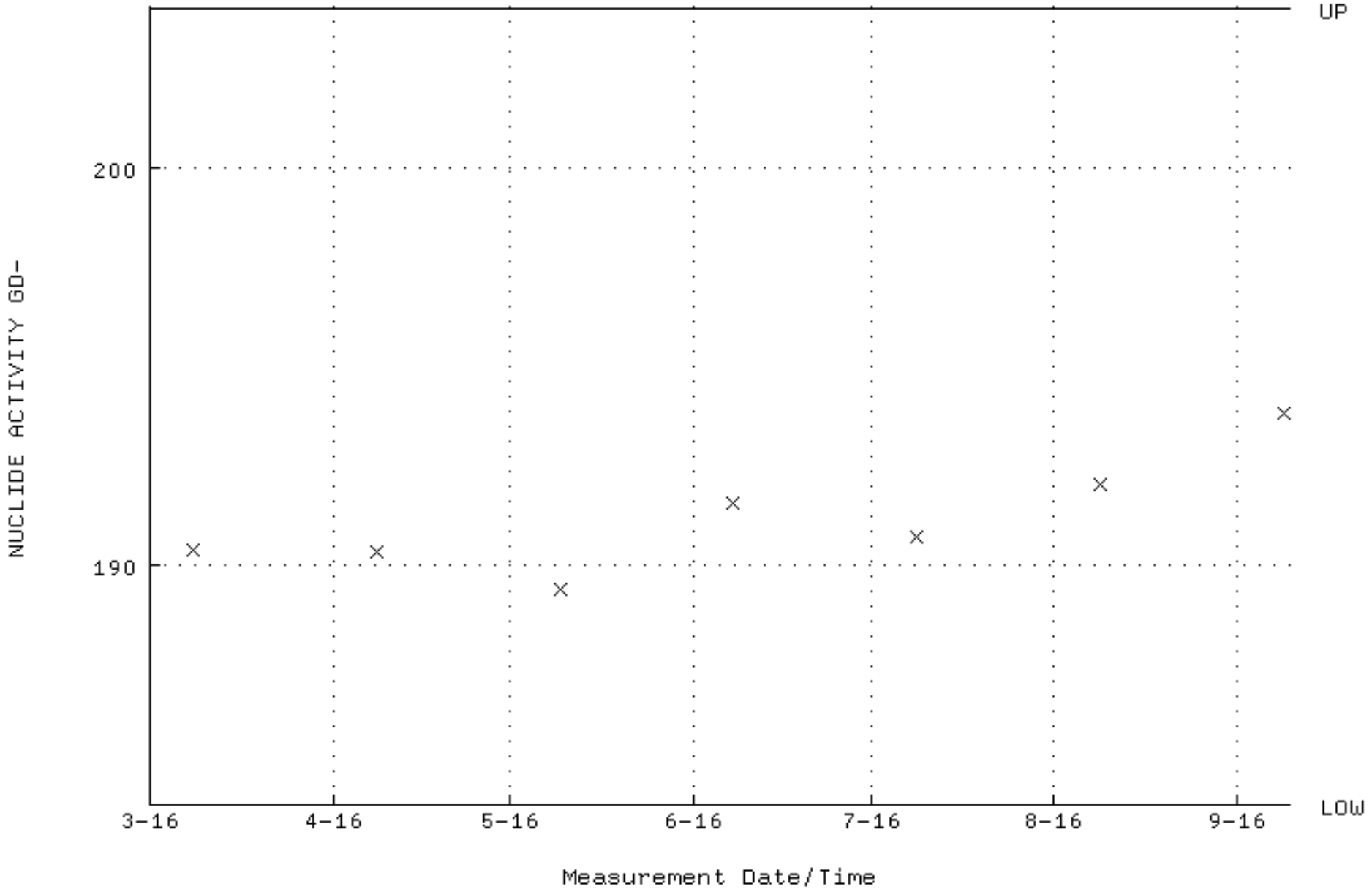
QA filename : DKA100:[ENV_ALPHA.QA.B]B122.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:31:22 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



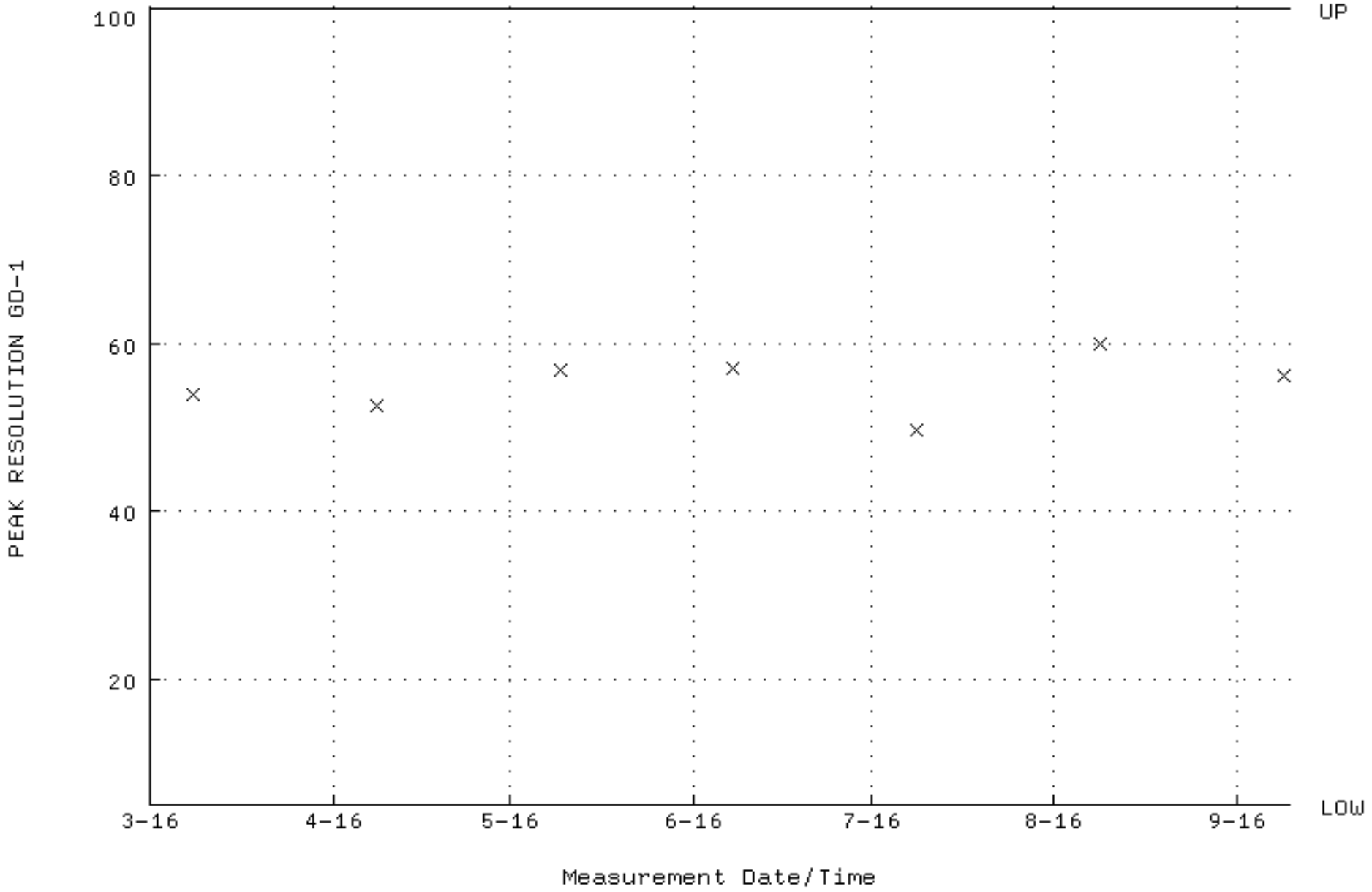
QA filename : DKA100:[ENV_ALPHA.QA.W]W124.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:01 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.242855 through 0.257877



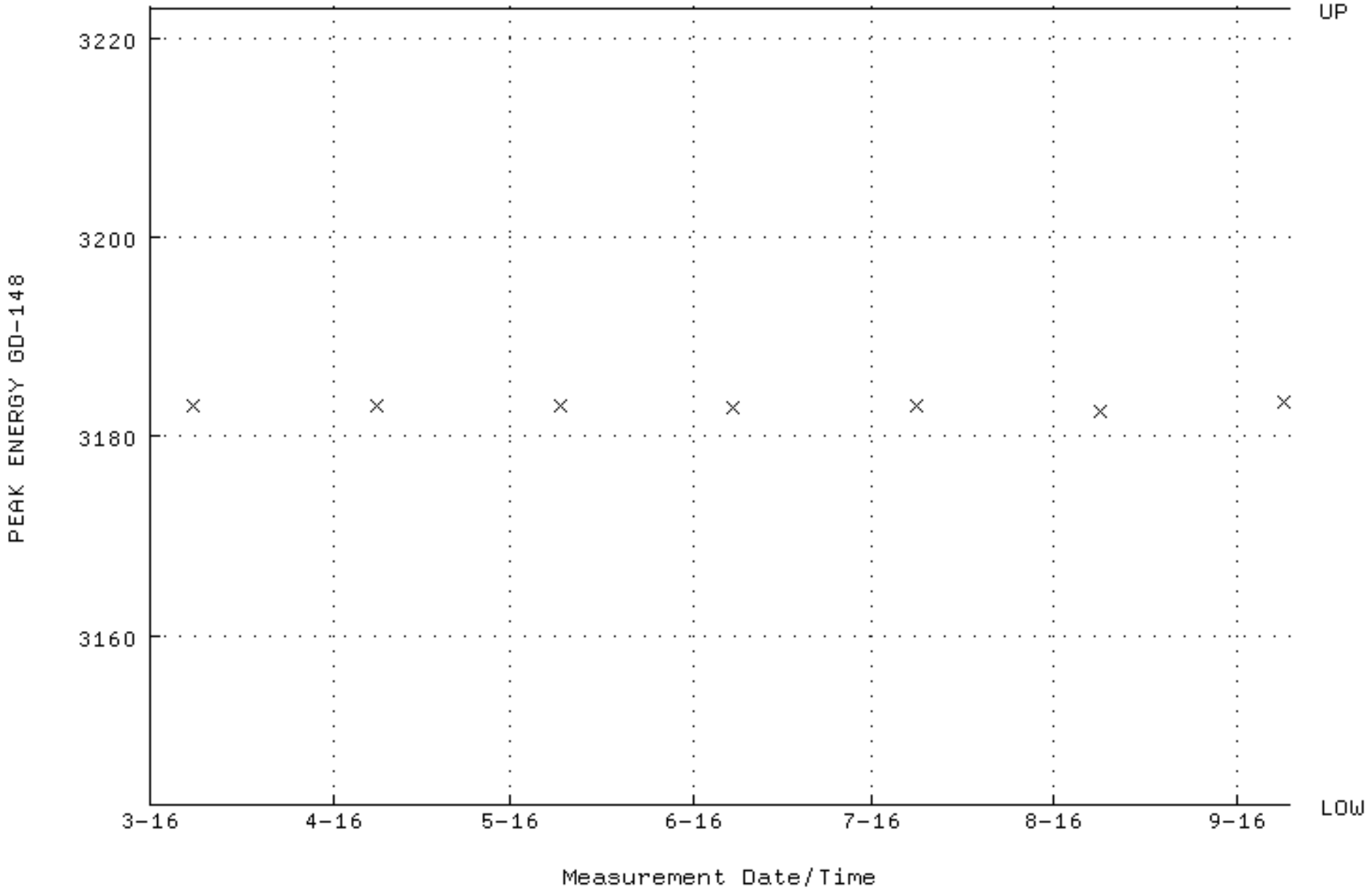
QA filename : DKA100:[ENV_ALPHA.QA.W]W124.QAF;8
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:01 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



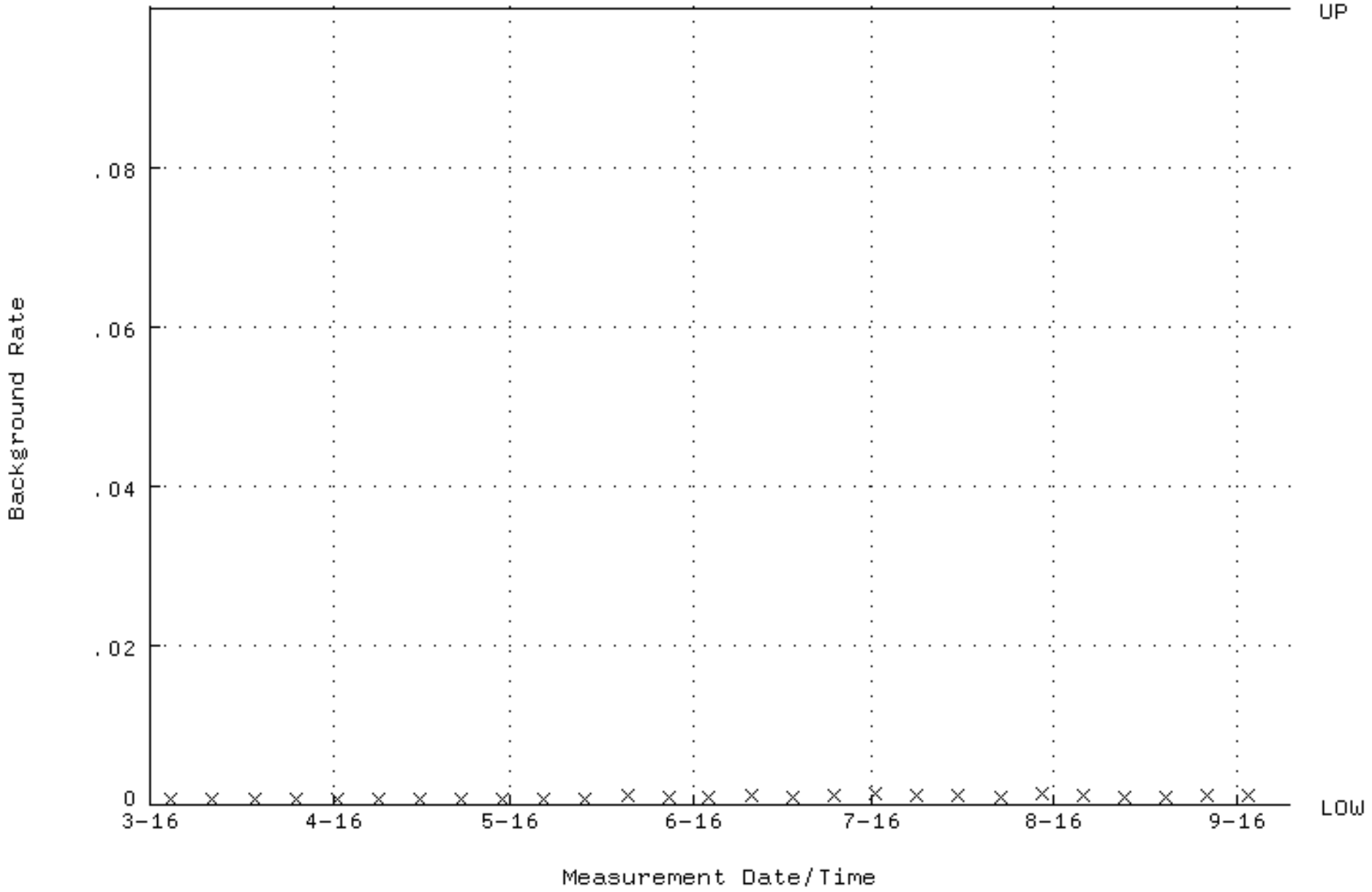
QA filename : DKA100:[ENV_ALPHA.QA.W]W124.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:01 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



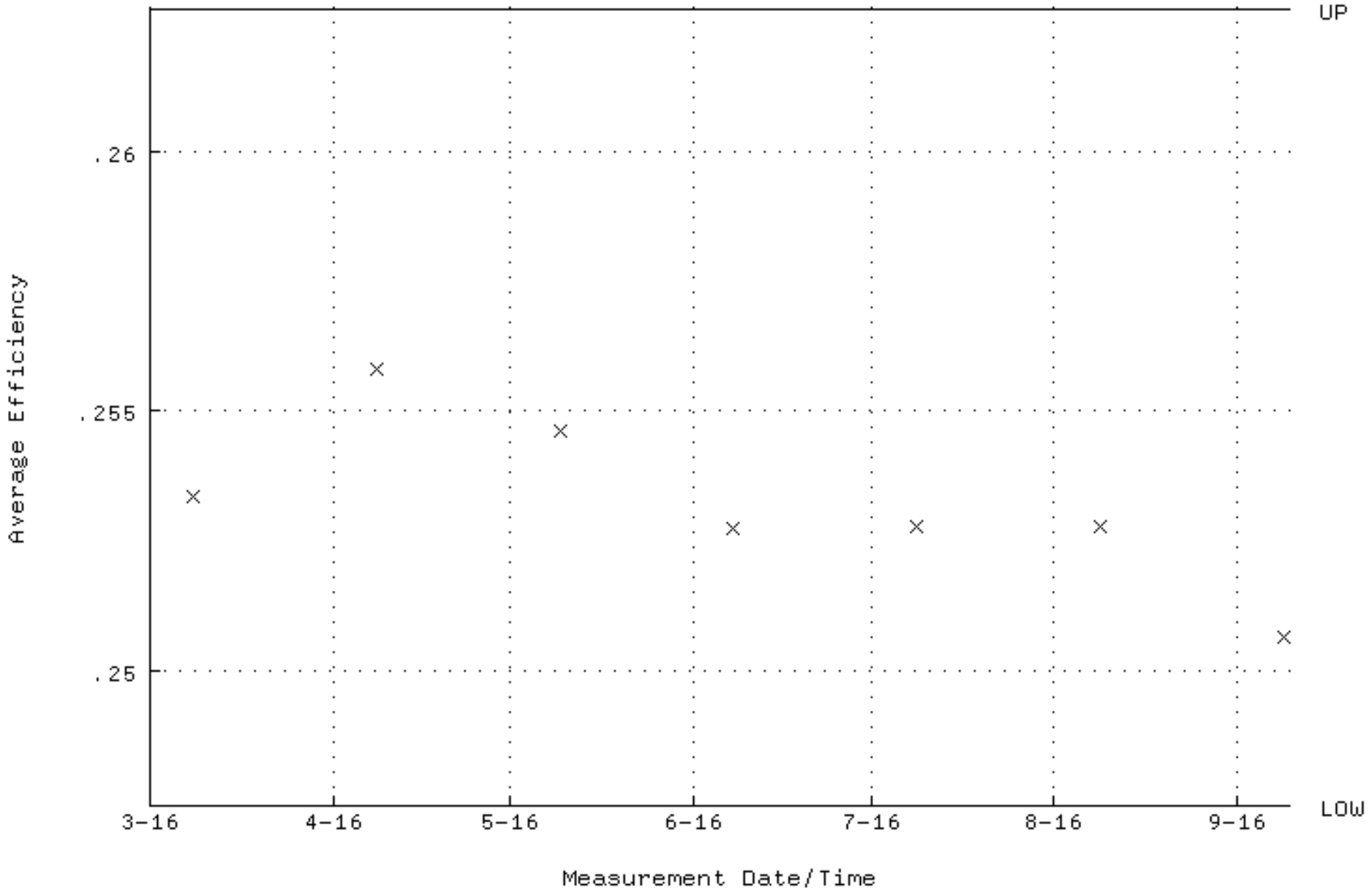
QA filename : DKA100:[ENV_ALPHA.QA.W]W124.QAF;8
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:01 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



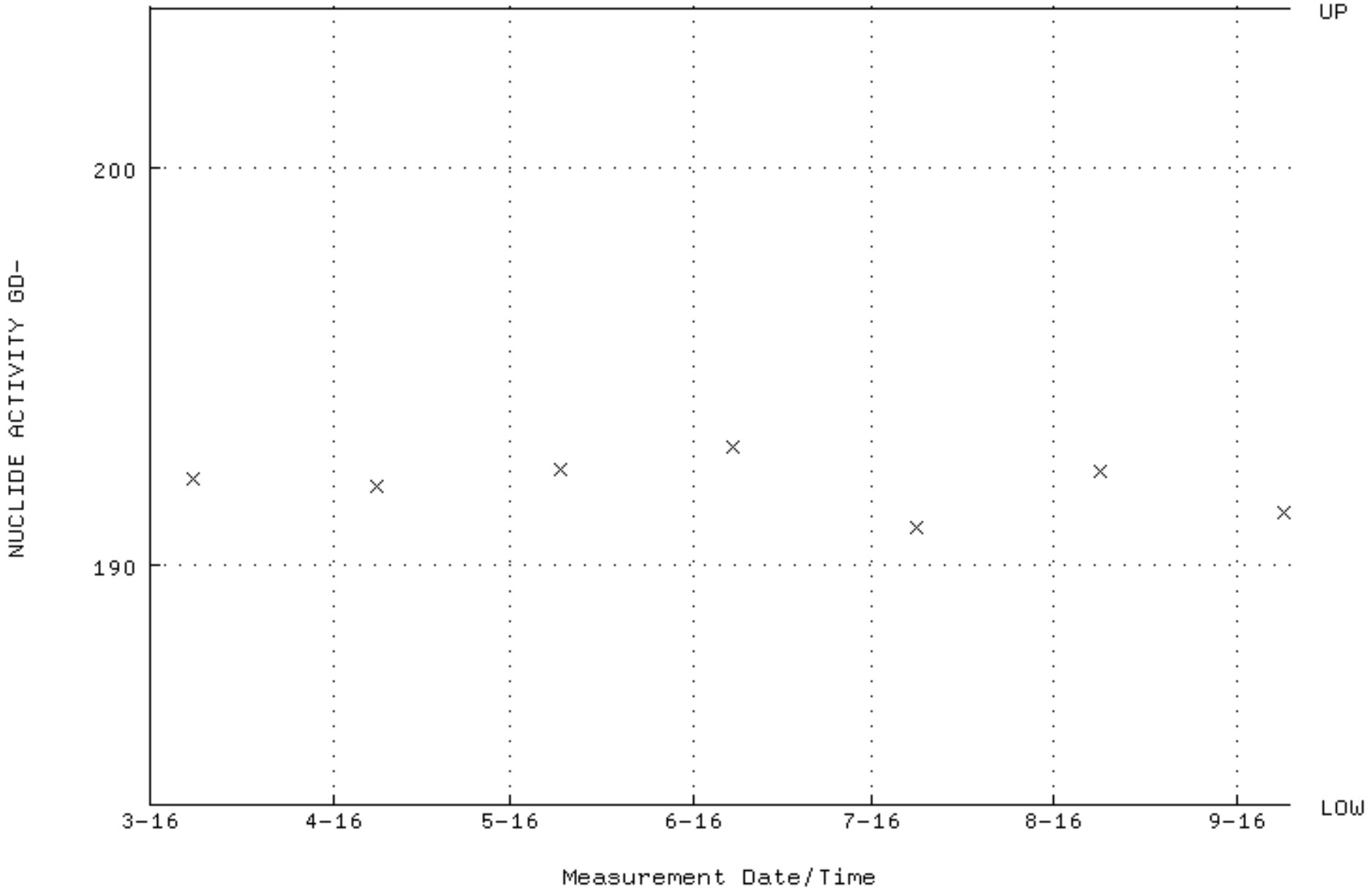
QA filename : DKA100:[ENV_ALPHA.QA.B]B124.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 12:31:30 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



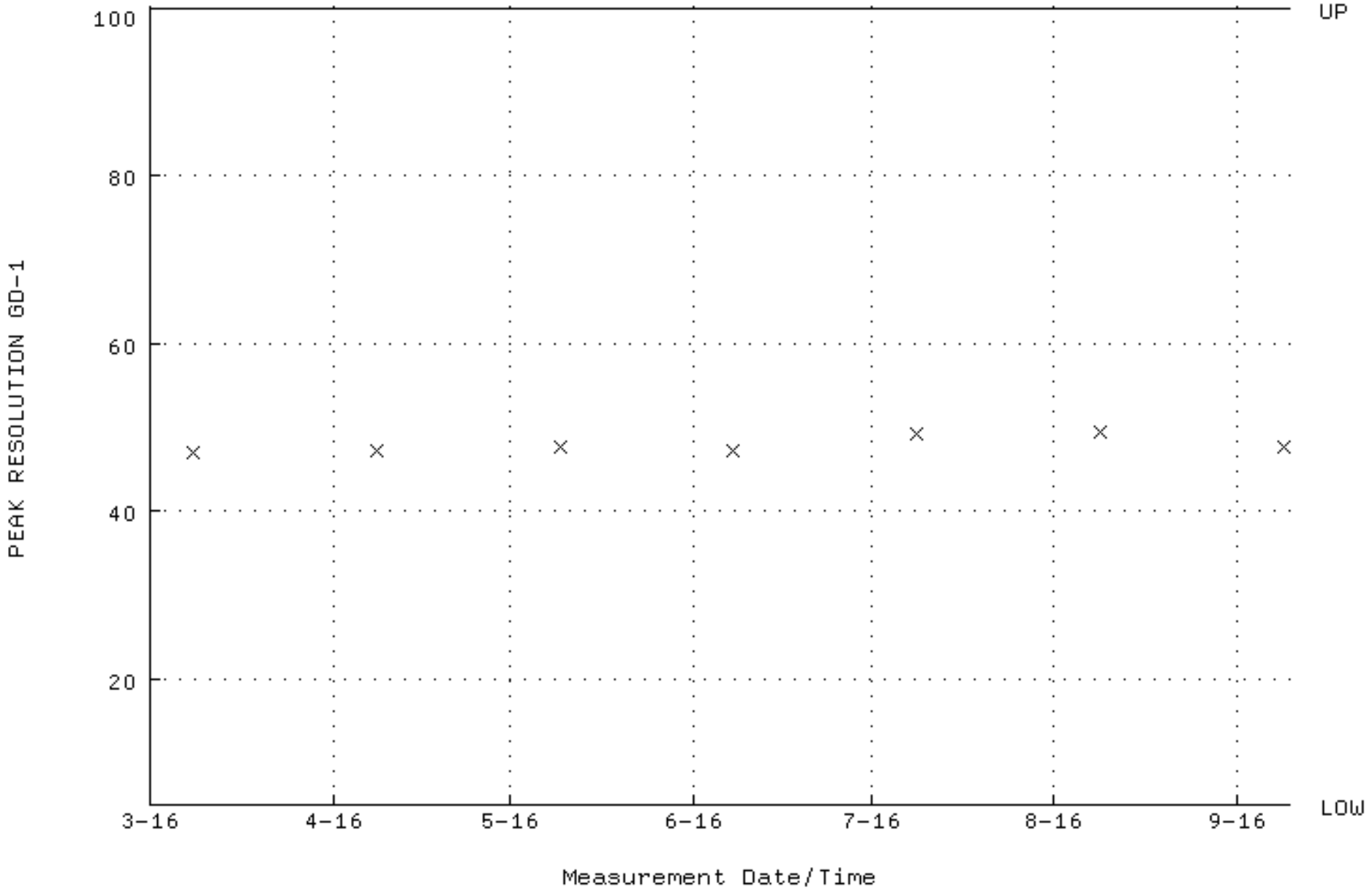
QA filename : DKA100:[ENV_ALPHA.QA.W]W126.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:09 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.247420 through 0.262720



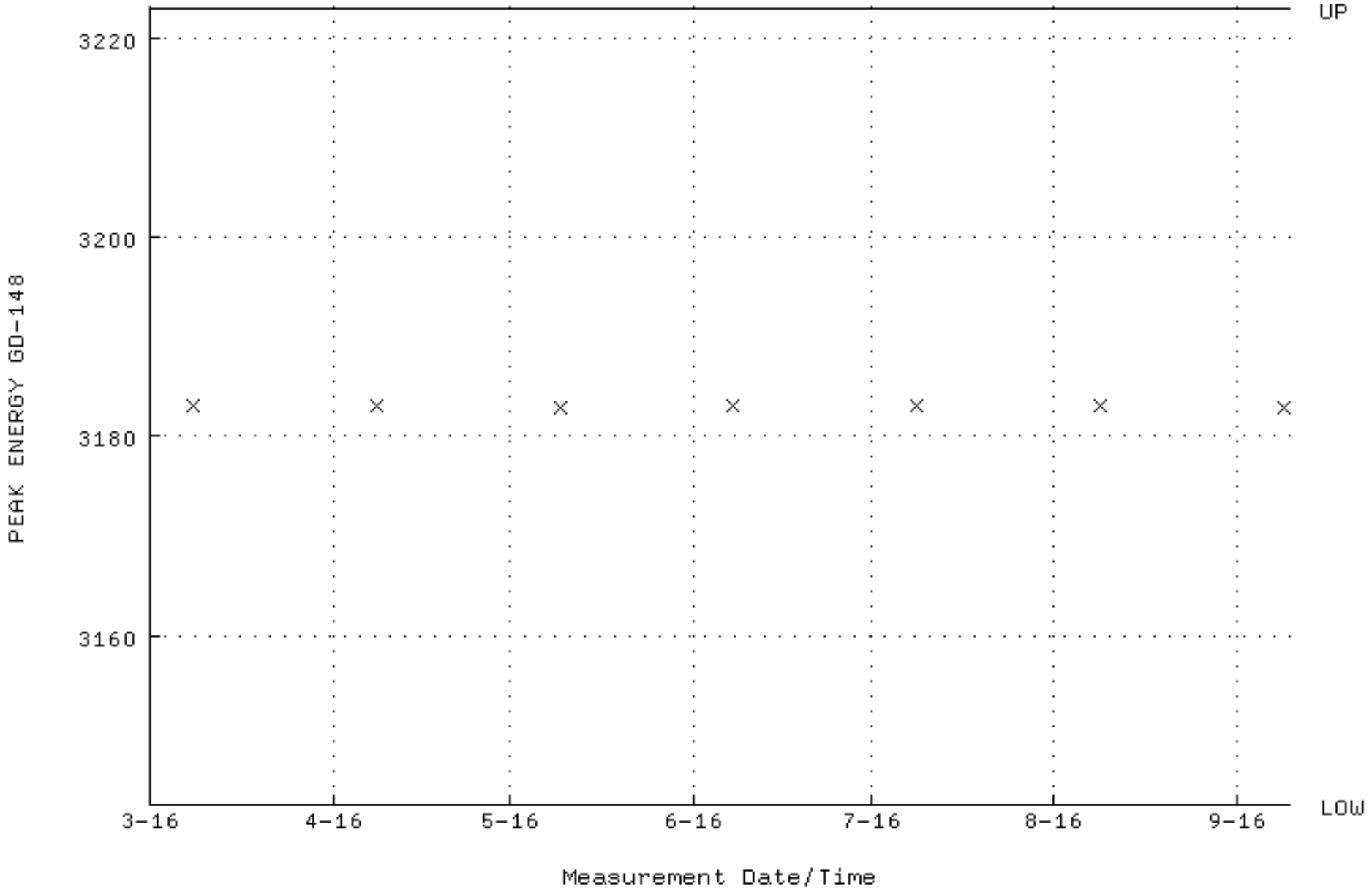
QA filename : DKA100:[ENV_ALPHA.QA.W]W126.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:09 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



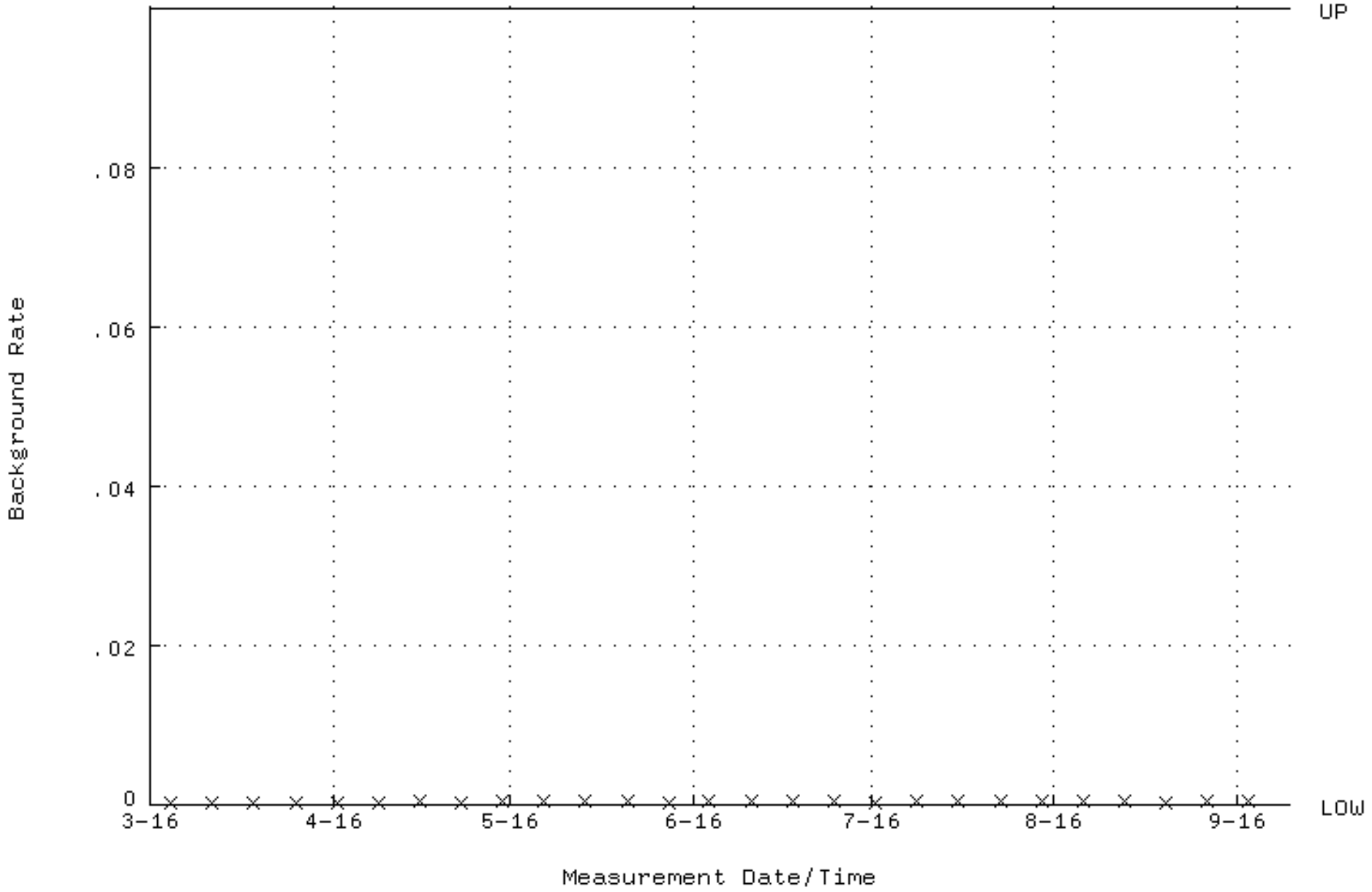
QA filename : DKA100:[ENV_ALPHA.QA.W]W126.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:09 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



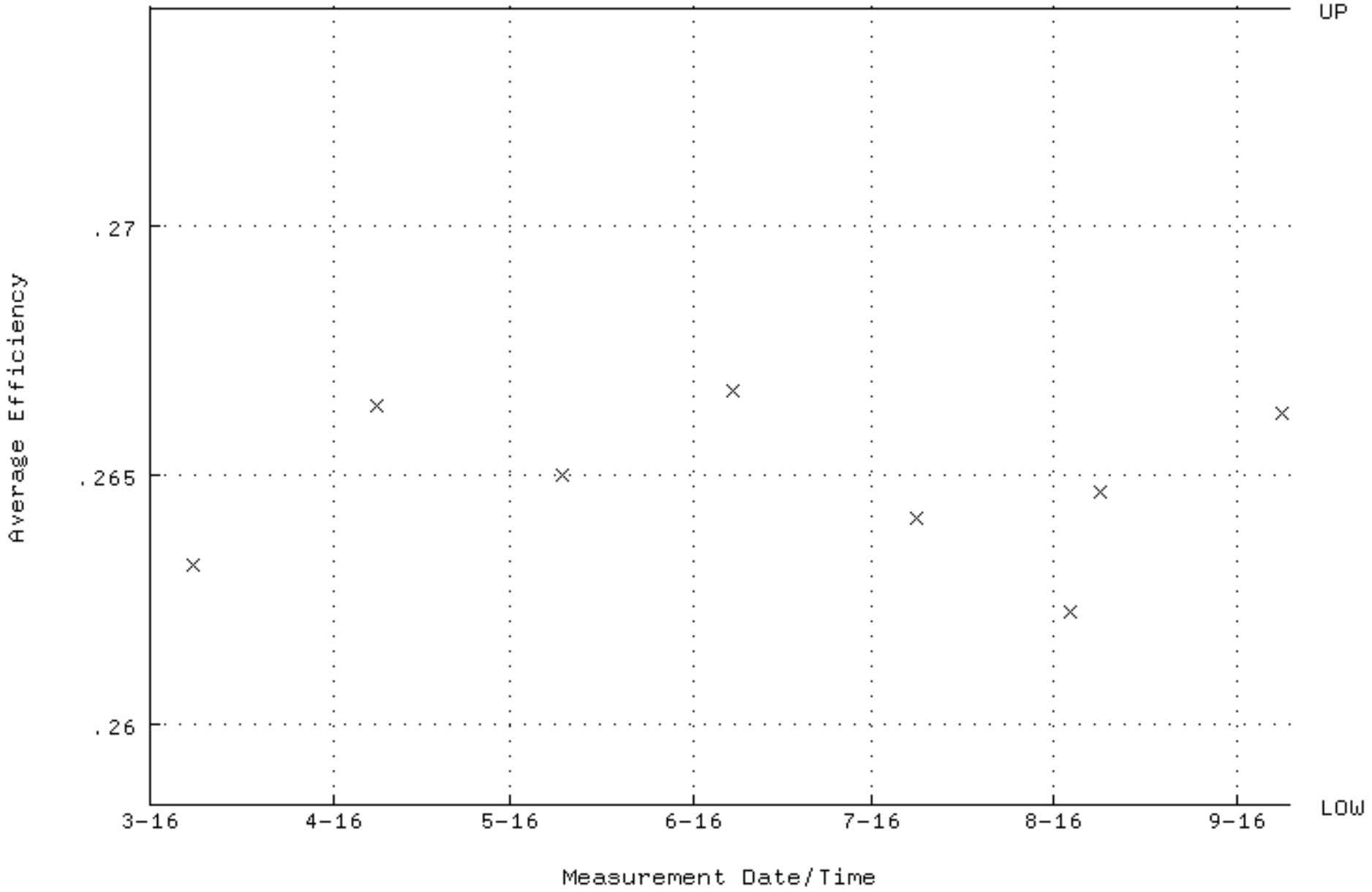
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:09 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



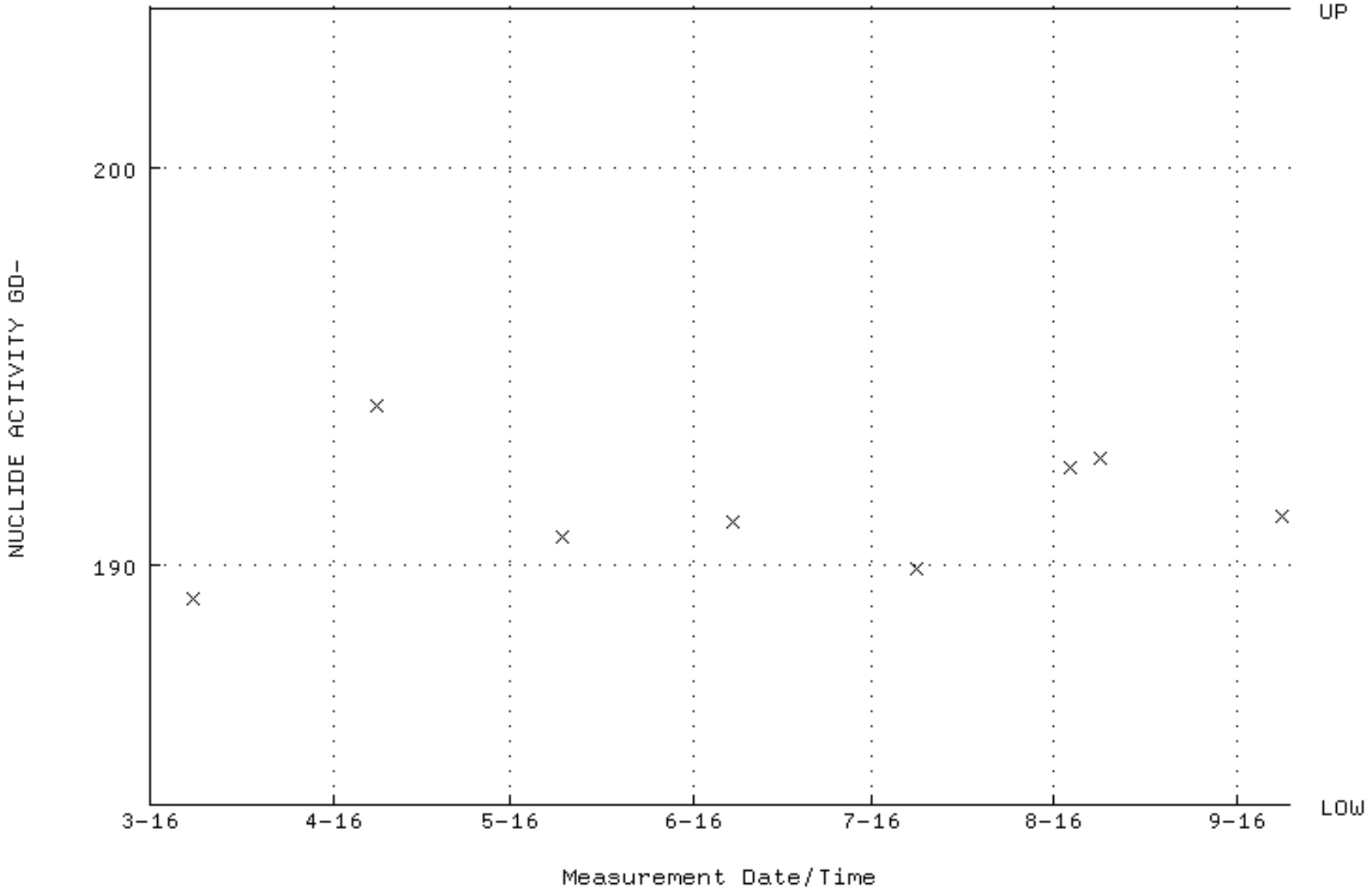
QA filename : DKA100:[ENV_ALPHA.QA.B]B126.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:13 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



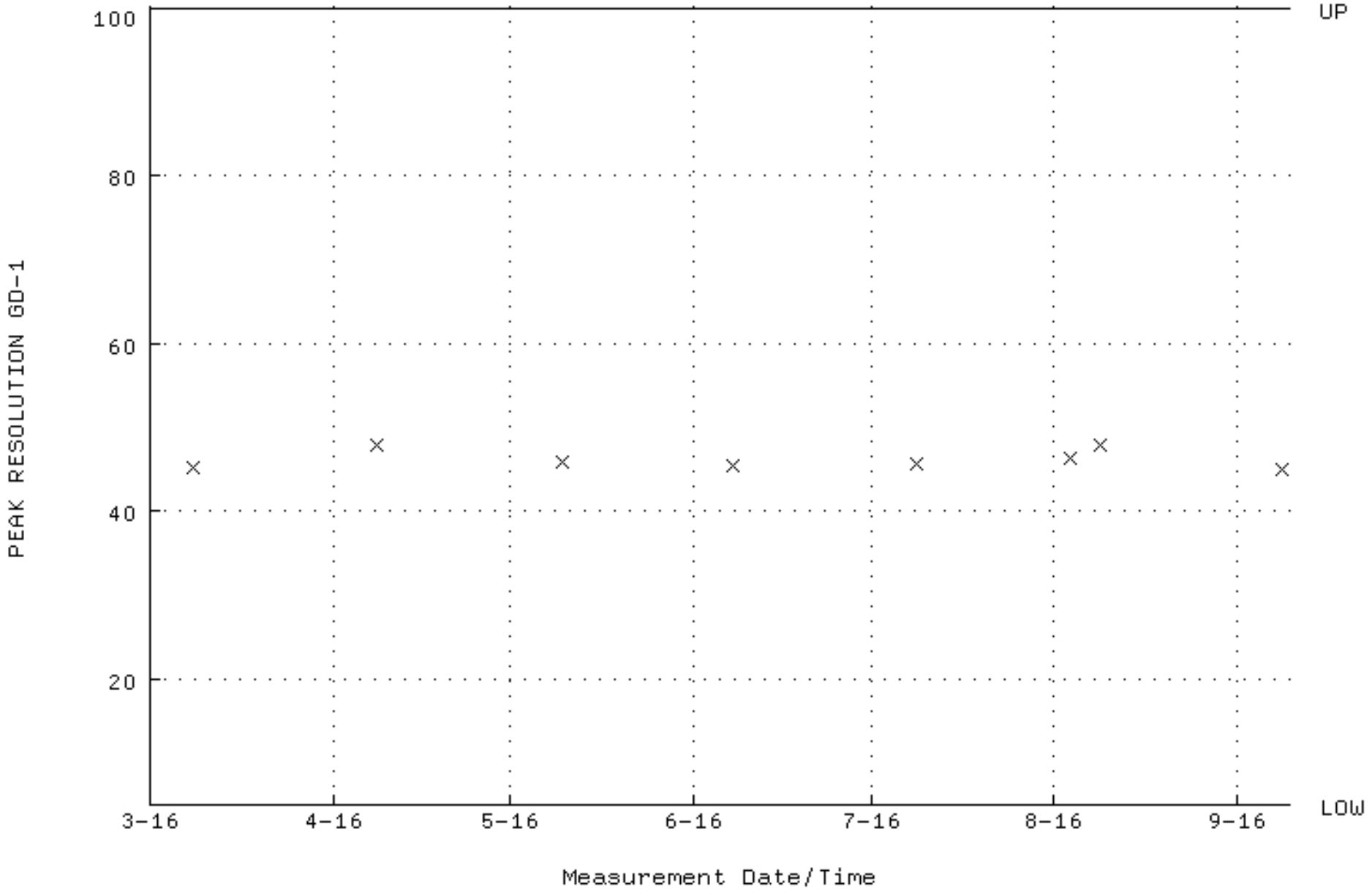
QA filename : DKA100:[ENV_ALPHA.QA.W]W127.QAF;8
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:12 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.258380 through 0.274360



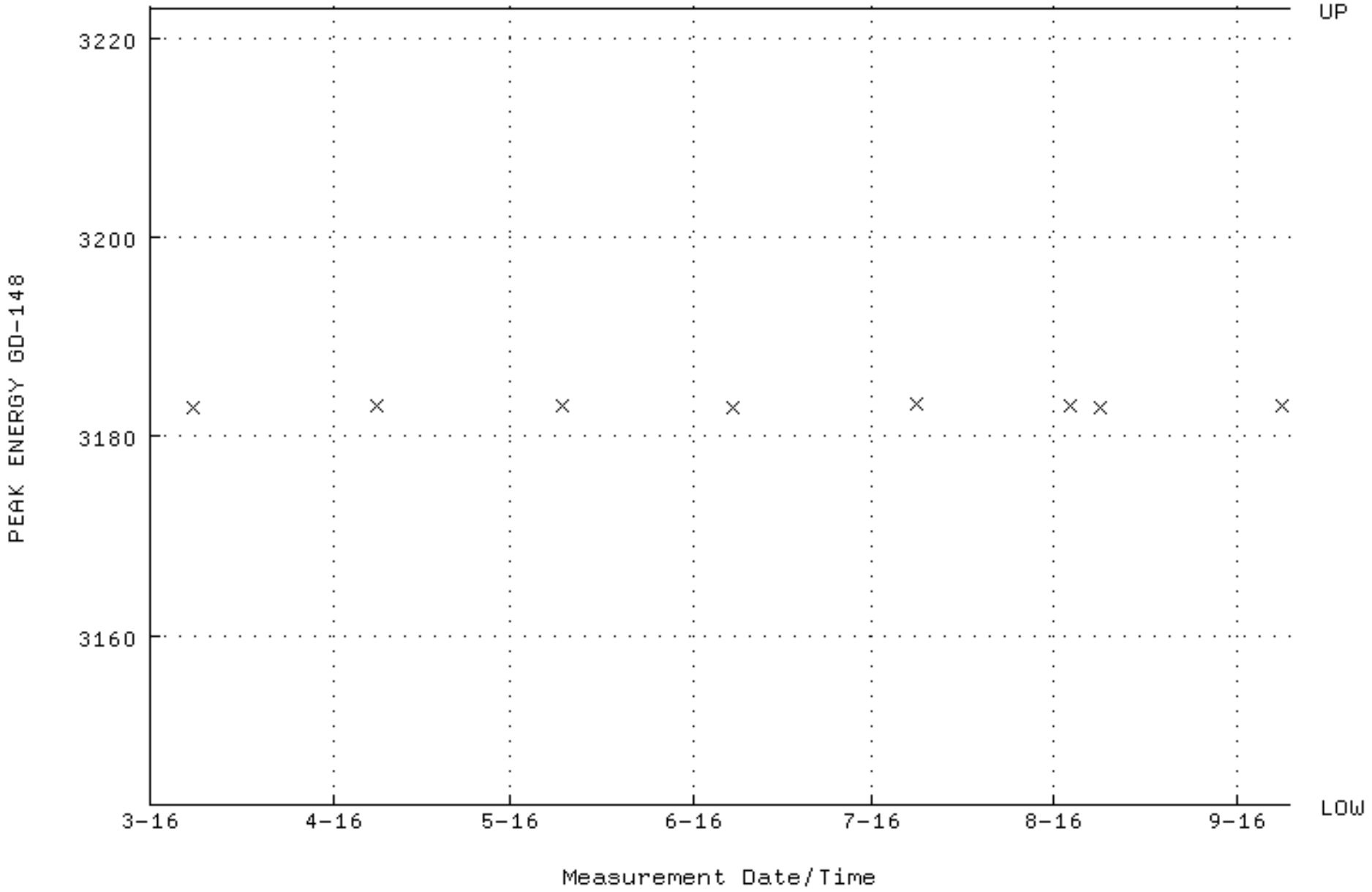
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:12 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



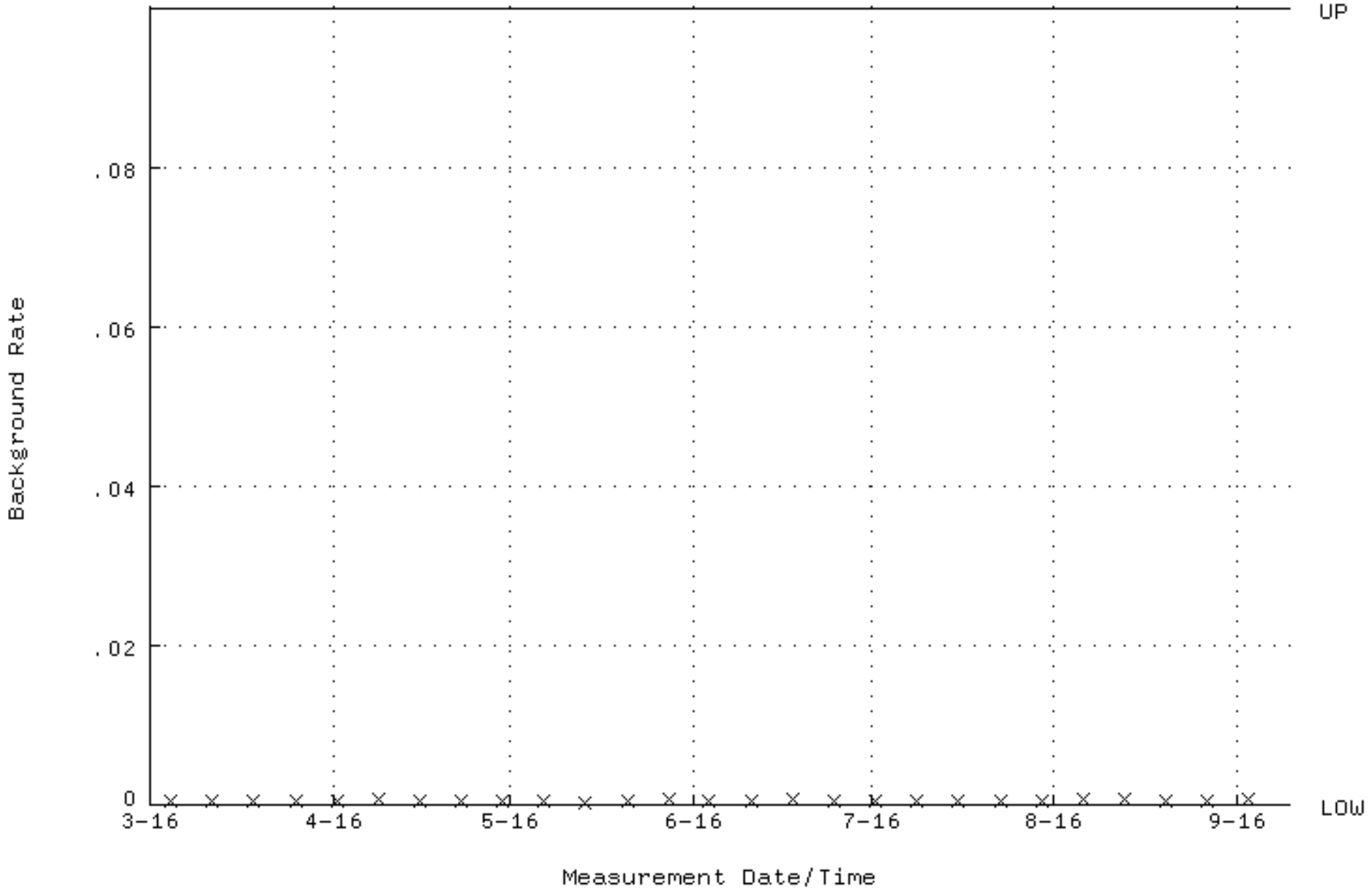
QA filename : DKA100:[ENV_ALPHA.QA.W]W127.QAF;8
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:12 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



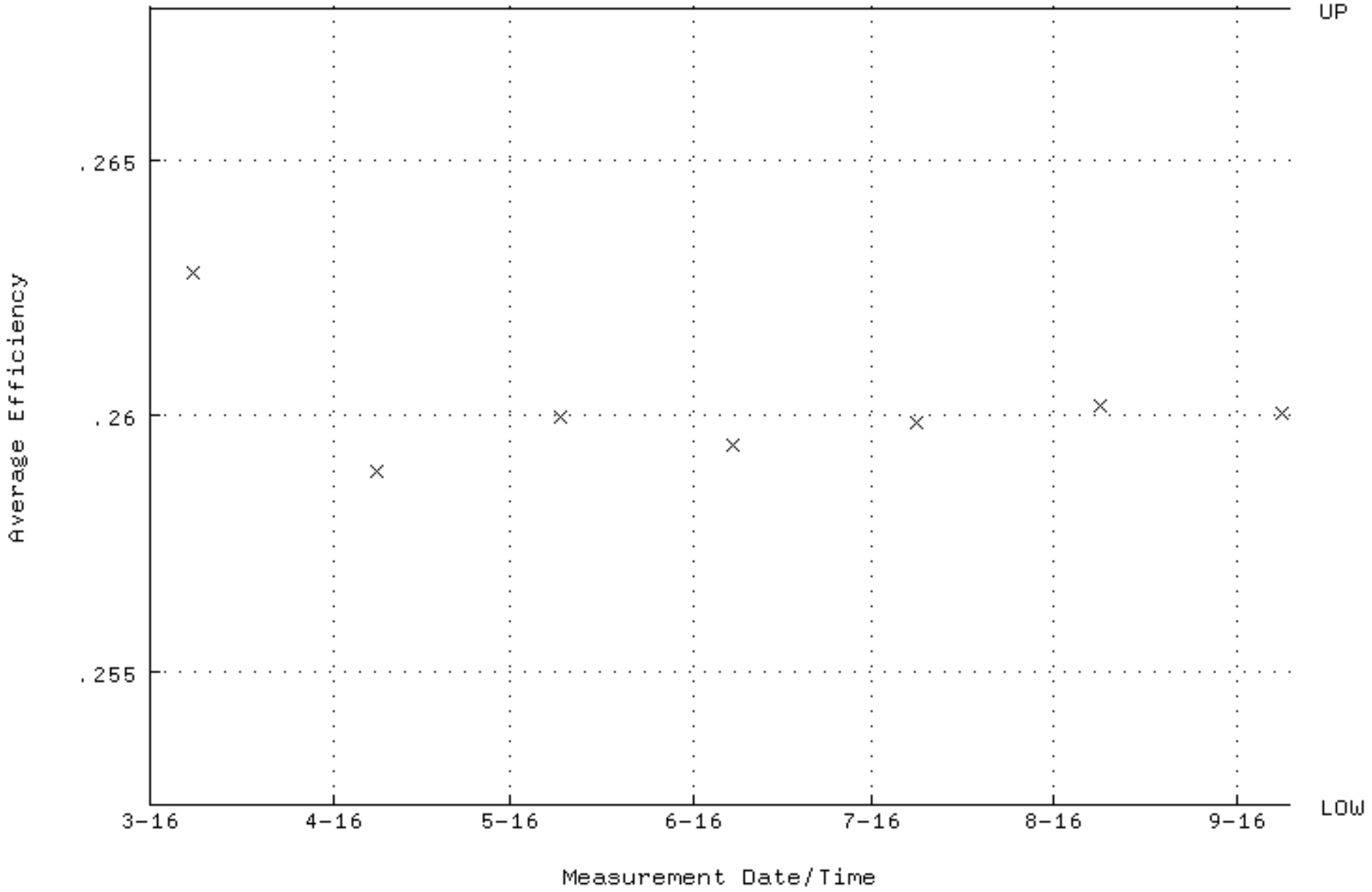
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:12 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



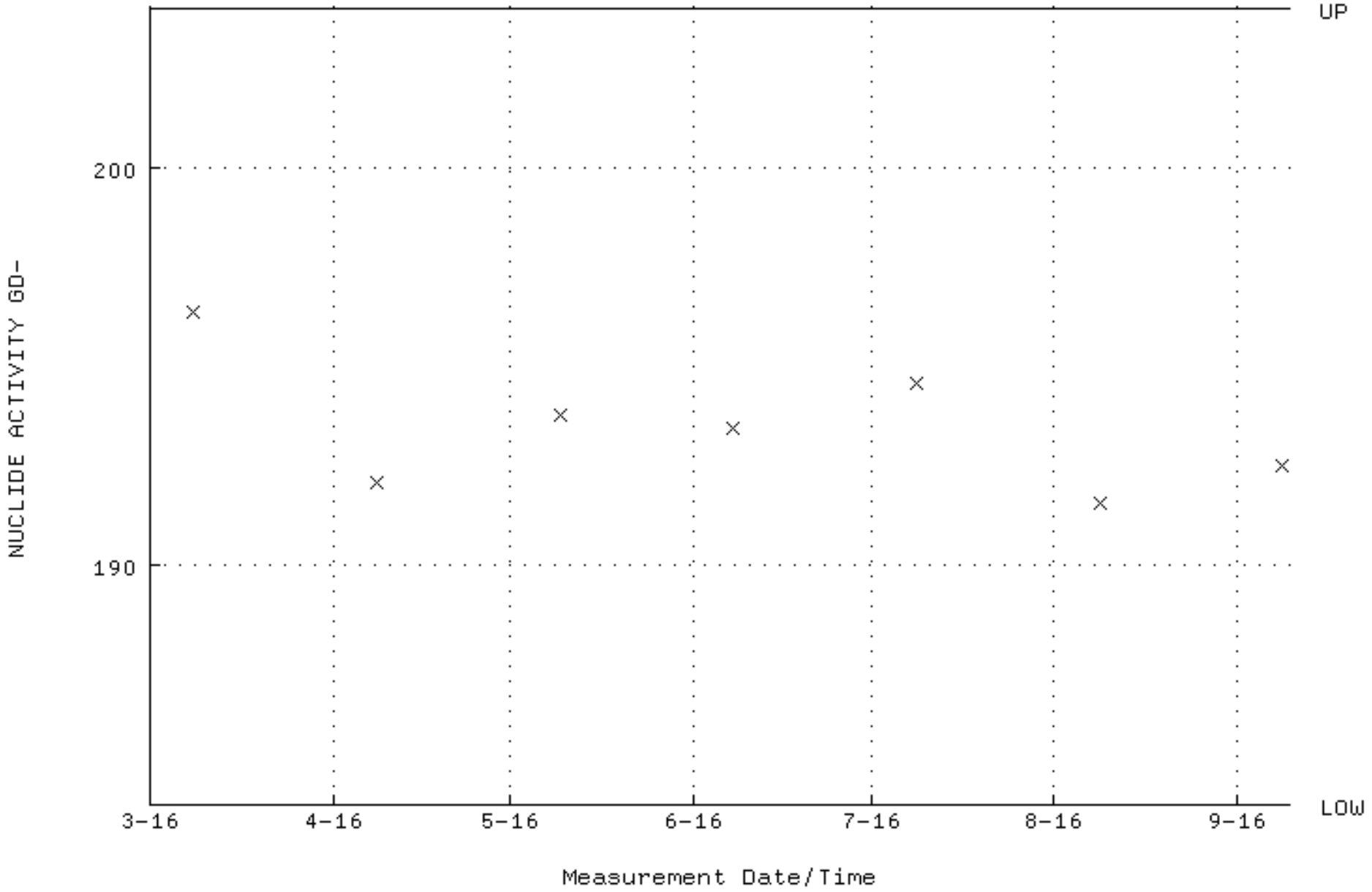
QA filename : DKA100:[ENV_ALPHA.QA.B]B127.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:18 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



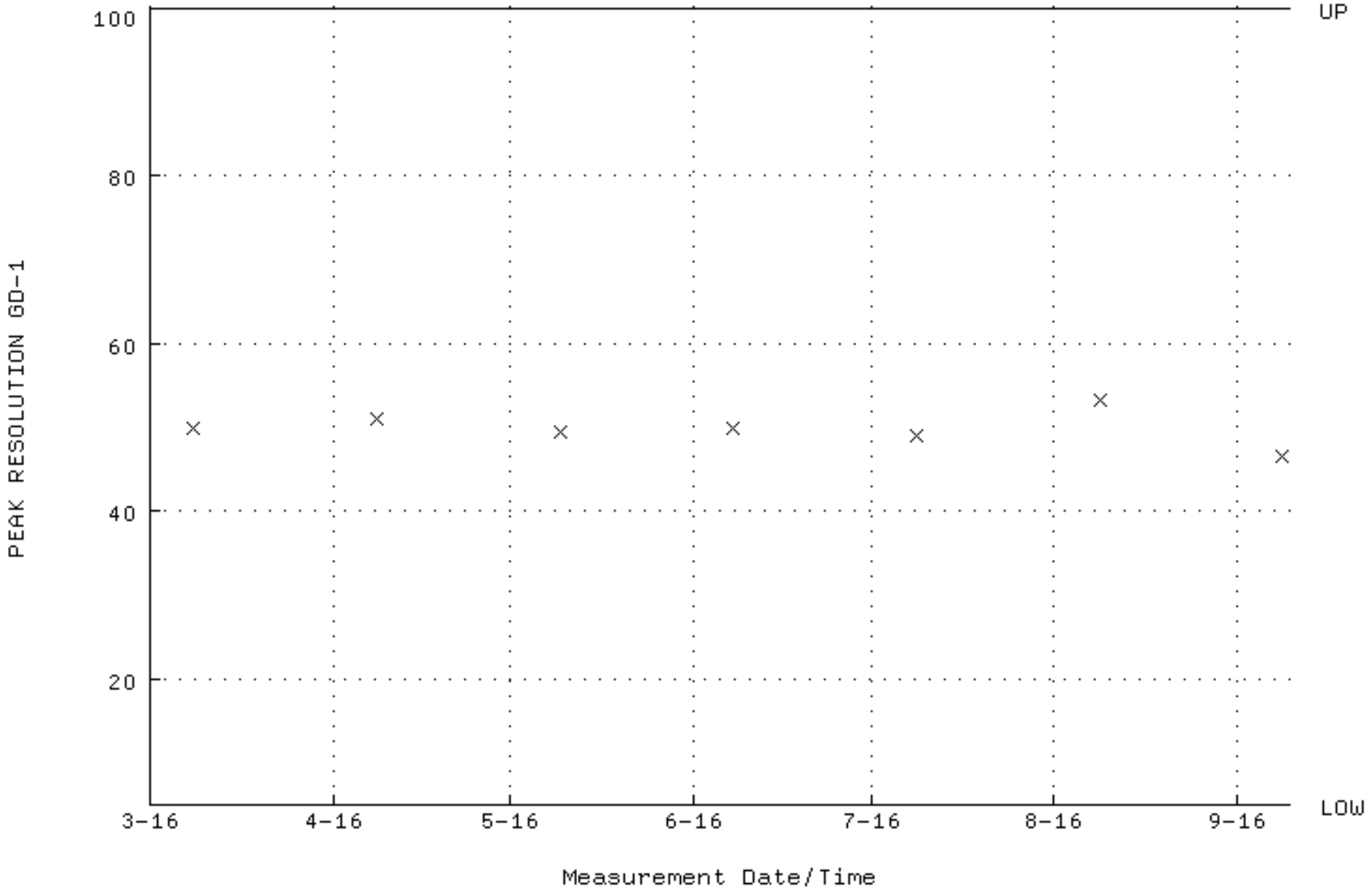
QA filename : DKA100:[ENV_ALPHA.QA.W]W128.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:17 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.252400 through 0.267960



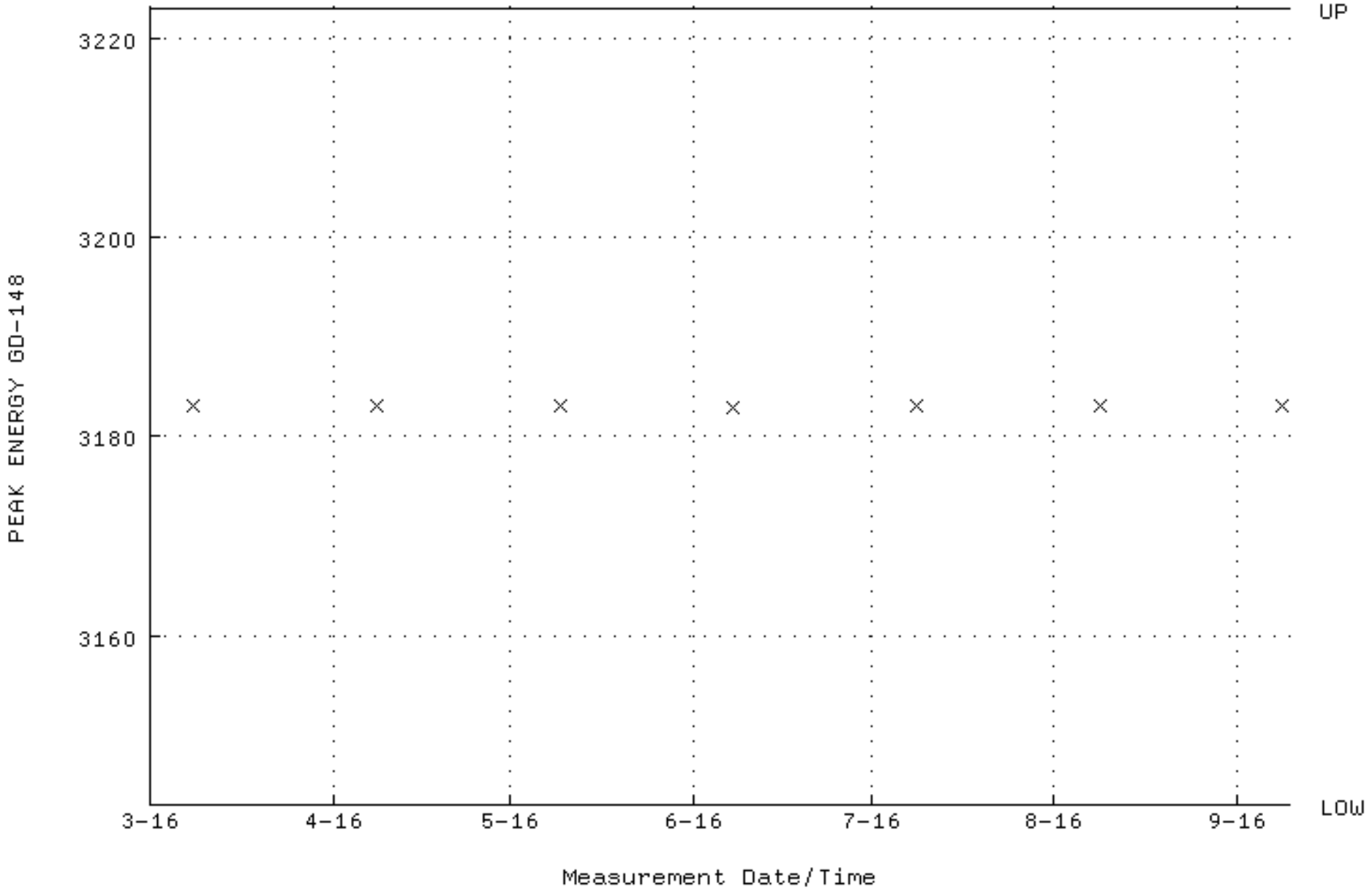
QA filename : DKA100:[ENV_ALPHA.QA.W]W128.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:17 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



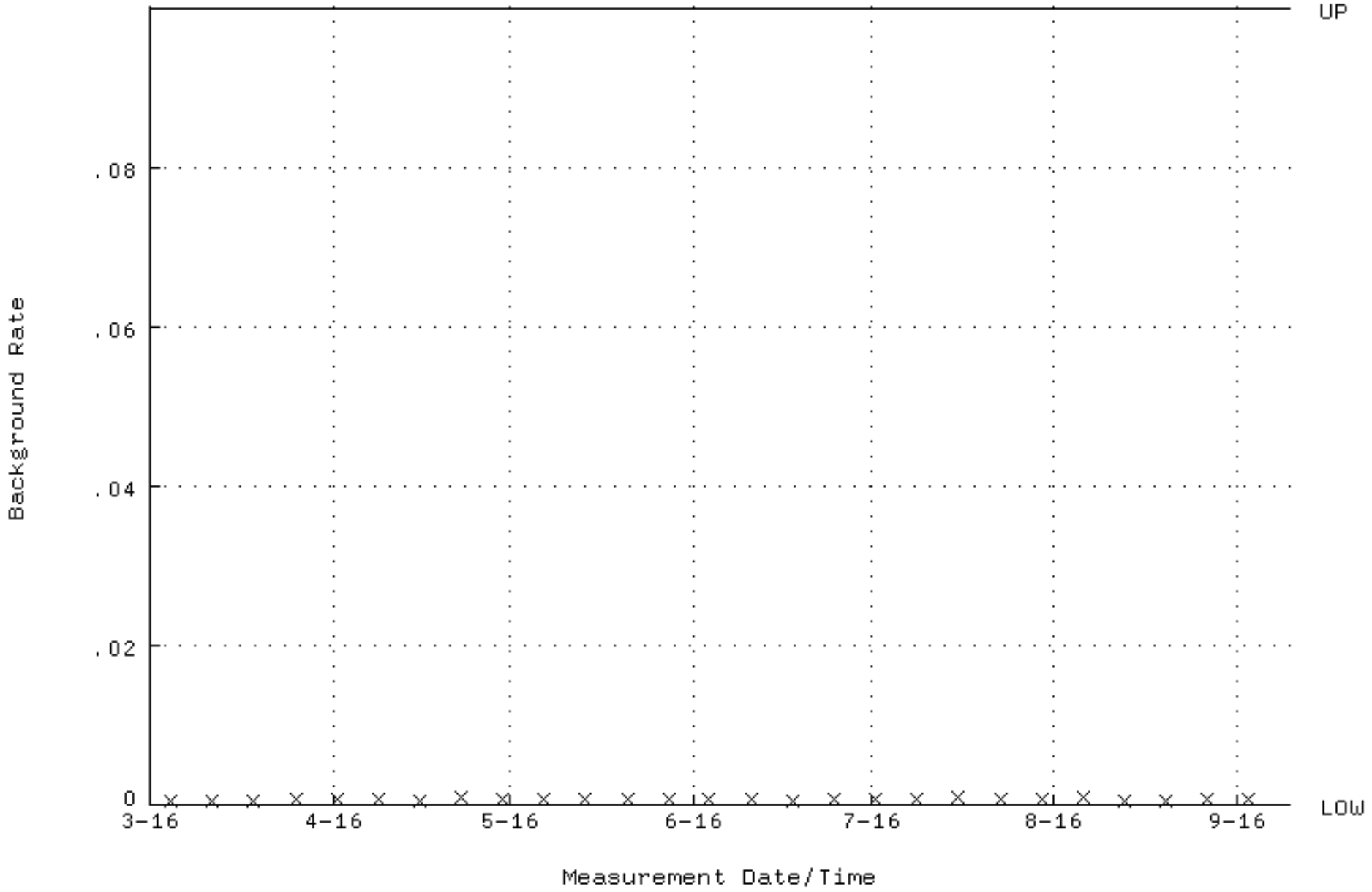
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:17 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



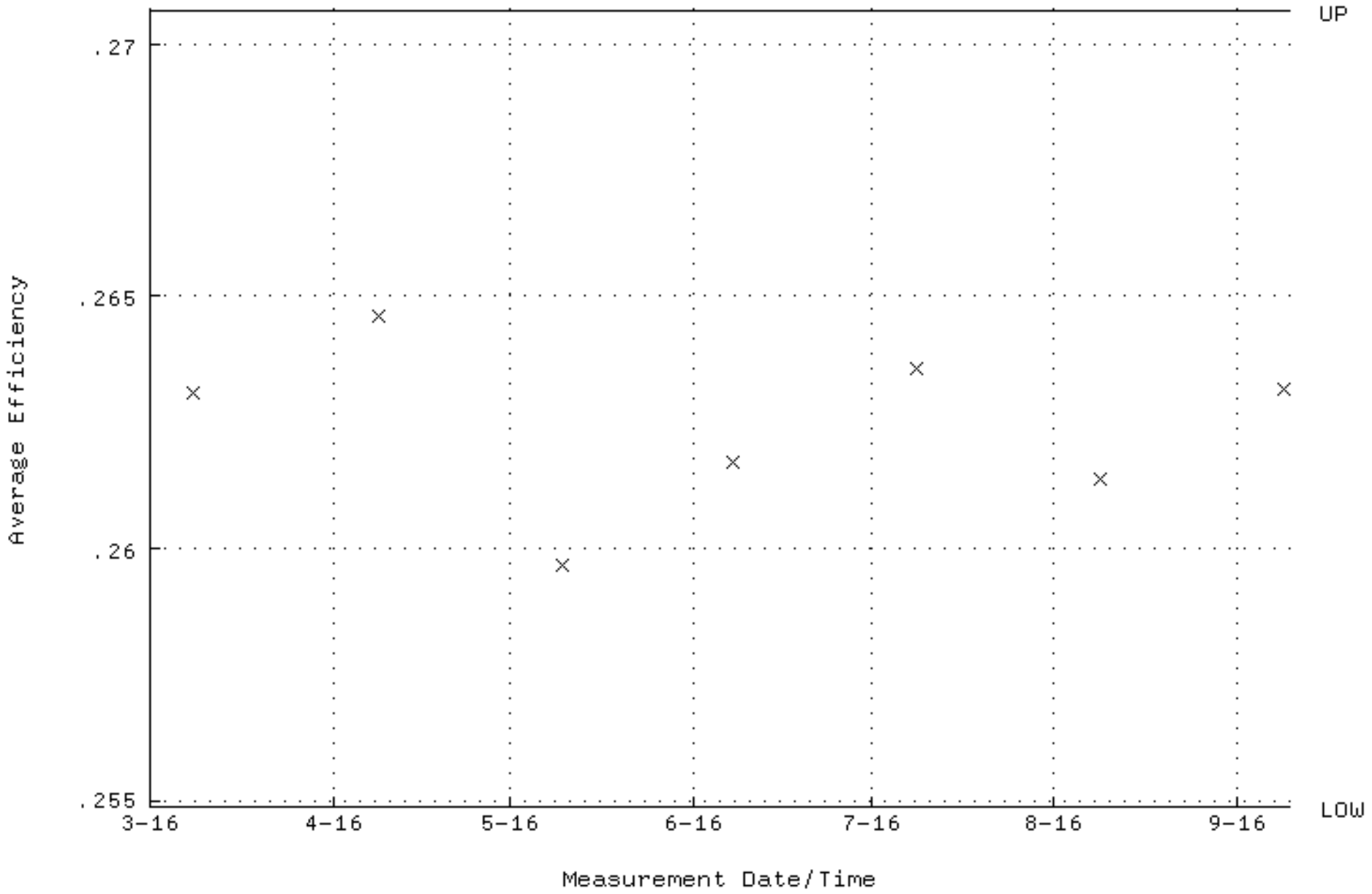
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:17 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



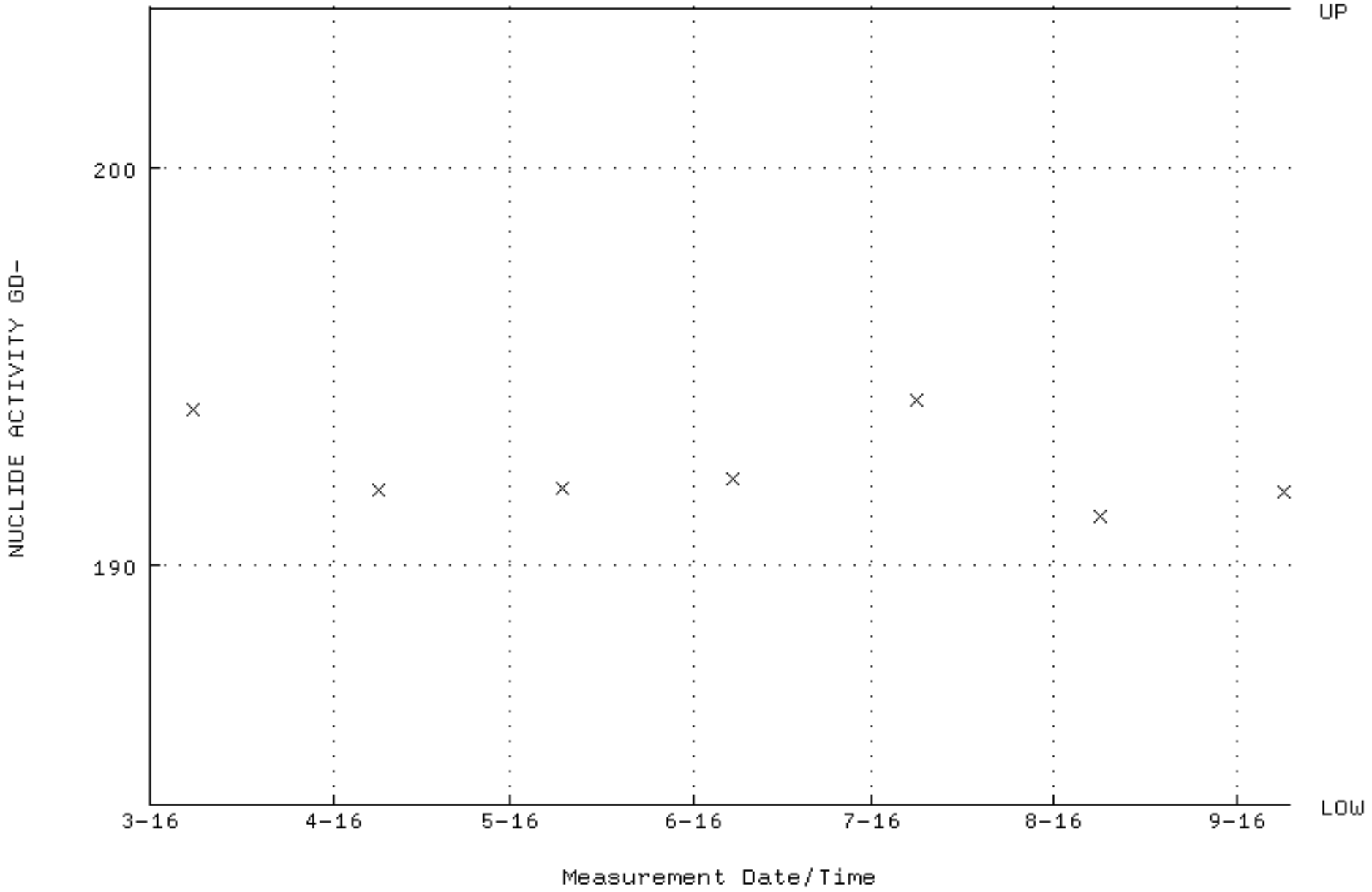
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Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:22 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



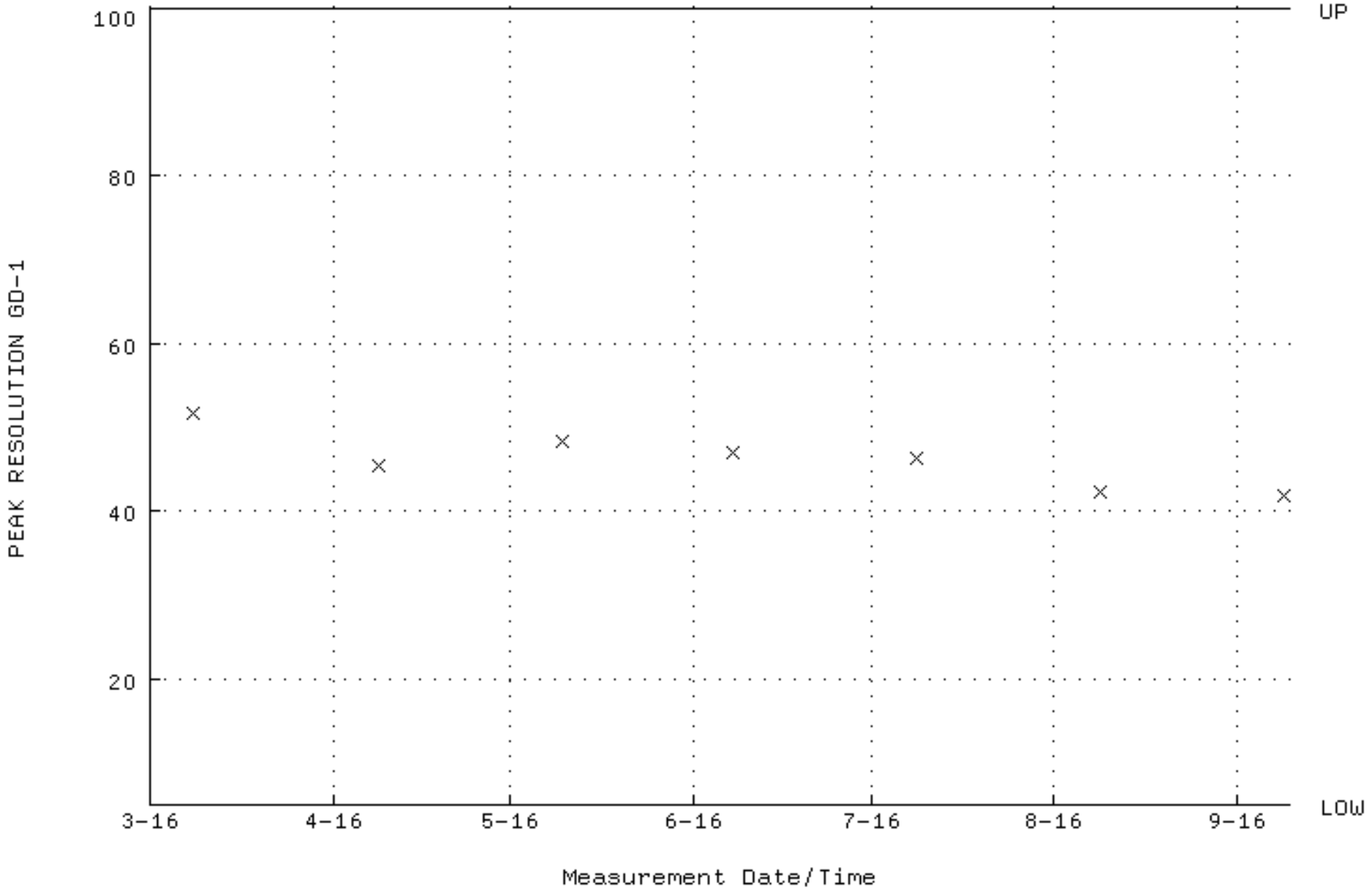
QA filename : DKA100:[ENV_ALPHA.QA.W]W129.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:21 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.254891 through 0.270657



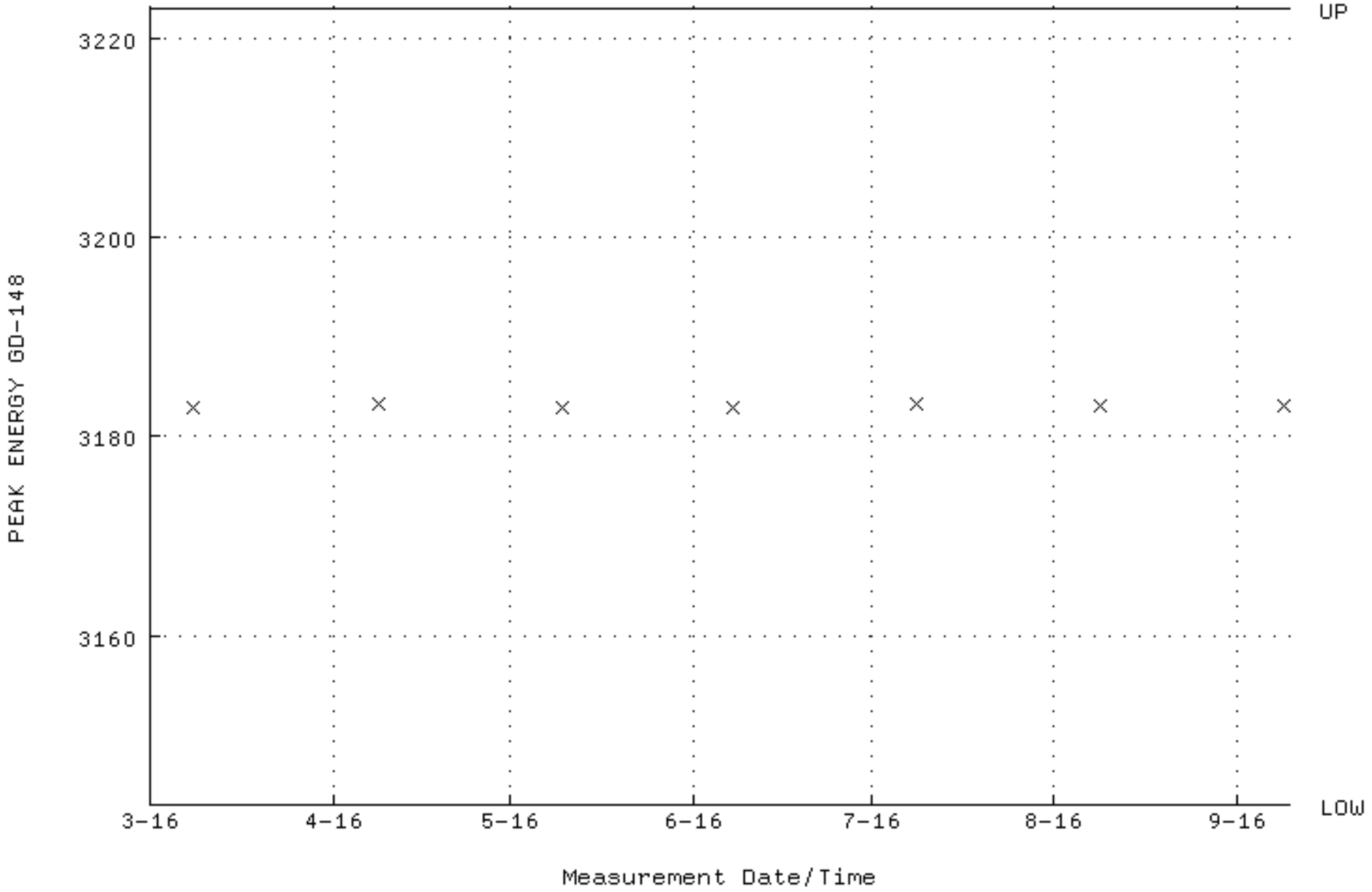
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:21 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



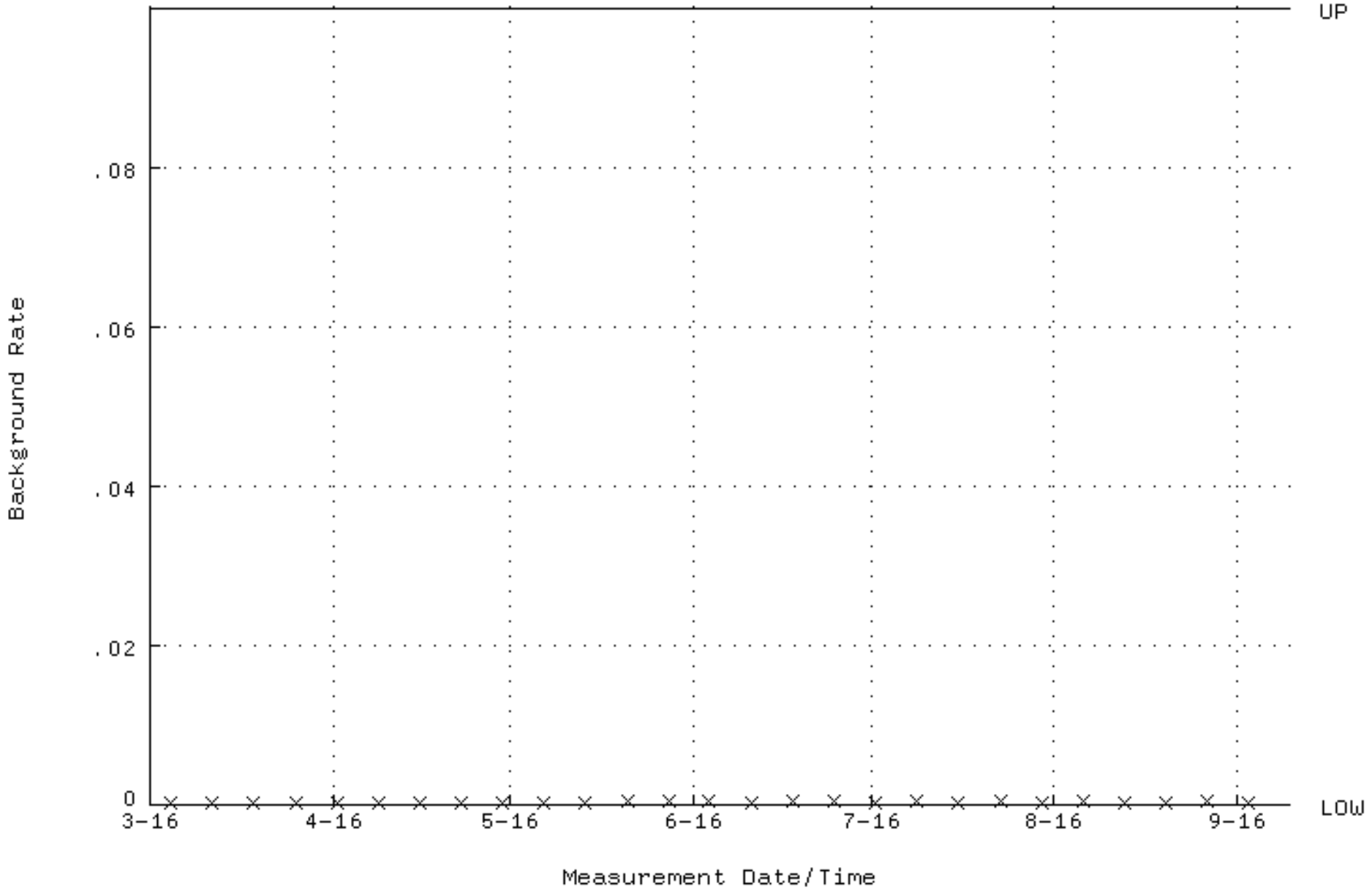
QA filename : DKA100:[ENV_ALPHA.QA.W]W129.QAF;7
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:21 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



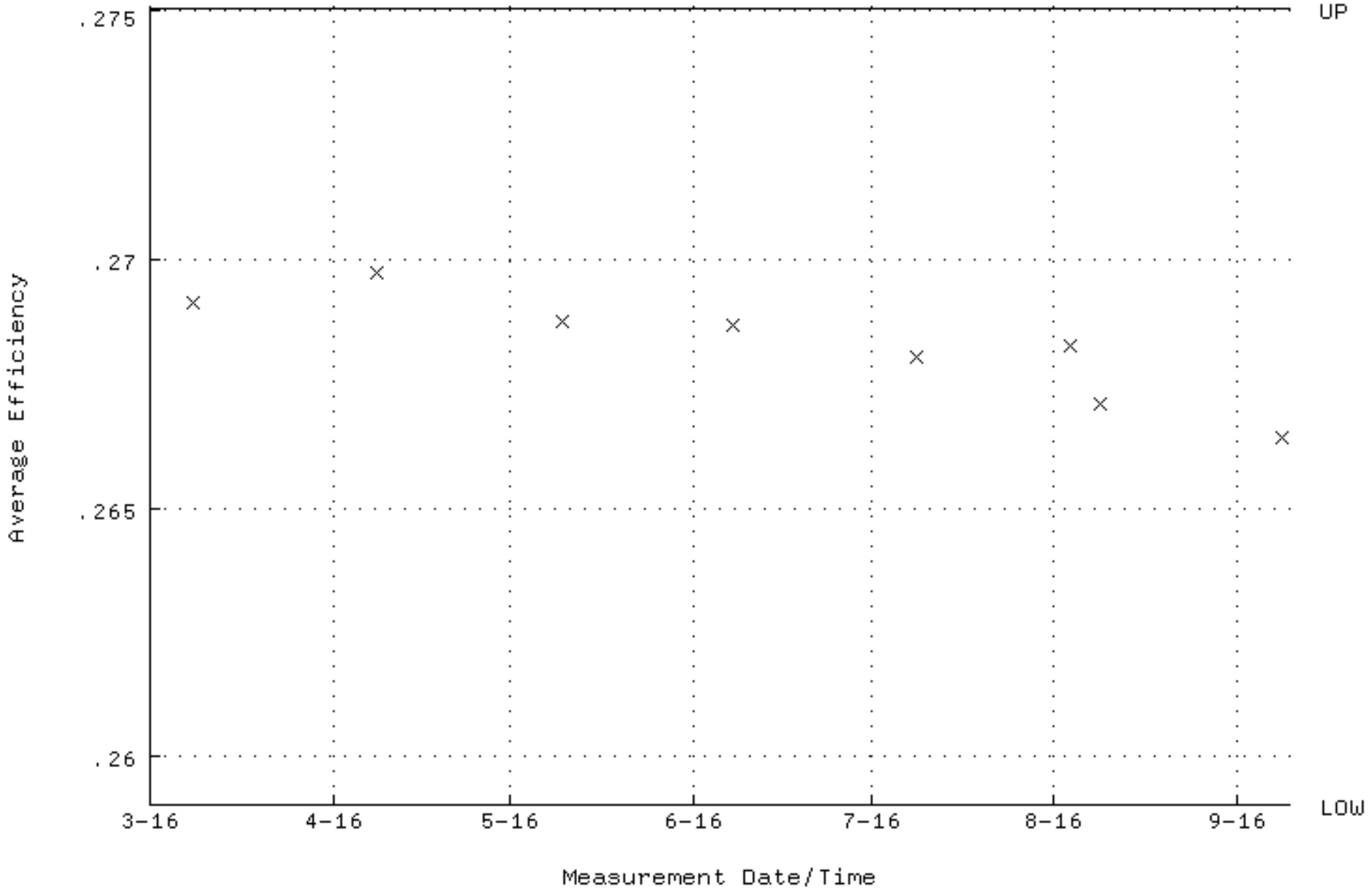
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:21 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



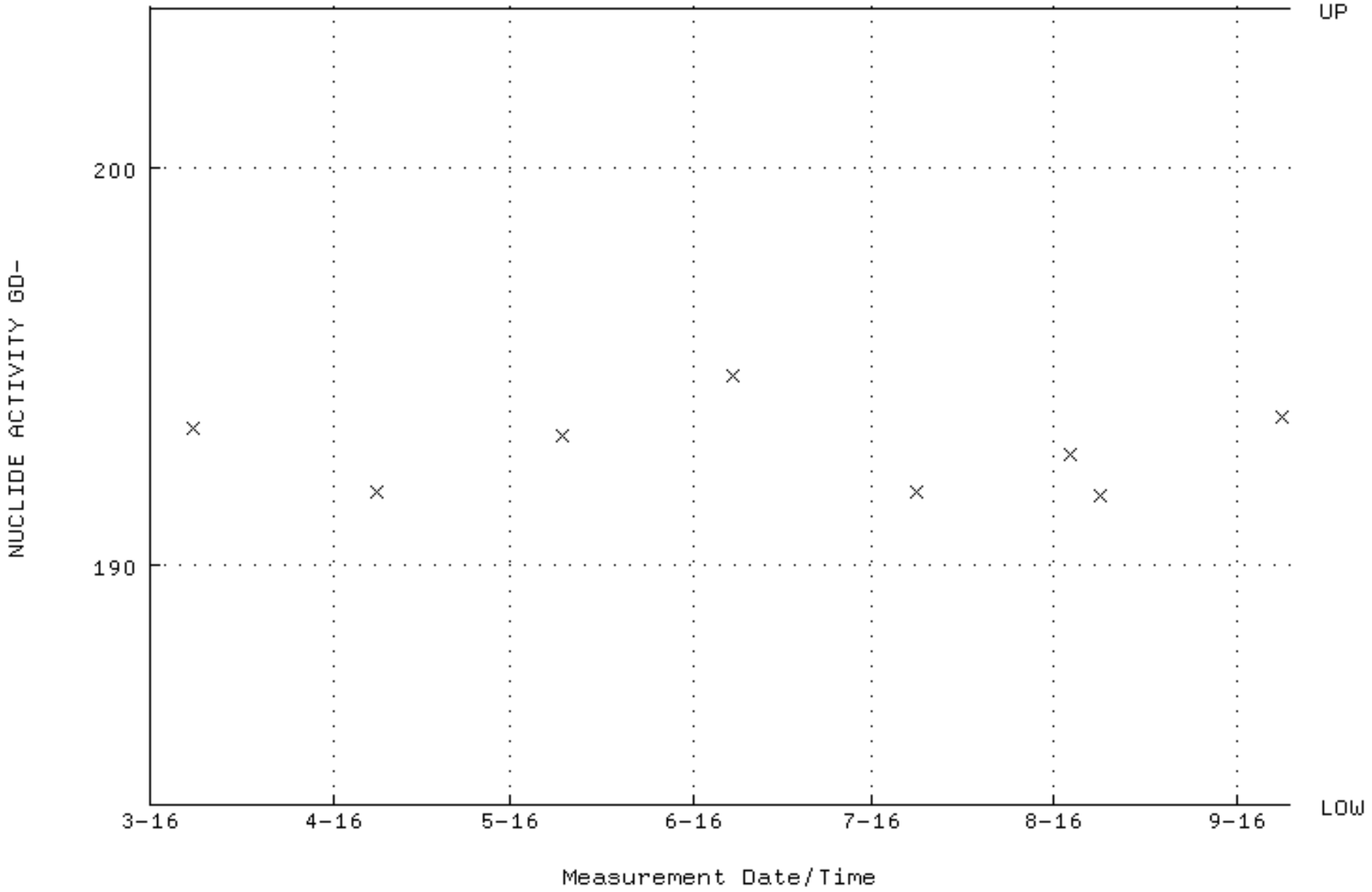
QA filename : DKA100:[ENV_ALPHA.QA.B]B129.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:26 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



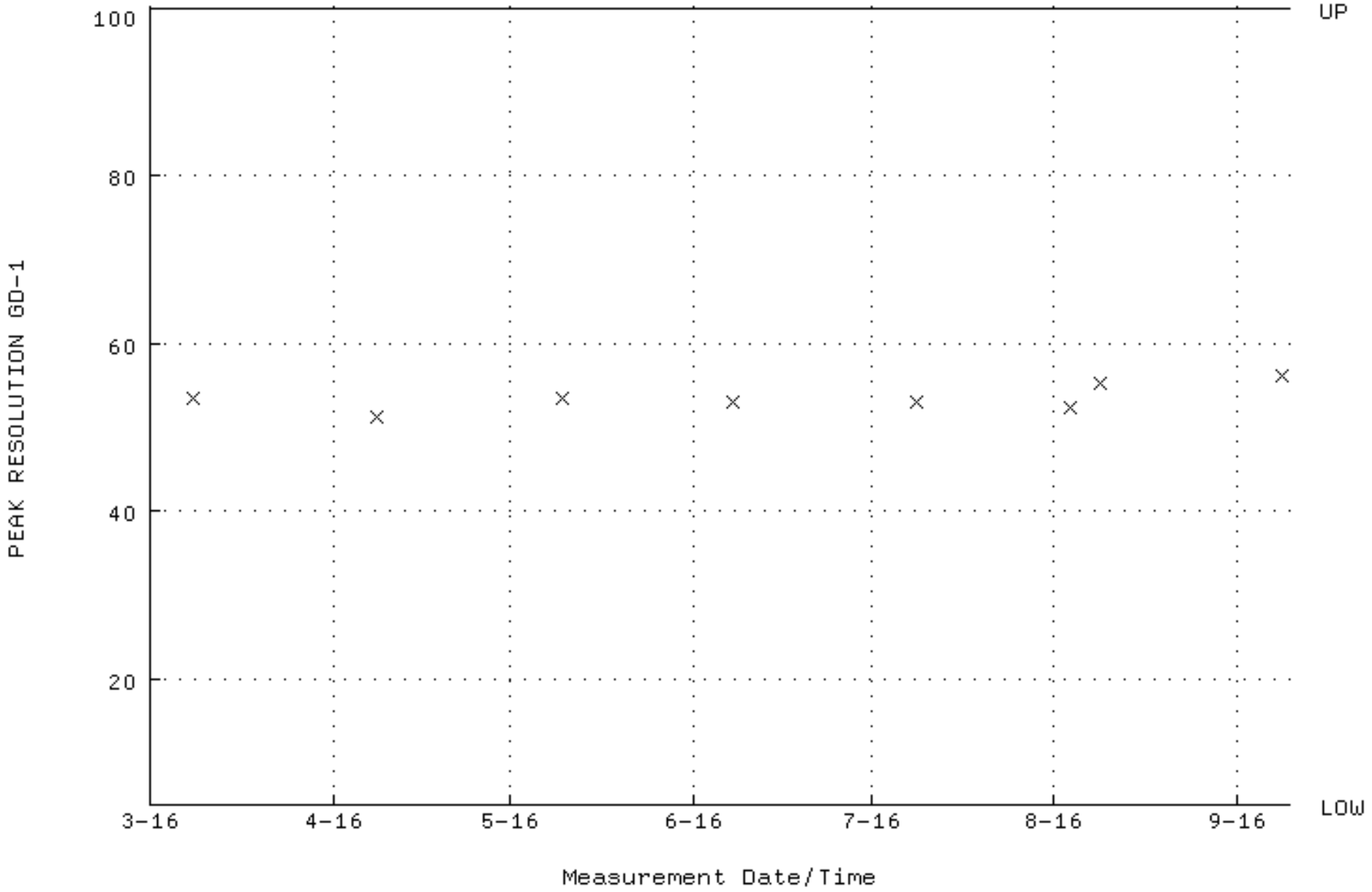
QA filename : DKA100:[ENV_ALPHA.QA.W]W130.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:25 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.259030 through 0.275050



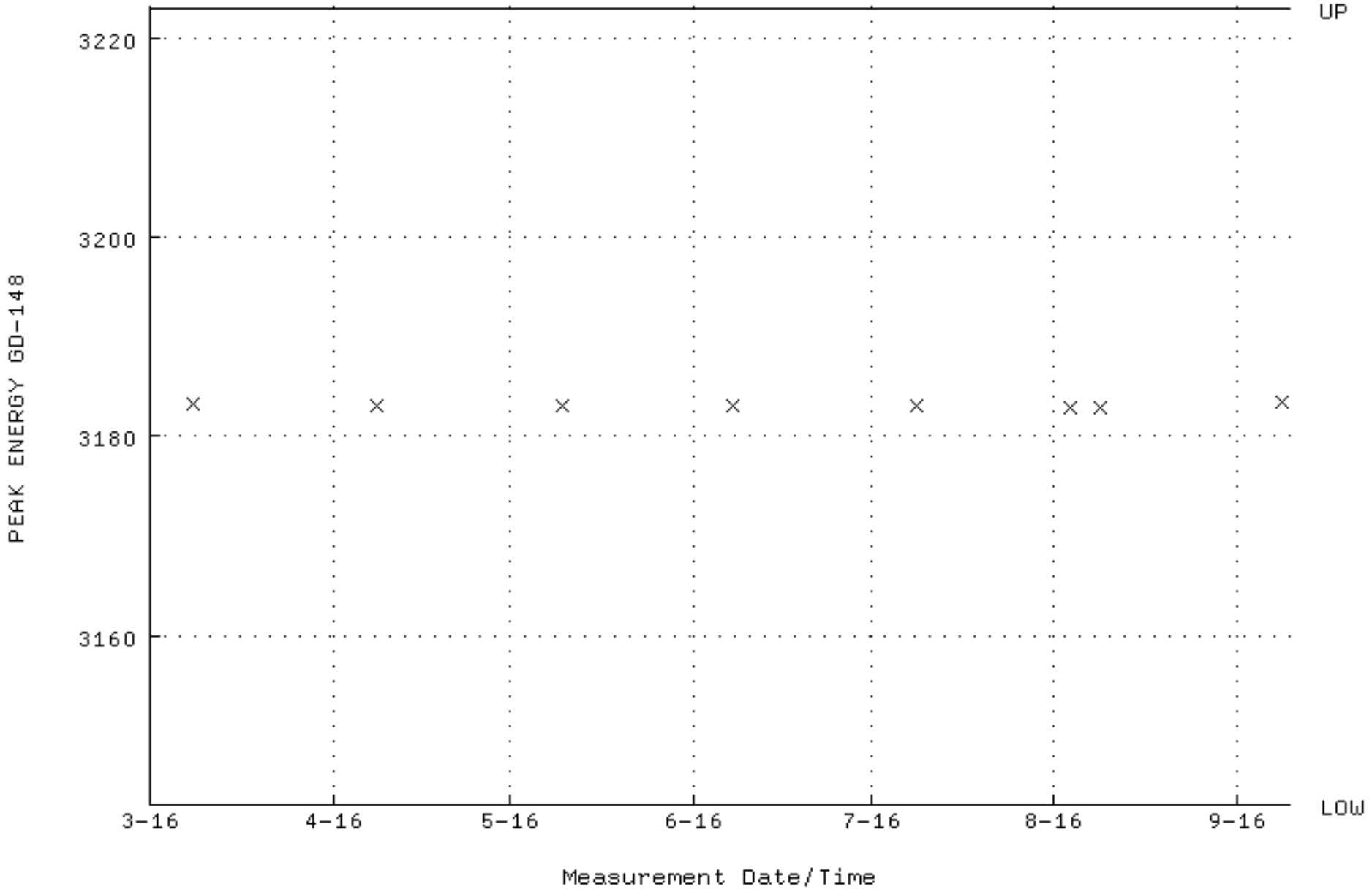
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:25 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



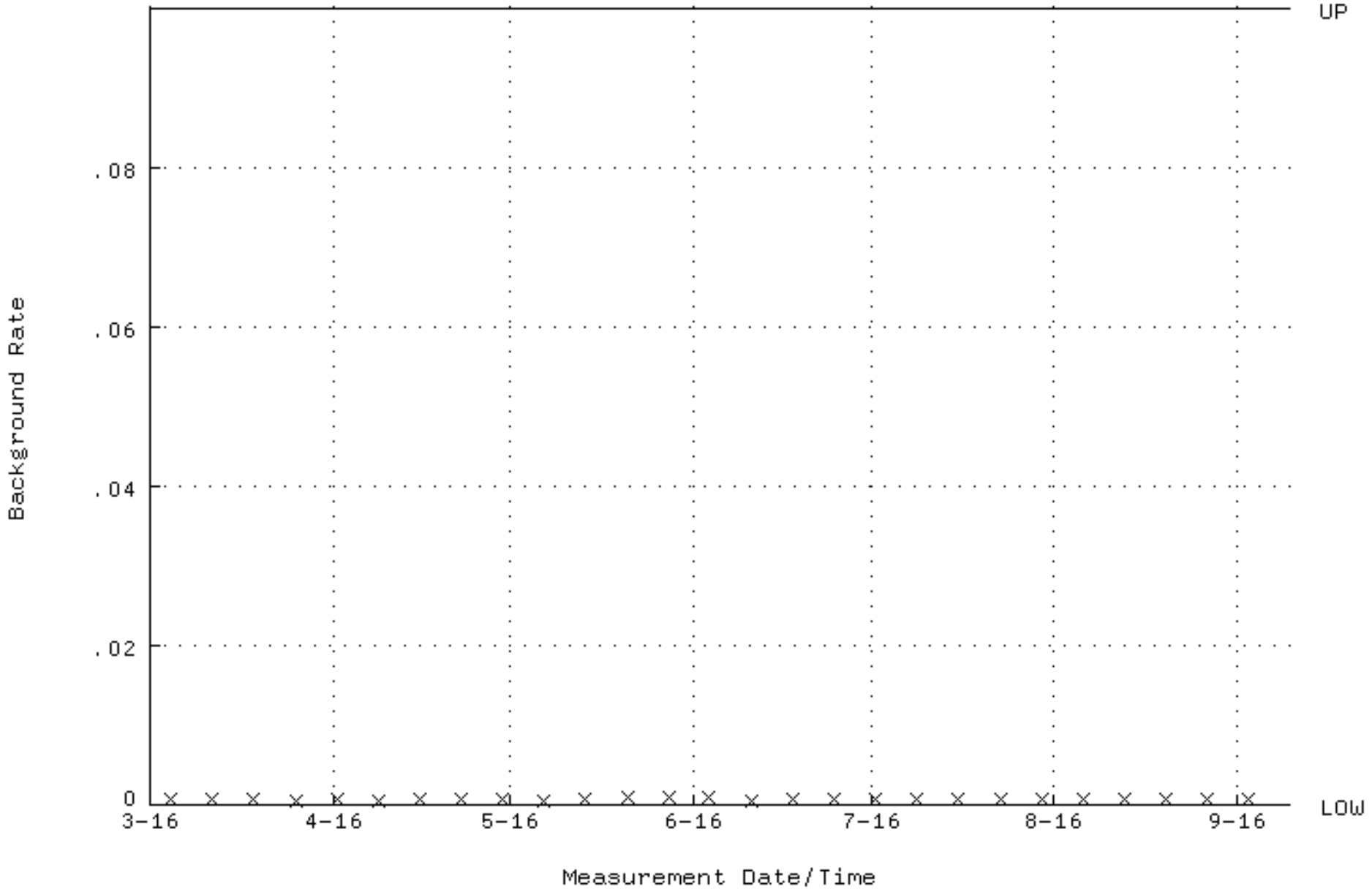
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:25 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



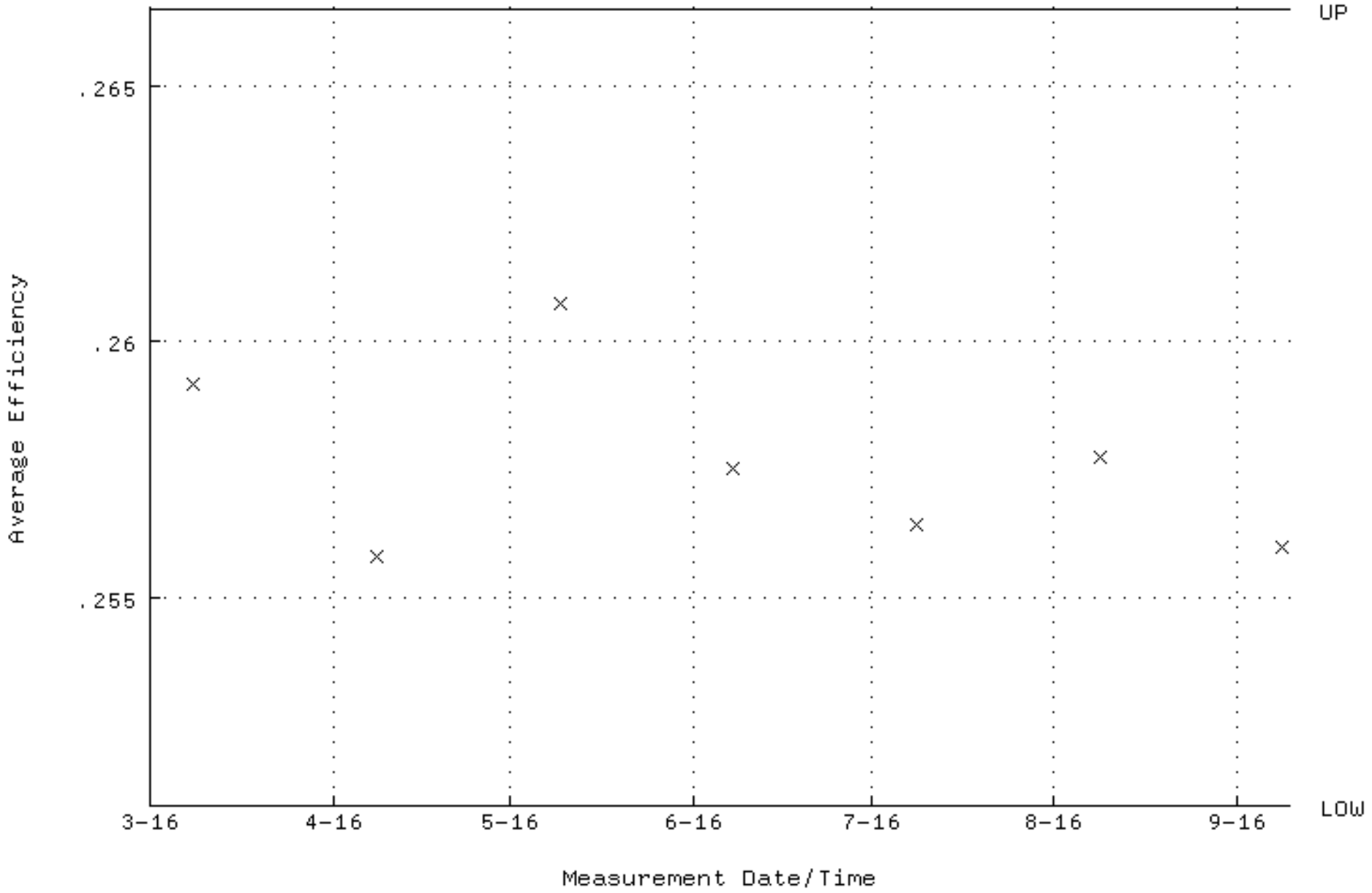
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:25 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



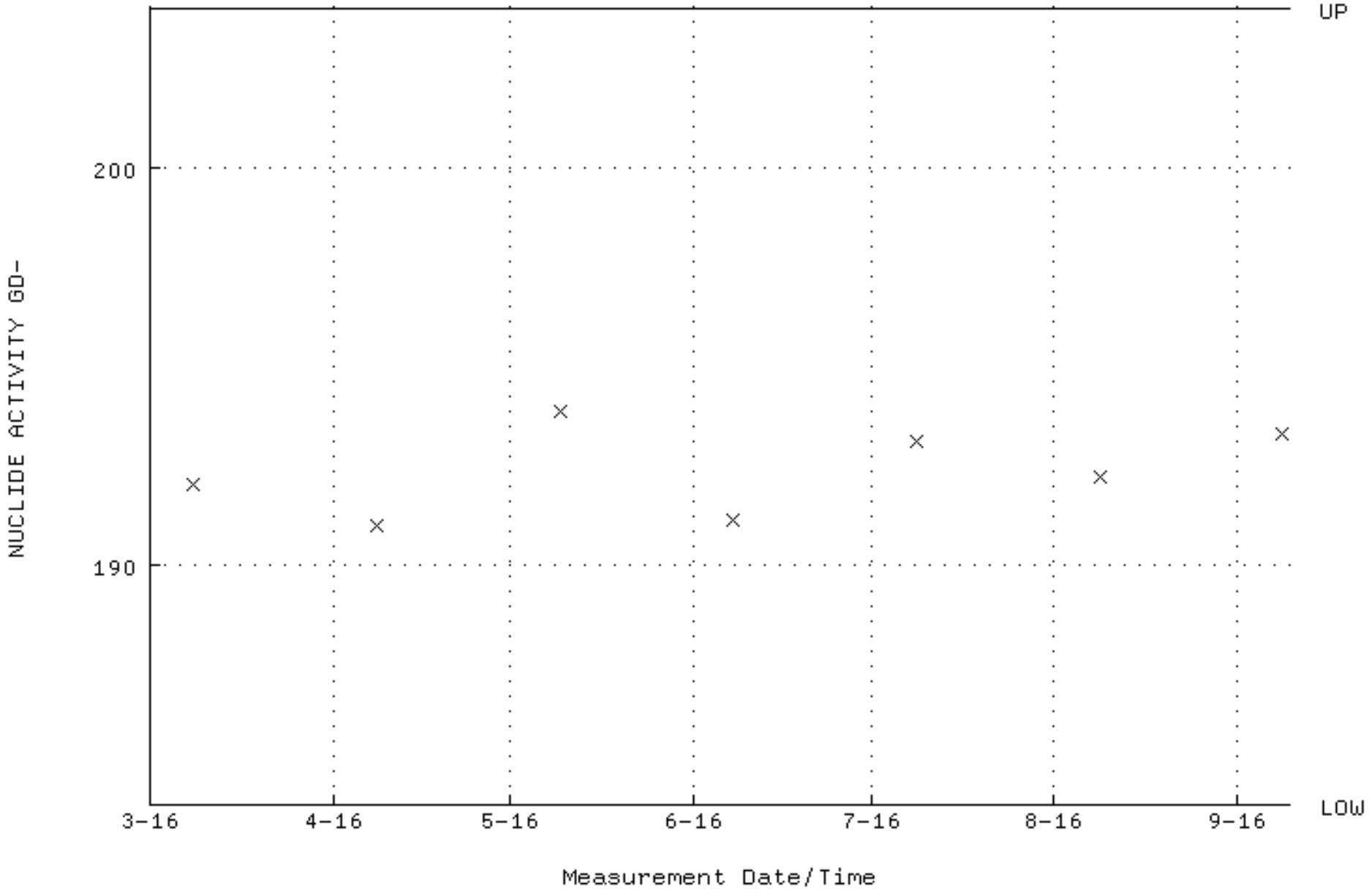
QA filename : DKA100:[ENV_ALPHA.QA.B]B130.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:30 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



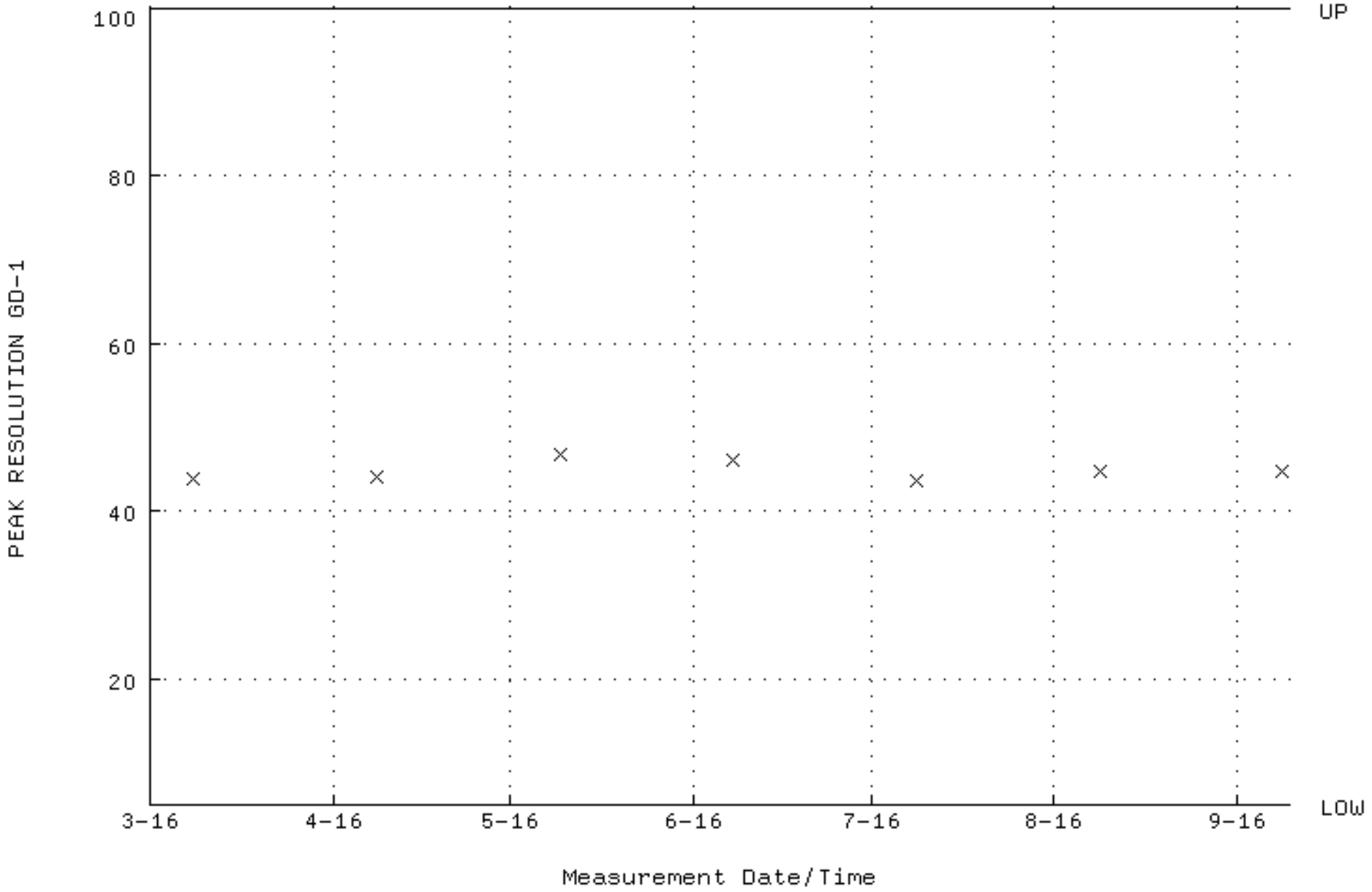
QA filename : DKA100:[ENV_ALPHA.QA.W]W131.QAF;7
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:28 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.250957 through 0.266481



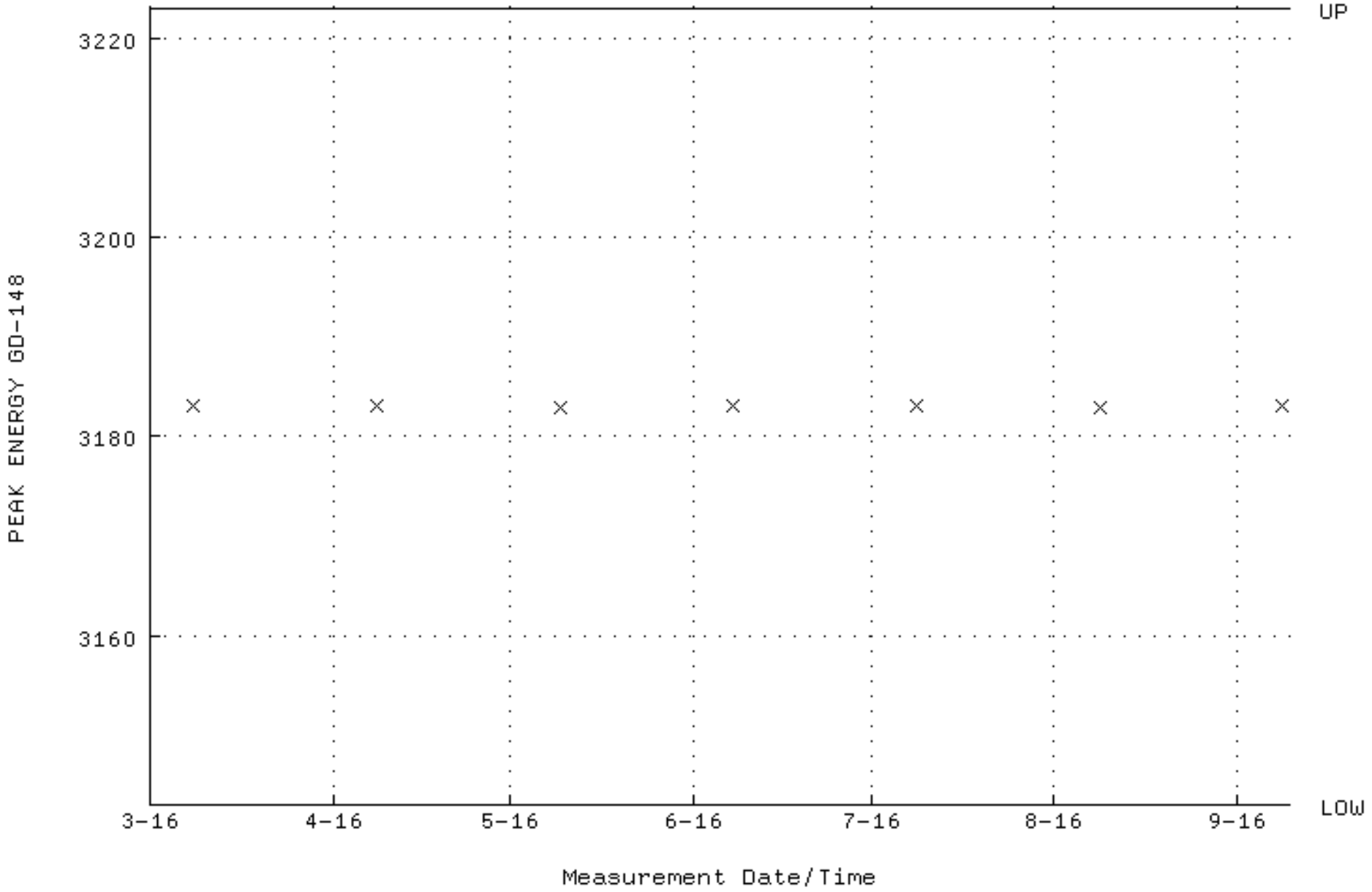
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Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:28 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



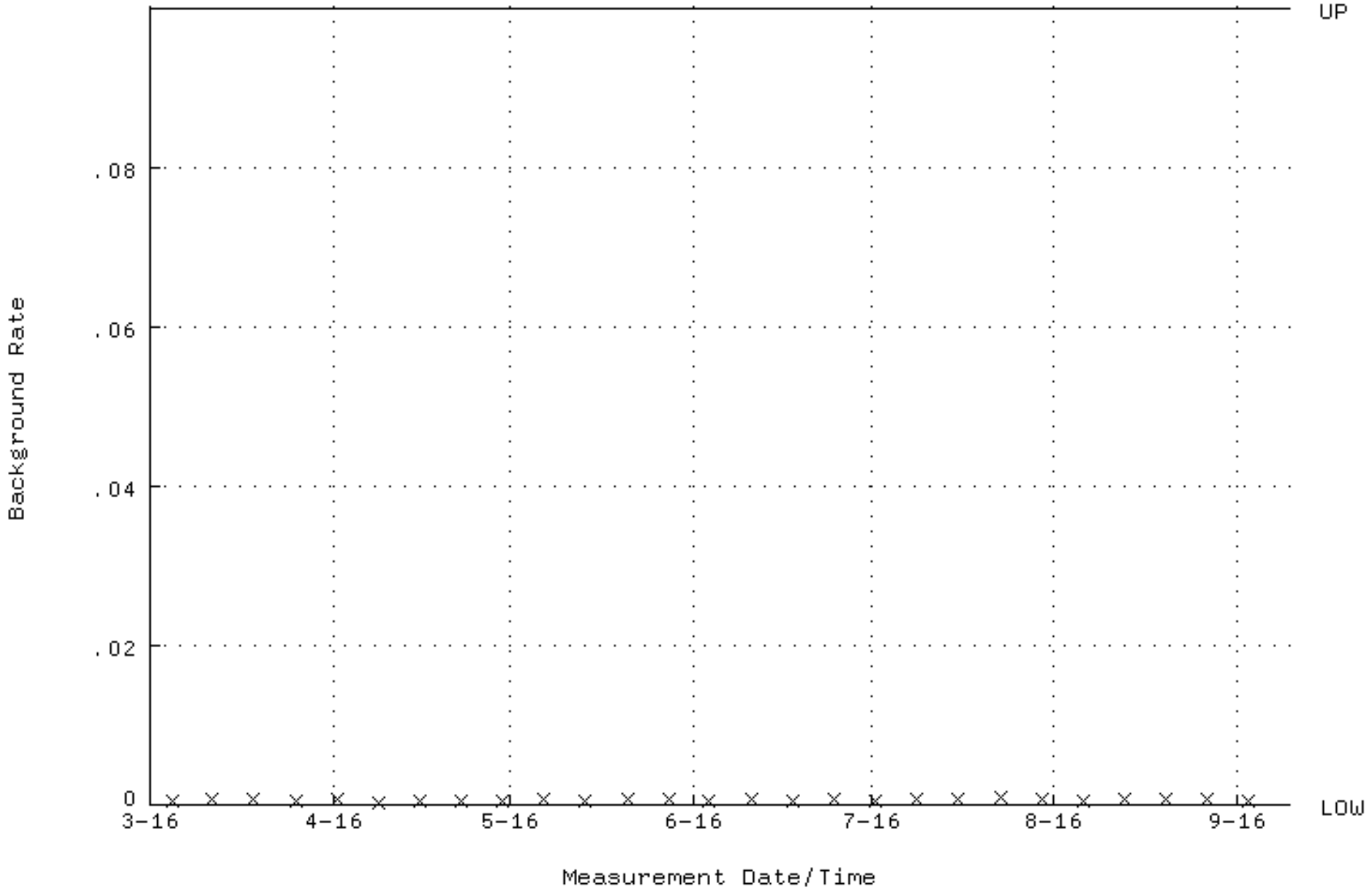
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Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:28 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



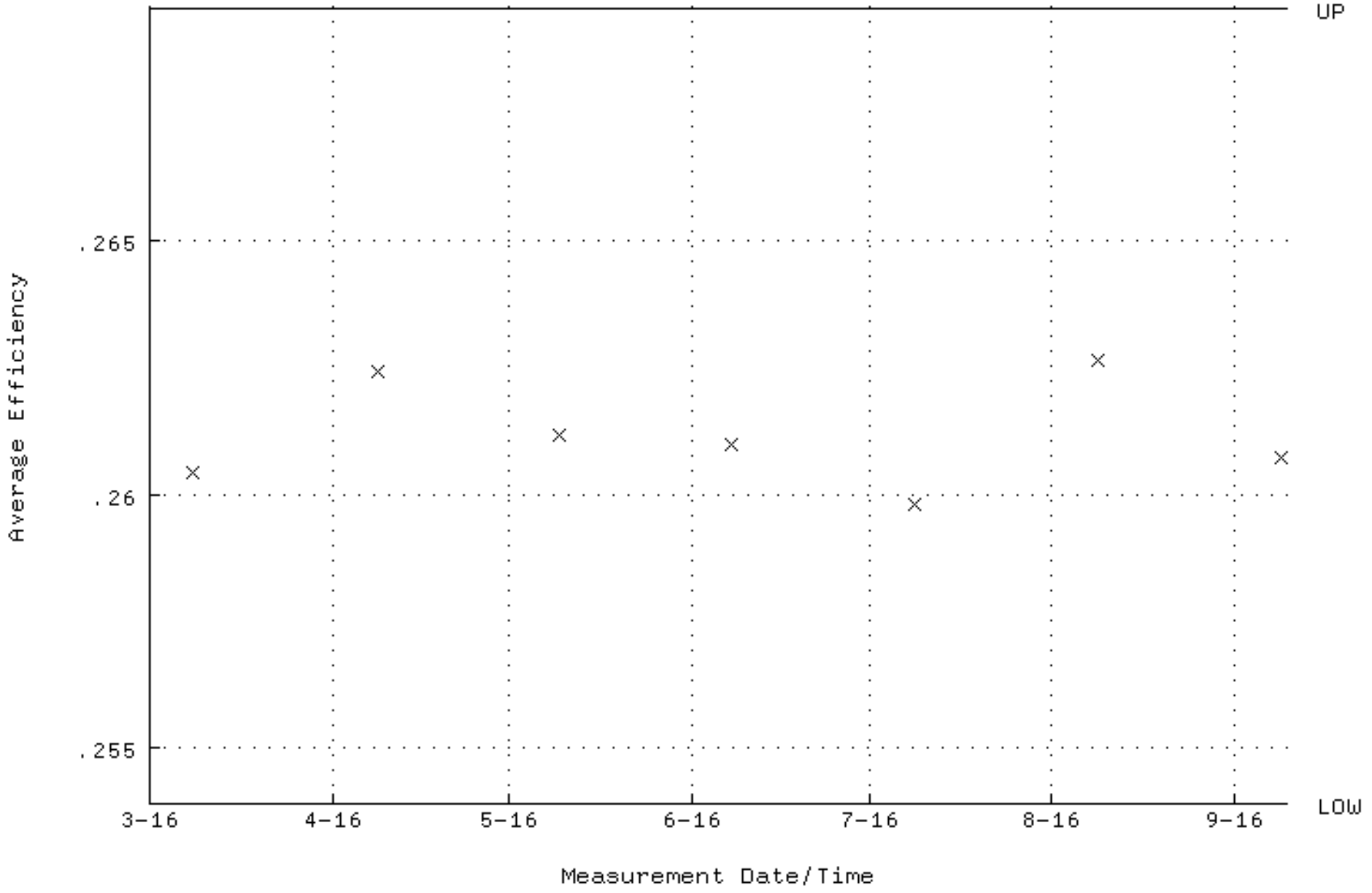
QA filename : DKA100:[ENV_ALPHA.QA.W]W131.QAF;7
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:28 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



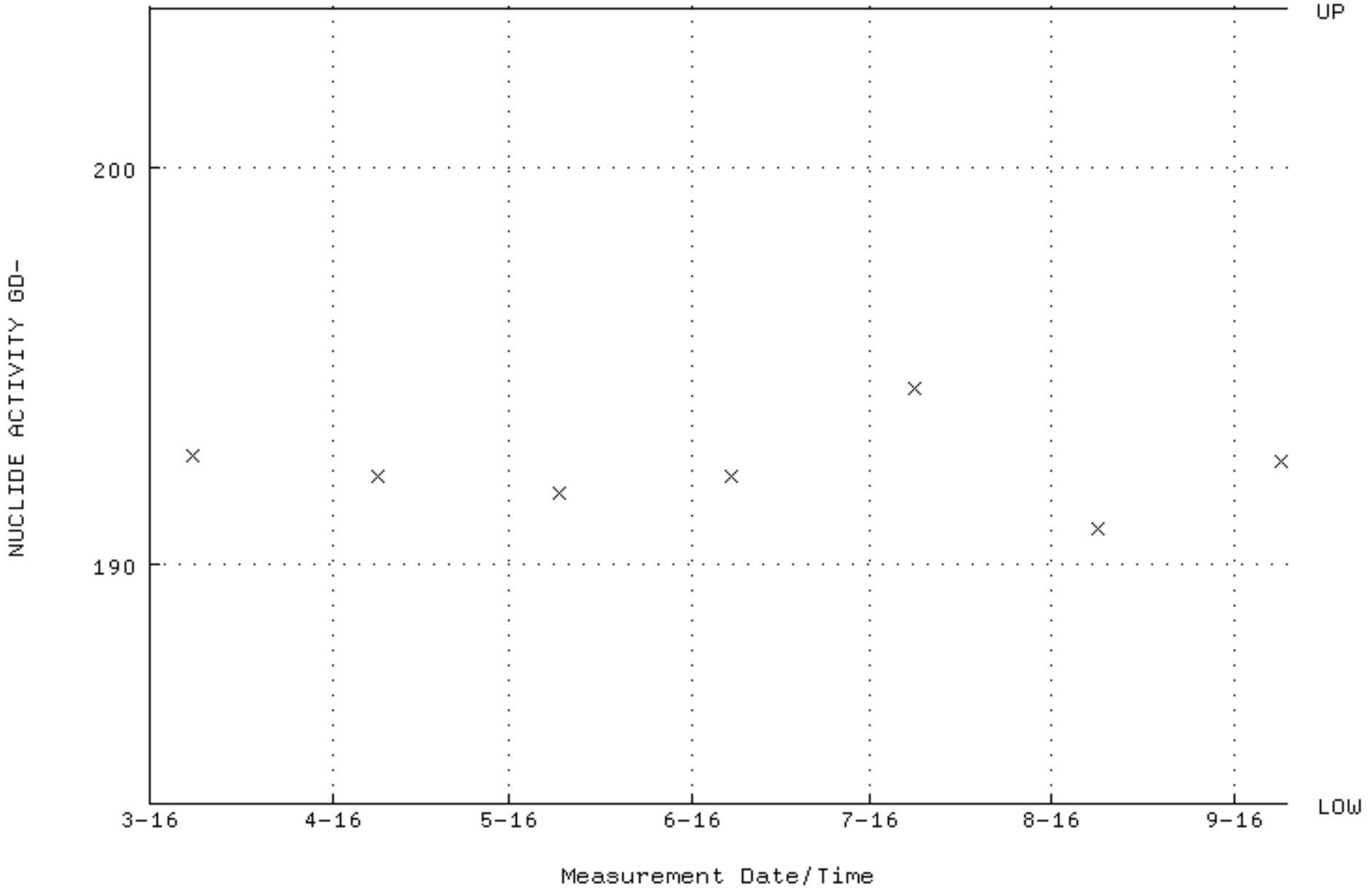
QA filename : DKA100:[ENV_ALPHA.QA.B]B131.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:23:28 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



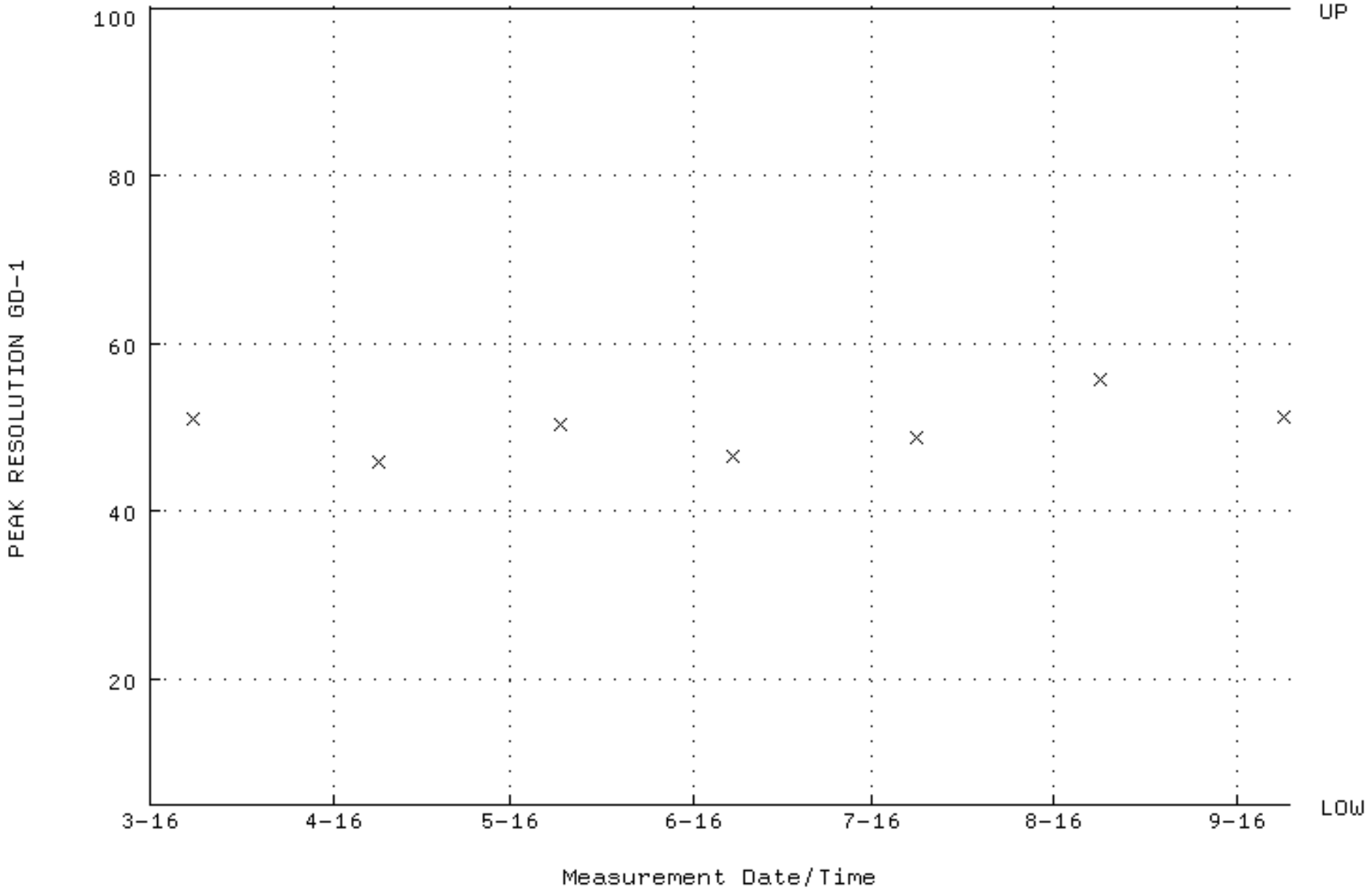
QA filename : DKA100:[ENV_ALPHA.QA.W]W132.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:33 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.253891 through 0.269595



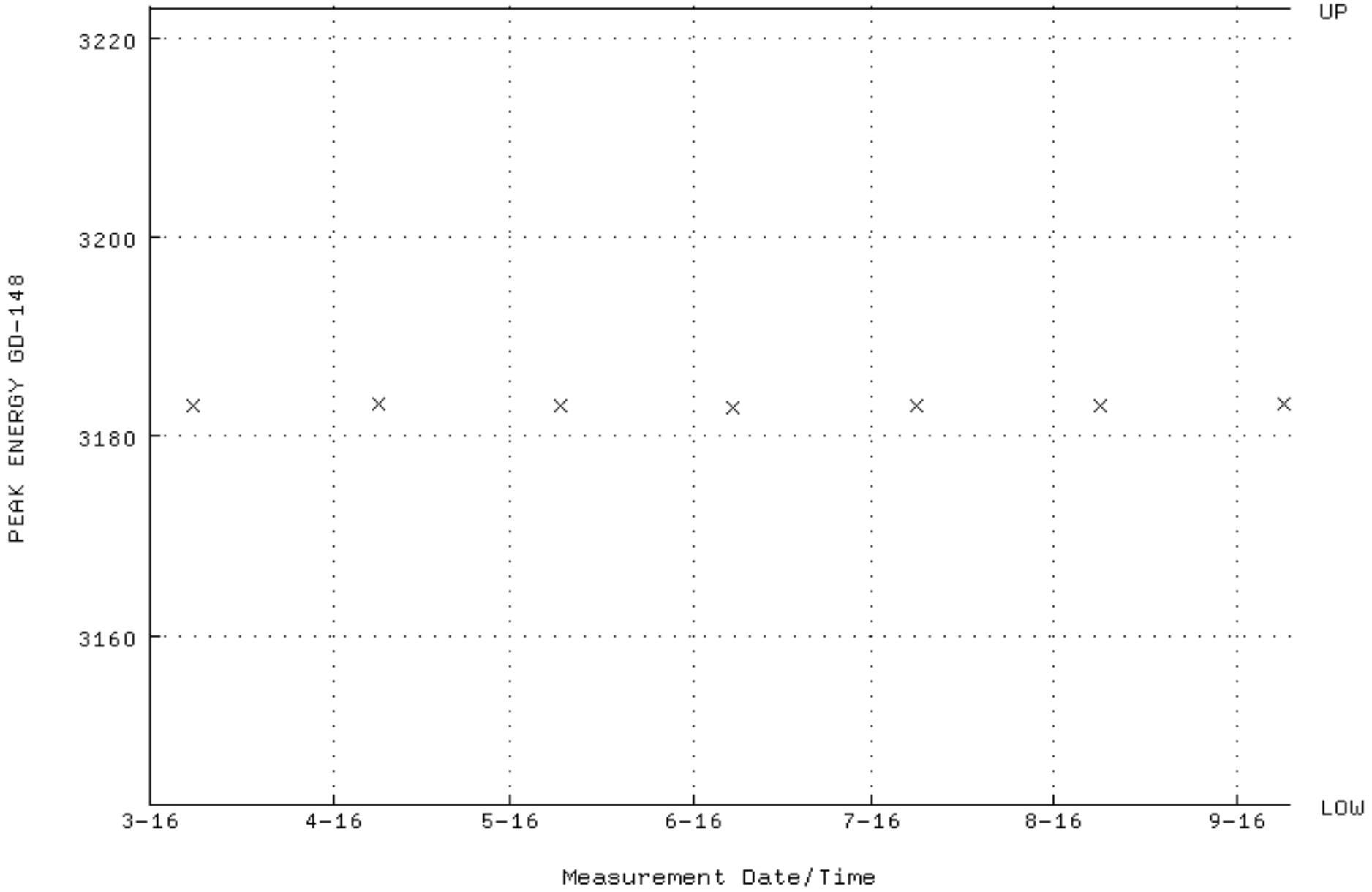
QA filename : DKA100:[ENV_ALPHA.QA.W]W132.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:33 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



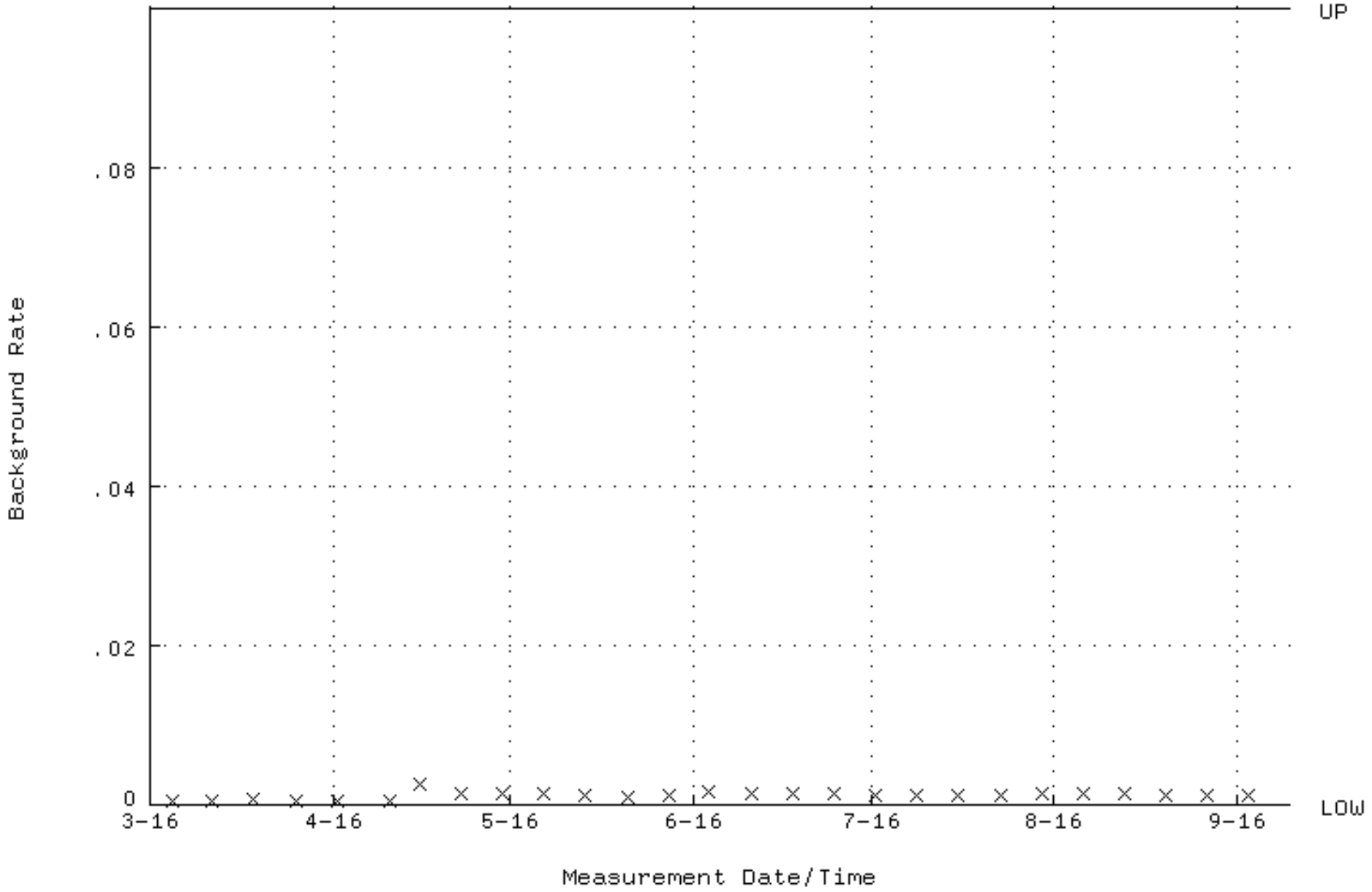
QA filename : DKA100:[ENV_ALPHA.QA.W]W132.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:33 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



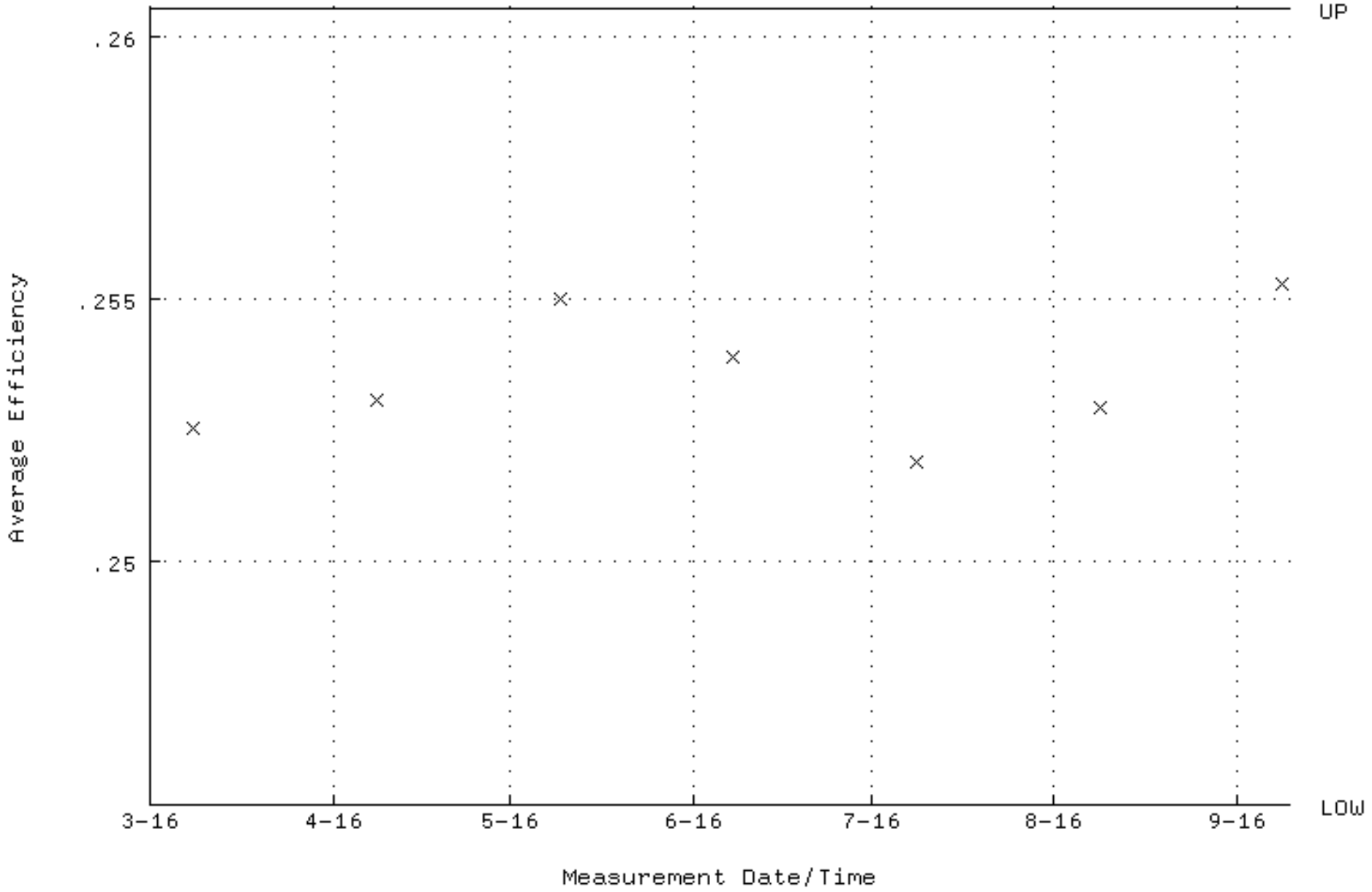
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:33 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



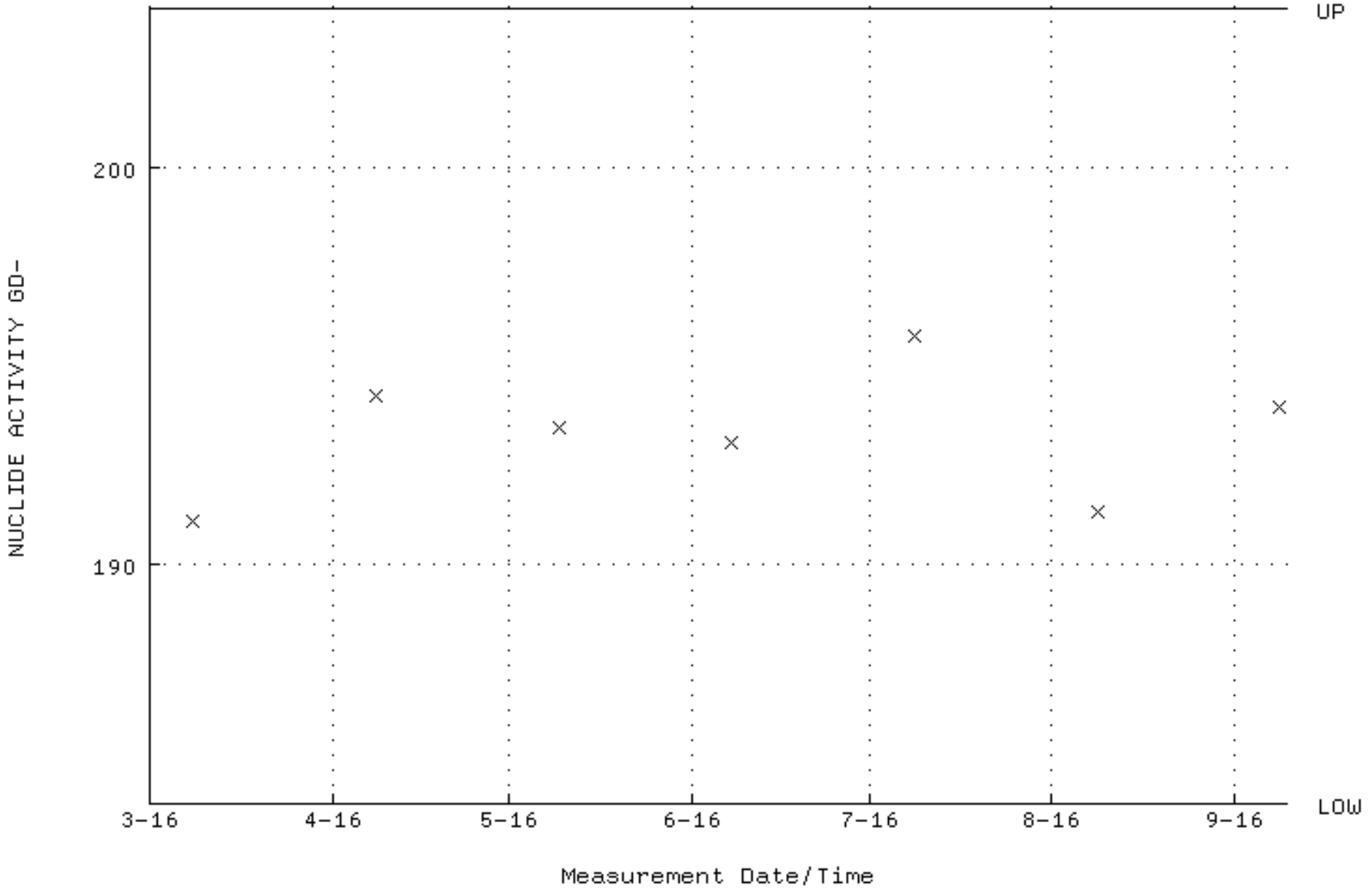
QA filename : DKA100:[ENV_ALPHA.QA.B]B132.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 16:23:31 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



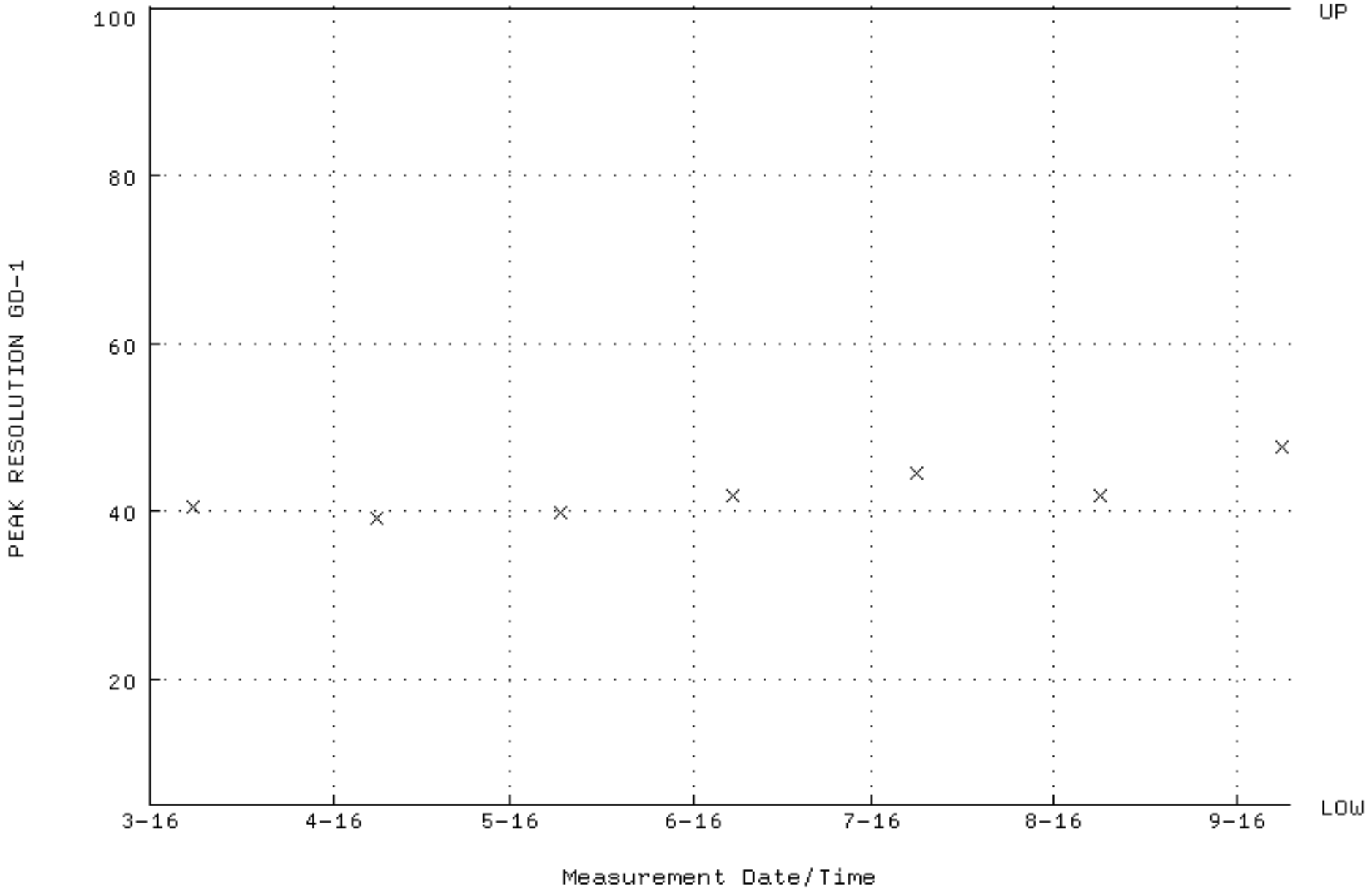
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 8-MAR-2016 08:22:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.245373 through 0.260550



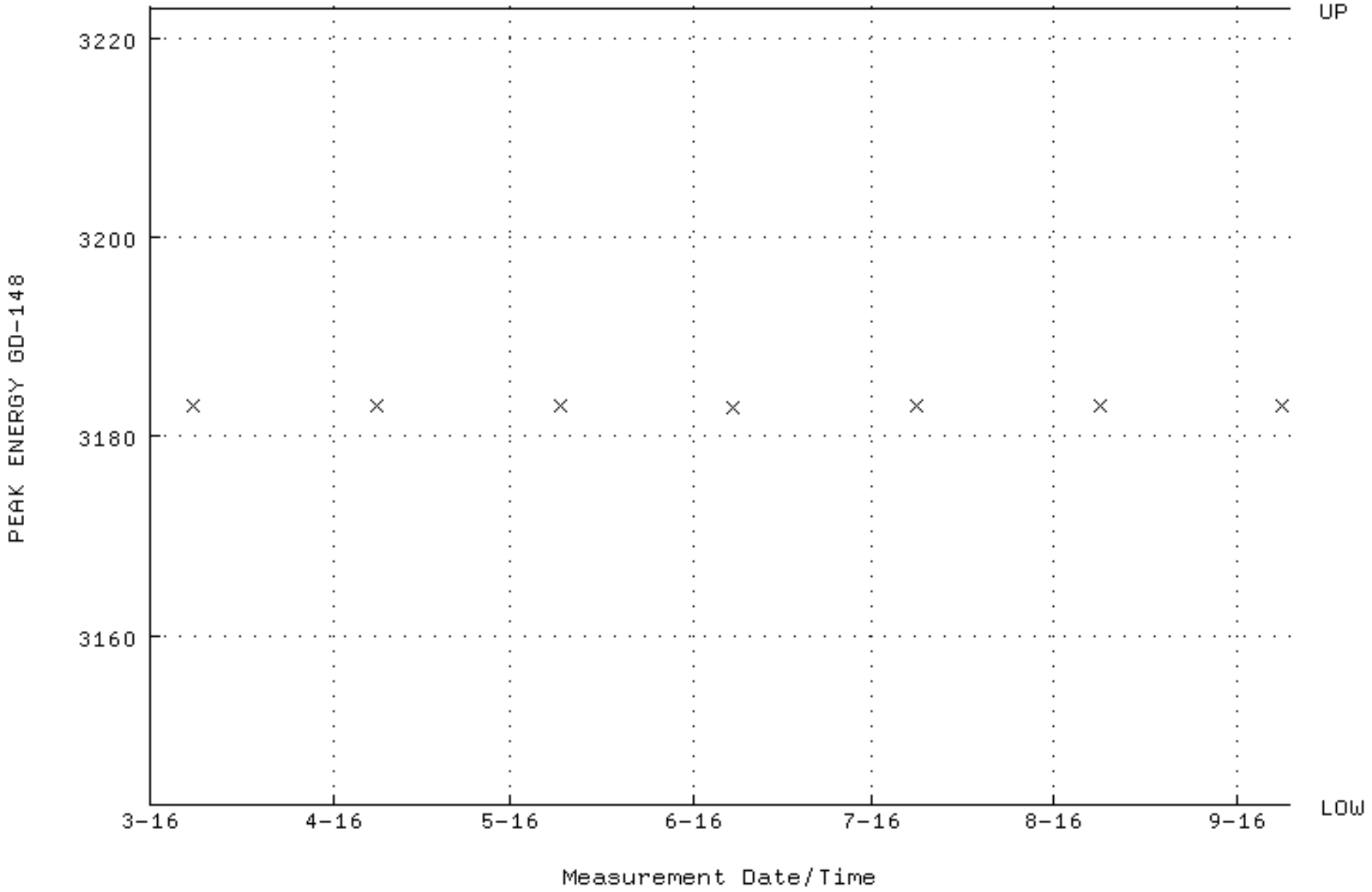
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 8-MAR-2016 08:22:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



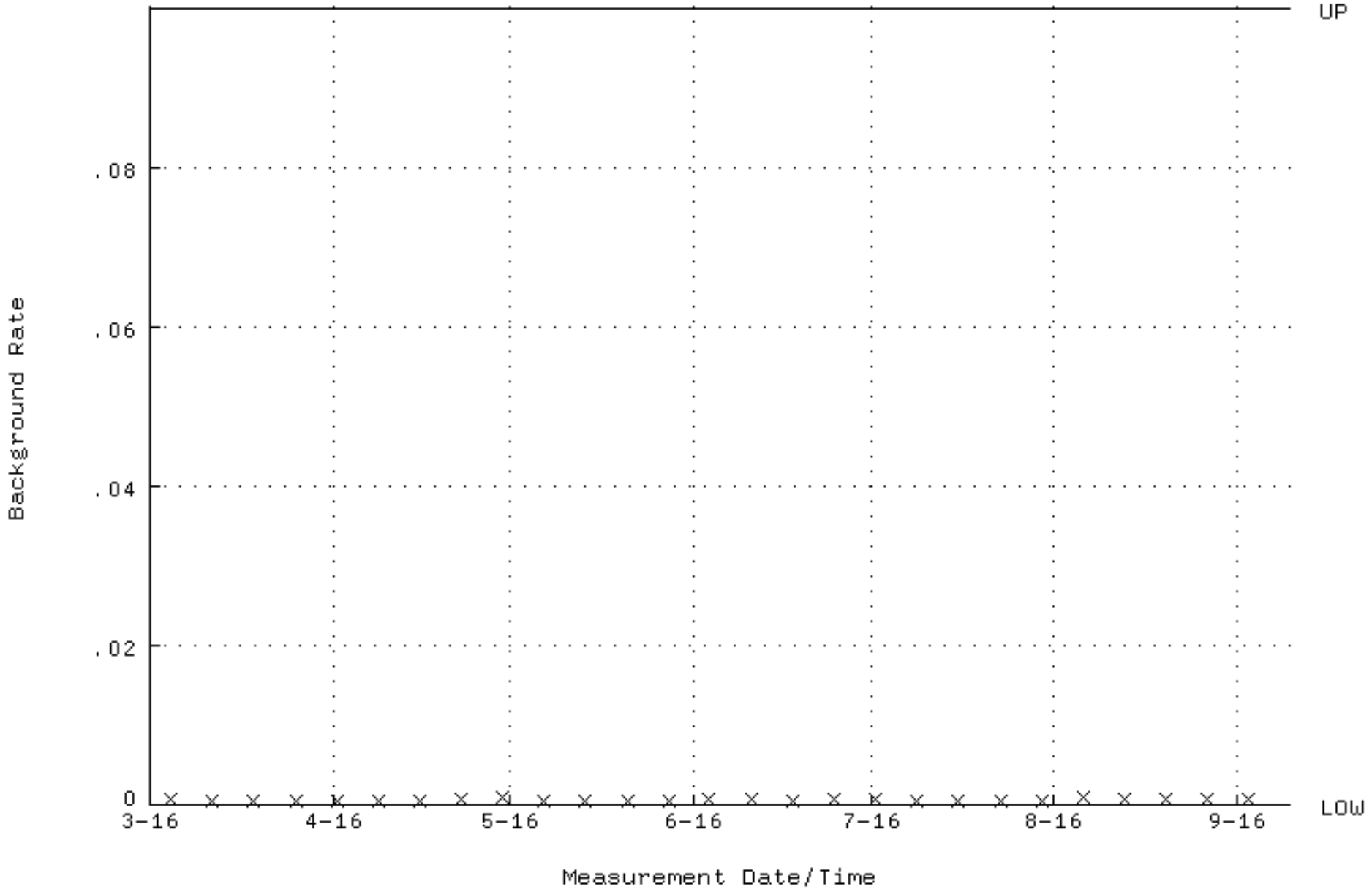
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 8-MAR-2016 08:22:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



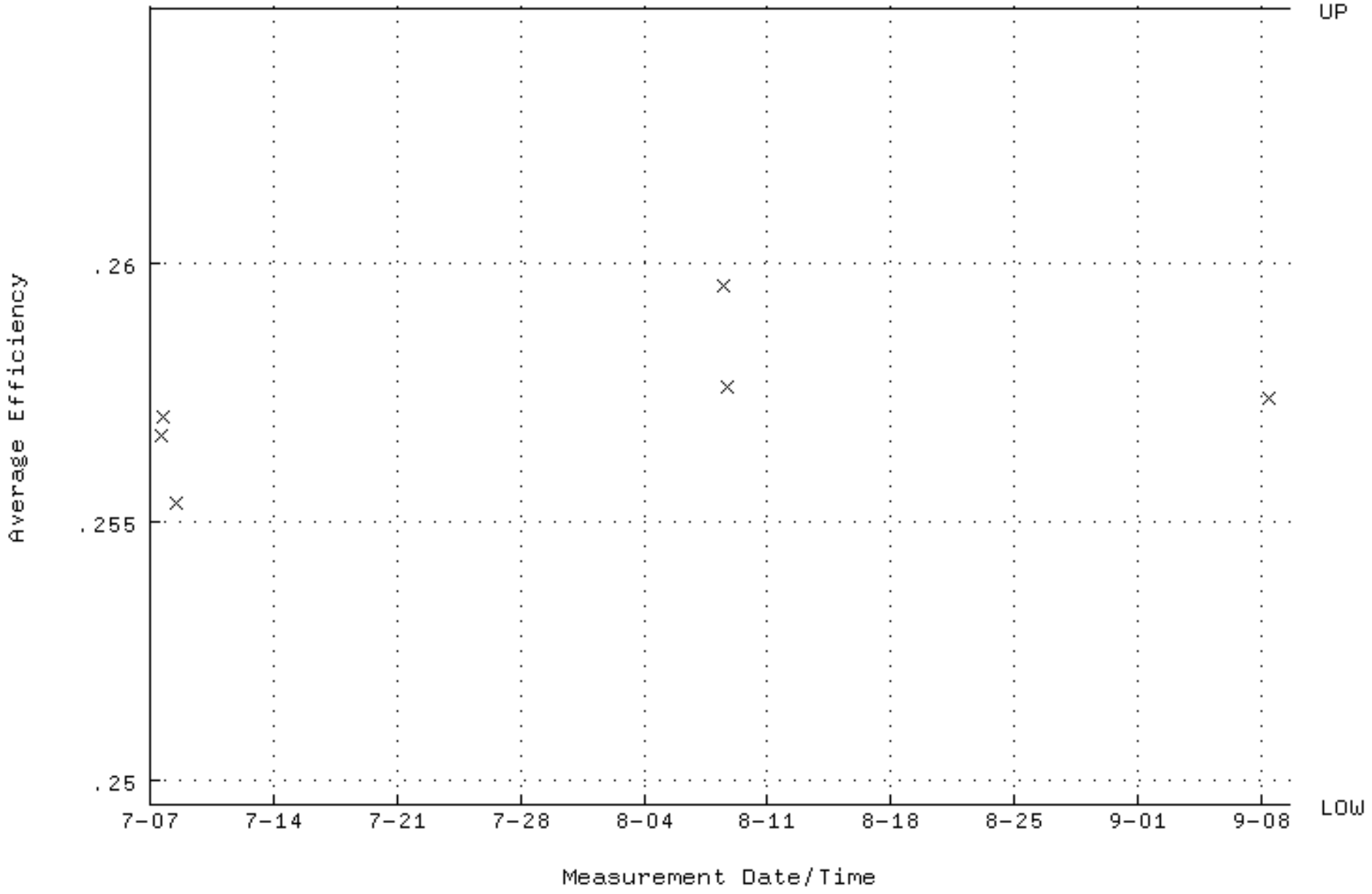
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 8-MAR-2016 08:22:37 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



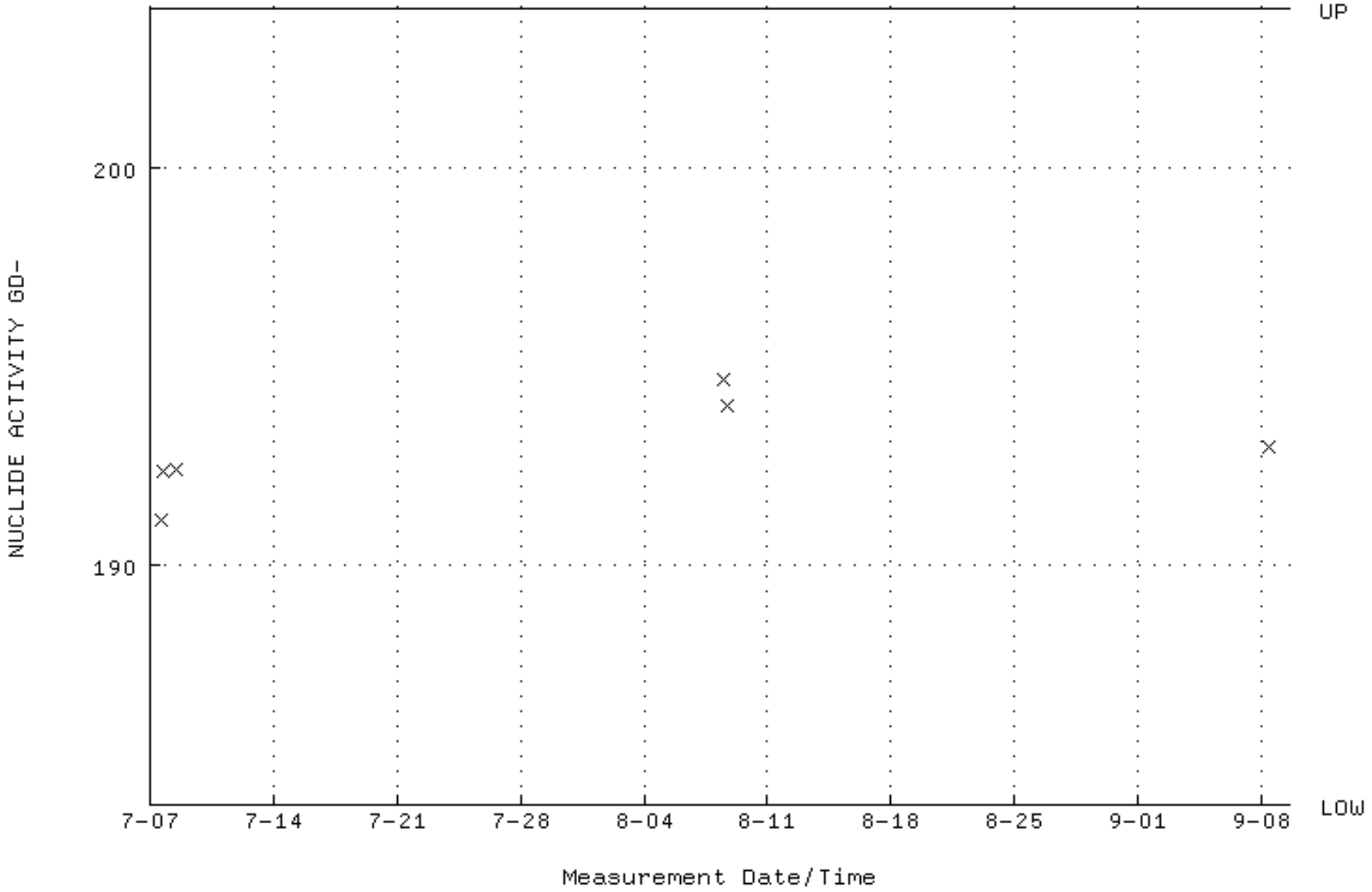
QA filename : DKA100:[ENV_ALPHA.QA.B]B133.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:43 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



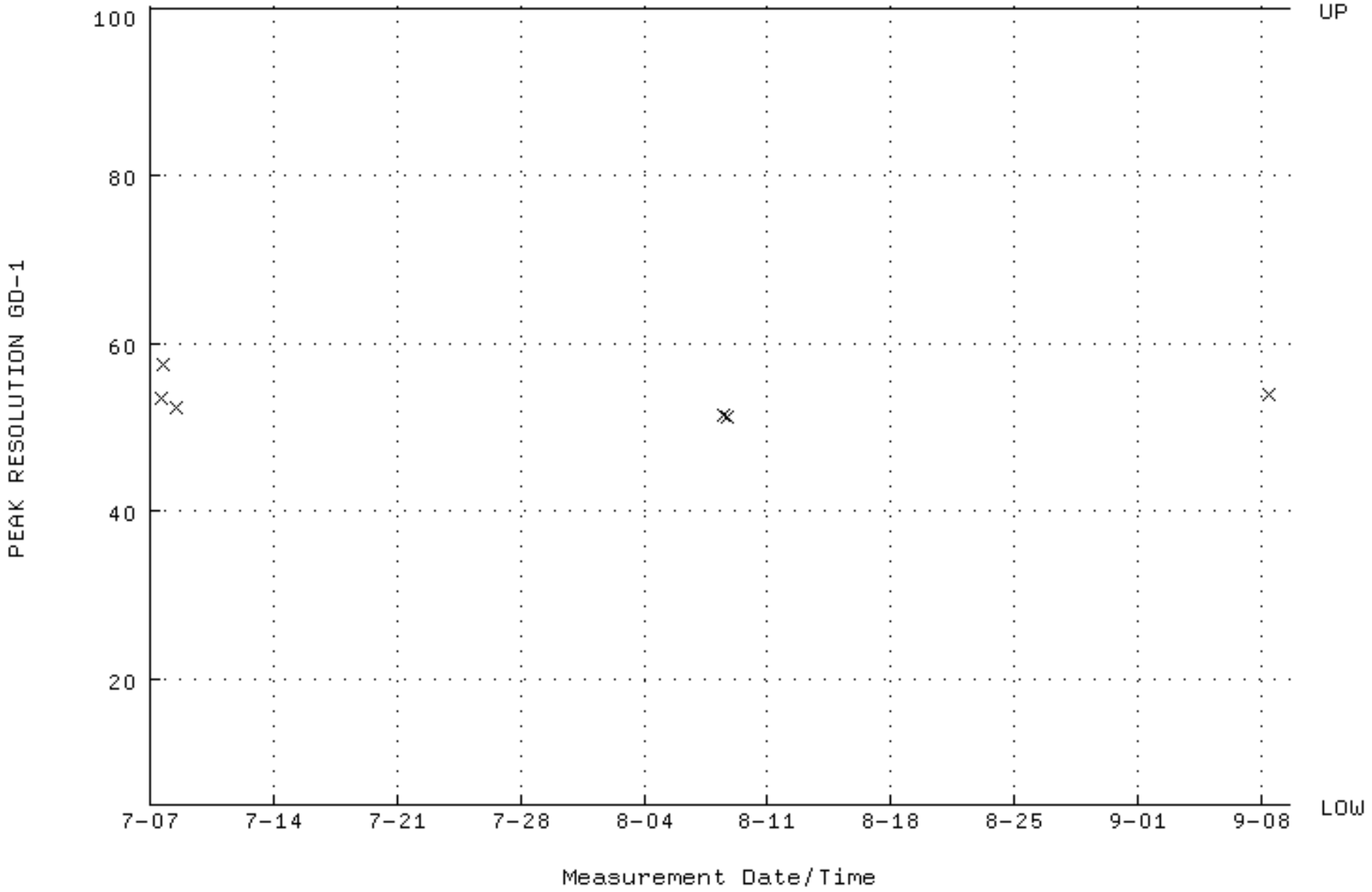
QA filename : DKA100:[ENV_ALPHA.QA.W]W134.QAF;6
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 7-JUL-2016 14:05:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.249513 through 0.264950



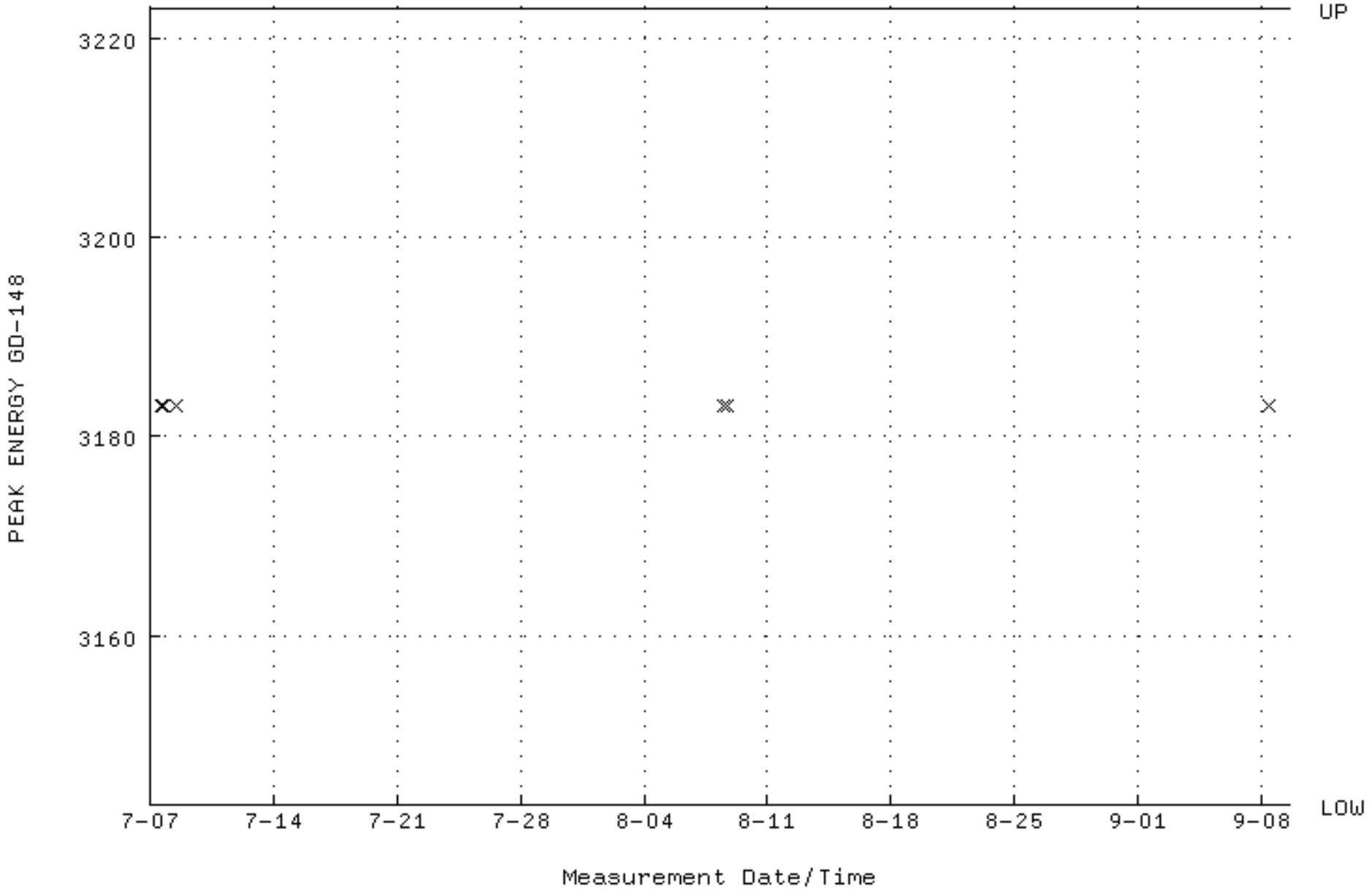
QA filename : DKA100:[ENV_ALPHA.QA.W]W134.QAF;6
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 7-JUL-2016 14:05:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



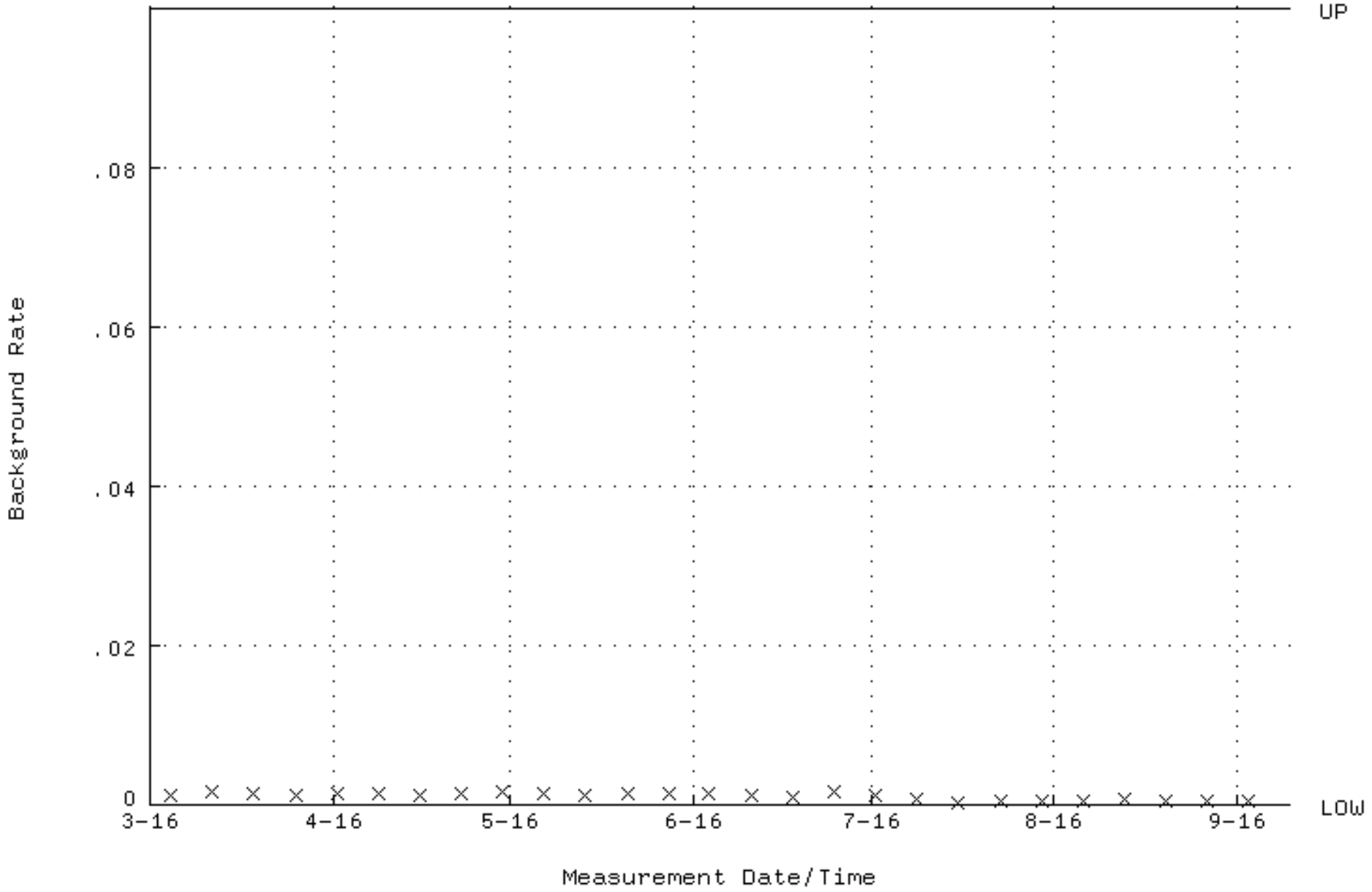
QA filename : DKA100:[ENV_ALPHA.QA.W]W134.QAF;6
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 7-JUL-2016 14:05:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



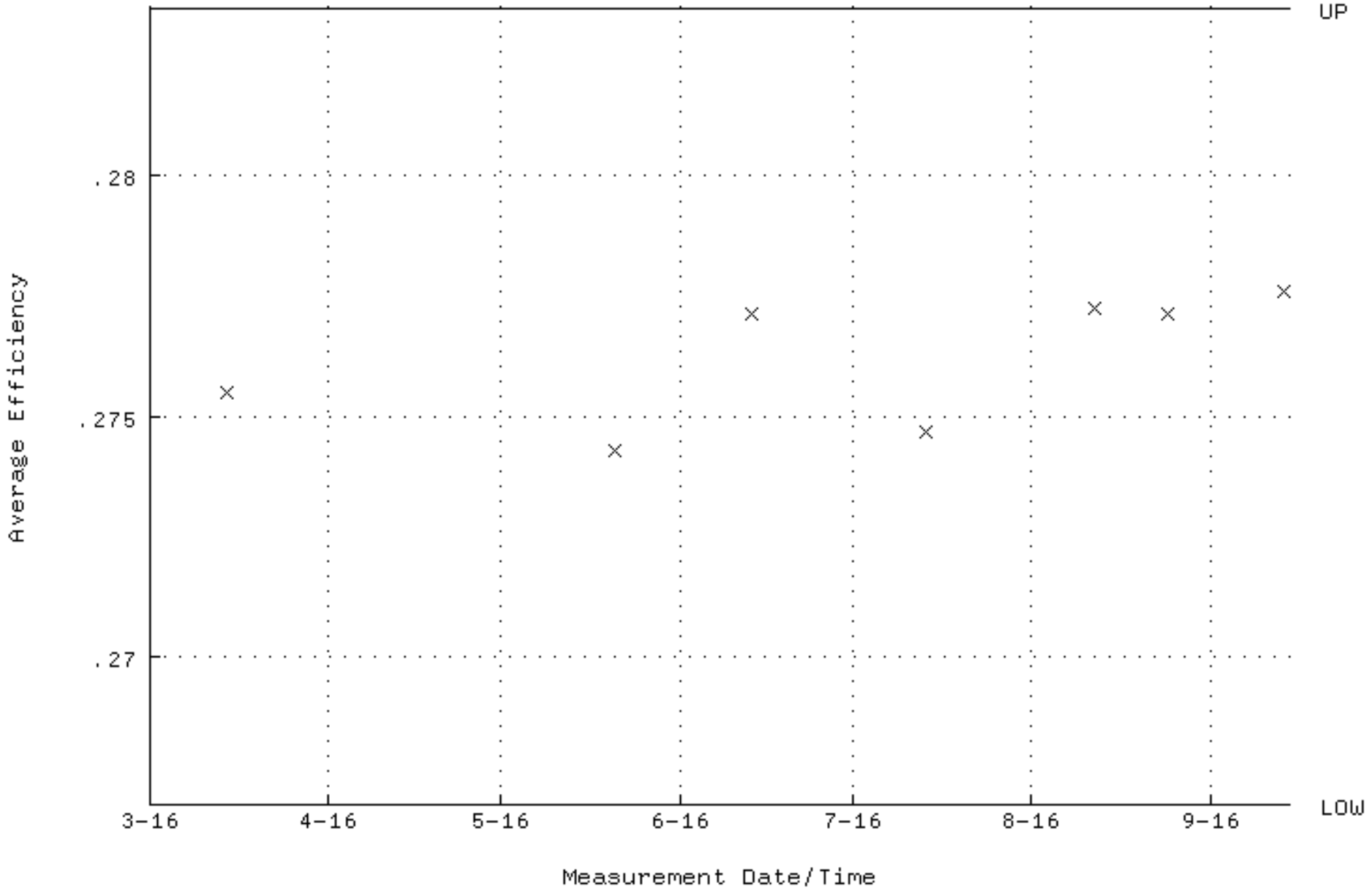
QA filename : DKA100:[ENV_ALPHA.QA.W]W134.QAF;6
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 7-JUL-2016 14:05:23 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



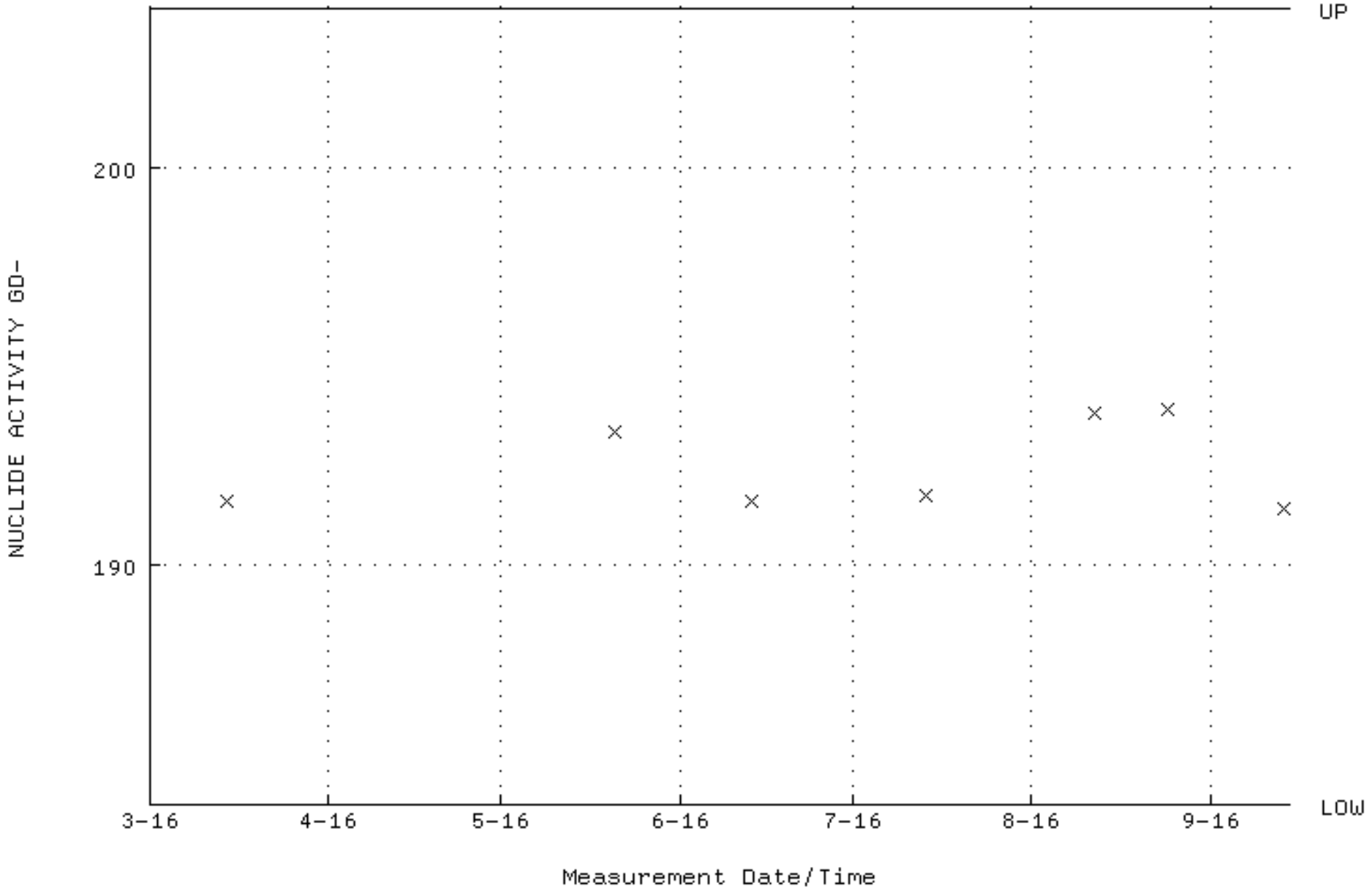
QA filename : DKA100:[ENV_ALPHA.QA.B]B134.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:43:47 through 9-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



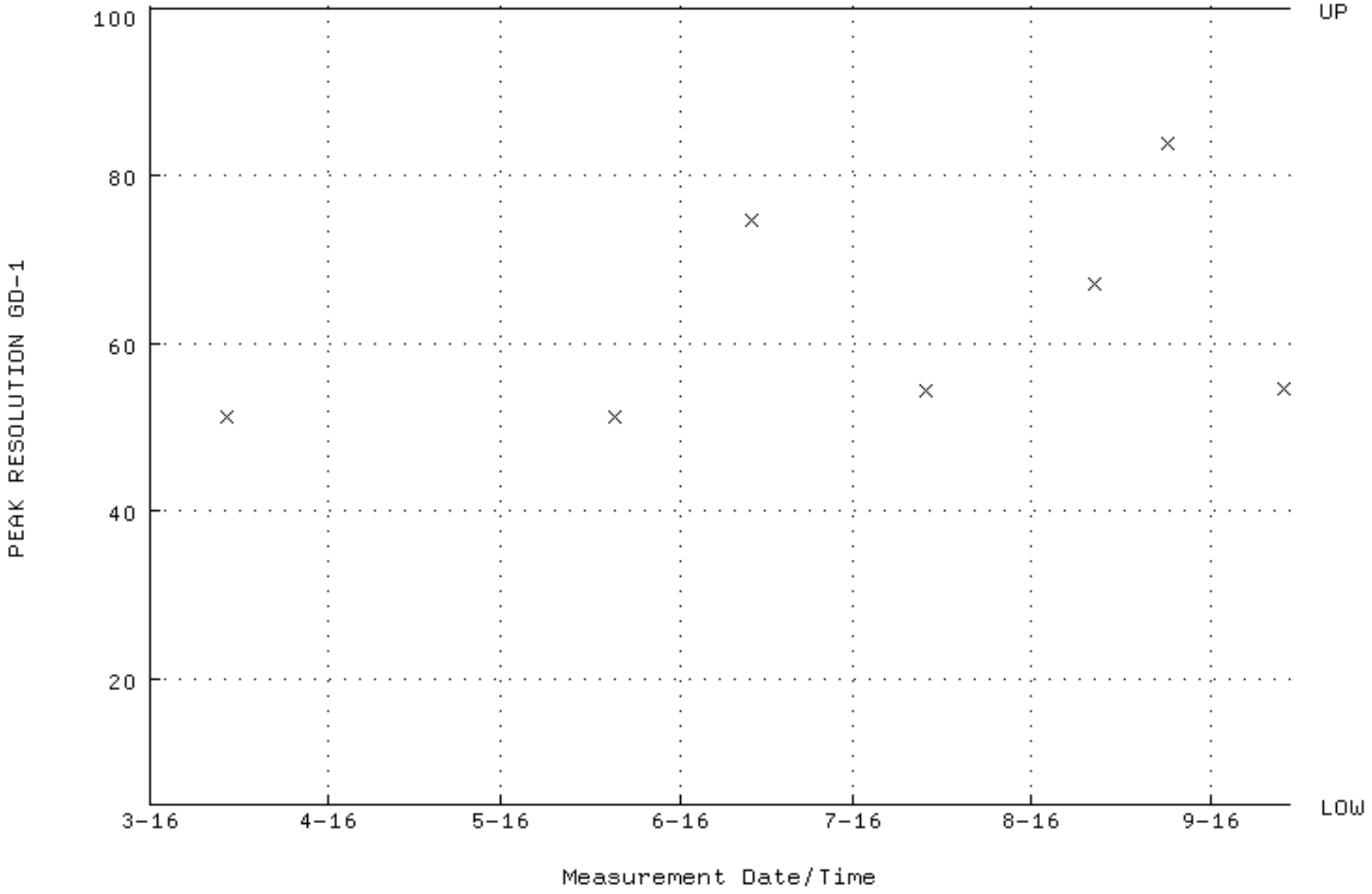
QA filename : DKA100:[ENV_ALPHA.QA.W]W178.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 14-MAR-2016 10:48:13 through 14-SEP-2016 12:00:00
Lower/Upper Lmts: 0.266941 through 0.283453



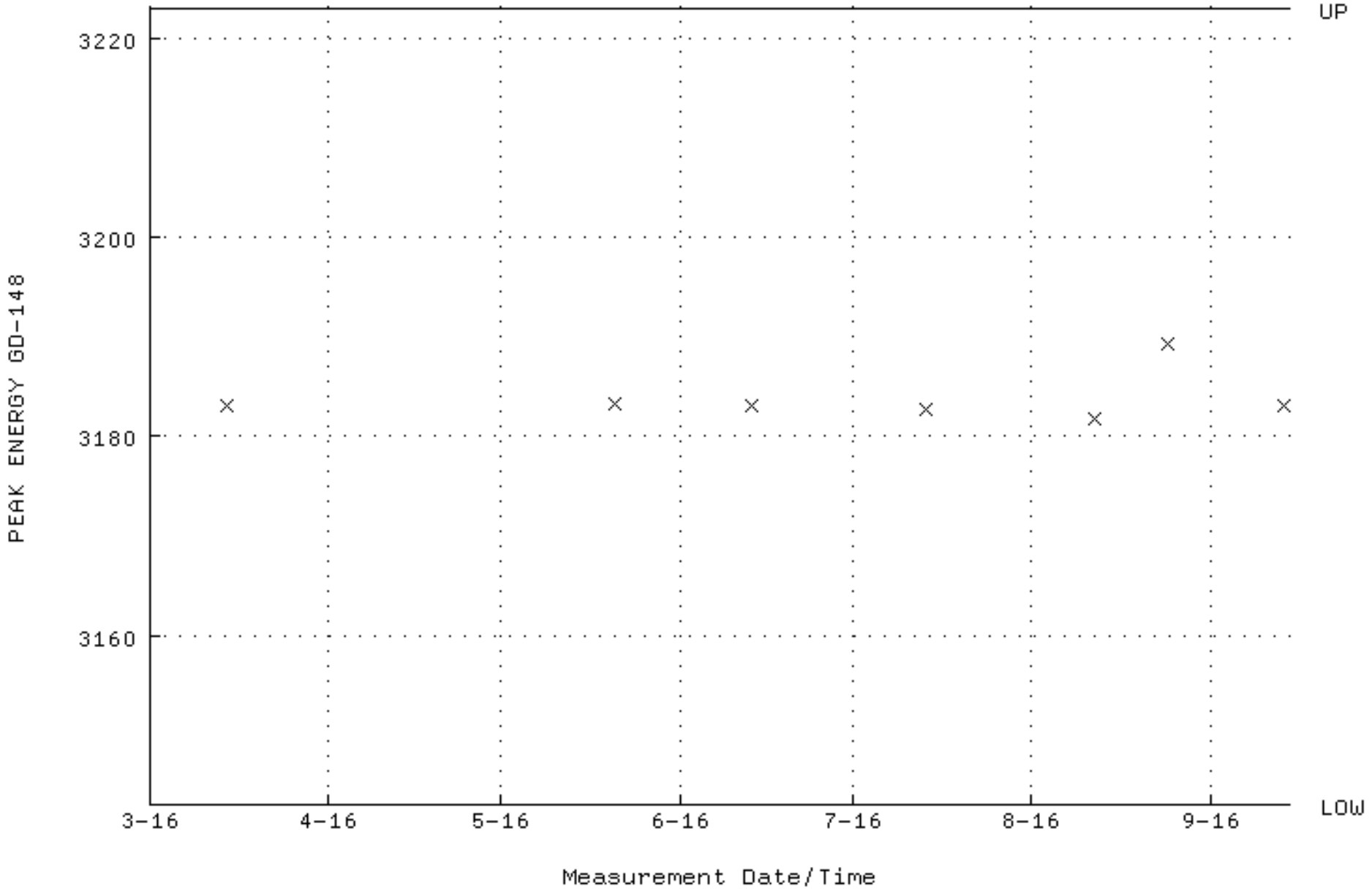
QA filename : DKA100:[ENV_ALPHA.QA.W]W178.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 14-MAR-2016 10:48:13 through 14-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



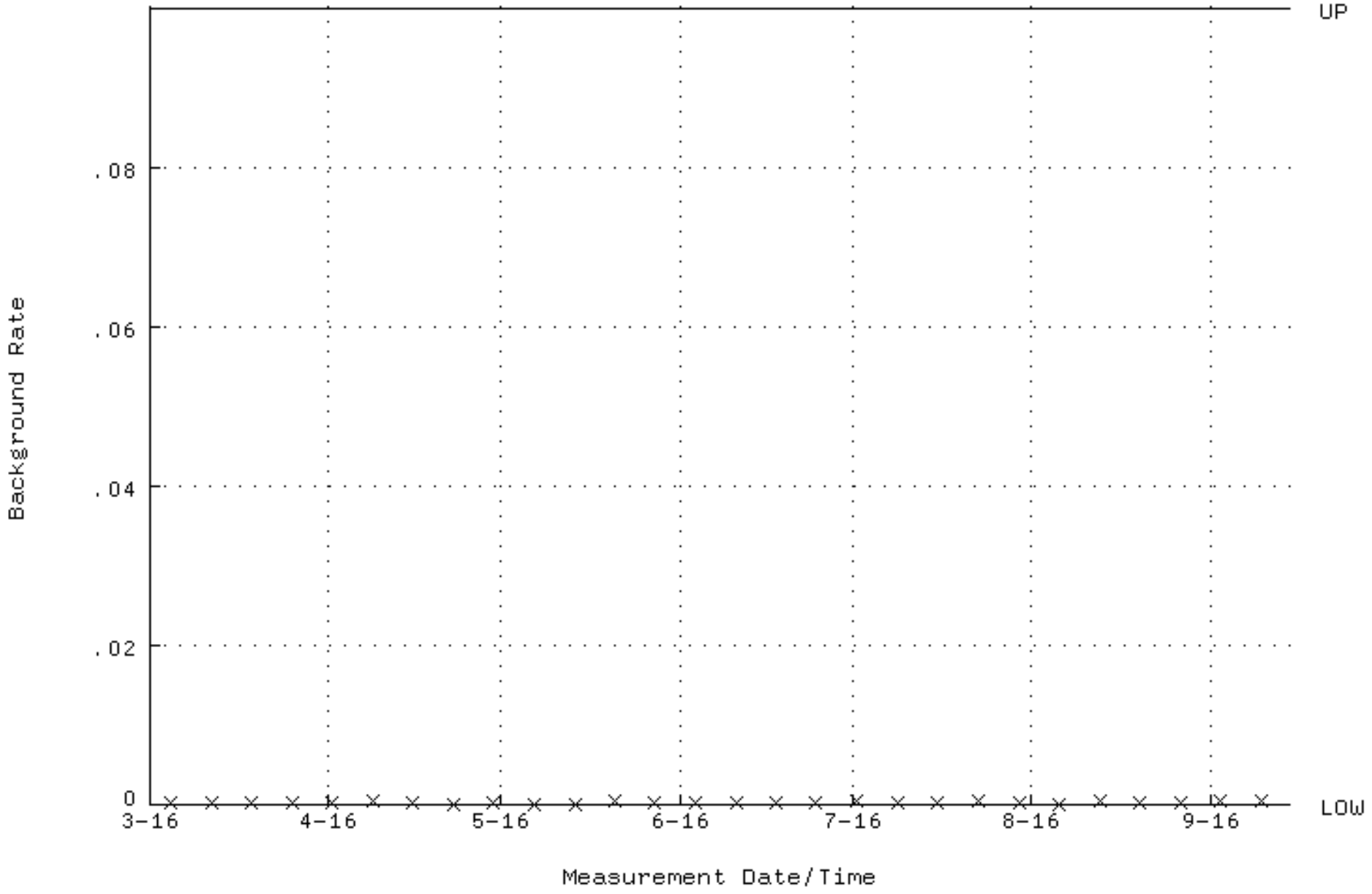
QA filename : DKA100:[ENV_ALPHA.QA.W]W178.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 14-MAR-2016 10:48:13 through 14-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



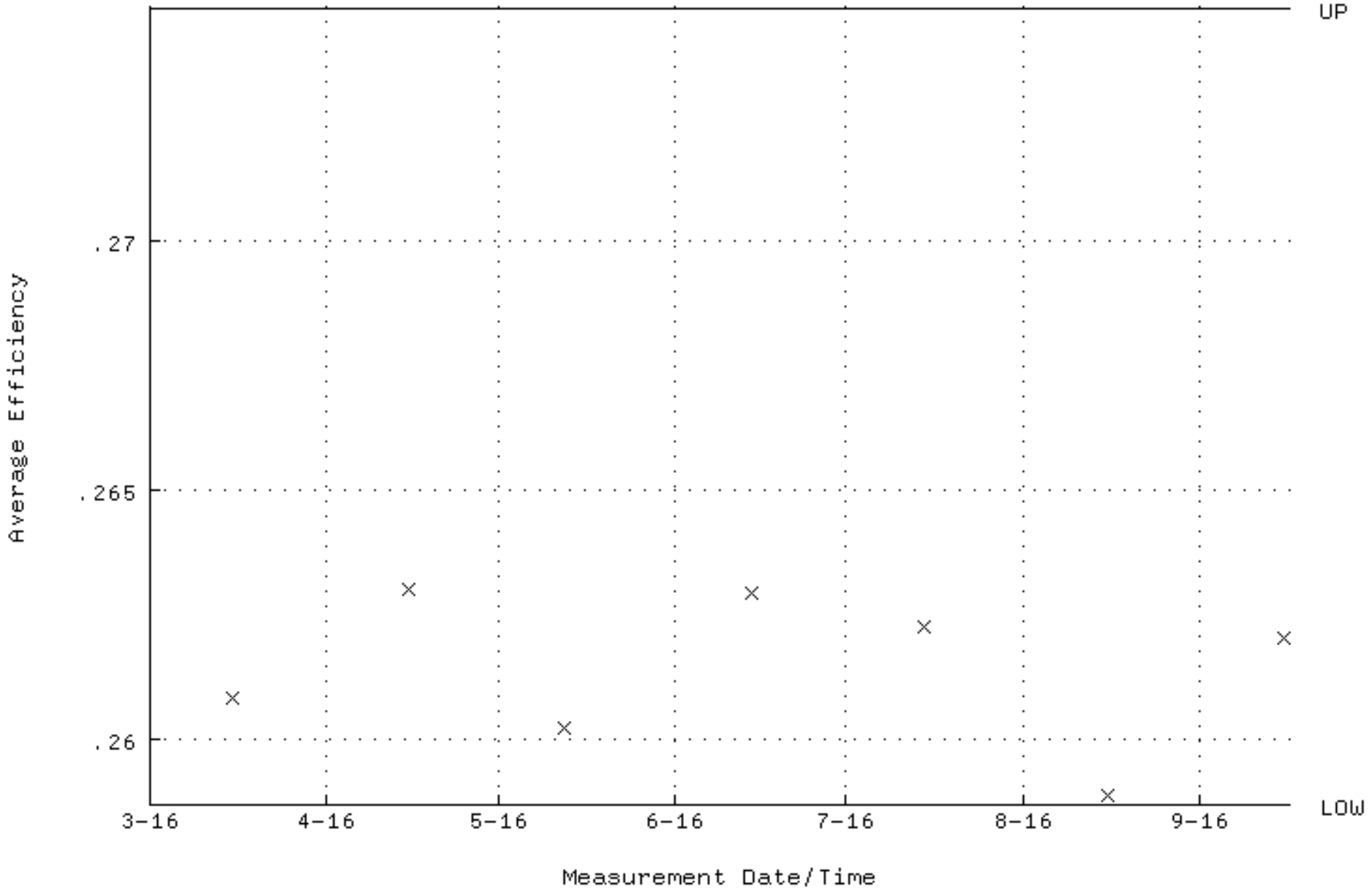
QA filename : DKA100:[ENV_ALPHA.QA.W]W178.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 14-MAR-2016 10:48:13 through 14-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



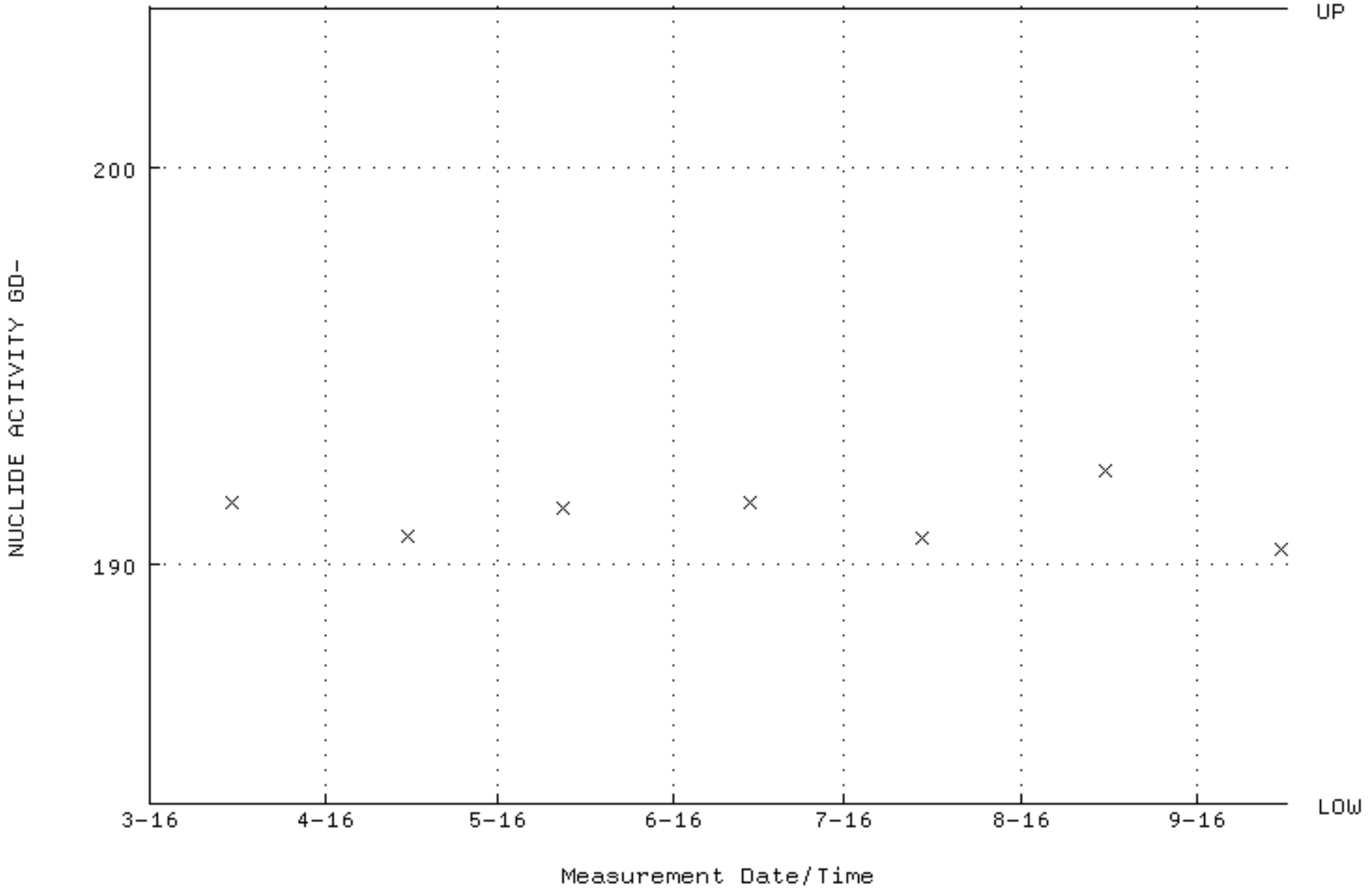
QA filename : DKA100:[ENV_ALPHA.QA.B]B178.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:05:33 through 14-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



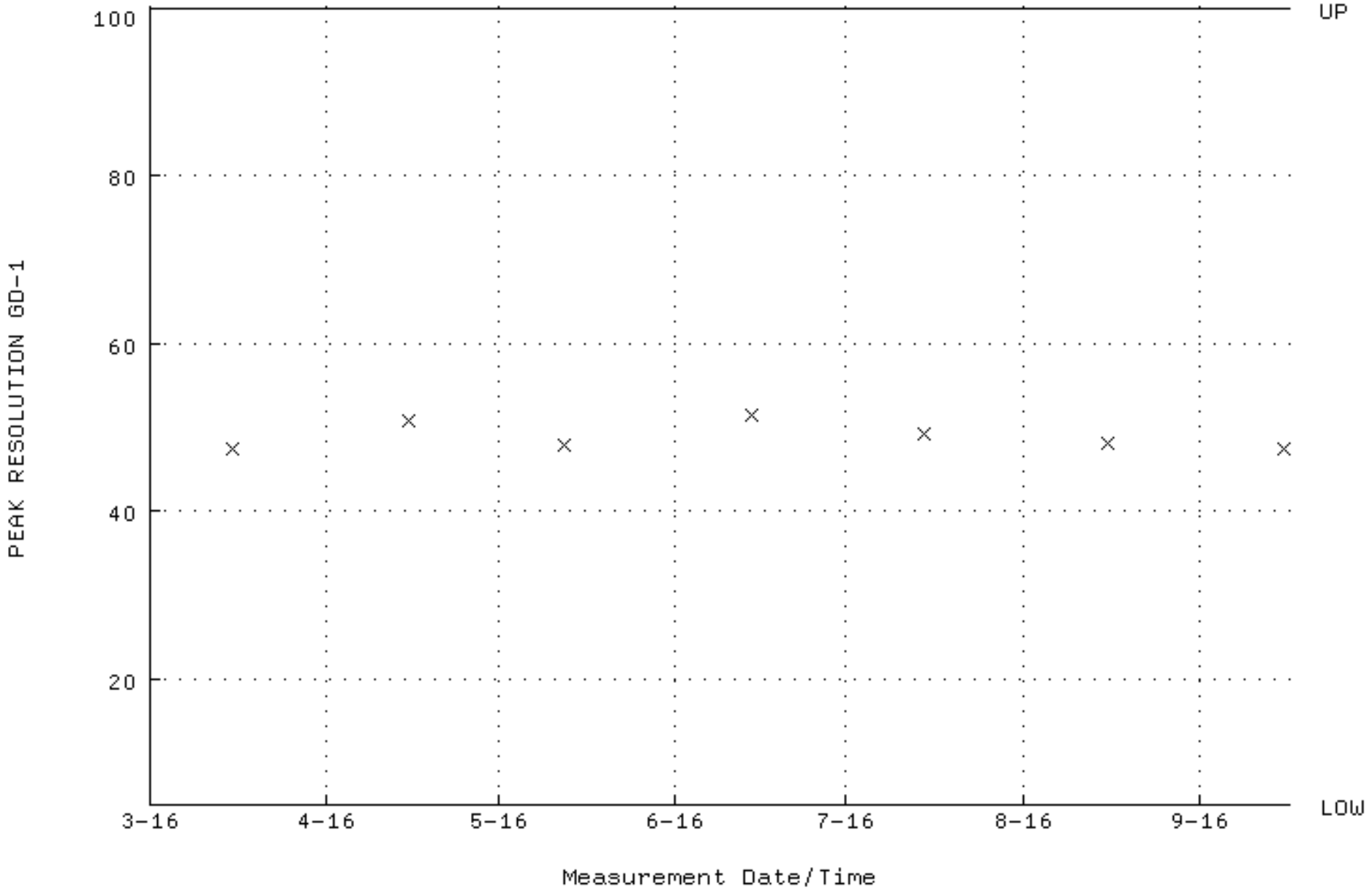
QA filename : DKA100:[ENV_ALPHA.QA.W]W199.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:06 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.258679 through 0.274679



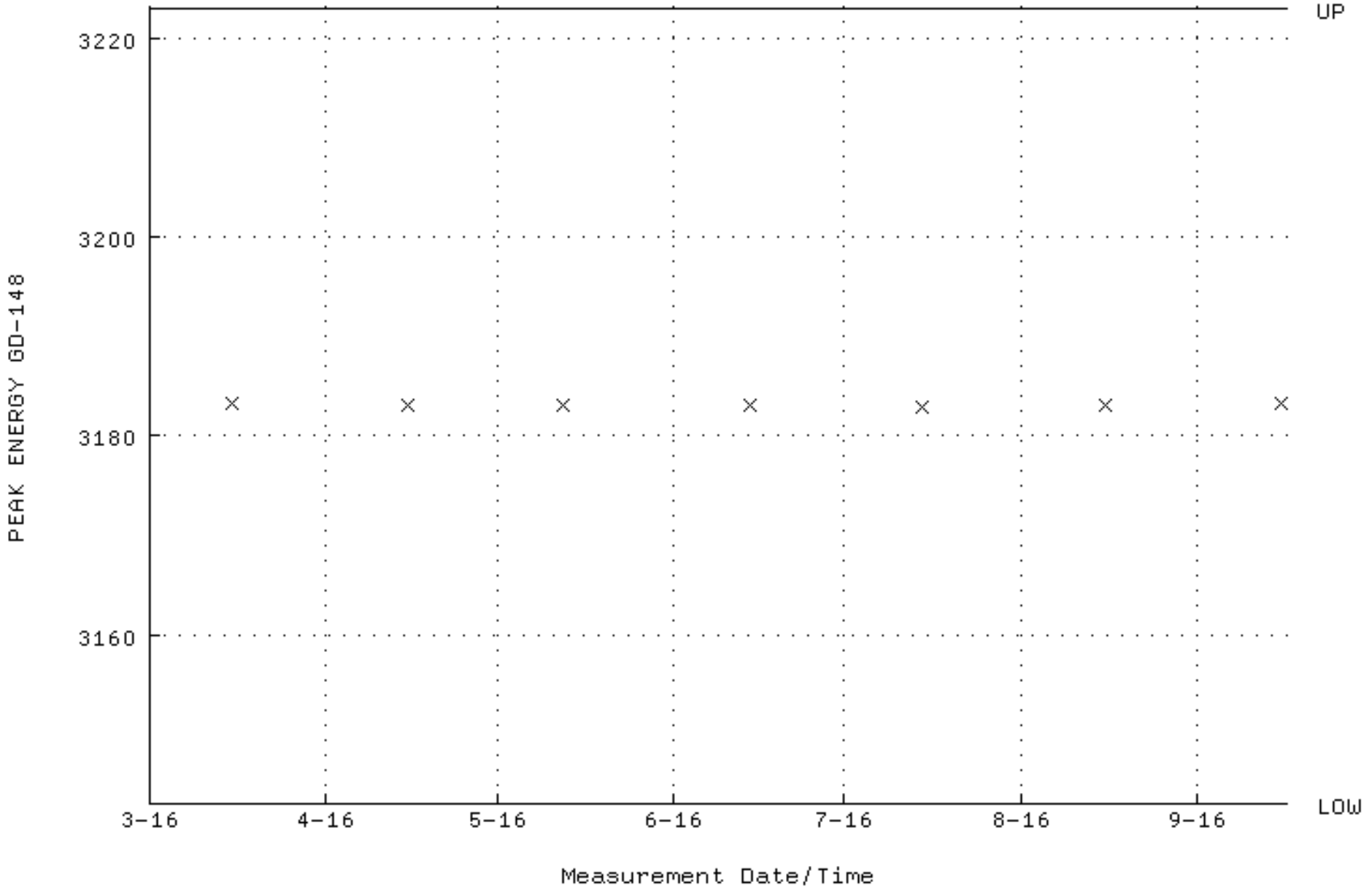
QA filename : DKA100:[ENV_ALPHA.QA.W]W199.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:06 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



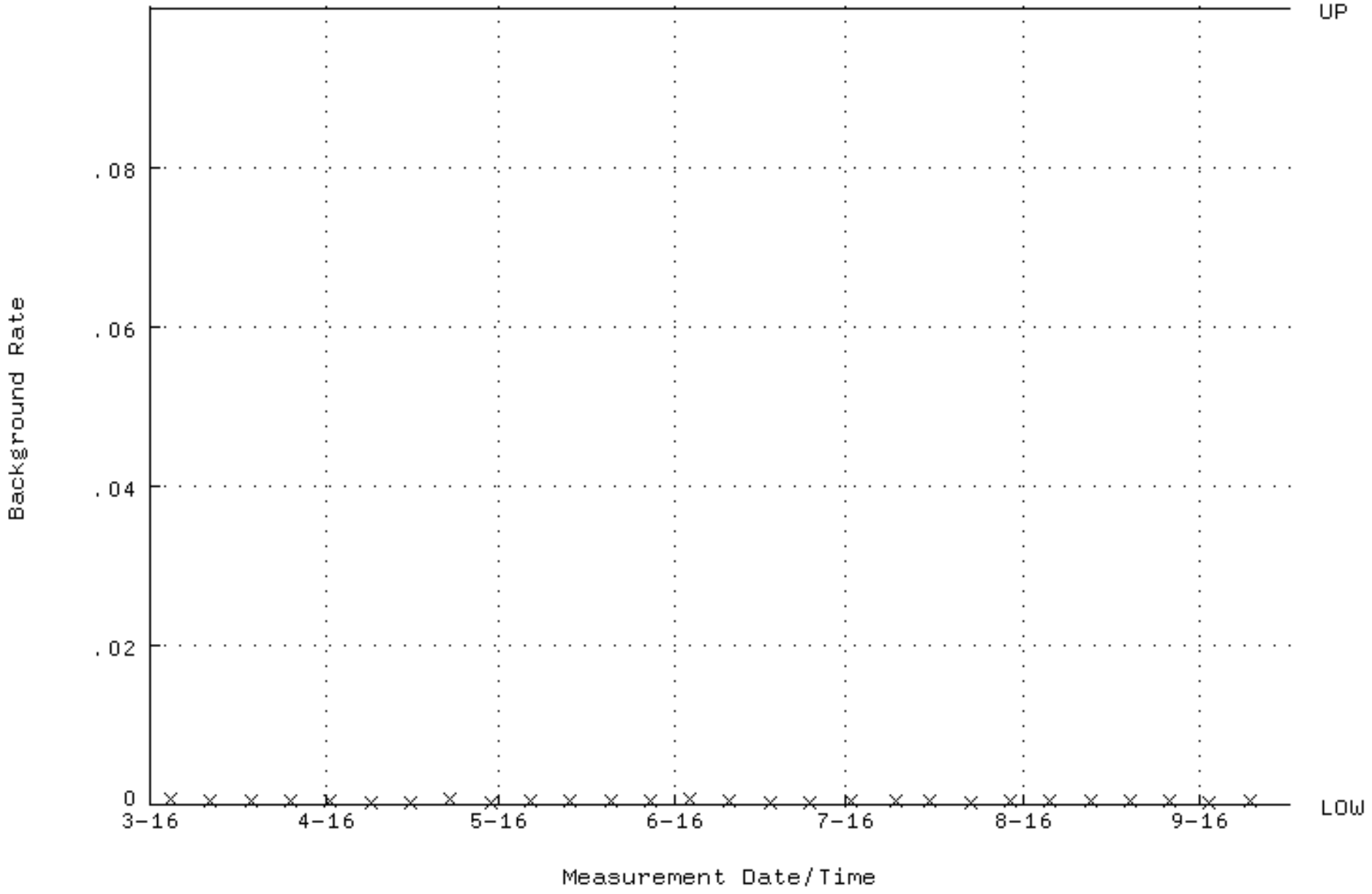
QA filename : DKA100:[ENV_ALPHA.QA.W]W199.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:06 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



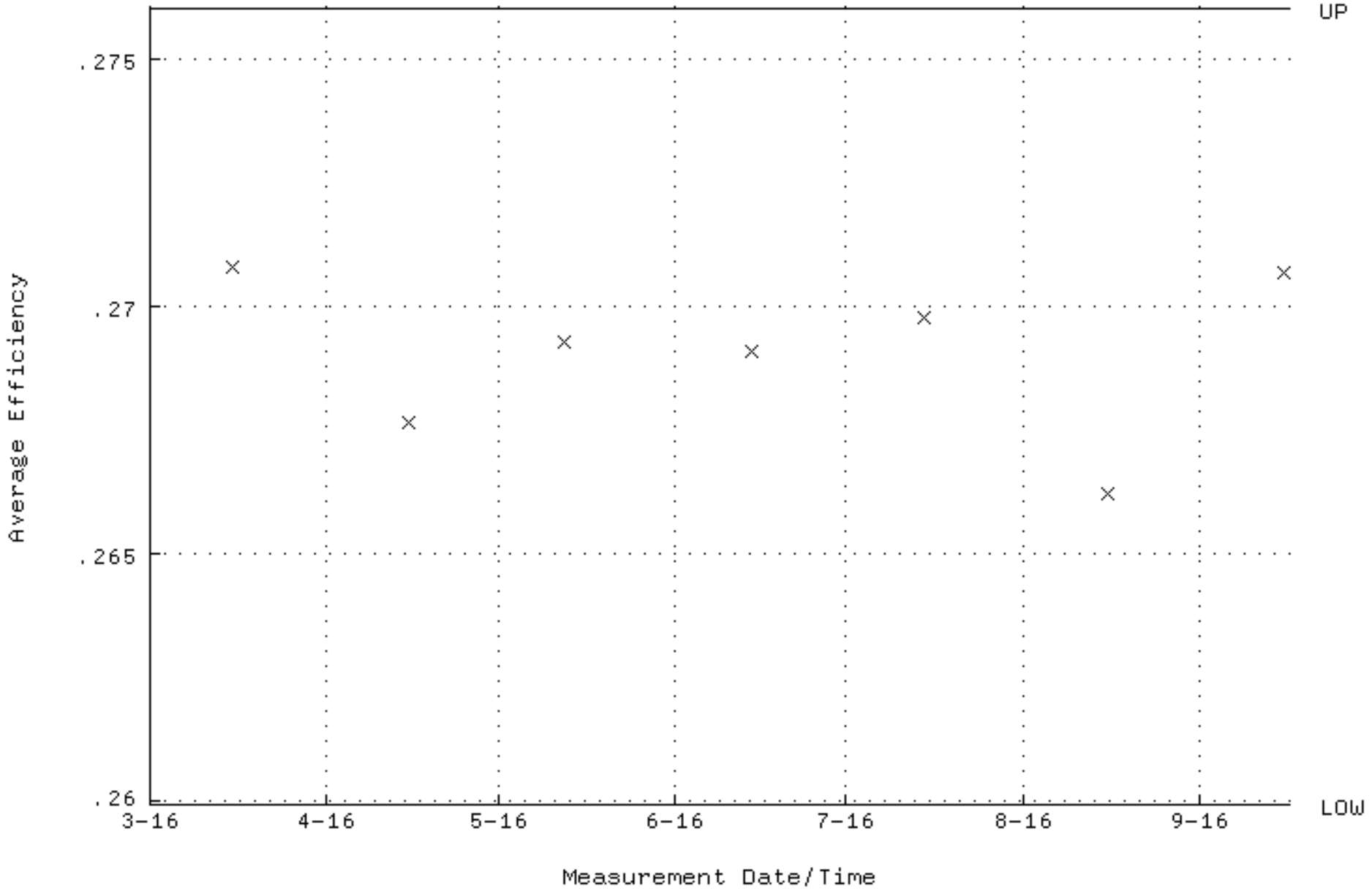
QA filename : DKA100:[ENV_ALPHA.QA.W]W199.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:06 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



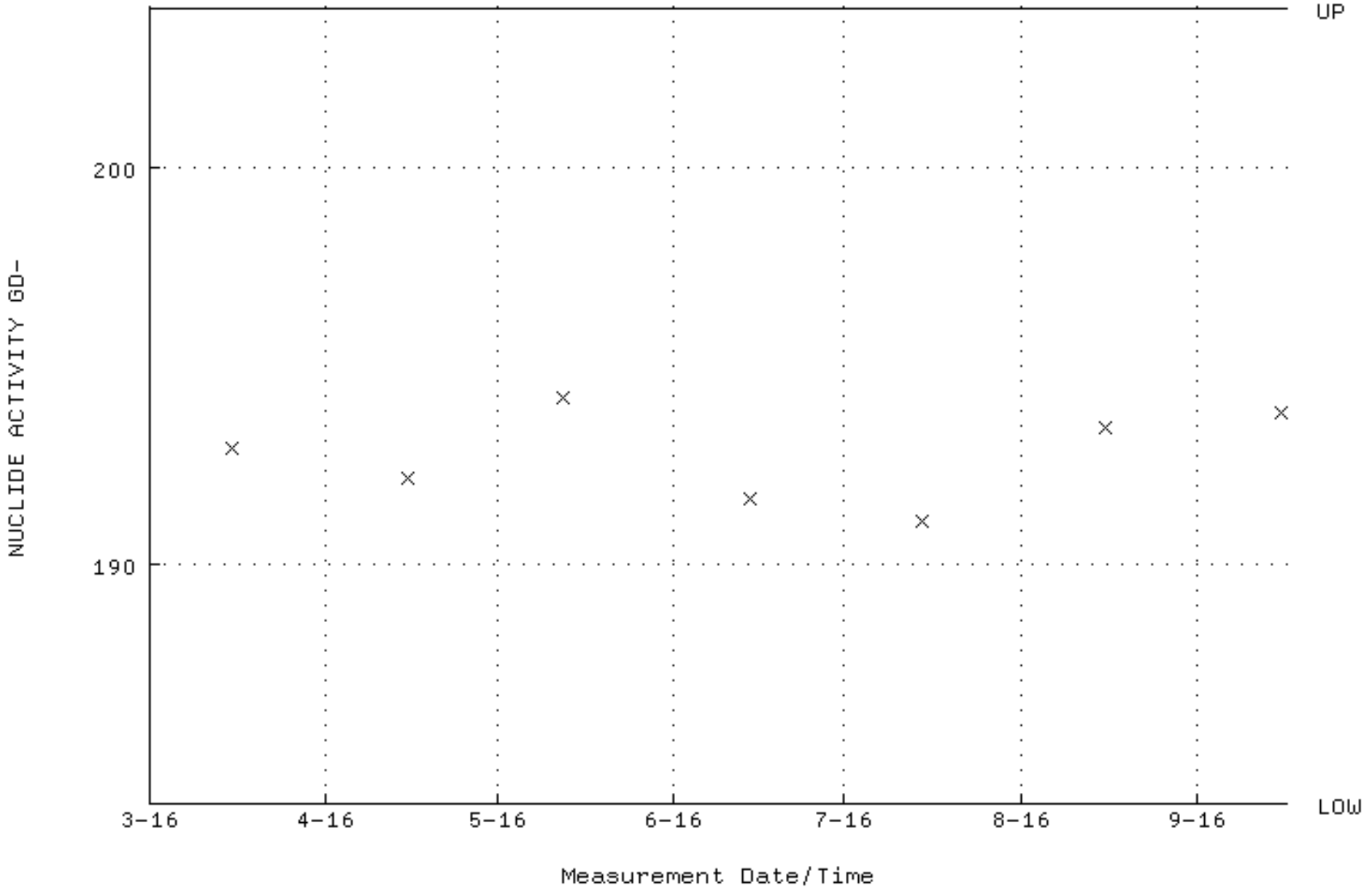
QA filename : DKA100:[ENV_ALPHA.QA.B]B199.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:22 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



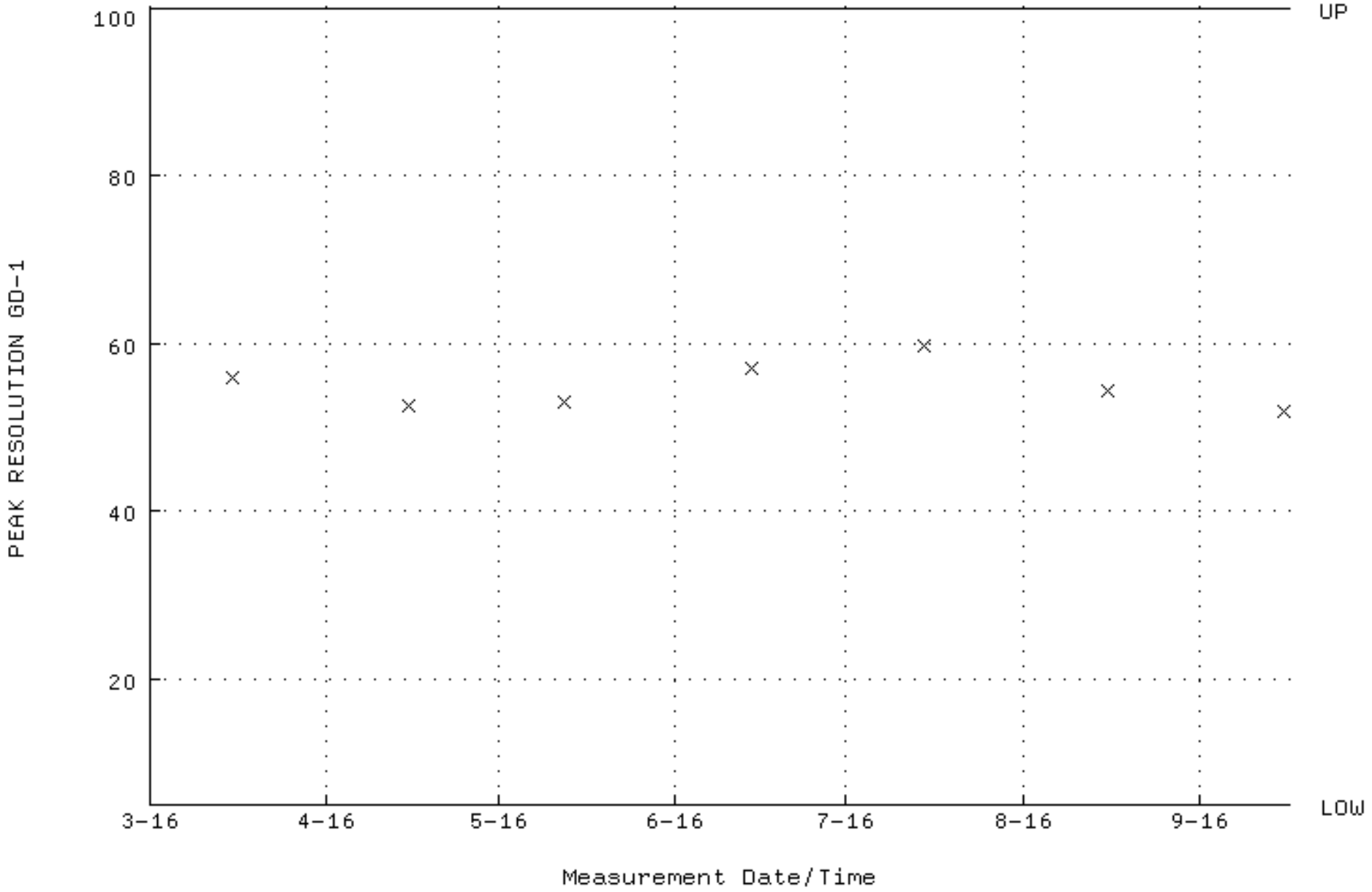
QA filename : DKA100:[ENV_ALPHA.QA.W]W200.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:09 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.259942 through 0.276020



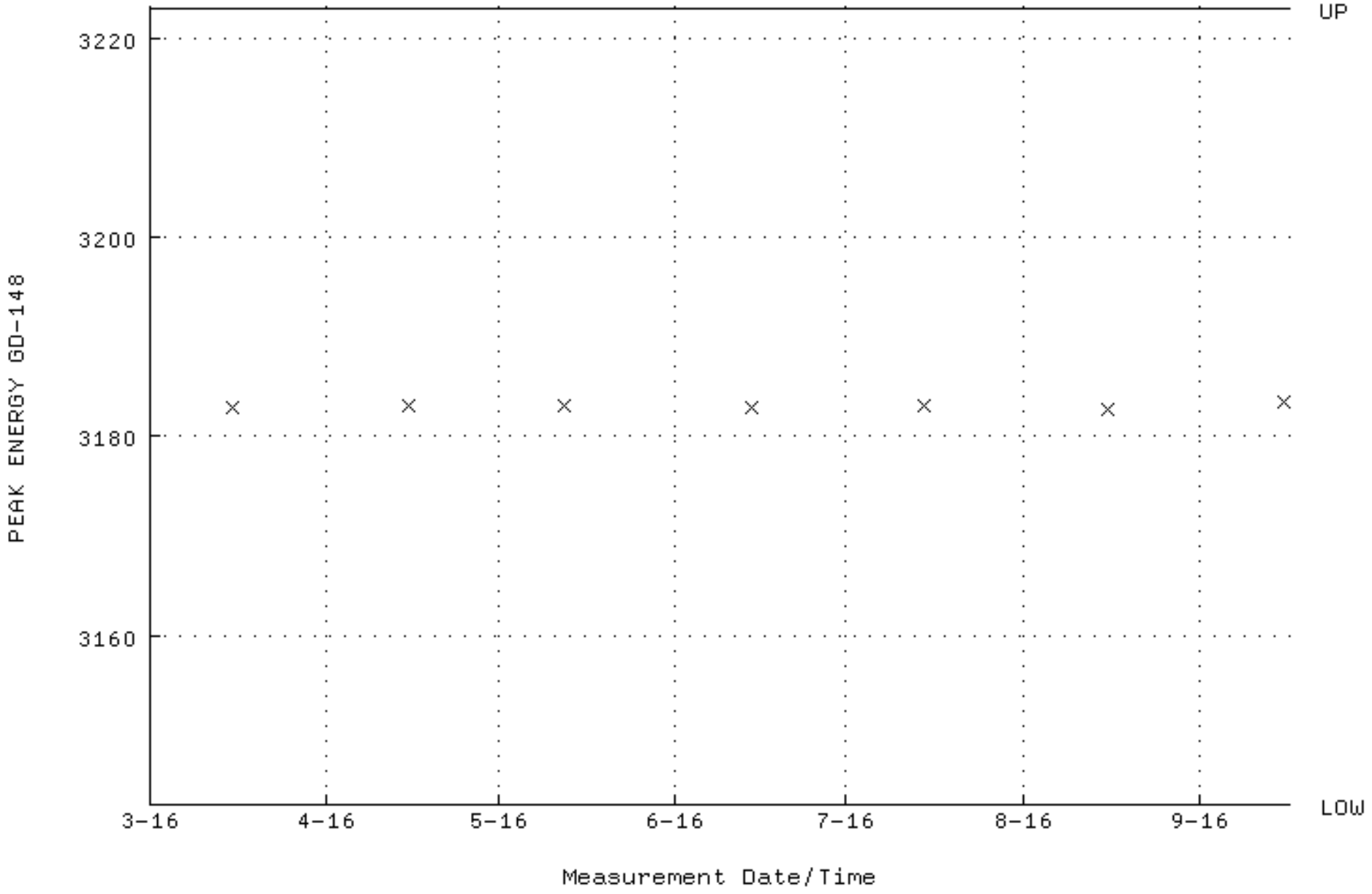
QA filename : DKA100:[ENV_ALPHA.QA.W]W200.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:09 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



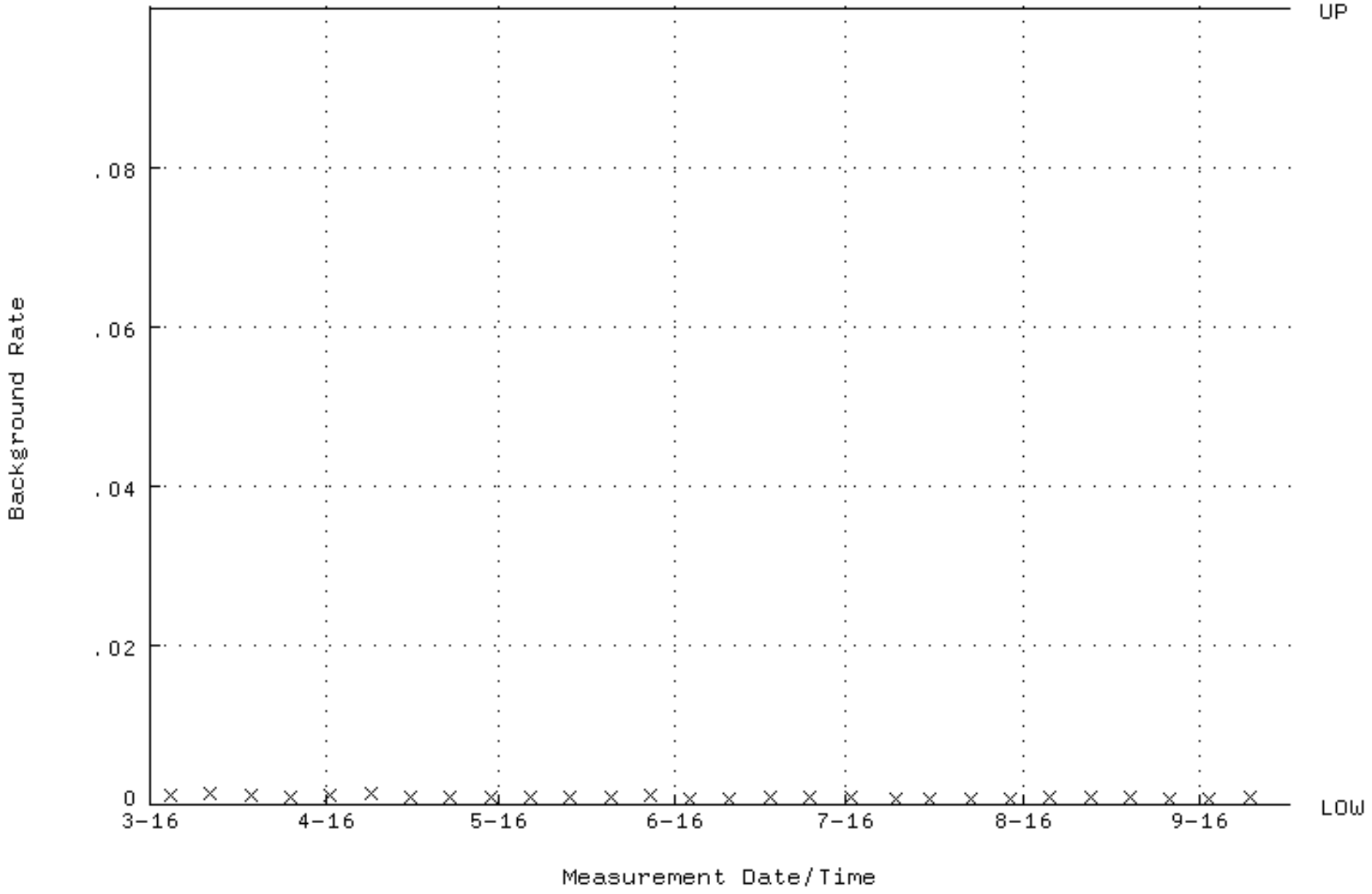
QA filename : DKA100:[ENV_ALPHA.QA.W]W200.QAF;4
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:09 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



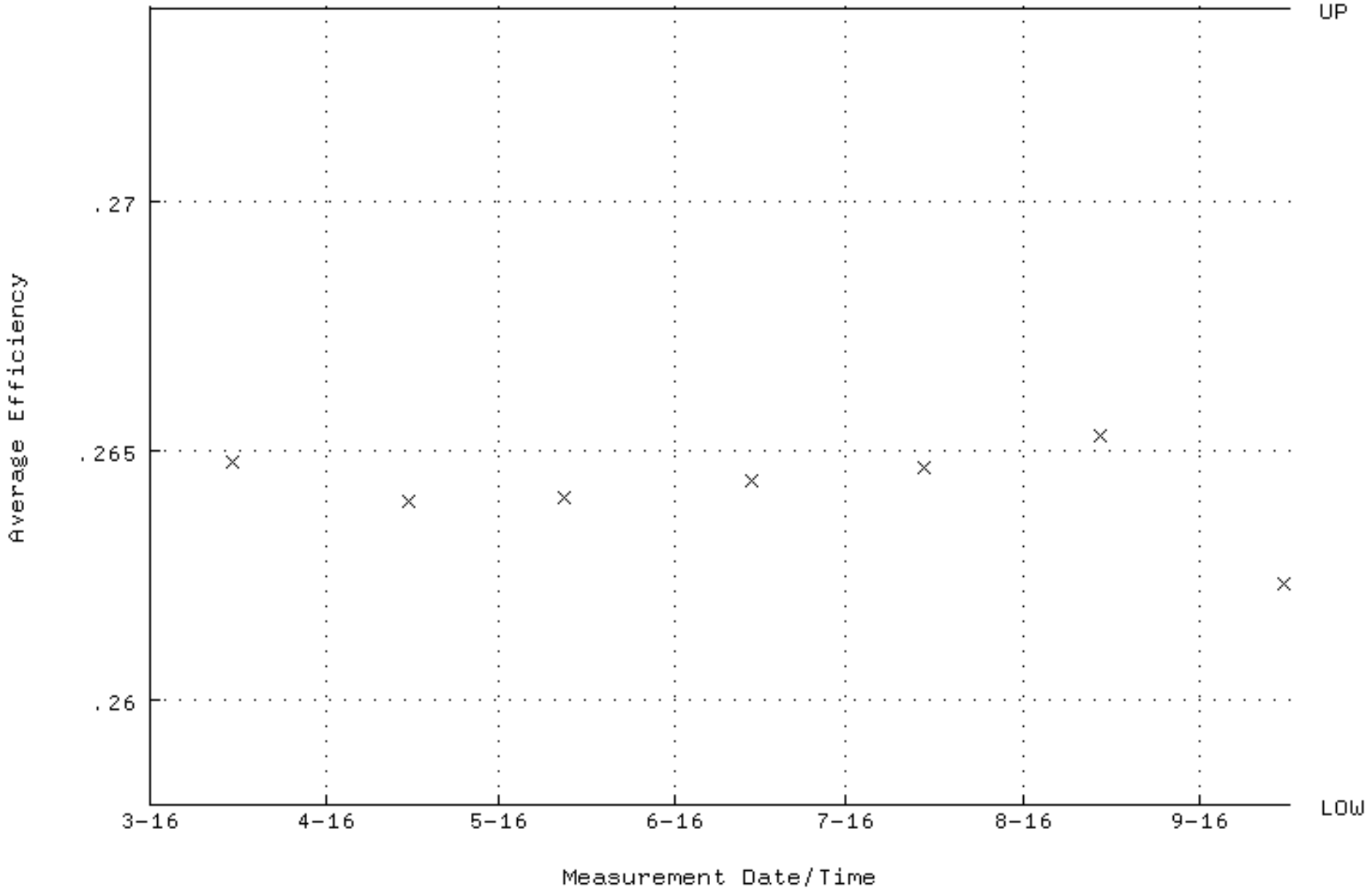
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:09 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



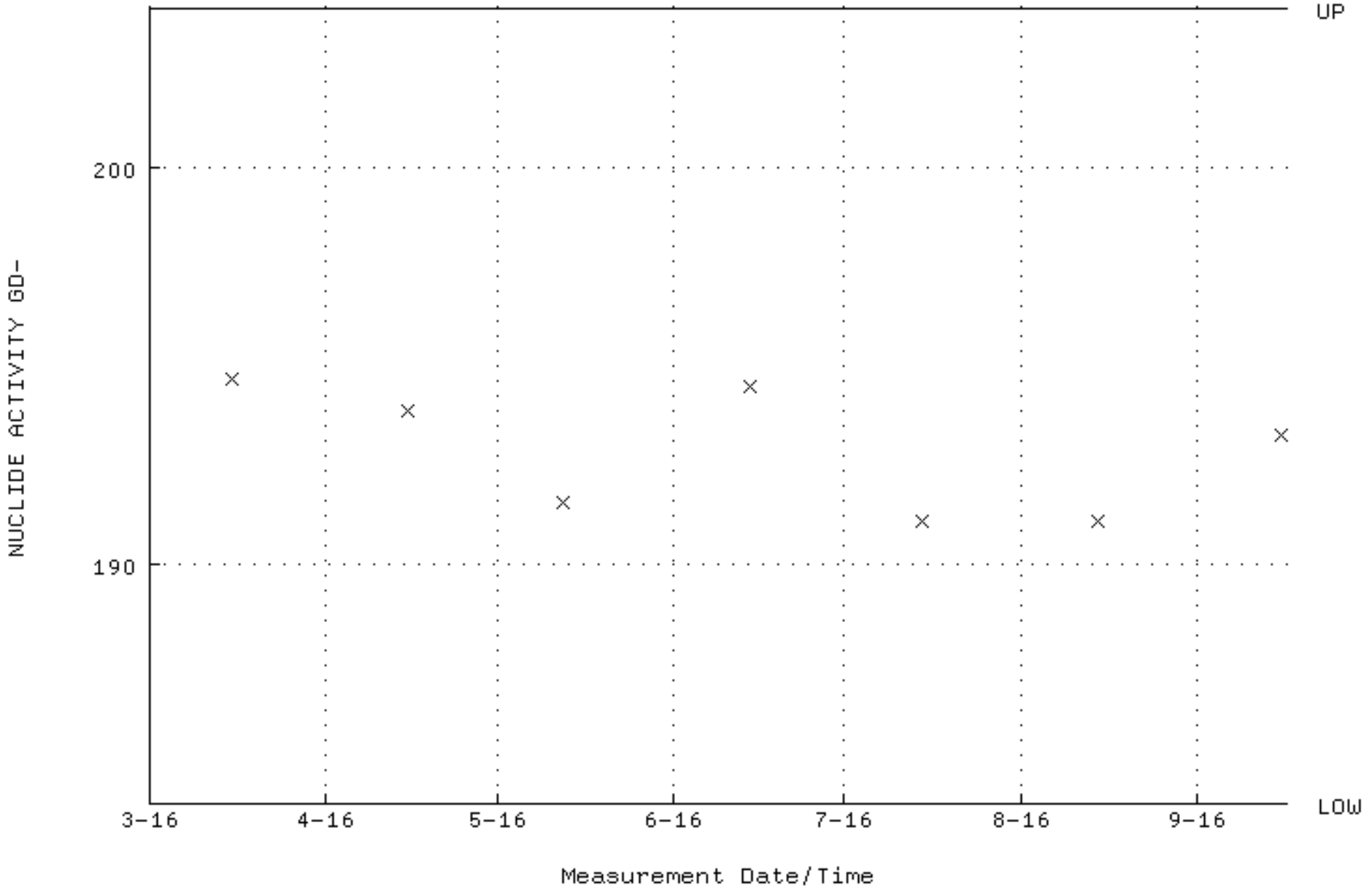
QA filename : DKA100:[ENV_ALPHA.QA.B]B200.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:26 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



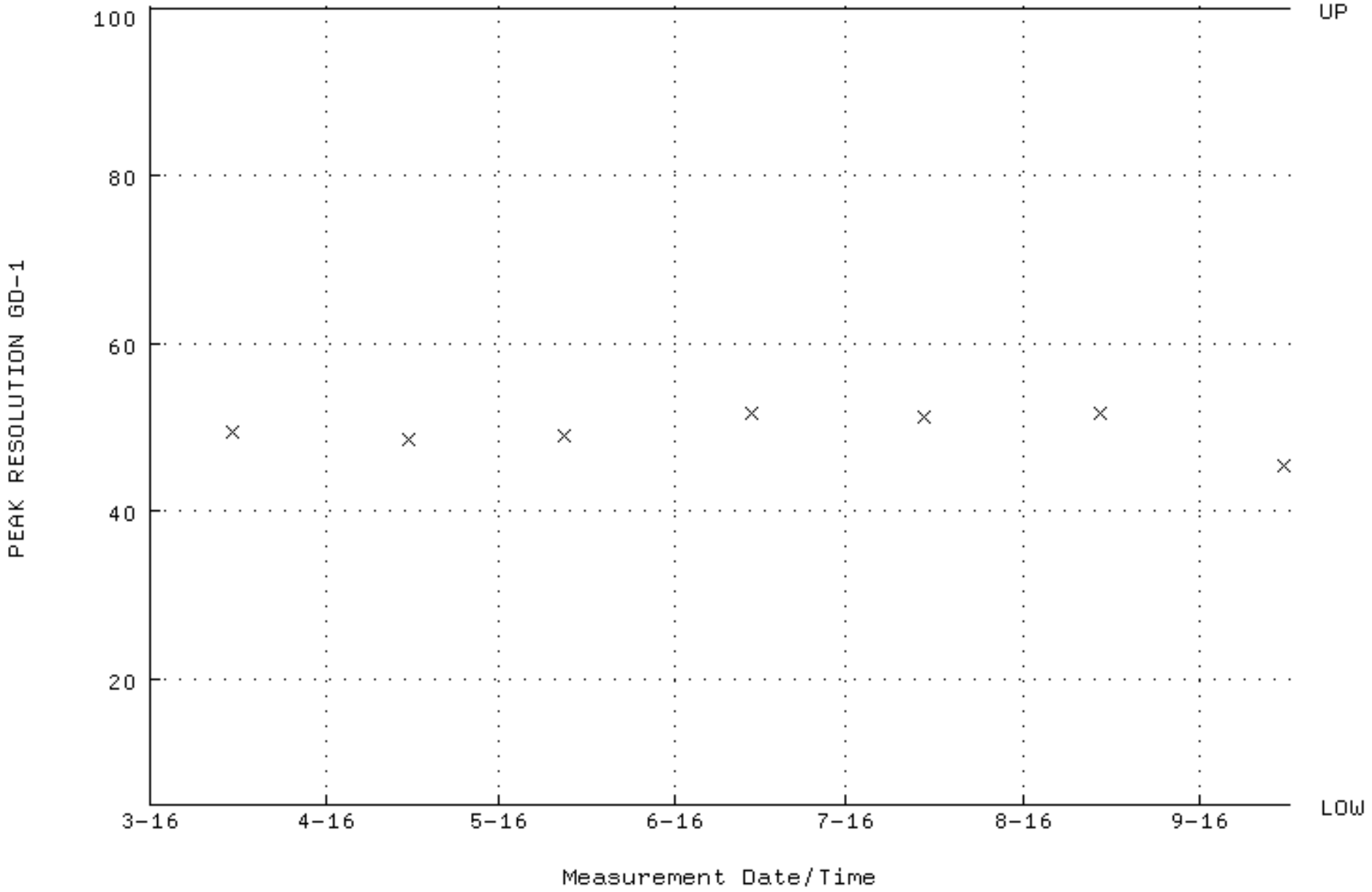
QA filename : DKA100:[ENV_ALPHA.QA.W]W201.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 10:07:54 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.257911 through 0.273865



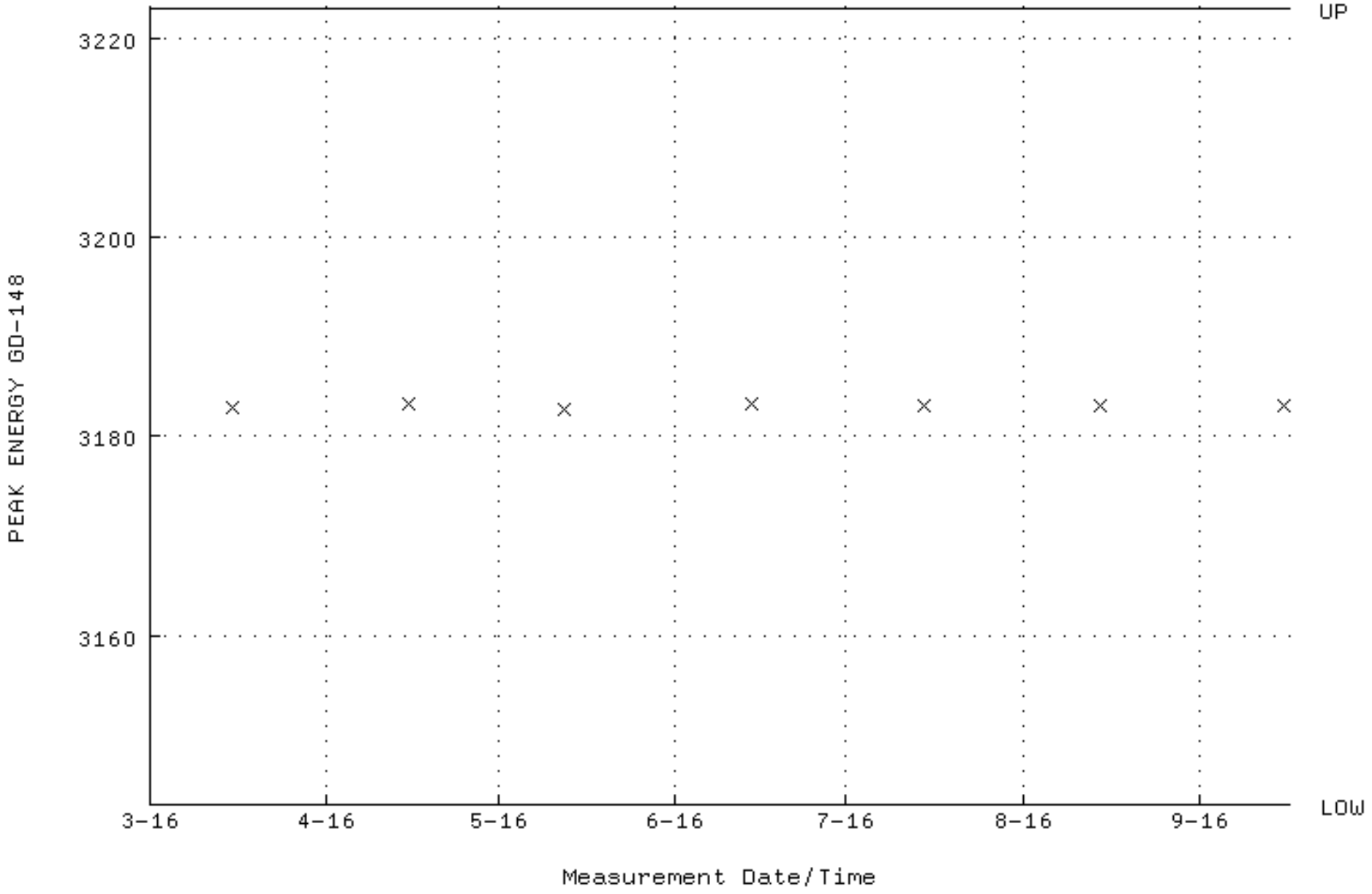
QA filename : DKA100:[ENV_ALPHA.QA.W]W201.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 10:07:54 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



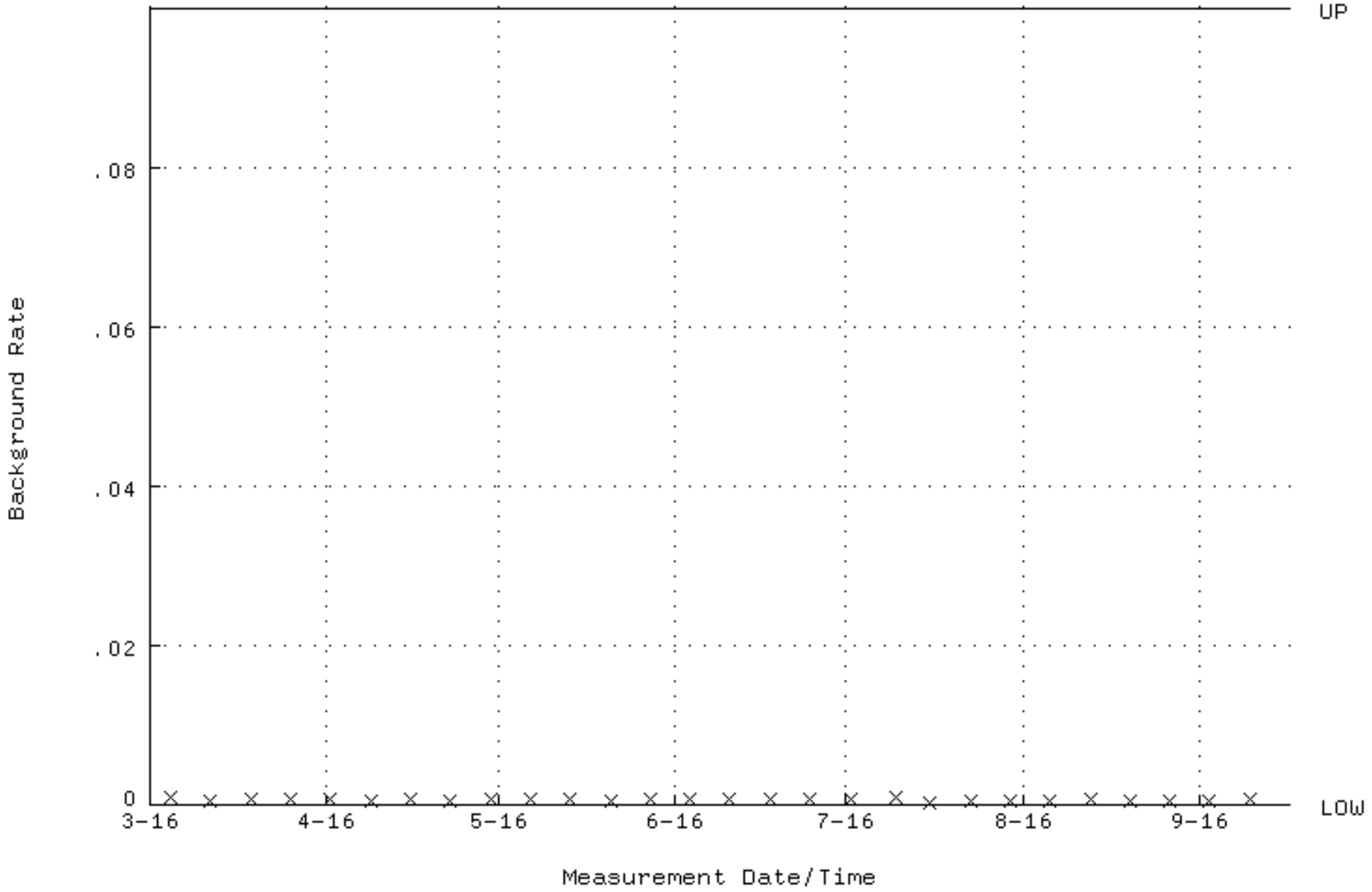
QA filename : DKA100:[ENV_ALPHA.QA.W]W201.QAF;4
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 10:07:54 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



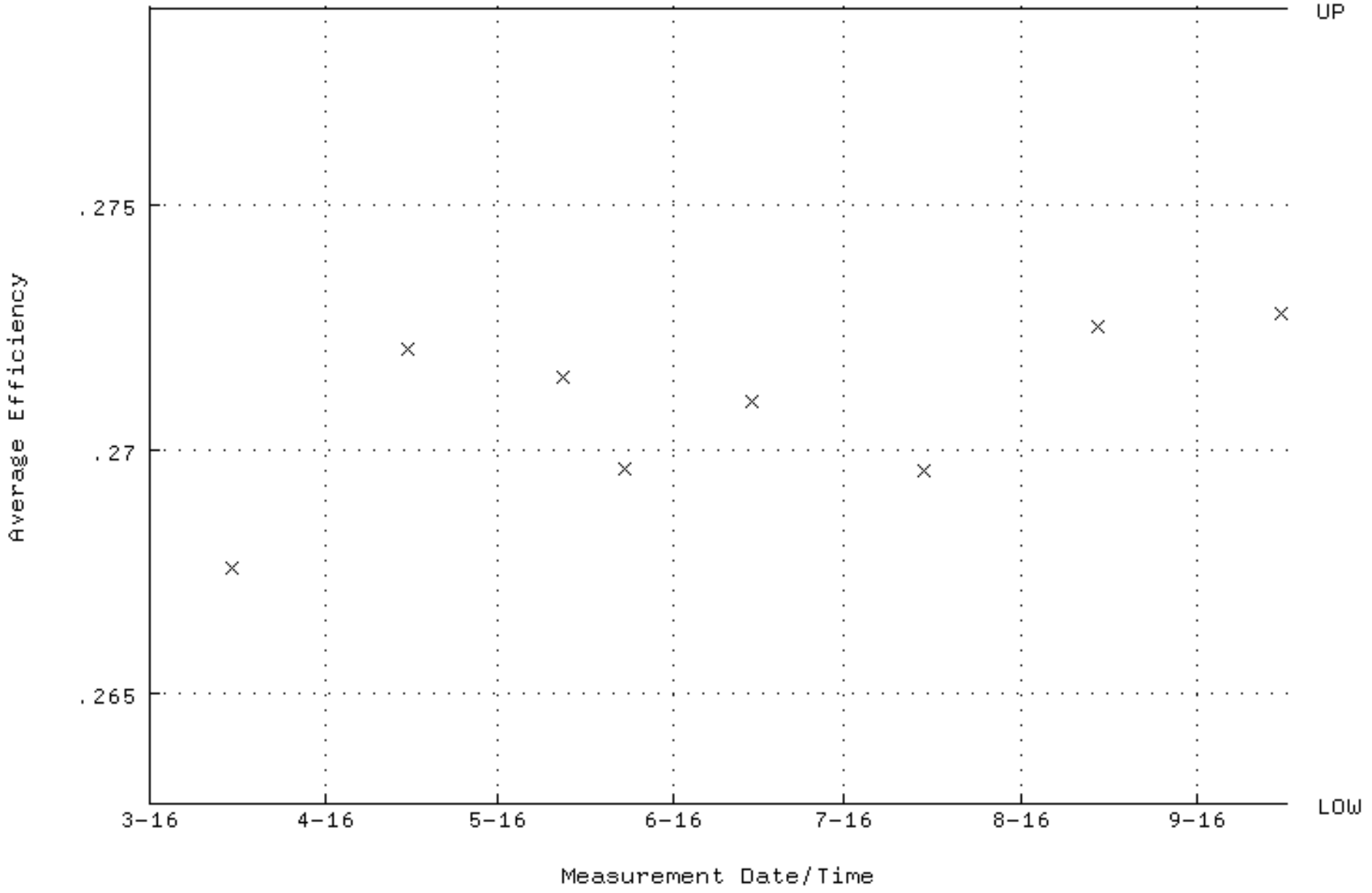
QA filename : DKA100:[ENV_ALPHA.QA.W]W201.QAF;4
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 10:07:54 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



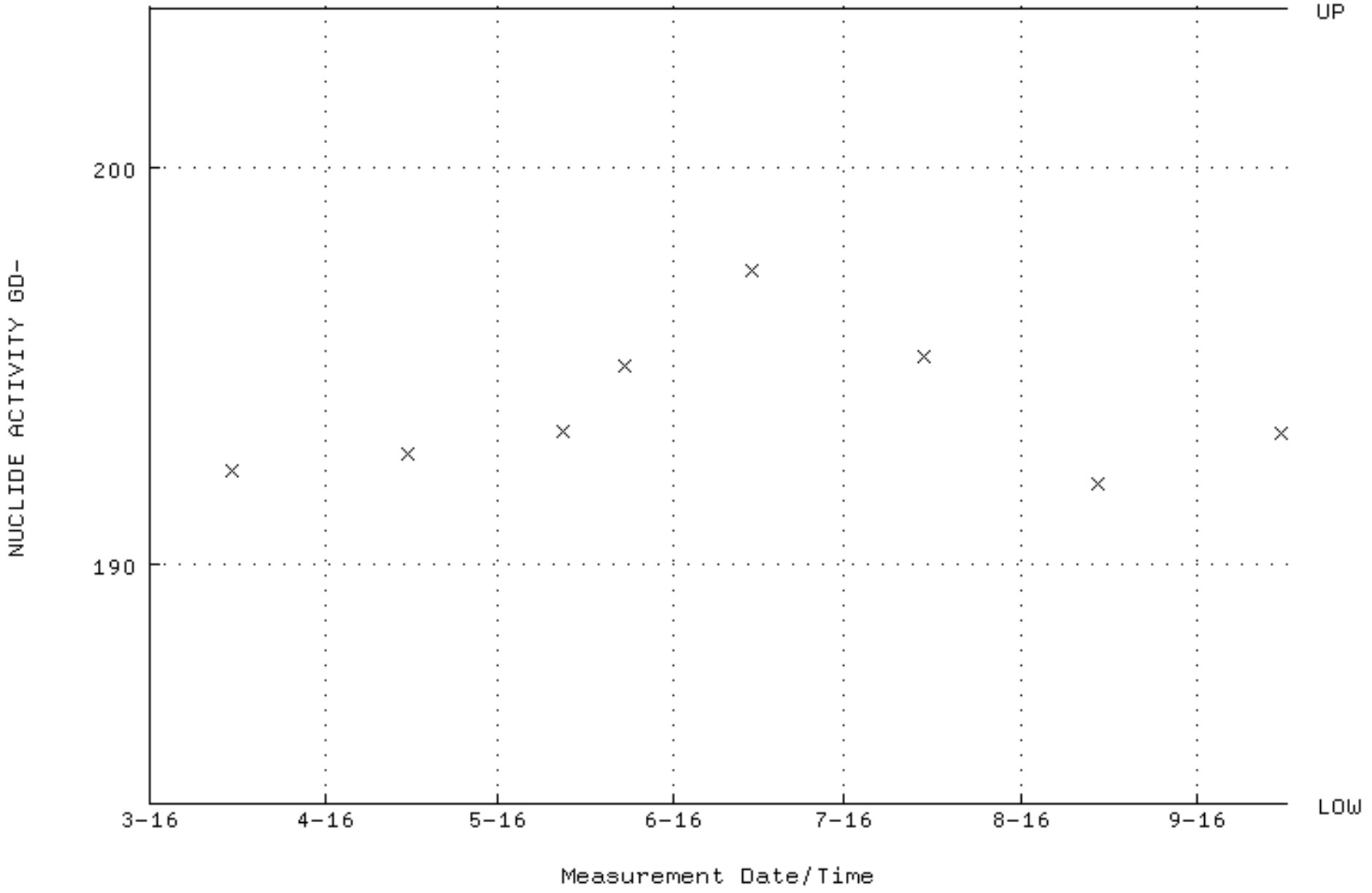
QA filename : DKA100:[ENV_ALPHA.QA.B]B201.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:30 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



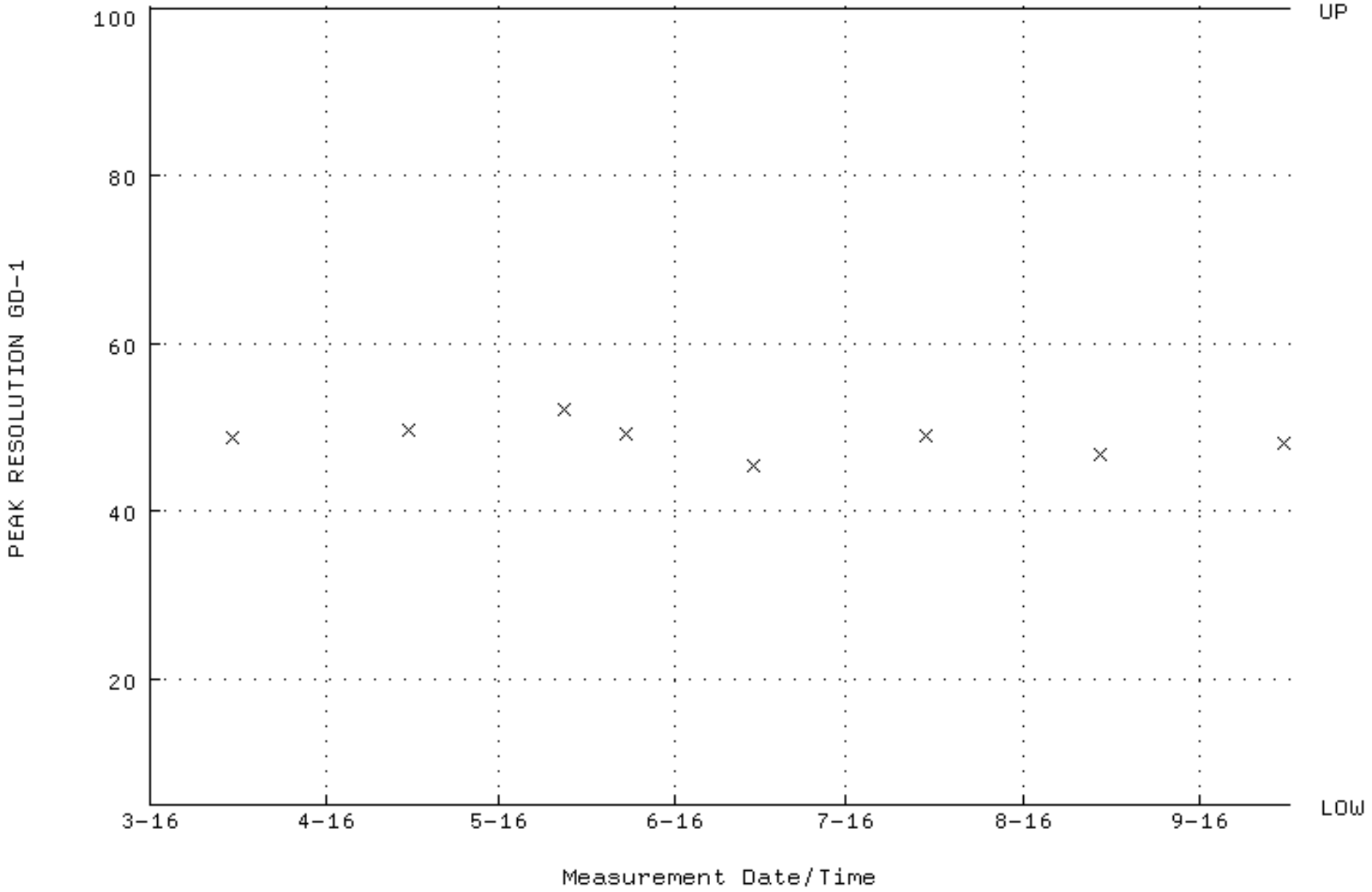
QA filename : DKA100:[ENV_ALPHA.QA.W]W202.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 10:07:31 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.262756 through 0.279008



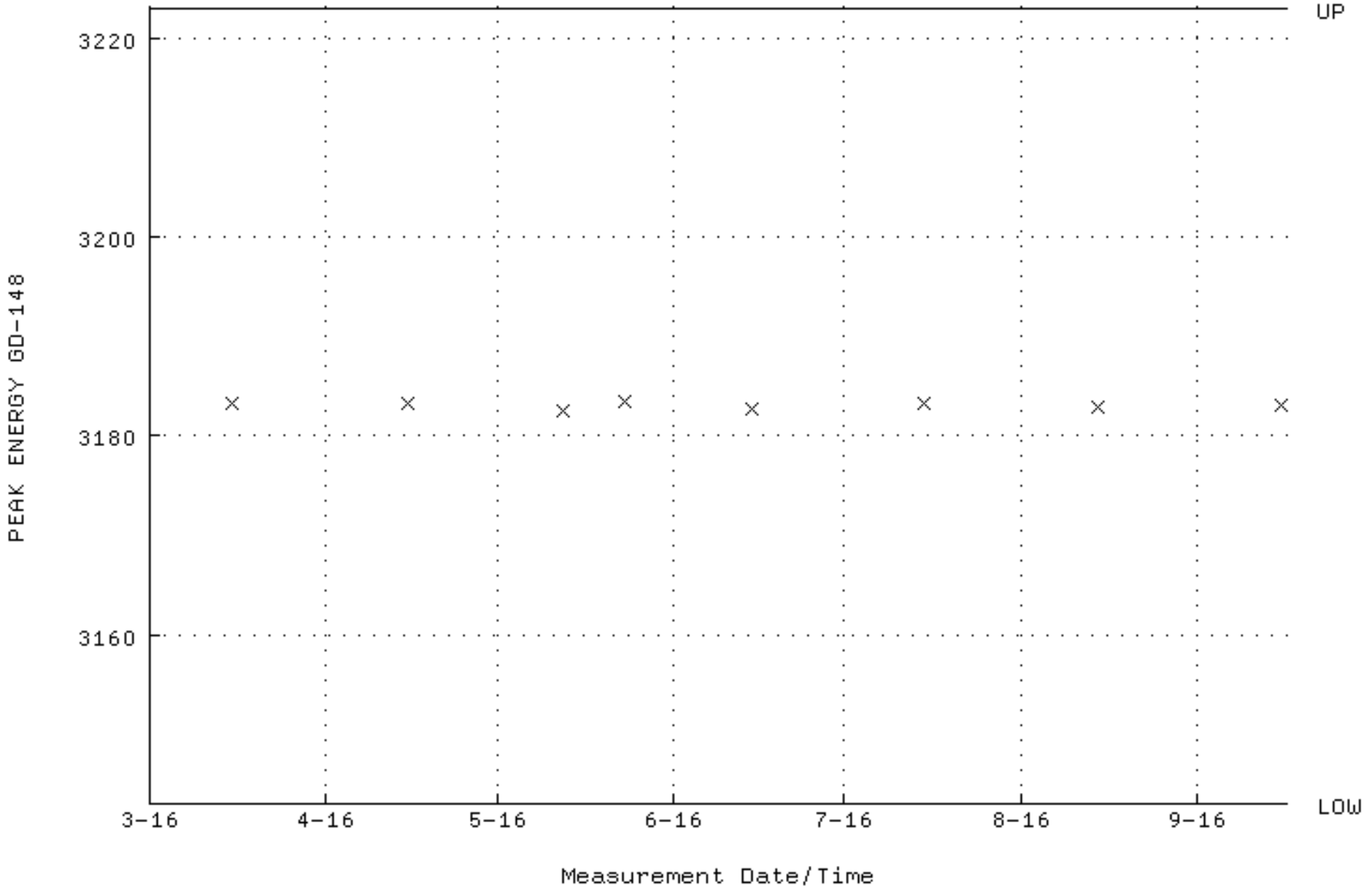
QA filename : DKA100:[ENV_ALPHA.QA.W]W202.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 10:07:31 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



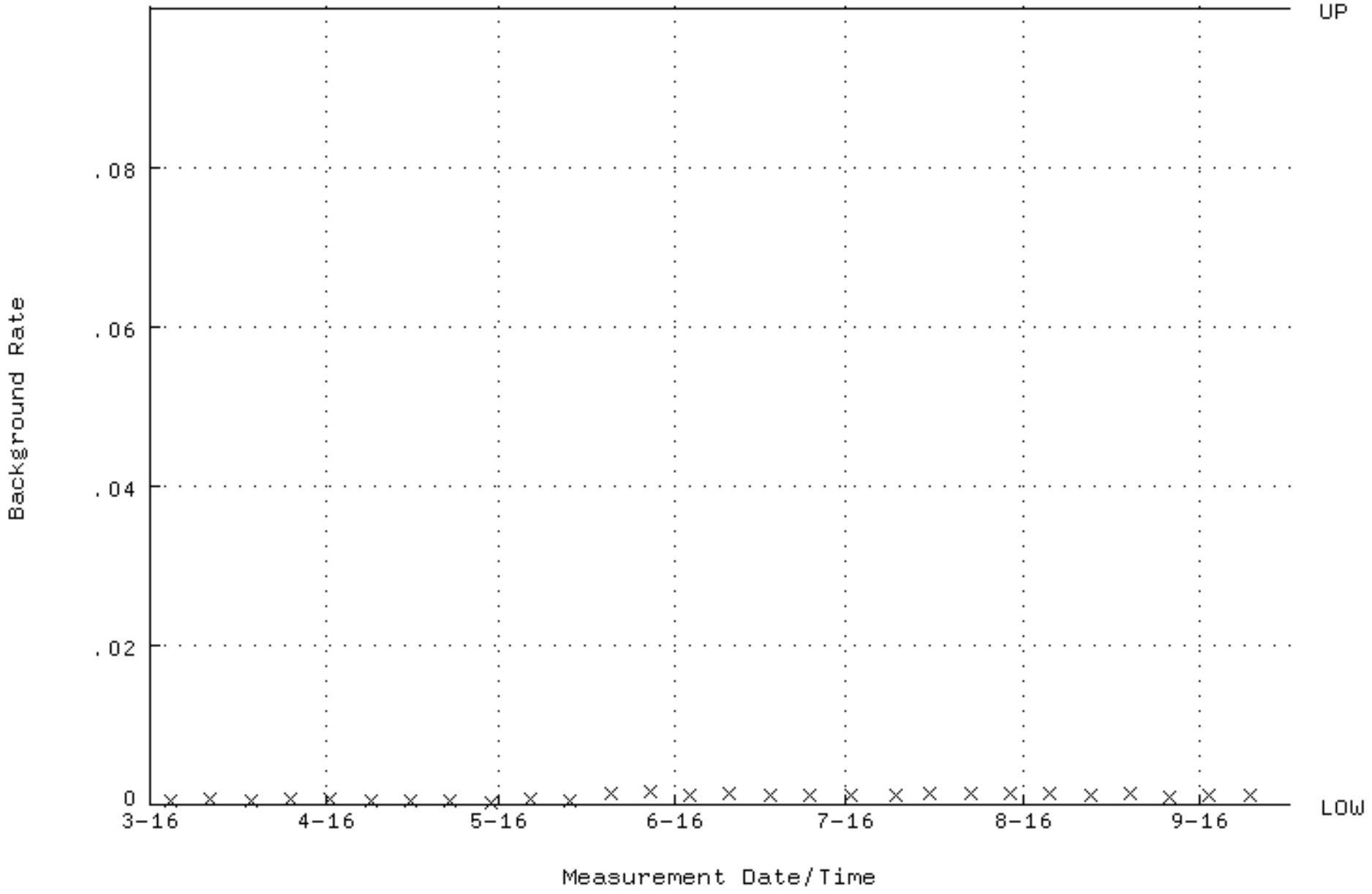
QA filename : DKA100:[ENV_ALPHA.QA.W]W202.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 10:07:31 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



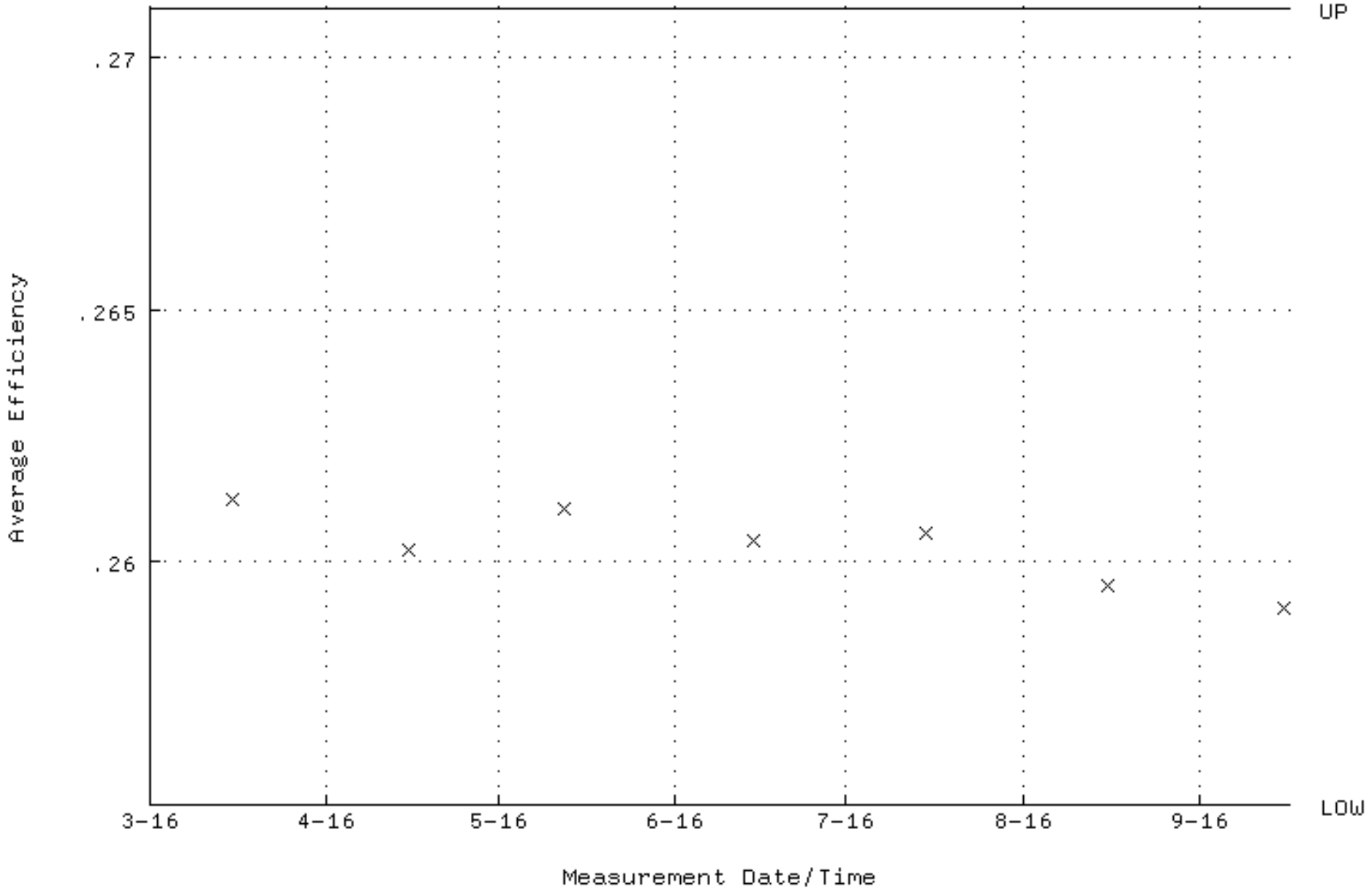
QA filename : DKA100:[ENV_ALPHA.QA.W]W202.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 10:07:31 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



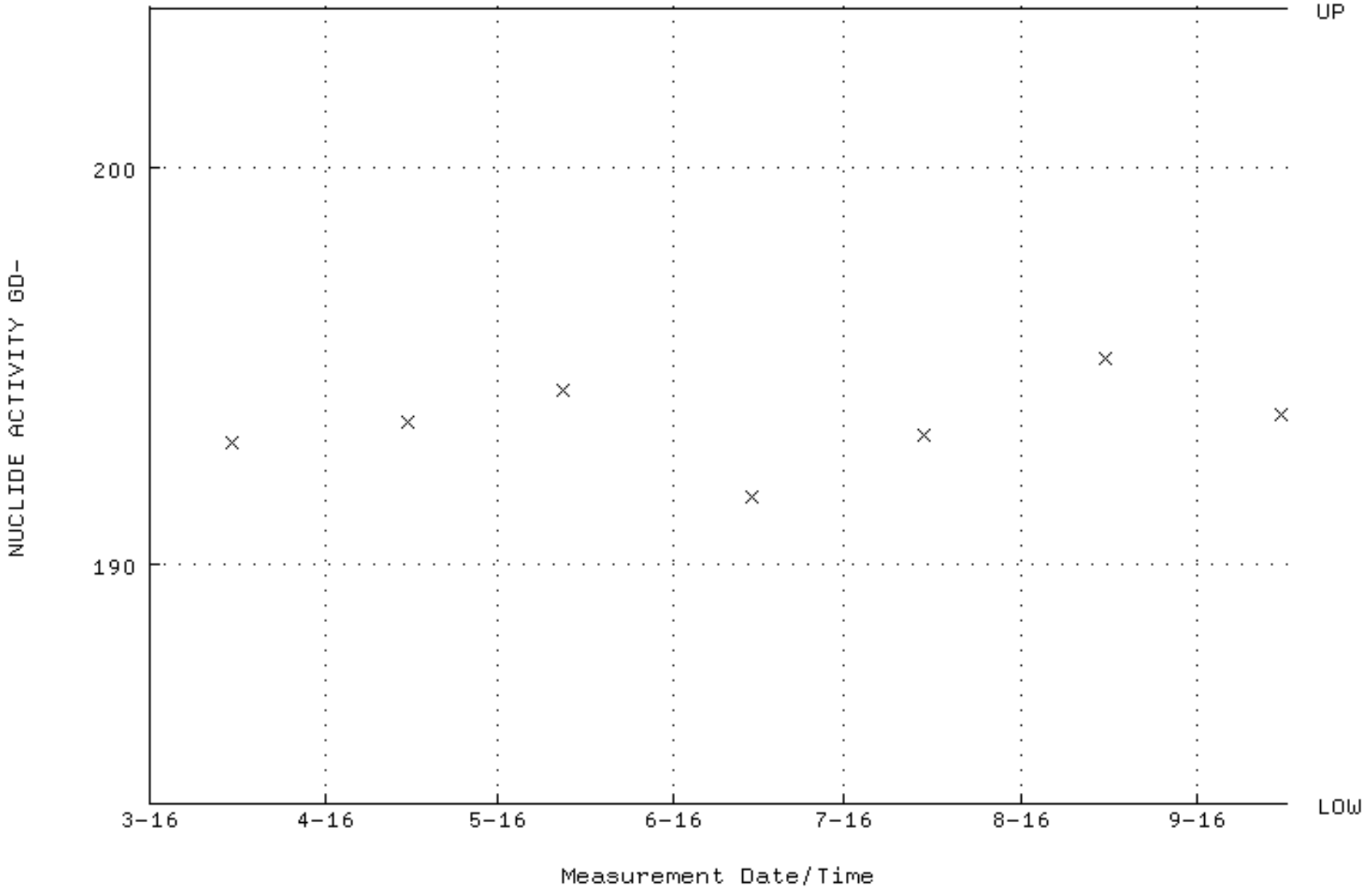
QA filename : DKA100:[ENV_ALPHA.QA.B]B202.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:35 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



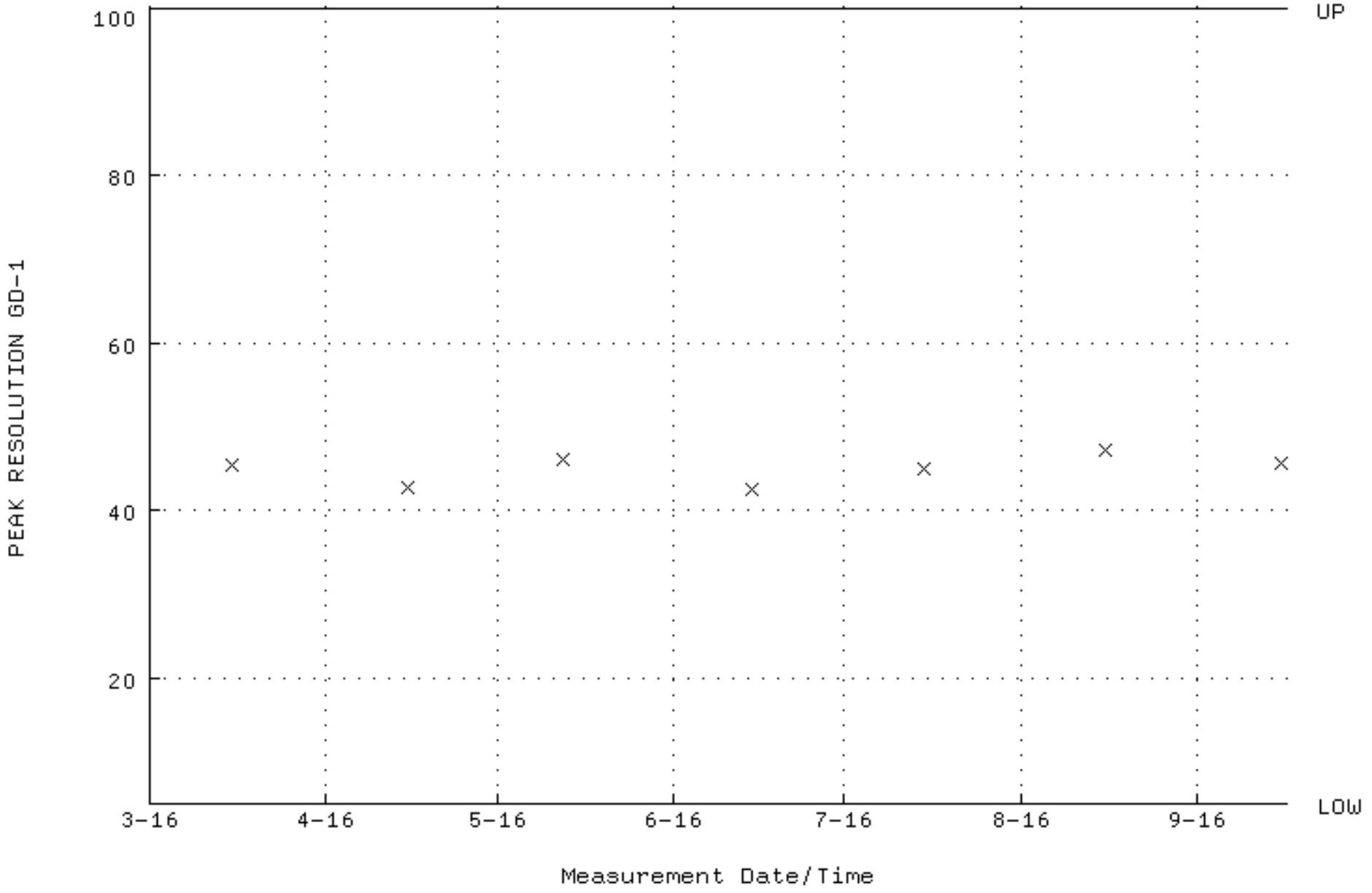
QA filename : DKA100:[ENV_ALPHA.QA.W]W203.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:21 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.255187 through 0.270971



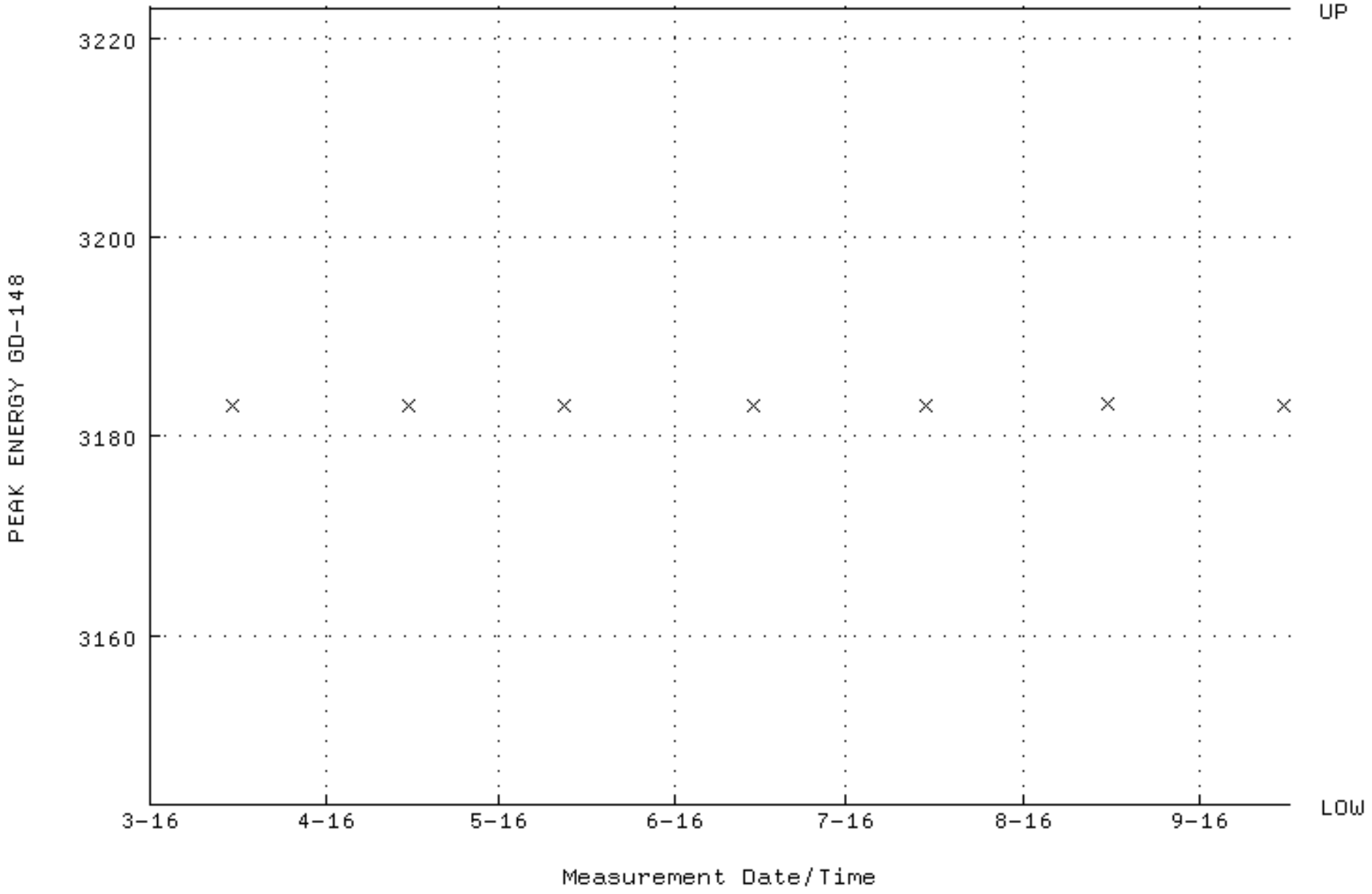
QA filename : DKA100:[ENV_ALPHA.QA.W]W203.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:21 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



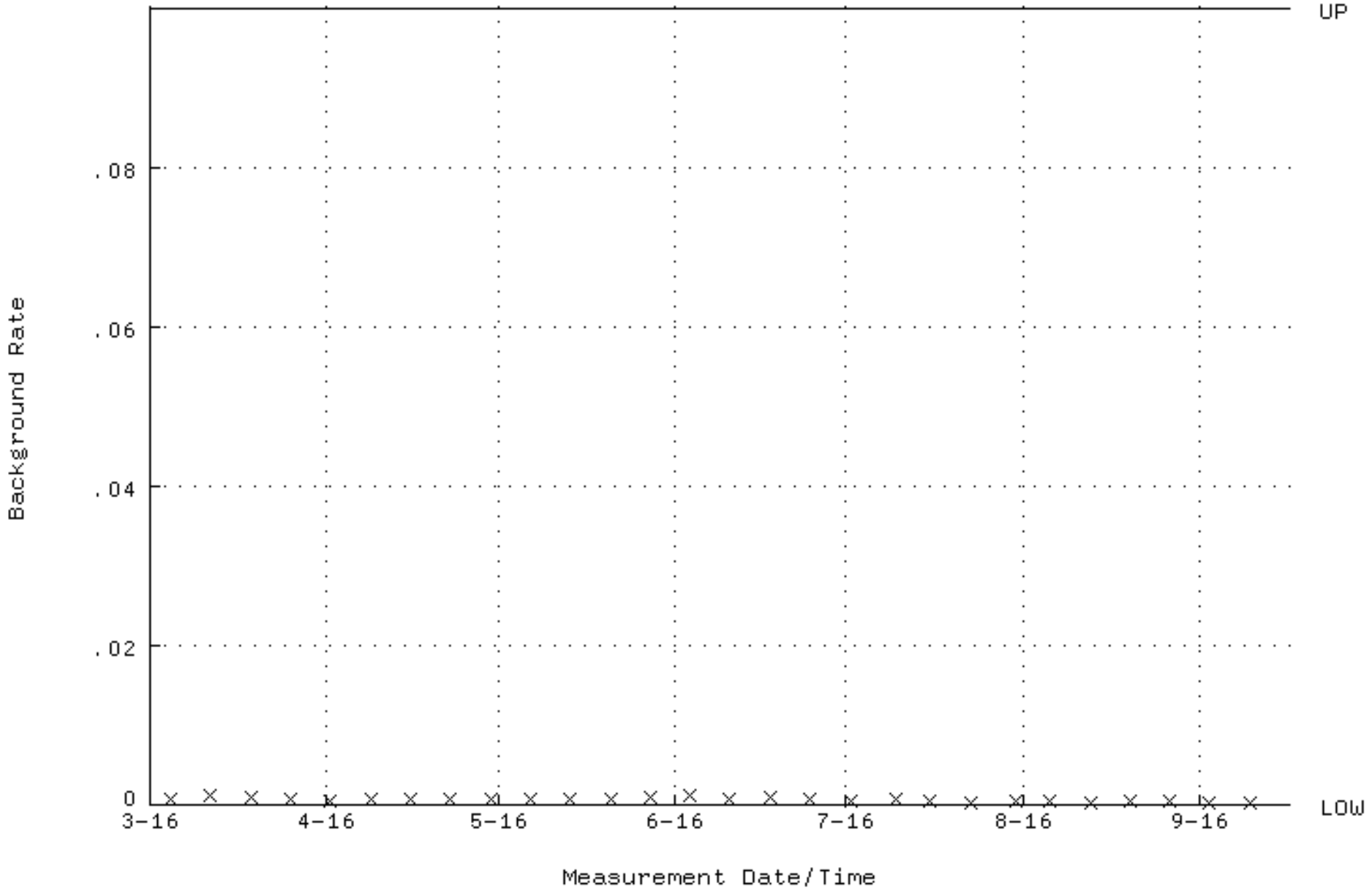
QA filename : DKA100:[ENV_ALPHA.QA.W]W203.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:21 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



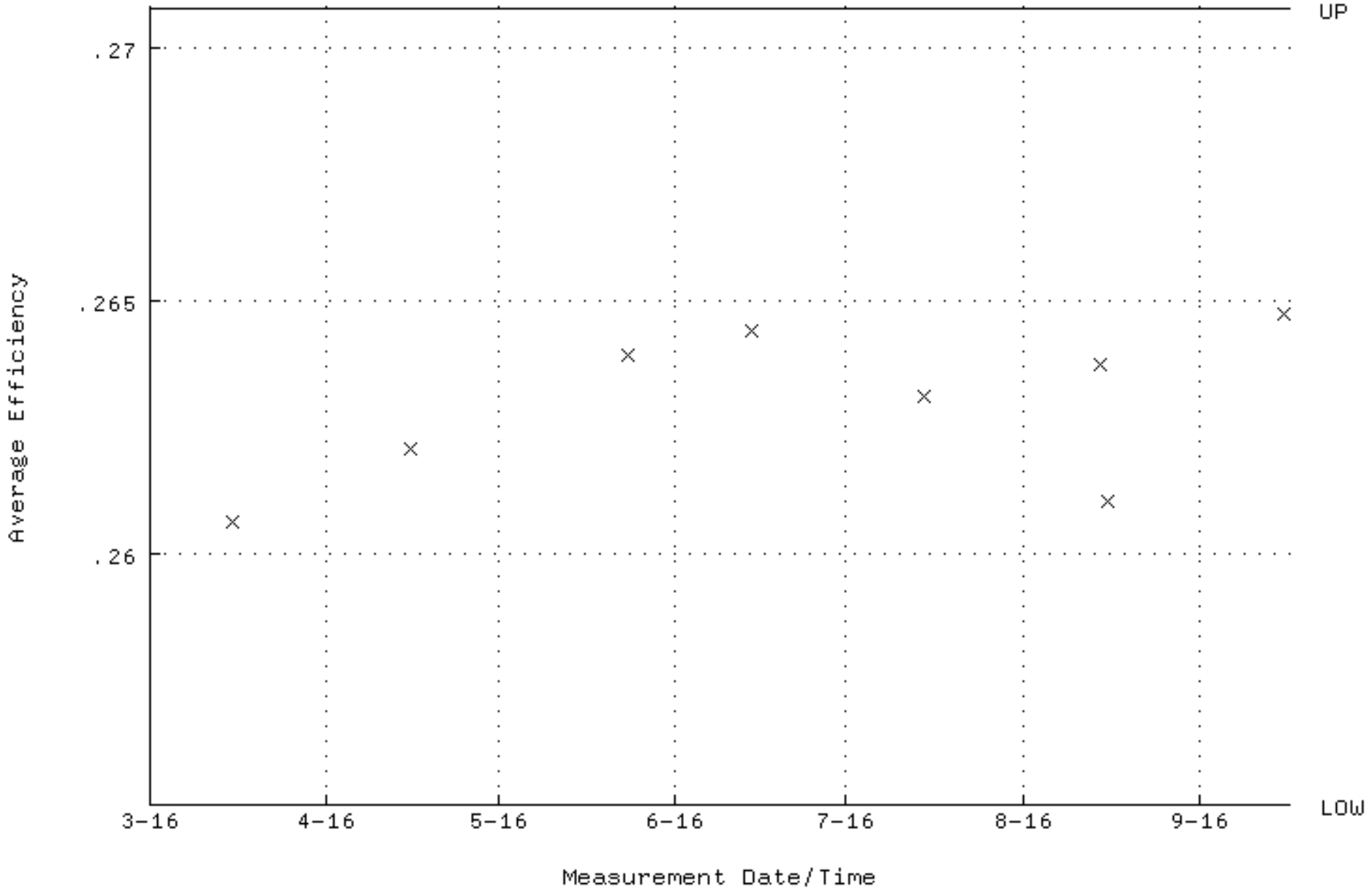
QA filename : DKA100:[ENV_ALPHA.QA.W]W203.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:21 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



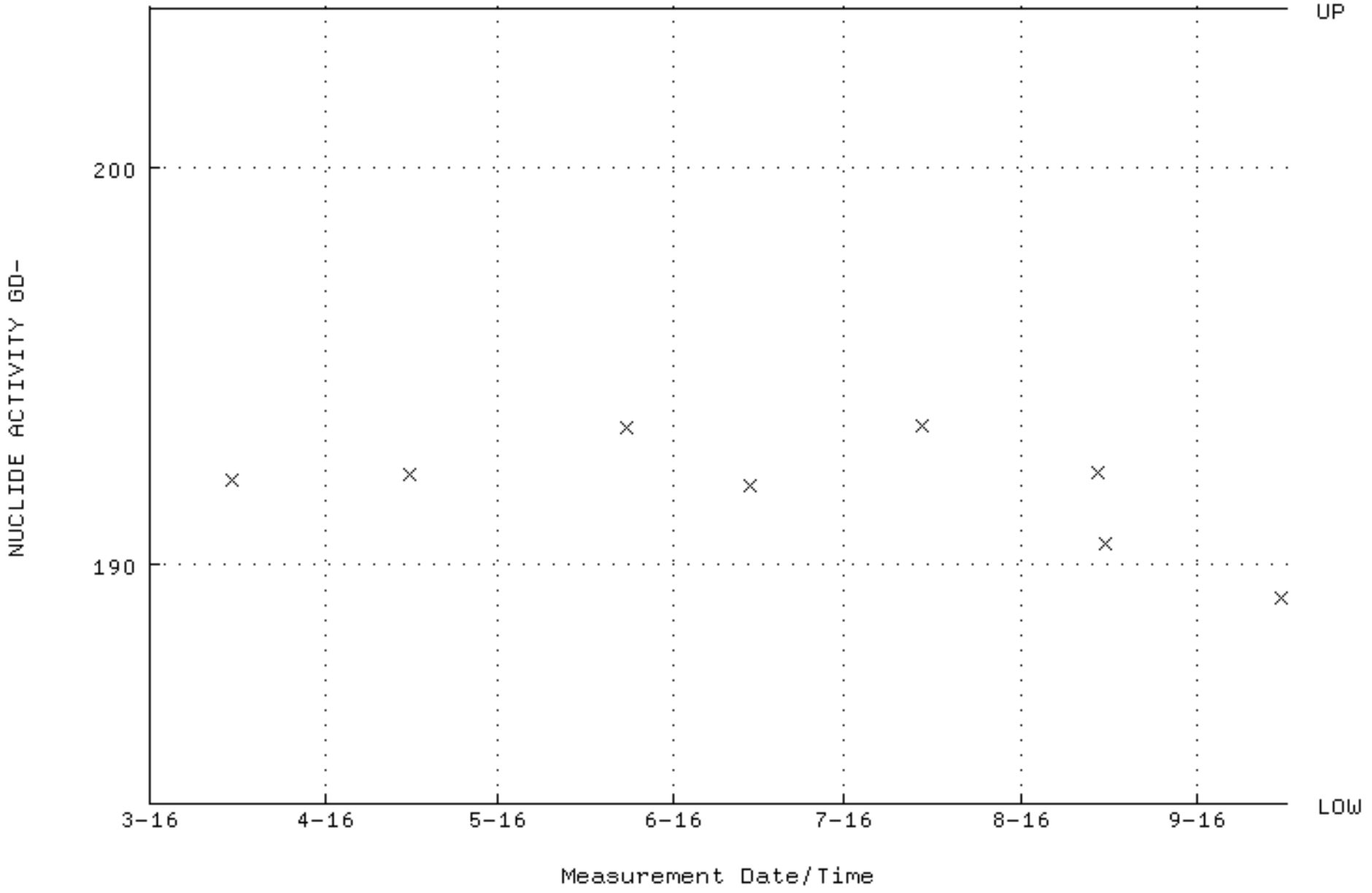
QA filename : DKA100:[ENV_ALPHA.QA.B]B203.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:39 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



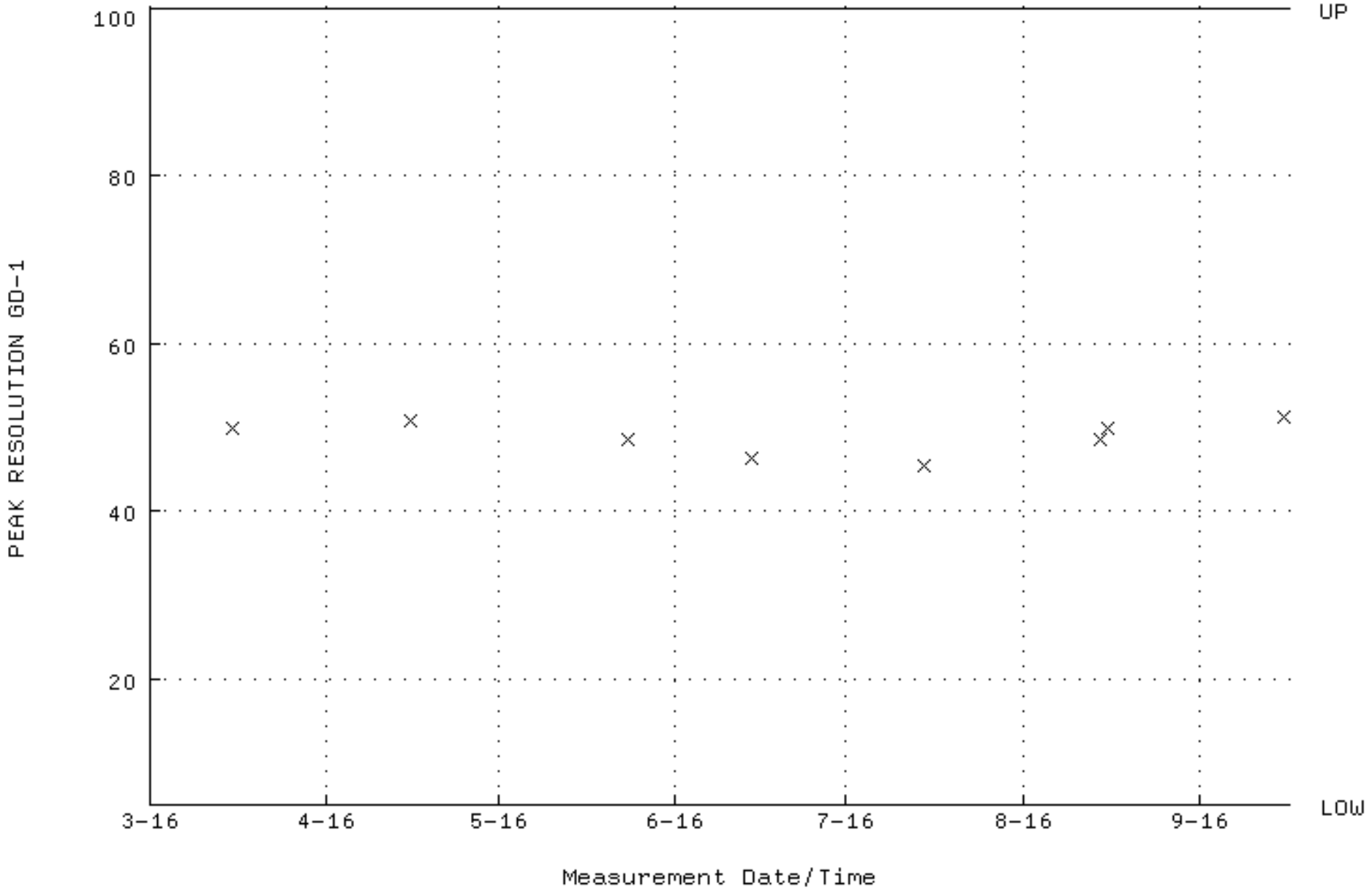
QA filename : DKA100:[ENV_ALPHA.QA.W]W204.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:26 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.255020 through 0.270790



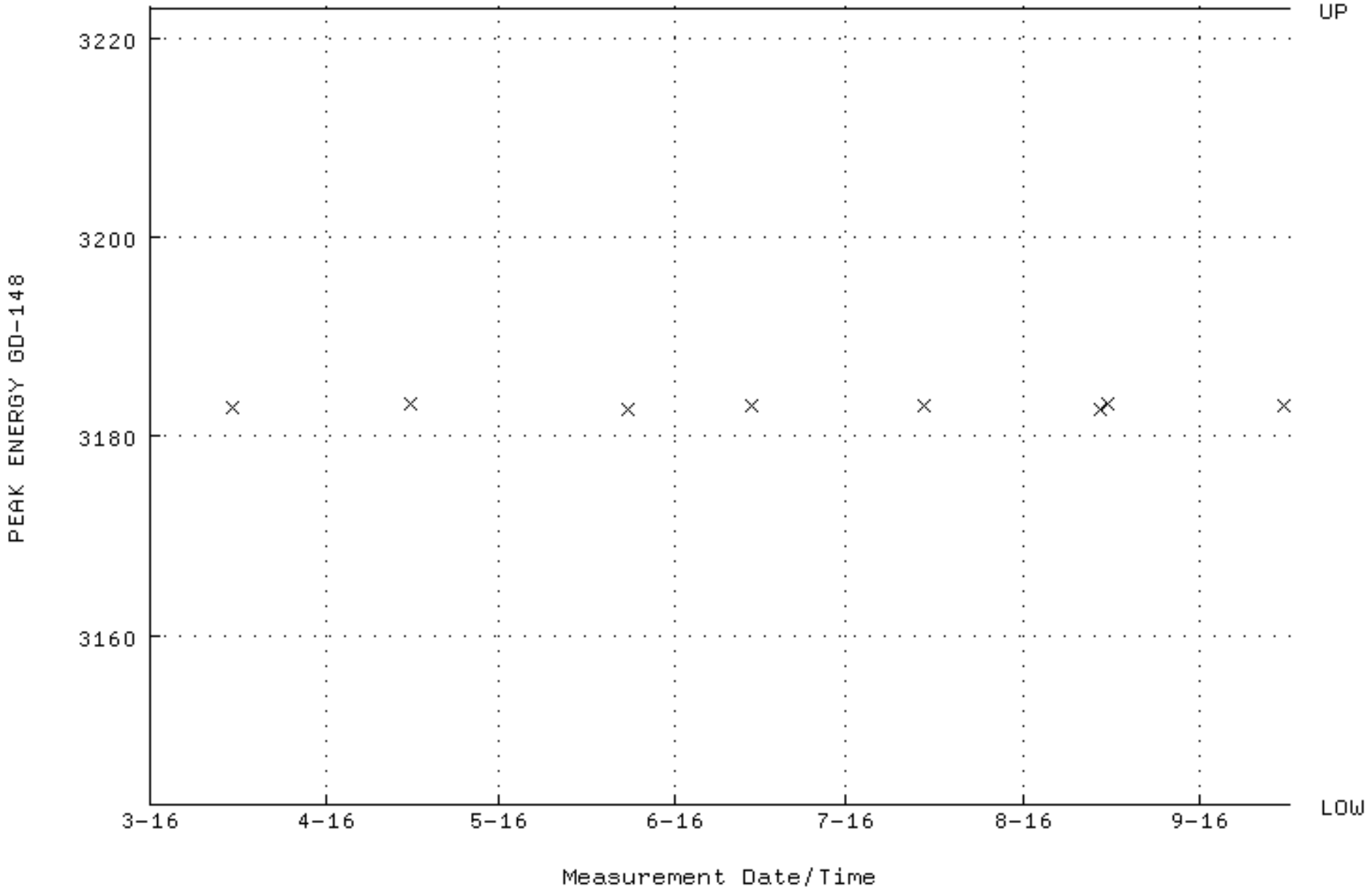
QA filename : DKA100:[ENV_ALPHA.QA.W]W204.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:26 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



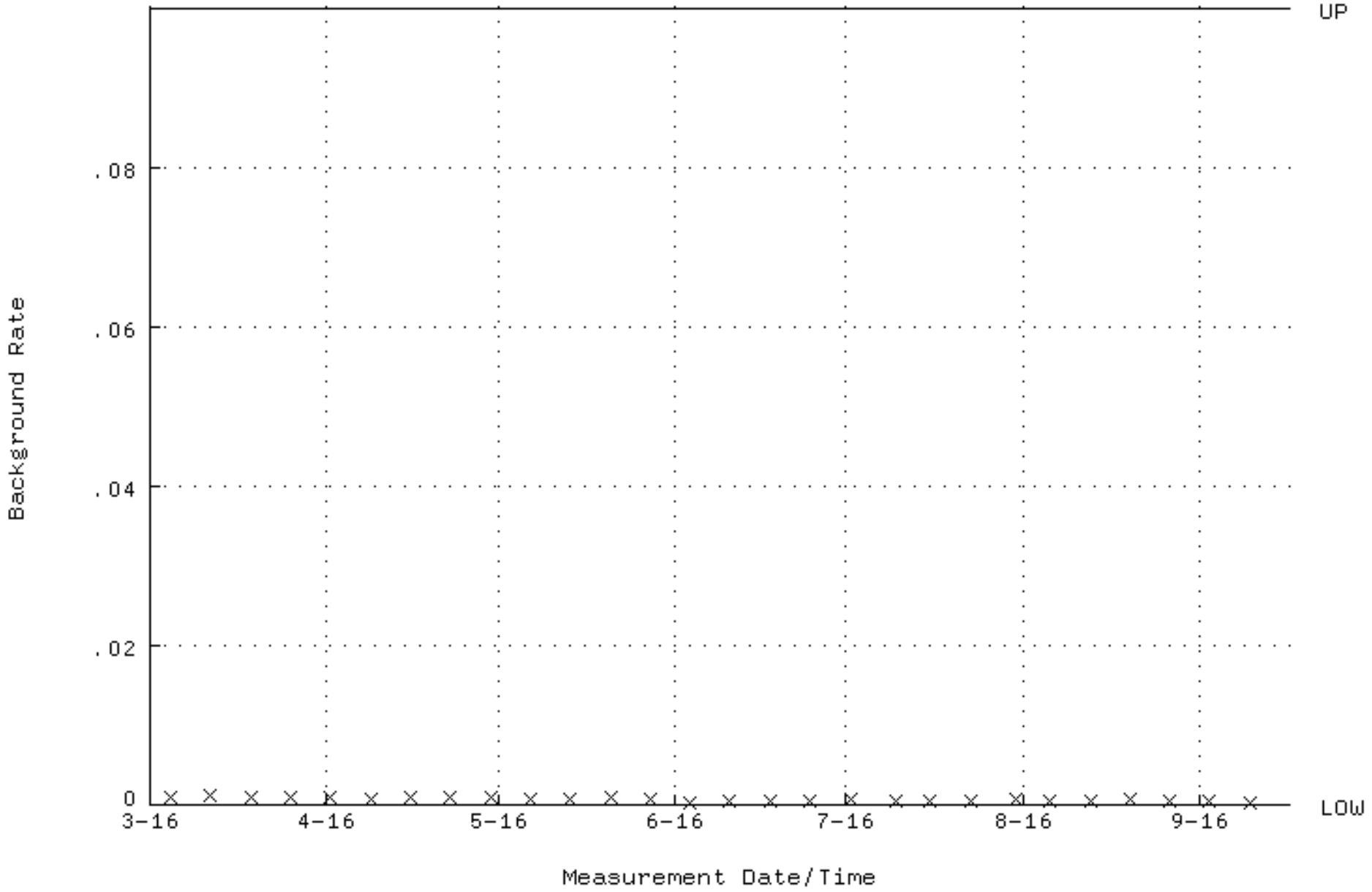
QA filename : DKA100:[ENV_ALPHA.QA.W]W204.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:26 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



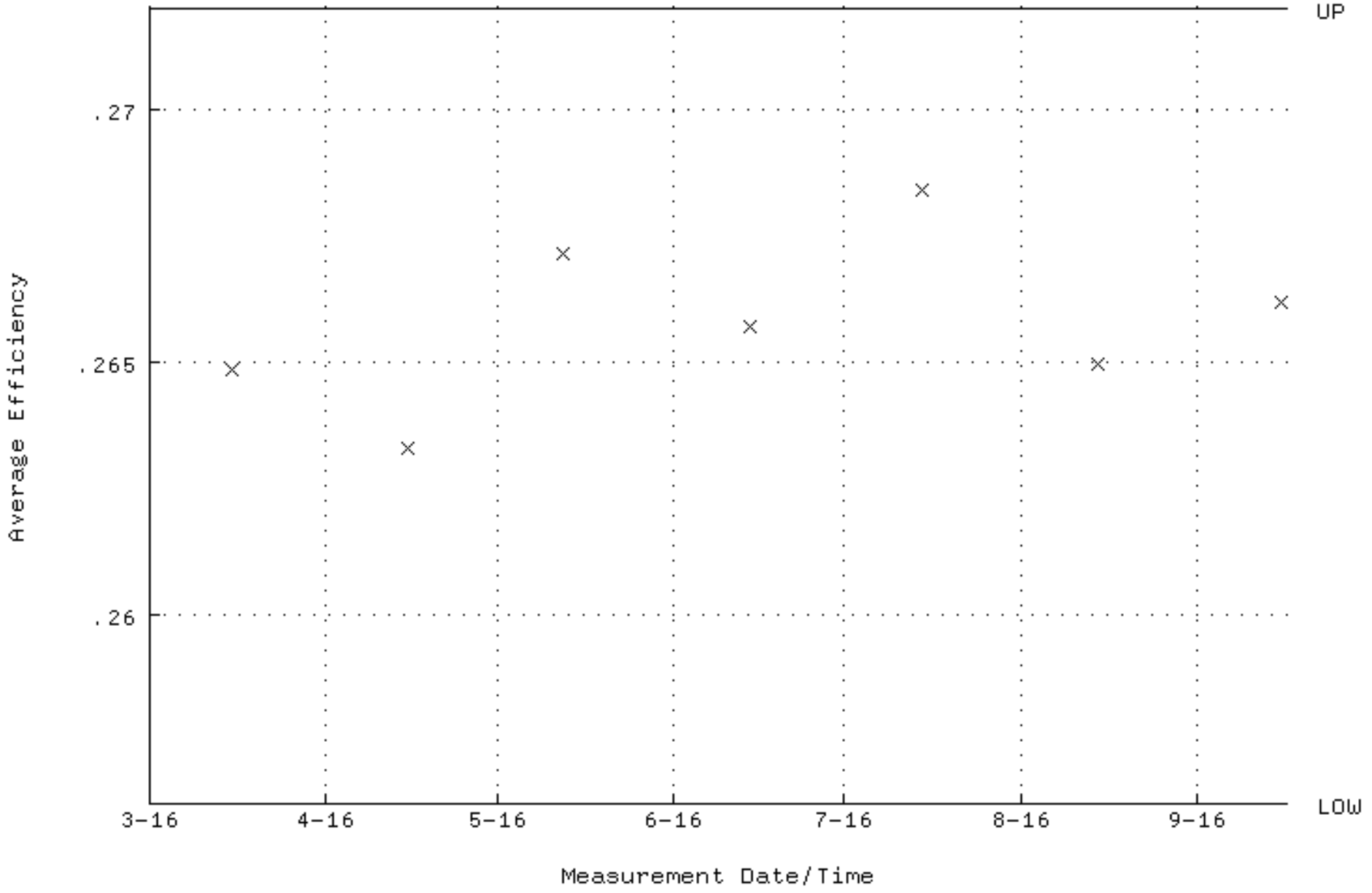
QA filename : DKA100:[ENV_ALPHA.QA.W]W204.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:26 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



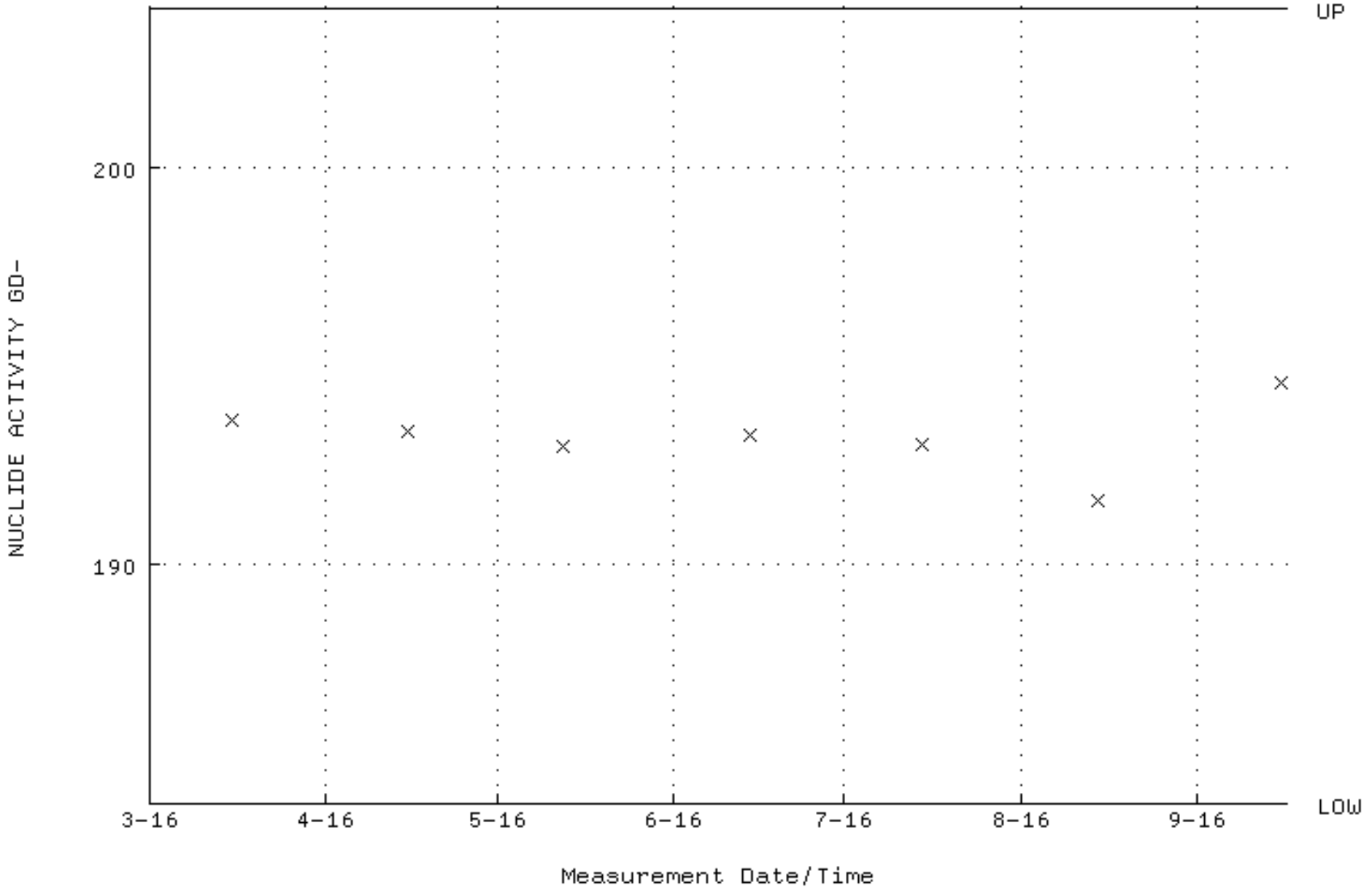
QA filename : DKA100:[ENV_ALPHA.QA.B]B204.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:43 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



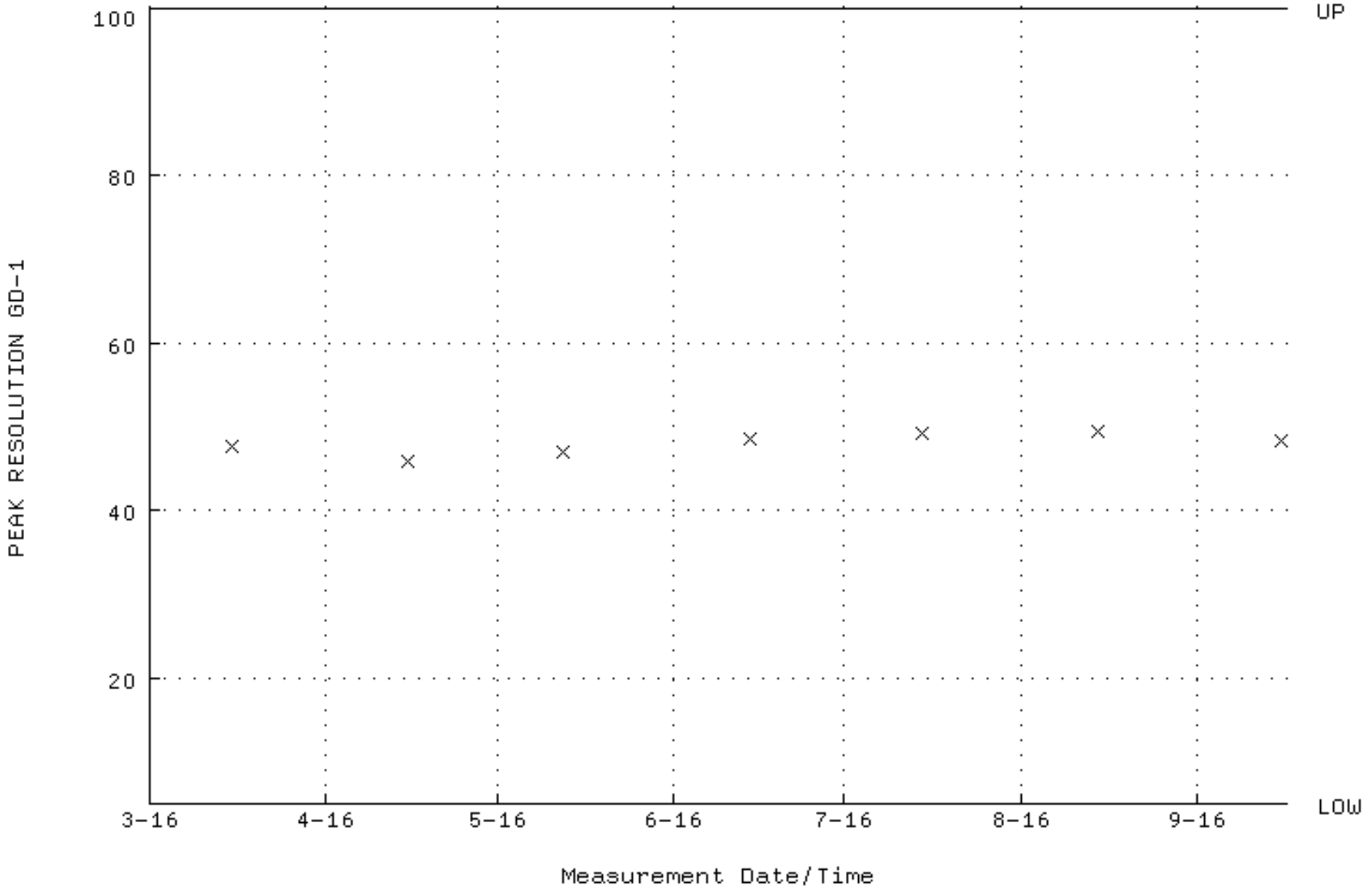
QA filename : DKA100:[ENV_ALPHA.QA.W]W205.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:30 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.256250 through 0.272000



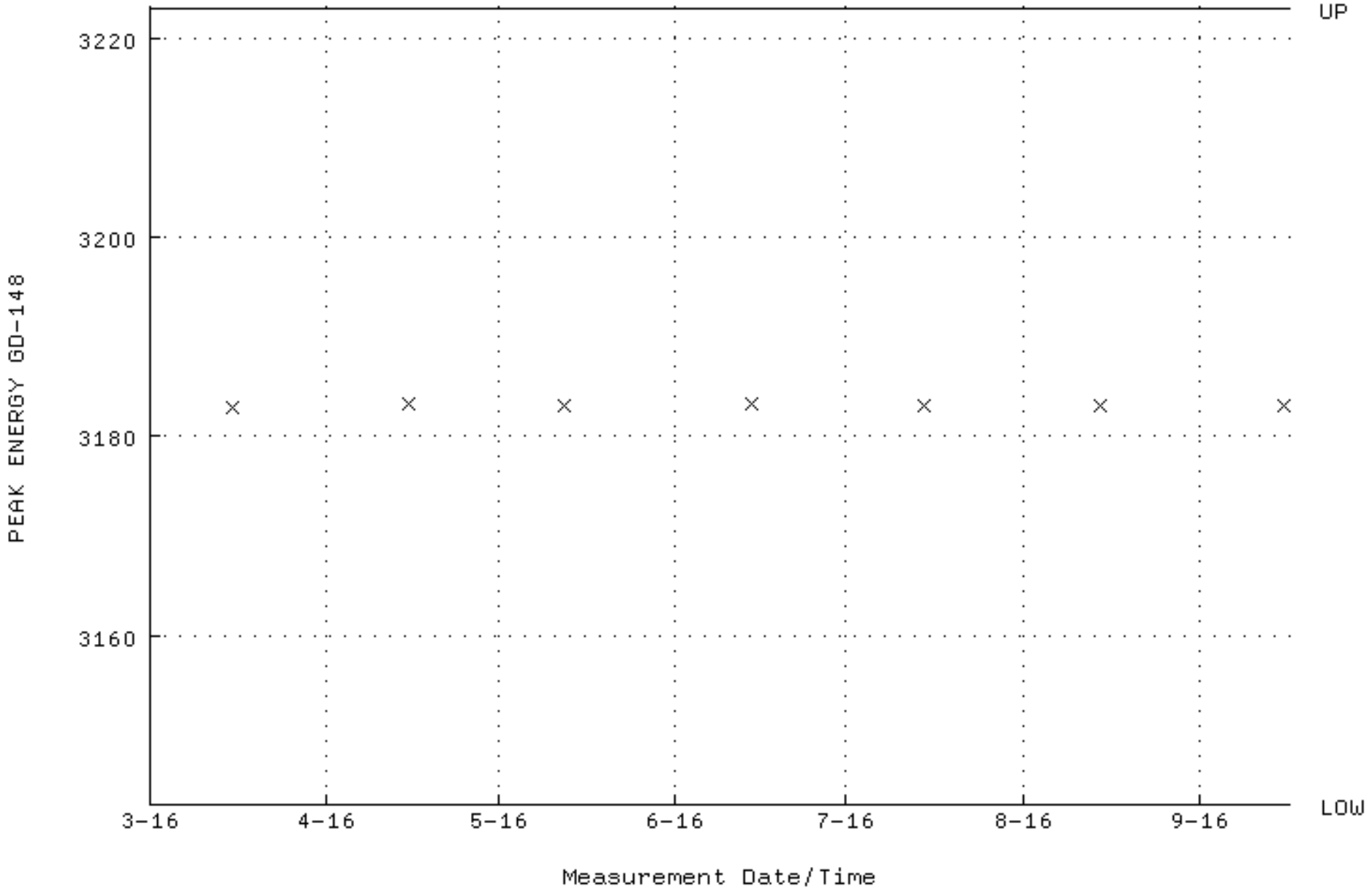
QA filename : DKA100:[ENV_ALPHA.QA.W]W205.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:30 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



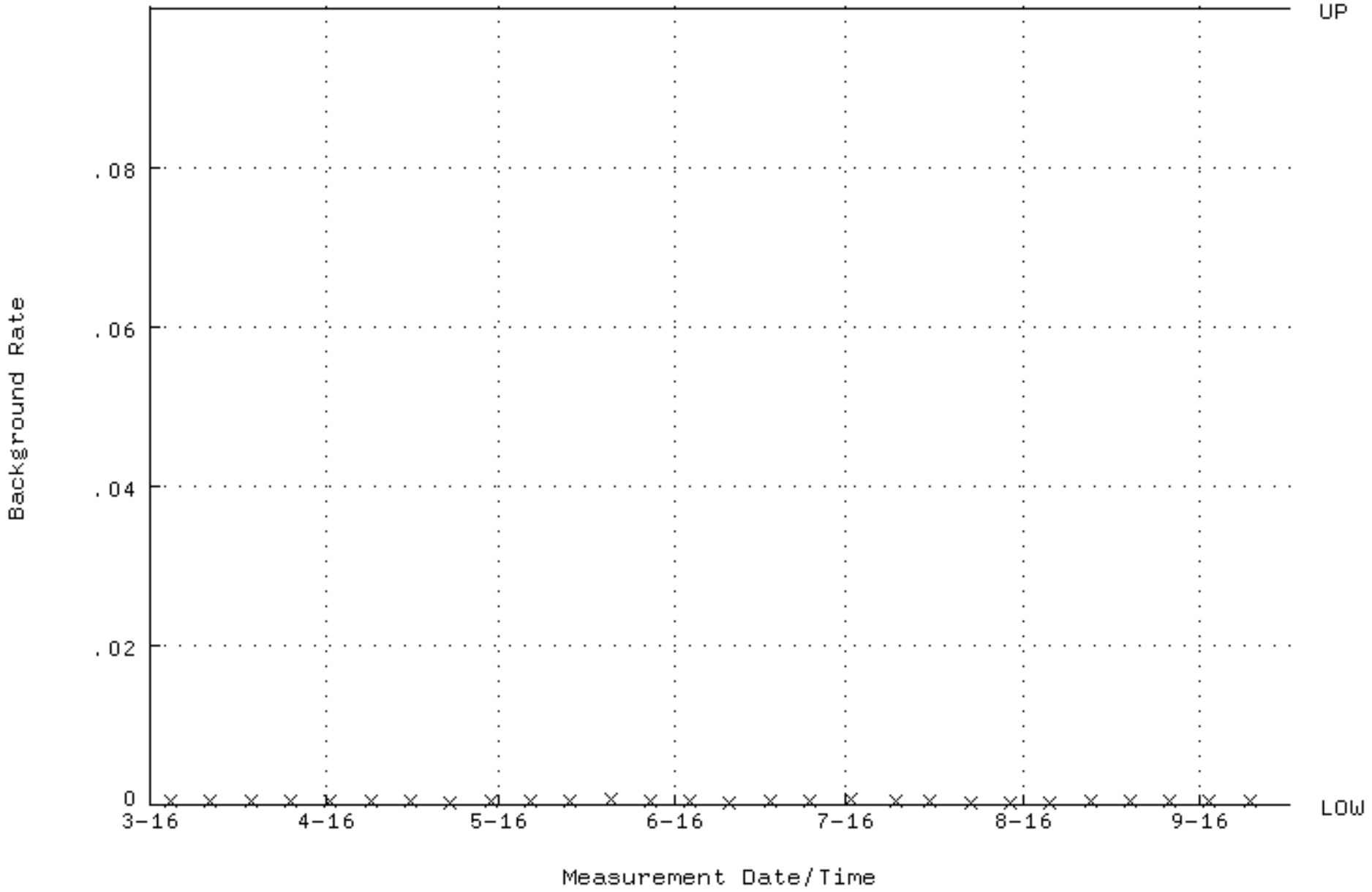
QA filename : DKA100:[ENV_ALPHA.QA.W]W205.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:30 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



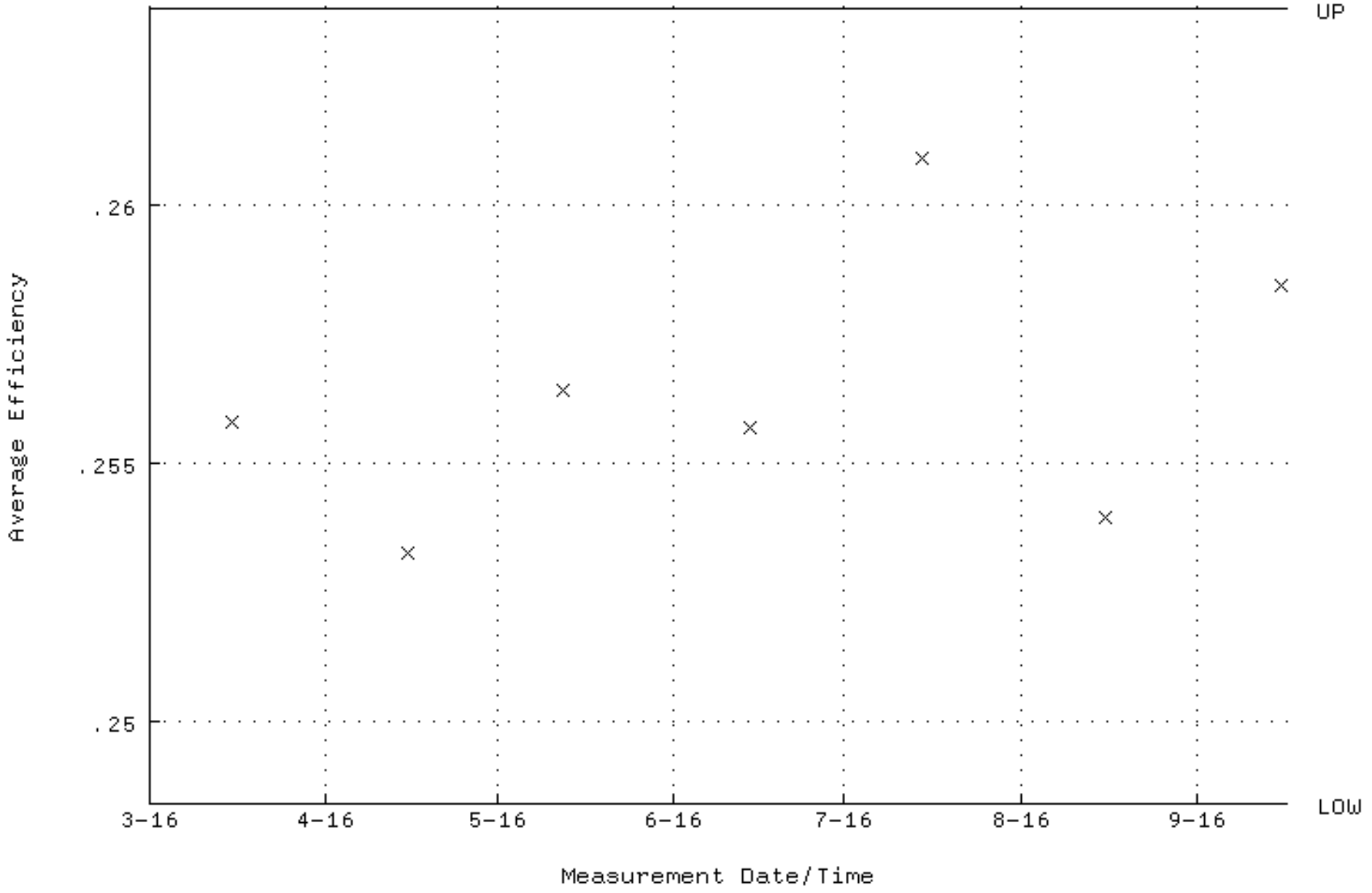
QA filename : DKA100:[ENV_ALPHA.QA.W]W205.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:30 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



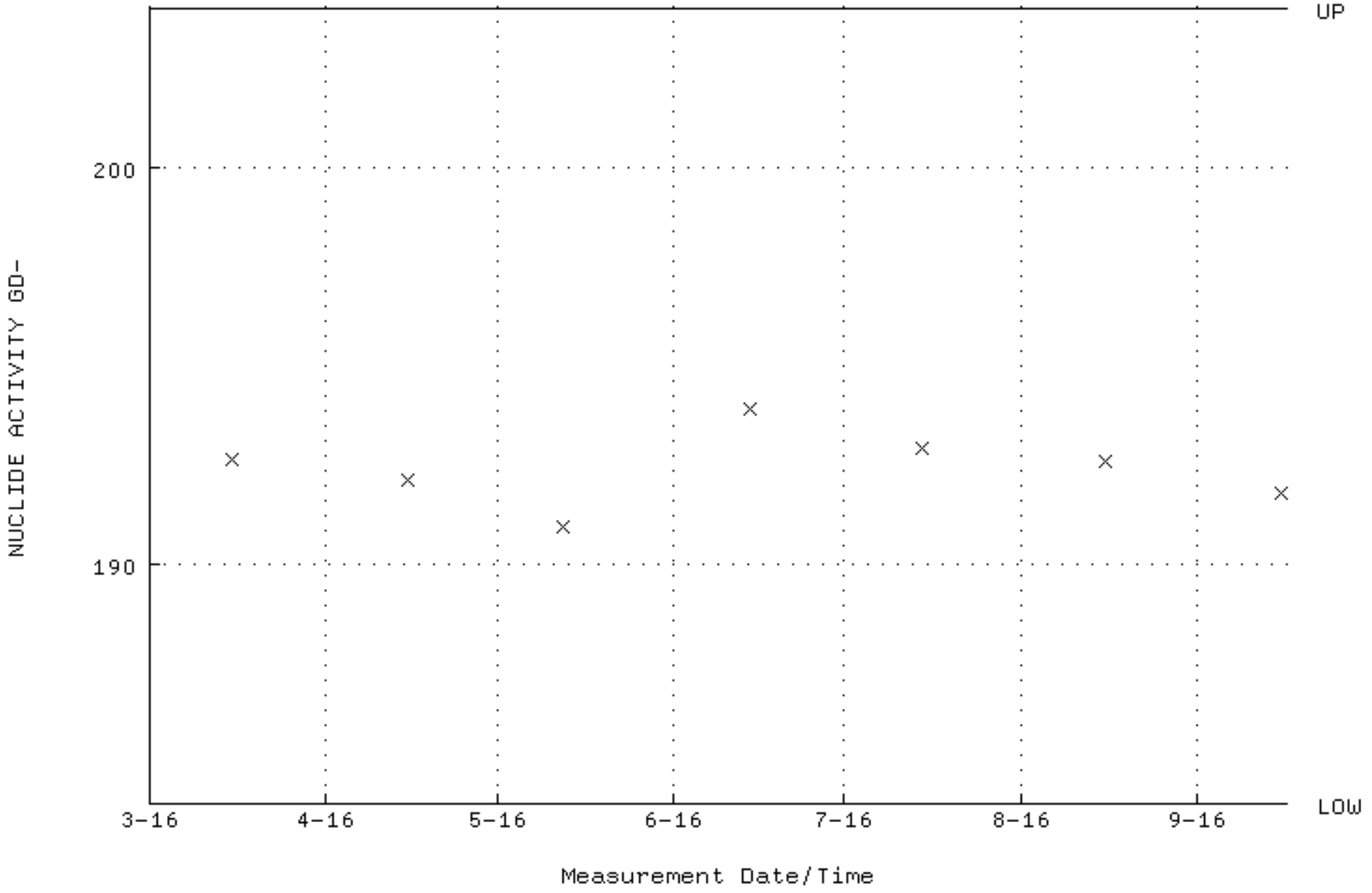
QA filename : DKA100:[ENV_ALPHA.QA.B]B205.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:47 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



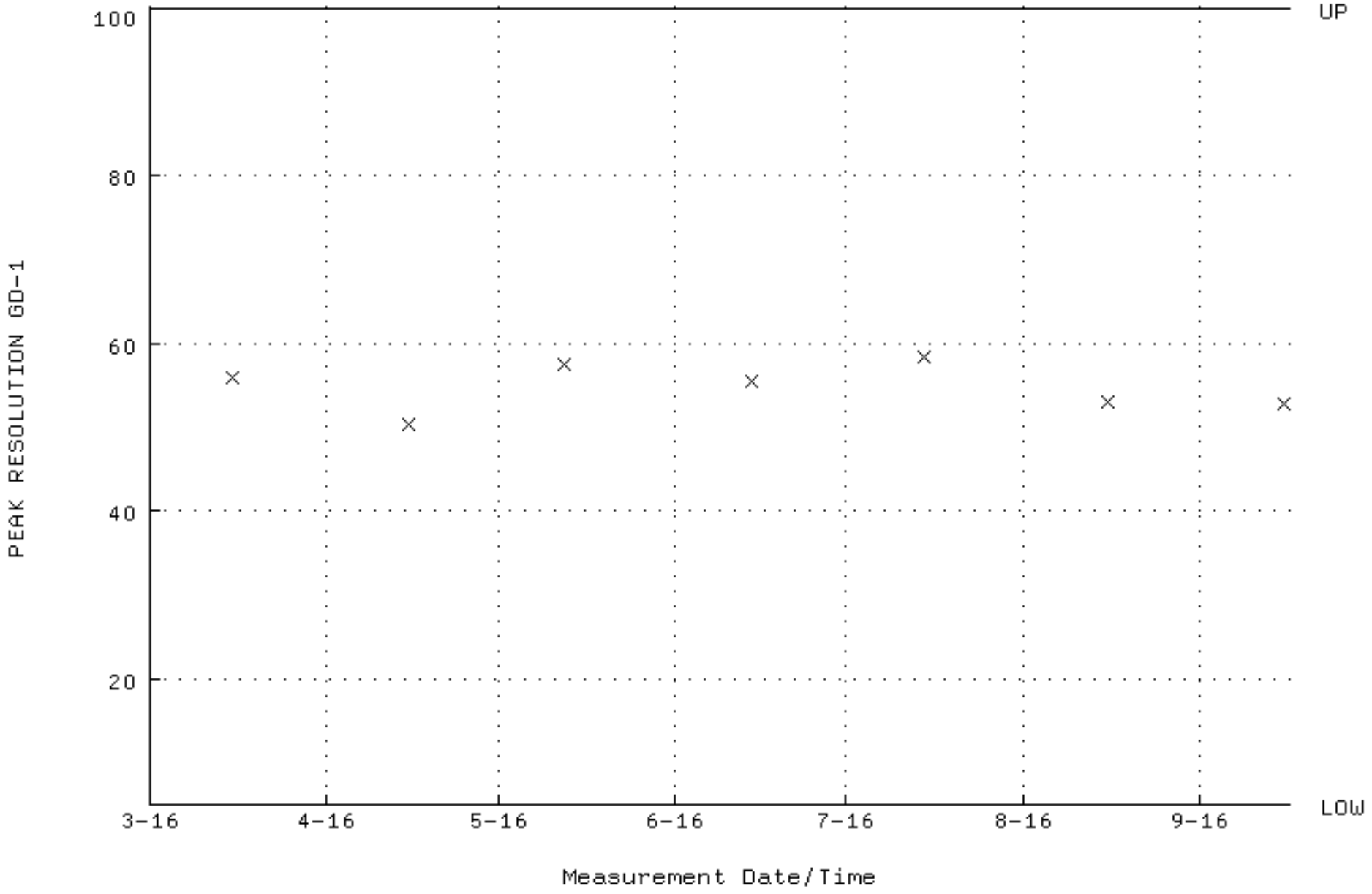
QA filename : DKA100:[ENV_ALPHA.QA.W]W206.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 15-MAR-2016 08:39:33 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.248420 through 0.263785



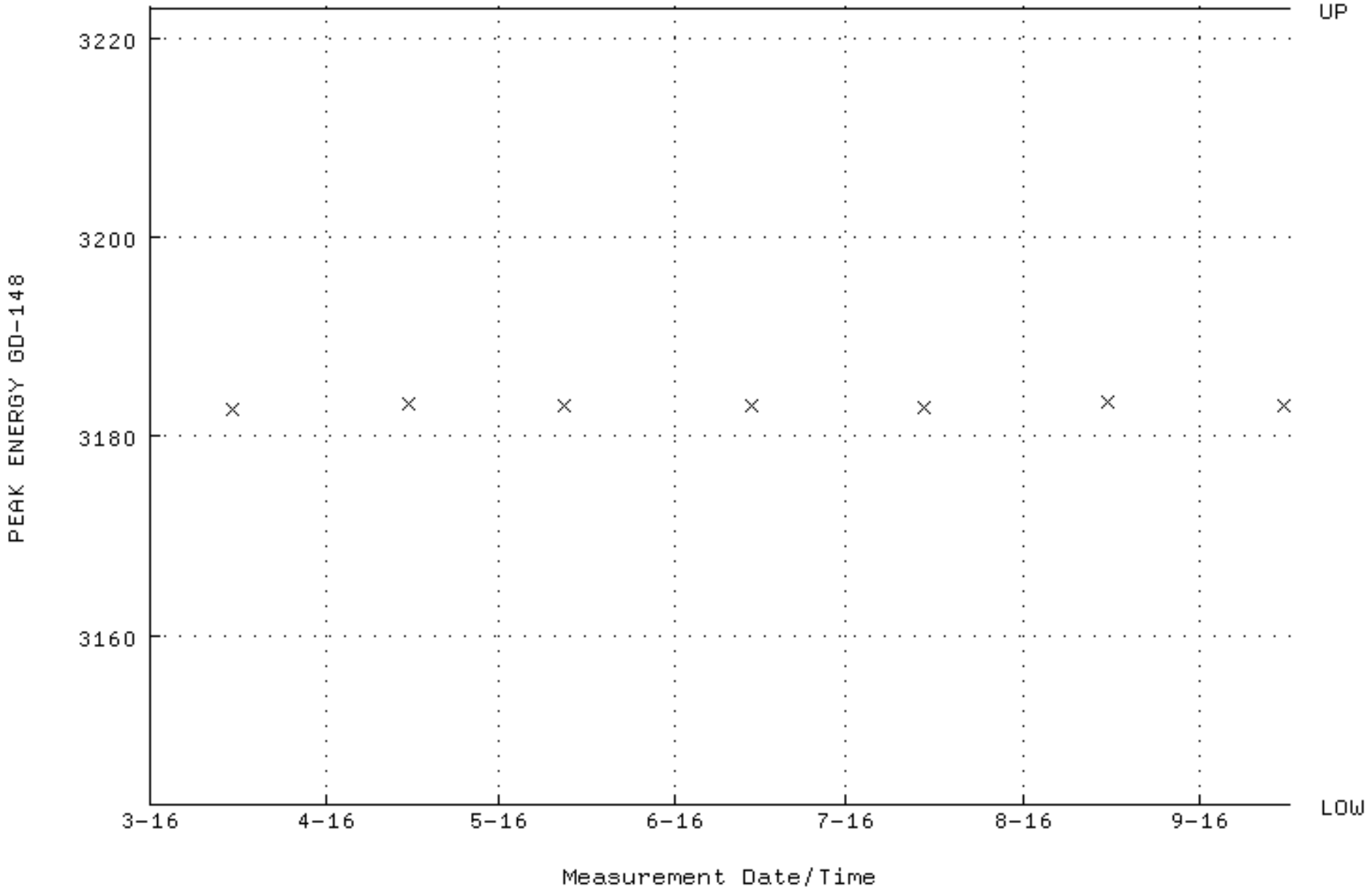
QA filename : DKA100:[ENV_ALPHA.QA.W]W206.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 15-MAR-2016 08:39:33 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



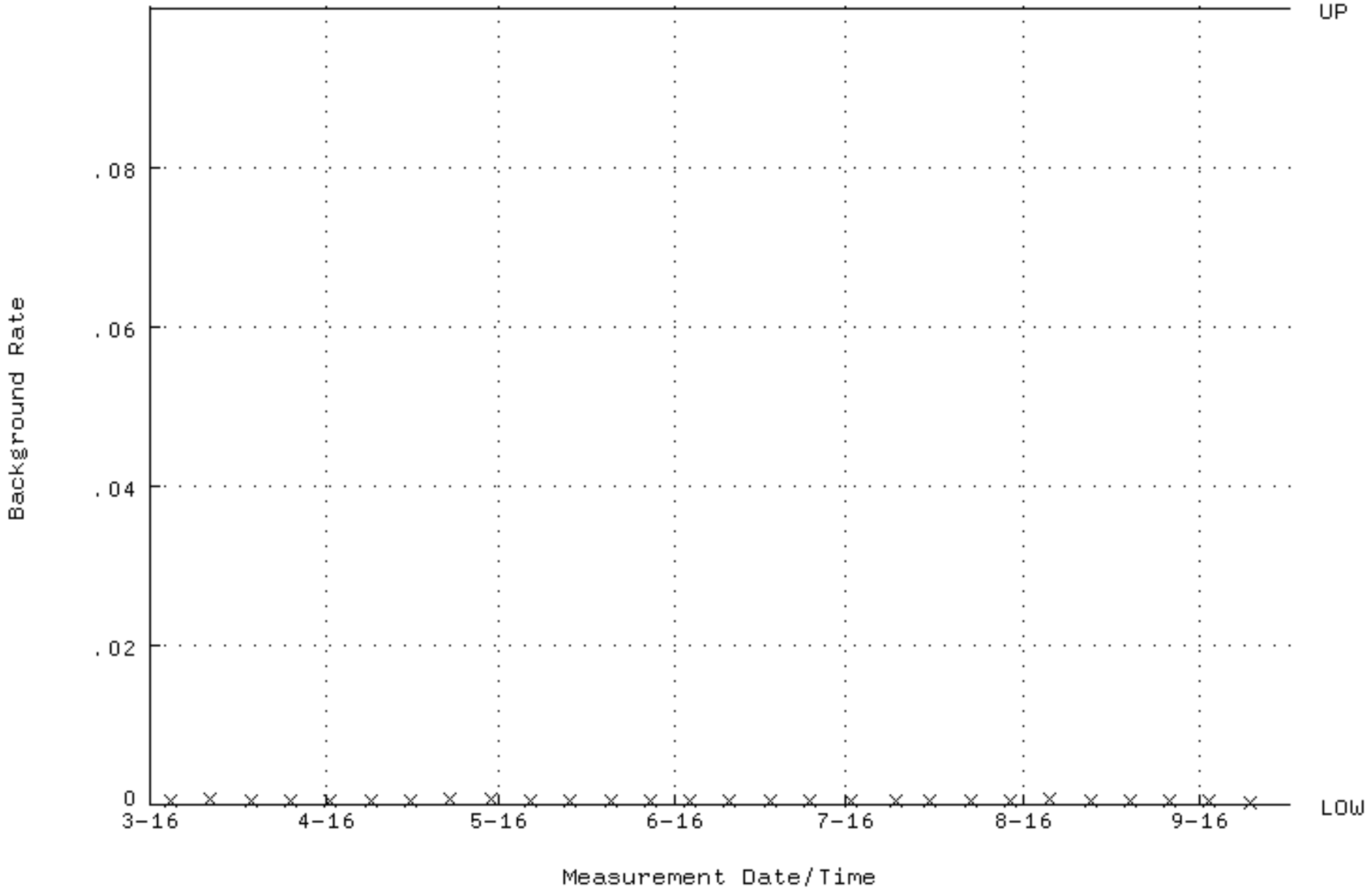
QA filename : DKA100:[ENV_ALPHA.QA.W]W206.QAF;4
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 15-MAR-2016 08:39:33 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



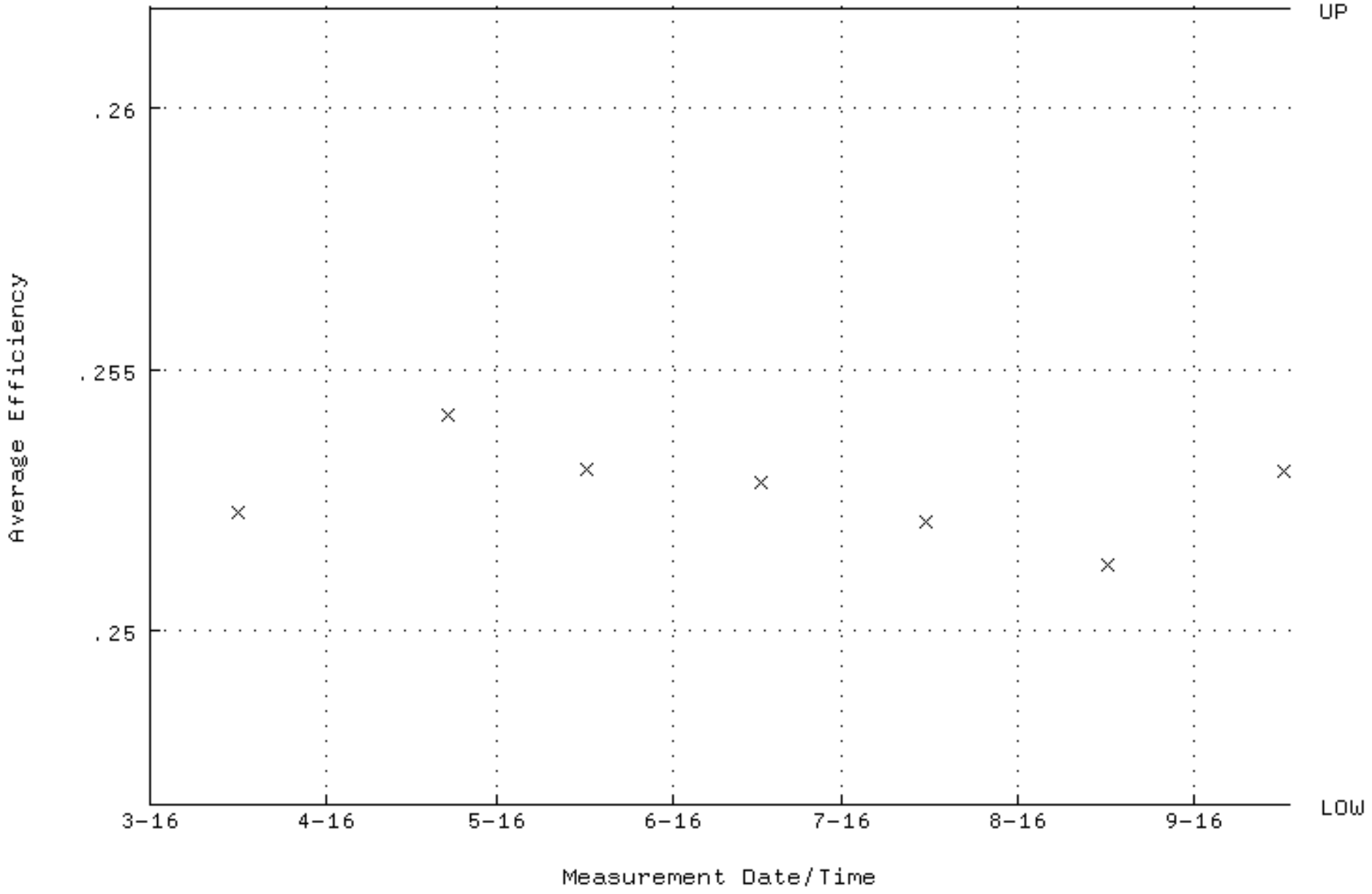
QA filename : DKA100:[ENV_ALPHA.QA.W]W206.QAF;4
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 15-MAR-2016 08:39:33 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



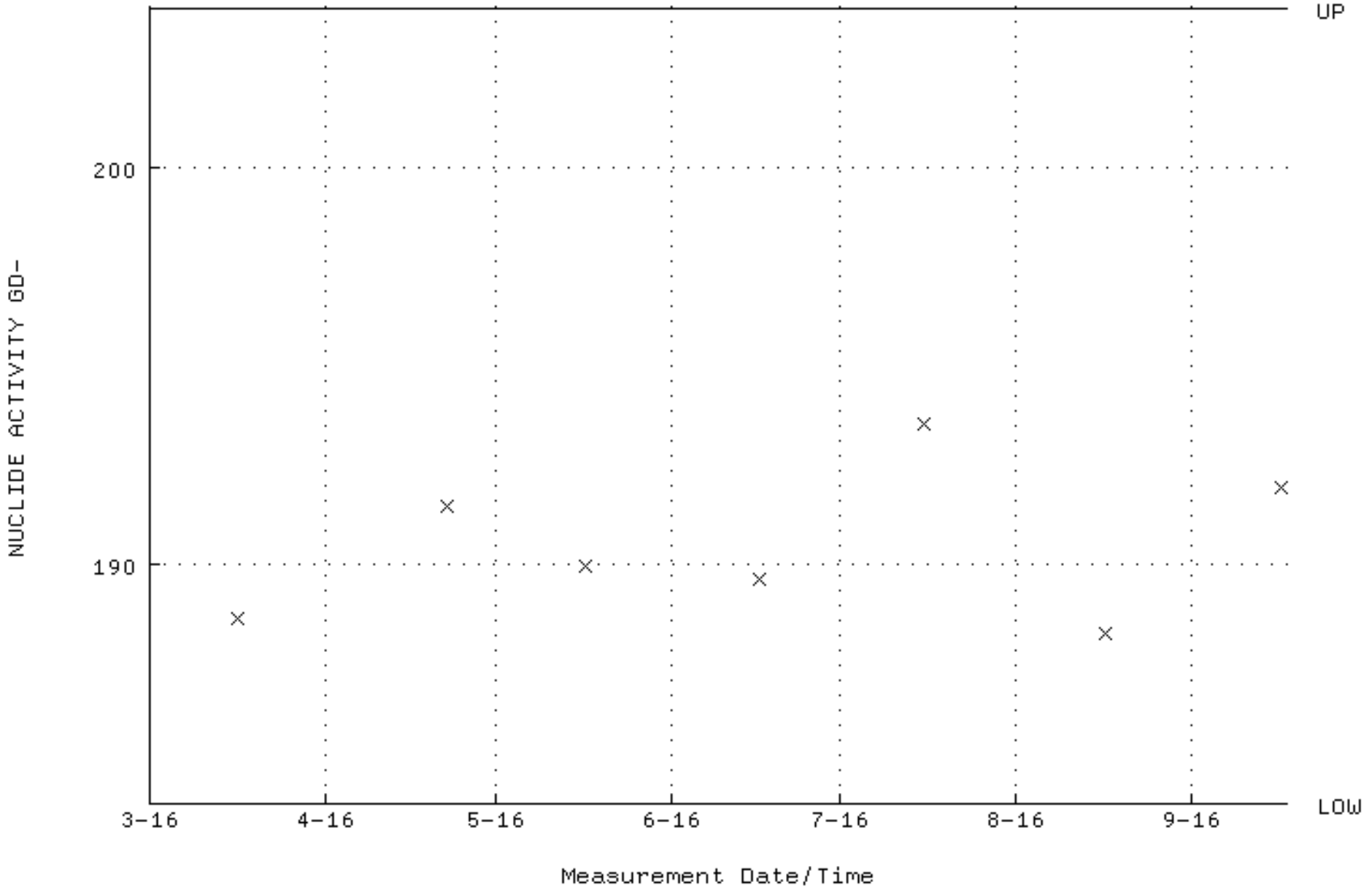
QA filename : DKA100:[ENV_ALPHA.QA.B]B206.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:17:51 through 16-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



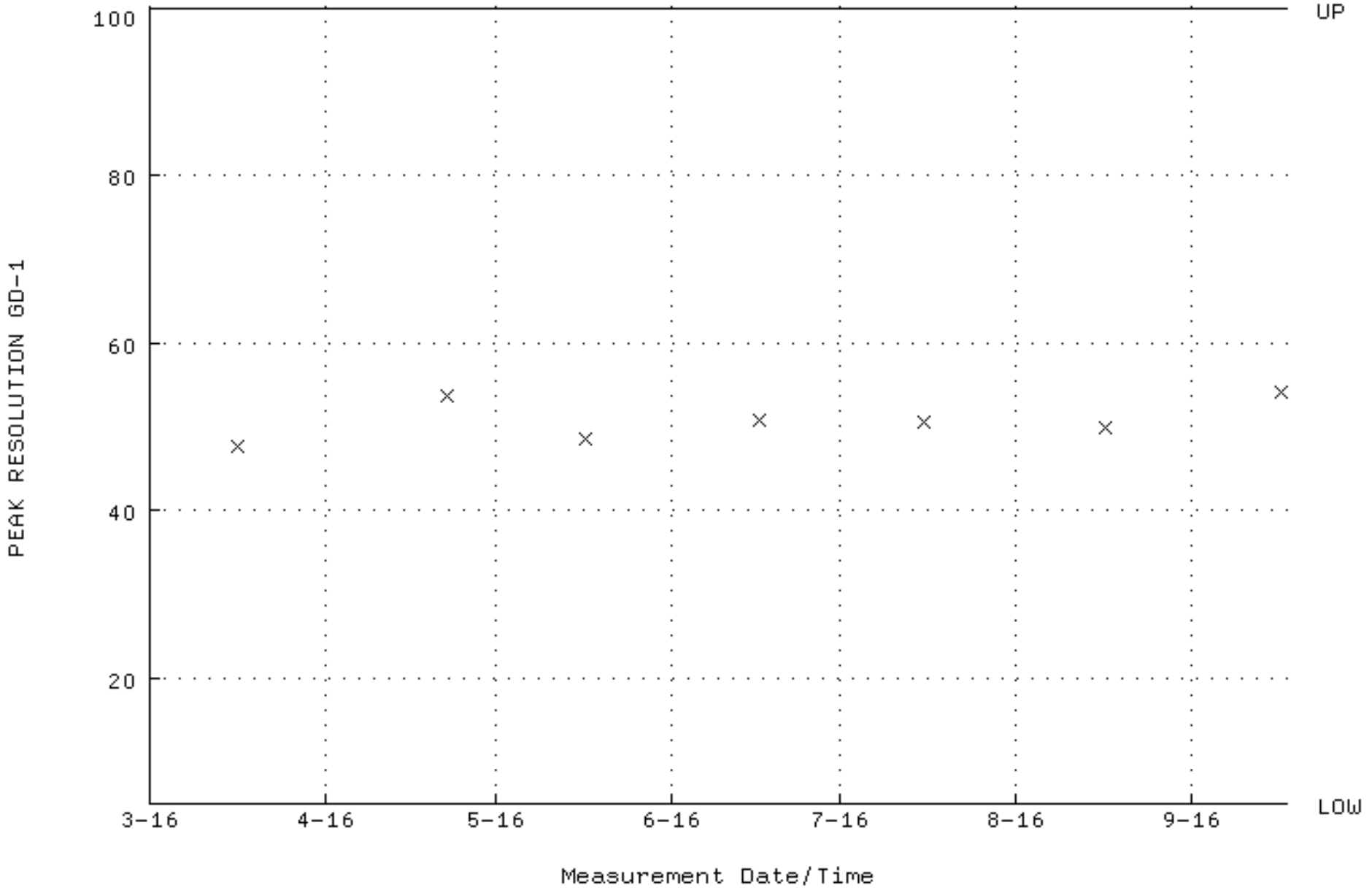
QA filename : DKA100:[ENV_ALPHA.QA.W]W210.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 08:35:29 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.246659 through 0.261915



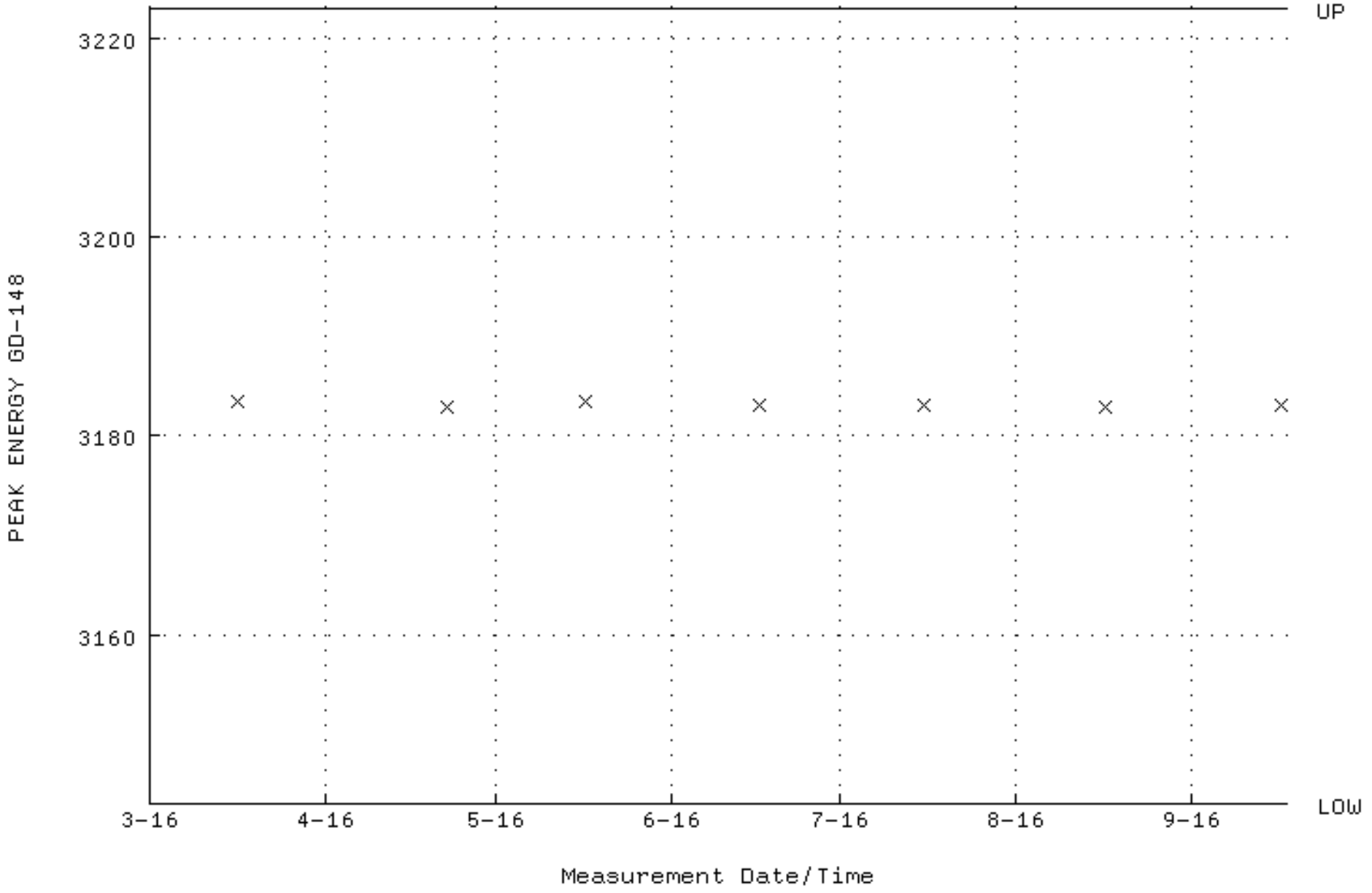
QA filename : DKA100:[ENV_ALPHA.QA.W]W210.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 08:35:29 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



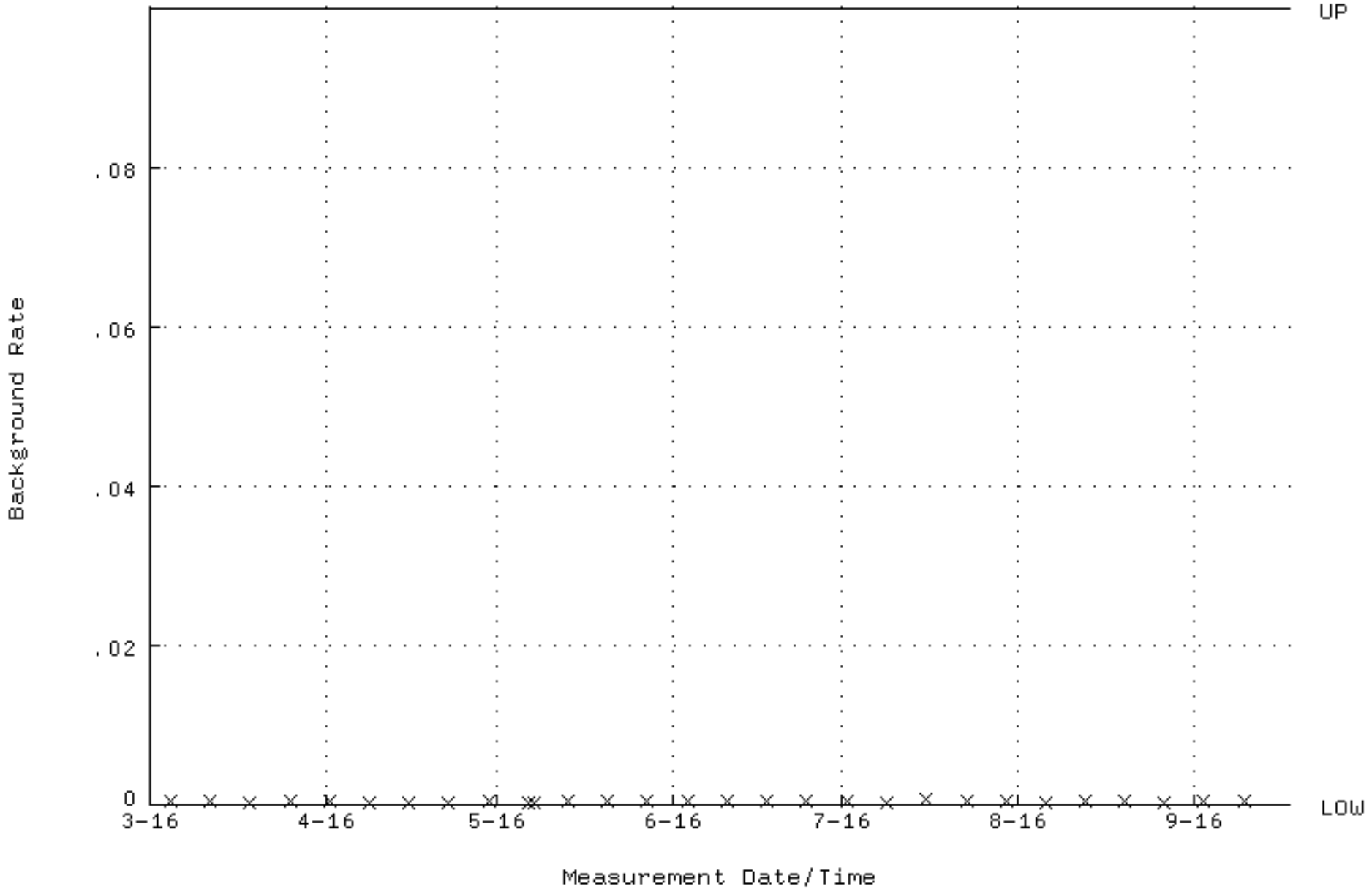
QA filename : DKA100:[ENV_ALPHA.QA.W]W210.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 08:35:29 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



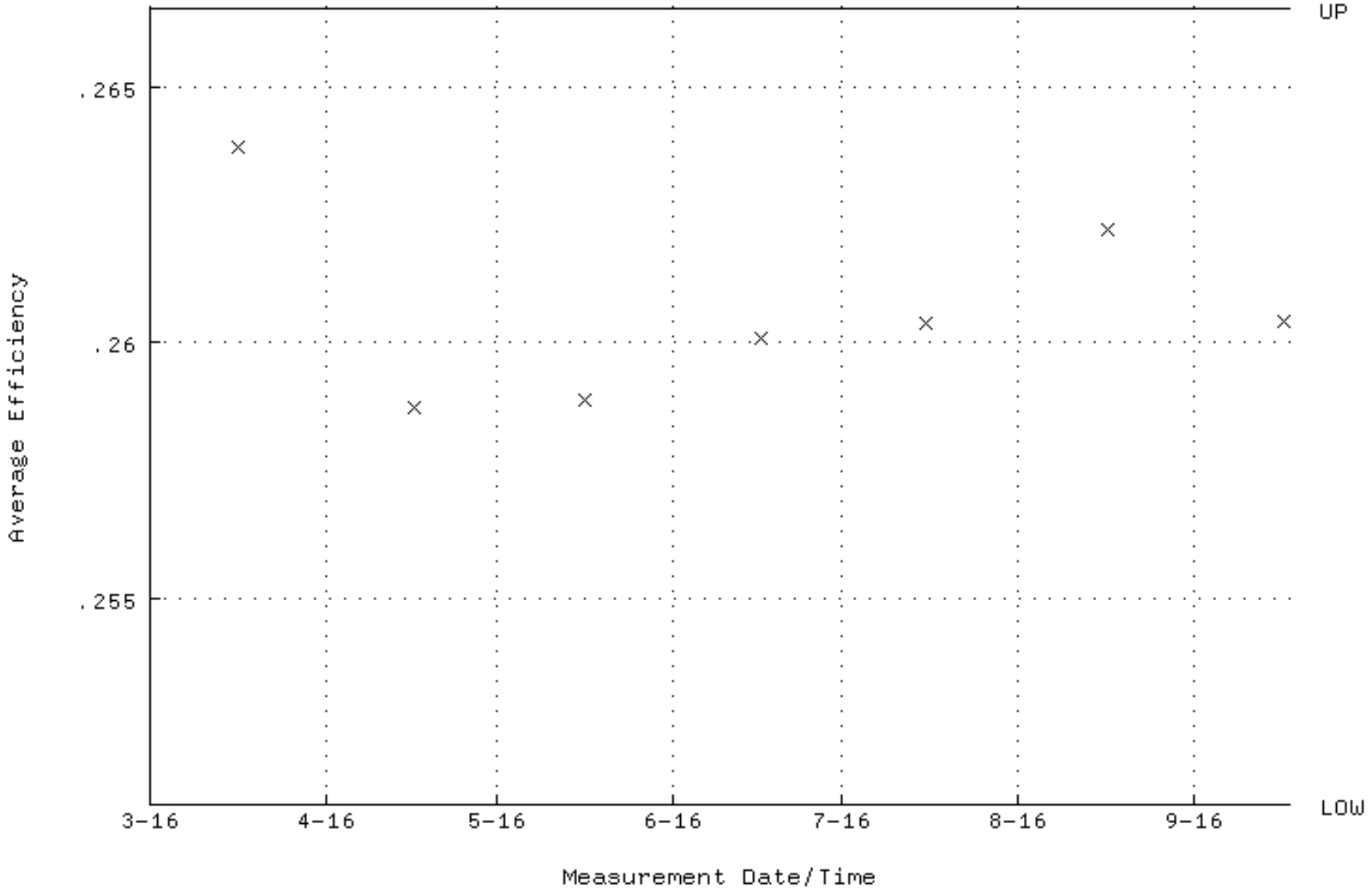
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 08:35:29 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



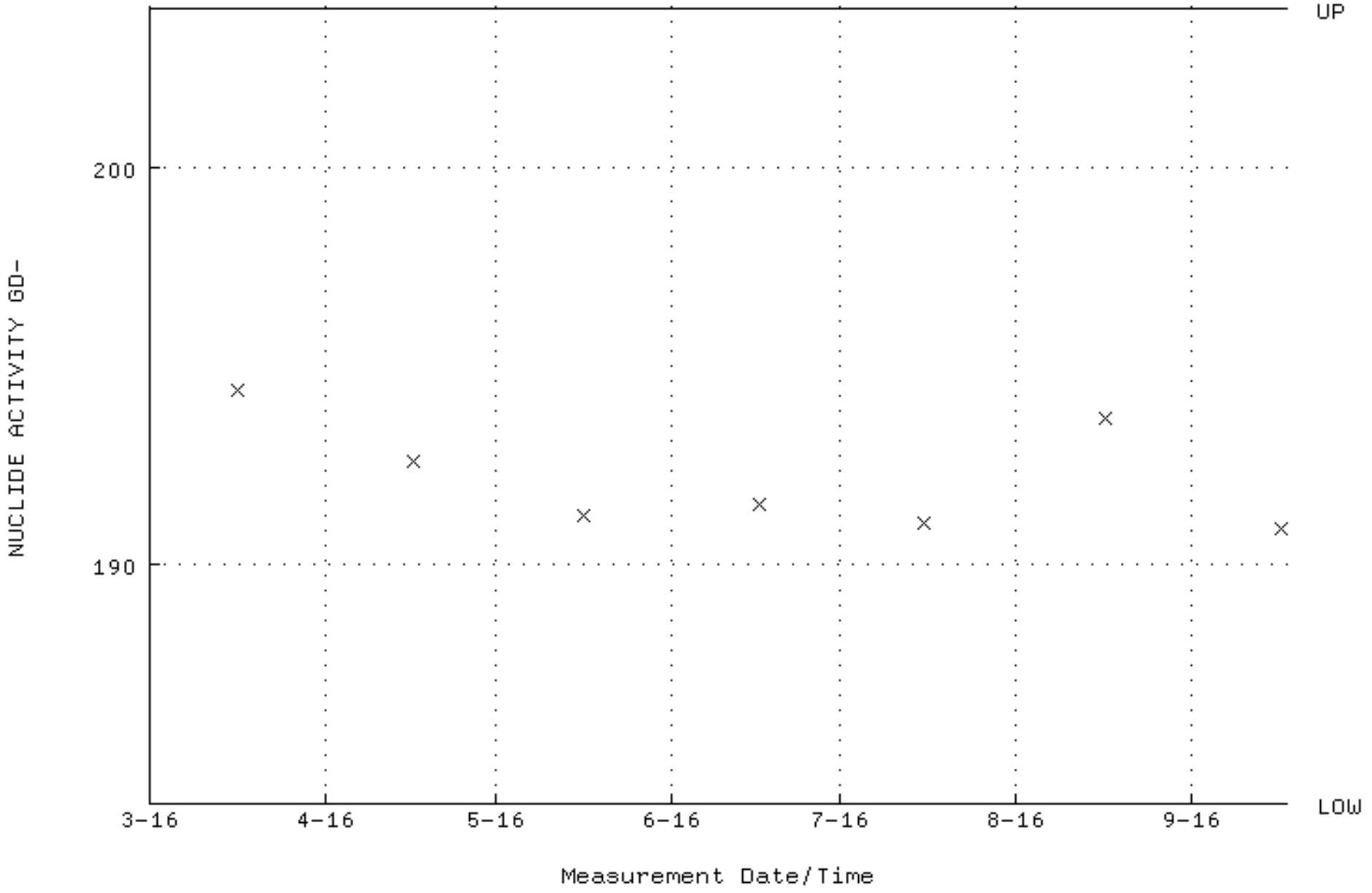
QA filename : DKA100:[ENV_ALPHA.QA.B]B210.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:04 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



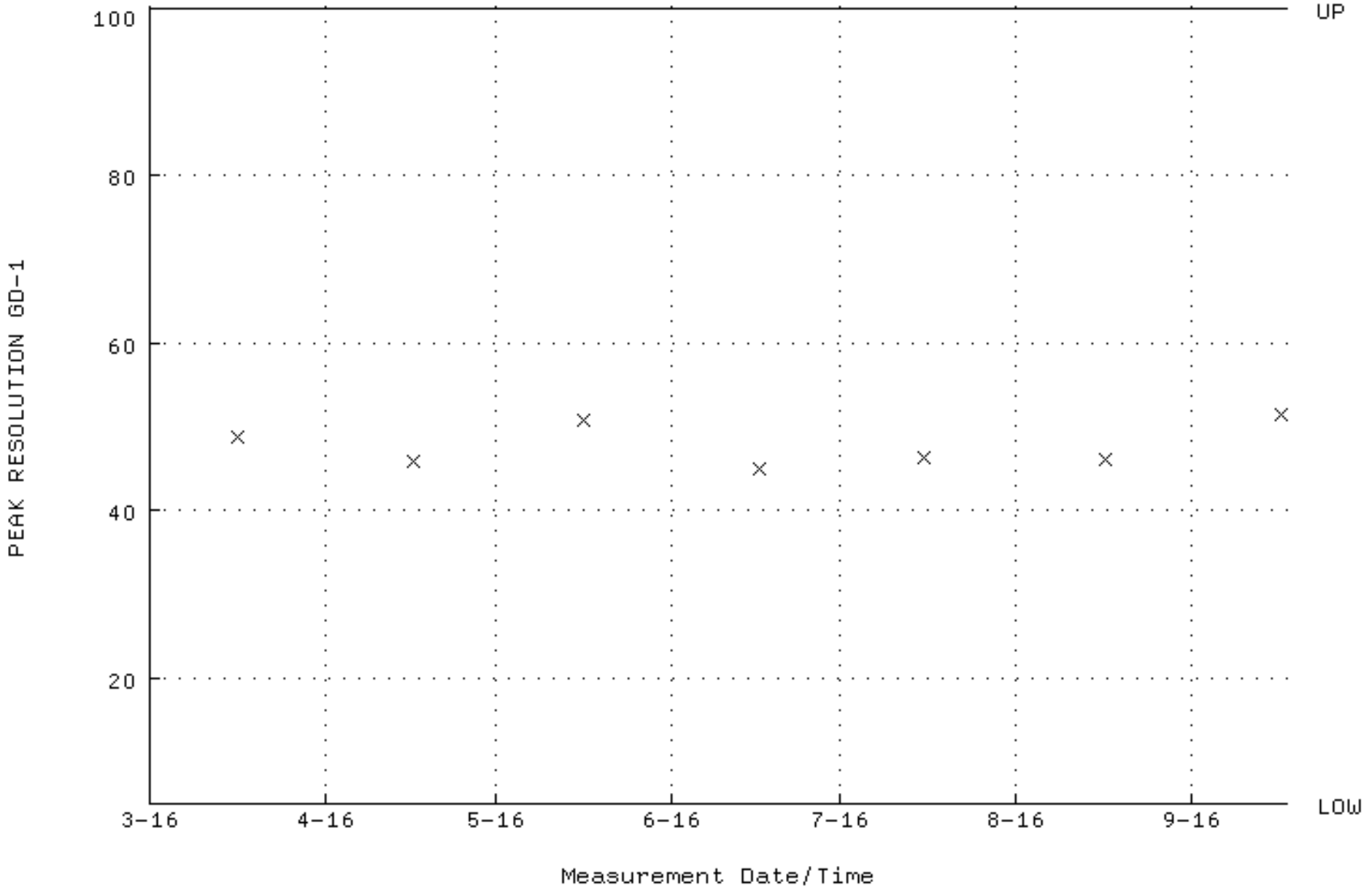
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 08:35:38 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.250992 through 0.266518



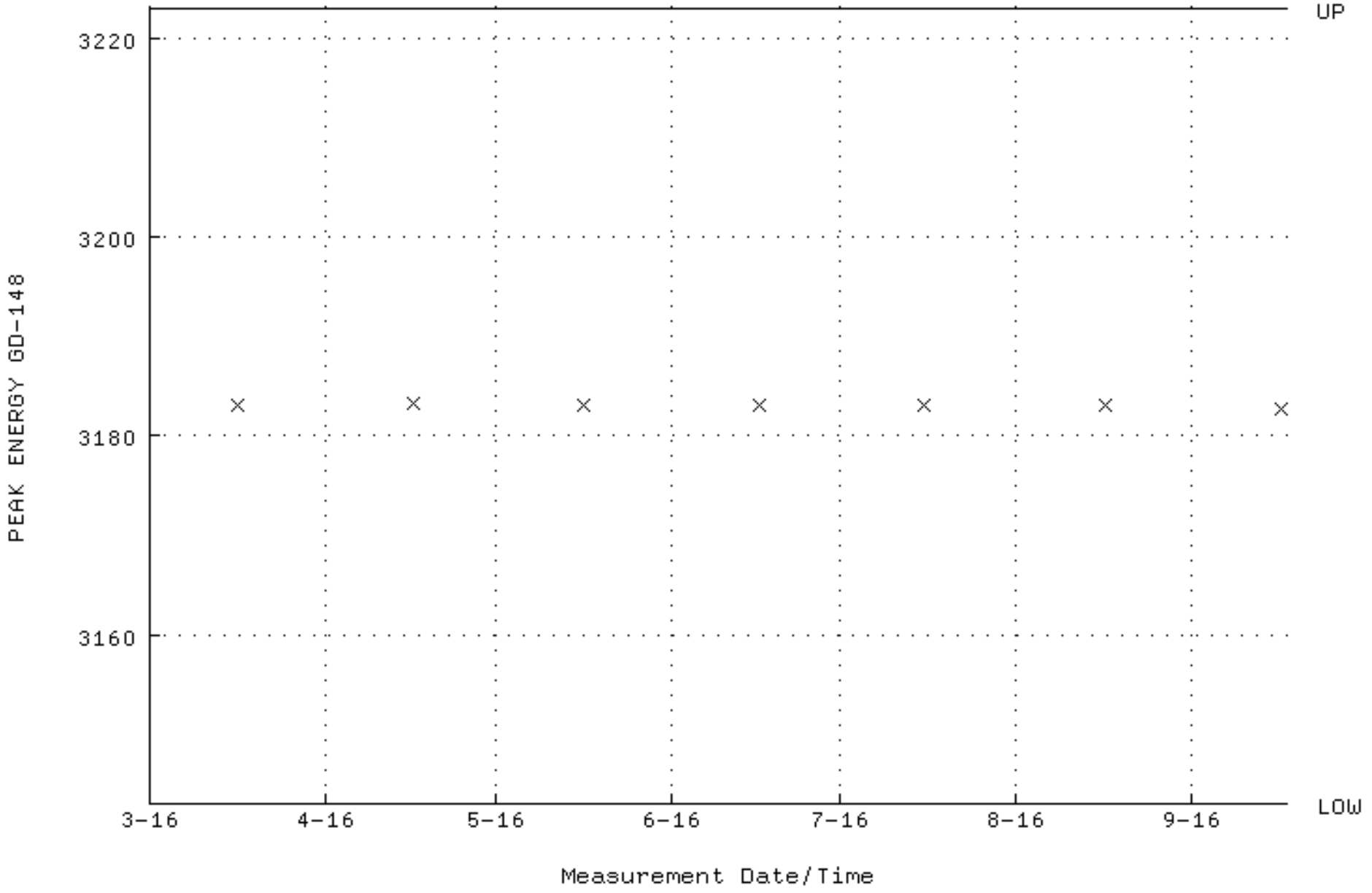
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 08:35:38 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



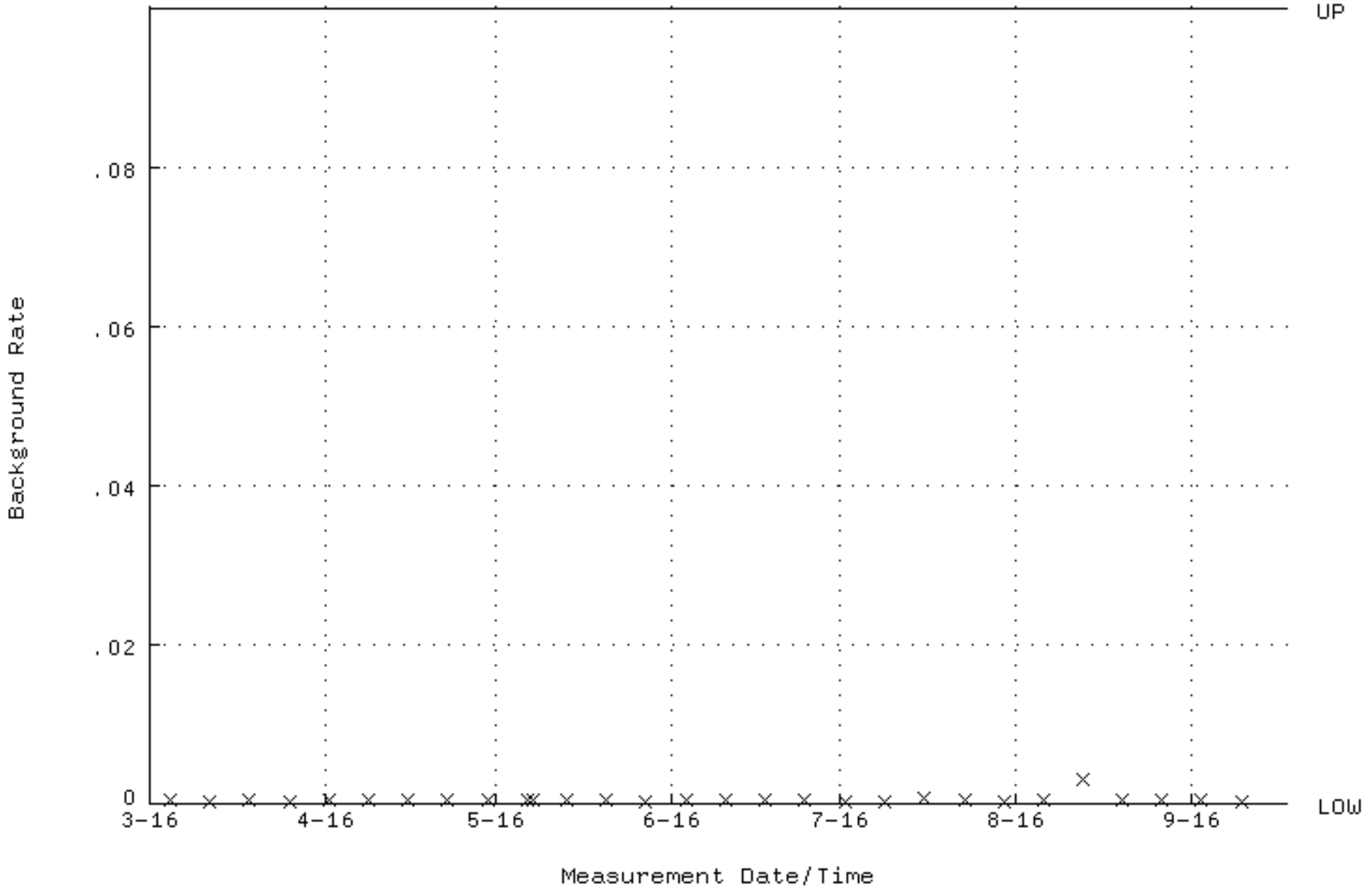
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 08:35:38 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



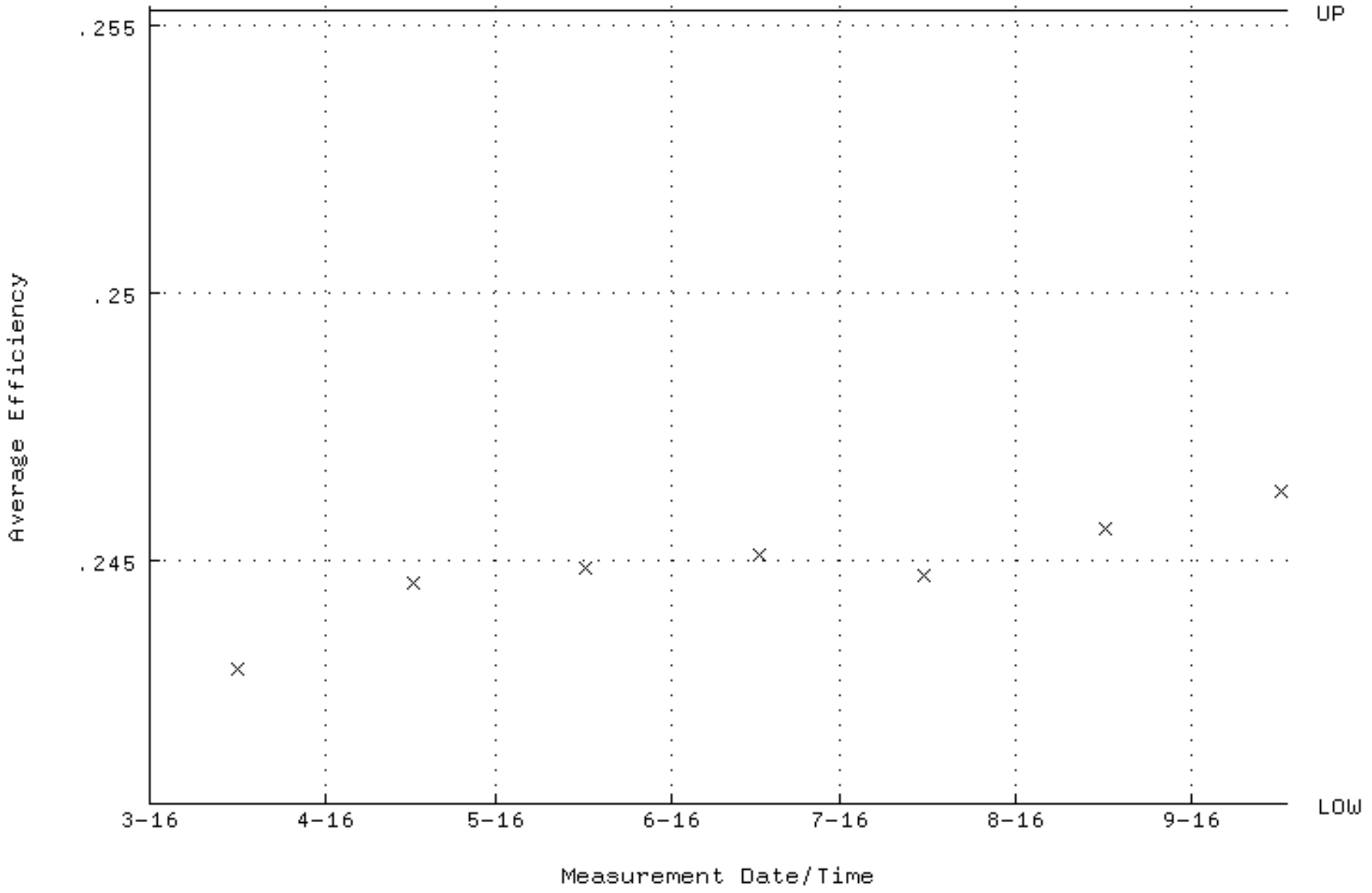
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 08:35:38 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



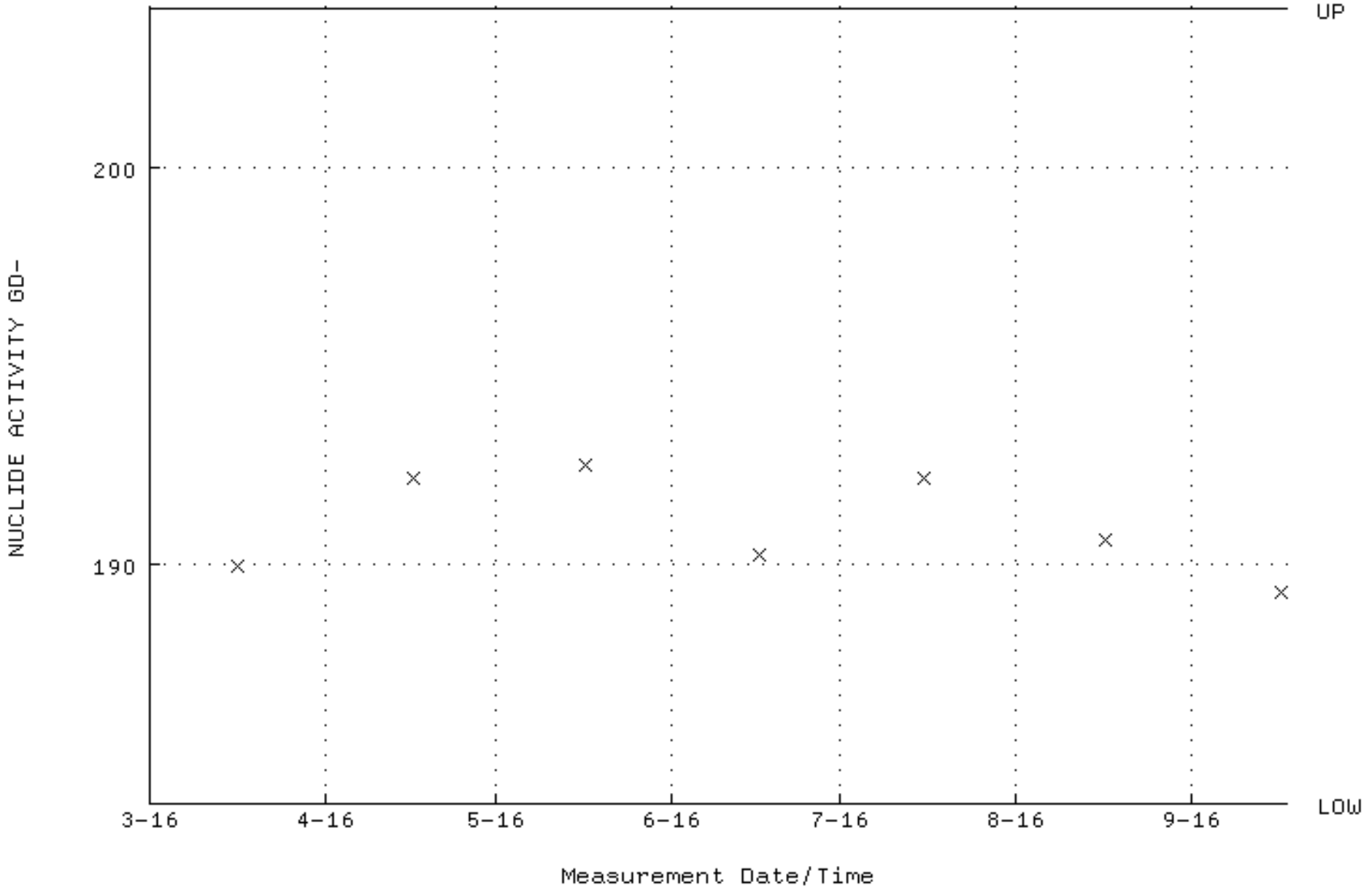
QA filename : DKA100:[ENV_ALPHA.QA.B]B212.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:12 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



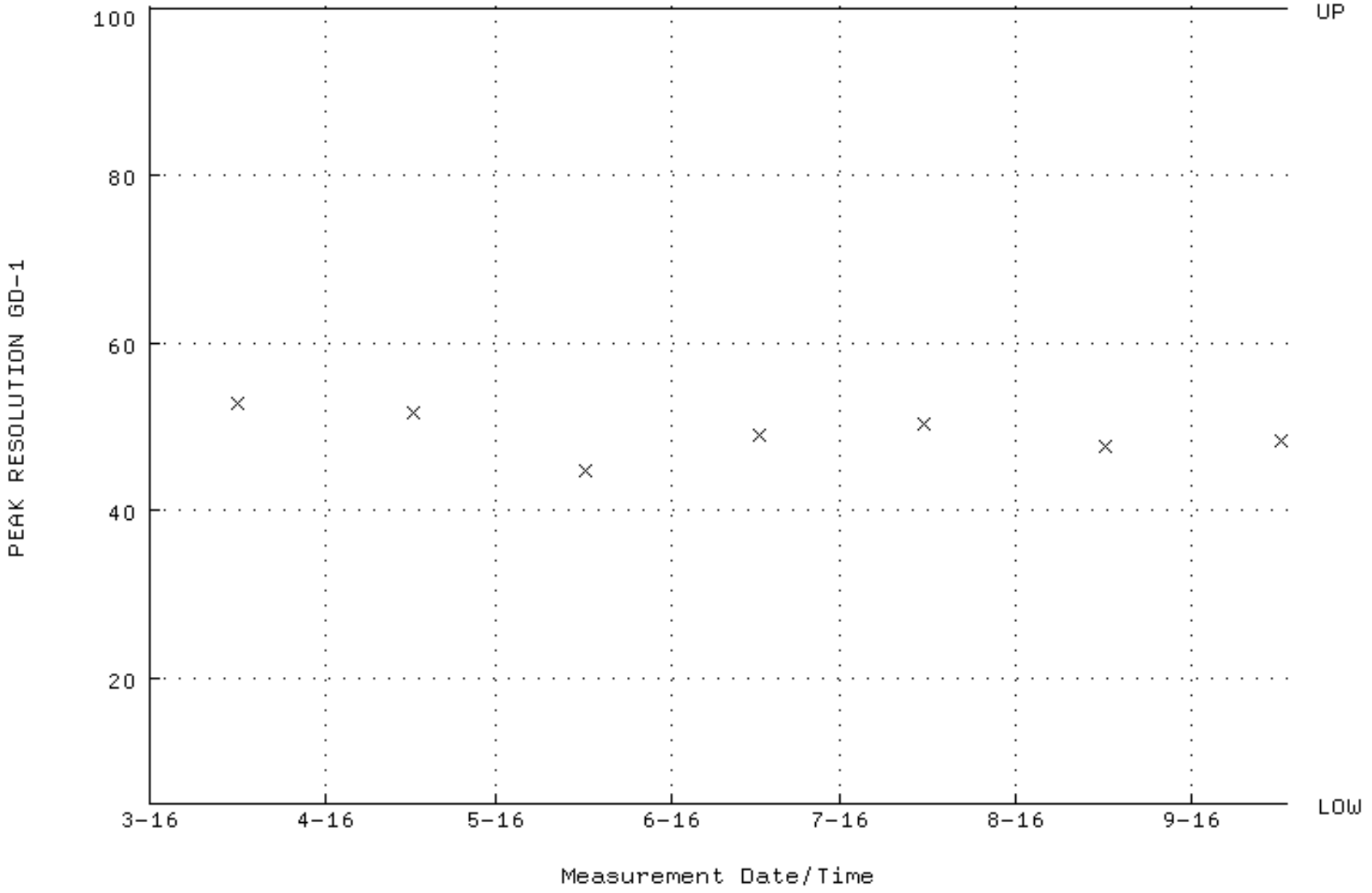
QA filename : DKA100:[ENV_ALPHA.QA.W]W216.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 08:35:56 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.240458 through 0.255332



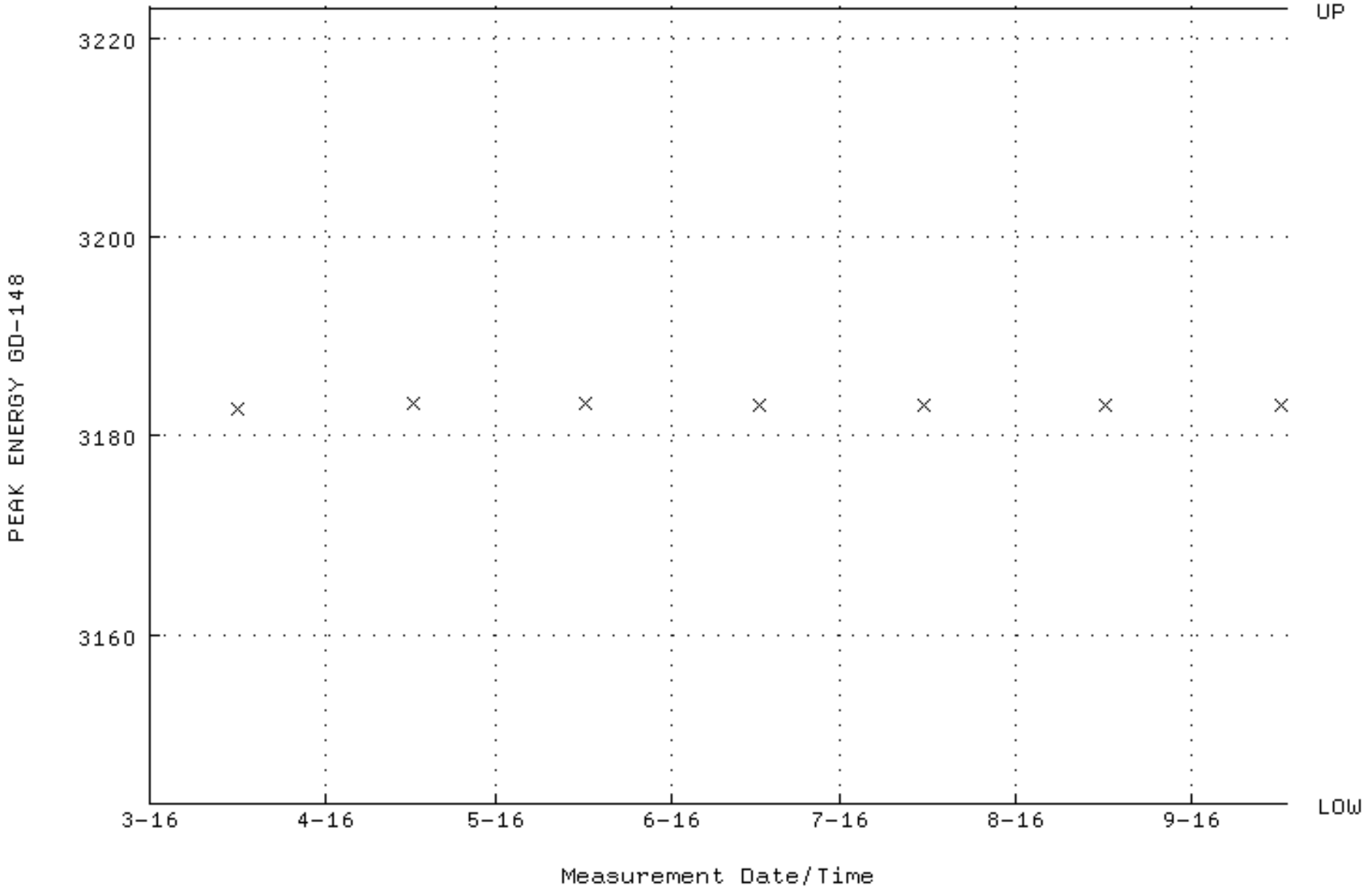
QA filename : DKA100:[ENV_ALPHA.QA.W]W216.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 08:35:56 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



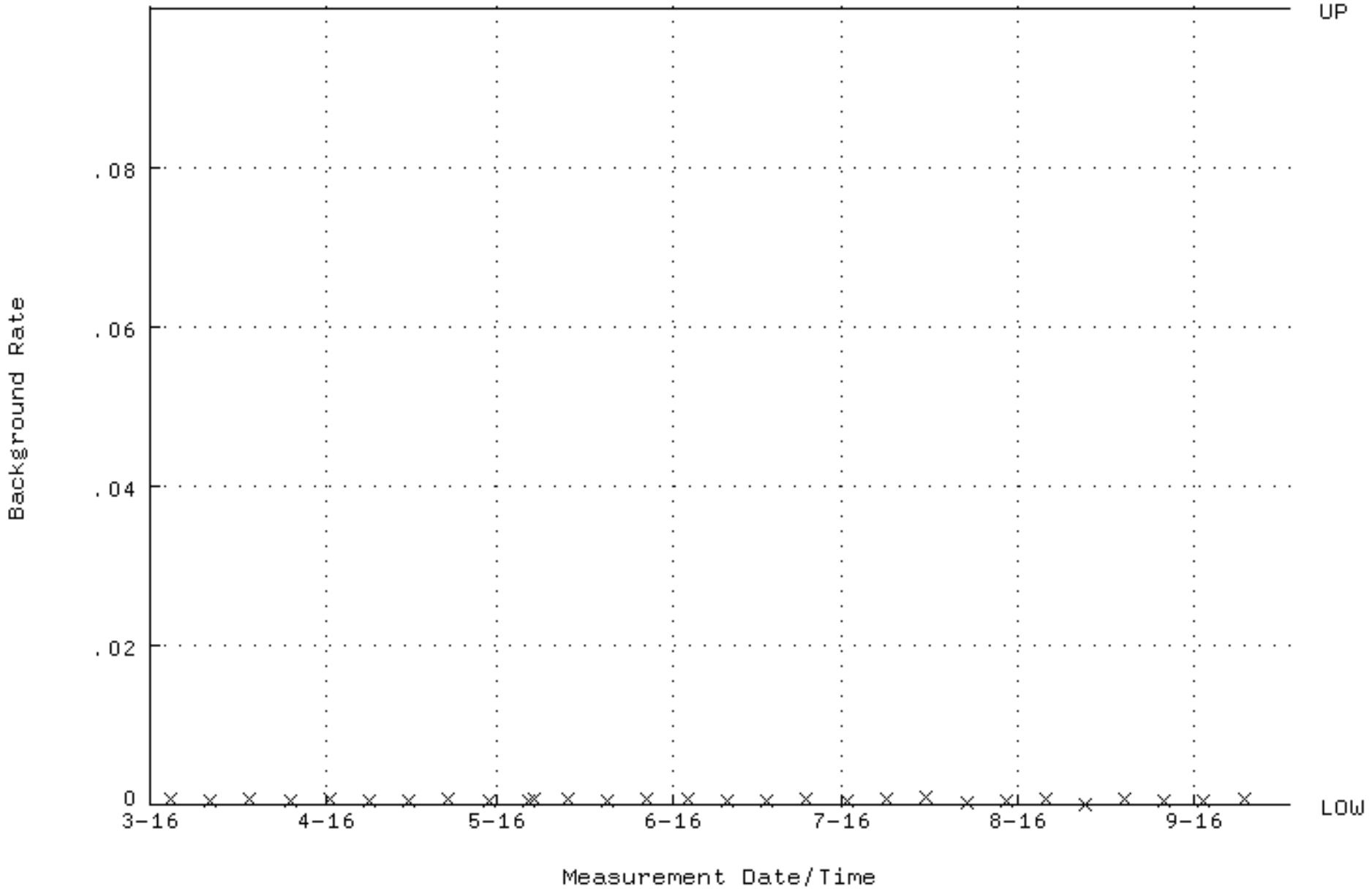
QA filename : DKA100:[ENV_ALPHA.QA.W]W216.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 08:35:56 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



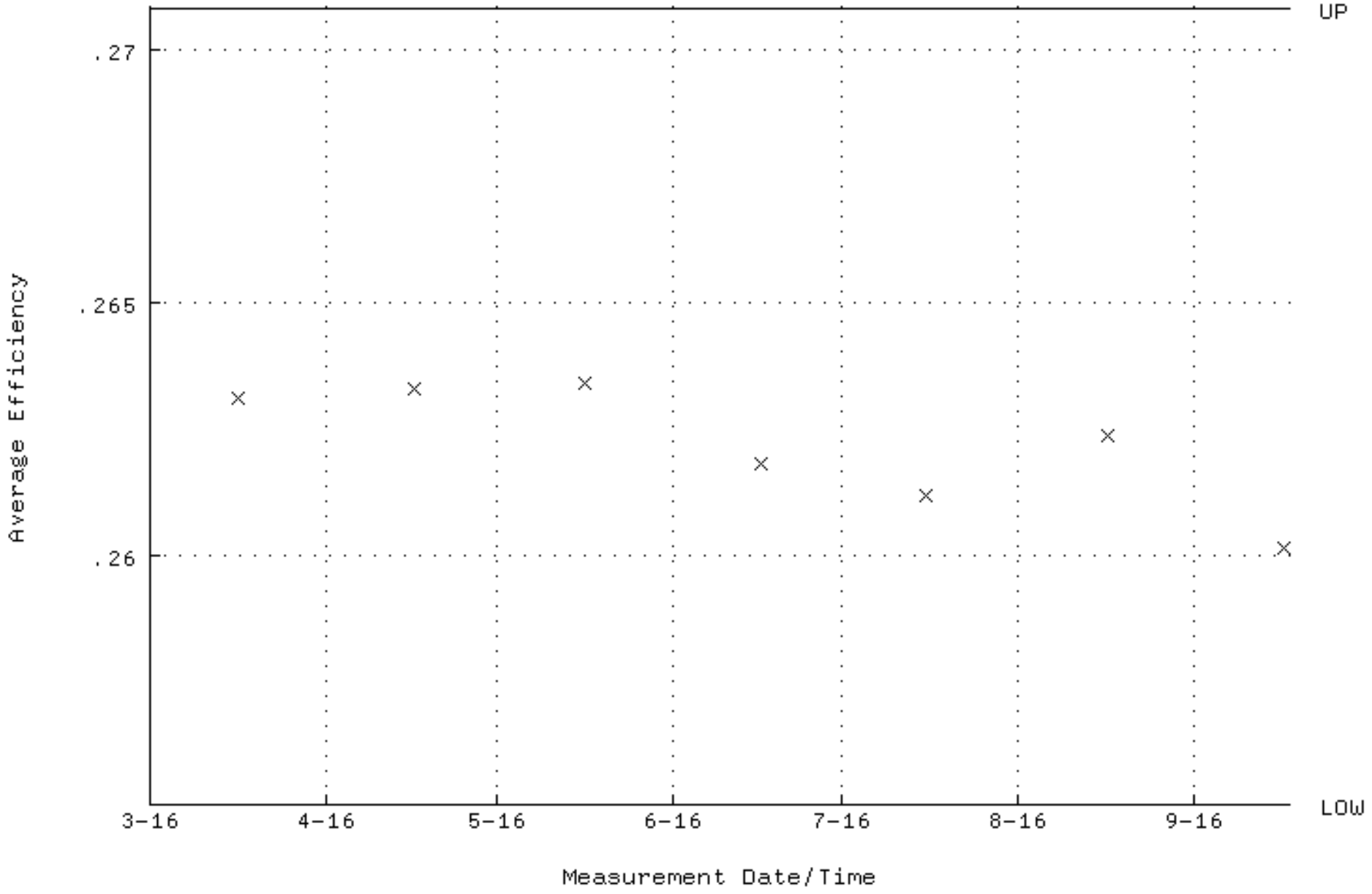
QA filename : DKA100:[ENV_ALPHA.QA.W]W216.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 08:35:56 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



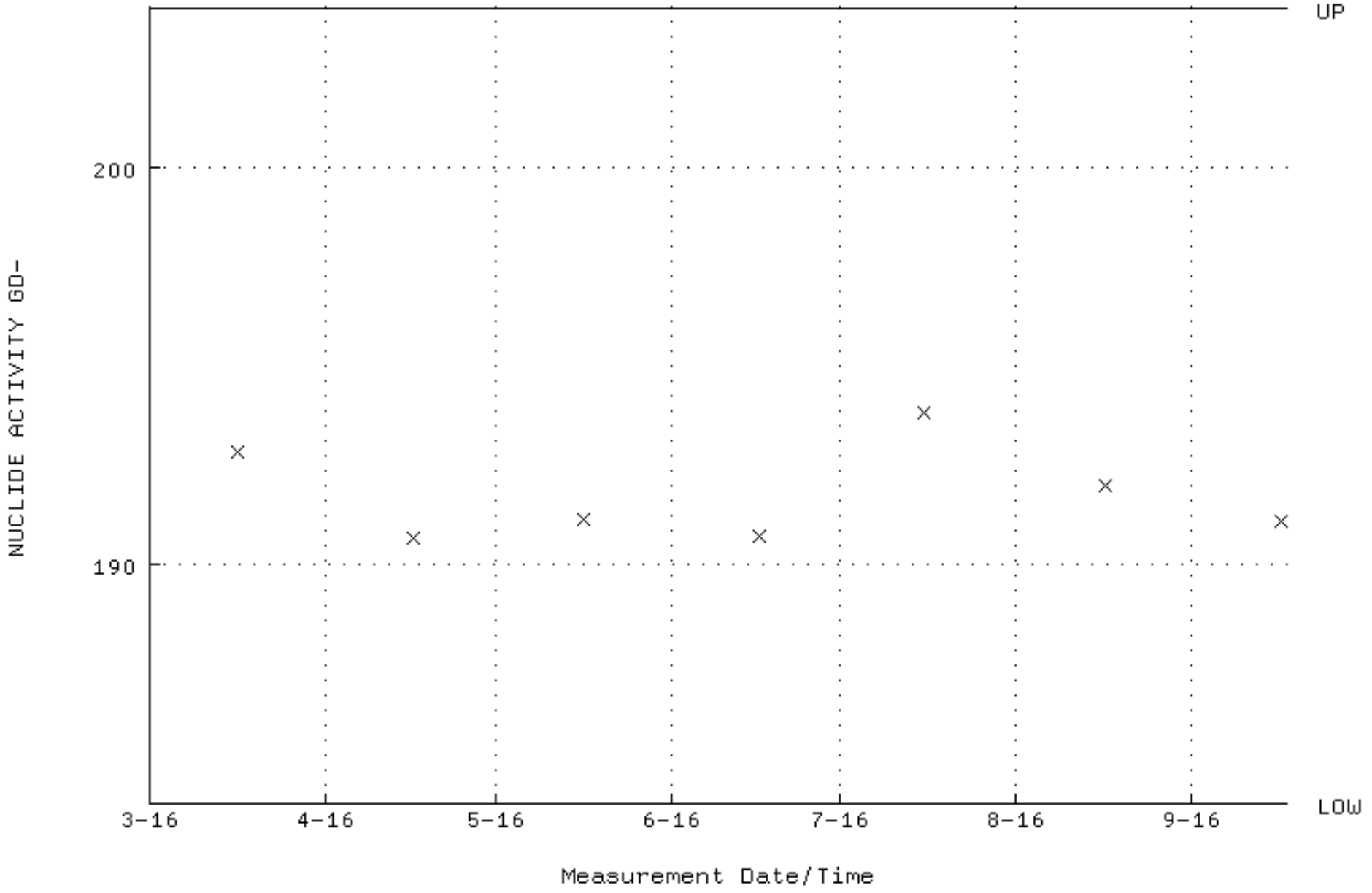
QA filename : DKA100:[ENV_ALPHA.QA.B]B216.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:29 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



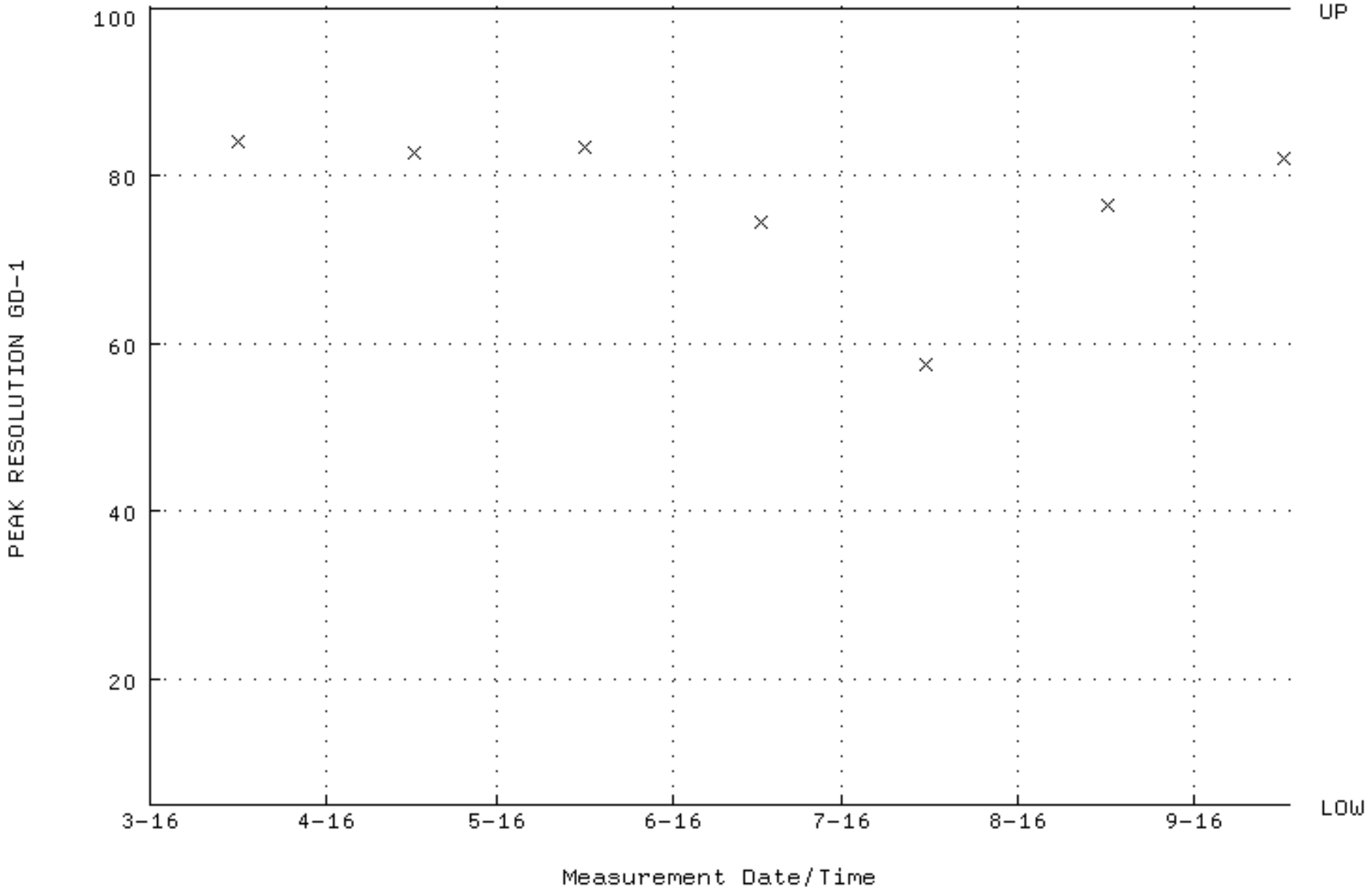
QA filename : DKA100:[ENV_ALPHA.QA.W]W217.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 08:36:02 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.255053 through 0.270829



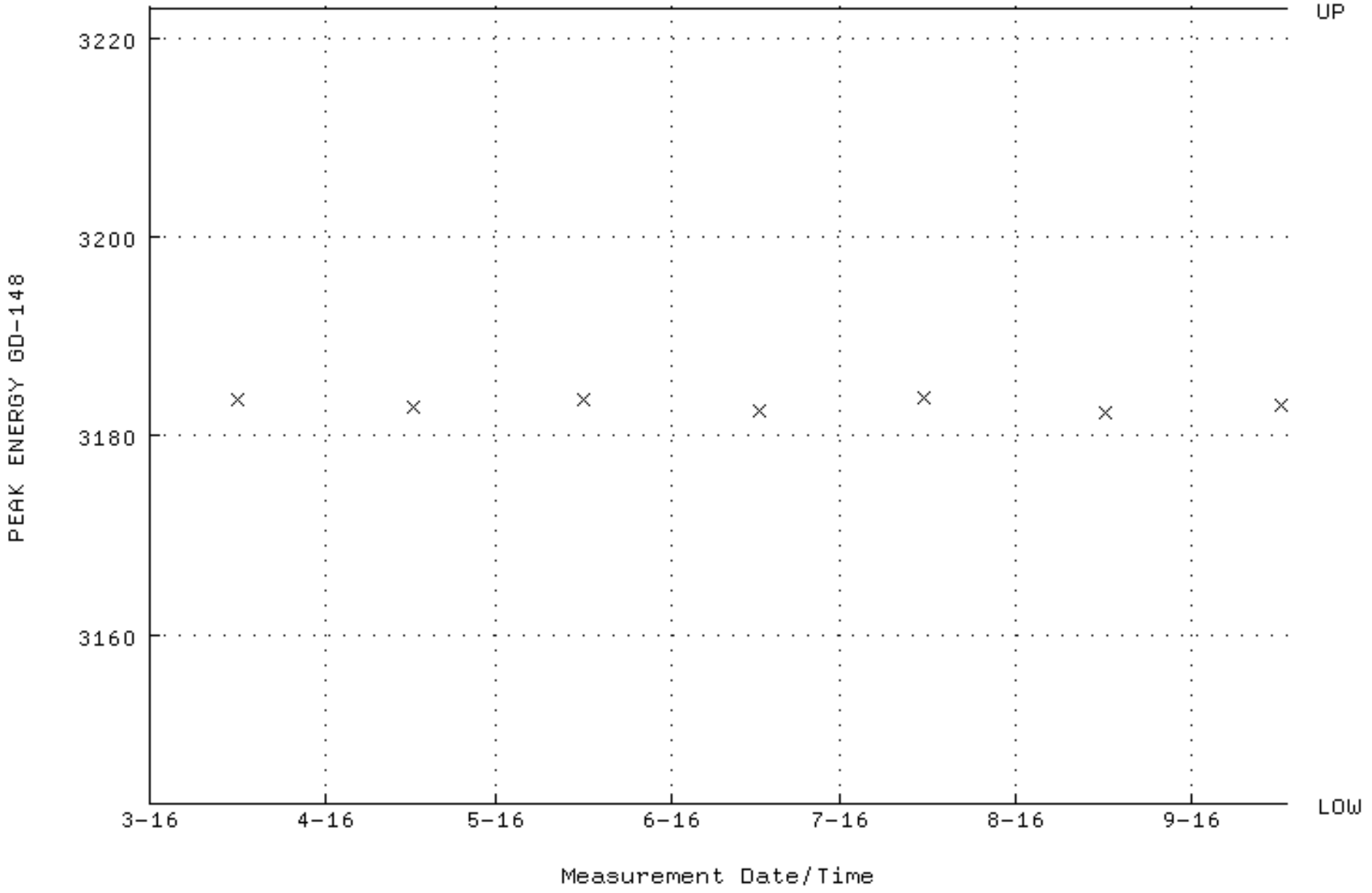
QA filename : DKA100:[ENV_ALPHA.QA.W]W217.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 08:36:02 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



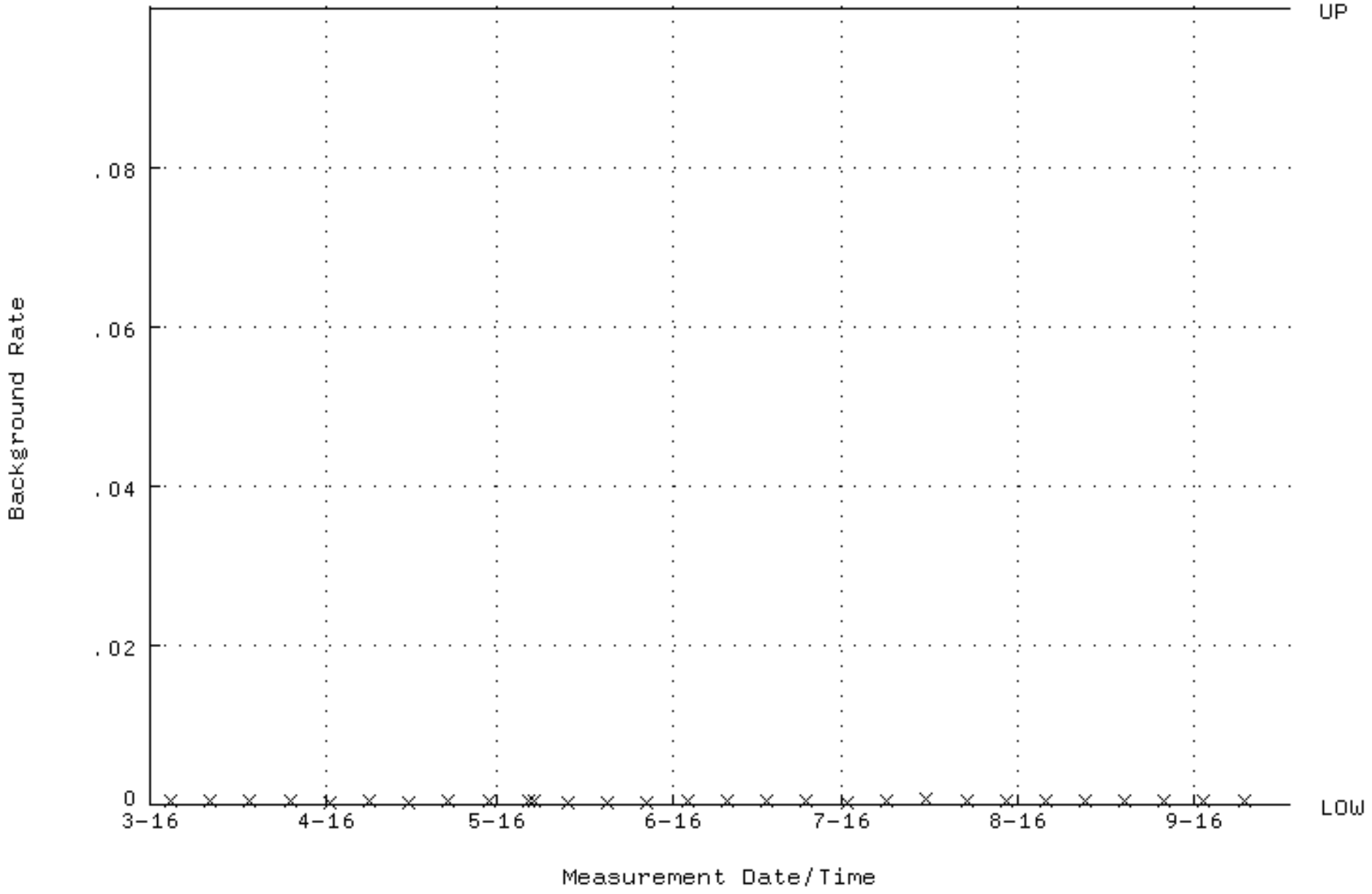
QA filename : DKA100:[ENV_ALPHA.QA.W]W217.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 08:36:02 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



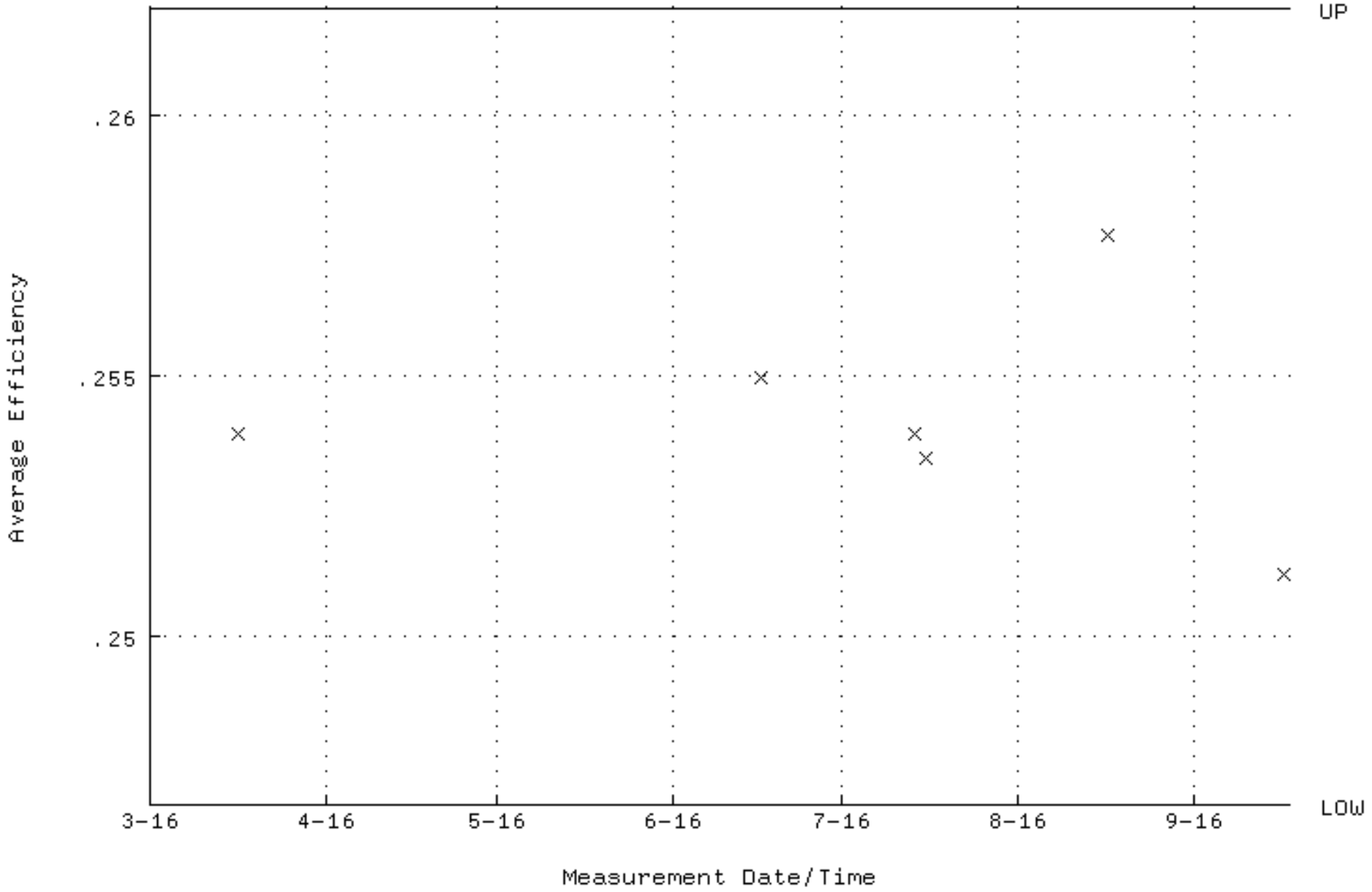
QA filename : DKA100:[ENV_ALPHA.QA.W]W217.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 08:36:02 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



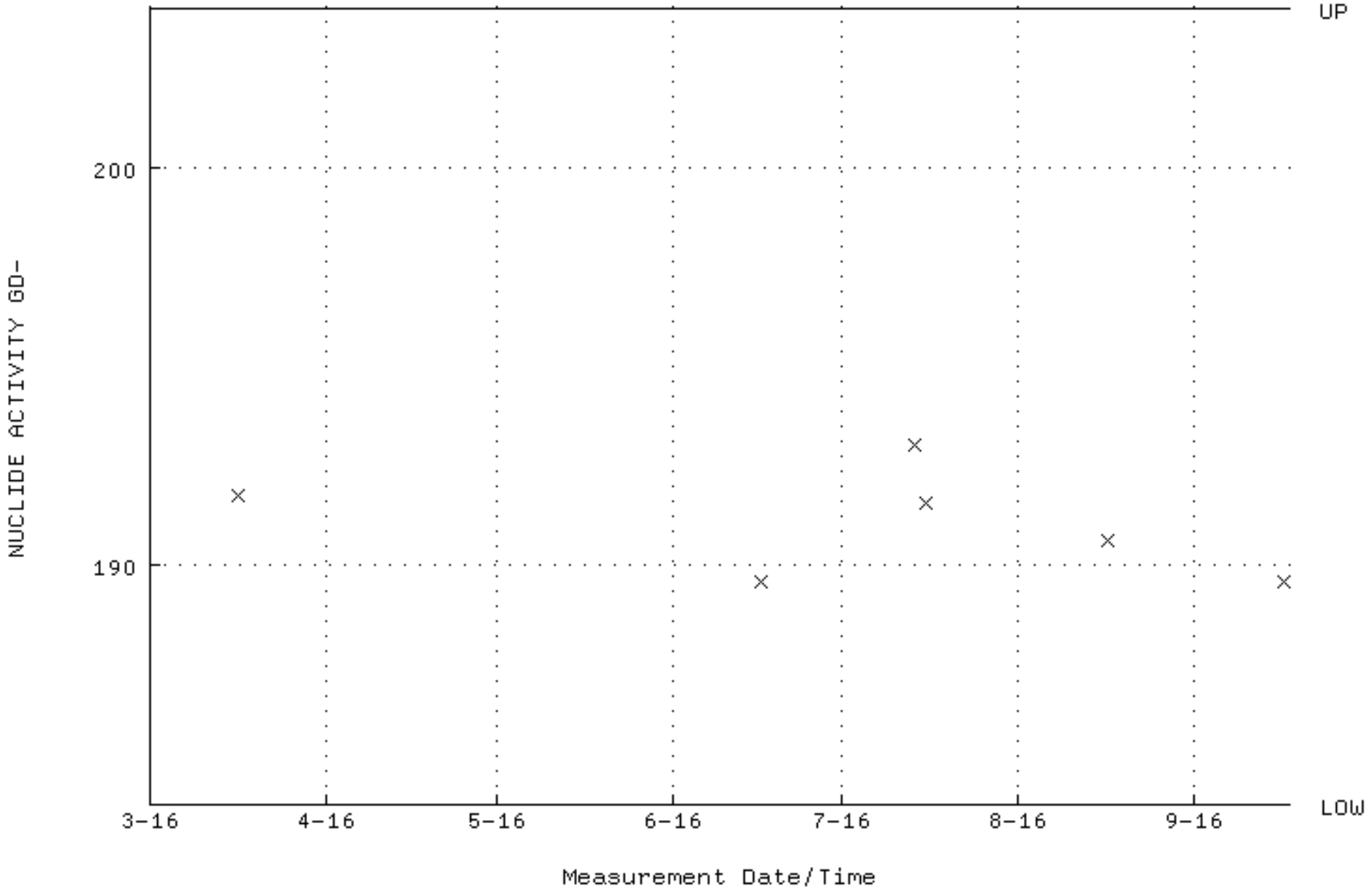
QA filename : DKA100:[ENV_ALPHA.QA.B]B217.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:33 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



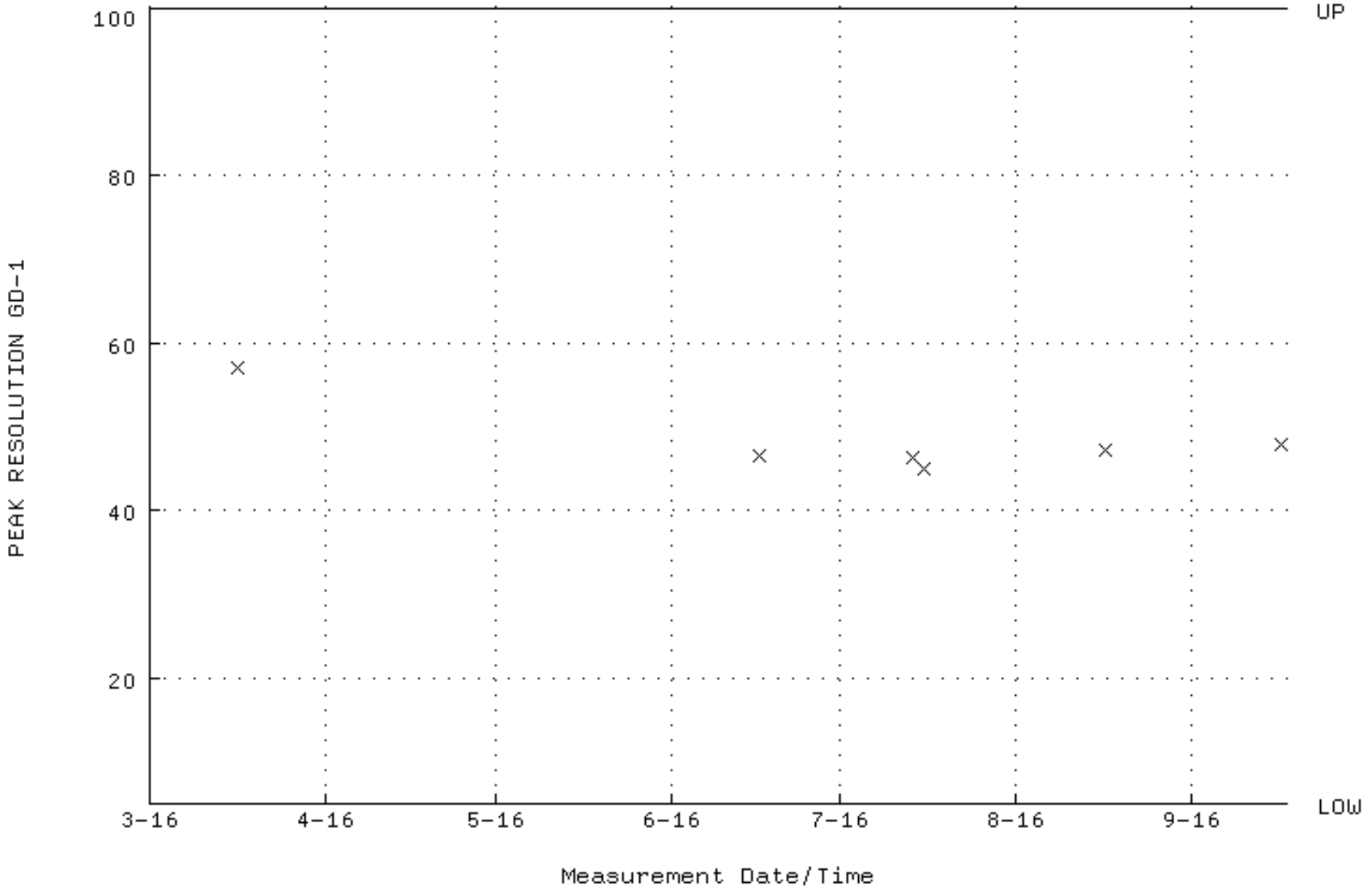
QA filename : DKA100:[ENV_ALPHA.QA.W]W218.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 09:48:51 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.246780 through 0.262040



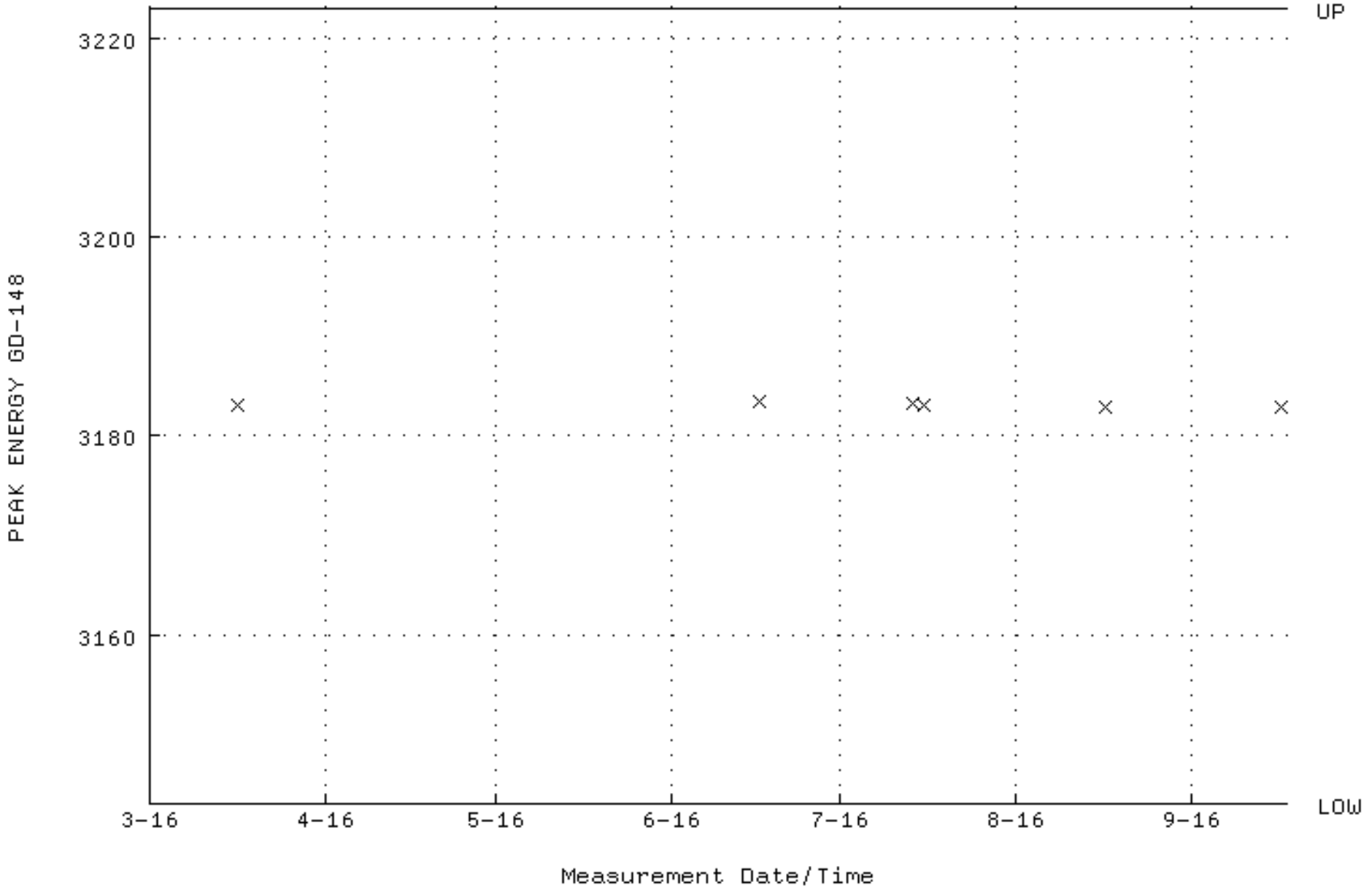
QA filename : DKA100:[ENV_ALPHA.QA.W]W218.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 09:48:51 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



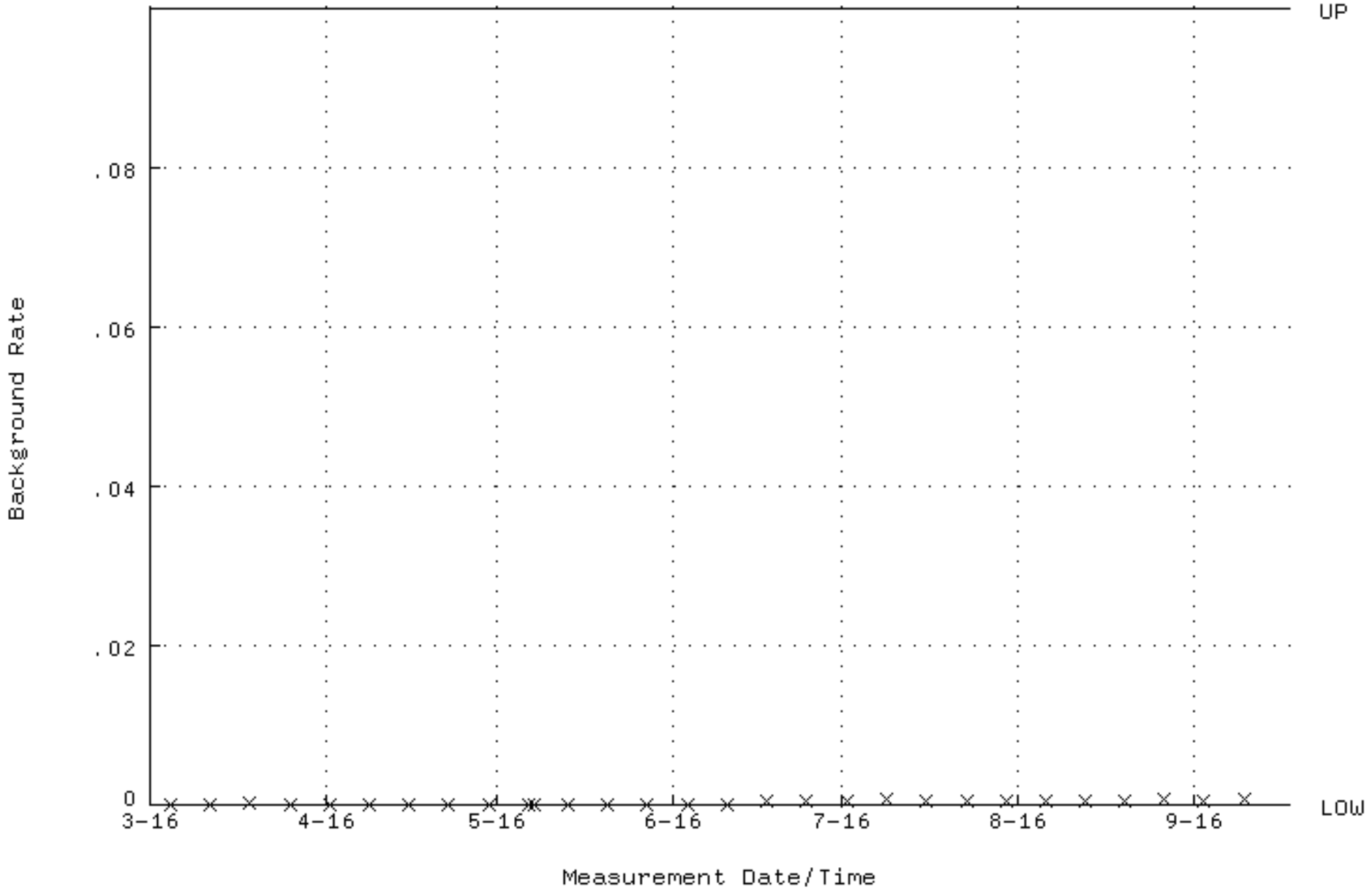
QA filename : DKA100:[ENV_ALPHA.QA.W]W218.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 09:48:51 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



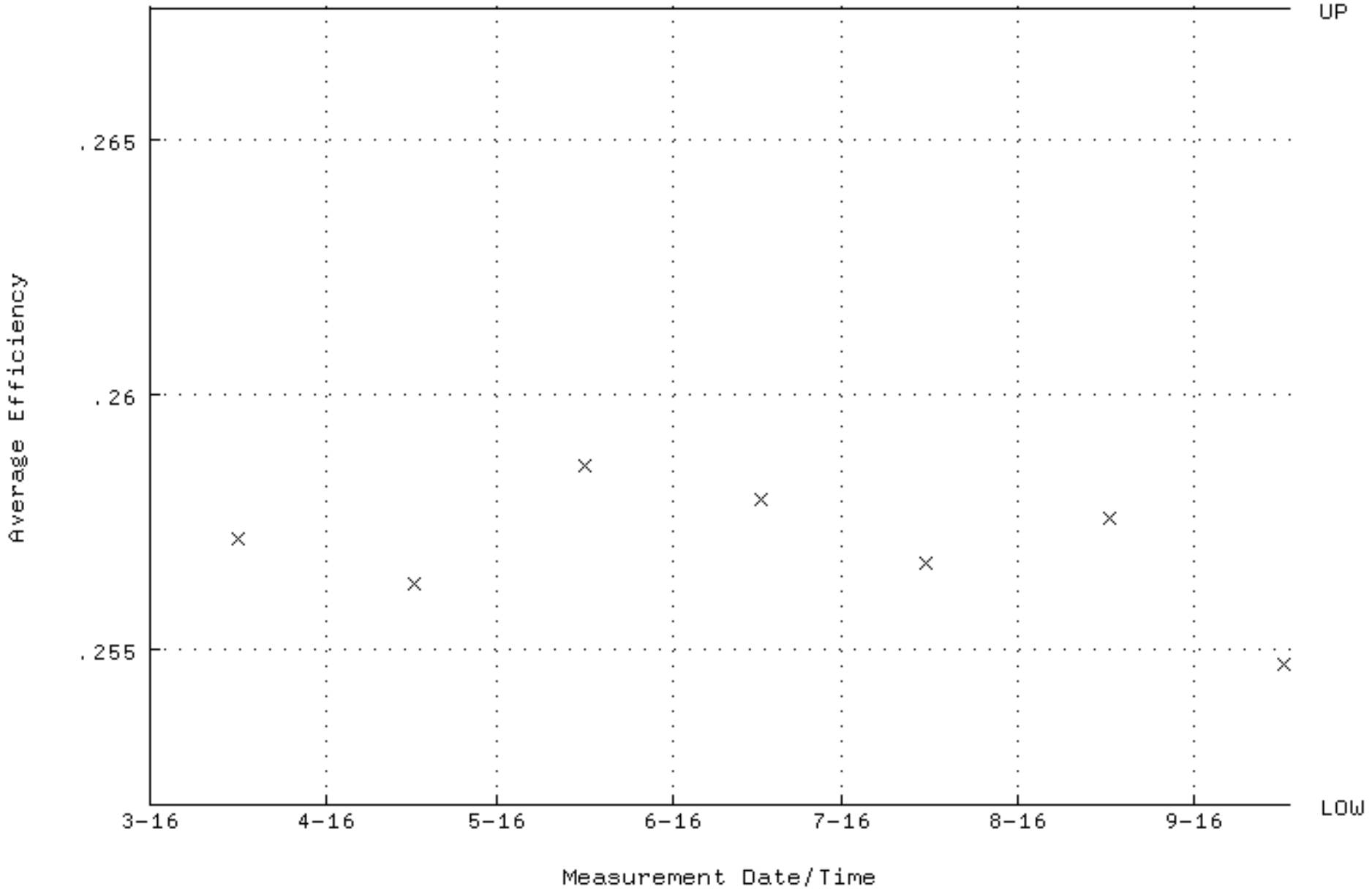
QA filename : DKA100:[ENV_ALPHA.QA.W]W218.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 09:48:51 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



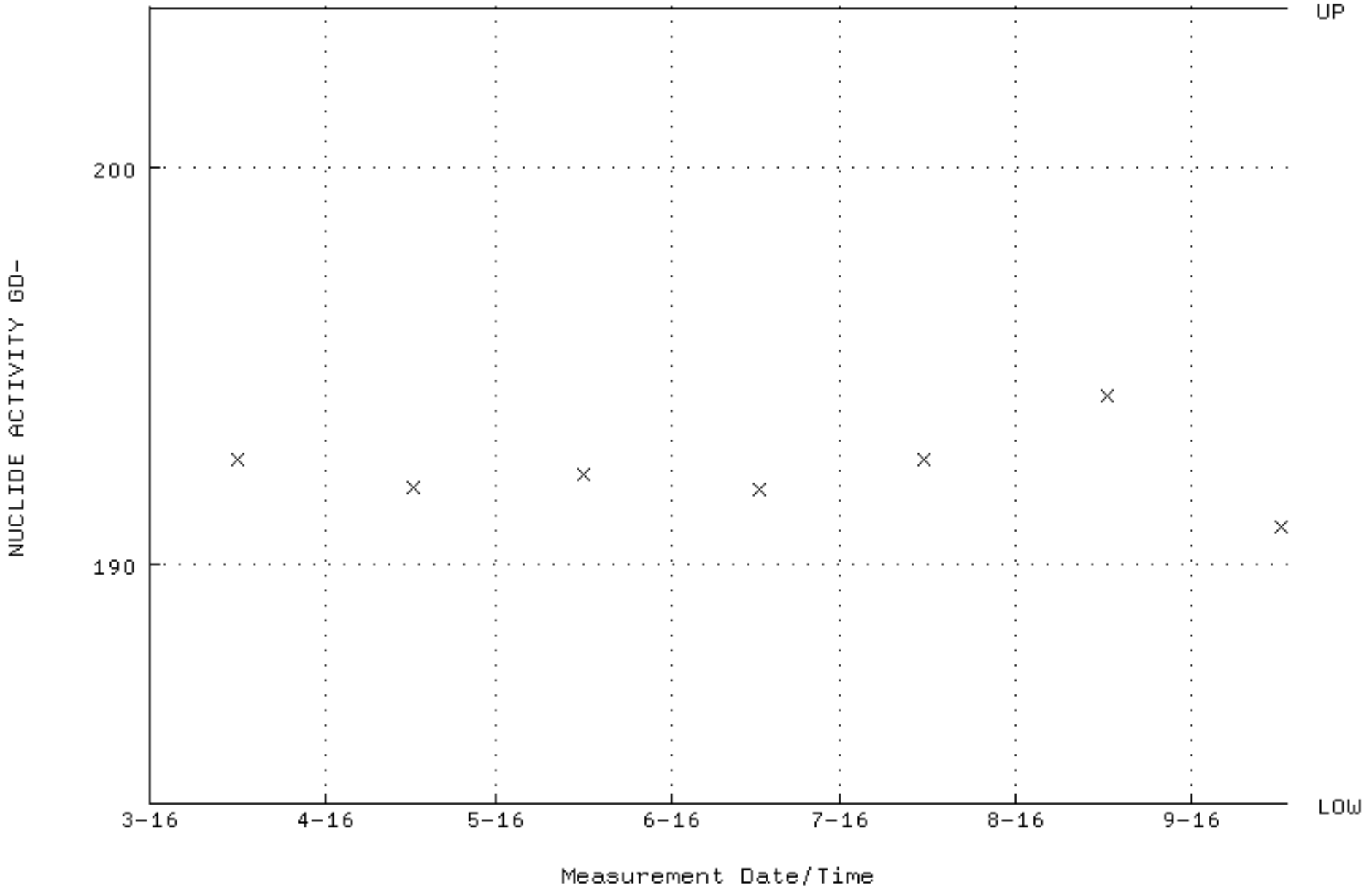
QA filename : DKA100:[ENV_ALPHA.QA.B]B218.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:37 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



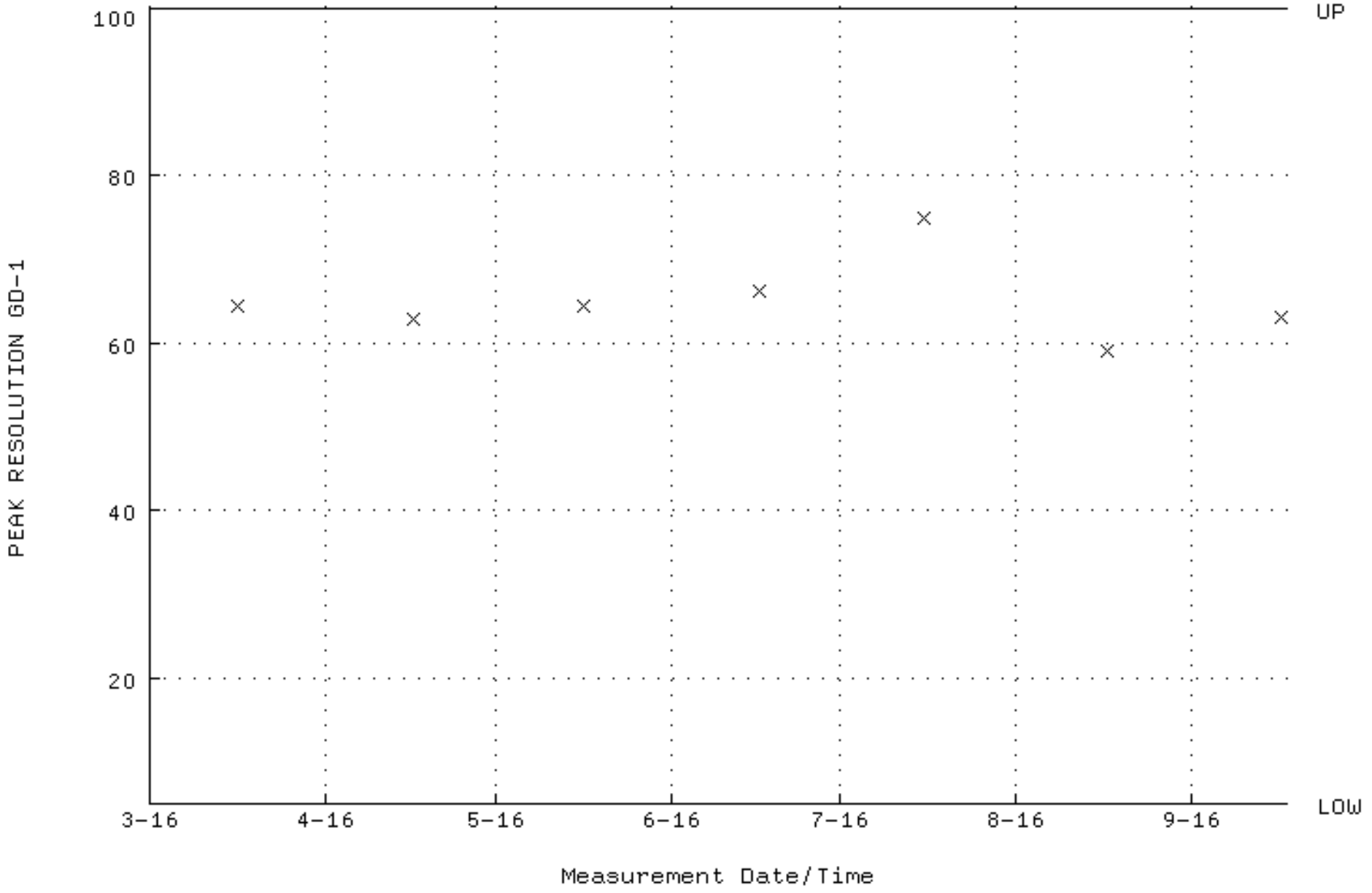
QA filename : DKA100:[ENV_ALPHA.QA.W]W219.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 08:36:12 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.251970 through 0.267550



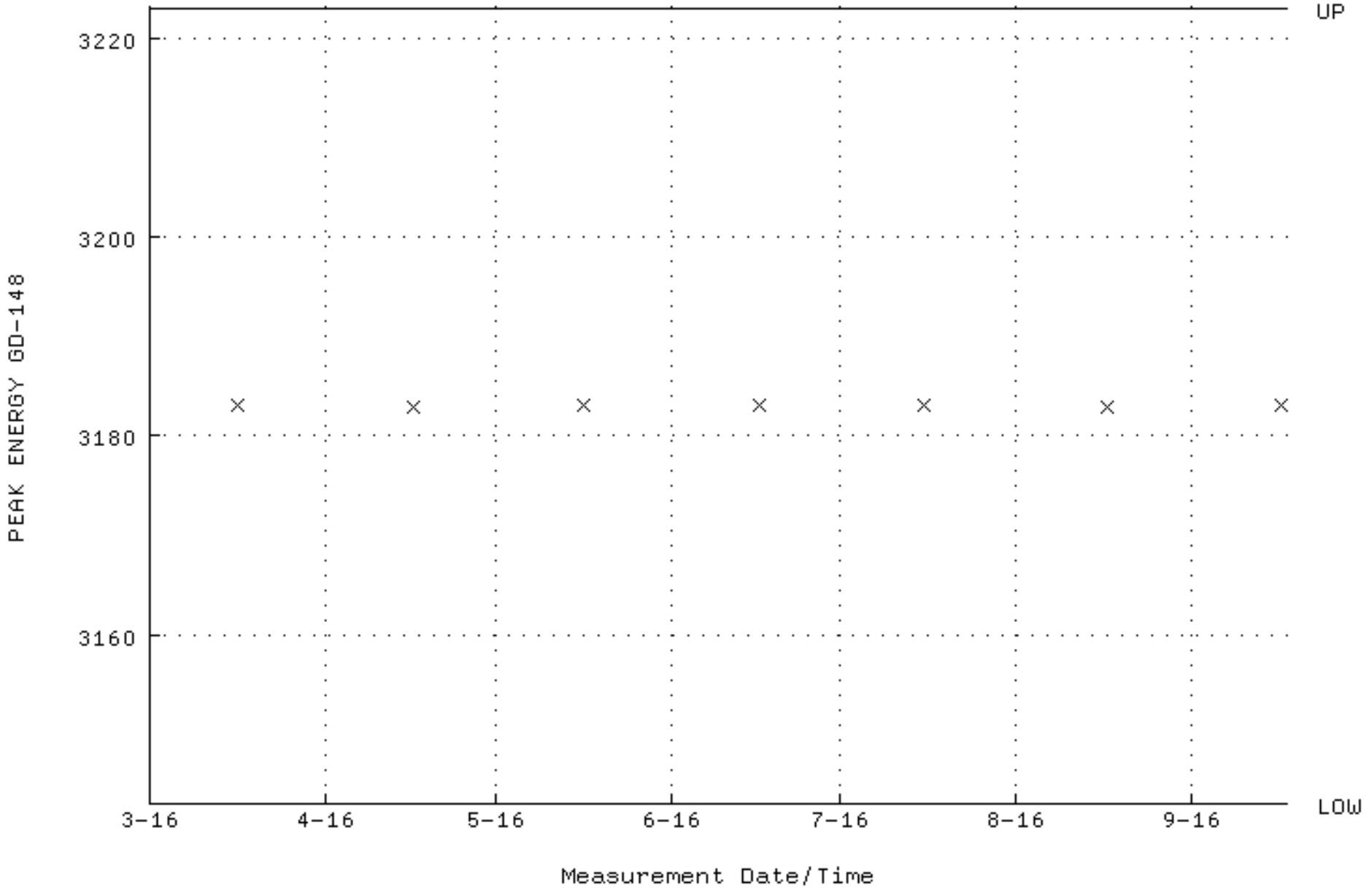
QA filename : DKA100:[ENV_ALPHA.QA.W]W219.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 08:36:12 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



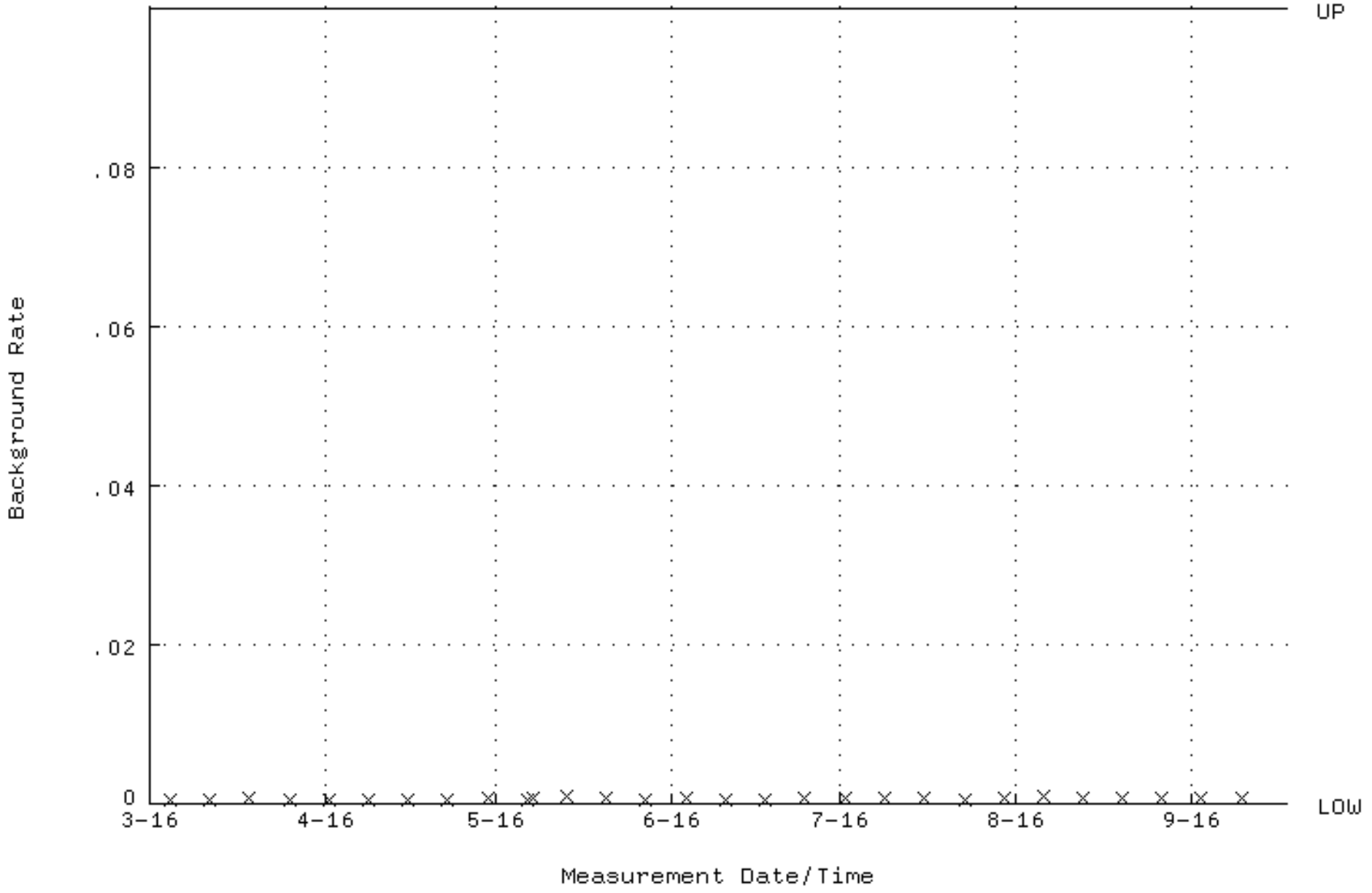
QA filename : DKA100:[ENV_ALPHA.QA.W]W219.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 08:36:12 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



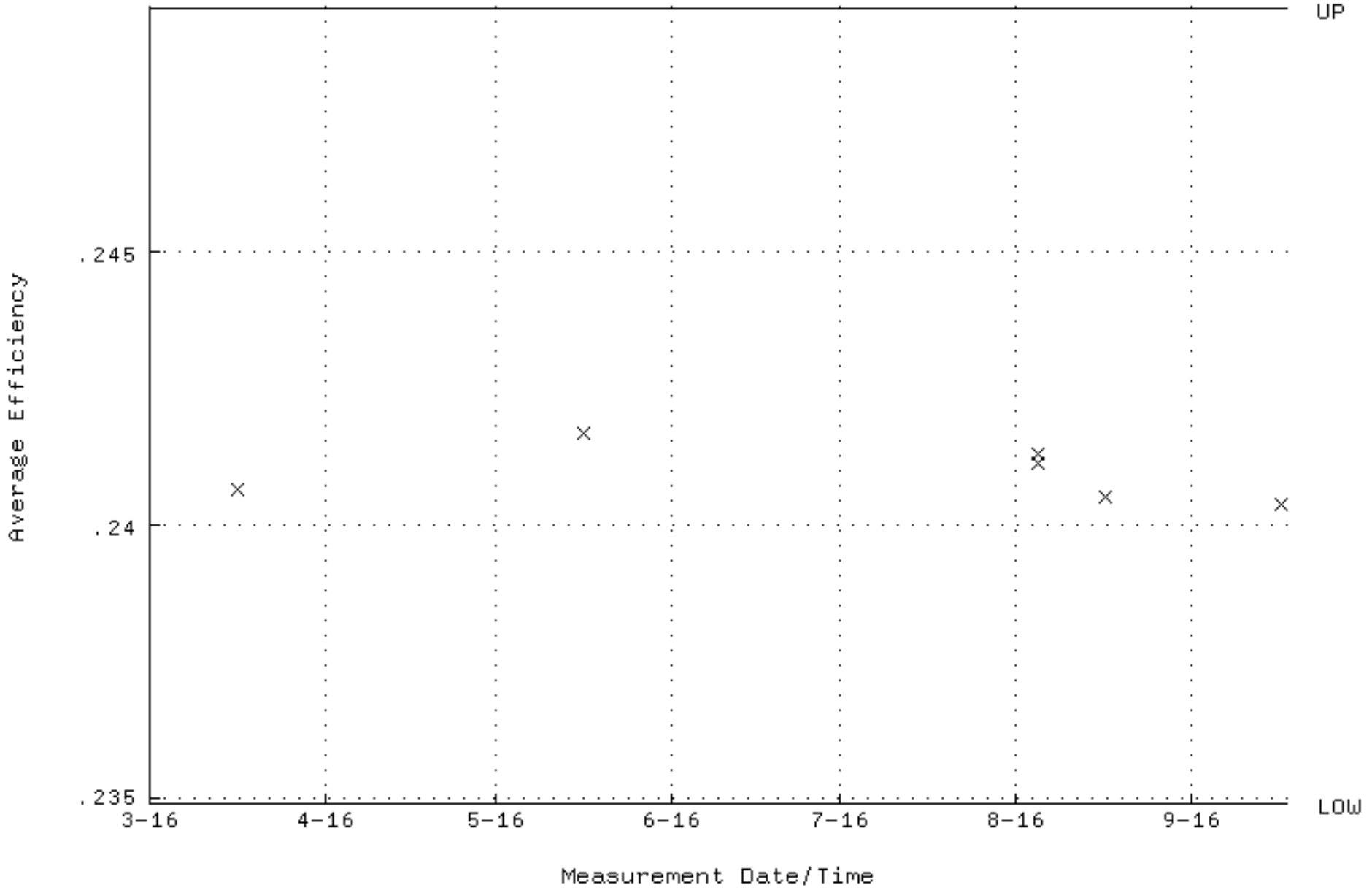
QA filename : DKA100:[ENV_ALPHA.QA.W]W219.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 08:36:12 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



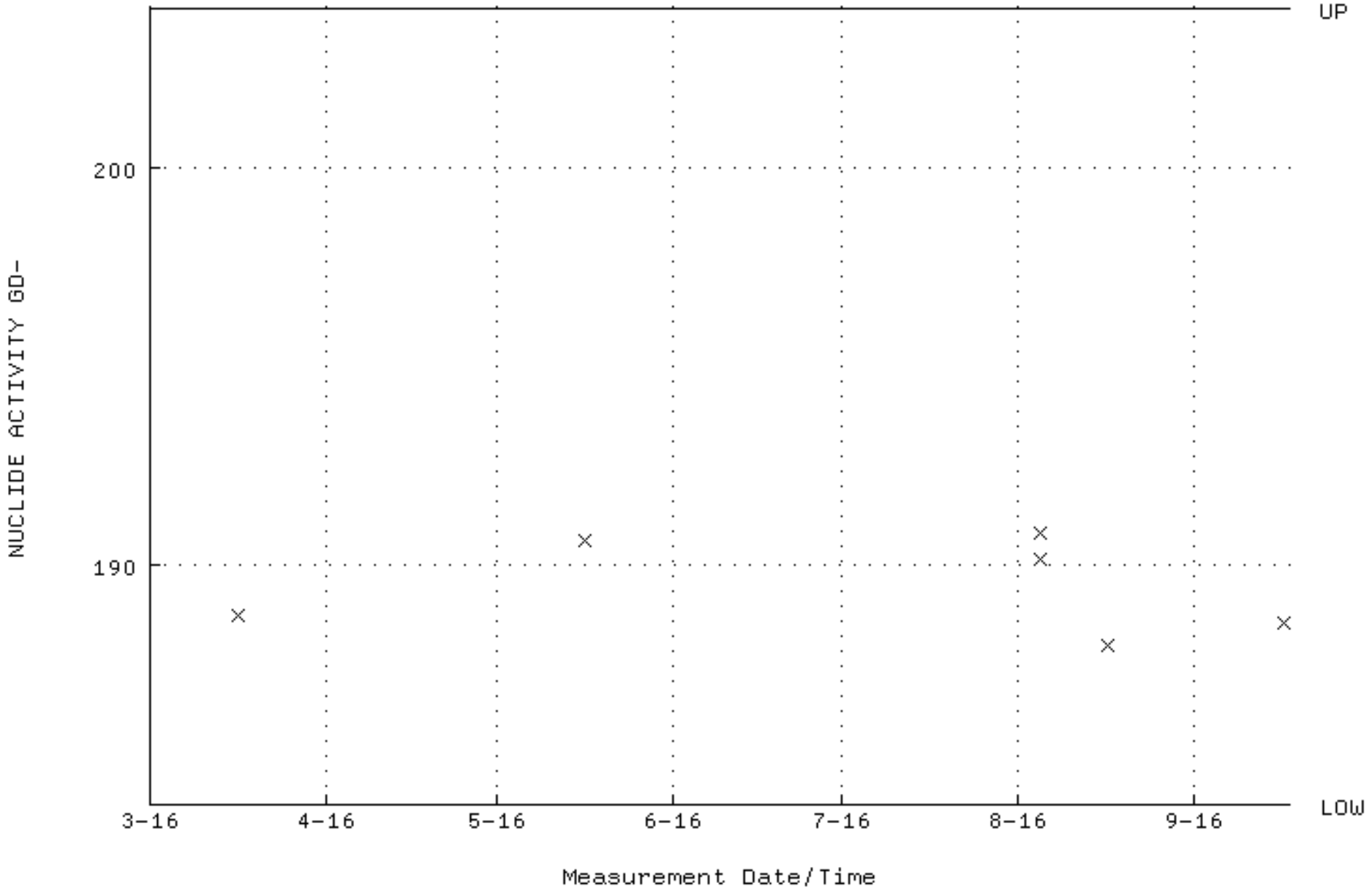
QA filename : DKA100:[ENV_ALPHA.QA.B]B219.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:42 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



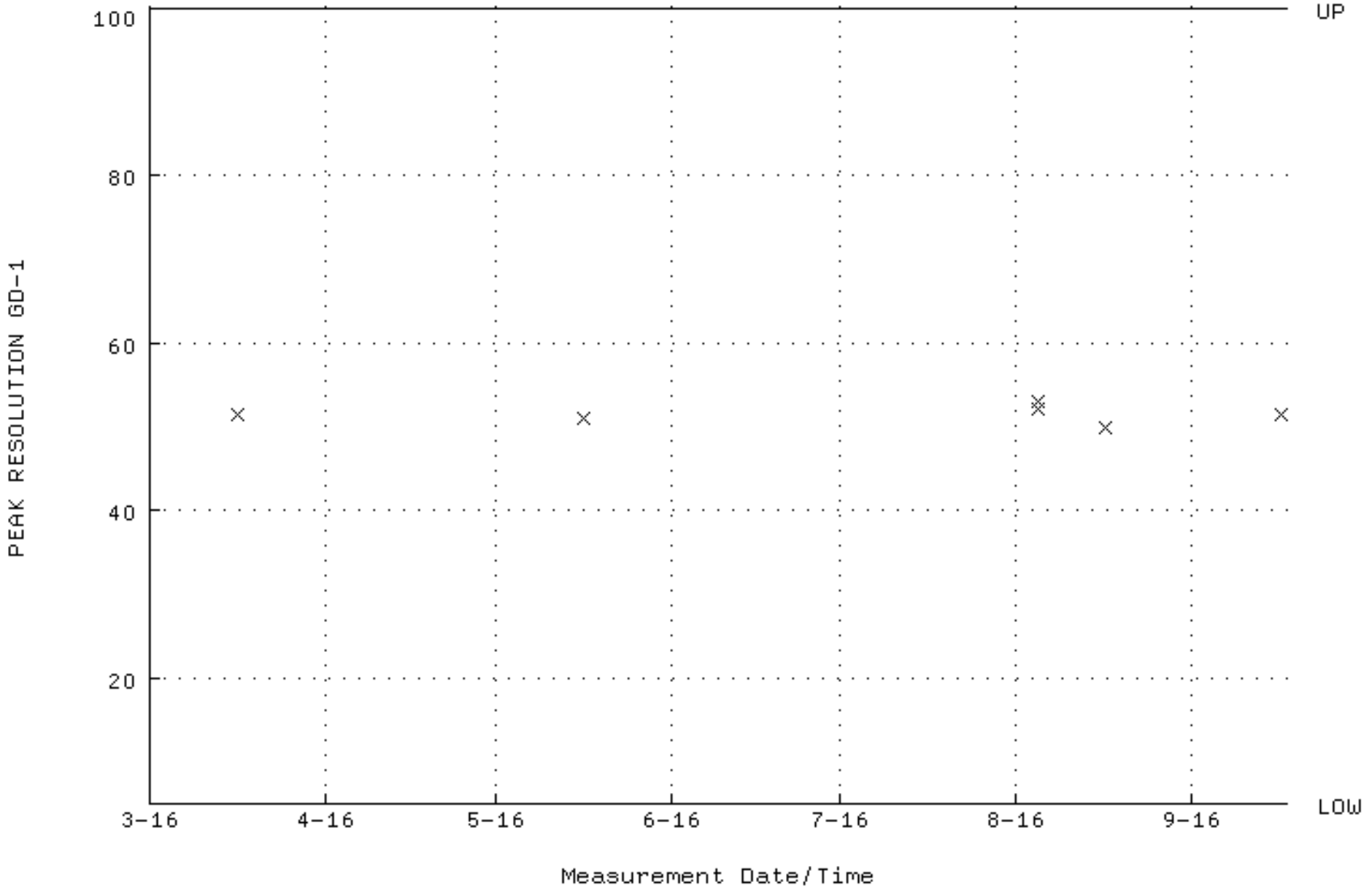
QA filename : DKA100:[ENV_ALPHA.QA.W]W220.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-MAR-2016 11:11:34 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.234900 through 0.249440



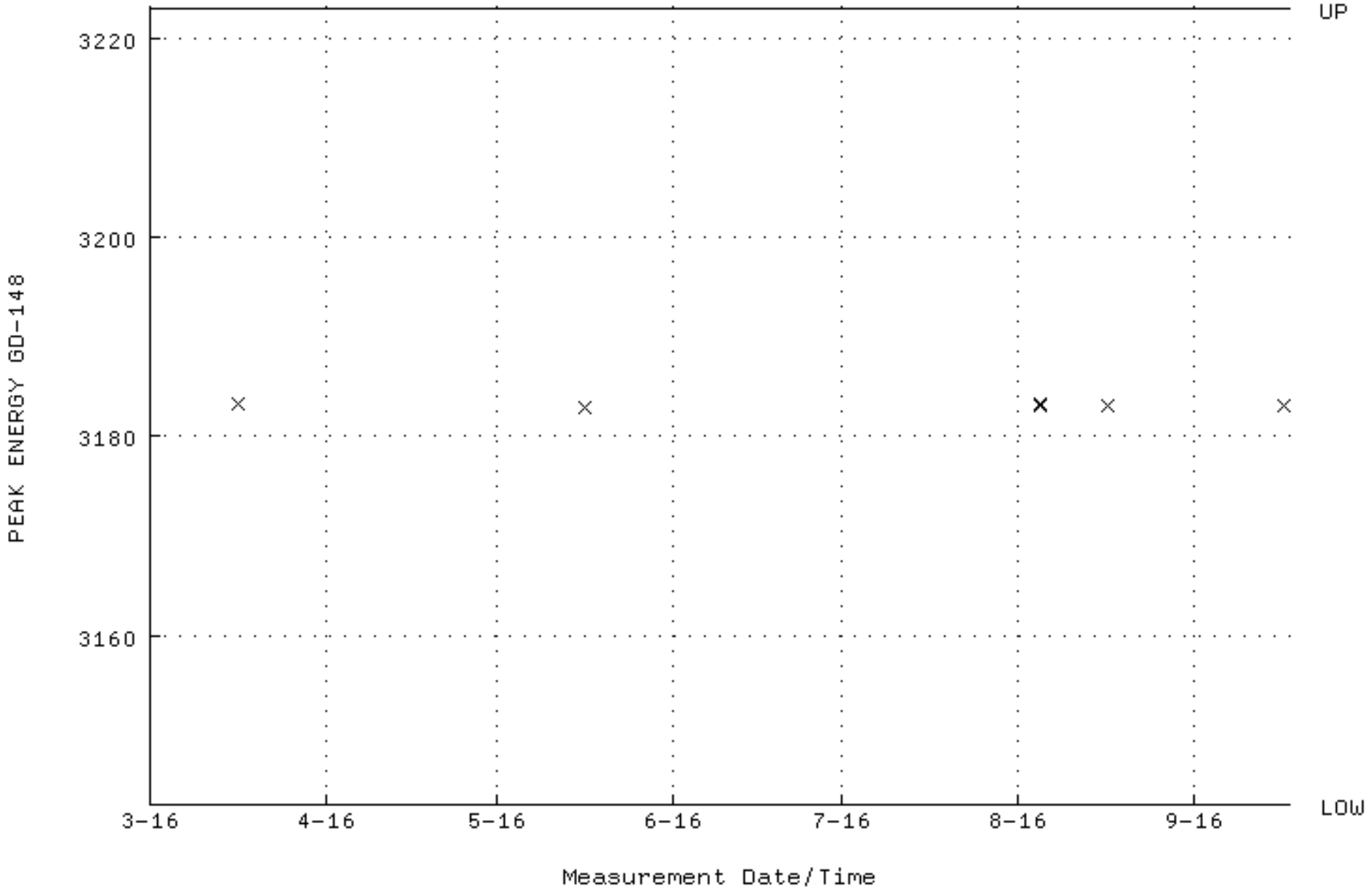
QA filename : DKA100:[ENV_ALPHA.QA.W]W220.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-MAR-2016 11:11:34 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



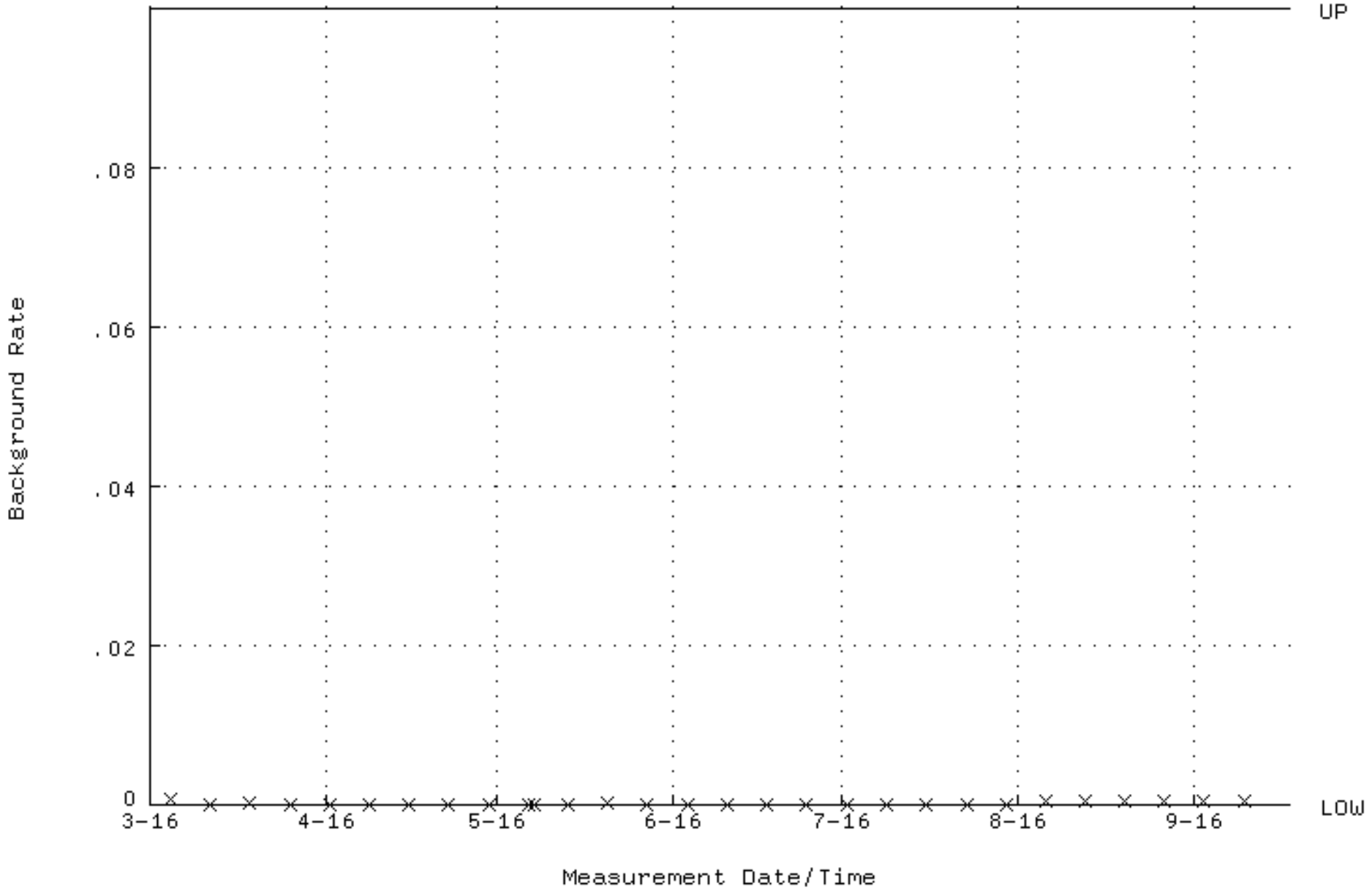
QA filename : DKA100:[ENV_ALPHA.QA.W]W220.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-MAR-2016 11:11:34 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



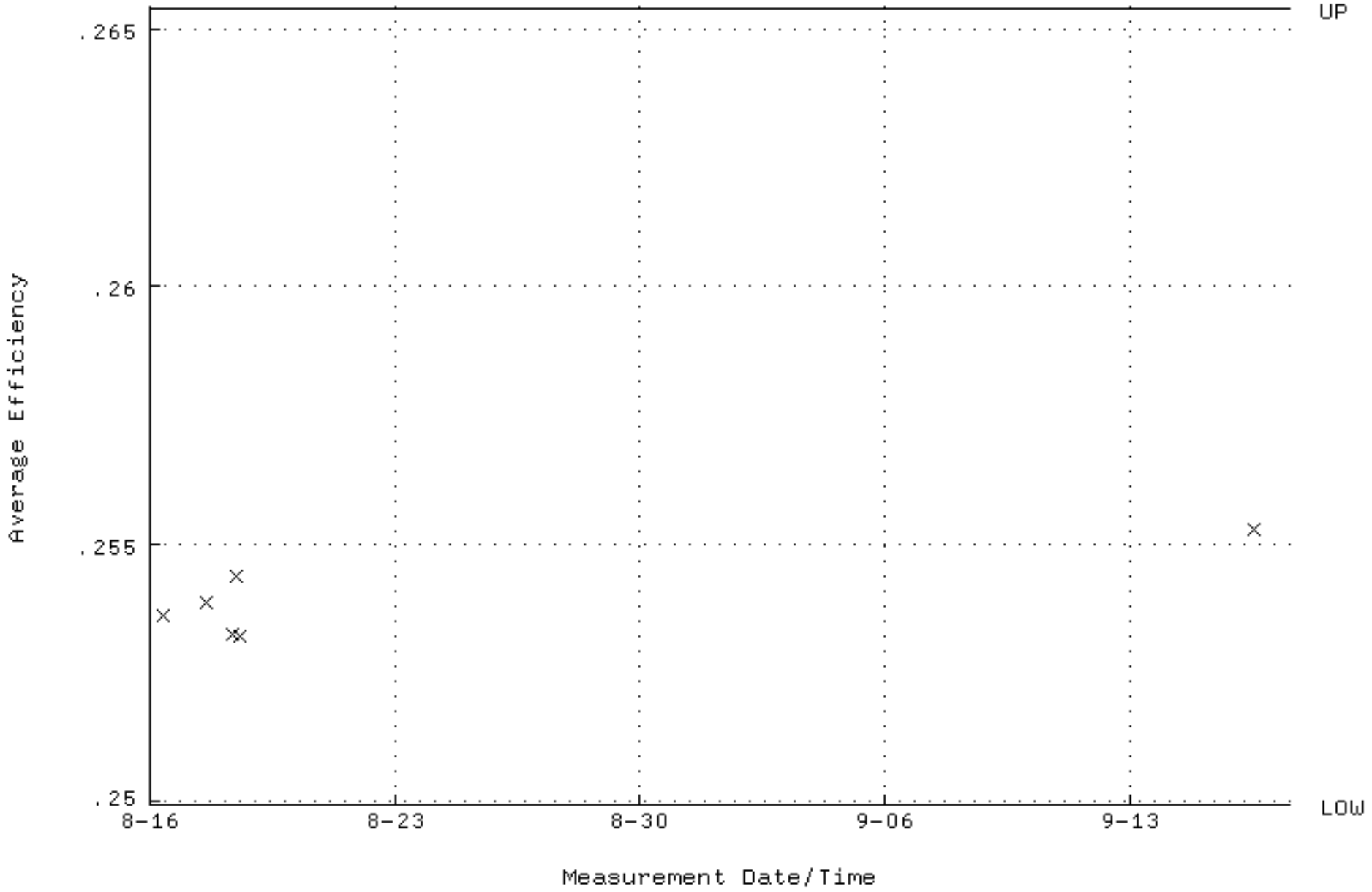
QA filename : DKA100:[ENV_ALPHA.QA.W]W220.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-MAR-2016 11:11:34 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



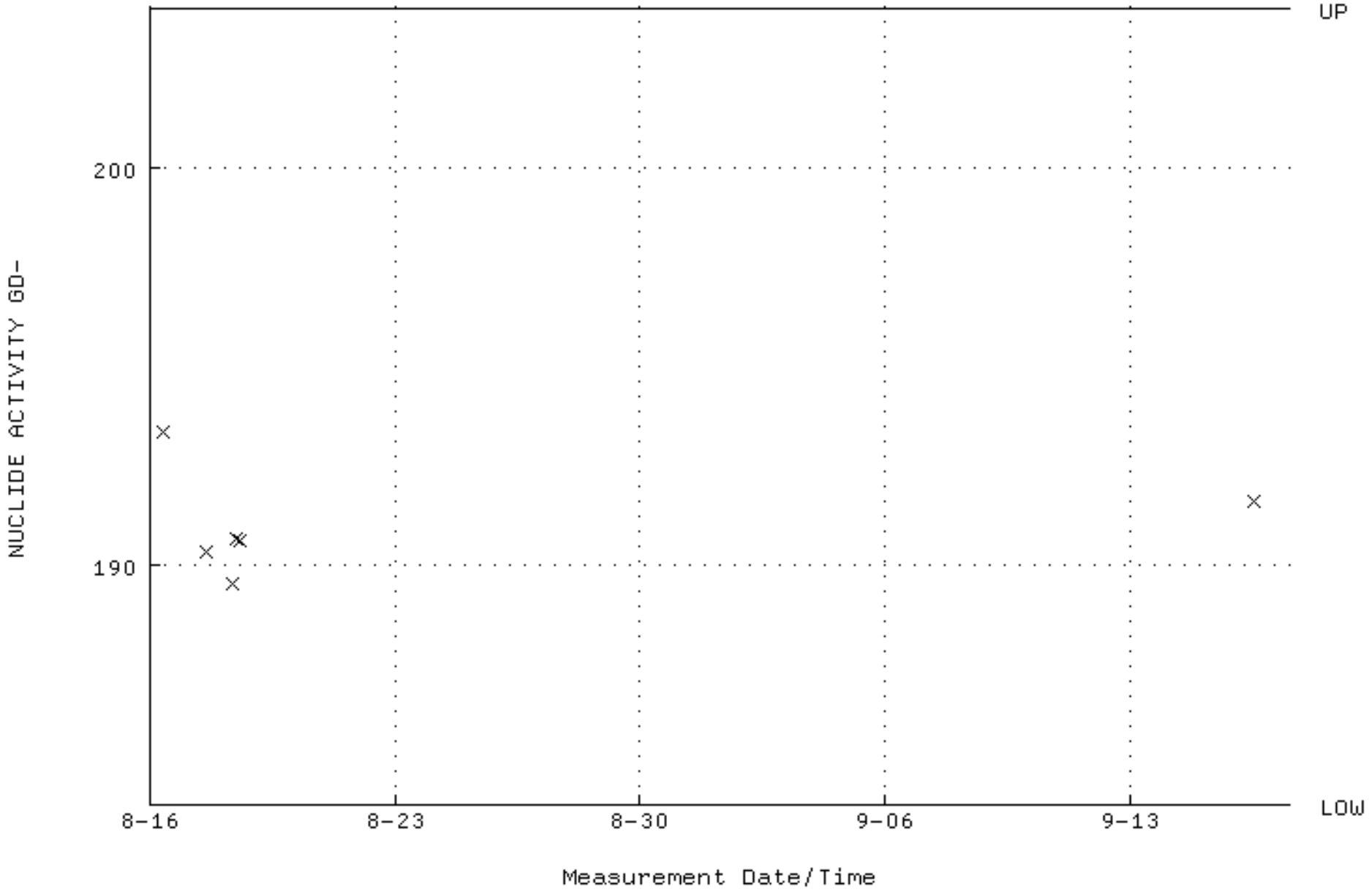
QA filename : DKA100:[ENV_ALPHA.QA.B]B220.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:31:46 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



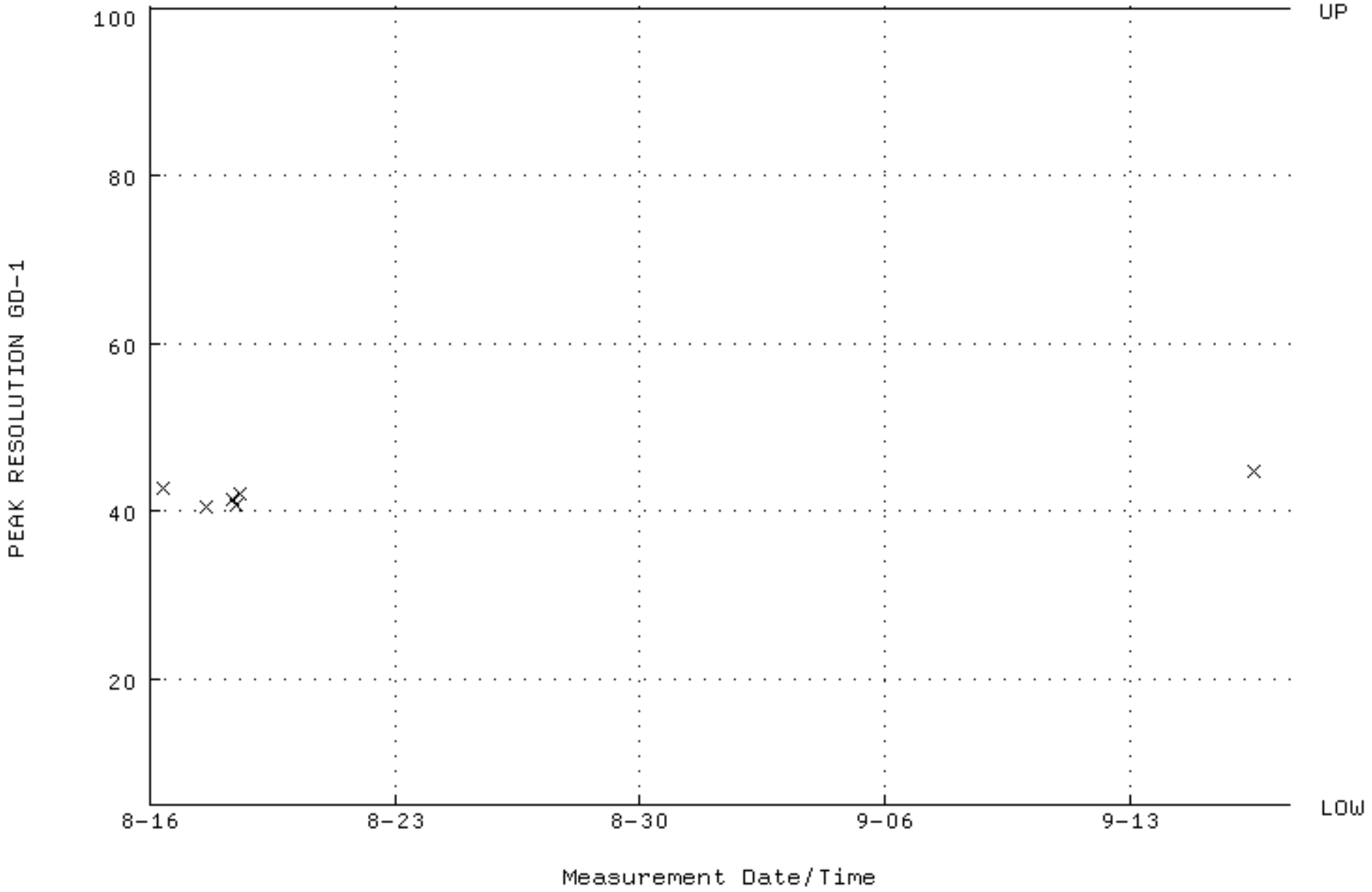
QA filename : DKA100:[ENV_ALPHA.QA.W]W221.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 16-AUG-2016 08:46:48 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.249939 through 0.265399



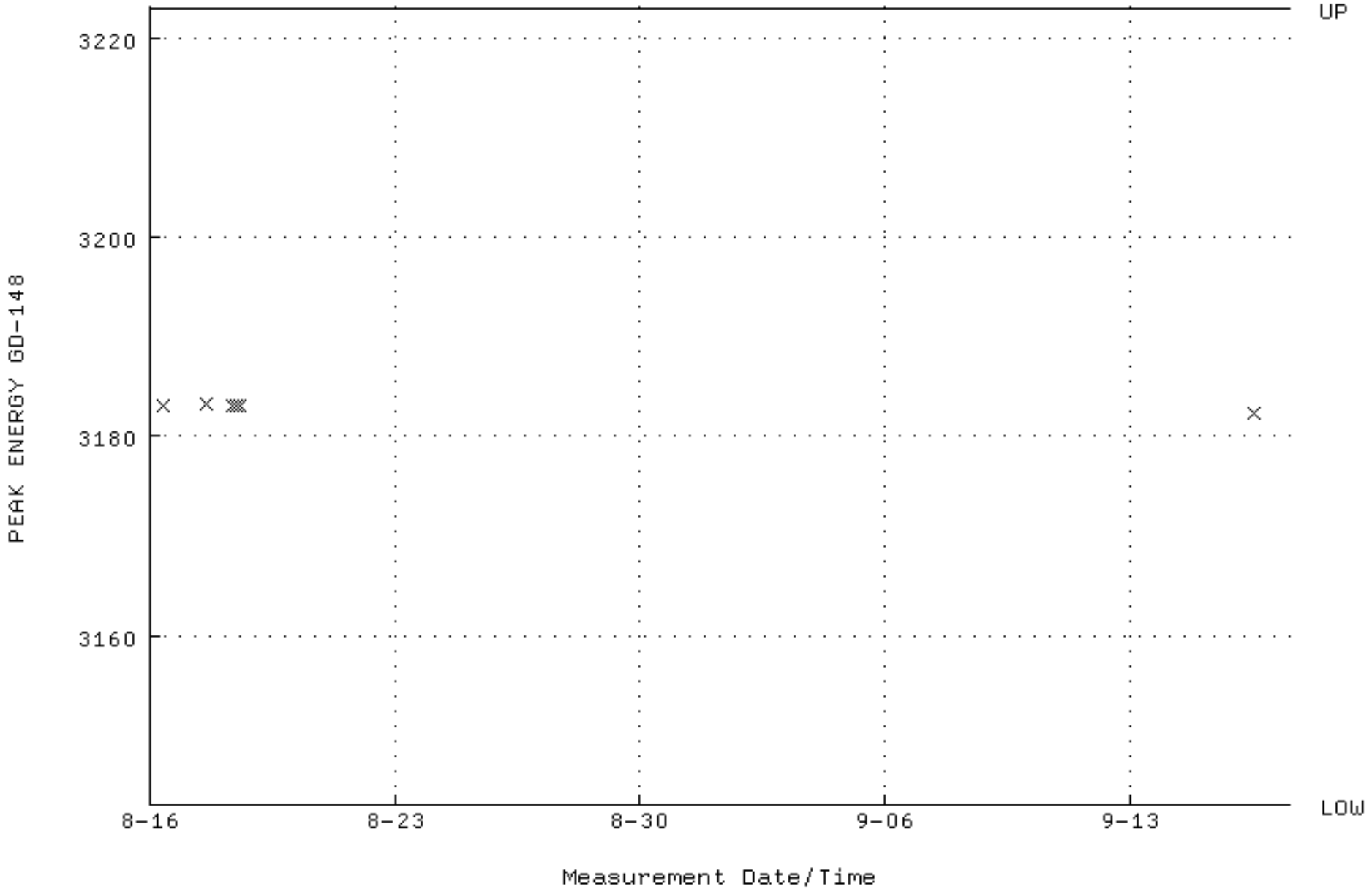
QA filename : DKA100:[ENV_ALPHA.QA.W]W221.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 16-AUG-2016 08:46:48 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



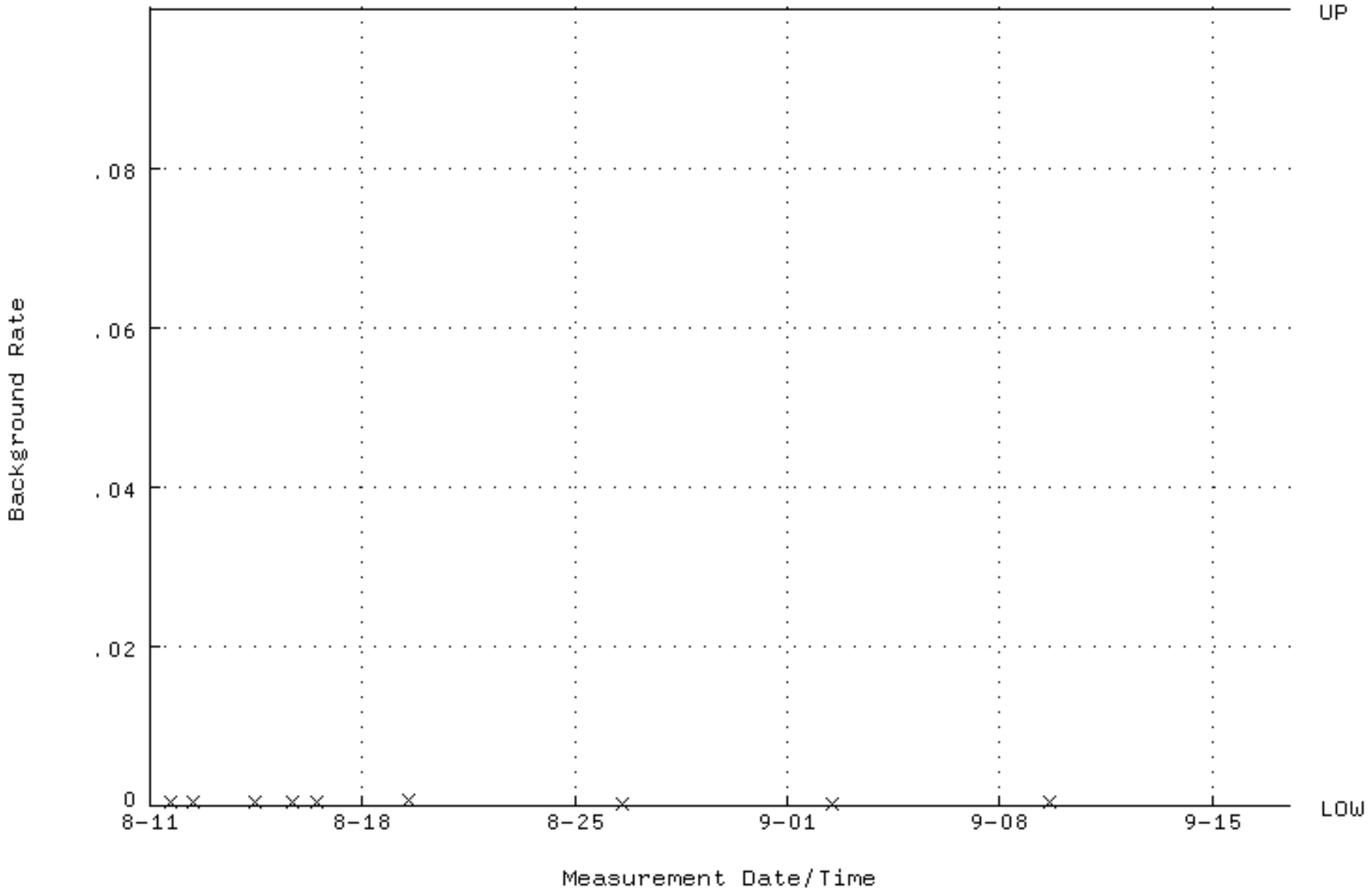
QA filename : DKA100:[ENV_ALPHA.QA.W]W221.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 16-AUG-2016 08:46:48 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



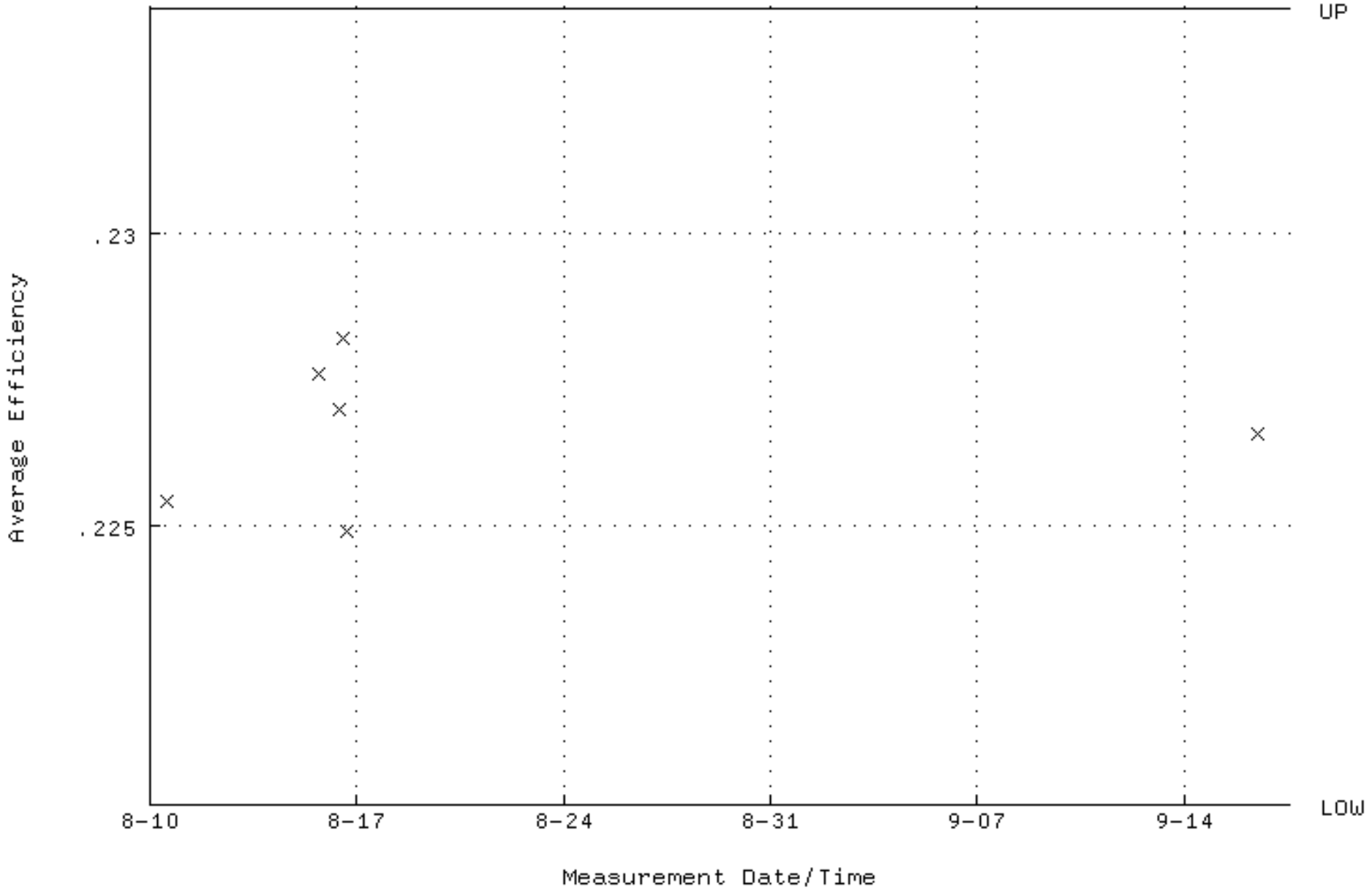
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Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 16-AUG-2016 08:46:48 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



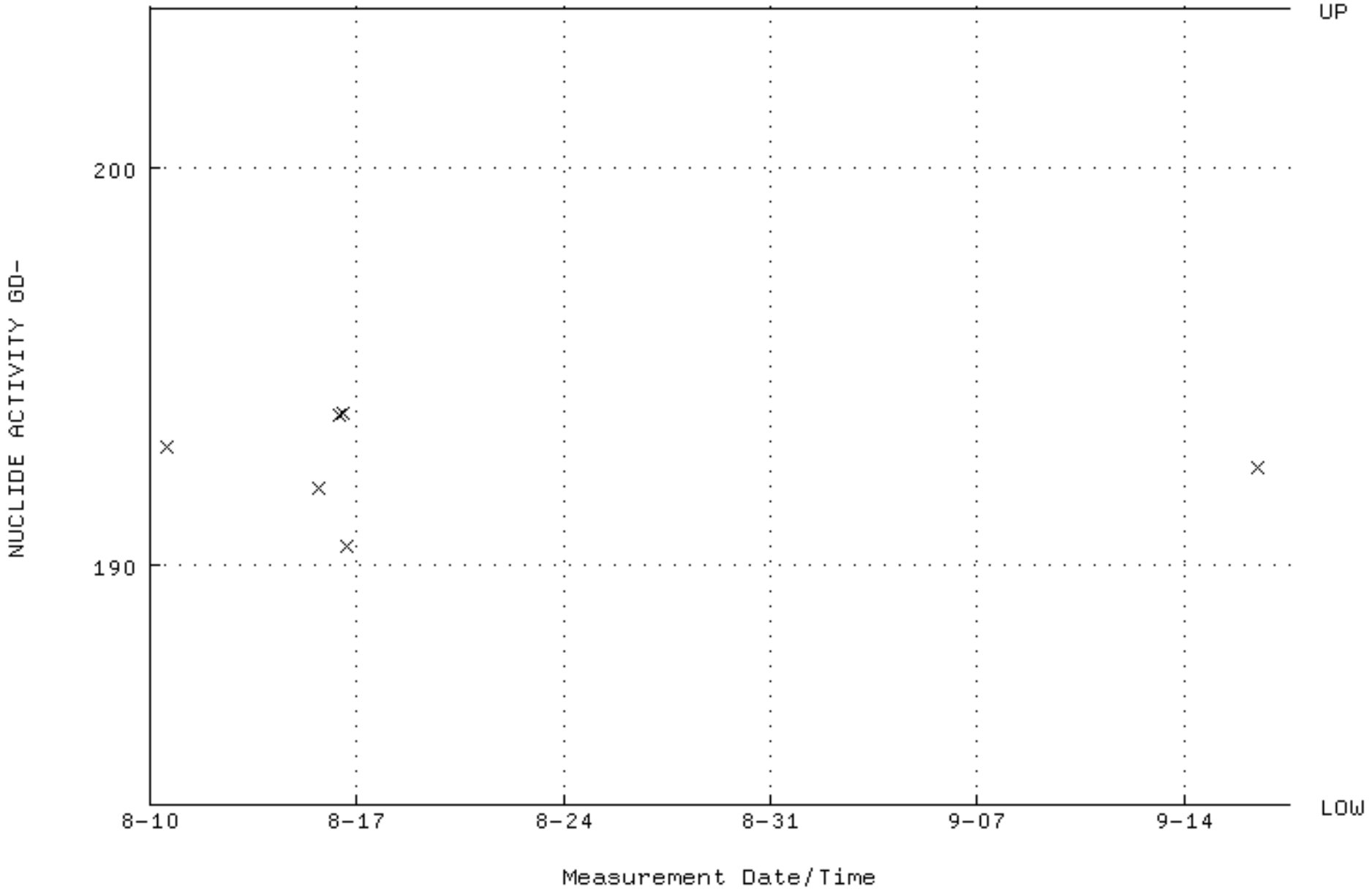
QA filename : DKA100:[ENV_ALPHA.QA.B]B221.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 11-AUG-2016 15:56:48 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



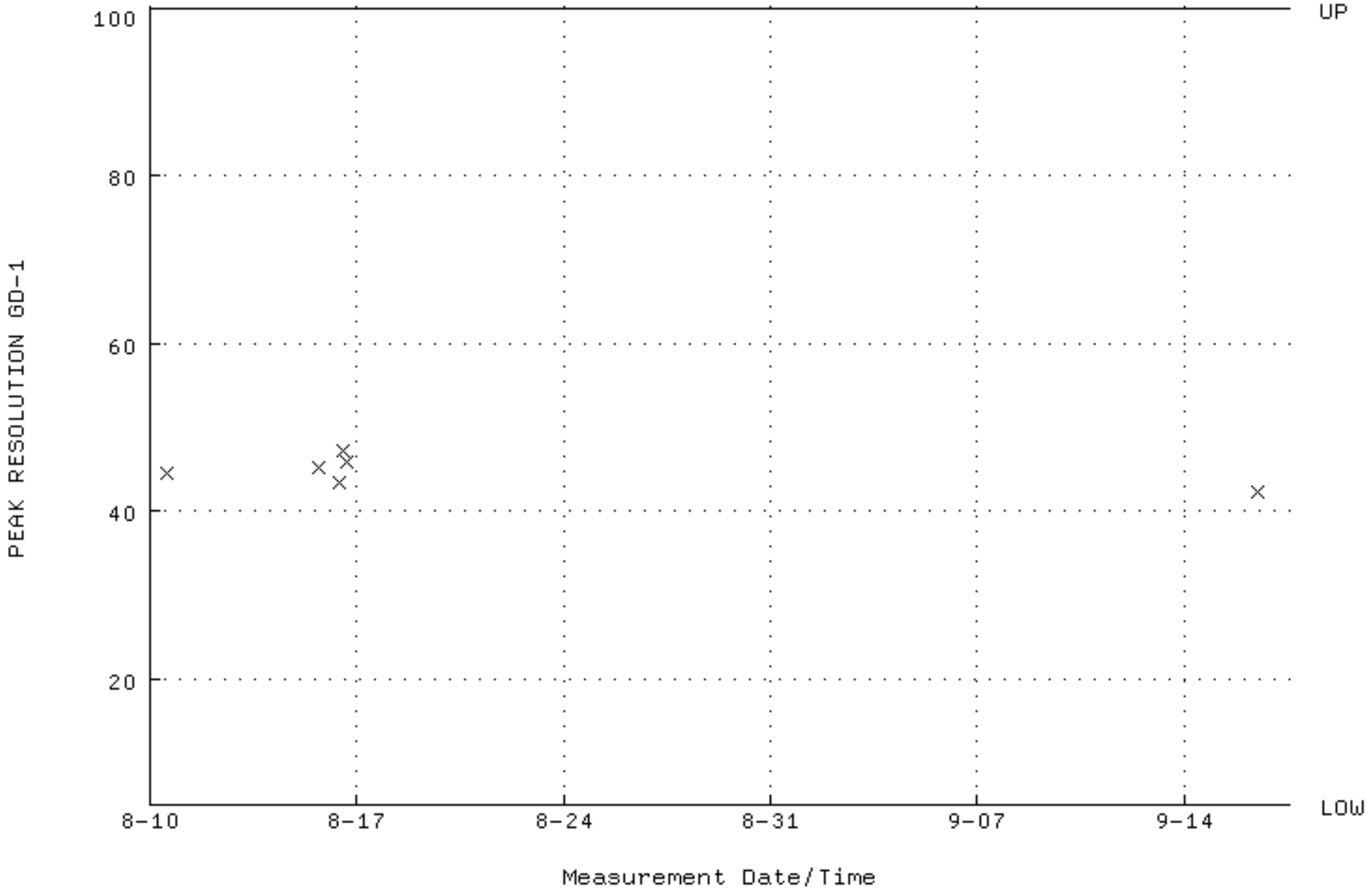
QA filename : DKA100:[ENV_ALPHA.QA.W]W231.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 10-AUG-2016 13:30:04 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.220210 through 0.233830



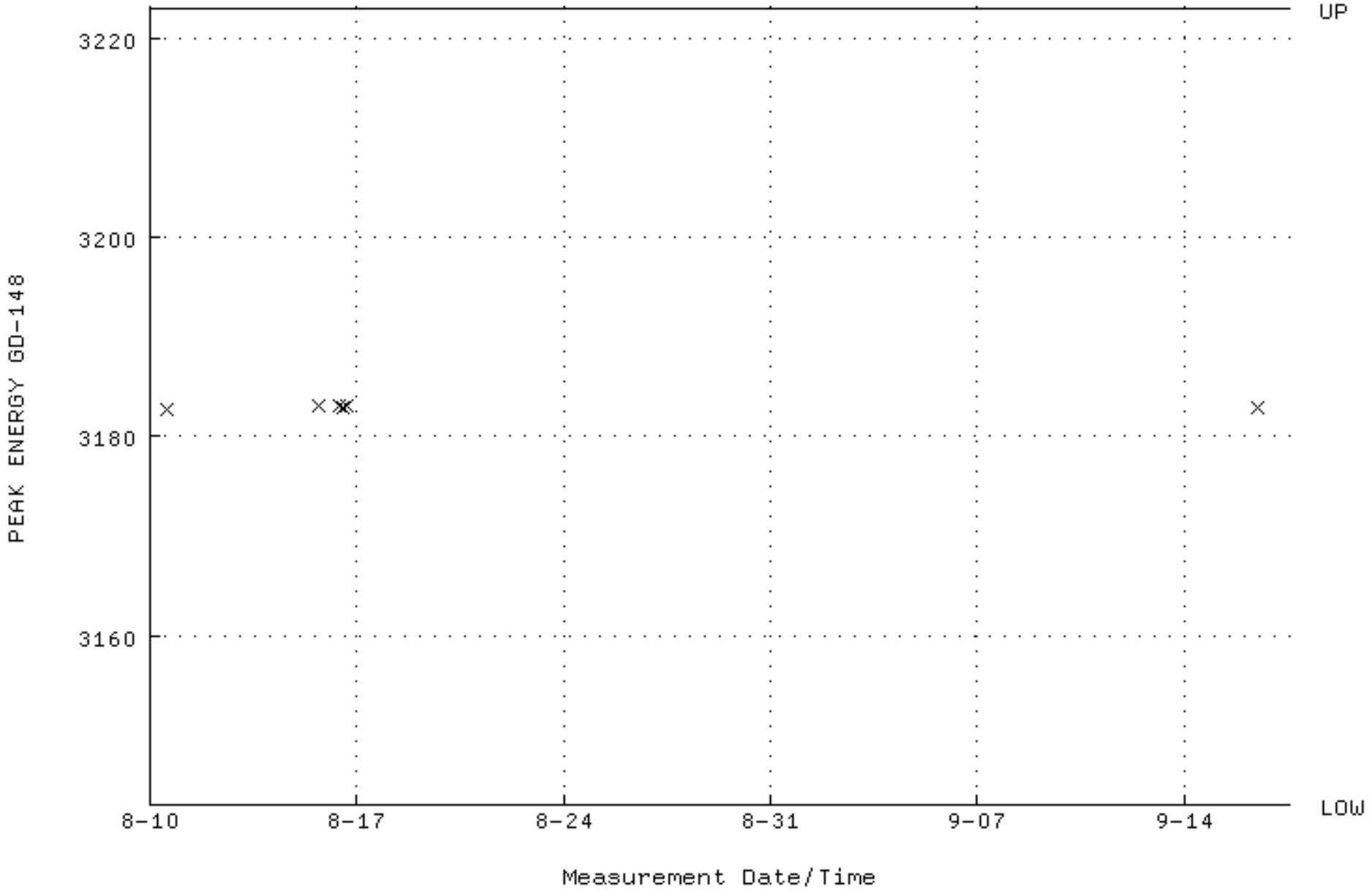
QA filename : DKA100:[ENV_ALPHA.QA.W]W231.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 10-AUG-2016 13:30:04 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



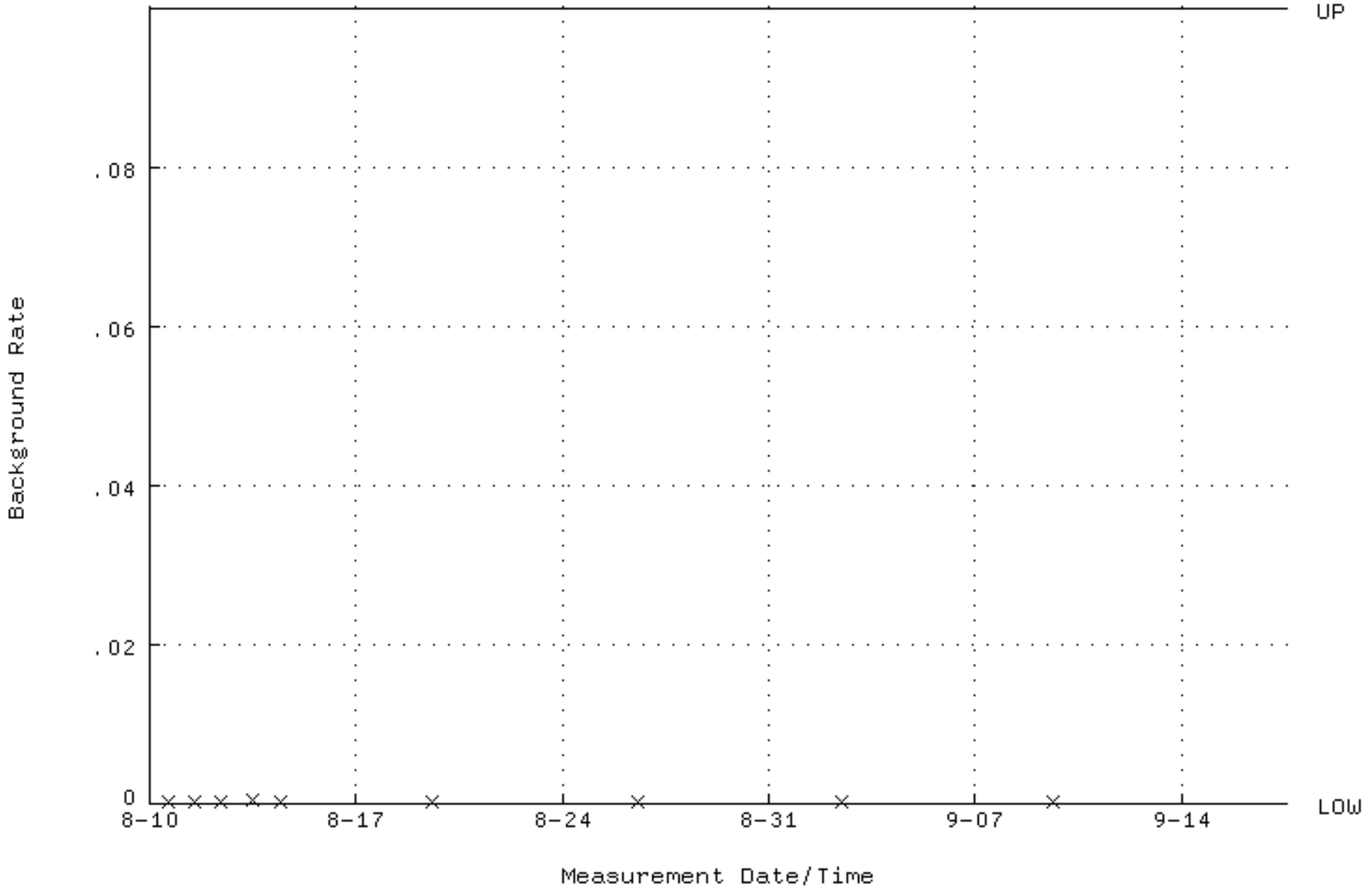
QA filename : DKA100:[ENV_ALPHA.QA.W]W231.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 10-AUG-2016 13:30:04 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



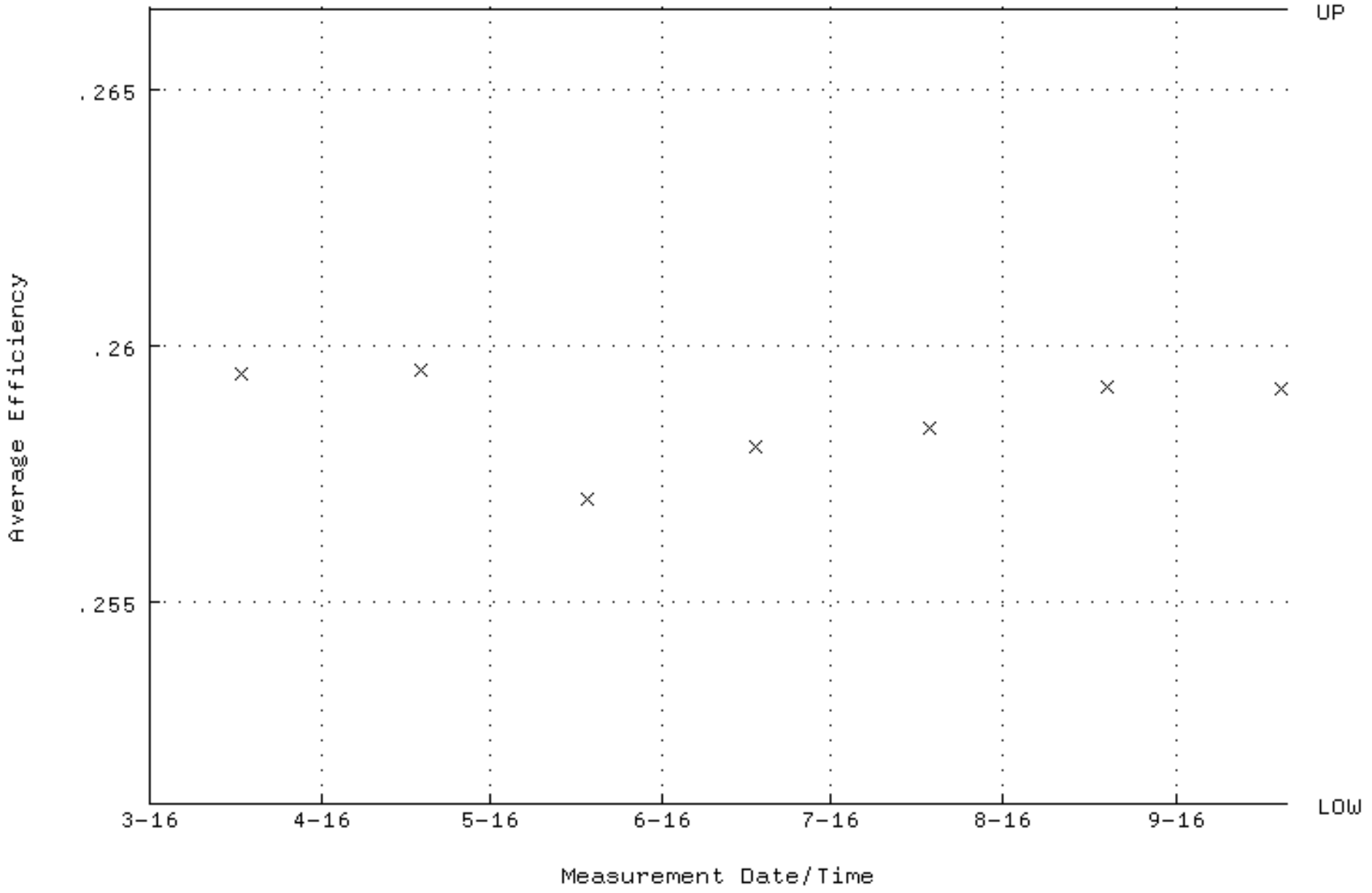
QA filename : DKA100:[ENV_ALPHA.QA.W]W231.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 10-AUG-2016 13:30:04 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



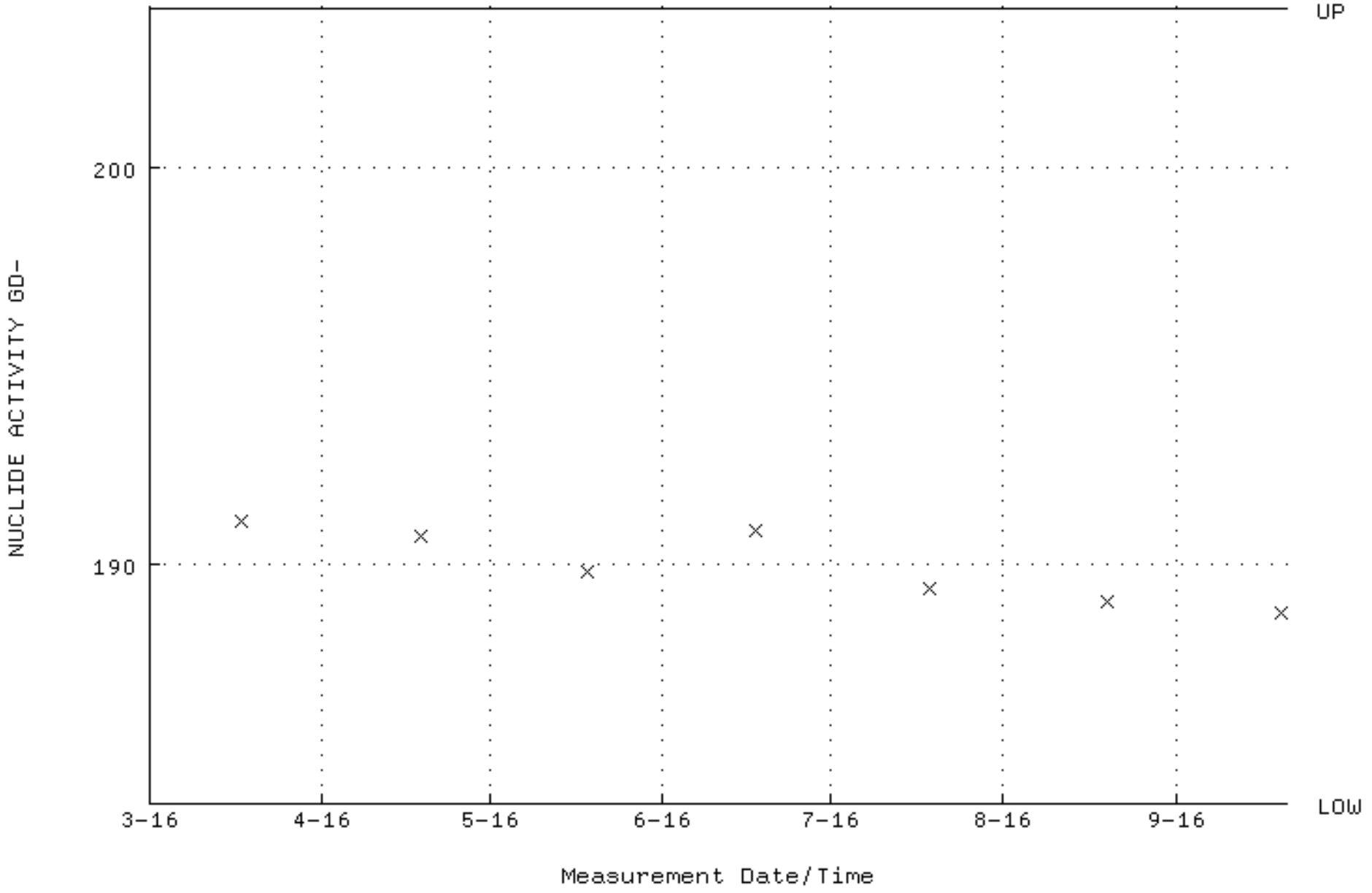
QA filename : DKA100:[ENV_ALPHA.QA.B]B231.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 10-AUG-2016 15:47:19 through 17-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



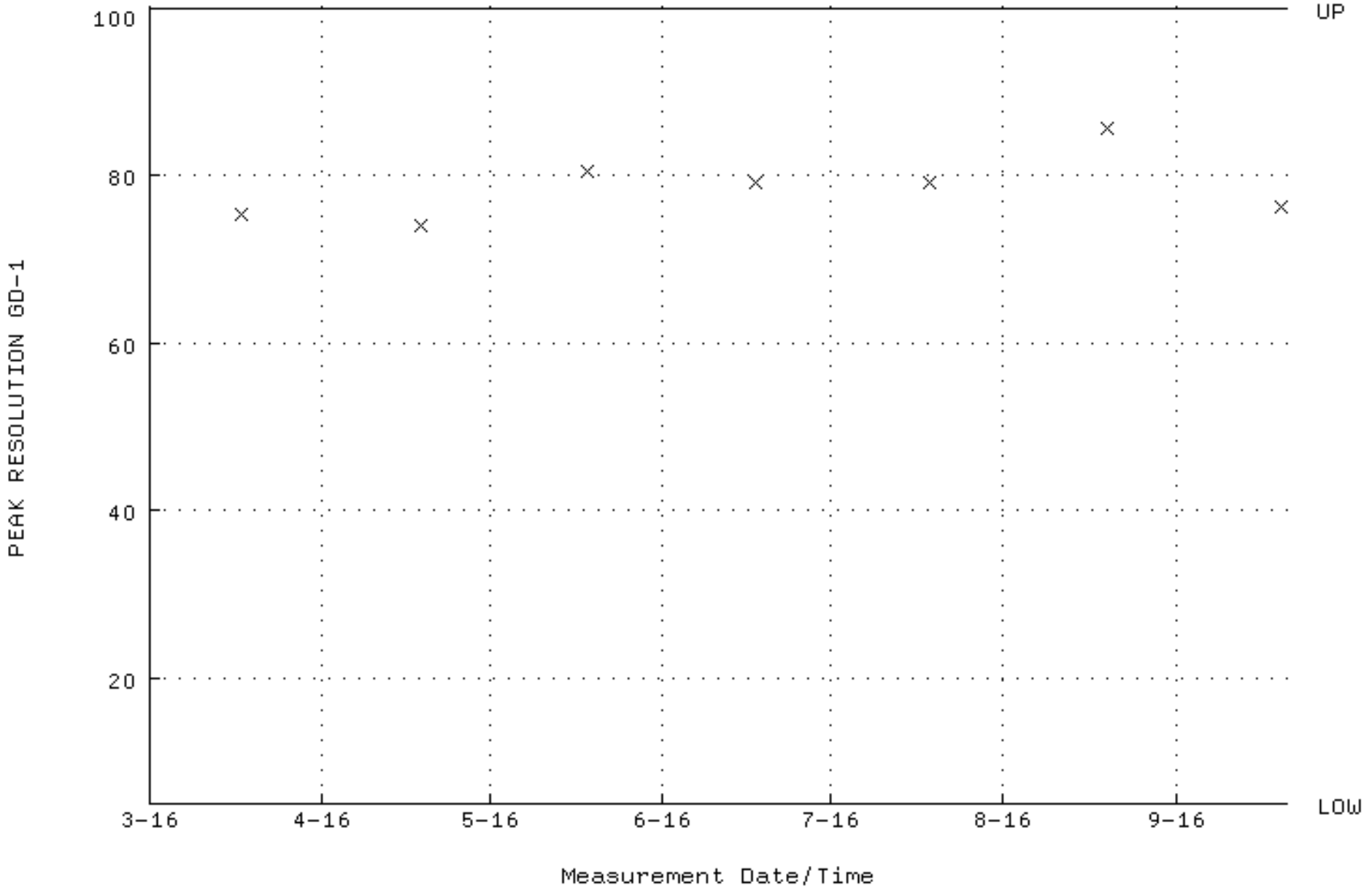
QA filename : DKA100:[ENV_ALPHA.QA.W]W241.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 17-MAR-2016 12:17:36 through 20-SEP-2016 12:00:00
Lower/Upper Lmts: 0.251040 through 0.266570



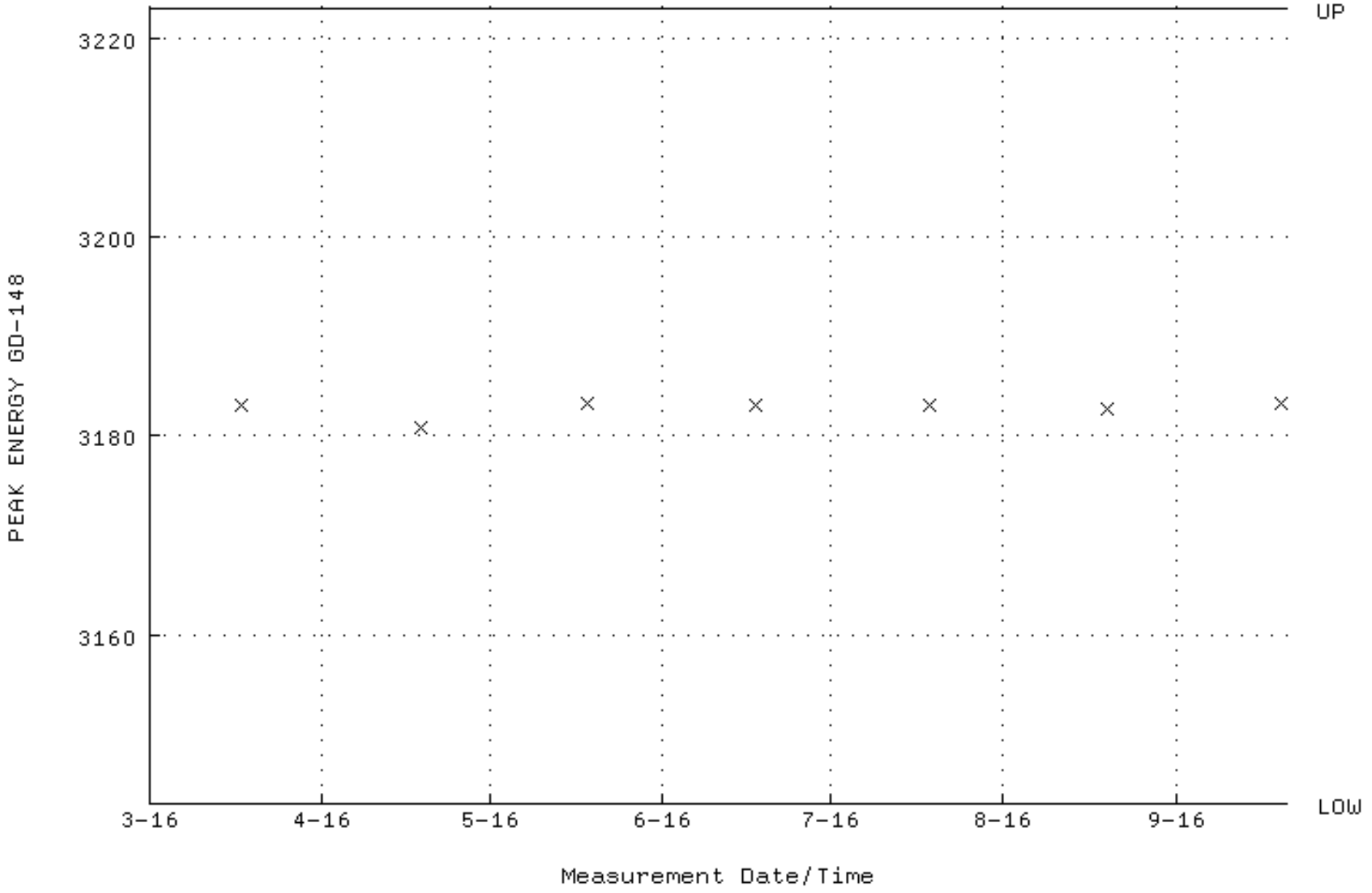
QA filename : DKA100:[ENV_ALPHA.QA.W]W241.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 17-MAR-2016 12:17:36 through 20-SEP-2016 12:00:00
Lower/Upper Lmts: 184.000 through 204.000



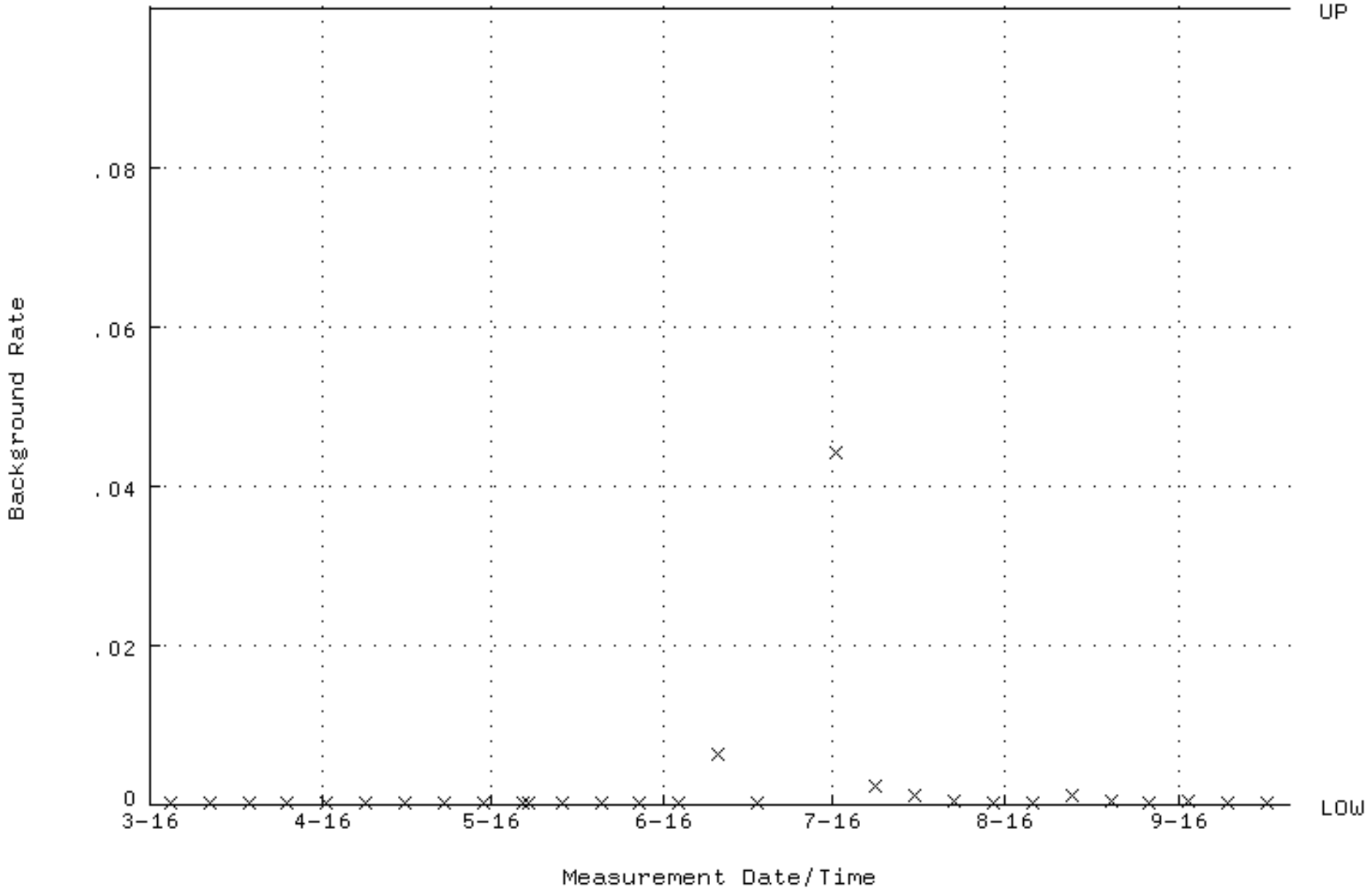
QA filename : DKA100:[ENV_ALPHA.QA.W]W241.QAF;3
Parameter Name : PSFWHM-GD148 (PEAK RESOLUTION GD-148)
Start/End Dates : 17-MAR-2016 12:17:36 through 20-SEP-2016 12:00:00
Lower/Upper Lmts: 5.00000 through 100.000



QA filename : DKA100:[ENV_ALPHA.QA.W]W241.QAF;3
Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)
Start/End Dates : 17-MAR-2016 12:17:36 through 20-SEP-2016 12:00:00
Lower/Upper Lmts: 3143.00 through 3223.00



QA filename : DKA100:[ENV_ALPHA.QA.B]B241.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-MAR-2016 13:35:51 through 20-SEP-2016 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



RAD Standards Traceability

0387

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

61762-278

Ac-227 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 by alpha spectroscopy. The nuclear decay rate and assay date for this source are given below.

Analytics maintains traceability to the National Institute of Standards and Technology through participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

ISOTOPE:	Ac-227
ACTIVITY (dps):	2.085 E5
HALF-LIFE:	21.77 years
CALIBRATION DATE:	June 8, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.0%
SYSTEMATIC:	2.0%
RANDOM:	3.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%
α-impurities <0.3%

5.3136 grams 2M HNO_3 solution, carrier free.

P O NUMBER 2533RD, Item 2

SOURCE PREPARED BY: _____
E. A. Taskaev, Production Manager

Q A APPROVED: _____ 6/26/01

RC-5-C34-049a

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0387
Prepared By:	Angela Johnson
Carrier Conc:	2 M HNO3
Reference Date:	06/08/2001
Ampoule Mass (g):	5.3136 g
Uncertainty:	+/- 5 %
LogBook No:	RC S 034-049a

A Solution Material Info			
Isotope:	Actinium-227		
Prepared By:	Angela Johnson		
Prep Date:	07/17/2001		
Verification Date:	08/02/2011		
Expiration Date:	07/31/2012		
Primary Code:	0387-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.7794 g		
Density(g/mL):	1.0370	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)
(4.7794 g) * (208500 dps) * (60 dpm/dps) / (5.3136 g * 100 mL) = 112523.1369 dpm/mL
(4.7794 g) * (208500 dps) * (60 dpm/dps) / (1.0370 g/mL)/ (5.3136 g * 100 mL) = 108511.1539 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
07/17/2001	Lonnie Morris	.4684	1000	0387-B-102	50.8266 dpm/mL	07/22/2010	07/22/2011
07/17/2001	Lonnie Morris	.4684	1000	0387-B-202	50.827 dpm/mL	07/11/2004	07/11/2005
05/12/2011	Ashley Drochter	.4605	1000	0387-B-302	49.9694 dpm/mL	05/12/2011	05/12/2012
08/01/2011	Ashley Drochter	.4603	1000	0387-B-402	49.9477 dpm/mL	05/31/2016	05/31/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ac-227 Standard 0387-B-402

v1.2

Analyst	TC1
Verification Prep Date	5/31/2016

Tracer Information	
Isotope	Th-230
Serial Number	1242-H
Amount of Std. (mL)	0.5
Expiration Date	2/11/2017

Standard Information	
Isotope	Ac-227
Serial Number	0387-B-402
Isotope Halflife	21.7730 Y
Reference Date	6/8/2001
Ref. Act. (dpm/mL)	49.9477
Amount of Std. (mL)	0.5
Standard Prep Date	8/1/2011

Std #	Count Date	Activity pCi	Standard dpm/mL
1	5/31/2016	7.280	32.32
2	5/31/2016	7.530	33.43
3	5/31/2016	7.180	31.88
Mean Value =		7.330	32.545
Stdev =		0.180277564	0.800432383

	pCi	dpm/mL
Certificate Value* =	**6.9829**	**31.0043**
Two sigma =	0.3606	1.6009
10 % of Mean =	0.7330	3.2545
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	104.97%	104.97%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**5/31/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Ac-227 standard 0387-B-402 using 0.5 mL for each source. Each standard was combined with 0.5 mL of Th-230 standard 1242-H and was diluted in a 50 mL plastic centrifuge tube containing 10 mL of 8M HNO3. The verification sources were then passed through an AG 1x8 column and eluted with 20mL 9M HCl. The elution was cooked dry, wet ashed and then dissolved in 5mL 2M HCl. The 2M HCl solution was transferred to a disposable centrifuge tube using deionized water and was analyzed following SOP GL-RAD-A-038. 100 micrograms of neodynium and five mL of 48% HF was added to precipitate neodymium (and Actinium) 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. DPM values for Ac-227 were calculated by comparison to Th-230 certified values.

TC

0533

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

65338-278

Am-241 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. 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:	Am-241
ACTIVITY (dps):	3.920 E4
HALF-LIFE:	4.322 E2 years
CALIBRATION DATE:	January 15, 2003 12:00 EST
TOTAL UNCERTAINTY*:	3.2%
SYSTEMATIC:	2.2%
RANDOM:	1.0%

*99% confidence level.

5.10649 grams 1M HCl solution.

Impurities: γ-impurities <0.1%
α-impurities <0.1%

P O NUMBER 3213 RD, Item 1

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: 1-16-03

RC-S-035-04Sa

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0533
Prepared By:	Angela Johnson
Carrier Conc:	1 M HCL
Reference Date:	01/15/2003
Ampoule Mass (g):	5.10649 g
Uncertainty:	+/- 1.24 %
LogBook No:	RC S 035 048

A Solution Material Info			
Isotope:	Americium-241		
Prepared By:	Angela Johnson		
Prep Date:	02/05/2003		
Verification Date:	01/22/2016		
Expiration Date:	01/22/2017		
Primary Code:	0533-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.8225 g		
Density(g/mL):	1.0139	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)
(4.8225 g) * (39200 dps) * (60 dpm/dps) / (5.10649 g * 100 mL) = 22211.9695 dpm/mL
(4.8225 g) * (39200 dps) * (60 dpm/dps) / (1.0139 g/mL)/ (5.10649 g * 100 mL) = 21907.2185 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
02/20/2003	Angela Johnson	1.0151	100	0533-B	222.38 dpm/mL	03/01/2006	03/01/2007
01/16/2015	Christina Kimball	.005081	500	0533-BB	.22263 dpm/mL	01/14/2016	01/14/2017
02/20/2003	Angela Johnson	.6819	250	0533-C	59.754 dpm/mL	02/20/2004	02/20/2005
05/04/2015	Tim Chandler	1.02	500	0533-CC	44.6907 dpm/mL	04/21/2016	04/21/2017
05/07/2003	Tim Chandler	.1245	100	0533-D	27.2745 dpm/mL	05/03/2004	05/03/2005
01/22/2016	Christina Kimball	.103	500	0533-DD	4.51289 dpm/mL	01/22/2016	01/22/2017
09/10/2004	Amanda Fehr	.6933	250	0533-E	60.753 dpm/mL	09/10/2005	09/10/2006
12/17/2004	Brenda Burke	.0093	100	0533-F	2.0374 dpm/mL	12/20/2004	12/20/2005

12/21/2004	Brenda Burke	.009273	100	0533-G	2.0315 dpm/mL	12/07/2005	12/07/2006
04/28/2005	Brenda Burke	.1347	100	0533-H	29.4598 dpm/mL	04/27/2006	04/27/2007
10/19/2005	Mary Aders	.6948	250	0533-I	60.7831 dpm/mL	10/18/2006	10/18/2007
05/08/2006	Julie Strock	.0711	100	0533-J	15.576 dpm/mL	05/10/2008	05/10/2009
05/11/2006	Brenda Burke	.00092601	100	0533-K	.20286 dpm/mL	08/02/2007	07/28/2007
11/15/2006	Tara Sides	.132	1000	0533-L	2.88586 dpm/mL	09/15/2015	09/15/2016
06/12/2007	Julie Strock	.000979	100	0533-M	.21448 dpm/mL	05/20/2009	05/20/2010
08/03/2007	Daniel Roy	.7042	250	0533-N	61.7083 dpm/ml	08/02/2008	08/02/2009
09/25/2008	Daniel Roy	1.4561	500	0533-O	63.7982 dpm/ml	09/07/2010	09/07/2011
09/29/2008	Tara Sides	.1004	100	0533-P	21.9948 dpm/mL	09/07/2010	09/07/2011
06/03/2009	Julie Strock	.0009751	100	0533-Q	.2136 dpm/mL	06/01/2010	06/01/2011
11/08/2010	Ashley Drochter	1.4675	500	0533-R	64.2977 dpm/mL	11/08/2010	11/08/2011
11/09/2010	Ashley Drochter	.7295	500	0533-S	31.9626 dpm/mL	10/31/2011	10/31/2012
01/03/2011	Christina Kimball	.097	100	0533-T	21.25 dpm/mL	01/03/2011	01/03/2012
01/05/2011	Christina Kimball	.1009	100	0533-U	22.10438 dpm/mL	12/18/2013	12/18/2014
05/23/2011	Christina Kimball	.001008999	100	0533-V	.2210438 dpm/mL	05/11/2012	05/11/2013
05/11/2012	Christina Kimball	.001016	100	0533-W	.222676 dpm/mL	05/01/2014	05/01/2015
06/13/2012	Ashley Drochter	.728	500	0533-X	31.8969 dpm/mL	06/02/2014	06/02/2015
01/23/2013	Salina Pizarro	2	500	1641	.1498555 dpm/mL	12/19/2013	12/01/2038
07/16/2013	Julie Strock	1	500	1641-A	.07492775 dpm/mL	07/16/2038	07/16/2039
03/17/2014	Christina Kimball	.1013	100	0533-Y	22.19201 dpm/mL	03/14/2016	03/14/2017
05/05/2014	Christina Kimball	.00101595	100	0533-Z	.222567 dpm/mL	05/05/2014	05/05/2015

Verification for Am-241 Standard 0533-CC

v1.2

Analyst	TC1
Verification Prep Date	4/21/2016

Tracer Information	
Isotope	Am-243
Serial Number	1752-B
Amount of Std. (mL)	0.5
Expiration Date	11/23/2016

Standard Information	
Isotope	Am-241
Serial Number	0533-CC
Isotope Halflife	432.6000 Y
Reference Date	1/15/2003
Ref. Act. (dpm/mL)	44.6907
Amount of Std. (mL)	0.5
Standard Prep Date	5/4/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	4/21/2016	9.430	41.87
2	4/21/2016	9.520	42.27
3	4/21/2016	9.880	43.87
Mean Value =		9.610	42.668
Stdev =		0.238117618	1.057242224

	pCi	dpm/mL
Certificate Value* =	**9.8538**	**43.7509**
Two sigma =	0.4762	2.1145
10 % of Mean =	0.9610	4.2668
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	97.53%	97.53%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**4/21/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Am-241 standard 0533-CC using 0.5 mL for each source. Each standard was combined with 0.5 mL of Am-243 standard 1752-B and was diluted in a 50 mL plastic centrifuge tube containing 10 mL of 1M HCl. 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Americium) 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. DPM values for Am-241 were calculated by comparison to Am-243 certified values.

TC
4-22-16

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION

Standard Reference Source

1752

101294

Am-243 5 mL Liquid in Flame Sealed Vial

RECEIVED 9/1/15

Customer: GEL Laboratories, LLC
P.O. No.: GEL1511998, Item 1 Product Code: 8243

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by Eckert & Ziegler Analytics, using a germanium gamma spectrometer system. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

			Uncertainty* , % Type			
Isotope	Half-Life, Days	Activity (Bq)	u_A	u_B	U	Reference Date (12:00 PM EST)
Am-243	2.692E+06	3.809E+04	0.5	1.8	3.7	09/01/2015

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities (other than decay products)<0.1%.
5.10528 g 1M HCl solution, carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QC Approved: _____ Date: 28AUG15
J. S. Lahr, Spectroscopist

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1752
Prepared By:	Gregory Ramsay
Carrier Conc:	1M HCl
Reference Date:	09/01/2015
Ampoule Mass (g):	5.10528 g
Uncertainty:	+/- 1.85 1
LogBook No:	GL-CED-297-045

A Solution Material Info			
Isotope:	Americium-243		
Prepared By:	Tim Chandler		
Prep Date:	11/23/2015		
Verification Date:	05/26/2016		
Expiration Date:	05/26/2017		
Primary Code:	1752-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.0826 g		
Density(g/mL):	1.0282	Balance ID:	C31514

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(5.0826 g) * (38090 Bq) * (60 dpm/Bq) / (5.10528 g * 100 mL) = 22752.4720 dpm/mL
(5.0826 g) * (38090 Bq) * (60 dpm/Bq) / (1.0282 g/mL)/ (5.10528 g * 100 mL) = 22128.4498 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
11/23/2015	Tim Chandler	1.0432	500	1752-B	46.1688 dpm/mL	11/24/2015	11/23/2016
05/26/2016	Tim Chandler	1.072	500	1752-C	47.4434 dpm/mL	05/26/2016	05/26/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Am-243 Standard 1752-C

v1.2

Analyst	TC1
Verification Prep Date	5/26/2016

Tracer Information	
Isotope	Am-241
Serial Number	0533-CC
Amount of Std. (mL)	0.5
Expiration Date	4/21/2017

Standard Information	
Isotope	Am-243
Serial Number	1752-C
Isotope Halflife	7.3700E+03 Y
Reference Date	9/1/2015
Ref. Act. (dpm/mL)	47.4434
Amount of Std. (mL)	0.5
Standard Prep Date	5/26/2016

Std #	Count Date	Activity pCi	Standard dpm/mL
1	5/27/2016	11.100	49.28
2	5/26/2016	10.900	48.40
3	5/26/2016	10.700	47.51
Mean Value =		10.900	48.396
Stdev =		0.2	0.888

	pCi	dpm/mL
Certificate Value* =	**10.6847**	**47.4401**
Two sigma =	0.4000	1.7760
10 % of Mean =	1.0900	4.8396
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	102.01%	102.01%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**5/26/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Am-243 standard 1752-C using 0.5 mL for each source. Each standard was combined with 0.5 mL of Am-241 standard 0533-CC and was diluted in a 50 mL plastic centrifuge tube containing 15 mL of 1M HCl. 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Americium) 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. DPM values for Am-243 were calculated by comparison to Am-241 certified values.

TPC
5-27-16

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide	Am-243	Customer:	GENERAL ENGINEERING LABS
Half Life:	7380 ± 40 years	P.O.No.:	9290-RAD
Catalog No.:	7243	Reference Date:	January 1 1994 12:00 PST.
Source No.:	445-96-2	Contained Radioactivity:	(Am-243) 101.2 μCi
		Contained Radioactivity:	(Am-243) 3750 kBq

Description of Solution

a. Mass of solution:	5.3739 g (in a 5 ml Flame Sealed Ampoule)	
b. Chemical form:	Am(NO3)3 in 2N HNO3	
c. Carrier content:	None added	
d. Density:	1.0651	g/ml @ 20°C.

Radioimpurities None detected

Radioactive Daughters

Np-239 (beta active) in equilibrium

Radionuclide Concentration

(Am-243) 18.84 μCi/g

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry for Np-239:

Energy peak(s) intergrated under:	228, 278	keV.
Branching ratio(s) used:	0.108, 0.1420	gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.4%
c. Random uncertainty in weighing(s):	±0.0%
d. Total uncertainty at the 99% confidence level:	±3.0%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Kuen
QUALITY CONTROL

Jan 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

RC-S-005-32

THE LEAK TEST(S) INDICATED BY THE CHECKED BOX(ES) WAS(WERE) APPLIED TO DETERMINE THE INTEGRITY OF THE SOURCE DESCRIBED ON THE FRONT SIDE

☑ **1. STANDARD WIPE TEST**

The source is wiped over its entire surface with a moistened filter paper disk. After drying, the disk is checked for activity using a windowless proportional counter or end-window G.M. tube. Activity levels exceeding 0.001 μCi beta-gamma or 0.0001 μCi alpha are cause for rejection of the source.

☐ **2. SOAK TEST**

The source is immersed in distilled water and maintained at 50 ± 10° C for a minimum of four hours. After removal of the source, the liquid is a) checked for activity using a liquid scintillation counter, or b) evaporated in a planchet and the residue is checked for activity using a windowless proportional counter or end-window G.M. tube. Activity levels exceeding 0.001 μCi beta-gamma or 0.0001 μCi alpha are cause for rejection of the source.

☐ **3. SOAK TEST -- BERYLLIUM WINDOW**

The source is immersed in distilled water and maintained at 50 ± 10° C for 20 minutes. The entire surface of the source is then wiped with a moistened cotton swab or filter paper disk. After drying, the swab or disk is checked for activity using a windowless proportional counter or end-window G.M. tube. Activity levels exceeding 0.001 μCi beta-gamma or 0.0001 μCi alpha are cause for rejection of the source.

☐ **4. GAS SOURCE TEST (Radioactive Gas)**

The source is placed in a vacuum desiccator and maintained at a pressure of less than 1 mm Hg for not less than 12 hours. The activity is checked by introducing air into the desiccator and monitoring the air with an end-window G.M. tube. Activity levels exceeding 1000 cpm are cause for rejection of the source.

☑ **5. OTHER LEAK TEST**

The ampoule is kept in an inverted position on a filter paper disk for a minimum of 16 hours. The filter paper disk is then checked for activity using a windowless proportional counter or end-window G.M. tube. Activity levels exceeding 0.001 μCi beta-gamma or 0.0001 μCi alpha are cause for rejection of the source.

☐ **6. LEAK TEST NOT APPLICABLE**

The active area of this source is uncovered or is protected by a very thin coating. Although the deposit is adherent, it is not designed or certified to pass a standard leak test. The inactive portions of the source have been checked using the standard wipe test. Levels of removable activity did not exceed 0.001 μCi beta-gamma or 0.0001 μCi alpha at the time of shipment.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	445-96-2
Prepared By:	Genie Bost
Carrier Conc:	2M HNO3
Reference Date:	01/01/1994
Ampoule Mass (g):	5.3739 g
Uncertainty:	+/- 3 %
LogBook No:	RC S 005 032

A Solution Material Info			
Isotope:	Americium-243		
Prepared By:	Angela Johnson		
Prep Date:	01/05/1994		
Verification Date:	08/01/2016		
Expiration Date:	08/01/2017		
Primary Code:	445-96-2-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.3419 g		
Density(g/mL):	1.0785	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (uCi/g)) * (conversion dpm to uCi) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (uCi/g)) * (conversion dpm to uCi) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.3419 g) * (18.8317609 uCi/g) * (2220000 dpm/uCi) / (100 mL) = 2233261.9148 dpm/mL
(5.3419 g) * (18.8317609 uCi/g) * (2220000 dpm/uCi) / (1.0785 g/mL) / (100 mL) = 2070711.0942 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/05/1994	Genie Bost	.0058	100	445-96-2-B	120.1 dpm/ml	01/05/1995	01/05/1996
09/10/2004	Amanda Fehr	.0325	1000	445-96-2-BB	67.328 dpm/mL	09/10/2005	09/10/2006
06/29/2011	Christina Kimball	.0010549	500	445-96-2-BBB	4.37074 dpm/mL	06/29/2011	06/29/2012
01/05/1994	Genie Bost	.0025	100	445-96-2-C	51.77 dpm/ml	01/05/1995	01/05/1996
05/27/2005	Brenda Burke	.000246	100	445-96-2-CC	5.10613 dpm/mL	05/31/2005	05/31/2006
05/07/2012	Christina Kimball	.001059	500	445-96-2-CCC	4.38535 dpm/mL	05/01/2013	05/01/2014
03/25/1994	Genie Bost	.0064	100	445-96-2-D	132.53 dpm/ml	01/05/1995	01/05/1996
08/16/2005	Brenda Burke	.001224	500	445-96-2-DD	5.07144 dpm/mL	08/18/2007	08/18/2008

06/13/2012	Christina Kimball	.00001105	100	445-96-2-DDD	.2288308 dpm/mL	07/29/2016	07/29/2017
08/04/1994	Genie Bost	.0094	100	445-96-2-E	194.65 dpm/ml	01/05/1995	01/05/1996
10/13/2005	Brenda Burke	.0017	500	445-96-2-EE	7.0435 dpm/mL	11/15/2005	11/15/2006
11/15/2012	Ashley Drochter	2.0992	1000	445-96-2-EEE	4346.8367 dpm/mL	11/21/2014	11/21/2015
03/21/2015	Christina Kimball	.00106557	500	445-96-2-GGG	4.41297 dpm/mL	03/17/2016	03/17/2017
07/20/2015	Christina Kimball	.00631239	500	445-96-2-HHH	26.14226 dpm/mL	07/18/2016	07/18/2017
08/04/1994	Genie Bost	.0046	100	445-96-2-F	95.25 dpm/ml	01/05/1995	01/05/1996
10/14/2005	Mary Aders	.0141	500	445-96-2-FF	58.4196 dpm/mL	10/14/2005	10/14/2006
09/01/1994	Genie Bost	.0031	100	445-96-2-G	64.19 dpm/ml	01/05/1995	01/05/1996
05/10/2006	Mary Aders	2.0753	1000	445-96-2-GG	4299.227 dpm/mL	09/30/2008	09/30/2009
10/17/1994	Genie Bost	.0969	100	445-96-2-H	2006.52 dpm/ml	01/05/1995	01/05/1996
06/07/2006	Mary Aders	.0365	1000	445-96-2-HH	75.614 dpm/mL	06/19/2006	06/19/2007
02/06/1995	Genie Bost	.0043	100	445-96-2-I	89.04 dpm/ml	01/05/1995	01/05/1996
05/11/2006	Brenda Burke	.000009739	100	445-96-2-II	.201761 dpm/mL	07/26/2006	07/26/2007
09/30/2015	Tim Chandler	1.0796	500	445-96-2-III	4471.0794 dpm/mL	09/21/2016	09/21/2017
07/20/1995	Theresa Austin	.0041	100	445-96-2-J	84.9 dpm/ml	01/05/1995	01/05/1996
05/01/2007	Daniel Roy	.0352	1000	445-96-2-JJ	72.9209 dpm/ml	04/30/2008	04/30/2009
05/31/2016	Christina Kimball	.0010641	500	445-96-2-JJJ	4.40688 dpm/mL	05/31/2016	05/31/2017
08/10/1995	Garret Ray	.0952	100	445-96-2-K	1971.32 dpm/ml	01/05/1995	01/05/1996
06/12/2007	Julie Strock	.01038	250	445-96-2-KK	22.1496 dpm/mL	05/28/2008	05/28/2009
08/01/2016	Christina Kimball	.0057457	100	445-96-2-KKK	.23521 dpm/mL	08/01/2016	08/01/2017
09/11/1995	Theresa Austin	1.0525	100	445-96-2-L	21794.23 dpm/ml	01/05/1995	01/05/1996

09/11/1995	Theresa Austin	.5107	100	445-96-2-L-1	111.3 dpm/ml	01/05/1995	01/05/1996
04/28/1998	Richard Kinney	.1264	100	445-96-2-M	2617.4 dpm/ml	04/28/1998	04/28/1999
11/01/2007	Eric Williamson	.001274	500	445-96-2-MM	5.27945 dpm/mL	04/06/2008	04/06/2010
10/12/1998	Gregory Smith	.1348	100	445-96-2-N	2791.32 dpm/mL	01/05/1995	01/05/1996
01/25/1999	Gregory Smith	1.9382	100	445-96-2-N-1	50.16 dpm/ml	01/05/1995	01/05/1996
04/19/2008	Daniel Roy	.0424	1000	445-96-2-NN	87.8366 dpm/ml	04/16/2009	04/16/2010
04/21/1999	Greg Smith	.1645	100	445-96-2-O	3406.32 dpm/mL	04/21/1999	04/21/2000
07/27/1999	Gregory Smith	1.567	100	445-96-2-O-2	50.56 dpm/ml	05/13/1999	05/13/2000
10/12/1999	Richard Kinney	1.5589	100	445-96-2-O-3	50.31 dpm/mL	05/13/1999	05/13/2000
04/21/1999	Greg Smith	1.5309	100	445-96-2-O-1	49.4 dpm/mL	04/21/1999	04/21/2000
02/23/2011	Christina Kimball	.0005294	250	445-96-2-OO	4.3866 dpm/mL	02/23/2011	02/23/2012
11/10/1999	Joe Davis	.1809	100	445-96-2-P	3745.92 dpm/mL	05/13/1999	05/13/2000
01/04/2008	Julie Strock	.00001005	100	445-96-2-PP	.20819 dpm/mL	12/29/2008	12/29/2009
01/28/2000	Angela Johnson	.0354	1000	445-96-2-Q	73.3 dpm/mL	02/08/2001	02/08/2002
09/29/2008	Tara Sides	.0025219	250	445-96-2-QQ	20.8977 dpm/mL	09/14/2009	09/14/2010
04/18/2000	Robert Timm	.429	250	445-96-2-R	3553.34 dpm/mL	04/18/2000	04/18/2001
04/23/2009	Tina Schoneman	.001251	500	445-96-2-RR	4.8075 dpm/mL	04/09/2010	04/09/2011
04/13/2001	Angela Johnson	.1869	100	445-96-2-S	3870.16 dpm/mL	04/13/2001	04/13/2002
05/08/2009	Mary Aders	.0141	1000	445-96-2-SS	29.2098 dpm/ml	05/11/2009	05/11/2010
07/03/2001	Lonnie Morris	2.0057	1000	445-96-2-T-103	4153.225 dpm/mL	07/03/2002	07/03/2003
07/03/2001	Lonnie Morris	2.0057	1000	445-96-2-T-203	4153.225 dpm/mL	07/03/2002	07/03/2003
07/03/2001	Lonnie Morris	2.0057	1000	445-96-2-T-303	4153.225 dpm/mL	07/03/2002	07/03/2003

06/03/2009	Julie Strock	.00000927	100	445-96-2-TT	.1923 dpm/mL	06/02/2011	06/02/2012
08/23/2001	Angela Johnson	.0194	500	445-96-2-U-103	80.34 dpm/mL	08/23/2001	08/23/2002
08/23/2001	Angela Johnson	.0194	500	445-96-2-U-203	80.34 dpm/mL	08/23/2001	08/23/2002
08/23/2001	Angela Johnson	.0194	500	445-96-2-U-303	80.34 dpm/ml	08/23/2001	08/23/2002
06/02/2009	Mary Aders	2.1177	1000	445-96-2-UU	4387.0634 dpm/ml	05/18/2011	05/18/2012
08/27/2001	Angela Johnson	.0394	1000	445-96-2-V-103	81.586 dpm/mL	08/27/2002	08/27/2003
08/27/2001	Angela Johnson	.0394	1000	445-96-2-V-203	81.586 dpm/mL	08/27/2002	08/27/2003
08/27/2001	Angela Johnson	.0394	1000	445-96-2-V-303	81.586 dpm/mL	08/27/2002	08/27/2003
03/09/2010	Ashley Drochter	.011	1000	445-96-2-VV	22.7878 dpm/mL	02/06/2015	02/06/2016
09/06/2013	Christina Kimball	.0010458	500	445-96-2-FFF	4.33111 dpm/mL	08/30/2014	08/30/2015
03/17/2003	Angela Johnson	2.1108	1000	445-96-2-W	4370.857 dpm/mL	03/14/2006	03/14/2007
03/23/2010	Ashley Drochter	.0163	1000	445-96-2-WW	33.7674 dpm/mL	03/23/2010	03/23/2011
04/14/2003	Lonnie Morris	.0315	1000	445-96-2-X	65.2559 dpm/mL	04/14/2004	04/14/2005
09/13/2010	Julie Strock	.00049678	250	445-96-2-XX	4.1166 dpm/mL	09/13/2010	09/13/2011
05/03/2003	Tim Chandler	.0103	1000	445-96-2-Y	21.3376 dpm/mL	05/05/2003	05/05/2004
10/20/2010	Ashley Drochter	.0146	1000	445-96-2-YY	30.2456 dpm/mL	10/20/2010	10/20/2011
05/05/2003	Eric Williamson	.011	1000	445-96-2-Z	22.7877 dpm/mL	04/03/2007	04/03/2008
11/23/2010	Ashley Drochter	2.1175	1000	445-96-2-ZZ	4386.6491 dpm/mL	06/14/2012	06/14/2013

Verification for Am-243 Standard 445-96-2-III

v1.2

Analyst	TC1
Verification Prep Date	9/21/2016

Tracer Information	
Isotope	Cm-244
Serial Number	1216-G
Amount of Std. (mL)	0.2
Expiration Date	9/30/2016

Standard Information	
Isotope	Am-243
Serial Number	445-96-2-III
Isotope Halflife	7.3700E+03 Y
Reference Date	1/1/1994
Ref. Act. (dpm/mL)	4471.0794
Amount of Std. (mL)	0.0
Standard Prep Date	9/30/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	9/21/2016	9.660	4289.04
2	9/21/2016	9.640	4280.16
3	9/21/2016	9.360	4155.84
	Mean Value =	9.553	4241.680
	Stdev =	0.167729942	74.4720941

	pCi	dpm/mL
Certificate Value* =	**10.0485**	**4461.5351**
Two sigma =	0.3355	148.9442
10 % of Mean =	0.9553	424.1680
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	95.07%	95.07%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**9/21/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Am-243 standard 445-96-2-III using 0.005 mL for each source. Each standard was combined with 0.2 mL of Cm-244 standard 1216-G and was diluted in a 50 mL plastic centrifuge tube containing 20 mL of 1M HCl, 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Americium) 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. DPM values for Am-243 were calculated by comparison to Cm-244 certified values.

9-22-16

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

1216

77573-278

Cm-244 5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs
P.O. No.: 7308 RD, Item 9

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. 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:	Cm-244
ACTIVITY (Bq):	1.950 E4
HALF-LIFE:	1.810 E1 years
CALIBRATION DATE:	June 19, 2008 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	2.0%

Comments:
Impurities: γ-impurities <0.1%
Pu-238 <41 Bq
Pu-240 ~59 Bq

5.03182 grams 1M HCl solution.

Source Prepared By: M I Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery
D. M. Montgomery, QA Manager

Date: 6-20-08

RECEIVED 6/23/08

RC-S-048-097

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1216
Prepared By:	Daniel Roy
Carrier Conc:	1M HCL
Reference Date:	06/19/2008
Ampoule Mass (g):	5.03182 g
Uncertainty:	+/- 1 %
LogBook No:	RC-S-048-097

A Solution Material Info			
Isotope:	Curium-244		
Prepared By:	Daniel Roy		
Prep Date:	06/24/2008		
Verification Date:	09/24/2014		
Expiration Date:	09/24/2015		
Primary Code:	1216-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.882 g		
Density(g/mL):	1.0153	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.882 g) * (19500 Bq) * (60 dpm/Bq) / (5.03182 g * 100 mL) = 11351.6382 dpm/mL
(4.882 g) * (19500 Bq) * (60 dpm/Bq) / (1.0153 g/mL)/ (5.03182 g * 100 mL) = 11181.0599 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
06/28/2008	Daniel Roy	7.0442	1000	1216-B	78.7616 dpm/ml	06/07/2011	06/07/2012
10/05/2009	Tara Sides	9.9307	100	1216-C	1110.36 dpm/mL	11/17/2011	11/17/2012
12/14/2011	Julie Strock	1		ASCS2012-001	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-002	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-004	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-005	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-007	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-008	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-009	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-016	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-017	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-018	1110.36 dpm	12/14/2020	12/14/2021

12/14/2011	Julie Strock	1		ASCS2012-019	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-020	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-021	1110.36 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	1		ASCS2012-023	1110.36 dpm	12/14/2020	12/14/2021
12/23/2011	Julie Strock	1		ASCS2012-025	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-026	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-027	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-028	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-029	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-030	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-031	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-032	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-033	1110.36 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	1		ASCS2012-034	1110.36 dpm	12/23/2020	12/23/2021
03/13/2012	Julie Strock	.5		ASCS2012-037	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-038	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-039	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-040	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-041	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-042	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-043	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-044	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-045	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-046	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-047	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-048	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-049	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-050	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-051	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-052	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-053	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-054	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-055	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-056	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-057	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-058	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-059	1110.36 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.5		ASCS2012-060	1110.36 dpm	03/13/2021	03/13/2022

10/05/2009	Tara Sides	.0496535	100	1216-D	5.5518 dpm/mL	09/13/2010	09/13/2011
01/03/2011	Christina Kimball	.044	100	1216-E	4.9197 dpm/mL	01/03/2011	01/03/2012
01/05/2011	Christina Kimball	.0508	100	1216-F	5.67998 dpm/mL	12/21/2012	12/21/2013
10/31/2011	Ashley Drochter	7.0911	1000	1216-G	79.2860138 dpm/mL	09/21/2016	09/21/2017
06/08/2016	Christina Kimball	.0513	100	2416618	5.73588 dpm/mL	01/22/2016	01/22/2017
03/08/2012	Christina Kimball	.009948	250	1216-H	.4449 dpm/mL	03/08/2012	03/08/2013
04/30/2012	Christina Kimball	.00535	250	1216-I	.239466 dpm/mL	04/25/2016	04/25/2017
05/21/2012	Christina Kimball	.0501	100	1216-J	5.601711 dpm/mL	12/12/2014	12/12/2015
09/24/2014	Christina Kimball	.0513	100	1216-K	5.73588 dpm/mL	01/22/2016	01/22/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Cm-244 Standard 1216-G

v1.2

Analyst	TC1
Verification Prep Date	9/21/2016

Tracer Information	
Isotope	Am-243
Serial Number	1752-C
Amount of Std. (mL)	0.5
Expiration Date	5/26/2017

Standard Information	
Isotope	Cm-244
Serial Number	1216-G
Isotope Halflife	18.1100 Y
Reference Date	6/19/2008
Ref. Act. (dpm/mL)	79.2860138
Amount of Std. (mL)	0.2
Standard Prep Date	10/31/2011

Std #	Count Date	Activity pCi	Standard dpm/mL
1	9/22/2016	5.050	56.06
2	9/22/2016	5.450	60.50
3	9/22/2016	5.280	58.61
Mean Value =		5.260	58.386
Stdev =		0.200748599	2.228309449

	pCi	dpm/mL
Certificate Value* =	**5.2074**	**57.8017**
Two sigma =	0.4015	4.4566
10 % of Mean =	0.5260	5.8386
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	101.01%	101.01%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**9/21/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Cm-244 standard 1216-G using 0.2 mL for each source. Each standard was combined with 0.5 mL of Am-243 standard 1752-C and was diluted in a 50 mL plastic centrifuge tube containing 20 mL of 1M HCl, 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (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. DPM values for Cm-244 were calculated by comparison to Am-243 certified values.

0518

Amersham plc
The Grove Centre

[redacted]

UKAS CALIBRATION
0146

ISSUED BY:	Amersham plc Radiation & Radioactivity Calibration Laboratory The Grove Centre White Lion Road Amersham Buckinghamshire HP7 9LL	ISSUED FOR:	AEA Technology plc Isotrak 329 Harwell Didcot Oxfordshire OX11 OQJ

Description

Principal radionuclide: Neptunium-237

Daughter radionuclide: Protactinium-233

Product code: NGZ44

Solution number: S5/31/100

Measurement

Reference time: **1200 GMT on 27 November 1995**

Radioactive concentration of neptunium-237:	45.86	kilobecquerels per gram of solution
which is equivalent to:	1.240	microcuries per gram of solution
Mass of solution:	5.0201	grams
Total activity of neptunium-237:	230.2	kilobecquerels
which is equivalent to:	6.22	microcuries

Method of measurement used:
4π coincidence and anticoincidence counting using a gas flow proportional counter.

Calibration date(s): 25 November 1995 to 1 December 1995
The calibration date is provided for added information only, and must not be confused with the reference date. It is the reference date that must be used in all calculations relating to the values of activity.

Uncertainty

Expanded uncertainty in the radioactive concentration quoted above: ± 1.79 %

Combined Type A uncertainty: ± 0.24 %

Combined Type B uncertainty: ± 0.87 %

Approved signatory [redacted]

Date of issue 11th March 2002

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

Plutonium-238 0.14(2)%

Chemical Composition 0.1M HCl containing 1.82 milligrams of neptunium per ml.

Physical Data Recommended half life: $(2.14 \pm 0.01) \times 10^6$ years (1 year = 365.25 days)

This measurement was based on the following assumptions about the decay scheme of neptunium-237 and protactinium-233:

Neptunium-237: 100% alpha particle emission followed by prompt L X-rays of Protactinium-233.

Protactinium-233: 100% beta particle emission. Half life 27.0 days.

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

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

The daughter nuclide protactinium-233 was chemically separated from the neptunium-237 at 0814 GMT on 22 November 1995. At any time t days from the time of separation, the ratio

$\frac{\text{activity of Pa-233}}{\text{activity of Np-237}}$ in the ampoule is given by $(1-e^{-0.02567t})$

There can be no guarantee that the protactinium will remain in solution.

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

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

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

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

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0518
Prepared By:	Penet Melton
Carrier Conc:	0.1 M HCL
Reference Date:	11/27/1995
Ampoule Mass (g):	5.02014 g
Uncertainty:	+/- 1.79 %
LogBook No:	RC S 035 033

A Solution Material Info			
Isotope:	Neptunium-237		
Prepared By:	Angela Johnson		
Prep Date:	12/20/2002		
Verification Date:	07/24/2015		
Expiration Date:	07/24/2016		
Primary Code:	0518-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	3.003 g		
Density(g/mL):	0.9992	Balance ID:	38080204

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)
(3.003 g) * (45.86 kBq/g) * (60000 dpm/kBq) / (100 mL) = 82630.5480 dpm/mL
(3.003 g) * (45.86 kBq/g) * (60000 dpm/kBq) / (0.9992 g/mL) / (100 mL) = 82693.3120 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/05/2003	Amanda Fehr	.1004	100	0518-B	83.0241 dpm/mL	09/10/2004	09/10/2005
01/19/2004	Tim Chandler	.1612	250	0518-C	53.3206 dpm/mL	01/18/2004	01/18/2005
11/23/2004	Amanda Fehr	.25	250	0518-D	82.69 dpm/mL	11/30/2007	11/29/2008
04/16/2008	Daniel Roy	.1312	100	0518-E	108.4936 dpm/ml	08/23/2008	04/16/2009
12/05/2008	Julie Strock	.096	250	0518-F	31.7542 dpm/mL	12/05/2008	12/05/2009
12/05/2008	Julie Strock	.0060406148	250	0518-G	.02555 dpm/mL	12/05/2008	12/05/2009
10/14/2008	Daniel Roy	.2195	250	0518-H	72.6047 dpm/ml	10/14/2008	10/14/2009
02/02/2009	Christina Kimball	.001312	500	0518-I	.216872 dpm/mL	03/17/2016	03/17/2017

02/11/2009	Tina Schoneman	.0569	250	0518-J	18.821 dpm/mL	02/11/2009	02/11/2010
07/10/2009	Mary Aders	.2642	250	0518-K	87.3903 dpm/mL	07/13/2010	07/13/2011
10/06/2009	Robert Timm	1.5146	100	0518-L	1252.47 dpm/mL	03/21/2015	03/21/2016
03/21/2015	Christina Kimball	.006099	100	0518-R	5.04428 dpm/mL	03/21/2016	03/21/2017
12/14/2011	Julie Strock	.5		ASCS2012-001	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-002	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-004	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-005	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-007	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-008	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-009	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-016	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-017	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-018	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-019	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-020	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-021	626.235 dpm	12/14/2020	12/14/2021
12/14/2011	Julie Strock	.5		ASCS2012-023	626.235 dpm	12/14/2020	12/14/2021
12/23/2011	Julie Strock	.5		ASCS2012-025	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-026	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-027	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-028	626.235 dpm	12/23/2020	12/23/2021

12/23/2011	Julie Strock	.5		ASCS2012-029	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-030	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-031	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-032	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-033	626.235 dpm	12/23/2020	12/23/2021
12/23/2011	Julie Strock	.5		ASCS2012-034	626.235 dpm	12/23/2020	12/23/2021
03/13/2012	Julie Strock	.25		ASCS2012-037	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-038	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-039	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-040	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-041	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-042	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-043	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-044	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-045	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-046	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-047	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-048	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-049	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-050	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-051	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-052	626.235 dpm	03/13/2021	03/13/2022

03/13/2012	Julie Strock	.25		ASCS2012-053	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-054	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-055	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-056	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-057	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-058	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-059	626.235 dpm	03/13/2021	03/13/2022
03/13/2012	Julie Strock	.25		ASCS2012-060	626.235 dpm	03/13/2021	03/13/2022
03/02/2010	Julie Strock	.095	250	0518-M	31.4235 dpm/mL	03/02/2010	03/02/2011
03/17/2010	Ashley Drochter	.2751	250	0518-N	90.9957 dpm/mL	01/23/2013	01/23/2014
06/03/2010	Julie Strock	.00532519	100	0518-O	4.4036 dpm/mL	05/23/2014	05/23/2015
08/16/2011	Ashley Drochter	.2893	250	0518-P	95.6927 dpm/mL	08/03/2015	08/03/2016
02/14/2012	Christina Kimball	.00174	500	0518-Q	.287518 dpm/mL	03/26/2012	03/26/2013
07/24/2015	Tim Chandler	.2997	250	0518-S	99.1327 dpm/mL	07/18/2016	07/18/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Np-237 Standard 0518-S

v1.2

Analyst	TC1
Verification Prep Date	7/18/2016

Tracer Information	
Isotope	Cm-244
Serial Number	1216-G
Amount of Std. (mL)	0.2
Expiration Date	9/30/2016

Standard Information	
Isotope	Np-237
Serial Number	0518-S
Isotope Halflife	2.1400E+06 Y
Reference Date	11/27/1995
Ref. Act. (dpm/mL)	99.1327
Amount of Std. (mL)	0.2
Standard Prep Date	7/24/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/18/2016	8.770	97.35
2	7/18/2016	9.520	105.67
3	7/18/2016	8.800	97.68
Mean Value =		9.030	100.233
Stdev =		0.424617475	4.713253972

	pCi	dpm/mL
Certificate Value* =	**8.9308**	**99.1320**
Two sigma =	0.8492	9.4265
10 % of Mean =	0.9030	10.0233
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	101.11%	101.11%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**7/18/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Np-237 standard 0518-S using 0.2 mL for each source. Each standard was combined with 0.2 mL of Cm-244 standard 1216-G and was diluted in a 50 mL plastic centrifuge tube containing 15 mL of 1M HCl. To each source, 0.5 mL of H2O2, 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Neptunium) 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. DPM values for Np-237 were calculated by comparison to Cm-244 certified values.

TC
7-18-16

0338

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

60513-278

Pu-239 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution standard. The master radionuclide solution standard was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 24148.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. 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:	Pu-239
ACTIVITY (dps):	3.674 E4
HALF-LIFE:	24131 years
CALIBRATION DATE:	October 30, 2000 12:00 EST
TOTAL UNCERTAINTY*:	5.0%

*99% confidence level.

5.45541 grams 3M HNO_3 solution.

Impurities detected (activity in dps/vial on Oct. 30, 2000):

Am-241 297.28
Pu-240 1208.8
Pu-241 2010.7
Pu-242 0.17

See reverse side for additional information.

P O NUMBER 2528RD, Item 1

PREPARED BY: M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: 11/13/00

RC-S-028-167

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0338
Prepared By:	Penet Melton
Carrier Conc:	3 M HNO3
Reference Date:	10/30/2000
Ampoule Mass (g):	5.45541 g
Uncertainty:	+/- 1.953 %
LogBook No:	RC-S-029-134

A Solution Material Info			
Isotope:	Plutonium-239		
Prepared By:	Penet Melton		
Prep Date:	12/01/2000		
Verification Date:	07/27/2015		
Expiration Date:	05/31/2017		
Primary Code:	0338-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.1674 g		
Density(g/mL):	1.0121	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)
(5.1674 g) * (36740 dps) * (60 dpm/dps) / (5.45541 g * 100 mL) = 20880.2208 dpm/mL
(5.1674 g) * (36740 dps) * (60 dpm/dps) / (1.0121 g/mL)/ (5.45541 g * 100 mL) = 20630.6111 dpm/g
(5.1674 g) * (37948.8 dps) * (60 dpm/dps) / (5.45541 g * 100 mL) = 21567.2108 dpm/mL
(5.1674 g) * (37948.8 dps) * (60 dpm/dps) / (1.0121 g/mL)/ (5.45541 g * 100 mL) = 21309.3885 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
06/23/2009	Mary Aders	.591	250	0338-BB	50.3753 dpm/mL	06/23/2009	06/23/2010
03/09/2010	Ashley Drochter	.5127	250	0338-CC	43.7013 dpm/mL	03/09/2010	03/09/2011
01/12/2011	Ashley Drochter	.5302	250	0338-DD	45.193 dpm/mL	01/06/2012	01/06/2013
10/29/2001	Tim Chandler	.3032	250	0338-E		10/16/2003	10/16/2004
04/18/2011	Ashley Drochter	.528	250	0338-EE	45.0054 dpm/mL	03/29/2012	03/29/2013
05/17/2011	Christina Kimball	.101	500	0338-FF	4.3045 dpm/mL	09/19/2016	09/19/2017
05/15/2012	Christina Kimball	.256	250	0338-GG	21.82081 dpm/mL	09/27/2016	09/27/2017

09/04/2012	Ashley Drochter	1.0264	500	0338-HH	43.7439 dpm/mL	07/22/2016	07/22/2017
12/30/2002	Tim Chandler	10.0252	100	0338-I		10/24/2003	10/24/2004
01/22/2013	Christina Kimball	.248	250	0338-II	21.1389 dpm/mL	01/22/2013	09/11/2013
01/07/2015	Christina Kimball	.119	500	0338-JJ	5.0716 dpm/mL	01/07/2015	01/07/2016
08/12/2003	Amanda Fehr	.2282	100	0338-K		08/12/2003	08/12/2004
01/07/2015	Christina Kimball	.0052	500	0338-KK	.22166 dpm/mL	01/04/2016	01/04/2017
12/09/2003	Amanda Fehr	.2409	100	0338-L		12/09/2003	12/09/2004
01/07/2015	Christina Kimball	.052	500	0338-LL	2.2162 dpm/mL	01/04/2016	01/04/2017
03/18/2004	Tim Chandler	10.0192	500	0338-M		03/18/2004	03/18/2005
07/24/2015	Tim Chandler	1.0298	500	0338-MM	42.8888 dpm/mL	07/20/2016	07/20/2017
04/26/2004	Amanda Fehr	.643	250	0338-N		04/26/2005	04/26/2006
05/31/2016	Christina Kimball	.005109	500	0338-NN	.21776 dpm/mL	05/31/2016	05/31/2017
05/26/2004	Eric Williamson	.355	250	0338-O	30.2619 dpm/mL	05/17/2007	05/17/2008
12/20/2004	Brenda Burke	.01957	100	0338-P	4.16992 dpm/mL	12/19/2006	12/19/2007
03/16/2005	Julie Strock	10.0395	100	0338-Q	2139.558 dpm/mL	06/12/2008	06/12/2009
07/19/2005	Amanda Fehr	.677	250	0338-R		07/10/2006	07/10/2007
05/11/2006	Brenda Burke	.0009935	100	0338-S	.21172 dpm/mL	07/30/2007	07/28/2007
01/04/2007	Julie Strock	.050286	250	0338-T	4.2887 dpm/mL	12/31/2007	12/31/2008
01/05/2007	Daniel Roy	.7285	250	0338-U		01/05/2008	01/05/2009
03/16/2007	Julie Strock	.010175	1000	0338-V	.216847 dpm/mL	03/21/2015	03/21/2016
05/15/2007	Eric Williamson	.253	250	0338-W	21.567 dpm/mL	05/02/2012	05/05/2013
07/31/2007	Julie Strock	.0010045	100	0338-X	.21379 dpm/mL	12/31/2007	12/31/2008
12/10/2008	Daniel Roy	.7715	250	0338-Y		12/10/2008	12/10/2009
09/29/2008	Tara Sides	.0504	250	0338-Z	4.29599 dpm/mL	09/01/2010	09/01/2011

Verification for Pu-239 Standard 0338-MM

v1.2

Analyst	TC1
Verification Prep Date	7/20/2016

Tracer Information	
Isotope	Pu-242
Serial Number	1769-A
Amount of Std. (mL)	0.2
Expiration Date	5/2/2017

Standard Information	
Isotope	Pu-239
Serial Number	0338-MM
Isotope Halflife	2.4131E+04 Y
Reference Date	11/15/2011
Ref. Act. (dpm/mL)	43.8888
Amount of Std. (mL)	0.2
Standard Prep Date	7/24/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/20/2016	3.990	44.29
2	7/20/2016	4.140	45.95
3	7/20/2016	4.050	44.96
Mean Value =		4.060	45.066
Stdev =		0.075498344	0.838031622

	pCi	dpm/mL
Certificate Value* =	**3.9534**	**43.8829**
Two sigma =	0.1510	1.6761
10 % of Mean =	0.4060	4.5066
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	102.70%	102.70%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**7/20/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Pu-239 standard 0338-MM using 0.2 mL for each source. Each standard was combined with 0.2 mL of Pu-242 standard 1769-A and was diluted in a 50 mL plastic centrifuge tube containing 15 mL of 1M HCl. To each source, 6 drops of 25% hydrazine dichloride, 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Plutonium) 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. DPM values for Pu-239 were calculated by comparison to Pu-242 certified values.

TMC
7-21-16

National Institute of Standards & Technology

Certificate

Standard Reference Material® 4334I 1770

Plutonium-242 Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of a standardized and certified quantity of radioactive plutonium-242 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit consists of a solution, whose composition is specified in Table 1, contained in a flame-sealed 5 mL borosilicate-glass ampoule (see Note 1)*.

The certified **Plutonium-242** massic activity value, at a **Reference Time of 1200 EST, 01 January 2010**, is:

(26.77 ± 0.18) Bq•g^{-1}.

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Table 1. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO Guide (see Note 2). Table 2 contains a specification of the components that comprise the uncertainty analyses.

Expiration of Certification: The certification of **SRM 4334I** is valid indefinitely provided the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Storage and Handling"). The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

This SRM may represent a radiological hazard and a chemical hazard. Consult the Material Safety Data Sheet (MSDS), enclosed with the SRM shipment, for details.

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, M.P. Unterweger, Group Leader. The overall technical direction and physical measurement leading to certification were provided by L. Lucas of the NIST Radioactivity Group.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

INSTRUCTIONS FOR STORAGE AND HANDLING

Storage: SRM 4334I should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

Handling: 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) because of both the radioactivity and the strong acid. The ampoule should be opened only by persons qualified to handle both radioactive material and alkaline and/or acidic solutions. Appropriate shielding and/or distance should be used to minimize personnel exposure. Refer to MSDS for further information.

Lisa R. Karam, Chief
Ionizing Radiation Division

Gaithersburg, MD 20899
Certificate Issue Date: 30 June 2010

Robert L. Watters, Jr., Chief
Measurement Services Division

RECEIVED 3/9/16

GL-CED-297-063

* Notes and references may be found on pages 4 and 5.

Table 1. Properties of SRM 4334I

Certified values

Radionuclide	**Plutonium-242**
Reference time	**1200 EST, 1 January 2010 (See Note 3) ***
Massic activity of the solution	**26.77 Bq•g^{-1}**
Relative expanded uncertainty ($k = 2$)	**0.68 %** (see Note 2)

Uncertified information

Source description	Liquid in a flame-sealed 5 mL borosilicate-glass ampoule (see Note 1)
Solution composition	3.2 mol L^{-1} HNO_3
Solution density	(1.105 ± 0.002) g mL^{-1} at 22 °C (see Note 4)
Solution mass	Approximately 5.5 g
Alpha-particle- emitting impurities	^{241}Am : (0.0016 ± 0.0003) Bq g^{-1} (See Note 3, 5 and 6)
Beta-particle- emitting impurities	^{241}Pu : (0.044 ± 0.009) Bq g^{-1} (see Note 4)
Photon-emitting impurities	None detected (see Note 7)
Half-lifes used	^{242}Pu : (373 500 ± 1100) a (see Note 8) [1] ^{241}Pu : (14.290 ± 0.006) a ^{240}Pu: (6 561 ± 7) a ^{239}Pu: (24 110 ± 30) a ^{238}Pu: (87.7 ± 0.1) a ^{241}Am : (432.6 ± 0.6) a
Calibration methods (and instruments)	The certified massic activity for ^{242}Pu was obtained by 4πα liquid scintillation (LS) spectrometry using four commercial LS counters, a calibrated germanium detector system, and a silicon surface-barrier detector.

* Notes and references may be found on pages 4 and 5.

Table 2. Uncertainty evaluation for the massic activity of SRM 4334I

	Uncertainty component	Assessment Type †	Relative standard uncertainty contribution on massic activity of ^{242}Pu (%)
1	Massic alpha-particle emission rate, corrected for background and decay. Standard deviation of the mean for 180 $4\pi\alpha$ liquid-scintillation measurements.	A	0.06
2	Half life of ^{242}Pu; standard uncertainty of the half life	B	3×10^{-6}
3	Decay-scheme data; standard uncertainty of the probability of decay by alpha-particle emission	B	0.001
4	Extrapolation of the alpha-particle-count-rate-versus-energy to zero energy	B	0.25
5	Gravimetric measurements	B	0.10
6	Live time	B	0.10
7	Alpha-particle detection efficiency of scintillators	B	0.10
8	^{241}Pu detection efficiency of scintillators	B	0.04
9	Alpha-particle emitting impurities; limit of detection	B	0.10
10	^{241}Pu impurity	B	0.02
11	Photon emitting impurities; limit of detection	B	0.10
Relative combined standard uncertainty			**0.34**
Relative expanded uncertainty ($k = 2$)			**0.68**

† = (A) denotes evaluation by statistical methods; (B) denotes evaluation by other methods.

Note 1. Refer to http://physics.nist.gov/Divisions/Div846/srm.html (accessed Jun 2010) for assistance and instructions on how to properly open an ampoule. Information on additional storage and handling requirements is also included on the website. This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

Note 2. The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO Guides [2-3]. The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain an approximate 95 % level of confidence.

Note 3. The ^{242}Pu was chemically purified 07 June 1994 at the Lawrence Livermore National Laboratory (LLNL). Americium-241, the daughter of ^{241}Pu, was removed but has been growing in since that time.

Note 4. The stated uncertainty is two times the standard uncertainty. See reference 3.

Note 5. The estimated limits of detection for alpha-particle-emitting impurities, expressed as massic alpha-particle emission rates (number of alpha-particles emission rates per second per gram), are:

$0.003\ s^{-1}\ g^{-1}$ for energies less than 3.1 MeV,
$0.03\ s^{-1}\ g^{-1}$ for energies between 3.1 MeV and 4.4 keV, and
$0.003\ s^{-1}\ g^{-1}$ for energies greater than 5.0 MeV

Note 6. The ^{242}Pu was chemically purified 07 June 1994. The relative massic activities of radionuclidic impurities after purification follow;

Radionuclide	Relative Activity As Determined By	
	LLNL	NIST
^{242}Pu	1	1
^{241}Pu	--	$(3.5 \pm 0.4) \times 10^{-3}$ (a)
^{240}Pu + ^{239}Pu	$< 10^{-6}$ (b)	$(2.0 \pm 2.1) \times 10^{-5}$ (c)
^{238}Pu + ^{241}Am	$< 1.6 \times 10^{-5}$ (b)	$(9 \pm 16) \times 10^{-6}$ (c)
^{241}Am	--	assumed 0 (a)

(a) The stated uncertainty is the standard uncertainty. The ^{241}Pu activity was calculated from a gamma-ray measurement of the ^{241}Am ingrowth as of 25 November 1998, assuming that ^{241}Am was completely removed at the time of chemical purification.
(b) Using alpha-particle spectrometry. The value shown is an estimated upper limit based upon background and counting statistics. Measurements were made at the Lawrence Livermore National Laboratory (LLNL) in July of 1994.
(c) Using alpha-particle spectrometry. The stated uncertainty is the standard uncertainty. Measurements were made at the National Institute of Standards and Technology (NIST) in June and July 1999.

Note 7. The estimated limits of detection for photon-emitting impurities, expressed as massic photon emission rates (numbers of photons per second per gram), are:

$5 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 19 keV and 39 keV,
$7 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 49 keV and 92 keV,
$2 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 106 keV and 507 keV,
$1 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 515 keV and 1456 keV, and
$5 \times 10^{-6}\ s^{-1}\ g^{-1}$ for energies between 1465 keV and 2750 keV.

provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of ^{242}Pu, ^{241}Pu, or ^{241}Am.

Note 8. The stated uncertainty is the standard uncertainty. See reference 2.

REFERENCES

[1] Evaluated Nuclear Structure Data File (ENSDF), online database, National Nuclear Center, Brookhaven National Laboratory (Upton, NY), accessed November 2009. Refer to http://www.nndc.bnl.gov/nudat2/ (accessed Jun 2010).

[2] JCGM 100:2008; *Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement* (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed May 2010); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at http://www.nist.gov/physlab/pubs/index.cfm (accessed Jun 2010).

[3] Thompson, A.; Taylor, B.N.; *Guide for the Use of the International System of Units (SI)*; NIST Special Publication 811; U.S. Government Printing Office: Washington, DC (2008); available at: http://ts.nist.gov/WeightsAndMeasures/Metric/mpo_pubs.cfm (accessed Jun 2010).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1770
Prepared By:	Gregory Ramsay
Carrier Conc:	3.2M HNO3
Reference Date:	01/01/2010
Ampoule Mass (g):	5.5 g
Uncertainty:	+/- .34 %
LogBook No:	GL-CED-297-063

A Solution Material Info			
Isotope:	Plutonium-242		
Prepared By:	Tim Chandler		
Prep Date:	08/03/2016		
Verification Date:	08/03/2016		
Expiration Date:	08/03/2017		
Primary Code:	1770-A		
Dilution(mL):	200 mL		
Mass of Parent(g):	5.4578 g		
Density(g/mL):	1.0312	Balance ID:	C31514

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

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.4578 g) * (26.77 Bq/g) * (60 dpm/Bq) / (200 mL) = 43.8316 dpm/mL
(5.4578 g) * (26.77 Bq/g) * (60 dpm/Bq) / (1.0312 g/mL) / (200 mL) = 42.5054 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

Verification for Pu-242 Standard 1770-A

v1.2

Analyst	TC1
Verification Prep Date	8/3/2016

Tracer Information	
Isotope	Pu-239
Serial Number	0338-MM
Amount of Std. (mL)	0.5
Expiration Date	7/20/2017

Standard Information	
Isotope	Pu-242
Serial Number	1770-A
Isotope Halflife	3.7350E+05 Y
Reference Date	1/1/2010
Ref. Act. (dpm/mL)	43.8316
Amount of Std. (mL)	0.5
Standard Prep Date	8/3/2016

Std #	Count Date	Activity pCi	Standard dpm/mL
1	8/4/2016	9.460	42.00
2	8/4/2016	9.440	41.91
3	8/4/2016	9.830	43.65
Mean Value =		9.577	42.520
Stdev =		0.219620885	0.975116731

	pCi	dpm/mL
Certificate Value* =	**9.8719**	**43.8311**
Two sigma =	0.4392	1.9502
10 % of Mean =	0.9577	4.2520
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	97.01%	97.01%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**8/3/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Pu-242 standard 1770-A using 0.5 mL for each source. Each standard was combined with 0.5 mL of Pu-239 standard 0338-MM and was diluted in a 50 mL plastic centrifuge tube containing 10 mL of 2M HCl. Five drops of 25% hydrazine dichloride, 100 micrograms of neodymium carrier and three mL of 48% HF was added to precipitate neodymium (and Plutonium) 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. DPM values for Pu-242 were calculated by comparison to Pu-239 certified values.

8-5-16

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

1242

78148-278

Th-230 5 mL Liquid in Flame Sealed Vial

Customer: General Engineerings Labs
P.O. No.: 7311RD, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. 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:	Th-230
Activity (Bq):	4.021 E4
Half-Life:	7.538 E4 years
Calibration Date:	August 25, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	2.0%

Comments:
Impurities: γ-impurities <0.1%, α-impurities <0.04%
5.07467 grams 0.5M HNO3 solution.

Source Prepared By: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: DM Montgomery
D. M. Montgomery, QA Manager

Date: 9-4-08

RECEIVED 9/17/08

End of Certificate

RC-S-048-123

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1242
Prepared By:	Daniel Roy
Carrier Conc:	0.5M HNO3
Reference Date:	08/25/2008
Ampoule Mass (g):	5.07467 g
Uncertainty:	+/- 2 %
LogBook No:	RC-S-048-123

A Solution Material Info			
Isotope:	Thorium-230		
Prepared By:	Ashley Drochter		
Prep Date:	11/10/2009		
Verification Date:	06/24/2015		
Expiration Date:	06/24/2016		
Primary Code:	1242-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.8836 g		
Density(g/mL):	1.0597	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.8836 g) * (40210 Bq) * (60 dpm/Bq) / (5.07467 g * 100 mL) = 23217.6149 dpm/mL
(4.8836 g) * (40210 Bq) * (60 dpm/Bq) / (1.0597 g/mL)/ (5.07467 g * 100 mL) = 21908.6601 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
12/01/2009	Bethany Fiem	6.3855	500	1242-B	279.79548 dpm/mL	12/02/2009	12/02/2010
08/03/2010	Gregory Ramsay	12.8745	1000	1242-C	282.063 dpm/mL	07/30/2013	07/30/2014
07/05/2011	Bethany Fiem	12.1975	1000	1242-D	267.2309 dpm/mL	06/22/2012	06/22/2013
01/12/2012	Christina Kimball	.105	500	1242-E	4.6008 dpm/mL	01/13/2015	01/13/2016
01/08/2013	Bethany Fiem	12.5093	1000	1242-F	274.062 dpm/mL	01/07/2014	01/07/2015
08/26/2013	Christina Kimball	.012512	100	1242-G	2.74129 dpm/mL	08/25/2014	08/25/2015
02/17/2014	Tim Chandler	.2121	100	1242-H	46.46827 dpm/mL	02/11/2016	02/11/2017
08/11/2014	Gregory Ramsay	6.16	500	1242-I	269.9147 dpm/mL	08/06/2015	08/06/2016

Verification for Th-230 Standard 1242-H

v1.0.2

Instrument	GREEN
Analyst	TC1
Verification Prep Date	2/11/2016

Standard Information	
Isotope	Th-230
Serial Number	1242-H
Isotope Halflife	7.5380E+04 Y
Reference Date	8/25/2008
Ref. Act. (DPM/mL)	46.46827
Amount of Std. (mL)	1.0
Standard Prep Date	11/10/2009

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	2/11/2016	117.00	95.32	47.60
2	2/11/2016	117.00	93.02	47.60
3	2/11/2016	117.00	95.52	47.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	47.72	1.014300	47.05	47.05
2	45.42	1.014300	44.78	44.78
3	47.92	1.014300	47.24	47.24

	dpm/mL
Mean Value =	46.36
Stdev =	1.369658179
Certificate Value* =	**46.5**
Two sigma =	2.739
10 % of Mean =	4.636
Rule A (Pass/Fail)	**Pass**
% Recovery	99.77%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**2/11/2017**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Th-230 source 1242-H by transferring 1 mL portions of the standard into glass liquid scintillation vials. 15 mL of Ecoscint Ultra 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 15 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGREEN for Th-230 source standard verification. The Th-230 efficiency calibration which was used for verification calculations was performed on 2/11/2016 using Th-230 source 1493-A.

Standard results for each verification source was calculated as follows:

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

where:

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

RAD-M-001

TJC
2-12-16

1564

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

85621-278
5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs/Charleston, SC
P.O. No.: 936814RD, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-232	2.517E+04	3.393E+04	0.5	2.4	4.9	09/12/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities (other than decay products) < 0.1 %, U-233 < 1.20E2 Bq, Am-241 < 5.8E1 Bq. 5.06048 grams 2M HNO3 solution.

Source Prepared by: M Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved:
J. D. McCorvey, QA Manager Alternate

Date: 9/12/11

RECEIVED 9/14/11 KM

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

ANA Form005 Rev. ---

Single Isotope Certificate, Rev 1 9/28/2009

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1564
Prepared By:	Ashley Drochter
Carrier Conc:	2M HNO3
Reference Date:	09/12/2011
Ampoule Mass (g):	5.06048 g
Uncertainty:	+/- 2.45 %
LogBook No:	RC-S-060-109

A Solution Material Info			
Isotope:	Uranium-232		
Prepared By:	Ashley Drochter		
Prep Date:	11/15/2012		
Verification Date:	09/21/2016		
Expiration Date:	09/21/2017		
Primary Code:	1564-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.9067 g		
Density(g/mL):	1.0615	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.9067 g) * (33930 Bq) * (60 dpm/Bq) / (5.06048 g * 100 mL) = 19739.3525 dpm/mL
(4.9067 g) * (33930 Bq) * (60 dpm/Bq) / (1.0615 g/mL)/ (5.06048 g * 100 mL) = 18595.7160 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
11/16/2012	Ashley Drochter	2.6179	1000	1564-B	48.6817 dpm/mL	11/13/2013	11/13/2014
01/15/2013	Christina Kimball	.265	250	1564-C	19.7115 dpm/mL	01/13/2014	01/13/2015
02/18/2013	Christina Kimball	.116	500	1564-D	4.31421 dpm/mL	02/16/2015	02/13/2016
01/02/2014	Gregory Ramsay	2.6936	1000	1564-E	50.08942 dpm/mL	12/10/2014	12/10/2015
03/17/2014	Christina Kimball	.266	250	1564-F	19.78584 dpm/mL	03/25/2015	03/25/2016
12/10/2014	Tim Chandler	2.6312	1000	1564-G	48.929 dpm/mL	12/10/2014	12/10/2015
07/20/2015	Christina Kimball	.266	250	1564-H	19.78584 dpm/mL	07/25/2016	07/25/2017
11/23/2015	Tim Chandler	2.6117	1000	1564-I	48.5664 dpm/mL	11/23/2015	11/23/2016

01/05/2016	Christina Kimball	.119	500	1564-J	4.4258 dpm/mL	01/05/2016	01/05/2017
09/20/2016	Tim Chandler	2.6389	1000	1564-K	49.0722 dpm/mL	09/21/2016	09/21/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for U-232 Standard 1564-I

v1.2

Analyst	TC1
Verification Prep Date	11/23/2015

Tracer Information	
Isotope	U-238
Serial Number	1600-E
Amount of Std. (mL)	0.5
Expiration Date	7/24/2016

Standard Information	
Isotope	U-232
Serial Number	1564-I
Isotope Halflife	68.9000 Y
Reference Date	9/12/2011
Ref. Act. (dpm/mL)	48.5664
Amount of Std. (mL)	0.5
Standard Prep Date	11/23/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	11/23/2015	10.100	44.84
2	11/23/2015	10.600	47.06
3	11/23/2015	10.600	47.06
Mean Value =		10.433	46.324
Stdev =		0.288675135	1.281717598

	pCi	dpm/mL
Certificate Value* =	**10.4861**	**46.5584**
Two sigma =	0.5774	2.5634
10 % of Mean =	1.0433	4.6324
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	99.50%	99.50%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**11/23/2016**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for U-232 standard 1564-I using 0.5 mL for each source. Each standard was combined with 0.5 mL of U-238 standard 1600-E and was diluted in a 50 mL plastic centrifuge tube containing 15 mL of 1M HCl, 1 mL of TiCl3. 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Uranium) 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. DPM values for U-232 were calculated by comparison to U-238 certified values.

TDC
11-24-15

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

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1570

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	GENERAL ENGINEERING LABS.
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	936817RD
Catalog No.:	7336	**Reference Date:**	15-Nov-11 12:00 PST
Source No.:	1555-47	**Contained Radioactivity:**	100.5 **nCi** 3719 **Bq**

Physical Description:

A. Mass of solution:	5.00824 g in 5 mL flame-sealed ampoule
B. Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C. Carrier content:	None
D. Density:	1.0016 g/mL @ 20°C

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 20.07 nCi/g, 742.6 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 1.3	%
B. Type B (systematic) uncertainty:	± 3.0	%
C. Uncertainty in aliquot weighing:	± 0.1	%
D. Total uncertainty at the 99% confidence level:	± 3.3	%

RECEIVED 10/20/11 TWO.

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsen
Quality Control

14-OCT-11
Date

EZIP Ref. No.: 1555-47

QC-S-060-115a

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

U-236 Technical Data

The U-236 used to prepare your order was taken from Isotope Products Laboratories Lot #30130.01 and had the following composition as of 8 Jul 05:

Nuclide	Mass %	Activity %
U-235	0.046	0.0015
U-236	99.657	99.997
U-238	0.297	0.0015

Isotopic composition provided by Techsnabexport Co. Ltd.

If you have any question, please contact IPL Technical Service: (661) 309-1010.

KC-5-060-1156

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1570
Prepared By:	Ashley Drochter
Carrier Conc:	0.1M HNO3
Reference Date:	11/15/2011
Ampoule Mass (g):	5.00824 g
Uncertainty:	+/- 1.289 %
LogBook No:	RC-S-060-115

A Solution Material Info			
Isotope:	Uranium-236		
Prepared By:	Jesse Craig		
Prep Date:	10/31/2011		
Verification Date:	07/28/2016		
Expiration Date:	07/28/2017		
Primary Code:	1570-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.852 g		
Density(g/mL):	0.9993	Balance ID:	1113021018

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

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.852 g) * (742.6 Bq/g) * (60 dpm/Bq) / (100 mL) = 2161.8571 dpm/mL
(4.852 g) * (742.6 Bq/g) * (60 dpm/Bq) / (0.9993 g/mL) / (100 mL) = 2163.3715 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
11/29/2011	Ashley Drochter	10.2782	200	1570-B	111.1778 dpm/mL	11/13/2013	11/13/2014
03/06/2012	Christina Kimball	.2059854	100	1570-C	4.4562 dpm/mL	02/19/2016	02/19/2017
03/27/2014	Tim Chandler	5.0353	100	1570-D	108.9322 dpm/mL	03/18/2015	03/18/2016
07/24/2015	Tim Chandler	5.1415	100	1570-E	111.2297 dpm/mL	07/18/2016	07/18/2017
10/31/2011	Paul Boyd	6.64	10	IMS121016-01	10 mg/L	07/28/2016	07/28/2017
10/16/2012	Paul Boyd	.05	50	WMS121016-100	10 ug/L	10/17/2011	10/17/2012
11/10/2012	Paul Boyd	.05	50	WMS121110-100	10 ug/L	11/11/2011	11/11/2012
11/10/2012	Paul Boyd	5	50	WMS121110-100a	1 ug/L	11/11/2011	11/11/2012
11/10/2012	Paul Boyd	.025	50	WMS121110-104	5 ug/L	11/11/2011	11/11/2012
11/11/2012	Paul Boyd	.05	50	WMS121111-100	10 ug/L	11/12/2011	11/12/2012
11/11/2012	Paul Boyd	5	50	WMS121111-100a	1 ug/L	11/12/2011	11/12/2012
11/11/2012	Paul Boyd	.025	50	WMS121111-104	5 ug/L	11/12/2011	11/12/2012

11/12/2012	Paul Boyd	.05	50	WMS121112-100	10 ug/L	11/13/2011	11/13/2012
11/12/2012	Paul Boyd	5	50	WMS121112-100a	1 ug/L	11/13/2011	11/13/2012
11/12/2012	Paul Boyd	.025	50	WMS121112-104	5 ug/L	11/13/2011	11/13/2012
11/13/2012	Paul Boyd	.05	50	WMS121113-100	10 ug/L	11/14/2011	11/14/2012
11/13/2012	Paul Boyd	5	50	WMS121113-100a	1 ug/L	11/14/2011	11/14/2012
11/13/2012	Paul Boyd	.025	50	WMS121113-104	5 ug/L	11/14/2011	11/14/2012
11/14/2012	Paul Boyd	.05	50	WMS121114-100	10 ug/L	11/15/2011	11/15/2012
11/14/2012	Paul Boyd	5	50	WMS121114-100a	1 ug/L	11/15/2011	11/15/2012
11/14/2012	Paul Boyd	.025	50	WMS121114-104	5 ug/L	11/15/2011	11/15/2012
11/15/2012	Paul Boyd	.05	50	WMS121115-100	10 ug/L	11/16/2011	11/16/2012
11/15/2012	Paul Boyd	5	50	WMS121115-100a	1 ug/L	11/16/2011	11/16/2012
11/15/2012	Paul Boyd	.025	50	WMS121115-104	5 ug/L	11/16/2011	11/16/2012
11/16/2012	Paul Boyd	.05	50	WMS121116-100	10 ug/L	11/17/2011	11/17/2012
11/16/2012	Paul Boyd	5	50	WMS121116-100a	1 ug/L	11/17/2011	11/17/2012
11/16/2012	Paul Boyd	.025	50	WMS121116-104	5 ug/L	11/17/2011	11/17/2012
11/17/2012	Paul Boyd	.05	50	WMS121117-100	10 ug/L	11/18/2011	11/18/2012
11/17/2012	Paul Boyd	5	50	WMS121117-100a	1 ug/L	11/18/2011	11/18/2012
11/17/2012	Paul Boyd	.025	50	WMS121117-104	5 ug/L	11/18/2011	11/18/2012
11/18/2012	Paul Boyd	.05	50	WMS121118-100	10 ug/L	11/19/2011	11/19/2012
11/18/2012	Paul Boyd	5	50	WMS121118-100a	1 ug/L	11/19/2011	11/19/2012
11/18/2012	Paul Boyd	.025	50	WMS121118-104	5 ug/L	11/19/2011	11/19/2012
11/19/2012	Paul Boyd	.05	50	WMS121119-100	10 ug/L	11/20/2011	11/20/2012
11/19/2012	Paul Boyd	5	50	WMS121119-100a	1 ug/L	11/20/2011	11/20/2012
11/19/2012	Paul Boyd	.025	50	WMS121119-104	5 ug/L	11/20/2011	11/20/2012
11/20/2012	Paul Boyd	.05	50	WMS121120-100	10 ug/L	11/21/2011	11/21/2012
11/20/2012	Paul Boyd	5	50	WMS121120-100a	1 ug/L	11/21/2011	11/21/2012
11/20/2012	Paul Boyd	.025	50	WMS121120-104	5 ug/L	11/21/2011	11/21/2012
12/31/2012	Elizabeth Janssen	.05	50	WMS121231-100	10 ug/L	01/01/2012	01/01/2013
12/31/2012	Elizabeth Janssen	5	50	WMS121231-100a	1 ug/L	01/01/2012	01/01/2013
12/31/2012	Elizabeth Janssen	.025	50	WMS121231-104	5 ug/L	01/01/2012	01/01/2013
01/03/2013	Elizabeth Janssen	.05	50	WMS130103-100	10 ug/L	01/04/2012	01/04/2013
01/03/2013	Elizabeth Janssen	5	50	WMS130103-100a	1 ug/L	01/04/2012	01/04/2013
01/03/2013	Elizabeth Janssen	.025	50	WMS130103-104	5 ug/L	01/04/2012	01/04/2013
01/07/2013	Paul Boyd	.05	50	WMS130107-100	10 ug/L	01/08/2012	01/08/2013

01/07/2013	Paul Boyd	5	50	WMS130107-100a	1 ug/L	01/08/2012	01/08/2013
01/07/2013	Paul Boyd	.025	50	WMS130107-104	5 ug/L	01/08/2012	01/08/2013
01/08/2013	Paul Boyd	.05	50	WMS130108-100	10 ug/L	01/09/2012	01/09/2013
01/08/2013	Paul Boyd	5	50	WMS130108-100a	1 ug/L	01/09/2012	01/09/2013
01/08/2013	Paul Boyd	.025	50	WMS130108-104	5 ug/L	01/09/2012	01/09/2013
01/09/2013	Paul Boyd	.05	50	WMS130109-100	10 ug/L	01/10/2012	01/10/2013
01/09/2013	Paul Boyd	5	50	WMS130109-100a	1 ug/L	01/10/2012	01/10/2013
01/09/2013	Paul Boyd	.025	50	WMS130109-104	5 ug/L	01/10/2012	01/10/2013
01/10/2013	Paul Boyd	.05	50	WMS130110-100	10 ug/L	01/11/2012	01/11/2013
01/10/2013	Paul Boyd	5	50	WMS130110-100a	1 ug/L	01/11/2012	01/11/2013
01/10/2013	Paul Boyd	.025	50	WMS130110-104	5 ug/L	01/11/2012	01/11/2013
02/05/2013	Paul Boyd	.05	50	WMS130205-100	10 ug/L	02/06/2012	02/06/2013
02/05/2013	Paul Boyd	5	50	WMS130205-100a	1 ug/L	02/06/2012	02/06/2013
02/05/2013	Paul Boyd	.025	50	WMS130205-104	5 ug/L	02/06/2012	02/06/2013
02/06/2013	Paul Boyd	.05	50	WMS130206-100	10 ug/L	02/07/2012	02/07/2013
02/06/2013	Paul Boyd	5	50	WMS130206-100a	1 ug/L	02/07/2012	02/07/2013
02/06/2013	Paul Boyd	.025	50	WMS130206-104	5 ug/L	02/07/2012	02/07/2013
02/25/2013	Paul Boyd	.05	50	WMS130225-100	10 ug/L	02/26/2012	02/26/2013
02/25/2013	Paul Boyd	5	50	WMS130225-100a	1 ug/L	02/26/2012	02/26/2013
02/25/2013	Paul Boyd	.025	50	WMS130225-104	5 ug/L	02/26/2012	02/26/2013
04/03/2013	Paul Boyd	.05	50	WMS130403-100	10 ug/L	04/04/2012	04/04/2013
04/03/2013	Paul Boyd	5	50	WMS130403-100a	1 ug/L	04/04/2012	04/04/2013
04/03/2013	Paul Boyd	.025	50	WMS130403-104	5 ug/L	04/04/2012	04/04/2013
04/05/2013	Elizabeth Janssen	.05	50	WMS130405-100	10 ug/L	04/06/2012	04/06/2013
04/05/2013	Elizabeth Janssen	5	50	WMS130405-100a	1 ug/L	04/06/2012	04/06/2013
04/05/2013	Elizabeth Janssen	.025	50	WMS130405-104	5 ug/L	04/06/2012	04/06/2013
04/09/2013	Paul Boyd	.05	50	WMS130409-100	10 ug/L	04/10/2012	04/10/2013
04/09/2013	Paul Boyd	5	50	WMS130409-100a	1 ug/L	04/10/2012	04/10/2013
04/09/2013	Paul Boyd	.025	50	WMS130409-104	5 ug/L	04/10/2012	04/10/2013
04/10/2013	Paul Boyd	.05	50	WMS130410-100	10 ug/L	04/11/2012	04/11/2013
04/10/2013	Paul Boyd	5	50	WMS130410-100a	1 ug/L	04/11/2012	04/11/2013
04/10/2013	Paul Boyd	.025	50	WMS130410-104	5 ug/L	04/11/2012	04/11/2013
04/11/2013	Paul Boyd	.05	50	WMS130411-100	10 ug/L	04/12/2012	04/12/2013
04/11/2013	Paul Boyd	5	50	WMS130411-100a	1 ug/L	04/12/2012	04/12/2013
04/11/2013	Paul Boyd	.025	50	WMS130411-104	5 ug/L	04/12/2012	04/12/2013
04/15/2013	Paul Boyd	.05	50	WMS130415-100	10 ug/L	04/16/2012	04/16/2013

04/15/2013	Paul Boyd	5	50	WMS130415-100a	1 ug/L	04/16/2012	04/16/2013
04/15/2013	Paul Boyd	.025	50	WMS130415-104	5 ug/L	04/16/2012	04/16/2013
04/16/2013	Paul Boyd	.05	50	WMS130416-100	10 ug/L	04/17/2012	04/17/2013
04/16/2013	Paul Boyd	5	50	WMS130416-100a	1 ug/L	04/17/2012	04/17/2013
04/16/2013	Paul Boyd	.025	50	WMS130416-104	5 ug/L	04/17/2012	04/17/2013
04/17/2013	Paul Boyd	.05	50	WMS130417-100	10 ug/L	04/18/2012	04/18/2013
04/17/2013	Paul Boyd	5	50	WMS130417-100a	1 ug/L	04/18/2012	04/18/2013
04/17/2013	Paul Boyd	.025	50	WMS130417-104	5 ug/L	04/18/2012	04/18/2013
05/28/2013	Paul Boyd	.05	50	WMS130528-100	10 ug/L	05/29/2012	05/29/2013
05/28/2013	Paul Boyd	5	50	WMS130528-100a	1 ug/L	05/29/2012	05/29/2013
05/28/2013	Paul Boyd	.025	50	WMS130528-104	5 ug/L	05/29/2012	05/29/2013
05/29/2013	Paul Boyd	.05	50	WMS130529-100	10 ug/L	05/30/2012	05/30/2013
05/29/2013	Paul Boyd	5	50	WMS130529-100a	1 ug/L	05/30/2012	05/30/2013
05/29/2013	Paul Boyd	.025	50	WMS130529-104	5 ug/L	05/30/2012	05/30/2013
07/08/2013	Elizabeth Janssen	.05	50	WMS130708-100	10 ug/L	07/09/2012	07/09/2013
07/08/2013	Elizabeth Janssen	5	50	WMS130708-100a	1 ug/L	07/09/2012	07/09/2013
07/08/2013	Elizabeth Janssen	.025	50	WMS130708-104	5 ug/L	07/09/2012	07/09/2013
07/10/2013	Elizabeth Janssen	.05	50	WMS130710-100	10 ug/L	07/11/2012	07/11/2013
07/10/2013	Elizabeth Janssen	5	50	WMS130710-100a	1 ug/L	07/11/2012	07/11/2013
07/10/2013	Elizabeth Janssen	.025	50	WMS130710-104	5 ug/L	07/11/2012	07/11/2013
07/11/2013	Paul Boyd	.05	50	WMS130711-100	10 ug/L	07/12/2012	07/12/2013
07/11/2013	Paul Boyd	5	50	WMS130711-100a	1 ug/L	07/12/2012	07/12/2013
07/11/2013	Paul Boyd	.025	50	WMS130711-104	5 ug/L	07/12/2012	07/12/2013
08/01/2013	Paul Boyd	.05	50	WMS130801-100	10 ug/L	08/02/2012	08/02/2013
08/01/2013	Paul Boyd	5	50	WMS130801-100a	1 ug/L	08/02/2012	08/02/2013
08/01/2013	Paul Boyd	.025	50	WMS130801-104	5 ug/L	08/02/2012	08/02/2013
10/11/2013	Paul Boyd	.05	50	WMS131011-100	10 ug/L	10/12/2012	10/12/2013
10/11/2013	Paul Boyd	5	50	WMS131011-100a	1 ug/L	10/12/2012	10/12/2013
10/11/2013	Paul Boyd	.025	50	WMS131011-104	5 ug/L	10/12/2012	10/12/2013
10/14/2013	Paul Boyd	.05	50	WMS131014-100	10 ug/L	10/15/2012	10/15/2013
10/14/2013	Paul Boyd	5	50	WMS131014-100a	1 ug/L	10/15/2012	10/15/2013
10/14/2013	Paul Boyd	.025	50	WMS131014-104	5 ug/L	10/15/2012	10/15/2013
10/15/2013	Paul Boyd	.05	50	WMS131015-100	10 ug/L	10/16/2012	10/16/2013
10/15/2013	Paul Boyd	5	50	WMS131015-100a	1 ug/L	10/16/2012	10/16/2013

10/15/2013	Paul Boyd	.025	50	WMS131015-104	5 ug/L	10/16/2012	10/16/2013
10/16/2013	Paul Boyd	.05	50	WMS131016-100	10 ug/L	10/17/2012	10/17/2013
10/16/2013	Paul Boyd	5	50	WMS131016-100a	1 ug/L	10/17/2012	10/17/2013
10/16/2013	Paul Boyd	.025	50	WMS131016-104	5 ug/L	10/17/2012	10/17/2013
10/17/2013	Paul Boyd	.05	50	WMS131017-100	10 ug/L	10/18/2012	10/18/2013
10/17/2013	Paul Boyd	5	50	WMS131017-100a	1 ug/L	10/18/2012	10/18/2013
10/17/2013	Paul Boyd	.025	50	WMS131017-104	5 ug/L	10/18/2012	10/18/2013
11/05/2013	Paul Boyd	.05	50	WMS131105-100	10 ug/L	11/06/2012	11/06/2013
11/05/2013	Paul Boyd	5	50	WMS131105-100a	1 ug/L	11/06/2012	11/06/2013
11/05/2013	Paul Boyd	.025	50	WMS131105-104	5 ug/L	11/06/2012	11/06/2013
11/06/2013	Paul Boyd	.05	50	WMS131106-100	10 ug/L	11/07/2012	11/07/2013
11/06/2013	Paul Boyd	5	50	WMS131106-100a	1 ug/L	11/07/2012	11/07/2013
11/06/2013	Paul Boyd	.025	50	WMS131106-104	5 ug/L	11/07/2012	11/07/2013
12/17/2013	Paul Boyd	.05	50	WMS131217-100	10 ug/L	12/18/2012	12/18/2013
12/17/2013	Paul Boyd	5	50	WMS131217-100a	1 ug/L	12/18/2012	12/18/2013
12/17/2013	Paul Boyd	.025	50	WMS131217-104	5 ug/L	12/18/2012	12/18/2013
01/08/2014	Paul Boyd	.05	50	WMS140108-100	10 ug/L	01/09/2013	01/09/2014
01/08/2014	Paul Boyd	5	50	WMS140108-100a	1 ug/L	01/09/2013	01/09/2014
01/08/2014	Paul Boyd	.025	50	WMS140108-104	5 ug/L	01/09/2013	01/09/2014
01/09/2014	Paul Boyd	.05	50	WMS140109-100	10 ug/L	01/10/2013	01/10/2014
01/09/2014	Paul Boyd	5	50	WMS140109-100a	1 ug/L	01/10/2013	01/10/2014
01/09/2014	Paul Boyd	.025	50	WMS140109-104	5 ug/L	01/10/2013	01/10/2014
01/10/2014	Paul Boyd	.05	50	WMS140110-100	10 ug/L	01/10/2013	01/10/2014
01/10/2014	Paul Boyd	5	50	WMS140110-100a	1 ug/L	01/10/2013	01/10/2014
01/10/2014	Paul Boyd	.025	50	WMS140110-104	5 ug/L	01/10/2013	01/10/2014
01/14/2014	Paul Boyd	.05	50	WMS140114-100	10 ug/L	01/15/2013	01/15/2014
01/14/2014	Paul Boyd	5	50	WMS140114-100a	1 ug/L	01/15/2013	01/15/2014
01/14/2014	Paul Boyd	.025	50	WMS140114-104	5 ug/L	01/15/2013	01/15/2014
01/15/2014	Paul Boyd	.05	50	WMS140115-100	10 ug/L	01/16/2013	01/16/2014
01/15/2014	Paul Boyd	5	50	WMS140115-100a	1 ug/L	01/16/2013	01/16/2014
01/15/2014	Paul Boyd	.025	50	WMS140115-104	5 ug/L	01/16/2013	01/16/2014
01/16/2014	Paul Boyd	.05	50	WMS140116-100	10 ug/L	01/17/2013	01/17/2014
01/16/2014	Paul Boyd	5	50	WMS140116-100a	1 ug/L	01/17/2013	01/17/2014
01/16/2014	Paul Boyd	.025	50	WMS140116-104	5 ug/L	01/17/2013	01/17/2014
01/17/2014	Paul Boyd	.05	50	WMS140117-100	10 ug/L	01/18/2013	01/18/2014
01/17/2014	Paul Boyd	5	50	WMS140117-100a	1 ug/L	01/18/2013	01/18/2014
01/17/2014	Paul Boyd	.025	50	WMS140117-104	5 ug/L	01/18/2013	01/18/2014
01/28/2014	Paul Boyd	.05	50	WMS140128-100	10 ug/L	01/29/2013	01/29/2014

01/28/2014	Paul Boyd	5	50	WMS140128-100a	1 ug/L	01/29/2013	01/29/2014
01/28/2014	Paul Boyd	.025	50	WMS140128-104	5 ug/L	01/29/2013	01/29/2014
01/30/2014	Paul Boyd	.05	50	WMS140130-100	10 ug/L	01/31/2013	01/31/2014
01/30/2014	Paul Boyd	5	50	WMS140130-100a	1 ug/L	01/31/2013	01/31/2014
01/30/2014	Paul Boyd	.025	50	WMS140130-104	5 ug/L	01/31/2013	01/31/2014
01/31/2014	Paul Boyd	.05	50	WMS140131-100	10 ug/L	02/01/2013	02/01/2014
01/31/2014	Paul Boyd	5	50	WMS140131-100a	1 ug/L	02/01/2013	02/01/2014
01/31/2014	Paul Boyd	.025	50	WMS140131-104	5 ug/L	02/01/2013	02/01/2014
02/03/2014	Paul Boyd	.05	50	WMS140203-100	10 ug/L	02/04/2013	02/04/2014
02/03/2014	Paul Boyd	5	50	WMS140203-100a	1 ug/L	02/04/2013	02/04/2014
02/03/2014	Paul Boyd	.025	50	WMS140203-104	5 ug/L	02/04/2013	02/04/2014
02/21/2014	Paul Boyd	.05	50	WMS140221-100	10 ug/L	02/22/2013	02/22/2014
02/21/2014	Paul Boyd	5	50	WMS140221-100a	1 ug/L	02/22/2013	02/22/2014
02/21/2014	Paul Boyd	.025	50	WMS140221-104	5 ug/L	02/22/2013	02/22/2014
02/24/2014	Paul Boyd	.05	50	WMS140224-100	10 ug/L	02/25/2013	02/25/2014
02/24/2014	Paul Boyd	5	50	WMS140224-100a	1 ug/L	02/25/2013	02/25/2014
02/24/2014	Paul Boyd	.025	50	WMS140224-104	5 ug/L	02/25/2013	02/25/2014
04/07/2014	Paul Boyd	.05	50	WMS140407-100	10 ug/L	04/08/2013	04/08/2014
04/07/2014	Paul Boyd	5	50	WMS140407-100a	1 ug/L	04/08/2013	04/08/2014
04/07/2014	Paul Boyd	.025	50	WMS140407-104	5 ug/L	04/08/2013	04/08/2014
04/08/2014	Paul Boyd	.05	50	WMS140408-100	10 ug/L	04/09/2013	04/09/2014
04/08/2014	Paul Boyd	5	50	WMS140408-100a	1 ug/L	04/09/2013	04/09/2014
04/08/2014	Paul Boyd	.025	50	WMS140408-104	5 ug/L	04/09/2013	04/09/2014
04/09/2014	Paul Boyd	.05	50	WMS140409-100	10 ug/L	04/10/2013	04/10/2014
04/09/2014	Paul Boyd	5	50	WMS140409-100a	1 ug/L	04/10/2013	04/10/2014
04/09/2014	Paul Boyd	.025	50	WMS140409-104	5 ug/L	04/10/2013	04/10/2014
04/10/2014	Paul Boyd	.05	50	WMS140410-100	10 ug/L	04/11/2013	04/11/2014
04/10/2014	Paul Boyd	5	50	WMS140410-100a	1 ug/L	04/11/2013	04/11/2014
04/10/2014	Paul Boyd	.025	50	WMS140410-104	5 ug/L	04/11/2013	04/11/2014
04/11/2014	Paul Boyd	.05	50	WMS140411-100	10 ug/L	04/12/2013	04/12/2014
04/11/2014	Paul Boyd	5	50	WMS140411-100a	1 ug/L	04/12/2013	04/12/2014
04/11/2014	Paul Boyd	.025	50	WMS140411-104	5 ug/L	04/12/2013	04/12/2014
04/14/2014	Paul Boyd	.05	50	WMS140414-100	10 ug/L	04/15/2013	04/15/2014
04/14/2014	Paul Boyd	5	50	WMS140414-100a	1 ug/L	04/15/2013	04/15/2014
04/14/2014	Paul Boyd	.025	50	WMS140414-104	5 ug/L	04/15/2013	04/15/2014
04/15/2014	Paul Boyd	.05	50	WMS140415-100	10 ug/L	04/16/2013	04/16/2014
04/15/2014	Paul Boyd	5	50	WMS140415-100a	1 ug/L	04/16/2013	04/16/2014
04/15/2014	Paul Boyd	.025	50	WMS140415-104	5 ug/L	04/16/2013	04/16/2014

04/16/2014	Paul Boyd	.05	50	WMS140416-100	10 ug/L	04/17/2013	04/17/2014
04/16/2014	Paul Boyd	5	50	WMS140416-100a	1 ug/L	04/17/2013	04/17/2014
04/16/2014	Paul Boyd	.025	50	WMS140416-104	5 ug/L	04/17/2013	04/17/2014
04/17/2014	Paul Boyd	.05	50	WMS140417-100	10 ug/L	04/18/2013	04/18/2014
04/17/2014	Paul Boyd	5	50	WMS140417-100a	1 ug/L	04/18/2013	04/18/2014
04/17/2014	Paul Boyd	.025	50	WMS140417-104	5 ug/L	04/18/2013	04/18/2014
06/05/2014	Paul Boyd	.05	50	WMS140605-100	10 ug/L	06/06/2013	06/06/2014
06/05/2014	Paul Boyd	5	50	WMS140605-100a	1 ug/L	06/06/2013	06/06/2014
06/05/2014	Paul Boyd	.025	50	WMS140605-104	5 ug/L	06/06/2013	06/06/2014
06/14/2014	Paul Boyd	.05	50	WMS140614-100	10 ug/L	06/15/2013	06/15/2014
06/14/2014	Paul Boyd	5	50	WMS140614-100a	1 ug/L	06/15/2013	06/15/2014
06/14/2014	Paul Boyd	.025	50	WMS140614-104	5 ug/L	06/15/2013	06/15/2014
06/20/2014	Paul Boyd	.05	50	WMS140620-100	10 ug/L	06/21/2013	06/21/2014
06/20/2014	Paul Boyd	5	50	WMS140620-100a	1 ug/L	06/21/2013	06/21/2014
06/20/2014	Paul Boyd	.025	50	WMS140620-104	5 ug/L	06/21/2013	06/21/2014
07/01/2014	Paul Boyd	.05	50	WMS140701-100	10 ug/L	07/02/2013	07/02/2014
07/01/2014	Paul Boyd	5	50	WMS140701-100a	1 ug/L	07/02/2013	07/02/2014
07/01/2014	Paul Boyd	.025	50	WMS140701-104	5 ug/L	07/02/2013	07/02/2014
07/02/2014	Paul Boyd	.05	50	WMS140702-100	10 ug/L	07/03/2013	07/03/2014
07/02/2014	Paul Boyd	5	50	WMS140702-100a	1 ug/L	07/03/2013	07/03/2014
07/02/2014	Paul Boyd	.025	50	WMS140702-104	5 ug/L	07/03/2013	07/03/2014
07/03/2014	Paul Boyd	.05	50	WMS140703-100	10 ug/L	07/04/2013	07/04/2014
07/03/2014	Paul Boyd	5	50	WMS140703-100a	1 ug/L	07/04/2013	07/04/2014
07/03/2014	Paul Boyd	.025	50	WMS140703-104	5 ug/L	07/04/2013	07/04/2014
07/05/2014	Elizabeth Janssen	.05	50	WMS140705-100	10 ug/L	07/06/2013	07/06/2014
07/05/2014	Elizabeth Janssen	5	50	WMS140705-100a	1 ug/L	07/06/2013	07/06/2014
07/05/2014	Elizabeth Janssen	.025	50	WMS140705-104	5 ug/L	07/06/2013	07/06/2014
07/08/2014	Elizabeth Janssen	.05	50	WMS140708-100	10 ug/L	07/09/2013	07/09/2014
07/08/2014	Elizabeth Janssen	5	50	WMS140708-100a	1 ug/L	07/09/2013	07/09/2014
07/09/2014	Bryan Davis	5	50	WMS140709-100a	1 ug/L	07/09/2013	07/09/2014
07/08/2014	Elizabeth Janssen	.025	50	WMS140708-104	5 ug/L	07/09/2013	07/09/2014
07/09/2014	Bryan Davis	.05	50	WMS140709-100	10 ug/L	07/10/2013	07/10/2014

07/09/2014	Bryan Davis	.025	50	WMS140709-104	5 ug/L	07/10/2013	07/10/2014
07/10/2014	Bryan Davis	.05	50	WMS140710-100	10 ug/L	07/11/2013	07/11/2014
07/10/2014	Bryan Davis	.025	50	WMS140710-104	5 ug/L	07/11/2013	07/11/2014
07/14/2014	Bryan Davis	.05	50	WMS140714-100	10 ug/L	07/15/2013	07/15/2014
07/14/2014	Bryan Davis	.025	50	WMS140714-104	5 ug/L	07/15/2013	07/15/2014
07/15/2014	Bryan Davis	.05	50	WMS140715-100	10 ug/L	07/16/2013	07/16/2014
07/15/2014	Bryan Davis	.025	50	WMS140715-104	5 ug/L	07/16/2013	07/16/2014
07/16/2014	Bryan Davis	.05	50	WMS140716-100	10 ug/L	07/17/2013	07/17/2014
07/16/2014	Bryan Davis	.025	50	WMS140716-104	5 ug/L	07/17/2013	07/17/2014
07/17/2014	Bryan Davis	.05	50	WMS140717-100	10 ug/L	07/18/2013	07/18/2014
07/17/2014	Bryan Davis	.025	50	WMS140717-104	5 ug/L	07/18/2013	07/18/2014
07/18/2014	Bryan Davis	.05	50	WMS140718-100	10 ug/L	07/19/2013	07/19/2014
07/18/2014	Bryan Davis	.025	50	WMS140718-104	5 ug/L	07/19/2013	07/19/2014
07/19/2014	Elizabeth Janssen	.05	50	WMS140719-100	10 ug/L	07/20/2013	07/20/2014
07/19/2014	Elizabeth Janssen	5	50	WMS140719-100a	1 ug/L	07/20/2013	07/20/2014
07/19/2014	Elizabeth Janssen	.025	50	WMS140719-104	5 ug/L	07/20/2013	07/20/2014
08/28/2014	Bryan Davis	.05	50	WMS140828-100	10 ug/L	08/29/2013	08/29/2014
08/28/2014	Bryan Davis	5	50	WMS140828-100a	1 ug/L	08/29/2013	08/29/2014
08/28/2014	Bryan Davis	.025	50	WMS140828-104	5 ug/L	08/29/2013	08/29/2014
09/26/2014	Paul Boyd	.05	50	WMS140926-100	10 ug/L	09/27/2013	09/27/2014
09/26/2014	Paul Boyd	5	50	WMS140926-100a	1 ug/L	09/27/2013	09/27/2014
09/26/2014	Paul Boyd	.025	50	WMS140926-104	5 ug/L	09/27/2013	09/27/2014
10/13/2014	Samantha Jacobs	.05	50	WMS141013-100	10 ug/L	10/14/2013	10/14/2014
10/13/2014	Samantha Jacobs	5	50	WMS141013-100a	1 ug/L	10/14/2013	10/14/2014

10/13/2014	Samantha Jacobs	.025	50	WMS141013-104	5 ug/L	10/14/2013	10/14/2014
10/14/2014	Samantha Jacobs	.05	50	WMS141014-100	10 ug/L	10/15/2013	10/15/2014
10/14/2014	Samantha Jacobs	5	50	WMS141014-100a	1 ug/L	10/15/2013	10/15/2014
10/14/2014	Samantha Jacobs	.025	50	WMS141014-104	5 ug/L	10/15/2013	10/15/2014
10/15/2014	Samantha Jacobs	.05	50	WMS141015-100	10 ug/L	10/16/2013	10/16/2014
10/15/2014	Samantha Jacobs	5	50	WMS141015-100a	1 ug/L	10/16/2013	10/16/2014
10/15/2014	Samantha Jacobs	.025	50	WMS141015-104	5 ug/L	10/16/2013	10/16/2014
10/16/2014	Samantha Jacobs	.05	50	WMS141016-100	10 ug/L	10/17/2013	10/17/2014
10/16/2014	Samantha Jacobs	5	50	WMS141016-100a	1 ug/L	10/17/2013	10/17/2014
10/16/2014	Samantha Jacobs	.025	50	WMS141016-104	5 ug/L	10/17/2013	10/17/2014
10/17/2014	Samantha Jacobs	.05	50	WMS141017-100	10 ug/L	10/18/2013	10/18/2014
10/17/2014	Samantha Jacobs	5	50	WMS141017-100a	1 ug/L	10/18/2013	10/18/2014
10/17/2014	Samantha Jacobs	.025	50	WMS141017-104	5 ug/L	10/18/2013	10/18/2014
10/21/2014	Samantha Jacobs	.05	50	WMS141021-100	10 ug/L	10/22/2013	10/22/2014
10/21/2014	Samantha Jacobs	5	50	WMS141021-100a	1 ug/L	10/22/2013	10/22/2014
10/21/2014	Samantha Jacobs	.025	50	WMS141021-104	5 ug/L	10/22/2013	10/22/2014
10/22/2014	Samantha Jacobs	.05	50	WMS141022-100	10 ug/L	10/23/2013	10/23/2014
10/22/2014	Samantha Jacobs	5	50	WMS141022-100a	1 ug/L	10/23/2013	10/23/2014
10/22/2014	Samantha Jacobs	.025	50	WMS141022-104	5 ug/L	10/23/2013	10/23/2014
10/23/2014	Samantha Jacobs	.05	50	WMS141023-100	10 ug/L	10/24/2013	10/24/2014
10/23/2014	Samantha Jacobs	5	50	WMS141023-100a	1 ug/L	10/24/2013	10/24/2014
10/23/2014	Samantha Jacobs	.025	50	WMS141023-104	5 ug/L	10/24/2013	10/24/2014

10/24/2014	Samantha Jacobs	.05	50	WMS141024-100	10 ug/L	10/25/2013	10/25/2014
10/24/2014	Samantha Jacobs	5	50	WMS141024-100a	1 ug/L	10/25/2013	10/25/2014
10/24/2014	Samantha Jacobs	.025	50	WMS141024-104	5 ug/L	10/25/2013	10/25/2014
10/27/2014	Samantha Jacobs	.05	50	WMS141027-100	10 ug/L	10/28/2013	10/28/2014
10/27/2014	Samantha Jacobs	5	50	WMS141027-100a	1 ug/L	10/28/2013	10/28/2014
10/27/2014	Samantha Jacobs	.025	50	WMS141027-104	5 ug/L	10/28/2013	10/28/2014
11/03/2014	Samantha Jacobs	.05	50	WMS141103-100	10 ug/L	11/04/2013	11/04/2014
11/03/2014	Samantha Jacobs	5	50	WMS141103-100a	1 ug/L	11/04/2013	11/04/2014
11/03/2014	Samantha Jacobs	.025	50	WMS141103-104	5 ug/L	11/04/2013	11/04/2014
11/04/2014	Samantha Jacobs	.05	50	WMS141104-100	10 ug/L	11/05/2013	11/05/2014
11/04/2014	Samantha Jacobs	5	50	WMS141104-100a	1 ug/L	11/05/2013	11/05/2014
11/04/2014	Samantha Jacobs	.025	50	WMS141104-104	5 ug/L	11/05/2013	11/05/2014
11/06/2014	Samantha Jacobs	.05	50	WMS141106-100	10 ug/L	11/07/2013	11/07/2014
11/06/2014	Samantha Jacobs	5	50	WMS141106-100a	1 ug/L	11/07/2013	11/07/2014
11/06/2014	Samantha Jacobs	.025	50	WMS141106-104	5 ug/L	11/07/2013	11/07/2014
11/12/2014	Samantha Jacobs	.05	50	WMS141112-100	10 ug/L	11/13/2013	11/13/2014
11/12/2014	Samantha Jacobs	5	50	WMS141112-100a	1 ug/L	11/13/2013	11/13/2014
11/12/2014	Samantha Jacobs	.025	50	WMS141112-104	5 ug/L	11/13/2013	11/13/2014
02/27/2015	Samantha Jacobs	.05	50	WMS150227-100	10 ug/L	02/28/2014	02/28/2015
02/27/2015	Samantha Jacobs	5	50	WMS150227-100a	1 ug/L	02/28/2014	02/28/2015
02/27/2015	Samantha Jacobs	.025	50	WMS150227-104	5 ug/L	02/28/2014	02/28/2015
03/12/2015	Samantha Jacobs	.05	50	WMS150312-100	10 ug/L	03/13/2014	03/13/2015

03/12/2015	Samantha Jacobs	5	50	WMS150312-100a	1 ug/L	03/13/2014	03/13/2015
03/12/2015	Samantha Jacobs	.025	50	WMS150312-104	5 ug/L	03/13/2014	03/13/2015
04/13/2015	Samantha Jacobs	.05	50	WMS150413-100	10 ug/L	04/14/2014	04/14/2015
04/13/2015	Samantha Jacobs	5	50	WMS150413-100a	1 ug/L	04/14/2014	04/14/2015
04/13/2015	Samantha Jacobs	.025	50	WMS150413-104	5 ug/L	04/14/2014	04/14/2015
06/09/2015	Paul Boyd	.05	50	WMS150609-100	10 ug/L	06/10/2014	06/10/2015
06/09/2015	Paul Boyd	5	50	WMS150609-100a	1 ug/L	06/10/2014	06/10/2015
06/09/2015	Paul Boyd	.025	50	WMS150609-104	5 ug/L	06/10/2014	06/10/2015
06/10/2015	Paul Boyd	.05	50	WMS150610-100	10 ug/L	06/11/2014	06/11/2015
06/10/2015	Paul Boyd	5	50	WMS150610-100a	1 ug/L	06/11/2014	06/11/2015
06/10/2015	Paul Boyd	.025	50	WMS150610-104	5 ug/L	06/11/2014	06/11/2015
06/11/2015	Paul Boyd	.05	50	WMS150611-100	10 ug/L	06/12/2014	06/12/2015
06/11/2015	Paul Boyd	5	50	WMS150611-100a	1 ug/L	06/12/2014	06/12/2015
06/11/2015	Paul Boyd	.025	50	WMS150611-104	5 ug/L	06/12/2014	06/12/2015
06/18/2015	Paul Boyd	.05	50	WMS150618-100	10 ug/L	06/19/2014	06/19/2015
06/18/2015	Paul Boyd	5	50	WMS150618-100a	1 ug/L	06/19/2014	06/19/2015
06/18/2015	Paul Boyd	.025	50	WMS150618-104	5 ug/L	06/19/2014	06/19/2015
06/25/2015	Paul Boyd	.05	50	WMS150625-100	10 ug/L	06/26/2014	06/26/2015
06/25/2015	Paul Boyd	5	50	WMS150625-100a	1 ug/L	06/26/2014	06/26/2015
06/25/2015	Paul Boyd	.025	50	WMS150625-104	5 ug/L	06/26/2014	06/26/2015
07/01/2015	Paul Boyd	.05	50	WMS150701-100	10 ug/L	07/02/2014	07/02/2015
07/01/2015	Paul Boyd	5	50	WMS150701-100a	1 ug/L	07/02/2014	07/02/2015
07/01/2015	Paul Boyd	.025	50	WMS150701-104	5 ug/L	07/02/2014	07/02/2015
07/08/2015	Paul Boyd	.05	50	WMS150708-100	10 ug/L	07/09/2014	07/09/2015
07/08/2015	Paul Boyd	5	50	WMS150708-100a	1 ug/L	07/09/2014	07/09/2015
07/08/2015	Paul Boyd	.025	50	WMS150708-104	5 ug/L	07/09/2014	07/09/2015
07/09/2015	Paul Boyd	.05	50	WMS150709-100	10 ug/L	07/10/2014	07/10/2015
07/09/2015	Paul Boyd	5	50	WMS150709-100a	1 ug/L	07/10/2014	07/10/2015
07/09/2015	Paul Boyd	.025	50	WMS150709-104	5 ug/L	07/10/2014	07/10/2015
07/10/2015	Paul Boyd	.05	50	WMS150710-100	10 ug/L	07/11/2014	07/11/2015
07/10/2015	Paul Boyd	5	50	WMS150710-100a	1 ug/L	07/11/2014	07/11/2015
07/10/2015	Paul Boyd	.025	50	WMS150710-104	5 ug/L	07/11/2014	07/11/2015
07/13/2015	Paul Boyd	.05	50	WMS150713-100	10 ug/L	07/14/2014	07/14/2015
07/13/2015	Paul Boyd	5	50	WMS150713-100a	1 ug/L	07/14/2014	07/14/2015

07/13/2015	Paul Boyd	.025	50	WMS150713-104	5 ug/L	07/14/2014	07/14/2015
07/14/2015	Paul Boyd	.05	50	WMS150714-100	10 ug/L	07/15/2014	07/15/2015
07/14/2015	Paul Boyd	5	50	WMS150714-100a	1 ug/L	07/15/2014	07/15/2015
07/14/2015	Paul Boyd	.025	50	WMS150714-104	5 ug/L	07/15/2014	07/15/2015
07/15/2015	Paul Boyd	.05	50	WMS150715-100	10 ug/L	07/16/2014	07/16/2015
07/15/2015	Paul Boyd	5	50	WMS150715-100a	1 ug/L	07/16/2014	07/16/2015
07/15/2015	Paul Boyd	.025	50	WMS150715-104	5 ug/L	07/16/2014	07/16/2015
07/16/2015	Paul Boyd	.05	50	WMS150716-100	10 ug/L	07/17/2014	07/17/2015
07/16/2015	Paul Boyd	5	50	WMS150716-100a	1 ug/L	07/17/2014	07/17/2015
07/16/2015	Paul Boyd	.025	50	WMS150716-104	5 ug/L	07/17/2014	07/17/2015
07/17/2015	Paul Boyd	.05	50	WMS150717-100	10 ug/L	07/18/2014	07/18/2015
07/17/2015	Paul Boyd	5	50	WMS150717-100a	1 ug/L	07/18/2014	07/18/2015
07/17/2015	Paul Boyd	.025	50	WMS150717-104	5 ug/L	07/18/2014	07/18/2015
07/28/2015	Paul Boyd	.05	50	WMS150728-100	10 ug/L	07/29/2014	07/29/2015
07/28/2015	Paul Boyd	5	50	WMS150728-100a	1 ug/L	07/29/2014	07/29/2015
07/28/2015	Paul Boyd	.025	50	WMS150728-104	5 ug/L	07/29/2014	07/29/2015
10/09/2015	Paul Boyd	.05	50	WMS151009-100	10 ug/L	10/10/2014	10/10/2015
10/09/2015	Paul Boyd	5	50	WMS151009-100a	1 ug/L	10/10/2014	10/10/2015
10/09/2015	Paul Boyd	.025	50	WMS151009-104	5 ug/L	10/10/2014	10/10/2015
10/10/2015	Paul Boyd	.05	50	WMS151010-100	10 ug/L	10/11/2014	10/11/2015
10/10/2015	Paul Boyd	5	50	WMS151010-100a	1 ug/L	10/11/2014	10/11/2015
10/10/2015	Paul Boyd	.025	50	WMS151010-104	5 ug/L	10/11/2014	10/11/2015
10/12/2015	Paul Boyd	.05	50	WMS151012-100	10 ug/L	10/13/2014	10/13/2015
10/12/2015	Paul Boyd	5	50	WMS151012-100a	1 ug/L	10/13/2014	10/13/2015
10/12/2015	Paul Boyd	.025	50	WMS151012-104	5 ug/L	10/13/2014	10/13/2015
10/13/2015	Paul Boyd	.05	50	WMS151013-100	10 ug/L	10/14/2014	10/14/2015
10/13/2015	Paul Boyd	5	50	WMS151013-100a	1 ug/L	10/14/2014	10/14/2015
10/13/2015	Paul Boyd	.025	50	WMS151013-104	5 ug/L	10/14/2014	10/14/2015
10/14/2015	Paul Boyd	.05	50	WMS151014-100	10 ug/L	10/15/2014	10/15/2015
10/14/2015	Paul Boyd	5	50	WMS151014-100a	1 ug/L	10/15/2014	10/15/2015
10/14/2015	Paul Boyd	.025	50	WMS151014-104	5 ug/L	10/15/2014	10/15/2015
10/15/2015	Paul Boyd	.05	50	WMS151015-100	10 ug/L	10/16/2014	10/16/2015
10/15/2015	Paul Boyd	5	50	WMS151015-100a	1 ug/L	10/16/2014	10/16/2015
10/15/2015	Paul Boyd	.025	50	WMS151015-104	5 ug/L	10/16/2014	10/16/2015
10/22/2015	Paul Boyd	.05	50	WMS151022-100	10 ug/L	10/23/2014	10/23/2015
10/22/2015	Paul Boyd	5	50	WMS151022-100a	1 ug/L	10/23/2014	10/23/2015
10/22/2015	Paul Boyd	.025	50	WMS151022-104	5 ug/L	10/23/2014	10/23/2015
12/04/2015	Paul Boyd	.05	50	WMS151204-100	10 ug/L	12/05/2014	12/05/2015

12/04/2015	Paul Boyd	5	50	WMS151204-100a	1 ug/L	12/05/2014	12/05/2015
12/04/2015	Paul Boyd	.025	50	WMS151204-104	5 ug/L	12/05/2014	12/05/2015
01/11/2016	Paul Boyd	.05	50	WMS160111-100	10 ug/L	01/12/2015	01/12/2016
01/11/2016	Paul Boyd	5	50	WMS160111-100a	1 ug/L	01/12/2015	01/12/2016
01/11/2016	Paul Boyd	.01	50	WMS160111-104	5 ug/L	01/12/2015	01/12/2016
01/12/2016	Paul Boyd	.05	50	WMS160112-100	10 ug/L	01/13/2015	01/13/2016
01/12/2016	Paul Boyd	5	50	WMS160112-100a	1 ug/L	01/13/2015	01/13/2016
01/12/2016	Paul Boyd	.01	50	WMS160112-104	5 ug/L	01/13/2015	01/13/2016
02/12/2016	Paul Boyd	.05	50	WMS160212-100	10 ug/L	02/13/2015	02/13/2016
02/12/2016	Paul Boyd	5	50	WMS160212-100a	1 ug/L	02/13/2015	02/13/2016
02/12/2016	Paul Boyd	.01	50	WMS160212-104	5 ug/L	02/13/2015	02/13/2016
02/16/2016	Paul Boyd	.05	50	WMS160216-100	10 ug/L	02/17/2015	02/17/2016
02/16/2016	Paul Boyd	5	50	WMS160216-100a	1 ug/L	02/17/2015	02/17/2016
02/16/2016	Paul Boyd	.01	50	WMS160216-104	5 ug/L	02/17/2015	02/17/2016
02/17/2016	Paul Boyd	.05	50	WMS160217-100	10 ug/L	02/18/2015	02/18/2016
02/17/2016	Paul Boyd	5	50	WMS160217-100a	1 ug/L	02/18/2015	02/18/2016
02/17/2016	Paul Boyd	.01	50	WMS160217-104	5 ug/L	02/18/2015	02/18/2016
02/18/2016	Paul Boyd	.05	50	WMS160218-100	10 ug/L	02/19/2015	02/19/2016
02/18/2016	Paul Boyd	5	50	WMS160218-100a	1 ug/L	02/19/2015	02/19/2016
02/18/2016	Paul Boyd	.01	50	WMS160218-104	5 ug/L	02/19/2015	02/19/2016
02/22/2016	Paul Boyd	.05	50	WMS160222-100	10 ug/L	02/23/2015	02/23/2016
02/22/2016	Paul Boyd	5	50	WMS160222-100a	1 ug/L	02/23/2015	02/23/2016
02/23/2016	Paul Boyd	.05	50	WMS160223-100	10 ug/L	02/24/2015	02/24/2016
02/23/2016	Paul Boyd	5	50	WMS160223-100a	1 ug/L	02/24/2015	02/24/2016
03/07/2016	Paul Boyd	.05	50	WMS160307-100	10 ug/L	03/08/2015	03/08/2016
03/07/2016	Paul Boyd	5	50	WMS160307-100a	1 ug/L	03/08/2015	03/08/2016
03/07/2016	Paul Boyd	.01	50	WMS160307-104	5 ug/L	03/08/2015	03/08/2016
03/09/2016	Paul Boyd	.05	50	WMS160309-100	10 ug/L	03/10/2015	03/10/2016
03/09/2016	Paul Boyd	5	50	WMS160309-100a	1 ug/L	03/10/2015	03/10/2016
03/10/2016	Paul Boyd	.05	50	WMS160310-100	10 ug/L	03/11/2015	03/11/2016
03/10/2016	Paul Boyd	5	50	WMS160310-100a	1 ug/L	03/11/2015	03/11/2016
03/14/2016	Paul Boyd	.05	50	WMS160314-100	10 ug/L	03/15/2015	03/15/2016
03/14/2016	Paul Boyd	5	50	WMS160314-100a	1 ug/L	03/15/2015	03/15/2016
03/15/2016	Paul Boyd	.05	50	WMS160315-100	10 ug/L	03/16/2015	03/16/2016
03/15/2016	Paul Boyd	5	50	WMS160315-100a	1 ug/L	03/16/2015	03/16/2016
04/07/2016	Paul Boyd	.05	50	WMS160407-100	10 ug/L	04/08/2015	04/08/2016
04/07/2016	Paul Boyd	5	50	WMS160407-100a	1 ug/L	04/08/2015	04/08/2016
04/08/2016	Paul Boyd	.05	50	WMS160408-100	10 ug/L	04/09/2015	04/09/2016

04/08/2016	Paul Boyd	5	50	WMS160408-100a	1 ug/L	04/09/2015	04/09/2016
04/08/2016	Paul Boyd	.01	50	WMS160408-104	5 ug/L	04/09/2015	04/09/2016
04/11/2016	Paul Boyd	.05	50	WMS160411-100	10 ug/L	04/12/2015	04/12/2016
04/11/2016	Paul Boyd	5	50	WMS160411-100a	1 ug/L	04/12/2015	04/12/2016
04/11/2016	Paul Boyd	.01	50	WMS160411-104	5 ug/L	04/12/2015	04/12/2016
04/12/2016	Paul Boyd	.05	50	WMS160412-100	10 ug/L	04/13/2015	04/13/2016
04/12/2016	Paul Boyd	5	50	WMS160412-100a	1 ug/L	04/13/2015	04/13/2016
04/12/2016	Paul Boyd	.01	50	WMS160412-104	5 ug/L	04/13/2015	04/13/2016
04/13/2016	Paul Boyd	.05	50	WMS160413-100	10 ug/L	04/14/2015	04/14/2016
04/13/2016	Paul Boyd	5	50	WMS160413-100a	1 ug/L	04/14/2015	04/14/2016
04/13/2016	Paul Boyd	.01	50	WMS160413-104	5 ug/L	04/14/2015	04/14/2016
04/14/2016	Paul Boyd	.05	50	WMS160414-100	10 ug/L	04/15/2015	04/15/2016
04/14/2016	Paul Boyd	5	50	WMS160414-100a	1 ug/L	04/15/2015	04/15/2016
04/14/2016	Paul Boyd	.01	50	WMS160414-104	5 ug/L	04/15/2015	04/15/2016
04/15/2016	Paul Boyd	.05	50	WMS160415-100	10 ug/L	04/16/2015	04/16/2016
04/15/2016	Paul Boyd	5	50	WMS160415-100a	1 ug/L	04/16/2015	04/16/2016
04/15/2016	Paul Boyd	.01	50	WMS160415-104	5 ug/L	04/16/2015	04/16/2016
04/19/2016	Paul Boyd	.05	50	WMS160419-100	10 ug/L	04/20/2015	04/20/2016
04/19/2016	Paul Boyd	5	50	WMS160419-100a	1 ug/L	04/20/2015	04/20/2016
04/19/2016	Paul Boyd	.01	50	WMS160419-104	5 ug/L	04/20/2015	04/20/2016
04/20/2016	Paul Boyd	.05	50	WMS160420-100	10 ug/L	04/21/2015	04/21/2016
04/20/2016	Paul Boyd	5	50	WMS160420-100a	1 ug/L	04/21/2015	04/21/2016
04/20/2016	Paul Boyd	.01	50	WMS160420-104	5 ug/L	04/21/2015	04/21/2016
04/21/2016	Paul Boyd	.05	50	WMS160421-100	10 ug/L	04/22/2015	04/22/2016
04/21/2016	Paul Boyd	5	50	WMS160421-100a	1 ug/L	04/22/2015	04/22/2016
04/21/2016	Paul Boyd	.01	50	WMS160421-104	5 ug/L	04/22/2015	04/22/2016
05/05/2016	Paul Boyd	.05	50	WMS160505-100	10 ug/L	05/06/2015	05/06/2016
05/05/2016	Paul Boyd	5	50	WMS160505-100a	1 ug/L	05/06/2015	05/06/2016
05/05/2016	Paul Boyd	.01	50	WMS160505-104	5 ug/L	05/06/2015	05/06/2016
05/12/2016	Elizabeth Janssen	.05	50	WMS160512-100	10 ug/L	05/13/2015	05/13/2016
05/12/2016	Elizabeth Janssen	5	50	WMS160512-100a	1 ug/L	05/13/2015	05/13/2016
05/12/2016	Elizabeth Janssen	.01	50	WMS160512-104	5 ug/L	05/13/2015	05/13/2016
06/16/2016	Paul Boyd	.05	50	WMS160616-100	10 ug/L	06/17/2015	06/17/2016
06/16/2016	Paul Boyd	5	50	WMS160616-100a	1 ug/L	06/17/2015	06/17/2016
06/16/2016	Paul Boyd	.01	50	WMS160616-104	5 ug/L	06/17/2015	06/17/2016
06/21/2016	Paul Boyd	.05	50	WMS160621-100	10 ug/L	06/22/2015	06/22/2016

06/21/2016	Paul Boyd	5	50	WMS160621-100a	1 ug/L	06/22/2015	06/22/2016
06/21/2016	Paul Boyd	.01	50	WMS160621-104	5 ug/L	06/22/2015	06/22/2016
06/22/2016	Paul Boyd	.05	50	WMS160622-100	10 ug/L	06/23/2015	06/23/2016
06/22/2016	Paul Boyd	5	50	WMS160622-100a	1 ug/L	06/23/2015	06/23/2016
06/22/2016	Paul Boyd	.01	50	WMS160622-104	5 ug/L	06/23/2015	06/23/2016
06/23/2016	Paul Boyd	.05	50	WMS160623-100	10 ug/L	06/24/2015	06/24/2016
06/23/2016	Paul Boyd	5	50	WMS160623-100a	1 ug/L	06/24/2015	06/24/2016
06/23/2016	Paul Boyd	.01	50	WMS160623-104	5 ug/L	06/24/2015	06/24/2016
06/24/2016	Paul Boyd	.05	50	WMS160624-100	10 ug/L	06/25/2015	06/25/2016
06/24/2016	Paul Boyd	5	50	WMS160624-100a	1 ug/L	06/25/2015	06/25/2016
06/24/2016	Paul Boyd	.01	50	WMS160624-104	5 ug/L	06/25/2015	06/25/2016
06/27/2016	Paul Boyd	.05	50	WMS160627-100	10 ug/L	06/28/2015	06/28/2016
06/27/2016	Paul Boyd	5	50	WMS160627-100a	1 ug/L	06/28/2015	06/28/2016
06/27/2016	Paul Boyd	.01	50	WMS160627-104	5 ug/L	06/28/2015	06/28/2016
06/28/2016	Paul Boyd	.05	50	WMS160628-100	10 ug/L	06/29/2015	06/29/2016
06/28/2016	Paul Boyd	5	50	WMS160628-100a	1 ug/L	06/29/2015	06/29/2016
06/28/2016	Paul Boyd	.01	50	WMS160628-104	5 ug/L	06/29/2015	06/29/2016
06/29/2016	Paul Boyd	.05	50	WMS160629-100	10 ug/L	06/30/2015	06/30/2016
06/29/2016	Paul Boyd	5	50	WMS160629-100a	1 ug/L	06/30/2015	06/30/2016
06/29/2016	Paul Boyd	.01	50	WMS160629-104	5 ug/L	06/30/2015	06/30/2016
07/08/2016	Paul Boyd	.05	50	WMS160708-100	10 ug/L	07/09/2015	07/09/2016
07/08/2016	Paul Boyd	5	50	WMS160708-100a	1 ug/L	07/09/2015	07/09/2016
07/08/2016	Paul Boyd	.01	50	WMS160708-104	5 ug/L	07/09/2015	07/09/2016
07/11/2016	Paul Boyd	.05	50	WMS160711-100	10 ug/L	07/12/2015	07/12/2016
07/11/2016	Paul Boyd	5	50	WMS160711-100a	1 ug/L	07/12/2015	07/12/2016
07/11/2016	Paul Boyd	.01	50	WMS160711-104	5 ug/L	07/12/2015	07/12/2016
07/14/2016	Paul Boyd	.05	50	WMS160714-100	10 ug/L	07/15/2015	07/15/2016
07/14/2016	Paul Boyd	5	50	WMS160714-100a	1 ug/L	07/15/2015	07/15/2016
07/14/2016	Paul Boyd	.01	50	WMS160714-104	5 ug/L	07/15/2015	07/15/2016
07/26/2016	Paul Boyd	.05	50	WMS160726-100	10 ug/L	07/27/2015	07/27/2016
07/26/2016	Paul Boyd	5	50	WMS160726-100a	1 ug/L	07/27/2015	07/27/2016
07/26/2016	Paul Boyd	.01	50	WMS160726-104	5 ug/L	07/27/2015	07/27/2016
07/27/2016	Paul Boyd	.05	50	WMS160727-100	10 ug/L	07/27/2015	07/27/2016
07/27/2016	Paul Boyd	5	50	WMS160727-100a	1 ug/L	07/27/2015	07/27/2016
07/27/2016	Paul Boyd	.01	50	WMS160727-104	5 ug/L	07/27/2015	07/27/2016
07/28/2016	Paul Boyd	.05	50	WMS160729-100	10 ug/L	07/29/2015	07/29/2016
07/28/2016	Paul Boyd	5	50	WMS160729-100a	1 ug/L	07/29/2015	07/29/2016
08/09/2016	Paul Boyd	.05	50	WMS160809-100	10 ug/L	08/10/2015	08/10/2016

08/09/2016	Paul Boyd	5	50	WMS160809-100a	1 ug/L	08/10/2015	08/10/2016
08/16/2016	Paul Boyd	.05	50	WMS160816-100	10 ug/L	08/17/2015	08/17/2016
08/16/2016	Paul Boyd	5	50	WMS160816-100a	1 ug/L	08/17/2015	08/17/2016
08/17/2016	Paul Boyd	.05	50	WMS160817-100	10 ug/L	08/18/2015	08/18/2016
08/17/2016	Paul Boyd	5	50	WMS160817-100a	1 ug/L	08/18/2015	08/18/2016
08/24/2016	Paul Boyd	.05	50	WMS160824-100	10 ug/L	08/25/2015	08/25/2016
08/24/2016	Paul Boyd	5	50	WMS160824-100a	1 ug/L	08/25/2015	08/25/2016
08/25/2016	Paul Boyd	.05	50	WMS160825-100	10 ug/L	08/26/2015	08/26/2016
08/25/2016	Paul Boyd	5	50	WMS160825-100a	1 ug/L	08/26/2015	08/26/2016
09/01/2016	Paul Boyd	.05	50	WMS160901-100	10 ug/L	09/02/2015	09/02/2016
09/01/2016	Paul Boyd	5	50	WMS160901-100a	1 ug/L	09/02/2015	09/02/2016
09/08/2016	Paul Boyd	.05	50	WMS160908-100	10 ug/L	09/09/2015	09/09/2016
09/08/2016	Paul Boyd	5	50	WMS160908-100a	1 ug/L	09/09/2015	09/09/2016
09/09/2016	Paul Boyd	.05	50	WMS160909-100	10 ug/L	09/10/2015	09/10/2016
09/09/2016	Paul Boyd	5	50	WMS160909-100a	1 ug/L	09/10/2015	09/10/2016
09/13/2016	Paul Boyd	.05	50	WMS160913-100	10 ug/L	09/14/2015	09/14/2016
09/13/2016	Paul Boyd	5	50	WMS160913-100a	1 ug/L	09/14/2015	09/14/2016
09/14/2016	Paul Boyd	.05	50	WMS160914-100	10 ug/L	09/15/2015	09/15/2016
09/14/2016	Paul Boyd	5	50	WMS160914-100a	1 ug/L	09/15/2015	09/15/2016
09/15/2016	Paul Boyd	.05	50	WMS160915-100	10 ug/L	09/16/2015	09/16/2016
09/15/2016	Paul Boyd	5	50	WMS160915-100a	1 ug/L	09/16/2015	09/16/2016
09/16/2016	Paul Boyd	5	50	WMS160916-100a	1 ug/L	09/16/2015	09/16/2016
09/16/2016	Paul Boyd	.05	50	WMS160916-100	10 ug/L	09/17/2015	09/17/2016
09/21/2016	Paul Boyd	.05	50	WMS160921-100	10 ug/L	09/22/2015	09/22/2016
09/21/2016	Paul Boyd	5	50	WMS160921-100a	1 ug/L	09/22/2015	09/22/2016
09/22/2016	Paul Boyd	.05	50	WMS160922-100	10 ug/L	09/23/2015	09/23/2016
09/22/2016	Paul Boyd	5	50	WMS160922-100a	1 ug/L	09/23/2015	09/23/2016
09/23/2016	Paul Boyd	.05	50	WMS160923-100	10 ug/L	09/24/2015	09/24/2016
09/23/2016	Paul Boyd	5	50	WMS160923-100a	1 ug/L	09/24/2015	09/24/2016
09/27/2016	Paul Boyd	.05	50	WMS160927-100	10 ug/L	09/28/2015	09/28/2016
09/27/2016	Paul Boyd	5	50	WMS160927-100a	1 ug/L	09/28/2015	09/28/2016
09/28/2016	Paul Boyd	.05	50	WMS160928-100	10 ug/L	09/29/2015	09/29/2016
09/28/2016	Paul Boyd	5	50	WMS160928-100a	1 ug/L	09/29/2015	09/29/2016
06/16/2016	Paul Boyd	.05	50	WMS2419735-100	10 ug/L	06/17/2015	06/17/2016
06/16/2016	Paul Boyd	5	50	WMS2419737-100a	1 ug/L	06/17/2015	06/17/2016
06/16/2016	Paul Boyd	.01	50	WMS2419743-104	5 ug/L	06/17/2015	06/17/2016

Verification for U-236 Standard 1570-E

v1.2

Analyst	TC1
Verification Prep Date	7/18/2016

Tracer Information	
Isotope	U-232
Serial Number	1564-I
Amount of Std. (mL)	0.2
Expiration Date	11/23/2016

Standard Information	
Isotope	U-236
Serial Number	1570-E
Isotope Halflife	2.3420E+07 Y
Reference Date	11/15/2011
Ref. Act. (dpm/mL)	111.2297
Amount of Std. (mL)	0.2
Standard Prep Date	7/24/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/20/2016	10.700	118.77
2	7/20/2016	9.920	110.11
3	7/20/2016	10.000	111.00
Mean Value =		10.207	113.294
Stdev =		0.429107601	4.763094372

	pCi	dpm/mL
Certificate Value* =	**10.0207**	**111.2297**
Two sigma =	0.8582	9.5262
10 % of Mean =	1.0207	11.3294
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	101.86%	101.86%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**7/18/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for U-236 standard 1570-E using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-232 standard 1564-I and was diluted in a 50mL plastic centrifuge tube containing 15mL of 1M HCL. In each source, 0.5mL of TiCl3, 100 micrograms of neodymium carrier and three mL of 48% HF was added to precipitate neodymium (and Uranium) 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. DPM values for U-236 were calculated by comparison to U-232 certified values.

TC
7-20-16

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

HE Rec'd 3/29/12 1600

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238 (Nat)	**Customer:**	GENERAL ENGINEERING LABS.
Half-life:	(4.468 ± 0.005)E+09 years	**P.O. No.:**	936823 RD
Catalog No.:	7338	**Reference Date:**	15-Apr-12 12:00 PST
Source No.:	1577-71-2	**Contained Radioactivity: (Total Uranium)**	1.023 µCi 37.85 kBq

Physical Description:

A. Mass of solution:	7.05210 g in 10 mL flame-sealed ampoule
B. Chemical form:	$UO_2(NO_3)_2$ in dilute HNO_3
C. Carrier content:	None
D. Density:	Approximately 1.41 g/mL @ 20°C

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.1451 µCi/g, 5.369 kBq/g

Method of Calibration:

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.0 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.0 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Mar-12
Date

EZIP Ref. No.: 1577-71

RC-S-065-030a

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Isotope Products

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U-238 Natural Technical Data

The U-238 Natural used to prepare your order was taken from Eckert & Ziegler Isotope Products Lot #4550102
It had the following composition as of 9 Feb 10:

Nuclide	Atom %	Activity %
U-234	0.0055	49.086
U-235	0.7200	2.241
U-238	99.274	48.673

Isotopic composition provided by New Brunswick Laboratory.

If you have any question, please contact Eckert & Ziegler Isotope Products Technical Service: (661) 309-1010

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1600
Prepared By:	Ashley Drochter
Carrier Conc:	UO2(NO3)2 in dilute HNO3
Reference Date:	04/15/2012
Ampoule Mass (g):	7.0521 g
Uncertainty:	+/- 1.17 %
LogBook No:	RC-S-065-030

A Solution Material Info			
Isotope:	Uranium-238		
Prepared By:	Ashley Drochter		
Prep Date:	09/04/2012		
Verification Date:	07/24/2015		
Expiration Date:	07/24/2016		
Primary Code:	1600-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	6.8204 g		
Density(g/mL):	1.0789	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (kbq)) * (conversion dpm to kbq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (kbq)) * (conversion dpm to kbq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(6.8204 g) * (18.42 kbq) * (60000 dpm/kbq) / (7.0521 g * 100 mL) = 10688.8814 dpm/mL
(6.8204 g) * (18.42 kbq) * (60000 dpm/kbq) / (1.0789 g/mL)/ (7.0521 g * 100 mL) = 9907.0626 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/04/2012	Ashley Drochter	1.4579	500	1600-B	28.8913 dpm/mL	09/04/2012	09/04/2013
09/11/2012	Ashley Drochter	3.0288	500	1600-C	60.0219 dpm/mL	09/04/2013	09/04/2014
03/27/2014	Tim Chandler	3.0445	500	1600-D	60.3241 dpm/mL	03/18/2015	03/18/2016
07/24/2015	Tim Chandler	3.0177	500	1600-E	59.7931 dpm/mL	07/12/2016	07/12/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for U-238 Standard 1600-E

v1.2

Analyst	TC1
Verification Prep Date	7/12/2016

Tracer Information	
Isotope	U-232
Serial Number	1564-I
Amount of Std. (mL)	0.2
Expiration Date	11/23/2016

Standard Information	
Isotope	U-238
Serial Number	1600-E
Isotope Halflife	4.4680E+09 Y
Reference Date	4/15/2012
Ref. Act. (dpm/mL)	59.7931
Amount of Std. (mL)	0.2
Standard Prep Date	7/24/2015

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/12/2016	5.160	57.28
2	7/12/2016	5.530	61.38
3	7/12/2016	5.420	60.16
	Mean Value =	5.370	59.607
	Stdev =	0.19	2.109

	pCi	dpm/mL
Certificate Value* =	**5.3868**	**59.7931**
Two sigma =	0.3800	4.2180
10 % of Mean =	0.5370	5.9607
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	99.69%	99.69%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**7/12/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for U-238 standard 1600-E using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-232 standard 1564-I and was diluted in a 50mL plastic centrifuge tube containing 15 mL of 1M HCl. One milliliter of TiCl3, 100 micrograms of neodymium carrier and five mL of 48% HF was added to precipitate neodymium (and Uranium) 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. DPM values for U-238 were calculated by comparison to U-232 certified values.

7-18-16

Runlogs

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 1596438**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXS2	1026	SEP-15-16 11:06:10	DUSE		29-AUG-16 12:35
405240002	SAMPLE	MXS2	1029	SEP-15-16 11:06:10	DUSE		29-AUG-16 16:41
405240003	SAMPLE	MXS2	1030	SEP-15-16 11:06:10	DUSE		29-AUG-16 16:41
1203621827	MB	MXS2	1028	SEP-15-16 11:06:10	DONE		29-AUG-16 12:35
405240004	SAMPLE	MXS2	1038	SEP-15-16 11:06:14	DUSE		29-AUG-16 12:38
405240005	SAMPLE	MXS2	1040	SEP-15-16 11:06:14	DUSE		29-AUG-16 12:38
405240006	SAMPLE	MXS2	1041	SEP-15-16 11:06:14	DUSE		29-AUG-16 12:38
405240007	SAMPLE	MXS2	1042	SEP-15-16 11:06:14	DUSE		29-AUG-16 12:38
405240008	SAMPLE	MXS2	1161	SEP-15-16 11:06:39	DUSE		13-SEP-16 13:45
405240009	SAMPLE	MXS2	1162	SEP-15-16 11:06:42	DUSE		13-SEP-16 11:19
405240010	SAMPLE	MXS2	1163	SEP-15-16 11:06:45	DUSE		13-SEP-16 11:20
405240011	SAMPLE	MXS2	1166	SEP-15-16 11:06:48	DUSE		13-SEP-16 11:30
405240012	SAMPLE	MXS2	1167	SEP-15-16 11:06:50	DUSE		13-SEP-16 11:21
405240013	SAMPLE	MXS2	1169	SEP-15-16 11:06:53	DUSE		13-SEP-16 11:21
405240014	SAMPLE	MXS2	1170	SEP-15-16 11:06:56	DUSE		13-SEP-16 11:21
405240015	SAMPLE	MXS2	1175	SEP-15-16 11:06:59	DUSE		13-SEP-16 11:21
405240016	SAMPLE	MXS2	1176	SEP-15-16 11:07:01	DUSE		13-SEP-16 11:22
1203621828	DUP	MXS2	1177	SEP-15-16 11:07:04	DUSE		13-SEP-16 12:10
1203621829	LCS	MXS2	1178	SEP-15-16 11:07:06	DONE		13-SEP-16 13:06
405240011	SAMPLE	MXS2	1199	SEP-19-16 17:40:42	DONE		15-SEP-16 12:02
405240012	SAMPLE	MXS2	1200	SEP-19-16 17:40:44	DONE		15-SEP-16 12:03
405240013	SAMPLE	MXS2	1201	SEP-19-16 17:40:47	DONE		15-SEP-16 12:03
405240014	SAMPLE	MXS2	1202	SEP-19-16 17:40:50	DONE		15-SEP-16 13:09
405240015	SAMPLE	MXS2	1203	SEP-19-16 17:40:52	DONE		15-SEP-16 17:14
405240016	SAMPLE	MXS2	1204	SEP-19-16 17:40:54	DONE		15-SEP-16 14:00
1203621828	DUP	MXS2	1205	SEP-19-16 17:40:56	DONE		15-SEP-16 12:03
405240001	SAMPLE	MXS2	1026	SEP-19-16 17:49:23	DONE		29-AUG-16 12:35
405240002	SAMPLE	MXS2	1028	SEP-19-16 17:49:23	DONE		29-AUG-16 12:35
405240003	SAMPLE	MXS2	1029	SEP-19-16 17:49:23	DONE		29-AUG-16 16:41
405240004	SAMPLE	MXS2	1030	SEP-19-16 17:49:23	DONE		29-AUG-16 16:41
405240005	SAMPLE	MXS2	1033	SEP-19-16 17:49:24	DONE		29-AUG-16 12:37
405240006	SAMPLE	MXS2	1034	SEP-19-16 17:49:24	DONE		29-AUG-16 12:37
405240007	SAMPLE	MXS2	1038	SEP-19-16 17:49:25	DONE		29-AUG-16 12:38
405240008	SAMPLE	MXS2	1040	SEP-19-16 17:49:25	DONE		29-AUG-16 12:38
405240009	SAMPLE	MXS2	1041	SEP-19-16 17:49:25	DONE		29-AUG-16 12:38
405240010	SAMPLE	MXS2	1042	SEP-19-16 17:49:25	DONE		29-AUG-16 12:38

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 1596443**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXS2	1002	SEP-15-16 11:04:30	DONE		27-AUG-16 14:30
405240002	SAMPLE	MXS2	1004	SEP-15-16 11:04:30	DONE		27-AUG-16 14:31
405240003	SAMPLE	MXS2	1005	SEP-15-16 11:04:30	DONE		27-AUG-16 14:31
405240004	SAMPLE	MXS2	1006	SEP-15-16 11:04:30	DONE		27-AUG-16 14:31
1203621839	MB	MXS2	1001	SEP-15-16 11:04:30	DONE		27-AUG-16 14:30
1203621839	MB	MXS2	1003	SEP-15-16 11:04:30	DONE		28-AUG-16 16:08
405240005	SAMPLE	MXS2	1008	SEP-15-16 11:04:31	DONE		27-AUG-16 14:31
405240006	SAMPLE	MXS2	1010	SEP-15-16 11:04:31	DONE		28-AUG-16 16:08
405240007	SAMPLE	MXS2	1011	SEP-15-16 11:04:31	DONE		27-AUG-16 14:32
405240008	SAMPLE	MXS2	1012	SEP-15-16 11:04:31	DONE		27-AUG-16 14:32
405240009	SAMPLE	MXS2	1013	SEP-15-16 11:04:32	DONE		27-AUG-16 14:32
405240010	SAMPLE	MXS2	1014	SEP-15-16 11:04:32	DONE		27-AUG-16 14:32
405240011	SAMPLE	MXS2	1015	SEP-15-16 11:04:32	DONE		27-AUG-16 14:32
405240012	SAMPLE	MXS2	1016	SEP-15-16 11:04:32	DONE		27-AUG-16 14:32
405240013	SAMPLE	MXS2	1017	SEP-15-16 11:04:32	DONE		27-AUG-16 14:32
405240014	SAMPLE	MXS2	1018	SEP-15-16 11:04:32	DONE		28-AUG-16 16:08
405240015	SAMPLE	MXS2	1020	SEP-15-16 11:04:34	DONE		27-AUG-16 14:33
405240016	SAMPLE	MXS2	1021	SEP-15-16 11:04:34	DONE		27-AUG-16 14:33
1203621840	DUP	MXS2	1022	SEP-15-16 11:04:34	DONE		27-AUG-16 14:33
1203621841	LCS	MXS2	1024	SEP-15-16 11:04:34	DONE		27-AUG-16 14:34
405240001	SAMPLE	MXS2	1113	SEP-15-16 11:04:56	DONE		08-SEP-16 11:00
405240002	SAMPLE	MXS2	1114	SEP-15-16 11:04:59	DONE		08-SEP-16 15:33
405240003	SAMPLE	MXS2	1115	SEP-15-16 11:05:01	DONE		08-SEP-16 11:00
405240004	SAMPLE	MXS2	1116	SEP-15-16 11:05:04	DONE		08-SEP-16 11:01
405240005	SAMPLE	MXS2	1117	SEP-15-16 11:05:05	DONE		08-SEP-16 11:01
405240006	SAMPLE	MXS2	1118	SEP-15-16 11:05:09	DONE		08-SEP-16 12:36
405240007	SAMPLE	MXS2	1121	SEP-15-16 11:05:10	DONE		08-SEP-16 12:37
405240008	SAMPLE	MXS2	1122	SEP-15-16 11:05:12	DONE		08-SEP-16 11:01
405240009	SAMPLE	MXS2	1124	SEP-15-16 11:05:15	DONE		08-SEP-16 12:37
405240010	SAMPLE	MXS2	1126	SEP-15-16 11:05:18	DONE		08-SEP-16 12:37
405240011	SAMPLE	MXS2	1127	SEP-15-16 11:05:20	DONE		08-SEP-16 11:02
405240012	SAMPLE	MXS2	1128	SEP-15-16 11:05:23	DONE		08-SEP-16 11:02
405240013	SAMPLE	MXS2	1129	SEP-15-16 11:05:25	DONE		08-SEP-16 15:34
405240014	SAMPLE	MXS2	1130	SEP-15-16 11:05:27	DONE		08-SEP-16 11:02
405240015	SAMPLE	MXS2	1131	SEP-15-16 11:05:30	DONE		08-SEP-16 11:02
405240016	SAMPLE	MXS2	1132	SEP-15-16 11:05:32	DONE		08-SEP-16 12:38
1203621840	DUP	MXS2	1133	SEP-15-16 11:05:34	DONE		08-SEP-16 11:03
1203621841	LCS	MXS2	1134	SEP-15-16 11:05:36	DONE		08-SEP-16 11:03

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 1596445**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXS2	1096	SEP-15-16 11:05:01	DONE		06-SEP-16 11:01
405240002	SAMPLE	MXS2	1097	SEP-15-16 11:05:01	DONE		06-SEP-16 11:01
405240003	SAMPLE	MXS2	1099	SEP-15-16 11:05:01	DONE		06-SEP-16 11:01
1203621842	MB	MXS2	1095	SEP-15-16 11:05:01	DONE		06-SEP-16 11:01
405240004	SAMPLE	MXS2	1103	SEP-15-16 11:05:05	DONE		06-SEP-16 11:02
405240005	SAMPLE	MXS2	1104	SEP-15-16 11:05:05	DUSE		06-SEP-16 11:02
405240006	SAMPLE	MXS2	1105	SEP-15-16 11:05:05	DONE		06-SEP-16 11:02
405240007	SAMPLE	MXS2	1106	SEP-15-16 11:05:05	DONE		06-SEP-16 11:02
405240008	SAMPLE	MXS2	1107	SEP-15-16 11:05:09	DONE		06-SEP-16 11:02
405240009	SAMPLE	MXS2	1108	SEP-15-16 11:05:09	DUSE		06-SEP-16 11:02
405240010	SAMPLE	MXS2	1109	SEP-15-16 11:05:09	DUSE		06-SEP-16 11:02
405240011	SAMPLE	MXS2	1110	SEP-15-16 11:05:09	DONE		06-SEP-16 11:02
405240012	SAMPLE	MXS2	1112	SEP-15-16 11:05:09	DUSE		06-SEP-16 11:03
405240013	SAMPLE	MXS2	1210	SEP-15-16 11:06:02	DUSE		16-AUG-16 16:04
405240014	SAMPLE	MXS2	1212	SEP-15-16 11:06:04	DUSE		16-AUG-16 11:25
405240015	SAMPLE	MXS2	1216	SEP-15-16 11:06:06	DONE		16-AUG-16 16:05
405240016	SAMPLE	MXS2	1217	SEP-15-16 11:06:09	DUSE		16-AUG-16 11:25
1203621843	DUP	MXS2	1218	SEP-15-16 11:06:12	DONE		16-AUG-16 11:26
1203621844	LCS	MXS2	1221	SEP-15-16 11:06:14	DONE		18-AUG-16 15:42
405240005	SAMPLE	MXS2	1096	SEP-16-16 11:29:04	DONE		06-SEP-16 11:01
405240009	SAMPLE	MXS2	1097	SEP-16-16 11:29:04	DONE		06-SEP-16 11:01
405240010	SAMPLE	MXS2	1099	SEP-16-16 11:29:04	DONE		06-SEP-16 11:01
405240012	SAMPLE	MXS2	1105	SEP-16-16 11:29:05	DONE		06-SEP-16 11:02
405240013	SAMPLE	MXS2	1107	SEP-16-16 11:29:06	DONE		06-SEP-16 11:02
405240014	SAMPLE	MXS2	1110	SEP-16-16 11:29:06	DONE		06-SEP-16 11:02
405240016	SAMPLE	MXS2	1241	SEP-16-16 11:29:12	DONE		19-AUG-16 14:12

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 1596446**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240007	SAMPLE	MXS2	1210	SEP-15-16 16:21:03	DONE		16-AUG-16 16:04
405240008	SAMPLE	MXS2	1212	SEP-15-16 16:21:05	DONE		16-AUG-16 11:25
405240009	SAMPLE	MXS2	1217	SEP-15-16 16:21:08	DONE		16-AUG-16 11:25
405240010	SAMPLE	MXS2	1218	SEP-15-16 16:21:10	DONE		16-AUG-16 11:26
405240011	SAMPLE	MXS2	1219	SEP-15-16 16:21:11	DONE		16-AUG-16 19:23
405240012	SAMPLE	MXS2	1220	SEP-15-16 16:21:15	DONE		16-AUG-16 11:27
405240001	SAMPLE	MXS2	1065	SEP-15-16 16:21:40	DONE		03-SEP-16 15:22
405240002	SAMPLE	MXS2	1066	SEP-15-16 16:21:40	DONE		03-SEP-16 15:22
405240003	SAMPLE	MXS2	1067	SEP-15-16 16:21:40	DONE		03-SEP-16 15:22
405240004	SAMPLE	MXS2	1068	SEP-15-16 16:21:40	DONE		03-SEP-16 15:23
405240005	SAMPLE	MXS2	1069	SEP-15-16 16:21:40	DONE		03-SEP-16 15:23
405240006	SAMPLE	MXS2	1070	SEP-15-16 16:21:40	DONE		03-SEP-16 15:23
405240013	SAMPLE	MXS2	1199	SEP-15-16 17:20:12	DONE		15-SEP-16 12:02
405240014	SAMPLE	MXS2	1200	SEP-15-16 17:20:14	DONE		15-SEP-16 12:03
405240015	SAMPLE	MXS2	1201	SEP-15-16 17:20:16	DONE		15-SEP-16 12:03
405240016	SAMPLE	MXS2	1202	SEP-15-16 17:20:19	DONE		15-SEP-16 13:09
1203621845	MB	MXS2	1203	SEP-15-16 17:20:22	DONE		15-SEP-16 17:14
1203621846	DUP	MXS2	1205	SEP-15-16 17:20:24	DONE		15-SEP-16 12:03
1203621847	LCS	MXS2	1206	SEP-15-16 17:20:26	DONE		15-SEP-16 12:03

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 1596447**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXS2	1070	SEP-15-16 09:05:52	DONE		03-SEP-16 15:23
405240002	SAMPLE	MXS2	1071	SEP-15-16 09:05:53	DONE		03-SEP-16 15:23
405240003	SAMPLE	MXS2	1072	SEP-15-16 09:05:53	DUSE		03-SEP-16 15:23
405240004	SAMPLE	MXS2	1073	SEP-15-16 09:05:53	DONE		03-SEP-16 15:23
405240005	SAMPLE	MXS2	1074	SEP-15-16 09:05:53	DONE		03-SEP-16 15:23
405240006	SAMPLE	MXS2	1075	SEP-15-16 09:05:53	DONE		03-SEP-16 15:24
405240007	SAMPLE	MXS2	1078	SEP-15-16 09:05:54	DONE		03-SEP-16 15:24
405240008	SAMPLE	MXS2	1080	SEP-15-16 09:05:54	DONE		03-SEP-16 15:24
405240009	SAMPLE	MXS2	1081	SEP-15-16 09:05:54	DONE		03-SEP-16 15:24
405240010	SAMPLE	MXS2	1082	SEP-15-16 09:05:54	DONE		03-SEP-16 15:24
405240011	SAMPLE	MXS2	1083	SEP-15-16 09:05:55	DONE		03-SEP-16 15:24
405240012	SAMPLE	MXS2	1084	SEP-15-16 09:05:55	DONE		03-SEP-16 15:24
405240013	SAMPLE	MXS2	1085	SEP-15-16 09:05:55	DONE		03-SEP-16 15:25
405240014	SAMPLE	MXS2	1086	SEP-15-16 09:05:55	DONE		03-SEP-16 15:25
405240015	SAMPLE	MXS2	1088	SEP-15-16 09:05:55	DONE		03-SEP-16 15:25
405240016	SAMPLE	MXS2	1089	SEP-15-16 09:05:56	DONE		06-SEP-16 10:59
1203621848	MB	MXS2	1090	SEP-15-16 09:05:56	DONE		06-SEP-16 11:00
1203621849	DUP	MXS2	1091	SEP-15-16 09:05:56	DONE		06-SEP-16 11:00
1203621850	LCS	MXS2	1092	SEP-15-16 09:05:56	DONE		06-SEP-16 11:00
405240003	SAMPLE	MXS2	1231	SEP-15-16 11:51:11	DONE		16-AUG-16 19:24

Gamma Spectroscopy Raw Data

Radiochemistry Batch Checklist

10/03/16

Gamma Solid

Batch# 1596386 Product: MJWC Date: 10/03/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			n/a
Samples have been blank corrected (if required). Blank correction reported included (if required).			n/a
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			n/a
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.		✓	DER 1563816
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.	✓		
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)	✓		
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER 1563816
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		
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.)	✓		

Primary Review Performed By: 10/3/16

Secondary Review Performed By: 10/3/16

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
03-OCT-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GAMMA SPECTROMETER	DOE HASL 300, 4.5.2.3/Ga-01-R	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596386	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Sample Analyzed out of Holding: QC 1203621683DUP 2. Sample Logged out of Holding: 405240 001,002,003,004,005,006,007,008,009, 010,011,012,013,014,015,016	1. Sample was analyzed in a timely manner upon receipt. Reporting results. 2. Samples were analyzed in a timely manner upon receipt. Reporting results.

Originator's Name:

Spencer Collins 03-OCT-16

Data Validator/Group Leader:

Tim Winters 03-OCT-16

Gamma Spec Queue Sheet 1.G.- 10/3/16

09/16/2016

Batch #:1596386 Analyst: MXR1 First Client DueDate10/04/2016 Internal Due Date: 09/30/2016

Gamma LCS Isotope: Mixed Gamma LCS Code: 1556 Expiration Date: 4/1/38 (37 per 11/4/16) Vol: 1.0 mL

Initials: MS Prep Date: 9/12/16 Library: SOLID Balance ID: N/A

Sample ID	Client Description / Container ID	Type	Hazard Code	Client	Matrix	Collect Date	Geometry	Wet/Dry Aliquot (1 g / F)	Detector	Sealing Date/Time (if Applicable)
405240001-1	HO.1.1	SAMPLE		MJWC001	SOIL	15-DEC-15 10:14:00	CAN	155.344 g	2	9/12/16
405240002-1	HO.1.2	SAMPLE		MJWC001	SOIL	15-DEC-15 10:19:00		148.274 g	25	
405240003-1	HO.1.5	SAMPLE		MJWC001	SOIL	15-DEC-15 10:18:00		135.282 g	33	
405240004-1	HO.1.6	SAMPLE		MJWC001	SOIL	15-DEC-15 10:21:00		139.13 g	41	
405240005-1	HO.2.1	SAMPLE		MJWC001	SOIL	15-DEC-15 11:42:00		115.18 g	31	
405240006-1	HO.2.2	SAMPLE		MJWC001	SOIL	15-DEC-15 11:46:00		119.145 g	43	
405240007-1	HO.3.1	SAMPLE		MJWC001	SOIL	15-DEC-15 12:17:00		131.484 g	1	
405240008-1	HO.3.2	SAMPLE		MJWC001	SOIL	15-DEC-15 12:20:00		150.704 g	6	
405240009-1	HO.4.1	SAMPLE		MJWC001	SOIL	15-DEC-15 12:31:00		137.062 g	7	
405240010-1	HO.4.2	SAMPLE		MJWC001	SOIL	15-DEC-15 12:35:00		144.811 g	18	
405240011-1	HO.5.1	SAMPLE		MJWC001	SOIL	15-DEC-15 12:53:00		135.975 g	24	
405240012-1	HO.5.2	SAMPLE		MJWC001	SOIL	15-DEC-15 12:56:00		130.921 g	29	
405240013-1	REACH7.1.1	SAMPLE		MJWC001	SOIL	15-DEC-15 11:04:00		133.855 g	36	
405240014-1	REACH7.1.2	SAMPLE		MJWC001	SOIL	15-DEC-15 11:08:00		138.765 g	32	
405240015-1	REACH21.1.1	SAMPLE		MJWC001	SOIL	15-DEC-15 14:02:00		122.616 g	39	
405240016-1	REACH21.1.2	SAMPLE		MJWC001	SOIL	15-DEC-15 14:06:00		126.69 g	8	
1203621682-1	MB	MB		QC ACCOUNT	SOIL	9/12/16		155.344	9	
1203621683-1	DUP HO.1.1(405240001)	DUP		QC ACCOUNT	SOIL	15-DEC-15 10:14:00		155.344	19	
1203621684-1	LCS	LCS		QC ACCOUNT	SOIL	9/12/16		115	11	

GEL Laboratories LLC, Radiochemistry Division

Data Reviewed By: -10/3/16

Page 1 of 1

10/3/16

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:42:29.96

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM02.CNF;493
                                        Background date  : 2-OCT-2016 11:00:01.
Sample date      : 15-DEC-2015 10:14:00 Acquisition date : 3-OCT-2016 04:37:20.
Sample ID        : R405240001           Sample quantity  : 1.55344E+02 GRAM
Detector name    : GAM02                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.33  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.90*	27	135	1.20	125.30	122	9	7.40E-03	85.9	
2	1	74.86*	88	152	1.21	149.21	143	29	2.44E-02	26.1	3.72E+00
3	1	77.16	124	142	1.20	153.79	143	29	3.44E-02	18.8	
4	1	79.26	31	133	1.11	158.00	143	29	8.55E-03	65.6	
5	1	84.38*	24	119	1.23	168.22	143	29	6.79E-03	83.9	
6	0	86.36	22	151	1.40	172.18	171	7	6.17E-03	93.4	
7	3	89.58	59	58	1.00	178.63	177	25	1.64E-02	21.5	2.96E+00
8	3	92.65*	63	118	1.51	184.75	177	25	1.74E-02	38.9	
9	3	98.66*	40	96	1.53	196.76	177	25	1.11E-02	52.9	
10	0	143.65*	9	110	0.56	286.65	284	8	2.45E-03	217.9	
11	0	185.45*	71	137	1.81	370.19	364	12	1.98E-02	37.3	
12	0	209.96	31	90	1.29	419.16	413	9	8.61E-03	58.0	
13	0	238.60*	261	115	1.05	476.40	472	9	7.25E-02	9.8	
14	0	242.09	42	81	1.97	483.38	480	8	1.18E-02	40.4	
15	0	270.51	55	73	3.14	540.17	535	12	1.52E-02	34.4	
16	0	295.46	104	79	1.19	590.01	584	11	2.90E-02	19.2	
17	0	337.99*	87	72	1.41	675.01	667	16	2.42E-02	24.6	
18	0	351.67*	222	41	1.43	702.34	695	12	6.17E-02	9.1	
19	0	486.85	13	34	3.44	972.48	966	12	3.53E-03	95.2	
20	0	511.01*	52	43	1.55	1020.77	1013	17	1.46E-02	36.7	
21	0	583.32*	88	26	1.39	1165.27	1161	12	2.45E-02	16.3	
22	0	609.25*	143	33	1.65	1217.09	1211	12	3.98E-02	12.0	
23	0	662.39*	19	35	1.21	1323.29	1317	11	5.26E-03	69.8	
24	0	728.89	20	27	3.48	1456.20	1447	14	5.42E-03	61.7	
25	0	767.72*	19	21	1.85	1533.80	1528	12	5.31E-03	55.3	
26	0	786.72	20	25	2.07	1571.77	1563	14	5.56E-03	59.8	
27	0	791.11	9	2	0.70	1580.54	1577	7	2.61E-03	39.9	
28	0	911.22*	56	14	2.32	1820.60	1815	11	1.56E-02	19.3	
29	0	916.73	13	12	1.22	1831.60	1827	8	3.73E-03	52.1	
30	0	934.22	14	6	1.79	1866.56	1863	10	3.86E-03	41.0	
31	0	963.58*	29	15	1.43	1925.24	1917	15	8.03E-03	35.5	
32	0	969.26*	26	17	2.54	1936.59	1931	13	7.19E-03	38.7	
33	0	1033.21	15	7	0.55	2064.41	2055	14	4.09E-03	46.3	
34	0	1095.77	11	12	2.98	2189.45	2183	12	3.06E-03	69.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1120.08*	20	17	1.17	2238.05	2234	11	5.54E-03	47.8	
36	0	1155.47	20	12	1.10	2308.77	2303	15	5.57E-03	42.9	
37	0	1223.35	24	7	2.00	2444.46	2437	14	6.67E-03	31.0	
38	0	1238.67	13	26	1.09	2475.08	2468	13	3.61E-03	85.5	
39	0	1307.10	13	7	1.58	2611.85	2604	14	3.61E-03	51.3	
40	0	1328.20	10	3	0.65	2654.03	2648	11	2.88E-03	43.7	
41	0	1407.24	15	4	3.97	2812.01	2805	15	4.19E-03	38.1	
42	0	1460.67*	293	8	2.25	2918.82	2911	15	8.13E-02	6.3	
43	0	1764.10*	19	0	1.68	3525.37	3519	12	5.26E-03	28.3	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 05:42:31

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240001.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 10:14:00 Acquisition date : 3-OCT-2016 04:37:20
Sample ID   : R405240001   Sample quantity : 155.34 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA2   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.33   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06
PB-214	87.09	TH-229	85.43
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.059E+00	1.212E+01	1.212E+01	12.64	OK
SN-126	64.28	9.60	2.432E+00	7.324E-01	7.324E-01	171.70	OK
	86.94	8.90	4.784E+00	2.759E-02	2.759E-02	2236.19	OK
	87.57	37.00*	4.784E+00	6.637E-03	6.637E-03	2236.19	OK
BA-137M	661.66	89.90*	2.014E+00	5.347E-02	5.447E-02	139.51	OK
CS-137	661.66	85.10*	2.014E+00	5.649E-02	5.754E-02	139.51	OK
TL-208	277.37	6.60	4.173E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.233E+00	2.413E-01	2.413E-01	32.52	OK
	860.56	12.50	1.634E+00	----- Line Not Found		-----	Absent
BI-211	72.87	1.23	3.574E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.418E+00	6.045E-01	6.045E-01	148.22	OK
PB-212	74.82	10.28	3.779E+00	9.886E-01	9.886E-01	76.93	OK
	77.11	17.10	4.005E+00	1.141E+00	1.141E+00	37.54	OK
	238.63	43.60*	4.701E+00	7.229E-01	7.229E-01	19.60	OK
	300.09	3.30	3.910E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98	OK
	1120.29	14.92	1.323E+00	4.870E-01	4.872E-01	95.61	OK
	1764.49	15.30	8.933E-01	6.331E-01	6.333E-01	56.59	OK
PB-214	74.82	5.80	3.775E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	4.005E+00	2.011E+00	2.012E+00	37.54	OK
	87.09	3.41	4.837E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.649E+00	7.150E-01	7.153E-01	80.83	OK
	295.22	18.42	3.961E+00	7.958E-01	7.961E-01	38.42	OK
	351.93	35.60*	3.416E+00	----- Line Not Found		-----	<<INT Reject
RN-222	609.32	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98	OK
	1120.29	14.92	1.323E+00	4.870E-01	4.872E-01	95.61	OK
	1764.49	15.30	8.933E-01	6.331E-01	6.333E-01	56.59	OK
RA-226	609.32	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98	OK
	1120.29	14.92	1.323E+00	4.870E-01	4.872E-01	95.61	OK
	1764.49	15.30	8.933E-01	6.331E-01	6.333E-01	56.59	OK
AC-228	105.21	1.10	5.776E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.536E+00	1.198E+00	1.198E+00	49.13	OK
	794.95	4.25	1.740E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.672E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55	OK
	968.97	15.80	1.486E+00	5.406E-01	5.406E-01	77.46	OK
RA-228	105.21	1.10	5.776E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.536E+00	1.198E+00	1.198E+00	49.13	OK
	794.95	4.25	1.740E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.672E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55	OK
	968.97	15.80	1.486E+00	5.406E-01	5.406E-01	77.46	OK
TH-228	74.82	10.28	3.779E+00	9.886E-01	9.886E-01	76.93	OK
	77.11	17.10	4.005E+00	1.141E+00	1.141E+00	37.54	OK
	238.63	43.60*	4.701E+00	7.229E-01	7.229E-01	19.60	OK
	300.09	3.30	3.910E+00	----- Line Not Found		-----	Absent
TH-229	85.43	14.70	4.784E+00	1.670E-02	1.671E-02	2236.19	OK
	88.47	24.00	5.009E+00	3.048E-01	3.049E-01	43.08	OK
	193.51	4.41*	5.427E+00	----- Line Not Found		-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	210.85	2.80	5.153E+00	1.236E+00	1.236E+00	116.04	OK
TH-230	609.32	45.49*	2.155E+00	7.546E-01	7.546E-01	23.98	OK
	1120.29	14.92	1.323E+00	4.870E-01	4.870E-01	95.61	OK
	1764.49	15.30	8.933E-01	6.331E-01	6.331E-01	56.59	OK
TH-232	105.21	1.10	5.776E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.536E+00	1.198E+00	1.198E+00	49.13	OK
	835.71	1.61	1.672E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55	OK
	968.97	15.80	1.486E+00	5.406E-01	5.406E-01	77.46	OK
TH-234	63.29	3.70*	2.432E+00	1.900E+00	1.900E+00	171.70	OK
	92.59	4.23	5.200E+00	1.769E+00	1.769E+00	77.83	OK
U-234	609.32	45.49*	2.155E+00	7.546E-01	7.546E-01	23.98	OK
	1120.29	14.92	1.323E+00	4.870E-01	4.870E-01	95.61	OK
	1764.49	15.30	8.933E-01	6.331E-01	6.331E-01	56.59	OK
U-235	89.96	3.47	5.009E+00	2.108E+00	2.108E+00	43.08	OK
	93.35	5.60	5.200E+00	1.336E+00	1.336E+00	77.83	OK
	143.76	10.96*	6.128E+00	7.829E-02	7.829E-02	435.73	OK
	163.33	5.08	5.908E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.562E+00	1.305E-01	1.305E-01	74.56	OK
	205.31	5.01	5.230E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	2.432E+00	1.900E+00	1.900E+00	171.70	OK
	92.59	4.23	5.200E+00	1.769E+00	1.769E+00	77.83	OK
AM-243	43.53	5.90	2.878E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.779E+00	1.512E-01	1.512E-01	76.93	OK
ANH-511	511.00	100.00*	2.490E+00	1.108E-01	1.108E-01	73.40	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:42:33.00

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240001.CNF;1		
Acquisition date	3-OCT-2016 04:37:20	Sensitivity	3.000
Detector ID	GAM02	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.33	Half life ratio	*****
Sample date	15-DEC-2015 10:14:00	Analyst initials	MXR1
Sample ID	R405240001	Sample Quantity	1.5534E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	22-AUG-2016 09:02:05	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;15		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.212E+01	1.502E+00	4.467E-01
SN-126	6.637E-03	1.454E-01	1.728E-01
BA-137M	5.447E-02	7.447E-02	6.994E-02
CS-137	5.754E-02	7.867E-02	7.388E-02
TL-208	2.413E-01	7.689E-02	6.969E-02
BI-211	6.045E-01	8.780E-01	2.965E-01
PB-212	7.229E-01	1.388E-01	1.100E-01
BI-214	7.548E-01	1.774E-01	1.482E-01
PB-214	9.978E-01	1.772E-01	3.086E-01
RN-222	7.548E-01	1.774E-01	1.482E-01
RA-226	7.548E-01	1.774E-01	1.482E-01
AC-228	6.890E-01	2.603E-01	2.461E-01
RA-228	6.890E-01	2.603E-01	2.461E-01
TH-228	7.229E-01	1.388E-01	1.100E-01
TH-229	-6.668E-01	4.205E-01	7.294E-01
TH-230	7.546E-01	1.773E-01	1.481E-01
TH-232	6.890E-01	2.603E-01	2.461E-01
TH-234	1.900E+00	3.197E+00	2.696E+00
U-234	7.546E-01	1.773E-01	1.481E-01
U-235	7.829E-02	3.343E-01	3.263E-01
U-238	1.900E+00	3.197E+00	2.696E+00
AM-243	1.512E-01	1.140E-01	1.037E-01
ANH-511	1.108E-01	7.973E-02	4.816E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-8.531E-01	1.153E+01	2.178E+01	NOT IDENT.
NA-22	4.650E-03	4.522E-02	9.095E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-5.493E-03	2.364E-02	5.088E-02	NOT IDENT.
SC-46	-8.357E-02	3.559E-01	6.512E-01	FAIL ABUN
V-48	0.000E+00	8.285E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.389E+02	0.000E+00	SHORT HLIF

MN-54	-6.189E-03	5.571E-02	1.105E-01	NOT IDENT.
CO-56	1.481E-01	4.932E-01	1.009E+00	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.199E-02	4.508E-02	8.143E-02	NOT IDENT.
CO-58	-1.682E-01	5.427E-01	1.037E+00	NOT IDENT.
FE-59	-3.045E+00	7.396E+00	1.141E+01	NOT IDENT.
CO-60	3.563E-03	3.575E-02	6.681E-02	NOT IDENT.
ZN-65	-6.082E-02	2.049E-01	3.251E-01	NOT IDENT.
GE-68	3.984E-01	2.249E+00	4.595E+00	NOT IDENT.
AS-73	-3.645E+00	1.010E+01	1.917E+01	NOT IDENT.
AS-74	0.000E+00	5.131E+03	0.000E+00	SHORT HLIF
SE-75	-1.324E-03	1.891E-01	3.703E-01	NOT IDENT.
BR-77	0.000E+00	3.184E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.095E+02	0.000E+00	SHORT HLIF
RB-83	-9.970E-02	6.449E-01	1.199E+00	NOT IDENT.
KR-85	9.391E+00	7.875E+00	1.571E+01	NOT IDENT.
SR-85	9.191E-01	7.723E-01	1.540E+00	NOT IDENT.
RB-86	0.000E+00	2.034E+04	0.000E+00	SHORT HLIF
Y-88	-6.532E-02	2.089E-01	4.170E-01	NOT IDENT.
Y-91	1.604E+01	6.795E+02	1.275E+03	NOT IDENT.
NB-94	2.107E-02	3.281E-02	6.995E-02	NOT IDENT.
NB-95	9.086E-02	9.479E-01	1.715E+00	NOT IDENT.
NB-95M	2.216E-01	2.292E+00	4.071E+00	NOT IDENT.
ZR-95	-1.843E-02	1.420E+00	2.821E+00	NOT IDENT.
NB-97	0.000E+00	1.329E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.708E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	1.058E-02	3.685E-02	6.894E-02	NOT IDENT.
RH-102	4.770E-03	5.008E-02	9.850E-02	FAIL ABUN
RU-103	2.333E+00	5.047E+00	1.023E+01	FAIL ABUN
RH-106	1.428E-01	5.405E-01	1.051E+00	NOT IDENT.
RU-106	1.428E-01	5.405E-01	1.051E+00	NOT IDENT.
AG-108M	-2.767E-03	2.808E-02	5.317E-02	NOT IDENT.
CD-109	0.000E+00	1.258E+00	2.401E+00	NOT IDENT.
AG-110M	-5.958E-02	8.951E-02	1.597E-01	NOT IDENT.
SN-113	4.992E-02	2.343E-01	4.582E-01	NOT IDENT.
CD-115	0.000E+00	3.635E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.156E+04	0.000E+00	SHORT HLIF
TE-123M	6.884E-02	1.136E-01	2.378E-01	NOT IDENT.
SB-124	-9.548E-01	2.447E+00	4.642E+00	NOT IDENT.
SB-125	1.388E-02	9.810E-02	1.925E-01	NOT IDENT.
TE-125M	1.287E+01	2.524E+02	4.718E+02	NOT IDENT.
I-126	0.000E+00	7.023E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	7.769E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	6.362E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.510E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.285E+25	0.000E+00	SHORT HLIF
BA-133	2.283E-02	4.163E-02	7.818E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	5.158E-02	4.685E-02	1.044E-01	NOT IDENT.
CS-135	7.899E-02	1.460E-01	2.722E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.146E+05	0.000E+00	SHORT HLIF
CE-139	-6.989E-02	9.426E-02	1.788E-01	NOT IDENT.
BA-140	0.000E+00	9.128E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.735E+05	0.000E+00	SHORT HLIF
CE-141	1.476E+00	2.181E+01	3.688E+01	NOT IDENT.
CE-143	0.000E+00	1.145E+41	0.000E+00	SHORT HLIF
CE-144	-1.499E-01	3.723E-01	6.568E-01	FAIL ABUN
PM-144	-3.072E-02	5.360E-02	9.936E-02	NOT IDENT.
PR-144	-2.659E+00	4.639E+00	8.599E+00	NOT IDENT.
PM-146	4.262E-02	4.542E-02	9.589E-02	NOT IDENT.
ND-147	0.000E+00	2.051E+07	0.000E+00	SHORT HLIF
PM-147	-2.371E+02	8.344E+02	1.502E+03	NOT IDENT.
PM-149	0.000E+00	5.099E+39	0.000E+00	SHORT HLIF
EU-150	1.420E-02	2.713E-02	5.028E-02	FAIL ABUN
EU-152	7.369E-02	8.273E-02	1.722E-01	FAIL ABUN
GD-153	3.576E-01	3.704E-01	3.600E-01	FAIL ABUN
EU-154	1.144E-02	1.113E-01	2.238E-01	NOT IDENT.
EU-155	9.440E-02	1.160E-01	2.291E-01	FAIL ABUN
TB-160	5.658E-01	1.768E+00	3.689E+00	FAIL ABUN
HO-166M	-3.760E-03	5.326E-02	1.064E-01	FAIL ABUN
TM-171	2.939E+00	2.608E+01	5.165E+01	NOT IDENT.
HF-172	3.272E-02	2.347E-01	4.367E-01	FAIL ABUN
LU-172	2.838E-02	9.287E-02	1.695E-01	FAIL ABUN
LU-176	1.123E-02	2.331E-02	4.745E-02	FAIL ABUN

HF-181	-1.378E+00	4.554E+00	7.315E+00	NOT IDENT.
TA-182	1.535E-01	1.100E+00	1.901E+00	FAIL ABUN
RE-183	9.477E-01	3.508E+00	6.918E+00	NOT IDENT.
RE-184	1.634E+01	2.559E+01	5.600E+01	FAIL ABUN
W-188	-4.832E+01	1.084E+02	1.787E+02	FAIL ABUN
IR-192	-8.177E-02	4.397E-01	8.358E-01	FAIL ABUN
HG-203	-1.422E+00	2.224E+00	4.075E+00	NOT IDENT.
BI-207	-8.314E-02	5.603E-02	8.096E-02	FAIL ABUN
PB-210	-8.700E-02	5.373E+00	1.040E+01	NOT IDENT.
PB-211	-3.052E-01	6.383E-01	1.158E+00	NOT IDENT.
BI-212	5.015E-01	5.141E-01	1.126E+00	FAIL ABUN
RN-219	-2.421E-02	3.689E-01	7.046E-01	FAIL ABUN
RA-223	-4.269E-01	5.408E-01	9.625E-01	FAIL ABUN
RA-224	1.264E+00	1.002E+00	1.329E+00	FAIL ABUN
AC-227	1.387E-01	2.086E-01	4.336E-01	FAIL ABUN
TH-227	1.387E-01	2.086E-01	4.336E-01	FAIL ABUN
PA-231	1.187E-01	4.161E-01	8.302E-01	NOT IDENT.
TH-231	-4.269E-01	5.408E-01	9.625E-01	FAIL ABUN
PA-233	4.326E-03	6.514E-02	1.261E-01	NOT IDENT.
PA-234	7.502E-02	2.661E-01	5.552E-01	FAIL ABUN
PA-234M	-1.371E+00	5.166E+00	1.004E+01	FAIL ABUN
NP-237	4.326E-03	6.514E-02	1.261E-01	FAIL ABUN
NP-238	0.000E+00	4.000E+40	0.000E+00	SHORT HLIF
NP-239	1.176E-01	2.377E-01	4.601E-01	FAIL ABUN
PU-239	1.147E+02	3.554E+02	6.628E+02	NOT IDENT.
AM-241	-4.790E-02	1.886E-01	3.276E-01	NOT IDENT.
CM-243	5.081E-03	9.849E-02	1.850E-01	FAIL ABUN
BK-247	-1.408E-02	7.295E-02	1.336E-01	FAIL ABUN
CM-247	6.426E-03	3.380E-02	6.648E-02	NOT IDENT.
CF-249	2.617E-02	3.794E-02	7.815E-02	NOT IDENT.
CF-251	-3.626E-02	1.104E-01	2.146E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:42:30.69

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	283	10.66*	1.059E+00	1.212E+01	1.212E+01	12.64
SN-126	64.28	35	9.60	2.432E+00	7.324E-01	7.324E-01	171.70
	86.94	29	8.90	4.784E+00	3.257E-01	3.257E-01	186.73
	87.57	29	37.00*	4.784E+00	7.835E-02	7.835E-02	186.73
BA-137M	661.66	20	89.90*	2.014E+00	5.347E-02	5.447E-02	139.51
CS-137	661.66	20	85.10*	2.014E+00	5.649E-02	5.754E-02	139.51
TL-208	277.37	------	6.60	4.173E+00	------ Line Not Found		------
	583.19	95	85.00*	2.233E+00	2.413E-01	2.413E-01	32.52
	860.56	------	12.50	1.634E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.574E+00	------ Line Not Found		------
	351.06	251	12.92*	3.418E+00	2.749E+00	2.749E+00	18.12
PB-212	74.82	115	10.28	3.779E+00	1.428E+00	1.428E+00	52.19
	77.11	162	17.10	4.005E+00	1.141E+00	1.141E+00	37.54
	238.63	307	43.60*	4.701E+00	7.229E-01	7.229E-01	19.60
	300.09	------	3.30	3.910E+00	------ Line Not Found		------
BI-214	609.32	153	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98
	1120.29	20	14.92	1.323E+00	4.870E-01	4.872E-01	95.61
	1764.49	18	15.30	8.933E-01	6.331E-01	6.333E-01	56.59
PB-214	74.82	115	5.80	3.779E+00	2.530E+00	2.531E+00	52.19
	77.11	162	9.70	4.005E+00	2.011E+00	2.012E+00	37.54
	87.09	29	3.41	4.784E+00	8.501E-01	8.504E-01	186.73
	242.00	50	7.25	4.649E+00	7.150E-01	7.153E-01	80.83
	295.22	120	18.42	3.961E+00	7.958E-01	7.961E-01	38.42
	351.93	251	35.60*	3.418E+00	9.975E-01	9.978E-01	18.12
RN-222	609.32	153	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98
	1120.29	20	14.92	1.323E+00	4.870E-01	4.872E-01	95.61
	1764.49	18	15.30	8.933E-01	6.331E-01	6.333E-01	56.59
RA-224	240.99	50	4.10*	4.649E+00	1.264E+00	1.264E+00	80.83
RA-226	609.32	153	45.49*	2.155E+00	7.546E-01	7.548E-01	23.98
	1120.29	20	14.92	1.323E+00	4.870E-01	4.872E-01	95.61
	1764.49	18	15.30	8.933E-01	6.331E-01	6.333E-01	56.59
AC-228	105.21	------	1.10	5.776E+00	------ Line Not Found		------
	338.32	99	11.27	3.536E+00	1.198E+00	1.198E+00	49.13
	794.95	------	4.25	1.740E+00	------ Line Not Found		------
	835.71	------	1.61	1.672E+00	------ Line Not Found		------
	911.20	57	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55
	968.97	26	15.80	1.486E+00	5.406E-01	5.406E-01	77.46
RA-228	105.21	------	1.10	5.776E+00	------ Line Not Found		------
	338.32	99	11.27	3.536E+00	1.198E+00	1.198E+00	49.13
	794.95	------	4.25	1.740E+00	------ Line Not Found		------
	835.71	------	1.61	1.672E+00	------ Line Not Found		------
	911.20	57	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55
	968.97	26	15.80	1.486E+00	5.406E-01	5.406E-01	77.46
TH-228	74.82	115	10.28	3.779E+00	1.428E+00	1.428E+00	52.19
	77.11	162	17.10	4.005E+00	1.141E+00	1.141E+00	37.54
	238.63	307	43.60*	4.701E+00	7.229E-01	7.229E-01	19.60
	300.09	------	3.30	3.910E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-229	85.43	29	14.70	4.784E+00	1.972E-01	1.972E-01	186.73
	88.47	76	24.00	5.009E+00	3.048E-01	3.049E-01	43.08
	193.51	------	4.41*	5.427E+00	------ Line Not Found		------
	210.85	37	2.80	5.153E+00	1.236E+00	1.236E+00	116.04
TH-230	609.32	153	45.49*	2.155E+00	7.546E-01	7.546E-01	23.98
	1120.29	20	14.92	1.323E+00	4.870E-01	4.870E-01	95.61
	1764.49	18	15.30	8.933E-01	6.331E-01	6.331E-01	56.59
TH-232	105.21	------	1.10	5.776E+00	------ Line Not Found		------
	338.32	99	11.27	3.536E+00	1.198E+00	1.198E+00	49.13
	835.71	------	1.61	1.672E+00	------ Line Not Found		------
	911.20	57	25.80*	1.561E+00	6.890E-01	6.890E-01	38.55
	968.97	26	15.80	1.486E+00	5.406E-01	5.406E-01	77.46
TH-234	63.29	35	3.70*	2.432E+00	1.900E+00	1.900E+00	171.70
	92.59	81	4.23	5.200E+00	1.769E+00	1.769E+00	77.83
U-234	609.32	153	45.49*	2.155E+00	7.546E-01	7.546E-01	23.98
	1120.29	20	14.92	1.323E+00	4.870E-01	4.870E-01	95.61
	1764.49	18	15.30	8.933E-01	6.331E-01	6.331E-01	56.59
U-235	89.96	76	3.47	5.009E+00	2.108E+00	2.108E+00	43.08
	93.35	81	5.60	5.200E+00	1.336E+00	1.336E+00	77.83
	143.76	11	10.96*	6.128E+00	7.829E-02	7.829E-02	435.73
	163.33	------	5.08	5.908E+00	------ Line Not Found		------
	185.72	86	57.20	5.562E+00	1.305E-01	1.305E-01	74.56
	205.31	------	5.01	5.230E+00	------ Line Not Found		------
U-238	63.29	35	3.70*	2.432E+00	1.900E+00	1.900E+00	171.70
	92.59	81	4.23	5.200E+00	1.769E+00	1.769E+00	77.83
AM-243	43.53	------	5.90	2.878E-01	------ Line Not Found		------
	74.66	115	67.20*	3.779E+00	2.184E-01	2.184E-01	52.19
ANH-511	511.00	57	100.00*	2.490E+00	1.108E-01	1.108E-01	73.40

Flag: "*" = Keyline

Sample ID : R405240001 Acquisition date : 3-OCT-2016 04:37:20

Total number of lines in spectrum 43
Number of unidentified lines 9
Number of lines tentatively identified by NID 34 79.07%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.212E+01	1.212E+01	0.153E+01	12.64	
SN-126	2.30E+05Y	1.00	7.835E-02	7.835E-02	14.63E-02	186.73	
BA-137M	30.08Y	1.02	5.347E-02	5.447E-02	7.599E-02	139.51	
CS-137	30.08Y	1.02	5.649E-02	5.754E-02	8.028E-02	139.51	
TL-208	1.41E+10Y	1.00	2.413E-01	2.413E-01	0.785E-01	32.52	
BI-211	7.04E+08Y	1.00	2.749E+00	2.749E+00	0.498E+00	18.12	
PB-212	1.41E+10Y	1.00	7.229E-01	7.229E-01	1.417E-01	19.60	
BI-214	1600.00Y	1.00	7.546E-01	7.548E-01	1.810E-01	23.98	
PB-214	1600.00Y	1.00	9.975E-01	9.978E-01	1.808E-01	18.12	
RN-222	1600.00Y	1.00	7.546E-01	7.548E-01	1.810E-01	23.98	
RA-224	1.41E+10Y	1.00	1.264E+00	1.264E+00	1.022E+00	80.83	
RA-226	1600.00Y	1.00	7.546E-01	7.548E-01	1.810E-01	23.98	
AC-228	1.41E+10Y	1.00	6.890E-01	6.890E-01	2.656E-01	38.55	
RA-228	1.41E+10Y	1.00	6.890E-01	6.890E-01	2.656E-01	38.55	
TH-228	1.41E+10Y	1.00	7.229E-01	7.229E-01	1.417E-01	19.60	
TH-229	7340.00Y	1.00	3.048E-01	3.049E-01	1.313E-01	43.08	K
TH-230	7.54E+04Y	1.00	7.546E-01	7.546E-01	1.809E-01	23.98	
TH-232	1.41E+10Y	1.00	6.890E-01	6.890E-01	2.656E-01	38.55	
TH-234	4.47E+09Y	1.00	1.900E+00	1.900E+00	3.263E+00	171.70	
U-234	2.45E+05Y	1.00	7.546E-01	7.546E-01	1.809E-01	23.98	
U-235	7.04E+08Y	1.00	7.829E-02	7.829E-02	34.11E-02	435.73	
U-238	4.47E+09Y	1.00	1.900E+00	1.900E+00	3.263E+00	171.70	
AM-243	7370.00Y	1.00	2.184E-01	2.184E-01	1.140E-01	52.19	
ANH-511	1.00E+09Y	1.00	1.108E-01	1.108E-01	0.814E-01	73.40	
Total Activity :			2.936E+01	2.937E+01			

Grand Total Activity : 2.936E+01 2.937E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240001 Acquisition date : 3-OCT-2016 04:37:20

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	79.26	40	172	1.11	158.00	143	29	8.55E-03	****	4.20E+00	T
1	84.38	32	154	1.23	168.22	143	29	6.79E-03	****	4.63E+00	T
3	98.66	51	123	1.53	196.76	177	25	1.11E-02	****	5.52E+00	T
0	270.51	63	85	3.14	540.17	535	12	1.52E-02	68.8	4.26E+00	T
0	486.85	14	38	3.44	972.48	966	12	3.53E-03	****	2.59E+00	T
0	728.89	20	29	3.48	1456.20	1447	14	5.42E-03	****	1.86E+00	
0	767.72	20	22	1.85	1533.80	1528	12	5.31E-03	****	1.79E+00	T
0	786.72	21	26	2.07	1571.77	1563	14	5.56E-03	****	1.75E+00	T
0	791.11	10	2	0.70	1580.54	1577	7	2.61E-03	79.7	1.75E+00	T
0	916.73	14	12	1.22	1831.60	1827	8	3.73E-03	****	1.55E+00	
0	934.22	14	6	1.79	1866.56	1863	10	3.86E-03	82.0	1.53E+00	
0	963.58	29	15	1.43	1925.24	1917	15	8.03E-03	71.0	1.49E+00	T
0	1033.21	15	7	0.55	2064.41	2055	14	4.09E-03	92.6	1.41E+00	
0	1095.77	11	12	2.98	2189.45	2183	12	3.06E-03	****	1.35E+00	
0	1155.47	20	12	1.10	2308.77	2303	15	5.57E-03	85.9	1.29E+00	
0	1223.35	24	7	2.00	2444.46	2437	14	6.67E-03	62.1	1.23E+00	
0	1238.67	13	26	1.09	2475.08	2468	13	3.61E-03	****	1.22E+00	T
0	1307.10	13	7	1.58	2611.85	2604	14	3.61E-03	****	1.16E+00	
0	1328.20	10	3	0.65	2654.03	2648	11	2.88E-03	87.3	1.15E+00	
0	1407.24	15	4	3.97	2812.01	2805	15	4.19E-03	76.3	1.09E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:42:45.01

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240001.CNF;1    *
* Acquisition date :  3-OCT-2016 04:37:20 Sensitivity     : 3.000            *
* Detector ID      : GAM02                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : SOLID            *
* Sample ID        : R405240001           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 22-AUG-2016 09:02:05 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;15             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.650E-01
SN-126	8.250E-02
BA-137M	3.119E-02
CS-137	3.295E-02
TL-208	3.129E-02
BI-211	1.328E-01
PB-212	5.162E-02
BI-214	6.722E-02
PB-214	1.487E-01
RN-222	6.722E-02
RA-226	6.722E-02
AC-228	1.065E-01
RA-228	1.065E-01
TH-228	5.162E-02
TH-229	3.358E-01
TH-230	6.720E-02
TH-232	1.065E-01
TH-234	1.271E+00
U-234	6.720E-02
U-235	1.528E-01
U-238	1.271E+00
AM-243	4.908E-02
ANH-511	2.136E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	9.776E+00	NOT IDENT.
NA-22	3.860E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.791E-02	NOT IDENT.
SC-46	2.783E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	4.761E-02	NOT IDENT.

CO-56	4.484E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	3.790E-02	NOT IDENT.
CO-58	4.498E-01	NOT IDENT.
FE-59	4.868E+00	NOT IDENT.
CO-60	2.700E-02	NOT IDENT.
ZN-65	1.399E-01	NOT IDENT.
GE-68	1.978E+00	NOT IDENT.
AS-73	8.903E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.705E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	5.352E-01	NOT IDENT.
KR-85	7.191E+00	NOT IDENT.
SR-85	7.051E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.570E-01	NOT IDENT.
Y-91	5.721E+02	NOT IDENT.
NB-94	3.148E-02	NOT IDENT.
NB-95	7.685E-01	NOT IDENT.
NB-95M	1.897E+00	NOT IDENT.
ZR-95	1.249E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.250E-02	NOT IDENT.
RH-102	4.259E-02	FAIL ABUN
RU-103	4.600E+00	FAIL ABUN
RH-106	4.703E-01	NOT IDENT.
RU-106	4.703E-01	NOT IDENT.
AG-108M	2.396E-02	NOT IDENT.
CD-109	1.140E+00	NOT IDENT.
AG-110M	6.690E-02	NOT IDENT.
SN-113	2.095E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.113E-01	NOT IDENT.
SB-124	1.889E+00	NOT IDENT.
SB-125	8.660E-02	NOT IDENT.
TE-125M	2.208E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.566E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.630E-02	NOT IDENT.
CS-135	1.261E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	8.294E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.723E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.076E-01	FAIL ABUN
PM-144	4.358E-02	NOT IDENT.
PR-144	3.771E+00	NOT IDENT.
PM-146	4.375E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	7.016E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.312E-02	FAIL ABUN
EU-152	7.840E-02	FAIL ABUN
GD-153	1.697E-01	FAIL ABUN
EU-154	9.496E-02	NOT IDENT.
EU-155	1.081E-01	FAIL ABUN
TB-160	1.616E+00	FAIL ABUN
HO-166M	4.667E-02	FAIL ABUN
TM-171	2.406E+01	NOT IDENT.
HF-172	2.048E-01	FAIL ABUN
LU-172	7.426E-02	FAIL ABUN
LU-176	2.182E-02	FAIL ABUN
HF-181	3.271E+00	NOT IDENT.

TA-182	8.337E-01	FAIL ABUN
RE-183	3.253E+00	NOT IDENT.
RE-184	2.456E+01	FAIL ABUN
W-188	8.154E+01	FAIL ABUN
IR-192	3.834E-01	FAIL ABUN
HG-203	1.880E+00	NOT IDENT.
BI-207	3.391E-02	FAIL ABUN
PB-210	4.876E+00	NOT IDENT.
PB-211	5.196E-01	NOT IDENT.
BI-212	5.093E-01	FAIL ABUN
RN-219	3.185E-01	FAIL ABUN
RA-223	4.345E-01	FAIL ABUN
RA-224	6.285E-01	FAIL ABUN
AC-227	2.006E-01	FAIL ABUN
TH-227	2.006E-01	FAIL ABUN
PA-231	3.822E-01	NOT IDENT.
TH-231	4.345E-01	FAIL ABUN
PA-233	5.836E-02	NOT IDENT.
PA-234	2.410E-01	FAIL ABUN
PA-234M	4.473E+00	FAIL ABUN
NP-237	5.836E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.155E-01	FAIL ABUN
PU-239	3.135E+02	NOT IDENT.
AM-241	1.540E-01	NOT IDENT.
CM-243	8.650E-02	FAIL ABUN
BK-247	6.153E-02	FAIL ABUN
CM-247	3.014E-02	NOT IDENT.
CF-249	3.579E-02	NOT IDENT.
CF-251	1.002E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:42:50.29

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240001.CNF;1    *
* Acquisition date :  3-OCT-2016 04:37:20 Sensitivity     : 3.000        *
* Detector ID      : GAM02                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.33     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : SOLID        *
* Sample ID        : R405240001           Analyst initials: MXR1         *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM   *
*                                         Quantity Err(%) : 1.2875E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 22-AUG-2016 09:02:05 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;15         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.212E+01	1.630E+00	1.630E+00
SN-126	6.650E-03	1.457E-01	1.457E-01
BA-137M	5.447E-02	7.451E-02	7.451E-02
CS-137	5.754E-02	7.871E-02	7.871E-02
TL-208	2.413E-01	7.758E-02	7.758E-02
BI-211	6.049E-01	8.866E-01	8.866E-01
PB-212	7.229E-01	1.441E-01	1.441E-01
BI-214	7.548E-01	1.803E-01	1.803E-01
PB-214	9.978E-01	1.821E-01	1.821E-01
RN-222	7.548E-01	1.803E-01	1.803E-01
RA-226	7.548E-01	1.803E-01	1.803E-01
AC-228	6.890E-01	2.627E-01	2.627E-01
RA-228	6.890E-01	2.627E-01	2.627E-01
TH-228	7.229E-01	1.441E-01	1.441E-01
TH-229	-6.668E-01	4.217E-01	4.217E-01
TH-230	7.546E-01	1.803E-01	1.803E-01
TH-232	6.890E-01	2.627E-01	2.627E-01
TH-234	1.900E+00	3.225E+00	3.225E+00
U-234	7.546E-01	1.803E-01	1.803E-01
U-235	7.829E-02	3.343E-01	3.343E-01
U-238	1.900E+00	3.225E+00	3.225E+00
AM-243	1.513E-01	1.147E-01	1.147E-01
ANH-511	1.108E-01	7.986E-02	7.986E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-8.531E-01	1.153E+01	1.154E+01	NOT IDENT.
NA-22	4.650E-03	4.522E-02	4.527E-02	NOT IDENT.
NA-24	-1.000E+41	6.153E+41	0.000E+00	SHORT HLIF
AL-26	-5.493E-03	2.365E-02	2.378E-02	NOT IDENT.
SC-46	-8.357E-02	3.560E-01	3.579E-01	FAIL ABUN
V-48	-2.873E+03	8.286E+03	8.386E+03	SHORT HLIF
CR-51	3.745E+01	3.389E+02	3.394E+02	SHORT HLIF

MN-54	-6.189E-03	5.571E-02	5.578E-02	NOT IDENT.
CO-56	1.481E-01	4.933E-01	4.978E-01	FAIL ABUN
MN-56	1.000E+41	3.296E+41	0.000E+00	SHORT HLIF
CO-57	-1.199E-02	4.508E-02	4.541E-02	NOT IDENT.
CO-58	-1.682E-01	5.427E-01	5.480E-01	NOT IDENT.
FE-59	-3.045E+00	7.399E+00	7.526E+00	NOT IDENT.
CO-60	3.563E-03	3.575E-02	3.579E-02	NOT IDENT.
ZN-65	-6.082E-02	2.049E-01	2.068E-01	NOT IDENT.
GE-68	3.984E-01	2.249E+00	2.257E+00	NOT IDENT.
AS-73	-3.645E+00	1.013E+01	1.026E+01	NOT IDENT.
AS-74	-5.644E+03	5.152E+03	5.746E+03	SHORT HLIF
SE-75	-1.324E-03	1.891E-01	1.891E-01	NOT IDENT.
BR-77	1.658E+37	1.401E+38	0.000E+00	SHORT HLIF
SR-82	-4.044E+00	5.095E+02	5.095E+02	SHORT HLIF
RB-83	-9.970E-02	6.450E-01	6.466E-01	NOT IDENT.
KR-85	9.391E+00	7.884E+00	8.949E+00	NOT IDENT.
SR-85	9.191E-01	7.732E-01	8.772E-01	NOT IDENT.
RB-86	4.006E+03	2.034E+04	2.042E+04	SHORT HLIF
Y-88	-6.532E-02	2.090E-01	2.110E-01	NOT IDENT.
Y-91	1.604E+01	6.795E+02	6.795E+02	NOT IDENT.
NB-94	2.107E-02	3.282E-02	3.417E-02	NOT IDENT.
NB-95	9.086E-02	9.479E-01	9.488E-01	NOT IDENT.
NB-95M	2.216E-01	2.292E+00	2.294E+00	NOT IDENT.
ZR-95	-1.843E-02	1.420E+00	1.420E+00	NOT IDENT.
NB-97	-1.000E+41	1.330E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	2.857E+41	0.000E+00	SHORT HLIF
MO-99	-1.207E+31	2.710E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	2.449E+41	0.000E+00	SHORT HLIF
RH-101	1.058E-02	3.690E-02	3.721E-02	NOT IDENT.
RH-102	4.770E-03	5.008E-02	5.013E-02	FAIL ABUN
RU-103	2.333E+00	5.048E+00	5.156E+00	FAIL ABUN
RH-106	1.428E-01	5.406E-01	5.444E-01	NOT IDENT.
RU-106	1.428E-01	5.406E-01	5.444E-01	NOT IDENT.
AG-108M	-2.767E-03	2.808E-02	2.811E-02	NOT IDENT.
CD-109	2.696E+00	1.277E+00	1.763E+00	NOT IDENT.
AG-110M	-5.958E-02	8.956E-02	9.350E-02	NOT IDENT.
SN-113	4.992E-02	2.343E-01	2.354E-01	NOT IDENT.
CD-115	-2.110E+38	3.654E+38	0.000E+00	SHORT HLIF
SN-117M	2.776E+04	6.164E+04	6.290E+04	SHORT HLIF
TE-123M	6.884E-02	1.137E-01	1.178E-01	NOT IDENT.
SB-124	-9.548E-01	2.448E+00	2.485E+00	NOT IDENT.
SB-125	1.388E-02	9.810E-02	9.830E-02	NOT IDENT.
TE-125M	1.287E+01	2.524E+02	2.525E+02	NOT IDENT.
I-126	5.114E+04	7.023E+05	7.027E+05	SHORT HLIF
SB-126	3.450E+05	7.795E+05	7.949E+05	SHORT HLIF
SB-127	5.107E+21	9.353E+21	0.000E+00	SHORT HLIF
I-131	-5.038E+08	2.510E+09	2.521E+09	SHORT HLIF
I-132	1.000E+41	1.843E+42	0.000E+00	SHORT HLIF
TE-132	-8.260E+25	8.911E+25	0.000E+00	SHORT HLIF
BA-133	2.283E-02	4.164E-02	4.289E-02	NOT IDENT.
I-133	1.000E+41	4.700E+41	0.000E+00	SHORT HLIF
CS-134	5.158E-02	4.690E-02	5.235E-02	NOT IDENT.
CS-135	7.899E-02	1.460E-01	1.503E-01	NOT IDENT.
I-135	1.000E+41	8.062E+41	0.000E+00	SHORT HLIF
CS-136	-1.454E+05	2.151E+05	2.249E+05	SHORT HLIF
CE-139	-6.989E-02	9.531E-02	1.004E-01	NOT IDENT.
BA-140	4.989E+05	9.130E+05	9.403E+05	SHORT HLIF
LA-140	-1.446E+05	2.736E+05	2.812E+05	SHORT HLIF
CE-141	1.476E+00	2.181E+01	2.182E+01	NOT IDENT.
CE-143	1.000E+41	1.149E+41	0.000E+00	SHORT HLIF
CE-144	-1.499E-01	3.724E-01	3.785E-01	FAIL ABUN
PM-144	-3.072E-02	5.364E-02	5.540E-02	NOT IDENT.
PR-144	-2.659E+00	4.641E+00	4.793E+00	NOT IDENT.
PM-146	4.262E-02	4.553E-02	4.942E-02	NOT IDENT.
ND-147	1.421E+07	2.052E+07	2.150E+07	SHORT HLIF
PM-147	-2.371E+02	8.345E+02	8.413E+02	NOT IDENT.
PM-149	-1.629E+39	5.111E+39	0.000E+00	SHORT HLIF
EU-150	1.420E-02	2.714E-02	2.788E-02	FAIL ABUN
EU-152	7.369E-02	8.283E-02	8.924E-02	FAIL ABUN
GD-153	3.576E-01	3.710E-01	4.045E-01	FAIL ABUN
EU-154	1.144E-02	1.113E-01	1.114E-01	NOT IDENT.
EU-155	9.440E-02	1.162E-01	1.237E-01	FAIL ABUN
TB-160	5.658E-01	1.768E+00	1.786E+00	FAIL ABUN
HO-166M	-3.760E-03	5.326E-02	5.329E-02	FAIL ABUN
TM-171	2.939E+00	2.608E+01	2.611E+01	NOT IDENT.
HF-172	3.272E-02	2.348E-01	2.352E-01	FAIL ABUN
LU-172	2.838E-02	9.292E-02	9.380E-02	FAIL ABUN
LU-176	1.123E-02	2.331E-02	2.385E-02	FAIL ABUN

HF-181	-1.378E+00	4.554E+00	4.597E+00	NOT IDENT.
TA-182	1.535E-01	1.100E+00	1.102E+00	FAIL ABUN
RE-183	9.477E-01	3.511E+00	3.537E+00	NOT IDENT.
RE-184	1.634E+01	2.587E+01	2.690E+01	FAIL ABUN
W-188	-4.832E+01	1.086E+02	1.107E+02	FAIL ABUN
IR-192	-8.177E-02	4.397E-01	4.412E-01	FAIL ABUN
HG-203	-1.422E+00	2.225E+00	2.316E+00	NOT IDENT.
BI-207	-8.314E-02	5.612E-02	6.749E-02	FAIL ABUN
PB-210	-8.700E-02	5.373E+00	5.373E+00	NOT IDENT.
PB-211	-3.052E-01	6.385E-01	6.532E-01	NOT IDENT.
BI-212	5.015E-01	5.147E-01	5.621E-01	FAIL ABUN
RN-219	-2.421E-02	3.689E-01	3.691E-01	FAIL ABUN
RA-223	-4.269E-01	5.415E-01	5.746E-01	FAIL ABUN
RA-224	1.264E+00	1.004E+00	1.154E+00	FAIL ABUN
AC-227	1.387E-01	2.094E-01	2.185E-01	FAIL ABUN
TH-227	1.387E-01	2.094E-01	2.185E-01	FAIL ABUN
PA-231	1.187E-01	4.169E-01	4.203E-01	NOT IDENT.
TH-231	-4.269E-01	5.415E-01	5.746E-01	FAIL ABUN
PA-233	4.326E-03	6.514E-02	6.517E-02	NOT IDENT.
PA-234	7.502E-02	2.796E-01	2.816E-01	FAIL ABUN
PA-234M	-1.371E+00	5.167E+00	5.204E+00	FAIL ABUN
NP-237	4.326E-03	6.514E-02	6.517E-02	FAIL ABUN
NP-238	-3.134E+40	4.002E+40	0.000E+00	SHORT HLIF
NP-239	1.176E-01	2.379E-01	2.437E-01	FAIL ABUN
PU-239	1.147E+02	3.554E+02	3.592E+02	NOT IDENT.
AM-241	-4.790E-02	1.886E-01	1.898E-01	NOT IDENT.
CM-243	5.081E-03	9.849E-02	9.851E-02	FAIL ABUN
BK-247	-1.408E-02	7.300E-02	7.328E-02	FAIL ABUN
CM-247	6.426E-03	3.382E-02	3.394E-02	NOT IDENT.
CF-249	2.617E-02	3.800E-02	3.979E-02	NOT IDENT.
CF-251	-3.626E-02	1.105E-01	1.117E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	65.0559	87.09	148.2593	136.47	58.3132
45.60	84.8715	87.57	148.3922	140.51	0.0000
46.54	69.7170	88.03	54.0066	143.76	72.3852
49.72	0.0000	88.34	54.0377	144.24	72.4311
51.35	63.3586	88.47	54.0505	145.44	65.5786
51.87	65.5249	89.96	58.7146	152.43	75.6869
52.39	59.3644	1093.63	58.7872	153.25	0.0000
52.97	61.5394	91.11	0.0000	323.87	80.8324
53.44	64.7465	92.59	58.9939	156.02	0.0000
54.07	65.8964	93.35	59.0741	158.56	0.0000
57.36	0.0000	94.56	59.2006	159.00	58.3818
57.53	84.4012	94.65	59.2101	162.33	73.6950
57.98	76.0439	94.67	59.2121	162.66	0.0000
59.27	91.8192	94.87	59.2328	163.33	51.9845
59.32	91.8301	97.43	59.4978	165.86	70.6460
59.54	89.0513	98.43	59.6001	176.31	69.8165
60.96	73.7502	98.44	59.6013	176.60	0.0000
61.17	85.1382	99.53	59.7124	177.52	75.0288
62.93	89.7614	100.11	50.5756	181.07	0.0000
63.29	89.8354	102.03	66.1154	181.52	60.3823
63.58	89.8954	103.18	73.9448	184.41	70.4596
64.28	90.0387	103.37	68.1895	143.76	70.5622
66.73	63.2308	105.21	71.8743	193.51	78.1082
67.24	97.8302	105.31	71.8862	197.03	56.6244
125.81	92.8848	106.12	70.8207	198.01	72.3801
67.75	92.8985	106.47	77.8312	201.83	59.5387
69.67	98.3504	109.28	70.0159	203.43	64.0228
70.83	98.5946	111.00	88.9297	205.31	75.1317
72.81	101.9196	111.76	0.0000	210.85	57.0005
72.87	101.9324	114.06	70.5455	215.65	52.3926
74.66	102.3119	116.30	0.0000	222.11	52.7275
74.82	102.3454	116.74	61.3925	227.09	49.3906
74.97	102.3774	119.76	56.9301	227.38	52.9970
77.11	102.8239	121.12	73.6846	228.16	0.0000
78.74	103.1600	121.22	73.6955	228.18	65.6231
79.69	103.3544	121.78	67.8088	116.74	65.6231
80.12	103.4420	122.06	66.6470	235.69	59.7534
80.19	0.0000	122.92	75.0730	235.96	59.7689
80.57	103.5331	123.07	75.0898	238.63	78.9818
81.00	103.6207	265.00	60.8415	238.98	0.0000
81.07	103.6349	125.81	72.9983	240.99	49.1303
81.75	103.7717	127.23	82.7411	242.00	61.4699
83.79	104.1804	127.91	86.4240	244.70	47.9285
84.00	104.2217	129.30	92.6089	252.40	0.0000
85.43	26.8726	131.20	82.0055	252.80	44.1406
86.55	132.4016	133.02	82.2161	254.15	0.0000
86.79	148.1767	133.52	83.4831	256.23	38.7405
86.94	148.2180	136.00	65.5595	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	45.5298	355.39	0.0000	584.27	26.0987
264.80	49.0671	356.01	26.9138	595.83	0.0000
265.00	49.0757	364.49	0.0000	427.87	22.8695
268.22	41.9412	366.42	0.0000	602.52	0.0000
269.46	43.8512	372.51	31.2498	604.72	13.7476
270.03	43.8722	375.05	39.3809	607.14	22.3652
271.23	43.9172	377.52	38.4337	609.32	32.1460
273.65	0.0000	356.01	28.4375	610.33	32.7351
276.40	55.1824	388.16	28.5178	614.28	24.1642
277.37	47.9007	388.63	0.0000	618.01	26.5105
277.60	49.7889	391.69	34.7076	620.36	20.7693
278.00	48.8653	264.66	36.9602	621.93	20.7847
279.20	60.2018	401.81	30.8228	630.19	0.0000
279.54	59.2778	402.40	28.7782	631.29	12.7550
279.70	53.6393	404.85	32.9401	633.25	6.9634
280.46	51.7897	410.95	35.1324	634.78	0.0000
283.69	41.5418	413.71	26.9119	635.95	24.4009
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	52.0000	423.72	0.0000	645.85	20.1313
285.90	0.0000	427.09	25.0454	657.76	32.3774
287.50	39.7766	427.87	25.0576	657.90	0.0000
290.67	45.5752	433.94	29.3398	661.66	22.9142
293.27	0.0000	439.40	23.1275	664.57	0.0000
351.93	41.9294	453.88	22.2634	666.33	0.0000
295.96	41.9545	463.37	42.6375	666.50	0.0000
879.38	41.5636	468.07	29.9255	667.71	0.0000
299.98	44.4792	473.00	0.0000	677.62	15.9719
300.09	44.4830	475.06	20.3862	685.70	0.0000
300.13	44.4840	476.78	37.5891	695.00	0.0000
301.36	40.2184	477.60	26.8616	696.49	24.1474
302.85	47.9340	482.18	29.0841	696.51	24.1474
256.23	37.4369	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	17.8931
306.78	35.5795	497.08	20.6328	697.49	17.8943
308.46	47.1796	505.52	26.1802	702.65	18.8287
311.90	46.3389	507.63	0.0000	706.68	20.6563
316.51	44.5644	511.00	20.7861	711.68	17.9987
319.41	0.0000	514.00	19.7232	720.70	0.0000
320.08	0.0000	514.00	19.7232	721.93	0.0000
321.04	35.9672	520.40	25.2854	722.78	17.3561
323.87	41.8872	520.69	0.0000	722.91	18.8037
325.23	42.9052	522.65	0.0000	723.31	18.8068
328.76	0.0000	527.90	0.0000	724.19	20.2604
333.37	39.7279	528.26	16.5576	727.33	17.2066
333.97	33.8571	529.59	20.9877	733.00	8.7138
334.37	39.7568	529.87	0.0000	735.93	10.9047
338.28	36.4241	531.02	0.0000	333.97	17.2762
338.32	36.4249	537.26	0.0000	739.50	0.0000
311.90	23.6636	546.56	0.0000	747.24	18.2556
340.48	23.6636	552.55	25.7009	748.06	19.1742
340.55	0.0000	563.25	23.5900	752.31	13.7187
344.28	21.3548	569.33	18.0267	753.82	0.0000
345.93	26.7248	946.00	18.0280	756.73	20.1550
351.06	24.8347	569.70	18.0299	756.80	22.9042
351.93	24.8494	583.19	26.0856	884.68	19.1090

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	19.1229	1274.44	12.9381	1620.50	3.7273
766.42	19.3113	1001.03	18.9374	1621.92	4.6606
766.84	19.3139	1002.74	14.9588	1678.03	0.0000
772.60	0.0000	1004.73	32.9295	1690.97	9.4536
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	1.5986
778.90	11.0874	1028.54	0.0000	1063.66	3.8408
783.70	0.0000	1037.84	8.0635	1771.35	0.9604
785.37	13.3374	1038.76	0.0000	1791.20	0.0000
792.07	17.8277	631.29	13.1381	1808.65	2.9019
794.95	7.4363	1048.07	0.0000	1810.72	0.0000
795.86	8.6785	1049.04	10.1135	1836.06	4.8616
810.06	17.7597	1050.41	8.0942		
810.29	19.6311	1063.66	26.4094		
344.28	19.6324	1077.00	0.0000		
810.76	17.7644	1077.34	11.2182		
815.77	0.0000	1085.87	18.4021		
1048.07	0.0000	1093.63	13.1156		
832.01	15.0752	1099.45	16.4219		
834.85	14.1476	1112.07	10.3003		
835.71	14.1518	1112.84	12.3633		
836.80	0.0000	1115.54	16.4971		
846.75	0.0000	1120.29	18.5845		
846.77	17.9963	1120.55	18.5856		
856.80	0.0000	1221.41	19.8281		
860.56	16.1803	1129.67	10.3516		
871.09	13.3737	1131.51	0.0000		
873.19	16.2514	1147.95	0.0000		
875.33	0.0000	1173.23	15.7150		
879.38	13.4121	1177.95	14.6862		
880.51	10.5421	1189.05	15.7828		
883.24	12.4704	1204.77	25.3594		
884.68	15.3560	1221.41	15.2824		
889.28	12.4962	1231.02	15.8075		
894.76	13.4826	1235.36	0.0000		
898.04	9.6411	1238.28	19.1876		
900.72	15.4395	1260.41	0.0000		
903.28	10.6240	1271.87	15.0527		
911.20	13.9447	1274.44	9.6833		
912.08	15.4985	1274.54	9.6833		
923.98	0.0000	1291.59	6.4834		
926.50	22.3858	1298.22	0.0000		
929.11	10.3906	1312.11	0.0000		
937.49	15.6289	1332.49	5.2397		
944.13	0.0000	1362.66	0.0000		
946.00	11.7543	1365.19	2.2006		
949.00	13.7266	1368.63	0.0000		
667.71	0.0000	1384.29	4.4211		
962.31	12.6035	1408.01	8.8921		
964.08	12.6109	1457.56	0.0000		
966.17	0.0000	1460.82	2.7003		
911.20	15.7881	1489.16	3.6234		
968.97	15.7881	1505.03	8.1813		
983.53	0.0000	1584.12	14.7961		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:54:58.98

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240002.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM25.CNF;357
                                     Background date  : 2-OCT-2016 11:01:25.
Sample date      : 15-DEC-2015 10:19:00 Acquisition date : 3-OCT-2016 04:54:22.
Sample ID        : R405240002           Sample quantity  : 1.48274E+02 GRAM
Detector name    : GAM25                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.49  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.38*	71	113	0.88	92.27	89	8	1.96E-02	30.1	
2	0	63.05*	39	276	0.71	125.59	121	10	1.08E-02	83.6	
3	3	74.91*	226	145	0.95	149.31	143	14	6.28E-02	10.8	9.61E-01
4	3	77.11*	318	114	0.90	153.72	143	14	8.84E-02	7.8	
5	2	84.58*	24	134	1.02	168.64	164	29	6.58E-03	77.4	2.52E+00
6	2	87.31	147	121	1.03	174.11	164	29	4.08E-02	14.2	
7	2	90.08	64	104	1.04	179.64	164	29	1.78E-02	28.8	
8	2	92.81*	75	91	1.05	185.11	164	29	2.10E-02	27.8	
9	0	108.99	17	79	0.91	217.47	216	6	4.68E-03	87.1	
10	0	140.93	25	73	0.86	281.34	279	7	7.05E-03	59.3	
11	0	143.85*	11	56	0.61	287.18	285	5	2.96E-03	117.5	
12	1	185.86*	93	74	1.17	371.18	367	20	2.59E-02	19.9	1.62E+00
13	1	189.28	26	74	1.17	378.02	367	20	7.16E-03	57.8	
14	0	209.26	33	81	0.88	417.98	415	8	9.27E-03	49.6	
15	4	238.75*	294	46	1.15	476.96	473	16	8.18E-02	7.1	2.17E+00
16	4	241.74	106	55	1.69	482.93	473	16	2.95E-02	19.6	
17	0	270.28	36	54	0.87	540.03	537	8	9.91E-03	39.4	
18	0	295.60*	143	90	0.93	590.66	586	11	3.98E-02	15.7	
19	0	300.74	46	82	1.81	600.93	596	13	1.28E-02	42.9	
20	0	330.72	16	97	2.69	660.90	648	16	4.55E-03	136.2	
21	0	338.28*	91	60	1.34	676.02	669	15	2.53E-02	21.6	
22	0	352.14*	297	41	1.49	703.73	698	12	8.24E-02	7.3	
23	0	412.84	17	13	0.90	825.14	821	7	4.59E-03	44.7	
24	0	511.59*	15	41	2.79	1022.68	1017	15	4.12E-03	118.3	
25	0	545.24	18	31	0.73	1090.00	1081	16	5.02E-03	73.7	
26	0	550.49	7	13	0.52	1100.49	1096	7	1.90E-03	94.0	
27	0	583.38*	89	20	1.21	1166.28	1162	11	2.46E-02	14.6	
28	0	609.49*	200	38	1.40	1218.52	1212	15	5.57E-02	9.8	
29	0	662.26	79	31	0.88	1324.08	1318	15	2.19E-02	18.9	
30	0	746.36	40	42	5.79	1492.34	1480	31	1.12E-02	48.5	
31	0	757.35	6	13	1.53	1514.33	1510	7	1.76E-03	100.3	
32	0	768.54	27	18	1.83	1536.72	1530	12	7.50E-03	36.9	
33	0	786.81	34	30	8.83	1573.26	1560	24	9.49E-03	45.7	
34	0	849.87	14	11	1.52	1699.45	1692	11	3.86E-03	53.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	861.39	16	19	2.19	1722.48	1713	13	4.52E-03	61.0	
36	0	884.23	15	15	4.94	1768.20	1761	15	4.17E-03	61.9	
37	0	889.19	8	3	0.62	1778.13	1775	6	2.22E-03	49.2	
38	2	931.01	14	3	2.27	1861.79	1859	22	3.79E-03	28.8	2.14E+00
39	2	934.11	26	6	1.88	1868.00	1859	22	7.17E-03	27.1	
40	2	936.73	14	7	2.28	1873.23	1859	22	3.75E-03	60.4	
41	1	965.11	15	20	2.10	1930.03	1926	21	4.20E-03	50.6	3.49E+00
42	1	969.74*	38	20	2.10	1939.30	1926	21	1.07E-02	30.0	
43	0	1001.41*	9	15	0.85	2002.67	1997	10	2.47E-03	91.1	
44	0	1020.04	10	2	1.07	2039.94	2036	7	2.84E-03	38.0	
45	0	1120.48*	57	10	2.06	2240.96	2234	13	1.58E-02	17.6	
46	0	1150.23	11	5	0.80	2300.50	2295	10	3.06E-03	48.5	
47	0	1238.12	40	12	2.55	2476.39	2467	16	1.10E-02	25.2	
48	0	1460.84*	287	11	1.59	2922.19	2914	15	7.97E-02	6.5	
49	0	1537.03	6	3	0.76	3074.72	3067	12	1.76E-03	67.0	
50	0	1764.77*	26	7	0.79	3530.68	3523	13	7.31E-03	28.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 05:55:01

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240002.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 10:19:00 Acquisition date : 3-OCT-2016 04:54:22
Sample ID   : R405240002   Sample quantity : 148.27 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA25   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.49   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.131E+00	1.162E+01	1.162E+01	12.96	OK
SC-46	889.28	99.98*	1.761E+00	2.333E-02	2.629E-01	98.43	OK
	1120.55	99.99	1.443E+00	1.977E-01	2.229E+00	35.25	OK
CD-109	88.03	3.70*	9.276E+00	1.812E+00	2.813E+00	45.23	OK
TE-125M	109.28	0.27*	8.893E+00	4.362E+00	1.497E+02	174.15	OK
SN-126	64.28	9.60	9.547E+00	2.767E-01	2.768E-01	167.16	OK
	86.94	8.90	9.276E+00	7.534E-01	7.534E-01	45.23	OK
	87.57	37.00*	9.276E+00	1.812E-01	1.812E-01	45.23	OK
BA-137M	661.66	89.90*	2.255E+00	2.058E-01	2.096E-01	37.80	OK
CS-137	661.66	85.10*	2.255E+00	2.174E-01	2.214E-01	37.80	OK
TL-208	277.37	6.60	4.809E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.510E+00	2.223E-01	2.223E-01	29.30	OK
	860.56	12.50	1.809E+00	3.703E-01	3.703E-01	122.02	OK
PB-210	46.54	4.25*	9.110E+00	1.216E+00	1.247E+00	60.27	OK
BI-211	72.87	1.23	9.424E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.892E+00	6.221E-01	6.221E-01	156.31	OK
PB-212	74.82	10.28	9.404E+00	9.475E-01	9.475E-01	38.71	OK
	77.11	17.10	9.383E+00	1.269E+00	1.269E+00	15.62	OK
	238.63	43.60*	5.476E+00	7.165E-01	7.165E-01	14.28	OK
	300.09	3.30	4.477E+00	1.778E+00	1.778E+00	85.80	OK
BI-214	609.32	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64	OK
	1120.29	14.92	1.443E+00	1.325E+00	1.326E+00	35.25	OK
	1764.49	15.30	9.334E-01	8.805E-01	8.808E-01	57.40	OK
PB-214	74.82	5.80	9.405E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	9.383E+00	2.237E+00	2.238E+00	15.62	OK
	87.09	3.41	9.279E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	5.413E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	4.546E+00	9.758E-01	9.761E-01	31.34	OK
	351.93	35.60*	3.894E+00	----- Line Not Found		-----	<<INT Reject
RN-222	609.32	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64	OK
	1120.29	14.92	1.443E+00	1.325E+00	1.326E+00	35.25	OK
	1764.49	15.30	9.334E-01	8.805E-01	8.808E-01	57.40	OK
RA-224	240.99	4.10*	5.418E+00	1.050E+00	1.050E+00	115.91	OK
RA-226	609.32	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64	OK
	1120.29	14.92	1.443E+00	1.325E+00	1.326E+00	35.25	OK
	1764.49	15.30	9.334E-01	8.805E-01	8.808E-01	57.40	OK
TH-228	74.82	10.28	9.404E+00	9.475E-01	9.475E-01	38.71	OK
	77.11	17.10	9.383E+00	1.269E+00	1.269E+00	15.62	OK
	238.63	43.60*	5.476E+00	7.165E-01	7.165E-01	14.28	OK
	300.09	3.30	4.477E+00	1.778E+00	1.778E+00	85.80	OK
TH-229	85.43	14.70	9.308E+00	1.098E-01	1.098E-01	154.86	OK
	88.47	24.00	9.276E+00	2.794E-01	2.794E-01	45.23	OK
	193.51	4.41*	6.496E+00	----- Line Not Found		-----	Absent
	210.85	2.80	6.071E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	2.419E+00	9.704E-01	9.704E-01	19.64	OK
	1120.29	14.92	1.443E+00	1.325E+00	1.325E+00	35.25	OK
	1764.49	15.30	9.334E-01	8.805E-01	8.805E-01	57.40	OK
PA-231	283.69	1.70	4.715E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.477E+00	1.097E+00	1.097E+00	85.80	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
TH-234	63.29	3.70*	9.547E+00	7.181E-01	7.181E-01	167.16	OK
	92.59	4.23	9.202E+00	1.221E+00	1.221E+00	55.51	OK
U-234	609.32	45.49*	2.419E+00	9.704E-01	9.704E-01	19.64	OK
	1120.29	14.92	1.443E+00	1.325E+00	1.325E+00	35.25	OK
	1764.49	15.30	9.334E-01	8.805E-01	8.805E-01	57.40	OK
U-235	89.96	3.47	9.241E+00	1.259E+00	1.259E+00	57.63	OK
	93.35	5.60	9.202E+00	9.227E-01	9.227E-01	55.51	OK
	143.76	10.96*	7.919E+00	7.467E-02	7.467E-02	234.94	OK
	163.33	5.08	7.333E+00	----- Line Not Found	-----		Absent
	185.72	57.20	6.697E+00	1.446E-01	1.446E-01	39.87	OK
	205.31	5.01	6.202E+00	----- Line Not Found	-----		Absent
U-238	63.29	3.70*	9.547E+00	7.181E-01	7.181E-01	167.16	OK
	92.59	4.23	9.202E+00	1.221E+00	1.221E+00	55.51	OK
AM-243	43.53	5.90	8.344E+00	----- Line Not Found	-----		Absent
	74.66	67.20*	9.404E+00	1.449E-01	1.450E-01	38.71	OK
ANH-511	511.00	100.00*	2.807E+00	2.863E-02	2.863E-02	236.52	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:55:02.35

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240002.CNF;1		
Acquisition date	3-OCT-2016 04:54:22	Sensitivity	3.000
Detector ID	GAM25	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.49	Half life ratio	*****
Sample date	15-DEC-2015 10:19:00	Analyst initials	MXR1
Sample ID	R405240002	Sample Quantity	1.4827E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	1-AUG-2016 08:41:33	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM25_CAN.CNF;15		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.162E+01	1.476E+00	6.083E-01
SC-46	2.629E-01	2.536E-01	7.621E-01
CD-109	2.813E+00	1.247E+00	1.009E+00
TE-125M	1.497E+02	2.555E+02	3.040E+02
SN-126	1.812E-01	8.032E-02	6.490E-02
BA-137M	2.096E-01	7.764E-02	5.629E-02
CS-137	2.214E-01	8.202E-02	5.946E-02
TL-208	2.223E-01	6.383E-02	4.148E-02
PB-210	1.247E+00	7.365E-01	5.029E-01
BI-211	6.221E-01	9.530E-01	3.121E-01
PB-212	7.165E-01	1.002E-01	7.359E-02
BI-214	9.707E-01	1.868E-01	1.193E-01
PB-214	1.202E+00	1.727E-01	3.162E-01
RN-222	9.707E-01	1.868E-01	1.193E-01
RA-224	1.050E+00	1.193E+00	7.902E-01
RA-226	9.707E-01	1.868E-01	1.193E-01
TH-228	7.165E-01	1.002E-01	7.359E-02
TH-229	-9.843E-02	3.903E-01	6.575E-01
TH-230	9.704E-01	1.868E-01	1.193E-01
PA-231	1.097E+00	9.223E-01	6.952E-01
TH-234	7.181E-01	1.176E+00	7.011E-01
U-234	9.704E-01	1.868E-01	1.193E-01
U-235	7.467E-02	1.719E-01	2.331E-01
U-238	7.181E-01	1.176E+00	7.011E-01
AM-243	1.450E-01	5.499E-02	4.066E-02
ANH-511	2.863E-02	6.636E-02	4.910E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-5.003E+00	9.497E+00	1.733E+01	NOT IDENT.
NA-22	-9.841E-03	4.033E-02	7.639E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-5.238E-03	2.870E-02	6.015E-02	NOT IDENT.

V-48	0.000E+00	1.157E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	2.852E+02	0.000E+00	SHORT HLIF
MN-54	-2.361E-02	5.581E-02	1.055E-01	NOT IDENT.
CO-56	3.582E-02	3.802E-01	7.089E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-2.260E-02	3.137E-02	5.774E-02	NOT IDENT.
CO-58	-6.369E-02	4.492E-01	9.009E-01	NOT IDENT.
FE-59	6.315E-01	5.577E+00	1.152E+01	NOT IDENT.
CO-60	-1.965E-02	2.365E-02	3.507E-02	NOT IDENT.
ZN-65	1.151E-01	1.992E-01	3.792E-01	NOT IDENT.
GE-68	8.634E-01	2.213E+00	4.654E+00	NOT IDENT.
AS-73	1.261E+00	1.378E+00	2.986E+00	NOT IDENT.
AS-74	0.000E+00	3.825E+03	0.000E+00	SHORT HLIF
SE-75	5.469E-02	1.624E-01	3.114E-01	NOT IDENT.
BR-77	0.000E+00	2.305E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.132E+02	0.000E+00	SHORT HLIF
RB-83	1.830E-02	5.083E-01	1.004E+00	NOT IDENT.
KR-85	1.787E+00	6.452E+00	1.280E+01	NOT IDENT.
SR-85	1.735E-01	6.328E-01	1.255E+00	NOT IDENT.
RB-86	0.000E+00	2.109E+04	0.000E+00	SHORT HLIF
Y-88	-4.156E-02	1.957E-01	4.059E-01	NOT IDENT.
Y-91	1.605E+02	4.874E+02	9.945E+02	NOT IDENT.
NB-94	2.902E-03	2.908E-02	5.592E-02	NOT IDENT.
NB-95	1.760E-01	7.598E-01	1.347E+00	NOT IDENT.
NB-95M	1.353E-01	1.800E+00	3.105E+00	NOT IDENT.
ZR-95	7.184E-01	1.412E+00	2.595E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.193E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.963E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.162E+41	0.000E+00	SHORT HLIF
RH-101	-2.981E-02	2.407E-02	4.215E-02	NOT IDENT.
RH-102	1.504E-03	5.586E-02	1.073E-01	NOT IDENT.
RU-103	3.648E+00	4.574E+00	9.570E+00	FAIL ABUN
RH-106	9.042E-02	5.420E-01	1.042E+00	NOT IDENT.
RU-106	9.042E-02	5.420E-01	1.042E+00	NOT IDENT.
AG-108M	-2.020E-02	2.129E-02	3.678E-02	NOT IDENT.
AG-110M	1.350E-01	1.638E-01	1.864E-01	FAIL ABUN
SN-113	2.890E-02	1.728E-01	3.513E-01	NOT IDENT.
CD-115	0.000E+00	2.729E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	4.624E+04	0.000E+00	SHORT HLIF
TE-123M	5.351E-02	8.760E-02	1.773E-01	NOT IDENT.
SB-124	3.310E-01	1.062E+00	2.955E+00	NOT IDENT.
SB-125	-4.908E-02	9.115E-02	1.678E-01	NOT IDENT.
I-126	0.000E+00	6.258E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	6.807E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	5.152E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.409E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.415E+25	0.000E+00	SHORT HLIF
BA-133	-1.501E-02	3.800E-02	6.427E-02	NOT IDENT.
I-133	0.000E+00	1.326E+41	0.000E+00	SHORT HLIF
CS-134	1.538E-02	4.337E-02	9.182E-02	NOT IDENT.
CS-135	9.801E-02	1.186E-01	2.247E-01	NOT IDENT.
I-135	0.000E+00	1.046E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.999E+05	0.000E+00	SHORT HLIF
CE-139	-1.117E-02	7.799E-02	1.468E-01	NOT IDENT.
BA-140	0.000E+00	8.106E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.024E+05	0.000E+00	SHORT HLIF
CE-141	-1.138E+01	1.599E+01	2.657E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	-3.823E-02	2.457E-01	4.700E-01	NOT IDENT.
PM-144	1.620E-02	5.074E-02	1.008E-01	NOT IDENT.
PR-144	1.388E+00	4.389E+00	8.713E+00	NOT IDENT.
PM-146	-2.383E-02	3.091E-02	5.468E-02	FAIL ABUN
ND-147	0.000E+00	1.974E+07	0.000E+00	SHORT HLIF
PM-147	2.860E+02	5.142E+02	1.056E+03	NOT IDENT.
PM-149	0.000E+00	4.774E+39	0.000E+00	SHORT HLIF
EU-150	2.408E-03	2.610E-02	3.865E-02	FAIL ABUN
EU-152	-2.217E-02	7.666E-02	1.331E-01	FAIL ABUN
GD-153	5.178E-03	1.013E-01	1.872E-01	NOT IDENT.
EU-154	-3.575E-02	1.026E-01	1.890E-01	FAIL ABUN
EU-155	2.728E-03	6.226E-02	1.239E-01	FAIL ABUN
TB-160	3.004E-02	1.440E+00	2.662E+00	FAIL ABUN
HO-166M	-1.625E-02	5.438E-02	9.791E-02	FAIL ABUN
TM-171	-9.609E-01	3.078E+00	6.186E+00	NOT IDENT.
HF-172	-3.901E-02	1.528E-01	2.917E-01	FAIL ABUN
LU-172	-1.057E-02	6.839E-02	1.326E-01	FAIL ABUN
LU-176	-1.294E-04	2.137E-02	3.877E-02	FAIL ABUN

HF-181	-1.145E+00	3.007E+00	5.635E+00	NOT IDENT.
TA-182	7.901E-01	9.021E-01	1.966E+00	FAIL ABUN
RE-183	-1.414E-01	6.153E-01	1.250E+00	NOT IDENT.
RE-184	-5.911E-03	2.906E+01	5.707E+01	NOT IDENT.
W-188	-1.565E+01	9.002E+01	1.605E+02	FAIL ABUN
IR-192	1.393E-01	3.364E-01	7.041E-01	FAIL ABUN
HG-203	8.928E-01	1.878E+00	3.619E+00	NOT IDENT.
BI-207	1.138E-02	4.029E-02	8.535E-02	FAIL ABUN
PB-211	7.145E-02	5.546E-01	1.112E+00	NOT IDENT.
BI-212	7.410E-01	5.716E-01	1.209E+00	FAIL ABUN
RN-219	-1.876E-01	3.309E-01	6.107E-01	FAIL ABUN
RA-223	-3.698E-01	5.112E-01	8.402E-01	FAIL ABUN
AC-227	1.360E-01	2.155E-01	4.171E-01	FAIL ABUN
TH-227	1.360E-01	2.155E-01	4.171E-01	FAIL ABUN
AC-228	3.805E-01	1.875E-01	4.254E-01	FAIL ABUN
RA-228	3.805E-01	1.875E-01	4.254E-01	FAIL ABUN
TH-231	-3.698E-01	5.112E-01	8.402E-01	FAIL ABUN
TH-232	3.805E-01	1.875E-01	4.254E-01	FAIL ABUN
PA-233	1.352E-02	4.832E-02	9.938E-02	FAIL ABUN
PA-234	1.318E-01	2.586E-01	5.557E-01	FAIL ABUN
PA-234M	3.378E+00	6.033E+00	9.969E+00	FAIL ABUN
NP-237	1.352E-02	4.832E-02	9.938E-02	FAIL ABUN
NP-238	0.000E+00	5.253E+40	0.000E+00	SHORT HLIF
NP-239	4.424E-02	1.561E-01	3.130E-01	NOT IDENT.
PU-239	1.879E+02	2.259E+02	4.623E+02	FAIL ABUN
AM-241	-1.638E-03	3.568E-02	6.855E-02	NOT IDENT.
CM-243	-2.760E-02	5.801E-02	1.109E-01	NOT IDENT.
BK-247	2.154E-03	5.868E-02	1.087E-01	FAIL ABUN
CM-247	1.099E-02	2.988E-02	6.120E-02	NOT IDENT.
CF-249	1.452E-02	3.026E-02	6.325E-02	NOT IDENT.
CF-251	2.271E-02	8.360E-02	1.628E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:54:59.83

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	277	10.66*	1.131E+00	1.162E+01	1.162E+01	12.96
SC-46	889.28	8	99.98*	1.761E+00	2.333E-02	2.629E-01	98.43
	1120.55	56	99.99	1.443E+00	1.977E-01	2.229E+00	35.25
CD-109	88.03	184	3.70*	9.276E+00	2.711E+00	4.210E+00	28.38
TE-125M	109.28	21	0.27*	8.893E+00	4.362E+00	1.497E+02	174.15
SN-126	64.28	50	9.60	9.547E+00	2.767E-01	2.768E-01	167.16
	86.94	184	8.90	9.276E+00	1.127E+00	1.127E+00	28.38
	87.57	184	37.00*	9.276E+00	2.711E-01	2.711E-01	28.38
BA-137M	661.66	82	89.90*	2.255E+00	2.058E-01	2.096E-01	37.80
CS-137	661.66	82	85.10*	2.255E+00	2.174E-01	2.214E-01	37.80
TL-208	277.37	------	6.60	4.809E+00	------ Line Not Found		------
	583.19	94	85.00*	2.510E+00	2.223E-01	2.223E-01	29.30
	860.56	17	12.50	1.809E+00	3.703E-01	3.703E-01	122.02
PB-210	46.54	93	4.25*	9.110E+00	1.216E+00	1.247E+00	60.27
BI-211	72.87	------	1.23	9.424E+00	------ Line Not Found		------
	351.06	329	12.92*	3.892E+00	3.311E+00	3.311E+00	14.66
PB-212	74.82	286	10.28	9.404E+00	1.498E+00	1.498E+00	21.61
	77.11	402	17.10	9.383E+00	1.269E+00	1.269E+00	15.62
	238.63	338	43.60*	5.476E+00	7.165E-01	7.165E-01	14.28
	300.09	52	3.30	4.477E+00	1.778E+00	1.778E+00	85.80
BI-214	609.32	211	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64
	1120.29	56	14.92	1.443E+00	1.325E+00	1.326E+00	35.25
	1764.49	25	15.30	9.334E-01	8.805E-01	8.808E-01	57.40
PB-214	74.82	286	5.80	9.404E+00	2.655E+00	2.656E+00	21.61
	77.11	402	9.70	9.383E+00	2.237E+00	2.238E+00	15.62
	87.09	184	3.41	9.276E+00	2.942E+00	2.943E+00	28.38
	242.00	122	7.25	5.418E+00	1.570E+00	1.570E+00	39.29
	295.22	161	18.42	4.546E+00	9.758E-01	9.761E-01	31.34
	351.93	329	35.60*	3.892E+00	1.202E+00	1.202E+00	14.66
RN-222	609.32	211	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64
	1120.29	56	14.92	1.443E+00	1.325E+00	1.326E+00	35.25
	1764.49	25	15.30	9.334E-01	8.805E-01	8.808E-01	57.40
RA-224	240.99	122	4.10*	5.418E+00	2.776E+00	2.776E+00	39.29
RA-226	609.32	211	45.49*	2.419E+00	9.704E-01	9.707E-01	19.64
	1120.29	56	14.92	1.443E+00	1.325E+00	1.326E+00	35.25
	1764.49	25	15.30	9.334E-01	8.805E-01	8.808E-01	57.40
TH-228	74.82	286	10.28	9.404E+00	1.498E+00	1.498E+00	21.61
	77.11	402	17.10	9.383E+00	1.269E+00	1.269E+00	15.62
	238.63	338	43.60*	5.476E+00	7.165E-01	7.165E-01	14.28
	300.09	52	3.30	4.477E+00	1.778E+00	1.778E+00	85.80
TH-229	85.43	30	14.70	9.308E+00	1.098E-01	1.098E-01	154.86
	88.47	184	24.00	9.276E+00	4.180E-01	4.181E-01	28.38
	193.51	------	4.41*	6.496E+00	------ Line Not Found		------
	210.85	------	2.80	6.071E+00	------ Line Not Found		------
TH-230	609.32	211	45.49*	2.419E+00	9.704E-01	9.704E-01	19.64
	1120.29	56	14.92	1.443E+00	1.325E+00	1.325E+00	35.25
	1764.49	25	15.30	9.334E-01	8.805E-01	8.805E-01	57.40

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
PA-231	283.69	------	1.70	4.715E+00	------ Line Not Found		------
	301.36	52	5.35*	4.477E+00	1.097E+00	1.097E+00	85.80
TH-234	63.29	50	3.70*	9.547E+00	7.181E-01	7.181E-01	167.16
	92.59	94	4.23	9.202E+00	1.221E+00	1.221E+00	55.51
U-234	609.32	211	45.49*	2.419E+00	9.704E-01	9.704E-01	19.64
	1120.29	56	14.92	1.443E+00	1.325E+00	1.325E+00	35.25
	1764.49	25	15.30	9.334E-01	8.805E-01	8.805E-01	57.40
U-235	89.96	80	3.47	9.241E+00	1.259E+00	1.259E+00	57.63
	93.35	94	5.60	9.202E+00	9.227E-01	9.227E-01	55.51
	143.76	13	10.96*	7.919E+00	7.467E-02	7.467E-02	234.94
	163.33	------	5.08	7.333E+00	------ Line Not Found		------
	185.72	109	57.20	6.697E+00	1.446E-01	1.446E-01	39.87
	205.31	------	5.01	6.202E+00	------ Line Not Found		------
U-238	63.29	50	3.70*	9.547E+00	7.181E-01	7.181E-01	167.16
	92.59	94	4.23	9.202E+00	1.221E+00	1.221E+00	55.51
AM-243	43.53	------	5.90	8.344E+00	------ Line Not Found		------
	74.66	286	67.20*	9.404E+00	2.292E-01	2.292E-01	21.61
ANH-511	511.00	16	100.00*	2.807E+00	2.863E-02	2.863E-02	236.52

Flag: "*" = Keyline

Sample ID : R405240002 Acquisition date : 3-OCT-2016 04:54:22

Total number of lines in spectrum	50	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	40	80.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.162E+01	1.162E+01	0.151E+01	12.96	
SC-46	83.79D	11.3	2.333E-02	2.629E-01	2.587E-01	98.43	
CD-109	461.40D	1.55	2.711E+00	4.210E+00	1.195E+00	28.38	
TE-125M	57.40D	34.3	4.362E+00	1.497E+02	2.607E+02	174.15	
SN-126	2.30E+05Y	1.00	2.711E-01	2.711E-01	0.770E-01	28.38	
BA-137M	30.08Y	1.02	2.058E-01	2.096E-01	0.792E-01	37.80	
CS-137	30.08Y	1.02	2.174E-01	2.214E-01	0.837E-01	37.80	
TL-208	1.41E+10Y	1.00	2.223E-01	2.223E-01	0.651E-01	29.30	
PB-210	22.20Y	1.03	1.216E+00	1.247E+00	0.752E+00	60.27	
BI-211	7.04E+08Y	1.00	3.311E+00	3.311E+00	0.486E+00	14.66	
PB-212	1.41E+10Y	1.00	7.165E-01	7.165E-01	1.023E-01	14.28	
BI-214	1600.00Y	1.00	9.704E-01	9.707E-01	1.906E-01	19.64	
PB-214	1600.00Y	1.00	1.202E+00	1.202E+00	0.176E+00	14.66	
RN-222	1600.00Y	1.00	9.704E-01	9.707E-01	1.906E-01	19.64	
RA-224	1.41E+10Y	1.00	2.776E+00	2.776E+00	1.090E+00	39.29	
RA-226	1600.00Y	1.00	9.704E-01	9.707E-01	1.906E-01	19.64	
TH-228	1.41E+10Y	1.00	7.165E-01	7.165E-01	1.023E-01	14.28	
TH-229	7340.00Y	1.00	4.180E-01	4.181E-01	1.187E-01	28.38	K
TH-230	7.54E+04Y	1.00	9.704E-01	9.704E-01	1.906E-01	19.64	
PA-231	7.04E+08Y	1.00	1.097E+00	1.097E+00	0.941E+00	85.80	
TH-234	4.47E+09Y	1.00	7.181E-01	7.181E-01	12.00E-01	167.16	
U-234	2.45E+05Y	1.00	9.704E-01	9.704E-01	1.906E-01	19.64	
U-235	7.04E+08Y	1.00	7.467E-02	7.467E-02	17.54E-02	234.94	
U-238	4.47E+09Y	1.00	7.181E-01	7.181E-01	12.00E-01	167.16	
AM-243	7370.00Y	1.00	2.292E-01	2.292E-01	0.495E-01	21.61	
ANH-511	1.00E+09Y	1.00	2.863E-02	2.863E-02	6.771E-02	236.52	
			---------	---------			
	Total Activity :		3.771E+01	1.848E+02			

Grand Total Activity : 3.771E+01 1.848E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240002 Acquisition date : 3-OCT-2016 04:54:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	140.93	31	87	0.86	281.34	279	7	7.05E-03	****	8.01E+00	T
1	189.28	30	86	1.17	378.02	367	20	7.16E-03	****	6.61E+00	
0	209.26	39	94	0.88	417.98	415	8	9.27E-03	99.2	6.11E+00	
0	270.28	40	62	0.87	540.03	537	8	9.91E-03	78.9	4.92E+00	T
0	330.72	18	108	2.69	660.90	648	16	4.55E-03	****	4.12E+00	
0	338.28	101	67	1.34	676.02	669	15	2.53E-02	43.3	4.03E+00	T
0	412.84	18	15	0.90	825.14	821	7	4.59E-03	89.3	3.38E+00	T
0	545.24	19	33	0.73	1090.00	1081	16	5.02E-03	****	2.66E+00	T
0	550.49	7	14	0.52	1100.49	1096	7	1.90E-03	****	2.64E+00	
0	746.36	42	43	5.79	1492.34	1480	31	1.12E-02	97.0	2.04E+00	T
0	757.35	7	13	1.53	1514.33	1510	7	1.76E-03	****	2.02E+00	T
0	768.54	28	19	1.83	1536.72	1530	12	7.50E-03	73.7	1.99E+00	
0	786.81	35	31	8.83	1573.26	1560	24	9.49E-03	91.4	1.95E+00	T
0	849.87	14	11	1.52	1699.45	1692	11	3.86E-03	****	1.83E+00	
0	884.23	15	15	4.94	1768.20	1761	15	4.17E-03	****	1.77E+00	T
2	931.01	14	3	2.27	1861.79	1859	22	3.79E-03	57.6	1.69E+00	
2	934.11	26	6	1.88	1868.00	1859	22	7.17E-03	54.3	1.69E+00	
2	936.73	14	7	2.28	1873.23	1859	22	3.75E-03	****	1.69E+00	T
1	965.11	15	20	2.10	1930.03	1926	21	4.20E-03	****	1.64E+00	T
1	969.74	39	20	2.10	1939.30	1926	21	1.07E-02	60.0	1.64E+00	T
0	1001.41	9	15	0.85	2002.67	1997	10	2.47E-03	****	1.59E+00	T
0	1020.04	10	2	1.07	2039.94	2036	7	2.84E-03	76.0	1.57E+00	T
0	1150.23	11	5	0.80	2300.50	2295	10	3.06E-03	97.1	1.41E+00	
0	1238.12	39	12	2.55	2476.39	2467	16	1.10E-02	50.4	1.32E+00	T
0	1537.03	6	3	0.76	3074.72	3067	12	1.76E-03	****	1.08E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:55:15.68

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240002.CNF;1    *
* Acquisition date :  3-OCT-2016 04:54:22 Sensitivity     : 3.000          *
* Detector ID      : GAM25                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.49     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:19:00 Nuclide Library : SOLID          *
* Sample ID        : R405240002           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.4827E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  1-AUG-2016 08:41:33 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_CAN.CNF;15          *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.470E-01
SC-46	3.365E-01
CD-109	4.712E-01
TE-125M	1.416E+02
SN-126	3.032E-02
BA-137M	2.463E-02
CS-137	2.601E-02
TL-208	1.744E-02
PB-210	2.318E-01
BI-211	1.419E-01
PB-212	3.380E-02
BI-214	5.327E-02
PB-214	1.530E-01
RN-222	5.327E-02
RA-224	3.629E-01
RA-226	5.327E-02
TH-228	3.380E-02
TH-229	3.036E-01
TH-230	5.326E-02
PA-231	3.178E-01
TH-234	3.297E-01
U-234	5.326E-02
U-235	1.082E-01
U-238	3.297E-01
AM-243	1.917E-02
ANH-511	2.204E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	7.638E+00	NOT IDENT.
NA-22	3.154E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.252E-02	NOT IDENT.
V-48	0.000E+00	SHORT HLIF

CR-51	0.000E+00	SHORT HLIF
MN-54	4.555E-02	NOT IDENT.
CO-56	3.018E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.678E-02	NOT IDENT.
CO-58	3.858E-01	NOT IDENT.
FE-59	4.961E+00	NOT IDENT.
CO-60	1.131E-02	NOT IDENT.
ZN-65	1.679E-01	NOT IDENT.
GE-68	2.022E+00	NOT IDENT.
AS-73	1.400E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.425E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.424E-01	NOT IDENT.
KR-85	5.790E+00	NOT IDENT.
SR-85	5.677E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.511E-01	NOT IDENT.
Y-91	4.342E+02	NOT IDENT.
NB-94	2.469E-02	NOT IDENT.
NB-95	5.902E-01	NOT IDENT.
NB-95M	1.428E+00	NOT IDENT.
ZR-95	1.146E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.957E-02	NOT IDENT.
RH-102	4.745E-02	NOT IDENT.
RU-103	4.312E+00	FAIL ABUN
RH-106	4.698E-01	NOT IDENT.
RU-106	4.698E-01	NOT IDENT.
AG-108M	1.597E-02	NOT IDENT.
AG-110M	8.100E-02	FAIL ABUN
SN-113	1.577E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	8.231E-02	NOT IDENT.
SB-124	1.047E+00	NOT IDENT.
SB-125	7.502E-02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.901E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.039E-02	NOT IDENT.
CS-135	1.034E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	6.799E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.230E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.188E-01	NOT IDENT.
PM-144	4.469E-02	NOT IDENT.
PR-144	3.864E+00	NOT IDENT.
PM-146	2.347E-02	FAIL ABUN
ND-147	0.000E+00	SHORT HLIF
PM-147	4.910E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.748E-02	FAIL ABUN
EU-152	5.951E-02	FAIL ABUN
GD-153	8.720E-02	NOT IDENT.
EU-154	7.812E-02	FAIL ABUN
EU-155	5.763E-02	FAIL ABUN
TB-160	1.115E+00	FAIL ABUN
HO-166M	4.286E-02	FAIL ABUN
TM-171	2.875E+00	NOT IDENT.
HF-172	1.356E-01	FAIL ABUN
LU-172	5.627E-02	FAIL ABUN
LU-176	1.765E-02	FAIL ABUN
HF-181	2.461E+00	NOT IDENT.

TA-182	8.701E-01	FAIL ABUN
RE-183	5.843E-01	NOT IDENT.
RE-184	2.529E+01	NOT IDENT.
W-188	7.319E+01	FAIL ABUN
IR-192	3.206E-01	FAIL ABUN
HG-203	1.667E+00	NOT IDENT.
BI-207	3.641E-02	FAIL ABUN
PB-211	5.014E-01	NOT IDENT.
BI-212	5.542E-01	FAIL ABUN
RN-219	2.744E-01	FAIL ABUN
RA-223	3.775E-01	FAIL ABUN
AC-227	1.940E-01	FAIL ABUN
TH-227	1.940E-01	FAIL ABUN
AC-228	1.971E-01	FAIL ABUN
RA-228	1.971E-01	FAIL ABUN
TH-231	3.775E-01	FAIL ABUN
TH-232	1.971E-01	FAIL ABUN
PA-233	4.542E-02	FAIL ABUN
PA-234	2.432E-01	FAIL ABUN
PA-234M	4.466E+00	FAIL ABUN
NP-237	4.542E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.460E-01	NOT IDENT.
PU-239	2.174E+02	FAIL ABUN
AM-241	3.213E-02	NOT IDENT.
CM-243	5.149E-02	NOT IDENT.
BK-247	4.959E-02	FAIL ABUN
CM-247	2.776E-02	NOT IDENT.
CF-249	2.861E-02	NOT IDENT.
CF-251	7.540E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:55:21.59

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240002.CNF;1   *
* Acquisition date :  3-OCT-2016 04:54:22 Sensitivity     : 3.000           *
* Detector ID      : GAM25                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.49     Half life ratio : *****           *
* Sample date      : 15-DEC-2015 10:19:00 Nuclide Library : SOLID           *
* Sample ID        : R405240002           Analyst initials: MXR1            *
* Batch Number     : 1596386              Sample Quantity : 1.4827E+02 GRAM *
*                                         Quantity Err(%) : 1.3489E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  1-AUG-2016 08:41:33 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM25_CAN.CNF;15            *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.162E+01	1.596E+00	1.596E+00
SC-46	2.629E-01	2.538E-01	2.538E-01
CD-109	2.813E+00	1.280E+00	1.280E+00
TE-125M	1.497E+02	2.557E+02	2.557E+02
SN-126	1.812E-01	8.187E-02	8.187E-02
BA-137M	2.096E-01	7.816E-02	7.816E-02
CS-137	2.214E-01	8.257E-02	8.257E-02
TL-208	2.223E-01	6.453E-02	6.453E-02
PB-210	1.247E+00	7.444E-01	7.444E-01
BI-211	6.221E-01	9.674E-01	9.674E-01
PB-212	7.165E-01	1.072E-01	1.072E-01
BI-214	9.707E-01	1.914E-01	1.914E-01
PB-214	1.202E+00	1.798E-01	1.798E-01
RN-222	9.707E-01	1.914E-01	1.914E-01
RA-224	1.050E+00	1.199E+00	1.199E+00
RA-226	9.707E-01	1.914E-01	1.914E-01
TH-228	7.165E-01	1.072E-01	1.072E-01
TH-229	-9.843E-02	3.903E-01	3.903E-01
TH-230	9.704E-01	1.914E-01	1.914E-01
PA-231	1.097E+00	9.516E-01	9.516E-01
TH-234	7.181E-01	1.187E+00	1.187E+00
U-234	9.704E-01	1.914E-01	1.914E-01
U-235	7.467E-02	1.719E-01	1.719E-01
U-238	7.181E-01	1.187E+00	1.187E+00
AM-243	1.450E-01	5.671E-02	5.671E-02
ANH-511	2.863E-02	6.637E-02	6.637E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-5.003E+00	9.499E+00	9.763E+00	NOT IDENT.
NA-22	-9.841E-03	4.033E-02	4.057E-02	NOT IDENT.
NA-24	-1.000E+41	1.347E+42	0.000E+00	SHORT HLIF
AL-26	-5.238E-03	2.870E-02	2.879E-02	NOT IDENT.

V-48	6.358E+03	1.157E+04	1.192E+04	SHORT HLIF
CR-51	1.136E+01	2.852E+02	2.853E+02	SHORT HLIF
MN-54	-2.361E-02	5.582E-02	5.683E-02	NOT IDENT.
CO-56	3.582E-02	3.802E-01	3.806E-01	FAIL ABUN
MN-56	1.000E+41	1.215E+42	0.000E+00	SHORT HLIF
CO-57	-2.260E-02	3.138E-02	3.300E-02	NOT IDENT.
CO-58	-6.369E-02	4.492E-01	4.501E-01	NOT IDENT.
FE-59	6.315E-01	5.577E+00	5.584E+00	NOT IDENT.
CO-60	-1.965E-02	2.366E-02	2.527E-02	NOT IDENT.
ZN-65	1.151E-01	1.992E-01	2.059E-01	NOT IDENT.
GE-68	8.634E-01	2.214E+00	2.248E+00	NOT IDENT.
AS-73	1.261E+00	1.403E+00	1.513E+00	NOT IDENT.
AS-74	-2.472E+03	3.831E+03	3.989E+03	SHORT HLIF
SE-75	5.469E-02	1.624E-01	1.643E-01	NOT IDENT.
BR-77	1.647E+37	1.392E+38	0.000E+00	SHORT HLIF
SR-82	-1.877E+02	5.133E+02	5.202E+02	SHORT HLIF
RB-83	1.830E-02	5.083E-01	5.083E-01	NOT IDENT.
KR-85	1.787E+00	6.453E+00	6.503E+00	NOT IDENT.
SR-85	1.735E-01	6.329E-01	6.377E-01	NOT IDENT.
RB-86	5.115E+03	2.109E+04	2.122E+04	SHORT HLIF
Y-88	-4.156E-02	1.957E-01	1.966E-01	NOT IDENT.
Y-91	1.605E+02	4.874E+02	4.928E+02	NOT IDENT.
NB-94	2.902E-03	2.908E-02	2.911E-02	NOT IDENT.
NB-95	1.760E-01	7.598E-01	7.639E-01	NOT IDENT.
NB-95M	1.353E-01	1.800E+00	1.801E+00	NOT IDENT.
ZR-95	7.184E-01	1.412E+00	1.449E+00	FAIL ABUN
NB-97	-1.000E+41	2.162E+41	0.000E+00	SHORT HLIF
ZR-97	-1.000E+41	1.193E+41	0.000E+00	SHORT HLIF
MO-99	2.364E+30	2.963E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	1.166E+41	0.000E+00	SHORT HLIF
RH-101	-2.981E-02	2.467E-02	2.809E-02	NOT IDENT.
RH-102	1.504E-03	5.586E-02	5.587E-02	NOT IDENT.
RU-103	3.648E+00	4.577E+00	4.863E+00	FAIL ABUN
RH-106	9.042E-02	5.420E-01	5.435E-01	NOT IDENT.
RU-106	9.042E-02	5.420E-01	5.435E-01	NOT IDENT.
AG-108M	-2.020E-02	2.130E-02	2.317E-02	NOT IDENT.
AG-110M	1.350E-01	1.640E-01	1.749E-01	FAIL ABUN
SN-113	2.890E-02	1.728E-01	1.733E-01	NOT IDENT.
CD-115	-8.549E+37	2.733E+38	0.000E+00	SHORT HLIF
SN-117M	2.238E+04	4.631E+04	4.740E+04	SHORT HLIF
TE-123M	5.351E-02	8.763E-02	9.089E-02	NOT IDENT.
SB-124	3.310E-01	1.063E+00	1.073E+00	NOT IDENT.
SB-125	-4.908E-02	9.118E-02	9.382E-02	NOT IDENT.
I-126	1.001E+05	6.259E+05	6.275E+05	SHORT HLIF
SB-126	-2.643E+05	6.825E+05	6.928E+05	SHORT HLIF
SB-127	-9.738E+20	5.315E+21	0.000E+00	SHORT HLIF
I-131	1.131E+09	2.410E+09	2.463E+09	SHORT HLIF
I-132	-1.000E+41	2.136E+42	0.000E+00	SHORT HLIF
TE-132	7.213E+25	7.025E+25	0.000E+00	SHORT HLIF
BA-133	-1.501E-02	3.801E-02	3.860E-02	NOT IDENT.
I-133	-1.000E+41	2.209E+41	0.000E+00	SHORT HLIF
CS-134	1.538E-02	4.337E-02	4.392E-02	NOT IDENT.
CS-135	9.801E-02	1.188E-01	1.267E-01	NOT IDENT.
I-135	1.000E+41	6.698E+41	0.000E+00	SHORT HLIF
CS-136	2.108E+04	1.999E+05	2.001E+05	SHORT HLIF
CE-139	-1.117E-02	7.802E-02	7.819E-02	NOT IDENT.
BA-140	2.546E+05	8.107E+05	8.188E+05	SHORT HLIF
LA-140	-2.662E+05	3.027E+05	3.256E+05	SHORT HLIF
CE-141	-1.138E+01	1.599E+01	1.680E+01	NOT IDENT.
CE-143	-1.000E+41	4.054E+41	0.000E+00	SHORT HLIF
CE-144	-3.823E-02	2.457E-01	2.463E-01	NOT IDENT.
PM-144	1.620E-02	5.075E-02	5.127E-02	NOT IDENT.
PR-144	1.388E+00	4.389E+00	4.434E+00	NOT IDENT.
PM-146	-2.383E-02	3.096E-02	3.277E-02	FAIL ABUN
ND-147	5.583E+06	1.974E+07	1.990E+07	SHORT HLIF
PM-147	2.860E+02	5.143E+02	5.302E+02	NOT IDENT.
PM-149	-1.660E+39	4.788E+39	0.000E+00	SHORT HLIF
EU-150	2.408E-03	2.610E-02	2.612E-02	FAIL ABUN
EU-152	-2.217E-02	7.667E-02	7.732E-02	FAIL ABUN
GD-153	5.178E-03	1.013E-01	1.013E-01	NOT IDENT.
EU-154	-3.575E-02	1.026E-01	1.039E-01	FAIL ABUN
EU-155	2.728E-03	6.226E-02	6.227E-02	FAIL ABUN
TB-160	3.004E-02	1.440E+00	1.440E+00	FAIL ABUN
HO-166M	-1.625E-02	5.438E-02	5.487E-02	FAIL ABUN
TM-171	-9.609E-01	3.079E+00	3.109E+00	NOT IDENT.
HF-172	-3.901E-02	1.529E-01	1.539E-01	FAIL ABUN
LU-172	-1.057E-02	6.840E-02	6.856E-02	FAIL ABUN
LU-176	-1.294E-04	2.137E-02	2.137E-02	FAIL ABUN

HF-181	-1.145E+00	3.008E+00	3.052E+00	NOT IDENT.
TA-182	7.901E-01	9.026E-01	9.703E-01	FAIL ABUN
RE-183	-1.414E-01	6.156E-01	6.189E-01	NOT IDENT.
RE-184	-5.911E-03	2.906E+01	2.906E+01	NOT IDENT.
W-188	-1.565E+01	9.004E+01	9.031E+01	FAIL ABUN
IR-192	1.393E-01	3.365E-01	3.423E-01	FAIL ABUN
HG-203	8.928E-01	1.879E+00	1.921E+00	NOT IDENT.
BI-207	1.138E-02	4.029E-02	4.062E-02	FAIL ABUN
PB-211	7.145E-02	5.546E-01	5.556E-01	NOT IDENT.
BI-212	7.410E-01	5.729E-01	6.631E-01	FAIL ABUN
RN-219	-1.876E-01	3.317E-01	3.423E-01	FAIL ABUN
RA-223	-3.698E-01	5.117E-01	5.382E-01	FAIL ABUN
AC-227	1.360E-01	2.162E-01	2.247E-01	FAIL ABUN
TH-227	1.360E-01	2.162E-01	2.247E-01	FAIL ABUN
AC-228	3.805E-01	1.885E-01	2.549E-01	FAIL ABUN
RA-228	3.805E-01	1.885E-01	2.549E-01	FAIL ABUN
TH-231	-3.698E-01	5.117E-01	5.382E-01	FAIL ABUN
TH-232	3.805E-01	1.885E-01	2.549E-01	FAIL ABUN
PA-233	1.352E-02	4.832E-02	4.870E-02	FAIL ABUN
PA-234	1.318E-01	2.993E-01	3.051E-01	FAIL ABUN
PA-234M	3.378E+00	6.034E+00	6.224E+00	FAIL ABUN
NP-237	1.352E-02	4.832E-02	4.870E-02	FAIL ABUN
NP-238	1.223E+40	5.253E+40	0.000E+00	SHORT HLIF
NP-239	4.424E-02	1.561E-01	1.574E-01	NOT IDENT.
PU-239	1.879E+02	2.261E+02	2.414E+02	FAIL ABUN
AM-241	-1.638E-03	3.568E-02	3.569E-02	NOT IDENT.
CM-243	-2.760E-02	5.807E-02	5.939E-02	NOT IDENT.
BK-247	2.154E-03	5.868E-02	5.869E-02	FAIL ABUN
CM-247	1.099E-02	2.994E-02	3.035E-02	NOT IDENT.
CF-249	1.452E-02	3.028E-02	3.098E-02	NOT IDENT.
CF-251	2.271E-02	8.363E-02	8.426E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	50.4263	87.09	67.3771	136.47	56.0707
45.60	46.5850	87.57	67.4753	140.51	0.0000
46.54	46.7996	88.03	67.5694	143.76	56.2818
49.72	0.0000	88.34	67.6327	144.24	55.0276
51.35	83.7654	88.47	67.6592	145.44	59.1028
51.87	59.9728	89.96	67.9611	152.43	56.9382
52.39	61.6151	1093.63	68.0980	153.25	0.0000
52.97	61.0207	91.11	0.0000	323.87	74.1784
53.44	52.8431	92.59	68.4879	156.02	0.0000
54.07	59.8018	93.35	68.6386	158.56	0.0000
57.36	0.0000	94.56	68.8779	159.00	44.5136
57.53	68.3712	94.65	68.8954	162.33	45.8123
57.98	69.2678	94.67	68.8996	162.66	0.0000
59.27	64.9928	94.87	68.9388	163.33	36.7180
59.32	71.1970	97.43	56.2539	165.86	55.3348
59.54	71.2608	98.43	52.0036	176.31	56.3805
60.96	77.9003	98.44	52.0049	176.60	0.0000
61.17	77.9655	99.53	66.3071	177.52	47.0826
62.93	83.2173	100.11	71.7253	181.07	0.0000
63.29	83.3337	102.03	51.6275	181.52	49.1639
63.58	83.4271	103.18	66.9657	184.41	59.2868
64.28	83.6519	103.37	67.0000	143.76	53.0510
66.73	82.8361	105.21	58.3503	193.51	54.4534
67.24	91.5053	105.31	58.3657	197.03	63.7696
125.81	90.3219	106.12	53.9905	198.01	46.5483
67.75	94.3427	106.47	61.2452	201.83	60.9877
69.67	85.3446	109.28	61.6909	203.43	48.0391
70.83	94.8625	111.00	55.8861	205.31	54.7493
72.81	90.3704	111.76	0.0000	210.85	45.6435
72.87	90.3891	114.06	57.8450	215.65	55.6122
74.66	90.9497	116.30	0.0000	222.11	30.3165
74.82	90.9988	116.74	58.2262	227.09	38.4497
74.97	91.0454	119.76	55.8572	227.38	37.3345
77.11	91.7059	121.12	48.5655	228.16	0.0000
78.74	69.7746	121.22	48.5770	228.18	30.5810
79.69	76.6578	121.78	64.5427	116.74	30.5810
80.12	81.2153	122.06	70.2015	235.69	42.7309
80.19	0.0000	122.92	52.5226	235.96	42.7468
80.57	90.2466	123.07	55.3557	238.63	42.5204
81.00	80.3306	265.00	68.5879	238.98	0.0000
81.07	80.3489	125.81	64.2045	240.99	42.6570
81.75	77.1688	127.23	85.2505	242.00	42.7152
83.79	66.6936	127.91	69.2548	244.70	32.4425
84.00	66.7376	129.30	63.7612	252.40	0.0000
85.43	67.0354	131.20	75.5006	252.80	45.6734
86.55	67.2662	133.02	65.2483	254.15	0.0000
86.79	67.3150	133.52	64.3593	256.23	45.8763
86.94	67.3464	136.00	45.3907	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	33.2910	355.39	0.0000	584.27	9.4314
264.80	32.1078	356.01	35.5034	595.83	0.0000
265.00	35.6845	364.49	0.0000	427.87	26.4699
268.22	28.6619	366.42	0.0000	602.52	0.0000
269.46	46.2483	372.51	37.4054	604.72	14.3300
270.03	43.0895	375.05	25.8889	607.14	22.3245
271.23	43.1532	377.52	33.1067	609.32	23.4198
273.65	0.0000	356.01	34.2009	610.33	23.4341
276.40	57.9009	388.16	23.4927	614.28	14.4146
277.37	36.2302	388.63	0.0000	618.01	19.2634
277.60	36.2402	391.69	23.5678	620.36	32.1509
278.00	37.4662	264.66	36.5487	621.93	25.7451
279.20	33.8892	401.81	34.7568	630.19	0.0000
279.54	38.7461	402.40	26.5385	631.29	19.4180
279.70	38.7539	404.85	26.5957	633.25	17.2806
280.46	52.1228	410.95	29.0423	634.78	0.0000
283.69	27.9870	413.71	27.7252	635.95	22.7167
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	43.8948	423.72	0.0000	645.85	18.4969
285.90	0.0000	427.09	29.9108	657.76	19.7212
287.50	26.8904	427.87	31.8010	657.90	0.0000
290.67	39.2578	433.94	26.3212	661.66	16.4709
293.27	0.0000	439.40	26.4391	664.57	0.0000
351.93	41.1082	453.88	21.0171	666.33	0.0000
295.96	41.1428	463.37	25.0246	666.50	0.0000
879.38	19.8076	468.07	26.0821	667.71	0.0000
299.98	38.0245	473.00	0.0000	677.62	13.2964
300.09	38.0292	475.06	19.4242	685.70	0.0000
300.13	38.0310	476.78	27.2292	695.00	0.0000
301.36	38.0835	477.60	25.3002	696.49	16.7944
302.85	38.1471	482.18	20.5057	696.51	16.7950
256.23	33.2324	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	14.5621
306.78	34.9829	497.08	15.7975	697.49	14.5631
308.46	39.2202	505.52	21.4581	702.65	17.9746
311.90	33.5050	507.63	0.0000	706.68	14.6361
316.51	28.6218	511.00	25.9312	711.68	20.3203
319.41	0.0000	514.00	25.9862	720.70	0.0000
320.08	0.0000	514.00	25.9873	721.93	0.0000
321.04	26.2237	520.40	18.0725	722.78	15.8981
323.87	35.6357	520.69	0.0000	722.91	15.8993
325.23	35.6870	522.65	0.0000	723.31	24.9899
328.76	0.0000	527.90	0.0000	724.19	27.2744
333.37	20.5664	528.26	19.1825	727.33	20.4895
333.97	28.2963	529.59	24.2520	733.00	17.1259
334.37	30.8811	529.87	0.0000	735.93	14.8646
338.28	29.2831	531.02	0.0000	333.97	22.3152
338.32	29.2838	537.26	0.0000	739.50	0.0000
311.90	29.3481	546.56	0.0000	747.24	17.2522
340.48	29.3481	552.55	24.6348	748.06	17.2595
340.55	0.0000	563.25	21.7092	752.31	17.2974
344.28	28.5950	569.33	16.6068	753.82	0.0000
345.93	24.3023	946.00	16.6081	756.73	15.6028
351.06	34.0226	569.70	15.5725	756.80	15.6033
351.93	34.0520	583.19	9.4252	884.68	13.9199

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	13.9326	1274.44	9.2646	1620.50	3.7621
766.42	13.9370	1001.03	10.6358	1621.92	3.7635
766.84	12.7783	1002.74	12.3844	1678.03	0.0000
772.60	0.0000	1004.73	9.2956	1690.97	0.9573
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	2.9232
778.90	12.6215	1028.54	0.0000	1063.66	11.7094
783.70	0.0000	1037.84	10.7892	1771.35	2.4401
785.37	14.0688	1038.76	0.0000	1791.20	0.0000
792.07	22.5844	631.29	9.8413	1808.65	3.9383
794.95	11.7790	1048.07	0.0000	1810.72	0.0000
795.86	14.1411	1049.04	11.8206	1836.06	3.9631
810.06	15.1282	1050.41	14.7830		
810.29	14.2397	1063.66	8.9143		
344.28	14.2412	1077.00	0.0000		
810.76	13.3530	1077.34	10.9510		
815.77	0.0000	1085.87	9.9872		
1048.07	0.0000	1093.63	12.0183		
832.01	16.1851	1099.45	9.0330		
834.85	18.0072	1112.07	20.1660		
835.71	9.9080	1112.84	17.2893		
836.80	0.0000	1115.54	12.9219		
846.75	0.0000	1120.29	15.1685		
846.77	10.1397	1120.55	15.1703		
856.80	0.0000	1221.41	8.0928		
860.56	11.8439	1129.67	12.1758		
871.09	13.7311	1131.51	0.0000		
873.19	13.7439	1147.95	0.0000		
875.33	0.0000	1173.23	16.4834		
879.38	8.8204	1177.95	14.4460		
880.51	10.2956	1189.05	12.4292		
883.24	11.7809	1204.77	12.4951		
884.68	11.7883	1221.41	10.4706		
889.28	19.1947	1231.02	13.4453		
894.76	11.1006	1235.36	0.0000		
898.04	14.8223	1238.28	13.6879		
900.72	12.0570	1260.41	0.0000		
903.28	20.4269	1271.87	13.8371		
911.20	15.8384	1274.44	10.6525		
912.08	13.9806	1274.54	9.5878		
923.98	0.0000	1291.59	10.7104		
926.50	7.5024	1298.22	0.0000		
929.11	10.5150	1312.11	0.0000		
937.49	8.4795	1332.49	5.4236		
944.13	0.0000	1362.66	0.0000		
946.00	11.3463	1365.19	6.5731		
949.00	5.6801	1368.63	0.0000		
667.71	0.0000	1384.29	4.4070		
962.31	24.3687	1408.01	2.2189		
964.08	19.8142	1457.56	0.0000		
966.17	10.4877	1460.82	6.3075		
911.20	10.4995	1489.16	7.2656		
968.97	10.4995	1505.03	13.6831		
983.53	0.0000	1584.12	6.5218		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:55:52.23

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM33.CNF;235
                                    Background date  : 2-OCT-2016 11:02:02.
Sample date      : 15-DEC-2015 10:18:00 Acquisition date : 3-OCT-2016 04:54:43.
Sample ID        : R405240003           Sample quantity  : 1.35282E+02 GRAM
Detector name    : GAM33                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.62  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.31*	15	117	0.69	126.73	123	8	4.12E-03	134.4	
2	3	73.29	26	49	1.33	146.66	145	14	7.34E-03	43.3	3.48E+00
3	3	74.99*	82	94	1.24	150.07	145	14	2.29E-02	23.7	
4	3	77.17	101	81	0.90	154.42	145	14	2.80E-02	16.2	
5	0	84.02*	32	117	1.32	168.10	165	8	8.79E-03	62.8	
6	2	87.19	51	60	1.24	174.43	172	20	1.42E-02	26.0	1.74E+00
7	2	89.98	46	65	1.03	180.00	172	20	1.29E-02	31.0	
8	2	92.77*	35	67	1.25	185.57	172	20	9.60E-03	52.9	
9	0	130.12	66	77	2.83	260.18	255	12	1.83E-02	29.5	
10	0	135.01	21	67	0.62	269.94	267	8	5.81E-03	70.3	
11	0	143.40*	24	91	0.99	286.70	283	9	6.65E-03	77.4	
12	0	185.85*	26	96	1.22	371.51	367	10	7.11E-03	80.3	
13	0	205.22*	15	39	1.07	410.19	408	6	4.26E-03	71.8	
14	0	238.40*	212	129	0.90	476.49	470	11	5.88E-02	12.9	
15	0	241.64	67	62	2.27	482.95	481	7	1.85E-02	24.7	
16	0	270.04	38	54	0.74	539.69	535	10	1.04E-02	40.4	
17	0	295.30	114	38	1.45	590.15	586	9	3.17E-02	13.5	
18	0	300.22	34	36	1.25	599.99	596	8	9.44E-03	35.0	
19	0	338.37*	41	43	1.16	676.21	671	9	1.14E-02	33.4	
20	0	352.07*	169	51	1.19	703.58	699	10	4.70E-02	11.2	
21	0	409.76	22	30	0.76	818.88	814	10	6.10E-03	52.6	
22	0	583.53*	74	33	1.43	1166.18	1160	12	2.06E-02	19.8	
23	0	609.51*	109	34	1.48	1218.11	1213	11	3.02E-02	14.6	
24	0	661.86	51	13	1.91	1322.75	1314	17	1.43E-02	21.2	
25	0	756.01	7	15	1.33	1511.00	1505	10	1.94E-03	110.2	
26	0	768.15	33	3	3.24	1535.27	1529	12	9.17E-03	20.3	
27	0	785.28	14	8	1.57	1569.51	1563	11	3.99E-03	46.5	
28	0	790.67	6	14	1.10	1580.30	1573	11	1.68E-03	125.7	
29	0	806.80	15	23	2.56	1612.55	1602	18	4.27E-03	76.8	
30	0	911.48*	67	3	1.38	1821.88	1816	12	1.85E-02	13.8	
31	0	998.00	6	7	1.25	1994.93	1991	8	1.78E-03	77.8	
32	0	1001.22*	4	6	0.73	2001.38	1998	6	1.20E-03	115.6	
33	0	1064.49	8	10	3.30	2127.94	2121	10	2.19E-03	83.1	
34	0	1106.42	14	2	3.84	2211.82	2207	10	3.83E-03	34.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1114.84	10	3	1.37	2228.67	2225	7	2.76E-03	44.1	
36	0	1120.90*	22	13	0.85	2240.80	2236	13	6.22E-03	40.3	
37	8	1155.44	9	4	1.53	2309.89	2308	13	2.51E-03	36.2	1.23E+00
38	8	1158.69	12	4	2.08	2316.41	2308	13	3.34E-03	49.8	
39	0	1246.10	8	5	1.53	2491.30	2488	7	2.25E-03	58.0	
40	0	1379.13	9	3	0.93	2757.52	2750	11	2.50E-03	49.1	
41	0	1460.98*	273	3	1.84	2921.36	2913	15	7.58E-02	6.3	
42	0	1764.64*	19	0	2.56	3529.36	3524	11	5.23E-03	25.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 05:55:54

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240003.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 10:18:00 Acquisition date : 3-OCT-2016 04:54:43
Sample ID   : R405240003   Sample quantity : 135.28 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA33   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.62   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.133E+00	1.197E+01	1.197E+01	12.64	OK
ZN-65	1115.54	50.60*	1.413E+00	7.524E-02	1.728E-01	88.14	OK
CD-109	88.03	3.70*	4.899E+00	9.998E-01	1.552E+00	98.76	OK
SN-126	64.28	9.60	2.456E+00	4.195E-01	4.195E-01	268.82	OK
	86.94	8.90	4.899E+00	4.156E-01	4.156E-01	98.76	OK
	87.57	37.00*	4.899E+00	9.998E-02	9.998E-02	98.76	OK
BA-137M	661.66	89.90*	2.114E+00	1.527E-01	1.555E-01	42.32	OK
CS-137	661.66	85.10*	2.114E+00	1.613E-01	1.643E-01	42.32	OK
CE-144	80.12	1.36	4.319E+00	----- Line Not Found	-----		Absent
	133.52	11.09*	6.224E+00	1.921E-01	3.916E-01	140.58	OK
TL-208	277.37	6.60	4.258E+00	----- Line Not Found	-----		Absent
	583.19	85.00*	2.333E+00	2.136E-01	2.136E-01	39.63	OK
	860.56	12.50	1.727E+00	----- Line Not Found	-----		Absent
PB-212	74.82	10.28	3.818E+00	8.678E-01	8.678E-01	77.39	OK
	77.11	17.10	4.039E+00	9.610E-01	9.610E-01	32.31	OK
	238.63	43.60*	4.779E+00	6.191E-01	6.191E-01	25.76	OK
	300.09	3.30	3.998E+00	1.544E+00	1.544E+00	70.10	OK
BI-214	609.32	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13	OK
	1120.29	14.92	1.407E+00	5.779E-01	5.781E-01	80.51	OK
	1764.49	15.30	9.591E-01	6.695E-01	6.698E-01	50.72	OK
PB-214	74.82	5.80	3.800E+00	----- Line Not Found	-----		<<INT Reject
	77.11	9.70	4.039E+00	1.694E+00	1.695E+00	32.31	OK
	87.09	3.41	4.892E+00	----- Line Not Found	-----		<<INT Reject
	242.00	7.25	4.727E+00	----- Line Not Found	-----		<<INT Reject
	295.22	18.42	4.051E+00	9.164E-01	9.167E-01	27.07	OK
	351.93	35.60*	3.511E+00	8.018E-01	8.021E-01	22.43	OK
RN-222	609.32	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13	OK
	1120.29	14.92	1.407E+00	5.779E-01	5.781E-01	80.51	OK
	1764.49	15.30	9.591E-01	6.695E-01	6.698E-01	50.72	OK
RA-224	240.99	4.10*	4.732E+00	4.688E-01	4.688E-01	238.95	OK
RA-226	609.32	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13	OK
	1120.29	14.92	1.407E+00	5.779E-01	5.781E-01	80.51	OK
	1764.49	15.30	9.591E-01	6.695E-01	6.698E-01	50.72	OK
TH-228	74.82	10.28	3.818E+00	8.678E-01	8.678E-01	77.39	OK
	77.11	17.10	4.039E+00	9.610E-01	9.610E-01	32.31	OK
	238.63	43.60*	4.779E+00	6.191E-01	6.191E-01	25.76	OK
	300.09	3.30	3.998E+00	1.544E+00	1.544E+00	70.10	OK
TH-229	85.43	14.70	4.655E+00	3.027E-01	3.027E-01	125.60	OK
	88.47	24.00	4.899E+00	1.541E-01	1.541E-01	98.76	OK
	193.51	4.41*	5.490E+00	----- Line Not Found	-----		Absent
	210.85	2.80	5.205E+00	----- Line Not Found	-----		Absent
TH-230	609.32	45.49*	2.255E+00	6.027E-01	6.027E-01	29.13	OK
	1120.29	14.92	1.407E+00	5.779E-01	5.779E-01	80.51	OK
	1764.49	15.30	9.591E-01	6.695E-01	6.695E-01	50.72	OK
PA-231	283.69	1.70	4.183E+00	----- Line Not Found	-----		Absent
	301.36	5.35*	3.998E+00	9.526E-01	9.526E-01	70.10	OK
TH-234	63.29	3.70*	2.456E+00	1.088E+00	1.088E+00	268.82	OK
	92.59	4.23	5.268E+00	1.009E+00	1.009E+00	105.76	OK
U-234	609.32	45.49*	2.255E+00	6.027E-01	6.027E-01	29.13	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	1120.29	14.92	1.407E+00	5.779E-01	5.779E-01	80.51	OK
	1764.49	15.30	9.591E-01	6.695E-01	6.695E-01	50.72	OK
U-235	89.96	3.47	5.093E+00	1.710E+00	1.710E+00	61.97	OK
	93.35	5.60	5.268E+00	7.622E-01	7.622E-01	105.76	OK
	143.76	10.96*	6.184E+00	2.230E-01	2.230E-01	154.75	OK
	163.33	5.08	5.963E+00	----- Line Not Found	-----		Absent
	185.72	57.20	5.615E+00	4.941E-02	4.941E-02	160.69	OK
	205.31	5.01	5.297E+00	3.559E-01	3.559E-01	143.66	OK
U-238	63.29	3.70*	2.456E+00	1.088E+00	1.088E+00	268.82	OK
	92.59	4.23	5.268E+00	1.009E+00	1.009E+00	105.76	OK
AM-243	43.53	5.90	2.461E-01	----- Line Not Found	-----		Absent
	74.66	67.20*	3.818E+00	1.328E-01	1.328E-01	77.39	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:55:55.28

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240003.CNF;1		
Acquisition date	3-OCT-2016 04:54:43	Sensitivity	3.000
Detector ID	GAM33	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.62	Half life ratio	*****
Sample date	15-DEC-2015 10:18:00	Analyst initials	MXR1
Sample ID	R405240003	Sample Quantity	1.3528E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	10-JUN-2016 07:00:49	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;8		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.197E+01	1.483E+00	5.958E-01
ZN-65	1.728E-01	1.493E-01	2.720E-01
CD-109	1.552E+00	1.502E+00	1.793E+00
SN-126	9.998E-02	9.676E-02	1.162E-01
BA-137M	1.555E-01	6.450E-02	5.961E-02
CS-137	1.643E-01	6.813E-02	6.298E-02
CE-144	3.916E-01	5.395E-01	4.550E-01
TL-208	2.136E-01	8.294E-02	6.064E-02
PB-212	6.191E-01	1.563E-01	1.109E-01
BI-214	6.029E-01	1.721E-01	1.328E-01
PB-214	8.021E-01	1.763E-01	1.234E-01
RN-222	6.029E-01	1.721E-01	1.328E-01
RA-224	4.688E-01	1.098E+00	1.351E+00
RA-226	6.029E-01	1.721E-01	1.328E-01
TH-228	6.191E-01	1.563E-01	1.109E-01
TH-229	-2.797E-01	4.416E-01	7.482E-01
TH-230	6.027E-01	1.721E-01	1.327E-01
PA-231	9.526E-01	6.544E-01	7.784E-01
TH-234	1.088E+00	2.868E+00	2.368E+00
U-234	6.027E-01	1.721E-01	1.327E-01
U-235	2.230E-01	3.382E-01	2.948E-01
U-238	1.088E+00	2.868E+00	2.368E+00
AM-243	1.328E-01	1.007E-01	9.482E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-4.304E+00	9.743E+00	1.812E+01	NOT IDENT.
NA-22	2.432E-02	4.819E-02	1.055E-01	NOT IDENT.
NA-24	0.000E+00	1.300E+41	0.000E+00	SHORT HLIF
AL-26	-1.759E-02	2.136E-02	2.661E-02	NOT IDENT.
SC-46	-2.657E-01	4.060E-01	6.902E-01	FAIL ABUN
V-48	0.000E+00	7.368E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.217E+02	0.000E+00	SHORT HLIF

MN-54	1.602E-02	6.228E-02	1.252E-01	NOT IDENT.
CO-56	-1.599E-01	4.225E-01	7.605E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	8.243E-03	4.476E-02	8.503E-02	FAIL ABUN
CO-58	-3.168E-01	6.063E-01	9.054E-01	NOT IDENT.
FE-59	4.660E+00	5.838E+00	1.341E+01	NOT IDENT.
CO-60	1.155E-02	3.339E-02	7.595E-02	NOT IDENT.
GE-68	-4.286E-02	2.190E+00	4.488E+00	NOT IDENT.
AS-73	1.572E+00	1.045E+01	2.074E+01	NOT IDENT.
AS-74	0.000E+00	4.256E+03	0.000E+00	SHORT HLIF
SE-75	-1.284E-01	2.010E-01	3.316E-01	FAIL ABUN
BR-77	0.000E+00	3.593E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.798E+02	0.000E+00	SHORT HLIF
RB-83	-4.255E-01	5.423E-01	9.403E-01	NOT IDENT.
KR-85	-1.938E+01	9.378E+00	1.374E+01	NOT IDENT.
SR-85	-1.903E+00	9.199E-01	1.348E+00	NOT IDENT.
RB-86	0.000E+00	1.869E+04	0.000E+00	SHORT HLIF
Y-88	-4.402E-02	1.417E-01	2.982E-01	NOT IDENT.
Y-91	4.832E+02	5.236E+02	1.178E+03	NOT IDENT.
NB-94	1.477E-02	3.205E-02	6.577E-02	NOT IDENT.
NB-95	7.686E-02	6.843E-01	1.274E+00	NOT IDENT.
NB-95M	1.626E+00	2.016E+00	3.771E+00	NOT IDENT.
ZR-95	8.976E-01	1.939E+00	2.566E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.176E+40	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.634E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.641E-02	3.337E-02	5.399E-02	NOT IDENT.
RH-102	8.410E-03	5.253E-02	1.066E-01	FAIL ABUN
RU-103	3.441E+00	5.259E+00	1.105E+01	FAIL ABUN
RH-106	-5.563E-01	5.112E-01	8.172E-01	NOT IDENT.
RU-106	-5.563E-01	5.112E-01	8.172E-01	NOT IDENT.
AG-108M	6.389E-03	2.529E-02	5.172E-02	NOT IDENT.
AG-110M	-4.728E-02	8.661E-02	1.498E-01	NOT IDENT.
SN-113	-2.085E-01	2.148E-01	3.735E-01	NOT IDENT.
CD-115	0.000E+00	3.059E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.124E+04	0.000E+00	SHORT HLIF
TE-123M	4.615E-02	1.158E-01	2.223E-01	NOT IDENT.
SB-124	-2.251E-01	1.562E+00	3.366E+00	NOT IDENT.
SB-125	1.898E-03	9.338E-02	1.856E-01	NOT IDENT.
TE-125M	-1.314E+02	2.573E+02	4.562E+02	NOT IDENT.
I-126	0.000E+00	6.542E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	8.441E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	5.524E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.497E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	9.459E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.951E+25	0.000E+00	SHORT HLIF
BA-133	1.277E-03	4.078E-02	7.321E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	2.847E-02	5.043E-02	1.054E-01	NOT IDENT.
CS-135	-4.992E-03	1.493E-01	2.455E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.729E+05	0.000E+00	SHORT HLIF
CE-139	3.547E-02	1.079E-01	2.033E-01	NOT IDENT.
BA-140	0.000E+00	8.023E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.434E+05	0.000E+00	SHORT HLIF
CE-141	1.588E-01	2.066E+01	3.531E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
PM-144	-6.964E-03	5.193E-02	9.865E-02	NOT IDENT.
PR-144	-6.858E-01	4.479E+00	8.485E+00	NOT IDENT.
PM-146	1.145E-02	3.988E-02	8.181E-02	NOT IDENT.
ND-147	0.000E+00	1.939E+07	0.000E+00	SHORT HLIF
PM-147	3.288E+02	7.803E+02	1.516E+03	NOT IDENT.
PM-149	0.000E+00	4.823E+39	0.000E+00	SHORT HLIF
EU-150	1.855E-02	2.299E-02	4.637E-02	FAIL ABUN
EU-152	1.065E-02	9.045E-02	1.804E-01	NOT IDENT.
GD-153	1.306E-02	1.649E-01	2.898E-01	NOT IDENT.
EU-154	5.451E-02	1.174E-01	2.560E-01	FAIL ABUN
EU-155	2.652E-02	1.113E-01	2.126E-01	FAIL ABUN
TB-160	2.686E-01	1.840E+00	3.626E+00	FAIL ABUN
HO-166M	5.356E-03	4.294E-02	8.861E-02	FAIL ABUN
TM-171	-6.060E+00	2.756E+01	5.290E+01	NOT IDENT.
HF-172	1.916E-01	2.218E-01	4.217E-01	FAIL ABUN
LU-172	1.777E-02	7.347E-02	1.563E-01	FAIL ABUN
LU-176	2.667E-03	2.142E-02	4.328E-02	FAIL ABUN
HF-181	1.625E+00	3.432E+00	7.256E+00	NOT IDENT.
TA-182	1.685E-02	8.332E-01	1.693E+00	FAIL ABUN
RE-183	4.398E-02	3.106E+00	6.066E+00	NOT IDENT.

RE-184	1.220E+01	2.436E+01	5.211E+01	FAIL ABUN
W-188	-6.412E+00	9.840E+01	1.858E+02	FAIL ABUN
IR-192	1.058E-01	3.742E-01	7.703E-01	FAIL ABUN
HG-203	-8.506E-01	1.891E+00	3.603E+00	FAIL ABUN
BI-207	3.994E-02	6.507E-02	1.046E-01	FAIL ABUN
PB-210	7.427E-01	5.181E+00	1.036E+01	NOT IDENT.
BI-211	0.000E+00	4.856E-01	7.751E-01	FAIL ABUN
PB-211	-2.304E-01	6.279E-01	1.051E+00	NOT IDENT.
BI-212	-8.079E-03	4.870E-01	9.328E-01	FAIL ABUN
RN-219	-1.143E-01	3.478E-01	6.601E-01	FAIL ABUN
RA-223	7.123E-02	5.614E-01	1.123E+00	FAIL ABUN
AC-227	1.247E-01	2.120E-01	4.129E-01	FAIL ABUN
TH-227	1.247E-01	2.120E-01	4.129E-01	FAIL ABUN
AC-228	0.000E+00	2.331E-01	5.354E-01	FAIL ABUN
RA-228	0.000E+00	2.331E-01	5.354E-01	FAIL ABUN
TH-231	7.123E-02	5.614E-01	1.123E+00	FAIL ABUN
TH-232	0.000E+00	2.331E-01	5.354E-01	FAIL ABUN
PA-233	-3.224E-02	5.327E-02	9.916E-02	FAIL ABUN
PA-234	1.128E-01	2.424E-01	5.221E-01	FAIL ABUN
PA-234M	1.828E+00	4.143E+00	9.226E+00	FAIL ABUN
NP-237	-3.224E-02	5.327E-02	9.916E-02	FAIL ABUN
NP-238	0.000E+00	2.646E+40	0.000E+00	SHORT HLIF
NP-239	-1.377E-01	2.320E-01	4.093E-01	NOT IDENT.
PU-239	0.000E+00	6.158E+02	6.149E+02	FAIL ABUN
AM-241	1.068E-01	1.666E-01	3.197E-01	NOT IDENT.
CM-243	-2.192E-03	9.688E-02	1.819E-01	NOT IDENT.
BK-247	8.502E-03	6.682E-02	1.234E-01	FAIL ABUN
CM-247	-3.620E-03	2.974E-02	5.834E-02	NOT IDENT.
CF-249	1.094E-02	3.362E-02	6.921E-02	NOT IDENT.
CF-251	-1.054E-01	1.132E-01	1.862E-01	NOT IDENT.
ANH-511	-4.430E-02	4.747E-02	1.011E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:55:52.97

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	261	10.66*	1.133E+00	1.197E+01	1.197E+01	12.64
ZN-65	1115.54	10	50.60*	1.413E+00	7.524E-02	1.728E-01	88.14
CD-109	88.03	60	3.70*	4.899E+00	1.844E+00	2.863E+00	52.08
SN-126	64.28	18	9.60	2.456E+00	4.195E-01	4.195E-01	268.82
	86.94	60	8.90	4.899E+00	7.668E-01	7.668E-01	52.08
	87.57	60	37.00*	4.899E+00	1.844E-01	1.844E-01	52.08
BA-137M	661.66	52	89.90*	2.114E+00	1.527E-01	1.555E-01	42.32
CS-137	661.66	52	85.10*	2.114E+00	1.613E-01	1.643E-01	42.32
CE-144	80.12	------	1.36	4.319E+00	------ Line Not Found		------
	133.52	24	11.09*	6.224E+00	1.921E-01	3.916E-01	140.58
TL-208	277.37	------	6.60	4.258E+00	------ Line Not Found		------
	583.19	76	85.00*	2.333E+00	2.136E-01	2.136E-01	39.63
	860.56	------	12.50	1.727E+00	------ Line Not Found		------
BI-211	72.87	31	1.23	3.637E+00	3.904E+00	3.904E+00	86.61
	351.06	181	12.92*	3.511E+00	2.209E+00	2.209E+00	22.43
PB-212	74.82	98	10.28	3.818E+00	1.385E+00	1.385E+00	47.43
	77.11	120	17.10	4.039E+00	9.610E-01	9.610E-01	32.31
	238.63	232	43.60*	4.779E+00	6.191E-01	6.191E-01	25.76
	300.09	37	3.30	3.998E+00	1.544E+00	1.544E+00	70.10
BI-214	609.32	111	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13
	1120.29	22	14.92	1.407E+00	5.779E-01	5.781E-01	80.51
	1764.49	18	15.30	9.591E-01	6.695E-01	6.698E-01	50.72
PB-214	74.82	98	5.80	3.818E+00	2.454E+00	2.455E+00	47.43
	77.11	120	9.70	4.039E+00	1.694E+00	1.695E+00	32.31
	87.09	60	3.41	4.899E+00	2.001E+00	2.002E+00	52.08
	242.00	73	7.25	4.732E+00	1.182E+00	1.182E+00	49.34
	295.22	123	18.42	4.051E+00	9.164E-01	9.167E-01	27.07
	351.93	181	35.60*	3.511E+00	8.018E-01	8.021E-01	22.43
RN-222	609.32	111	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13
	1120.29	22	14.92	1.407E+00	5.779E-01	5.781E-01	80.51
	1764.49	18	15.30	9.591E-01	6.695E-01	6.698E-01	50.72
RA-224	240.99	73	4.10*	4.732E+00	2.089E+00	2.089E+00	49.34
RA-226	609.32	111	45.49*	2.255E+00	6.027E-01	6.029E-01	29.13
	1120.29	22	14.92	1.407E+00	5.779E-01	5.781E-01	80.51
	1764.49	18	15.30	9.591E-01	6.695E-01	6.698E-01	50.72
TH-228	74.82	98	10.28	3.818E+00	1.385E+00	1.385E+00	47.43
	77.11	120	17.10	4.039E+00	9.610E-01	9.610E-01	32.31
	238.63	232	43.60*	4.779E+00	6.191E-01	6.191E-01	25.76
	300.09	37	3.30	3.998E+00	1.544E+00	1.544E+00	70.10
TH-229	85.43	37	14.70	4.655E+00	3.027E-01	3.027E-01	125.60
	88.47	60	24.00	4.899E+00	2.843E-01	2.844E-01	52.08
	193.51	------	4.41*	5.490E+00	------ Line Not Found		------
	210.85	------	2.80	5.205E+00	------ Line Not Found		------
TH-230	609.32	111	45.49*	2.255E+00	6.027E-01	6.027E-01	29.13
	1120.29	22	14.92	1.407E+00	5.779E-01	5.779E-01	80.51
	1764.49	18	15.30	9.591E-01	6.695E-01	6.695E-01	50.72
PA-231	283.69	------	1.70	4.183E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	301.36	37	5.35*	3.998E+00	9.526E-01	9.526E-01	70.10
TH-234	63.29	18	3.70*	2.456E+00	1.088E+00	1.088E+00	268.82
	92.59	41	4.23	5.268E+00	1.009E+00	1.009E+00	105.76
U-234	609.32	111	45.49*	2.255E+00	6.027E-01	6.027E-01	29.13
	1120.29	22	14.92	1.407E+00	5.779E-01	5.779E-01	80.51
	1764.49	18	15.30	9.591E-01	6.695E-01	6.695E-01	50.72
U-235	89.96	54	3.47	5.093E+00	1.710E+00	1.710E+00	61.97
	93.35	41	5.60	5.268E+00	7.622E-01	7.622E-01	105.76
	143.76	27	10.96*	6.184E+00	2.230E-01	2.230E-01	154.75
	163.33	------	5.08	5.963E+00	------ Line Not Found		------
	185.72	29	57.20	5.615E+00	4.941E-02	4.941E-02	160.69
	205.31	17	5.01	5.297E+00	3.559E-01	3.559E-01	143.66
U-238	63.29	18	3.70*	2.456E+00	1.088E+00	1.088E+00	268.82
	92.59	41	4.23	5.268E+00	1.009E+00	1.009E+00	105.76
AM-243	43.53	------	5.90	2.461E-01	------ Line Not Found		------
	74.66	98	67.20*	3.818E+00	2.118E-01	2.119E-01	47.43

Flag: "*" = Keyline

Sample ID : R405240003 Acquisition date : 3-OCT-2016 04:54:43

Total number of lines in spectrum 42
Number of unidentified lines 7
Number of lines tentatively identified by NID 35 83.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.197E+01	1.197E+01	0.151E+01	12.64	
ZN-65	244.06D	2.30	7.524E-02	1.728E-01	1.523E-01	88.14	
CD-109	461.40D	1.55	1.844E+00	2.863E+00	1.491E+00	52.08	
SN-126	2.30E+05Y	1.00	1.844E-01	1.844E-01	0.960E-01	52.08	
BA-137M	30.08Y	1.02	1.527E-01	1.555E-01	0.658E-01	42.32	
CS-137	30.08Y	1.02	1.613E-01	1.643E-01	0.695E-01	42.32	
CE-144	284.91D	2.04	1.921E-01	3.916E-01	5.505E-01	140.58	
TL-208	1.41E+10Y	1.00	2.136E-01	2.136E-01	0.846E-01	39.63	
BI-211	7.04E+08Y	1.00	2.209E+00	2.209E+00	0.496E+00	22.43	
PB-212	1.41E+10Y	1.00	6.191E-01	6.191E-01	1.594E-01	25.76	
BI-214	1600.00Y	1.00	6.027E-01	6.029E-01	1.756E-01	29.13	
PB-214	1600.00Y	1.00	8.018E-01	8.021E-01	1.799E-01	22.43	
RN-222	1600.00Y	1.00	6.027E-01	6.029E-01	1.756E-01	29.13	
RA-224	1.41E+10Y	1.00	2.089E+00	2.089E+00	1.031E+00	49.34	
RA-226	1600.00Y	1.00	6.027E-01	6.029E-01	1.756E-01	29.13	
TH-228	1.41E+10Y	1.00	6.191E-01	6.191E-01	1.594E-01	25.76	
TH-229	7340.00Y	1.00	2.843E-01	2.844E-01	1.481E-01	52.08	K
TH-230	7.54E+04Y	1.00	6.027E-01	6.027E-01	1.756E-01	29.13	
PA-231	7.04E+08Y	1.00	9.526E-01	9.526E-01	6.677E-01	70.10	
TH-234	4.47E+09Y	1.00	1.088E+00	1.088E+00	2.926E+00	268.82	
U-234	2.45E+05Y	1.00	6.027E-01	6.027E-01	1.756E-01	29.13	
U-235	7.04E+08Y	1.00	2.230E-01	2.230E-01	3.451E-01	154.75	
U-238	4.47E+09Y	1.00	1.088E+00	1.088E+00	2.926E+00	268.82	
AM-243	7370.00Y	1.00	2.118E-01	2.119E-01	1.005E-01	47.43	
	Total Activity :		2.799E+01	2.932E+01			

Grand Total Activity : 2.799E+01 2.932E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240003 Acquisition date : 3-OCT-2016 04:54:43

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	130.12	75	88	2.83	260.18	255	12	1.83E-02	58.9	6.23E+00	T
0	270.04	41	59	0.74	539.69	535	10	1.04E-02	80.7	4.35E+00	T
0	338.37	44	46	1.16	676.21	671	9	1.14E-02	66.8	3.63E+00	T
0	409.76	23	32	0.76	818.88	814	10	6.10E-03	****	3.10E+00	T
0	756.01	7	15	1.33	1511.00	1505	10	1.94E-03	****	1.91E+00	T
0	768.15	33	3	3.24	1535.27	1529	12	9.17E-03	40.7	1.88E+00	T
0	785.28	14	8	1.57	1569.51	1563	11	3.99E-03	93.1	1.85E+00	T
0	790.67	6	14	1.10	1580.30	1573	11	1.68E-03	****	1.84E+00	T
0	806.80	15	23	2.56	1612.55	1602	18	4.27E-03	****	1.81E+00	
0	911.48	66	3	1.38	1821.88	1816	12	1.85E-02	27.6	1.65E+00	T
0	998.00	6	6	1.25	1994.93	1991	8	1.78E-03	****	1.54E+00	
0	1001.22	4	6	0.73	2001.38	1998	6	1.20E-03	****	1.54E+00	T
0	1064.49	8	10	3.30	2127.94	2121	10	2.19E-03	****	1.47E+00	T
0	1106.42	13	2	3.84	2211.82	2207	10	3.83E-03	68.5	1.42E+00	
8	1155.44	9	4	1.53	2309.89	2308	13	2.51E-03	72.4	1.37E+00	
8	1158.69	12	4	2.08	2316.41	2308	13	3.34E-03	99.6	1.37E+00	
0	1246.10	8	5	1.53	2491.30	2488	7	2.25E-03	****	1.29E+00	
0	1379.13	9	3	0.93	2757.52	2750	11	2.50E-03	98.3	1.19E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:56:07.22

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240003.CNF;1    *
* Acquisition date :  3-OCT-2016 04:54:43 Sensitivity     : 3.000            *
* Detector ID      : GAM33                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.62     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 10:18:00 Nuclide Library : SOLID            *
* Sample ID        : R405240003           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.3528E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 10-JUN-2016 07:00:49 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;8              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.357E-01
ZN-65	1.117E-01
CD-109	8.298E-01
SN-126	5.379E-02
BA-137M	2.572E-02
CS-137	2.717E-02
CE-144	2.044E-01
TL-208	2.647E-02
PB-212	5.175E-02
BI-214	5.895E-02
PB-214	5.554E-02
RN-222	5.895E-02
RA-224	6.355E-01
RA-226	5.895E-02
TH-228	5.175E-02
TH-229	3.420E-01
TH-230	5.893E-02
PA-231	3.530E-01
TH-234	1.097E+00
U-234	5.893E-02
U-235	1.359E-01
U-238	1.097E+00
AM-243	4.431E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	7.847E+00	NOT IDENT.
NA-22	4.539E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	5.283E-03	NOT IDENT.
SC-46	2.944E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	5.437E-02	NOT IDENT.

CO-56	3.201E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.939E-02	FAIL ABUN
CO-58	3.786E-01	NOT IDENT.
FE-59	5.809E+00	NOT IDENT.
CO-60	3.114E-02	NOT IDENT.
GE-68	1.902E+00	NOT IDENT.
AS-73	9.569E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.496E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.000E-01	NOT IDENT.
KR-85	6.153E+00	NOT IDENT.
SR-85	6.032E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	9.426E-02	NOT IDENT.
Y-91	5.191E+02	NOT IDENT.
NB-94	2.911E-02	NOT IDENT.
NB-95	5.411E-01	NOT IDENT.
NB-95M	1.731E+00	NOT IDENT.
ZR-95	1.108E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.481E-02	NOT IDENT.
RH-102	4.610E-02	FAIL ABUN
RU-103	4.970E+00	FAIL ABUN
RH-106	3.488E-01	NOT IDENT.
RU-106	3.488E-01	NOT IDENT.
AG-108M	2.299E-02	NOT IDENT.
AG-110M	6.098E-02	NOT IDENT.
SN-113	1.653E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.027E-01	NOT IDENT.
SB-124	1.223E+00	NOT IDENT.
SB-125	8.225E-02	NOT IDENT.
TE-125M	2.114E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.285E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.638E-02	NOT IDENT.
CS-135	1.117E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	9.449E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.630E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
PM-144	4.274E-02	NOT IDENT.
PR-144	3.673E+00	NOT IDENT.
PM-146	3.633E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	7.032E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.096E-02	FAIL ABUN
EU-152	8.177E-02	NOT IDENT.
GD-153	1.335E-01	NOT IDENT.
EU-154	1.099E-01	FAIL ABUN
EU-155	9.913E-02	FAIL ABUN
TB-160	1.567E+00	FAIL ABUN
HO-166M	3.726E-02	FAIL ABUN
TM-171	2.436E+01	NOT IDENT.
HF-172	1.959E-01	FAIL ABUN
LU-172	6.688E-02	FAIL ABUN
LU-176	1.954E-02	FAIL ABUN
HF-181	3.207E+00	NOT IDENT.
TA-182	7.212E-01	FAIL ABUN
RE-183	2.797E+00	NOT IDENT.
RE-184	2.236E+01	FAIL ABUN

W-188	8.434E+01	FAIL ABUN
IR-192	3.471E-01	FAIL ABUN
HG-203	1.627E+00	FAIL ABUN
BI-207	4.530E-02	FAIL ABUN
PB-210	4.772E+00	NOT IDENT.
BI-211	3.707E-01	FAIL ABUN
PB-211	4.605E-01	NOT IDENT.
BI-212	4.084E-01	FAIL ABUN
RN-219	2.931E-01	FAIL ABUN
RA-223	5.100E-01	FAIL ABUN
AC-227	1.885E-01	FAIL ABUN
TH-227	1.885E-01	FAIL ABUN
AC-228	2.500E-01	FAIL ABUN
RA-228	2.500E-01	FAIL ABUN
TH-231	5.100E-01	FAIL ABUN
TH-232	2.500E-01	FAIL ABUN
PA-233	4.441E-02	FAIL ABUN
PA-234	2.217E-01	FAIL ABUN
PA-234M	4.027E+00	FAIL ABUN
NP-237	4.441E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.885E-01	NOT IDENT.
PU-239	2.876E+02	FAIL ABUN
AM-241	1.486E-01	NOT IDENT.
CM-243	8.433E-02	NOT IDENT.
BK-247	5.583E-02	FAIL ABUN
CM-247	2.578E-02	NOT IDENT.
CF-249	3.101E-02	NOT IDENT.
CF-251	8.525E-02	NOT IDENT.
ANH-511	4.759E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:56:13.19

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240003.CNF;1    *
* Acquisition date :  3-OCT-2016 04:54:43 Sensitivity     : 3.000          *
* Detector ID      : GAM33                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.62     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:18:00 Nuclide Library : SOLID          *
* Sample ID        : R405240003           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3528E+02 GRAM   *
*                                         Quantity Err(%) : 1.4784E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 10-JUN-2016 07:00:49 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM33_CAN.CNF;8           *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.197E+01	1.609E+00	1.609E+00
ZN-65	1.728E-01	1.494E-01	1.494E-01
CD-109	1.552E+00	1.516E+00	1.516E+00
SN-126	9.998E-02	9.752E-02	9.752E-02
BA-137M	1.555E-01	6.484E-02	6.484E-02
CS-137	1.643E-01	6.850E-02	6.850E-02
CE-144	3.916E-01	5.399E-01	5.399E-01
TL-208	2.136E-01	8.343E-02	8.343E-02
PB-212	6.191E-01	1.596E-01	1.596E-01
BI-214	6.029E-01	1.740E-01	1.740E-01
PB-214	8.021E-01	1.794E-01	1.794E-01
RN-222	6.029E-01	1.740E-01	1.740E-01
RA-224	4.688E-01	1.103E+00	1.103E+00
RA-226	6.029E-01	1.740E-01	1.740E-01
TH-228	6.191E-01	1.596E-01	1.596E-01
TH-229	-2.797E-01	4.418E-01	4.418E-01
TH-230	6.027E-01	1.740E-01	1.740E-01
PA-231	9.526E-01	6.852E-01	6.852E-01
TH-234	1.088E+00	2.878E+00	2.878E+00
U-234	6.027E-01	1.740E-01	1.740E-01
U-235	2.230E-01	3.384E-01	3.384E-01
U-238	1.088E+00	2.878E+00	2.878E+00
AM-243	1.328E-01	1.015E-01	1.015E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-4.304E+00	9.745E+00	9.936E+00	NOT IDENT.
NA-22	2.432E-02	4.820E-02	4.943E-02	NOT IDENT.
NA-24	1.000E+41	1.368E+41	0.000E+00	SHORT HLIF
AL-26	-1.759E-02	2.139E-02	2.281E-02	NOT IDENT.
SC-46	-2.657E-01	4.061E-01	4.234E-01	FAIL ABUN
V-48	4.102E+02	7.368E+03	7.370E+03	SHORT HLIF
CR-51	-3.473E+02	3.221E+02	3.581E+02	SHORT HLIF

MN-54	1.602E-02	6.228E-02	6.270E-02	NOT IDENT.
CO-56	-1.599E-01	4.226E-01	4.287E-01	NOT IDENT.
MN-56	-1.000E+41	2.740E+41	0.000E+00	SHORT HLIF
CO-57	8.243E-03	4.476E-02	4.492E-02	FAIL ABUN
CO-58	-3.168E-01	6.065E-01	6.231E-01	NOT IDENT.
FE-59	4.660E+00	5.848E+00	6.214E+00	NOT IDENT.
CO-60	1.155E-02	3.339E-02	3.380E-02	NOT IDENT.
GE-68	-4.286E-02	2.190E+00	2.190E+00	NOT IDENT.
AS-73	1.572E+00	1.045E+01	1.048E+01	NOT IDENT.
AS-74	2.146E+03	4.259E+03	4.368E+03	SHORT HLIF
SE-75	-1.284E-01	2.011E-01	2.092E-01	FAIL ABUN
BR-77	1.423E+37	1.204E+38	0.000E+00	SHORT HLIF
SR-82	3.721E+01	5.798E+02	5.800E+02	SHORT HLIF
RB-83	-4.255E-01	5.454E-01	5.782E-01	NOT IDENT.
KR-85	-1.938E+01	9.411E+00	1.284E+01	NOT IDENT.
SR-85	-1.903E+00	9.232E-01	1.260E+00	NOT IDENT.
RB-86	2.955E+03	1.869E+04	1.874E+04	SHORT HLIF
Y-88	-4.402E-02	1.418E-01	1.431E-01	NOT IDENT.
Y-91	4.832E+02	5.239E+02	5.674E+02	NOT IDENT.
NB-94	1.477E-02	3.206E-02	3.274E-02	NOT IDENT.
NB-95	7.686E-02	6.843E-01	6.852E-01	NOT IDENT.
NB-95M	1.626E+00	2.020E+00	2.149E+00	NOT IDENT.
ZR-95	8.976E-01	1.939E+00	1.981E+00	FAIL ABUN
NB-97	-1.000E+41	2.318E+41	0.000E+00	SHORT HLIF
ZR-97	-1.000E+41	6.189E+40	0.000E+00	SHORT HLIF
MO-99	8.039E+30	2.635E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	8.208E+41	0.000E+00	SHORT HLIF
RH-101	-1.641E-02	3.350E-02	3.431E-02	NOT IDENT.
RH-102	8.410E-03	5.254E-02	5.267E-02	FAIL ABUN
RU-103	3.441E+00	5.261E+00	5.485E+00	FAIL ABUN
RH-106	-5.563E-01	5.124E-01	5.704E-01	NOT IDENT.
RU-106	-5.563E-01	5.124E-01	5.704E-01	NOT IDENT.
AG-108M	6.389E-03	2.529E-02	2.545E-02	NOT IDENT.
AG-110M	-4.728E-02	8.664E-02	8.923E-02	NOT IDENT.
SN-113	-2.085E-01	2.150E-01	2.347E-01	NOT IDENT.
CD-115	-2.693E+37	3.059E+38	0.000E+00	SHORT HLIF
SN-117M	1.727E+04	6.127E+04	6.176E+04	SHORT HLIF
TE-123M	4.615E-02	1.158E-01	1.176E-01	NOT IDENT.
SB-124	-2.251E-01	1.562E+00	1.565E+00	NOT IDENT.
SB-125	1.898E-03	9.338E-02	9.338E-02	NOT IDENT.
TE-125M	-1.314E+02	2.574E+02	2.641E+02	NOT IDENT.
I-126	5.165E+04	6.542E+05	6.546E+05	SHORT HLIF
SB-126	-3.300E+05	8.463E+05	8.593E+05	SHORT HLIF
SB-127	5.013E+20	5.565E+21	0.000E+00	SHORT HLIF
I-131	-9.097E+08	2.497E+09	2.531E+09	SHORT HLIF
I-132	1.000E+41	1.807E+42	0.000E+00	SHORT HLIF
TE-132	-9.068E+24	8.959E+25	0.000E+00	SHORT HLIF
BA-133	1.277E-03	4.078E-02	4.079E-02	NOT IDENT.
I-133	-1.000E+41	4.249E+41	0.000E+00	SHORT HLIF
CS-134	2.847E-02	5.045E-02	5.205E-02	NOT IDENT.
CS-135	-4.992E-03	1.493E-01	1.493E-01	NOT IDENT.
I-135	-1.000E+41	6.906E+41	0.000E+00	SHORT HLIF
CS-136	-1.262E+05	1.734E+05	1.825E+05	SHORT HLIF
CE-139	3.547E-02	1.081E-01	1.093E-01	NOT IDENT.
BA-140	-6.331E+05	8.028E+05	8.520E+05	SHORT HLIF
LA-140	-1.345E+05	3.435E+05	3.488E+05	SHORT HLIF
CE-141	1.588E-01	2.066E+01	2.066E+01	NOT IDENT.
CE-143	1.000E+41	2.891E+41	0.000E+00	SHORT HLIF
PM-144	-6.964E-03	5.193E-02	5.202E-02	NOT IDENT.
PR-144	-6.858E-01	4.479E+00	4.490E+00	NOT IDENT.
PM-146	1.145E-02	3.989E-02	4.022E-02	NOT IDENT.
ND-147	2.363E+07	1.944E+07	2.216E+07	SHORT HLIF
PM-147	3.288E+02	7.805E+02	7.944E+02	NOT IDENT.
PM-149	1.219E+39	4.830E+39	0.000E+00	SHORT HLIF
EU-150	1.855E-02	2.301E-02	2.448E-02	FAIL ABUN
EU-152	1.065E-02	9.045E-02	9.058E-02	NOT IDENT.
GD-153	1.306E-02	1.649E-01	1.650E-01	NOT IDENT.
EU-154	5.451E-02	1.174E-01	1.200E-01	FAIL ABUN
EU-155	2.652E-02	1.114E-01	1.120E-01	FAIL ABUN
TB-160	2.686E-01	1.840E+00	1.844E+00	FAIL ABUN
HO-166M	5.356E-03	4.295E-02	4.301E-02	FAIL ABUN
TM-171	-6.060E+00	2.757E+01	2.770E+01	NOT IDENT.
HF-172	1.916E-01	2.240E-01	2.401E-01	FAIL ABUN
LU-172	1.777E-02	7.349E-02	7.393E-02	FAIL ABUN
LU-176	2.667E-03	2.142E-02	2.146E-02	FAIL ABUN
HF-181	1.625E+00	3.433E+00	3.510E+00	NOT IDENT.
TA-182	1.685E-02	8.332E-01	8.333E-01	FAIL ABUN
RE-183	4.398E-02	3.106E+00	3.106E+00	NOT IDENT.

RE-184	1.220E+01	2.452E+01	2.513E+01	FAIL ABUN
W-188	-6.412E+00	9.840E+01	9.845E+01	FAIL ABUN
IR-192	1.058E-01	3.742E-01	3.773E-01	FAIL ABUN
HG-203	-8.506E-01	1.891E+00	1.929E+00	FAIL ABUN
BI-207	3.994E-02	6.509E-02	6.753E-02	FAIL ABUN
PB-210	7.427E-01	5.182E+00	5.192E+00	NOT IDENT.
BI-211	2.209E+00	4.955E-01	1.112E+00	FAIL ABUN
PB-211	-2.304E-01	6.280E-01	6.365E-01	NOT IDENT.
BI-212	-8.079E-03	4.870E-01	4.870E-01	FAIL ABUN
RN-219	-1.143E-01	3.481E-01	3.519E-01	FAIL ABUN
RA-223	7.123E-02	5.614E-01	5.623E-01	FAIL ABUN
AC-227	1.247E-01	2.126E-01	2.199E-01	FAIL ABUN
TH-227	1.247E-01	2.126E-01	2.199E-01	FAIL ABUN
AC-228	8.621E-01	2.373E-01	4.553E-01	FAIL ABUN
RA-228	8.621E-01	2.373E-01	4.553E-01	FAIL ABUN
TH-231	7.123E-02	5.614E-01	5.623E-01	FAIL ABUN
TH-232	8.621E-01	2.373E-01	4.553E-01	FAIL ABUN
PA-233	-3.224E-02	5.330E-02	5.524E-02	FAIL ABUN
PA-234	1.128E-01	2.746E-01	2.793E-01	FAIL ABUN
PA-234M	1.828E+00	4.144E+00	4.225E+00	FAIL ABUN
NP-237	-3.224E-02	5.330E-02	5.524E-02	FAIL ABUN
NP-238	2.109E+40	2.647E+40	0.000E+00	SHORT HLIF
NP-239	-1.377E-01	2.323E-01	2.404E-01	NOT IDENT.
PU-239	1.066E+03	6.176E+02	7.826E+02	FAIL ABUN
AM-241	1.068E-01	1.668E-01	1.736E-01	NOT IDENT.
CM-243	-2.192E-03	9.688E-02	9.688E-02	NOT IDENT.
BK-247	8.502E-03	6.684E-02	6.695E-02	FAIL ABUN
CM-247	-3.620E-03	2.975E-02	2.979E-02	NOT IDENT.
CF-249	1.094E-02	3.363E-02	3.399E-02	NOT IDENT.
CF-251	-1.054E-01	1.138E-01	1.233E-01	NOT IDENT.
ANH-511	-4.430E-02	4.751E-02	5.153E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	44.8980	87.09	58.5966	136.47	54.0946
45.60	46.0741	87.57	51.8244	140.51	0.0000
46.54	43.3542	88.03	51.8638	143.76	46.4630
49.72	0.0000	88.34	51.8903	144.24	46.4899
51.35	32.4149	88.47	51.9013	145.44	48.7729
51.87	38.1812	89.96	52.0281	152.43	50.2899
52.39	49.6948	1093.63	52.0853	153.25	0.0000
52.97	46.8899	91.11	0.0000	323.87	43.6733
53.44	45.0240	92.59	52.2492	156.02	0.0000
54.07	48.9251	93.35	52.3122	158.56	0.0000
57.36	0.0000	94.56	52.4127	159.00	41.6583
57.53	54.1331	94.65	52.4201	162.33	56.5033
57.98	46.4447	94.67	52.4216	162.66	0.0000
59.27	45.2792	94.87	38.6387	163.33	45.2521
59.32	45.2840	97.43	41.5640	165.86	51.0493
59.54	45.3050	98.43	39.5467	176.31	43.5896
60.96	54.5284	98.44	39.5473	176.60	0.0000
61.17	58.4489	99.53	48.9955	177.52	58.5750
62.93	52.7951	100.11	54.2554	181.07	0.0000
63.29	52.8340	102.03	48.1345	181.52	47.6680
63.58	52.8651	103.18	59.7471	184.41	49.3503
64.28	67.9723	103.37	54.5216	143.76	52.1178
66.73	53.8559	105.21	53.6190	193.51	50.1872
67.24	51.2799	105.31	58.8843	197.03	48.0162
125.81	51.3240	106.12	74.7455	198.01	43.3729
67.75	66.1382	106.47	65.3041	201.83	40.7858
69.67	60.4397	109.28	60.2820	203.43	26.7081
70.83	50.3122	111.00	61.4900	205.31	37.7725
72.81	61.1312	111.76	0.0000	210.85	58.1367
72.87	61.1382	114.06	67.0788	215.65	46.4756
74.66	68.0078	116.30	0.0000	222.11	51.5395
74.82	68.0280	116.74	57.7099	227.09	51.7659
74.97	68.0467	119.76	59.0203	227.38	44.5540
77.11	68.3113	121.12	41.9276	228.16	0.0000
78.74	71.1966	121.22	46.2341	228.18	48.2001
79.69	72.6619	121.78	48.4205	116.74	48.2001
80.12	72.7169	122.06	49.5151	235.69	27.4906
80.19	0.0000	122.92	54.9599	235.96	27.4970
80.57	48.5160	123.07	54.9708	238.63	64.8454
81.00	80.9204	265.00	62.5662	238.98	0.0000
81.07	80.9302	125.81	38.9432	240.99	85.2783
81.75	55.3678	127.23	53.4651	242.00	32.5146
83.79	66.4035	127.91	50.6196	244.70	30.9581
84.00	66.4269	129.30	40.5679	252.40	0.0000
85.43	44.8449	131.20	40.6670	252.80	29.5243
86.55	44.9292	133.02	26.2031	254.15	0.0000
86.79	58.5673	133.52	26.2196	256.23	27.1388
86.94	58.5822	136.00	43.8348	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	39.7393	355.39	0.0000	584.27	15.9180
264.80	28.5661	356.01	25.1607	595.83	0.0000
265.00	28.5703	364.49	0.0000	427.87	9.0179
268.22	34.8684	366.42	0.0000	602.52	0.0000
269.46	21.1909	372.51	21.4072	604.72	12.0449
270.03	21.2002	375.05	22.3338	607.14	16.5792
271.23	19.9717	377.52	21.4727	609.32	21.1205
273.65	0.0000	356.01	22.4533	610.33	21.1290
276.40	29.2407	388.16	20.7104	614.28	19.6531
277.37	31.7703	388.63	0.0000	618.01	19.1794
277.60	31.7757	391.69	33.3867	620.36	14.1458
278.00	35.9681	264.66	19.0492	621.93	24.2666
279.20	36.0004	401.81	25.4154	630.19	0.0000
279.54	37.6849	402.40	20.8845	631.29	12.1807
279.70	37.6895	404.85	21.8232	633.25	9.1428
280.46	31.0065	410.95	13.6874	634.78	0.0000
283.69	33.6019	413.71	17.8214	635.95	17.2891
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	35.3273	423.72	0.0000	645.85	12.2534
285.90	0.0000	427.09	23.0204	657.76	16.9297
287.50	34.5395	427.87	20.2669	657.90	0.0000
290.67	33.4383	433.94	18.4863	661.66	13.3597
293.27	0.0000	439.40	21.3224	664.57	0.0000
351.93	31.7703	453.88	17.7518	666.33	0.0000
295.96	31.7871	463.37	20.6577	666.50	0.0000
879.38	25.4779	468.07	13.1780	667.71	0.0000
299.98	28.0539	473.00	0.0000	677.62	16.5469
300.09	28.0566	475.06	18.8936	685.70	0.0000
300.13	28.0573	476.78	14.1827	695.00	0.0000
301.36	31.9115	477.60	18.9185	696.49	15.6268
302.85	21.7226	482.18	14.2218	696.51	15.6268
256.23	34.7969	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	11.4633
306.78	27.3359	497.08	18.1496	697.49	13.5485
308.46	35.0659	505.52	20.1438	702.65	14.6192
311.90	33.4355	507.63	0.0000	706.68	21.9630
316.51	24.0819	511.00	24.0448	711.68	8.3825
319.41	0.0000	514.00	61.6432	720.70	0.0000
320.08	0.0000	514.00	61.6432	721.93	0.0000
321.04	25.8826	520.40	19.3229	722.78	17.8875
323.87	31.1191	520.69	0.0000	722.91	18.9404
325.23	43.2607	522.65	0.0000	723.31	16.8385
328.76	0.0000	527.90	0.0000	724.19	18.9500
333.37	28.7085	528.26	16.4867	727.33	16.8639
333.97	18.2763	529.59	21.3492	733.00	13.7305
334.37	24.8099	529.87	0.0000	735.93	17.9746
338.28	27.0563	531.02	0.0000	333.97	10.5794
338.32	27.0569	537.26	0.0000	739.50	0.0000
311.90	19.6660	546.56	0.0000	747.24	16.9876
340.48	19.6660	552.55	16.6742	748.06	14.8687
340.55	0.0000	563.25	14.7839	752.31	15.9552
344.28	29.7915	569.33	30.6380	753.82	0.0000
345.93	21.9289	946.00	30.6405	756.73	9.5885
351.06	27.2814	569.70	30.6430	756.80	9.5889
351.93	27.2965	583.19	15.9108	884.68	3.2045

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	8.0167	1274.44	1.7266	1620.50	5.0052
766.42	8.5527	1001.03	6.9160	1621.92	4.0051
766.84	8.5540	1002.74	10.3792	1678.03	0.0000
772.60	0.0000	1004.73	10.3850	1690.97	3.0443
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	4.1150
778.90	14.1749	1028.54	0.0000	1063.66	2.0597
783.70	0.0000	1037.84	13.9785	1771.35	2.0601
785.37	8.0722	1038.76	0.0000	1791.20	0.0000
792.07	16.1823	631.29	4.3790	1808.65	3.1111
794.95	15.5502	1048.07	0.0000	1810.72	0.0000
795.86	11.8827	1049.04	11.3932	1836.06	2.0842
810.06	11.3981	1050.41	7.8904		
810.29	16.2842	1063.66	11.4393		
344.28	16.2848	1077.00	0.0000		
810.76	14.6580	1077.34	10.5989		
815.77	0.0000	1085.87	9.7385		
1048.07	0.0000	1093.63	9.7586		
832.01	7.6554	1099.45	7.1084		
834.85	12.0411	1112.07	3.5662		
835.71	9.8547	1112.84	5.7070		
836.80	0.0000	1115.54	7.1392		
846.75	0.0000	1120.29	8.9349		
846.77	13.1880	1120.55	8.9355		
856.80	0.0000	1221.41	8.9374		
860.56	14.3518	1129.67	8.9575		
871.09	7.7542	1131.51	0.0000		
873.19	5.5426	1147.95	0.0000		
875.33	0.0000	1173.23	12.6824		
879.38	12.2179	1177.95	13.6047		
880.51	14.4446	1189.05	13.6432		
883.24	12.2331	1204.77	9.1315		
884.68	11.1259	1221.41	11.0032		
889.28	16.7139	1231.02	10.1104		
894.76	8.9294	1235.36	0.0000		
898.04	8.9388	1238.28	6.4454		
900.72	10.0646	1260.41	0.0000		
903.28	7.8343	1271.87	12.0677		
911.20	7.8536	1274.44	8.3595		
912.08	7.8559	1274.54	8.3595		
923.98	0.0000	1291.59	6.5283		
926.50	6.7637	1298.22	0.0000		
929.11	10.1539	1312.11	0.0000		
937.49	16.9666	1332.49	4.7079		
944.13	0.0000	1362.66	0.0000		
946.00	6.8042	1365.19	8.5375		
949.00	13.6206	1368.63	0.0000		
667.71	0.0000	1384.29	2.1776		
962.31	18.2337	1408.01	7.6621		
964.08	11.4022	1457.56	0.0000		
966.17	35.3682	1460.82	4.8441		
911.20	13.7021	1489.16	3.8984		
968.97	13.7021	1505.03	5.8674		
983.53	0.0000	1584.12	2.9815		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:56:42.22

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240004.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM41.CNF;119
                                       Background date  : 2-OCT-2016 11:02:18.
Sample date      : 15-DEC-2015 10:21:00 Acquisition date : 3-OCT-2016 04:55:28.
Sample ID        : R405240004           Sample quantity  : 1.39130E+02 GRAM
Detector name    : GAM41                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:05.86  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.66*	67	149	0.80	93.62	89	9	1.85E-02	37.3	
2	0	63.54*	11	159	0.73	127.37	124	7	3.02E-03	214.8	
3	3	72.71	32	48	1.23	145.69	144	21	8.91E-03	31.1	2.06E+00
4	3	75.00*	242	91	1.08	150.27	144	21	6.74E-02	9.0	
5	3	77.26*	270	84	0.96	154.79	144	21	7.50E-02	8.3	
6	1	83.99*	34	80	1.37	168.25	165	27	9.54E-03	49.3	1.50E+00
7	1	87.24	93	114	1.38	174.75	165	27	2.59E-02	22.6	
8	1	89.92	74	106	1.13	180.10	165	27	2.04E-02	25.3	
9	1	92.77*	61	112	1.14	185.81	165	27	1.70E-02	35.9	
10	0	144.21*	28	90	1.70	288.66	285	11	7.66E-03	71.0	
11	0	186.06*	79	76	1.32	372.32	368	11	2.18E-02	25.9	
12	0	210.47	53	93	3.23	421.14	414	14	1.48E-02	41.1	
13	3	238.88*	198	46	1.11	477.95	474	25	5.50E-02	9.1	3.00E+00
14	3	242.31	66	61	1.93	484.81	474	25	1.82E-02	30.8	
15	0	271.26	34	44	2.53	542.69	537	10	9.34E-03	41.0	
16	0	277.40	41	28	1.21	554.96	551	10	1.14E-02	28.5	
17	0	295.52	115	65	1.12	591.20	584	13	3.19E-02	17.2	
18	0	338.73	51	50	1.19	677.61	673	10	1.42E-02	29.5	
19	0	352.31*	189	37	1.22	704.75	700	12	5.25E-02	9.8	
20	0	409.92	33	28	1.03	819.96	815	11	9.09E-03	35.7	
21	0	464.31	12	26	0.59	928.74	921	9	3.31E-03	76.8	
22	0	512.69*	38	47	2.63	1025.48	1016	22	1.05E-02	55.5	
23	0	553.57	13	9	1.56	1107.24	1103	8	3.57E-03	52.7	
24	0	565.51	15	14	1.82	1131.11	1126	8	4.27E-03	49.1	
25	0	583.71*	72	12	0.92	1167.51	1163	11	1.99E-02	15.3	
26	0	609.83*	133	22	1.49	1219.75	1214	11	3.71E-02	11.2	
27	0	657.13	15	16	1.16	1314.36	1307	14	4.03E-03	65.9	
28	0	662.84*	39	31	1.21	1325.76	1320	13	1.08E-02	33.4	
29	0	684.74	9	17	1.24	1369.57	1362	10	2.41E-03	96.3	
30	0	720.19	8	7	0.48	1440.47	1436	7	2.34E-03	61.9	
31	0	728.20*	25	14	2.80	1456.48	1451	15	7.04E-03	36.3	
32	0	759.94	11	8	0.92	1519.98	1515	10	3.13E-03	54.6	
33	0	824.34	11	2	1.34	1648.77	1644	8	3.02E-03	37.9	
34	0	911.57*	53	8	0.88	1823.26	1816	15	1.48E-02	18.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	965.48	16	13	1.04	1931.09	1924	10	4.53E-03	47.6	
36	0	969.60*	19	14	1.05	1939.33	1935	9	5.14E-03	44.0	
37	0	1073.14	14	5	1.30	2146.45	2140	11	3.83E-03	42.4	
38	0	1121.24	29	12	1.79	2242.66	2233	16	7.98E-03	32.8	
39	0	1162.20	13	0	2.42	2324.62	2319	11	3.61E-03	27.7	
40	0	1166.06	9	0	1.44	2332.33	2329	7	2.50E-03	33.3	
41	0	1241.45	31	13	5.28	2483.15	2475	15	8.48E-03	32.8	
42	0	1461.74	225	0	2.06	2923.89	2916	15	6.25E-02	6.7	
43	0	1765.77	32	0	1.03	3532.25	3526	12	8.89E-03	17.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 05:56:44

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240004.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 10:21:00 Acquisition date : 3-OCT-2016 04:55:28
Sample ID   : R405240004   Sample quantity : 139.13 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA41   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:05.86   0.2%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Empirical   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
U-235	143.76	CE-141	145.44
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	8.926E-01	1.222E+01	1.222E+01	13.33	OK
KR-85	514.00	0.43*	2.307E+00	2.129E+01	2.244E+01	111.02	OK
SR-85	514.00	96.00*	2.307E+00	9.624E-02	2.202E+00	111.02	OK
CD-109	88.03	3.70*	7.451E+00	1.270E+00	1.972E+00	81.71	OK
SN-126	64.28	9.60	7.793E+00	9.622E-02	9.622E-02	429.65	OK
	86.94	8.90	7.451E+00	5.279E-01	5.279E-01	81.71	OK
	87.57	37.00*	7.451E+00	1.270E-01	1.270E-01	81.71	OK
BA-137M	661.66	89.90*	1.824E+00	1.310E-01	1.335E-01	66.87	OK
CS-137	661.66	85.10*	1.824E+00	1.384E-01	1.410E-01	66.87	OK
CE-141	145.44	48.29*	6.083E+00	1.903E-02	9.788E+00	447.78	OK
TL-208	277.37	6.60	3.907E+00	9.465E-01	9.465E-01	57.08	OK
	583.19	85.00*	2.050E+00	2.301E-01	2.301E-01	30.69	OK
	860.56	12.50	1.434E+00	----- Line Not Found		-----	Absent
PB-210	46.54	4.25*	7.557E+00	1.400E+00	1.435E+00	74.52	OK
PB-212	74.82	10.28	7.681E+00	1.448E+00	1.448E+00	28.21	OK
	77.11	17.10	7.645E+00	1.347E+00	1.347E+00	16.56	OK
	238.63	43.60*	4.383E+00	6.217E-01	6.217E-01	18.21	OK
	300.09	3.30	3.668E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42	OK
	1120.29	14.92	1.127E+00	9.035E-01	9.038E-01	65.70	OK
	1764.49	15.30	7.616E-01	1.396E+00	1.396E+00	35.36	OK
PB-214	74.82	5.80	7.683E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	7.645E+00	2.374E+00	2.375E+00	16.56	OK
	87.09	3.41	7.454E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.340E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	3.714E+00	9.926E-01	9.930E-01	34.40	OK
	351.93	35.60*	3.211E+00	9.622E-01	9.626E-01	19.63	OK
RN-222	609.32	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42	OK
	1120.29	14.92	1.127E+00	9.035E-01	9.038E-01	65.70	OK
	1764.49	15.30	7.616E-01	1.396E+00	1.396E+00	35.36	OK
RA-224	240.99	4.10*	4.336E+00	4.563E-01	4.563E-01	326.99	OK
RA-226	609.32	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42	OK
	1120.29	14.92	1.127E+00	9.035E-01	9.038E-01	65.70	OK
	1764.49	15.30	7.616E-01	1.396E+00	1.396E+00	35.36	OK
AC-228	105.21	1.10	7.028E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.319E+00	7.966E-01	7.966E-01	58.95	OK
	794.95	4.25	1.543E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.473E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42	OK
	968.97	15.80	1.286E+00	4.879E-01	4.879E-01	87.97	OK
RA-228	105.21	1.10	7.028E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.319E+00	7.966E-01	7.966E-01	58.95	OK
	794.95	4.25	1.543E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.473E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42	OK
	968.97	15.80	1.286E+00	4.879E-01	4.879E-01	87.97	OK
TH-228	74.82	10.28	7.681E+00	1.448E+00	1.448E+00	28.21	OK
	77.11	17.10	7.645E+00	1.347E+00	1.347E+00	16.56	OK
	238.63	43.60*	4.383E+00	6.217E-01	6.217E-01	18.21	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	300.09	3.30	3.668E+00	----- Line Not Found		-----	Absent
TH-229	85.43	14.70	7.519E+00	2.016E-01	2.016E-01	98.66	OK
	88.47	24.00	7.451E+00	1.958E-01	1.958E-01	81.71	OK
	193.51	4.41*	5.088E+00	----- Line Not Found		-----	Absent
	210.85	2.80	4.803E+00	2.394E+00	2.394E+00	82.22	OK
TH-230	609.32	45.49*	1.970E+00	8.297E-01	8.297E-01	22.42	OK
	1120.29	14.92	1.127E+00	9.035E-01	9.035E-01	65.70	OK
	1764.49	15.30	7.616E-01	1.396E+00	1.396E+00	35.36	OK
TH-232	105.21	1.10	7.028E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.319E+00	7.966E-01	7.966E-01	58.95	OK
	835.71	1.61	1.473E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42	OK
	968.97	15.80	1.286E+00	4.879E-01	4.879E-01	87.97	OK
TH-234	63.29	3.70*	7.793E+00	2.496E-01	2.496E-01	429.65	OK
	92.59	4.23	7.327E+00	1.275E+00	1.275E+00	71.76	OK
U-234	609.32	45.49*	1.970E+00	8.297E-01	8.297E-01	22.42	OK
	1120.29	14.92	1.127E+00	9.035E-01	9.035E-01	65.70	OK
	1764.49	15.30	7.616E-01	1.396E+00	1.396E+00	35.36	OK
U-235	89.96	3.47	7.392E+00	1.851E+00	1.851E+00	50.64	OK
	93.35	5.60	7.327E+00	9.630E-01	9.630E-01	71.76	OK
	143.76	10.96*	6.093E+00	----- Line Not Found		-----	<<INT Reject
	163.33	5.08	5.667E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.222E+00	1.609E-01	1.609E-01	51.71	OK
	205.31	5.01	4.887E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	7.793E+00	2.496E-01	2.496E-01	429.65	OK
	92.59	4.23	7.327E+00	1.275E+00	1.275E+00	71.76	OK
AM-243	43.53	5.90	7.421E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	7.681E+00	2.215E-01	2.215E-01	28.21	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:56:45.73

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240004.CNF;1    *
* Acquisition date :  3-OCT-2016 04:55:28 Sensitivity     : 3.000          *
* Detector ID      : GAM41                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:05.86     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:21:00 Analyst initials: MXR1           *
* Sample ID        : R405240004           Sample Quantity : 1.3913E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                          *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 06:01:47 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;3           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.222E+01	1.597E+00	7.048E-01
KR-85	2.244E+01	2.441E+01	1.340E+01
SR-85	2.202E+00	2.395E+00	1.315E+00
CD-109	1.972E+00	1.579E+00	1.391E+00
SN-126	1.270E-01	1.017E-01	8.944E-02
BA-137M	1.335E-01	8.745E-02	6.900E-02
CS-137	1.410E-01	9.239E-02	7.289E-02
CE-141	9.788E+00	4.295E+01	3.719E+01
TL-208	2.301E-01	6.920E-02	6.755E-02
PB-210	1.435E+00	1.048E+00	8.070E-01
PB-212	6.217E-01	1.109E-01	9.062E-02
BI-214	8.299E-01	1.823E-01	1.643E-01
PB-214	9.626E-01	1.852E-01	1.213E-01
RN-222	8.299E-01	1.823E-01	1.643E-01
RA-224	4.563E-01	1.462E+00	9.713E-01
RA-226	8.299E-01	1.823E-01	1.643E-01
AC-228	8.169E-01	2.915E-01	2.662E-01
RA-228	8.169E-01	2.915E-01	2.662E-01
TH-228	6.217E-01	1.109E-01	9.062E-02
TH-229	-6.900E-02	4.832E-01	9.191E-01
TH-230	8.297E-01	1.823E-01	1.643E-01
TH-232	8.169E-01	2.915E-01	2.662E-01
TH-234	2.496E-01	1.051E+00	1.105E+00
U-234	8.297E-01	1.823E-01	1.643E-01
U-235	2.580E-01	3.589E-01	3.690E-01
U-238	2.496E-01	1.051E+00	1.105E+00
AM-243	2.215E-01	6.124E-02	5.076E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-4.370E+00	1.169E+01	2.100E+01	NOT IDENT.
NA-22	-9.396E-03	5.815E-02	1.116E-01	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF

AL-26	5.127E-02	4.223E-02	1.148E-01	NOT IDENT.
SC-46	-6.500E-02	3.726E-01	7.373E-01	FAIL ABUN
V-48	0.000E+00	1.384E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.881E+02	0.000E+00	SHORT HLIF
MN-54	6.710E-03	6.806E-02	1.392E-01	NOT IDENT.
CO-56	1.341E-02	5.109E-01	1.029E+00	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-1.038E-02	4.238E-02	8.173E-02	NOT IDENT.
CO-58	1.058E-02	6.612E-01	1.323E+00	NOT IDENT.
FE-59	3.876E+00	7.799E+00	1.661E+01	NOT IDENT.
CO-60	-9.761E-03	4.832E-02	9.292E-02	NOT IDENT.
ZN-65	6.360E-02	2.077E-01	3.958E-01	NOT IDENT.
GE-68	5.288E-01	1.443E+00	3.433E+00	NOT IDENT.
AS-73	-6.187E-01	2.359E+00	4.199E+00	NOT IDENT.
AS-74	0.000E+00	5.288E+03	0.000E+00	SHORT HLIF
SE-75	-6.980E-02	1.874E-01	3.472E-01	NOT IDENT.
BR-77	0.000E+00	2.550E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	6.809E+02	0.000E+00	SHORT HLIF
RB-83	2.213E-01	6.876E-01	1.258E+00	FAIL ABUN
RB-86	0.000E+00	1.562E+04	0.000E+00	SHORT HLIF
Y-88	8.905E-03	1.876E-01	4.613E-01	NOT IDENT.
Y-91	4.607E+01	6.267E+02	1.239E+03	NOT IDENT.
NB-94	-1.779E-02	3.811E-02	7.090E-02	NOT IDENT.
NB-95	-3.890E-01	9.745E-01	1.752E+00	NOT IDENT.
NB-95M	-3.473E-02	2.507E+00	4.284E+00	NOT IDENT.
ZR-95	-6.663E-01	1.513E+00	2.433E+00	NOT IDENT.
NB-97	0.000E+00	1.291E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.223E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-2.673E-02	3.039E-02	5.554E-02	NOT IDENT.
RH-102	-2.424E-03	6.204E-02	1.252E-01	NOT IDENT.
RU-103	8.778E-02	5.113E+00	9.819E+00	FAIL ABUN
RH-106	-2.520E-01	4.990E-01	8.602E-01	NOT IDENT.
RU-106	-2.520E-01	4.990E-01	8.602E-01	NOT IDENT.
AG-108M	1.931E-03	2.877E-02	5.545E-02	NOT IDENT.
AG-110M	-3.928E-02	1.028E-01	2.033E-01	FAIL ABUN
SN-113	4.867E-02	2.451E-01	4.754E-01	NOT IDENT.
CD-115	0.000E+00	3.868E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.591E+04	0.000E+00	SHORT HLIF
TE-123M	-1.168E-01	1.278E-01	2.297E-01	NOT IDENT.
SB-124	-7.161E-01	1.524E+00	3.081E+00	NOT IDENT.
SB-125	-1.632E-02	1.097E-01	2.045E-01	FAIL ABUN
TE-125M	-1.572E+02	2.305E+02	4.296E+02	NOT IDENT.
I-126	0.000E+00	7.636E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	8.475E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	1.085E+22	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.919E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.065E+25	0.000E+00	SHORT HLIF
BA-133	2.434E-02	4.229E-02	8.008E-02	FAIL ABUN
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	-6.640E-03	5.831E-02	1.142E-01	NOT IDENT.
CS-135	4.917E-02	1.358E-01	2.494E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.908E+05	0.000E+00	SHORT HLIF
CE-139	-9.542E-02	1.055E-01	1.892E-01	NOT IDENT.
BA-140	0.000E+00	1.035E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.453E+05	0.000E+00	SHORT HLIF
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	-3.233E-01	3.392E-01	6.143E-01	NOT IDENT.
PM-144	-1.947E-02	6.359E-02	1.215E-01	NOT IDENT.
PR-144	-2.163E+00	5.556E+00	1.048E+01	NOT IDENT.
PM-146	-8.624E-04	4.198E-02	8.051E-02	NOT IDENT.
ND-147	0.000E+00	2.580E+07	0.000E+00	SHORT HLIF
PM-147	3.874E+02	7.155E+02	1.467E+03	NOT IDENT.
PM-149	0.000E+00	5.073E+39	0.000E+00	SHORT HLIF
EU-150	5.854E-03	3.143E-02	5.460E-02	FAIL ABUN
EU-152	-1.912E-02	9.948E-02	1.850E-01	FAIL ABUN
GD-153	-9.879E-02	1.636E-01	2.749E-01	NOT IDENT.
EU-154	-2.639E-02	1.423E-01	2.719E-01	NOT IDENT.
EU-155	1.070E-01	9.497E-02	2.001E-01	FAIL ABUN
TB-160	1.357E+00	1.906E+00	4.308E+00	FAIL ABUN
HO-166M	-4.945E-03	5.298E-02	1.073E-01	FAIL ABUN
TM-171	-6.179E+00	5.550E+00	9.180E+00	NOT IDENT.
HF-172	-7.524E-02	1.982E-01	3.758E-01	FAIL ABUN
LU-172	-1.959E-02	1.040E-01	1.971E-01	FAIL ABUN
LU-176	-7.338E-03	2.473E-02	4.575E-02	FAIL ABUN

HF-181	1.398E+00	3.788E+00	7.701E+00	NOT IDENT.
TA-182	-7.785E-01	9.971E-01	1.655E+00	FAIL ABUN
RE-183	2.806E-01	1.003E+00	1.863E+00	NOT IDENT.
RE-184	2.863E+00	3.249E+01	6.552E+01	NOT IDENT.
W-188	-1.619E+01	1.170E+02	1.965E+02	FAIL ABUN
IR-192	2.620E-02	4.838E-01	9.240E-01	FAIL ABUN
HG-203	1.150E+00	2.021E+00	3.848E+00	FAIL ABUN
BI-207	3.090E-02	5.828E-02	1.261E-01	FAIL ABUN
BI-211	0.000E+00	5.102E-01	8.332E-01	FAIL ABUN
PB-211	-1.372E-02	7.974E-01	1.346E+00	NOT IDENT.
BI-212	1.246E+00	8.877E-01	1.399E+00	FAIL ABUN
RN-219	1.350E-01	4.308E-01	8.435E-01	FAIL ABUN
RA-223	9.223E-02	6.152E-01	1.193E+00	FAIL ABUN
AC-227	-2.037E-01	2.301E-01	4.002E-01	NOT IDENT.
TH-227	-2.037E-01	2.301E-01	4.002E-01	NOT IDENT.
PA-231	3.832E-01	4.907E-01	9.987E-01	NOT IDENT.
TH-231	9.223E-02	6.152E-01	1.193E+00	FAIL ABUN
PA-233	-1.891E-02	6.294E-02	1.160E-01	NOT IDENT.
PA-234	6.945E-02	2.930E-01	6.211E-01	NOT IDENT.
PA-234M	3.690E-01	5.508E+00	1.085E+01	NOT IDENT.
NP-237	-1.891E-02	6.294E-02	1.160E-01	NOT IDENT.
NP-238	0.000E+00	5.296E+40	0.000E+00	SHORT HLIF
NP-239	-1.714E-01	2.001E-01	3.682E-01	FAIL ABUN
PU-239	2.353E+02	2.930E+02	6.041E+02	NOT IDENT.
AM-241	-2.474E-02	6.176E-02	9.886E-02	NOT IDENT.
CM-243	-5.184E-02	8.653E-02	1.633E-01	FAIL ABUN
BK-247	-8.231E-03	6.658E-02	1.272E-01	FAIL ABUN
CM-247	2.049E-02	3.985E-02	7.967E-02	FAIL ABUN
CF-249	7.357E-04	3.843E-02	7.351E-02	NOT IDENT.
CF-251	4.575E-02	1.144E-01	2.288E-01	NOT IDENT.
ANH-511	-7.329E-03	4.980E-02	1.080E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:56:43.07

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	216	10.66*	8.926E-01	1.222E+01	1.222E+01	13.33
KR-85	514.00	40	0.43*	2.307E+00	2.129E+01	2.244E+01	111.02
SR-85	514.00	40	96.00*	2.307E+00	9.624E-02	2.202E+00	111.02
CD-109	88.03	112	3.70*	7.451E+00	2.185E+00	3.392E+00	45.26
SN-126	64.28	13	9.60	7.793E+00	9.622E-02	9.622E-02	429.65
	86.94	112	8.90	7.451E+00	9.083E-01	9.083E-01	45.26
	87.57	112	37.00*	7.451E+00	2.185E-01	2.185E-01	45.26
BA-137M	661.66	40	89.90*	1.824E+00	1.310E-01	1.335E-01	66.87
CS-137	661.66	40	85.10*	1.824E+00	1.384E-01	1.410E-01	66.87
CE-141	145.44	32	48.29*	6.083E+00	5.855E-02	3.011E+01	141.97
TL-208	277.37	45	6.60	3.907E+00	9.465E-01	9.465E-01	57.08
	583.19	74	85.00*	2.050E+00	2.301E-01	2.301E-01	30.69
	860.56	------	12.50	1.434E+00	------ Line Not Found		------
PB-210	46.54	83	4.25*	7.557E+00	1.400E+00	1.435E+00	74.52
BI-211	72.87	39	1.23	7.714E+00	2.215E+00	2.215E+00	62.25
	351.06	204	12.92*	3.211E+00	2.651E+00	2.651E+00	19.63
PB-212	74.82	294	10.28	7.681E+00	2.008E+00	2.008E+00	17.94
	77.11	326	17.10	7.645E+00	1.347E+00	1.347E+00	16.56
	238.63	220	43.60*	4.383E+00	6.217E-01	6.217E-01	18.21
	300.09	------	3.30	3.668E+00	------ Line Not Found		------
BI-214	609.32	138	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42
	1120.29	28	14.92	1.127E+00	9.035E-01	9.038E-01	65.70
	1764.49	30	15.30	7.616E-01	1.396E+00	1.396E+00	35.36
PB-214	74.82	294	5.80	7.681E+00	3.558E+00	3.560E+00	17.94
	77.11	326	9.70	7.645E+00	2.374E+00	2.375E+00	16.56
	87.09	112	3.41	7.451E+00	2.371E+00	2.371E+00	45.26
	242.00	73	7.25	4.336E+00	1.251E+00	1.251E+00	61.69
	295.22	126	18.42	3.714E+00	9.926E-01	9.930E-01	34.40
	351.93	204	35.60*	3.211E+00	9.622E-01	9.626E-01	19.63
RN-222	609.32	138	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42
	1120.29	28	14.92	1.127E+00	9.035E-01	9.038E-01	65.70
	1764.49	30	15.30	7.616E-01	1.396E+00	1.396E+00	35.36
RA-224	240.99	73	4.10*	4.336E+00	2.212E+00	2.212E+00	61.69
RA-226	609.32	138	45.49*	1.970E+00	8.297E-01	8.299E-01	22.42
	1120.29	28	14.92	1.127E+00	9.035E-01	9.038E-01	65.70
	1764.49	30	15.30	7.616E-01	1.396E+00	1.396E+00	35.36
AC-228	105.21	------	1.10	7.028E+00	------ Line Not Found		------
	338.32	55	11.27	3.319E+00	7.966E-01	7.966E-01	58.95
	794.95	------	4.25	1.543E+00	------ Line Not Found		------
	835.71	------	1.61	1.473E+00	------ Line Not Found		------
	911.20	53	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42
	968.97	18	15.80	1.286E+00	4.879E-01	4.879E-01	87.97
RA-228	105.21	------	1.10	7.028E+00	------ Line Not Found		------
	338.32	55	11.27	3.319E+00	7.966E-01	7.966E-01	58.95
	794.95	------	4.25	1.543E+00	------ Line Not Found		------
	835.71	------	1.61	1.473E+00	------ Line Not Found		------
	911.20	53	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	18	15.80	1.286E+00	4.879E-01	4.879E-01	87.97
TH-228	74.82	294	10.28	7.681E+00	2.008E+00	2.008E+00	17.94
	77.11	326	17.10	7.645E+00	1.347E+00	1.347E+00	16.56
	238.63	220	43.60*	4.383E+00	6.217E-01	6.217E-01	18.21
	300.09	------	3.30	3.668E+00	------ Line Not Found		------
TH-229	85.43	41	14.70	7.519E+00	2.016E-01	2.016E-01	98.66
	88.47	112	24.00	7.451E+00	3.368E-01	3.368E-01	45.26
	193.51	------	4.41*	5.088E+00	------ Line Not Found		------
	210.85	60	2.80	4.803E+00	2.394E+00	2.394E+00	82.22
TH-230	609.32	138	45.49*	1.970E+00	8.297E-01	8.297E-01	22.42
	1120.29	28	14.92	1.127E+00	9.035E-01	9.035E-01	65.70
	1764.49	30	15.30	7.616E-01	1.396E+00	1.396E+00	35.36
TH-232	105.21	------	1.10	7.028E+00	------ Line Not Found		------
	338.32	55	11.27	3.319E+00	7.966E-01	7.966E-01	58.95
	835.71	------	1.61	1.473E+00	------ Line Not Found		------
	911.20	53	25.80*	1.360E+00	8.169E-01	8.169E-01	36.42
	968.97	18	15.80	1.286E+00	4.879E-01	4.879E-01	87.97
TH-234	63.29	13	3.70*	7.793E+00	2.496E-01	2.496E-01	429.65
	92.59	73	4.23	7.327E+00	1.275E+00	1.275E+00	71.76
U-234	609.32	138	45.49*	1.970E+00	8.297E-01	8.297E-01	22.42
	1120.29	28	14.92	1.127E+00	9.035E-01	9.035E-01	65.70
	1764.49	30	15.30	7.616E-01	1.396E+00	1.396E+00	35.36
U-235	89.96	88	3.47	7.392E+00	1.851E+00	1.851E+00	50.64
	93.35	73	5.60	7.327E+00	9.630E-01	9.630E-01	71.76
	143.76	32	10.96*	6.083E+00	2.580E-01	2.580E-01	141.97
	163.33	------	5.08	5.667E+00	------ Line Not Found		------
	185.72	89	57.20	5.222E+00	1.609E-01	1.609E-01	51.71
	205.31	------	5.01	4.887E+00	------ Line Not Found		------
U-238	63.29	13	3.70*	7.793E+00	2.496E-01	2.496E-01	429.65
	92.59	73	4.23	7.327E+00	1.275E+00	1.275E+00	71.76
AM-243	43.53	------	5.90	7.421E+00	------ Line Not Found		------
	74.66	294	67.20*	7.681E+00	3.071E-01	3.072E-01	17.94

Flag: "*" = Keyline

Sample ID : R405240004 Acquisition date : 3-OCT-2016 04:55:28

Total number of lines in spectrum 43
Number of unidentified lines 7
Number of lines tentatively identified by NID 36 83.72%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.222E+01	1.222E+01	0.163E+01	13.33	
KR-85	10.56Y	1.05	2.129E+01	2.244E+01	2.491E+01	111.02	
SR-85	64.84D	22.9	9.624E-02	2.202E+00	2.444E+00	111.02	
CD-109	461.40D	1.55	2.185E+00	3.392E+00	1.535E+00	45.26	
SN-126	2.30E+05Y	1.00	2.185E-01	2.185E-01	0.989E-01	45.26	
BA-137M	30.08Y	1.02	1.310E-01	1.335E-01	0.892E-01	66.87	
CS-137	30.08Y	1.02	1.384E-01	1.410E-01	0.943E-01	66.87	
CE-141	32.51D	514.	5.855E-02	3.011E+01	4.275E+01	141.97	
TL-208	1.41E+10Y	1.00	2.301E-01	2.301E-01	0.706E-01	30.69	
PB-210	22.20Y	1.03	1.400E+00	1.435E+00	1.070E+00	74.52	
BI-211	7.04E+08Y	1.00	2.651E+00	2.651E+00	0.521E+00	19.63	
PB-212	1.41E+10Y	1.00	6.217E-01	6.217E-01	1.132E-01	18.21	
BI-214	1600.00Y	1.00	8.297E-01	8.299E-01	1.861E-01	22.42	
PB-214	1600.00Y	1.00	9.622E-01	9.626E-01	1.890E-01	19.63	
RN-222	1600.00Y	1.00	8.297E-01	8.299E-01	1.861E-01	22.42	
RA-224	1.41E+10Y	1.00	2.212E+00	2.212E+00	1.364E+00	61.69	
RA-226	1600.00Y	1.00	8.297E-01	8.299E-01	1.861E-01	22.42	
AC-228	1.41E+10Y	1.00	8.169E-01	8.169E-01	2.975E-01	36.42	
RA-228	1.41E+10Y	1.00	8.169E-01	8.169E-01	2.975E-01	36.42	
TH-228	1.41E+10Y	1.00	6.217E-01	6.217E-01	1.132E-01	18.21	
TH-229	7340.00Y	1.00	3.368E-01	3.368E-01	1.524E-01	45.26	K
TH-230	7.54E+04Y	1.00	8.297E-01	8.297E-01	1.860E-01	22.42	
TH-232	1.41E+10Y	1.00	8.169E-01	8.169E-01	2.975E-01	36.42	
TH-234	4.47E+09Y	1.00	2.496E-01	2.496E-01	10.73E-01	429.65	
U-234	2.45E+05Y	1.00	8.297E-01	8.297E-01	1.860E-01	22.42	
U-235	7.04E+08Y	1.00	2.580E-01	2.580E-01	3.662E-01	141.97	
U-238	4.47E+09Y	1.00	2.496E-01	2.496E-01	10.73E-01	429.65	
AM-243	7370.00Y	1.00	3.071E-01	3.072E-01	0.551E-01	17.94	
	Total Activity :		5.304E+01	8.759E+01			

Grand Total Activity : 5.304E+01 8.759E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240004 Acquisition date : 3-OCT-2016 04:55:28

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	271.26	37	49	2.53	542.69	537	10	9.34E-03	82.1	3.98E+00	T
0	409.92	35	30	1.03	819.96	815	11	9.09E-03	71.4	2.82E+00	T
0	464.31	13	28	0.59	928.74	921	9	3.31E-03	****	2.52E+00	T
0	553.57	13	10	1.56	1107.24	1103	8	3.57E-03	****	2.15E+00	T
0	565.51	16	14	1.82	1131.11	1126	8	4.27E-03	98.3	2.11E+00	
0	657.13	15	16	1.16	1314.36	1307	14	4.03E-03	****	1.84E+00	T
0	684.74	9	18	1.24	1369.57	1362	10	2.41E-03	****	1.77E+00	T
0	720.19	9	7	0.48	1440.47	1436	7	2.34E-03	****	1.69E+00	T
0	728.20	26	14	2.80	1456.48	1451	15	7.04E-03	72.7	1.67E+00	T
0	759.94	11	8	0.92	1519.98	1515	10	3.13E-03	****	1.61E+00	
0	824.34	11	2	1.34	1648.77	1644	8	3.02E-03	75.8	1.49E+00	
0	965.48	16	13	1.04	1931.09	1924	10	4.53E-03	95.3	1.29E+00	T
0	1073.14	14	5	1.30	2146.45	2140	11	3.83E-03	84.7	1.17E+00	
0	1162.20	13	0	2.42	2324.62	2319	11	3.61E-03	55.5	1.09E+00	
0	1166.06	9	0	1.44	2332.33	2329	7	2.50E-03	66.7	1.09E+00	
0	1241.45	30	13	5.28	2483.15	2475	15	8.48E-03	65.6	1.03E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:56:57.82

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240004.CNF;1    *
* Acquisition date :  3-OCT-2016 04:55:28 Sensitivity     : 3.000        *
* Detector ID      : GAM41                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:05.86     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:21:00 Nuclide Library : SOLID        *
* Sample ID        : R405240004           Analyst initials: MXR1         *
* Batch Number     : 1596386              Sample Quantity : 1.3913E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 06:01:47 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;3          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.755E-01
KR-85	5.915E+00
SR-85	5.803E-01
CD-109	6.519E-01
SN-126	4.193E-02
BA-137M	2.989E-02
CS-137	3.158E-02
CE-141	1.726E+01
TL-208	2.950E-02
PB-210	3.787E-01
PB-212	4.135E-02
BI-214	7.388E-02
PB-214	5.407E-02
RN-222	7.388E-02
RA-224	4.433E-01
RA-226	7.388E-02
AC-228	1.121E-01
RA-228	1.121E-01
TH-228	4.135E-02
TH-229	4.258E-01
TH-230	7.386E-02
TH-232	1.121E-01
TH-234	5.259E-01
U-234	7.386E-02
U-235	1.731E-01
U-238	5.259E-01
AM-243	2.389E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	9.179E+00	NOT IDENT.
NA-22	4.675E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.761E-02	NOT IDENT.

SC-46	3.088E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	6.001E-02	NOT IDENT.
CO-56	4.440E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.801E-02	NOT IDENT.
CO-58	5.755E-01	NOT IDENT.
FE-59	7.219E+00	NOT IDENT.
CO-60	3.804E-02	NOT IDENT.
ZN-65	1.684E-01	NOT IDENT.
GE-68	1.302E+00	NOT IDENT.
AS-73	1.978E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.564E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	5.521E-01	FAIL ABUN
RB-86	0.000E+00	SHORT HLIF
Y-88	1.638E-01	NOT IDENT.
Y-91	5.339E+02	NOT IDENT.
NB-94	3.115E-02	NOT IDENT.
NB-95	7.655E-01	NOT IDENT.
NB-95M	1.978E+00	NOT IDENT.
ZR-95	1.016E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.572E-02	NOT IDENT.
RH-102	5.454E-02	NOT IDENT.
RU-103	4.301E+00	FAIL ABUN
RH-106	3.632E-01	NOT IDENT.
RU-106	3.632E-01	NOT IDENT.
AG-108M	2.463E-02	NOT IDENT.
AG-110M	8.526E-02	FAIL ABUN
SN-113	2.147E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.062E-01	NOT IDENT.
SB-124	9.739E-01	NOT IDENT.
SB-125	9.090E-02	FAIL ABUN
TE-125M	2.007E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.603E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.974E-02	NOT IDENT.
CS-135	1.130E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	8.719E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-143	0.000E+00	SHORT HLIF
CE-144	2.850E-01	NOT IDENT.
PM-144	5.326E-02	NOT IDENT.
PR-144	4.593E+00	NOT IDENT.
PM-146	3.531E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.834E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.494E-02	FAIL ABUN
EU-152	8.351E-02	FAIL ABUN
GD-153	1.289E-01	NOT IDENT.
EU-154	1.137E-01	NOT IDENT.
EU-155	9.423E-02	FAIL ABUN
TB-160	1.865E+00	FAIL ABUN
HO-166M	4.562E-02	FAIL ABUN
TM-171	4.304E+00	NOT IDENT.
HF-172	1.739E-01	FAIL ABUN
LU-172	8.493E-02	FAIL ABUN
LU-176	2.064E-02	FAIL ABUN
HF-181	3.394E+00	NOT IDENT.

TA-182	6.742E-01	FAIL ABUN
RE-183	8.786E-01	NOT IDENT.
RE-184	2.840E+01	NOT IDENT.
W-188	8.911E+01	FAIL ABUN
IR-192	4.215E-01	FAIL ABUN
HG-203	1.739E+00	FAIL ABUN
BI-207	5.457E-02	FAIL ABUN
BI-211	3.987E-01	FAIL ABUN
PB-211	6.033E-01	NOT IDENT.
BI-212	6.330E-01	FAIL ABUN
RN-219	3.822E-01	FAIL ABUN
RA-223	5.417E-01	FAIL ABUN
AC-227	1.809E-01	NOT IDENT.
TH-227	1.809E-01	NOT IDENT.
PA-231	4.609E-01	NOT IDENT.
TH-231	5.417E-01	FAIL ABUN
PA-233	5.252E-02	NOT IDENT.
PA-234	2.638E-01	NOT IDENT.
PA-234M	4.724E+00	NOT IDENT.
NP-237	5.252E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	1.698E-01	FAIL ABUN
PU-239	2.832E+02	NOT IDENT.
AM-241	4.666E-02	NOT IDENT.
CM-243	7.637E-02	FAIL ABUN
BK-247	5.740E-02	FAIL ABUN
CM-247	3.620E-02	FAIL ABUN
CF-249	3.291E-02	NOT IDENT.
CF-251	1.062E-01	NOT IDENT.
ANH-511	5.079E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:57:05.03

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240004.CNF;1    *
* Acquisition date :  3-OCT-2016 04:55:28 Sensitivity     : 3.000          *
* Detector ID      : GAM41                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:05.86     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:21:00 Nuclide Library : SOLID          *
* Sample ID        : R405240004           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3913E+02 GRAM   *
*                                         Quantity Err(%) : 1.4375E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 06:01:47 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM41_CAN.CNF;3           *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.222E+01	1.907E+00	1.907E+00
KR-85	2.244E+01	2.449E+01	2.449E+01
SR-85	2.202E+00	2.403E+00	2.403E+00
CD-109	1.972E+00	1.607E+00	1.607E+00
SN-126	1.270E-01	1.033E-01	1.033E-01
BA-137M	1.335E-01	8.813E-02	8.813E-02
CS-137	1.410E-01	9.310E-02	9.310E-02
CE-141	9.791E+00	4.306E+01	4.306E+01
TL-208	2.301E-01	7.194E-02	7.194E-02
PB-210	1.435E+00	1.064E+00	1.064E+00
PB-212	6.217E-01	1.256E-01	1.256E-01
BI-214	8.299E-01	1.954E-01	1.954E-01
PB-214	9.626E-01	2.026E-01	2.026E-01
RN-222	8.299E-01	1.954E-01	1.954E-01
RA-224	4.563E-01	1.480E+00	1.480E+00
RA-226	8.299E-01	1.954E-01	1.954E-01
AC-228	8.169E-01	3.073E-01	3.073E-01
RA-228	8.169E-01	3.073E-01	3.073E-01
TH-228	6.217E-01	1.256E-01	1.256E-01
TH-229	-6.900E-02	4.832E-01	4.832E-01
TH-230	8.297E-01	1.953E-01	1.953E-01
TH-232	8.169E-01	3.073E-01	3.073E-01
TH-234	2.496E-01	1.053E+00	1.053E+00
U-234	8.297E-01	1.953E-01	1.953E-01
U-235	2.580E-01	3.600E-01	3.600E-01
U-238	2.496E-01	1.053E+00	1.053E+00
AM-243	2.215E-01	6.733E-02	6.733E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-4.370E+00	1.170E+01	1.186E+01	NOT IDENT.
NA-22	-9.396E-03	5.815E-02	5.831E-02	NOT IDENT.
NA-24	1.000E+41	8.008E+41	0.000E+00	SHORT HLIF

AL-26	5.127E-02	4.241E-02	4.830E-02	NOT IDENT.
SC-46	-6.500E-02	3.727E-01	3.738E-01	FAIL ABUN
V-48	-5.097E+03	1.386E+04	1.405E+04	SHORT HLIF
CR-51	1.868E+02	3.884E+02	3.974E+02	SHORT HLIF
MN-54	6.710E-03	6.807E-02	6.813E-02	NOT IDENT.
CO-56	1.341E-02	5.109E-01	5.109E-01	NOT IDENT.
MN-56	1.000E+41	4.497E+42	0.000E+00	SHORT HLIF
CO-57	-1.038E-02	4.240E-02	4.266E-02	NOT IDENT.
CO-58	1.058E-02	6.612E-01	6.612E-01	NOT IDENT.
FE-59	3.876E+00	7.832E+00	8.025E+00	NOT IDENT.
CO-60	-9.761E-03	4.833E-02	4.853E-02	NOT IDENT.
ZN-65	6.360E-02	2.080E-01	2.099E-01	NOT IDENT.
GE-68	5.288E-01	1.446E+00	1.465E+00	NOT IDENT.
AS-73	-6.187E-01	2.364E+00	2.380E+00	NOT IDENT.
AS-74	4.168E+03	5.308E+03	5.631E+03	SHORT HLIF
SE-75	-6.980E-02	1.875E-01	1.901E-01	NOT IDENT.
BR-77	1.429E+37	1.208E+38	0.000E+00	SHORT HLIF
SR-82	2.105E+02	6.812E+02	6.878E+02	SHORT HLIF
RB-83	2.213E-01	6.884E-01	6.956E-01	FAIL ABUN
RB-86	-1.528E+03	1.562E+04	1.563E+04	SHORT HLIF
Y-88	8.905E-03	1.876E-01	1.877E-01	NOT IDENT.
Y-91	4.607E+01	6.267E+02	6.271E+02	NOT IDENT.
NB-94	-1.779E-02	3.814E-02	3.897E-02	NOT IDENT.
NB-95	-3.890E-01	9.752E-01	9.909E-01	NOT IDENT.
NB-95M	-3.473E-02	2.507E+00	2.507E+00	NOT IDENT.
ZR-95	-6.663E-01	1.515E+00	1.544E+00	NOT IDENT.
NB-97	1.000E+41	1.294E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	4.042E+41	0.000E+00	SHORT HLIF
MO-99	-1.236E+31	3.225E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	5.088E+41	0.000E+00	SHORT HLIF
RH-101	-2.673E-02	3.091E-02	3.318E-02	NOT IDENT.
RH-102	-2.424E-03	6.204E-02	6.205E-02	NOT IDENT.
RU-103	8.778E-02	5.113E+00	5.114E+00	FAIL ABUN
RH-106	-2.520E-01	4.996E-01	5.124E-01	NOT IDENT.
RU-106	-2.520E-01	4.996E-01	5.124E-01	NOT IDENT.
AG-108M	1.931E-03	2.877E-02	2.879E-02	NOT IDENT.
AG-110M	-3.928E-02	1.028E-01	1.044E-01	FAIL ABUN
SN-113	4.867E-02	2.451E-01	2.461E-01	NOT IDENT.
CD-115	2.771E+38	3.905E+38	0.000E+00	SHORT HLIF
SN-117M	-2.141E+04	6.598E+04	6.668E+04	SHORT HLIF
TE-123M	-1.168E-01	1.283E-01	1.387E-01	NOT IDENT.
SB-124	-7.161E-01	1.525E+00	1.558E+00	NOT IDENT.
SB-125	-1.632E-02	1.097E-01	1.100E-01	FAIL ABUN
TE-125M	-1.572E+02	2.311E+02	2.417E+02	NOT IDENT.
I-126	5.274E+05	7.677E+05	8.037E+05	SHORT HLIF
SB-126	6.985E+05	8.589E+05	9.148E+05	SHORT HLIF
SB-127	5.749E+21	1.332E+22	0.000E+00	SHORT HLIF
I-131	-9.264E+08	2.920E+09	2.950E+09	SHORT HLIF
I-132	1.000E+41	1.823E+42	0.000E+00	SHORT HLIF
TE-132	3.595E+25	9.181E+25	0.000E+00	SHORT HLIF
BA-133	2.434E-02	4.234E-02	4.374E-02	FAIL ABUN
I-133	1.000E+41	6.915E+41	0.000E+00	SHORT HLIF
CS-134	-6.640E-03	5.832E-02	5.839E-02	NOT IDENT.
CS-135	4.917E-02	1.359E-01	1.377E-01	NOT IDENT.
I-135	1.000E+41	7.874E+41	0.000E+00	SHORT HLIF
CS-136	1.200E+05	2.917E+05	2.967E+05	SHORT HLIF
CE-139	-9.542E-02	1.075E-01	1.158E-01	NOT IDENT.
BA-140	-1.254E+05	1.035E+06	1.037E+06	SHORT HLIF
LA-140	3.101E+04	3.454E+05	3.456E+05	SHORT HLIF
CE-143	1.000E+41	2.448E+41	0.000E+00	SHORT HLIF
CE-144	-3.233E-01	3.413E-01	3.712E-01	NOT IDENT.
PM-144	-1.947E-02	6.361E-02	6.422E-02	NOT IDENT.
PR-144	-2.163E+00	5.559E+00	5.644E+00	NOT IDENT.
PM-146	-8.624E-04	4.198E-02	4.198E-02	NOT IDENT.
ND-147	-7.818E+05	2.580E+07	2.580E+07	SHORT HLIF
PM-147	3.874E+02	7.170E+02	7.379E+02	NOT IDENT.
PM-149	-6.445E+38	5.075E+39	0.000E+00	SHORT HLIF
EU-150	5.854E-03	3.144E-02	3.155E-02	FAIL ABUN
EU-152	-1.912E-02	9.950E-02	9.987E-02	FAIL ABUN
GD-153	-9.879E-02	1.639E-01	1.698E-01	NOT IDENT.
EU-154	-2.639E-02	1.423E-01	1.428E-01	NOT IDENT.
EU-155	1.070E-01	9.571E-02	1.072E-01	FAIL ABUN
TB-160	1.357E+00	1.912E+00	2.008E+00	FAIL ABUN
HO-166M	-4.945E-03	5.298E-02	5.303E-02	FAIL ABUN
TM-171	-6.179E+00	5.612E+00	6.266E+00	NOT IDENT.
HF-172	-7.524E-02	1.988E-01	2.016E-01	FAIL ABUN
LU-172	-1.959E-02	1.041E-01	1.044E-01	FAIL ABUN
LU-176	-7.338E-03	2.474E-02	2.496E-02	FAIL ABUN

HF-181	1.398E+00	3.790E+00	3.842E+00	NOT IDENT.
TA-182	-7.785E-01	9.992E-01	1.059E+00	FAIL ABUN
RE-183	2.806E-01	1.005E+00	1.013E+00	NOT IDENT.
RE-184	2.863E+00	3.250E+01	3.252E+01	NOT IDENT.
W-188	-1.619E+01	1.171E+02	1.173E+02	FAIL ABUN
IR-192	2.620E-02	4.838E-01	4.840E-01	FAIL ABUN
HG-203	1.150E+00	2.023E+00	2.089E+00	FAIL ABUN
BI-207	3.090E-02	5.850E-02	6.013E-02	FAIL ABUN
BI-211	2.651E+00	5.597E-01	1.320E+00	FAIL ABUN
PB-211	-1.372E-02	7.974E-01	7.974E-01	NOT IDENT.
BI-212	1.246E+00	8.954E-01	1.057E+00	FAIL ABUN
RN-219	1.350E-01	4.313E-01	4.355E-01	FAIL ABUN
RA-223	9.223E-02	6.153E-01	6.167E-01	FAIL ABUN
AC-227	-2.037E-01	2.322E-01	2.497E-01	NOT IDENT.
TH-227	-2.037E-01	2.322E-01	2.497E-01	NOT IDENT.
PA-231	3.832E-01	4.983E-01	5.274E-01	NOT IDENT.
TH-231	9.223E-02	6.153E-01	6.167E-01	FAIL ABUN
PA-233	-1.891E-02	6.296E-02	6.354E-02	NOT IDENT.
PA-234	6.945E-02	3.037E-01	3.053E-01	NOT IDENT.
PA-234M	3.690E-01	5.509E+00	5.511E+00	NOT IDENT.
NP-237	-1.891E-02	6.296E-02	6.354E-02	NOT IDENT.
NP-238	-1.985E+40	5.303E+40	0.000E+00	SHORT HLIF
NP-239	-1.714E-01	2.014E-01	2.157E-01	FAIL ABUN
PU-239	2.353E+02	2.943E+02	3.128E+02	NOT IDENT.
AM-241	-2.474E-02	6.185E-02	6.285E-02	NOT IDENT.
CM-243	-5.184E-02	8.677E-02	8.987E-02	FAIL ABUN
BK-247	-8.231E-03	6.660E-02	6.670E-02	FAIL ABUN
CM-247	2.049E-02	4.003E-02	4.108E-02	FAIL ABUN
CF-249	7.357E-04	3.843E-02	3.843E-02	NOT IDENT.
CF-251	4.575E-02	1.146E-01	1.164E-01	NOT IDENT.
ANH-511	-7.329E-03	4.981E-02	4.992E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	69.9305	87.09	75.1295	136.47	64.5626
45.60	77.2478	87.57	75.1785	140.51	0.0000
46.54	77.3928	88.03	75.2252	143.76	55.2370
49.72	0.0000	88.34	75.2568	144.24	55.2635
51.35	89.9470	88.47	75.2696	145.44	55.3285
51.87	114.9122	89.96	75.4198	152.43	66.4851
52.39	100.7932	1093.63	75.4880	153.25	0.0000
52.97	90.2172	91.11	0.0000	323.87	62.9974
53.44	89.1066	92.59	75.6816	156.02	0.0000
54.07	72.5564	93.35	75.7562	158.56	0.0000
57.36	0.0000	94.56	82.1982	159.00	69.6089
57.53	93.3501	94.65	82.2076	162.33	52.5938
57.98	85.0386	94.67	82.2096	162.66	0.0000
59.27	120.0397	94.87	78.4356	163.33	47.1959
59.32	111.6465	97.43	92.6535	165.86	64.5886
59.54	107.2853	98.43	74.5553	176.31	45.9071
60.96	128.4110	98.44	74.5562	176.60	0.0000
61.17	128.4562	99.53	72.9610	177.52	48.7122
62.93	128.0288	100.11	73.0139	181.07	0.0000
63.29	128.1046	102.03	85.9529	181.52	38.7346
63.58	128.1661	103.18	77.5514	184.41	54.0838
64.28	122.6641	103.37	83.5364	143.76	50.9040
66.73	105.3255	105.21	61.5106	193.51	55.8899
67.24	102.1680	105.31	61.5183	197.03	53.2473
125.81	109.5419	106.12	67.5648	198.01	45.8099
67.75	109.5536	106.47	77.0050	201.83	47.8255
69.67	89.5356	109.28	78.9792	203.43	53.5198
70.83	102.7429	111.00	80.8587	205.31	39.4938
72.81	91.6033	111.76	0.0000	210.85	42.4974
72.87	85.0681	114.06	66.4699	215.65	36.9664
74.66	85.2972	116.30	0.0000	222.11	41.9089
74.82	85.3173	116.74	64.0751	227.09	42.0633
74.97	85.3363	119.76	52.9977	227.38	37.2913
77.11	85.6061	121.12	51.3372	228.16	0.0000
78.74	85.8087	121.22	51.3429	228.18	44.9671
79.69	85.9261	121.78	58.3408	116.74	44.9671
80.12	85.9790	122.06	64.4557	235.69	49.0597
80.19	0.0000	122.92	58.4137	235.96	49.0690
80.57	86.0340	123.07	56.6793	238.63	36.6308
81.00	64.5652	265.00	55.8444	238.98	0.0000
81.07	64.5715	125.81	55.9733	240.99	36.6919
81.75	64.6334	127.23	70.9487	242.00	36.7182
83.79	84.7624	127.91	61.3588	244.70	36.7878
84.00	84.7873	129.30	57.9373	252.40	0.0000
85.43	84.9543	131.20	65.0910	252.80	27.2586
86.55	75.0746	133.02	66.9770	254.15	0.0000
86.79	75.0989	133.52	75.8291	256.23	44.8863
86.94	75.1144	136.00	58.3435	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	33.3643	355.39	0.0000	584.27	16.0758
264.80	30.4235	356.01	18.6522	595.83	0.0000
265.00	30.4273	364.49	0.0000	427.87	25.4178
268.22	25.0818	366.42	0.0000	602.52	0.0000
269.46	36.9156	372.51	31.3611	604.72	19.0929
270.03	34.4674	375.05	20.9351	607.14	20.8469
271.23	34.4944	377.52	26.2024	609.32	26.6593
273.65	0.0000	356.01	23.1337	610.33	26.6696
276.40	28.1823	388.16	24.2382	614.28	10.4509
277.37	26.7155	388.63	0.0000	618.01	10.4652
277.60	26.7193	391.69	26.3931	620.36	10.4744
278.00	26.7264	264.66	24.3912	621.93	15.1381
279.20	20.8030	401.81	26.5274	630.19	0.0000
279.54	20.8077	402.40	25.4736	631.29	15.7736
279.70	20.8099	404.85	25.5049	633.25	15.7846
280.46	22.3068	410.95	23.4493	634.78	0.0000
283.69	24.8362	413.71	24.0147	635.95	13.1667
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	28.8413	423.72	0.0000	645.85	14.0942
285.90	0.0000	427.09	33.3008	657.76	12.7380
287.50	38.8373	427.87	23.6413	657.90	0.0000
290.67	34.4242	433.94	20.4763	661.66	14.1724
293.27	0.0000	439.40	25.9312	664.57	0.0000
351.93	33.0201	453.88	17.4033	666.33	0.0000
295.96	33.0349	463.37	18.0244	666.50	0.0000
879.38	37.5999	468.07	17.5150	667.71	0.0000
299.98	39.1373	473.00	0.0000	677.62	14.2505
300.09	39.1396	475.06	14.2751	685.70	0.0000
300.13	39.1412	476.78	20.8794	695.00	0.0000
301.36	34.1480	477.60	20.8868	696.49	20.6163
302.85	48.2529	482.18	14.3198	696.51	21.5127
256.23	34.2131	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	23.3118
306.78	33.2524	497.08	16.6295	697.49	21.5200
308.46	30.2600	505.52	15.0202	702.65	23.3538
311.90	35.3753	507.63	0.0000	706.68	17.0889
316.51	35.4714	511.00	18.9579	711.68	11.7118
319.41	0.0000	514.00	18.9818	720.70	0.0000
320.08	0.0000	514.00	18.9818	721.93	0.0000
321.04	29.4685	520.40	13.4346	722.78	3.6167
323.87	30.5347	520.69	0.0000	722.91	3.6169
325.23	39.7260	522.65	0.0000	723.31	0.0000
328.76	0.0000	527.90	0.0000	724.19	7.2368
333.37	33.1567	528.26	13.4780	727.33	12.6772
333.97	33.7822	529.59	20.2280	733.00	11.6121
334.37	32.2537	529.87	0.0000	735.93	16.9503
338.28	35.9164	531.02	0.0000	333.97	19.0787
338.32	35.9172	537.26	0.0000	739.50	0.0000
311.90	35.4469	546.56	0.0000	747.24	14.5815
340.48	35.4469	552.55	15.3122	748.06	18.2312
340.55	0.0000	563.25	17.0850	752.31	11.8665
344.28	31.9177	569.33	17.1252	753.82	0.0000
345.93	25.7640	946.00	13.7012	756.73	13.1629
351.06	15.5017	569.70	13.7021	756.80	13.1629
351.93	22.7466	583.19	16.0690	884.68	19.0557

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	20.9528	1274.44	11.7400	1620.50	3.3481
766.42	18.3374	1001.03	12.7338	1621.92	3.3490
766.84	19.2568	1002.74	8.8195	1678.03	0.0000
772.60	0.0000	1004.73	14.7066	1690.97	2.7114
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	4.5752
778.90	16.5674	1028.54	0.0000	1063.66	0.0000
783.70	0.0000	1037.84	12.8524	1771.35	5.4964
785.37	16.6003	1038.76	0.0000	1791.20	0.0000
792.07	14.7861	631.29	11.8894	1808.65	0.9216
794.95	12.0244	1048.07	0.0000	1810.72	0.0000
795.86	16.6536	1049.04	6.9398	1836.06	1.8515
810.06	13.0084	1050.41	14.8764		
810.29	14.8677	1063.66	8.9550		
344.28	15.7979	1077.00	0.0000		
810.76	14.8701	1077.34	1.5973		
815.77	0.0000	1085.87	8.0024		
1048.07	0.0000	1093.63	15.0330		
832.01	10.2877	1099.45	10.0360		
834.85	12.1685	1112.07	14.0923		
835.71	10.2987	1112.84	13.4237		
836.80	0.0000	1115.54	8.0596		
846.75	0.0000	1120.29	14.1196		
846.77	13.1498	1120.55	14.1205		
856.80	0.0000	1221.41	14.1230		
860.56	13.2023	1129.67	15.1611		
871.09	7.5669	1131.51	0.0000		
873.19	11.3569	1147.95	0.0000		
875.33	0.0000	1173.23	9.1884		
879.38	7.5847	1177.95	11.2424		
880.51	10.4320	1189.05	9.2214		
883.24	14.2365	1204.77	12.3384		
884.68	9.4949	1221.41	13.4158		
889.28	10.4579	1231.02	16.5459		
894.76	13.3305	1235.36	0.0000		
898.04	10.4834	1238.28	23.2012		
900.72	14.3060	1260.41	0.0000		
903.28	13.3617	1271.87	9.3895		
911.20	9.5651	1274.44	10.4382		
912.08	9.5673	1274.54	10.4388		
923.98	0.0000	1291.59	4.1907		
926.50	6.7236	1298.22	0.0000		
929.11	17.3013	1312.11	0.0000		
937.49	17.3403	1332.49	8.4526		
944.13	0.0000	1362.66	0.0000		
946.00	8.6899	1365.19	6.3820		
949.00	6.7642	1368.63	0.0000		
667.71	0.0000	1384.29	3.2032		
962.31	13.9641	1408.01	6.4365		
964.08	13.9707	1457.56	0.0000		
966.17	15.5313	1460.82	4.3352		
911.20	7.7715	1489.16	5.4483		
968.97	7.7715	1505.03	6.5574		
983.53	0.0000	1584.12	3.3265		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 08:39:18.70

```
*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240005.CNF;2
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM31.CNF;306
                                       Background date  : 2-OCT-2016 11:01:52.
Sample date      : 15-DEC-2015 11:42:00 Acquisition date : 3-OCT-2016 05:03:08.
Sample ID        : R405240005           Sample quantity  : 1.15180E+02 GRAM
Detector name    : GAM31                Detector geometry: CAN
Elapsed live time: 0 01:30:00.00        Elapsed real time: 0 01:30:09.48  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*****************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.60*	31	394	1.01	92.84	88	8	5.79E-03	116.2	
2	0	52.55*	30	329	1.52	104.74	102	7	5.57E-03	104.2	
3	0	63.42*	82	460	0.94	126.47	122	9	1.52E-02	51.1	
4	3	72.92	35	274	1.23	145.44	142	17	6.53E-03	81.3	1.04E+00
5	3	74.82	234	264	1.10	149.25	142	17	4.33E-02	13.4	
6	3	77.11*	349	213	0.95	153.83	142	17	6.47E-02	8.8	
7	0	84.09*	19	166	1.31	167.77	166	6	3.44E-03	117.9	
8	4	87.27*	108	162	1.28	174.12	171	21	2.00E-02	20.8	1.47E+00
9	4	89.97	82	177	1.20	179.53	171	21	1.51E-02	28.8	
10	4	92.73*	143	185	1.31	185.03	171	21	2.65E-02	20.8	
11	0	105.38	28	103	1.23	210.32	208	6	5.14E-03	60.9	
12	0	129.65	24	188	0.97	258.81	253	10	4.42E-03	109.2	
13	0	144.14*	36	176	0.84	287.79	283	9	6.60E-03	70.6	
14	0	176.19	14	82	1.28	351.83	351	6	2.56E-03	106.1	
15	0	185.90*	123	136	1.08	371.23	366	11	2.27E-02	21.5	
16	5	238.70*	407	68	0.97	476.76	471	17	7.53E-02	6.1	2.53E+00
17	5	241.42*	76	113	1.94	482.20	471	17	1.42E-02	42.2	
18	0	270.55	51	83	1.17	540.41	536	10	9.40E-03	37.0	
19	0	295.28*	132	69	0.89	589.83	586	8	2.45E-02	14.2	
20	0	300.79	29	58	1.14	600.86	597	8	5.43E-03	48.6	
21	0	338.30*	74	58	1.21	675.82	671	10	1.37E-02	23.3	
22	0	352.05*	206	65	1.15	703.30	697	10	3.82E-02	10.6	
23	0	398.97	20	54	1.28	797.09	790	12	3.63E-03	78.3	
24	0	464.83	23	48	1.48	928.72	923	14	4.33E-03	66.6	
25	0	511.29*	35	89	1.99	1021.58	1014	19	6.45E-03	76.1	
26	0	583.75*	126	41	1.41	1166.39	1160	14	2.33E-02	14.5	
27	0	603.68	30	46	5.17	1206.24	1197	16	5.52E-03	54.9	
28	0	609.59*	186	12	1.55	1218.04	1213	10	3.44E-02	8.6	
29	0	652.28	15	19	1.39	1303.36	1296	11	2.83E-03	61.0	
30	0	727.88	49	21	0.66	1454.46	1448	12	9.17E-03	23.3	
31	0	888.12	8	19	0.99	1774.76	1770	9	1.57E-03	97.1	
32	0	911.48*	101	26	1.85	1821.44	1814	15	1.87E-02	15.2	
33	0	935.25	6	28	1.70	1868.95	1864	9	1.15E-03	156.1	
34	0	968.98	72	22	1.71	1936.37	1926	17	1.33E-02	18.9	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1010.15	20	26	6.61	2018.66	2009	20	3.79E-03	63.9	
36	0	1049.67	13	7	1.47	2097.67	2092	9	2.48E-03	44.3	
37	0	1071.43	10	12	0.64	2141.16	2137	9	1.78E-03	75.1	
38	0	1084.32	12	2	2.62	2166.92	2163	8	2.26E-03	34.7	
39	0	1108.44	23	8	2.00	2215.14	2209	13	4.27E-03	34.3	
40	0	1121.22	28	21	0.91	2240.68	2236	9	5.20E-03	35.6	
41	0	1271.40	12	24	1.19	2540.87	2531	14	2.19E-03	93.2	
42	0	1352.52*	3	4	0.80	2703.03	2697	10	5.21E-04	178.9	
43	0	1378.70	11	8	1.09	2755.35	2749	11	2.03E-03	58.8	
44	0	1461.55*	288	3	2.09	2920.97	2914	14	5.34E-02	6.2	
45	0	1561.24	8	2	1.02	3120.26	3116	8	1.51E-03	45.9	
46	0	1765.35*	17	2	0.78	3528.29	3522	11	3.24E-03	32.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 08:39:21

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240005.CNF;2
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 11:42:00 Acquisition date : 3-OCT-2016 05:03:08
Sample ID   : R405240005   Sample quantity : 115.18 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA31   Detector geometry: CAN
Elapsed live time: 0 01:30:00.00   Elapsed real time: 0 01:30:09.48   0.2%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	87.09	EU-155	86.55
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	242.00	RA-224	240.99
U-235	143.76	CE-141	145.44
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	6.944E-01	1.597E+01	1.597E+01	12.32	OK
SC-46	889.28	99.98*	1.057E+00	3.356E-02	3.781E-01	194.16	OK
	1120.55	99.99	8.734E-01	1.333E-01	1.502E+00	71.11	OK
AS-73	53.44	10.30*	5.707E+00	2.413E-01	3.020E+00	208.35	OK
CD-109	88.03	3.70*	5.390E+00	1.405E+00	2.181E+00	77.07	OK
SN-126	64.28	9.60	5.586E+00	7.160E-01	7.160E-01	102.18	OK
	86.94	8.90	5.390E+00	5.840E-01	5.840E-01	77.07	OK
	87.57	37.00*	5.390E+00	1.405E-01	1.405E-01	77.07	OK
CE-141	145.44	48.29*	4.605E+00	1.336E-02	6.866E+00	787.47	OK
EU-155	86.55	30.70	5.390E+00	1.693E-01	1.903E-01	77.07	OK
	105.31	21.10*	5.213E+00	1.158E-01	1.301E-01	121.83	OK
TM-171	51.35	0.27	5.707E+00	9.204E+00	1.229E+01	208.35	OK
	52.39	0.47*	5.707E+00	5.287E+00	7.061E+00	208.35	OK
	66.73	0.14	5.547E+00	----- Line Not Found	-----		Absent
TL-208	277.37	6.60	2.816E+00	----- Line Not Found	-----		Absent
	583.19	85.00*	1.485E+00	4.251E-01	4.251E-01	29.01	OK
	860.56	12.50	1.084E+00	----- Line Not Found	-----		Absent
PB-210	46.54	4.25*	5.491E+00	6.350E-01	6.511E-01	232.37	OK
PB-212	74.82	10.28	5.476E+00	1.261E+00	1.261E+00	43.70	OK
	77.11	17.10	5.460E+00	1.737E+00	1.737E+00	17.52	OK
	238.63	43.60*	3.202E+00	1.292E+00	1.292E+00	12.19	OK
	300.09	3.30	2.623E+00	1.488E+00	1.488E+00	97.16	OK
BI-214	609.32	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12	OK
	1120.29	14.92	8.734E-01	8.936E-01	8.939E-01	71.11	OK
	1764.49	15.30	5.811E-01	7.988E-01	7.991E-01	65.59	OK
PB-214	74.82	5.80	5.476E+00	----- Line Not Found	-----		<<INT Reject
	77.11	9.70	5.460E+00	3.062E+00	3.063E+00	17.52	OK
	87.09	3.41	5.392E+00	----- Line Not Found	-----		<<INT Reject
	242.00	7.25	3.165E+00	----- Line Not Found	-----		<<INT Reject
	295.22	18.42	2.666E+00	1.185E+00	1.186E+00	28.43	OK
	351.93	35.60*	2.285E+00	1.107E+00	1.107E+00	21.10	OK
RN-222	609.32	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12	OK
	1120.29	14.92	8.734E-01	8.936E-01	8.939E-01	71.11	OK
	1764.49	15.30	5.811E-01	7.988E-01	7.991E-01	65.59	OK
RA-224	240.99	4.10*	3.172E+00	5.089E-01	5.089E-01	447.23	OK
RA-226	609.32	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12	OK
	1120.29	14.92	8.734E-01	8.936E-01	8.939E-01	71.11	OK
	1764.49	15.30	5.811E-01	7.988E-01	7.991E-01	65.59	OK
AC-228	105.21	1.10	5.213E+00	2.221E+00	2.221E+00	121.83	OK
	338.32	11.27	2.367E+00	1.208E+00	1.208E+00	46.62	OK
	794.95	4.25	1.156E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.110E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45	OK
	968.97	15.80	9.848E-01	1.925E+00	1.925E+00	37.84	OK
RA-228	105.21	1.10	5.213E+00	2.221E+00	2.221E+00	121.83	OK
	338.32	11.27	2.367E+00	1.208E+00	1.208E+00	46.62	OK
	794.95	4.25	1.156E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.110E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	968.97	15.80	9.848E-01	1.925E+00	1.925E+00	37.84	OK
TH-228	74.82	10.28	5.476E+00	1.261E+00	1.261E+00	43.70	OK
	77.11	17.10	5.460E+00	1.737E+00	1.737E+00	17.52	OK
	238.63	43.60*	3.202E+00	1.292E+00	1.292E+00	12.19	OK
	300.09	3.30	2.623E+00	1.488E+00	1.488E+00	97.16	OK
TH-229	85.43	14.70	5.413E+00	1.080E-01	1.080E-01	235.75	OK
	88.47	24.00	5.390E+00	2.166E-01	2.166E-01	77.07	OK
	193.51	4.41*	3.791E+00	----- Line Not Found		-----	Absent
	210.85	2.80	3.546E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	1.434E+00	1.212E+00	1.212E+00	17.12	OK
	1120.29	14.92	8.734E-01	8.936E-01	8.936E-01	71.11	OK
	1764.49	15.30	5.811E-01	7.988E-01	7.988E-01	65.59	OK
PA-231	283.69	1.70	2.761E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	2.623E+00	9.176E-01	9.176E-01	97.16	OK
TH-232	105.21	1.10	5.213E+00	2.221E+00	2.221E+00	121.83	OK
	338.32	11.27	2.367E+00	1.208E+00	1.208E+00	46.62	OK
	835.71	1.61	1.110E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45	OK
	968.97	15.80	9.848E-01	1.925E+00	1.925E+00	37.84	OK
TH-234	63.29	3.70*	5.586E+00	1.858E+00	1.858E+00	102.18	OK
	92.59	4.23	5.346E+00	2.915E+00	2.915E+00	41.51	OK
U-234	609.32	45.49*	1.434E+00	1.212E+00	1.212E+00	17.12	OK
	1120.29	14.92	8.734E-01	8.936E-01	8.936E-01	71.11	OK
	1764.49	15.30	5.811E-01	7.988E-01	7.988E-01	65.59	OK
U-235	89.96	3.47	5.369E+00	2.025E+00	2.025E+00	57.69	OK
	93.35	5.60	5.346E+00	2.202E+00	2.202E+00	41.51	OK
	143.76	10.96*	4.611E+00	----- Line Not Found		-----	<<INT Reject
	163.33	5.08	4.273E+00	----- Line Not Found		-----	Absent
	185.72	57.20	3.906E+00	2.462E-01	2.462E-01	43.03	OK
	205.31	5.01	3.621E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	5.586E+00	1.858E+00	1.858E+00	102.18	OK
	92.59	4.23	5.346E+00	2.915E+00	2.915E+00	41.51	OK
AM-243	43.53	5.90	5.049E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	5.476E+00	1.929E-01	1.929E-01	43.70	OK
ANH-511	511.00	100.00*	1.658E+00	9.012E-02	9.012E-02	152.12	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 08:39:22.05

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240005.CNF;2    *
* Acquisition date :  3-OCT-2016 05:03:08 Sensitivity     : 3.000          *
* Detector ID      : GAM31                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:30:09.48     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:42:00 Analyst initials: MXR1           *
* Sample ID        : R405240005           Sample Quantity : 1.1518E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-JUN-2016 06:54:07 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;7          *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.597E+01	1.929E+00	7.151E-01
SC-46	3.781E-01	7.195E-01	8.046E-01
AS-73	3.020E+00	6.166E+00	6.117E+00
CD-109	2.181E+00	1.647E+00	1.650E+00
SN-126	1.405E-01	1.061E-01	1.062E-01
CE-141	6.866E+00	5.299E+01	4.462E+01
EU-155	1.301E-01	1.554E-01	1.968E-01
TM-171	7.061E+00	1.442E+01	1.428E+01
TL-208	4.251E-01	1.208E-01	7.850E-02
PB-210	6.511E-01	1.483E+00	1.278E+00
PB-212	1.292E+00	1.544E-01	1.126E-01
BI-214	1.213E+00	2.034E-01	1.211E-01
PB-214	1.107E+00	2.289E-01	1.730E-01
RN-222	1.213E+00	2.034E-01	1.211E-01
RA-224	5.089E-01	2.230E+00	1.209E+00
RA-226	1.213E+00	2.034E-01	1.211E-01
AC-228	1.587E+00	4.737E-01	3.792E-01
RA-228	1.587E+00	4.737E-01	3.792E-01
TH-228	1.292E+00	1.544E-01	1.126E-01
TH-229	-3.898E-01	5.666E-01	9.385E-01
TH-230	1.212E+00	2.033E-01	1.211E-01
PA-231	9.176E-01	8.737E-01	1.031E+00
TH-232	1.587E+00	4.737E-01	3.792E-01
TH-234	1.858E+00	1.860E+00	1.469E+00
U-234	1.212E+00	2.033E-01	1.211E-01
U-235	3.196E-01	4.425E-01	4.675E-01
U-238	1.858E+00	1.860E+00	1.469E+00
AM-243	1.929E-01	8.263E-02	6.815E-02
ANH-511	9.012E-02	1.343E-01	6.680E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-1.607E+01	1.865E+01	3.111E+01	NOT IDENT.

NA-22	-2.407E-02	6.810E-02	1.069E-01	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	4.053E-02	4.870E-02	1.211E-01	NOT IDENT.
V-48	0.000E+00	1.723E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	4.404E+02	0.000E+00	SHORT HLIF
MN-54	2.919E-02	8.959E-02	1.712E-01	NOT IDENT.
CO-56	5.253E-01	6.966E-01	1.415E+00	NOT IDENT.
MN-56	0.000E+00	1.316E+41	0.000E+00	SHORT HLIF
CO-57	2.685E-02	5.402E-02	1.013E-01	NOT IDENT.
CO-58	-1.312E-01	6.907E-01	1.258E+00	NOT IDENT.
FE-59	-1.529E+00	9.366E+00	1.771E+01	NOT IDENT.
CO-60	-1.995E-02	6.343E-02	1.162E-01	NOT IDENT.
ZN-65	1.107E-01	2.670E-01	5.150E-01	NOT IDENT.
GE-68	1.501E+00	3.090E+00	6.436E+00	NOT IDENT.
AS-74	0.000E+00	6.848E+03	0.000E+00	SHORT HLIF
SE-75	-9.172E-02	3.067E-01	5.150E-01	NOT IDENT.
BR-77	0.000E+00	3.507E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	7.947E+02	0.000E+00	SHORT HLIF
RB-83	6.388E-01	8.609E-01	1.767E+00	NOT IDENT.
KR-85	6.684E+00	9.515E+00	1.923E+01	NOT IDENT.
SR-85	6.521E-01	9.326E-01	1.885E+00	NOT IDENT.
RB-86	0.000E+00	2.797E+04	0.000E+00	SHORT HLIF
Y-88	2.307E-02	3.119E-01	6.849E-01	NOT IDENT.
Y-91	-8.263E+02	8.052E+02	1.300E+03	NOT IDENT.
NB-94	-2.395E-02	4.758E-02	7.811E-02	NOT IDENT.
NB-95	-1.191E+00	1.346E+00	2.145E+00	NOT IDENT.
NB-95M	1.232E+00	3.005E+00	5.078E+00	NOT IDENT.
ZR-95	-4.394E-01	2.011E+00	3.593E+00	NOT IDENT.
NB-97	0.000E+00	1.545E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.929E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.037E+41	0.000E+00	SHORT HLIF
RH-101	-1.978E-02	3.959E-02	6.308E-02	NOT IDENT.
RH-102	-5.207E-02	8.990E-02	1.539E-01	NOT IDENT.
RU-103	3.512E+00	7.217E+00	1.434E+01	FAIL ABUN
RH-106	-4.717E-01	7.036E-01	1.190E+00	FAIL ABUN
RU-106	-4.717E-01	7.036E-01	1.190E+00	FAIL ABUN
AG-108M	1.410E-02	3.723E-02	7.369E-02	NOT IDENT.
AG-110M	-1.920E-03	1.449E-01	2.553E-01	NOT IDENT.
SN-113	-2.090E-02	3.007E-01	5.676E-01	NOT IDENT.
CD-115	0.000E+00	4.445E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	8.225E+04	0.000E+00	SHORT HLIF
TE-123M	1.415E-03	1.625E-01	2.897E-01	NOT IDENT.
SB-124	2.057E-01	2.993E+00	6.152E+00	NOT IDENT.
SB-125	-1.238E-01	1.436E-01	2.460E-01	FAIL ABUN
TE-125M	-1.995E+01	2.655E+02	4.815E+02	NOT IDENT.
I-126	0.000E+00	9.850E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	1.078E+06	0.000E+00	SHORT HLIF
SB-127	0.000E+00	8.869E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	3.631E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.209E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.131E+26	0.000E+00	SHORT HLIF
BA-133	8.880E-03	6.097E-02	1.121E-01	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	-1.366E-02	8.431E-02	1.495E-01	FAIL ABUN
CS-135	-6.375E-02	2.377E-01	3.648E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.144E+05	0.000E+00	SHORT HLIF
BA-137M	6.802E-02	5.998E-02	1.226E-01	NOT IDENT.
CS-137	7.185E-02	6.336E-02	1.295E-01	NOT IDENT.
CE-139	4.880E-02	1.363E-01	2.495E-01	NOT IDENT.
BA-140	0.000E+00	1.255E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	4.860E+05	0.000E+00	SHORT HLIF
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	-2.377E-01	4.417E-01	6.978E-01	NOT IDENT.
PM-144	2.480E-02	8.381E-02	1.602E-01	NOT IDENT.
PR-144	2.783E+00	7.181E+00	1.390E+01	NOT IDENT.
PM-146	-3.614E-02	5.721E-02	1.005E-01	NOT IDENT.
ND-147	0.000E+00	2.849E+07	0.000E+00	SHORT HLIF
PM-147	3.777E+01	9.555E+02	1.735E+03	NOT IDENT.
PM-149	0.000E+00	6.649E+39	0.000E+00	SHORT HLIF
EU-150	2.084E-02	3.500E-02	6.483E-02	FAIL ABUN
EU-152	5.710E-03	1.187E-01	2.284E-01	NOT IDENT.
GD-153	5.924E-02	1.801E-01	3.144E-01	NOT IDENT.
EU-154	-5.247E-02	1.689E-01	2.686E-01	NOT IDENT.
TB-160	2.746E-01	2.313E+00	4.693E+00	FAIL ABUN
HO-166M	-1.738E-02	9.114E-02	1.482E-01	FAIL ABUN
HF-172	1.039E-01	2.741E-01	4.757E-01	FAIL ABUN

LU-172	1.119E-01	1.234E-01	2.652E-01	FAIL ABUN
LU-176	1.077E-02	3.163E-02	6.242E-02	FAIL ABUN
HF-181	-2.470E+00	5.918E+00	1.058E+01	NOT IDENT.
TA-182	8.638E-02	1.578E+00	2.987E+00	FAIL ABUN
RE-183	6.628E-01	1.581E+00	2.968E+00	NOT IDENT.
RE-184	-1.408E+00	4.086E+01	7.943E+01	NOT IDENT.
W-188	-6.095E+01	1.386E+02	2.439E+02	FAIL ABUN
IR-192	5.945E-02	5.629E-01	1.089E+00	FAIL ABUN
HG-203	-2.147E+00	3.111E+00	4.979E+00	FAIL ABUN
BI-207	3.528E-02	5.942E-02	1.300E-01	FAIL ABUN
BI-211	0.000E+00	6.306E-01	1.039E+00	FAIL ABUN
PB-211	1.320E-01	9.642E-01	1.843E+00	NOT IDENT.
BI-212	0.000E+00	1.155E+00	1.818E+00	FAIL ABUN
RN-219	-4.756E-01	6.344E-01	9.670E-01	FAIL ABUN
RA-223	-5.719E-01	7.323E-01	1.301E+00	FAIL ABUN
AC-227	1.606E-01	3.131E-01	5.752E-01	FAIL ABUN
TH-227	1.606E-01	3.131E-01	5.752E-01	FAIL ABUN
TH-231	-5.719E-01	7.323E-01	1.301E+00	FAIL ABUN
PA-233	-2.358E-02	7.341E-02	1.372E-01	FAIL ABUN
PA-234	3.583E-01	3.904E-01	8.619E-01	NOT IDENT.
PA-234M	6.840E+00	7.166E+00	1.499E+01	NOT IDENT.
NP-237	-2.358E-02	7.341E-02	1.372E-01	FAIL ABUN
NP-238	0.000E+00	7.465E+40	0.000E+00	SHORT HLIF
NP-239	-2.728E-02	2.588E-01	4.675E-01	FAIL ABUN
PU-239	3.547E+02	7.593E+02	7.542E+02	FAIL ABUN
AM-241	6.371E-02	9.063E-02	1.607E-01	NOT IDENT.
CM-243	-1.263E-02	1.029E-01	1.730E-01	NOT IDENT.
BK-247	3.213E-02	1.034E-01	1.856E-01	FAIL ABUN
CM-247	-3.972E-02	5.768E-02	8.871E-02	NOT IDENT.
CF-249	-4.661E-02	5.106E-02	8.783E-02	NOT IDENT.
CF-251	8.846E-02	1.840E-01	2.675E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 08:39:19.51

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	272	10.66*	6.944E-01	1.597E+01	1.597E+01	12.32
SC-46	889.28	8	99.98*	1.057E+00	3.356E-02	3.781E-01	194.16
	1120.55	27	99.99	8.734E-01	1.333E-01	1.502E+00	71.11
AS-73	53.44	33	10.30*	5.707E+00	2.413E-01	3.020E+00	208.35
CD-109	88.03	115	3.70*	5.390E+00	2.497E+00	3.876E+00	41.53
SN-126	64.28	88	9.60	5.586E+00	7.160E-01	7.160E-01	102.18
	86.94	115	8.90	5.390E+00	1.038E+00	1.038E+00	41.53
	87.57	115	37.00*	5.390E+00	2.497E-01	2.497E-01	41.53
CE-141	145.44	37	48.29*	4.605E+00	7.254E-02	3.727E+01	141.27
EU-155	86.55	115	30.70	5.390E+00	3.010E-01	3.383E-01	41.53
	105.31	29	21.10*	5.213E+00	1.158E-01	1.301E-01	121.83
TM-171	51.35	33	0.27	5.707E+00	9.204E+00	1.229E+01	208.35
	52.39	33	0.47*	5.707E+00	5.287E+00	7.061E+00	208.35
	66.73	------	0.14	5.547E+00	------	Line Not Found	------
TL-208	277.37	------	6.60	2.816E+00	------	Line Not Found	------
	583.19	124	85.00*	1.485E+00	4.251E-01	4.251E-01	29.01
	860.56	------	12.50	1.084E+00	------	Line Not Found	------
PB-210	46.54	34	4.25*	5.491E+00	6.350E-01	6.511E-01	232.37
BI-211	72.87	38	1.23	5.490E+00	2.430E+00	2.430E+00	162.66
	351.06	207	12.92*	2.285E+00	3.049E+00	3.049E+00	21.10
PB-212	74.82	250	10.28	5.476E+00	1.930E+00	1.930E+00	26.81
	77.11	373	17.10	5.460E+00	1.737E+00	1.737E+00	17.52
	238.63	415	43.60*	3.202E+00	1.292E+00	1.292E+00	12.19
	300.09	30	3.30	2.623E+00	1.488E+00	1.488E+00	97.16
BI-214	609.32	182	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12
	1120.29	27	14.92	8.734E-01	8.936E-01	8.939E-01	71.11
	1764.49	16	15.30	5.811E-01	7.988E-01	7.991E-01	65.59
PB-214	74.82	250	5.80	5.476E+00	3.421E+00	3.422E+00	26.81
	77.11	373	9.70	5.460E+00	3.062E+00	3.063E+00	17.52
	87.09	115	3.41	5.390E+00	2.709E+00	2.710E+00	41.53
	242.00	78	7.25	3.172E+00	1.473E+00	1.474E+00	84.32
	295.22	134	18.42	2.666E+00	1.185E+00	1.186E+00	28.43
	351.93	207	35.60*	2.285E+00	1.107E+00	1.107E+00	21.10
RN-222	609.32	182	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12
	1120.29	27	14.92	8.734E-01	8.936E-01	8.939E-01	71.11
	1764.49	16	15.30	5.811E-01	7.988E-01	7.991E-01	65.59
RA-224	240.99	78	4.10*	3.172E+00	2.605E+00	2.605E+00	84.32
RA-226	609.32	182	45.49*	1.434E+00	1.212E+00	1.213E+00	17.12
	1120.29	27	14.92	8.734E-01	8.936E-01	8.939E-01	71.11
	1764.49	16	15.30	5.811E-01	7.988E-01	7.991E-01	65.59
AC-228	105.21	29	1.10	5.213E+00	2.221E+00	2.221E+00	121.83
	338.32	74	11.27	2.367E+00	1.208E+00	1.208E+00	46.62
	794.95	------	4.25	1.156E+00	------	Line Not Found	------
	835.71	------	1.61	1.110E+00	------	Line Not Found	------
	911.20	98	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45
	968.97	69	15.80	9.848E-01	1.925E+00	1.925E+00	37.84
RA-228	105.21	29	1.10	5.213E+00	2.221E+00	2.221E+00	121.83

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	74	11.27	2.367E+00	1.208E+00	1.208E+00	46.62
	794.95	------	4.25	1.156E+00	------ Line Not Found		------
	835.71	------	1.61	1.110E+00	------ Line Not Found		------
	911.20	98	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45
	968.97	69	15.80	9.848E-01	1.925E+00	1.925E+00	37.84
TH-228	74.82	250	10.28	5.476E+00	1.930E+00	1.930E+00	26.81
	77.11	373	17.10	5.460E+00	1.737E+00	1.737E+00	17.52
	238.63	415	43.60*	3.202E+00	1.292E+00	1.292E+00	12.19
	300.09	30	3.30	2.623E+00	1.488E+00	1.488E+00	97.16
TH-229	85.43	20	14.70	5.413E+00	1.080E-01	1.080E-01	235.75
	88.47	115	24.00	5.390E+00	3.850E-01	3.850E-01	41.53
	193.51	------	4.41*	3.791E+00	------ Line Not Found		------
	210.85	------	2.80	3.546E+00	------ Line Not Found		------
TH-230	609.32	182	45.49*	1.434E+00	1.212E+00	1.212E+00	17.12
	1120.29	27	14.92	8.734E-01	8.936E-01	8.936E-01	71.11
	1764.49	16	15.30	5.811E-01	7.988E-01	7.988E-01	65.59
PA-231	283.69	------	1.70	2.761E+00	------ Line Not Found		------
	301.36	30	5.35*	2.623E+00	9.176E-01	9.176E-01	97.16
TH-232	105.21	29	1.10	5.213E+00	2.221E+00	2.221E+00	121.83
	338.32	74	11.27	2.367E+00	1.208E+00	1.208E+00	46.62
	835.71	------	1.61	1.110E+00	------ Line Not Found		------
	911.20	98	25.80*	1.035E+00	1.587E+00	1.587E+00	30.45
	968.97	69	15.80	9.848E-01	1.925E+00	1.925E+00	37.84
TH-234	63.29	88	3.70*	5.586E+00	1.858E+00	1.858E+00	102.18
	92.59	152	4.23	5.346E+00	2.915E+00	2.915E+00	41.51
U-234	609.32	182	45.49*	1.434E+00	1.212E+00	1.212E+00	17.12
	1120.29	27	14.92	8.734E-01	8.936E-01	8.936E-01	71.11
	1764.49	16	15.30	5.811E-01	7.988E-01	7.988E-01	65.59
U-235	89.96	87	3.47	5.369E+00	2.025E+00	2.025E+00	57.69
	93.35	152	5.60	5.346E+00	2.202E+00	2.202E+00	41.51
	143.76	37	10.96*	4.605E+00	3.196E-01	3.196E-01	141.27
	163.33	------	5.08	4.273E+00	------ Line Not Found		------
	185.72	127	57.20	3.906E+00	2.462E-01	2.462E-01	43.03
	205.31	------	5.01	3.621E+00	------ Line Not Found		------
U-238	63.29	88	3.70*	5.586E+00	1.858E+00	1.858E+00	102.18
	92.59	152	4.23	5.346E+00	2.915E+00	2.915E+00	41.51
AM-243	43.53	------	5.90	5.049E+00	------ Line Not Found		------
	74.66	250	67.20*	5.476E+00	2.952E-01	2.952E-01	26.81
ANH-511	511.00	34	100.00*	1.658E+00	9.012E-02	9.012E-02	152.12

Flag: "*" = Keyline

Sample ID : R405240005 Acquisition date : 3-OCT-2016 05:03:08

Total number of lines in spectrum 46
Number of unidentified lines 10
Number of lines tentatively identified by NID 36 78.26%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.597E+01	1.597E+01	0.197E+01	12.32	
SC-46	83.79D	11.3	3.356E-02	3.781E-01	7.342E-01	194.16	
AS-73	80.30D	12.5	2.413E-01	3.020E+00	6.291E+00	208.35	
CD-109	461.40D	1.55	2.497E+00	3.876E+00	1.610E+00	41.53	
SN-126	2.30E+05Y	1.00	2.497E-01	2.497E-01	1.037E-01	41.53	
CE-141	32.51D	514.	7.254E-02	3.727E+01	5.265E+01	141.27	
EU-155	4.75Y	1.12	1.158E-01	1.301E-01	1.586E-01	121.83	
TM-171	1.92Y	1.34	5.287E+00	7.061E+00	14.71E+00	208.35	
TL-208	1.41E+10Y	1.00	4.251E-01	4.251E-01	1.233E-01	29.01	
PB-210	22.20Y	1.03	6.350E-01	6.511E-01	15.13E-01	232.37	
BI-211	7.04E+08Y	1.00	3.049E+00	3.049E+00	0.643E+00	21.10	
PB-212	1.41E+10Y	1.00	1.292E+00	1.292E+00	0.158E+00	12.19	
BI-214	1600.00Y	1.00	1.212E+00	1.213E+00	0.208E+00	17.12	
PB-214	1600.00Y	1.00	1.107E+00	1.107E+00	0.234E+00	21.10	
RN-222	1600.00Y	1.00	1.212E+00	1.213E+00	0.208E+00	17.12	
RA-224	1.41E+10Y	1.00	2.605E+00	2.605E+00	2.196E+00	84.32	
RA-226	1600.00Y	1.00	1.212E+00	1.213E+00	0.208E+00	17.12	
AC-228	1.41E+10Y	1.00	1.587E+00	1.587E+00	0.483E+00	30.45	
RA-228	1.41E+10Y	1.00	1.587E+00	1.587E+00	0.483E+00	30.45	
TH-228	1.41E+10Y	1.00	1.292E+00	1.292E+00	0.158E+00	12.19	
TH-229	7340.00Y	1.00	3.850E-01	3.850E-01	1.599E-01	41.53	K
TH-230	7.54E+04Y	1.00	1.212E+00	1.212E+00	0.207E+00	17.12	
PA-231	7.04E+08Y	1.00	9.176E-01	9.176E-01	8.916E-01	97.16	
TH-232	1.41E+10Y	1.00	1.587E+00	1.587E+00	0.483E+00	30.45	
TH-234	4.47E+09Y	1.00	1.858E+00	1.858E+00	1.898E+00	102.18	
U-234	2.45E+05Y	1.00	1.212E+00	1.212E+00	0.207E+00	17.12	
U-235	7.04E+08Y	1.00	3.196E-01	3.196E-01	4.515E-01	141.27	
U-238	4.47E+09Y	1.00	1.858E+00	1.858E+00	1.898E+00	102.18	
AM-243	7370.00Y	1.00	2.952E-01	2.952E-01	0.791E-01	26.81	
ANH-511	1.00E+09Y	1.00	9.012E-02	9.012E-02	13.71E-02	152.12	
Total Activity :			5.142E+01	9.492E+01			

Grand Total Activity : 5.142E+01 9.492E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240005 Acquisition date : 3-OCT-2016 05:03:08

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	129.65	25	197	0.97	258.81	253	10	4.42E-03	****	4.85E+00	T
0	176.19	14	85	1.28	351.83	351	6	2.56E-03	****	4.06E+00	T
0	270.55	52	84	1.17	540.41	536	10	9.40E-03	74.0	2.88E+00	T
0	398.97	20	54	1.28	797.09	790	12	3.63E-03	****	2.05E+00	
0	464.83	23	47	1.48	928.72	923	14	4.33E-03	****	1.80E+00	T
0	603.68	29	45	5.17	1206.24	1197	16	5.52E-03	****	1.44E+00	T
0	652.28	15	18	1.39	1303.36	1296	11	2.83E-03	****	1.36E+00	
0	727.88	48	20	0.66	1454.46	1448	12	9.17E-03	46.6	1.24E+00	T
0	935.25	6	27	1.70	1868.95	1864	9	1.15E-03	****	1.01E+00	
0	1010.15	20	24	6.61	2018.66	2009	20	3.79E-03	****	9.52E-01	
0	1049.67	13	6	1.47	2097.67	2092	9	2.48E-03	88.5	9.22E-01	T
0	1071.43	9	12	0.64	2141.16	2137	9	1.78E-03	****	9.07E-01	
0	1084.32	12	2	2.62	2166.92	2163	8	2.26E-03	69.5	8.98E-01	
0	1108.44	22	8	2.00	2215.14	2209	13	4.27E-03	68.7	8.82E-01	
0	1271.40	11	23	1.19	2540.87	2531	14	2.19E-03	****	7.85E-01	T
0	1352.52	3	4	0.80	2703.03	2697	10	5.21E-04	****	7.44E-01	
0	1378.70	10	8	1.09	2755.35	2749	11	2.03E-03	****	7.32E-01	
0	1561.24	8	2	1.02	3120.26	3116	8	1.51E-03	91.8	6.54E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 08:39:33.89

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240005.CNF;2    *
* Acquisition date :  3-OCT-2016 05:03:08 Sensitivity     : 3.000       *
* Detector ID      : GAM31                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:30:09.48     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 11:42:00 Nuclide Library : SOLID       *
* Sample ID        : R405240005           Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.1518E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-JUN-2016 06:54:07 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;7         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.785E-01
SC-46	3.396E-01
AS-73	2.931E+00
CD-109	7.787E-01
SN-126	5.011E-02
CE-141	2.093E+01
EU-155	9.229E-02
TM-171	6.844E+00
TL-208	3.459E-02
PB-210	6.128E-01
PB-212	5.206E-02
BI-214	5.152E-02
PB-214	7.925E-02
RN-222	5.152E-02
RA-224	5.589E-01
RA-226	5.152E-02
AC-228	1.676E-01
RA-228	1.676E-01
TH-228	5.206E-02
TH-229	4.337E-01
TH-230	5.150E-02
PA-231	4.731E-01
TH-232	1.676E-01
TH-234	7.056E-01
U-234	5.150E-02
U-235	2.220E-01
U-238	7.056E-01
AM-243	3.246E-02
ANH-511	2.985E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.410E+01	NOT IDENT.
NA-22	4.420E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	5.022E-02	NOT IDENT.
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	7.547E-02	NOT IDENT.
CO-56	6.336E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	4.772E-02	NOT IDENT.
CO-58	5.379E-01	NOT IDENT.
FE-59	7.741E+00	NOT IDENT.
CO-60	4.949E-02	NOT IDENT.
ZN-65	2.272E-01	NOT IDENT.
GE-68	2.792E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	2.388E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	7.993E-01	NOT IDENT.
KR-85	8.750E+00	NOT IDENT.
SR-85	8.574E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	2.718E-01	NOT IDENT.
Y-91	5.619E+02	NOT IDENT.
NB-94	3.444E-02	NOT IDENT.
NB-95	9.548E-01	NOT IDENT.
NB-95M	2.363E+00	NOT IDENT.
ZR-95	1.583E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.942E-02	NOT IDENT.
RH-102	6.818E-02	NOT IDENT.
RU-103	6.501E+00	FAIL ABUN
RH-106	5.223E-01	FAIL ABUN
RU-106	5.223E-01	FAIL ABUN
AG-108M	3.342E-02	NOT IDENT.
AG-110M	1.105E-01	NOT IDENT.
SN-113	2.583E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.360E-01	NOT IDENT.
SB-124	2.486E+00	NOT IDENT.
SB-125	1.104E-01	FAIL ABUN
TE-125M	2.261E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	5.164E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	6.695E-02	FAIL ABUN
CS-135	1.696E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
BA-137M	5.631E-02	NOT IDENT.
CS-137	5.949E-02	NOT IDENT.
CE-139	1.171E-01	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-143	0.000E+00	SHORT HLIF
CE-144	3.261E-01	NOT IDENT.
PM-144	7.204E-02	NOT IDENT.
PR-144	6.253E+00	NOT IDENT.
PM-146	4.479E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	8.159E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.980E-02	FAIL ABUN
EU-152	1.042E-01	NOT IDENT.
GD-153	1.482E-01	NOT IDENT.
EU-154	1.115E-01	NOT IDENT.
TB-160	2.043E+00	FAIL ABUN
HO-166M	6.551E-02	FAIL ABUN
HF-172	2.234E-01	FAIL ABUN
LU-172	1.186E-01	FAIL ABUN

LU-176	2.876E-02	FAIL ABUN
HF-181	4.785E+00	NOT IDENT.
TA-182	1.337E+00	FAIL ABUN
RE-183	1.428E+00	NOT IDENT.
RE-184	3.516E+01	NOT IDENT.
W-188	1.120E+02	FAIL ABUN
IR-192	5.001E-01	FAIL ABUN
HG-203	2.288E+00	FAIL ABUN
BI-207	5.622E-02	FAIL ABUN
BI-211	4.998E-01	FAIL ABUN
PB-211	8.444E-01	NOT IDENT.
BI-212	8.382E-01	FAIL ABUN
RN-219	4.396E-01	FAIL ABUN
RA-223	5.903E-01	FAIL ABUN
AC-227	2.669E-01	FAIL ABUN
TH-227	2.669E-01	FAIL ABUN
TH-231	5.903E-01	FAIL ABUN
PA-233	6.254E-02	FAIL ABUN
PA-234	3.823E-01	NOT IDENT.
PA-234M	6.767E+00	NOT IDENT.
NP-237	6.254E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.189E-01	FAIL ABUN
PU-239	3.577E+02	FAIL ABUN
AM-241	7.742E-02	NOT IDENT.
CM-243	8.092E-02	NOT IDENT.
BK-247	8.605E-02	FAIL ABUN
CM-247	4.033E-02	NOT IDENT.
CF-249	3.964E-02	NOT IDENT.
CF-251	1.253E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 08:39:39.16

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240005.CNF;2    *
* Acquisition date :  3-OCT-2016 05:03:08 Sensitivity     : 3.000          *
* Detector ID      : GAM31                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:30:09.48     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:42:00 Nuclide Library : SOLID          *
* Sample ID        : R405240005           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.1518E+02 GRAM   *
*                                         Quantity Err(%) : 1.7364E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-JUN-2016 06:54:07 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM31_CAN.CNF;7           *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.597E+01	2.102E+00	2.102E+00
SC-46	3.781E-01	7.197E-01	7.197E-01
AS-73	3.020E+00	6.197E+00	6.197E+00
CD-109	2.181E+00	1.670E+00	1.670E+00
SN-126	1.405E-01	1.073E-01	1.073E-01
CE-141	6.869E+00	5.304E+01	5.304E+01
EU-155	1.301E-01	1.557E-01	1.557E-01
TM-171	7.061E+00	1.443E+01	1.443E+01
TL-208	4.251E-01	1.222E-01	1.222E-01
PB-210	6.511E-01	1.484E+00	1.484E+00
PB-212	1.292E+00	1.688E-01	1.688E-01
BI-214	1.213E+00	2.100E-01	2.100E-01
PB-214	1.107E+00	2.335E-01	2.335E-01
RN-222	1.213E+00	2.100E-01	2.100E-01
RA-224	5.089E-01	2.235E+00	2.235E+00
RA-226	1.213E+00	2.100E-01	2.100E-01
AC-228	1.587E+00	4.807E-01	4.807E-01
RA-228	1.587E+00	4.807E-01	4.807E-01
TH-228	1.292E+00	1.688E-01	1.688E-01
TH-229	-3.898E-01	5.669E-01	5.669E-01
TH-230	1.212E+00	2.099E-01	2.099E-01
PA-231	9.176E-01	8.954E-01	8.954E-01
TH-232	1.587E+00	4.807E-01	4.807E-01
TH-234	1.858E+00	1.905E+00	1.905E+00
U-234	1.212E+00	2.099E-01	2.099E-01
U-235	3.196E-01	4.428E-01	4.428E-01
U-238	1.858E+00	1.905E+00	1.905E+00
AM-243	1.929E-01	8.448E-02	8.448E-02
ANH-511	9.012E-02	1.344E-01	1.344E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.607E+01	1.866E+01	2.002E+01	NOT IDENT.

NA-22	-2.407E-02	6.811E-02	6.897E-02	NOT IDENT.
NA-24	1.000E+41	8.543E+42	0.000E+00	SHORT HLIF
AL-26	4.053E-02	4.877E-02	5.208E-02	NOT IDENT.
V-48	-1.967E+04	1.725E+04	1.940E+04	SHORT HLIF
CR-51	-1.465E+01	4.404E+02	4.404E+02	SHORT HLIF
MN-54	2.919E-02	8.960E-02	9.056E-02	NOT IDENT.
CO-56	5.253E-01	6.970E-01	7.361E-01	NOT IDENT.
MN-56	1.000E+41	1.317E+41	0.000E+00	SHORT HLIF
CO-57	2.685E-02	5.404E-02	5.538E-02	NOT IDENT.
CO-58	-1.312E-01	6.908E-01	6.933E-01	NOT IDENT.
FE-59	-1.529E+00	9.366E+00	9.392E+00	NOT IDENT.
CO-60	-1.995E-02	6.343E-02	6.407E-02	NOT IDENT.
ZN-65	1.107E-01	2.670E-01	2.717E-01	NOT IDENT.
GE-68	1.501E+00	3.091E+00	3.164E+00	NOT IDENT.
AS-74	-2.826E+03	6.852E+03	6.969E+03	SHORT HLIF
SE-75	-9.172E-02	3.067E-01	3.095E-01	NOT IDENT.
BR-77	2.935E+37	2.480E+38	0.000E+00	SHORT HLIF
SR-82	-3.710E+01	7.947E+02	7.949E+02	SHORT HLIF
RB-83	6.388E-01	8.653E-01	9.120E-01	NOT IDENT.
KR-85	6.684E+00	9.518E+00	9.984E+00	NOT IDENT.
SR-85	6.521E-01	9.330E-01	9.782E-01	NOT IDENT.
RB-86	2.850E+04	2.800E+04	3.081E+04	SHORT HLIF
Y-88	2.307E-02	3.119E-01	3.121E-01	NOT IDENT.
Y-91	-8.263E+02	8.057E+02	8.877E+02	NOT IDENT.
NB-94	-2.395E-02	4.759E-02	4.880E-02	NOT IDENT.
NB-95	-1.191E+00	1.347E+00	1.450E+00	NOT IDENT.
NB-95M	1.232E+00	3.007E+00	3.058E+00	NOT IDENT.
ZR-95	-4.394E-01	2.011E+00	2.020E+00	NOT IDENT.
NB-97	-1.000E+41	1.545E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	2.133E+41	0.000E+00	SHORT HLIF
MO-99	1.638E+30	3.929E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	1.042E+41	0.000E+00	SHORT HLIF
RH-101	-1.978E-02	3.975E-02	4.074E-02	NOT IDENT.
RH-102	-5.207E-02	9.001E-02	9.302E-02	NOT IDENT.
RU-103	3.512E+00	7.219E+00	7.391E+00	FAIL ABUN
RH-106	-4.717E-01	7.042E-01	7.356E-01	FAIL ABUN
RU-106	-4.717E-01	7.042E-01	7.356E-01	FAIL ABUN
AG-108M	1.410E-02	3.723E-02	3.777E-02	NOT IDENT.
AG-110M	-1.920E-03	1.449E-01	1.449E-01	NOT IDENT.
SN-113	-2.090E-02	3.007E-01	3.008E-01	NOT IDENT.
CD-115	-6.266E+37	4.446E+38	0.000E+00	SHORT HLIF
SN-117M	7.040E+04	8.266E+04	8.854E+04	SHORT HLIF
TE-123M	1.415E-03	1.625E-01	1.625E-01	NOT IDENT.
SB-124	2.057E-01	2.993E+00	2.995E+00	NOT IDENT.
SB-125	-1.238E-01	1.437E-01	1.541E-01	FAIL ABUN
TE-125M	-1.995E+01	2.655E+02	2.656E+02	NOT IDENT.
I-126	-4.236E+05	9.866E+05	1.005E+06	SHORT HLIF
SB-126	-3.453E+04	1.078E+06	1.078E+06	SHORT HLIF
SB-127	2.105E+21	9.308E+21	0.000E+00	SHORT HLIF
I-131	2.033E+09	3.632E+09	3.746E+09	SHORT HLIF
I-132	-1.000E+41	1.808E+42	0.000E+00	SHORT HLIF
TE-132	-5.960E+25	1.156E+26	0.000E+00	SHORT HLIF
BA-133	8.880E-03	6.097E-02	6.111E-02	NOT IDENT.
I-133	1.000E+41	2.175E+42	0.000E+00	SHORT HLIF
CS-134	-1.366E-02	8.432E-02	8.454E-02	FAIL ABUN
CS-135	-6.375E-02	2.378E-01	2.395E-01	NOT IDENT.
I-135	-1.000E+41	1.085E+44	0.000E+00	SHORT HLIF
CS-136	1.174E+05	3.147E+05	3.191E+05	SHORT HLIF
BA-137M	6.802E-02	6.005E-02	6.743E-02	NOT IDENT.
CS-137	7.185E-02	6.344E-02	7.123E-02	NOT IDENT.
CE-139	4.880E-02	1.366E-01	1.384E-01	NOT IDENT.
BA-140	8.158E+05	1.256E+06	1.309E+06	SHORT HLIF
LA-140	-1.214E+05	4.860E+05	4.891E+05	SHORT HLIF
CE-143	-1.000E+41	6.820E+41	0.000E+00	SHORT HLIF
CE-144	-2.377E-01	4.419E-01	4.547E-01	NOT IDENT.
PM-144	2.480E-02	8.382E-02	8.457E-02	NOT IDENT.
PR-144	2.783E+00	7.182E+00	7.291E+00	NOT IDENT.
PM-146	-3.614E-02	5.727E-02	5.955E-02	NOT IDENT.
ND-147	2.190E+07	2.852E+07	3.018E+07	SHORT HLIF
PM-147	3.777E+01	9.556E+02	9.557E+02	NOT IDENT.
PM-149	-1.685E+39	6.659E+39	0.000E+00	SHORT HLIF
EU-150	2.084E-02	3.502E-02	3.625E-02	FAIL ABUN
EU-152	5.710E-03	1.187E-01	1.187E-01	NOT IDENT.
GD-153	5.924E-02	1.801E-01	1.821E-01	NOT IDENT.
EU-154	-5.247E-02	1.689E-01	1.705E-01	NOT IDENT.
TB-160	2.746E-01	2.313E+00	2.317E+00	FAIL ABUN
HO-166M	-1.738E-02	9.114E-02	9.148E-02	FAIL ABUN
HF-172	1.039E-01	2.746E-01	2.786E-01	FAIL ABUN

LU-172	1.119E-01	1.239E-01	1.338E-01	FAIL ABUN
LU-176	1.077E-02	3.163E-02	3.200E-02	FAIL ABUN
HF-181	-2.470E+00	5.919E+00	6.022E+00	NOT IDENT.
TA-182	8.638E-02	1.578E+00	1.578E+00	FAIL ABUN
RE-183	6.628E-01	1.585E+00	1.612E+00	NOT IDENT.
RE-184	-1.408E+00	4.087E+01	4.087E+01	NOT IDENT.
W-188	-6.095E+01	1.387E+02	1.414E+02	FAIL ABUN
IR-192	5.945E-02	5.629E-01	5.635E-01	FAIL ABUN
HG-203	-2.147E+00	3.113E+00	3.260E+00	FAIL ABUN
BI-207	3.528E-02	5.943E-02	6.153E-02	FAIL ABUN
BI-211	3.049E+00	6.451E-01	1.518E+00	FAIL ABUN
PB-211	1.320E-01	9.642E-01	9.661E-01	NOT IDENT.
BI-212	2.528E+00	1.162E+00	1.627E+00	FAIL ABUN
RN-219	-4.756E-01	6.372E-01	6.723E-01	FAIL ABUN
RA-223	-5.719E-01	7.331E-01	7.771E-01	FAIL ABUN
AC-227	1.606E-01	3.138E-01	3.221E-01	FAIL ABUN
TH-227	1.606E-01	3.138E-01	3.221E-01	FAIL ABUN
TH-231	-5.719E-01	7.331E-01	7.771E-01	FAIL ABUN
PA-233	-2.358E-02	7.342E-02	7.419E-02	FAIL ABUN
PA-234	3.583E-01	5.660E-01	5.886E-01	NOT IDENT.
PA-234M	6.840E+00	7.172E+00	7.807E+00	NOT IDENT.
NP-237	-2.358E-02	7.342E-02	7.419E-02	FAIL ABUN
NP-238	-4.482E+40	7.467E+40	0.000E+00	SHORT HLIF
NP-239	-2.728E-02	2.588E-01	2.591E-01	FAIL ABUN
PU-239	3.547E+02	7.595E+02	7.761E+02	FAIL ABUN
AM-241	6.371E-02	9.075E-02	9.518E-02	NOT IDENT.
CM-243	-1.263E-02	1.029E-01	1.031E-01	NOT IDENT.
BK-247	3.213E-02	1.036E-01	1.046E-01	FAIL ABUN
CM-247	-3.972E-02	5.806E-02	6.076E-02	NOT IDENT.
CF-249	-4.661E-02	5.120E-02	5.534E-02	NOT IDENT.
CF-251	8.846E-02	1.842E-01	1.885E-01	FAIL ABUN

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	152.8418	87.09	93.1577	136.47	59.8441
45.60	178.7459	87.57	93.2565	140.51	0.0000
46.54	179.3168	88.03	93.3508	143.76	80.7164
49.72	0.0000	88.34	93.4147	144.24	80.7767
51.35	174.3111	88.47	93.4407	145.44	76.6670
51.87	174.5972	89.96	93.7444	152.43	90.3946
52.39	174.8817	1093.63	93.8818	153.25	0.0000
52.97	175.1968	91.11	0.0000	323.87	88.4751
53.44	175.4517	92.59	94.2731	156.02	0.0000
54.07	174.6185	93.35	94.4246	158.56	0.0000
57.36	0.0000	94.56	94.6645	159.00	77.1427
57.53	193.6074	94.65	94.6823	162.33	67.6857
57.98	200.0859	94.67	94.6860	162.66	0.0000
59.27	223.7444	94.87	94.7261	163.33	81.9946
59.32	223.7759	97.43	80.8780	165.86	69.1206
59.54	197.7143	98.43	84.3111	176.31	69.7436
60.96	206.8850	98.44	84.3124	176.60	0.0000
61.17	207.0073	99.53	90.3940	177.52	71.3418
62.93	197.5030	100.11	92.4667	181.07	0.0000
63.29	197.6998	102.03	80.3132	181.52	68.7314
63.58	197.8568	103.18	73.8976	184.41	68.6148
64.28	198.2352	103.37	73.9255	143.76	68.7311
66.73	173.7285	105.21	76.5095	193.51	64.8608
67.24	138.6835	105.31	76.5242	197.03	67.4301
125.81	155.2869	106.12	75.6486	198.01	70.9439
67.75	155.3141	106.47	75.6996	201.83	77.0230
69.67	162.8270	109.28	81.1125	203.43	76.0194
70.83	133.8406	111.00	78.3606	205.31	71.5730
72.81	132.3518	111.76	0.0000	210.85	84.8251
72.87	132.3714	114.06	86.8877	215.65	65.4353
74.66	132.9606	116.30	0.0000	222.11	56.5012
74.82	133.0119	116.74	75.1280	227.09	60.3672
74.97	133.0610	119.76	78.5961	227.38	55.6497
77.11	133.7538	121.12	81.8542	228.16	0.0000
78.74	112.6785	121.22	81.8683	228.18	62.8097
79.69	114.1869	121.78	76.8270	116.74	62.8097
80.12	100.4850	122.06	74.8145	235.69	50.9792
80.19	0.0000	122.92	89.2966	235.96	63.7427
80.57	99.3334	123.07	88.2932	238.63	50.3409
81.00	104.4677	265.00	80.1644	238.98	0.0000
81.07	115.1848	125.81	70.1426	240.99	50.4672
81.75	112.2142	127.23	77.2054	242.00	50.5210
83.79	87.4046	127.91	81.7804	244.70	61.1191
84.00	101.3875	129.30	81.9714	252.40	0.0000
85.43	91.5432	131.20	90.2108	252.80	42.5756
86.55	94.3209	133.02	69.6014	254.15	0.0000
86.79	94.3706	133.52	82.1969	256.23	45.1655
86.94	93.1273	136.00	55.6024	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	61.5509	355.39	0.0000	584.27	18.5171
264.80	61.5585	356.01	42.6777	595.83	0.0000
265.00	48.0252	364.49	0.0000	427.87	29.5704
268.22	65.8838	366.42	0.0000	602.52	0.0000
269.46	48.2358	372.51	34.2187	604.72	29.6330
270.03	48.2620	375.05	39.6978	607.14	12.4927
271.23	48.3180	377.52	35.2525	609.32	10.9435
273.65	0.0000	356.01	43.5918	610.33	15.6415
276.40	41.0879	388.16	43.7305	614.28	21.9425
277.37	49.8499	388.63	0.0000	618.01	30.3582
277.60	49.8608	391.69	35.6230	620.36	22.0100
278.00	34.9163	264.66	35.8547	621.93	26.2227
279.20	57.4270	401.81	48.3055	630.19	0.0000
279.54	54.9476	402.40	46.9451	631.29	28.4535
279.70	54.9557	404.85	37.8061	633.25	24.2616
280.46	47.4965	410.95	37.9687	634.78	0.0000
283.69	39.2824	413.71	28.7635	635.95	28.5194
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	54.4140	423.72	0.0000	645.85	23.8824
285.90	0.0000	427.09	44.0128	657.76	27.7572
287.50	31.8731	427.87	39.3519	657.90	0.0000
290.67	50.4736	433.94	26.3423	661.66	24.6003
293.27	0.0000	439.40	31.1597	664.57	0.0000
351.93	43.0811	453.88	31.4572	666.33	0.0000
295.96	49.0272	463.37	24.9362	666.50	0.0000
879.38	35.5862	468.07	31.7445	667.71	0.0000
299.98	49.2042	473.00	0.0000	677.62	21.5535
300.09	49.2089	475.06	33.8165	685.70	0.0000
300.13	49.2113	476.78	41.5906	695.00	0.0000
301.36	42.0456	477.60	44.5148	696.49	22.8303
302.85	51.0315	482.18	36.8782	696.51	21.7432
256.23	44.7182	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	19.5762
306.78	40.1143	497.08	24.4832	697.49	19.5776
308.46	42.7378	505.52	26.5759	702.65	23.9846
311.90	41.1514	507.63	0.0000	706.68	20.7526
316.51	40.4547	511.00	23.6997	711.68	19.7043
319.41	0.0000	514.00	23.7422	720.70	0.0000
320.08	0.0000	514.00	23.7422	721.93	0.0000
321.04	39.7484	520.40	19.8592	722.78	11.5515
323.87	45.0409	520.69	0.0000	722.91	11.5523
325.23	45.0916	522.65	0.0000	723.31	21.4583
328.76	0.0000	527.90	0.0000	724.19	24.7687
333.37	35.3592	528.26	20.9470	727.33	17.6380
333.97	32.7560	529.59	26.9517	733.00	13.2617
334.37	32.7667	529.87	0.0000	735.93	11.0657
338.28	40.3230	531.02	0.0000	333.97	23.2533
338.32	40.3239	537.26	0.0000	739.50	0.0000
311.90	46.1031	546.56	0.0000	747.24	17.7923
340.48	46.1031	552.55	30.3369	748.06	16.6864
340.55	0.0000	563.25	24.4121	752.31	18.9458
344.28	36.1152	569.33	16.3288	753.82	0.0000
345.93	33.8703	946.00	16.3301	756.73	21.2150
351.06	39.8538	569.70	16.3320	756.80	21.2157
351.93	39.8813	583.19	18.5068	884.68	29.1209

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	35.8698	1274.44	22.9378	1620.50	4.3564
766.42	35.8789	1001.03	14.7036	1621.92	4.3579
766.84	33.6426	1002.74	19.1261	1678.03	0.0000
772.60	0.0000	1004.73	32.3888	1690.97	5.5310
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	4.4946
778.90	19.1610	1028.54	0.0000	1063.66	12.6000
783.70	0.0000	1037.84	17.6768	1771.35	7.2020
785.37	18.0827	1038.76	0.0000	1791.20	0.0000
792.07	19.2661	631.29	5.9715	1808.65	2.7215
794.95	28.3661	1048.07	0.0000	1810.72	0.0000
795.86	27.2422	1049.04	11.2053	1836.06	4.5613
810.06	17.1252	1050.41	10.4631		
810.29	17.1265	1063.66	8.4441		
344.28	17.1277	1077.00	0.0000		
810.76	13.7041	1077.34	9.6931		
815.77	0.0000	1085.87	6.0477		
1048.07	0.0000	1093.63	13.2617		
832.01	14.9725	1099.45	18.0305		
834.85	10.3773	1112.07	12.1945		
835.71	12.6879	1112.84	19.8212		
836.80	0.0000	1115.54	13.9881		
846.75	0.0000	1120.29	25.9798		
846.77	15.0598	1120.55	23.8815		
856.80	0.0000	1221.41	22.9307		
860.56	11.6467	1129.67	15.3271		
871.09	18.4179	1131.51	0.0000		
873.19	14.0439	1147.95	0.0000		
875.33	0.0000	1173.23	14.5587		
879.38	14.0767	1177.95	7.7754		
880.51	13.2028	1189.05	14.6274		
883.24	16.9166	1204.77	26.4496		
884.68	14.1050	1221.41	23.6235		
889.28	9.8906	1231.02	25.6636		
894.76	9.7338	1235.36	0.0000		
898.04	21.2637	1238.28	22.7487		
900.72	20.3980	1260.41	0.0000		
903.28	20.4170	1271.87	9.5854		
911.20	19.5864	1274.44	11.1904		
912.08	19.5931	1274.54	11.1911		
923.98	0.0000	1291.59	12.0469		
926.50	17.0106	1298.22	0.0000		
929.11	14.3379	1312.11	0.0000		
937.49	20.1339	1332.49	14.2102		
944.13	0.0000	1362.66	0.0000		
946.00	10.8190	1365.19	5.1190		
949.00	18.0505	1368.63	0.0000		
667.71	0.0000	1384.29	9.6034		
962.31	8.7053	1408.01	11.3867		
964.08	18.8729	1457.56	0.0000		
966.17	16.3444	1460.82	4.1958		
911.20	16.3603	1489.16	5.2811		
968.97	16.3603	1505.03	5.3015		
983.53	0.0000	1584.12	7.5610		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:04:38.78

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240006.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM43.CNF;151
                                       Background date  : 2-OCT-2016 11:02:23.
Sample date      : 15-DEC-2015 11:46:00 Acquisition date : 3-OCT-2016 05:03:30.
Sample ID        : R405240006           Sample quantity  : 1.19145E+02 GRAM
Detector name    : GAM43                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.67  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	74.72	105	112	1.23	149.22	142	17	2.91E-02	19.6	3.95E+00
2	1	77.05	191	108	1.16	153.89	142	17	5.31E-02	11.7	
3	3	86.97	31	117	1.33	173.75	171	11	8.48E-03	58.0	2.64E+00
4	3	89.70	32	109	1.05	179.21	171	11	8.99E-03	53.7	
5	0	92.70*	86	119	1.27	185.21	182	8	2.39E-02	25.7	
6	0	108.86	16	65	1.36	217.54	216	5	4.43E-03	79.5	
7	0	143.19*	29	103	1.57	286.21	282	8	8.02E-03	64.6	
8	0	185.82*	73	115	1.05	371.51	366	9	2.02E-02	30.0	
9	0	209.56	53	92	2.18	418.99	413	10	1.48E-02	36.3	
10	0	238.50*	388	132	1.25	476.90	471	10	1.08E-01	7.6	
11	0	241.71	63	66	1.32	483.31	481	7	1.74E-02	25.6	
12	0	270.19	67	78	2.98	540.29	534	14	1.87E-02	30.2	
13	0	280.05	46	126	3.88	560.02	548	21	1.28E-02	62.8	
14	0	295.21*	147	76	1.10	590.33	585	11	4.07E-02	14.3	
15	0	300.16*	14	65	1.31	600.24	596	9	3.96E-03	105.9	
16	0	328.67	39	72	0.98	657.28	651	12	1.08E-02	46.4	
17	0	338.34	84	82	0.86	676.62	670	14	2.34E-02	25.1	
18	0	351.76*	230	38	1.10	703.47	698	11	6.39E-02	8.5	
19	0	386.74	57	47	7.39	773.44	763	21	1.57E-02	33.2	
20	0	463.94	15	55	0.60	927.88	920	11	4.25E-03	97.1	
21	0	510.82*	20	53	1.24	1021.66	1016	13	5.48E-03	90.4	
22	0	583.27*	153	22	1.49	1166.59	1161	14	4.24E-02	10.7	
23	0	609.21*	152	37	1.19	1218.49	1214	12	4.23E-02	11.5	
24	0	656.84	10	24	2.69	1313.77	1305	12	2.71E-03	114.0	
25	4	661.50	53	8	2.55	1323.09	1317	28	1.48E-02	17.8	1.83E+00
26	4	665.62	14	15	2.15	1331.33	1317	28	3.98E-03	61.8	
27	4	669.81*	16	15	2.77	1339.70	1317	28	4.52E-03	48.2	
28	0	723.18	7	11	0.80	1446.46	1442	6	2.05E-03	78.6	
29	0	727.33	38	16	2.04	1454.78	1450	11	1.07E-02	25.9	
30	0	754.93	12	13	2.27	1509.97	1505	10	3.33E-03	62.5	
31	0	847.50	8	7	1.49	1695.15	1689	9	2.33E-03	65.4	
32	0	864.39	18	33	10.31	1728.93	1717	25	5.00E-03	87.2	
33	0	896.18	14	13	4.23	1792.53	1784	14	3.78E-03	64.1	
34	0	910.96	115	3	2.01	1822.09	1816	14	3.19E-02	9.9	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	969.51	43	30	1.76	1939.19	1933	14	1.21E-02	31.2	
36	0	1121.40	30	32	1.39	2243.02	2235	16	8.21E-03	48.6	
37	0	1185.91	7	15	0.64	2372.03	2362	12	1.91E-03	118.9	
38	0	1254.96	7	8	0.70	2510.14	2505	8	1.94E-03	84.5	
39	0	1460.66*	376	0	2.69	2921.56	2914	17	1.04E-01	5.2	
40	0	1586.91	9	2	1.40	3174.08	3166	12	2.46E-03	50.5	
41	0	1764.83*	27	4	2.00	3529.90	3522	13	7.63E-03	24.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:04:40

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240006.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 11:46:00 Acquisition date : 3-OCT-2016 05:03:30
Sample ID   : R405240006   Sample quantity : 119.14 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA43   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.67   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.001E+00	2.099E+01	2.099E+01	10.41	OK
CD-109	88.03	3.70*	4.278E+00	1.534E-01	2.382E-01	1016.35	OK
TE-125M	109.28	0.27*	5.542E+00	7.213E+00	2.474E+02	159.07	OK
SN-126	64.28	9.60	1.983E+00	----- Line Not Found	-----		Absent
	86.94	8.90	4.278E+00	6.379E-02	6.379E-02	1016.35	OK
	87.57	37.00*	4.278E+00	1.534E-02	1.534E-02	1016.35	OK
BA-137M	661.66	89.90*	1.974E+00	1.868E-01	1.902E-01	35.58	OK
CS-137	661.66	85.10*	1.974E+00	1.973E-01	2.010E-01	35.58	OK
HG-203	70.83	3.69	2.720E+00	----- Line Not Found	-----		Absent
	72.87	6.19	2.941E+00	----- Line Not Found	-----		Absent
	279.20	81.56*	4.171E+00	8.756E-02	6.820E+00	125.52	OK
TL-208	277.37	6.60	4.205E+00	----- Line Not Found	-----		Absent
	583.19	85.00*	2.198E+00	5.103E-01	5.103E-01	21.48	OK
	860.56	12.50	1.582E+00	----- Line Not Found	-----		Absent
PB-212	74.82	10.28	3.136E+00	1.525E+00	1.525E+00	58.69	OK
	77.11	17.10	3.375E+00	2.278E+00	2.278E+00	23.42	OK
	238.63	43.60*	4.740E+00	1.225E+00	1.225E+00	15.20	OK
	300.09	3.30	3.934E+00	7.082E-01	7.082E-01	211.86	OK
BI-214	609.32	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94	OK
	1120.29	14.92	1.265E+00	9.459E-01	9.462E-01	97.15	OK
	1764.49	15.30	8.361E-01	1.267E+00	1.267E+00	48.95	OK
PB-214	74.82	5.80	3.147E+00	----- Line Not Found	-----		<<INT Reject
	77.11	9.70	3.375E+00	4.015E+00	4.017E+00	23.42	OK
	87.09	3.41	4.287E+00	----- Line Not Found	-----		<<INT Reject
	242.00	7.25	4.693E+00	1.203E+00	1.203E+00	51.17	OK
	295.22	18.42	3.991E+00	1.288E+00	1.289E+00	28.62	OK
	351.93	35.60*	3.427E+00	1.207E+00	1.207E+00	16.97	OK
RN-222	609.32	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94	OK
	1120.29	14.92	1.265E+00	9.459E-01	9.462E-01	97.15	OK
	1764.49	15.30	8.361E-01	1.267E+00	1.267E+00	48.95	OK
RA-226	609.32	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94	OK
	1120.29	14.92	1.265E+00	9.459E-01	9.462E-01	97.15	OK
	1764.49	15.30	8.361E-01	1.267E+00	1.267E+00	48.95	OK
AC-228	105.21	1.10	5.396E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.546E+00	1.355E+00	1.355E+00	50.13	OK
	794.95	4.25	1.691E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.621E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85	OK
	968.97	15.80	1.431E+00	1.170E+00	1.170E+00	62.31	OK
RA-228	105.21	1.10	5.396E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.546E+00	1.355E+00	1.355E+00	50.13	OK
	794.95	4.25	1.691E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.621E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85	OK
	968.97	15.80	1.431E+00	1.170E+00	1.170E+00	62.31	OK
TH-228	74.82	10.28	3.136E+00	1.525E+00	1.525E+00	58.69	OK
	77.11	17.10	3.375E+00	2.278E+00	2.278E+00	23.42	OK
	238.63	43.60*	4.740E+00	1.225E+00	1.225E+00	15.20	OK
	300.09	3.30	3.934E+00	7.082E-01	7.082E-01	211.86	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
TH-230	609.32	45.49*	2.118E+00	9.855E-01	9.855E-01	22.94	OK
	1120.29	14.92	1.265E+00	9.459E-01	9.459E-01	97.15	OK
	1764.49	15.30	8.361E-01	1.267E+00	1.267E+00	48.95	OK
PA-231	283.69	1.70	4.127E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	3.934E+00	4.368E-01	4.368E-01	211.86	OK
TH-232	105.21	1.10	5.396E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.546E+00	1.355E+00	1.355E+00	50.13	OK
	835.71	1.61	1.621E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85	OK
	968.97	15.80	1.431E+00	1.170E+00	1.170E+00	62.31	OK
U-234	609.32	45.49*	2.118E+00	9.855E-01	9.855E-01	22.94	OK
	1120.29	14.92	1.265E+00	9.459E-01	9.459E-01	97.15	OK
	1764.49	15.30	8.361E-01	1.267E+00	1.267E+00	48.95	OK
U-235	89.96	3.47	4.490E+00	1.420E+00	1.420E+00	107.36	OK
	93.35	5.60	4.704E+00	2.227E+00	2.227E+00	51.32	OK
	143.76	10.96*	6.024E+00	2.924E-01	2.924E-01	129.29	OK
	163.33	5.08	5.876E+00	----- Line Not Found		-----	Absent
	185.72	57.20	5.568E+00	1.507E-01	1.507E-01	59.93	OK
	205.31	5.01	5.260E+00	----- Line Not Found		-----	Absent
AM-243	43.53	5.90	1.216E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.136E+00	2.332E-01	2.332E-01	58.69	OK
CF-249	252.80	2.50	4.533E+00	----- Line Not Found		-----	Absent
	333.37	14.60	3.593E+00	----- Line Not Found		-----	Absent
	388.16	66.00*	3.152E+00	1.733E-01	1.735E-01	66.39	OK
ANH-511	511.00	100.00*	2.466E+00	5.030E-02	5.030E-02	180.88	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:04:41.90

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240006.CNF;1    *
* Acquisition date :  3-OCT-2016 05:03:30 Sensitivity     : 3.000          *
* Detector ID      : GAM43                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.67     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:46:00 Analyst initials: MXR1           *
* Sample ID        : R405240006           Sample Quantity : 1.1914E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 07:25:20 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;7          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	2.099E+01	2.141E+00	9.256E-01
CD-109	2.382E-01	2.373E+00	3.136E+00
TE-125M	2.474E+02	3.856E+02	5.623E+02
SN-126	1.534E-02	1.528E-01	2.036E-01
BA-137M	1.902E-01	6.633E-02	8.485E-02
CS-137	2.010E-01	7.008E-02	8.963E-02
HG-203	6.820E+00	8.389E+00	4.366E+00
TL-208	5.103E-01	1.074E-01	7.983E-02
PB-212	1.225E+00	1.825E-01	1.363E-01
BI-214	9.858E-01	2.216E-01	1.649E-01
PB-214	1.207E+00	2.008E-01	1.390E-01
RN-222	9.858E-01	2.216E-01	1.649E-01
RA-226	9.858E-01	2.216E-01	1.649E-01
AC-228	1.805E+00	3.510E-01	3.221E-01
RA-228	1.805E+00	3.510E-01	3.221E-01
TH-228	1.225E+00	1.825E-01	1.363E-01
TH-230	9.855E-01	2.216E-01	1.648E-01
PA-231	4.368E-01	9.070E-01	1.038E+00
TH-232	1.805E+00	3.510E-01	3.221E-01
U-234	9.855E-01	2.216E-01	1.648E-01
U-235	2.924E-01	3.704E-01	4.131E-01
AM-243	2.332E-01	1.342E-01	1.328E-01
CF-249	1.735E-01	1.129E-01	7.320E-02
ANH-511	5.030E-02	8.916E-02	6.908E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-4.468E+00	1.672E+01	2.921E+01	NOT IDENT.
NA-22	-3.015E-02	6.691E-02	1.228E-01	NOT IDENT.
NA-24	0.000E+00	1.053E+41	0.000E+00	SHORT HLIF
AL-26	-9.481E-03	4.145E-02	8.290E-02	NOT IDENT.
SC-46	-2.378E-01	6.239E-01	9.507E-01	FAIL ABUN
V-48	0.000E+00	1.404E+04	0.000E+00	SHORT HLIF

CR-51	0.000E+00	4.510E+02	0.000E+00	SHORT HLIF
MN-54	-7.652E-03	8.719E-02	1.644E-01	NOT IDENT.
CO-56	4.449E-01	5.703E-01	1.116E+00	FAIL ABUN
MN-56	0.000E+00	1.282E+41	0.000E+00	SHORT HLIF
CO-57	5.827E-02	6.285E-02	1.188E-01	NOT IDENT.
CO-58	-4.605E-01	8.217E-01	1.437E+00	NOT IDENT.
FE-59	-2.438E+00	9.859E+00	1.763E+01	NOT IDENT.
CO-60	-1.187E-02	5.938E-02	1.141E-01	NOT IDENT.
ZN-65	1.003E-01	3.093E-01	5.352E-01	NOT IDENT.
GE-68	-2.537E+00	3.340E+00	5.418E+00	NOT IDENT.
AS-73	9.811E+00	2.150E+01	4.046E+01	NOT IDENT.
AS-74	0.000E+00	5.463E+03	0.000E+00	SHORT HLIF
SE-75	5.496E-02	2.894E-01	4.925E-01	FAIL ABUN
BR-77	0.000E+00	4.130E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	8.551E+02	0.000E+00	SHORT HLIF
RB-83	4.995E-01	8.088E-01	1.686E+00	NOT IDENT.
KR-85	3.042E+00	1.106E+01	1.850E+01	NOT IDENT.
SR-85	2.961E-01	1.084E+00	1.813E+00	NOT IDENT.
RB-86	0.000E+00	3.106E+04	0.000E+00	SHORT HLIF
Y-88	-9.846E-03	2.625E-01	5.675E-01	NOT IDENT.
Y-91	4.334E+01	6.868E+02	1.366E+03	NOT IDENT.
NB-94	4.292E-03	4.405E-02	8.527E-02	NOT IDENT.
NB-95	-1.789E-01	1.180E+00	2.187E+00	NOT IDENT.
NB-95M	1.507E+00	3.295E+00	5.704E+00	NOT IDENT.
ZR-95	-3.360E-03	2.136E+00	3.599E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.092E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	4.038E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.027E-02	4.761E-02	8.098E-02	NOT IDENT.
RH-102	1.879E-02	7.580E-02	1.525E-01	NOT IDENT.
RU-103	1.246E+00	6.324E+00	1.198E+01	FAIL ABUN
RH-106	1.949E-01	6.471E-01	1.305E+00	NOT IDENT.
RU-106	1.949E-01	6.471E-01	1.305E+00	NOT IDENT.
AG-108M	-1.315E-02	3.426E-02	5.988E-02	FAIL ABUN
AG-110M	-6.358E-02	1.418E-01	2.514E-01	FAIL ABUN
SN-113	-2.813E-01	3.053E-01	4.177E-01	NOT IDENT.
CD-115	0.000E+00	4.535E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	7.781E+04	0.000E+00	SHORT HLIF
TE-123M	9.906E-02	1.372E-01	2.774E-01	NOT IDENT.
SB-124	5.102E-01	2.953E+00	6.332E+00	FAIL ABUN
SB-125	-1.975E-02	1.472E-01	2.638E-01	FAIL ABUN
I-126	0.000E+00	1.089E+06	0.000E+00	SHORT HLIF
SB-126	0.000E+00	1.167E+06	0.000E+00	SHORT HLIF
SB-127	0.000E+00	8.058E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	3.472E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.027E+26	0.000E+00	SHORT HLIF
BA-133	2.223E-02	5.545E-02	9.728E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	9.329E-02	7.103E-02	1.574E-01	NOT IDENT.
CS-135	5.901E-02	2.032E-01	3.485E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.454E+05	0.000E+00	SHORT HLIF
CE-139	1.292E-01	1.202E-01	2.474E-01	NOT IDENT.
BA-140	0.000E+00	1.194E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	4.772E+05	0.000E+00	SHORT HLIF
CE-141	8.732E+00	2.696E+01	4.792E+01	NOT IDENT.
CE-143	0.000E+00	5.252E+40	0.000E+00	SHORT HLIF
CE-144	1.199E-01	4.044E-01	7.958E-01	NOT IDENT.
PM-144	-9.072E-04	7.695E-02	1.470E-01	NOT IDENT.
PR-144	-1.191E-01	6.653E+00	1.270E+01	NOT IDENT.
PM-146	4.739E-03	6.331E-02	1.172E-01	NOT IDENT.
ND-147	0.000E+00	3.000E+07	0.000E+00	SHORT HLIF
PM-147	6.760E+02	1.089E+03	2.014E+03	NOT IDENT.
PM-149	0.000E+00	5.730E+39	0.000E+00	SHORT HLIF
EU-150	-1.769E-02	4.154E-02	5.768E-02	FAIL ABUN
EU-152	-3.114E-02	1.384E-01	2.201E-01	NOT IDENT.
GD-153	-1.919E-01	2.664E-01	4.413E-01	NOT IDENT.
EU-154	-6.399E-02	1.666E-01	3.092E-01	FAIL ABUN
EU-155	1.182E-01	1.529E-01	2.866E-01	FAIL ABUN
TB-160	1.002E+00	2.620E+00	5.255E+00	FAIL ABUN
HO-166M	1.928E-02	7.504E-02	1.498E-01	FAIL ABUN
TM-171	1.827E+01	5.645E+01	1.053E+02	NOT IDENT.
HF-172	2.751E-02	3.231E-01	5.650E-01	NOT IDENT.
LU-172	-4.440E-03	1.201E-01	2.233E-01	FAIL ABUN
LU-176	1.394E-02	3.002E-02	5.839E-02	FAIL ABUN
HF-181	2.728E+00	5.993E+00	1.137E+01	NOT IDENT.

TA-182	-2.529E-01	1.635E+00	3.059E+00	FAIL ABUN
RE-183	-3.136E-01	6.450E+00	1.168E+01	NOT IDENT.
RE-184	-1.544E+01	3.695E+01	6.581E+01	FAIL ABUN
W-188	5.349E+01	1.234E+02	2.208E+02	NOT IDENT.
IR-192	1.694E-01	5.674E-01	1.079E+00	FAIL ABUN
BI-207	3.207E-02	7.261E-02	1.462E-01	FAIL ABUN
PB-210	-2.092E+00	1.346E+01	2.449E+01	NOT IDENT.
BI-211	0.000E+00	5.532E-01	1.076E+00	FAIL ABUN
PB-211	-3.157E-01	8.385E-01	1.470E+00	NOT IDENT.
BI-212	0.000E+00	9.932E-01	1.843E+00	FAIL ABUN
RN-219	1.953E-01	4.875E-01	9.387E-01	FAIL ABUN
RA-223	5.326E-01	8.167E-01	1.471E+00	FAIL ABUN
RA-224	0.000E+00	1.066E+00	1.856E+00	FAIL ABUN
AC-227	7.970E-02	2.523E-01	4.897E-01	FAIL ABUN
TH-227	7.970E-02	2.523E-01	4.897E-01	FAIL ABUN
TH-229	2.315E-01	5.767E-01	1.116E+00	FAIL ABUN
TH-231	5.326E-01	8.167E-01	1.471E+00	FAIL ABUN
PA-233	3.266E-02	7.208E-02	1.404E-01	FAIL ABUN
PA-234	3.170E-01	4.287E-01	8.930E-01	NOT IDENT.
PA-234M	8.649E+00	6.147E+00	1.392E+01	NOT IDENT.
TH-234	2.451E-01	2.292E+00	4.206E+00	FAIL ABUN
NP-237	3.266E-02	7.208E-02	1.404E-01	FAIL ABUN
NP-238	0.000E+00	6.358E+40	0.000E+00	SHORT HLIF
U-238	2.451E-01	2.292E+00	4.206E+00	FAIL ABUN
NP-239	7.563E-03	3.224E-01	5.666E-01	NOT IDENT.
PU-239	1.877E+02	4.230E+02	7.615E+02	NOT IDENT.
AM-241	9.305E-02	2.922E-01	5.446E-01	NOT IDENT.
CM-243	-1.710E-02	1.460E-01	2.542E-01	NOT IDENT.
BK-247	-2.501E-02	1.082E-01	1.748E-01	NOT IDENT.
CM-247	-3.953E-03	4.528E-02	8.226E-02	NOT IDENT.
CF-251	-3.360E-02	1.423E-01	2.642E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:04:39.52

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	356	10.66*	1.001E+00	2.099E+01	2.099E+01	10.41
CD-109	88.03	33	3.70*	4.278E+00	1.320E+00	2.049E+00	116.07
TE-125M	109.28	17	0.27*	5.542E+00	7.213E+00	2.474E+02	159.07
SN-126	64.28	------	9.60	1.983E+00	------ Line Not Found		------
	86.94	33	8.90	4.278E+00	5.487E-01	5.487E-01	116.07
	87.57	33	37.00*	4.278E+00	1.320E-01	1.320E-01	116.07
BA-137M	661.66	53	89.90*	1.974E+00	1.868E-01	1.902E-01	35.58
CS-137	661.66	53	85.10*	1.974E+00	1.973E-01	2.010E-01	35.58
HG-203	70.83	------	3.69	2.720E+00	------ Line Not Found		------
	72.87	------	6.19	2.941E+00	------ Line Not Found		------
	279.20	47	81.56*	4.171E+00	8.756E-02	6.820E+00	125.52
TL-208	277.37	------	6.60	4.205E+00	------ Line Not Found		------
	583.19	151	85.00*	2.198E+00	5.103E-01	5.103E-01	21.48
	860.56	------	12.50	1.582E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	2.941E+00	------ Line Not Found		------
	351.06	234	12.92*	3.427E+00	3.325E+00	3.325E+00	16.97
PB-212	74.82	115	10.28	3.136E+00	2.239E+00	2.239E+00	39.17
	77.11	209	17.10	3.375E+00	2.278E+00	2.278E+00	23.42
	238.63	402	43.60*	4.740E+00	1.225E+00	1.225E+00	15.20
	300.09	15	3.30	3.934E+00	7.082E-01	7.082E-01	211.86
BI-214	609.32	151	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94
	1120.29	28	14.92	1.265E+00	9.459E-01	9.462E-01	97.15
	1764.49	26	15.30	8.361E-01	1.267E+00	1.267E+00	48.95
PB-214	74.82	115	5.80	3.136E+00	3.968E+00	3.969E+00	39.17
	77.11	209	9.70	3.375E+00	4.015E+00	4.017E+00	23.42
	87.09	33	3.41	4.278E+00	1.432E+00	1.433E+00	116.07
	242.00	65	7.25	4.693E+00	1.203E+00	1.203E+00	51.17
	295.22	150	18.42	3.991E+00	1.288E+00	1.289E+00	28.62
	351.93	234	35.60*	3.427E+00	1.207E+00	1.207E+00	16.97
RN-222	609.32	151	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94
	1120.29	28	14.92	1.265E+00	9.459E-01	9.462E-01	97.15
	1764.49	26	15.30	8.361E-01	1.267E+00	1.267E+00	48.95
RA-224	240.99	65	4.10*	4.693E+00	2.127E+00	2.127E+00	51.17
RA-226	609.32	151	45.49*	2.118E+00	9.855E-01	9.858E-01	22.94
	1120.29	28	14.92	1.265E+00	9.459E-01	9.462E-01	97.15
	1764.49	26	15.30	8.361E-01	1.267E+00	1.267E+00	48.95
AC-228	105.21	------	1.10	5.396E+00	------ Line Not Found		------
	338.32	86	11.27	3.546E+00	1.355E+00	1.355E+00	50.13
	794.95	------	4.25	1.691E+00	------ Line Not Found		------
	835.71	------	1.61	1.621E+00	------ Line Not Found		------
	911.20	111	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85
	968.97	42	15.80	1.431E+00	1.170E+00	1.170E+00	62.31
RA-228	105.21	------	1.10	5.396E+00	------ Line Not Found		------
	338.32	86	11.27	3.546E+00	1.355E+00	1.355E+00	50.13
	794.95	------	4.25	1.691E+00	------ Line Not Found		------
	835.71	------	1.61	1.621E+00	------ Line Not Found		------
	911.20	111	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	42	15.80	1.431E+00	1.170E+00	1.170E+00	62.31
TH-228	74.82	115	10.28	3.136E+00	2.239E+00	2.239E+00	39.17
	77.11	209	17.10	3.375E+00	2.278E+00	2.278E+00	23.42
	238.63	402	43.60*	4.740E+00	1.225E+00	1.225E+00	15.20
	300.09	15	3.30	3.934E+00	7.082E-01	7.082E-01	211.86
TH-230	609.32	151	45.49*	2.118E+00	9.855E-01	9.855E-01	22.94
	1120.29	28	14.92	1.265E+00	9.459E-01	9.459E-01	97.15
	1764.49	26	15.30	8.361E-01	1.267E+00	1.267E+00	48.95
PA-231	283.69	------	1.70	4.127E+00	------ Line Not Found		------
	301.36	15	5.35*	3.934E+00	4.368E-01	4.368E-01	211.86
TH-232	105.21	------	1.10	5.396E+00	------ Line Not Found		------
	338.32	86	11.27	3.546E+00	1.355E+00	1.355E+00	50.13
	835.71	------	1.61	1.621E+00	------ Line Not Found		------
	911.20	111	25.80*	1.508E+00	1.805E+00	1.805E+00	19.85
	968.97	42	15.80	1.431E+00	1.170E+00	1.170E+00	62.31
U-234	609.32	151	45.49*	2.118E+00	9.855E-01	9.855E-01	22.94
	1120.29	28	14.92	1.265E+00	9.459E-01	9.459E-01	97.15
	1764.49	26	15.30	8.361E-01	1.267E+00	1.267E+00	48.95
U-235	89.96	35	3.47	4.490E+00	1.420E+00	1.420E+00	107.36
	93.35	93	5.60	4.704E+00	2.227E+00	2.227E+00	51.32
	143.76	31	10.96*	6.024E+00	2.924E-01	2.924E-01	129.29
	163.33	------	5.08	5.876E+00	------ Line Not Found		------
	185.72	76	57.20	5.568E+00	1.507E-01	1.507E-01	59.93
	205.31	------	5.01	5.260E+00	------ Line Not Found		------
AM-243	43.53	------	5.90	1.216E-01	------ Line Not Found		------
	74.66	115	67.20*	3.136E+00	3.425E-01	3.425E-01	39.17
CF-249	252.80	------	2.50	4.533E+00	------ Line Not Found		------
	333.37	------	14.60	3.593E+00	------ Line Not Found		------
	388.16	57	66.00*	3.152E+00	1.733E-01	1.735E-01	66.39
ANH-511	511.00	20	100.00*	2.466E+00	5.030E-02	5.030E-02	180.88

Flag: "*" = Keyline

Sample ID : R405240006 Acquisition date : 3-OCT-2016 05:03:30

Total number of lines in spectrum 41
Number of unidentified lines 5
Number of lines tentatively identified by NID 36 87.80%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	2.099E+01	2.099E+01	0.218E+01	10.41	
CD-109	461.40D	1.55	1.320E+00	2.049E+00	2.378E+00	116.07	
TE-125M	57.40D	34.3	7.213E+00	2.474E+02	3.935E+02	159.07	
SN-126	2.30E+05Y	1.00	1.320E-01	1.320E-01	1.532E-01	116.07	
BA-137M	30.08Y	1.02	1.868E-01	1.902E-01	0.677E-01	35.58	
CS-137	30.08Y	1.02	1.973E-01	2.010E-01	0.715E-01	35.58	
HG-203	46.59D	77.9	8.756E-02	6.820E+00	8.561E+00	125.52	
TL-208	1.41E+10Y	1.00	5.103E-01	5.103E-01	1.096E-01	21.48	
BI-211	7.04E+08Y	1.00	3.325E+00	3.325E+00	0.564E+00	16.97	
PB-212	1.41E+10Y	1.00	1.225E+00	1.225E+00	0.186E+00	15.20	
BI-214	1600.00Y	1.00	9.855E-01	9.858E-01	2.262E-01	22.94	
PB-214	1600.00Y	1.00	1.207E+00	1.207E+00	0.205E+00	16.97	
RN-222	1600.00Y	1.00	9.855E-01	9.858E-01	2.262E-01	22.94	
RA-224	1.41E+10Y	1.00	2.127E+00	2.127E+00	1.088E+00	51.17	
RA-226	1600.00Y	1.00	9.855E-01	9.858E-01	2.262E-01	22.94	
AC-228	1.41E+10Y	1.00	1.805E+00	1.805E+00	0.358E+00	19.85	
RA-228	1.41E+10Y	1.00	1.805E+00	1.805E+00	0.358E+00	19.85	
TH-228	1.41E+10Y	1.00	1.225E+00	1.225E+00	0.186E+00	15.20	
TH-230	7.54E+04Y	1.00	9.855E-01	9.855E-01	2.261E-01	22.94	
PA-231	7.04E+08Y	1.00	4.368E-01	4.368E-01	9.255E-01	211.86	
TH-232	1.41E+10Y	1.00	1.805E+00	1.805E+00	0.358E+00	19.85	
U-234	2.45E+05Y	1.00	9.855E-01	9.855E-01	2.261E-01	22.94	
U-235	7.04E+08Y	1.00	2.924E-01	2.924E-01	3.780E-01	129.29	
AM-243	7370.00Y	1.00	3.425E-01	3.425E-01	1.341E-01	39.17	
CF-249	351.00Y	1.00	1.733E-01	1.735E-01	1.152E-01	66.39	
ANH-511	1.00E+09Y	1.00	5.030E-02	5.030E-02	9.098E-02	180.88	
	Total Activity :		5.138E+01	2.990E+02			

Grand Total Activity : 5.138E+01 2.990E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240006 Acquisition date : 3-OCT-2016 05:03:30

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	209.56	56	95	2.18	418.99	413	10	1.48E-02	72.6	5.19E+00	T
0	270.19	69	80	2.98	540.29	534	14	1.87E-02	60.4	4.30E+00	T
0	328.67	40	73	0.98	657.28	651	12	1.08E-02	92.7	3.64E+00	T
0	463.94	15	55	0.60	927.88	920	11	4.25E-03	****	2.68E+00	T
0	656.84	10	24	2.69	1313.77	1305	12	2.71E-03	****	1.99E+00	T
4	665.62	14	15	2.15	1331.33	1317	28	3.98E-03	****	1.96E+00	T
4	669.81	16	15	2.77	1339.70	1317	28	4.52E-03	96.5	1.95E+00	
0	723.18	7	10	0.80	1446.46	1442	6	2.05E-03	****	1.83E+00	T
0	727.33	38	15	2.04	1454.78	1450	11	1.07E-02	51.9	1.82E+00	T
0	754.93	12	13	2.27	1509.97	1505	10	3.33E-03	****	1.77E+00	T
0	847.50	8	6	1.49	1695.15	1689	9	2.33E-03	****	1.60E+00	T
0	864.39	17	32	10.31	1728.93	1717	25	5.00E-03	****	1.58E+00	
0	896.18	13	13	4.23	1792.53	1784	14	3.78E-03	****	1.53E+00	T
0	1185.91	7	14	0.64	2372.03	2362	12	1.91E-03	****	1.21E+00	
0	1254.96	7	8	0.70	2510.14	2505	8	1.94E-03	****	1.15E+00	
0	1586.91	8	2	1.40	3174.08	3166	12	2.46E-03	****	9.27E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:04:56.52

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240006.CNF;1    *
* Acquisition date :  3-OCT-2016 05:03:30 Sensitivity     : 3.000          *
* Detector ID      : GAM43                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.67     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:46:00 Nuclide Library : SOLID          *
* Sample ID        : R405240006           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.1914E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 07:25:20 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;7           *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.832E-01
CD-109	1.484E+00
TE-125M	2.613E+02
SN-126	9.637E-02
BA-137M	3.751E-02
CS-137	3.963E-02
HG-203	1.986E+00
TL-208	3.533E-02
PB-212	6.396E-02
BI-214	7.354E-02
PB-214	6.243E-02
RN-222	7.354E-02
RA-226	7.354E-02
AC-228	1.391E-01
RA-228	1.391E-01
TH-228	6.396E-02
TH-230	7.352E-02
PA-231	4.778E-01
TH-232	1.391E-01
U-234	7.352E-02
U-235	1.934E-01
AM-243	6.224E-02
CF-249	3.244E-02
ANH-511	3.106E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.318E+01	NOT IDENT.
NA-22	5.208E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.103E-02	NOT IDENT.
SC-46	4.129E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF

MN-54	7.212E-02	NOT IDENT.
CO-56	4.841E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	5.578E-02	NOT IDENT.
CO-58	6.279E-01	NOT IDENT.
FE-59	7.695E+00	NOT IDENT.
CO-60	4.839E-02	NOT IDENT.
ZN-65	2.373E-01	NOT IDENT.
GE-68	2.282E+00	NOT IDENT.
AS-73	1.892E+01	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	2.280E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	7.603E-01	NOT IDENT.
KR-85	8.399E+00	NOT IDENT.
SR-85	8.231E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	2.124E-01	NOT IDENT.
Y-91	5.948E+02	NOT IDENT.
NB-94	3.807E-02	NOT IDENT.
NB-95	9.769E-01	NOT IDENT.
NB-95M	2.679E+00	NOT IDENT.
ZR-95	1.588E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.796E-02	NOT IDENT.
RH-102	6.760E-02	NOT IDENT.
RU-103	5.333E+00	FAIL ABUN
RH-106	5.813E-01	NOT IDENT.
RU-106	5.813E-01	NOT IDENT.
AG-108M	2.660E-02	FAIL ABUN
AG-110M	1.086E-01	FAIL ABUN
SN-113	1.840E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.291E-01	NOT IDENT.
SB-124	2.571E+00	FAIL ABUN
SB-125	1.197E-01	FAIL ABUN
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.433E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	7.099E-02	NOT IDENT.
CS-135	1.618E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	1.156E-01	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	2.243E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.714E-01	NOT IDENT.
PM-144	6.554E-02	NOT IDENT.
PR-144	5.662E+00	NOT IDENT.
PM-146	5.326E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	9.428E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.630E-02	FAIL ABUN
EU-152	1.004E-01	NOT IDENT.
GD-153	2.067E-01	NOT IDENT.
EU-154	1.317E-01	FAIL ABUN
EU-155	1.347E-01	FAIL ABUN
TB-160	2.325E+00	FAIL ABUN
HO-166M	6.640E-02	FAIL ABUN
TM-171	4.915E+01	NOT IDENT.
HF-172	2.651E-01	NOT IDENT.
LU-172	9.757E-02	FAIL ABUN
LU-176	2.681E-02	FAIL ABUN
HF-181	5.194E+00	NOT IDENT.
TA-182	1.372E+00	FAIL ABUN

RE-183	5.476E+00	NOT IDENT.
RE-184	2.836E+01	FAIL ABUN
W-188	1.007E+02	NOT IDENT.
IR-192	4.964E-01	FAIL ABUN
BI-207	6.433E-02	FAIL ABUN
PB-210	1.145E+01	NOT IDENT.
BI-211	5.188E-01	FAIL ABUN
PB-211	6.597E-01	NOT IDENT.
BI-212	8.515E-01	FAIL ABUN
RN-219	4.266E-01	FAIL ABUN
RA-223	6.769E-01	FAIL ABUN
RA-224	8.836E-01	FAIL ABUN
AC-227	2.246E-01	FAIL ABUN
TH-227	2.246E-01	FAIL ABUN
TH-229	5.221E-01	FAIL ABUN
TH-231	6.769E-01	FAIL ABUN
PA-233	6.431E-02	FAIL ABUN
PA-234	3.979E-01	NOT IDENT.
PA-234M	6.232E+00	NOT IDENT.
TH-234	1.977E+00	FAIL ABUN
NP-237	6.431E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.977E+00	FAIL ABUN
NP-239	2.644E-01	NOT IDENT.
PU-239	3.578E+02	NOT IDENT.
AM-241	2.554E-01	NOT IDENT.
CM-243	1.191E-01	NOT IDENT.
BK-247	8.083E-02	NOT IDENT.
CM-247	3.721E-02	NOT IDENT.
CF-251	1.233E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:05:03.55

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240006.CNF;1  *
* Acquisition date :  3-OCT-2016 05:03:30 Sensitivity     : 3.000           *
* Detector ID      : GAM43                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.67     Half life ratio : *****           *
* Sample date      : 15-DEC-2015 11:46:00 Nuclide Library : SOLID           *
* Sample ID        : R405240006           Analyst initials: MXR1            *
* Batch Number     : 1596386              Sample Quantity : 1.1914E+02 GRAM *
*                                         Quantity Err(%) : 1.6786E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  6-SEP-2016 07:25:20 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM43_CAN.CNF;7             *
*****************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	2.099E+01	2.406E+00	2.406E+00
CD-109	2.386E-01	2.383E+00	2.383E+00
TE-125M	2.474E+02	3.859E+02	3.859E+02
SN-126	1.537E-02	1.535E-01	1.535E-01
BA-137M	1.902E-01	6.684E-02	6.684E-02
CS-137	2.010E-01	7.061E-02	7.061E-02
HG-203	6.820E+00	8.395E+00	8.395E+00
TL-208	5.103E-01	1.096E-01	1.096E-01
PB-212	1.225E+00	1.939E-01	1.939E-01
BI-214	9.858E-01	2.257E-01	2.257E-01
PB-214	1.207E+00	2.072E-01	2.072E-01
RN-222	9.858E-01	2.257E-01	2.257E-01
RA-226	9.858E-01	2.257E-01	2.257E-01
AC-228	1.805E+00	3.630E-01	3.630E-01
RA-228	1.805E+00	3.630E-01	3.630E-01
TH-228	1.225E+00	1.939E-01	1.939E-01
TH-230	9.855E-01	2.256E-01	2.256E-01
PA-231	4.368E-01	9.117E-01	9.117E-01
TH-232	1.805E+00	3.630E-01	3.630E-01
U-234	9.855E-01	2.256E-01	2.256E-01
U-235	2.924E-01	3.707E-01	3.707E-01
AM-243	2.333E-01	1.356E-01	1.356E-01
CF-249	1.735E-01	1.138E-01	1.138E-01
ANH-511	5.030E-02	8.919E-02	8.919E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-4.468E+00	1.672E+01	1.684E+01	NOT IDENT.
NA-22	-3.015E-02	6.692E-02	6.829E-02	NOT IDENT.
NA-24	-1.000E+41	1.136E+41	0.000E+00	SHORT HLIF
AL-26	-9.481E-03	4.145E-02	4.167E-02	NOT IDENT.
SC-46	-2.378E-01	6.240E-01	6.331E-01	FAIL ABUN
V-48	-4.104E+03	1.404E+04	1.416E+04	SHORT HLIF

CR-51	-5.236E+01	4.510E+02	4.516E+02	SHORT HLIF
MN-54	-7.652E-03	8.719E-02	8.726E-02	NOT IDENT.
CO-56	4.449E-01	5.706E-01	6.049E-01	FAIL ABUN
MN-56	1.000E+41	1.283E+41	0.000E+00	SHORT HLIF
CO-57	5.827E-02	6.291E-02	6.818E-02	NOT IDENT.
CO-58	-4.605E-01	8.219E-01	8.477E-01	NOT IDENT.
FE-59	-2.438E+00	9.860E+00	9.921E+00	NOT IDENT.
CO-60	-1.187E-02	5.938E-02	5.962E-02	NOT IDENT.
ZN-65	1.003E-01	3.094E-01	3.126E-01	NOT IDENT.
GE-68	-2.537E+00	3.341E+00	3.531E+00	NOT IDENT.
AS-73	9.811E+00	2.160E+01	2.205E+01	NOT IDENT.
AS-74	1.503E+03	5.465E+03	5.506E+03	SHORT HLIF
SE-75	5.496E-02	2.894E-01	2.905E-01	FAIL ABUN
BR-77	2.772E+37	2.343E+38	0.000E+00	SHORT HLIF
SR-82	-1.575E+02	8.551E+02	8.580E+02	SHORT HLIF
RB-83	4.995E-01	8.117E-01	8.423E-01	NOT IDENT.
KR-85	3.042E+00	1.106E+01	1.115E+01	NOT IDENT.
SR-85	2.961E-01	1.084E+00	1.093E+00	NOT IDENT.
RB-86	-2.590E+04	3.108E+04	3.320E+04	SHORT HLIF
Y-88	-9.846E-03	2.625E-01	2.625E-01	NOT IDENT.
Y-91	4.334E+01	6.868E+02	6.871E+02	NOT IDENT.
NB-94	4.292E-03	4.405E-02	4.409E-02	NOT IDENT.
NB-95	-1.789E-01	1.180E+00	1.182E+00	NOT IDENT.
NB-95M	1.507E+00	3.297E+00	3.366E+00	NOT IDENT.
ZR-95	-3.360E-03	2.136E+00	2.136E+00	FAIL ABUN
NB-97	1.000E+41	2.236E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.093E+41	0.000E+00	SHORT HLIF
MO-99	-1.520E+31	4.039E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	8.346E+41	0.000E+00	SHORT HLIF
RH-101	-1.027E-02	4.765E-02	4.787E-02	NOT IDENT.
RH-102	1.879E-02	7.582E-02	7.629E-02	NOT IDENT.
RU-103	1.246E+00	6.325E+00	6.350E+00	FAIL ABUN
RH-106	1.949E-01	6.472E-01	6.531E-01	NOT IDENT.
RU-106	1.949E-01	6.472E-01	6.531E-01	NOT IDENT.
AG-108M	-1.315E-02	3.427E-02	3.477E-02	FAIL ABUN
AG-110M	-6.358E-02	1.418E-01	1.447E-01	FAIL ABUN
SN-113	-2.813E-01	3.055E-01	3.308E-01	NOT IDENT.
CD-115	4.374E+38	4.601E+38	0.000E+00	SHORT HLIF
SN-117M	2.925E+04	7.789E+04	7.899E+04	SHORT HLIF
TE-123M	9.906E-02	1.372E-01	1.443E-01	NOT IDENT.
SB-124	5.102E-01	2.953E+00	2.962E+00	FAIL ABUN
SB-125	-1.975E-02	1.472E-01	1.475E-01	FAIL ABUN
I-126	8.993E+05	1.095E+06	1.168E+06	SHORT HLIF
SB-126	-6.237E+04	1.167E+06	1.167E+06	SHORT HLIF
SB-127	6.322E+21	1.170E+22	0.000E+00	SHORT HLIF
I-131	-1.490E+09	3.473E+09	3.537E+09	SHORT HLIF
I-132	1.000E+41	1.868E+42	0.000E+00	SHORT HLIF
TE-132	3.615E+25	1.037E+26	0.000E+00	SHORT HLIF
BA-133	2.223E-02	5.546E-02	5.636E-02	NOT IDENT.
I-133	-1.000E+41	2.713E+42	0.000E+00	SHORT HLIF
CS-134	9.329E-02	7.114E-02	8.264E-02	NOT IDENT.
CS-135	5.901E-02	2.032E-01	2.050E-01	NOT IDENT.
I-135	1.000E+41	6.934E+41	0.000E+00	SHORT HLIF
CS-136	-2.718E+05	3.467E+05	3.677E+05	SHORT HLIF
CE-139	1.292E-01	1.230E-01	1.361E-01	NOT IDENT.
BA-140	1.277E+05	1.194E+06	1.196E+06	SHORT HLIF
LA-140	-4.104E+05	4.776E+05	5.121E+05	SHORT HLIF
CE-141	8.732E+00	2.696E+01	2.725E+01	NOT IDENT.
CE-143	1.000E+41	5.347E+40	0.000E+00	SHORT HLIF
CE-144	1.199E-01	4.044E-01	4.080E-01	NOT IDENT.
PM-144	-9.072E-04	7.695E-02	7.695E-02	NOT IDENT.
PR-144	-1.191E-01	6.653E+00	6.653E+00	NOT IDENT.
PM-146	4.739E-03	6.331E-02	6.335E-02	NOT IDENT.
ND-147	-4.496E+06	3.000E+07	3.007E+07	SHORT HLIF
PM-147	6.760E+02	1.090E+03	1.131E+03	NOT IDENT.
PM-149	5.316E+39	5.845E+39	0.000E+00	SHORT HLIF
EU-150	-1.769E-02	4.155E-02	4.231E-02	FAIL ABUN
EU-152	-3.114E-02	1.384E-01	1.392E-01	NOT IDENT.
GD-153	-1.919E-01	2.667E-01	2.804E-01	NOT IDENT.
EU-154	-6.399E-02	1.666E-01	1.691E-01	FAIL ABUN
EU-155	1.182E-01	1.531E-01	1.621E-01	FAIL ABUN
TB-160	1.002E+00	2.620E+00	2.659E+00	FAIL ABUN
HO-166M	1.928E-02	7.505E-02	7.555E-02	FAIL ABUN
TM-171	1.827E+01	5.648E+01	5.708E+01	NOT IDENT.
HF-172	2.751E-02	3.232E-01	3.234E-01	NOT IDENT.
LU-172	-4.440E-03	1.201E-01	1.201E-01	FAIL ABUN
LU-176	1.394E-02	3.003E-02	3.068E-02	FAIL ABUN
HF-181	2.728E+00	5.994E+00	6.119E+00	NOT IDENT.

TA-182	-2.529E-01	1.635E+00	1.639E+00	FAIL ABUN
RE-183	-3.136E-01	6.450E+00	6.452E+00	NOT IDENT.
RE-184	-1.544E+01	3.713E+01	3.777E+01	FAIL ABUN
W-188	5.349E+01	1.235E+02	1.258E+02	NOT IDENT.
IR-192	1.694E-01	5.675E-01	5.726E-01	FAIL ABUN
BI-207	3.207E-02	7.262E-02	7.404E-02	FAIL ABUN
PB-210	-2.092E+00	1.346E+01	1.349E+01	NOT IDENT.
BI-211	3.325E+00	5.731E-01	1.605E+00	FAIL ABUN
PB-211	-3.157E-01	8.386E-01	8.506E-01	NOT IDENT.
BI-212	1.953E+00	9.981E-01	1.331E+00	FAIL ABUN
RN-219	1.953E-01	4.881E-01	4.960E-01	FAIL ABUN
RA-223	5.326E-01	8.174E-01	8.519E-01	FAIL ABUN
RA-224	2.127E+00	1.073E+00	1.439E+00	FAIL ABUN
AC-227	7.970E-02	2.525E-01	2.550E-01	FAIL ABUN
TH-227	7.970E-02	2.525E-01	2.550E-01	FAIL ABUN
TH-229	2.315E-01	5.769E-01	5.862E-01	FAIL ABUN
TH-231	5.326E-01	8.174E-01	8.519E-01	FAIL ABUN
PA-233	3.266E-02	7.209E-02	7.358E-02	FAIL ABUN
PA-234	3.170E-01	5.616E-01	5.795E-01	NOT IDENT.
PA-234M	8.649E+00	6.159E+00	7.289E+00	NOT IDENT.
TH-234	2.451E-01	2.293E+00	2.295E+00	FAIL ABUN
NP-237	3.266E-02	7.209E-02	7.358E-02	FAIL ABUN
NP-238	1.584E+40	6.359E+40	0.000E+00	SHORT HLIF
U-238	2.451E-01	2.293E+00	2.295E+00	FAIL ABUN
NP-239	7.563E-03	3.224E-01	3.224E-01	NOT IDENT.
PU-239	1.877E+02	4.230E+02	4.314E+02	NOT IDENT.
AM-241	9.305E-02	2.922E-01	2.952E-01	NOT IDENT.
CM-243	-1.710E-02	1.460E-01	1.462E-01	NOT IDENT.
BK-247	-2.501E-02	1.084E-01	1.089E-01	NOT IDENT.
CM-247	-3.953E-03	4.528E-02	4.532E-02	NOT IDENT.
CF-251	-3.360E-02	1.423E-01	1.431E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	69.8871	87.09	104.3097	136.47	72.8443
45.60	51.7355	87.57	104.4141	140.51	0.0000
46.54	72.6473	88.03	104.5144	143.76	72.3763
49.72	0.0000	88.34	104.5815	144.24	72.4276
51.35	56.8755	88.47	104.6092	145.44	63.6444
51.87	55.9083	89.96	81.0123	152.43	76.2879
52.39	55.9941	1093.63	81.1250	153.25	0.0000
52.97	52.9142	91.11	0.0000	323.87	60.1520
53.44	56.1657	92.59	79.1179	156.02	0.0000
54.07	70.0695	93.35	79.2382	158.56	0.0000
57.36	0.0000	94.56	71.6415	159.00	46.7122
57.53	70.7559	94.65	71.6541	162.33	57.3525
57.98	77.2836	94.67	71.6569	162.66	0.0000
59.27	60.3212	94.87	68.5687	163.33	58.2999
59.32	62.4839	97.43	89.2730	165.86	46.2742
59.54	68.9888	98.43	70.6146	176.31	66.3788
60.96	84.4002	98.44	70.6160	176.60	0.0000
61.17	84.4472	99.53	70.7634	177.52	70.9131
62.93	71.7864	100.11	68.4803	181.07	0.0000
63.29	71.8534	102.03	73.4689	181.52	65.4796
63.58	70.8179	103.18	77.1890	184.41	70.6318
64.28	69.8541	103.37	77.2168	143.76	70.7459
66.73	87.8613	105.21	63.1757	193.51	61.4707
67.24	86.8734	105.31	63.1870	197.03	73.5274
125.81	79.2625	106.12	76.4146	198.01	73.6122
67.75	79.2757	106.47	74.8704	201.83	77.5907
69.67	64.9007	109.28	57.6390	203.43	73.1608
70.83	82.8322	111.00	64.2395	205.31	75.6099
72.81	74.6783	111.76	0.0000	210.85	58.0999
72.87	74.6890	114.06	70.2357	215.65	50.0658
74.66	75.0024	116.30	0.0000	222.11	62.5562
74.82	75.0300	116.74	64.4777	227.09	55.3803
74.97	75.0560	119.76	61.1397	227.38	51.6414
77.11	75.4251	121.12	57.6018	228.16	0.0000
78.74	94.9108	121.22	57.6115	228.18	51.6850
79.69	75.4857	121.78	56.4380	116.74	51.6850
80.12	66.4910	122.06	56.4643	235.69	68.1914
80.19	0.0000	122.92	82.3586	235.96	66.7894
80.57	90.7593	123.07	82.3785	238.63	78.3718
81.00	87.8172	265.00	72.6152	238.98	0.0000
81.07	87.8307	125.81	75.3378	240.99	77.1314
81.75	86.4451	127.23	80.4615	242.00	51.4737
83.79	80.7341	127.91	74.3539	244.70	51.6132
84.00	96.0105	129.30	69.5505	252.40	0.0000
85.43	97.8320	131.20	67.2685	252.80	50.1015
86.55	104.1921	133.02	57.4663	254.15	0.0000
86.79	104.2440	133.52	59.1782	256.23	35.7679
86.94	104.2772	136.00	73.6287	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	48.2381	355.39	0.0000	584.27	19.9811
264.80	55.5551	356.01	28.4123	595.83	0.0000
265.00	55.5655	364.49	0.0000	427.87	21.9785
268.22	49.8669	366.42	0.0000	602.52	0.0000
269.46	46.9873	372.51	35.1531	604.72	29.3652
270.03	47.0127	375.05	39.4864	607.14	24.9903
271.23	47.0654	377.52	37.4189	609.32	22.9935
273.65	0.0000	356.01	20.4051	610.33	23.0049
276.40	33.9890	388.16	20.4678	614.28	16.2271
277.37	34.0192	388.63	0.0000	618.01	27.7103
277.60	34.0262	391.69	34.0173	620.36	18.4949
278.00	34.0388	264.66	23.9067	621.93	18.5089
279.20	34.0760	401.81	27.1881	630.19	0.0000
279.54	34.0866	402.40	31.5506	631.29	17.6635
279.70	34.0915	404.85	31.6037	633.25	13.9577
280.46	34.1147	410.95	33.9233	634.78	0.0000
283.69	32.7267	413.71	27.4083	635.95	27.0202
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	32.7771	423.72	0.0000	645.85	13.1053
285.90	0.0000	427.09	36.5013	657.76	3.7654
287.50	35.8228	427.87	34.3067	657.90	0.0000
290.67	28.4397	433.94	26.6650	661.66	19.6155
293.27	0.0000	439.40	28.9887	664.57	0.0000
351.93	37.5694	453.88	29.2553	666.33	0.0000
295.96	37.5938	463.37	29.4277	666.50	0.0000
879.38	33.1571	468.07	32.6906	667.71	0.0000
299.98	37.7243	473.00	0.0000	677.62	12.3498
300.09	37.7281	475.06	23.9377	685.70	0.0000
300.13	37.7289	476.78	30.8090	695.00	0.0000
301.36	45.3223	477.60	33.1076	696.49	22.9929
302.85	57.4813	482.18	29.7642	696.51	22.9929
256.23	42.4144	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	19.1675
306.78	34.4019	497.08	19.6324	697.49	19.1693
308.46	45.5960	505.52	24.3701	702.65	22.0952
311.90	32.5176	507.63	0.0000	706.68	23.0969
316.51	38.7623	511.00	26.7746	711.68	17.3606
319.41	0.0000	514.00	27.9863	720.70	0.0000
320.08	0.0000	514.00	27.9863	721.93	0.0000
321.04	50.1694	520.40	20.1882	722.78	12.4047
323.87	32.3261	520.69	0.0000	722.91	12.4055
325.23	38.5254	522.65	0.0000	723.31	23.2639
328.76	0.0000	527.90	0.0000	724.19	23.2727
333.37	49.6348	528.26	15.8687	727.33	16.8308
333.97	45.5200	529.59	25.5847	733.00	20.2458
334.37	45.0169	529.87	0.0000	735.93	6.8221
338.28	36.3323	531.02	0.0000	333.97	16.5787
338.32	36.3337	537.26	0.0000	739.50	0.0000
311.90	31.1957	546.56	0.0000	747.24	23.5020
340.48	31.1957	552.55	24.1194	748.06	16.6529
340.55	0.0000	563.25	23.3586	752.31	20.4115
344.28	40.6742	569.33	18.9265	753.82	0.0000
345.93	35.0868	946.00	19.8294	756.73	18.8760
351.06	26.2090	569.70	18.0286	756.80	18.8766
351.93	26.2263	583.19	19.9704	884.68	29.5816

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	25.6572	1274.44	18.2602	1620.50	3.0460
766.42	24.6765	1001.03	8.6064	1621.92	5.0781
766.84	20.7321	1002.74	16.1462	1678.03	0.0000
772.60	0.0000	1004.73	23.6966	1690.97	5.1543
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	5.2339
778.90	15.8735	1028.54	0.0000	1063.66	16.7680
783.70	0.0000	1037.84	16.3312	1771.35	5.2412
785.37	17.9044	1038.76	0.0000	1791.20	0.0000
792.07	30.9186	631.29	15.2852	1808.65	4.2246
794.95	16.9751	1048.07	0.0000	1810.72	0.0000
795.86	11.9865	1049.04	19.6677	1836.06	3.1857
810.06	22.0994	1050.41	17.4902		
810.29	22.1014	1063.66	13.1719		
344.28	22.1027	1077.00	0.0000		
810.76	23.1102	1077.34	17.6377		
815.77	0.0000	1085.87	12.1581		
1048.07	0.0000	1093.63	16.6187		
832.01	21.2749	1099.45	18.8687		
834.85	18.2554	1112.07	15.5979		
835.71	21.3051	1112.84	16.7166		
836.80	0.0000	1115.54	16.0603		
846.75	0.0000	1120.29	12.2864		
846.77	9.7808	1120.55	12.2870		
856.80	0.0000	1221.41	12.2897		
860.56	11.2652	1129.67	7.8404		
871.09	16.4502	1131.51	0.0000		
873.19	14.8166	1147.95	0.0000		
875.33	0.0000	1173.23	20.8741		
879.38	15.4692	1177.95	18.1758		
880.51	12.3805	1189.05	18.2344		
883.24	19.6222	1204.77	14.6523		
884.68	18.5988	1221.41	27.6021		
889.28	19.8721	1231.02	17.5277		
894.76	13.4820	1235.36	0.0000		
898.04	14.9515	1238.28	12.0167		
900.72	13.3031	1260.41	0.0000		
903.28	17.6843	1271.87	9.3291		
911.20	13.5618	1274.44	14.9367		
912.08	13.5657	1274.54	14.9367		
923.98	0.0000	1291.59	8.4406		
926.50	15.7329	1298.22	0.0000		
929.11	18.8970	1312.11	0.0000		
937.49	20.0054	1332.49	12.3233		
944.13	0.0000	1362.66	0.0000		
946.00	13.7284	1365.19	5.7357		
949.00	23.2562	1368.63	0.0000		
667.71	0.0000	1384.29	4.8030		
962.31	23.0595	1408.01	6.7642		
964.08	13.6012	1457.56	0.0000		
966.17	37.4290	1460.82	7.8305		
911.20	21.2872	1489.16	4.9272		
968.97	21.2872	1505.03	11.8693		
983.53	0.0000	1584.12	3.3573		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:38:59.63

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240007.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM01.CNF;402
                                     Background date  : 2-OCT-2016 10:59:55.
Sample date      : 15-DEC-2015 12:17:00 Acquisition date : 3-OCT-2016 05:38:25.
Sample ID        : R405240007           Sample quantity  : 1.31484E+02 GRAM
Detector name    : GAM01                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.32  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	4	35.04*	24	6	1.33	70.78	68	30	6.56E-03	44.7	4.91E+00
2	4	36.58*	14	15	1.52	73.85	68	30	3.94E-03	104.8	
3	4	38.43*	42	19	1.22	77.55	68	30	1.16E-02	31.7	
4	4	41.04*	15	33	1.27	82.77	68	30	4.29E-03	88.8	
5	4	43.32*	34	50	1.69	87.34	68	30	9.31E-03	47.0	
6	4	45.45*	13	55	1.43	91.60	68	30	3.60E-03	117.0	
7	4	47.11*	29	42	1.70	94.92	68	30	7.97E-03	40.1	
8	0	63.38*	17	101	1.29	127.46	124	8	4.67E-03	112.9	
9	4	72.89	34	95	1.75	146.47	143	16	9.37E-03	51.4	2.61E+00
10	4	74.99	101	115	1.44	150.67	143	16	2.79E-02	23.0	
11	4	77.18*	144	81	1.18	155.05	143	16	4.01E-02	13.9	
12	0	86.89	33	109	1.09	174.47	173	6	9.29E-03	52.5	
13	0	98.58*	40	80	1.10	197.84	194	8	1.10E-02	43.0	
14	0	105.67	28	88	1.24	212.04	210	9	7.67E-03	63.6	
15	0	186.24*	40	81	1.12	373.16	369	8	1.12E-02	46.0	
16	0	218.66	22	59	1.70	437.98	435	8	6.12E-03	63.7	
17	5	238.64*	255	55	1.17	477.95	474	18	7.10E-02	8.0	3.24E+00
18	5	241.69*	74	89	2.17	484.04	474	18	2.07E-02	35.3	
19	0	270.95	72	82	1.69	542.55	536	16	2.00E-02	30.7	
20	0	295.40*	87	81	1.31	591.45	587	10	2.43E-02	22.3	
21	0	301.14	17	52	0.86	602.93	598	8	4.79E-03	77.1	
22	0	338.21*	78	45	1.34	677.04	671	13	2.16E-02	21.6	
23	0	351.97*	161	59	1.15	704.57	699	12	4.47E-02	12.5	
24	0	463.06	22	21	1.50	926.71	922	8	5.97E-03	43.1	
25	0	485.77	20	83	10.03	972.13	946	28	5.51E-03	132.5	
26	0	511.07*	29	29	1.99	1022.72	1015	15	7.99E-03	55.2	
27	1	528.70	21	23	1.66	1057.97	1053	24	5.95E-03	41.5	1.43E+00
28	1	536.07	14	13	1.66	1072.70	1053	24	3.87E-03	56.0	
29	0	566.79	42	41	2.20	1134.13	1125	15	1.16E-02	37.0	
30	0	583.10*	100	24	1.26	1166.75	1161	13	2.78E-02	14.4	
31	0	609.77*	122	37	1.63	1220.08	1214	15	3.40E-02	15.0	
32	0	661.71	70	11	1.57	1323.92	1318	11	1.95E-02	15.1	
33	0	768.97	14	13	1.03	1538.38	1534	8	3.89E-03	53.0	
34	0	796.68	11	12	0.91	1593.79	1589	7	3.01E-03	61.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	861.24	17	7	1.07	1722.86	1717	10	4.62E-03	39.3	
36	0	865.88	10	3	1.26	1732.15	1729	6	2.76E-03	42.2	
37	0	911.58*	65	11	1.36	1823.51	1818	12	1.80E-02	16.9	
38	0	964.29	27	8	2.17	1928.91	1924	10	7.60E-03	26.8	
39	0	969.54	35	11	2.12	1939.41	1935	9	9.59E-03	24.5	
40	0	1001.38*	13	6	3.30	2003.05	1998	11	3.63E-03	49.3	
41	0	1068.73	12	3	1.32	2137.71	2132	11	3.45E-03	38.2	
42	0	1097.70	7	13	1.47	2195.63	2189	10	1.97E-03	106.8	
43	0	1121.33*	17	34	1.98	2242.88	2235	16	4.80E-03	77.9	
44	0	1148.58	11	6	1.23	2297.36	2292	9	2.98E-03	52.8	
45	0	1173.13	10	7	3.37	2346.43	2340	10	2.67E-03	62.2	
46	0	1286.81	7	2	1.34	2573.70	2569	8	1.96E-03	51.1	
47	0	1297.19	9	2	1.43	2594.44	2590	8	2.51E-03	42.8	
48	0	1460.66*	230	5	1.79	2921.24	2912	15	6.39E-02	6.9	
49	0	1764.20*	30	0	1.99	3528.00	3521	14	8.45E-03	19.2	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:39:01

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240007.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:17:00 Acquisition date : 3-OCT-2016 05:38:25
Sample ID   : R405240007   Sample quantity : 131.48 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA1   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.32   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	87.09	EU-155	86.55
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	242.00	RA-224	240.99
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	9.709E-01	1.210E+01	1.210E+01	13.89	OK
CD-109	88.03	3.70*	4.557E+00	5.946E-01	9.231E-01	237.29	OK
SN-126	64.28	9.60	2.310E+00	5.101E-01	5.101E-01	225.87	OK
	86.94	8.90	4.557E+00	2.472E-01	2.472E-01	237.29	OK
	87.57	37.00*	4.557E+00	5.946E-02	5.946E-02	237.29	OK
BA-137M	661.66	89.90*	1.883E+00	2.387E-01	2.432E-01	30.11	OK
CS-137	661.66	85.10*	1.883E+00	2.522E-01	2.569E-01	30.11	OK
EU-155	86.55	30.70	4.557E+00	7.167E-02	8.056E-02	237.29	OK
	105.31	21.10*	5.534E+00	1.541E-01	1.732E-01	127.23	OK
TL-208	277.37	6.60	3.944E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.090E+00	3.277E-01	3.277E-01	28.73	OK
	860.56	12.50	1.519E+00	4.962E-01	4.962E-01	78.56	OK
PB-210	46.54	4.25*	6.473E-01	7.139E+00	7.320E+00	80.22	OK
BI-211	72.87	1.23	3.330E+00	5.494E+00	5.494E+00	102.73	OK
	351.06	12.92*	3.216E+00	2.000E-01	2.000E-01	557.35	OK
PB-212	74.82	10.28	3.539E+00	1.403E+00	1.403E+00	61.99	OK
	77.11	17.10	3.748E+00	1.498E+00	1.498E+00	27.87	OK
	238.63	43.60*	4.454E+00	8.137E-01	8.137E-01	16.06	OK
	300.09	3.30	3.679E+00	8.652E-01	8.652E-01	154.28	OK
BI-214	609.32	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97	OK
	1120.29	14.92	1.222E+00	5.256E-01	5.258E-01	155.75	OK
	1764.49	15.30	8.118E-01	1.315E+00	1.315E+00	38.37	OK
PB-214	74.82	5.80	3.522E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	3.748E+00	2.642E+00	2.643E+00	27.87	OK
	87.09	3.41	4.572E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.406E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	3.739E+00	7.743E-01	7.746E-01	44.55	OK
	351.93	35.60*	3.216E+00	----- Line Not Found		-----	<<INT Reject
RN-222	609.32	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97	OK
	1120.29	14.92	1.222E+00	5.256E-01	5.258E-01	155.75	OK
	1764.49	15.30	8.118E-01	1.315E+00	1.315E+00	38.37	OK
RA-224	240.99	4.10*	4.410E+00	1.172E+00	1.172E+00	161.74	OK
RA-226	609.32	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97	OK
	1120.29	14.92	1.222E+00	5.256E-01	5.258E-01	155.75	OK
	1764.49	15.30	8.118E-01	1.315E+00	1.315E+00	38.37	OK
AC-228	105.21	1.10	5.534E+00	2.956E+00	2.956E+00	127.23	OK
	338.32	11.27	3.329E+00	1.250E+00	1.250E+00	43.29	OK
	794.95	4.25	1.621E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.557E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72	OK
	968.97	15.80	1.379E+00	8.894E-01	8.894E-01	48.91	OK
RA-228	105.21	1.10	5.534E+00	2.956E+00	2.956E+00	127.23	OK
	338.32	11.27	3.329E+00	1.250E+00	1.250E+00	43.29	OK
	794.95	4.25	1.621E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.557E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72	OK
	968.97	15.80	1.379E+00	8.894E-01	8.894E-01	48.91	OK
TH-228	74.82	10.28	3.539E+00	1.403E+00	1.403E+00	61.99	OK
	77.11	17.10	3.748E+00	1.498E+00	1.498E+00	27.87	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	238.63	43.60*	4.454E+00	8.137E-01	8.137E-01	16.06	OK
	300.09	3.30	3.679E+00	8.652E-01	8.652E-01	154.28	OK
TH-230	609.32	45.49*	2.014E+00	7.747E-01	7.747E-01	29.97	OK
	1120.29	14.92	1.222E+00	5.256E-01	5.256E-01	155.75	OK
	1764.49	15.30	8.118E-01	1.315E+00	1.315E+00	38.37	OK
PA-231	283.69	1.70	3.870E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	3.679E+00	5.336E-01	5.336E-01	154.28	OK
TH-232	105.21	1.10	5.534E+00	2.956E+00	2.956E+00	127.23	OK
	338.32	11.27	3.329E+00	1.250E+00	1.250E+00	43.29	OK
	835.71	1.61	1.557E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72	OK
	968.97	15.80	1.379E+00	8.894E-01	8.894E-01	48.91	OK
U-234	609.32	45.49*	2.014E+00	7.747E-01	7.747E-01	29.97	OK
	1120.29	14.92	1.222E+00	5.256E-01	5.256E-01	155.75	OK
	1764.49	15.30	8.118E-01	1.315E+00	1.315E+00	38.37	OK
AM-243	43.53	5.90	3.686E-01	1.061E+01	1.061E+01	93.99	OK
	74.66	67.20*	3.539E+00	2.147E-01	2.147E-01	61.99	OK
ANH-511	511.00	100.00*	2.334E+00	7.235E-02	7.235E-02	110.37	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:39:02.94

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240007.CNF;1		
Acquisition date	3-OCT-2016 05:38:25	Sensitivity	3.000
Detector ID	GAM01	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.32	Half life ratio	*****
Sample date	15-DEC-2015 12:17:00	Analyst initials	MXR1
Sample ID	R405240007	Sample Quantity	1.3148E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	20-JUL-2016 07:03:55	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;9		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.210E+01	1.647E+00	5.763E-01
CD-109	9.231E-01	2.147E+00	2.868E+00
SN-126	5.946E-02	1.383E-01	1.823E-01
BA-137M	2.432E-01	7.175E-02	6.445E-02
CS-137	2.569E-01	7.580E-02	6.808E-02
EU-155	1.732E-01	2.160E-01	2.275E-01
TL-208	3.277E-01	9.227E-02	7.589E-02
PB-210	7.320E+00	5.755E+00	6.098E+00
BI-211	2.000E-01	1.093E+00	4.196E-01
PB-212	8.137E-01	1.281E-01	1.160E-01
BI-214	7.749E-01	2.276E-01	1.509E-01
PB-214	8.472E-01	2.073E-01	3.484E-01
RN-222	7.749E-01	2.276E-01	1.509E-01
RA-224	1.172E+00	1.858E+00	1.244E+00
RA-226	7.749E-01	2.276E-01	1.509E-01
AC-228	9.770E-01	3.229E-01	2.551E-01
RA-228	9.770E-01	3.229E-01	2.551E-01
TH-228	8.137E-01	1.281E-01	1.160E-01
TH-230	7.747E-01	2.275E-01	1.508E-01
PA-231	5.336E-01	8.069E-01	8.820E-01
TH-232	9.770E-01	3.229E-01	2.551E-01
U-234	7.747E-01	2.275E-01	1.508E-01
AM-243	2.147E-01	1.304E-01	1.163E-01
ANH-511	7.235E-02	7.825E-02	5.732E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	1.904E+00	1.262E+01	2.491E+01	NOT IDENT.
NA-22	-7.226E-03	6.004E-02	1.191E-01	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	2.462E-04	1.970E-02	5.306E-02	NOT IDENT.
SC-46	2.572E-01	4.220E-01	9.031E-01	FAIL ABUN
V-48	0.000E+00	1.339E+04	0.000E+00	SHORT HLIF

CR-51	0.000E+00	4.118E+02	0.000E+00	SHORT HLIF
MN-54	6.523E-02	6.264E-02	1.460E-01	NOT IDENT.
CO-56	2.949E-01	4.174E-01	9.486E-01	NOT IDENT.
MN-56	0.000E+00	1.376E+41	0.000E+00	SHORT HLIF
CO-57	-1.538E-02	4.995E-02	9.590E-02	NOT IDENT.
CO-58	2.052E-02	5.624E-01	1.115E+00	NOT IDENT.
FE-59	-1.701E+00	8.463E+00	1.357E+01	NOT IDENT.
CO-60	-1.698E-02	4.723E-02	9.111E-02	FAIL ABUN
ZN-65	1.025E-01	2.212E-01	4.207E-01	NOT IDENT.
GE-68	2.892E+00	2.575E+00	6.068E+00	NOT IDENT.
AS-73	-2.052E+00	1.356E+01	2.436E+01	NOT IDENT.
AS-74	0.000E+00	4.656E+03	0.000E+00	SHORT HLIF
SE-75	2.374E-03	2.412E-01	4.441E-01	NOT IDENT.
BR-77	0.000E+00	2.901E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	7.949E+02	0.000E+00	SHORT HLIF
RB-83	-7.087E-01	7.030E-01	1.150E+00	FAIL ABUN
KR-85	-1.015E+00	8.039E+00	1.360E+01	NOT IDENT.
SR-85	-1.006E-01	7.881E-01	1.333E+00	NOT IDENT.
RB-86	0.000E+00	2.204E+04	0.000E+00	SHORT HLIF
Y-88	4.540E-03	2.340E-01	5.312E-01	NOT IDENT.
Y-91	3.246E+02	4.936E+02	1.136E+03	NOT IDENT.
NB-94	-1.939E-03	3.539E-02	6.752E-02	NOT IDENT.
NB-95	-2.511E-02	9.215E-01	1.583E+00	NOT IDENT.
NB-95M	9.542E-01	2.560E+00	4.618E+00	NOT IDENT.
ZR-95	1.431E+00	1.827E+00	3.818E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.292E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	7.771E-03	3.904E-02	7.697E-02	NOT IDENT.
RH-102	-4.738E-03	6.358E-02	1.224E-01	NOT IDENT.
RU-103	1.850E+00	5.705E+00	1.152E+01	FAIL ABUN
RH-106	-3.603E-01	5.439E-01	9.378E-01	NOT IDENT.
RU-106	-3.603E-01	5.439E-01	9.378E-01	NOT IDENT.
AG-108M	1.414E-02	3.210E-02	6.516E-02	NOT IDENT.
AG-110M	-2.471E-03	1.000E-01	1.968E-01	NOT IDENT.
SN-113	-1.548E-01	2.589E-01	4.629E-01	NOT IDENT.
CD-115	0.000E+00	5.971E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	7.031E+04	0.000E+00	SHORT HLIF
TE-123M	-5.113E-03	1.318E-01	2.561E-01	NOT IDENT.
SB-124	-6.160E-01	2.511E+00	5.050E+00	NOT IDENT.
SB-125	8.651E-02	1.153E-01	2.429E-01	FAIL ABUN
TE-125M	7.604E+01	3.045E+02	5.154E+02	NOT IDENT.
I-126	0.000E+00	6.547E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	8.704E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	7.234E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.768E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.887E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.175E+25	0.000E+00	SHORT HLIF
BA-133	-6.136E-03	5.243E-02	8.891E-02	NOT IDENT.
I-133	0.000E+00	8.128E+40	0.000E+00	SHORT HLIF
CS-134	5.838E-02	7.032E-02	1.343E-01	FAIL ABUN
CS-135	2.143E-02	1.802E-01	3.153E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.324E+05	0.000E+00	SHORT HLIF
CE-139	-8.710E-03	1.241E-01	2.385E-01	NOT IDENT.
BA-140	0.000E+00	1.337E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.022E+05	0.000E+00	SHORT HLIF
CE-141	-4.202E+00	2.368E+01	4.537E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	-7.933E-02	3.678E-01	7.086E-01	NOT IDENT.
PM-144	-5.486E-02	5.886E-02	9.448E-02	NOT IDENT.
PR-144	-4.729E+00	5.097E+00	8.191E+00	NOT IDENT.
PM-146	4.782E-03	4.897E-02	9.587E-02	NOT IDENT.
ND-147	0.000E+00	2.208E+07	0.000E+00	SHORT HLIF
PM-147	-2.087E+01	9.023E+02	1.766E+03	NOT IDENT.
PM-149	0.000E+00	5.533E+39	0.000E+00	SHORT HLIF
EU-150	1.163E-02	2.816E-02	5.222E-02	FAIL ABUN
EU-152	3.422E-02	9.303E-02	1.829E-01	FAIL ABUN
GD-153	0.000E+00	3.329E-01	3.817E-01	FAIL ABUN
EU-154	2.485E-02	1.397E-01	2.932E-01	NOT IDENT.
TB-160	-1.083E-01	1.962E+00	3.777E+00	FAIL ABUN
HO-166M	-4.534E-02	7.993E-02	1.382E-01	NOT IDENT.
TM-171	1.152E+01	3.332E+01	6.276E+01	NOT IDENT.
HF-172	-1.406E-01	2.554E-01	4.798E-01	FAIL ABUN
LU-172	5.082E-02	1.027E-01	1.968E-01	FAIL ABUN
LU-176	4.673E-03	2.519E-02	4.991E-02	FAIL ABUN
HF-181	1.618E+00	4.519E+00	9.105E+00	NOT IDENT.

TA-182	2.319E-01	8.883E-01	1.922E+00	FAIL ABUN
RE-183	-2.333E+00	4.316E+00	7.456E+00	NOT IDENT.
RE-184	2.366E+01	3.312E+01	7.073E+01	NOT IDENT.
W-188	1.346E+01	1.258E+02	2.212E+02	FAIL ABUN
IR-192	-2.253E-01	4.398E-01	8.056E-01	FAIL ABUN
HG-203	6.859E-01	2.190E+00	4.386E+00	FAIL ABUN
BI-207	4.139E-02	4.044E-02	9.984E-02	FAIL ABUN
PB-211	-8.042E-02	7.995E-01	1.514E+00	NOT IDENT.
BI-212	4.509E-01	5.738E-01	1.219E+00	NOT IDENT.
RN-219	8.414E-02	4.778E-01	9.283E-01	FAIL ABUN
RA-223	3.714E-01	6.984E-01	1.406E+00	FAIL ABUN
AC-227	-1.343E-02	2.688E-01	5.140E-01	FAIL ABUN
TH-227	-1.343E-02	2.688E-01	5.140E-01	FAIL ABUN
TH-229	1.978E-01	5.259E-01	1.042E+00	FAIL ABUN
TH-231	3.714E-01	6.984E-01	1.406E+00	FAIL ABUN
PA-233	-1.453E-02	6.270E-02	1.186E-01	FAIL ABUN
PA-234	1.716E-01	3.085E-01	6.622E-01	FAIL ABUN
PA-234M	6.478E+00	6.262E+00	1.153E+01	FAIL ABUN
TH-234	1.323E+00	2.930E+00	3.469E+00	FAIL ABUN
U-235	7.612E-03	2.105E-01	4.104E-01	FAIL ABUN
NP-237	-1.453E-02	6.270E-02	1.186E-01	FAIL ABUN
NP-238	0.000E+00	5.906E+40	0.000E+00	SHORT HLIF
U-238	1.323E+00	2.930E+00	3.469E+00	FAIL ABUN
NP-239	-6.862E-02	2.932E-01	5.081E-01	FAIL ABUN
PU-239	1.259E+02	3.695E+02	7.324E+02	NOT IDENT.
AM-241	-6.322E-02	2.336E-01	3.779E-01	NOT IDENT.
CM-243	5.049E-03	1.273E-01	2.098E-01	FAIL ABUN
BK-247	2.398E-02	8.628E-02	1.633E-01	FAIL ABUN
CM-247	-3.578E-04	4.221E-02	8.073E-02	NOT IDENT.
CF-249	-5.403E-03	4.096E-02	7.799E-02	NOT IDENT.
CF-251	1.142E-01	1.353E-01	2.757E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:39:00.38

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	219	10.66*	9.709E-01	1.210E+01	1.210E+01	13.89
CD-109	88.03	39	3.70*	4.557E+00	1.308E+00	2.031E+00	105.08
SN-126	64.28	20	9.60	2.310E+00	5.101E-01	5.101E-01	225.87
	86.94	39	8.90	4.557E+00	5.439E-01	5.439E-01	105.08
	87.57	39	37.00*	4.557E+00	1.308E-01	1.308E-01	105.08
BA-137M	661.66	71	89.90*	1.883E+00	2.387E-01	2.432E-01	30.11
CS-137	661.66	71	85.10*	1.883E+00	2.522E-01	2.569E-01	30.11
EU-155	86.55	39	30.70	4.557E+00	1.577E-01	1.772E-01	105.08
	105.31	32	21.10*	5.534E+00	1.541E-01	1.732E-01	127.23
TL-208	277.37	------	6.60	3.944E+00	------ Line Not Found		------
	583.19	102	85.00*	2.090E+00	3.277E-01	3.277E-01	28.73
	860.56	16	12.50	1.519E+00	4.962E-01	4.962E-01	78.56
PB-210	46.54	34	4.25*	6.473E-01	7.139E+00	7.320E+00	80.22
BI-211	72.87	39	1.23	3.330E+00	5.494E+00	5.494E+00	102.73
	351.06	170	12.92*	3.216E+00	2.334E+00	2.334E+00	24.96
PB-212	74.82	117	10.28	3.539E+00	1.840E+00	1.840E+00	46.07
	77.11	168	17.10	3.748E+00	1.498E+00	1.498E+00	27.87
	238.63	277	43.60*	4.454E+00	8.137E-01	8.137E-01	16.06
	300.09	18	3.30	3.679E+00	8.652E-01	8.652E-01	154.28
BI-214	609.32	124	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97
	1120.29	17	14.92	1.222E+00	5.256E-01	5.258E-01	155.75
	1764.49	29	15.30	8.118E-01	1.315E+00	1.315E+00	38.37
PB-214	74.82	117	5.80	3.539E+00	3.261E+00	3.263E+00	46.07
	77.11	168	9.70	3.748E+00	2.642E+00	2.643E+00	27.87
	87.09	39	3.41	4.557E+00	1.420E+00	1.420E+00	105.08
	242.00	80	7.25	4.410E+00	1.437E+00	1.438E+00	70.63
	295.22	93	18.42	3.739E+00	7.743E-01	7.746E-01	44.55
	351.93	170	35.60*	3.216E+00	8.469E-01	8.472E-01	24.96
RN-222	609.32	124	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97
	1120.29	17	14.92	1.222E+00	5.256E-01	5.258E-01	155.75
	1764.49	29	15.30	8.118E-01	1.315E+00	1.315E+00	38.37
RA-224	240.99	80	4.10*	4.410E+00	2.541E+00	2.541E+00	70.63
RA-226	609.32	124	45.49*	2.014E+00	7.747E-01	7.749E-01	29.97
	1120.29	17	14.92	1.222E+00	5.256E-01	5.258E-01	155.75
	1764.49	29	15.30	8.118E-01	1.315E+00	1.315E+00	38.37
AC-228	105.21	32	1.10	5.534E+00	2.956E+00	2.956E+00	127.23
	338.32	82	11.27	3.329E+00	1.250E+00	1.250E+00	43.29
	794.95	------	4.25	1.621E+00	------ Line Not Found		------
	835.71	------	1.61	1.557E+00	------ Line Not Found		------
	911.20	64	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72
	968.97	34	15.80	1.379E+00	8.894E-01	8.894E-01	48.91
RA-228	105.21	32	1.10	5.534E+00	2.956E+00	2.956E+00	127.23
	338.32	82	11.27	3.329E+00	1.250E+00	1.250E+00	43.29
	794.95	------	4.25	1.621E+00	------ Line Not Found		------
	835.71	------	1.61	1.557E+00	------ Line Not Found		------
	911.20	64	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72
	968.97	34	15.80	1.379E+00	8.894E-01	8.894E-01	48.91

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	117	10.28	3.539E+00	1.840E+00	1.840E+00	46.07
	77.11	168	17.10	3.748E+00	1.498E+00	1.498E+00	27.87
	238.63	277	43.60*	4.454E+00	8.137E-01	8.137E-01	16.06
	300.09	18	3.30	3.679E+00	8.652E-01	8.652E-01	154.28
TH-230	609.32	124	45.49*	2.014E+00	7.747E-01	7.747E-01	29.97
	1120.29	17	14.92	1.222E+00	5.256E-01	5.256E-01	155.75
	1764.49	29	15.30	8.118E-01	1.315E+00	1.315E+00	38.37
PA-231	283.69	------	1.70	3.870E+00	------ Line Not Found		------
	301.36	18	5.35*	3.679E+00	5.336E-01	5.336E-01	154.28
TH-232	105.21	32	1.10	5.534E+00	2.956E+00	2.956E+00	127.23
	338.32	82	11.27	3.329E+00	1.250E+00	1.250E+00	43.29
	835.71	------	1.61	1.557E+00	------ Line Not Found		------
	911.20	64	25.80*	1.450E+00	9.770E-01	9.770E-01	33.72
	968.97	34	15.80	1.379E+00	8.894E-01	8.894E-01	48.91
U-234	609.32	124	45.49*	2.014E+00	7.747E-01	7.747E-01	29.97
	1120.29	17	14.92	1.222E+00	5.256E-01	5.256E-01	155.75
	1764.49	29	15.30	8.118E-01	1.315E+00	1.315E+00	38.37
AM-243	43.53	40	5.90	3.686E-01	1.061E+01	1.061E+01	93.99
	74.66	117	67.20*	3.539E+00	2.815E-01	2.815E-01	46.07
ANH-511	511.00	30	100.00*	2.334E+00	7.235E-02	7.235E-02	110.37

Flag: "*" = Keyline

Sample ID : R405240007 Acquisition date : 3-OCT-2016 05:38:25

Total number of lines in spectrum 49
Number of unidentified lines 11
Number of lines tentatively identified by NID 38 77.55%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.210E+01	1.210E+01	0.168E+01	13.89	
CD-109	461.40D	1.55	1.308E+00	2.031E+00	2.134E+00	105.08	
SN-126	2.30E+05Y	1.00	1.308E-01	1.308E-01	1.375E-01	105.08	
BA-137M	30.08Y	1.02	2.387E-01	2.432E-01	0.732E-01	30.11	
CS-137	30.08Y	1.02	2.522E-01	2.569E-01	0.773E-01	30.11	
EU-155	4.75Y	1.12	1.541E-01	1.732E-01	2.204E-01	127.23	
TL-208	1.41E+10Y	1.00	3.277E-01	3.277E-01	0.941E-01	28.73	
PB-210	22.20Y	1.03	7.139E+00	7.320E+00	5.872E+00	80.22	
BI-211	7.04E+08Y	1.00	2.334E+00	2.334E+00	0.583E+00	24.96	
PB-212	1.41E+10Y	1.00	8.137E-01	8.137E-01	1.307E-01	16.06	
BI-214	1600.00Y	1.00	7.747E-01	7.749E-01	2.322E-01	29.97	
PB-214	1600.00Y	1.00	8.469E-01	8.472E-01	2.115E-01	24.96	
RN-222	1600.00Y	1.00	7.747E-01	7.749E-01	2.322E-01	29.97	
RA-224	1.41E+10Y	1.00	2.541E+00	2.541E+00	1.795E+00	70.63	
RA-226	1600.00Y	1.00	7.747E-01	7.749E-01	2.322E-01	29.97	
AC-228	1.41E+10Y	1.00	9.770E-01	9.770E-01	3.295E-01	33.72	
RA-228	1.41E+10Y	1.00	9.770E-01	9.770E-01	3.295E-01	33.72	
TH-228	1.41E+10Y	1.00	8.137E-01	8.137E-01	1.307E-01	16.06	
TH-230	7.54E+04Y	1.00	7.747E-01	7.747E-01	2.322E-01	29.97	
PA-231	7.04E+08Y	1.00	5.336E-01	5.336E-01	8.233E-01	154.28	
TH-232	1.41E+10Y	1.00	9.770E-01	9.770E-01	3.295E-01	33.72	
U-234	2.45E+05Y	1.00	7.747E-01	7.747E-01	2.322E-01	29.97	
AM-243	7370.00Y	1.00	2.815E-01	2.815E-01	1.297E-01	46.07	
ANH-511	1.00E+09Y	1.00	7.235E-02	7.235E-02	7.985E-02	110.37	
	Total Activity :		3.669E+01	3.762E+01			

Grand Total Activity : 3.669E+01 3.762E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240007 Acquisition date : 3-OCT-2016 05:38:25

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	35.04	29	7	1.33	70.78	68	30	6.56E-03	89.4	3.51E-02	
4	36.58	17	18	1.52	73.85	68	30	3.94E-03	****	6.62E-02	
4	38.43	51	23	1.22	77.55	68	30	1.16E-02	63.5	1.22E-01	
4	41.04	19	40	1.27	82.77	68	30	4.29E-03	****	2.36E-01	
4	45.45	16	66	1.43	91.60	68	30	3.60E-03	****	5.17E-01	T
0	98.58	45	92	1.10	197.84	194	8	1.10E-02	86.0	5.25E+00	T
0	186.24	44	89	1.12	373.16	369	8	1.12E-02	92.0	5.29E+00	T
0	218.66	24	64	1.70	437.98	435	8	6.12E-03	****	4.76E+00	
0	270.95	77	88	1.69	542.55	536	16	2.00E-02	61.5	4.02E+00	T
0	463.06	22	21	1.50	926.71	922	8	5.97E-03	86.3	2.54E+00	T
0	485.77	20	86	10.03	972.13	946	28	5.51E-03	****	2.44E+00	T
1	528.70	22	24	1.66	1057.97	1053	24	5.95E-03	82.9	2.27E+00	T
1	536.07	14	14	1.66	1072.70	1053	24	3.87E-03	****	2.24E+00	T
0	566.79	43	42	2.20	1134.13	1125	15	1.16E-02	73.9	2.14E+00	
0	768.97	14	13	1.03	1538.38	1534	8	3.89E-03	****	1.67E+00	
0	796.68	11	12	0.91	1593.79	1589	7	3.01E-03	****	1.62E+00	T
0	865.88	10	3	1.26	1732.15	1729	6	2.76E-03	84.3	1.51E+00	
0	964.29	27	8	2.17	1928.91	1924	10	7.60E-03	53.6	1.38E+00	T
0	1001.38	13	5	3.30	2003.05	1998	11	3.63E-03	98.6	1.34E+00	T
0	1068.73	12	3	1.32	2137.71	2132	11	3.45E-03	76.4	1.27E+00	
0	1097.70	7	13	1.47	2195.63	2189	10	1.97E-03	****	1.24E+00	
0	1148.58	10	6	1.23	2297.36	2292	9	2.98E-03	****	1.20E+00	T
0	1173.13	9	7	3.37	2346.43	2340	10	2.67E-03	****	1.18E+00	T
0	1286.81	7	2	1.34	2573.70	2569	8	1.96E-03	****	1.09E+00	
0	1297.19	9	2	1.43	2594.44	2590	8	2.51E-03	85.6	1.08E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:39:16.09

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240007.CNF;1    *
* Acquisition date :  3-OCT-2016 05:38:25 Sensitivity     : 3.000          *
* Detector ID      : GAM01                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.32     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:17:00 Nuclide Library : SOLID          *
* Sample ID        : R405240007           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3148E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 20-JUL-2016 07:03:55 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;9           *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.134E-01
CD-109	1.361E+00
SN-126	8.645E-02
BA-137M	2.751E-02
CS-137	2.907E-02
EU-155	1.060E-01
TL-208	3.353E-02
PB-210	2.721E+00
BI-211	1.909E-01
PB-212	5.393E-02
BI-214	6.689E-02
PB-214	1.674E-01
RN-222	6.689E-02
RA-224	5.782E-01
RA-226	6.689E-02
AC-228	1.068E-01
RA-228	1.068E-01
TH-228	5.393E-02
TH-230	6.687E-02
PA-231	4.008E-01
TH-232	1.068E-01
U-234	6.687E-02
AM-243	5.472E-02
ANH-511	2.529E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.108E+01	NOT IDENT.
NA-22	5.082E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.677E-02	NOT IDENT.
SC-46	3.923E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF

MN-54	6.342E-02	NOT IDENT.
CO-56	4.042E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	4.459E-02	NOT IDENT.
CO-58	4.714E-01	NOT IDENT.
FE-59	5.730E+00	NOT IDENT.
CO-60	3.740E-02	FAIL ABUN
ZN-65	1.817E-01	NOT IDENT.
GE-68	2.631E+00	NOT IDENT.
AS-73	1.138E+01	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	2.042E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.948E-01	FAIL ABUN
KR-85	5.978E+00	NOT IDENT.
SR-85	5.859E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.988E-01	NOT IDENT.
Y-91	4.847E+02	NOT IDENT.
NB-94	2.939E-02	NOT IDENT.
NB-95	6.801E-01	NOT IDENT.
NB-95M	2.140E+00	NOT IDENT.
ZR-95	1.707E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.613E-02	NOT IDENT.
RH-102	5.293E-02	NOT IDENT.
RU-103	5.126E+00	FAIL ABUN
RH-106	4.002E-01	NOT IDENT.
RU-106	4.002E-01	NOT IDENT.
AG-108M	2.934E-02	NOT IDENT.
AG-110M	8.216E-02	NOT IDENT.
SN-113	2.073E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.189E-01	NOT IDENT.
SB-124	1.968E+00	NOT IDENT.
SB-125	1.096E-01	FAIL ABUN
TE-125M	2.396E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.024E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.981E-02	FAIL ABUN
CS-135	1.454E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	1.115E-01	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	2.124E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.295E-01	NOT IDENT.
PM-144	3.962E-02	NOT IDENT.
PR-144	3.437E+00	NOT IDENT.
PM-146	4.276E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	8.240E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.363E-02	FAIL ABUN
EU-152	8.203E-02	FAIL ABUN
GD-153	1.784E-01	FAIL ABUN
EU-154	1.251E-01	NOT IDENT.
TB-160	1.602E+00	FAIL ABUN
HO-166M	6.098E-02	NOT IDENT.
TM-171	2.934E+01	NOT IDENT.
HF-172	2.237E-01	FAIL ABUN
LU-172	8.510E-02	FAIL ABUN
LU-176	2.262E-02	FAIL ABUN
HF-181	4.075E+00	NOT IDENT.
TA-182	8.125E-01	FAIL ABUN

RE-183	3.478E+00	NOT IDENT.
RE-184	3.105E+01	NOT IDENT.
W-188	1.011E+02	FAIL ABUN
IR-192	3.604E-01	FAIL ABUN
HG-203	2.000E+00	FAIL ABUN
BI-207	4.163E-02	FAIL ABUN
PB-211	6.841E-01	NOT IDENT.
BI-212	5.424E-01	NOT IDENT.
RN-219	4.226E-01	FAIL ABUN
RA-223	6.458E-01	FAIL ABUN
AC-227	2.372E-01	FAIL ABUN
TH-227	2.372E-01	FAIL ABUN
TH-229	4.861E-01	FAIL ABUN
TH-231	6.458E-01	FAIL ABUN
PA-233	5.353E-02	FAIL ABUN
PA-234	2.851E-01	FAIL ABUN
PA-234M	5.078E+00	FAIL ABUN
TH-234	1.640E+00	FAIL ABUN
U-235	1.928E-01	FAIL ABUN
NP-237	5.353E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.640E+00	FAIL ABUN
NP-239	2.366E-01	FAIL ABUN
PU-239	3.448E+02	NOT IDENT.
AM-241	1.770E-01	NOT IDENT.
CM-243	9.771E-02	FAIL ABUN
BK-247	7.522E-02	FAIL ABUN
CM-247	3.655E-02	NOT IDENT.
CF-249	3.494E-02	NOT IDENT.
CF-251	1.294E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:39:22.85

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240007.CNF;1		
Acquisition date	: 3-OCT-2016 05:38:25	Sensitivity	: 3.000
Detector ID	: GAM01	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.32	Half life ratio	: *****
Sample date	: 15-DEC-2015 12:17:00	Nuclide Library	: SOLID
Sample ID	: R405240007	Analyst initials	: MXR1
Batch Number	: 1596386	Sample Quantity	: 1.3148E+02 GRAM
		Quantity Err(%)	: 1.5211E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 20-JUL-2016 07:03:55	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM01_CAN.CNF;9		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.210E+01	1.763E+00	1.763E+00
CD-109	9.231E-01	2.152E+00	2.152E+00
SN-126	5.946E-02	1.386E-01	1.386E-01
BA-137M	2.432E-01	7.251E-02	7.251E-02
CS-137	2.569E-01	7.660E-02	7.660E-02
EU-155	1.732E-01	2.163E-01	2.163E-01
TL-208	3.277E-01	9.331E-02	9.331E-02
PB-210	7.320E+00	5.784E+00	5.784E+00
BI-211	2.000E-01	1.100E+00	1.100E+00
PB-212	8.137E-01	1.351E-01	1.351E-01
BI-214	7.749E-01	2.300E-01	2.300E-01
PB-214	8.472E-01	2.102E-01	2.102E-01
RN-222	7.749E-01	2.300E-01	2.300E-01
RA-224	1.172E+00	1.861E+00	1.861E+00
RA-226	7.749E-01	2.300E-01	2.300E-01
AC-228	9.770E-01	3.267E-01	3.267E-01
RA-228	9.770E-01	3.267E-01	3.267E-01
TH-228	8.137E-01	1.351E-01	1.351E-01
TH-230	7.747E-01	2.299E-01	2.299E-01
PA-231	5.336E-01	8.149E-01	8.149E-01
TH-232	9.770E-01	3.267E-01	3.267E-01
U-234	7.747E-01	2.299E-01	2.299E-01
AM-243	2.147E-01	1.314E-01	1.314E-01
ANH-511	7.235E-02	7.831E-02	7.831E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.904E+00	1.262E+01	1.265E+01	NOT IDENT.
NA-22	-7.226E-03	6.004E-02	6.012E-02	NOT IDENT.
NA-24	1.000E+41	3.215E+42	0.000E+00	SHORT HLIF
AL-26	2.462E-04	1.970E-02	1.970E-02	NOT IDENT.
SC-46	2.572E-01	4.221E-01	4.377E-01	FAIL ABUN
V-48	3.968E+03	1.339E+04	1.351E+04	SHORT HLIF

CR-51	1.405E+02	4.118E+02	4.167E+02	SHORT HLIF
MN-54	6.523E-02	6.270E-02	6.925E-02	NOT IDENT.
CO-56	2.949E-01	4.176E-01	4.382E-01	NOT IDENT.
MN-56	1.000E+41	1.376E+41	0.000E+00	SHORT HLIF
CO-57	-1.538E-02	4.996E-02	5.044E-02	NOT IDENT.
CO-58	2.052E-02	5.624E-01	5.625E-01	NOT IDENT.
FE-59	-1.701E+00	8.464E+00	8.499E+00	NOT IDENT.
CO-60	-1.698E-02	4.723E-02	4.785E-02	FAIL ABUN
ZN-65	1.025E-01	2.212E-01	2.260E-01	NOT IDENT.
GE-68	2.892E+00	2.578E+00	2.889E+00	NOT IDENT.
AS-73	-2.052E+00	1.356E+01	1.359E+01	NOT IDENT.
AS-74	1.539E+03	4.658E+03	4.710E+03	SHORT HLIF
SE-75	2.374E-03	2.412E-01	2.412E-01	NOT IDENT.
BR-77	1.843E+37	1.557E+38	0.000E+00	SHORT HLIF
SR-82	-3.546E+02	7.951E+02	8.110E+02	SHORT HLIF
RB-83	-7.087E-01	7.097E-01	7.783E-01	FAIL ABUN
KR-85	-1.015E+00	8.039E+00	8.052E+00	NOT IDENT.
SR-85	-1.006E-01	7.881E-01	7.894E-01	NOT IDENT.
RB-86	1.773E+04	2.205E+04	2.346E+04	SHORT HLIF
Y-88	4.540E-03	2.340E-01	2.340E-01	NOT IDENT.
Y-91	3.246E+02	4.938E+02	5.150E+02	NOT IDENT.
NB-94	-1.939E-03	3.539E-02	3.540E-02	NOT IDENT.
NB-95	-2.511E-02	9.215E-01	9.215E-01	NOT IDENT.
NB-95M	9.542E-01	2.561E+00	2.597E+00	NOT IDENT.
ZR-95	1.431E+00	1.828E+00	1.939E+00	NOT IDENT.
NB-97	1.000E+41	3.518E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	2.483E+41	0.000E+00	SHORT HLIF
MO-99	-4.225E+31	3.305E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	6.262E+41	0.000E+00	SHORT HLIF
RH-101	7.771E-03	3.906E-02	3.922E-02	NOT IDENT.
RH-102	-4.738E-03	6.358E-02	6.361E-02	NOT IDENT.
RU-103	1.850E+00	5.706E+00	5.766E+00	FAIL ABUN
RH-106	-3.603E-01	5.444E-01	5.681E-01	NOT IDENT.
RU-106	-3.603E-01	5.444E-01	5.681E-01	NOT IDENT.
AG-108M	1.414E-02	3.211E-02	3.273E-02	NOT IDENT.
AG-110M	-2.471E-03	1.000E-01	1.001E-01	NOT IDENT.
SN-113	-1.548E-01	2.590E-01	2.682E-01	NOT IDENT.
CD-115	7.347E+38	6.112E+38	0.000E+00	SHORT HLIF
SN-117M	-3.641E+03	7.032E+04	7.034E+04	SHORT HLIF
TE-123M	-5.113E-03	1.318E-01	1.318E-01	NOT IDENT.
SB-124	-6.160E-01	2.511E+00	2.527E+00	NOT IDENT.
SB-125	8.651E-02	1.154E-01	1.218E-01	FAIL ABUN
TE-125M	7.604E+01	3.045E+02	3.065E+02	NOT IDENT.
I-126	1.268E+05	6.549E+05	6.574E+05	SHORT HLIF
SB-126	5.788E+05	8.769E+05	9.149E+05	SHORT HLIF
SB-127	2.227E+21	7.827E+21	0.000E+00	SHORT HLIF
I-131	1.531E+09	2.769E+09	2.853E+09	SHORT HLIF
I-132	1.000E+41	1.814E+42	0.000E+00	SHORT HLIF
TE-132	-2.421E+24	9.176E+25	0.000E+00	SHORT HLIF
BA-133	-6.136E-03	5.243E-02	5.250E-02	NOT IDENT.
I-133	1.000E+41	1.944E+41	0.000E+00	SHORT HLIF
CS-134	5.838E-02	7.037E-02	7.513E-02	FAIL ABUN
CS-135	2.143E-02	1.802E-01	1.805E-01	NOT IDENT.
I-135	-1.000E+41	8.994E+41	0.000E+00	SHORT HLIF
CS-136	4.276E+04	2.324E+05	2.332E+05	SHORT HLIF
CE-139	-8.710E-03	1.241E-01	1.241E-01	NOT IDENT.
BA-140	1.218E+06	1.338E+06	1.447E+06	SHORT HLIF
LA-140	3.802E+04	3.022E+05	3.027E+05	SHORT HLIF
CE-141	-4.202E+00	2.368E+01	2.376E+01	NOT IDENT.
CE-143	1.000E+41	2.271E+41	0.000E+00	SHORT HLIF
CE-144	-7.933E-02	3.678E-01	3.695E-01	NOT IDENT.
PM-144	-5.486E-02	5.895E-02	6.393E-02	NOT IDENT.
PR-144	-4.729E+00	5.102E+00	5.529E+00	NOT IDENT.
PM-146	4.782E-03	4.897E-02	4.902E-02	NOT IDENT.
ND-147	8.175E+06	2.208E+07	2.239E+07	SHORT HLIF
PM-147	-2.087E+01	9.023E+02	9.024E+02	NOT IDENT.
PM-149	-2.883E+39	5.568E+39	0.000E+00	SHORT HLIF
EU-150	1.163E-02	2.816E-02	2.864E-02	FAIL ABUN
EU-152	3.422E-02	9.305E-02	9.432E-02	FAIL ABUN
GD-153	3.952E-01	3.337E-01	3.783E-01	FAIL ABUN
EU-154	2.485E-02	1.397E-01	1.401E-01	NOT IDENT.
TB-160	-1.083E-01	1.962E+00	1.963E+00	FAIL ABUN
HO-166M	-4.534E-02	7.997E-02	8.254E-02	NOT IDENT.
TM-171	1.152E+01	3.334E+01	3.374E+01	NOT IDENT.
HF-172	-1.406E-01	2.564E-01	2.641E-01	FAIL ABUN
LU-172	5.082E-02	1.029E-01	1.054E-01	FAIL ABUN
LU-176	4.673E-03	2.519E-02	2.528E-02	FAIL ABUN
HF-181	1.618E+00	4.519E+00	4.578E+00	NOT IDENT.

TA-182	2.319E-01	8.884E-01	8.945E-01	FAIL ABUN
RE-183	-2.333E+00	4.331E+00	4.457E+00	NOT IDENT.
RE-184	2.366E+01	3.358E+01	3.524E+01	NOT IDENT.
W-188	1.346E+01	1.258E+02	1.260E+02	FAIL ABUN
IR-192	-2.253E-01	4.399E-01	4.514E-01	FAIL ABUN
HG-203	6.859E-01	2.191E+00	2.212E+00	FAIL ABUN
BI-207	4.139E-02	4.047E-02	4.456E-02	FAIL ABUN
PB-211	-8.042E-02	7.996E-01	8.004E-01	NOT IDENT.
BI-212	4.509E-01	5.743E-01	6.092E-01	NOT IDENT.
RN-219	8.414E-02	4.779E-01	4.794E-01	FAIL ABUN
RA-223	3.714E-01	6.988E-01	7.186E-01	FAIL ABUN
AC-227	-1.343E-02	2.688E-01	2.689E-01	FAIL ABUN
TH-227	-1.343E-02	2.688E-01	2.689E-01	FAIL ABUN
TH-229	1.978E-01	5.260E-01	5.335E-01	FAIL ABUN
TH-231	3.714E-01	6.988E-01	7.186E-01	FAIL ABUN
PA-233	-1.453E-02	6.271E-02	6.305E-02	FAIL ABUN
PA-234	1.716E-01	3.656E-01	3.737E-01	FAIL ABUN
PA-234M	6.478E+00	6.268E+00	6.915E+00	FAIL ABUN
TH-234	1.323E+00	2.944E+00	3.004E+00	FAIL ABUN
U-235	7.612E-03	2.105E-01	2.105E-01	FAIL ABUN
NP-237	-1.453E-02	6.271E-02	6.305E-02	FAIL ABUN
NP-238	2.923E+40	5.908E+40	0.000E+00	SHORT HLIF
U-238	1.323E+00	2.944E+00	3.004E+00	FAIL ABUN
NP-239	-6.862E-02	2.932E-01	2.949E-01	FAIL ABUN
PU-239	1.259E+02	3.696E+02	3.739E+02	NOT IDENT.
AM-241	-6.322E-02	2.336E-01	2.354E-01	NOT IDENT.
CM-243	5.049E-03	1.273E-01	1.273E-01	FAIL ABUN
BK-247	2.398E-02	8.641E-02	8.709E-02	FAIL ABUN
CM-247	-3.578E-04	4.221E-02	4.221E-02	NOT IDENT.
CF-249	-5.403E-03	4.096E-02	4.104E-02	NOT IDENT.
CF-251	1.142E-01	1.359E-01	1.454E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	23.1090	87.09	111.7383	136.47	64.9531
45.60	23.1760	87.57	111.7891	140.51	0.0000
46.54	23.2059	88.03	116.7004	143.76	69.5353
49.72	0.0000	88.34	123.2201	144.24	68.7104
51.35	80.5733	88.47	123.2348	145.44	75.5609
51.87	79.4587	89.96	142.8935	152.43	52.8934
52.39	60.8030	1093.63	186.8539	153.25	0.0000
52.97	72.5493	91.11	0.0000	323.87	67.4784
53.44	71.4218	92.59	100.1070	156.02	0.0000
54.07	65.6194	93.35	92.8465	158.56	0.0000
57.36	0.0000	94.56	161.4380	159.00	57.4132
57.53	69.4303	94.65	167.9743	162.33	61.8340
57.98	77.7098	94.67	167.9775	162.66	0.0000
59.27	80.1884	94.87	166.3767	163.33	65.3125
59.32	80.1933	97.43	73.5709	165.86	70.5847
59.54	80.2143	98.43	49.0909	176.31	63.2579
60.96	59.8677	98.44	49.0915	176.60	0.0000
61.17	66.1858	99.53	57.3286	177.52	58.9694
62.93	78.1640	100.11	55.7190	181.07	0.0000
63.29	78.1964	102.03	64.0201	181.52	66.7664
63.58	78.2223	103.18	60.7976	184.41	58.7851
64.28	71.1679	103.37	60.8078	143.76	54.0381
66.73	63.4347	105.21	62.5498	193.51	56.9180
67.24	60.2973	105.31	62.5552	197.03	68.4428
125.81	66.6769	106.12	56.8325	198.01	61.4586
67.75	71.4445	106.47	56.8493	201.83	64.2344
69.67	52.5031	109.28	52.8548	203.43	63.4131
70.83	78.0569	111.00	74.4333	205.31	66.1263
72.81	85.0064	111.76	0.0000	210.85	69.8716
72.87	85.0118	114.06	62.1834	215.65	43.8976
74.66	85.1716	116.30	0.0000	222.11	44.0532
74.82	85.1857	116.74	67.3039	227.09	52.6489
74.97	85.1990	119.76	59.9696	227.38	51.7648
77.11	85.3872	121.12	71.7069	228.16	0.0000
78.74	70.6720	121.22	65.0417	228.18	49.1080
79.69	93.2476	121.78	65.0702	116.74	49.1080
80.12	57.9027	122.06	65.0845	235.69	45.7176
80.19	0.0000	122.92	68.4680	235.96	49.7588
80.57	49.8831	123.07	68.4760	238.63	58.3574
81.00	82.1010	265.00	56.8119	238.98	0.0000
81.07	82.1067	125.81	76.1527	240.99	58.4289
81.75	106.3275	127.23	73.7221	242.00	58.4593
83.79	82.3266	127.91	69.5694	244.70	59.4406
84.00	82.3438	129.30	78.0336	252.40	0.0000
85.43	95.3925	131.20	84.0271	252.80	41.5986
86.55	123.0106	133.02	63.1058	254.15	0.0000
86.79	111.7060	133.52	63.1294	256.23	48.9166
86.94	111.7221	136.00	69.1475	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	43.6621	355.39	0.0000	584.27	19.4461
264.80	40.3902	356.01	32.6743	595.83	0.0000
265.00	40.3938	364.49	0.0000	427.87	17.4814
268.22	45.1041	366.42	0.0000	602.52	0.0000
269.46	33.7345	372.51	26.6926	604.72	26.2533
270.03	33.7435	375.05	28.6279	607.14	30.9070
271.23	33.7631	377.52	27.7002	609.32	20.6177
273.65	0.0000	356.01	27.7681	610.33	20.6234
276.40	34.3040	388.16	26.8544	614.28	10.8392
277.37	32.9465	388.63	0.0000	618.01	16.5345
277.60	27.4585	391.69	33.6136	620.36	13.4433
278.00	26.3654	264.66	30.8359	621.93	18.6218
279.20	31.1431	401.81	31.8137	630.19	0.0000
279.54	35.7286	402.40	30.8561	631.29	14.5212
279.70	36.6479	404.85	30.8841	633.25	13.4914
280.46	37.5775	410.95	26.1172	634.78	0.0000
283.69	31.2089	413.71	30.9850	635.95	13.5015
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	39.5015	423.72	0.0000	645.85	13.5380
285.90	0.0000	427.09	19.4596	657.76	10.9700
287.50	30.3447	427.87	18.4921	657.90	0.0000
290.67	35.9142	433.94	21.4580	661.66	11.5044
293.27	0.0000	439.40	22.4768	664.57	0.0000
351.93	48.4465	453.88	21.6079	666.33	0.0000
295.96	48.4625	463.37	16.2586	666.50	0.0000
879.38	60.9968	468.07	22.6996	667.71	0.0000
299.98	43.0025	473.00	0.0000	677.62	14.7041
300.09	43.0044	475.06	19.7852	685.70	0.0000
300.13	43.0053	476.78	19.7965	695.00	0.0000
301.36	33.3127	477.60	19.8018	696.49	18.9983
302.85	25.0010	482.18	19.8324	696.51	18.9983
256.23	33.3596	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	16.8913
306.78	28.7554	497.08	17.9363	697.49	14.7804
308.46	29.7051	505.52	23.9800	702.65	15.8569
311.90	32.5391	507.63	0.0000	706.68	24.3392
316.51	31.6730	511.00	19.0176	711.68	26.4903
319.41	0.0000	514.00	19.5365	720.70	0.0000
320.08	0.0000	514.00	19.5365	721.93	0.0000
321.04	40.1358	520.40	25.0977	722.78	14.8761
323.87	33.6431	520.69	0.0000	722.91	14.8767
325.23	37.4023	522.65	0.0000	723.31	17.0033
328.76	0.0000	527.90	0.0000	724.19	21.2590
333.37	29.5562	528.26	13.0830	727.33	12.7656
333.97	23.9327	529.59	13.0883	733.00	14.9143
334.37	21.1208	529.87	0.0000	735.93	9.5947
338.28	28.2068	531.02	0.0000	333.97	10.6649
338.32	28.2074	537.26	0.0000	739.50	0.0000
311.90	26.8208	546.56	0.0000	747.24	13.8982
340.48	26.8208	552.55	16.2227	748.06	20.3166
340.55	0.0000	563.25	16.7833	752.31	13.9151
344.28	20.3594	569.33	21.3990	753.82	0.0000
345.93	30.1829	946.00	21.3999	756.73	12.8589
351.06	34.0269	569.70	21.4016	756.80	12.8589
351.93	34.0386	583.19	19.4399	884.68	8.0508

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	12.8872	1274.44	8.4750	1620.50	3.7656
766.42	8.0557	1001.03	12.4417	1621.92	5.6495
766.84	8.0566	1002.74	5.0916	1678.03	0.0000
772.60	0.0000	1004.73	10.1873	1690.97	5.7045
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	2.8810
778.90	10.7735	1028.54	0.0000	1063.66	3.8442
783.70	0.0000	1037.84	10.2546	1771.35	1.9224
785.37	12.9482	1038.76	0.0000	1791.20	0.0000
792.07	8.1055	631.29	11.4136	1808.65	0.9659
794.95	6.4888	1048.07	0.0000	1810.72	0.0000
795.86	9.7354	1049.04	14.8440	1836.06	2.9083
810.06	16.2793	1050.41	7.9952		
810.29	14.1098	1063.66	1.7177		
344.28	10.8541	1077.00	0.0000		
810.76	9.7694	1077.34	4.5924		
815.77	0.0000	1085.87	9.1999		
1048.07	0.0000	1093.63	8.6377		
832.01	14.1807	1099.45	12.1064		
834.85	5.4576	1112.07	19.6466		
835.71	9.8258	1112.84	15.0260		
836.80	0.0000	1115.54	8.6731		
846.75	0.0000	1120.29	12.7322		
846.77	5.4724	1120.55	12.7331		
856.80	0.0000	1221.41	12.7349		
860.56	9.2224	1129.67	10.4355		
871.09	4.4019	1131.51	0.0000		
873.19	9.9089	1147.95	0.0000		
875.33	0.0000	1173.23	7.0122		
879.38	11.0250	1177.95	6.0159		
880.51	12.1302	1189.05	12.3064		
883.24	11.0343	1204.77	6.1703		
884.68	8.8301	1221.41	7.9568		
889.28	8.8392	1231.02	4.4278		
894.76	8.8496	1235.36	0.0000		
898.04	12.1767	1238.28	12.4132		
900.72	12.1839	1260.41	0.0000		
903.28	9.9741	1271.87	8.0261		
911.20	8.8812	1274.44	9.8137		
912.08	8.8828	1274.54	12.4910		
923.98	0.0000	1291.59	4.2949		
926.50	10.0239	1298.22	0.0000		
929.11	6.6863	1312.11	0.0000		
937.49	10.0474	1332.49	9.9097		
944.13	0.0000	1362.66	0.0000		
946.00	7.8286	1365.19	5.4342		
949.00	4.4762	1368.63	0.0000		
667.71	0.0000	1384.29	8.1760		
962.31	11.7830	1408.01	1.8237		
964.08	13.4712	1457.56	0.0000		
966.17	13.4771	1460.82	2.7583		
911.20	18.5410	1489.16	5.5404		
968.97	18.5410	1505.03	2.7768		
983.53	0.0000	1584.12	4.6826		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:39:53.47

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240008.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;499
                                    Background date  : 2-OCT-2016 11:00:12.
Sample date      : 15-DEC-2015 12:20:00 Acquisition date : 3-OCT-2016 05:38:51.
Sample ID        : R405240008           Sample quantity  : 1.50704E+02 GRAM
Detector name    : GAM06                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.65  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	36.92	24	95	2.67	73.60	72	6	6.67E-03	70.1	
2	4	61.67	21	54	1.32	123.06	121	18	5.80E-03	54.6	1.04E+00
3	4	63.41*	35	96	1.20	126.52	121	18	9.61E-03	53.1	
4	4	68.07	33	84	1.34	135.85	121	18	9.06E-03	47.2	
5	2	74.74*	103	130	1.12	149.17	146	16	2.85E-02	21.2	8.28E-01
6	2	77.09	156	111	1.00	153.86	146	16	4.33E-02	13.5	
7	0	87.32	30	187	0.97	174.31	171	8	8.21E-03	82.4	
8	0	92.91*	68	86	1.22	185.49	183	7	1.89E-02	27.3	
9	0	128.40	26	84	1.25	256.41	254	7	7.14E-03	62.0	
10	0	170.21	31	79	1.76	339.97	335	9	8.63E-03	55.0	
11	0	185.78*	47	172	1.21	371.08	365	13	1.30E-02	60.5	
12	0	209.86	48	85	1.20	419.20	414	11	1.33E-02	39.9	
13	3	241.74*	77	57	1.58	482.92	472	26	2.14E-02	24.6	1.42E+01
14	3	245.68	32	43	1.58	490.79	472	26	9.00E-03	49.0	
15	0	271.79	28	81	4.22	542.98	537	12	7.90E-03	66.8	
16	0	277.13	35	39	0.89	553.65	550	7	9.70E-03	34.4	
17	3	295.08*	110	35	1.41	589.53	585	22	3.05E-02	13.8	4.98E+00
18	3	297.08*	8	32	1.51	593.52	585	22	2.31E-03	189.5	
19	3	300.05	39	27	1.52	599.47	585	22	1.10E-02	31.8	
20	3	302.34	17	16	1.67	604.05	585	22	4.60E-03	50.4	
21	0	339.64	40	100	1.11	678.60	671	13	1.11E-02	53.6	
22	0	351.89	192	72	0.91	703.08	698	11	5.34E-02	11.3	
23	0	463.56*	17	16	1.07	926.29	920	9	4.77E-03	49.9	
24	0	511.11*	4	70	3.23	1021.35	1013	18	1.00E-03	606.1	
25	0	516.91	8	9	1.35	1032.96	1030	5	2.23E-03	65.8	
26	0	550.15	17	7	2.46	1099.41	1096	8	4.71E-03	37.3	
27	0	582.95*	106	24	1.30	1164.98	1159	13	2.94E-02	14.0	
28	0	609.11*	121	40	1.35	1217.28	1209	16	3.36E-02	15.1	
29	0	661.58	73	22	1.88	1322.17	1314	15	2.02E-02	18.5	
30	0	723.64	11	10	1.02	1446.27	1442	7	3.14E-03	55.5	
31	0	726.86	29	2	1.55	1452.71	1449	7	8.11E-03	20.0	
32	0	730.31	15	5	1.39	1459.60	1456	9	4.14E-03	36.8	
33	0	772.85	11	37	4.92	1544.66	1533	15	3.05E-03	129.7	
34	0	786.48	23	7	1.38	1571.91	1566	14	6.39E-03	32.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	860.81*	20	8	1.72	1720.53	1716	9	5.57E-03	36.1	
36	0	910.63*	63	11	1.03	1820.16	1813	15	1.75E-02	17.3	
37	0	950.00	15	17	3.38	1898.91	1891	14	4.12E-03	65.1	
38	0	963.87	22	9	1.37	1926.64	1923	9	6.11E-03	32.5	
39	0	968.23	28	12	1.94	1935.37	1931	9	7.88E-03	28.5	
40	0	1030.20	7	4	1.62	2059.29	2055	8	1.94E-03	62.3	
41	0	1119.26	38	17	2.12	2237.42	2228	17	1.06E-02	29.7	
42	0	1180.59	14	2	1.60	2360.09	2355	9	3.88E-03	32.9	
43	0	1460.02*	332	4	1.89	2919.07	2911	17	9.21E-02	5.7	
44	0	1509.23	10	2	2.27	3017.53	3012	10	2.66E-03	44.6	
45	0	1763.47	30	0	2.51	3526.27	3519	14	8.33E-03	18.3	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:39:56

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240008.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:20:00 Acquisition date : 3-OCT-2016 05:38:51
Sample ID   : R405240008   Sample quantity : 150.70 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA6   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.65   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Empirical   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	74.82	AM-243	74.66
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.005E+00	1.488E+01	1.488E+01	11.44	OK
BA-137M	661.66	89.90*	2.028E+00	2.080E-01	2.119E-01	36.91	OK
CS-137	661.66	85.10*	2.028E+00	2.198E-01	2.239E-01	36.91	OK
TL-208	277.37	6.60	3.961E+00	7.598E-01	7.598E-01	68.81	OK
	583.19	85.00*	2.244E+00	2.939E-01	2.939E-01	28.08	OK
	860.56	12.50	1.623E+00	5.022E-01	5.022E-01	72.18	OK
BI-212	727.33	6.67*	1.876E+00	1.208E+00	1.208E+00	39.96	OK
	785.37	1.10	1.755E+00	6.116E+00	6.116E+00	64.19	OK
	1620.50	1.47	9.190E-01	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18	OK
	1120.29	14.92	1.281E+00	9.838E-01	9.842E-01	59.37	OK
	1764.49	15.30	8.595E-01	1.074E+00	1.074E+00	36.51	OK
PB-214	74.82	5.80	4.080E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	4.322E+00	2.366E+00	2.367E+00	26.95	OK
	87.09	3.41	5.206E+00	1.048E+00	1.049E+00	164.80	OK
	242.00	7.25	4.384E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	3.777E+00	8.933E-01	8.936E-01	27.61	OK
	351.93	35.60*	3.304E+00	9.087E-01	9.090E-01	22.51	OK
RN-222	609.32	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18	OK
	1120.29	14.92	1.281E+00	9.838E-01	9.842E-01	59.37	OK
	1764.49	15.30	8.595E-01	1.074E+00	1.074E+00	36.51	OK
RA-224	240.99	4.10*	4.387E+00	5.452E-01	5.452E-01	234.62	OK
RA-226	609.32	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18	OK
	1120.29	14.92	1.281E+00	9.838E-01	9.842E-01	59.37	OK
	1764.49	15.30	8.595E-01	1.074E+00	1.074E+00	36.51	OK
AC-228	105.21	1.10	6.007E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.394E+00	5.815E-01	5.815E-01	107.22	OK
	794.95	4.25	1.739E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.666E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70	OK
	968.97	15.80	1.462E+00	6.171E-01	6.171E-01	56.96	OK
RA-228	105.21	1.10	6.007E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.394E+00	5.815E-01	5.815E-01	107.22	OK
	794.95	4.25	1.739E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.666E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70	OK
	968.97	15.80	1.462E+00	6.171E-01	6.171E-01	56.96	OK
TH-230	609.32	45.49*	2.167E+00	6.474E-01	6.474E-01	30.18	OK
	1120.29	14.92	1.281E+00	9.838E-01	9.838E-01	59.37	OK
	1764.49	15.30	8.595E-01	1.074E+00	1.074E+00	36.51	OK
PA-231	283.69	1.70	3.891E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	3.708E+00	4.711E-01	4.711E-01	100.81	OK
TH-232	105.21	1.10	6.007E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.394E+00	5.815E-01	5.815E-01	107.22	OK
	835.71	1.61	1.666E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70	OK
	968.97	15.80	1.462E+00	6.171E-01	6.171E-01	56.96	OK
TH-234	63.29	3.70*	2.654E+00	2.279E+00	2.279E+00	106.14	OK
	92.59	4.23	5.548E+00	1.821E+00	1.821E+00	54.69	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
U-234	609.32	45.49*	2.167E+00	6.474E-01	6.474E-01	30.18	OK
	1120.29	14.92	1.281E+00	9.838E-01	9.838E-01	59.37	OK
	1764.49	15.30	8.595E-01	1.074E+00	1.074E+00	36.51	OK
U-238	63.29	3.70*	2.654E+00	2.279E+00	2.279E+00	106.14	OK
	92.59	4.23	5.548E+00	1.821E+00	1.821E+00	54.69	OK
AM-243	43.53	5.90	3.924E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	4.071E+00	1.456E-01	1.457E-01	70.95	OK
ANH-511	511.00	100.00*	2.486E+00	7.763E-03	7.763E-03	12.18	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:39:57.39

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240008.CNF;1    *
* Acquisition date :  3-OCT-2016 05:38:51 Sensitivity     : 3.000          *
* Detector ID      : GAM06                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.65     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:20:00 Analyst initials: MXR1           *
* Sample ID        : R405240008           Sample Quantity : 1.5070E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-MAR-2016 07:26:53 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;14         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.488E+01	1.667E+00	5.074E-01
BA-137M	2.119E-01	7.666E-02	5.676E-02
CS-137	2.239E-01	8.099E-02	5.997E-02
TL-208	2.939E-01	8.089E-02	5.906E-02
BI-212	1.208E+00	4.731E-01	1.107E-01
BI-214	6.477E-01	1.915E-01	1.206E-01
PB-214	9.090E-01	2.005E-01	1.205E-01
RN-222	6.477E-01	1.915E-01	1.206E-01
RA-224	5.452E-01	1.254E+00	9.627E-01
RA-226	6.477E-01	1.915E-01	1.206E-01
AC-228	7.997E-01	2.719E-01	1.906E-01
RA-228	7.997E-01	2.719E-01	1.906E-01
TH-230	6.474E-01	1.915E-01	1.206E-01
PA-231	4.711E-01	4.654E-01	7.022E-01
TH-232	7.997E-01	2.719E-01	1.906E-01
TH-234	2.279E+00	2.370E+00	2.139E+00
U-234	6.474E-01	1.915E-01	1.206E-01
U-238	2.279E+00	2.370E+00	2.139E+00
AM-243	1.457E-01	1.013E-01	8.397E-02
ANH-511	7.763E-03	9.222E-02	6.002E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	2.805E+00	9.011E+00	1.899E+01	NOT IDENT.
NA-22	-1.052E-02	4.648E-02	9.027E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	2.872E-03	3.153E-02	6.963E-02	NOT IDENT.
SC-46	1.885E-01	3.485E-01	7.402E-01	FAIL ABUN
V-48	0.000E+00	1.149E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.168E+02	0.000E+00	SHORT HLIF
MN-54	-9.844E-03	6.313E-02	1.176E-01	NOT IDENT.
CO-56	5.016E-02	3.919E-01	7.860E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF

CO-57	-2.241E-02	3.966E-02	7.265E-02	NOT IDENT.
CO-58	3.248E-02	4.695E-01	9.384E-01	NOT IDENT.
FE-59	3.582E-01	6.160E+00	1.259E+01	NOT IDENT.
CO-60	1.815E-02	3.633E-02	8.333E-02	NOT IDENT.
ZN-65	2.114E-02	2.020E-01	3.648E-01	NOT IDENT.
GE-68	-1.355E+00	2.110E+00	3.829E+00	NOT IDENT.
AS-73	1.123E+00	8.598E+00	1.776E+01	NOT IDENT.
AS-74	0.000E+00	4.769E+03	0.000E+00	SHORT HLIF
SE-75	-2.489E-02	2.043E-01	3.691E-01	NOT IDENT.
BR-77	0.000E+00	2.174E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	4.420E+02	0.000E+00	SHORT HLIF
RB-83	-1.173E-01	5.341E-01	9.835E-01	NOT IDENT.
KR-85	-6.623E+00	7.707E+00	1.145E+01	NOT IDENT.
SR-85	-6.508E-01	7.556E-01	1.122E+00	NOT IDENT.
RB-86	0.000E+00	1.972E+04	0.000E+00	SHORT HLIF
Y-88	1.395E-02	1.291E-01	3.355E-01	NOT IDENT.
Y-91	-1.514E+02	5.204E+02	9.872E+02	NOT IDENT.
NB-94	1.141E-02	3.004E-02	6.141E-02	NOT IDENT.
NB-95	-2.322E-01	9.012E-01	1.448E+00	NOT IDENT.
NB-95M	7.458E-01	2.295E+00	4.045E+00	NOT IDENT.
ZR-95	-1.017E+00	1.387E+00	2.333E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.472E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.564E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.265E+41	0.000E+00	SHORT HLIF
RH-101	4.429E-02	5.381E-02	5.543E-02	FAIL ABUN
RH-102	4.013E-03	5.952E-02	1.168E-01	NOT IDENT.
RU-103	1.578E-02	4.433E+00	8.845E+00	FAIL ABUN
RH-106	1.654E-01	3.796E-01	8.222E-01	NOT IDENT.
RU-106	1.654E-01	3.796E-01	8.222E-01	NOT IDENT.
AG-108M	8.351E-03	2.720E-02	5.570E-02	FAIL ABUN
CD-109	1.500E+00	2.422E+00	2.302E+00	FAIL ABUN
AG-110M	6.900E-02	1.074E-01	2.259E-01	NOT IDENT.
SN-113	-9.528E-02	2.256E-01	4.265E-01	NOT IDENT.
CD-115	0.000E+00	2.919E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.177E+04	0.000E+00	SHORT HLIF
TE-123M	1.467E-02	1.127E-01	2.164E-01	NOT IDENT.
SB-124	-4.285E-01	1.564E+00	3.176E+00	FAIL ABUN
SB-125	-6.393E-02	1.022E-01	1.873E-01	FAIL ABUN
TE-125M	4.686E+01	2.035E+02	4.052E+02	NOT IDENT.
I-126	0.000E+00	5.801E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	9.159E+05	0.000E+00	SHORT HLIF
SN-126	9.661E-02	1.560E-01	1.524E-01	FAIL ABUN
SB-127	0.000E+00	4.910E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.517E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.184E+25	0.000E+00	SHORT HLIF
BA-133	-6.304E-03	3.958E-02	7.009E-02	FAIL ABUN
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	-6.454E-03	4.615E-02	8.713E-02	NOT IDENT.
CS-135	-9.129E-02	1.616E-01	2.490E-01	NOT IDENT.
I-135	0.000E+00	1.622E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.004E+05	0.000E+00	SHORT HLIF
CE-139	3.967E-02	9.658E-02	1.783E-01	NOT IDENT.
BA-140	0.000E+00	6.867E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.484E+05	0.000E+00	SHORT HLIF
CE-141	-7.867E+00	1.967E+01	3.599E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	3.363E-02	3.106E-01	6.007E-01	NOT IDENT.
PM-144	-1.458E-03	5.514E-02	1.057E-01	NOT IDENT.
PR-144	-9.499E-02	4.777E+00	9.161E+00	NOT IDENT.
PM-146	5.397E-03	3.752E-02	7.656E-02	NOT IDENT.
ND-147	0.000E+00	1.851E+07	0.000E+00	SHORT HLIF
PM-147	7.265E+01	6.795E+02	1.330E+03	NOT IDENT.
PM-149	0.000E+00	5.223E+39	0.000E+00	SHORT HLIF
EU-150	-8.921E-03	2.629E-02	4.528E-02	FAIL ABUN
EU-152	-5.788E-02	8.023E-02	1.292E-01	FAIL ABUN
GD-153	-6.310E-02	1.388E-01	2.615E-01	NOT IDENT.
EU-154	-2.053E-02	1.155E-01	2.263E-01	FAIL ABUN
EU-155	5.780E-02	8.800E-02	1.816E-01	FAIL ABUN
TB-160	3.253E-01	1.808E+00	3.577E+00	FAIL ABUN
HO-166M	-1.160E-02	5.777E-02	1.078E-01	FAIL ABUN
TM-171	1.021E+01	2.247E+01	4.758E+01	FAIL ABUN
HF-172	8.347E-02	2.051E-01	3.830E-01	FAIL ABUN
LU-172	-2.765E-02	6.384E-02	1.219E-01	FAIL ABUN
LU-176	2.071E-03	1.997E-02	4.115E-02	FAIL ABUN
HF-181	-8.848E-01	3.432E+00	6.601E+00	NOT IDENT.
TA-182	5.299E-03	6.981E-01	1.453E+00	FAIL ABUN

RE-183	-2.787E+00	2.847E+00	5.307E+00	FAIL ABUN
RE-184	1.760E+01	2.622E+01	5.635E+01	NOT IDENT.
W-188	-6.747E-01	1.006E+02	1.703E+02	FAIL ABUN
IR-192	-2.698E-01	3.883E-01	7.277E-01	FAIL ABUN
HG-203	-6.076E-01	2.136E+00	3.449E+00	NOT IDENT.
BI-207	-5.382E-02	4.537E-02	7.149E-02	FAIL ABUN
PB-210	1.338E+00	4.057E+00	8.494E+00	NOT IDENT.
BI-211	0.000E+00	5.524E-01	8.460E-01	FAIL ABUN
PB-211	2.660E-01	6.402E-01	1.326E+00	NOT IDENT.
PB-212	0.000E+00	9.719E-02	2.317E-01	FAIL ABUN
RN-219	-1.040E-01	3.469E-01	6.683E-01	FAIL ABUN
RA-223	1.744E-01	5.023E-01	1.053E+00	FAIL ABUN
AC-227	8.931E-02	2.379E-01	4.534E-01	FAIL ABUN
TH-227	8.931E-02	2.379E-01	4.534E-01	FAIL ABUN
TH-228	0.000E+00	9.719E-02	2.317E-01	FAIL ABUN
TH-229	2.623E-01	4.571E-01	8.969E-01	FAIL ABUN
TH-231	1.744E-01	5.023E-01	1.053E+00	FAIL ABUN
PA-233	-5.538E-02	5.091E-02	9.095E-02	FAIL ABUN
PA-234	1.621E-01	2.596E-01	5.487E-01	FAIL ABUN
PA-234M	1.338E+00	4.239E+00	8.900E+00	NOT IDENT.
U-235	1.090E-01	1.752E-01	3.483E-01	FAIL ABUN
NP-237	-5.538E-02	5.091E-02	9.095E-02	FAIL ABUN
NP-238	0.000E+00	5.171E+40	0.000E+00	SHORT HLIF
NP-239	-3.369E-02	1.973E-01	3.775E-01	FAIL ABUN
PU-239	4.033E+02	4.901E+02	5.694E+02	FAIL ABUN
AM-241	1.369E-01	1.430E-01	2.924E-01	NOT IDENT.
CM-243	-4.170E-02	8.030E-02	1.498E-01	FAIL ABUN
BK-247	6.305E-02	6.612E-02	1.366E-01	NOT IDENT.
CM-247	-2.883E-02	3.137E-02	5.563E-02	FAIL ABUN
CF-249	-1.137E-02	3.342E-02	6.432E-02	NOT IDENT.
CF-251	-4.014E-02	1.097E-01	1.985E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:39:54.59

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	320	10.66*	1.005E+00	1.488E+01	1.488E+01	11.44
CD-109	88.03	37	3.70*	5.206E+00	9.661E-01	1.500E+00	164.80
SN-126	64.28	45	9.60	2.654E+00	8.782E-01	8.782E-01	106.14
	86.94	37	8.90	5.206E+00	4.016E-01	4.016E-01	164.80
	87.57	37	37.00*	5.206E+00	9.661E-02	9.661E-02	164.80
BA-137M	661.66	76	89.90*	2.028E+00	2.080E-01	2.119E-01	36.91
CS-137	661.66	76	85.10*	2.028E+00	2.198E-01	2.239E-01	36.91
TL-208	277.37	40	6.60	3.961E+00	7.598E-01	7.598E-01	68.81
	583.19	113	85.00*	2.244E+00	2.939E-01	2.939E-01	28.08
	860.56	20	12.50	1.623E+00	5.022E-01	5.022E-01	72.18
BI-211	72.87	------	1.23	3.859E+00	------ Line Not Found		------
	351.06	215	12.92*	3.304E+00	2.504E+00	2.504E+00	22.51
BI-212	727.33	30	6.67*	1.876E+00	1.208E+00	1.208E+00	39.96
	785.37	24	1.10	1.755E+00	6.116E+00	6.116E+00	64.19
	1620.50	------	1.47	9.190E-01	------ Line Not Found		------
BI-214	609.32	128	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18
	1120.29	38	14.92	1.281E+00	9.838E-01	9.842E-01	59.37
	1764.49	28	15.30	8.595E-01	1.074E+00	1.074E+00	36.51
PB-214	74.82	131	5.80	4.071E+00	2.772E+00	2.773E+00	42.40
	77.11	199	9.70	4.322E+00	2.366E+00	2.367E+00	26.95
	87.09	37	3.41	5.206E+00	1.048E+00	1.049E+00	164.80
	242.00	89	7.25	4.387E+00	1.393E+00	1.394E+00	49.23
	295.22	125	18.42	3.777E+00	8.933E-01	8.936E-01	27.61
	351.93	215	35.60*	3.304E+00	9.087E-01	9.090E-01	22.51
RN-222	609.32	128	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18
	1120.29	38	14.92	1.281E+00	9.838E-01	9.842E-01	59.37
	1764.49	28	15.30	8.595E-01	1.074E+00	1.074E+00	36.51
RA-224	240.99	89	4.10*	4.387E+00	2.464E+00	2.464E+00	49.23
RA-226	609.32	128	45.49*	2.167E+00	6.474E-01	6.477E-01	30.18
	1120.29	38	14.92	1.281E+00	9.838E-01	9.842E-01	59.37
	1764.49	28	15.30	8.595E-01	1.074E+00	1.074E+00	36.51
AC-228	105.21	------	1.10	6.007E+00	------ Line Not Found		------
	338.32	45	11.27	3.394E+00	5.815E-01	5.815E-01	107.22
	794.95	------	4.25	1.739E+00	------ Line Not Found		------
	835.71	------	1.61	1.666E+00	------ Line Not Found		------
	911.20	64	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70
	968.97	29	15.80	1.462E+00	6.171E-01	6.171E-01	56.96
RA-228	105.21	------	1.10	6.007E+00	------ Line Not Found		------
	338.32	45	11.27	3.394E+00	5.815E-01	5.815E-01	107.22
	794.95	------	4.25	1.739E+00	------ Line Not Found		------
	835.71	------	1.61	1.666E+00	------ Line Not Found		------
	911.20	64	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70
	968.97	29	15.80	1.462E+00	6.171E-01	6.171E-01	56.96
TH-230	609.32	128	45.49*	2.167E+00	6.474E-01	6.474E-01	30.18
	1120.29	38	14.92	1.281E+00	9.838E-01	9.838E-01	59.37
	1764.49	28	15.30	8.595E-01	1.074E+00	1.074E+00	36.51
PA-231	283.69	------	1.70	3.891E+00	------ Line Not Found		------

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	301.36	19	5.35*	3.708E+00	4.711E-01	4.711E-01	100.81
TH-232	105.21	------	1.10	6.007E+00	------ Line Not Found		------
	338.32	45	11.27	3.394E+00	5.815E-01	5.815E-01	107.22
	835.71	------	1.61	1.666E+00	------ Line Not Found		------
	911.20	64	25.80*	1.545E+00	7.997E-01	7.997E-01	34.70
	968.97	29	15.80	1.462E+00	6.171E-01	6.171E-01	56.96
TH-234	63.29	45	3.70*	2.654E+00	2.279E+00	2.279E+00	106.14
	92.59	86	4.23	5.548E+00	1.821E+00	1.821E+00	54.69
U-234	609.32	128	45.49*	2.167E+00	6.474E-01	6.474E-01	30.18
	1120.29	38	14.92	1.281E+00	9.838E-01	9.838E-01	59.37
	1764.49	28	15.30	8.595E-01	1.074E+00	1.074E+00	36.51
U-238	63.29	45	3.70*	2.654E+00	2.279E+00	2.279E+00	106.14
	92.59	86	4.23	5.548E+00	1.821E+00	1.821E+00	54.69
AM-243	43.53	------	5.90	3.924E-01	------ Line Not Found		------
	74.66	131	67.20*	4.071E+00	2.392E-01	2.392E-01	42.40
ANH-511	511.00	4	100.00*	2.486E+00	7.763E-03	7.763E-03	1212.18

Flag: "*" = Keyline

Sample ID : R405240008 Acquisition date : 3-OCT-2016 05:38:51

Total number of lines in spectrum 45
Number of unidentified lines 9
Number of lines tentatively identified by NID 36 80.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.488E+01	1.488E+01	0.170E+01	11.44	
CD-109	461.40D	1.55	9.661E-01	1.500E+00	2.472E+00	164.80	
SN-126	2.30E+05Y	1.00	9.661E-02	9.661E-02	15.92E-02	164.80	
BA-137M	30.08Y	1.02	2.080E-01	2.119E-01	0.782E-01	36.91	
CS-137	30.08Y	1.02	2.198E-01	2.239E-01	0.826E-01	36.91	
TL-208	1.41E+10Y	1.00	2.939E-01	2.939E-01	0.825E-01	28.08	
BI-211	7.04E+08Y	1.00	2.504E+00	2.504E+00	0.564E+00	22.51	
BI-212	1.41E+10Y	1.00	1.208E+00	1.208E+00	0.483E+00	39.96	
BI-214	1600.00Y	1.00	6.474E-01	6.477E-01	1.954E-01	30.18	
PB-214	1600.00Y	1.00	9.087E-01	9.090E-01	2.046E-01	22.51	
RN-222	1600.00Y	1.00	6.474E-01	6.477E-01	1.954E-01	30.18	
RA-224	1.41E+10Y	1.00	2.464E+00	2.464E+00	1.213E+00	49.23	
RA-226	1600.00Y	1.00	6.474E-01	6.477E-01	1.954E-01	30.18	
AC-228	1.41E+10Y	1.00	7.997E-01	7.997E-01	2.775E-01	34.70	
RA-228	1.41E+10Y	1.00	7.997E-01	7.997E-01	2.775E-01	34.70	
TH-230	7.54E+04Y	1.00	6.474E-01	6.474E-01	1.954E-01	30.18	
PA-231	7.04E+08Y	1.00	4.711E-01	4.711E-01	4.749E-01	100.81	
TH-232	1.41E+10Y	1.00	7.997E-01	7.997E-01	2.775E-01	34.70	
TH-234	4.47E+09Y	1.00	2.279E+00	2.279E+00	2.418E+00	106.14	
U-234	2.45E+05Y	1.00	6.474E-01	6.474E-01	1.954E-01	30.18	
U-238	4.47E+09Y	1.00	2.279E+00	2.279E+00	2.418E+00	106.14	
AM-243	7370.00Y	1.00	2.392E-01	2.392E-01	1.014E-01	42.40	
ANH-511	1.00E+09Y	1.00	7.763E-03	7.763E-03	94.10E-03	1212.18	
	Total Activity :		3.466E+01	3.520E+01			
	Grand Total Activity :		3.466E+01	3.520E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240008 Acquisition date : 3-OCT-2016 05:38:51

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	36.92	33	129	2.67	73.60	72	6	6.67E-03	****	9.67E-02	
4	61.67	27	71	1.32	123.06	121	18	5.80E-03	****	2.42E+00	T
4	68.07	42	108	1.34	135.85	121	18	9.06E-03	94.4	3.27E+00	T
0	128.40	31	103	1.25	256.41	254	7	7.14E-03	****	6.15E+00	T
0	170.21	37	94	1.76	339.97	335	9	8.63E-03	****	5.55E+00	
0	185.78	55	204	1.21	371.08	365	13	1.30E-02	****	5.27E+00	T
0	209.86	56	100	1.20	419.20	414	11	1.33E-02	79.9	4.86E+00	T
3	245.68	37	50	1.58	490.79	472	26	9.00E-03	98.0	4.34E+00	T
0	271.79	33	92	4.22	542.98	537	12	7.90E-03	****	4.02E+00	T
3	297.08	9	36	1.51	593.52	585	22	2.31E-03	****	3.76E+00	
3	300.05	45	30	1.52	599.47	585	22	1.10E-02	63.5	3.73E+00	T
0	463.56	19	17	1.07	926.29	920	9	4.77E-03	99.8	2.68E+00	T
0	516.91	9	10	1.35	1032.96	1030	5	2.23E-03	****	2.46E+00	
0	550.15	18	8	2.46	1099.41	1096	8	4.71E-03	74.6	2.35E+00	
0	723.64	12	10	1.02	1446.27	1442	7	3.14E-03	****	1.88E+00	T
0	730.31	15	5	1.39	1459.60	1456	9	4.14E-03	73.7	1.87E+00	
0	772.85	11	38	4.92	1544.66	1533	15	3.05E-03	****	1.78E+00	T
0	950.00	15	17	3.38	1898.91	1891	14	4.12E-03	****	1.49E+00	T
0	963.87	22	9	1.37	1926.64	1923	9	6.11E-03	65.1	1.47E+00	T
0	1030.20	7	4	1.62	2059.29	2055	8	1.94E-03	****	1.38E+00	
0	1180.59	14	2	1.60	2360.09	2355	9	3.88E-03	65.7	1.22E+00	
0	1509.23	9	2	2.27	3017.53	3012	10	2.66E-03	89.2	9.76E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:40:10.33

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240008.CNF;1    *
* Acquisition date :  3-OCT-2016 05:38:51 Sensitivity     : 3.000          *
* Detector ID      : GAM06                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.65     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:20:00 Nuclide Library : SOLID          *
* Sample ID        : R405240008           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.5070E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  8-MAR-2016 07:26:53 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;14          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.903E-01
BA-137M	2.452E-02
CS-137	2.590E-02
TL-208	2.590E-02
BI-212	0.000E+00
BI-214	5.327E-02
PB-214	5.430E-02
RN-222	5.327E-02
RA-224	4.422E-01
RA-226	5.327E-02
AC-228	7.808E-02
RA-228	7.808E-02
TH-230	5.326E-02
PA-231	3.157E-01
TH-232	7.808E-02
TH-234	9.948E-01
U-234	5.326E-02
U-238	9.948E-01
AM-243	3.933E-02
ANH-511	2.722E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	8.343E+00	NOT IDENT.
NA-22	3.772E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.680E-02	NOT IDENT.
SC-46	3.211E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	5.092E-02	NOT IDENT.
CO-56	3.352E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.346E-02	NOT IDENT.

CO-58	3.983E-01	NOT IDENT.
FE-59	5.408E+00	NOT IDENT.
CO-60	3.474E-02	NOT IDENT.
ZN-65	1.583E-01	NOT IDENT.
GE-68	1.576E+00	NOT IDENT.
AS-73	8.218E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.687E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.254E-01	NOT IDENT.
KR-85	5.042E+00	NOT IDENT.
SR-85	4.940E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.131E-01	NOT IDENT.
Y-91	4.234E+02	NOT IDENT.
NB-94	2.712E-02	NOT IDENT.
NB-95	6.329E-01	NOT IDENT.
NB-95M	1.871E+00	NOT IDENT.
ZR-95	1.000E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.569E-02	FAIL ABUN
RH-102	5.159E-02	NOT IDENT.
RU-103	3.894E+00	FAIL ABUN
RH-106	3.546E-01	NOT IDENT.
RU-106	3.546E-01	NOT IDENT.
AG-108M	2.511E-02	FAIL ABUN
CD-109	1.093E+00	FAIL ABUN
AG-110M	9.952E-02	NOT IDENT.
SN-113	1.927E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.001E-01	NOT IDENT.
SB-124	1.122E+00	FAIL ABUN
SB-125	8.361E-02	FAIL ABUN
TE-125M	1.876E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SN-126	7.248E-02	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.141E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	3.751E-02	NOT IDENT.
CS-135	1.136E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	8.222E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.672E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.788E-01	NOT IDENT.
PM-144	4.659E-02	NOT IDENT.
PR-144	4.041E+00	NOT IDENT.
PM-146	3.393E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.147E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.048E-02	FAIL ABUN
EU-152	5.643E-02	FAIL ABUN
GD-153	1.207E-01	NOT IDENT.
EU-154	9.491E-02	FAIL ABUN
EU-155	8.441E-02	FAIL ABUN
TB-160	1.552E+00	FAIL ABUN
HO-166M	4.721E-02	FAIL ABUN
TM-171	2.208E+01	FAIL ABUN
HF-172	1.777E-01	FAIL ABUN
LU-172	4.978E-02	FAIL ABUN
LU-176	1.853E-02	FAIL ABUN
HF-181	2.902E+00	NOT IDENT.
TA-182	6.007E-01	FAIL ABUN
RE-183	2.453E+00	FAIL ABUN

RE-184	2.461E+01	NOT IDENT.
W-188	7.674E+01	FAIL ABUN
IR-192	3.268E-01	FAIL ABUN
HG-203	1.554E+00	NOT IDENT.
BI-207	2.880E-02	FAIL ABUN
PB-210	3.962E+00	NOT IDENT.
BI-211	4.067E-01	FAIL ABUN
PB-211	6.008E-01	NOT IDENT.
PB-212	1.122E-01	FAIL ABUN
RN-219	2.987E-01	FAIL ABUN
RA-223	4.764E-01	FAIL ABUN
AC-227	2.090E-01	FAIL ABUN
TH-227	2.090E-01	FAIL ABUN
TH-228	1.122E-01	FAIL ABUN
TH-229	4.171E-01	FAIL ABUN
TH-231	4.764E-01	FAIL ABUN
PA-233	4.043E-02	FAIL ABUN
PA-234	2.361E-01	FAIL ABUN
PA-234M	3.876E+00	NOT IDENT.
U-235	1.633E-01	FAIL ABUN
NP-237	4.043E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.741E-01	FAIL ABUN
PU-239	2.663E+02	FAIL ABUN
AM-241	1.367E-01	NOT IDENT.
CM-243	6.900E-02	FAIL ABUN
BK-247	6.255E-02	NOT IDENT.
CM-247	2.456E-02	FAIL ABUN
CF-249	2.870E-02	NOT IDENT.
CF-251	9.165E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:40:16.50

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240008.CNF;1		
Acquisition date	: 3-OCT-2016 05:38:51	Sensitivity	: 3.000
Detector ID	: GAM06	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.65	Half life ratio	: *****
Sample date	: 15-DEC-2015 12:20:00	Nuclide Library	: SOLID
Sample ID	: R405240008	Analyst initials	: MXR1
Batch Number	: 1596386	Sample Quantity	: 1.5070E+02 GRAM
		Quantity Err(%)	: 1.3271E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 8-MAR-2016 07:26:53	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;14		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.488E+01	2.093E+00	2.093E+00
BA-137M	2.119E-01	7.863E-02	7.863E-02
CS-137	2.239E-01	8.307E-02	8.307E-02
TL-208	2.939E-01	8.473E-02	8.473E-02
BI-212	1.208E+00	4.874E-01	4.874E-01
BI-214	6.477E-01	1.993E-01	1.993E-01
PB-214	9.090E-01	2.165E-01	2.165E-01
RN-222	6.477E-01	1.993E-01	1.993E-01
RA-224	5.707E-01	1.274E+00	1.274E+00
RA-226	6.477E-01	1.993E-01	1.993E-01
AC-228	7.997E-01	2.914E-01	2.914E-01
RA-228	7.997E-01	2.914E-01	2.914E-01
TH-230	6.474E-01	1.992E-01	1.992E-01
PA-231	4.711E-01	4.778E-01	4.778E-01
TH-232	7.997E-01	2.914E-01	2.914E-01
TH-234	2.279E+00	2.425E+00	2.425E+00
U-234	6.474E-01	1.992E-01	1.992E-01
U-238	2.279E+00	2.425E+00	2.425E+00
AM-243	1.469E-01	1.028E-01	1.028E-01
ANH-511	7.763E-03	9.223E-02	9.223E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	2.805E+00	9.014E+00	9.103E+00	NOT IDENT.
NA-22	-1.052E-02	4.648E-02	4.672E-02	NOT IDENT.
NA-24	-1.000E+41	2.838E+41	0.000E+00	SHORT HLIF
AL-26	2.872E-03	3.153E-02	3.156E-02	NOT IDENT.
SC-46	1.885E-01	3.492E-01	3.594E-01	FAIL ABUN
V-48	5.316E+03	1.152E+04	1.176E+04	SHORT HLIF
CR-51	-1.672E+02	3.172E+02	3.260E+02	SHORT HLIF
MN-54	-9.844E-03	6.314E-02	6.330E-02	NOT IDENT.
CO-56	5.016E-02	3.920E-01	3.926E-01	NOT IDENT.
MN-56	1.000E+41	8.077E+41	0.000E+00	SHORT HLIF

CO-57	-2.241E-02	3.969E-02	4.096E-02	NOT IDENT.
CO-58	3.248E-02	4.695E-01	4.697E-01	NOT IDENT.
FE-59	3.582E-01	6.160E+00	6.162E+00	NOT IDENT.
CO-60	1.815E-02	3.636E-02	3.727E-02	NOT IDENT.
ZN-65	2.114E-02	2.021E-01	2.023E-01	NOT IDENT.
GE-68	-1.355E+00	2.122E+00	2.209E+00	NOT IDENT.
AS-73	1.123E+00	8.601E+00	8.616E+00	NOT IDENT.
AS-74	-2.601E+02	4.769E+03	4.770E+03	SHORT HLIF
SE-75	-2.489E-02	2.043E-01	2.046E-01	NOT IDENT.
BR-77	1.460E+37	1.234E+38	0.000E+00	SHORT HLIF
SR-82	4.270E+02	4.442E+02	4.841E+02	SHORT HLIF
RB-83	-1.173E-01	5.344E-01	5.370E-01	NOT IDENT.
KR-85	-6.623E+00	7.728E+00	8.285E+00	NOT IDENT.
SR-85	-6.508E-01	7.576E-01	8.125E-01	NOT IDENT.
RB-86	-1.338E+04	1.985E+04	2.074E+04	SHORT HLIF
Y-88	1.395E-02	1.291E-01	1.293E-01	NOT IDENT.
Y-91	-1.514E+02	5.205E+02	5.250E+02	NOT IDENT.
NB-94	1.141E-02	3.006E-02	3.050E-02	NOT IDENT.
NB-95	-2.322E-01	9.015E-01	9.075E-01	NOT IDENT.
NB-95M	7.458E-01	2.296E+00	2.321E+00	NOT IDENT.
ZR-95	-1.017E+00	1.391E+00	1.464E+00	FAIL ABUN
NB-97	1.000E+41	2.963E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.475E+41	0.000E+00	SHORT HLIF
MO-99	5.694E+30	2.564E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	1.270E+41	0.000E+00	SHORT HLIF
RH-101	4.429E-02	5.446E-02	5.801E-02	FAIL ABUN
RH-102	4.013E-03	5.952E-02	5.955E-02	NOT IDENT.
RU-103	1.578E-02	4.433E+00	4.433E+00	FAIL ABUN
RH-106	1.654E-01	3.800E-01	3.872E-01	NOT IDENT.
RU-106	1.654E-01	3.800E-01	3.872E-01	NOT IDENT.
AG-108M	8.351E-03	2.721E-02	2.746E-02	FAIL ABUN
CD-109	1.500E+00	2.427E+00	2.519E+00	FAIL ABUN
AG-110M	6.900E-02	1.077E-01	1.121E-01	NOT IDENT.
SN-113	-9.528E-02	2.257E-01	2.298E-01	NOT IDENT.
CD-115	-2.358E+38	2.954E+38	0.000E+00	SHORT HLIF
SN-117M	4.620E+03	6.177E+04	6.181E+04	SHORT HLIF
TE-123M	1.467E-02	1.127E-01	1.129E-01	NOT IDENT.
SB-124	-4.285E-01	1.564E+00	1.576E+00	FAIL ABUN
SB-125	-6.393E-02	1.023E-01	1.063E-01	FAIL ABUN
TE-125M	4.686E+01	2.035E+02	2.046E+02	NOT IDENT.
I-126	-3.940E+05	5.832E+05	6.096E+05	SHORT HLIF
SB-126	-6.681E+05	9.257E+05	9.735E+05	SHORT HLIF
SN-126	9.661E-02	1.562E-01	1.622E-01	FAIL ABUN
SB-127	2.531E+21	5.974E+21	0.000E+00	SHORT HLIF
I-131	-2.544E+08	2.517E+09	2.519E+09	SHORT HLIF
I-132	-1.000E+41	1.828E+42	0.000E+00	SHORT HLIF
TE-132	2.147E+25	7.236E+25	0.000E+00	SHORT HLIF
BA-133	-6.304E-03	3.958E-02	3.969E-02	FAIL ABUN
I-133	1.000E+41	5.335E+41	0.000E+00	SHORT HLIF
CS-134	-6.454E-03	4.615E-02	4.624E-02	NOT IDENT.
CS-135	-9.129E-02	1.619E-01	1.671E-01	NOT IDENT.
I-135	1.000E+41	6.811E+41	0.000E+00	SHORT HLIF
CS-136	-5.183E+04	2.007E+05	2.020E+05	SHORT HLIF
CE-139	3.967E-02	9.693E-02	9.857E-02	NOT IDENT.
BA-140	3.309E+03	6.867E+05	6.867E+05	SHORT HLIF
LA-140	-4.280E+04	2.484E+05	2.492E+05	SHORT HLIF
CE-141	-7.867E+00	1.968E+01	2.000E+01	NOT IDENT.
CE-143	1.000E+41	2.816E+41	0.000E+00	SHORT HLIF
CE-144	3.363E-02	3.106E-01	3.109E-01	NOT IDENT.
PM-144	-1.458E-03	5.514E-02	5.515E-02	NOT IDENT.
PR-144	-9.499E-02	4.777E+00	4.777E+00	NOT IDENT.
PM-146	5.397E-03	3.752E-02	3.760E-02	NOT IDENT.
ND-147	1.664E+06	1.851E+07	1.853E+07	SHORT HLIF
PM-147	7.265E+01	6.795E+02	6.803E+02	NOT IDENT.
PM-149	-4.957E+38	5.225E+39	0.000E+00	SHORT HLIF
EU-150	-8.921E-03	2.630E-02	2.661E-02	FAIL ABUN
EU-152	-5.788E-02	8.043E-02	8.455E-02	FAIL ABUN
GD-153	-6.310E-02	1.388E-01	1.417E-01	NOT IDENT.
EU-154	-2.053E-02	1.156E-01	1.159E-01	FAIL ABUN
EU-155	5.780E-02	8.815E-02	9.192E-02	FAIL ABUN
TB-160	3.253E-01	1.809E+00	1.815E+00	FAIL ABUN
HO-166M	-1.160E-02	5.778E-02	5.802E-02	FAIL ABUN
TM-171	1.021E+01	2.249E+01	2.296E+01	FAIL ABUN
HF-172	8.347E-02	2.056E-01	2.090E-01	FAIL ABUN
LU-172	-2.765E-02	6.407E-02	6.527E-02	FAIL ABUN
LU-176	2.071E-03	1.997E-02	1.999E-02	FAIL ABUN
HF-181	-8.848E-01	3.433E+00	3.456E+00	NOT IDENT.
TA-182	5.299E-03	6.981E-01	6.981E-01	FAIL ABUN

RE-183	-2.787E+00	2.880E+00	3.142E+00	FAIL ABUN
RE-184	1.760E+01	2.662E+01	2.778E+01	NOT IDENT.
W-188	-6.747E-01	1.006E+02	1.006E+02	FAIL ABUN
IR-192	-2.698E-01	3.891E-01	4.077E-01	FAIL ABUN
HG-203	-6.076E-01	2.137E+00	2.154E+00	NOT IDENT.
BI-207	-5.382E-02	4.623E-02	5.221E-02	FAIL ABUN
PB-210	1.338E+00	4.058E+00	4.103E+00	NOT IDENT.
BI-211	2.504E+00	5.976E-01	1.277E+00	FAIL ABUN
PB-211	2.660E-01	6.406E-01	6.517E-01	NOT IDENT.
PB-212	6.687E-01	1.143E-01	3.224E-01	FAIL ABUN
RN-219	-1.040E-01	3.473E-01	3.504E-01	FAIL ABUN
RA-223	1.744E-01	5.027E-01	5.088E-01	FAIL ABUN
AC-227	8.931E-02	2.382E-01	2.416E-01	FAIL ABUN
TH-227	8.931E-02	2.382E-01	2.416E-01	FAIL ABUN
TH-228	6.687E-01	1.143E-01	3.224E-01	FAIL ABUN
TH-229	2.623E-01	4.576E-01	4.726E-01	FAIL ABUN
TH-231	1.744E-01	5.027E-01	5.088E-01	FAIL ABUN
PA-233	-5.538E-02	5.119E-02	5.695E-02	FAIL ABUN
PA-234	1.621E-01	3.197E-01	3.280E-01	FAIL ABUN
PA-234M	1.338E+00	4.244E+00	4.286E+00	NOT IDENT.
U-235	1.090E-01	1.754E-01	1.821E-01	FAIL ABUN
NP-237	-5.538E-02	5.119E-02	5.695E-02	FAIL ABUN
NP-238	7.692E+38	5.171E+40	0.000E+00	SHORT HLIF
NP-239	-3.369E-02	1.974E-01	1.979E-01	FAIL ABUN
PU-239	4.033E+02	4.909E+02	5.235E+02	FAIL ABUN
AM-241	1.369E-01	1.434E-01	1.561E-01	NOT IDENT.
CM-243	-4.170E-02	8.042E-02	8.259E-02	FAIL ABUN
BK-247	6.305E-02	6.751E-02	7.325E-02	NOT IDENT.
CM-247	-2.883E-02	3.182E-02	3.437E-02	FAIL ABUN
CF-249	-1.137E-02	3.344E-02	3.383E-02	NOT IDENT.
CF-251	-4.014E-02	1.098E-01	1.113E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	51.0306	87.09	110.5200	136.47	60.3559
45.60	68.5043	87.57	110.6315	140.51	0.0000
46.54	51.5337	88.03	110.7377	143.76	56.8155
49.72	0.0000	88.34	110.8094	144.24	61.0674
51.35	53.1770	88.47	104.4694	145.44	66.4492
51.87	52.3865	89.96	78.5936	152.43	57.5349
52.39	47.2205	1093.63	65.2664	153.25	0.0000
52.97	48.1770	91.11	0.0000	323.87	60.8843
53.44	49.1205	92.59	61.6709	156.02	0.0000
54.07	52.7254	93.35	61.7651	158.56	0.0000
57.36	0.0000	94.56	58.0449	159.00	48.3886
57.53	69.2191	94.65	58.0554	162.33	44.2888
57.98	70.1936	94.67	58.0577	162.66	0.0000
59.27	59.4452	94.87	58.0806	163.33	46.5123
59.32	51.1296	97.43	57.4007	165.86	39.0734
59.54	47.5909	98.43	46.7893	176.31	41.8118
60.96	74.0488	98.44	46.7904	176.60	0.0000
61.17	74.0905	99.53	52.7496	177.52	56.2023
62.93	59.4286	100.11	51.8306	181.07	0.0000
63.29	59.4844	102.03	49.0753	181.52	60.5482
63.58	59.5294	103.18	56.0668	184.41	60.0257
64.28	59.6373	103.37	56.0868	143.76	60.1230
66.73	60.0109	105.21	45.4178	193.51	47.2064
67.24	60.0879	105.31	45.4262	197.03	47.4044
125.81	60.1539	106.12	47.4719	198.01	55.3687
67.75	60.1645	106.47	47.5023	201.83	59.0213
69.67	76.9370	109.28	47.7451	203.43	55.7194
70.83	68.5815	111.00	52.8811	205.31	53.1807
72.81	77.5208	111.76	0.0000	210.85	44.7236
72.87	86.1463	114.06	41.1292	215.65	36.8931
74.66	73.2247	116.30	0.0000	222.11	52.2482
74.82	73.2518	116.74	50.3906	227.09	46.6913
74.97	73.2778	119.76	41.5333	227.38	44.3706
77.11	73.6400	121.12	47.7204	228.16	0.0000
78.74	73.9130	121.22	47.7283	228.18	31.5533
79.69	74.0703	121.78	50.8221	116.74	31.5533
80.12	70.0746	122.06	56.9472	235.69	43.9733
80.19	0.0000	122.92	54.9921	235.96	40.8440
80.57	62.6292	123.07	56.0243	238.63	42.5314
81.00	66.4506	265.00	54.0416	238.98	0.0000
81.07	66.4608	125.81	46.3858	240.99	42.6341
81.75	79.1185	127.23	57.4319	242.00	42.6775
83.79	87.0396	127.91	45.1749	244.70	42.7945
84.00	64.3627	129.30	60.7105	252.40	0.0000
85.43	100.0053	131.20	59.1740	252.80	25.1650
86.55	110.3943	133.02	60.0338	254.15	0.0000
86.79	110.4492	133.52	53.8654	256.23	39.6777
86.94	110.4846	136.00	61.3524	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	40.0002	355.39	0.0000	584.27	17.0865
264.80	29.0947	356.01	27.4958	595.83	0.0000
265.00	24.2499	364.49	0.0000	427.87	23.3098
268.22	48.6475	366.42	0.0000	602.52	0.0000
269.46	37.3404	372.51	17.6733	604.72	15.2332
270.03	38.9844	375.05	15.0500	607.14	19.3185
271.23	39.0283	377.52	23.0589	609.32	19.3394
273.65	0.0000	356.01	25.8370	610.33	19.3494
276.40	26.1432	388.16	27.7040	614.28	19.8975
277.37	29.4375	388.63	0.0000	618.01	15.3339
277.60	29.4434	391.69	35.8358	620.36	15.3516
278.00	32.7271	264.66	18.9317	621.93	9.2179
279.20	32.7629	401.81	27.9689	630.19	0.0000
279.54	29.4954	402.40	31.5906	631.29	18.5200
279.70	29.4998	404.85	25.3152	633.25	17.5070
280.46	24.6002	410.95	32.6836	634.78	0.0000
283.69	29.6067	413.71	32.7444	635.95	21.6545
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	32.1231	423.72	0.0000	645.85	18.6489
285.90	0.0000	427.09	22.0249	657.76	17.1909
287.50	29.7078	427.87	32.1360	657.90	0.0000
290.67	28.1362	433.94	23.9672	661.66	13.5686
293.27	0.0000	439.40	23.1267	664.57	0.0000
351.93	28.6644	453.88	18.6723	666.33	0.0000
295.96	28.6826	463.37	21.1308	666.50	0.0000
879.38	28.7486	468.07	18.8371	667.71	0.0000
299.98	26.6973	473.00	0.0000	677.62	16.8229
300.09	26.6999	475.06	25.5383	685.70	0.0000
300.13	26.7005	476.78	14.2029	695.00	0.0000
301.36	26.7292	477.60	14.2099	696.49	19.0876
302.85	26.3448	482.18	20.8985	696.51	19.0876
256.23	25.1257	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	14.8511
306.78	26.0137	497.08	18.2079	697.49	13.7916
308.46	33.6141	505.52	28.8904	702.65	14.8864
311.90	37.0829	507.63	0.0000	706.68	22.3698
316.51	36.3792	511.00	31.8795	711.68	19.2158
319.41	0.0000	514.00	31.9338	720.70	0.0000
320.08	0.0000	514.00	31.9338	721.93	0.0000
321.04	32.2689	520.40	16.3160	722.78	8.0453
323.87	25.5347	520.69	0.0000	722.91	12.8735
325.23	31.5274	522.65	0.0000	723.31	12.8755
328.76	0.0000	527.90	0.0000	724.19	3.2201
333.37	30.8767	528.26	17.5591	727.33	0.0000
333.97	36.0399	529.59	14.6429	733.00	4.8484
334.37	32.1892	529.87	0.0000	735.93	10.7878
338.28	27.5527	531.02	0.0000	333.97	9.7156
338.32	27.5540	537.26	0.0000	739.50	0.0000
311.90	27.6003	546.56	0.0000	747.24	14.0918
340.48	27.6003	552.55	11.8623	748.06	8.6748
340.55	0.0000	563.25	17.8945	752.31	18.4665
344.28	25.9521	569.33	21.9418	753.82	0.0000
345.93	23.3871	946.00	21.9436	756.73	20.6777
351.06	27.8275	569.70	21.9454	756.80	20.6777
351.93	27.8457	583.19	17.0775	884.68	18.3381

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	19.6626	1274.44	12.4884	1620.50	2.1090
766.42	16.3898	1001.03	11.6146	1621.92	2.1097
766.84	16.3928	1002.74	16.0911	1678.03	0.0000
772.60	0.0000	1004.73	15.2070	1690.97	3.2122
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	1.7396
778.90	8.7861	1028.54	0.0000	1063.66	2.1770
783.70	0.0000	1037.84	8.1381	1771.35	3.2664
785.37	13.2139	1038.76	0.0000	1791.20	0.0000
792.07	14.9057	631.29	12.6943	1808.65	3.2911
794.95	14.3700	1048.07	0.0000	1810.72	0.0000
795.86	14.3753	1049.04	9.0747	1836.06	1.1030
810.06	11.1202	1050.41	9.0784		
810.29	12.2336	1063.66	15.4986		
344.28	13.3467	1077.00	0.0000		
810.76	10.0111	1077.34	12.8182		
815.77	0.0000	1085.87	11.0156		
1048.07	0.0000	1093.63	10.1218		
832.01	13.4590	1099.45	11.9836		
834.85	15.7192	1112.07	7.4028		
835.71	12.3549	1112.84	7.4048		
836.80	0.0000	1115.54	13.3392		
846.75	0.0000	1120.29	12.9874		
846.77	10.1514	1120.55	12.9883		
856.80	0.0000	1221.41	11.8781		
860.56	12.4721	1129.67	13.9545		
871.09	11.3826	1131.51	0.0000		
873.19	14.8091	1147.95	0.0000		
875.33	0.0000	1173.23	9.4232		
879.38	12.5594	1177.95	7.5488		
880.51	17.1338	1189.05	11.3591		
883.24	12.5773	1204.77	15.2139		
884.68	11.4400	1221.41	7.6426		
889.28	9.1673	1231.02	12.4525		
894.76	8.0374	1235.36	0.0000		
898.04	12.6453	1238.28	12.4771		
900.72	18.4108	1260.41	0.0000		
903.28	9.2139	1271.87	11.6243		
911.20	6.9302	1274.44	10.6630		
912.08	6.9324	1274.54	10.6630		
923.98	0.0000	1291.59	4.8691		
926.50	12.7743	1298.22	0.0000		
929.11	9.2992	1312.11	0.0000		
937.49	12.8239	1332.49	4.9219		
944.13	0.0000	1362.66	0.0000		
946.00	7.0156	1365.19	5.9561		
949.00	12.2902	1368.63	0.0000		
667.71	0.0000	1384.29	5.9850		
962.31	7.0549	1408.01	5.0174		
964.08	14.1187	1457.56	0.0000		
966.17	0.0000	1460.82	3.0494		
911.20	14.1421	1489.16	1.0234		
968.97	14.1421	1505.03	1.6436		
983.53	0.0000	1584.12	5.2301		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:40:48.20

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240009.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM07.CNF;484
                                        Background date  : 2-OCT-2016 11:00:17.
Sample date      : 15-DEC-2015 12:31:00 Acquisition date : 3-OCT-2016 05:39:22.
Sample ID        : R405240009           Sample quantity  : 1.37062E+02 GRAM
Detector name    : GAM07                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.46  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.04*	27	146	1.48	126.58	122	9	7.58E-03	84.3	
2	1	74.76*	109	148	1.13	150.01	146	12	3.02E-02	21.1	1.69E+00
3	1	77.15	153	117	1.04	154.79	146	12	4.25E-02	14.1	
4	0	83.99	60	111	1.60	168.46	166	7	1.66E-02	31.9	
5	3	87.10	64	85	1.19	174.68	172	21	1.78E-02	24.1	1.95E+00
6	3	93.01*	56	117	1.41	186.50	172	21	1.55E-02	40.0	
7	4	156.26	32	20	1.21	312.96	311	14	9.00E-03	21.8	8.22E+00
8	4	157.78	27	45	1.17	316.00	311	14	7.38E-03	48.7	
9	4	159.86	32	59	1.71	320.16	311	14	8.87E-03	50.7	
10	4	185.84*	78	104	1.77	372.12	365	35	2.18E-02	28.3	1.54E+00
11	4	191.27*	15	90	1.78	382.97	365	35	4.15E-03	128.8	
12	0	209.93	27	111	0.91	420.29	413	11	7.36E-03	79.8	
13	3	238.66*	323	43	1.05	477.73	473	16	8.97E-02	6.6	1.89E+00
14	3	241.48	80	49	1.70	483.37	473	16	2.22E-02	28.5	
15	0	245.94	42	41	3.30	492.28	489	9	1.16E-02	31.7	
16	0	278.53	26	78	1.31	557.44	551	11	7.24E-03	69.8	
17	0	288.95	13	51	4.46	578.28	570	10	3.47E-03	111.7	
18	0	295.22*	108	68	1.12	590.82	586	10	3.01E-02	17.5	
19	0	300.67*	10	48	1.05	601.73	597	8	2.87E-03	122.4	
20	0	328.58	30	40	1.09	657.53	652	10	8.22E-03	44.1	
21	0	338.47*	61	33	0.88	677.31	673	8	1.70E-02	21.5	
22	0	352.32*	163	56	1.53	704.99	700	13	4.53E-02	13.4	
23	0	358.17	18	22	2.27	716.70	712	8	5.11E-03	49.8	
24	0	433.68	19	11	0.69	867.68	864	9	5.15E-03	45.3	
25	0	438.36	10	9	0.56	877.05	873	8	2.76E-03	59.5	
26	0	462.95	21	20	1.30	926.21	921	8	5.83E-03	42.9	
27	0	511.04*	31	31	2.03	1022.38	1016	13	8.55E-03	51.9	
28	0	583.26*	54	48	1.07	1166.79	1162	10	1.50E-02	28.2	
29	0	608.93*	139	17	1.59	1218.12	1212	13	3.86E-02	10.6	
30	1	661.72	86	17	1.81	1323.67	1318	19	2.38E-02	14.4	1.60E+00
31	1	665.05	19	17	1.81	1330.33	1318	19	5.28E-03	54.8	
32	0	670.70	18	18	1.10	1341.64	1337	12	5.00E-03	52.7	
33	0	689.28	14	13	4.06	1378.79	1371	13	3.89E-03	59.4	
34	0	727.41*	27	8	3.37	1455.04	1450	11	7.48E-03	29.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	786.24*	7	4	0.57	1572.67	1569	6	2.01E-03	64.7	
36	0	794.83	21	12	1.89	1589.85	1585	11	5.92E-03	37.3	
37	0	837.47	14	17	3.01	1675.13	1668	12	3.81E-03	67.2	
38	0	853.05	9	4	1.23	1706.27	1703	6	2.41E-03	51.1	
39	0	861.97	11	19	0.72	1724.12	1715	11	3.19E-03	83.0	
40	0	911.33*	35	31	1.89	1822.83	1816	17	9.69E-03	40.7	
41	0	935.84	16	13	3.62	1871.83	1866	11	4.43E-03	54.0	
42	0	964.61	17	12	1.23	1929.36	1922	12	4.78E-03	46.9	
43	0	968.87*	41	17	1.77	1937.88	1933	15	1.13E-02	26.9	
44	0	998.15	14	9	2.75	1996.45	1992	11	3.96E-03	47.5	
45	0	1078.98	7	6	0.92	2158.08	2151	9	1.82E-03	81.2	
46	0	1120.75	32	18	1.74	2241.61	2235	14	8.84E-03	34.9	
47	0	1161.47	7	10	0.54	2323.04	2315	10	2.06E-03	87.4	
48	0	1222.61	6	8	1.02	2445.31	2437	10	1.77E-03	90.0	
49	0	1240.52	39	29	8.78	2481.12	2466	31	1.08E-02	45.1	
50	0	1344.58	7	4	1.20	2689.24	2683	10	1.82E-03	74.1	
51	0	1460.40*	330	4	2.33	2920.85	2913	16	9.17E-02	5.7	
52	0	1671.38	6	2	1.03	3342.79	3336	10	1.63E-03	64.3	
53	0	1764.11*	21	0	1.02	3528.24	3522	13	5.92E-03	24.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:40:50

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240009.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:31:00 Acquisition date : 3-OCT-2016 05:39:22
Sample ID   : R405240009   Sample quantity : 137.06 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA7   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.46   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
TL-208	277.37	HG-203	279.20
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.122E+00	1.445E+01	1.445E+01	11.50	OK
CD-109	88.03	3.70*	5.736E+00	1.182E+00	1.835E+00	83.02	OK
TE-123M	159.00	84.00*	6.325E+00	3.746E-02	2.055E-01	101.39	OK
SN-126	64.28	9.60	3.467E+00	5.449E-01	5.449E-01	168.58	OK
	86.94	8.90	5.736E+00	4.915E-01	4.915E-01	83.02	OK
	87.57	37.00*	5.736E+00	1.182E-01	1.182E-01	83.02	OK
BA-137M	661.66	89.90*	2.138E+00	2.499E-01	2.545E-01	28.85	OK
CS-137	661.66	85.10*	2.138E+00	2.640E-01	2.689E-01	28.85	OK
HG-203	70.83	3.69	4.380E+00	----- Line Not Found	-----		Absent
	72.87	6.19	4.591E+00	----- Line Not Found	-----		Absent
	279.20	81.56*	4.362E+00	3.125E-02	2.434E+00	196.90	OK
TL-208	277.37	6.60	4.377E+00	----- Line Not Found	-----		<<INT Reject
	583.19	85.00*	2.365E+00	1.513E-01	1.513E-01	56.40	OK
	860.56	12.50	1.734E+00	2.897E-01	2.897E-01	165.93	OK
BI-212	727.33	6.67*	1.983E+00	1.130E+00	1.130E+00	58.96	OK
	785.37	1.10	1.865E+00	1.944E+00	1.944E+00	129.49	OK
	1620.50	1.47	1.021E+00	----- Line Not Found	-----		Absent
PB-212	74.82	10.28	4.775E+00	9.817E-01	9.817E-01	64.80	OK
	77.11	17.10	4.994E+00	1.174E+00	1.174E+00	28.13	OK
	238.63	43.60*	4.929E+00	9.091E-01	9.091E-01	13.20	OK
	300.09	3.30	4.097E+00	4.547E-01	4.547E-01	244.84	OK
BI-214	609.32	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29	OK
	1120.29	14.92	1.405E+00	8.139E-01	8.142E-01	69.81	OK
	1764.49	15.30	9.424E-01	7.622E-01	7.624E-01	48.77	OK
PB-214	74.82	5.80	4.781E+00	----- Line Not Found	-----		<<INT Reject
	77.11	9.70	4.994E+00	2.070E+00	2.070E+00	28.13	OK
	87.09	3.41	5.736E+00	----- Line Not Found	-----		<<INT Reject
	242.00	7.25	4.877E+00	----- Line Not Found	-----		<<INT Reject
	295.22	18.42	4.159E+00	8.417E-01	8.420E-01	35.08	OK
	351.93	35.60*	3.589E+00	7.502E-01	7.505E-01	26.80	OK
RN-222	609.32	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29	OK
	1120.29	14.92	1.405E+00	8.139E-01	8.142E-01	69.81	OK
	1764.49	15.30	9.424E-01	7.622E-01	7.624E-01	48.77	OK
RA-224	240.99	4.10*	4.885E+00	9.245E-01	9.245E-01	159.09	OK
RA-226	609.32	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29	OK
	1120.29	14.92	1.405E+00	8.139E-01	8.142E-01	69.81	OK
	1764.49	15.30	9.424E-01	7.622E-01	7.624E-01	48.77	OK
AC-228	105.21	1.10	6.488E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.711E+00	8.631E-01	8.631E-01	43.05	OK
	794.95	4.25	1.849E+00	1.496E+00	1.496E+00	74.61	OK
	835.71	1.61	1.777E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44	OK
	968.97	15.80	1.580E+00	8.816E-01	8.816E-01	53.78	OK
RA-228	105.21	1.10	6.488E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.711E+00	8.631E-01	8.631E-01	43.05	OK
	794.95	4.25	1.849E+00	1.496E+00	1.496E+00	74.61	OK
	835.71	1.61	1.777E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44	OK
	968.97	15.80	1.580E+00	8.816E-01	8.816E-01	53.78	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
TH-228	74.82	10.28	4.775E+00	9.817E-01	9.817E-01	64.80	OK
	77.11	17.10	4.994E+00	1.174E+00	1.174E+00	28.13	OK
	238.63	43.60*	4.929E+00	9.091E-01	9.091E-01	13.20	OK
	300.09	3.30	4.097E+00	4.547E-01	4.547E-01	244.84	OK
TH-229	85.43	14.70	5.532E+00	4.791E-01	4.791E-01	63.83	OK
	88.47	24.00	5.736E+00	1.823E-01	1.823E-01	83.02	OK
	193.51	4.41*	5.712E+00	----- Line Not Found	-----		Absent
	210.85	2.80	5.413E+00	1.068E+00	1.068E+00	159.58	OK
TH-230	609.32	45.49*	2.285E+00	7.536E-01	7.536E-01	21.29	OK
	1120.29	14.92	1.405E+00	8.139E-01	8.140E-01	69.81	OK
	1764.49	15.30	9.424E-01	7.622E-01	7.622E-01	48.77	OK
PA-231	283.69	1.70	4.298E+00	----- Line Not Found	-----		Absent
	301.36	5.35*	4.097E+00	2.805E-01	2.805E-01	244.84	OK
TH-232	105.21	1.10	6.488E+00	----- Line Not Found	-----		Absent
	338.32	11.27	3.711E+00	8.631E-01	8.631E-01	43.05	OK
	835.71	1.61	1.777E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44	OK
	968.97	15.80	1.580E+00	8.816E-01	8.816E-01	53.78	OK
TH-234	63.29	3.70*	3.467E+00	1.414E+00	1.414E+00	168.58	OK
	92.59	4.23	6.059E+00	1.408E+00	1.408E+00	79.93	OK
U-234	609.32	45.49*	2.285E+00	7.536E-01	7.536E-01	21.29	OK
	1120.29	14.92	1.405E+00	8.139E-01	8.139E-01	69.81	OK
	1764.49	15.30	9.424E-01	7.622E-01	7.622E-01	48.77	OK
U-238	63.29	3.70*	3.467E+00	1.414E+00	1.414E+00	168.58	OK
	92.59	4.23	6.059E+00	1.408E+00	1.408E+00	79.93	OK
AM-243	43.53	5.90	6.933E-01	----- Line Not Found	-----		Absent
	74.66	67.20*	4.775E+00	1.502E-01	1.502E-01	64.80	OK
ANH-511	511.00	100.00*	2.633E+00	6.678E-02	6.678E-02	103.74	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:40:51.73

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240009.CNF;1    *
* Acquisition date :  3-OCT-2016 05:39:22 Sensitivity     : 3.000          *
* Detector ID      : GAM07                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:31:00 Analyst initials: MXR1           *
* Sample ID        : R405240009           Sample Quantity : 1.3706E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 19-AUG-2016 11:09:59 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;15         *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.445E+01	1.628E+00	5.033E-01
CD-109	1.835E+00	1.493E+00	1.748E+00
TE-123M	2.055E-01	2.042E-01	2.084E-01
SN-126	1.182E-01	9.619E-02	1.131E-01
BA-137M	2.545E-01	7.197E-02	6.378E-02
CS-137	2.689E-01	7.603E-02	6.738E-02
HG-203	2.434E+00	4.697E+00	4.015E+00
TL-208	1.513E-01	8.364E-02	7.409E-02
BI-212	1.130E+00	6.531E-01	7.019E-01
PB-212	9.091E-01	1.176E-01	1.023E-01
BI-214	7.538E-01	1.573E-01	1.214E-01
PB-214	7.505E-01	1.971E-01	1.425E-01
RN-222	7.538E-01	1.573E-01	1.214E-01
RA-224	9.245E-01	1.441E+00	1.097E+00
RA-226	7.538E-01	1.573E-01	1.214E-01
AC-228	4.444E-01	3.547E-01	2.493E-01
RA-228	4.444E-01	3.547E-01	2.493E-01
TH-228	9.091E-01	1.176E-01	1.023E-01
TH-229	-4.298E-01	4.239E-01	6.740E-01
TH-230	7.536E-01	1.572E-01	1.214E-01
PA-231	2.805E-01	6.730E-01	7.812E-01
TH-232	4.444E-01	3.547E-01	2.493E-01
TH-234	1.414E+00	2.336E+00	1.899E+00
U-234	7.536E-01	1.572E-01	1.214E-01
U-238	1.414E+00	2.336E+00	1.899E+00
AM-243	1.502E-01	9.538E-02	8.597E-02
ANH-511	6.678E-02	6.790E-02	5.376E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-4.277E+00	1.174E+01	2.148E+01	NOT IDENT.
NA-22	-3.538E-03	5.103E-02	9.943E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF

AL-26	-1.781E-02	3.515E-02	6.673E-02	NOT IDENT.
SC-46	1.899E-01	3.370E-01	7.469E-01	FAIL ABUN
V-48	0.000E+00	8.914E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.559E+02	0.000E+00	SHORT HLIF
MN-54	2.393E-02	7.128E-02	1.347E-01	NOT IDENT.
CO-56	4.619E-02	4.449E-01	9.113E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-5.024E-03	4.242E-02	7.766E-02	NOT IDENT.
CO-58	2.727E-01	4.376E-01	9.740E-01	NOT IDENT.
FE-59	-1.617E+00	5.690E+00	1.091E+01	NOT IDENT.
CO-60	2.626E-03	4.042E-02	8.252E-02	NOT IDENT.
ZN-65	-2.763E-03	2.155E-01	3.707E-01	NOT IDENT.
GE-68	1.100E+00	2.235E+00	4.872E+00	NOT IDENT.
AS-73	-7.472E-01	6.640E+00	1.274E+01	NOT IDENT.
AS-74	0.000E+00	4.176E+03	0.000E+00	SHORT HLIF
SE-75	7.586E-03	1.831E-01	3.620E-01	FAIL ABUN
BR-77	0.000E+00	2.656E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	4.707E+02	0.000E+00	SHORT HLIF
RB-83	-1.560E-01	5.668E-01	1.057E+00	NOT IDENT.
KR-85	3.014E+00	6.944E+00	1.295E+01	NOT IDENT.
SR-85	2.943E-01	6.807E-01	1.269E+00	NOT IDENT.
RB-86	0.000E+00	2.495E+04	0.000E+00	SHORT HLIF
Y-88	7.133E-03	1.854E-01	4.332E-01	NOT IDENT.
Y-91	2.246E+02	5.094E+02	1.072E+03	NOT IDENT.
NB-94	5.004E-03	3.322E-02	6.398E-02	NOT IDENT.
NB-95	-5.822E-01	8.294E-01	1.367E+00	NOT IDENT.
NB-95M	1.149E+00	2.349E+00	4.341E+00	NOT IDENT.
ZR-95	-5.474E-01	1.438E+00	2.534E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.894E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.176E+41	0.000E+00	SHORT HLIF
RH-101	4.620E-04	3.311E-02	6.080E-02	NOT IDENT.
RH-102	-4.306E-02	5.681E-02	9.473E-02	NOT IDENT.
RU-103	4.125E-01	4.978E+00	9.721E+00	FAIL ABUN
RH-106	-5.517E-02	5.886E-01	1.091E+00	NOT IDENT.
RU-106	-5.517E-02	5.886E-01	1.091E+00	NOT IDENT.
AG-108M	3.933E-02	3.492E-02	5.102E-02	FAIL ABUN
AG-110M	-4.776E-03	9.102E-02	1.847E-01	NOT IDENT.
SN-113	9.277E-02	2.094E-01	4.282E-01	NOT IDENT.
CD-115	0.000E+00	2.897E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	8.687E+04	0.000E+00	SHORT HLIF
SB-124	1.276E+00	1.936E+00	4.794E+00	NOT IDENT.
SB-125	-4.460E-02	9.996E-02	1.828E-01	FAIL ABUN
TE-125M	-2.123E+02	2.413E+02	4.104E+02	NOT IDENT.
I-126	0.000E+00	1.065E+06	0.000E+00	SHORT HLIF
SB-126	0.000E+00	7.796E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	6.494E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.249E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.226E+25	0.000E+00	SHORT HLIF
BA-133	3.950E-02	3.887E-02	7.158E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	9.727E-02	7.112E-02	1.114E-01	FAIL ABUN
CS-135	-9.464E-02	1.378E-01	2.528E-01	NOT IDENT.
I-135	0.000E+00	1.383E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.917E+05	0.000E+00	SHORT HLIF
CE-139	-7.737E-02	9.987E-02	1.666E-01	NOT IDENT.
BA-140	0.000E+00	8.901E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	1.888E+05	0.000E+00	SHORT HLIF
CE-141	-3.649E+00	1.985E+01	3.558E+01	NOT IDENT.
CE-143	0.000E+00	9.458E+40	0.000E+00	SHORT HLIF
CE-144	7.512E-02	3.350E-01	6.269E-01	NOT IDENT.
PM-144	2.972E-02	5.024E-02	1.057E-01	NOT IDENT.
PR-144	2.475E+00	4.330E+00	9.092E+00	NOT IDENT.
PM-146	-7.648E-03	3.724E-02	7.098E-02	NOT IDENT.
ND-147	0.000E+00	1.825E+07	0.000E+00	SHORT HLIF
PM-147	-4.850E+02	7.774E+02	1.352E+03	NOT IDENT.
PM-149	0.000E+00	4.422E+39	0.000E+00	SHORT HLIF
EU-150	-2.052E-03	2.420E-02	4.220E-02	FAIL ABUN
EU-152	-1.129E-03	8.375E-02	1.639E-01	FAIL ABUN
GD-153	-1.426E-01	1.791E-01	2.847E-01	NOT IDENT.
EU-154	-6.059E-03	1.261E-01	2.465E-01	NOT IDENT.
EU-155	1.183E-01	9.793E-02	2.011E-01	FAIL ABUN
TB-160	-7.604E-02	1.542E+00	3.152E+00	FAIL ABUN
HO-166M	6.346E-02	5.534E-02	1.242E-01	FAIL ABUN
TM-171	7.358E+00	1.674E+01	3.360E+01	NOT IDENT.
HF-172	-9.846E-02	2.216E-01	3.909E-01	FAIL ABUN

LU-172	-1.525E-02	6.919E-02	1.349E-01	FAIL ABUN
LU-176	1.758E-02	2.202E-02	4.668E-02	FAIL ABUN
HF-181	-2.613E+00	3.642E+00	6.326E+00	NOT IDENT.
TA-182	5.642E-01	9.955E-01	1.690E+00	FAIL ABUN
RE-183	6.778E-01	2.430E+00	4.755E+00	NOT IDENT.
RE-184	2.586E+01	2.944E+01	6.518E+01	NOT IDENT.
W-188	-5.103E+01	1.409E+02	1.827E+02	FAIL ABUN
IR-192	-4.245E-01	4.269E-01	7.335E-01	FAIL ABUN
BI-207	5.630E-02	5.251E-02	1.197E-01	FAIL ABUN
PB-210	-2.878E+00	2.880E+00	5.139E+00	NOT IDENT.
BI-211	0.000E+00	5.430E-01	7.478E-01	FAIL ABUN
PB-211	6.991E-02	5.960E-01	1.182E+00	NOT IDENT.
RN-219	2.648E-01	3.215E-01	6.969E-01	NOT IDENT.
RA-223	-2.235E-01	6.028E-01	1.003E+00	FAIL ABUN
AC-227	1.545E-02	2.292E-01	4.505E-01	FAIL ABUN
TH-227	1.545E-02	2.292E-01	4.505E-01	FAIL ABUN
TH-231	-2.235E-01	6.028E-01	1.003E+00	FAIL ABUN
PA-233	2.981E-02	5.425E-02	1.123E-01	FAIL ABUN
PA-234	-1.506E-01	2.645E-01	4.844E-01	NOT IDENT.
PA-234M	1.392E+00	3.656E+00	7.780E+00	NOT IDENT.
U-235	-1.025E-02	1.802E-01	3.244E-01	FAIL ABUN
NP-237	2.981E-02	5.425E-02	1.123E-01	FAIL ABUN
NP-238	0.000E+00	4.410E+40	0.000E+00	SHORT HLIF
NP-239	1.378E-02	2.064E-01	3.873E-01	FAIL ABUN
PU-239	-8.394E+01	3.055E+02	5.458E+02	NOT IDENT.
AM-241	8.911E-03	1.337E-01	2.378E-01	NOT IDENT.
CM-243	-2.800E-02	8.875E-02	1.610E-01	FAIL ABUN
BK-247	-9.958E-03	6.621E-02	1.286E-01	FAIL ABUN
CM-247	1.301E-02	2.983E-02	6.181E-02	FAIL ABUN
CF-249	-3.012E-02	3.708E-02	6.493E-02	NOT IDENT.
CF-251	2.825E-02	1.136E-01	2.098E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:40:49.37

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	316	10.66*	1.122E+00	1.445E+01	1.445E+01	11.50
CD-109	88.03	76	3.70*	5.736E+00	1.958E+00	3.039E+00	48.16
TE-123M	159.00	36	84.00*	6.325E+00	3.746E-02	2.055E-01	101.39
SN-126	64.28	33	9.60	3.467E+00	5.449E-01	5.449E-01	168.58
	86.94	76	8.90	5.736E+00	8.140E-01	8.140E-01	48.16
	87.57	76	37.00*	5.736E+00	1.958E-01	1.958E-01	48.16
BA-137M	661.66	88	89.90*	2.138E+00	2.499E-01	2.545E-01	28.85
CS-137	661.66	88	85.10*	2.138E+00	2.640E-01	2.689E-01	28.85
HG-203	70.83	------	3.69	4.380E+00	------ Line Not Found		------
	72.87	------	6.19	4.591E+00	------ Line Not Found		------
	279.20	28	81.56*	4.362E+00	4.384E-02	3.414E+00	139.51
TL-208	277.37	28	6.60	4.362E+00	5.418E-01	5.418E-01	139.51
	583.19	56	85.00*	2.365E+00	1.513E-01	1.513E-01	56.40
	860.56	11	12.50	1.734E+00	2.897E-01	2.897E-01	165.93
BI-211	72.87	------	1.23	4.591E+00	------ Line Not Found		------
	351.06	175	12.92*	3.589E+00	2.067E+00	2.067E+00	26.80
BI-212	727.33	27	6.67*	1.983E+00	1.130E+00	1.130E+00	58.96
	785.37	7	1.10	1.865E+00	1.944E+00	1.944E+00	129.49
	1620.50	------	1.47	1.021E+00	------ Line Not Found		------
PB-212	74.82	131	10.28	4.775E+00	1.457E+00	1.457E+00	42.15
	77.11	183	17.10	4.994E+00	1.174E+00	1.174E+00	28.13
	238.63	357	43.60*	4.929E+00	9.091E-01	9.091E-01	13.20
	300.09	11	3.30	4.097E+00	4.547E-01	4.547E-01	244.84
BI-214	609.32	143	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29
	1120.29	31	14.92	1.405E+00	8.139E-01	8.142E-01	69.81
	1764.49	20	15.30	9.424E-01	7.622E-01	7.624E-01	48.77
PB-214	74.82	131	5.80	4.775E+00	2.582E+00	2.583E+00	42.15
	77.11	183	9.70	4.994E+00	2.070E+00	2.070E+00	28.13
	87.09	76	3.41	5.736E+00	2.124E+00	2.125E+00	48.16
	242.00	88	7.25	4.885E+00	1.364E+00	1.365E+00	56.99
	295.22	118	18.42	4.159E+00	8.417E-01	8.420E-01	35.08
	351.93	175	35.60*	3.589E+00	7.502E-01	7.505E-01	26.80
RN-222	609.32	143	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29
	1120.29	31	14.92	1.405E+00	8.139E-01	8.142E-01	69.81
	1764.49	20	15.30	9.424E-01	7.622E-01	7.624E-01	48.77
RA-224	240.99	88	4.10*	4.885E+00	2.413E+00	2.413E+00	56.99
RA-226	609.32	143	45.49*	2.285E+00	7.536E-01	7.538E-01	21.29
	1120.29	31	14.92	1.405E+00	8.139E-01	8.142E-01	69.81
	1764.49	20	15.30	9.424E-01	7.622E-01	7.624E-01	48.77
AC-228	105.21	------	1.10	6.488E+00	------ Line Not Found		------
	338.32	66	11.27	3.711E+00	8.631E-01	8.631E-01	43.05
	794.95	21	4.25	1.849E+00	1.496E+00	1.496E+00	74.61
	835.71	------	1.61	1.777E+00	------ Line Not Found		------
	911.20	35	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44
	968.97	40	15.80	1.580E+00	8.816E-01	8.816E-01	53.78
RA-228	105.21	------	1.10	6.488E+00	------ Line Not Found		------
	338.32	66	11.27	3.711E+00	8.631E-01	8.631E-01	43.05

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	794.95	21	4.25	1.849E+00	1.496E+00	1.496E+00	74.61
	835.71	------	1.61	1.777E+00	------ Line Not Found		------
	911.20	35	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44
	968.97	40	15.80	1.580E+00	8.816E-01	8.816E-01	53.78
TH-228	74.82	131	10.28	4.775E+00	1.457E+00	1.457E+00	42.15
	77.11	183	17.10	4.994E+00	1.174E+00	1.174E+00	28.13
	238.63	357	43.60*	4.929E+00	9.091E-01	9.091E-01	13.20
	300.09	11	3.30	4.097E+00	4.547E-01	4.547E-01	244.84
TH-229	85.43	71	14.70	5.532E+00	4.791E-01	4.791E-01	63.83
	88.47	76	24.00	5.736E+00	3.019E-01	3.019E-01	48.16
	193.51	------	4.41*	5.712E+00	------ Line Not Found		------
	210.85	30	2.80	5.413E+00	1.068E+00	1.068E+00	159.58
TH-230	609.32	143	45.49*	2.285E+00	7.536E-01	7.536E-01	21.29
	1120.29	31	14.92	1.405E+00	8.139E-01	8.140E-01	69.81
	1764.49	20	15.30	9.424E-01	7.622E-01	7.622E-01	48.77
PA-231	283.69	------	1.70	4.298E+00	------ Line Not Found		------
	301.36	11	5.35*	4.097E+00	2.805E-01	2.805E-01	244.84
TH-232	105.21	------	1.10	6.488E+00	------ Line Not Found		------
	338.32	66	11.27	3.711E+00	8.631E-01	8.631E-01	43.05
	835.71	------	1.61	1.777E+00	------ Line Not Found		------
	911.20	35	25.80*	1.659E+00	4.444E-01	4.444E-01	81.44
	968.97	40	15.80	1.580E+00	8.816E-01	8.816E-01	53.78
TH-234	63.29	33	3.70*	3.467E+00	1.414E+00	1.414E+00	168.58
	92.59	66	4.23	6.059E+00	1.408E+00	1.408E+00	79.93
U-234	609.32	143	45.49*	2.285E+00	7.536E-01	7.536E-01	21.29
	1120.29	31	14.92	1.405E+00	8.139E-01	8.139E-01	69.81
	1764.49	20	15.30	9.424E-01	7.622E-01	7.622E-01	48.77
U-238	63.29	33	3.70*	3.467E+00	1.414E+00	1.414E+00	168.58
	92.59	66	4.23	6.059E+00	1.408E+00	1.408E+00	79.93
AM-243	43.53	------	5.90	6.933E-01	------ Line Not Found		------
	74.66	131	67.20*	4.775E+00	2.228E-01	2.228E-01	42.15
ANH-511	511.00	32	100.00*	2.633E+00	6.678E-02	6.678E-02	103.74

Flag: "*" = Keyline

Sample ID : R405240009 Acquisition date : 3-OCT-2016 05:39:22

Total number of lines in spectrum	53	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	41	77.36%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.445E+01	1.445E+01	0.166E+01	11.50	
CD-109	461.40D	1.55	1.958E+00	3.039E+00	1.464E+00	48.16	
TE-123M	119.20D	5.49	3.746E-02	2.055E-01	2.084E-01	101.39	
SN-126	2.30E+05Y	1.00	1.958E-01	1.958E-01	0.943E-01	48.16	
BA-137M	30.08Y	1.02	2.499E-01	2.545E-01	0.734E-01	28.85	
CS-137	30.08Y	1.02	2.640E-01	2.689E-01	0.776E-01	28.85	
HG-203	46.59D	77.9	4.384E-02	3.414E+00	4.764E+00	139.51	
TL-208	1.41E+10Y	1.00	1.513E-01	1.513E-01	0.853E-01	56.40	
BI-211	7.04E+08Y	1.00	2.067E+00	2.067E+00	0.554E+00	26.80	
BI-212	1.41E+10Y	1.00	1.130E+00	1.130E+00	0.666E+00	58.96	
PB-212	1.41E+10Y	1.00	9.091E-01	9.091E-01	1.200E-01	13.20	
BI-214	1600.00Y	1.00	7.536E-01	7.538E-01	1.605E-01	21.29	
PB-214	1600.00Y	1.00	7.502E-01	7.505E-01	2.011E-01	26.80	
RN-222	1600.00Y	1.00	7.536E-01	7.538E-01	1.605E-01	21.29	
RA-224	1.41E+10Y	1.00	2.413E+00	2.413E+00	1.375E+00	56.99	
RA-226	1600.00Y	1.00	7.536E-01	7.538E-01	1.605E-01	21.29	
AC-228	1.41E+10Y	1.00	4.444E-01	4.444E-01	3.619E-01	81.44	
RA-228	1.41E+10Y	1.00	4.444E-01	4.444E-01	3.619E-01	81.44	
TH-228	1.41E+10Y	1.00	9.091E-01	9.091E-01	1.200E-01	13.20	
TH-229	7340.00Y	1.00	3.019E-01	3.019E-01	1.454E-01	48.16	K
TH-230	7.54E+04Y	1.00	7.536E-01	7.536E-01	1.604E-01	21.29	
PA-231	7.04E+08Y	1.00	2.805E-01	2.805E-01	6.867E-01	244.84	
TH-232	1.41E+10Y	1.00	4.444E-01	4.444E-01	3.619E-01	81.44	
TH-234	4.47E+09Y	1.00	1.414E+00	1.414E+00	2.383E+00	168.58	
U-234	2.45E+05Y	1.00	7.536E-01	7.536E-01	1.604E-01	21.29	
U-238	4.47E+09Y	1.00	1.414E+00	1.414E+00	2.383E+00	168.58	
AM-243	7370.00Y	1.00	2.228E-01	2.228E-01	0.939E-01	42.15	
ANH-511	1.00E+09Y	1.00	6.678E-02	6.678E-02	6.928E-02	103.74	
			---------	---------			
	Total Activity :		3.433E+01	3.896E+01			
	Grand Total Activity :		3.433E+01	3.896E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240009 Acquisition date : 3-OCT-2016 05:39:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	156.26	37	23	1.21	312.96	311	14	9.00E-03	43.7	6.38E+00	T
4	157.78	30	51	1.17	316.00	311	14	7.38E-03	97.4	6.36E+00	T
4	185.84	88	117	1.77	372.12	365	35	2.18E-02	56.6	5.86E+00	T
4	191.27	17	101	1.78	382.97	365	35	4.15E-03	****	5.75E+00	
0	245.94	46	46	3.30	492.28	489	9	1.16E-02	63.4	4.82E+00	T
0	288.95	14	56	4.46	578.28	570	10	3.47E-03	****	4.23E+00	T
0	328.58	32	44	1.09	657.53	652	10	8.22E-03	88.1	3.80E+00	T
0	358.17	20	23	2.27	716.70	712	8	5.11E-03	99.6	3.54E+00	
0	433.68	20	12	0.69	867.68	864	9	5.15E-03	90.6	3.02E+00	T
0	438.36	10	10	0.56	877.05	873	8	2.76E-03	****	2.99E+00	T
0	462.95	22	21	1.30	926.21	921	8	5.83E-03	85.7	2.86E+00	T
1	665.05	19	17	1.81	1330.33	1318	19	5.28E-03	****	2.13E+00	T
0	670.70	18	18	1.10	1341.64	1337	12	5.00E-03	****	2.12E+00	
0	689.28	14	13	4.06	1378.79	1371	13	3.89E-03	****	2.07E+00	
0	837.47	14	17	3.01	1675.13	1668	12	3.81E-03	****	1.77E+00	T
0	853.05	9	4	1.23	1706.27	1703	6	2.41E-03	****	1.75E+00	
0	935.84	16	13	3.62	1871.83	1866	11	4.43E-03	****	1.62E+00	
0	964.61	17	12	1.23	1929.36	1922	12	4.78E-03	93.7	1.59E+00	T
0	998.15	14	9	2.75	1996.45	1992	11	3.96E-03	94.9	1.54E+00	
0	1078.98	6	6	0.92	2158.08	2151	9	1.82E-03	****	1.45E+00	
0	1161.47	7	9	0.54	2323.04	2315	10	2.06E-03	****	1.36E+00	
0	1222.61	6	7	1.02	2445.31	2437	10	1.77E-03	****	1.31E+00	T
0	1240.52	38	28	8.78	2481.12	2466	31	1.08E-02	90.1	1.29E+00	
0	1344.58	6	4	1.20	2689.24	2683	10	1.82E-03	****	1.21E+00	
0	1671.38	6	2	1.03	3342.79	3336	10	1.63E-03	****	9.92E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:41:04.84

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240009.CNF;1    *
* Acquisition date :  3-OCT-2016 05:39:22 Sensitivity     : 3.000          *
* Detector ID      : GAM07                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:31:00 Nuclide Library : SOLID          *
* Sample ID        : R405240009           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3706E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 19-AUG-2016 11:09:59 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;15          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.896E-01
CD-109	8.176E-01
TE-123M	9.627E-02
SN-126	5.291E-02
BA-137M	2.790E-02
CS-137	2.948E-02
HG-203	1.840E+00
TL-208	3.329E-02
BI-212	2.941E-01
PB-212	4.761E-02
BI-214	5.344E-02
PB-214	6.531E-02
RN-222	5.344E-02
RA-224	5.106E-01
RA-226	5.344E-02
AC-228	1.072E-01
RA-228	1.072E-01
TH-228	4.761E-02
TH-229	3.065E-01
TH-230	5.342E-02
PA-231	3.558E-01
TH-232	1.072E-01
TH-234	8.888E-01
U-234	5.342E-02
U-238	8.888E-01
AM-243	4.055E-02
ANH-511	2.401E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	9.559E+00	NOT IDENT.
NA-22	4.242E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.530E-02	NOT IDENT.

SC-46	3.236E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	5.930E-02	NOT IDENT.
CO-56	3.967E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.598E-02	NOT IDENT.
CO-58	4.144E-01	NOT IDENT.
FE-59	4.569E+00	NOT IDENT.
CO-60	3.446E-02	NOT IDENT.
ZN-65	1.614E-01	NOT IDENT.
GE-68	2.098E+00	NOT IDENT.
AS-73	5.921E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.655E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.602E-01	NOT IDENT.
KR-85	5.774E+00	NOT IDENT.
SR-85	5.658E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.614E-01	NOT IDENT.
Y-91	4.667E+02	NOT IDENT.
NB-94	2.829E-02	NOT IDENT.
NB-95	5.894E-01	NOT IDENT.
NB-95M	2.023E+00	NOT IDENT.
ZR-95	1.096E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.839E-02	NOT IDENT.
RH-102	4.032E-02	NOT IDENT.
RU-103	4.319E+00	FAIL ABUN
RH-106	4.873E-01	NOT IDENT.
RU-106	4.873E-01	NOT IDENT.
AG-108M	2.273E-02	FAIL ABUN
AG-110M	7.869E-02	NOT IDENT.
SN-113	1.933E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
SB-124	1.936E+00	NOT IDENT.
SB-125	8.120E-02	FAIL ABUN
TE-125M	1.902E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.215E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.949E-02	FAIL ABUN
CS-135	1.158E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	7.654E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.653E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.921E-01	NOT IDENT.
PM-144	4.641E-02	NOT IDENT.
PR-144	3.989E+00	NOT IDENT.
PM-146	3.104E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.258E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.895E-02	FAIL ABUN
EU-152	7.380E-02	FAIL ABUN
GD-153	1.324E-01	NOT IDENT.
EU-154	1.053E-01	NOT IDENT.
EU-155	9.417E-02	FAIL ABUN
TB-160	1.334E+00	FAIL ABUN
HO-166M	5.521E-02	FAIL ABUN
TM-171	1.567E+01	NOT IDENT.
HF-172	1.817E-01	FAIL ABUN
LU-172	5.633E-02	FAIL ABUN

LU-176	2.132E-02	FAIL ABUN
HF-181	2.754E+00	NOT IDENT.
TA-182	7.208E-01	FAIL ABUN
RE-183	2.228E+00	NOT IDENT.
RE-184	2.896E+01	NOT IDENT.
W-188	8.311E+01	FAIL ABUN
IR-192	3.301E-01	FAIL ABUN
BI-207	5.292E-02	FAIL ABUN
PB-210	2.397E+00	NOT IDENT.
BI-211	3.577E-01	FAIL ABUN
PB-211	5.279E-01	NOT IDENT.
RN-219	3.126E-01	NOT IDENT.
RA-223	4.520E-01	FAIL ABUN
AC-227	2.080E-01	FAIL ABUN
TH-227	2.080E-01	FAIL ABUN
TH-231	4.520E-01	FAIL ABUN
PA-233	5.119E-02	FAIL ABUN
PA-234	2.035E-01	NOT IDENT.
PA-234M	3.312E+00	NOT IDENT.
U-235	1.515E-01	FAIL ABUN
NP-237	5.119E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.790E-01	FAIL ABUN
PU-239	2.546E+02	NOT IDENT.
AM-241	1.116E-01	NOT IDENT.
CM-243	7.461E-02	FAIL ABUN
BK-247	5.867E-02	FAIL ABUN
CM-247	2.762E-02	FAIL ABUN
CF-249	2.898E-02	NOT IDENT.
CF-251	9.748E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:41:10.64

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240009.CNF;1    *
* Acquisition date :  3-OCT-2016 05:39:22 Sensitivity     : 3.000          *
* Detector ID      : GAM07                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.46     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:31:00 Nuclide Library : SOLID          *
* Sample ID        : R405240009           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3706E+02 GRAM   *
*                                         Quantity Err(%) : 1.4592E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 19-AUG-2016 11:09:59 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM07_CAN.CNF;15          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.445E+01	1.795E+00	1.795E+00
CD-109	1.835E+00	1.508E+00	1.508E+00
TE-123M	2.055E-01	2.044E-01	2.044E-01
SN-126	1.182E-01	9.695E-02	9.695E-02
BA-137M	2.545E-01	7.280E-02	7.280E-02
CS-137	2.689E-01	7.690E-02	7.690E-02
HG-203	2.434E+00	4.700E+00	4.700E+00
TL-208	1.513E-01	8.389E-02	8.389E-02
BI-212	1.130E+00	6.556E-01	6.556E-01
PB-212	9.091E-01	1.271E-01	1.271E-01
BI-214	7.538E-01	1.606E-01	1.606E-01
PB-214	7.505E-01	1.996E-01	1.996E-01
RN-222	7.538E-01	1.606E-01	1.606E-01
RA-224	9.245E-01	1.446E+00	1.446E+00
RA-226	7.538E-01	1.606E-01	1.606E-01
AC-228	4.444E-01	3.554E-01	3.554E-01
RA-228	4.444E-01	3.554E-01	3.554E-01
TH-228	9.091E-01	1.271E-01	1.271E-01
TH-229	-4.298E-01	4.244E-01	4.244E-01
TH-230	7.536E-01	1.605E-01	1.605E-01
PA-231	2.805E-01	6.756E-01	6.756E-01
TH-232	4.444E-01	3.554E-01	3.554E-01
TH-234	1.414E+00	2.356E+00	2.356E+00
U-234	7.536E-01	1.605E-01	1.605E-01
U-238	1.414E+00	2.356E+00	2.356E+00
AM-243	1.502E-01	9.627E-02	9.627E-02
ANH-511	6.678E-02	6.795E-02	6.795E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-4.277E+00	1.174E+01	1.189E+01	NOT IDENT.
NA-22	-3.538E-03	5.103E-02	5.105E-02	NOT IDENT.
NA-24	1.000E+41	8.260E+41	0.000E+00	SHORT HLIF

AL-26	-1.781E-02	3.516E-02	3.607E-02	NOT IDENT.
SC-46	1.899E-01	3.371E-01	3.478E-01	FAIL ABUN
V-48	-6.821E+03	8.918E+03	9.433E+03	SHORT HLIF
CR-51	1.465E+02	3.560E+02	3.620E+02	SHORT HLIF
MN-54	2.393E-02	7.129E-02	7.210E-02	NOT IDENT.
CO-56	4.619E-02	4.449E-01	4.454E-01	NOT IDENT.
MN-56	1.000E+41	9.636E+41	0.000E+00	SHORT HLIF
CO-57	-5.024E-03	4.242E-02	4.248E-02	NOT IDENT.
CO-58	2.727E-01	4.377E-01	4.547E-01	NOT IDENT.
FE-59	-1.617E+00	5.692E+00	5.738E+00	NOT IDENT.
CO-60	2.626E-03	4.042E-02	4.044E-02	NOT IDENT.
ZN-65	-2.763E-03	2.155E-01	2.155E-01	NOT IDENT.
GE-68	1.100E+00	2.235E+00	2.289E+00	NOT IDENT.
AS-73	-7.472E-01	6.642E+00	6.650E+00	NOT IDENT.
AS-74	2.106E+03	4.180E+03	4.287E+03	SHORT HLIF
SE-75	7.586E-03	1.831E-01	1.831E-01	FAIL ABUN
BR-77	2.053E+37	1.735E+38	0.000E+00	SHORT HLIF
SR-82	2.864E+02	4.709E+02	4.883E+02	SHORT HLIF
RB-83	-1.560E-01	5.672E-01	5.715E-01	NOT IDENT.
KR-85	3.014E+00	6.945E+00	7.077E+00	NOT IDENT.
SR-85	2.943E-01	6.808E-01	6.936E-01	NOT IDENT.
RB-86	6.772E+03	2.495E+04	2.514E+04	SHORT HLIF
Y-88	7.133E-03	1.854E-01	1.854E-01	NOT IDENT.
Y-91	2.246E+02	5.095E+02	5.195E+02	NOT IDENT.
NB-94	5.004E-03	3.322E-02	3.330E-02	NOT IDENT.
NB-95	-5.822E-01	8.298E-01	8.703E-01	NOT IDENT.
NB-95M	1.149E+00	2.351E+00	2.407E+00	NOT IDENT.
ZR-95	-5.474E-01	1.438E+00	1.459E+00	NOT IDENT.
NB-97	-1.000E+41	2.935E+41	0.000E+00	SHORT HLIF
ZR-97	-1.000E+41	3.126E+41	0.000E+00	SHORT HLIF
MO-99	1.382E+31	2.896E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	1.180E+41	0.000E+00	SHORT HLIF
RH-101	4.620E-04	3.311E-02	3.311E-02	NOT IDENT.
RH-102	-4.306E-02	5.692E-02	6.014E-02	NOT IDENT.
RU-103	4.125E-01	4.978E+00	4.982E+00	FAIL ABUN
RH-106	-5.517E-02	5.886E-01	5.891E-01	NOT IDENT.
RU-106	-5.517E-02	5.886E-01	5.891E-01	NOT IDENT.
AG-108M	3.933E-02	3.496E-02	3.920E-02	FAIL ABUN
AG-110M	-4.776E-03	9.102E-02	9.105E-02	NOT IDENT.
SN-113	9.277E-02	2.095E-01	2.136E-01	NOT IDENT.
CD-115	4.295E+36	2.897E+38	0.000E+00	SHORT HLIF
SN-117M	9.103E+04	8.752E+04	9.666E+04	SHORT HLIF
SB-124	1.276E+00	1.937E+00	2.021E+00	NOT IDENT.
SB-125	-4.460E-02	9.998E-02	1.020E-01	FAIL ABUN
TE-125M	-2.123E+02	2.417E+02	2.599E+02	NOT IDENT.
I-126	9.918E+05	1.073E+06	1.162E+06	SHORT HLIF
SB-126	2.787E+05	7.813E+05	7.913E+05	SHORT HLIF
SB-127	-2.283E+21	7.180E+21	0.000E+00	SHORT HLIF
I-131	3.414E+08	2.250E+09	2.255E+09	SHORT HLIF
I-132	1.000E+41	1.818E+42	0.000E+00	SHORT HLIF
TE-132	7.613E+24	8.232E+25	0.000E+00	SHORT HLIF
BA-133	3.950E-02	3.891E-02	4.279E-02	NOT IDENT.
I-133	-1.000E+41	4.614E+41	0.000E+00	SHORT HLIF
CS-134	9.727E-02	7.125E-02	8.366E-02	FAIL ABUN
CS-135	-9.464E-02	1.379E-01	1.444E-01	NOT IDENT.
I-135	1.000E+41	6.757E+41	0.000E+00	SHORT HLIF
CS-136	8.099E+04	1.919E+05	1.953E+05	SHORT HLIF
CE-139	-7.737E-02	1.011E-01	1.069E-01	NOT IDENT.
BA-140	2.497E+05	8.901E+05	8.972E+05	SHORT HLIF
LA-140	1.035E+05	1.888E+05	1.945E+05	SHORT HLIF
CE-141	-3.649E+00	1.985E+01	1.992E+01	NOT IDENT.
CE-143	1.000E+41	9.511E+40	0.000E+00	SHORT HLIF
CE-144	7.512E-02	3.351E-01	3.368E-01	NOT IDENT.
PM-144	2.972E-02	5.027E-02	5.202E-02	NOT IDENT.
PR-144	2.475E+00	4.331E+00	4.473E+00	NOT IDENT.
PM-146	-7.648E-03	3.724E-02	3.740E-02	NOT IDENT.
ND-147	-4.779E+06	1.826E+07	1.838E+07	SHORT HLIF
PM-147	-4.850E+02	7.777E+02	8.079E+02	NOT IDENT.
PM-149	-1.627E+39	4.436E+39	0.000E+00	SHORT HLIF
EU-150	-2.052E-03	2.420E-02	2.421E-02	FAIL ABUN
EU-152	-1.129E-03	8.375E-02	8.375E-02	FAIL ABUN
GD-153	-1.426E-01	1.793E-01	1.905E-01	NOT IDENT.
EU-154	-6.059E-03	1.261E-01	1.261E-01	NOT IDENT.
EU-155	1.183E-01	9.829E-02	1.118E-01	FAIL ABUN
TB-160	-7.604E-02	1.542E+00	1.543E+00	FAIL ABUN
HO-166M	6.346E-02	5.545E-02	6.239E-02	FAIL ABUN
TM-171	7.358E+00	1.675E+01	1.708E+01	NOT IDENT.
HF-172	-9.846E-02	2.221E-01	2.265E-01	FAIL ABUN

LU-172	-1.525E-02	6.921E-02	6.955E-02	FAIL ABUN
LU-176	1.758E-02	2.204E-02	2.342E-02	FAIL ABUN
HF-181	-2.613E+00	3.644E+00	3.830E+00	NOT IDENT.
TA-182	5.642E-01	9.957E-01	1.028E+00	FAIL ABUN
RE-183	6.778E-01	2.432E+00	2.452E+00	NOT IDENT.
RE-184	2.586E+01	3.006E+01	3.224E+01	NOT IDENT.
W-188	-5.103E+01	1.410E+02	1.429E+02	FAIL ABUN
IR-192	-4.245E-01	4.273E-01	4.682E-01	FAIL ABUN
BI-207	5.630E-02	5.256E-02	5.836E-02	FAIL ABUN
PB-210	-2.878E+00	2.891E+00	3.169E+00	NOT IDENT.
BI-211	2.067E+00	5.508E-01	1.082E+00	FAIL ABUN
PB-211	6.991E-02	5.960E-01	5.968E-01	NOT IDENT.
RN-219	2.648E-01	3.232E-01	3.445E-01	NOT IDENT.
RA-223	-2.235E-01	6.030E-01	6.113E-01	FAIL ABUN
AC-227	1.545E-02	2.292E-01	2.293E-01	FAIL ABUN
TH-227	1.545E-02	2.292E-01	2.293E-01	FAIL ABUN
TH-231	-2.235E-01	6.030E-01	6.113E-01	FAIL ABUN
PA-233	2.981E-02	5.427E-02	5.591E-02	FAIL ABUN
PA-234	-1.506E-01	3.157E-01	3.229E-01	NOT IDENT.
PA-234M	1.392E+00	3.657E+00	3.710E+00	NOT IDENT.
U-235	-1.025E-02	1.802E-01	1.802E-01	FAIL ABUN
NP-237	2.981E-02	5.427E-02	5.591E-02	FAIL ABUN
NP-238	-2.979E+40	4.411E+40	0.000E+00	SHORT HLIF
NP-239	1.378E-02	2.064E-01	2.065E-01	FAIL ABUN
PU-239	-8.394E+01	3.055E+02	3.078E+02	NOT IDENT.
AM-241	8.911E-03	1.337E-01	1.338E-01	NOT IDENT.
CM-243	-2.800E-02	8.879E-02	8.968E-02	FAIL ABUN
BK-247	-9.958E-03	6.624E-02	6.639E-02	FAIL ABUN
CM-247	1.301E-02	2.991E-02	3.048E-02	FAIL ABUN
CF-249	-3.012E-02	3.716E-02	3.956E-02	NOT IDENT.
CF-251	2.825E-02	1.136E-01	1.143E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	69.4542	87.09	70.0419	136.47	67.0169
45.60	44.9814	87.57	70.1040	140.51	0.0000
46.54	79.6438	88.03	70.1635	143.76	63.0877
49.72	0.0000	88.34	70.2031	144.24	63.1271
51.35	58.3223	88.47	70.2199	145.44	62.0774
51.87	61.3211	89.96	70.4107	152.43	62.6385
52.39	54.5809	1093.63	70.4971	153.25	0.0000
52.97	54.6621	91.11	0.0000	323.87	52.7037
53.44	60.5911	92.59	70.7438	156.02	0.0000
54.07	65.5820	93.35	70.8389	158.56	0.0000
57.36	0.0000	94.56	70.9900	159.00	49.1201
57.53	68.1198	94.65	71.0012	162.33	48.5371
57.98	68.1935	94.67	71.0037	162.66	0.0000
59.27	68.7348	94.87	71.0286	163.33	25.0817
59.32	68.7430	97.43	68.4902	165.86	58.9645
59.54	76.7150	98.43	68.6079	176.31	37.0074
60.96	86.2613	98.44	68.6089	176.60	0.0000
61.17	74.3536	99.53	53.6999	177.52	52.5991
62.93	71.9900	100.11	66.6531	181.07	0.0000
63.29	72.0492	102.03	70.1039	181.52	54.4386
63.58	72.0968	103.18	60.5121	184.41	53.0080
64.28	69.5366	103.37	60.5314	143.76	53.0845
66.73	69.9173	105.21	46.6199	193.51	53.5364
67.24	74.7068	105.31	46.6274	197.03	53.7371
125.81	81.8528	106.12	74.9197	198.01	53.7928
67.75	81.8652	106.47	69.5298	201.83	62.6006
69.67	87.2801	109.28	69.8442	203.43	56.5573
70.83	84.1047	111.00	59.0913	205.31	65.7007
72.81	83.0925	111.76	0.0000	210.85	37.9917
72.87	83.1031	114.06	65.9711	215.65	49.7925
74.66	92.2982	116.30	0.0000	222.11	48.4389
74.82	92.3284	116.74	48.5779	227.09	56.2245
74.97	92.3573	119.76	39.9271	227.38	53.7220
77.11	92.7576	121.12	62.2344	228.16	0.0000
78.74	85.4764	121.22	65.5783	228.18	52.9230
79.69	95.3053	121.78	55.6210	116.74	52.9230
80.12	77.4141	122.06	55.6438	235.69	52.0301
80.19	0.0000	122.92	63.5144	235.96	52.0430
80.57	74.7153	123.07	63.5284	238.63	59.8071
81.00	85.8555	265.00	46.8520	238.98	0.0000
81.07	87.2524	125.81	68.2583	240.99	59.9369
81.75	73.4993	127.23	66.1551	242.00	59.9921
83.79	76.5711	127.91	50.5067	244.70	20.4731
84.00	76.6019	129.30	70.8490	252.40	0.0000
85.43	62.8432	131.20	59.7633	252.80	50.6959
86.55	62.9745	133.02	57.6544	254.15	0.0000
86.79	67.2026	133.52	57.6948	256.23	47.4021
86.94	67.2217	136.00	60.1628	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	37.3311	355.39	0.0000	584.27	28.6018
264.80	36.4680	356.01	11.1726	595.83	0.0000
265.00	39.0793	364.49	0.0000	427.87	14.9439
268.22	52.2485	366.42	0.0000	602.52	0.0000
269.46	41.8428	372.51	34.8358	604.72	22.4586
270.03	37.5025	375.05	23.5774	607.14	20.8774
271.23	37.5401	377.52	24.5607	609.32	18.2195
273.65	0.0000	356.01	27.5085	610.33	18.2278
276.40	40.3333	388.16	35.1949	614.28	12.8896
277.37	40.3651	388.63	0.0000	618.01	22.5953
277.60	40.3735	391.69	22.8809	620.36	18.3108
278.00	40.3866	264.66	23.0117	621.93	24.7913
279.20	40.4269	401.81	15.3522	630.19	0.0000
279.54	40.8777	402.40	18.2377	631.29	19.4832
279.70	40.8824	404.85	22.1109	633.25	11.9167
280.46	40.9079	410.95	19.3001	634.78	0.0000
283.69	33.0780	413.71	28.9996	635.95	13.0156
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	37.0986	423.72	0.0000	645.85	13.0723
285.90	0.0000	427.09	23.3887	657.76	13.1401
287.50	35.3923	427.87	27.2999	657.90	0.0000
290.67	42.5781	433.94	19.0815	661.66	16.4526
293.27	0.0000	439.40	20.6155	664.57	0.0000
351.93	40.0616	453.88	18.8094	666.33	0.0000
295.96	40.0854	463.37	20.9017	666.50	0.0000
879.38	37.4900	468.07	17.9634	667.71	0.0000
299.98	32.1694	473.00	0.0000	677.62	19.8772
300.09	32.1724	475.06	25.0463	685.70	0.0000
300.13	32.1738	476.78	26.0730	695.00	0.0000
301.36	34.8883	477.60	27.0879	696.49	11.1300
302.85	41.6458	482.18	24.1392	696.51	11.1300
256.23	31.2069	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	17.8138
306.78	25.1534	497.08	20.2787	697.49	17.8151
308.46	37.7780	505.52	13.7497	702.65	17.8529
311.90	27.0557	507.63	0.0000	706.68	16.7645
316.51	40.7245	511.00	23.4927	711.68	8.9593
319.41	0.0000	514.00	16.8800	720.70	0.0000
320.08	0.0000	514.00	16.8800	721.93	0.0000
321.04	35.4144	520.40	18.4761	722.78	10.1243
323.87	34.1240	520.69	0.0000	722.91	15.1875
325.23	27.3260	522.65	0.0000	723.31	15.1897
328.76	0.0000	527.90	0.0000	724.19	21.9486
333.37	38.4846	528.26	16.4896	727.33	9.0156
333.97	27.5012	529.59	13.4068	733.00	9.4879
334.37	23.3828	529.87	0.0000	735.93	15.8315
338.28	36.7814	531.02	0.0000	333.97	12.4466
338.32	36.7830	537.26	0.0000	739.50	0.0000
311.90	33.1553	546.56	0.0000	747.24	13.6299
340.48	33.1553	552.55	16.6914	748.06	10.2257
340.55	0.0000	563.25	19.9254	752.31	18.2090
344.28	27.7039	569.33	25.2432	753.82	0.0000
345.93	35.1325	946.00	25.2451	756.73	18.2402
351.06	40.3626	569.70	26.2990	756.80	18.2409
351.93	40.3865	583.19	26.4689	884.68	14.8615

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	21.7360	1274.44	7.4285	1620.50	3.2587
766.42	24.0300	1001.03	4.4637	1621.92	6.5193
766.84	20.6001	1002.74	7.4434	1678.03	0.0000
772.60	0.0000	1004.73	15.9600	1690.97	2.2039
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	5.5899
778.90	13.7964	1028.54	0.0000	1063.66	7.8344
783.70	0.0000	1037.84	11.2844	1771.35	6.7167
785.37	16.1351	1038.76	0.0000	1791.20	0.0000
792.07	15.5978	631.29	11.3145	1808.65	6.3137
794.95	13.8794	1048.07	0.0000	1810.72	0.0000
795.86	13.8843	1049.04	4.7177	1836.06	2.7199
810.06	8.1416	1050.41	13.2147		
810.29	8.1422	1063.66	8.5287		
344.28	5.8162	1077.00	0.0000		
810.76	5.8169	1077.34	8.5627		
815.77	0.0000	1085.87	9.5374		
1048.07	0.0000	1093.63	10.5146		
832.01	12.6611	1099.45	11.4902		
834.85	14.0820	1112.07	15.3750		
835.71	15.8472	1112.84	16.3391		
836.80	0.0000	1115.54	15.3896		
846.75	0.0000	1120.29	12.5208		
846.77	14.1421	1120.55	12.5223		
856.80	0.0000	1221.41	12.5247		
860.56	15.0986	1129.67	8.6913		
871.09	16.0450	1131.51	0.0000		
873.19	11.5964	1147.95	0.0000		
875.33	0.0000	1173.23	10.7509		
879.38	10.7274	1177.95	16.6358		
880.51	9.8372	1189.05	14.7226		
883.24	8.9511	1204.77	10.8422		
884.68	11.6424	1221.41	7.9199		
889.28	8.9694	1231.02	6.3516		
894.76	9.8848	1235.36	0.0000		
898.04	16.1933	1238.28	9.9432		
900.72	15.3072	1260.41	0.0000		
903.28	11.7154	1271.87	7.0205		
911.20	12.6503	1274.44	12.0432		
912.08	12.6537	1274.54	12.0432		
923.98	0.0000	1291.59	5.0397		
926.50	14.5308	1298.22	0.0000		
929.11	11.4266	1312.11	0.0000		
937.49	4.3749	1332.49	8.1455		
944.13	0.0000	1362.66	0.0000		
946.00	14.6230	1365.19	5.1312		
949.00	14.6372	1368.63	0.0000		
667.71	0.0000	1384.29	2.0619		
962.31	8.8198	1408.01	4.1467		
964.08	10.2956	1457.56	0.0000		
966.17	0.0000	1460.82	3.1479		
911.20	10.3117	1489.16	6.3362		
968.97	10.3117	1505.03	7.4183		
983.53	0.0000	1584.12	4.3120		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:41:40.84

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240010.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM18.CNF;511
                                     Background date  : 2-OCT-2016 11:01:02.
Sample date      : 15-DEC-2015 12:35:00 Acquisition date : 3-OCT-2016 05:39:46.
Sample ID        : R405240010           Sample quantity  : 1.44811E+02 GRAM
Detector name    : GAM18                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.95  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.97*	29	199	1.46	126.74	122	10	7.99E-03	95.2	
2	2	74.74	131	164	1.14	150.27	146	14	3.63E-02	18.4	6.41E-01
3	2	77.10*	159	132	0.93	154.98	146	14	4.40E-02	14.5	
4	4	87.38	77	100	1.14	175.53	173	20	2.13E-02	21.9	2.63E+00
5	4	89.98	54	130	1.21	180.72	173	20	1.50E-02	37.7	
6	4	92.64*	67	117	1.14	186.05	173	20	1.86E-02	32.9	
7	0	185.79*	60	180	1.13	372.19	366	13	1.68E-02	48.9	
8	0	198.86*	28	75	1.08	398.30	394	7	7.85E-03	58.3	
9	0	208.79	66	110	3.09	418.15	414	11	1.84E-02	32.7	
10	0	238.68*	427	130	1.06	477.89	472	10	1.19E-01	7.1	
11	0	241.88	70	100	1.39	484.28	482	7	1.95E-02	26.6	
12	0	270.02	81	47	1.17	540.52	536	11	2.24E-02	20.1	
13	0	295.51*	175	91	1.22	591.45	585	13	4.87E-02	13.7	
14	0	339.03*	90	92	1.33	678.43	670	13	2.50E-02	24.8	
15	0	352.15*	284	81	1.34	704.66	698	12	7.89E-02	8.8	
16	0	368.80	34	69	1.84	737.92	732	11	9.40E-03	50.5	
17	0	441.65	58	51	4.68	883.53	876	18	1.62E-02	31.3	
18	0	463.81	35	69	1.00	927.81	922	12	9.80E-03	50.0	
19	0	472.45	12	45	0.97	945.08	939	10	3.33E-03	108.5	
20	0	477.23	23	32	3.90	954.63	948	12	6.48E-03	53.2	
21	0	511.46*	91	74	2.24	1023.07	1014	21	2.53E-02	29.2	
22	0	557.01	16	14	0.50	1114.09	1110	8	4.37E-03	51.6	
23	0	561.00	9	16	1.29	1122.07	1117	7	2.50E-03	80.6	
24	0	583.52*	157	56	1.75	1167.09	1161	13	4.37E-02	12.9	
25	0	609.79*	193	36	1.95	1219.60	1213	12	5.37E-02	9.4	
26	0	662.39	118	63	1.36	1324.73	1319	14	3.28E-02	17.0	
27	1	725.56	23	31	2.05	1451.00	1437	24	6.37E-03	52.9	4.05E+00
28	1	728.06	35	28	2.06	1456.00	1437	24	9.77E-03	30.3	
29	0	758.57	9	24	1.74	1516.97	1510	10	2.63E-03	103.4	
30	0	761.31	12	9	1.12	1522.44	1519	7	3.45E-03	48.5	
31	0	764.48	10	11	0.67	1528.79	1525	7	2.64E-03	65.2	
32	0	795.87*	14	36	1.23	1591.54	1584	14	3.97E-03	94.1	
33	0	911.76*	108	29	1.29	1823.18	1813	19	3.00E-02	15.8	
34	2	965.21	37	10	2.79	1930.03	1924	23	1.04E-02	28.1	1.94E+00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	2	969.80*	65	22	2.80	1939.22	1924	23	1.80E-02	20.8	
36	0	1121.26*	56	40	2.48	2242.00	2233	16	1.55E-02	29.2	
37	0	1240.71	28	41	0.84	2480.81	2470	19	7.71E-03	59.5	
38	0	1246.27	13	3	0.94	2491.93	2488	8	3.52E-03	38.6	
39	0	1250.37	10	7	0.57	2500.13	2495	9	2.83E-03	55.8	
40	0	1275.61	8	18	0.86	2550.59	2541	14	2.33E-03	111.1	
41	0	1364.61	7	10	0.47	2728.52	2719	12	1.98E-03	102.3	
42	0	1395.15	6	6	0.88	2789.58	2781	12	1.67E-03	91.3	
43	0	1461.73*	526	16	2.58	2922.71	2911	20	1.46E-01	4.8	
44	0	1470.77	9	0	0.74	2940.78	2936	12	2.50E-03	33.3	
45	0	1765.63*	40	8	3.28	3530.38	3522	15	1.10E-02	23.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:41:43

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240010.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:35:00 Acquisition date : 3-OCT-2016 05:39:46
Sample ID   : R405240010   Sample quantity : 144.81 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA18   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.95   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
BE-7	477.60	10.44*	4.225E+00	2.930E-01	1.327E+01	106.35	OK
NA-22	1274.54	99.94*	2.123E+00	2.001E-02	2.477E-02	222.30	OK
K-40	1460.82	10.66*	1.911E+00	1.287E+01	1.287E+01	9.52	OK
NB-95	765.81	99.81*	3.054E+00	1.654E-02	3.933E-01	130.42	OK
CD-109	88.03	3.70*	6.148E+00	1.303E+00	2.023E+00	73.92	OK
SN-126	64.28	9.60	3.049E+00	6.427E-01	6.427E-01	190.33	OK
	86.94	8.90	6.148E+00	5.419E-01	5.419E-01	73.92	OK
	87.57	37.00*	6.148E+00	1.303E-01	1.303E-01	73.92	OK
BA-137M	661.66	89.90*	3.369E+00	2.095E-01	2.134E-01	33.96	OK
CS-137	661.66	85.10*	3.369E+00	2.213E-01	2.254E-01	33.96	OK
TL-208	277.37	6.60	6.127E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	3.676E+00	2.741E-01	2.741E-01	25.89	OK
	860.56	12.50	2.814E+00	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	4.742E+00	1.214E+00	1.214E+00	53.54	OK
	77.11	17.10	5.039E+00	1.185E+00	1.185E+00	28.95	OK
	238.63	43.60*	6.722E+00	8.565E-01	8.565E-01	14.23	OK
	300.09	3.30	5.819E+00	----- Line Not Found		-----	Absent
BI-214	609.32	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88	OK
	1120.29	14.92	2.335E+00	8.214E-01	8.216E-01	58.44	OK
	1764.49	15.30	1.633E+00	7.741E-01	7.744E-01	46.76	OK
PB-214	74.82	5.80	4.752E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	5.039E+00	2.090E+00	2.090E+00	28.95	OK
	87.09	3.41	6.121E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	6.670E+00	8.529E-01	8.532E-01	53.12	OK
	295.22	18.42	5.878E+00	9.348E-01	9.351E-01	27.49	OK
	351.93	35.60*	5.219E+00	8.696E-01	8.699E-01	17.68	OK
RN-222	609.32	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88	OK
	1120.29	14.92	2.335E+00	8.214E-01	8.216E-01	58.44	OK
	1764.49	15.30	1.633E+00	7.741E-01	7.744E-01	46.76	OK
RA-226	609.32	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88	OK
	1120.29	14.92	2.335E+00	8.214E-01	8.216E-01	58.44	OK
	1764.49	15.30	1.633E+00	7.741E-01	7.744E-01	46.76	OK
AC-228	105.21	1.10	7.385E+00	----- Line Not Found		-----	Absent
	338.32	11.27	5.357E+00	8.516E-01	8.516E-01	49.51	OK
	794.95	4.25	2.970E+00	5.980E-01	5.980E-01	188.28	OK
	835.71	1.61	2.872E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61	OK
	968.97	15.80	2.590E+00	8.223E-01	8.223E-01	41.62	OK
RA-228	105.21	1.10	7.385E+00	----- Line Not Found		-----	Absent
	338.32	11.27	5.357E+00	8.516E-01	8.516E-01	49.51	OK
	794.95	4.25	2.970E+00	5.980E-01	5.980E-01	188.28	OK
	835.71	1.61	2.872E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61	OK
	968.97	15.80	2.590E+00	8.223E-01	8.223E-01	41.62	OK
TH-228	74.82	10.28	4.742E+00	1.214E+00	1.214E+00	53.54	OK
	77.11	17.10	5.039E+00	1.185E+00	1.185E+00	28.95	OK
	238.63	43.60*	6.722E+00	8.565E-01	8.565E-01	14.23	OK
	300.09	3.30	5.819E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	3.566E+00	6.460E-01	6.460E-01	18.88	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	1120.29	14.92	2.335E+00	8.214E-01	8.214E-01	58.44	OK
	1764.49	15.30	1.633E+00	7.741E-01	7.741E-01	46.76	OK
TH-232	105.21	1.10	7.385E+00	----- Line Not Found		-----	Absent
	338.32	11.27	5.357E+00	8.516E-01	8.516E-01	49.51	OK
	835.71	1.61	2.872E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61	OK
	968.97	15.80	2.590E+00	8.223E-01	8.223E-01	41.62	OK
TH-234	63.29	3.70*	3.049E+00	1.668E+00	1.668E+00	190.33	OK
	92.59	4.23	6.599E+00	1.523E+00	1.523E+00	65.75	OK
U-234	609.32	45.49*	3.566E+00	6.460E-01	6.460E-01	18.88	OK
	1120.29	14.92	2.335E+00	8.214E-01	8.214E-01	58.44	OK
	1764.49	15.30	1.633E+00	7.741E-01	7.741E-01	46.76	OK
U-235	89.96	3.47	6.380E+00	1.550E+00	1.550E+00	75.44	OK
	93.35	5.60	6.599E+00	1.150E+00	1.150E+00	65.75	OK
	143.76	10.96*	8.086E+00	----- Line Not Found		-----	Absent
	163.33	5.08	7.938E+00	----- Line Not Found		-----	Absent
	185.72	57.20	7.617E+00	8.334E-02	8.334E-02	97.72	OK
	205.31	5.01	7.289E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.049E+00	1.668E+00	1.668E+00	190.33	OK
	92.59	4.23	6.599E+00	1.523E+00	1.523E+00	65.75	OK
AM-243	43.53	5.90	3.443E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	4.742E+00	1.858E-01	1.858E-01	53.54	OK
ANH-511	511.00	100.00*	4.026E+00	1.243E-01	1.243E-01	58.32	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:41:44.41

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240010.CNF;1		
Acquisition date	: 3-OCT-2016 05:39:46	Sensitivity	: 3.000
Detector ID	: GAM18	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.95	Half life ratio	: *****
Sample date	: 15-DEC-2015 12:35:00	Analyst initials	: MXR1
Sample ID	: R405240010	Sample Quantity	: 1.4481E+02 GRAM
Batch Number	: 1596386	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	: 25-JUN-2016 08:25:19	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM18_CAN.CNF;10		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
BE-7	1.327E+01	1.383E+01	1.364E+01
NA-22	2.477E-02	5.396E-02	6.943E-02
K-40	1.287E+01	1.201E+00	4.427E-01
NB-95	3.933E-01	5.026E-01	1.357E+00
CD-109	2.023E+00	1.466E+00	1.749E+00
SN-126	1.303E-01	9.441E-02	1.134E-01
BA-137M	2.134E-01	7.101E-02	5.076E-02
CS-137	2.254E-01	7.502E-02	5.362E-02
TL-208	2.741E-01	6.955E-02	5.320E-02
PB-212	8.565E-01	1.194E-01	7.929E-02
BI-214	6.462E-01	1.196E-01	9.710E-02
PB-214	8.699E-01	1.507E-01	1.058E-01
RN-222	6.462E-01	1.196E-01	9.710E-02
RA-226	6.462E-01	1.196E-01	9.710E-02
AC-228	8.089E-01	2.506E-01	1.870E-01
RA-228	8.089E-01	2.506E-01	1.870E-01
TH-228	8.565E-01	1.194E-01	7.929E-02
TH-230	6.460E-01	1.195E-01	9.707E-02
TH-232	8.089E-01	2.506E-01	1.870E-01
TH-234	1.668E+00	3.110E+00	2.187E+00
U-234	6.460E-01	1.195E-01	9.707E-02
U-235	-7.205E-02	1.649E-01	2.915E-01
U-238	1.668E+00	3.110E+00	2.187E+00
AM-243	1.858E-01	9.749E-02	7.782E-02
ANH-511	1.243E-01	7.106E-02	4.180E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	3.244E-03	1.912E-02	4.262E-02	NOT IDENT.
SC-46	-1.030E-03	2.387E-01	4.543E-01	FAIL ABUN
V-48	0.000E+00	7.986E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	2.754E+02	0.000E+00	SHORT HLIF

MN-54	-2.743E-02	5.346E-02	9.256E-02	NOT IDENT.
CO-56	-2.696E-01	3.607E-01	6.019E-01	NOT IDENT.
MN-56	0.000E+00	1.333E+41	0.000E+00	SHORT HLIF
CO-57	2.517E-02	3.735E-02	7.368E-02	NOT IDENT.
CO-58	-9.798E-02	4.514E-01	8.203E-01	NOT IDENT.
FE-59	1.919E+00	4.572E+00	9.312E+00	NOT IDENT.
CO-60	-4.460E-03	2.592E-02	4.922E-02	NOT IDENT.
ZN-65	2.185E-02	1.441E-01	2.477E-01	NOT IDENT.
GE-68	5.602E-01	1.836E+00	3.670E+00	NOT IDENT.
AS-73	1.146E+00	8.597E+00	1.752E+01	NOT IDENT.
AS-74	0.000E+00	3.717E+03	0.000E+00	SHORT HLIF
SE-75	5.381E-03	1.561E-01	2.880E-01	NOT IDENT.
BR-77	0.000E+00	2.696E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	4.709E+02	0.000E+00	SHORT HLIF
RB-83	-6.351E-01	5.329E-01	8.115E-01	NOT IDENT.
KR-85	1.243E+01	6.529E+00	1.416E+01	NOT IDENT.
SR-85	1.216E+00	6.398E-01	1.387E+00	NOT IDENT.
RB-86	0.000E+00	1.712E+04	0.000E+00	SHORT HLIF
Y-88	1.793E-01	1.515E-01	3.882E-01	NOT IDENT.
Y-91	9.757E+01	4.163E+02	8.042E+02	NOT IDENT.
NB-94	3.434E-03	2.545E-02	4.810E-02	NOT IDENT.
NB-95M	6.847E-01	1.808E+00	3.256E+00	NOT IDENT.
ZR-95	1.664E-01	1.276E+00	2.141E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.776E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.319E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-6.419E-03	2.853E-02	5.190E-02	FAIL ABUN
RH-102	-2.994E-02	4.498E-02	7.952E-02	NOT IDENT.
RU-103	4.522E-01	3.826E+00	7.490E+00	FAIL ABUN
RH-106	-8.978E-02	3.920E-01	7.322E-01	NOT IDENT.
RU-106	-8.978E-02	3.920E-01	7.322E-01	NOT IDENT.
AG-108M	-1.372E-02	2.253E-02	3.858E-02	NOT IDENT.
AG-110M	2.778E-02	8.014E-02	1.561E-01	FAIL ABUN
SN-113	-9.275E-02	1.924E-01	3.382E-01	NOT IDENT.
CD-115	0.000E+00	2.671E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	5.751E+04	0.000E+00	SHORT HLIF
TE-123M	3.411E-02	1.075E-01	1.998E-01	NOT IDENT.
SB-124	5.193E-01	1.185E+00	2.757E+00	NOT IDENT.
SB-125	-4.544E-03	8.834E-02	1.612E-01	FAIL ABUN
TE-125M	3.678E+01	2.046E+02	3.918E+02	NOT IDENT.
I-126	0.000E+00	5.478E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	6.076E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	4.685E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.227E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.673E+25	0.000E+00	SHORT HLIF
BA-133	-1.546E-02	3.982E-02	6.294E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	3.889E-02	7.176E-02	8.802E-02	FAIL ABUN
CS-135	5.483E-02	1.139E-01	2.069E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.800E+05	0.000E+00	SHORT HLIF
CE-139	1.457E-02	8.918E-02	1.632E-01	NOT IDENT.
BA-140	0.000E+00	6.564E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.210E+05	0.000E+00	SHORT HLIF
CE-141	5.954E+00	1.911E+01	3.569E+01	NOT IDENT.
CE-143	0.000E+00	1.048E+41	0.000E+00	SHORT HLIF
CE-144	-1.067E-01	2.869E-01	5.137E-01	NOT IDENT.
PM-144	7.448E-03	3.853E-02	7.548E-02	FAIL ABUN
PR-144	6.348E-01	3.333E+00	6.528E+00	NOT IDENT.
PM-146	1.886E-02	3.987E-02	7.582E-02	NOT IDENT.
ND-147	0.000E+00	1.759E+07	0.000E+00	SHORT HLIF
PM-147	2.925E+02	6.766E+02	1.307E+03	NOT IDENT.
PM-149	0.000E+00	3.844E+39	0.000E+00	SHORT HLIF
EU-150	1.445E-03	2.181E-02	3.701E-02	FAIL ABUN
EU-152	-4.083E-02	7.421E-02	1.318E-01	FAIL ABUN
GD-153	-1.532E-01	1.564E-01	2.491E-01	NOT IDENT.
EU-154	6.094E-02	1.328E-01	1.754E-01	FAIL ABUN
EU-155	1.385E-01	8.551E-02	1.823E-01	FAIL ABUN
TB-160	-1.490E-01	1.425E+00	2.613E+00	FAIL ABUN
HO-166M	-1.863E-02	4.895E-02	8.794E-02	FAIL ABUN
TM-171	-9.461E-02	2.136E+01	4.329E+01	NOT IDENT.
HF-172	2.357E-02	1.824E-01	3.433E-01	FAIL ABUN
LU-172	-3.205E-02	5.702E-02	1.016E-01	FAIL ABUN
LU-176	2.311E-03	1.950E-02	3.730E-02	FAIL ABUN
HF-181	-1.215E+00	3.505E+00	5.359E+00	NOT IDENT.
TA-182	5.283E-01	7.086E-01	1.457E+00	FAIL ABUN

RE-183	-6.897E-02	2.624E+00	5.248E+00	NOT IDENT.
RE-184	1.622E+01	2.354E+01	4.315E+01	NOT IDENT.
W-188	4.620E+01	8.469E+01	1.543E+02	FAIL ABUN
IR-192	6.354E-03	3.346E-01	6.350E-01	FAIL ABUN
HG-203	-7.100E-01	1.670E+00	3.075E+00	NOT IDENT.
BI-207	-1.922E-02	4.029E-02	7.262E-02	FAIL ABUN
PB-210	-2.608E+00	4.405E+00	8.483E+00	NOT IDENT.
BI-211	0.000E+00	4.151E-01	6.364E-01	FAIL ABUN
PB-211	3.988E-01	5.688E-01	1.117E+00	NOT IDENT.
BI-212	0.000E+00	5.284E-01	8.833E-01	FAIL ABUN
RN-219	-1.563E-01	3.189E-01	5.588E-01	FAIL ABUN
RA-223	8.494E-02	4.707E-01	9.008E-01	FAIL ABUN
RA-224	0.000E+00	7.852E-01	1.158E+00	FAIL ABUN
AC-227	-9.777E-02	1.833E-01	3.371E-01	NOT IDENT.
TH-227	-9.777E-02	1.833E-01	3.371E-01	NOT IDENT.
TH-229	1.117E-01	3.678E-01	7.356E-01	FAIL ABUN
PA-231	1.271E-02	3.637E-01	6.589E-01	NOT IDENT.
TH-231	8.494E-02	4.707E-01	9.008E-01	FAIL ABUN
PA-233	2.024E-03	4.690E-02	8.914E-02	FAIL ABUN
PA-234	-1.306E-01	2.013E-01	3.616E-01	NOT IDENT.
PA-234M	3.344E-01	3.443E+00	6.609E+00	NOT IDENT.
NP-237	2.024E-03	4.690E-02	8.914E-02	FAIL ABUN
NP-238	0.000E+00	3.543E+40	0.000E+00	SHORT HLIF
NP-239	-8.758E-02	2.044E-01	3.693E-01	NOT IDENT.
PU-239	-7.450E+01	2.642E+02	4.772E+02	NOT IDENT.
AM-241	1.789E-02	1.410E-01	2.643E-01	NOT IDENT.
CM-243	-5.203E-02	8.446E-02	1.522E-01	NOT IDENT.
BK-247	2.415E-05	5.744E-02	1.055E-01	NOT IDENT.
CM-247	-1.056E-02	2.965E-02	5.268E-02	NOT IDENT.
CF-249	2.022E-02	3.187E-02	6.241E-02	NOT IDENT.
CF-251	6.750E-02	9.478E-02	1.805E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:41:41.63

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
BE-7	477.60	25	10.44*	4.225E+00	2.930E-01	1.327E+01	106.35
NA-22	1274.54	8	99.94*	2.123E+00	2.001E-02	2.477E-02	222.30
K-40	1460.82	506	10.66*	1.911E+00	1.287E+01	1.287E+01	9.52
NB-95	765.81	10	99.81*	3.054E+00	1.654E-02	3.933E-01	130.42
CD-109	88.03	94	3.70*	6.148E+00	2.147E+00	3.332E+00	43.84
SN-126	64.28	36	9.60	3.049E+00	6.427E-01	6.427E-01	190.33
	86.94	94	8.90	6.148E+00	8.924E-01	8.924E-01	43.84
	87.57	94	37.00*	6.148E+00	2.147E-01	2.147E-01	43.84
BA-137M	661.66	122	89.90*	3.369E+00	2.095E-01	2.134E-01	33.96
CS-137	661.66	122	85.10*	3.369E+00	2.213E-01	2.254E-01	33.96
TL-208	277.37	------	6.60	6.127E+00	------	Line Not Found	------
	583.19	165	85.00*	3.676E+00	2.741E-01	2.741E-01	25.89
	860.56	------	12.50	2.814E+00	------	Line Not Found	------
BI-211	72.87	------	1.23	4.495E+00	------	Line Not Found	------
	351.06	312	12.92*	5.219E+00	2.396E+00	2.396E+00	17.68
PB-212	74.82	163	10.28	4.742E+00	1.731E+00	1.731E+00	36.86
	77.11	197	17.10	5.039E+00	1.185E+00	1.185E+00	28.95
	238.63	484	43.60*	6.722E+00	8.565E-01	8.565E-01	14.23
	300.09	------	3.30	5.819E+00	------	Line Not Found	------
BI-214	609.32	202	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88
	1120.29	55	14.92	2.335E+00	8.214E-01	8.216E-01	58.44
	1764.49	37	15.30	1.633E+00	7.741E-01	7.744E-01	46.76
PB-214	74.82	163	5.80	4.742E+00	3.067E+00	3.068E+00	36.86
	77.11	197	9.70	5.039E+00	2.090E+00	2.090E+00	28.95
	87.09	94	3.41	6.148E+00	2.329E+00	2.330E+00	43.84
	242.00	80	7.25	6.670E+00	8.529E-01	8.532E-01	53.12
	295.22	195	18.42	5.878E+00	9.348E-01	9.351E-01	27.49
	351.93	312	35.60*	5.219E+00	8.696E-01	8.699E-01	17.68
RN-222	609.32	202	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88
	1120.29	55	14.92	2.335E+00	8.214E-01	8.216E-01	58.44
	1764.49	37	15.30	1.633E+00	7.741E-01	7.744E-01	46.76
RA-224	240.99	80	4.10*	6.670E+00	1.508E+00	1.508E+00	53.12
RA-226	609.32	202	45.49*	3.566E+00	6.460E-01	6.462E-01	18.88
	1120.29	55	14.92	2.335E+00	8.214E-01	8.216E-01	58.44
	1764.49	37	15.30	1.633E+00	7.741E-01	7.744E-01	46.76
AC-228	105.21	------	1.10	7.385E+00	------	Line Not Found	------
	338.32	99	11.27	5.357E+00	8.516E-01	8.516E-01	49.51
	794.95	15	4.25	2.970E+00	5.980E-01	5.980E-01	188.28
	835.71	------	1.61	2.872E+00	------	Line Not Found	------
	911.20	109	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61
	968.97	65	15.80	2.590E+00	8.223E-01	8.223E-01	41.62
RA-228	105.21	------	1.10	7.385E+00	------	Line Not Found	------
	338.32	99	11.27	5.357E+00	8.516E-01	8.516E-01	49.51
	794.95	15	4.25	2.970E+00	5.980E-01	5.980E-01	188.28
	835.71	------	1.61	2.872E+00	------	Line Not Found	------
	911.20	109	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61
	968.97	65	15.80	2.590E+00	8.223E-01	8.223E-01	41.62

Sample ID : R405240010 Acquisition date : 3-OCT-2016 05:39:46

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	163	10.28	4.742E+00	1.731E+00	1.731E+00	36.86
	77.11	197	17.10	5.039E+00	1.185E+00	1.185E+00	28.95
	238.63	484	43.60*	6.722E+00	8.565E-01	8.565E-01	14.23
	300.09	------	3.30	5.819E+00	------ Line Not Found		------
TH-230	609.32	202	45.49*	3.566E+00	6.460E-01	6.460E-01	18.88
	1120.29	55	14.92	2.335E+00	8.214E-01	8.214E-01	58.44
	1764.49	37	15.30	1.633E+00	7.741E-01	7.741E-01	46.76
TH-232	105.21	------	1.10	7.385E+00	------ Line Not Found		------
	338.32	99	11.27	5.357E+00	8.516E-01	8.516E-01	49.51
	835.71	------	1.61	2.872E+00	------ Line Not Found		------
	911.20	109	25.80*	2.704E+00	8.089E-01	8.089E-01	31.61
	968.97	65	15.80	2.590E+00	8.223E-01	8.223E-01	41.62
TH-234	63.29	36	3.70*	3.049E+00	1.668E+00	1.668E+00	190.33
	92.59	82	4.23	6.599E+00	1.523E+00	1.523E+00	65.75
U-234	609.32	202	45.49*	3.566E+00	6.460E-01	6.460E-01	18.88
	1120.29	55	14.92	2.335E+00	8.214E-01	8.214E-01	58.44
	1764.49	37	15.30	1.633E+00	7.741E-01	7.741E-01	46.76
U-235	89.96	66	3.47	6.380E+00	1.550E+00	1.550E+00	75.44
	93.35	82	5.60	6.599E+00	1.150E+00	1.150E+00	65.75
	143.76	------	10.96*	8.086E+00	------ Line Not Found		------
	163.33	------	5.08	7.938E+00	------ Line Not Found		------
	185.72	70	57.20	7.617E+00	8.334E-02	8.334E-02	97.72
	205.31	------	5.01	7.289E+00	------ Line Not Found		------
U-238	63.29	36	3.70*	3.049E+00	1.668E+00	1.668E+00	190.33
	92.59	82	4.23	6.599E+00	1.523E+00	1.523E+00	65.75
AM-243	43.53	------	5.90	3.443E-01	------ Line Not Found		------
	74.66	163	67.20*	4.742E+00	2.647E-01	2.648E-01	36.86
ANH-511	511.00	97	100.00*	4.026E+00	1.243E-01	1.243E-01	58.32

Flag: "*" = Keyline

Sample ID : R405240010 Acquisition date : 3-OCT-2016 05:39:46

Total number of lines in spectrum 45
Number of unidentified lines 12
Number of lines tentatively identified by NID 33 73.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.22D	45.3	2.930E-01	1.327E+01	1.411E+01	106.35	
NA-22	2.60Y	1.24	2.001E-02	2.477E-02	5.506E-02	222.30	
K-40	1.25E+09Y	1.00	1.287E+01	1.287E+01	0.123E+01	9.52	
NB-95	64.03D	23.8	1.654E-02	3.933E-01	5.129E-01	130.42	
CD-109	461.40D	1.55	2.147E+00	3.332E+00	1.461E+00	43.84	
SN-126	2.30E+05Y	1.00	2.147E-01	2.147E-01	0.941E-01	43.84	
BA-137M	30.08Y	1.02	2.095E-01	2.134E-01	0.725E-01	33.96	
CS-137	30.08Y	1.02	2.213E-01	2.254E-01	0.765E-01	33.96	
TL-208	1.41E+10Y	1.00	2.741E-01	2.741E-01	0.710E-01	25.89	
BI-211	7.04E+08Y	1.00	2.396E+00	2.396E+00	0.424E+00	17.68	
PB-212	1.41E+10Y	1.00	8.565E-01	8.565E-01	1.219E-01	14.23	
BI-214	1600.00Y	1.00	6.460E-01	6.462E-01	1.220E-01	18.88	
PB-214	1600.00Y	1.00	8.696E-01	8.699E-01	1.538E-01	17.68	
RN-222	1600.00Y	1.00	6.460E-01	6.462E-01	1.220E-01	18.88	
RA-224	1.41E+10Y	1.00	1.508E+00	1.508E+00	0.801E+00	53.12	
RA-226	1600.00Y	1.00	6.460E-01	6.462E-01	1.220E-01	18.88	
AC-228	1.41E+10Y	1.00	8.089E-01	8.089E-01	2.557E-01	31.61	
RA-228	1.41E+10Y	1.00	8.089E-01	8.089E-01	2.557E-01	31.61	
TH-228	1.41E+10Y	1.00	8.565E-01	8.565E-01	1.219E-01	14.23	
TH-230	7.54E+04Y	1.00	6.460E-01	6.460E-01	1.220E-01	18.88	
TH-232	1.41E+10Y	1.00	8.089E-01	8.089E-01	2.557E-01	31.61	
TH-234	4.47E+09Y	1.00	1.668E+00	1.668E+00	3.174E+00	190.33	
U-234	2.45E+05Y	1.00	6.460E-01	6.460E-01	1.220E-01	18.88	
U-235	7.04E+08Y	1.00	8.334E-02	8.334E-02	8.144E-02	97.72	K
U-238	4.47E+09Y	1.00	1.668E+00	1.668E+00	3.174E+00	190.33	
AM-243	7370.00Y	1.00	2.647E-01	2.648E-01	0.976E-01	36.86	
ANH-511	1.00E+09Y	1.00	1.243E-01	1.243E-01	0.725E-01	58.32	
			---	---			
	Total Activity :		3.222E+01	4.677E+01			

Grand Total Activity : 3.222E+01 4.677E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240010 Acquisition date : 3-OCT-2016 05:39:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	198.86	33	87	1.08	398.30	394	7	7.85E-03	****	7.40E+00	T
0	208.79	76	126	3.09	418.15	414	11	1.84E-02	65.5	7.23E+00	
0	270.02	91	53	1.17	540.52	536	11	2.24E-02	40.3	6.23E+00	T
0	368.80	37	76	1.84	737.92	732	11	9.40E-03	****	5.06E+00	
0	441.65	63	55	4.68	883.53	876	18	1.62E-02	62.5	4.46E+00	
0	463.81	38	74	1.00	927.81	922	12	9.80E-03	****	4.31E+00	T
0	472.45	13	48	0.97	945.08	939	10	3.33E-03	****	4.25E+00	T
0	557.01	17	15	0.50	1114.09	1110	8	4.37E-03	****	3.80E+00	
0	561.00	9	17	1.29	1122.07	1117	7	2.50E-03	****	3.78E+00	
1	725.56	24	32	2.05	1451.00	1437	24	6.37E-03	****	3.17E+00	T
1	728.06	36	29	2.06	1456.00	1437	24	9.77E-03	60.6	3.16E+00	T
0	758.57	10	24	1.74	1516.97	1510	10	2.63E-03	****	3.07E+00	
0	761.31	13	9	1.12	1522.44	1519	7	3.45E-03	97.0	3.06E+00	
2	965.21	37	10	2.79	1930.03	1924	23	1.04E-02	56.1	2.60E+00	T
0	1240.71	27	40	0.84	2480.81	2470	19	7.71E-03	****	2.17E+00	
0	1246.27	12	3	0.94	2491.93	2488	8	3.52E-03	77.2	2.16E+00	
0	1250.37	10	7	0.57	2500.13	2495	9	2.83E-03	****	2.16E+00	
0	1364.61	7	10	0.47	2728.52	2719	12	1.98E-03	****	2.02E+00	T
0	1395.15	6	6	0.88	2789.58	2781	12	1.67E-03	****	1.98E+00	
0	1470.77	9	0	0.74	2940.78	2936	12	2.50E-03	66.7	1.90E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:41:58.64

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240010.CNF;1    *
* Acquisition date :  3-OCT-2016 05:39:46 Sensitivity     : 3.000        *
* Detector ID      : GAM18                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.95     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:35:00 Nuclide Library : SOLID        *
* Sample ID        : R405240010           Analyst initials: MXR1         *
* Batch Number     : 1596386              Sample Quantity : 1.4481E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 25-JUN-2016 08:25:19 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM18_CAN.CNF;10         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
BE-7	6.079E+00
NA-22	3.060E-02
K-40	1.868E-01
NB-95	6.226E-01
CD-109	8.245E-01
SN-126	5.344E-02
BA-137M	2.298E-02
CS-137	2.427E-02
TL-208	2.431E-02
PB-212	3.716E-02
BI-214	4.414E-02
PB-214	4.899E-02
RN-222	4.414E-02
RA-226	4.414E-02
AC-228	8.331E-02
RA-228	8.331E-02
TH-228	3.716E-02
TH-230	4.412E-02
TH-232	8.331E-02
TH-234	1.028E+00
U-234	4.412E-02
U-235	1.374E-01
U-238	1.028E+00
AM-243	3.656E-02
ANH-511	1.911E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
NA-24	0.000E+00	SHORT HLIF
AL-26	1.691E-02	NOT IDENT.
SC-46	1.980E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	4.153E-02	NOT IDENT.

CO-56	2.663E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.454E-02	NOT IDENT.
CO-58	3.673E-01	NOT IDENT.
FE-59	4.151E+00	NOT IDENT.
CO-60	2.079E-02	NOT IDENT.
ZN-65	1.102E-01	NOT IDENT.
GE-68	1.641E+00	NOT IDENT.
AS-73	8.175E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.334E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	3.634E-01	NOT IDENT.
KR-85	6.645E+00	NOT IDENT.
SR-85	6.511E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.641E-01	NOT IDENT.
Y-91	3.628E+02	NOT IDENT.
NB-94	2.184E-02	NOT IDENT.
NB-95M	1.525E+00	NOT IDENT.
ZR-95	9.691E-01	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.434E-02	FAIL ABUN
RH-102	3.550E-02	NOT IDENT.
RU-103	3.407E+00	FAIL ABUN
RH-106	3.307E-01	NOT IDENT.
RU-106	3.307E-01	NOT IDENT.
AG-108M	1.752E-02	NOT IDENT.
AG-110M	7.007E-02	FAIL ABUN
SN-113	1.557E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	9.388E-02	NOT IDENT.
SB-124	1.125E+00	NOT IDENT.
SB-125	7.412E-02	FAIL ABUN
TE-125M	1.834E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.910E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.034E-02	FAIL ABUN
CS-135	9.620E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	7.652E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.688E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.400E-01	NOT IDENT.
PM-144	3.388E-02	FAIL ABUN
PR-144	2.930E+00	NOT IDENT.
PM-146	3.511E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.132E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.709E-02	FAIL ABUN
EU-152	6.055E-02	FAIL ABUN
GD-153	1.160E-01	NOT IDENT.
EU-154	7.759E-02	FAIL ABUN
EU-155	8.581E-02	FAIL ABUN
TB-160	1.165E+00	FAIL ABUN
HO-166M	3.985E-02	FAIL ABUN
TM-171	2.013E+01	NOT IDENT.
HF-172	1.607E-01	FAIL ABUN
LU-172	4.442E-02	FAIL ABUN
LU-176	1.730E-02	FAIL ABUN
HF-181	2.424E+00	NOT IDENT.
TA-182	6.583E-01	FAIL ABUN
RE-183	2.449E+00	NOT IDENT.

RE-184	1.946E+01	NOT IDENT.
W-188	7.158E+01	FAIL ABUN
IR-192	2.931E-01	FAIL ABUN
HG-203	1.424E+00	NOT IDENT.
BI-207	3.233E-02	FAIL ABUN
PB-210	3.957E+00	NOT IDENT.
BI-211	3.076E-01	FAIL ABUN
PB-211	5.181E-01	NOT IDENT.
BI-212	4.078E-01	FAIL ABUN
RN-219	2.564E-01	FAIL ABUN
RA-223	4.175E-01	FAIL ABUN
RA-224	5.526E-01	FAIL ABUN
AC-227	1.566E-01	NOT IDENT.
TH-227	1.566E-01	NOT IDENT.
TH-229	3.456E-01	FAIL ABUN
PA-231	3.060E-01	NOT IDENT.
TH-231	4.175E-01	FAIL ABUN
PA-233	4.124E-02	FAIL ABUN
PA-234	1.583E-01	NOT IDENT.
PA-234M	2.972E+00	NOT IDENT.
NP-237	4.124E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.727E-01	NOT IDENT.
PU-239	2.240E+02	NOT IDENT.
AM-241	1.238E-01	NOT IDENT.
CM-243	7.114E-02	NOT IDENT.
BK-247	4.890E-02	NOT IDENT.
CM-247	2.423E-02	NOT IDENT.
CF-249	2.896E-02	NOT IDENT.
CF-251	8.478E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:42:04.37

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240010.CNF;1  *
* Acquisition date :  3-OCT-2016 05:39:46 Sensitivity     : 3.000           *
* Detector ID      : GAM18                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.95     Half life ratio : *****           *
* Sample date      : 15-DEC-2015 12:35:00 Nuclide Library : SOLID           *
* Sample ID        : R405240010           Analyst initials: MXR1            *
* Batch Number     : 1596386              Sample Quantity : 1.4481E+02 GRAM *
*                                         Quantity Err(%) : 1.3811E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   : 25-JUN-2016 08:25:19 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM18_CAN.CNF;10            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
BE-7	1.327E+01	1.384E+01	1.384E+01
NA-22	2.477E-02	5.397E-02	5.397E-02
K-40	1.287E+01	1.376E+00	1.376E+00
NB-95	3.933E-01	5.029E-01	5.029E-01
CD-109	2.024E+00	1.483E+00	1.483E+00
SN-126	1.304E-01	9.531E-02	9.531E-02
BA-137M	2.134E-01	7.160E-02	7.160E-02
CS-137	2.254E-01	7.564E-02	7.564E-02
TL-208	2.741E-01	7.052E-02	7.052E-02
PB-212	8.565E-01	1.277E-01	1.277E-01
BI-214	6.462E-01	1.227E-01	1.227E-01
PB-214	8.699E-01	1.550E-01	1.550E-01
RN-222	6.462E-01	1.227E-01	1.227E-01
RA-226	6.462E-01	1.227E-01	1.227E-01
AC-228	8.089E-01	2.540E-01	2.540E-01
RA-228	8.089E-01	2.540E-01	2.540E-01
TH-228	8.565E-01	1.277E-01	1.277E-01
TH-230	6.460E-01	1.227E-01	1.227E-01
TH-232	8.089E-01	2.540E-01	2.540E-01
TH-234	1.668E+00	3.132E+00	3.132E+00
U-234	6.460E-01	1.227E-01	1.227E-01
U-235	-7.205E-02	1.649E-01	1.649E-01
U-238	1.668E+00	3.132E+00	3.132E+00
AM-243	1.858E-01	9.865E-02	9.865E-02
ANH-511	1.243E-01	7.124E-02	7.124E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
NA-24	1.000E+41	2.463E+41	0.000E+00	SHORT HLIF
AL-26	3.244E-03	1.912E-02	1.917E-02	NOT IDENT.
SC-46	-1.030E-03	2.387E-01	2.387E-01	FAIL ABUN
V-48	3.427E+03	7.987E+03	8.135E+03	SHORT HLIF
CR-51	-4.190E+01	2.754E+02	2.760E+02	SHORT HLIF

MN-54	-2.743E-02	5.347E-02	5.488E-02	NOT IDENT.
CO-56	-2.696E-01	3.609E-01	3.808E-01	NOT IDENT.
MN-56	-1.000E+41	1.333E+41	0.000E+00	SHORT HLIF
CO-57	2.517E-02	3.737E-02	3.906E-02	NOT IDENT.
CO-58	-9.798E-02	4.514E-01	4.536E-01	NOT IDENT.
FE-59	1.919E+00	4.574E+00	4.655E+00	NOT IDENT.
CO-60	-4.460E-03	2.592E-02	2.600E-02	NOT IDENT.
ZN-65	2.185E-02	1.441E-01	1.444E-01	NOT IDENT.
GE-68	5.602E-01	1.836E+00	1.853E+00	NOT IDENT.
AS-73	1.146E+00	8.600E+00	8.616E+00	NOT IDENT.
AS-74	-4.369E+02	3.717E+03	3.722E+03	SHORT HLIF
SE-75	5.381E-03	1.561E-01	1.561E-01	NOT IDENT.
BR-77	1.933E+37	1.633E+38	0.000E+00	SHORT HLIF
SR-82	7.145E+01	4.709E+02	4.720E+02	SHORT HLIF
RB-83	-6.351E-01	5.400E-01	6.112E-01	NOT IDENT.
KR-85	1.243E+01	6.548E+00	8.619E+00	NOT IDENT.
SR-85	1.216E+00	6.417E-01	8.440E-01	NOT IDENT.
RB-86	1.695E+03	1.712E+04	1.713E+04	SHORT HLIF
Y-88	1.793E-01	1.520E-01	1.721E-01	NOT IDENT.
Y-91	9.757E+01	4.163E+02	4.186E+02	NOT IDENT.
NB-94	3.434E-03	2.545E-02	2.550E-02	NOT IDENT.
NB-95M	6.847E-01	1.809E+00	1.835E+00	NOT IDENT.
ZR-95	1.664E-01	1.276E+00	1.279E+00	FAIL ABUN
NB-97	-1.000E+41	3.894E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.776E+41	0.000E+00	SHORT HLIF
MO-99	2.177E+31	2.324E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	4.416E+41	0.000E+00	SHORT HLIF
RH-101	-6.419E-03	2.856E-02	2.870E-02	FAIL ABUN
RH-102	-2.994E-02	4.504E-02	4.702E-02	NOT IDENT.
RU-103	4.522E-01	3.826E+00	3.831E+00	FAIL ABUN
RH-106	-8.978E-02	3.921E-01	3.941E-01	NOT IDENT.
RU-106	-8.978E-02	3.921E-01	3.941E-01	NOT IDENT.
AG-108M	-1.372E-02	2.253E-02	2.337E-02	NOT IDENT.
AG-110M	2.778E-02	8.016E-02	8.113E-02	FAIL ABUN
SN-113	-9.275E-02	1.924E-01	1.969E-01	NOT IDENT.
CD-115	-4.333E+37	2.672E+38	0.000E+00	SHORT HLIF
SN-117M	-2.121E+04	5.756E+04	5.835E+04	SHORT HLIF
TE-123M	3.411E-02	1.075E-01	1.086E-01	NOT IDENT.
SB-124	5.193E-01	1.185E+00	1.208E+00	NOT IDENT.
SB-125	-4.544E-03	8.834E-02	8.836E-02	FAIL ABUN
TE-125M	3.678E+01	2.046E+02	2.053E+02	NOT IDENT.
I-126	4.034E+05	5.504E+05	5.797E+05	SHORT HLIF
SB-126	5.226E+05	6.152E+05	6.587E+05	SHORT HLIF
SB-127	-2.065E+21	5.444E+21	0.000E+00	SHORT HLIF
I-131	1.450E+09	2.228E+09	2.322E+09	SHORT HLIF
I-132	1.000E+41	2.269E+42	0.000E+00	SHORT HLIF
TE-132	-1.164E+25	6.689E+25	0.000E+00	SHORT HLIF
BA-133	-1.546E-02	3.982E-02	4.043E-02	NOT IDENT.
I-133	1.000E+41	6.870E+41	0.000E+00	SHORT HLIF
CS-134	3.889E-02	7.178E-02	7.389E-02	FAIL ABUN
CS-135	5.483E-02	1.139E-01	1.166E-01	NOT IDENT.
I-135	-1.000E+41	1.154E+43	0.000E+00	SHORT HLIF
CS-136	1.042E+05	1.804E+05	1.864E+05	SHORT HLIF
CE-139	1.457E-02	8.923E-02	8.947E-02	NOT IDENT.
BA-140	-5.098E+05	6.568E+05	6.958E+05	SHORT HLIF
LA-140	3.977E+03	2.210E+05	2.210E+05	SHORT HLIF
CE-141	5.954E+00	1.912E+01	1.930E+01	NOT IDENT.
CE-143	1.000E+41	1.053E+41	0.000E+00	SHORT HLIF
CE-144	-1.067E-01	2.870E-01	2.910E-01	NOT IDENT.
PM-144	7.448E-03	3.854E-02	3.868E-02	FAIL ABUN
PR-144	6.348E-01	3.333E+00	3.346E+00	NOT IDENT.
PM-146	1.886E-02	3.989E-02	4.079E-02	NOT IDENT.
ND-147	-7.165E+05	1.759E+07	1.759E+07	SHORT HLIF
PM-147	2.925E+02	6.767E+02	6.894E+02	NOT IDENT.
PM-149	2.223E+39	3.873E+39	0.000E+00	SHORT HLIF
EU-150	1.445E-03	2.181E-02	2.182E-02	FAIL ABUN
EU-152	-4.083E-02	7.424E-02	7.649E-02	FAIL ABUN
GD-153	-1.532E-01	1.566E-01	1.712E-01	NOT IDENT.
EU-154	6.094E-02	1.328E-01	1.356E-01	FAIL ABUN
EU-155	1.385E-01	8.608E-02	1.063E-01	FAIL ABUN
TB-160	-1.490E-01	1.425E+00	1.426E+00	FAIL ABUN
HO-166M	-1.863E-02	4.896E-02	4.967E-02	FAIL ABUN
TM-171	-9.461E-02	2.136E+01	2.136E+01	NOT IDENT.
HF-172	2.357E-02	1.825E-01	1.828E-01	FAIL ABUN
LU-172	-3.205E-02	5.711E-02	5.891E-02	FAIL ABUN
LU-176	2.311E-03	1.950E-02	1.953E-02	FAIL ABUN
HF-181	-1.215E+00	3.505E+00	3.548E+00	NOT IDENT.
TA-182	5.283E-01	7.089E-01	7.478E-01	FAIL ABUN

RE-183	-6.897E-02	2.624E+00	2.624E+00	NOT IDENT.
RE-184	1.622E+01	2.385E+01	2.494E+01	NOT IDENT.
W-188	4.620E+01	8.485E+01	8.737E+01	FAIL ABUN
IR-192	6.354E-03	3.346E-01	3.346E-01	FAIL ABUN
HG-203	-7.100E-01	1.671E+00	1.701E+00	NOT IDENT.
BI-207	-1.922E-02	4.030E-02	4.122E-02	FAIL ABUN
PB-210	-2.608E+00	4.412E+00	4.566E+00	NOT IDENT.
BI-211	2.396E+00	4.287E-01	1.162E+00	FAIL ABUN
PB-211	3.988E-01	5.692E-01	5.969E-01	NOT IDENT.
BI-212	8.899E-01	5.303E-01	6.649E-01	FAIL ABUN
RN-219	-1.563E-01	3.195E-01	3.272E-01	FAIL ABUN
RA-223	8.494E-02	4.707E-01	4.723E-01	FAIL ABUN
RA-224	1.508E+00	7.893E-01	1.042E+00	FAIL ABUN
AC-227	-9.777E-02	1.837E-01	1.890E-01	NOT IDENT.
TH-227	-9.777E-02	1.837E-01	1.890E-01	NOT IDENT.
TH-229	1.117E-01	3.678E-01	3.713E-01	FAIL ABUN
PA-231	1.271E-02	3.637E-01	3.637E-01	NOT IDENT.
TH-231	8.494E-02	4.707E-01	4.723E-01	FAIL ABUN
PA-233	2.024E-03	4.690E-02	4.691E-02	FAIL ABUN
PA-234	-1.306E-01	2.507E-01	2.576E-01	NOT IDENT.
PA-234M	3.344E-01	3.443E+00	3.447E+00	NOT IDENT.
NP-237	2.024E-03	4.690E-02	4.691E-02	FAIL ABUN
NP-238	-6.377E+39	3.543E+40	0.000E+00	SHORT HLIF
NP-239	-8.758E-02	2.045E-01	2.083E-01	NOT IDENT.
PU-239	-7.450E+01	2.643E+02	2.664E+02	NOT IDENT.
AM-241	1.789E-02	1.411E-01	1.413E-01	NOT IDENT.
CM-243	-5.203E-02	8.460E-02	8.779E-02	NOT IDENT.
BK-247	2.415E-05	5.744E-02	5.744E-02	NOT IDENT.
CM-247	-1.056E-02	2.970E-02	3.008E-02	NOT IDENT.
CF-249	2.022E-02	3.191E-02	3.319E-02	NOT IDENT.
CF-251	6.750E-02	9.508E-02	9.983E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
74.66	65.0586	105.31	104.3205	131.20	83.1757
879.38	72.3953	86.79	104.4035	133.02	81.3096
46.54	71.1128	86.94	89.1143	133.52	76.9459
228.16	0.0000	87.09	89.1595	136.00	56.0829
52.39	58.5007	87.57	89.3018	136.47	62.8812
1093.63	56.1027	88.03	89.4372	739.50	0.0000
52.39	58.8041	306.78	89.5288	140.51	0.0000
125.81	61.5361	88.47	89.5670	143.76	93.6138
53.44	62.5339	143.76	90.0044	144.24	90.2854
54.07	65.3026	90.64	90.2030	145.44	82.5040
293.27	0.0000	531.02	0.0000	152.43	80.2698
482.18	73.3622	92.59	90.7674	1048.07	0.0000
57.98	65.6367	93.35	90.9854	154.21	78.2365
59.27	63.3804	94.56	91.3319	158.56	0.0000
59.32	63.3947	311.90	91.3576	159.00	73.1208
59.54	70.5081	946.00	91.3631	162.33	84.3038
60.96	76.8668	94.87	66.9744	537.26	0.0000
61.17	76.9376	97.43	86.4056	163.33	71.3855
62.93	82.2983	98.43	58.9071	165.86	71.7453
63.29	82.4251	98.44	58.9089	427.87	69.5453
290.67	82.5271	103.37	63.1788	176.60	0.0000
87.57	82.7722	116.74	63.1788	177.52	62.3664
66.73	73.9255	100.11	74.5166	181.07	0.0000
67.24	83.7947	102.03	57.4894	181.52	62.4187
67.68	84.8574	103.18	67.9829	184.41	70.5925
1221.41	84.8815	103.37	83.4800	185.72	70.7595
97.43	97.4955	911.20	48.6968	193.51	73.8391
279.20	86.2375	105.31	48.7108	197.03	73.4452
1063.66	100.5579	106.12	70.6386	198.01	74.4138
72.87	100.5809	106.47	60.3103	201.83	84.2584
351.06	100.5809	109.28	68.1247	203.43	65.7097
74.66	80.6381	111.00	86.3511	205.31	77.0444
238.63	80.6867	111.76	0.0000	210.85	69.9711
351.93	80.6867	114.06	84.9481	215.65	70.5116
238.63	80.6867	116.30	0.0000	222.11	61.5569
74.97	80.7319	116.74	80.2088	227.09	77.0932
77.11	81.3743	119.76	76.5312	227.38	66.4886
78.74	91.3762	264.66	65.9825	228.16	0.0000
256.23	92.9617	121.22	65.9993	228.18	72.7827
133.52	91.8289	344.28	61.7597	235.69	63.2810
364.49	0.0000	122.06	59.6351	235.96	66.0000
711.68	75.3693	122.92	85.8445	238.63	74.3720
356.01	81.8809	1274.44	83.7030	238.98	0.0000
323.87	81.9010	123.68	68.5895	240.99	84.1252
81.75	83.7005	125.81	67.8607	242.00	55.7125
83.79	103.6726	127.23	82.3772	244.70	55.9289
265.00	78.8605	127.91	62.7119	685.70	0.0000
193.51	102.6291	129.30	86.1064	388.16	51.5105

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
507.63	0.0000	345.93	46.9424	569.50	28.9045
256.23	69.3150	351.06	52.7857	569.70	28.9083
527.90	0.0000	351.93	52.8345	583.19	37.6440
264.66	51.6018	355.39	0.0000	584.27	37.6709
264.80	51.6107	356.01	59.3008	595.83	0.0000
265.00	53.8688	364.49	0.0000	600.60	46.6478
268.22	47.9007	366.42	0.0000	602.52	0.0000
269.46	49.8611	372.51	34.9114	604.72	39.7084
270.03	49.8978	375.05	45.6053	607.14	45.8906
401.81	49.9765	377.52	43.5900	609.32	33.5089
273.65	0.0000	383.85	41.7208	610.33	26.0578
276.40	52.2115	388.16	42.9688	614.28	26.1242
583.19	56.0783	666.33	0.0000	618.01	31.7704
277.60	50.3905	391.69	54.9698	884.68	26.9968
402.40	51.3677	400.66	55.4368	621.93	32.8140
279.20	60.9727	401.81	51.1433	630.19	0.0000
279.54	61.0000	402.40	51.1710	631.29	33.0081
279.70	55.2919	404.85	41.4666	633.25	23.3284
280.46	49.6207	410.95	38.4073	634.78	0.0000
301.36	52.6971	413.71	52.8057	635.95	22.3936
284.31	0.0000	720.70	0.0000	636.99	0.0000
285.41	54.7317	423.72	0.0000	1690.97	22.5304
285.90	0.0000	427.09	42.3078	657.76	36.3104
287.50	61.6133	427.87	44.5654	657.90	0.0000
290.67	43.4926	433.94	43.6830	661.66	30.6594
293.27	0.0000	439.40	29.2595	664.57	0.0000
295.22	49.5671	453.88	39.8749	666.33	0.0000
316.51	49.6117	463.37	34.4482	666.50	0.0000
298.58	45.3770	468.07	31.1226	667.71	0.0000
299.98	39.5887	473.00	0.0000	677.62	26.9563
300.09	49.8586	631.29	20.8663	685.70	0.0000
300.13	49.8618	696.49	22.6361	695.00	0.0000
311.90	49.8618	477.60	22.6512	696.49	23.2155
301.36	56.3977	482.18	36.7237	696.51	23.2155
302.85	59.8322	487.02	0.0000	697.00	0.0000
304.50	53.0706	492.35	0.0000	697.30	24.2358
304.85	0.0000	497.08	25.6542	697.49	28.2786
306.78	52.2279	505.52	32.7655	702.65	25.3227
308.46	51.3430	507.63	0.0000	706.68	33.5025
311.90	50.5580	511.00	38.4452	711.68	37.6685
316.51	47.8379	514.00	38.5318	720.70	0.0000
319.41	0.0000	514.00	38.5318	721.93	0.0000
320.08	0.0000	520.40	45.6198	722.78	21.5121
321.04	53.0938	520.69	0.0000	722.91	21.5133
323.87	50.2482	667.71	0.0000	723.31	21.5185
325.23	64.4154	527.90	0.0000	756.73	21.5287
1596.21	0.0000	528.26	34.4131	727.33	21.5659
333.37	47.2256	529.59	33.5403	733.00	24.7236
333.97	47.2568	529.87	0.0000	735.93	24.7632
334.37	50.3278	531.02	0.0000	737.46	34.0776
338.28	49.0098	537.26	0.0000	739.50	0.0000
338.32	49.0127	1260.41	0.0000	747.24	20.7623
340.48	42.9861	552.55	32.4371	748.06	15.5786
340.55	0.0000	795.86	34.1653	752.31	28.3140
344.28	53.4367	569.33	28.9017	753.82	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
756.73	28.3804	968.97	25.8412	1505.03	9.2472
756.80	28.3812	983.53	0.0000	1584.12	20.7933
763.94	36.8672	984.45	0.0000	1596.21	0.0000
765.81	41.9360	996.26	20.5369	1620.50	6.6807
1001.03	36.9155	1001.03	22.4479	1621.92	5.7283
766.84	45.3160	1002.74	18.7197	1678.03	0.0000
772.60	0.0000	1004.73	24.3560	1690.97	3.8879
776.52	0.0000	1021.30	0.0000	1750.46	0.0000
777.92	0.0000	1025.87	0.0000	1764.49	12.8688
778.90	17.9447	1028.54	0.0000	1770.23	8.4968
783.70	0.0000	1037.84	18.0379	1771.35	6.7994
785.37	18.0044	1038.76	0.0000	1791.20	0.0000
903.28	15.3031	1046.59	18.1010	1808.65	4.0020
794.95	21.2854	1048.07	0.0000	1810.72	0.0000
795.86	21.2958	1049.04	22.8867	1836.06	2.0141
801.95	35.8866	1050.41	33.3936		
810.06	26.8105	1063.66	28.7725		
810.29	24.6684	1077.00	0.0000		
810.45	24.6698	1077.34	20.2474		
810.76	27.8924	1085.87	19.3467		
815.77	0.0000	1093.63	23.2852		
818.51	0.0000	1099.45	17.5017		
832.01	22.7656	1112.07	25.6450		
834.85	33.6527	1112.84	25.1292		
835.71	29.3228	1115.54	19.5645		
836.80	0.0000	1120.29	25.4782		
846.75	0.0000	1120.55	25.4808		
846.77	30.5712	1121.30	25.4884		
856.80	0.0000	1808.65	24.5837		
860.56	27.4750	1131.51	0.0000		
871.09	16.5669	1147.95	0.0000		
873.19	23.2164	1332.49	16.9830		
875.33	0.0000	1177.95	24.0164		
879.38	24.3922	1189.05	25.1147		
880.51	31.0608	1204.77	25.2539		
883.24	22.2144	1221.41	19.3034		
884.68	21.1176	1231.02	27.6664		
889.28	15.5932	1235.36	0.0000		
894.76	23.4481	1238.28	37.4670		
1836.06	21.2469	1260.41	0.0000		
900.72	27.9907	1271.87	10.3335		
903.28	17.9346	1274.44	18.6161		
911.20	22.4982	1274.54	18.6170		
912.08	22.5073	1291.59	18.7216		
984.45	0.0000	1298.22	0.0000		
926.50	24.4641	1312.11	0.0000		
929.11	26.3067	1332.49	11.5919		
937.49	28.2247	1362.66	0.0000		
983.53	0.0000	1365.19	14.1960		
946.00	24.6738	1368.63	0.0000		
949.00	20.1309	1384.29	13.9223		
954.55	0.0000	1408.01	20.4946		
962.31	23.0072	1457.56	0.0000		
964.08	23.0243	1460.82	9.8609		
966.17	25.8104	1489.16	6.4437		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:42:33.45

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240011.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM24.CNF;330
                                       Background date  : 2-OCT-2016 11:01:18.
Sample date      : 15-DEC-2015 12:53:00 Acquisition date : 3-OCT-2016 05:40:12.
Sample ID        : R405240011           Sample quantity  : 1.35975E+02 GRAM
Detector name    : GAM24                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:02.11  0.1%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.31*	22	172	0.73	126.67	123	7	6.15E-03	103.3	
2	0	68.06	27	159	0.88	136.19	134	7	7.52E-03	79.6	
3	3	74.99*	153	189	1.13	150.04	145	15	4.26E-02	17.1	9.73E-01
4	3	77.32*	251	174	1.16	154.70	145	15	6.98E-02	11.2	
5	3	87.33	123	132	1.41	174.74	165	29	3.42E-02	18.8	3.69E+00
6	3	89.82	74	146	1.42	179.70	165	29	2.04E-02	34.3	
7	3	92.82*	92	143	1.42	185.71	165	29	2.56E-02	29.0	
8	0	124.71	8	155	3.73	249.50	245	10	2.17E-03	303.3	
9	0	128.73	45	100	1.73	257.56	254	8	1.24E-02	41.7	
10	0	167.26	60	102	0.78	334.62	330	9	1.68E-02	33.0	
11	2	183.70	28	36	1.45	367.50	366	12	7.68E-03	31.4	2.05E+00
12	2	185.99*	68	105	1.27	372.09	366	12	1.88E-02	30.4	
13	0	209.10	44	123	0.82	418.33	413	10	1.23E-02	49.2	
14	5	238.75*	436	67	1.17	477.63	473	16	1.21E-01	5.7	7.81E-01
15	5	241.87	150	40	2.03	483.88	473	16	4.18E-02	14.5	
16	0	295.31	161	74	1.21	590.79	585	11	4.47E-02	13.0	
17	0	300.52	24	42	1.14	601.21	598	7	6.67E-03	49.2	
18	0	338.66	108	70	0.80	677.52	671	15	3.00E-02	19.2	
19	0	352.33*	240	89	1.16	704.87	698	14	6.67E-02	10.7	
20	0	415.05	31	27	1.50	830.35	825	11	8.62E-03	37.3	
21	0	463.72	35	62	2.44	927.72	921	15	9.85E-03	51.7	
22	0	511.37*	90	40	2.13	1023.05	1014	20	2.51E-02	23.2	
23	0	552.44	34	22	3.93	1105.21	1097	17	9.57E-03	35.1	
24	3	575.58	16	24	2.04	1151.51	1147	34	4.44E-03	52.8	1.31E+00
25	3	583.38*	134	24	1.65	1167.12	1147	34	3.71E-02	11.7	
26	0	609.58*	158	51	1.39	1219.53	1213	12	4.40E-02	12.2	
27	0	661.89	167	41	1.51	1324.19	1318	15	4.65E-02	11.4	
28	0	688.76	13	11	1.43	1377.96	1374	7	3.47E-03	51.5	
29	0	727.07*	26	25	0.82	1454.60	1449	10	7.17E-03	42.5	
30	0	768.63*	11	20	0.90	1537.76	1534	7	3.01E-03	75.6	
31	0	860.73	20	16	1.61	1722.05	1717	10	5.56E-03	42.9	
32	0	911.14*	91	26	1.35	1822.92	1819	12	2.53E-02	15.4	
33	0	969.92*	42	44	6.35	1940.54	1933	20	1.16E-02	42.7	
34	0	1003.30	6	7	1.35	2007.33	2004	7	1.67E-03	83.7	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1021.70	12	7	1.83	2044.14	2041	8	3.39E-03	45.6	
36	0	1120.64*	38	29	1.77	2242.12	2236	16	1.06E-02	35.6	
37	0	1173.79	8	11	1.24	2348.49	2342	9	2.16E-03	85.5	
38	0	1191.81	5	8	1.39	2384.56	2378	8	1.25E-03	117.6	
39	0	1193.64	10	4	0.55	2388.21	2385	7	2.64E-03	46.0	
40	0	1203.59	13	24	0.80	2408.12	2398	16	3.61E-03	88.7	
41	0	1239.91	13	30	2.62	2480.80	2472	13	3.59E-03	90.9	
42	0	1279.51	14	3	0.68	2560.05	2555	10	3.75E-03	34.9	
43	0	1296.07	11	8	0.62	2593.19	2587	11	2.95E-03	60.9	
44	0	1318.44	8	4	0.61	2637.96	2633	9	2.11E-03	62.0	
45	0	1377.98	23	6	1.68	2757.11	2751	12	6.39E-03	29.8	
46	0	1460.92*	362	14	1.68	2923.10	2916	14	1.01E-01	5.7	
47	0	1629.99	9	2	2.13	3261.46	3258	8	2.39E-03	45.1	
48	0	1715.11	6	0	0.99	3431.83	3428	8	1.67E-03	40.8	
49	0	1765.04*	30	3	1.43	3531.77	3525	14	8.20E-03	24.2	
50	0	1847.60	11	0	1.24	3697.00	3693	9	3.06E-03	30.2	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:42:35

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240011.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:53:00 Acquisition date : 3-OCT-2016 05:40:12
Sample ID   : R405240011   Sample quantity : 135.98 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA24   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:02.11   0.1%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.354E+00	1.325E+01	1.325E+01	11.48	OK
Y-91	1204.77	0.26*	1.594E+00	1.683E+01	5.395E+02	177.42	OK
CD-109	88.03	3.70*	7.500E+00	1.885E+00	2.927E+00	59.20	OK
SN-126	64.28	9.60	5.532E+00	2.779E-01	2.779E-01	206.66	OK
	86.94	8.90	7.500E+00	7.838E-01	7.838E-01	59.20	OK
	87.57	37.00*	7.500E+00	1.885E-01	1.885E-01	59.20	OK
BA-137M	661.66	89.90*	2.533E+00	4.136E-01	4.213E-01	22.76	OK
CS-137	661.66	85.10*	2.533E+00	4.369E-01	4.451E-01	22.76	OK
CE-139	165.86	80.00*	7.118E+00	6.601E-02	2.883E-01	65.91	OK
TL-208	277.37	6.60	5.023E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.790E+00	3.201E-01	3.201E-01	23.39	OK
	860.56	12.50	2.074E+00	4.252E-01	4.252E-01	85.73	OK
PB-212	74.82	10.28	6.744E+00	8.408E-01	8.408E-01	62.27	OK
	77.11	17.10	6.922E+00	1.396E+00	1.396E+00	22.40	OK
	238.63	43.60*	5.636E+00	1.077E+00	1.077E+00	11.48	OK
	300.09	3.30	4.715E+00	9.217E-01	9.217E-01	98.43	OK
BI-214	609.32	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37	OK
	1120.29	14.92	1.688E+00	8.149E-01	8.152E-01	71.25	OK
	1764.49	15.30	1.138E+00	8.808E-01	8.811E-01	48.40	OK
PB-214	74.82	5.80	6.730E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	6.922E+00	2.461E+00	2.462E+00	22.40	OK
	87.09	3.41	7.489E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	5.579E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	4.781E+00	1.093E+00	1.093E+00	26.05	OK
	351.93	35.60*	4.152E+00	9.596E-01	9.599E-01	21.40	OK
RN-222	609.32	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37	OK
	1120.29	14.92	1.688E+00	8.149E-01	8.152E-01	71.25	OK
	1764.49	15.30	1.138E+00	8.808E-01	8.811E-01	48.40	OK
RA-224	240.99	4.10*	5.581E+00	2.055E+00	2.055E+00	61.54	OK
RA-226	609.32	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37	OK
	1120.29	14.92	1.688E+00	8.149E-01	8.152E-01	71.25	OK
	1764.49	15.30	1.138E+00	8.808E-01	8.811E-01	48.40	OK
AC-228	105.21	1.10	7.950E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.285E+00	1.326E+00	1.326E+00	38.40	OK
	794.95	4.25	2.203E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.121E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78	OK
	968.97	15.80	1.891E+00	7.659E-01	7.659E-01	85.48	OK
RA-228	105.21	1.10	7.950E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.285E+00	1.326E+00	1.326E+00	38.40	OK
	794.95	4.25	2.203E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.121E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78	OK
	968.97	15.80	1.891E+00	7.659E-01	7.659E-01	85.48	OK
TH-228	74.82	10.28	6.744E+00	8.408E-01	8.408E-01	62.27	OK
	77.11	17.10	6.922E+00	1.396E+00	1.396E+00	22.40	OK
	238.63	43.60*	5.636E+00	1.077E+00	1.077E+00	11.48	OK
	300.09	3.30	4.715E+00	9.217E-01	9.217E-01	98.43	OK
TH-230	609.32	45.49*	2.698E+00	7.310E-01	7.310E-01	24.37	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	1120.29	14.92	1.688E+00	8.149E-01	8.149E-01	71.25	OK
	1764.49	15.30	1.138E+00	8.808E-01	8.808E-01	48.40	OK
PA-231	283.69	1.70	4.935E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.715E+00	5.685E-01	5.685E-01	98.43	OK
TH-232	105.21	1.10	7.950E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.285E+00	1.326E+00	1.326E+00	38.40	OK
	835.71	1.61	2.121E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78	OK
	968.97	15.80	1.891E+00	7.659E-01	7.659E-01	85.48	OK
TH-234	63.29	3.70*	5.532E+00	7.211E-01	7.211E-01	206.66	OK
	92.59	4.23	7.706E+00	1.833E+00	1.833E+00	57.92	OK
U-234	609.32	45.49*	2.698E+00	7.310E-01	7.310E-01	24.37	OK
	1120.29	14.92	1.688E+00	8.149E-01	8.149E-01	71.25	OK
	1764.49	15.30	1.138E+00	8.808E-01	8.808E-01	48.40	OK
U-235	89.96	3.47	7.602E+00	1.813E+00	1.813E+00	68.62	OK
	93.35	5.60	7.706E+00	1.384E+00	1.384E+00	57.92	OK
	143.76	10.96*	7.620E+00	----- Line Not Found		-----	Absent
	163.33	5.08	7.206E+00	----- Line Not Found		-----	Absent
	185.72	57.20	6.696E+00	1.093E-01	1.093E-01	60.86	OK
	205.31	5.01	6.280E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	5.532E+00	7.211E-01	7.211E-01	206.66	OK
	92.59	4.23	7.706E+00	1.833E+00	1.833E+00	57.92	OK
PU-239	129.30	0.01*	7.870E+00	5.697E+02	5.697E+02	83.37	OK
	375.05	0.00	3.949E+00	----- Line Not Found		-----	Absent
	413.71	0.00	3.642E+00	3.388E+03	3.388E+03	74.54	OK
AM-243	43.53	5.90	1.694E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	6.744E+00	1.286E-01	1.286E-01	62.27	OK
ANH-511	511.00	100.00*	3.090E+00	1.676E-01	1.676E-01	46.31	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:42:36.48

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240011.CNF;1		
Acquisition date	: 3-OCT-2016 05:40:12	Sensitivity	: 3.000
Detector ID	: GAM24	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:02.11	Half life ratio	: *****
Sample date	: 15-DEC-2015 12:53:00	Analyst initials	: MXR1
Sample ID	: R405240011	Sample Quantity	: 1.3598E+02 GRAM
Batch Number	: 1596386	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	: 17-JUN-2016 07:45:20	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;7		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.325E+01	1.491E+00	7.201E-01
Y-91	5.395E+02	9.381E+02	9.294E+02
CD-109	2.927E+00	1.698E+00	1.454E+00
SN-126	1.885E-01	1.094E-01	9.390E-02
BA-137M	4.213E-01	9.395E-02	5.179E-02
CS-137	4.451E-01	9.925E-02	5.471E-02
CE-139	2.883E-01	1.862E-01	1.857E-01
TL-208	3.201E-01	7.337E-02	4.825E-02
PB-212	1.077E+00	1.212E-01	8.503E-02
BI-214	7.312E-01	1.747E-01	1.231E-01
PB-214	9.599E-01	2.013E-01	1.141E-01
RN-222	7.312E-01	1.747E-01	1.231E-01
RA-224	2.055E+00	1.240E+00	9.116E-01
RA-226	7.312E-01	1.747E-01	1.231E-01
AC-228	9.760E-01	2.944E-01	2.183E-01
RA-228	9.760E-01	2.944E-01	2.183E-01
TH-228	1.077E+00	1.212E-01	8.503E-02
TH-230	7.310E-01	1.746E-01	1.231E-01
PA-231	5.685E-01	5.484E-01	7.129E-01
TH-232	9.760E-01	2.944E-01	2.183E-01
TH-234	7.211E-01	1.460E+00	1.454E+00
U-234	7.310E-01	1.746E-01	1.231E-01
U-235	5.653E-03	1.784E-01	3.261E-01
U-238	7.211E-01	1.460E+00	1.454E+00
PU-239	5.697E+02	4.654E+02	5.158E+02
AM-243	1.286E-01	7.850E-02	6.550E-02
ANH-511	1.676E-01	7.608E-02	4.723E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	5.543E-01	9.662E+00	1.888E+01	NOT IDENT.
NA-22	1.780E-02	3.881E-02	7.894E-02	NOT IDENT.
NA-24	0.000E+00	9.143E+40	0.000E+00	SHORT HLIF

AL-26	-1.898E-03	3.490E-02	7.010E-02	NOT IDENT.
SC-46	9.296E-03	3.098E-01	6.082E-01	FAIL ABUN
V-48	0.000E+00	9.018E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.093E+02	0.000E+00	SHORT HLIF
MN-54	7.268E-03	5.150E-02	1.011E-01	NOT IDENT.
CO-56	2.093E-01	4.343E-01	8.753E-01	NOT IDENT.
MN-56	0.000E+00	1.674E+41	0.000E+00	SHORT HLIF
CO-57	1.710E-02	4.415E-02	7.753E-02	NOT IDENT.
CO-58	-3.006E-01	5.083E-01	8.636E-01	NOT IDENT.
FE-59	1.662E+00	4.835E+00	1.040E+01	NOT IDENT.
CO-60	-1.306E-03	3.726E-02	7.425E-02	FAIL ABUN
ZN-65	-3.453E-02	1.686E-01	2.838E-01	NOT IDENT.
GE-68	-6.364E-01	1.877E+00	3.600E+00	NOT IDENT.
AS-73	1.889E+00	4.271E+00	8.277E+00	NOT IDENT.
AS-74	0.000E+00	3.924E+03	0.000E+00	SHORT HLIF
SE-75	-9.405E-02	1.840E-01	3.441E-01	NOT IDENT.
BR-77	0.000E+00	2.727E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.501E+02	0.000E+00	SHORT HLIF
RB-83	2.566E-01	6.417E-01	1.274E+00	FAIL ABUN
KR-85	6.941E+00	6.905E+00	1.443E+01	NOT IDENT.
SR-85	6.764E-01	6.765E-01	1.414E+00	NOT IDENT.
RB-86	0.000E+00	1.643E+04	0.000E+00	SHORT HLIF
Y-88	-5.648E-02	2.047E-01	3.958E-01	NOT IDENT.
NB-94	9.155E-04	3.357E-02	6.273E-02	NOT IDENT.
NB-95	-4.075E-01	8.372E-01	1.258E+00	NOT IDENT.
NB-95M	5.886E-01	2.151E+00	3.888E+00	NOT IDENT.
ZR-95	1.529E-01	1.279E+00	2.462E+00	NOT IDENT.
NB-97	0.000E+00	1.814E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.843E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	3.491E-02	3.019E-02	5.285E-02	NOT IDENT.
RH-102	1.211E-02	5.624E-02	1.102E-01	NOT IDENT.
RU-103	1.113E+00	4.862E+00	9.562E+00	FAIL ABUN
RH-106	-1.342E-01	4.759E-01	8.697E-01	NOT IDENT.
RU-106	-1.342E-01	4.759E-01	8.697E-01	NOT IDENT.
AG-108M	-5.386E-03	2.602E-02	4.898E-02	NOT IDENT.
AG-110M	-3.954E-03	7.679E-02	1.475E-01	NOT IDENT.
SN-113	-4.698E-02	2.132E-01	4.013E-01	NOT IDENT.
CD-115	0.000E+00	3.308E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.263E+04	0.000E+00	SHORT HLIF
TE-123M	-9.922E-04	1.150E-01	2.076E-01	NOT IDENT.
SB-124	1.139E+00	1.116E+00	3.419E+00	NOT IDENT.
SB-125	-1.755E-02	9.394E-02	1.777E-01	FAIL ABUN
TE-125M	-9.105E+01	2.113E+02	3.745E+02	NOT IDENT.
I-126	0.000E+00	5.067E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	7.081E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	6.793E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.415E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.721E+25	0.000E+00	SHORT HLIF
BA-133	-2.049E-02	3.871E-02	6.257E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	-3.894E-02	4.847E-02	7.952E-02	NOT IDENT.
CS-135	-6.692E-02	1.343E-01	2.505E-01	NOT IDENT.
I-135	0.000E+00	1.361E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.613E+05	0.000E+00	SHORT HLIF
BA-140	0.000E+00	7.036E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.183E+05	0.000E+00	SHORT HLIF
CE-141	-2.552E+00	1.988E+01	3.550E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	1.128E-01	3.208E-01	6.000E-01	NOT IDENT.
PM-144	1.423E-02	5.410E-02	1.052E-01	NOT IDENT.
PR-144	1.259E+00	4.686E+00	9.116E+00	NOT IDENT.
PM-146	-7.050E-04	3.868E-02	7.466E-02	NOT IDENT.
ND-147	0.000E+00	1.920E+07	0.000E+00	SHORT HLIF
PM-147	6.330E+02	7.326E+02	1.355E+03	NOT IDENT.
PM-149	0.000E+00	4.430E+39	0.000E+00	SHORT HLIF
EU-150	5.466E-03	2.454E-02	4.415E-02	FAIL ABUN
EU-152	5.417E-02	8.274E-02	1.593E-01	NOT IDENT.
GD-153	-1.775E-01	1.581E-01	2.395E-01	NOT IDENT.
EU-154	5.488E-02	9.792E-02	2.022E-01	FAIL ABUN
EU-155	1.144E-02	9.376E-02	1.741E-01	FAIL ABUN
TB-160	-3.445E-01	1.447E+00	2.651E+00	FAIL ABUN
HO-166M	-2.895E-02	5.522E-02	9.615E-02	FAIL ABUN
TM-171	3.733E+00	1.011E+01	1.982E+01	FAIL ABUN
HF-172	7.487E-02	4.451E-01	3.745E-01	FAIL ABUN
LU-172	4.430E-03	6.235E-02	1.281E-01	FAIL ABUN

LU-176	-8.234E-03	2.085E-02	3.923E-02	FAIL ABUN
HF-181	1.691E+00	3.281E+00	6.783E+00	NOT IDENT.
TA-182	7.068E-01	8.121E-01	1.792E+00	FAIL ABUN
RE-183	-2.007E-01	1.560E+00	2.930E+00	FAIL ABUN
RE-184	1.046E+01	2.378E+01	4.847E+01	NOT IDENT.
W-188	8.868E+00	1.025E+02	1.819E+02	FAIL ABUN
IR-192	5.783E-01	4.008E-01	8.733E-01	FAIL ABUN
HG-203	-2.025E-01	1.926E+00	3.724E+00	NOT IDENT.
BI-207	-2.692E-03	4.062E-02	8.128E-02	FAIL ABUN
PB-210	1.394E-01	1.347E+00	2.647E+00	NOT IDENT.
BI-211	0.000E+00	5.545E-01	7.648E-01	FAIL ABUN
PB-211	-2.756E-01	5.892E-01	1.081E+00	NOT IDENT.
BI-212	9.161E-01	7.634E-01	1.183E+00	FAIL ABUN
RN-219	-9.577E-02	3.323E-01	6.238E-01	NOT IDENT.
RA-223	-2.172E-01	5.136E-01	9.597E-01	FAIL ABUN
AC-227	-2.992E-02	2.058E-01	3.978E-01	FAIL ABUN
TH-227	-2.992E-02	2.058E-01	3.978E-01	FAIL ABUN
TH-229	-4.351E-01	4.652E-01	7.550E-01	FAIL ABUN
TH-231	-2.172E-01	5.136E-01	9.597E-01	FAIL ABUN
PA-233	3.848E-02	4.784E-02	1.014E-01	FAIL ABUN
PA-234	-1.292E-01	2.610E-01	4.538E-01	NOT IDENT.
PA-234M	3.674E-01	3.394E+00	6.562E+00	NOT IDENT.
NP-237	3.848E-02	4.784E-02	1.014E-01	FAIL ABUN
NP-238	0.000E+00	4.628E+40	0.000E+00	SHORT HLIF
NP-239	3.505E-02	2.133E-01	3.962E-01	NOT IDENT.
AM-241	-6.813E-03	8.659E-02	1.505E-01	NOT IDENT.
CM-243	-3.928E-02	8.619E-02	1.530E-01	NOT IDENT.
BK-247	-3.698E-02	6.735E-02	1.255E-01	FAIL ABUN
CM-247	5.527E-03	2.994E-02	5.935E-02	NOT IDENT.
CF-249	-3.676E-02	3.509E-02	6.006E-02	NOT IDENT.
CF-251	-1.817E-02	1.032E-01	1.825E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:42:34.24

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	346	10.66*	1.354E+00	1.325E+01	1.325E+01	11.48
Y-91	1204.77	13	0.26*	1.594E+00	1.683E+01	5.395E+02	177.42
CD-109	88.03	145	3.70*	7.500E+00	2.893E+00	4.490E+00	37.50
SN-126	64.28	27	9.60	5.532E+00	2.779E-01	2.779E-01	206.66
	86.94	145	8.90	7.500E+00	1.203E+00	1.203E+00	37.50
	87.57	145	37.00*	7.500E+00	2.893E-01	2.893E-01	37.50
BA-137M	661.66	171	89.90*	2.533E+00	4.136E-01	4.213E-01	22.76
CS-137	661.66	171	85.10*	2.533E+00	4.369E-01	4.451E-01	22.76
CE-139	165.86	68	80.00*	7.118E+00	6.601E-02	2.883E-01	65.91
TL-208	277.37	------	6.60	5.023E+00	------ Line Not Found		------
	583.19	137	85.00*	2.790E+00	3.201E-01	3.201E-01	23.39
	860.56	20	12.50	2.074E+00	4.252E-01	4.252E-01	85.73
BI-211	72.87	------	1.23	6.565E+00	------ Line Not Found		------
	351.06	257	12.92*	4.152E+00	2.644E+00	2.644E+00	21.40
PB-212	74.82	183	10.28	6.744E+00	1.457E+00	1.457E+00	34.19
	77.11	299	17.10	6.922E+00	1.396E+00	1.396E+00	22.40
	238.63	480	43.60*	5.636E+00	1.077E+00	1.077E+00	11.48
	300.09	26	3.30	4.715E+00	9.217E-01	9.217E-01	98.43
BI-214	609.32	162	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37
	1120.29	37	14.92	1.688E+00	8.149E-01	8.152E-01	71.25
	1764.49	28	15.30	1.138E+00	8.808E-01	8.811E-01	48.40
PB-214	74.82	183	5.80	6.744E+00	2.583E+00	2.584E+00	34.19
	77.11	299	9.70	6.922E+00	2.461E+00	2.462E+00	22.40
	87.09	145	3.41	7.500E+00	3.139E+00	3.140E+00	37.50
	242.00	165	7.25	5.581E+00	2.255E+00	2.256E+00	29.09
	295.22	174	18.42	4.781E+00	1.093E+00	1.093E+00	26.05
	351.93	257	35.60*	4.152E+00	9.596E-01	9.599E-01	21.40
RN-222	609.32	162	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37
	1120.29	37	14.92	1.688E+00	8.149E-01	8.152E-01	71.25
	1764.49	28	15.30	1.138E+00	8.808E-01	8.811E-01	48.40
RA-224	240.99	165	4.10*	5.581E+00	3.988E+00	3.988E+00	29.09
RA-226	609.32	162	45.49*	2.698E+00	7.310E-01	7.312E-01	24.37
	1120.29	37	14.92	1.688E+00	8.149E-01	8.152E-01	71.25
	1764.49	28	15.30	1.138E+00	8.808E-01	8.811E-01	48.40
AC-228	105.21	------	1.10	7.950E+00	------ Line Not Found		------
	338.32	116	11.27	4.285E+00	1.326E+00	1.326E+00	38.40
	794.95	------	4.25	2.203E+00	------ Line Not Found		------
	835.71	------	1.61	2.121E+00	------ Line Not Found		------
	911.20	91	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78
	968.97	41	15.80	1.891E+00	7.659E-01	7.659E-01	85.48
RA-228	105.21	------	1.10	7.950E+00	------ Line Not Found		------
	338.32	116	11.27	4.285E+00	1.326E+00	1.326E+00	38.40
	794.95	------	4.25	2.203E+00	------ Line Not Found		------
	835.71	------	1.61	2.121E+00	------ Line Not Found		------
	911.20	91	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78
	968.97	41	15.80	1.891E+00	7.659E-01	7.659E-01	85.48
TH-228	74.82	183	10.28	6.744E+00	1.457E+00	1.457E+00	34.19

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	299	17.10	6.922E+00	1.396E+00	1.396E+00	22.40
	238.63	480	43.60*	5.636E+00	1.077E+00	1.077E+00	11.48
	300.09	26	3.30	4.715E+00	9.217E-01	9.217E-01	98.43
TH-230	609.32	162	45.49*	2.698E+00	7.310E-01	7.310E-01	24.37
	1120.29	37	14.92	1.688E+00	8.149E-01	8.149E-01	71.25
	1764.49	28	15.30	1.138E+00	8.808E-01	8.808E-01	48.40
PA-231	283.69	------	1.70	4.935E+00	------ Line Not Found		------
	301.36	26	5.35*	4.715E+00	5.685E-01	5.685E-01	98.43
TH-232	105.21	------	1.10	7.950E+00	------ Line Not Found		------
	338.32	116	11.27	4.285E+00	1.326E+00	1.326E+00	38.40
	835.71	------	1.61	2.121E+00	------ Line Not Found		------
	911.20	91	25.80*	1.985E+00	9.760E-01	9.760E-01	30.78
	968.97	41	15.80	1.891E+00	7.659E-01	7.659E-01	85.48
TH-234	63.29	27	3.70*	5.532E+00	7.211E-01	7.211E-01	206.66
	92.59	108	4.23	7.706E+00	1.833E+00	1.833E+00	57.92
U-234	609.32	162	45.49*	2.698E+00	7.310E-01	7.310E-01	24.37
	1120.29	37	14.92	1.688E+00	8.149E-01	8.149E-01	71.25
	1764.49	28	15.30	1.138E+00	8.808E-01	8.808E-01	48.40
U-235	89.96	87	3.47	7.602E+00	1.813E+00	1.813E+00	68.62
	93.35	108	5.60	7.706E+00	1.384E+00	1.384E+00	57.92
	143.76	------	10.96*	7.620E+00	------ Line Not Found		------
	163.33	------	5.08	7.206E+00	------ Line Not Found		------
	185.72	76	57.20	6.696E+00	1.093E-01	1.093E-01	60.86
	205.31	------	5.01	6.280E+00	------ Line Not Found		------
U-238	63.29	27	3.70*	5.532E+00	7.211E-01	7.211E-01	206.66
	92.59	108	4.23	7.706E+00	1.833E+00	1.833E+00	57.92
PU-239	129.30	51	0.01*	7.870E+00	5.697E+02	5.697E+02	83.37
	375.05	------	0.00	3.949E+00	------ Line Not Found		------
	413.71	33	0.00	3.642E+00	3.388E+03	3.388E+03	74.54
AM-243	43.53	------	5.90	1.694E+00	------ Line Not Found		------
	74.66	183	67.20*	6.744E+00	2.230E-01	2.230E-01	34.19
ANH-511	511.00	94	100.00*	3.090E+00	1.676E-01	1.676E-01	46.31

Flag: "*" = Keyline

Sample ID : R405240011 Acquisition date : 3-OCT-2016 05:40:12

Total number of lines in spectrum 50
Number of unidentified lines 14
Number of lines tentatively identified by NID 36 72.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.325E+01	1.325E+01	0.152E+01	11.48	
Y-91	58.51D	32.1	1.683E+01	5.395E+02	9.572E+02	177.42	
CD-109	461.40D	1.55	2.893E+00	4.490E+00	1.684E+00	37.50	
SN-126	2.30E+05Y	1.00	2.893E-01	2.893E-01	1.085E-01	37.50	
BA-137M	30.08Y	1.02	4.136E-01	4.213E-01	0.959E-01	22.76	
CS-137	30.08Y	1.02	4.369E-01	4.451E-01	1.013E-01	22.76	
CE-139	137.64D	4.37	6.601E-02	2.883E-01	1.900E-01	65.91	
TL-208	1.41E+10Y	1.00	3.201E-01	3.201E-01	0.749E-01	23.39	
BI-211	7.04E+08Y	1.00	2.644E+00	2.644E+00	0.566E+00	21.40	
PB-212	1.41E+10Y	1.00	1.077E+00	1.077E+00	0.124E+00	11.48	
BI-214	1600.00Y	1.00	7.310E-01	7.312E-01	1.782E-01	24.37	
PB-214	1600.00Y	1.00	9.596E-01	9.599E-01	2.054E-01	21.40	
RN-222	1600.00Y	1.00	7.310E-01	7.312E-01	1.782E-01	24.37	
RA-224	1.41E+10Y	1.00	3.988E+00	3.988E+00	1.160E+00	29.09	
RA-226	1600.00Y	1.00	7.310E-01	7.312E-01	1.782E-01	24.37	
AC-228	1.41E+10Y	1.00	9.760E-01	9.760E-01	3.004E-01	30.78	
RA-228	1.41E+10Y	1.00	9.760E-01	9.760E-01	3.004E-01	30.78	
TH-228	1.41E+10Y	1.00	1.077E+00	1.077E+00	0.124E+00	11.48	
TH-230	7.54E+04Y	1.00	7.310E-01	7.310E-01	1.782E-01	24.37	
PA-231	7.04E+08Y	1.00	5.685E-01	5.685E-01	5.595E-01	98.43	
TH-232	1.41E+10Y	1.00	9.760E-01	9.760E-01	3.004E-01	30.78	
TH-234	4.47E+09Y	1.00	7.211E-01	7.211E-01	14.90E-01	206.66	
U-234	2.45E+05Y	1.00	7.310E-01	7.310E-01	1.782E-01	24.37	
U-235	7.04E+08Y	1.00	1.093E-01	1.093E-01	0.665E-01	60.86	K
U-238	4.47E+09Y	1.00	7.211E-01	7.211E-01	14.90E-01	206.66	
PU-239	24110.00Y	1.00	5.697E+02	5.697E+02	4.749E+02	83.37	
AM-243	7370.00Y	1.00	2.230E-01	2.230E-01	0.762E-01	34.19	
ANH-511	1.00E+09Y	1.00	1.676E-01	1.676E-01	0.776E-01	46.31	
			---------	---------			
	Total Activity :		6.230E+02	1.148E+03			

Grand Total Activity : 6.230E+02 1.148E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240011 Acquisition date : 3-OCT-2016 05:40:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	68.06	32	191	0.88	136.19	134	7	7.52E-03	****	6.10E+00	T
0	124.71	9	179	3.73	249.50	245	10	2.17E-03	****	7.92E+00	T
2	183.70	31	40	1.45	367.50	366	12	7.68E-03	62.7	6.75E+00	T
0	209.10	49	136	0.82	418.33	413	10	1.23E-02	98.4	6.20E+00	
0	463.72	37	64	2.44	927.72	921	15	9.85E-03	****	3.34E+00	T
0	552.44	36	22	3.93	1105.21	1097	17	9.57E-03	70.2	2.91E+00	T
3	575.58	16	24	2.04	1151.51	1147	34	4.44E-03	****	2.82E+00	
0	688.76	13	11	1.43	1377.96	1374	7	3.47E-03	****	2.46E+00	
0	727.07	26	25	0.82	1454.60	1449	10	7.17E-03	85.0	2.36E+00	T
0	768.63	11	20	0.90	1537.76	1534	7	3.01E-03	****	2.26E+00	
0	1003.30	6	7	1.35	2007.33	2004	7	1.67E-03	****	1.84E+00	T
0	1021.70	12	7	1.83	2044.14	2041	8	3.39E-03	91.2	1.82E+00	T
0	1173.79	8	11	1.24	2348.49	2342	9	2.16E-03	****	1.63E+00	T
0	1191.81	4	7	1.39	2384.56	2378	8	1.25E-03	****	1.61E+00	
0	1193.64	9	3	0.55	2388.21	2385	7	2.64E-03	92.1	1.60E+00	
0	1239.91	13	29	2.62	2480.80	2472	13	3.59E-03	****	1.56E+00	
0	1279.51	13	2	0.68	2560.05	2555	10	3.75E-03	69.9	1.52E+00	
0	1296.07	10	8	0.62	2593.19	2587	11	2.95E-03	****	1.50E+00	
0	1318.44	7	4	0.61	2637.96	2633	9	2.11E-03	****	1.48E+00	
0	1377.98	22	6	1.68	2757.11	2751	12	6.39E-03	59.6	1.42E+00	
0	1629.99	8	2	2.13	3261.46	3258	8	2.39E-03	90.2	1.23E+00	
0	1715.11	6	0	0.99	3431.83	3428	8	1.67E-03	81.6	1.17E+00	
0	1847.60	10	0	1.24	3697.00	3693	9	3.06E-03	60.3	1.09E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:42:48.52

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240011.CNF;1    *
* Acquisition date :  3-OCT-2016 05:40:12 Sensitivity     : 3.000        *
* Detector ID      : GAM24                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:02.11     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:53:00 Nuclide Library : SOLID        *
* Sample ID        : R405240011           Analyst initials: MXR1         *
* Batch Number     : 1596386              Sample Quantity : 1.3598E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 07:45:20 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;7         *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.082E-01
Y-91	4.067E+02
CD-109	6.835E-01
SN-126	4.413E-02
BA-137M	2.250E-02
CS-137	2.377E-02
CE-139	8.692E-02
TL-208	2.092E-02
PB-212	3.938E-02
BI-214	5.538E-02
PB-214	5.188E-02
RN-222	5.538E-02
RA-224	4.222E-01
RA-226	5.538E-02
AC-228	9.441E-02
RA-228	9.441E-02
TH-228	3.938E-02
TH-230	5.536E-02
PA-231	3.260E-01
TH-232	9.441E-02
TH-234	6.887E-01
U-234	5.536E-02
U-235	1.538E-01
U-238	6.887E-01
PU-239	2.422E+02
AM-243	3.101E-02
ANH-511	2.115E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	8.424E+00	NOT IDENT.
NA-22	3.337E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.833E-02	NOT IDENT.

SC-46	2.621E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	4.372E-02	NOT IDENT.
CO-56	3.879E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.635E-02	NOT IDENT.
CO-58	3.704E-01	NOT IDENT.
FE-59	4.457E+00	NOT IDENT.
CO-60	3.144E-02	FAIL ABUN
ZN-65	1.218E-01	NOT IDENT.
GE-68	1.517E+00	NOT IDENT.
AS-73	3.896E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.584E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	5.784E-01	FAIL ABUN
KR-85	6.617E+00	NOT IDENT.
SR-85	6.480E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.519E-01	NOT IDENT.
NB-94	2.823E-02	NOT IDENT.
NB-95	5.494E-01	NOT IDENT.
NB-95M	1.814E+00	NOT IDENT.
ZR-95	1.086E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.471E-02	NOT IDENT.
RH-102	4.912E-02	NOT IDENT.
RU-103	4.316E+00	FAIL ABUN
RH-106	3.852E-01	NOT IDENT.
RU-106	3.852E-01	NOT IDENT.
AG-108M	2.209E-02	NOT IDENT.
AG-110M	6.222E-02	NOT IDENT.
SN-113	1.827E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	9.685E-02	NOT IDENT.
SB-124	1.325E+00	NOT IDENT.
SB-125	8.002E-02	FAIL ABUN
TE-125M	1.748E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.812E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.450E-02	NOT IDENT.
CS-135	1.160E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.666E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.817E-01	NOT IDENT.
PM-144	4.713E-02	NOT IDENT.
PR-144	4.086E+00	NOT IDENT.
PM-146	3.350E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.350E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.021E-02	FAIL ABUN
EU-152	7.253E-02	NOT IDENT.
GD-153	1.117E-01	NOT IDENT.
EU-154	8.608E-02	FAIL ABUN
EU-155	8.183E-02	FAIL ABUN
TB-160	1.122E+00	FAIL ABUN
HO-166M	4.223E-02	FAIL ABUN
TM-171	9.313E+00	FAIL ABUN
HF-172	1.755E-01	FAIL ABUN
LU-172	5.470E-02	FAIL ABUN
LU-176	1.784E-02	FAIL ABUN

HF-181	3.041E+00	NOT IDENT.
TA-182	7.924E-01	FAIL ABUN
RE-183	1.377E+00	FAIL ABUN
RE-184	2.118E+01	NOT IDENT.
W-188	8.371E+01	FAIL ABUN
IR-192	4.047E-01	FAIL ABUN
HG-203	1.715E+00	NOT IDENT.
BI-207	3.481E-02	FAIL ABUN
PB-210	1.245E+00	NOT IDENT.
BI-211	3.683E-01	FAIL ABUN
PB-211	4.861E-01	NOT IDENT.
BI-212	5.435E-01	FAIL ABUN
RN-219	2.809E-01	NOT IDENT.
RA-223	4.365E-01	FAIL ABUN
AC-227	1.837E-01	FAIL ABUN
TH-227	1.837E-01	FAIL ABUN
TH-229	3.506E-01	FAIL ABUN
TH-231	4.365E-01	FAIL ABUN
PA-233	4.635E-02	FAIL ABUN
PA-234	1.943E-01	NOT IDENT.
PA-234M	2.796E+00	NOT IDENT.
NP-237	4.635E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.858E-01	NOT IDENT.
AM-241	7.083E-02	NOT IDENT.
CM-243	7.171E-02	NOT IDENT.
BK-247	5.780E-02	FAIL ABUN
CM-247	2.683E-02	NOT IDENT.
CF-249	2.701E-02	NOT IDENT.
CF-251	8.473E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:42:54.12

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240011.CNF;1    *
* Acquisition date :  3-OCT-2016 05:40:12 Sensitivity     : 3.000            *
* Detector ID      : GAM24                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:02.11     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:53:00 Nuclide Library : SOLID            *
* Sample ID        : R405240011           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.3598E+02 GRAM  *
*                                         Quantity Err(%) : 1.4709E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 17-JUN-2016 07:45:20 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM24_CAN.CNF;7              *
**************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.325E+01	1.643E+00	1.643E+00
Y-91	5.395E+02	9.383E+02	9.383E+02
CD-109	2.927E+00	1.726E+00	1.726E+00
SN-126	1.885E-01	1.107E-01	1.107E-01
BA-137M	4.213E-01	9.568E-02	9.568E-02
CS-137	4.451E-01	1.011E-01	1.011E-01
CE-139	2.883E-01	1.950E-01	1.950E-01
TL-208	3.201E-01	7.461E-02	7.461E-02
PB-212	1.077E+00	1.339E-01	1.339E-01
BI-214	7.312E-01	1.774E-01	1.774E-01
PB-214	9.599E-01	2.052E-01	2.052E-01
RN-222	7.312E-01	1.774E-01	1.774E-01
RA-224	2.055E+00	1.251E+00	1.251E+00
RA-226	7.312E-01	1.774E-01	1.774E-01
AC-228	9.760E-01	2.986E-01	2.986E-01
RA-228	9.760E-01	2.986E-01	2.986E-01
TH-228	1.077E+00	1.339E-01	1.339E-01
TH-230	7.310E-01	1.774E-01	1.774E-01
PA-231	5.685E-01	5.616E-01	5.616E-01
TH-232	9.760E-01	2.986E-01	2.986E-01
TH-234	7.211E-01	1.469E+00	1.469E+00
U-234	7.310E-01	1.774E-01	1.774E-01
U-235	5.653E-03	1.784E-01	1.784E-01
U-238	7.211E-01	1.469E+00	1.469E+00
PU-239	5.697E+02	4.661E+02	4.661E+02
AM-243	1.286E-01	7.979E-02	7.979E-02
ANH-511	1.676E-01	7.639E-02	7.639E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.543E-01	9.662E+00	9.665E+00	NOT IDENT.
NA-22	1.780E-02	3.882E-02	3.964E-02	NOT IDENT.
NA-24	-1.000E+41	1.009E+41	0.000E+00	SHORT HLIF

AL-26	-1.898E-03	3.490E-02	3.491E-02	NOT IDENT.
SC-46	9.296E-03	3.098E-01	3.098E-01	FAIL ABUN
V-48	8.820E+03	9.025E+03	9.862E+03	SHORT HLIF
CR-51	-1.715E+02	3.094E+02	3.189E+02	SHORT HLIF
MN-54	7.268E-03	5.151E-02	5.161E-02	NOT IDENT.
CO-56	2.093E-01	4.344E-01	4.445E-01	NOT IDENT.
MN-56	1.000E+41	1.675E+41	0.000E+00	SHORT HLIF
CO-57	1.710E-02	4.416E-02	4.482E-02	NOT IDENT.
CO-58	-3.006E-01	5.085E-01	5.262E-01	NOT IDENT.
FE-59	1.662E+00	4.836E+00	4.894E+00	NOT IDENT.
CO-60	-1.306E-03	3.726E-02	3.727E-02	FAIL ABUN
ZN-65	-3.453E-02	1.686E-01	1.694E-01	NOT IDENT.
GE-68	-6.364E-01	1.878E+00	1.899E+00	NOT IDENT.
AS-73	1.889E+00	4.289E+00	4.373E+00	NOT IDENT.
AS-74	-6.802E+02	3.925E+03	3.937E+03	SHORT HLIF
SE-75	-9.405E-02	1.841E-01	1.889E-01	NOT IDENT.
BR-77	2.423E+37	2.047E+38	0.000E+00	SHORT HLIF
SR-82	-2.030E+02	5.501E+02	5.577E+02	SHORT HLIF
RB-83	2.566E-01	6.427E-01	6.530E-01	FAIL ABUN
KR-85	6.941E+00	6.911E+00	7.587E+00	NOT IDENT.
SR-85	6.764E-01	6.770E-01	7.425E-01	NOT IDENT.
RB-86	5.384E+03	1.643E+04	1.661E+04	SHORT HLIF
Y-88	-5.648E-02	2.048E-01	2.063E-01	NOT IDENT.
NB-94	9.155E-04	3.357E-02	3.357E-02	NOT IDENT.
NB-95	-4.075E-01	8.373E-01	8.573E-01	NOT IDENT.
NB-95M	5.886E-01	2.152E+00	2.168E+00	NOT IDENT.
ZR-95	1.529E-01	1.279E+00	1.281E+00	NOT IDENT.
NB-97	-1.000E+41	1.814E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	4.195E+41	0.000E+00	SHORT HLIF
MO-99	-3.374E+30	2.843E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	8.432E+41	0.000E+00	SHORT HLIF
RH-101	3.491E-02	3.084E-02	3.463E-02	NOT IDENT.
RH-102	1.211E-02	5.625E-02	5.651E-02	NOT IDENT.
RU-103	1.113E+00	4.862E+00	4.888E+00	FAIL ABUN
RH-106	-1.342E-01	4.759E-01	4.798E-01	NOT IDENT.
RU-106	-1.342E-01	4.759E-01	4.798E-01	NOT IDENT.
AG-108M	-5.386E-03	2.602E-02	2.613E-02	NOT IDENT.
AG-110M	-3.954E-03	7.679E-02	7.681E-02	NOT IDENT.
SN-113	-4.698E-02	2.133E-01	2.143E-01	NOT IDENT.
CD-115	-3.616E+38	3.369E+38	0.000E+00	SHORT HLIF
SN-117M	-1.139E+04	6.264E+04	6.285E+04	SHORT HLIF
TE-123M	-9.922E-04	1.150E-01	1.150E-01	NOT IDENT.
SB-124	1.139E+00	1.118E+00	1.230E+00	NOT IDENT.
SB-125	-1.755E-02	9.394E-02	9.427E-02	FAIL ABUN
TE-125M	-9.105E+01	2.113E+02	2.153E+02	NOT IDENT.
I-126	2.830E+05	5.081E+05	5.239E+05	SHORT HLIF
SB-126	-4.718E+04	7.082E+05	7.085E+05	SHORT HLIF
SB-127	-5.768E+21	1.030E+22	0.000E+00	SHORT HLIF
I-131	2.096E+08	2.415E+09	2.417E+09	SHORT HLIF
I-132	-1.000E+41	2.090E+42	0.000E+00	SHORT HLIF
TE-132	3.526E+25	7.847E+25	0.000E+00	SHORT HLIF
BA-133	-2.049E-02	3.872E-02	3.980E-02	NOT IDENT.
I-133	1.000E+41	2.758E+41	0.000E+00	SHORT HLIF
CS-134	-3.894E-02	4.850E-02	5.158E-02	NOT IDENT.
CS-135	-6.692E-02	1.343E-01	1.377E-01	NOT IDENT.
I-135	-1.000E+41	6.752E+41	0.000E+00	SHORT HLIF
CS-136	2.284E+04	1.614E+05	1.617E+05	SHORT HLIF
BA-140	4.549E+05	7.039E+05	7.331E+05	SHORT HLIF
LA-140	-1.391E+05	2.184E+05	2.272E+05	SHORT HLIF
CE-141	-2.552E+00	1.988E+01	1.991E+01	NOT IDENT.
CE-143	1.000E+41	2.058E+41	0.000E+00	SHORT HLIF
CE-144	1.128E-01	3.209E-01	3.249E-01	NOT IDENT.
PM-144	1.423E-02	5.411E-02	5.449E-02	NOT IDENT.
PR-144	1.259E+00	4.686E+00	4.720E+00	NOT IDENT.
PM-146	-7.050E-04	3.868E-02	3.868E-02	NOT IDENT.
ND-147	1.977E+07	1.924E+07	2.120E+07	SHORT HLIF
PM-147	6.330E+02	7.331E+02	7.867E+02	NOT IDENT.
PM-149	-1.928E+39	4.449E+39	0.000E+00	SHORT HLIF
EU-150	5.466E-03	2.454E-02	2.466E-02	FAIL ABUN
EU-152	5.417E-02	8.280E-02	8.632E-02	NOT IDENT.
GD-153	-1.775E-01	1.584E-01	1.775E-01	NOT IDENT.
EU-154	5.488E-02	9.795E-02	1.010E-01	FAIL ABUN
EU-155	1.144E-02	9.376E-02	9.390E-02	FAIL ABUN
TB-160	-3.445E-01	1.447E+00	1.455E+00	FAIL ABUN
HO-166M	-2.895E-02	5.524E-02	5.676E-02	FAIL ABUN
TM-171	3.733E+00	1.011E+01	1.025E+01	FAIL ABUN
HF-172	7.487E-02	4.453E-01	4.466E-01	FAIL ABUN
LU-172	4.430E-03	6.236E-02	6.239E-02	FAIL ABUN

LU-176	-8.234E-03	2.085E-02	2.118E-02	FAIL ABUN
HF-181	1.691E+00	3.282E+00	3.369E+00	NOT IDENT.
TA-182	7.068E-01	8.125E-01	8.728E-01	FAIL ABUN
RE-183	-2.007E-01	1.561E+00	1.563E+00	FAIL ABUN
RE-184	1.046E+01	2.391E+01	2.437E+01	NOT IDENT.
W-188	8.868E+00	1.026E+02	1.026E+02	FAIL ABUN
IR-192	5.783E-01	4.016E-01	4.788E-01	FAIL ABUN
HG-203	-2.025E-01	1.926E+00	1.929E+00	NOT IDENT.
BI-207	-2.692E-03	4.062E-02	4.064E-02	FAIL ABUN
PB-210	1.394E-01	1.347E+00	1.349E+00	NOT IDENT.
BI-211	2.644E+00	5.669E-01	1.320E+00	FAIL ABUN
PB-211	-2.756E-01	5.893E-01	6.023E-01	NOT IDENT.
BI-212	9.161E-01	7.648E-01	8.692E-01	FAIL ABUN
RN-219	-9.577E-02	3.326E-01	3.353E-01	NOT IDENT.
RA-223	-2.172E-01	5.138E-01	5.230E-01	FAIL ABUN
AC-227	-2.992E-02	2.059E-01	2.063E-01	FAIL ABUN
TH-227	-2.992E-02	2.059E-01	2.063E-01	FAIL ABUN
TH-229	-4.351E-01	4.657E-01	5.053E-01	FAIL ABUN
TH-231	-2.172E-01	5.138E-01	5.230E-01	FAIL ABUN
PA-233	3.848E-02	4.788E-02	5.092E-02	FAIL ABUN
PA-234	-1.292E-01	2.999E-01	3.055E-01	NOT IDENT.
PA-234M	3.674E-01	3.394E+00	3.398E+00	NOT IDENT.
NP-237	3.848E-02	4.788E-02	5.092E-02	FAIL ABUN
NP-238	7.571E+39	4.628E+40	0.000E+00	SHORT HLIF
NP-239	3.505E-02	2.133E-01	2.139E-01	NOT IDENT.
AM-241	-6.813E-03	8.659E-02	8.664E-02	NOT IDENT.
CM-243	-3.928E-02	8.627E-02	8.807E-02	NOT IDENT.
BK-247	-3.698E-02	6.776E-02	6.978E-02	FAIL ABUN
CM-247	5.527E-03	2.996E-02	3.006E-02	NOT IDENT.
CF-249	-3.676E-02	3.522E-02	3.892E-02	NOT IDENT.
CF-251	-1.817E-02	1.032E-01	1.035E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	76.8495	87.09	81.6680	136.47	85.2081
45.60	69.4207	87.57	81.7314	140.51	0.0000
46.54	66.6389	88.03	81.7919	143.76	82.5117
49.72	0.0000	88.34	81.8331	144.24	63.0650
51.35	87.2104	88.47	81.8501	145.44	81.5250
51.87	78.3831	89.96	82.0451	152.43	82.1783
52.39	71.5210	1093.63	82.1338	153.25	0.0000
52.97	72.6082	91.11	0.0000	323.87	86.9820
53.44	72.6837	92.59	82.3859	156.02	0.0000
54.07	69.7933	93.35	82.4828	158.56	0.0000
57.36	0.0000	94.56	82.6373	159.00	65.2909
57.53	70.3146	94.65	82.6490	162.33	73.7176
57.98	85.4624	94.67	82.6514	162.66	0.0000
59.27	88.7167	94.87	82.6767	163.33	59.3503
59.32	88.7261	97.43	96.2941	165.86	72.0388
59.54	88.7664	98.43	70.5302	176.31	49.8699
60.96	71.4897	98.44	70.5312	176.60	0.0000
61.17	71.5201	99.53	64.8793	177.52	60.6310
62.93	106.6450	100.11	62.7706	181.07	0.0000
63.29	106.7213	102.03	73.8017	181.52	58.8859
63.58	106.7830	103.18	88.0586	184.41	67.0358
64.28	101.8387	103.37	85.9078	143.76	67.1229
66.73	100.2782	105.21	81.7755	193.51	79.7084
67.24	107.8873	105.31	78.5154	197.03	72.7048
125.81	107.9781	106.12	72.0561	198.01	66.7081
67.75	99.4488	106.47	81.9225	201.83	59.6432
69.67	102.8969	109.28	71.2822	203.43	74.3605
70.83	103.1189	111.00	74.7511	205.31	71.6396
72.81	114.5336	111.76	0.0000	210.85	75.2741
72.87	114.5463	114.06	93.8326	215.65	65.3264
74.66	105.9174	116.30	0.0000	222.11	66.9380
74.82	105.9478	116.74	72.0152	227.09	54.7771
74.97	105.9758	119.76	55.6190	227.38	54.7905
77.11	106.3781	121.12	53.4899	228.16	0.0000
78.74	93.4329	121.22	53.4968	228.18	46.1055
79.69	96.3792	121.78	63.9458	116.74	46.1055
80.12	96.4508	122.06	65.4571	235.69	58.9386
80.19	0.0000	122.92	72.9766	235.96	57.6972
80.57	92.3278	123.07	72.9911	238.63	52.7974
81.00	75.5964	265.00	67.0853	238.98	0.0000
81.07	75.6052	125.81	67.2693	240.99	52.8999
81.75	92.5131	127.23	40.4344	242.00	52.9441
83.79	81.2262	127.91	82.4376	244.70	35.3738
84.00	81.2544	129.30	79.5787	252.40	0.0000
85.43	81.4465	131.20	79.7674	252.80	48.3205
86.55	81.5963	133.02	84.8499	254.15	0.0000
86.79	81.6280	133.52	70.1861	256.23	51.8522
86.94	81.6480	136.00	74.9409	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	54.7604	355.39	0.0000	584.27	14.3486
264.80	54.7656	356.01	35.5413	595.83	0.0000
265.00	56.4865	364.49	0.0000	427.87	24.7695
268.22	61.7739	366.42	0.0000	602.52	0.0000
269.46	56.6785	372.51	33.1406	604.72	31.0156
270.03	48.1125	375.05	39.6450	607.14	26.3903
271.23	41.2764	377.52	31.3936	609.32	26.9331
273.65	0.0000	356.01	31.5118	610.33	26.9437
276.40	45.7539	388.16	43.6705	614.28	32.6971
277.37	44.0585	388.63	0.0000	618.01	18.7134
277.60	39.7465	391.69	38.1739	620.36	15.6097
278.00	41.4863	264.66	29.9486	621.93	23.9499
279.20	47.5789	401.81	31.8418	630.19	0.0000
279.54	53.6483	402.40	27.1680	631.29	19.8612
279.70	53.6546	404.85	33.7727	633.25	14.6460
280.46	55.4167	410.95	33.8892	634.78	0.0000
283.69	39.0573	413.71	21.6851	635.95	21.9929
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	53.8804	423.72	0.0000	645.85	14.7206
285.90	0.0000	427.09	28.4943	657.76	28.5249
287.50	39.1658	427.87	30.4069	657.90	0.0000
290.67	43.1816	433.94	31.4605	661.66	14.8135
293.27	0.0000	439.40	32.5086	664.57	0.0000
351.93	47.2610	453.88	26.0140	666.33	0.0000
295.96	47.2852	463.37	30.9831	666.50	0.0000
879.38	39.4775	468.07	34.9402	667.71	0.0000
299.98	39.5169	473.00	0.0000	677.62	11.7117
300.09	45.3159	475.06	19.4800	685.70	0.0000
300.13	45.3169	476.78	26.3210	695.00	0.0000
301.36	38.2368	477.60	22.4310	696.49	21.4486
302.85	35.6369	482.18	18.5725	696.51	21.4486
256.23	46.5137	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	22.5278
306.78	40.5869	497.08	25.6022	697.49	23.6024
308.46	35.3345	505.52	16.3144	702.65	26.8728
311.90	25.6777	507.63	0.0000	706.68	24.7604
316.51	28.4232	511.00	24.7833	711.68	21.5706
319.41	0.0000	514.00	24.8189	720.70	0.0000
320.08	0.0000	514.00	24.8189	721.93	0.0000
321.04	31.1833	520.40	26.8857	722.78	17.8696
323.87	41.0614	520.69	0.0000	722.91	17.8703
325.23	41.0988	522.65	0.0000	723.31	17.8730
328.76	0.0000	527.90	0.0000	724.19	13.0024
333.37	30.9898	528.26	26.9857	727.33	20.6112
333.97	35.0454	529.59	19.0015	733.00	20.6537
334.37	29.6612	529.87	0.0000	735.93	14.1468
338.28	35.1438	531.02	0.0000	333.97	26.1318
338.32	35.1446	537.26	0.0000	739.50	0.0000
311.90	35.1938	546.56	0.0000	747.24	6.5559
340.48	35.1938	552.55	18.1912	748.06	8.7438
340.55	0.0000	563.25	20.3101	752.31	10.9465
344.28	24.4243	569.33	16.2917	753.82	0.0000
345.93	41.2925	946.00	16.2930	756.73	17.5417
351.06	33.6141	569.70	20.3678	756.80	17.5423
351.93	33.6321	583.19	14.3418	884.68	18.1362

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	23.0978	1274.44	11.5361	1620.50	6.1622
766.42	28.0525	1001.03	7.1089	1621.92	5.1364
766.84	21.4551	1002.74	11.5575	1678.03	0.0000
772.60	0.0000	1004.73	15.6562	1690.97	0.0000
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	2.1102
778.90	16.5741	1028.54	0.0000	1063.66	3.3799
783.70	0.0000	1037.84	8.9789	1771.35	0.0000
785.37	12.1812	1038.76	0.0000	1791.20	0.0000
792.07	19.9790	631.29	8.1002	1808.65	6.3812
794.95	15.5546	1048.07	0.0000	1810.72	0.0000
795.86	22.2282	1049.04	9.9070	1836.06	5.3433
810.06	17.8685	1050.41	15.3170		
810.29	20.1035	1063.66	12.6593		
344.28	22.3381	1077.00	0.0000		
810.76	18.9894	1077.34	12.7072		
815.77	0.0000	1085.87	11.8265		
1048.07	0.0000	1093.63	10.9395		
832.01	17.9993	1099.45	9.1302		
834.85	12.3862	1112.07	14.6572		
835.71	18.0215	1112.84	15.5764		
836.80	0.0000	1115.54	14.6699		
846.75	0.0000	1120.29	17.4426		
846.77	14.6954	1120.55	17.4437		
856.80	0.0000	1221.41	17.4472		
860.56	20.4382	1129.67	14.7246		
871.09	15.9505	1131.51	0.0000		
873.19	17.1008	1147.95	0.0000		
875.33	0.0000	1173.23	14.8896		
879.38	12.5652	1177.95	11.1804		
880.51	12.5697	1189.05	16.4431		
883.24	8.0060	1204.77	16.5075		
884.68	10.2979	1221.41	10.3595		
889.28	9.1670	1231.02	18.8794		
894.76	8.0348	1235.36	0.0000		
898.04	11.4901	1238.28	22.6948		
900.72	17.2498	1260.41	0.0000		
903.28	11.5088	1271.87	6.6727		
911.20	13.8442	1274.44	6.1043		
912.08	13.8481	1274.54	6.1047		
923.98	0.0000	1291.59	7.6611		
926.50	16.2274	1298.22	0.0000		
929.11	9.2803	1312.11	0.0000		
937.49	12.7926	1332.49	10.6341		
944.13	0.0000	1362.66	0.0000		
946.00	13.9912	1365.19	5.8433		
949.00	15.7538	1368.63	0.0000		
667.71	0.0000	1384.29	4.4710		
962.31	22.0928	1408.01	5.8989		
964.08	14.0664	1457.56	0.0000		
966.17	16.8896	1460.82	11.9319		
911.20	22.8904	1489.16	3.0007		
968.97	22.8904	1505.03	3.0106		
983.53	0.0000	1584.12	9.1774		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:43:23.29

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240012.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM29.CNF;354
                                       Background date  : 2-OCT-2016 11:01:41.
Sample date      : 15-DEC-2015 12:56:00 Acquisition date : 3-OCT-2016 05:40:36.
Sample ID        : R405240012           Sample quantity  : 1.30921E+02 GRAM
Detector name    : GAM29                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:01.52  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.75*	59	171	4.18	93.52	88	11	1.65E-02	45.9	
2	0	64.17*	28	212	0.79	128.31	123	10	7.85E-03	101.3	
3	1	74.93*	135	183	1.11	149.80	146	17	3.75E-02	18.3	1.67E+00
4	1	77.12*	184	157	1.09	154.17	146	17	5.11E-02	13.8	
5	0	84.05*	45	199	0.71	168.00	163	9	1.24E-02	59.5	
6	1	87.15	71	116	1.13	174.20	172	11	1.98E-02	24.6	1.07E+00
7	1	89.95	70	139	1.13	179.79	172	11	1.96E-02	31.4	
8	0	93.14*	131	119	1.42	186.16	183	9	3.63E-02	18.8	
9	0	115.16	42	123	0.97	230.14	225	9	1.17E-02	50.1	
10	0	128.93	34	106	0.75	257.64	255	7	9.57E-03	52.2	
11	0	186.14*	92	128	1.79	371.90	367	12	2.56E-02	28.1	
12	0	205.29*	38	95	1.15	410.16	405	10	1.06E-02	51.1	
13	0	209.30	77	68	1.07	418.17	414	9	2.14E-02	22.3	
14	0	238.65*	347	151	1.02	476.80	473	8	9.64E-02	8.2	
15	0	241.77	65	98	2.21	483.03	481	7	1.79E-02	29.5	
16	0	270.03	51	66	1.51	539.49	534	11	1.42E-02	33.9	
17	0	295.06*	162	78	1.18	589.49	583	12	4.51E-02	13.6	
18	0	300.16	37	56	1.51	599.67	595	9	1.04E-02	39.7	
19	0	328.42	31	52	0.98	656.14	651	9	8.72E-03	45.0	
20	0	338.30*	67	71	0.95	675.89	672	7	1.86E-02	24.6	
21	0	351.91*	253	49	1.15	703.07	699	10	7.03E-02	8.3	
22	0	463.35	26	63	0.67	925.74	919	12	7.30E-03	63.4	
23	0	511.01*	61	45	1.46	1020.99	1016	13	1.71E-02	30.6	
24	0	583.40*	128	31	1.18	1165.68	1161	12	3.54E-02	12.7	
25	0	609.35*	182	35	1.53	1217.56	1209	16	5.05E-02	10.6	
26	0	661.78	243	45	1.08	1322.35	1317	10	6.75E-02	8.2	
27	0	728.15	26	40	1.54	1455.04	1446	16	7.19E-03	58.1	
28	0	757.13	14	33	3.34	1512.97	1503	19	3.92E-03	101.6	
29	0	768.96	17	24	2.89	1536.63	1529	10	4.65E-03	60.8	
30	0	818.74	16	6	1.04	1636.17	1631	10	4.35E-03	40.8	
31	0	822.83	12	8	1.59	1644.35	1641	9	3.24E-03	50.8	
32	0	831.97	12	21	2.34	1662.61	1653	12	3.40E-03	80.1	
33	0	860.12	25	14	1.49	1718.91	1714	11	6.98E-03	34.9	
34	0	911.22*	87	32	1.35	1821.11	1813	16	2.41E-02	18.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	934.03*	19	13	0.81	1866.72	1862	10	5.28E-03	43.9	
36	0	969.10*	47	19	1.00	1936.86	1932	10	1.31E-02	23.6	
37	0	1040.10	15	10	4.04	2078.87	2073	13	4.12E-03	50.8	
38	0	1094.55	9	10	0.82	2187.80	2182	8	2.59E-03	67.0	
39	0	1119.89*	37	24	1.70	2238.50	2231	14	1.02E-02	33.7	
40	0	1160.19	9	9	1.95	2319.11	2314	9	2.50E-03	68.7	
41	0	1171.06	15	5	0.63	2340.86	2336	9	4.03E-03	37.2	
42	0	1209.00	11	7	1.13	2416.77	2413	7	2.92E-03	51.5	
43	0	1215.81	6	9	0.92	2430.40	2427	6	1.78E-03	83.4	
44	0	1239.00*	14	11	2.19	2476.81	2472	8	3.90E-03	52.6	
45	0	1336.13	9	6	1.41	2671.18	2664	11	2.36E-03	63.5	
46	0	1348.53	6	0	0.67	2696.00	2693	6	1.67E-03	40.8	
47	0	1460.97*	341	0	2.21	2921.04	2915	12	9.48E-02	5.5	
48	0	1764.71*	25	2	1.92	3529.22	3523	11	6.83E-03	26.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:43:26

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240012.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 12:56:00 Acquisition date : 3-OCT-2016 05:40:36
Sample ID   : R405240012   Sample quantity : 130.92 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA29   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:01.52   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.347E+00	1.299E+01	1.299E+01	10.95	OK
CD-109	88.03	3.70*	6.261E+00	1.004E+00	1.559E+00	103.09	OK
SN-126	64.28	9.60	3.722E+00	5.326E-01	5.326E-01	202.64	OK
	86.94	8.90	6.261E+00	4.174E-01	4.174E-01	103.09	OK
	87.57	37.00*	6.261E+00	1.004E-01	1.004E-01	103.09	OK
BA-137M	661.66	89.90*	2.522E+00	6.198E-01	6.314E-01	16.48	OK
CS-137	661.66	85.10*	2.522E+00	6.548E-01	6.670E-01	16.48	OK
TL-208	277.37	6.60	4.914E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.772E+00	3.161E-01	3.161E-01	25.33	OK
	860.56	12.50	2.070E+00	5.512E-01	5.512E-01	69.79	OK
PB-210	46.54	4.25*	1.164E+00	8.237E+00	8.446E+00	91.80	OK
PB-212	74.82	10.28	5.116E+00	1.080E+00	1.080E+00	59.78	OK
	77.11	17.10	5.357E+00	1.337E+00	1.337E+00	27.56	OK
	238.63	43.60*	5.496E+00	8.982E-01	8.982E-01	16.48	OK
	300.09	3.30	4.626E+00	1.492E+00	1.492E+00	79.44	OK
BI-214	609.32	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23	OK
	1120.29	14.92	1.686E+00	8.168E-01	8.171E-01	67.34	OK
	1764.49	15.30	1.129E+00	7.675E-01	7.678E-01	52.81	OK
PB-214	74.82	5.80	5.103E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	5.357E+00	2.357E+00	2.357E+00	27.56	OK
	87.09	3.41	6.257E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	5.444E+00	1.012E+00	1.013E+00	58.92	OK
	295.22	18.42	4.687E+00	1.149E+00	1.150E+00	27.11	OK
	351.93	35.60*	4.088E+00	1.051E+00	1.051E+00	16.51	OK
RN-222	609.32	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23	OK
	1120.29	14.92	1.686E+00	8.168E-01	8.171E-01	67.34	OK
	1764.49	15.30	1.129E+00	7.675E-01	7.678E-01	52.81	OK
RA-226	609.32	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23	OK
	1120.29	14.92	1.686E+00	8.168E-01	8.171E-01	67.34	OK
	1764.49	15.30	1.129E+00	7.675E-01	7.678E-01	52.81	OK
AC-228	105.21	1.10	7.155E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.215E+00	8.529E-01	8.529E-01	49.27	OK
	794.95	4.25	2.197E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.116E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79	OK
	968.97	15.80	1.889E+00	8.882E-01	8.882E-01	47.18	OK
RA-228	105.21	1.10	7.155E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.215E+00	8.529E-01	8.529E-01	49.27	OK
	794.95	4.25	2.197E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.116E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79	OK
	968.97	15.80	1.889E+00	8.882E-01	8.882E-01	47.18	OK
TH-228	74.82	10.28	5.116E+00	1.080E+00	1.080E+00	59.78	OK
	77.11	17.10	5.357E+00	1.337E+00	1.337E+00	27.56	OK
	238.63	43.60*	5.496E+00	8.982E-01	8.982E-01	16.48	OK
	300.09	3.30	4.626E+00	1.492E+00	1.492E+00	79.44	OK
TH-229	85.43	14.70	6.016E+00	3.346E-01	3.347E-01	118.92	OK
	88.47	24.00	6.261E+00	1.548E-01	1.548E-01	103.09	OK
	193.51	4.41*	6.326E+00	----- Line Not Found		-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	210.85	2.80	5.989E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	2.683E+00	8.661E-01	8.661E-01	21.23	OK
	1120.29	14.92	1.686E+00	8.168E-01	8.168E-01	67.34	OK
	1764.49	15.30	1.129E+00	7.675E-01	7.675E-01	52.81	OK
PA-231	283.69	1.70	4.831E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.626E+00	9.205E-01	9.205E-01	79.44	OK
TH-232	105.21	1.10	7.155E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.215E+00	8.529E-01	8.529E-01	49.27	OK
	835.71	1.61	2.116E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79	OK
	968.97	15.80	1.889E+00	8.882E-01	8.882E-01	47.18	OK
TH-234	63.29	3.70*	3.722E+00	1.382E+00	1.382E+00	202.64	OK
	92.59	4.23	6.652E+00	3.055E+00	3.055E+00	37.69	OK
U-234	609.32	45.49*	2.683E+00	8.661E-01	8.661E-01	21.23	OK
	1120.29	14.92	1.686E+00	8.168E-01	8.168E-01	67.34	OK
	1764.49	15.30	1.129E+00	7.675E-01	7.675E-01	52.81	OK
U-235	89.96	3.47	6.457E+00	2.073E+00	2.073E+00	62.83	OK
	93.35	5.60	6.652E+00	2.308E+00	2.308E+00	37.69	OK
	143.76	10.96*	7.247E+00	----- Line Not Found		-----	Absent
	163.33	5.08	6.922E+00	----- Line Not Found		-----	Absent
	185.72	57.20	6.473E+00	1.571E-01	1.571E-01	56.29	OK
	205.31	5.01	6.095E+00	7.842E-01	7.842E-01	102.28	OK
U-238	63.29	3.70*	3.722E+00	1.382E+00	1.382E+00	202.64	OK
	92.59	4.23	6.652E+00	3.055E+00	3.055E+00	37.69	OK
AM-243	43.53	5.90	7.707E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	5.116E+00	1.652E-01	1.652E-01	59.78	OK
ANH-511	511.00	100.00*	3.064E+00	1.181E-01	1.181E-01	61.22	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:43:27.20

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240012.CNF;1    *
* Acquisition date :  3-OCT-2016 05:40:36 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:01.52     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:56:00 Analyst initials: MXR1           *
* Sample ID        : R405240012           Sample Quantity : 1.3092E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000     *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000     *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUN-2016 09:55:57 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;10         *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.299E+01	1.394E+00	5.019E-01
CD-109	1.559E+00	1.575E+00	1.908E+00
SN-126	1.004E-01	1.014E-01	1.235E-01
BA-137M	6.314E-01	1.020E-01	6.824E-02
CS-137	6.670E-01	1.077E-01	7.209E-02
TL-208	3.161E-01	7.847E-02	5.917E-02
PB-210	8.446E+00	7.598E+00	5.248E+00
PB-212	8.982E-01	1.451E-01	1.204E-01
BI-214	8.664E-01	1.803E-01	1.050E-01
PB-214	1.051E+00	1.701E-01	1.120E-01
RN-222	8.664E-01	1.803E-01	1.050E-01
RA-226	8.664E-01	1.803E-01	1.050E-01
AC-228	9.600E-01	3.461E-01	1.835E-01
RA-228	9.600E-01	3.461E-01	1.835E-01
TH-228	8.982E-01	1.451E-01	1.204E-01
TH-229	3.864E-01	4.314E-01	8.460E-01
TH-230	8.661E-01	1.802E-01	1.050E-01
PA-231	9.205E-01	7.166E-01	7.637E-01
TH-232	9.600E-01	3.461E-01	1.835E-01
TH-234	1.382E+00	2.744E+00	2.102E+00
U-234	8.661E-01	1.802E-01	1.050E-01
U-235	5.360E-02	1.864E-01	3.415E-01
U-238	1.382E+00	2.744E+00	2.102E+00
AM-243	1.652E-01	9.681E-02	8.967E-02
ANH-511	1.181E-01	7.085E-02	5.397E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	5.764E-01	8.963E+00	1.799E+01	NOT IDENT.
NA-22	3.831E-02	3.905E-02	9.089E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-2.890E-02	3.135E-02	4.918E-02	NOT IDENT.
SC-46	2.614E-01	3.286E-01	7.176E-01	FAIL ABUN

V-48	0.000E+00	1.127E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.355E+02	0.000E+00	SHORT HLIF
MN-54	3.413E-02	5.941E-02	1.159E-01	NOT IDENT.
CO-56	3.907E-01	4.158E-01	9.126E-01	FAIL ABUN
MN-56	0.000E+00	1.075E+41	0.000E+00	SHORT HLIF
CO-57	-2.043E-02	4.767E-02	8.445E-02	NOT IDENT.
CO-58	-2.167E-01	4.879E-01	8.789E-01	NOT IDENT.
FE-59	4.714E-01	5.713E+00	1.110E+01	NOT IDENT.
CO-60	4.902E-04	3.762E-02	6.610E-02	NOT IDENT.
ZN-65	3.518E-02	1.622E-01	2.941E-01	NOT IDENT.
GE-68	-4.259E-01	1.842E+00	3.445E+00	NOT IDENT.
AS-73	-9.231E-01	8.293E+00	1.563E+01	NOT IDENT.
AS-74	0.000E+00	4.009E+03	0.000E+00	SHORT HLIF
SE-75	4.915E-02	2.074E-01	3.792E-01	NOT IDENT.
BR-77	0.000E+00	3.260E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.006E+02	0.000E+00	SHORT HLIF
RB-83	-3.787E-03	5.667E-01	1.109E+00	NOT IDENT.
KR-85	8.264E+00	6.975E+00	1.424E+01	NOT IDENT.
SR-85	8.075E-01	6.834E-01	1.395E+00	NOT IDENT.
RB-86	0.000E+00	1.877E+04	0.000E+00	SHORT HLIF
Y-88	-1.950E-01	2.167E-01	3.431E-01	NOT IDENT.
Y-91	5.747E+01	5.045E+02	8.762E+02	NOT IDENT.
NB-94	-2.113E-03	2.742E-02	5.271E-02	NOT IDENT.
NB-95	-2.789E-02	8.290E-01	1.412E+00	NOT IDENT.
NB-95M	-1.167E-02	2.510E+00	4.101E+00	NOT IDENT.
ZR-95	1.550E+00	3.085E+00	2.378E+00	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	9.760E+40	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.913E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.297E+41	0.000E+00	SHORT HLIF
RH-101	1.019E-02	3.285E-02	5.766E-02	NOT IDENT.
RH-102	6.172E-03	5.303E-02	1.053E-01	NOT IDENT.
RU-103	2.772E-01	4.797E+00	9.426E+00	FAIL ABUN
RH-106	4.990E-01	4.651E-01	1.024E+00	NOT IDENT.
RU-106	4.990E-01	4.651E-01	1.024E+00	NOT IDENT.
AG-108M	-3.777E-03	2.526E-02	4.880E-02	NOT IDENT.
AG-110M	3.428E-02	7.469E-02	1.619E-01	NOT IDENT.
SN-113	4.556E-04	2.267E-01	4.408E-01	NOT IDENT.
CD-115	0.000E+00	2.980E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.726E+04	0.000E+00	SHORT HLIF
TE-123M	-2.759E-02	1.292E-01	2.300E-01	NOT IDENT.
SB-124	8.481E-01	1.261E+00	3.497E+00	NOT IDENT.
SB-125	-3.682E-02	1.068E-01	2.002E-01	FAIL ABUN
TE-125M	1.521E+02	2.472E+02	4.770E+02	NOT IDENT.
I-126	0.000E+00	5.700E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	7.221E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	6.291E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.384E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.364E+25	0.000E+00	SHORT HLIF
BA-133	-2.840E-03	4.375E-02	7.655E-02	NOT IDENT.
I-133	0.000E+00	1.197E+41	0.000E+00	SHORT HLIF
CS-134	4.876E-02	5.608E-02	1.165E-01	NOT IDENT.
CS-135	1.629E-03	1.490E-01	2.452E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	1.743E+05	0.000E+00	SHORT HLIF
CE-139	1.450E-02	1.049E-01	1.925E-01	NOT IDENT.
BA-140	0.000E+00	7.867E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.334E+05	0.000E+00	SHORT HLIF
CE-141	1.792E+00	2.036E+01	3.733E+01	NOT IDENT.
CE-143	0.000E+00	1.699E+41	0.000E+00	SHORT HLIF
CE-144	-1.837E-01	3.683E-01	6.448E-01	NOT IDENT.
PM-144	1.994E-02	5.151E-02	1.044E-01	NOT IDENT.
PR-144	1.711E+00	4.456E+00	9.025E+00	NOT IDENT.
PM-146	-7.637E-03	4.419E-02	8.425E-02	NOT IDENT.
ND-147	0.000E+00	1.754E+07	0.000E+00	SHORT HLIF
PM-147	3.097E+02	8.268E+02	1.561E+03	NOT IDENT.
PM-149	0.000E+00	5.352E+39	0.000E+00	SHORT HLIF
EU-150	-2.486E-02	2.979E-02	4.725E-02	FAIL ABUN
EU-152	-5.641E-02	9.007E-02	1.661E-01	NOT IDENT.
GD-153	-6.329E-02	1.753E-01	2.903E-01	NOT IDENT.
EU-154	9.195E-02	9.555E-02	2.221E-01	FAIL ABUN
EU-155	-1.945E-02	1.024E-01	1.867E-01	FAIL ABUN
TB-160	1.264E+00	1.459E+00	3.284E+00	FAIL ABUN
HO-166M	1.445E-02	4.517E-02	9.362E-02	NOT IDENT.
TM-171	5.873E+00	2.082E+01	4.036E+01	NOT IDENT.
HF-172	-1.880E-02	2.374E-01	3.993E-01	FAIL ABUN
LU-172	6.469E-02	8.500E-02	1.637E-01	FAIL ABUN

LU-176	2.533E-03	2.556E-02	4.588E-02	FAIL ABUN
HF-181	-1.240E+00	3.524E+00	6.618E+00	NOT IDENT.
TA-182	-5.709E-01	9.125E-01	1.514E+00	FAIL ABUN
RE-183	-4.315E-01	2.484E+00	4.667E+00	NOT IDENT.
RE-184	-1.339E+01	2.448E+01	4.267E+01	NOT IDENT.
W-188	1.347E+01	1.136E+02	1.890E+02	FAIL ABUN
IR-192	1.675E-01	4.563E-01	8.432E-01	FAIL ABUN
HG-203	-4.451E-01	2.183E+00	3.800E+00	NOT IDENT.
BI-207	-3.638E-02	4.665E-02	7.589E-02	FAIL ABUN
BI-211	0.000E+00	4.687E-01	8.055E-01	FAIL ABUN
PB-211	4.504E-01	6.199E-01	1.300E+00	FAIL ABUN
BI-212	9.505E-01	1.082E+00	1.189E+00	FAIL ABUN
RN-219	-4.951E-03	3.537E-01	6.916E-01	FAIL ABUN
RA-223	3.161E-01	5.890E-01	1.114E+00	FAIL ABUN
RA-224	0.000E+00	1.033E+00	1.475E+00	FAIL ABUN
AC-227	-5.875E-02	2.153E-01	3.749E-01	FAIL ABUN
TH-227	-5.875E-02	2.153E-01	3.749E-01	FAIL ABUN
TH-231	3.161E-01	5.890E-01	1.114E+00	FAIL ABUN
PA-233	1.399E-02	6.340E-02	1.145E-01	FAIL ABUN
PA-234	-1.451E-01	2.427E-01	4.179E-01	NOT IDENT.
PA-234M	2.214E+00	4.266E+00	8.545E+00	NOT IDENT.
NP-237	1.399E-02	6.340E-02	1.145E-01	FAIL ABUN
NP-238	0.000E+00	5.130E+40	0.000E+00	SHORT HLIF
NP-239	-1.256E-01	2.547E-01	4.118E-01	NOT IDENT.
PU-239	4.766E+02	4.880E+02	6.285E+02	FAIL ABUN
AM-241	-2.189E-02	1.406E-01	2.432E-01	NOT IDENT.
CM-243	-2.313E-02	1.011E-01	1.834E-01	NOT IDENT.
BK-247	-3.554E-02	9.163E-02	1.420E-01	FAIL ABUN
CM-247	-7.567E-03	3.465E-02	6.601E-02	NOT IDENT.
CF-249	3.001E-04	3.344E-02	6.587E-02	NOT IDENT.
CF-251	1.221E-04	1.126E-01	2.037E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:43:24.09

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	325	10.66*	1.347E+00	1.299E+01	1.299E+01	10.95
CD-109	88.03	82	3.70*	6.261E+00	2.036E+00	3.161E+00	49.28
SN-126	64.28	33	9.60	3.722E+00	5.326E-01	5.326E-01	202.64
	86.94	82	8.90	6.261E+00	8.465E-01	8.465E-01	49.28
	87.57	82	37.00*	6.261E+00	2.036E-01	2.036E-01	49.28
BA-137M	661.66	245	89.90*	2.522E+00	6.198E-01	6.314E-01	16.48
CS-137	661.66	245	85.10*	2.522E+00	6.548E-01	6.670E-01	16.48
TL-208	277.37	------	6.60	4.914E+00	------ Line Not Found		------
	583.19	130	85.00*	2.772E+00	3.161E-01	3.161E-01	25.33
	860.56	25	12.50	2.070E+00	5.512E-01	5.512E-01	69.79
PB-210	46.54	71	4.25*	1.164E+00	8.237E+00	8.446E+00	91.80
BI-211	72.87	------	1.23	4.875E+00	------ Line Not Found		------
	351.06	267	12.92*	4.088E+00	2.896E+00	2.896E+00	16.51
PB-212	74.82	157	10.28	5.116E+00	1.712E+00	1.712E+00	36.60
	77.11	214	17.10	5.357E+00	1.337E+00	1.337E+00	27.56
	238.63	375	43.60*	5.496E+00	8.982E-01	8.982E-01	16.48
	300.09	40	3.30	4.626E+00	1.492E+00	1.492E+00	79.44
BI-214	609.32	184	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23
	1120.29	36	14.92	1.686E+00	8.168E-01	8.171E-01	67.34
	1764.49	23	15.30	1.129E+00	7.675E-01	7.678E-01	52.81
PB-214	74.82	157	5.80	5.116E+00	3.034E+00	3.035E+00	36.60
	77.11	214	9.70	5.357E+00	2.357E+00	2.357E+00	27.56
	87.09	82	3.41	6.261E+00	2.209E+00	2.210E+00	49.28
	242.00	70	7.25	5.444E+00	1.012E+00	1.013E+00	58.92
	295.22	173	18.42	4.687E+00	1.149E+00	1.150E+00	27.11
	351.93	267	35.60*	4.088E+00	1.051E+00	1.051E+00	16.51
RN-222	609.32	184	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23
	1120.29	36	14.92	1.686E+00	8.168E-01	8.171E-01	67.34
	1764.49	23	15.30	1.129E+00	7.675E-01	7.678E-01	52.81
RA-224	240.99	70	4.10*	5.444E+00	1.790E+00	1.790E+00	58.92
RA-226	609.32	184	45.49*	2.683E+00	8.661E-01	8.664E-01	21.23
	1120.29	36	14.92	1.686E+00	8.168E-01	8.171E-01	67.34
	1764.49	23	15.30	1.129E+00	7.675E-01	7.678E-01	52.81
AC-228	105.21	------	1.10	7.155E+00	------ Line Not Found		------
	338.32	71	11.27	4.215E+00	8.529E-01	8.529E-01	49.27
	794.95	------	4.25	2.197E+00	------ Line Not Found		------
	835.71	------	1.61	2.116E+00	------ Line Not Found		------
	911.20	86	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79
	968.97	46	15.80	1.889E+00	8.882E-01	8.882E-01	47.18
RA-228	105.21	------	1.10	7.155E+00	------ Line Not Found		------
	338.32	71	11.27	4.215E+00	8.529E-01	8.529E-01	49.27
	794.95	------	4.25	2.197E+00	------ Line Not Found		------
	835.71	------	1.61	2.116E+00	------ Line Not Found		------
	911.20	86	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79
	968.97	46	15.80	1.889E+00	8.882E-01	8.882E-01	47.18
TH-228	74.82	157	10.28	5.116E+00	1.712E+00	1.712E+00	36.60
	77.11	214	17.10	5.357E+00	1.337E+00	1.337E+00	27.56

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	375	43.60*	5.496E+00	8.982E-01	8.982E-01	16.48
	300.09	40	3.30	4.626E+00	1.492E+00	1.492E+00	79.44
TH-229	85.43	52	14.70	6.016E+00	3.346E-01	3.347E-01	118.92
	88.47	82	24.00	6.261E+00	3.139E-01	3.139E-01	49.28
	193.51	------	4.41*	6.326E+00	------ Line Not Found		------
	210.85	------	2.80	5.989E+00	------ Line Not Found		------
TH-230	609.32	184	45.49*	2.683E+00	8.661E-01	8.661E-01	21.23
	1120.29	36	14.92	1.686E+00	8.168E-01	8.168E-01	67.34
	1764.49	23	15.30	1.129E+00	7.675E-01	7.675E-01	52.81
PA-231	283.69	------	1.70	4.831E+00	------ Line Not Found		------
	301.36	40	5.35*	4.626E+00	9.205E-01	9.205E-01	79.44
TH-232	105.21	------	1.10	7.155E+00	------ Line Not Found		------
	338.32	71	11.27	4.215E+00	8.529E-01	8.529E-01	49.27
	835.71	------	1.61	2.116E+00	------ Line Not Found		------
	911.20	86	25.80*	1.981E+00	9.600E-01	9.600E-01	36.79
	968.97	46	15.80	1.889E+00	8.882E-01	8.882E-01	47.18
TH-234	63.29	33	3.70*	3.722E+00	1.382E+00	1.382E+00	202.64
	92.59	150	4.23	6.652E+00	3.055E+00	3.055E+00	37.69
U-234	609.32	184	45.49*	2.683E+00	8.661E-01	8.661E-01	21.23
	1120.29	36	14.92	1.686E+00	8.168E-01	8.168E-01	67.34
	1764.49	23	15.30	1.129E+00	7.675E-01	7.675E-01	52.81
U-235	89.96	81	3.47	6.457E+00	2.073E+00	2.073E+00	62.83
	93.35	150	5.60	6.652E+00	2.308E+00	2.308E+00	37.69
	143.76	------	10.96*	7.247E+00	------ Line Not Found		------
	163.33	------	5.08	6.922E+00	------ Line Not Found		------
	185.72	101	57.20	6.473E+00	1.571E-01	1.571E-01	56.29
	205.31	42	5.01	6.095E+00	7.842E-01	7.842E-01	102.28
U-238	63.29	33	3.70*	3.722E+00	1.382E+00	1.382E+00	202.64
	92.59	150	4.23	6.652E+00	3.055E+00	3.055E+00	37.69
AM-243	43.53	------	5.90	7.707E-01	------ Line Not Found		------
	74.66	157	67.20*	5.116E+00	2.619E-01	2.619E-01	36.60
ANH-511	511.00	63	100.00*	3.064E+00	1.181E-01	1.181E-01	61.22

Flag: "*" = Keyline

Sample ID : R405240012 Acquisition date : 3-OCT-2016 05:40:36

Total number of lines in spectrum 48
Number of unidentified lines 10
Number of lines tentatively identified by NID 38 79.17%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.299E+01	1.299E+01	0.142E+01	10.95	
CD-109	461.40D	1.55	2.036E+00	3.161E+00	1.558E+00	49.28	
SN-126	2.30E+05Y	1.00	2.036E-01	2.036E-01	1.003E-01	49.28	
BA-137M	30.08Y	1.02	6.198E-01	6.314E-01	1.041E-01	16.48	
CS-137	30.08Y	1.02	6.548E-01	6.670E-01	1.099E-01	16.48	
TL-208	1.41E+10Y	1.00	3.161E-01	3.161E-01	0.801E-01	25.33	
PB-210	22.20Y	1.03	8.237E+00	8.446E+00	7.754E+00	91.80	
BI-211	7.04E+08Y	1.00	2.896E+00	2.896E+00	0.478E+00	16.51	
PB-212	1.41E+10Y	1.00	8.982E-01	8.982E-01	1.480E-01	16.48	
BI-214	1600.00Y	1.00	8.661E-01	8.664E-01	1.839E-01	21.23	
PB-214	1600.00Y	1.00	1.051E+00	1.051E+00	0.174E+00	16.51	
RN-222	1600.00Y	1.00	8.661E-01	8.664E-01	1.839E-01	21.23	
RA-224	1.41E+10Y	1.00	1.790E+00	1.790E+00	1.055E+00	58.92	
RA-226	1600.00Y	1.00	8.661E-01	8.664E-01	1.839E-01	21.23	
AC-228	1.41E+10Y	1.00	9.600E-01	9.600E-01	3.532E-01	36.79	
RA-228	1.41E+10Y	1.00	9.600E-01	9.600E-01	3.532E-01	36.79	
TH-228	1.41E+10Y	1.00	8.982E-01	8.982E-01	1.480E-01	16.48	
TH-229	7340.00Y	1.00	3.139E-01	3.139E-01	1.547E-01	49.28	K
TH-230	7.54E+04Y	1.00	8.661E-01	8.661E-01	1.839E-01	21.23	
PA-231	7.04E+08Y	1.00	9.205E-01	9.205E-01	7.312E-01	79.44	
TH-232	1.41E+10Y	1.00	9.600E-01	9.600E-01	3.532E-01	36.79	
TH-234	4.47E+09Y	1.00	1.382E+00	1.382E+00	2.800E+00	202.64	
U-234	2.45E+05Y	1.00	8.661E-01	8.661E-01	1.839E-01	21.23	
U-235	7.04E+08Y	1.00	1.571E-01	1.571E-01	0.884E-01	56.29	K
U-238	4.47E+09Y	1.00	1.382E+00	1.382E+00	2.800E+00	202.64	
AM-243	7370.00Y	1.00	2.619E-01	2.619E-01	0.959E-01	36.60	
ANH-511	1.00E+09Y	1.00	1.181E-01	1.181E-01	0.723E-01	61.22	
	Total Activity :		4.434E+01	4.570E+01			

Grand Total Activity : 4.434E+01 4.570E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240012 Acquisition date : 3-OCT-2016 05:40:36

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	115.16	48	139	0.97	230.14	225	9	1.17E-02	****	7.35E+00	T
0	128.93	39	119	0.75	257.64	255	7	9.57E-03	****	7.39E+00	T
0	209.30	84	74	1.07	418.17	414	9	2.14E-02	44.7	6.02E+00	
0	270.03	55	71	1.51	539.49	534	11	1.42E-02	67.8	5.02E+00	T
0	328.42	33	55	0.98	656.14	651	9	8.72E-03	90.0	4.31E+00	T
0	463.35	27	65	0.67	925.74	919	12	7.30E-03	****	3.30E+00	T
0	728.15	26	40	1.54	1455.04	1446	16	7.19E-03	****	2.35E+00	T
0	757.13	14	33	3.34	1512.97	1503	19	3.92E-03	****	2.28E+00	T
0	768.96	17	24	2.89	1536.63	1529	10	4.65E-03	****	2.25E+00	
0	818.74	16	6	1.04	1636.17	1631	10	4.35E-03	81.5	2.15E+00	T
0	822.83	12	8	1.59	1644.35	1641	9	3.24E-03	****	2.14E+00	
0	831.97	12	21	2.34	1662.61	1653	12	3.40E-03	****	2.12E+00	T
0	934.03	19	12	0.81	1866.72	1862	10	5.28E-03	87.8	1.94E+00	
0	1040.10	14	10	4.04	2078.87	2073	13	4.12E-03	****	1.79E+00	T
0	1094.55	9	9	0.82	2187.80	2182	8	2.59E-03	****	1.72E+00	T
0	1160.19	9	9	1.95	2319.11	2314	9	2.50E-03	****	1.64E+00	
0	1171.06	14	4	0.63	2340.86	2336	9	4.03E-03	74.4	1.63E+00	
0	1209.00	10	6	1.13	2416.77	2413	7	2.92E-03	****	1.58E+00	
0	1215.81	6	8	0.92	2430.40	2427	6	1.78E-03	****	1.58E+00	
0	1239.00	14	11	2.19	2476.81	2472	8	3.90E-03	****	1.55E+00	T
0	1336.13	8	5	1.41	2671.18	2664	11	2.36E-03	****	1.46E+00	
0	1348.53	6	0	0.67	2696.00	2693	6	1.67E-03	81.6	1.45E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:43:39.45

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240012.CNF;1		
Acquisition date	: 3-OCT-2016 05:40:36	Sensitivity	: 3.000
Detector ID	: GAM29	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:01.52	Half life ratio	: *****
Sample date	: 15-DEC-2015 12:56:00	Nuclide Library	: SOLID
Sample ID	: R405240012	Analyst initials	: MXR1
Batch Number	: 1596386	Sample Quantity	: 1.3092E+02 GRAM
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 25-JUN-2016 09:55:57	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;10		

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.969E-01
CD-109	9.004E-01
SN-126	5.830E-02
BA-137M	3.060E-02
CS-137	3.232E-02
TL-208	2.625E-02
PB-210	2.451E+00
PB-212	5.688E-02
BI-214	4.607E-02
PB-214	5.054E-02
RN-222	4.607E-02
RA-226	4.607E-02
AC-228	7.645E-02
RA-228	7.645E-02
TH-228	5.688E-02
TH-229	3.944E-01
TH-230	4.605E-02
PA-231	3.497E-01
TH-232	7.645E-02
TH-234	9.902E-01
U-234	4.605E-02
U-235	1.607E-01
U-238	9.902E-01
AM-243	4.247E-02
ANH-511	2.442E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	7.937E+00	NOT IDENT.
NA-22	3.910E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.755E-02	NOT IDENT.
SC-46	3.152E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF

CR-51	0.000E+00	SHORT HLIF
MN-54	5.088E-02	NOT IDENT.
CO-56	4.047E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	3.954E-02	NOT IDENT.
CO-58	3.758E-01	NOT IDENT.
FE-59	4.781E+00	NOT IDENT.
CO-60	2.714E-02	NOT IDENT.
ZN-65	1.261E-01	NOT IDENT.
GE-68	1.428E+00	NOT IDENT.
AS-73	7.347E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.752E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	4.937E-01	NOT IDENT.
KR-85	6.494E+00	NOT IDENT.
SR-85	6.361E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.234E-01	NOT IDENT.
Y-91	3.778E+02	NOT IDENT.
NB-94	2.310E-02	NOT IDENT.
NB-95	6.237E-01	NOT IDENT.
NB-95M	1.913E+00	NOT IDENT.
ZR-95	1.039E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.694E-02	NOT IDENT.
RH-102	4.644E-02	NOT IDENT.
RU-103	4.227E+00	FAIL ABUN
RH-106	4.602E-01	NOT IDENT.
RU-106	4.602E-01	NOT IDENT.
AG-108M	2.189E-02	NOT IDENT.
AG-110M	6.902E-02	NOT IDENT.
SN-113	2.015E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.075E-01	NOT IDENT.
SB-124	1.346E+00	NOT IDENT.
SB-125	9.086E-02	FAIL ABUN
TE-125M	2.244E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.495E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.282E-02	NOT IDENT.
CS-135	1.128E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	8.992E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.749E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.024E-01	NOT IDENT.
PM-144	4.651E-02	NOT IDENT.
PR-144	4.021E+00	NOT IDENT.
PM-146	3.813E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	7.336E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.166E-02	FAIL ABUN
EU-152	7.559E-02	NOT IDENT.
GD-153	1.357E-01	NOT IDENT.
EU-154	9.544E-02	FAIL ABUN
EU-155	8.737E-02	FAIL ABUN
TB-160	1.431E+00	FAIL ABUN
HO-166M	4.074E-02	NOT IDENT.
TM-171	1.900E+01	NOT IDENT.
HF-172	1.867E-01	FAIL ABUN
LU-172	7.219E-02	FAIL ABUN
LU-176	2.108E-02	FAIL ABUN

HF-181	2.942E+00	NOT IDENT.
TA-182	6.489E-01	FAIL ABUN
RE-183	2.180E+00	NOT IDENT.
RE-184	1.816E+01	NOT IDENT.
W-188	8.685E+01	FAIL ABUN
IR-192	3.879E-01	FAIL ABUN
HG-203	1.745E+00	NOT IDENT.
BI-207	3.189E-02	FAIL ABUN
BI-211	3.879E-01	FAIL ABUN
PB-211	5.928E-01	FAIL ABUN
BI-212	5.444E-01	FAIL ABUN
RN-219	3.133E-01	FAIL ABUN
RA-223	5.113E-01	FAIL ABUN
RA-224	7.023E-01	FAIL ABUN
AC-227	1.714E-01	FAIL ABUN
TH-227	1.714E-01	FAIL ABUN
TH-231	5.113E-01	FAIL ABUN
PA-233	5.269E-02	FAIL ABUN
PA-234	1.751E-01	NOT IDENT.
PA-234M	3.769E+00	NOT IDENT.
NP-237	5.269E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.922E-01	NOT IDENT.
PU-239	2.971E+02	FAIL ABUN
AM-241	1.141E-01	NOT IDENT.
CM-243	8.617E-02	NOT IDENT.
BK-247	6.581E-02	FAIL ABUN
CM-247	3.003E-02	NOT IDENT.
CF-249	2.977E-02	NOT IDENT.
CF-251	9.489E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:43:44.85

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240012.CNF;1    *
* Acquisition date :  3-OCT-2016 05:40:36 Sensitivity     : 3.000          *
* Detector ID      : GAM29                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:01.52     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:56:00 Nuclide Library : SOLID          *
* Sample ID        : R405240012           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3092E+02 GRAM   *
*                                         Quantity Err(%) : 1.5276E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 25-JUN-2016 09:55:57 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM29_CAN.CNF;10          *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.299E+01	1.551E+00	1.551E+00
CD-109	1.559E+00	1.592E+00	1.592E+00
SN-126	1.005E-01	1.024E-01	1.024E-01
BA-137M	6.314E-01	1.055E-01	1.055E-01
CS-137	6.670E-01	1.115E-01	1.115E-01
TL-208	3.161E-01	7.962E-02	7.962E-02
PB-210	8.446E+00	7.633E+00	7.633E+00
PB-212	8.982E-01	1.527E-01	1.527E-01
BI-214	8.664E-01	1.841E-01	1.841E-01
PB-214	1.051E+00	1.757E-01	1.757E-01
RN-222	8.664E-01	1.841E-01	1.841E-01
RA-226	8.664E-01	1.841E-01	1.841E-01
AC-228	9.600E-01	3.496E-01	3.496E-01
RA-228	9.600E-01	3.496E-01	3.496E-01
TH-228	8.982E-01	1.527E-01	1.527E-01
TH-229	3.864E-01	4.318E-01	4.318E-01
TH-230	8.661E-01	1.840E-01	1.840E-01
PA-231	9.205E-01	7.431E-01	7.431E-01
TH-232	9.600E-01	3.496E-01	3.496E-01
TH-234	1.382E+00	2.761E+00	2.761E+00
U-234	8.661E-01	1.840E-01	1.840E-01
U-235	5.360E-02	1.864E-01	1.864E-01
U-238	1.382E+00	2.761E+00	2.761E+00
AM-243	1.653E-01	9.808E-02	9.808E-02
ANH-511	1.181E-01	7.101E-02	7.101E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.764E-01	8.963E+00	8.966E+00	NOT IDENT.
NA-22	3.831E-02	3.908E-02	4.272E-02	NOT IDENT.
NA-24	1.000E+41	1.224E+42	0.000E+00	SHORT HLIF
AL-26	-2.890E-02	3.140E-02	3.400E-02	NOT IDENT.
SC-46	2.614E-01	3.288E-01	3.493E-01	FAIL ABUN

V-48	3.412E+03	1.127E+04	1.138E+04	SHORT HLIF
CR-51	6.363E+01	3.355E+02	3.367E+02	SHORT HLIF
MN-54	3.413E-02	5.942E-02	6.138E-02	NOT IDENT.
CO-56	3.907E-01	4.161E-01	4.518E-01	FAIL ABUN
MN-56	1.000E+41	1.076E+41	0.000E+00	SHORT HLIF
CO-57	-2.043E-02	4.768E-02	4.856E-02	NOT IDENT.
CO-58	-2.167E-01	4.880E-01	4.977E-01	NOT IDENT.
FE-59	4.714E-01	5.714E+00	5.717E+00	NOT IDENT.
CO-60	4.902E-04	3.762E-02	3.762E-02	NOT IDENT.
ZN-65	3.518E-02	1.622E-01	1.630E-01	NOT IDENT.
GE-68	-4.259E-01	1.842E+00	1.852E+00	NOT IDENT.
AS-73	-9.231E-01	8.295E+00	8.305E+00	NOT IDENT.
AS-74	-1.498E+03	4.011E+03	4.068E+03	SHORT HLIF
SE-75	4.915E-02	2.074E-01	2.086E-01	NOT IDENT.
BR-77	2.019E+37	1.706E+38	0.000E+00	SHORT HLIF
SR-82	-1.682E+02	5.007E+02	5.064E+02	SHORT HLIF
RB-83	-3.787E-03	5.667E-01	5.667E-01	NOT IDENT.
KR-85	8.264E+00	6.983E+00	7.914E+00	NOT IDENT.
SR-85	8.075E-01	6.842E-01	7.750E-01	NOT IDENT.
RB-86	-1.141E+04	1.878E+04	1.947E+04	SHORT HLIF
Y-88	-1.950E-01	2.171E-01	2.342E-01	NOT IDENT.
Y-91	5.747E+01	5.045E+02	5.052E+02	NOT IDENT.
NB-94	-2.113E-03	2.742E-02	2.744E-02	NOT IDENT.
NB-95	-2.789E-02	8.290E-01	8.291E-01	NOT IDENT.
NB-95M	-1.167E-02	2.510E+00	2.510E+00	NOT IDENT.
ZR-95	1.550E+00	3.085E+00	3.164E+00	FAIL ABUN
NB-97	-1.000E+41	2.250E+42	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	9.768E+40	0.000E+00	SHORT HLIF
MO-99	-9.064E+30	2.913E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	1.301E+41	0.000E+00	SHORT HLIF
RH-101	1.019E-02	3.290E-02	3.322E-02	NOT IDENT.
RH-102	6.172E-03	5.303E-02	5.310E-02	NOT IDENT.
RU-103	2.772E-01	4.797E+00	4.799E+00	FAIL ABUN
RH-106	4.990E-01	4.662E-01	5.176E-01	NOT IDENT.
RU-106	4.990E-01	4.662E-01	5.176E-01	NOT IDENT.
AG-108M	-3.777E-03	2.526E-02	2.532E-02	NOT IDENT.
AG-110M	3.428E-02	7.471E-02	7.629E-02	NOT IDENT.
SN-113	4.556E-04	2.267E-01	2.267E-01	NOT IDENT.
CD-115	-1.635E+38	2.994E+38	0.000E+00	SHORT HLIF
SN-117M	1.813E+04	6.730E+04	6.779E+04	SHORT HLIF
TE-123M	-2.759E-02	1.292E-01	1.298E-01	NOT IDENT.
SB-124	8.481E-01	1.261E+00	1.318E+00	NOT IDENT.
SB-125	-3.682E-02	1.068E-01	1.081E-01	FAIL ABUN
TE-125M	1.521E+02	2.474E+02	2.567E+02	NOT IDENT.
I-126	1.350E+05	5.703E+05	5.736E+05	SHORT HLIF
SB-126	-2.042E+05	7.231E+05	7.290E+05	SHORT HLIF
SB-127	1.006E+21	6.434E+21	0.000E+00	SHORT HLIF
I-131	2.015E+09	2.386E+09	2.553E+09	SHORT HLIF
I-132	-1.000E+41	1.872E+42	0.000E+00	SHORT HLIF
TE-132	1.262E+25	8.379E+25	0.000E+00	SHORT HLIF
BA-133	-2.840E-03	4.375E-02	4.377E-02	NOT IDENT.
I-133	1.000E+41	2.133E+41	0.000E+00	SHORT HLIF
CS-134	4.876E-02	5.612E-02	6.027E-02	NOT IDENT.
CS-135	1.629E-03	1.490E-01	1.490E-01	NOT IDENT.
I-135	1.000E+41	2.707E+42	0.000E+00	SHORT HLIF
CS-136	-1.661E+04	1.743E+05	1.745E+05	SHORT HLIF
CE-139	1.450E-02	1.049E-01	1.052E-01	NOT IDENT.
BA-140	-4.276E+05	7.869E+05	8.102E+05	SHORT HLIF
LA-140	3.695E+04	3.334E+05	3.338E+05	SHORT HLIF
CE-141	1.792E+00	2.036E+01	2.037E+01	NOT IDENT.
CE-143	1.000E+41	1.702E+41	0.000E+00	SHORT HLIF
CE-144	-1.837E-01	3.684E-01	3.776E-01	NOT IDENT.
PM-144	1.994E-02	5.153E-02	5.230E-02	NOT IDENT.
PR-144	1.711E+00	4.456E+00	4.523E+00	NOT IDENT.
PM-146	-7.637E-03	4.419E-02	4.433E-02	NOT IDENT.
ND-147	-6.994E+06	1.755E+07	1.783E+07	SHORT HLIF
PM-147	3.097E+02	8.269E+02	8.386E+02	NOT IDENT.
PM-149	1.570E+39	5.362E+39	0.000E+00	SHORT HLIF
EU-150	-2.486E-02	2.980E-02	3.184E-02	FAIL ABUN
EU-152	-5.641E-02	9.012E-02	9.364E-02	NOT IDENT.
GD-153	-6.329E-02	1.753E-01	1.776E-01	NOT IDENT.
EU-154	9.195E-02	9.562E-02	1.042E-01	FAIL ABUN
EU-155	-1.945E-02	1.025E-01	1.028E-01	FAIL ABUN
TB-160	1.264E+00	1.461E+00	1.568E+00	FAIL ABUN
HO-166M	1.445E-02	4.517E-02	4.564E-02	NOT IDENT.
TM-171	5.873E+00	2.082E+01	2.099E+01	NOT IDENT.
HF-172	-1.880E-02	2.374E-01	2.376E-01	FAIL ABUN
LU-172	6.469E-02	8.525E-02	9.010E-02	FAIL ABUN

LU-176	2.533E-03	2.556E-02	2.559E-02	FAIL ABUN
HF-181	-1.240E+00	3.525E+00	3.569E+00	NOT IDENT.
TA-182	-5.709E-01	9.128E-01	9.484E-01	FAIL ABUN
RE-183	-4.315E-01	2.485E+00	2.492E+00	NOT IDENT.
RE-184	-1.339E+01	2.468E+01	2.541E+01	NOT IDENT.
W-188	1.347E+01	1.136E+02	1.137E+02	FAIL ABUN
IR-192	1.675E-01	4.564E-01	4.626E-01	FAIL ABUN
HG-203	-4.451E-01	2.183E+00	2.192E+00	NOT IDENT.
BI-207	-3.638E-02	4.668E-02	4.947E-02	FAIL ABUN
BI-211	2.896E+00	4.862E-01	1.393E+00	FAIL ABUN
PB-211	4.504E-01	6.203E-01	6.527E-01	FAIL ABUN
BI-212	9.505E-01	1.083E+00	1.164E+00	FAIL ABUN
RN-219	-4.951E-03	3.537E-01	3.537E-01	FAIL ABUN
RA-223	3.161E-01	5.893E-01	6.063E-01	FAIL ABUN
RA-224	1.790E+00	1.038E+00	1.315E+00	FAIL ABUN
AC-227	-5.875E-02	2.155E-01	2.171E-01	FAIL ABUN
TH-227	-5.875E-02	2.155E-01	2.171E-01	FAIL ABUN
TH-231	3.161E-01	5.893E-01	6.063E-01	FAIL ABUN
PA-233	1.399E-02	6.340E-02	6.371E-02	FAIL ABUN
PA-234	-1.451E-01	2.940E-01	3.012E-01	NOT IDENT.
PA-234M	2.214E+00	4.267E+00	4.382E+00	NOT IDENT.
NP-237	1.399E-02	6.340E-02	6.371E-02	FAIL ABUN
NP-238	-6.542E+39	5.130E+40	0.000E+00	SHORT HLIF
NP-239	-1.256E-01	2.549E-01	2.611E-01	NOT IDENT.
PU-239	4.766E+02	4.885E+02	5.336E+02	FAIL ABUN
AM-241	-2.189E-02	1.406E-01	1.409E-01	NOT IDENT.
CM-243	-2.313E-02	1.012E-01	1.017E-01	NOT IDENT.
BK-247	-3.554E-02	9.191E-02	9.330E-02	FAIL ABUN
CM-247	-7.567E-03	3.468E-02	3.484E-02	NOT IDENT.
CF-249	3.001E-04	3.344E-02	3.344E-02	NOT IDENT.
CF-251	1.221E-04	1.126E-01	1.126E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	83.6239	87.09	94.1401	136.47	71.6749
45.60	66.8087	87.57	94.2033	140.51	0.0000
46.54	66.9380	88.03	94.2636	143.76	68.9351
49.72	0.0000	88.34	94.3044	144.24	61.3055
51.35	67.5807	88.47	94.3212	145.44	71.2445
51.87	75.3795	89.96	94.5149	152.43	76.1563
52.39	79.3240	1093.63	74.0369	153.25	0.0000
52.97	81.3484	91.11	0.0000	323.87	90.6622
53.44	85.2977	92.59	70.1087	156.02	0.0000
54.07	79.5761	93.35	70.1800	158.56	0.0000
57.36	0.0000	94.56	70.2936	159.00	74.4201
57.53	76.1766	94.65	70.3019	162.33	65.7412
57.98	71.3512	94.67	70.3040	162.66	0.0000
59.27	79.3525	94.87	62.0490	163.33	70.2636
59.32	82.2988	97.43	78.8603	165.86	63.7223
59.54	82.3309	98.43	72.7290	176.31	66.5875
60.96	96.9470	98.44	72.7301	176.60	0.0000
61.17	96.9823	99.53	75.9535	177.52	62.1394
62.93	87.7459	100.11	82.2577	181.07	0.0000
63.29	87.8000	102.03	82.4590	181.52	57.4453
63.58	87.8431	103.18	75.2618	184.41	69.7141
64.28	87.9470	103.37	86.7804	143.76	59.1721
66.73	80.6998	105.21	73.3571	193.51	44.6736
67.24	91.3599	105.31	75.4623	197.03	78.1218
125.81	92.7509	106.12	81.8324	198.01	67.8370
67.75	92.7608	106.47	81.8681	201.83	69.2029
69.67	79.7571	109.28	69.5112	203.43	47.7349
70.83	109.2032	111.00	71.7665	205.31	50.8918
72.81	93.5135	111.76	0.0000	210.85	44.9213
72.87	93.5220	114.06	62.4951	215.65	69.9692
74.66	107.1794	116.30	0.0000	222.11	65.6310
74.82	107.2054	116.74	77.9217	227.09	55.2911
74.97	107.2298	119.76	84.2358	227.38	47.0667
77.11	107.5798	121.12	71.5515	228.16	0.0000
78.74	107.8426	121.22	71.5591	228.18	52.9823
79.69	107.9940	121.78	83.3606	116.74	52.9823
80.12	108.0623	122.06	83.3874	235.69	64.7231
80.19	0.0000	122.92	66.3466	235.96	64.7357
80.57	77.0454	123.07	71.7089	238.63	98.0847
81.00	77.0941	265.00	72.8290	238.98	0.0000
81.07	77.1023	125.81	71.5708	240.99	109.3455
81.75	77.1782	127.23	60.2135	242.00	50.7480
83.79	71.2951	127.91	77.4756	244.70	46.0795
84.00	71.3165	129.30	75.4378	252.40	0.0000
85.43	102.0882	131.20	71.9940	252.80	37.1559
86.55	102.2491	133.02	90.8893	254.15	0.0000
86.79	102.2835	133.52	88.7729	256.23	43.2521
86.94	94.1205	136.00	73.8105	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	44.7110	355.39	0.0000	584.27	20.8175
264.80	60.4263	356.01	38.3340	595.83	0.0000
265.00	62.8513	364.49	0.0000	427.87	26.6624
268.22	43.6080	366.42	0.0000	602.52	0.0000
269.46	35.1579	372.51	29.2257	604.72	18.5978
270.03	35.1712	375.05	29.2651	607.14	17.1826
271.23	35.1995	377.52	37.0607	609.32	17.1965
273.65	0.0000	356.01	25.0782	610.33	17.2031
276.40	49.9362	388.16	29.4678	614.28	31.5861
277.37	43.8739	388.63	0.0000	618.01	23.9624
277.60	43.8805	391.69	38.2055	620.36	31.6586
278.00	35.3579	264.66	34.0203	621.93	13.4389
279.20	46.3670	401.81	31.4216	630.19	0.0000
279.54	40.2751	402.40	37.5428	631.29	17.3379
279.70	40.2792	404.85	25.3508	633.25	22.1699
280.46	46.4053	410.95	32.4435	634.78	0.0000
283.69	48.9502	413.71	22.8299	635.95	19.2977
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	42.8795	423.72	0.0000	645.85	15.4935
285.90	0.0000	427.09	32.7032	657.76	20.4224
287.50	46.6175	427.87	38.0213	657.90	0.0000
290.67	40.9749	433.94	27.4908	661.66	25.3197
293.27	0.0000	439.40	35.5656	664.57	0.0000
351.93	42.7367	453.88	33.1232	666.33	0.0000
295.96	42.7568	463.37	38.6643	666.50	0.0000
879.38	34.5916	468.07	28.3847	667.71	0.0000
299.98	28.0269	473.00	0.0000	677.62	13.7106
300.09	28.0290	475.06	22.5993	685.70	0.0000
300.13	28.0297	476.78	14.4749	695.00	0.0000
301.36	39.6016	477.60	18.1002	696.49	17.7437
302.85	36.3346	482.18	26.2995	696.51	17.7437
256.23	40.9187	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	12.8186
306.78	40.9761	497.08	24.6473	697.49	10.8469
308.46	37.2894	505.52	20.8898	702.65	17.7810
311.90	37.3672	507.63	0.0000	706.68	19.7835
316.51	37.4716	511.00	30.3064	711.68	11.8901
319.41	0.0000	514.00	17.9313	720.70	0.0000
320.08	0.0000	514.00	17.9313	721.93	0.0000
321.04	41.7480	520.40	22.1299	722.78	13.4264
323.87	32.6182	520.69	0.0000	722.91	13.4269
325.23	36.4111	522.65	0.0000	723.31	13.4286
328.76	0.0000	527.90	0.0000	724.19	10.4474
333.37	59.5445	528.26	23.1283	727.33	15.9368
333.97	58.0503	529.59	14.8099	733.00	13.4714
334.37	50.4907	529.87	0.0000	735.93	10.9875
338.28	53.1345	531.02	0.0000	333.97	16.9889
338.32	53.1357	537.26	0.0000	739.50	0.0000
311.90	46.8676	546.56	0.0000	747.24	15.0385
340.48	46.8676	552.55	26.1634	748.06	21.0590
340.55	0.0000	563.25	26.2762	752.31	10.5440
344.28	44.8535	569.33	25.3993	753.82	0.0000
345.93	36.4247	946.00	19.7567	756.73	18.1018
351.06	28.8840	569.70	19.7576	756.80	18.1018
351.93	28.8985	583.19	20.8085	884.68	20.1595

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	19.6674	1274.44	9.7002	1620.50	2.7731
766.42	18.1575	1001.03	10.7914	1621.92	7.3970
766.84	18.1604	1002.74	15.1148	1678.03	0.0000
772.60	0.0000	1004.73	15.1228	1690.97	0.9359
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	4.7385
778.90	19.2428	1028.54	0.0000	1063.66	4.7430
783.70	0.0000	1037.84	9.8049	1771.35	1.8976
785.37	11.1629	1038.76	0.0000	1791.20	0.0000
792.07	28.4740	631.29	12.0098	1808.65	7.6377
794.95	20.3573	1048.07	0.0000	1810.72	0.0000
795.86	19.3448	1049.04	10.9245	1836.06	7.6719
810.06	10.2258	1050.41	8.7428		
810.29	10.2266	1063.66	17.5443		
344.28	16.3633	1077.00	0.0000		
810.76	16.3652	1077.34	9.9016		
815.77	0.0000	1085.87	11.0254		
1048.07	0.0000	1093.63	13.2549		
832.01	20.0737	1099.45	12.1682		
834.85	10.8179	1112.07	11.0954		
835.71	12.3667	1112.84	9.3222		
836.80	0.0000	1115.54	9.9939		
846.75	0.0000	1120.29	14.4526		
846.77	10.3394	1120.55	14.4536		
856.80	0.0000	1221.41	15.0117		
860.56	13.4956	1129.67	8.9141		
871.09	21.8682	1131.51	0.0000		
873.19	15.6293	1147.95	0.0000		
875.33	0.0000	1173.23	16.8848		
879.38	7.3068	1177.95	13.5225		
880.51	12.5298	1189.05	6.7783		
883.24	13.5845	1204.77	11.9048		
884.68	7.3179	1221.41	19.3464		
889.28	9.4211	1231.02	19.3879		
894.76	10.4842	1235.36	0.0000		
898.04	14.6916	1238.28	14.8503		
900.72	10.5017	1260.41	0.0000		
903.28	15.7642	1271.87	16.1100		
911.20	8.4264	1274.44	4.6055		
912.08	8.4284	1274.54	4.6058		
923.98	0.0000	1291.59	11.5568		
926.50	19.0400	1298.22	0.0000		
929.11	7.9391	1312.11	0.0000		
937.49	11.1404	1332.49	6.9941		
944.13	0.0000	1362.66	0.0000		
946.00	14.8881	1365.19	6.1617		
949.00	12.7720	1368.63	0.0000		
667.71	0.0000	1384.29	6.1857		
962.31	29.9084	1408.01	7.9909		
964.08	14.4267	1457.56	0.0000		
966.17	19.2466	1460.82	4.4861		
911.20	18.1912	1489.16	10.8252		
968.97	18.1912	1505.03	10.8582		
983.53	0.0000	1584.12	5.5096		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:44:14.50

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240013.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM30.CNF;300
                                     Background date  : 2-OCT-2016 11:01:47.
Sample date      : 15-DEC-2015 11:04:00 Acquisition date : 3-OCT-2016 05:41:01.
Sample ID        : R405240013           Sample quantity  : 1.33855E+02 GRAM
Detector name    : GAM30                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:01.37  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	45.74*	20	126	0.62	91.20	88	9	5.57E-03	104.1	
2	0	63.06*	21	176	0.92	125.85	121	10	5.89E-03	121.2	
3	2	74.76	145	141	1.19	149.25	143	16	4.02E-02	16.0	1.68E+00
4	2	77.19*	191	102	0.84	154.10	143	16	5.30E-02	10.9	
5	4	84.34*	36	98	1.47	168.41	165	27	1.00E-02	50.1	2.20E+00
6	4	87.09	81	111	1.33	173.90	165	27	2.25E-02	25.6	
7	4	90.22	67	96	1.21	180.17	165	27	1.85E-02	27.8	
8	4	92.75*	110	122	1.49	185.23	165	27	3.05E-02	22.0	
9	0	109.26*	5	111	0.93	218.24	214	7	1.44E-03	343.9	
10	0	129.39*	26	100	1.08	258.50	255	9	7.27E-03	72.5	
11	0	162.60	21	61	0.91	324.94	321	6	5.89E-03	62.3	
12	0	186.09*	94	107	0.98	371.92	367	10	2.61E-02	23.7	
13	1	207.54	19	31	1.18	414.82	413	13	5.27E-03	41.8	2.01E+00
14	1	209.21	43	82	1.27	418.17	413	13	1.19E-02	39.9	
15	1	238.68*	385	67	1.14	477.10	472	22	1.07E-01	6.2	4.02E+00
16	1	242.63	39	48	1.19	485.00	472	22	1.08E-02	41.5	
17	0	264.11	21	29	1.28	527.98	525	6	5.75E-03	48.2	
18	0	270.82	24	61	1.65	541.39	537	9	6.58E-03	64.3	
19	0	295.46*	110	76	1.16	590.67	586	9	3.06E-02	17.4	
20	0	300.72	18	52	1.24	601.19	595	9	4.87E-03	78.9	
21	0	328.18	22	58	2.00	656.12	650	9	6.09E-03	66.4	
22	0	338.76*	71	52	1.48	677.27	672	9	1.97E-02	22.3	
23	0	352.06*	215	45	1.27	703.89	699	10	5.97E-02	9.1	
24	0	357.74	16	30	1.41	715.25	711	10	4.44E-03	68.8	
25	0	371.99	29	46	3.66	743.76	737	15	8.12E-03	53.4	
26	0	409.07	31	34	2.43	817.92	813	10	8.50E-03	40.4	
27	0	439.03	12	21	0.66	877.86	874	8	3.37E-03	72.3	
28	0	463.87	40	37	1.78	927.54	923	12	1.11E-02	34.0	
29	0	511.06*	58	42	1.17	1021.94	1016	13	1.62E-02	31.5	
30	0	583.37*	152	30	1.48	1166.59	1161	14	4.22E-02	11.2	
31	0	609.54*	143	32	1.22	1218.94	1214	11	3.96E-02	11.7	
32	0	630.18	39	15	4.56	1260.23	1254	15	1.08E-02	26.9	
33	0	644.93	18	13	2.23	1289.73	1284	11	4.88E-03	47.2	
34	0	662.07	32	14	1.43	1324.02	1323	6	8.76E-03	29.9	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	728.42	28	36	2.43	1456.76	1448	12	7.87E-03	46.3	
36	0	768.72	22	15	2.16	1537.39	1533	9	6.17E-03	38.3	
37	0	785.97	17	6	1.97	1571.90	1568	8	4.67E-03	35.2	
38	0	807.19	10	18	1.87	1614.35	1609	10	2.86E-03	82.4	
39	0	861.19	17	13	1.30	1722.38	1718	9	4.83E-03	44.7	
40	0	892.32	15	9	0.88	1784.65	1778	12	4.22E-03	47.0	
41	0	911.51	107	20	1.53	1823.05	1816	13	2.96E-02	12.9	
42	0	946.67	8	3	0.75	1893.39	1889	7	2.12E-03	54.2	
43	0	965.04*	22	10	0.82	1930.14	1926	8	6.11E-03	34.0	
44	0	969.06*	53	18	1.29	1938.19	1934	9	1.47E-02	20.3	
45	0	1001.59*	10	9	1.40	2003.27	1997	11	2.80E-03	74.4	
46	0	1025.65	18	3	1.46	2051.41	2046	11	4.86E-03	30.0	
47	0	1120.99*	28	21	1.75	2242.16	2236	13	7.70E-03	38.9	
48	0	1156.40	11	16	0.73	2313.01	2303	14	2.99E-03	87.2	
49	0	1175.65	19	9	1.61	2351.53	2346	11	5.24E-03	40.5	
50	0	1219.44	16	6	1.65	2439.15	2434	10	4.37E-03	40.6	
51	0	1254.73	21	6	2.72	2509.76	2504	12	5.79E-03	32.2	
52	0	1461.13*	338	6	2.06	2922.78	2916	13	9.40E-02	5.7	
53	0	1765.01*	39	0	2.00	3530.91	3525	12	1.08E-02	17.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:44:16

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240013.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 11:04:00 Acquisition date : 3-OCT-2016 05:41:01
Sample ID   : R405240013   Sample quantity : 133.85 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA30   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:01.37   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Empirical   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	87.09	TH-229	88.47
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.307E+00	1.300E+01	1.300E+01	11.40	OK
CD-109	88.03	3.70*	6.542E+00	1.503E+00	2.334E+00	76.00	OK
TE-125M	109.28	0.27*	7.339E+00	1.693E+00	5.812E+01	687.74	OK
SN-126	64.28	9.60	3.845E+00	3.843E-01	3.843E-01	242.48	OK
	86.94	8.90	6.542E+00	6.250E-01	6.250E-01	76.00	OK
	87.57	37.00*	6.542E+00	1.503E-01	1.503E-01	76.00	OK
BA-137M	661.66	89.90*	2.540E+00	7.857E-02	8.003E-02	59.77	OK
CS-137	661.66	85.10*	2.540E+00	8.300E-02	8.455E-02	59.77	OK
TL-208	277.37	6.60	4.820E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.799E+00	3.665E-01	3.665E-01	22.48	OK
	860.56	12.50	2.057E+00	3.775E-01	3.775E-01	89.31	OK
PB-210	46.54	4.25*	1.147E+00	2.809E+00	2.880E+00	208.22	OK
BI-211	72.87	1.23	5.213E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	4.059E+00	3.858E-01	3.858E-01	206.66	OK
BI-212	727.33	6.67*	2.357E+00	1.018E+00	1.018E+00	92.59	OK
	785.37	1.10	2.217E+00	3.871E+00	3.871E+00	70.41	OK
	1620.50	1.47	1.200E+00	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	5.435E+00	1.292E+00	1.292E+00	43.82	OK
	77.11	17.10	5.699E+00	1.293E+00	1.293E+00	21.76	OK
	238.63	43.60*	5.356E+00	1.010E+00	1.010E+00	12.45	OK
	300.09	3.30	4.549E+00	7.045E-01	7.045E-01	157.77	OK
BI-214	609.32	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34	OK
	1120.29	14.92	1.644E+00	6.180E-01	6.182E-01	77.74	OK
	1764.49	15.30	1.122E+00	1.197E+00	1.198E+00	34.19	OK
PB-214	74.82	5.80	5.442E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	5.699E+00	2.279E+00	2.280E+00	21.76	OK
	87.09	3.41	6.542E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	5.296E+00	6.174E-01	6.176E-01	82.98	OK
	295.22	18.42	4.607E+00	7.836E-01	7.839E-01	34.78	OK
	351.93	35.60*	4.060E+00	----- Line Not Found		-----	<<INT Reject
RN-222	609.32	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34	OK
	1120.29	14.92	1.644E+00	6.180E-01	6.182E-01	77.74	OK
	1764.49	15.30	1.122E+00	1.197E+00	1.198E+00	34.19	OK
RA-226	609.32	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34	OK
	1120.29	14.92	1.644E+00	6.180E-01	6.182E-01	77.74	OK
	1764.49	15.30	1.122E+00	1.197E+00	1.198E+00	34.19	OK
AC-228	105.21	1.10	7.278E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.174E+00	8.991E-01	8.991E-01	44.55	OK
	794.95	4.25	2.197E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.109E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84	OK
	968.97	15.80	1.863E+00	9.926E-01	9.926E-01	40.65	OK
RA-228	105.21	1.10	7.278E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.174E+00	8.991E-01	8.991E-01	44.55	OK
	794.95	4.25	2.197E+00	----- Line Not Found		-----	Absent
	835.71	1.61	2.109E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84	OK
	968.97	15.80	1.863E+00	9.926E-01	9.926E-01	40.65	OK
TH-228	74.82	10.28	5.435E+00	1.292E+00	1.292E+00	43.82	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	77.11	17.10	5.699E+00	1.293E+00	1.293E+00	21.76	OK
	238.63	43.60*	5.356E+00	1.010E+00	1.010E+00	12.45	OK
	300.09	3.30	4.549E+00	7.045E-01	7.045E-01	157.77	OK
TH-229	85.43	14.70	6.345E+00	2.545E-01	2.545E-01	100.24	OK
	88.47	24.00	6.542E+00	2.318E-01	2.318E-01	76.00	OK
	193.51	4.41*	6.145E+00	----- Line Not Found		-----	Absent
	210.85	2.80	5.821E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	2.707E+00	6.635E-01	6.635E-01	23.34	OK
	1120.29	14.92	1.644E+00	6.180E-01	6.180E-01	77.74	OK
	1764.49	15.30	1.122E+00	1.197E+00	1.197E+00	34.19	OK
PA-231	283.69	1.70	4.743E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.549E+00	4.345E-01	4.345E-01	157.77	OK
TH-232	105.21	1.10	7.278E+00	----- Line Not Found		-----	Absent
	338.32	11.27	4.174E+00	8.991E-01	8.991E-01	44.55	OK
	835.71	1.61	2.109E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84	OK
	968.97	15.80	1.863E+00	9.926E-01	9.926E-01	40.65	OK
TH-234	63.29	3.70*	3.845E+00	9.970E-01	9.970E-01	242.48	OK
	92.59	4.23	6.868E+00	2.472E+00	2.472E+00	43.99	OK
U-234	609.32	45.49*	2.707E+00	6.635E-01	6.635E-01	23.34	OK
	1120.29	14.92	1.644E+00	6.180E-01	6.180E-01	77.74	OK
	1764.49	15.30	1.122E+00	1.197E+00	1.197E+00	34.19	OK
U-235	89.96	3.47	6.735E+00	1.868E+00	1.868E+00	55.53	OK
	93.35	5.60	6.868E+00	1.867E+00	1.867E+00	43.99	OK
	143.76	10.96*	7.121E+00	----- Line Not Found		-----	Absent
	163.33	5.08	6.765E+00	3.880E-01	3.880E-01	124.56	OK
	185.72	57.20	6.291E+00	1.630E-01	1.630E-01	47.44	OK
	205.31	5.01	5.922E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.845E+00	9.970E-01	9.970E-01	242.48	OK
	92.59	4.23	6.868E+00	2.472E+00	2.472E+00	43.99	OK
AM-243	43.53	5.90	8.765E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	5.435E+00	1.977E-01	1.977E-01	43.82	OK
BK-247	84.00	40.00	6.345E+00	9.351E-02	9.355E-02	100.24	OK
	102.03	7.00	7.207E+00	----- Line Not Found		-----	Absent
	106.47	11.00	7.300E+00	----- Line Not Found		-----	Absent
	119.76	4.00	7.384E+00	----- Line Not Found		-----	Absent
	123.68	1.00	7.369E+00	----- Line Not Found		-----	Absent
	265.00	30.00*	4.991E+00	8.411E-02	8.415E-02	96.38	OK
ANH-511	511.00	100.00*	3.091E+00	1.093E-01	1.093E-01	62.96	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:44:18.53

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240013.CNF;1		
Acquisition date	3-OCT-2016 05:41:01	Sensitivity	3.000
Detector ID	GAM30	Energy tolerance	1.500
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:01.37	Half life ratio	*****
Sample date	15-DEC-2015 11:04:00	Analyst initials	MXR1
Sample ID	R405240013	Sample Quantity	1.3385E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	11-MAR-2016 05:58:49	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;7		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.300E+01	1.452E+00	5.125E-01
CD-109	2.334E+00	1.738E+00	1.470E+00
TE-125M	5.812E+01	3.917E+02	4.017E+02
SN-126	1.503E-01	1.120E-01	9.508E-02
BA-137M	8.003E-02	4.688E-02	5.467E-02
CS-137	8.455E-02	4.952E-02	5.776E-02
TL-208	3.665E-01	8.076E-02	4.887E-02
PB-210	2.880E+00	5.877E+00	4.032E+00
BI-211	3.858E-01	7.814E-01	3.079E-01
BI-212	1.018E+00	9.242E-01	7.542E-01
PB-212	1.010E+00	1.232E-01	8.924E-02
BI-214	6.637E-01	1.518E-01	1.075E-01
PB-214	8.873E-01	1.576E-01	2.958E-01
RN-222	6.637E-01	1.518E-01	1.075E-01
RA-226	6.637E-01	1.518E-01	1.075E-01
AC-228	1.169E+00	2.960E-01	2.095E-01
RA-228	1.169E+00	2.960E-01	2.095E-01
TH-228	1.010E+00	1.232E-01	8.924E-02
TH-229	-1.806E-01	4.225E-01	7.364E-01
TH-230	6.635E-01	1.518E-01	1.075E-01
PA-231	4.345E-01	6.718E-01	6.157E-01
TH-232	1.169E+00	2.960E-01	2.095E-01
TH-234	9.970E-01	2.369E+00	1.865E+00
U-234	6.635E-01	1.518E-01	1.075E-01
U-235	1.288E-03	1.687E-01	3.097E-01
U-238	9.970E-01	2.369E+00	1.865E+00
AM-243	1.977E-01	8.491E-02	7.558E-02
BK-247	8.415E-02	7.948E-02	1.251E-01
ANH-511	1.093E-01	6.744E-02	4.572E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	1.752E+00	8.093E+00	1.675E+01	NOT IDENT.

NA-22	-7.350E-03	3.993E-02	7.946E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	1.033E-02	2.442E-02	6.119E-02	NOT IDENT.
SC-46	-2.922E-02	3.042E-01	5.243E-01	FAIL ABUN
V-48	0.000E+00	6.673E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	2.849E+02	0.000E+00	SHORT HLIF
MN-54	5.905E-03	5.967E-02	1.157E-01	NOT IDENT.
CO-56	2.414E-01	4.165E-01	8.692E-01	NOT IDENT.
MN-56	0.000E+00	1.716E+41	0.000E+00	SHORT HLIF
CO-57	-2.967E-02	4.079E-02	7.100E-02	NOT IDENT.
CO-58	-9.148E-02	4.924E-01	8.245E-01	NOT IDENT.
FE-59	2.852E+00	6.502E+00	1.303E+01	NOT IDENT.
CO-60	-6.063E-03	2.812E-02	5.762E-02	NOT IDENT.
ZN-65	9.779E-02	1.508E-01	3.042E-01	NOT IDENT.
GE-68	-4.348E-01	1.909E+00	3.613E+00	NOT IDENT.
AS-73	3.301E+00	5.714E+00	1.172E+01	NOT IDENT.
AS-74	0.000E+00	3.611E+03	0.000E+00	SHORT HLIF
SE-75	2.332E-01	2.202E-01	3.331E-01	FAIL ABUN
BR-77	0.000E+00	2.834E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.559E+02	0.000E+00	SHORT HLIF
RB-83	-3.652E-01	4.578E-01	8.008E-01	NOT IDENT.
KR-85	5.882E+00	6.538E+00	1.301E+01	NOT IDENT.
SR-85	5.760E-01	6.414E-01	1.276E+00	NOT IDENT.
RB-86	0.000E+00	1.674E+04	0.000E+00	SHORT HLIF
Y-88	2.364E-02	1.647E-01	3.995E-01	NOT IDENT.
Y-91	1.867E+02	4.966E+02	9.860E+02	NOT IDENT.
NB-94	-3.934E-03	2.632E-02	4.981E-02	NOT IDENT.
NB-95	2.416E-01	7.267E-01	1.343E+00	NOT IDENT.
NB-95M	1.978E-01	2.378E+00	4.001E+00	NOT IDENT.
ZR-95	6.460E-01	9.542E-01	2.134E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.423E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-2.202E-03	3.146E-02	5.358E-02	NOT IDENT.
RH-102	0.000E+00	9.230E-02	1.041E-01	FAIL ABUN
RU-103	-4.942E-02	4.569E+00	8.924E+00	FAIL ABUN
RH-106	3.289E-02	3.785E-01	7.610E-01	NOT IDENT.
RU-106	3.289E-02	3.785E-01	7.610E-01	NOT IDENT.
AG-108M	2.443E-02	2.534E-02	5.459E-02	NOT IDENT.
AG-110M	5.201E-02	8.249E-02	1.788E-01	NOT IDENT.
SN-113	-6.872E-02	1.777E-01	3.373E-01	NOT IDENT.
CD-115	0.000E+00	2.680E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	6.273E+04	0.000E+00	SHORT HLIF
TE-123M	-8.219E-03	1.125E-01	1.904E-01	NOT IDENT.
SB-124	-8.317E-01	1.704E+00	3.184E+00	FAIL ABUN
SB-125	-9.524E-03	9.582E-02	1.854E-01	FAIL ABUN
I-126	0.000E+00	5.322E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	7.644E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	5.532E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.115E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.220E+25	0.000E+00	SHORT HLIF
BA-133	4.090E-02	3.106E-02	6.313E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	4.448E-02	3.924E-02	9.030E-02	NOT IDENT.
CS-135	-1.062E-02	1.532E-01	2.497E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.011E+05	0.000E+00	SHORT HLIF
CE-139	9.965E-02	1.011E-01	2.005E-01	NOT IDENT.
BA-140	0.000E+00	7.031E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.569E+05	0.000E+00	SHORT HLIF
CE-141	1.427E+01	1.783E+01	3.528E+01	NOT IDENT.
CE-143	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CE-144	6.635E-02	3.237E-01	5.716E-01	NOT IDENT.
PM-144	3.034E-02	5.243E-02	1.097E-01	NOT IDENT.
PR-144	2.611E+00	4.535E+00	9.483E+00	NOT IDENT.
PM-146	1.849E-03	3.592E-02	7.148E-02	NOT IDENT.
ND-147	0.000E+00	1.551E+07	0.000E+00	SHORT HLIF
PM-147	4.757E+01	7.036E+02	1.320E+03	NOT IDENT.
PM-149	0.000E+00	4.440E+39	0.000E+00	SHORT HLIF
EU-150	-1.798E-03	2.363E-02	4.180E-02	FAIL ABUN
EU-152	-8.977E-03	8.277E-02	1.616E-01	FAIL ABUN
GD-153	-4.432E-02	1.623E-01	2.728E-01	NOT IDENT.
EU-154	-1.808E-02	9.824E-02	1.955E-01	NOT IDENT.
EU-155	8.025E-02	9.549E-02	1.799E-01	FAIL ABUN
TB-160	-8.441E-01	1.369E+00	2.354E+00	FAIL ABUN
HO-166M	-7.000E-03	4.545E-02	8.688E-02	NOT IDENT.

TM-171	-1.995E+01	1.487E+01	2.548E+01	NOT IDENT.
HF-172	4.310E-02	2.291E-01	3.989E-01	FAIL ABUN
LU-172	-6.524E-02	7.908E-02	1.258E-01	FAIL ABUN
LU-176	8.245E-03	2.408E-02	4.476E-02	FAIL ABUN
HF-181	-2.168E-01	3.267E+00	6.387E+00	NOT IDENT.
TA-182	2.271E-01	6.980E-01	1.395E+00	FAIL ABUN
RE-183	-7.451E-01	2.116E+00	3.970E+00	FAIL ABUN
RE-184	-6.914E-01	2.115E+01	4.125E+01	NOT IDENT.
W-188	-5.373E+01	1.092E+02	1.663E+02	FAIL ABUN
IR-192	1.276E-01	3.778E-01	7.719E-01	FAIL ABUN
HG-203	-1.039E+00	1.896E+00	3.180E+00	NOT IDENT.
BI-207	8.888E-03	3.521E-02	7.373E-02	FAIL ABUN
PB-211	9.454E-02	5.689E-01	1.047E+00	NOT IDENT.
RN-219	9.492E-02	3.101E-01	6.350E-01	FAIL ABUN
RA-223	1.330E-01	5.438E-01	1.005E+00	FAIL ABUN
RA-224	0.000E+00	6.625E-01	1.382E+00	NOT IDENT.
AC-227	-6.984E-02	2.327E-01	4.035E-01	FAIL ABUN
TH-227	-6.984E-02	2.327E-01	4.035E-01	FAIL ABUN
TH-231	1.330E-01	5.438E-01	1.005E+00	FAIL ABUN
PA-233	-4.008E-03	5.114E-02	1.007E-01	FAIL ABUN
PA-234	1.855E-01	1.970E-01	4.500E-01	FAIL ABUN
PA-234M	3.651E+00	5.325E+00	8.461E+00	FAIL ABUN
NP-237	-4.008E-03	5.114E-02	1.007E-01	FAIL ABUN
NP-238	0.000E+00	3.281E+40	0.000E+00	SHORT HLIF
NP-239	-1.225E-01	2.149E-01	3.806E-01	NOT IDENT.
PU-239	3.620E+02	5.146E+02	5.657E+02	FAIL ABUN
AM-241	-3.720E-03	1.112E-01	1.982E-01	NOT IDENT.
CM-243	-7.988E-02	8.500E-02	1.465E-01	NOT IDENT.
CM-247	-1.498E-02	2.907E-02	5.407E-02	NOT IDENT.
CF-249	2.794E-02	3.221E-02	6.911E-02	NOT IDENT.
CF-251	2.401E-02	9.730E-02	1.834E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:44:15.23

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	323	10.66*	1.307E+00	1.300E+01	1.300E+01	11.40
CD-109	88.03	95	3.70*	6.542E+00	2.192E+00	3.403E+00	51.14
TE-125M	109.28	6	0.27*	7.339E+00	1.693E+00	5.812E+01	687.74
SN-126	64.28	25	9.60	3.845E+00	3.843E-01	3.843E-01	242.48
	86.94	95	8.90	6.542E+00	9.112E-01	9.112E-01	51.14
	87.57	95	37.00*	6.542E+00	2.192E-01	2.192E-01	51.14
BA-137M	661.66	32	89.90*	2.540E+00	7.857E-02	8.003E-02	59.77
CS-137	661.66	32	85.10*	2.540E+00	8.300E-02	8.455E-02	59.77
TL-208	277.37	------	6.60	4.820E+00	------ Line Not Found		------
	583.19	155	85.00*	2.799E+00	3.665E-01	3.665E-01	22.48
	860.56	17	12.50	2.057E+00	3.775E-01	3.775E-01	89.31
PB-210	46.54	24	4.25*	1.147E+00	2.809E+00	2.880E+00	208.22
BI-211	72.87	------	1.23	5.213E+00	------ Line Not Found		------
	351.06	229	12.92*	4.059E+00	2.444E+00	2.444E+00	18.13
BI-212	727.33	29	6.67*	2.357E+00	1.018E+00	1.018E+00	92.59
	785.37	17	1.10	2.217E+00	3.871E+00	3.871E+00	70.41
	1620.50	------	1.47	1.200E+00	------ Line Not Found		------
PB-212	74.82	171	10.28	5.435E+00	1.714E+00	1.714E+00	32.08
	77.11	225	17.10	5.699E+00	1.293E+00	1.293E+00	21.76
	238.63	421	43.60*	5.356E+00	1.010E+00	1.010E+00	12.45
	300.09	19	3.30	4.549E+00	7.045E-01	7.045E-01	157.77
BI-214	609.32	146	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34
	1120.29	27	14.92	1.644E+00	6.180E-01	6.182E-01	77.74
	1764.49	37	15.30	1.122E+00	1.197E+00	1.198E+00	34.19
PB-214	74.82	171	5.80	5.435E+00	3.038E+00	3.039E+00	32.08
	77.11	225	9.70	5.699E+00	2.279E+00	2.280E+00	21.76
	87.09	95	3.41	6.542E+00	2.378E+00	2.379E+00	51.14
	242.00	42	7.25	5.296E+00	6.174E-01	6.176E-01	82.98
	295.22	119	18.42	4.607E+00	7.836E-01	7.839E-01	34.78
	351.93	229	35.60*	4.059E+00	8.870E-01	8.873E-01	18.13
RN-222	609.32	146	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34
	1120.29	27	14.92	1.644E+00	6.180E-01	6.182E-01	77.74
	1764.49	37	15.30	1.122E+00	1.197E+00	1.198E+00	34.19
RA-226	609.32	146	45.49*	2.707E+00	6.635E-01	6.637E-01	23.34
	1120.29	27	14.92	1.644E+00	6.180E-01	6.182E-01	77.74
	1764.49	37	15.30	1.122E+00	1.197E+00	1.198E+00	34.19
AC-228	105.21	------	1.10	7.278E+00	------ Line Not Found		------
	338.32	75	11.27	4.174E+00	8.991E-01	8.991E-01	44.55
	794.95	------	4.25	2.197E+00	------ Line Not Found		------
	835.71	------	1.61	2.109E+00	------ Line Not Found		------
	911.20	105	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84
	968.97	52	15.80	1.863E+00	9.926E-01	9.926E-01	40.65
RA-228	105.21	------	1.10	7.278E+00	------ Line Not Found		------
	338.32	75	11.27	4.174E+00	8.991E-01	8.991E-01	44.55
	794.95	------	4.25	2.197E+00	------ Line Not Found		------
	835.71	------	1.61	2.109E+00	------ Line Not Found		------
	911.20	105	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	968.97	52	15.80	1.863E+00	9.926E-01	9.926E-01	40.65
TH-228	74.82	171	10.28	5.435E+00	1.714E+00	1.714E+00	32.08
	77.11	225	17.10	5.699E+00	1.293E+00	1.293E+00	21.76
	238.63	421	43.60*	5.356E+00	1.010E+00	1.010E+00	12.45
	300.09	19	3.30	4.549E+00	7.045E-01	7.045E-01	157.77
TH-229	85.43	42	14.70	6.345E+00	2.545E-01	2.545E-01	100.24
	88.47	95	24.00	6.542E+00	3.379E-01	3.379E-01	51.14
	193.51	------	4.41*	6.145E+00	------ Line Not Found		------
	210.85	------	2.80	5.821E+00	------ Line Not Found		------
TH-230	609.32	146	45.49*	2.707E+00	6.635E-01	6.635E-01	23.34
	1120.29	27	14.92	1.644E+00	6.180E-01	6.180E-01	77.74
	1764.49	37	15.30	1.122E+00	1.197E+00	1.197E+00	34.19
PA-231	283.69	------	1.70	4.743E+00	------ Line Not Found		------
	301.36	19	5.35*	4.549E+00	4.345E-01	4.345E-01	157.77
TH-232	105.21	------	1.10	7.278E+00	------ Line Not Found		------
	338.32	75	11.27	4.174E+00	8.991E-01	8.991E-01	44.55
	835.71	------	1.61	2.109E+00	------ Line Not Found		------
	911.20	105	25.80*	1.962E+00	1.169E+00	1.169E+00	25.84
	968.97	52	15.80	1.863E+00	9.926E-01	9.926E-01	40.65
TH-234	63.29	25	3.70*	3.845E+00	9.970E-01	9.970E-01	242.48
	92.59	128	4.23	6.868E+00	2.472E+00	2.472E+00	43.99
U-234	609.32	146	45.49*	2.707E+00	6.635E-01	6.635E-01	23.34
	1120.29	27	14.92	1.644E+00	6.180E-01	6.180E-01	77.74
	1764.49	37	15.30	1.122E+00	1.197E+00	1.197E+00	34.19
U-235	89.96	78	3.47	6.735E+00	1.868E+00	1.868E+00	55.53
	93.35	128	5.60	6.868E+00	1.867E+00	1.867E+00	43.99
	143.76	------	10.96*	7.121E+00	------ Line Not Found		------
	163.33	24	5.08	6.765E+00	3.880E-01	3.880E-01	124.56
	185.72	105	57.20	6.291E+00	1.630E-01	1.630E-01	47.44
	205.31	------	5.01	5.922E+00	------ Line Not Found		------
U-238	63.29	25	3.70*	3.845E+00	9.970E-01	9.970E-01	242.48
	92.59	128	4.23	6.868E+00	2.472E+00	2.472E+00	43.99
AM-243	43.53	------	5.90	8.765E-01	------ Line Not Found		------
	74.66	171	67.20*	5.435E+00	2.622E-01	2.622E-01	32.08
BK-247	84.00	42	40.00	6.345E+00	9.351E-02	9.355E-02	100.24
	102.03	------	7.00	7.207E+00	------ Line Not Found		------
	106.47	------	11.00	7.300E+00	------ Line Not Found		------
	119.76	------	4.00	7.384E+00	------ Line Not Found		------
	123.68	------	1.00	7.369E+00	------ Line Not Found		------
	265.00	22	30.00*	4.991E+00	8.411E-02	8.415E-02	96.38
ANH-511	511.00	60	100.00*	3.091E+00	1.093E-01	1.093E-01	62.96

Flag: "*" = Keyline

Sample ID : R405240013 Acquisition date : 3-OCT-2016 05:41:01

Total number of lines in spectrum 53
Number of unidentified lines 11
Number of lines tentatively identified by NID 42 79.25%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.300E+01	1.300E+01	0.148E+01	11.40	
CD-109	461.40D	1.55	2.192E+00	3.403E+00	1.740E+00	51.14	
TE-125M	57.40D	34.3	1.693E+00	5.812E+01	39.97E+01	687.74	
SN-126	2.30E+05Y	1.00	2.192E-01	2.192E-01	1.121E-01	51.14	
BA-137M	30.08Y	1.02	7.857E-02	8.003E-02	4.784E-02	59.77	
CS-137	30.08Y	1.02	8.300E-02	8.455E-02	5.054E-02	59.77	
TL-208	1.41E+10Y	1.00	3.665E-01	3.665E-01	0.824E-01	22.48	
PB-210	22.20Y	1.03	2.809E+00	2.880E+00	5.997E+00	208.22	
BI-211	7.04E+08Y	1.00	2.444E+00	2.444E+00	0.443E+00	18.13	
BI-212	1.41E+10Y	1.00	1.018E+00	1.018E+00	0.943E+00	92.59	
PB-212	1.41E+10Y	1.00	1.010E+00	1.010E+00	0.126E+00	12.45	
BI-214	1600.00Y	1.00	6.635E-01	6.637E-01	1.549E-01	23.34	
PB-214	1600.00Y	1.00	8.870E-01	8.873E-01	1.609E-01	18.13	
RN-222	1600.00Y	1.00	6.635E-01	6.637E-01	1.549E-01	23.34	
RA-226	1600.00Y	1.00	6.635E-01	6.637E-01	1.549E-01	23.34	
AC-228	1.41E+10Y	1.00	1.169E+00	1.169E+00	0.302E+00	25.84	
RA-228	1.41E+10Y	1.00	1.169E+00	1.169E+00	0.302E+00	25.84	
TH-228	1.41E+10Y	1.00	1.010E+00	1.010E+00	0.126E+00	12.45	
TH-229	7340.00Y	1.00	3.379E-01	3.379E-01	1.728E-01	51.14	K
TH-230	7.54E+04Y	1.00	6.635E-01	6.635E-01	1.549E-01	23.34	
PA-231	7.04E+08Y	1.00	4.345E-01	4.345E-01	6.856E-01	157.77	
TH-232	1.41E+10Y	1.00	1.169E+00	1.169E+00	0.302E+00	25.84	
TH-234	4.47E+09Y	1.00	9.970E-01	9.970E-01	24.18E-01	242.48	
U-234	2.45E+05Y	1.00	6.635E-01	6.635E-01	1.549E-01	23.34	
U-235	7.04E+08Y	1.00	1.630E-01	1.630E-01	0.773E-01	47.44	K
U-238	4.47E+09Y	1.00	9.970E-01	9.970E-01	24.18E-01	242.48	
AM-243	7370.00Y	1.00	2.622E-01	2.622E-01	0.841E-01	32.08	
BK-247	1380.00Y	1.00	8.411E-02	8.415E-02	8.110E-02	96.38	
ANH-511	1.00E+09Y	1.00	1.093E-01	1.093E-01	0.688E-01	62.96	
Total Activity :			3.702E+01	9.473E+01			

Grand Total Activity : 3.702E+01 9.473E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240013 Acquisition date : 3-OCT-2016 05:41:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	129.39	30	114	1.08	258.50	255	9	7.27E-03	****	7.32E+00	T
1	207.54	21	35	1.18	414.82	413	13	5.27E-03	83.7	5.88E+00	
1	209.21	47	91	1.27	418.17	413	13	1.19E-02	79.7	5.85E+00	
0	270.82	26	66	1.65	541.39	537	9	6.58E-03	****	4.90E+00	T
0	328.18	23	62	2.00	656.12	650	9	6.09E-03	****	4.27E+00	T
0	357.74	17	32	1.41	715.25	711	10	4.44E-03	****	4.01E+00	
0	371.99	31	48	3.66	743.76	737	15	8.12E-03	****	3.90E+00	T
0	409.07	32	36	2.43	817.92	813	10	8.50E-03	80.8	3.64E+00	
0	439.03	13	22	0.66	877.86	874	8	3.37E-03	****	3.46E+00	T
0	463.87	42	39	1.78	927.54	923	12	1.11E-02	67.9	3.32E+00	T
0	630.18	40	15	4.56	1260.23	1254	15	1.08E-02	53.8	2.64E+00	T
0	644.93	18	14	2.23	1289.73	1284	11	4.88E-03	94.5	2.59E+00	T
0	768.72	22	15	2.16	1537.39	1533	9	6.17E-03	76.7	2.26E+00	
0	807.19	10	18	1.87	1614.35	1609	10	2.86E-03	****	2.17E+00	
0	892.32	15	9	0.88	1784.65	1778	12	4.22E-03	94.0	2.00E+00	
0	946.67	8	3	0.75	1893.39	1889	7	2.12E-03	****	1.90E+00	T
0	965.04	22	10	0.82	1930.14	1926	8	6.11E-03	67.9	1.87E+00	T
0	1001.59	10	9	1.40	2003.27	1997	11	2.80E-03	****	1.81E+00	T
0	1025.65	17	2	1.46	2051.41	2046	11	4.86E-03	60.0	1.78E+00	T
0	1156.40	10	16	0.73	2313.01	2303	14	2.99E-03	****	1.60E+00	
0	1175.65	18	9	1.61	2351.53	2346	11	5.24E-03	80.9	1.58E+00	
0	1219.44	15	6	1.65	2439.15	2434	10	4.37E-03	81.2	1.53E+00	
0	1254.73	20	6	2.72	2509.76	2504	12	5.79E-03	64.3	1.49E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:44:32.03

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
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*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240013.CNF;1    *
* Acquisition date :  3-OCT-2016 05:41:01 Sensitivity     : 3.000          *
* Detector ID      : GAM30                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:01.37     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:04:00 Nuclide Library : SOLID          *
* Sample ID        : R405240013           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3385E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-MAR-2016 05:58:49 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;7           *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.018E-01
CD-109	6.845E-01
TE-125M	1.872E+02
SN-126	4.428E-02
BA-137M	2.391E-02
CS-137	2.526E-02
TL-208	2.120E-02
PB-210	1.862E+00
BI-211	1.392E-01
BI-212	3.283E-01
PB-212	4.128E-02
BI-214	4.752E-02
PB-214	1.426E-01
RN-222	4.752E-02
RA-226	4.752E-02
AC-228	8.965E-02
RA-228	8.965E-02
TH-228	4.128E-02
TH-229	3.393E-01
TH-230	4.750E-02
PA-231	2.758E-01
TH-232	8.965E-02
TH-234	8.769E-01
U-234	4.750E-02
U-235	1.448E-01
U-238	8.769E-01
AM-243	3.561E-02
BK-247	5.733E-02
ANH-511	2.036E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	7.342E+00	NOT IDENT.
NA-22	3.332E-02	NOT IDENT.

NA-24	0.000E+00	SHORT HLIF
AL-26	2.371E-02	NOT IDENT.
SC-46	2.191E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	5.088E-02	NOT IDENT.
CO-56	3.838E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.286E-02	NOT IDENT.
CO-58	3.497E-01	NOT IDENT.
FE-59	5.745E+00	NOT IDENT.
CO-60	2.283E-02	NOT IDENT.
ZN-65	1.311E-01	NOT IDENT.
GE-68	1.512E+00	NOT IDENT.
AS-73	5.433E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.521E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	3.410E-01	NOT IDENT.
KR-85	5.895E+00	NOT IDENT.
SR-85	5.782E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.528E-01	NOT IDENT.
Y-91	4.322E+02	NOT IDENT.
NB-94	2.173E-02	NOT IDENT.
NB-95	5.906E-01	NOT IDENT.
NB-95M	1.862E+00	NOT IDENT.
ZR-95	9.201E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.492E-02	NOT IDENT.
RH-102	4.598E-02	FAIL ABUN
RU-103	3.989E+00	FAIL ABUN
RH-106	3.303E-01	NOT IDENT.
RU-106	3.303E-01	NOT IDENT.
AG-108M	2.484E-02	NOT IDENT.
AG-110M	7.760E-02	NOT IDENT.
SN-113	1.501E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	8.767E-02	NOT IDENT.
SB-124	1.192E+00	FAIL ABUN
SB-125	8.370E-02	FAIL ABUN
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.829E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.980E-02	NOT IDENT.
CS-135	1.150E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	9.384E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	1.646E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.659E-01	NOT IDENT.
PM-144	4.930E-02	NOT IDENT.
PR-144	4.263E+00	NOT IDENT.
PM-146	3.184E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.137E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.895E-02	FAIL ABUN
EU-152	7.340E-02	FAIL ABUN
GD-153	1.274E-01	NOT IDENT.
EU-154	8.198E-02	NOT IDENT.
EU-155	8.418E-02	FAIL ABUN
TB-160	9.686E-01	FAIL ABUN
HO-166M	3.752E-02	NOT IDENT.
TM-171	1.167E+01	NOT IDENT.

HF-172	1.867E-01	FAIL ABUN
LU-172	5.320E-02	FAIL ABUN
LU-176	2.053E-02	FAIL ABUN
HF-181	2.836E+00	NOT IDENT.
TA-182	5.887E-01	FAIL ABUN
RE-183	1.845E+00	FAIL ABUN
RE-184	1.748E+01	NOT IDENT.
W-188	7.553E+01	FAIL ABUN
IR-192	3.524E-01	FAIL ABUN
HG-203	1.435E+00	NOT IDENT.
BI-207	3.082E-02	FAIL ABUN
PB-211	4.678E-01	NOT IDENT.
RN-219	2.857E-01	FAIL ABUN
RA-223	4.573E-01	FAIL ABUN
RA-224	6.555E-01	NOT IDENT.
AC-227	1.856E-01	FAIL ABUN
TH-227	1.856E-01	FAIL ABUN
TH-231	4.573E-01	FAIL ABUN
PA-233	4.580E-02	FAIL ABUN
PA-234	1.915E-01	FAIL ABUN
PA-234M	3.729E+00	FAIL ABUN
NP-237	4.580E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.768E-01	NOT IDENT.
PU-239	2.658E+02	FAIL ABUN
AM-241	9.232E-02	NOT IDENT.
CM-243	6.789E-02	NOT IDENT.
CM-247	2.411E-02	NOT IDENT.
CF-249	3.144E-02	NOT IDENT.
CF-251	8.468E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:44:37.65

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240013.CNF;1    *
* Acquisition date :  3-OCT-2016 05:41:01 Sensitivity     : 3.000          *
* Detector ID      : GAM30                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:01.37     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:04:00 Nuclide Library : SOLID          *
* Sample ID        : R405240013           Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.3385E+02 GRAM   *
*                                         Quantity Err(%) : 1.4942E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000        *
*                                         Dry Weight      :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 11-MAR-2016 05:58:49 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM30_CAN.CNF;7           *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.300E+01	1.858E+00	1.858E+00
CD-109	2.336E+00	1.759E+00	1.759E+00
TE-125M	5.812E+01	3.917E+02	3.917E+02
SN-126	1.505E-01	1.130E-01	1.130E-01
BA-137M	8.003E-02	4.730E-02	4.730E-02
CS-137	8.455E-02	4.997E-02	4.997E-02
TL-208	3.665E-01	8.615E-02	8.615E-02
PB-210	2.880E+00	5.883E+00	5.883E+00
BI-211	3.897E-01	8.130E-01	8.130E-01
BI-212	1.018E+00	9.293E-01	9.293E-01
PB-212	1.010E+00	1.484E-01	1.484E-01
BI-214	6.637E-01	1.611E-01	1.611E-01
PB-214	8.873E-01	1.738E-01	1.738E-01
RN-222	6.637E-01	1.611E-01	1.611E-01
RA-226	6.637E-01	1.611E-01	1.611E-01
AC-228	1.169E+00	3.380E-01	3.380E-01
RA-228	1.169E+00	3.380E-01	3.380E-01
TH-228	1.010E+00	1.484E-01	1.484E-01
TH-229	-1.806E-01	4.227E-01	4.227E-01
TH-230	6.635E-01	1.610E-01	1.610E-01
PA-231	4.345E-01	6.789E-01	6.789E-01
TH-232	1.169E+00	3.380E-01	3.380E-01
TH-234	9.970E-01	2.380E+00	2.380E+00
U-234	6.635E-01	1.610E-01	1.610E-01
U-235	1.288E-03	1.687E-01	1.687E-01
U-238	9.970E-01	2.380E+00	2.380E+00
AM-243	1.979E-01	8.664E-02	8.664E-02
BK-247	8.415E-02	8.146E-02	8.146E-02
ANH-511	1.093E-01	6.804E-02	6.804E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.752E+00	8.094E+00	8.132E+00	NOT IDENT.

NA-22	-7.350E-03	3.993E-02	4.007E-02	NOT IDENT.
NA-24	-1.000E+41	5.030E+41	0.000E+00	SHORT HLIF
AL-26	1.033E-02	2.443E-02	2.487E-02	NOT IDENT.
SC-46	-2.922E-02	3.042E-01	3.045E-01	FAIL ABUN
V-48	-4.798E+03	6.716E+03	7.055E+03	SHORT HLIF
CR-51	8.933E-01	2.849E+02	2.849E+02	SHORT HLIF
MN-54	5.905E-03	5.967E-02	5.973E-02	NOT IDENT.
CO-56	2.414E-01	4.175E-01	4.314E-01	NOT IDENT.
MN-56	1.000E+41	1.720E+41	0.000E+00	SHORT HLIF
CO-57	-2.967E-02	4.085E-02	4.298E-02	NOT IDENT.
CO-58	-9.148E-02	4.925E-01	4.942E-01	NOT IDENT.
FE-59	2.852E+00	6.527E+00	6.653E+00	NOT IDENT.
CO-60	-6.063E-03	2.812E-02	2.826E-02	NOT IDENT.
ZN-65	9.779E-02	1.520E-01	1.583E-01	NOT IDENT.
GE-68	-4.348E-01	1.911E+00	1.921E+00	NOT IDENT.
AS-73	3.301E+00	5.754E+00	5.943E+00	NOT IDENT.
AS-74	3.670E+01	3.611E+03	3.611E+03	SHORT HLIF
SE-75	2.332E-01	2.211E-01	2.448E-01	FAIL ABUN
BR-77	2.323E+37	1.963E+38	0.000E+00	SHORT HLIF
SR-82	-2.667E+02	5.566E+02	5.695E+02	SHORT HLIF
RB-83	-3.652E-01	4.613E-01	4.898E-01	NOT IDENT.
KR-85	5.882E+00	6.556E+00	7.072E+00	NOT IDENT.
SR-85	5.760E-01	6.431E-01	6.936E-01	NOT IDENT.
RB-86	-9.656E+03	1.684E+04	1.740E+04	SHORT HLIF
Y-88	2.364E-02	1.647E-01	1.650E-01	NOT IDENT.
Y-91	1.867E+02	4.969E+02	5.040E+02	NOT IDENT.
NB-94	-3.934E-03	2.633E-02	2.639E-02	NOT IDENT.
NB-95	2.416E-01	7.272E-01	7.353E-01	NOT IDENT.
NB-95M	1.978E-01	2.378E+00	2.380E+00	NOT IDENT.
ZR-95	6.460E-01	9.563E-01	9.997E-01	NOT IDENT.
NB-97	1.000E+41	1.026E+42	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	7.005E+41	0.000E+00	SHORT HLIF
MO-99	-9.784E+30	2.426E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	2.881E+41	0.000E+00	SHORT HLIF
RH-101	-2.202E-03	3.146E-02	3.148E-02	NOT IDENT.
RH-102	1.749E-01	9.415E-02	1.228E-01	FAIL ABUN
RU-103	-4.942E-02	4.569E+00	4.569E+00	FAIL ABUN
RH-106	3.289E-02	3.785E-01	3.788E-01	NOT IDENT.
RU-106	3.289E-02	3.785E-01	3.788E-01	NOT IDENT.
AG-108M	2.443E-02	2.542E-02	2.770E-02	NOT IDENT.
AG-110M	5.201E-02	8.278E-02	8.603E-02	NOT IDENT.
SN-113	-6.872E-02	1.778E-01	1.805E-01	NOT IDENT.
CD-115	-7.355E+37	2.684E+38	0.000E+00	SHORT HLIF
SN-117M	-2.835E+04	6.284E+04	6.412E+04	SHORT HLIF
TE-123M	-8.219E-03	1.125E-01	1.126E-01	NOT IDENT.
SB-124	-8.317E-01	1.705E+00	1.746E+00	FAIL ABUN
SB-125	-9.524E-03	9.582E-02	9.592E-02	FAIL ABUN
I-126	1.925E+05	5.330E+05	5.400E+05	SHORT HLIF
SB-126	5.696E+05	7.729E+05	8.144E+05	SHORT HLIF
SB-127	-8.659E+20	5.653E+21	0.000E+00	SHORT HLIF
I-131	-3.202E+08	2.115E+09	2.120E+09	SHORT HLIF
I-132	1.000E+41	1.974E+42	0.000E+00	SHORT HLIF
TE-132	-2.891E+25	8.302E+25	0.000E+00	SHORT HLIF
BA-133	4.090E-02	3.124E-02	3.627E-02	NOT IDENT.
I-133	-1.000E+41	1.571E+42	0.000E+00	SHORT HLIF
CS-134	4.448E-02	3.953E-02	4.433E-02	NOT IDENT.
CS-135	-1.062E-02	1.532E-01	1.533E-01	NOT IDENT.
I-135	-1.000E+41	7.163E+41	0.000E+00	SHORT HLIF
CS-136	4.864E+04	2.013E+05	2.025E+05	SHORT HLIF
CE-139	9.965E-02	1.032E-01	1.125E-01	NOT IDENT.
BA-140	6.505E+05	7.051E+05	7.637E+05	SHORT HLIF
LA-140	-8.118E+04	2.569E+05	2.595E+05	SHORT HLIF
CE-141	1.427E+01	1.786E+01	1.898E+01	NOT IDENT.
CE-143	1.000E+41	2.137E+41	0.000E+00	SHORT HLIF
CE-144	6.635E-02	3.238E-01	3.251E-01	NOT IDENT.
PM-144	3.034E-02	5.251E-02	5.426E-02	NOT IDENT.
PR-144	2.611E+00	4.541E+00	4.691E+00	NOT IDENT.
PM-146	1.849E-03	3.592E-02	3.593E-02	NOT IDENT.
ND-147	5.331E+06	1.551E+07	1.570E+07	SHORT HLIF
PM-147	4.757E+01	7.036E+02	7.039E+02	NOT IDENT.
PM-149	1.594E+39	4.455E+39	0.000E+00	SHORT HLIF
EU-150	-1.798E-03	2.363E-02	2.365E-02	FAIL ABUN
EU-152	-8.977E-03	8.277E-02	8.287E-02	FAIL ABUN
GD-153	-4.432E-02	1.623E-01	1.636E-01	NOT IDENT.
EU-154	-1.808E-02	9.825E-02	9.859E-02	NOT IDENT.
EU-155	8.025E-02	9.573E-02	1.023E-01	FAIL ABUN
TB-160	-8.441E-01	1.374E+00	1.426E+00	FAIL ABUN
HO-166M	-7.000E-03	4.546E-02	4.556E-02	NOT IDENT.

TM-171	-1.995E+01	1.498E+01	1.747E+01	NOT IDENT.
HF-172	4.310E-02	2.292E-01	2.300E-01	FAIL ABUN
LU-172	-6.524E-02	8.029E-02	8.551E-02	FAIL ABUN
LU-176	8.245E-03	2.409E-02	2.438E-02	FAIL ABUN
HF-181	-2.168E-01	3.267E+00	3.269E+00	NOT IDENT.
TA-182	2.271E-01	6.984E-01	7.058E-01	FAIL ABUN
RE-183	-7.451E-01	2.119E+00	2.146E+00	FAIL ABUN
RE-184	-6.914E-01	2.115E+01	2.115E+01	NOT IDENT.
W-188	-5.373E+01	1.094E+02	1.121E+02	FAIL ABUN
IR-192	1.276E-01	3.779E-01	3.823E-01	FAIL ABUN
HG-203	-1.039E+00	1.898E+00	1.955E+00	NOT IDENT.
BI-207	8.888E-03	3.525E-02	3.548E-02	FAIL ABUN
PB-211	9.454E-02	5.689E-01	5.705E-01	NOT IDENT.
RN-219	9.492E-02	3.104E-01	3.133E-01	FAIL ABUN
RA-223	1.330E-01	5.439E-01	5.472E-01	FAIL ABUN
RA-224	1.571E+00	6.751E-01	9.784E-01	NOT IDENT.
AC-227	-6.984E-02	2.329E-01	2.351E-01	FAIL ABUN
TH-227	-6.984E-02	2.329E-01	2.351E-01	FAIL ABUN
TH-231	1.330E-01	5.439E-01	5.472E-01	FAIL ABUN
PA-233	-4.008E-03	5.114E-02	5.117E-02	FAIL ABUN
PA-234	1.855E-01	2.907E-01	3.025E-01	FAIL ABUN
PA-234M	3.651E+00	5.358E+00	5.605E+00	FAIL ABUN
NP-237	-4.008E-03	5.114E-02	5.117E-02	FAIL ABUN
NP-238	-2.290E+40	3.300E+40	0.000E+00	SHORT HLIF
NP-239	-1.225E-01	2.152E-01	2.222E-01	NOT IDENT.
PU-239	3.620E+02	5.152E+02	5.405E+02	FAIL ABUN
AM-241	-3.720E-03	1.112E-01	1.112E-01	NOT IDENT.
CM-243	-7.988E-02	8.541E-02	9.269E-02	NOT IDENT.
CM-247	-1.498E-02	2.920E-02	2.997E-02	NOT IDENT.
CF-249	2.794E-02	3.235E-02	3.472E-02	NOT IDENT.
CF-251	2.401E-02	9.735E-02	9.795E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	37.0694	87.09	61.4091	136.47	63.4500
45.60	48.4259	87.57	61.4547	140.51	0.0000
46.54	48.5312	88.03	61.4984	143.76	62.8968
49.72	0.0000	88.34	61.5278	144.24	55.3361
51.35	47.1675	88.47	61.5403	145.44	47.8047
51.87	58.5533	89.96	61.6809	152.43	54.7424
52.39	66.1823	1093.63	61.7446	153.25	0.0000
52.97	53.0112	91.11	0.0000	323.87	49.3629
53.44	43.5883	92.59	61.9266	156.02	0.0000
54.07	51.2368	93.35	61.9969	158.56	0.0000
57.36	0.0000	94.56	62.1081	159.00	47.0423
57.53	61.1587	94.65	62.1165	162.33	61.9575
57.98	65.9962	94.67	62.1183	162.66	0.0000
59.27	60.0930	94.87	58.4015	163.33	72.3585
59.32	60.0990	97.43	69.5268	165.86	49.9686
59.54	62.6836	98.43	55.2920	176.31	69.5703
60.96	64.1413	98.44	55.2928	176.60	0.0000
61.17	64.1675	99.53	65.6348	177.52	43.8137
62.93	83.0569	100.11	60.5570	181.07	0.0000
63.29	83.1140	102.03	49.4008	181.52	60.1489
63.58	83.1596	103.18	64.9433	184.41	70.8710
64.28	83.2699	103.37	75.2718	143.76	55.4839
66.73	67.4391	105.21	50.9985	193.51	54.7493
67.24	77.8876	105.31	51.0056	197.03	54.9258
125.81	80.8729	106.12	59.3428	198.01	44.6671
67.75	80.8831	106.47	67.6556	201.83	48.2690
69.67	75.6235	109.28	62.3701	203.43	64.4501
70.83	70.5536	111.00	72.2384	205.31	58.4094
72.81	88.4997	111.76	0.0000	210.85	53.2879
72.87	88.5086	114.06	53.3517	215.65	52.3457
74.66	88.7833	116.30	0.0000	222.11	45.6156
74.82	88.8073	116.74	70.3344	227.09	44.6304
74.97	88.8300	119.76	42.1530	227.38	43.4666
77.11	89.1534	121.12	57.0042	228.16	0.0000
78.74	86.0855	121.22	57.0116	228.18	52.8999
79.69	96.8321	121.78	63.3907	116.74	52.8999
80.12	82.2990	122.06	67.6406	235.69	53.6182
80.19	0.0000	122.92	61.3652	235.96	53.6300
80.57	51.8072	123.07	51.8528	238.63	50.9785
81.00	85.7408	265.00	62.4822	238.98	0.0000
81.07	85.7507	125.81	66.5398	240.99	51.0743
81.75	77.1947	127.23	60.9827	242.00	51.1150
83.79	61.0903	127.91	65.2916	244.70	51.2239
84.00	61.1108	129.30	60.7808	252.40	0.0000
85.43	61.2495	131.20	54.1503	252.80	39.5591
86.55	61.3574	133.02	55.6959	254.15	0.0000
86.79	61.3802	133.52	51.4424	256.23	50.4800
86.94	61.3947	136.00	56.9659	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	35.4806	355.39	0.0000	584.27	14.4067
264.80	40.3229	356.01	7.7135	595.83	0.0000
265.00	40.3290	364.49	0.0000	427.87	19.3400
268.22	46.8925	366.42	0.0000	602.52	0.0000
269.46	45.3166	372.51	20.7715	604.72	20.3412
270.03	35.2163	375.05	20.8022	607.14	29.0881
271.23	35.2473	377.52	19.5300	609.32	19.4092
273.65	0.0000	356.01	30.4911	610.33	19.4173
276.40	35.3800	388.16	21.8328	614.28	8.7517
277.37	26.8582	388.63	0.0000	618.01	16.5559
277.60	29.3049	391.69	27.1263	620.36	14.6216
278.00	31.7565	264.66	17.5887	621.93	13.6559
279.20	37.8957	401.81	22.8801	630.19	0.0000
279.54	37.9052	402.40	29.9298	631.29	17.6228
279.70	41.5776	404.85	21.1553	633.25	14.6973
280.46	28.1414	410.95	22.5527	634.78	0.0000
283.69	28.2060	413.71	22.3207	635.95	7.3563
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	28.2404	423.72	0.0000	645.85	11.8159
285.90	0.0000	427.09	29.4396	657.76	15.8275
287.50	35.6597	427.87	30.3442	657.90	0.0000
290.67	42.7229	433.94	20.5925	661.66	16.3463
293.27	0.0000	439.40	16.1616	664.57	0.0000
351.93	46.1540	453.88	21.7095	666.33	0.0000
295.96	46.1779	463.37	19.9952	666.50	0.0000
879.38	37.1732	468.07	19.1308	667.71	0.0000
299.98	31.4208	473.00	0.0000	677.62	12.9572
300.09	31.4231	475.06	19.1966	685.70	0.0000
300.13	31.4239	476.78	15.5532	695.00	0.0000
301.36	24.8291	477.60	14.6442	696.49	15.0562
302.85	23.1972	482.18	22.0151	696.51	15.0562
256.23	36.0792	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	17.0685
306.78	34.8881	497.08	24.0206	697.49	19.0781
308.46	34.9274	505.52	18.0872	702.65	16.0957
311.90	35.0077	507.63	0.0000	706.68	15.1123
316.51	31.7695	511.00	22.3181	711.68	15.1398
319.41	0.0000	514.00	18.1583	720.70	0.0000
320.08	0.0000	514.00	18.1583	721.93	0.0000
321.04	33.5409	520.40	19.6132	722.78	27.3604
323.87	30.2417	520.69	0.0000	722.91	27.3615
325.23	32.7912	522.65	0.0000	723.31	27.3658
328.76	0.0000	527.90	0.0000	724.19	25.8538
333.37	37.5257	528.26	14.0594	727.33	15.2246
333.97	32.9737	529.59	12.1923	733.00	10.1705
334.37	27.9082	529.87	0.0000	735.93	16.2897
338.28	31.3678	531.02	0.0000	333.97	10.1864
338.32	31.3685	537.26	0.0000	739.50	0.0000
311.90	34.3820	546.56	0.0000	747.24	19.4206
340.48	34.3820	552.55	10.4222	748.06	14.3139
340.55	0.0000	563.25	15.2305	752.31	21.5024
344.28	34.8890	569.33	24.8140	753.82	0.0000
345.93	34.9241	946.00	26.7251	756.73	7.1786
351.06	29.7363	569.70	26.7274	756.80	7.1789
351.93	29.7519	583.19	14.4000	884.68	7.7106

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	13.8878	1274.44	8.2843	1620.50	4.7775
766.42	20.0641	1001.03	9.9543	1621.92	3.8232
766.84	24.6982	1002.74	6.6394	1678.03	0.0000
772.60	0.0000	1004.73	8.3038	1690.97	5.8092
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	5.8868
778.90	12.3999	1028.54	0.0000	1063.66	8.8391
783.70	0.0000	1037.84	11.1727	1771.35	2.9469
785.37	11.3912	1038.76	0.0000	1791.20	0.0000
792.07	16.6061	631.29	14.5594	1808.65	1.9775
794.95	10.3890	1048.07	0.0000	1810.72	0.0000
795.86	7.2746	1049.04	11.2069	1836.06	1.9869
810.06	12.5293	1050.41	10.0898		
810.29	15.6628	1063.66	6.7505		
344.28	15.6635	1077.00	0.0000		
810.76	12.5317	1077.34	9.0332		
815.77	0.0000	1085.87	11.3167		
1048.07	0.0000	1093.63	19.2772		
832.01	17.8764	1099.45	13.6279		
834.85	16.8405	1112.07	17.0898		
835.71	11.5810	1112.84	19.3726		
836.80	0.0000	1115.54	6.8423		
846.75	0.0000	1120.29	14.8429		
846.77	12.6782	1120.55	14.8440		
856.80	0.0000	1221.41	14.8461		
860.56	14.8556	1129.67	11.4445		
871.09	6.3877	1131.51	0.0000		
873.19	14.9143	1147.95	0.0000		
875.33	0.0000	1173.23	8.6774		
879.38	12.8081	1177.95	8.6877		
880.51	9.6094	1189.05	12.7760		
883.24	10.6860	1204.77	12.8253		
884.68	8.5527	1221.41	7.0234		
889.28	9.6354	1231.02	7.9195		
894.76	8.0429	1235.36	0.0000		
898.04	6.4407	1238.28	14.1035		
900.72	13.9659	1260.41	0.0000		
903.28	10.7515	1271.87	11.5488		
911.20	11.8549	1274.44	10.6670		
912.08	11.8580	1274.54	10.6670		
923.98	0.0000	1291.59	7.1392		
926.50	8.6611	1298.22	0.0000		
929.11	4.3338	1312.11	0.0000		
937.49	14.1198	1332.49	6.3044		
944.13	0.0000	1362.66	0.0000		
946.00	3.2665	1365.19	5.4430		
949.00	8.1735	1368.63	0.0000		
667.71	0.0000	1384.29	9.1095		
962.31	14.7689	1408.01	6.4091		
964.08	8.2092	1457.56	0.0000		
966.17	6.5713	1460.82	4.6289		
911.20	23.0175	1489.16	2.7935		
968.97	23.0175	1505.03	8.4073		
983.53	0.0000	1584.12	8.5397		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:45:07.11

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240014.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM32.CNF;277
                                       Background date  : 2-OCT-2016 11:01:57.
Sample date      : 15-DEC-2015 11:08:00 Acquisition date : 3-OCT-2016 05:43:20.
Sample ID        : R405240014           Sample quantity  : 1.38765E+02 GRAM
Detector name    : GAM32                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.57  0.0%
Energy tolerance : 2.00000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	35.52	35	110	2.85	72.24	70	8	9.70E-03	54.4	
2	0	46.95*	19	82	0.76	95.10	90	8	5.37E-03	87.0	
3	0	77.73	136	153	1.13	156.68	153	7	3.78E-02	17.6	
4	0	87.62	50	118	1.25	176.44	173	8	1.40E-02	40.0	
5	0	94.29*	27	234	1.17	189.78	183	11	7.46E-03	117.3	
6	0	186.17*	78	80	1.39	373.56	369	8	2.16E-02	24.2	
7	3	239.07*	304	69	1.21	479.35	475	14	8.46E-02	7.4	1.29E+00
8	3	241.98	66	67	1.45	485.17	475	14	1.84E-02	23.8	
9	0	270.26	24	52	1.53	541.75	539	7	6.63E-03	53.8	
10	0	295.79*	135	77	1.32	592.81	585	14	3.74E-02	16.5	
11	0	301.16	65	45	3.91	603.55	598	13	1.82E-02	24.6	
12	0	308.29	23	91	0.70	617.81	611	15	6.52E-03	89.2	
13	0	338.57	70	66	1.22	678.37	672	11	1.95E-02	25.4	
14	0	352.24*	172	101	1.46	705.71	698	16	4.77E-02	15.2	
15	0	396.31	18	13	1.33	793.84	791	6	5.09E-03	39.1	
16	0	463.60	37	18	1.67	928.44	924	9	1.04E-02	26.1	
17	0	583.63*	115	27	1.54	1168.49	1162	12	3.20E-02	13.2	0.00E+00
18	0	609.80*	149	38	1.53	1220.85	1214	14	4.13E-02	12.3	
19	0	644.38	22	8	4.74	1290.00	1284	12	6.15E-03	34.1	
20	4	662.06	43	10	2.39	1325.37	1320	36	1.20E-02	20.4	6.75E-01
21	4	670.60	17	14	2.40	1342.45	1320	36	4.63E-03	57.3	
22	0	686.67	12	9	1.12	1374.58	1371	9	3.33E-03	53.5	
23	0	728.62*	11	31	1.99	1458.49	1453	16	2.99E-03	117.5	
24	0	753.67*	8	12	0.94	1508.58	1503	10	2.33E-03	90.2	
25	0	768.07	31	18	3.24	1537.39	1531	12	8.61E-03	32.7	
26	0	860.72*	40	7	0.71	1722.70	1717	13	1.12E-02	20.9	
27	0	875.37	13	6	1.55	1752.01	1745	12	3.65E-03	46.2	
28	0	912.06*	64	27	1.37	1825.39	1818	14	1.77E-02	22.0	
29	0	923.49	16	6	1.47	1848.25	1844	10	4.55E-03	35.9	
30	0	969.55	38	24	1.99	1940.37	1934	11	1.06E-02	29.9	
31	0	1014.83*	7	6	1.47	2030.93	2026	9	1.90E-03	82.6	
32	0	1027.45	6	3	0.50	2056.17	2052	6	1.67E-03	61.2	
33	0	1042.77*	5	5	0.52	2086.82	2081	10	1.39E-03	120.9	
34	0	1054.94	7	14	0.80	2111.15	2105	9	1.81E-03	109.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1088.34	9	13	2.19	2177.95	2166	13	2.42E-03	91.8	
36	0	1106.23	11	11	0.58	2213.73	2207	11	3.16E-03	63.6	
37	0	1120.85*	38	16	2.16	2242.98	2235	16	1.05E-02	29.0	
38	0	1145.18	17	3	3.44	2291.64	2286	11	4.83E-03	30.2	
39	0	1175.83	14	11	3.22	2352.93	2346	11	3.89E-03	53.1	
40	0	1238.83*	15	12	1.78	2478.94	2472	12	4.10E-03	55.3	
41	0	1332.21	6	4	0.72	2665.71	2659	9	1.56E-03	80.1	
42	0	1378.44	10	3	0.65	2758.17	2751	11	2.79E-03	45.2	
43	0	1414.65	5	4	1.15	2830.58	2825	7	1.25E-03	83.5	
44	0	1461.27*	322	9	1.74	2923.84	2914	18	8.93E-02	6.0	
45	0	1712.60	6	0	0.58	3426.50	3422	8	1.67E-03	40.8	
46	0	1765.28*	38	0	1.88	3531.88	3525	12	1.06E-02	17.0	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:45:09

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240014.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 11:08:00 Acquisition date : 3-OCT-2016 05:43:20
Sample ID   : R405240014   Sample quantity : 138.76 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA32   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.57   0.0%
Energy tolerance :   2.00 keV   Half life ratio :   8.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	1-Sigma %Error	Status
K-40	1460.82	10.66*	1.119E+00	1.397E+01	1.397E+01	6.04	OK
CD-109	88.03	3.70*	4.586E+00	9.379E-01	1.456E+00	83.54	OK
SN-126	64.28	9.60	2.229E+00	----- Line Not Found		-----	Absent
	86.94	8.90	4.586E+00	3.899E-01	3.899E-01	83.54	OK
	87.57	37.00*	4.586E+00	9.379E-02	9.379E-02	83.54	OK
BA-137M	661.66	89.90*	2.104E+00	1.266E-01	1.290E-01	20.44	OK
CS-137	661.66	85.10*	2.104E+00	1.337E-01	1.362E-01	20.44	OK
TL-208	277.37	6.60	4.277E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.326E+00	3.266E-01	3.266E-01	13.15	OK
	860.56	12.50	1.713E+00	1.022E+00	1.022E+00	20.89	OK
PB-210	46.54	4.25*	3.762E-01	8.171E+00	8.378E+00	86.99	OK
PB-212	74.82	10.28	3.423E+00	----- Line Not Found		-----	Absent
	77.11	17.10	3.719E+00	1.398E+00	1.398E+00	17.59	OK
	238.63	43.60*	4.787E+00	8.768E-01	8.768E-01	7.41	OK
	300.09	3.30	4.005E+00	2.923E+00	2.923E+00	24.55	OK
BI-214	609.32	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27	OK
	1120.29	14.92	1.392E+00	9.681E-01	9.685E-01	28.97	OK
	1764.49	15.30	9.459E-01	1.339E+00	1.339E+00	16.95	OK
PB-214	74.82	5.80	3.423E+00	----- Line Not Found		-----	Absent
	77.11	9.70	3.719E+00	2.464E+00	2.465E+00	17.59	OK
	87.09	3.41	4.545E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.745E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	4.063E+00	1.063E+00	1.063E+00	16.49	OK
	351.93	35.60*	3.521E+00	7.992E-01	7.995E-01	15.21	OK
RN-222	609.32	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27	OK
	1120.29	14.92	1.392E+00	9.681E-01	9.685E-01	28.97	OK
	1764.49	15.30	9.459E-01	1.339E+00	1.339E+00	16.95	OK
RA-224	240.99	4.10*	4.745E+00	1.701E-01	1.701E-01	340.10	OK
RA-226	609.32	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27	OK
	1120.29	14.92	1.392E+00	9.681E-01	9.685E-01	28.97	OK
	1764.49	15.30	9.459E-01	1.339E+00	1.339E+00	16.95	OK
AC-228	105.21	1.10	5.586E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.639E+00	1.002E+00	1.002E+00	25.39	OK
	794.95	4.25	1.823E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.753E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96	OK
	968.97	15.80	1.561E+00	8.302E-01	8.302E-01	29.90	OK
RA-228	105.21	1.10	5.586E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.639E+00	1.002E+00	1.002E+00	25.39	OK
	794.95	4.25	1.823E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.753E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96	OK
	968.97	15.80	1.561E+00	8.302E-01	8.302E-01	29.90	OK
TH-228	74.82	10.28	3.423E+00	----- Line Not Found		-----	Absent
	77.11	17.10	3.719E+00	1.398E+00	1.398E+00	17.59	OK
	238.63	43.60*	4.787E+00	8.768E-01	8.768E-01	7.41	OK
	300.09	3.30	4.005E+00	2.923E+00	2.923E+00	24.55	OK
TH-230	609.32	45.49*	2.246E+00	8.115E-01	8.115E-01	12.27	OK
	1120.29	14.92	1.392E+00	9.681E-01	9.681E-01	28.97	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	1-Sigma %Error	Status
	1764.49	15.30	9.459E-01	1.339E+00	1.339E+00	16.95	OK
PA-231	283.69	1.70	4.201E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.005E+00	1.803E+00	1.803E+00	24.55	OK
TH-232	105.21	1.10	5.586E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.639E+00	1.002E+00	1.002E+00	25.39	OK
	835.71	1.61	1.753E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96	OK
	968.97	15.80	1.561E+00	8.302E-01	8.302E-01	29.90	OK
U-234	609.32	45.49*	2.246E+00	8.115E-01	8.115E-01	12.27	OK
	1120.29	14.92	1.392E+00	9.681E-01	9.681E-01	28.97	OK
	1764.49	15.30	9.459E-01	1.339E+00	1.339E+00	16.95	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:45:10.98

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240014.CNF;1		
Acquisition date	3-OCT-2016 05:43:20	Sensitivity	3.000
Detector ID	GAM32	Energy tolerance	2.000
Elapsed live time	0 01:00:00.00	Abundance limit	75.000
Elapsed real time	0 01:00:00.57	Half life ratio	8.000
Sample date	15-DEC-2015 11:08:00	Analyst initials	MXR1
Sample ID	R405240014	Sample Quantity	1.3876E+02 GRAM
Batch Number	1596386	Wet Weight	0.00000
Wet wt corr	1.00000	Dry Weight	0.00000
Nuclide Library	SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	23-AUG-2016 07:56:33	Eff. Geometry	CAN
Eff. File	DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;11		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.397E+01	1.655E+00	6.374E-01
CD-109	1.456E+00	2.384E+00	3.599E+00
SN-126	9.379E-02	1.536E-01	2.129E-01
BA-137M	1.290E-01	5.168E-02	6.914E-02
CS-137	1.362E-01	5.459E-02	7.304E-02
TL-208	3.266E-01	8.418E-02	7.937E-02
PB-210	8.378E+00	1.429E+01	1.685E+01
PB-212	8.768E-01	1.273E-01	1.340E-01
BI-214	8.118E-01	1.953E-01	1.584E-01
PB-214	7.995E-01	2.383E-01	1.582E-01
RN-222	8.118E-01	1.953E-01	1.584E-01
RA-224	1.701E-01	1.134E+00	1.417E+00
RA-226	8.118E-01	1.953E-01	1.584E-01
AC-228	8.138E-01	3.502E-01	3.250E-01
RA-228	8.138E-01	3.502E-01	3.250E-01
TH-228	8.768E-01	1.273E-01	1.340E-01
TH-230	8.115E-01	1.952E-01	1.584E-01
PA-231	1.803E+00	8.676E-01	7.776E-01
TH-232	8.138E-01	3.502E-01	3.250E-01
U-234	8.115E-01	1.952E-01	1.584E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	9.543E+00	1.305E+01	2.722E+01	NOT IDENT.
NA-22	5.870E-03	5.445E-02	1.094E-01	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-5.203E-03	3.964E-02	7.900E-02	NOT IDENT.
SC-46	2.503E-02	4.599E-01	8.804E-01	FAIL ABUN
V-48	0.000E+00	1.486E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	4.470E+02	0.000E+00	SHORT HLIF
MN-54	4.737E-02	9.078E-02	1.784E-01	NOT IDENT.
CO-56	-3.400E-01	5.789E-01	1.007E+00	FAIL ABUN
MN-56	0.000E+00	1.703E+41	0.000E+00	SHORT HLIF

CO-57	-7.839E-03	6.142E-02	1.161E-01	NOT IDENT.
CO-58	-8.977E-02	5.840E-01	1.108E+00	NOT IDENT.
FE-59	-7.478E-01	9.045E+00	1.437E+01	NOT IDENT.
CO-60	2.687E-02	4.219E-02	9.733E-02	FAIL ABUN
ZN-65	1.240E-01	2.166E-01	4.137E-01	NOT IDENT.
GE-68	-2.993E+00	2.924E+00	4.308E+00	NOT IDENT.
AS-73	1.676E+01	1.745E+01	3.466E+01	NOT IDENT.
AS-74	0.000E+00	5.922E+03	0.000E+00	SHORT HLIF
SE-75	-1.522E-01	2.827E-01	4.800E-01	NOT IDENT.
BR-77	0.000E+00	2.927E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	7.330E+02	0.000E+00	SHORT HLIF
RB-83	5.751E-01	7.657E-01	1.589E+00	NOT IDENT.
KR-85	-1.650E+01	1.219E+01	2.047E+01	NOT IDENT.
SR-85	-1.621E+00	1.195E+00	2.008E+00	NOT IDENT.
RB-86	0.000E+00	2.705E+04	0.000E+00	SHORT HLIF
Y-88	-2.578E-01	2.821E-01	4.313E-01	NOT IDENT.
Y-91	3.782E+02	6.452E+02	1.335E+03	NOT IDENT.
NB-94	-6.821E-03	3.861E-02	7.108E-02	NOT IDENT.
NB-95	7.101E-01	1.120E+00	2.034E+00	NOT IDENT.
NB-95M	1.249E+00	3.239E+00	5.434E+00	NOT IDENT.
ZR-95	4.462E-01	1.930E+00	3.323E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	5.452E+40	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.550E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.893E+41	0.000E+00	SHORT HLIF
RH-101	1.251E-02	4.472E-02	8.620E-02	NOT IDENT.
RH-102	-6.541E-03	7.261E-02	1.380E-01	FAIL ABUN
RU-103	-1.725E-01	5.988E+00	1.157E+01	FAIL ABUN
RH-106	4.410E-02	5.807E-01	1.131E+00	NOT IDENT.
RU-106	4.410E-02	5.807E-01	1.131E+00	NOT IDENT.
AG-108M	1.930E-02	3.673E-02	7.084E-02	NOT IDENT.
AG-110M	1.414E-02	1.169E-01	2.282E-01	NOT IDENT.
SN-113	2.662E-02	3.221E-01	5.218E-01	NOT IDENT.
CD-115	0.000E+00	4.442E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	9.184E+04	0.000E+00	SHORT HLIF
TE-123M	2.845E-02	1.677E-01	3.183E-01	NOT IDENT.
SB-124	-2.886E-01	2.244E+00	4.511E+00	FAIL ABUN
SB-125	-3.345E-02	1.308E-01	2.329E-01	FAIL ABUN
TE-125M	-5.424E+01	3.269E+02	6.200E+02	NOT IDENT.
I-126	0.000E+00	6.529E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	9.150E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	7.238E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	3.454E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.123E+26	0.000E+00	SHORT HLIF
BA-133	1.520E-02	6.383E-02	1.049E-01	FAIL ABUN
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	7.320E-02	6.981E-02	1.458E-01	NOT IDENT.
CS-135	2.027E-01	1.976E-01	3.561E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.920E+05	0.000E+00	SHORT HLIF
CE-139	3.412E-02	1.342E-01	2.564E-01	NOT IDENT.
BA-140	0.000E+00	1.083E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	3.616E+05	0.000E+00	SHORT HLIF
CE-141	0.000E+00	2.705E+01	0.000E+00	SHORT HLIF
CE-143	0.000E+00	8.559E+40	0.000E+00	SHORT HLIF
CE-144	1.484E-01	4.670E-01	9.006E-01	NOT IDENT.
PM-144	3.619E-02	7.422E-02	1.474E-01	NOT IDENT.
PR-144	3.197E+00	6.431E+00	1.278E+01	NOT IDENT.
PM-146	1.449E-02	5.098E-02	1.017E-01	NOT IDENT.
ND-147	0.000E+00	2.622E+07	0.000E+00	SHORT HLIF
PM-147	-2.963E+01	1.070E+03	2.036E+03	NOT IDENT.
PM-149	0.000E+00	6.366E+39	0.000E+00	SHORT HLIF
EU-150	-3.124E-02	3.985E-02	5.734E-02	FAIL ABUN
EU-152	1.596E-02	1.294E-01	2.121E-01	NOT IDENT.
GD-153	-1.181E-01	2.558E-01	4.171E-01	NOT IDENT.
EU-154	2.801E-02	1.319E-01	2.699E-01	NOT IDENT.
EU-155	-1.876E-02	1.459E-01	2.773E-01	FAIL ABUN
TB-160	-8.746E-01	2.261E+00	3.422E+00	FAIL ABUN
HO-166M	5.666E-03	5.986E-02	1.178E-01	FAIL ABUN
TM-171	1.824E+01	4.656E+01	8.878E+01	NOT IDENT.
HF-172	-1.814E-01	3.172E-01	5.767E-01	NOT IDENT.
LU-172	4.689E-02	9.145E-02	1.842E-01	FAIL ABUN
LU-176	3.760E-02	6.570E-02	6.309E-02	FAIL ABUN
HF-181	-2.290E+00	4.479E+00	8.214E+00	NOT IDENT.
TA-182	-5.151E-01	1.271E+00	2.310E+00	FAIL ABUN
RE-183	-1.241E-01	5.233E+00	9.607E+00	NOT IDENT.
RE-184	0.000E+00	3.296E+01	0.000E+00	SHORT HLIF

W-188	-2.712E+01	1.470E+02	2.324E+02	NOT IDENT.
IR-192	-1.211E-01	5.283E-01	9.560E-01	FAIL ABUN
HG-203	3.041E+00	2.794E+00	5.591E+00	NOT IDENT.
BI-207	-3.169E-02	6.384E-02	1.118E-01	NOT IDENT.
BI-211	0.000E+00	6.563E-01	8.883E-01	FAIL ABUN
PB-211	-1.400E-01	8.730E-01	1.569E+00	NOT IDENT.
BI-212	4.547E-01	1.047E+00	1.286E+00	FAIL ABUN
RN-219	4.177E-01	5.000E-01	9.655E-01	FAIL ABUN
RA-223	1.799E-01	7.560E-01	1.421E+00	FAIL ABUN
AC-227	-1.657E-01	2.825E-01	4.986E-01	FAIL ABUN
TH-227	-1.657E-01	2.825E-01	4.986E-01	FAIL ABUN
TH-229	-3.949E-01	6.121E-01	1.091E+00	FAIL ABUN
TH-231	1.799E-01	7.560E-01	1.421E+00	FAIL ABUN
PA-233	-8.417E-04	8.554E-02	1.379E-01	FAIL ABUN
PA-234	-1.670E-01	3.211E-01	5.622E-01	FAIL ABUN
PA-234M	3.629E+00	5.091E+00	1.071E+01	FAIL ABUN
TH-234	9.942E-01	2.199E+00	4.167E+00	FAIL ABUN
U-235	8.664E-02	2.366E-01	4.554E-01	FAIL ABUN
NP-237	-8.417E-04	8.554E-02	1.379E-01	FAIL ABUN
NP-238	0.000E+00	6.752E+40	0.000E+00	SHORT HLIF
U-238	9.942E-01	2.199E+00	4.167E+00	FAIL ABUN
NP-239	3.293E-03	3.342E-01	6.365E-01	NOT IDENT.
PU-239	1.847E+01	4.139E+02	7.857E+02	NOT IDENT.
AM-241	-1.874E-01	2.548E-01	4.408E-01	NOT IDENT.
AM-243	1.202E-02	9.798E-02	1.675E-01	NOT IDENT.
CM-243	6.597E-02	1.330E-01	2.626E-01	NOT IDENT.
BK-247	-3.751E-02	9.945E-02	1.715E-01	NOT IDENT.
CM-247	2.046E-02	4.555E-02	8.704E-02	NOT IDENT.
CF-249	-1.494E-02	5.081E-02	9.006E-02	NOT IDENT.
CF-251	1.348E-01	1.539E-01	3.028E-01	NOT IDENT.
ANH-511	3.937E-02	5.498E-02	1.185E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:45:08.33

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	1-Sigma %Error
K-40	1460.82	308	10.66*	1.119E+00	1.397E+01	1.397E+01	6.04
CD-109	88.03	60	3.70*	4.586E+00	1.917E+00	2.977E+00	39.99
SN-126	64.28	------	9.60	2.229E+00	------ Line Not Found		------
	86.94	60	8.90	4.586E+00	7.971E-01	7.971E-01	39.99
	87.57	60	37.00*	4.586E+00	1.917E-01	1.917E-01	39.99
BA-137M	661.66	44	89.90*	2.104E+00	1.266E-01	1.290E-01	20.44
CS-137	661.66	44	85.10*	2.104E+00	1.337E-01	1.362E-01	20.44
TL-208	277.37	------	6.60	4.277E+00	------ Line Not Found		------
	583.19	119	85.00*	2.326E+00	3.266E-01	3.266E-01	13.15
	860.56	40	12.50	1.713E+00	1.022E+00	1.022E+00	20.89
PB-210	46.54	24	4.25*	3.762E-01	8.171E+00	8.378E+00	86.99
BI-211	72.87	------	1.23	3.214E+00	------ Line Not Found		------
	351.06	185	12.92*	3.521E+00	2.202E+00	2.202E+00	15.21
PB-212	74.82	------	10.28	3.423E+00	------ Line Not Found		------
	77.11	164	17.10	3.719E+00	1.398E+00	1.398E+00	17.59
	238.63	338	43.60*	4.787E+00	8.768E-01	8.768E-01	7.41
	300.09	71	3.30	4.005E+00	2.923E+00	2.923E+00	24.55
BI-214	609.32	153	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27
	1120.29	37	14.92	1.392E+00	9.681E-01	9.685E-01	28.97
	1764.49	36	15.30	9.459E-01	1.339E+00	1.339E+00	16.95
PB-214	74.82	------	5.80	3.423E+00	------ Line Not Found		------
	77.11	164	9.70	3.719E+00	2.464E+00	2.465E+00	17.59
	87.09	60	3.41	4.586E+00	2.080E+00	2.081E+00	39.99
	242.00	74	7.25	4.745E+00	1.159E+00	1.159E+00	23.84
	295.22	147	18.42	4.063E+00	1.063E+00	1.063E+00	16.49
	351.93	185	35.60*	3.521E+00	7.992E-01	7.995E-01	15.21
RN-222	609.32	153	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27
	1120.29	37	14.92	1.392E+00	9.681E-01	9.685E-01	28.97
	1764.49	36	15.30	9.459E-01	1.339E+00	1.339E+00	16.95
RA-224	240.99	74	4.10*	4.745E+00	2.049E+00	2.049E+00	23.84
RA-226	609.32	153	45.49*	2.246E+00	8.115E-01	8.118E-01	12.27
	1120.29	37	14.92	1.392E+00	9.681E-01	9.685E-01	28.97
	1764.49	36	15.30	9.459E-01	1.339E+00	1.339E+00	16.95
AC-228	105.21	------	1.10	5.586E+00	------ Line Not Found		------
	338.32	76	11.27	3.639E+00	1.002E+00	1.002E+00	25.39
	794.95	------	4.25	1.823E+00	------ Line Not Found		------
	835.71	------	1.61	1.753E+00	------ Line Not Found		------
	911.20	64	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96
	968.97	38	15.80	1.561E+00	8.302E-01	8.302E-01	29.90
RA-228	105.21	------	1.10	5.586E+00	------ Line Not Found		------
	338.32	76	11.27	3.639E+00	1.002E+00	1.002E+00	25.39
	794.95	------	4.25	1.823E+00	------ Line Not Found		------
	835.71	------	1.61	1.753E+00	------ Line Not Found		------
	911.20	64	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96
	968.97	38	15.80	1.561E+00	8.302E-01	8.302E-01	29.90
TH-228	74.82	------	10.28	3.423E+00	------ Line Not Found		------
	77.11	164	17.10	3.719E+00	1.398E+00	1.398E+00	17.59

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	1-Sigma %Error
	238.63	338	43.60*	4.787E+00	8.768E-01	8.768E-01	7.41
	300.09	71	3.30	4.005E+00	2.923E+00	2.923E+00	24.55
TH-230	609.32	153	45.49*	2.246E+00	8.115E-01	8.115E-01	12.27
	1120.29	37	14.92	1.392E+00	9.681E-01	9.681E-01	28.97
	1764.49	36	15.30	9.459E-01	1.339E+00	1.339E+00	16.95
PA-231	283.69	------	1.70	4.201E+00	------ Line Not Found		------
	301.36	71	5.35*	4.005E+00	1.803E+00	1.803E+00	24.55
TH-232	105.21	------	1.10	5.586E+00	------ Line Not Found		------
	338.32	76	11.27	3.639E+00	1.002E+00	1.002E+00	25.39
	835.71	------	1.61	1.753E+00	------ Line Not Found		------
	911.20	64	25.80*	1.638E+00	8.138E-01	8.138E-01	21.96
	968.97	38	15.80	1.561E+00	8.302E-01	8.302E-01	29.90
U-234	609.32	153	45.49*	2.246E+00	8.115E-01	8.115E-01	12.27
	1120.29	37	14.92	1.392E+00	9.681E-01	9.681E-01	28.97
	1764.49	36	15.30	9.459E-01	1.339E+00	1.339E+00	16.95

Flag: "*" = Keyline

Sample ID : R405240014 Acquisition date : 3-OCT-2016 05:43:20

Total number of lines in spectrum	46	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	33	71.74%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.397E+01	1.397E+01	0.084E+01	6.04	
CD-109	461.40D	1.55	1.917E+00	2.977E+00	1.190E+00	39.99	
SN-126	2.30E+05Y	1.00	1.917E-01	1.917E-01	0.767E-01	39.99	
BA-137M	30.08Y	1.02	1.266E-01	1.290E-01	0.264E-01	20.44	
CS-137	30.08Y	1.02	1.337E-01	1.362E-01	0.279E-01	20.44	
TL-208	1.41E+10Y	1.00	3.266E-01	3.266E-01	0.429E-01	13.15	
PB-210	22.20Y	1.03	8.171E+00	8.378E+00	7.289E+00	86.99	
BI-211	7.04E+08Y	1.00	2.202E+00	2.202E+00	0.335E+00	15.21	
PB-212	1.41E+10Y	1.00	8.768E-01	8.768E-01	0.650E-01	7.41	
BI-214	1600.00Y	1.00	8.115E-01	8.118E-01	0.996E-01	12.27	
PB-214	1600.00Y	1.00	7.992E-01	7.995E-01	1.216E-01	15.21	
RN-222	1600.00Y	1.00	8.115E-01	8.118E-01	0.996E-01	12.27	
RA-224	1.41E+10Y	1.00	2.049E+00	2.049E+00	0.489E+00	23.84	
RA-226	1600.00Y	1.00	8.115E-01	8.118E-01	0.996E-01	12.27	
AC-228	1.41E+10Y	1.00	8.138E-01	8.138E-01	1.787E-01	21.96	
RA-228	1.41E+10Y	1.00	8.138E-01	8.138E-01	1.787E-01	21.96	
TH-228	1.41E+10Y	1.00	8.768E-01	8.768E-01	0.650E-01	7.41	
TH-230	7.54E+04Y	1.00	8.115E-01	8.115E-01	0.996E-01	12.27	
PA-231	7.04E+08Y	1.00	1.803E+00	1.803E+00	0.443E+00	24.55	
TH-232	1.41E+10Y	1.00	8.138E-01	8.138E-01	1.787E-01	21.96	
U-234	2.45E+05Y	1.00	8.115E-01	8.115E-01	0.996E-01	12.27	
	Total Activity :		3.994E+01	4.122E+01			

Grand Total Activity : 3.994E+01 4.122E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240014 Acquisition date : 3-OCT-2016 05:43:20

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	35.52	44	140	2.85	72.24	70	8	9.70E-03	54.4	3.48E-03	
0	94.29	32	279	1.17	189.78	183	11	7.46E-03	****	5.04E+00	T
0	186.17	88	91	1.39	373.56	369	8	2.16E-02	24.2	5.60E+00	T
0	270.26	26	57	1.53	541.75	539	7	6.63E-03	53.8	4.36E+00	T
0	308.29	26	99	0.70	617.81	611	15	6.52E-03	89.2	3.93E+00	T
0	396.31	20	14	1.33	793.84	791	6	5.09E-03	39.1	3.19E+00	
0	463.60	39	19	1.67	928.44	924	9	1.04E-02	26.1	2.80E+00	T
0	644.38	23	8	4.74	1290.00	1284	12	6.15E-03	34.1	2.15E+00	T
4	670.60	17	14	2.40	1342.45	1320	36	4.63E-03	57.3	2.08E+00	
0	686.67	12	9	1.12	1374.58	1371	9	3.33E-03	53.5	2.04E+00	T
0	728.62	11	31	1.99	1458.49	1453	16	2.99E-03	****	1.95E+00	T
0	753.67	9	12	0.94	1508.58	1503	10	2.33E-03	90.2	1.90E+00	T
0	768.07	31	18	3.24	1537.39	1531	12	8.61E-03	32.7	1.87E+00	T
0	875.37	13	6	1.55	1752.01	1745	12	3.65E-03	46.2	1.69E+00	T
0	923.49	16	6	1.47	1848.25	1844	10	4.55E-03	35.9	1.62E+00	T
0	1014.83	7	6	1.47	2030.93	2026	9	1.90E-03	82.6	1.51E+00	
0	1027.45	6	3	0.50	2056.17	2052	6	1.67E-03	61.2	1.49E+00	T
0	1042.77	5	5	0.52	2086.82	2081	10	1.39E-03	****	1.47E+00	
0	1054.94	6	13	0.80	2111.15	2105	9	1.81E-03	****	1.46E+00	
0	1088.34	9	13	2.19	2177.95	2166	13	2.42E-03	91.8	1.43E+00	
0	1106.23	11	10	0.58	2213.73	2207	11	3.16E-03	63.6	1.41E+00	
0	1145.18	17	3	3.44	2291.64	2286	11	4.83E-03	30.2	1.37E+00	
0	1175.83	14	11	3.22	2352.93	2346	11	3.89E-03	53.1	1.34E+00	
0	1238.83	14	12	1.78	2478.94	2472	12	4.10E-03	55.3	1.28E+00	T
0	1332.21	5	4	0.72	2665.71	2659	9	1.56E-03	80.1	1.21E+00	T
0	1378.44	10	3	0.65	2758.17	2751	11	2.79E-03	45.2	1.18E+00	
0	1414.65	4	3	1.15	2830.58	2825	7	1.25E-03	83.5	1.15E+00	
0	1712.60	6	0	0.58	3426.50	3422	8	1.67E-03	40.8	9.73E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:45:27.37

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240014.CNF;1    *
* Acquisition date :  3-OCT-2016 05:43:20 Sensitivity     : 3.000        *
* Detector ID      : GAM32                Energy tolerance: 2.000        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.57     Half life ratio : 8.000        *
* Sample date      : 15-DEC-2015 11:08:00 Nuclide Library : SOLID        *
* Sample ID        : R405240014           Analyst initials: MXR1         *
* Batch Number     : 1596386              Sample Quantity : 1.3876E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000   *
*                                         Dry Weight      :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 23-AUG-2016 07:56:33 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;11         *
*************************************************************************
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.572E-01
CD-109	1.730E+00
SN-126	1.019E-01
BA-137M	3.056E-02
CS-137	3.229E-02
TL-208	3.592E-02
PB-210	7.884E+00
PB-212	6.339E-02
BI-214	7.194E-02
PB-214	7.313E-02
RN-222	7.194E-02
RA-224	6.698E-01
RA-226	7.194E-02
AC-228	1.450E-01
RA-228	1.450E-01
TH-228	6.339E-02
TH-230	7.191E-02
PA-231	3.536E-01
TH-232	1.450E-01
U-234	7.191E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.242E+01	NOT IDENT.
NA-22	4.745E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.158E-02	NOT IDENT.
SC-46	3.903E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	8.115E-02	NOT IDENT.
CO-56	4.444E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	5.490E-02	NOT IDENT.

CO-58	4.811E-01	NOT IDENT.
FE-59	6.303E+00	NOT IDENT.
CO-60	4.192E-02	FAIL ABUN
ZN-65	1.829E-01	NOT IDENT.
GE-68	1.817E+00	NOT IDENT.
AS-73	1.636E+01	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	2.243E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	7.261E-01	NOT IDENT.
KR-85	9.532E+00	NOT IDENT.
SR-85	9.349E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	1.615E-01	NOT IDENT.
Y-91	5.986E+02	NOT IDENT.
NB-94	3.183E-02	NOT IDENT.
NB-95	9.229E-01	NOT IDENT.
NB-95M	2.567E+00	NOT IDENT.
ZR-95	1.490E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	4.091E-02	NOT IDENT.
RH-102	6.194E-02	FAIL ABUN
RU-103	5.238E+00	FAIL ABUN
RH-106	5.070E-01	NOT IDENT.
RU-106	5.070E-01	NOT IDENT.
AG-108M	3.262E-02	NOT IDENT.
AG-110M	1.004E-01	NOT IDENT.
SN-113	2.400E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.508E-01	NOT IDENT.
SB-124	1.800E+00	FAIL ABUN
SB-125	1.062E-01	FAIL ABUN
TE-125M	2.930E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.881E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	6.669E-02	NOT IDENT.
CS-135	1.673E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	1.212E-01	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	0.000E+00	SHORT HLIF
CE-143	0.000E+00	SHORT HLIF
CE-144	4.273E-01	NOT IDENT.
PM-144	6.726E-02	NOT IDENT.
PR-144	5.834E+00	NOT IDENT.
PM-146	4.641E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	9.630E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.651E-02	FAIL ABUN
EU-152	9.787E-02	NOT IDENT.
GD-153	1.968E-01	NOT IDENT.
EU-154	1.171E-01	NOT IDENT.
EU-155	1.314E-01	FAIL ABUN
TB-160	1.469E+00	FAIL ABUN
HO-166M	5.200E-02	FAIL ABUN
TM-171	4.182E+01	NOT IDENT.
HF-172	2.734E-01	NOT IDENT.
LU-172	8.102E-02	FAIL ABUN
LU-176	2.951E-02	FAIL ABUN
HF-181	3.696E+00	NOT IDENT.
TA-182	1.032E+00	FAIL ABUN
RE-183	4.526E+00	NOT IDENT.
RE-184	0.000E+00	SHORT HLIF
W-188	1.078E+02	NOT IDENT.

IR-192	4.410E-01	FAIL ABUN
HG-203	2.626E+00	NOT IDENT.
BI-207	4.896E-02	NOT IDENT.
BI-211	4.278E-01	FAIL ABUN
PB-211	7.213E-01	NOT IDENT.
BI-212	5.861E-01	FAIL ABUN
RN-219	4.468E-01	FAIL ABUN
RA-223	6.604E-01	FAIL ABUN
AC-227	2.318E-01	FAIL ABUN
TH-227	2.318E-01	FAIL ABUN
TH-229	5.143E-01	FAIL ABUN
TH-231	6.604E-01	FAIL ABUN
PA-233	6.391E-02	FAIL ABUN
PA-234	2.424E-01	FAIL ABUN
PA-234M	4.777E+00	FAIL ABUN
TH-234	1.984E+00	FAIL ABUN
U-235	2.163E-01	FAIL ABUN
NP-237	6.391E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.984E+00	FAIL ABUN
NP-239	3.020E-01	NOT IDENT.
PU-239	3.730E+02	NOT IDENT.
AM-241	2.074E-01	NOT IDENT.
AM-243	8.041E-02	NOT IDENT.
CM-243	1.245E-01	NOT IDENT.
BK-247	8.006E-02	NOT IDENT.
CM-247	4.022E-02	NOT IDENT.
CF-249	4.153E-02	NOT IDENT.
CF-251	1.438E-01	NOT IDENT.
ANH-511	5.639E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:45:33.75

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240014.CNF;1		
Acquisition date	: 3-OCT-2016 05:43:20	Sensitivity	: 3.000
Detector ID	: GAM32	Energy tolerance	: 2.000
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.57	Half life ratio	: 8.000
Sample date	: 15-DEC-2015 11:08:00	Nuclide Library	: SOLID
Sample ID	: R405240014	Analyst initials	: MXR1
Batch Number	: 1596386	Sample Quantity	: 1.3876E+02 GRAM
		Quantity Err(%)	: 1.4413E-03 %
Wet wt corr	: 1.00000	Wet Weight	: 0.00000
		Dry Weight	: 0.00000

CALIBRATION INFORMATION

Eff. Cal. date	: 23-AUG-2016 07:56:33	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM32_CAN.CNF;11		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.397E+01	1.809E+00	1.809E+00
CD-109	1.456E+00	2.395E+00	2.395E+00
SN-126	9.379E-02	1.542E-01	1.542E-01
BA-137M	1.290E-01	5.198E-02	5.198E-02
CS-137	1.362E-01	5.491E-02	5.491E-02
TL-208	3.266E-01	8.532E-02	8.532E-02
PB-210	8.378E+00	1.431E+01	1.431E+01
PB-212	8.768E-01	1.356E-01	1.356E-01
BI-214	8.118E-01	1.984E-01	1.984E-01
PB-214	7.995E-01	2.406E-01	2.406E-01
RN-222	8.118E-01	1.984E-01	1.984E-01
RA-224	1.701E-01	1.141E+00	1.141E+00
RA-226	8.118E-01	1.984E-01	1.984E-01
AC-228	8.138E-01	3.527E-01	3.527E-01
RA-228	8.138E-01	3.527E-01	3.527E-01
TH-228	8.768E-01	1.356E-01	1.356E-01
TH-230	8.115E-01	1.983E-01	1.983E-01
PA-231	1.803E+00	9.491E-01	9.491E-01
TH-232	8.138E-01	3.527E-01	3.527E-01
U-234	8.115E-01	1.983E-01	1.983E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	9.543E+00	1.306E+01	1.375E+01	NOT IDENT.
NA-22	5.870E-03	5.445E-02	5.452E-02	NOT IDENT.
NA-24	1.000E+41	2.158E+41	0.000E+00	SHORT HLIF
AL-26	-5.203E-03	3.964E-02	3.971E-02	NOT IDENT.
SC-46	2.503E-02	4.599E-01	4.601E-01	FAIL ABUN
V-48	-4.249E+03	1.486E+04	1.499E+04	SHORT HLIF
CR-51	-5.397E+01	4.470E+02	4.477E+02	SHORT HLIF
MN-54	4.737E-02	9.080E-02	9.328E-02	NOT IDENT.
CO-56	-3.400E-01	5.791E-01	5.991E-01	FAIL ABUN
MN-56	-1.000E+41	1.703E+41	0.000E+00	SHORT HLIF

CO-57	-7.839E-03	6.143E-02	6.153E-02	NOT IDENT.
CO-58	-8.977E-02	5.840E-01	5.854E-01	NOT IDENT.
FE-59	-7.478E-01	9.045E+00	9.052E+00	NOT IDENT.
CO-60	2.687E-02	4.221E-02	4.391E-02	FAIL ABUN
ZN-65	1.240E-01	2.166E-01	2.237E-01	NOT IDENT.
GE-68	-2.993E+00	2.926E+00	3.222E+00	NOT IDENT.
AS-73	1.676E+01	1.779E+01	1.932E+01	NOT IDENT.
AS-74	-3.805E+03	5.930E+03	6.173E+03	SHORT HLIF
SE-75	-1.522E-01	2.828E-01	2.910E-01	NOT IDENT.
BR-77	2.016E+37	1.704E+38	0.000E+00	SHORT HLIF
SR-82	-3.687E+02	7.332E+02	7.518E+02	SHORT HLIF
RB-83	5.751E-01	7.697E-01	8.122E-01	NOT IDENT.
KR-85	-1.650E+01	1.220E+01	1.429E+01	NOT IDENT.
SR-85	-1.621E+00	1.197E+00	1.403E+00	NOT IDENT.
RB-86	-3.139E+04	2.708E+04	3.056E+04	SHORT HLIF
Y-88	-2.578E-01	2.826E-01	3.056E-01	NOT IDENT.
Y-91	3.782E+02	6.453E+02	6.675E+02	NOT IDENT.
NB-94	-6.821E-03	3.861E-02	3.873E-02	NOT IDENT.
NB-95	7.101E-01	1.120E+00	1.165E+00	NOT IDENT.
NB-95M	1.249E+00	3.240E+00	3.289E+00	NOT IDENT.
ZR-95	4.462E-01	1.930E+00	1.941E+00	NOT IDENT.
NB-97	1.000E+41	8.884E+41	0.000E+00	SHORT HLIF
ZR-97	-1.000E+41	5.467E+40	0.000E+00	SHORT HLIF
MO-99	-1.049E+31	3.550E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	1.896E+41	0.000E+00	SHORT HLIF
RH-101	1.251E-02	4.477E-02	4.513E-02	NOT IDENT.
RH-102	-6.541E-03	7.261E-02	7.267E-02	FAIL ABUN
RU-103	-1.725E-01	5.988E+00	5.988E+00	FAIL ABUN
RH-106	4.410E-02	5.807E-01	5.810E-01	NOT IDENT.
RU-106	4.410E-02	5.807E-01	5.810E-01	NOT IDENT.
AG-108M	1.930E-02	3.674E-02	3.776E-02	NOT IDENT.
AG-110M	1.414E-02	1.169E-01	1.171E-01	NOT IDENT.
SN-113	2.662E-02	3.221E-01	3.223E-01	NOT IDENT.
CD-115	3.122E+38	4.476E+38	0.000E+00	SHORT HLIF
SN-117M	-2.011E+04	9.187E+04	9.232E+04	SHORT HLIF
TE-123M	2.845E-02	1.678E-01	1.682E-01	NOT IDENT.
SB-124	-2.886E-01	2.244E+00	2.248E+00	FAIL ABUN
SB-125	-3.345E-02	1.308E-01	1.317E-01	FAIL ABUN
TE-125M	-5.424E+01	3.269E+02	3.279E+02	NOT IDENT.
I-126	1.545E+05	6.532E+05	6.569E+05	SHORT HLIF
SB-126	6.025E+03	9.150E+05	9.150E+05	SHORT HLIF
SB-127	6.900E+21	1.176E+22	0.000E+00	SHORT HLIF
I-131	-2.256E+08	3.454E+09	3.455E+09	SHORT HLIF
I-132	1.000E+41	1.830E+42	0.000E+00	SHORT HLIF
TE-132	5.119E+25	1.141E+26	0.000E+00	SHORT HLIF
BA-133	1.520E-02	6.383E-02	6.420E-02	FAIL ABUN
I-133	1.000E+41	8.274E+41	0.000E+00	SHORT HLIF
CS-134	7.320E-02	6.988E-02	7.728E-02	NOT IDENT.
CS-135	2.027E-01	1.980E-01	2.181E-01	NOT IDENT.
I-135	1.000E+41	8.124E+41	0.000E+00	SHORT HLIF
CS-136	1.377E+05	3.923E+05	3.972E+05	SHORT HLIF
CE-139	3.412E-02	1.344E-01	1.352E-01	NOT IDENT.
BA-140	4.649E+05	1.083E+06	1.103E+06	SHORT HLIF
LA-140	-5.574E+04	3.616E+05	3.625E+05	SHORT HLIF
CE-141	4.192E+00	2.705E+01	2.712E+01	SHORT HLIF
CE-143	1.000E+41	8.618E+40	0.000E+00	SHORT HLIF
CE-144	1.484E-01	4.671E-01	4.718E-01	NOT IDENT.
PM-144	3.619E-02	7.425E-02	7.603E-02	NOT IDENT.
PR-144	3.197E+00	6.433E+00	6.592E+00	NOT IDENT.
PM-146	1.449E-02	5.099E-02	5.141E-02	NOT IDENT.
ND-147	3.811E+06	2.622E+07	2.628E+07	SHORT HLIF
PM-147	-2.963E+01	1.070E+03	1.070E+03	NOT IDENT.
PM-149	1.128E+39	6.371E+39	0.000E+00	SHORT HLIF
EU-150	-3.124E-02	3.987E-02	4.228E-02	FAIL ABUN
EU-152	1.596E-02	1.294E-01	1.296E-01	NOT IDENT.
GD-153	-1.181E-01	2.558E-01	2.613E-01	NOT IDENT.
EU-154	2.801E-02	1.319E-01	1.325E-01	NOT IDENT.
EU-155	-1.876E-02	1.459E-01	1.462E-01	FAIL ABUN
TB-160	-8.746E-01	2.261E+00	2.295E+00	FAIL ABUN
HO-166M	5.666E-03	5.986E-02	5.991E-02	FAIL ABUN
TM-171	1.824E+01	4.659E+01	4.731E+01	NOT IDENT.
HF-172	-1.814E-01	3.186E-01	3.289E-01	NOT IDENT.
LU-172	4.689E-02	9.158E-02	9.398E-02	FAIL ABUN
LU-176	3.760E-02	6.573E-02	6.787E-02	FAIL ABUN
HF-181	-2.290E+00	4.480E+00	4.597E+00	NOT IDENT.
TA-182	-5.151E-01	1.271E+00	1.292E+00	FAIL ABUN
RE-183	-1.241E-01	5.233E+00	5.233E+00	NOT IDENT.
RE-184	1.240E+01	3.308E+01	3.355E+01	SHORT HLIF

W-188	-2.712E+01	1.470E+02	1.475E+02	NOT IDENT.
IR-192	-1.211E-01	5.283E-01	5.311E-01	FAIL ABUN
HG-203	3.041E+00	2.798E+00	3.116E+00	NOT IDENT.
BI-207	-3.169E-02	6.386E-02	6.543E-02	NOT IDENT.
BI-211	2.202E+00	6.637E-01	1.194E+00	FAIL ABUN
PB-211	-1.400E-01	8.730E-01	8.753E-01	NOT IDENT.
BI-212	4.547E-01	1.047E+00	1.067E+00	FAIL ABUN
RN-219	4.177E-01	5.027E-01	5.368E-01	FAIL ABUN
RA-223	1.799E-01	7.561E-01	7.604E-01	FAIL ABUN
AC-227	-1.657E-01	2.833E-01	2.930E-01	FAIL ABUN
TH-227	-1.657E-01	2.833E-01	2.930E-01	FAIL ABUN
TH-229	-3.949E-01	6.124E-01	6.378E-01	FAIL ABUN
TH-231	1.799E-01	7.561E-01	7.604E-01	FAIL ABUN
PA-233	-8.417E-04	8.554E-02	8.554E-02	FAIL ABUN
PA-234	-1.670E-01	3.736E-01	3.811E-01	FAIL ABUN
PA-234M	3.629E+00	5.093E+00	5.350E+00	FAIL ABUN
TH-234	9.942E-01	2.210E+00	2.255E+00	FAIL ABUN
U-235	8.664E-02	2.366E-01	2.398E-01	FAIL ABUN
NP-237	-8.417E-04	8.554E-02	8.554E-02	FAIL ABUN
NP-238	-2.899E+40	6.753E+40	0.000E+00	SHORT HLIF
U-238	9.942E-01	2.210E+00	2.255E+00	FAIL ABUN
NP-239	3.293E-03	3.342E-01	3.342E-01	NOT IDENT.
PU-239	1.847E+01	4.139E+02	4.140E+02	NOT IDENT.
AM-241	-1.874E-01	2.551E-01	2.688E-01	NOT IDENT.
AM-243	1.202E-02	9.798E-02	9.813E-02	NOT IDENT.
CM-243	6.597E-02	1.332E-01	1.364E-01	NOT IDENT.
BK-247	-3.751E-02	9.973E-02	1.012E-01	NOT IDENT.
CM-247	2.046E-02	4.568E-02	4.661E-02	NOT IDENT.
CF-249	-1.494E-02	5.082E-02	5.127E-02	NOT IDENT.
CF-251	1.348E-01	1.546E-01	1.661E-01	NOT IDENT.
ANH-511	3.937E-02	5.500E-02	5.779E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	105.3245	87.09	149.7436	136.47	123.9424
45.60	90.6174	87.57	167.6677	140.51	0.0000
46.54	70.5981	88.03	203.4548	143.76	108.6978
49.72	0.0000	88.34	203.5313	144.24	99.2883
51.35	83.6125	88.47	139.2803	145.44	0.0000
51.87	87.0775	89.96	203.9279	152.43	102.8609
52.39	78.0976	1093.63	204.0932	153.25	0.0000
52.97	69.1087	91.11	0.0000	323.87	108.7415
53.44	69.1618	92.59	131.5907	156.02	0.0000
54.07	87.3920	93.35	131.7082	158.56	0.0000
57.36	0.0000	94.56	92.0855	159.00	104.3946
57.53	86.7329	94.65	92.0953	162.33	99.8828
57.98	89.0777	94.67	92.0973	162.66	0.0000
59.27	90.3995	94.87	86.3613	163.33	113.4221
59.32	90.4063	97.43	106.8253	165.86	91.5043
59.54	105.3189	98.43	105.5016	176.31	101.9871
60.96	111.2825	98.44	105.5029	176.60	0.0000
61.17	111.3178	99.53	104.3923	177.52	92.3618
62.93	105.8575	100.11	102.2623	181.07	0.0000
63.29	105.9138	102.03	101.5739	181.52	106.1072
63.58	107.1107	103.18	98.9785	184.41	84.4488
64.28	112.9854	103.37	98.0909	143.76	105.6665
66.73	133.0553	105.21	111.0293	193.51	107.2694
67.24	122.7312	105.31	111.0414	197.03	101.6279
125.81	123.9669	106.12	101.1180	198.01	91.8264
67.75	123.9789	106.47	95.6882	201.83	115.8440
69.67	145.2268	109.28	103.2886	203.43	116.9692
70.83	133.8233	111.00	119.0434	205.31	104.2221
72.81	162.1907	111.76	0.0000	210.85	81.7116
72.87	162.2041	114.06	101.9695	215.65	77.9857
74.66	183.8845	116.30	0.0000	222.11	88.3733
74.82	183.9237	116.74	114.2255	227.09	87.6618
74.97	185.3648	119.76	114.5741	227.38	79.6166
77.11	161.9497	121.12	101.7768	228.16	0.0000
78.74	139.7142	121.22	101.7868	228.18	80.6671
79.69	128.5814	121.78	105.5469	116.74	80.6671
80.12	141.3763	122.06	105.5760	235.69	85.9309
80.19	0.0000	122.92	106.5925	235.96	85.9464
80.57	137.2144	123.07	109.3894	238.63	102.3396
81.00	141.5356	265.00	101.1068	238.98	0.0000
81.07	141.5479	125.81	124.5554	240.99	99.6479
81.75	140.2538	127.23	107.9721	242.00	91.1661
83.79	146.2947	127.91	94.0724	244.70	88.0618
84.00	133.5467	129.30	115.6483	252.40	0.0000
85.43	132.3604	131.20	124.2669	252.80	56.3440
86.55	141.0937	133.02	116.0570	254.15	0.0000
86.79	141.1348	133.52	105.8108	256.23	71.8628
86.94	149.7160	136.00	114.5025	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	81.3732	355.39	0.0000	584.27	22.2521
264.80	75.4833	356.01	53.7959	595.83	0.0000
265.00	75.4922	364.49	0.0000	427.87	43.1598
268.22	54.6015	366.42	0.0000	602.52	0.0000
269.46	56.2976	372.51	42.6408	604.72	40.0197
270.03	73.5015	375.05	38.3144	607.14	44.8586
271.23	84.5360	377.52	49.3190	609.32	32.7076
273.65	0.0000	356.01	43.9709	610.33	32.7184
276.40	83.1311	388.16	52.8713	614.28	27.3020
277.37	77.9800	388.63	0.0000	618.01	24.6565
277.60	80.0701	391.69	42.3668	620.36	30.8992
278.00	80.0889	264.66	51.4049	621.93	24.1528
279.20	55.1649	401.81	35.4707	630.19	0.0000
279.54	54.1344	402.40	41.0237	631.29	27.1359
279.70	54.1400	404.85	46.6194	633.25	28.1235
280.46	58.3302	410.95	52.3135	634.78	0.0000
283.69	64.7000	413.71	50.1492	635.95	24.2657
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	65.8089	423.72	0.0000	645.85	11.3610
285.90	0.0000	427.09	35.8730	657.76	21.1811
287.50	55.4294	427.87	40.3709	657.90	0.0000
290.67	60.3492	433.94	35.9805	661.66	19.5762
293.27	0.0000	439.40	36.9666	664.57	0.0000
351.93	57.1434	453.88	31.7512	666.33	0.0000
295.96	57.1667	463.37	38.2522	666.50	0.0000
879.38	25.2576	468.07	33.4597	667.71	0.0000
299.98	25.2773	473.00	0.0000	677.62	22.9556
300.09	25.2788	475.06	35.6908	685.70	0.0000
300.13	25.2795	476.78	29.3051	695.00	0.0000
301.36	33.7290	477.60	25.6505	696.49	28.6998
302.85	25.3176	482.18	34.8759	696.51	28.6998
256.23	25.3403	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	32.6665
306.78	52.4359	497.08	31.3902	697.49	32.6689
308.46	52.4843	505.52	56.5047	702.65	25.7804
311.90	54.2781	507.63	0.0000	706.68	21.8410
316.51	52.0752	511.00	39.9157	711.68	17.8972
319.41	0.0000	514.00	93.8639	720.70	0.0000
320.08	0.0000	514.00	93.8639	721.93	0.0000
321.04	58.5936	520.40	26.0853	722.78	16.6276
323.87	53.3463	520.69	0.0000	722.91	16.6284
325.23	75.8058	522.65	0.0000	723.31	23.2821
328.76	0.0000	527.90	0.0000	724.19	21.6249
333.37	85.7788	528.26	27.0976	727.33	14.9854
333.97	70.3606	529.59	33.6560	733.00	21.6825
334.37	72.0921	529.87	0.0000	735.93	26.7096
338.28	54.8225	531.02	0.0000	333.97	20.0410
338.32	54.8241	537.26	0.0000	739.50	0.0000
311.90	41.3250	546.56	0.0000	747.24	25.1245
340.48	41.3250	552.55	30.1719	748.06	25.1300
340.55	0.0000	563.25	27.4502	752.31	23.4843
344.28	44.8551	569.33	30.3563	753.82	0.0000
345.93	48.3458	946.00	30.3578	756.73	21.8349
351.06	49.7685	569.70	34.1552	756.80	21.8354
351.93	49.7903	583.19	30.5055	884.68	28.6135

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	21.8931	1274.44	20.3967	1620.50	1.0120
766.42	21.8968	1001.03	11.8220	1621.92	2.0246
766.84	25.2686	1002.74	20.4282	1678.03	0.0000
772.60	0.0000	1004.73	23.6650	1690.97	6.1423
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	3.1071
778.90	17.2424	1028.54	0.0000	1063.66	1.7771
783.70	0.0000	1037.84	14.4544	1771.35	27.9932
785.37	26.4196	1038.76	0.0000	1791.20	0.0000
792.07	0.0000	631.29	13.0354	1808.65	6.2566
794.95	26.4913	1048.07	0.0000	1810.72	0.0000
795.86	22.4216	1049.04	13.5864	1836.06	9.4237
810.06	16.3715	1050.41	16.3088		
810.29	16.3727	1063.66	19.6295		
344.28	16.3734	1077.00	0.0000		
810.76	16.3746	1077.34	21.8789		
815.77	0.0000	1085.87	15.3446		
1048.07	0.0000	1093.63	12.1994		
832.01	27.7950	1099.45	18.3228		
834.85	24.7254	1112.07	15.4342		
835.71	31.9445	1112.84	13.2316		
836.80	0.0000	1115.54	12.6088		
846.75	0.0000	1120.29	23.0092		
846.77	26.8728	1120.55	23.0103		
856.80	0.0000	1221.41	23.0143		
860.56	14.5236	1129.67	23.2405		
871.09	12.1366	1131.51	0.0000		
873.19	15.6130	1147.95	0.0000		
875.33	0.0000	1173.23	23.9387		
879.38	17.3759	1177.95	15.9745		
880.51	17.3812	1189.05	18.6808		
883.24	15.6544	1204.77	17.8048		
884.68	16.7043	1221.41	29.1508		
889.28	19.8600	1231.02	28.2654		
894.76	0.0000	1235.36	0.0000		
898.04	17.8097	1238.28	24.5337		
900.72	22.0156	1260.41	0.0000		
903.28	0.0000	1271.87	13.2999		
911.20	23.1263	1274.44	12.3562		
912.08	23.1312	1274.54	13.3067		
923.98	0.0000	1291.59	13.3517		
926.50	10.5527	1298.22	0.0000		
929.11	19.3597	1312.11	0.0000		
937.49	20.1059	1332.49	13.1842		
944.13	0.0000	1362.66	0.0000		
946.00	19.0881	1365.19	15.4779		
949.00	13.7960	1368.63	0.0000		
667.71	0.0000	1384.29	5.8250		
962.31	24.3365	1408.01	15.0450		
964.08	12.4272	1457.56	0.0000		
966.17	14.2096	1460.82	5.9072		
911.20	20.2626	1489.16	5.9373		
968.97	20.2626	1505.03	12.9000		
983.53	0.0000	1584.12	8.0472		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:46:07.55

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240015.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM39.CNF;134
                                     Background date  : 2-OCT-2016 11:02:13.
Sample date      : 15-DEC-2015 14:02:00 Acquisition date : 3-OCT-2016 05:43:43.
Sample ID        : R405240015           Sample quantity  : 1.22616E+02 GRAM
Detector name    : GAM39                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:06.96  0.2%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.19*	93	223	1.42	92.21	87	12	2.57E-02	34.4	
2	0	52.98*	65	143	1.88	105.79	102	9	1.80E-02	36.5	
3	0	63.38*	45	212	1.21	126.59	123	9	1.24E-02	63.7	
4	3	74.87*	180	216	1.16	149.59	145	15	5.01E-02	15.5	3.62E-01
5	3	77.15*	313	187	1.15	154.14	145	15	8.70E-02	9.6	
6	0	86.30	48	201	1.40	172.45	172	7	1.33E-02	50.3	
7	0	92.75*	102	182	1.86	185.35	182	10	2.82E-02	29.3	
8	0	104.99	30	89	1.88	209.82	207	7	8.39E-03	54.6	
9	0	129.13	50	117	1.48	258.10	254	8	1.39E-02	40.1	
10	0	164.77*	9	134	0.68	329.38	325	11	2.44E-03	260.4	
11	0	185.90*	76	138	1.09	371.64	366	12	2.10E-02	34.4	
12	0	209.05	32	74	0.99	417.94	415	7	8.75E-03	48.5	
13	4	238.65*	329	72	1.23	477.14	470	19	9.15E-02	7.2	3.47E-01
14	4	241.50	106	94	2.01	482.85	470	19	2.95E-02	26.9	
15	0	271.49*	19	82	0.69	542.83	535	10	5.30E-03	93.3	
16	0	279.93	48	82	4.84	559.71	550	16	1.34E-02	44.7	
17	0	295.59*	108	96	1.50	591.04	585	12	3.01E-02	20.8	
18	0	328.94	35	85	1.35	657.72	651	13	9.58E-03	57.5	
19	0	338.75*	64	84	1.09	677.35	671	13	1.77E-02	32.8	
20	0	352.14*	195	67	1.15	704.14	698	13	5.42E-02	11.5	
21	0	410.44	37	42	0.66	820.74	816	12	1.03E-02	38.7	
22	0	465.31	77	69	6.73	930.49	919	24	2.14E-02	31.3	
23	0	511.01*	34	52	1.43	1021.89	1014	15	9.49E-03	57.2	
24	0	538.89	11	13	0.86	1077.66	1074	7	2.94E-03	65.8	
25	0	583.14*	101	51	1.52	1166.16	1157	17	2.81E-02	19.4	
26	0	609.40*	154	25	1.33	1218.69	1213	13	4.28E-02	10.8	
27	0	661.70	74	36	1.36	1323.29	1317	14	2.06E-02	20.6	
28	0	727.53*	11	16	1.51	1454.97	1451	7	3.03E-03	73.5	
29	0	740.47	9	21	0.71	1480.84	1471	11	2.37E-03	116.3	
30	0	757.36	7	34	1.17	1514.64	1509	12	1.97E-03	166.7	
31	0	911.47*	71	12	1.81	1822.89	1817	12	1.98E-02	16.1	
32	0	935.10	15	32	0.99	1870.16	1865	14	4.15E-03	84.0	
33	0	969.59*	55	20	0.99	1939.15	1934	15	1.52E-02	22.4	
34	0	1046.56	9	3	1.28	2093.11	2090	6	2.50E-03	45.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1120.64	44	6	1.41	2241.28	2235	12	1.23E-02	18.7	
36	0	1155.89	19	20	1.39	2311.79	2304	16	5.40E-03	56.1	
37	0	1236.91	31	4	2.49	2473.86	2468	14	8.61E-03	22.2	
38	0	1438.48	11	3	2.10	2877.07	2869	13	3.12E-03	44.2	
39	0	1461.00*	268	6	2.13	2922.13	2916	12	7.45E-02	6.5	
40	0	1764.87*	24	6	1.04	3530.01	3525	11	6.72E-03	28.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:46:09

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240015.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 14:02:00 Acquisition date : 3-OCT-2016 05:43:43
Sample ID   : R405240015   Sample quantity : 122.62 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA39   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:06.96   0.2%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	87.09	EU-155	86.55
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	242.00	RA-224	240.99
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	8.983E-01	1.625E+01	1.625E+01	12.99	OK
AS-73	53.44	10.30*	7.098E+00	6.166E-01	7.712E+00	72.97	OK
SN-126	64.28	9.60	6.929E+00	4.625E-01	4.625E-01	127.31	OK
	86.94	8.90	6.759E+00	1.335E-01	1.335E-01	426.48	OK
	87.57	37.00*	6.759E+00	3.211E-02	3.211E-02	426.48	OK
BA-137M	661.66	89.90*	1.758E+00	2.844E-01	2.897E-01	41.22	OK
CS-137	661.66	85.10*	1.758E+00	3.004E-01	3.060E-01	41.22	OK
CE-139	165.86	80.00*	5.526E+00	1.302E-02	5.686E-02	520.79	OK
EU-155	86.55	30.70	6.759E+00	3.870E-02	4.350E-02	426.48	OK
	105.31	21.10*	6.614E+00	1.451E-01	1.631E-01	109.24	OK
HG-203	70.83	3.69	6.839E+00	----- Line Not Found	-----		Absent
	72.87	6.19	6.824E+00	----- Line Not Found	-----		Absent
	279.20	81.56*	3.680E+00	1.025E-01	7.978E+00	89.35	OK
TL-208	277.37	6.60	3.709E+00	----- Line Not Found	-----		Absent
	583.19	85.00*	1.953E+00	3.733E-01	3.733E-01	38.76	OK
	860.56	12.50	1.416E+00	----- Line Not Found	-----		Absent
PB-210	46.54	4.25*	6.771E+00	2.250E+00	2.307E+00	68.85	OK
BI-211	72.87	1.23	6.824E+00	----- Line Not Found	-----		Absent
	351.06	12.92*	3.012E+00	2.273E-01	2.273E-01	624.20	OK
PB-212	74.82	10.28	6.811E+00	1.158E+00	1.158E+00	51.77	OK
	77.11	17.10	6.799E+00	1.834E+00	1.834E+00	19.22	OK
	238.63	43.60*	4.211E+00	1.152E+00	1.152E+00	14.35	OK
	300.09	3.30	3.465E+00	----- Line Not Found	-----		Absent
BI-214	609.32	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56	OK
	1120.29	14.92	1.136E+00	1.534E+00	1.535E+00	37.38	OK
	1764.49	15.30	7.483E-01	1.212E+00	1.212E+00	57.09	OK
PB-214	74.82	5.80	6.812E+00	----- Line Not Found	-----		<<INT Reject
	77.11	9.70	6.799E+00	3.234E+00	3.235E+00	19.22	OK
	87.09	3.41	6.755E+00	----- Line Not Found	-----		<<INT Reject
	242.00	7.25	4.163E+00	----- Line Not Found	-----		<<INT Reject
	295.22	18.42	3.511E+00	1.063E+00	1.063E+00	41.61	OK
	351.93	35.60*	3.014E+00	----- Line Not Found	-----		<<INT Reject
RN-222	609.32	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56	OK
	1120.29	14.92	1.136E+00	1.534E+00	1.535E+00	37.38	OK
	1764.49	15.30	7.483E-01	1.212E+00	1.212E+00	57.09	OK
RA-224	240.99	4.10*	4.170E+00	2.114E+00	2.114E+00	108.23	OK
RA-226	609.32	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56	OK
	1120.29	14.92	1.136E+00	1.534E+00	1.535E+00	37.38	OK
	1764.49	15.30	7.483E-01	1.212E+00	1.212E+00	57.09	OK
AC-228	105.21	1.10	6.614E+00	2.783E+00	2.783E+00	109.24	OK
	338.32	11.27	3.117E+00	1.141E+00	1.141E+00	65.50	OK
	794.95	4.25	1.512E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.451E+00	----- Line Not Found	-----		Absent
	911.20	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27	OK
	968.97	15.80	1.283E+00	1.604E+00	1.604E+00	44.73	OK
RA-228	105.21	1.10	6.614E+00	2.783E+00	2.783E+00	109.24	OK
	338.32	11.27	3.117E+00	1.141E+00	1.141E+00	65.50	OK
	794.95	4.25	1.512E+00	----- Line Not Found	-----		Absent
	835.71	1.61	1.451E+00	----- Line Not Found	-----		Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	911.20	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27	OK
	968.97	15.80	1.283E+00	1.604E+00	1.604E+00	44.73	OK
TH-228	74.82	10.28	6.811E+00	1.158E+00	1.158E+00	51.77	OK
	77.11	17.10	6.799E+00	1.834E+00	1.834E+00	19.22	OK
	238.63	43.60*	4.211E+00	1.152E+00	1.152E+00	14.35	OK
	300.09	3.30	3.465E+00	----- Line Not Found		-----	Absent
TH-230	609.32	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56	OK
	1120.29	14.92	1.136E+00	1.534E+00	1.534E+00	37.38	OK
	1764.49	15.30	7.483E-01	1.212E+00	1.212E+00	57.09	OK
TH-232	105.21	1.10	6.614E+00	2.783E+00	2.783E+00	109.24	OK
	338.32	11.27	3.117E+00	1.141E+00	1.141E+00	65.50	OK
	835.71	1.61	1.451E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27	OK
	968.97	15.80	1.283E+00	1.604E+00	1.604E+00	44.73	OK
TH-234	63.29	3.70*	6.929E+00	1.200E+00	1.200E+00	127.31	OK
	92.59	4.23	6.723E+00	2.409E+00	2.409E+00	58.70	OK
U-234	609.32	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56	OK
	1120.29	14.92	1.136E+00	1.534E+00	1.534E+00	37.38	OK
	1764.49	15.30	7.483E-01	1.212E+00	1.212E+00	57.09	OK
U-235	89.96	3.47	6.740E+00	----- Line Not Found		-----	Absent
	93.35	5.60	6.723E+00	1.819E+00	1.819E+00	58.70	OK
	143.76	10.96*	5.959E+00	----- Line Not Found		-----	Absent
	163.33	5.08	5.526E+00	2.051E-01	2.051E-01	520.79	OK
	185.72	57.20	5.104E+00	1.683E-01	1.683E-01	68.73	OK
	205.31	5.01	4.746E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	6.929E+00	1.200E+00	1.200E+00	127.31	OK
	92.59	4.23	6.723E+00	2.409E+00	2.409E+00	58.70	OK
AM-243	43.53	5.90	6.236E+00	----- Line Not Found		-----	Absent
	74.66	67.20*	6.811E+00	1.771E-01	1.771E-01	51.77	OK
ANH-511	511.00	100.00*	2.183E+00	9.647E-02	9.647E-02	114.38	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:46:10.50

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240015.CNF;1    *
* Acquisition date :  3-OCT-2016 05:43:43 Sensitivity     : 3.000            *
* Detector ID      : GAM39                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:06.96     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:02:00 Analyst initials: MXR1             *
* Sample ID        : R405240015           Sample Quantity : 1.2262E+02 GRAM  *
* Batch Number     : 1596386              Wet Weight      :    0.00000       *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000       *
* Nuclide Library  : SOLID.NLB;6                                          *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 27-JUL-2016 13:04:01 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM39_CAN.CNF;4             *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.625E+01	2.068E+00	1.173E+00
AS-73	7.712E+00	5.515E+00	5.071E+00
SN-126	3.211E-02	1.342E-01	1.619E-01
BA-137M	2.897E-01	1.170E-01	8.415E-02
CS-137	3.060E-01	1.236E-01	8.890E-02
CE-139	5.686E-02	2.902E-01	2.403E-01
EU-155	1.631E-01	1.746E-01	2.256E-01
HG-203	7.978E+00	6.986E+00	5.098E+00
TL-208	3.733E-01	1.418E-01	8.019E-02
PB-210	2.307E+00	1.556E+00	1.121E+00
BI-211	2.273E-01	1.390E+00	5.078E-01
PB-212	1.152E+00	1.621E-01	1.285E-01
BI-214	1.099E+00	2.322E-01	1.649E-01
PB-214	1.146E+00	2.585E-01	4.286E-01
RN-222	1.099E+00	2.322E-01	1.649E-01
RA-224	2.114E+00	2.242E+00	1.378E+00
RA-226	1.099E+00	2.322E-01	1.649E-01
AC-228	1.222E+00	3.866E-01	3.609E-01
RA-228	1.222E+00	3.866E-01	3.609E-01
TH-228	1.152E+00	1.621E-01	1.285E-01
TH-230	1.099E+00	2.321E-01	1.648E-01
TH-232	1.222E+00	3.866E-01	3.609E-01
TH-234	1.200E+00	1.497E+00	1.366E+00
U-234	1.099E+00	2.321E-01	1.648E-01
U-235	6.519E-03	2.415E-01	4.623E-01
U-238	1.200E+00	1.497E+00	1.366E+00
AM-243	1.771E-01	8.985E-02	7.634E-02
ANH-511	9.647E-02	1.081E-01	7.424E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	5.663E+00	1.626E+01	3.163E+01	NOT IDENT.
NA-22	-1.720E-02	7.084E-02	1.333E-01	NOT IDENT.

NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-1.929E-02	3.541E-02	6.161E-02	NOT IDENT.
SC-46	3.446E-01	6.169E-01	1.283E+00	FAIL ABUN
V-48	0.000E+00	1.756E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	4.077E+02	0.000E+00	SHORT HLIF
MN-54	1.334E-01	8.169E-02	1.987E-01	NOT IDENT.
CO-56	-5.172E-01	6.350E-01	1.108E+00	FAIL ABUN
MN-56	0.000E+00	1.209E+41	0.000E+00	SHORT HLIF
CO-57	-2.075E-02	5.966E-02	1.010E-01	NOT IDENT.
CO-58	-1.241E-01	7.983E-01	1.553E+00	NOT IDENT.
FE-59	2.462E+00	9.438E+00	1.920E+01	NOT IDENT.
CO-60	2.090E-02	5.974E-02	1.265E-01	NOT IDENT.
ZN-65	2.364E-01	2.399E-01	5.179E-01	NOT IDENT.
GE-68	7.678E-01	3.676E+00	7.408E+00	NOT IDENT.
AS-74	0.000E+00	6.688E+03	0.000E+00	SHORT HLIF
SE-75	-1.248E-01	2.802E-01	4.831E-01	FAIL ABUN
BR-77	0.000E+00	3.598E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	1.044E+03	0.000E+00	SHORT HLIF
RB-83	-5.596E-01	8.680E-01	1.479E+00	NOT IDENT.
KR-85	5.504E+00	1.154E+01	2.052E+01	NOT IDENT.
SR-85	5.345E-01	1.130E+00	2.009E+00	NOT IDENT.
RB-86	0.000E+00	3.273E+04	0.000E+00	SHORT HLIF
Y-88	-1.775E-02	2.909E-01	6.168E-01	NOT IDENT.
Y-91	-3.829E+01	7.642E+02	1.465E+03	NOT IDENT.
NB-94	-1.054E-02	4.990E-02	8.882E-02	NOT IDENT.
NB-95	2.375E-01	1.300E+00	2.428E+00	NOT IDENT.
NB-95M	8.041E-01	3.290E+00	5.706E+00	NOT IDENT.
ZR-95	1.189E+00	3.884E+00	4.968E+00	FAIL ABUN
NB-97	0.000E+00	1.798E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.355E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	7.031E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.503E-02	4.980E-02	7.694E-02	NOT IDENT.
RH-102	-7.499E-02	9.846E-02	1.615E-01	FAIL ABUN
RU-103	4.644E-01	6.527E+00	1.252E+01	FAIL ABUN
RH-106	6.364E-01	7.039E-01	1.489E+00	NOT IDENT.
RU-106	6.364E-01	7.039E-01	1.489E+00	NOT IDENT.
AG-108M	4.540E-02	3.736E-02	8.072E-02	NOT IDENT.
CD-109	-1.402E-01	1.442E+00	2.489E+00	NOT IDENT.
AG-110M	-4.461E-02	1.656E-01	3.122E-01	NOT IDENT.
SN-113	-1.857E-01	3.209E-01	5.623E-01	NOT IDENT.
CD-115	0.000E+00	4.242E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	8.166E+04	0.000E+00	SHORT HLIF
TE-123M	1.821E-02	1.589E-01	3.064E-01	NOT IDENT.
SB-124	9.216E-01	1.915E+00	5.139E+00	NOT IDENT.
SB-125	3.788E-03	1.502E-01	2.824E-01	NOT IDENT.
TE-125M	9.548E+01	3.025E+02	5.449E+02	NOT IDENT.
I-126	0.000E+00	1.062E+06	0.000E+00	SHORT HLIF
SB-126	0.000E+00	9.951E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	9.522E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	3.962E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.202E+26	0.000E+00	SHORT HLIF
BA-133	-4.977E-03	5.777E-02	9.692E-02	NOT IDENT.
I-133	0.000E+00	1.504E+41	0.000E+00	SHORT HLIF
CS-134	1.001E-01	7.934E-02	1.765E-01	NOT IDENT.
CS-135	2.122E-02	1.958E-01	3.384E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	3.659E+05	0.000E+00	SHORT HLIF
BA-140	0.000E+00	1.379E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	4.479E+05	0.000E+00	SHORT HLIF
CE-141	4.971E+00	2.824E+01	5.451E+01	NOT IDENT.
CE-143	0.000E+00	1.531E+41	0.000E+00	SHORT HLIF
CE-144	-3.788E-02	4.802E-01	8.756E-01	NOT IDENT.
PM-144	-8.653E-04	8.483E-02	1.561E-01	NOT IDENT.
PR-144	-5.828E-02	7.344E+00	1.351E+01	NOT IDENT.
PM-146	3.141E-02	6.177E-02	1.232E-01	NOT IDENT.
ND-147	0.000E+00	2.499E+07	0.000E+00	SHORT HLIF
PM-147	-4.028E+02	1.052E+03	1.775E+03	NOT IDENT.
PM-149	0.000E+00	6.700E+39	0.000E+00	SHORT HLIF
EU-150	-1.237E-02	4.792E-02	6.043E-02	FAIL ABUN
EU-152	-5.340E-02	1.485E-01	2.373E-01	NOT IDENT.
GD-153	3.237E-02	2.136E-01	3.507E-01	NOT IDENT.
EU-154	-4.601E-02	1.736E-01	3.254E-01	FAIL ABUN
TB-160	-1.069E+00	2.437E+00	4.543E+00	FAIL ABUN
HO-166M	-7.090E-03	7.721E-02	1.426E-01	FAIL ABUN
TM-171	0.000E+00	1.290E+01	1.400E+01	FAIL ABUN
HF-172	-1.866E-02	3.311E-01	5.261E-01	FAIL ABUN

LU-172	-9.928E-02	1.217E-01	2.067E-01	FAIL ABUN
LU-176	-1.011E-02	3.505E-02	6.236E-02	NOT IDENT.
HF-181	2.402E+00	5.786E+00	1.136E+01	NOT IDENT.
TA-182	4.500E-01	1.420E+00	2.862E+00	FAIL ABUN
RE-183	1.075E+00	1.320E+00	2.495E+00	NOT IDENT.
RE-184	-2.645E+00	3.705E+01	7.307E+01	NOT IDENT.
W-188	-9.982E+00	1.546E+02	2.600E+02	FAIL ABUN
IR-192	-4.045E-02	5.347E-01	1.011E+00	FAIL ABUN
BI-207	-1.003E-02	7.298E-02	1.405E-01	FAIL ABUN
PB-211	-8.881E-02	9.222E-01	1.639E+00	NOT IDENT.
BI-212	6.072E-01	8.749E-01	1.680E+00	FAIL ABUN
RN-219	-1.030E-01	5.404E-01	9.923E-01	FAIL ABUN
RA-223	-2.703E-01	8.622E-01	1.397E+00	FAIL ABUN
AC-227	1.610E-01	3.164E-01	6.227E-01	NOT IDENT.
TH-227	1.610E-01	3.164E-01	6.227E-01	NOT IDENT.
TH-229	2.694E-01	5.776E-01	1.140E+00	FAIL ABUN
PA-231	2.220E-01	6.544E-01	1.259E+00	NOT IDENT.
TH-231	-2.703E-01	8.622E-01	1.397E+00	FAIL ABUN
PA-233	6.493E-02	8.480E-02	1.707E-01	NOT IDENT.
PA-234	3.592E-02	3.862E-01	7.812E-01	NOT IDENT.
PA-234M	-5.039E+00	5.552E+00	9.561E+00	NOT IDENT.
NP-237	6.493E-02	8.480E-02	1.707E-01	NOT IDENT.
NP-238	0.000E+00	7.460E+40	0.000E+00	SHORT HLIF
NP-239	7.257E-02	3.198E-01	5.680E-01	FAIL ABUN
PU-239	8.423E+02	6.624E+02	8.838E+02	FAIL ABUN
AM-241	-7.596E-03	7.970E-02	1.299E-01	NOT IDENT.
CM-243	-2.505E-02	1.223E-01	1.937E-01	NOT IDENT.
BK-247	-8.985E-02	1.136E-01	1.740E-01	FAIL ABUN
CM-247	-7.475E-03	4.662E-02	8.631E-02	NOT IDENT.
CF-249	3.684E-02	5.385E-02	1.083E-01	NOT IDENT.
CF-251	-1.300E-01	1.466E-01	2.612E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:46:08.30

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	254	10.66*	8.983E-01	1.625E+01	1.625E+01	12.99
AS-73	53.44	74	10.30*	7.098E+00	6.166E-01	7.712E+00	72.97
SN-126	64.28	50	9.60	6.929E+00	4.625E-01	4.625E-01	127.31
	86.94	53	8.90	6.759E+00	5.407E-01	5.407E-01	100.53
	87.57	53	37.00*	6.759E+00	1.301E-01	1.301E-01	100.53
BA-137M	661.66	73	89.90*	1.758E+00	2.844E-01	2.897E-01	41.22
CS-137	661.66	73	85.10*	1.758E+00	3.004E-01	3.060E-01	41.22
CE-139	165.86	9	80.00*	5.526E+00	1.302E-02	5.686E-02	520.79
EU-155	86.55	53	30.70	6.759E+00	1.567E-01	1.762E-01	100.53
	105.31	33	21.10*	6.614E+00	1.451E-01	1.631E-01	109.24
HG-203	70.83	------	3.69	6.839E+00	------	Line Not Found	------
	72.87	------	6.19	6.824E+00	------	Line Not Found	------
	279.20	50	81.56*	3.680E+00	1.025E-01	7.978E+00	89.35
TL-208	277.37	------	6.60	3.709E+00	------	Line Not Found	------
	583.19	101	85.00*	1.953E+00	3.733E-01	3.733E-01	38.76
	860.56	------	12.50	1.416E+00	------	Line Not Found	------
PB-210	46.54	106	4.25*	6.771E+00	2.250E+00	2.307E+00	68.85
BI-211	72.87	------	1.23	6.824E+00	------	Line Not Found	------
	351.06	201	12.92*	3.012E+00	3.156E+00	3.156E+00	23.03
PB-212	74.82	201	10.28	6.811E+00	1.757E+00	1.757E+00	31.01
	77.11	348	17.10	6.799E+00	1.834E+00	1.834E+00	19.22
	238.63	346	43.60*	4.211E+00	1.152E+00	1.152E+00	14.35
	300.09	------	3.30	3.465E+00	------	Line Not Found	------
BI-214	609.32	154	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56
	1120.29	42	14.92	1.136E+00	1.534E+00	1.535E+00	37.38
	1764.49	23	15.30	7.483E-01	1.212E+00	1.212E+00	57.09
PB-214	74.82	201	5.80	6.811E+00	3.115E+00	3.116E+00	31.01
	77.11	348	9.70	6.799E+00	3.234E+00	3.235E+00	19.22
	87.09	53	3.41	6.759E+00	1.411E+00	1.412E+00	100.53
	242.00	112	7.25	4.170E+00	2.258E+00	2.259E+00	53.85
	295.22	112	18.42	3.511E+00	1.063E+00	1.063E+00	41.61
	351.93	201	35.60*	3.012E+00	1.145E+00	1.146E+00	23.03
RN-222	609.32	154	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56
	1120.29	42	14.92	1.136E+00	1.534E+00	1.535E+00	37.38
	1764.49	23	15.30	7.483E-01	1.212E+00	1.212E+00	57.09
RA-224	240.99	112	4.10*	4.170E+00	3.993E+00	3.993E+00	53.85
RA-226	609.32	154	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56
	1120.29	42	14.92	1.136E+00	1.534E+00	1.535E+00	37.38
	1764.49	23	15.30	7.483E-01	1.212E+00	1.212E+00	57.09
AC-228	105.21	33	1.10	6.614E+00	2.783E+00	2.783E+00	109.24
	338.32	65	11.27	3.117E+00	1.141E+00	1.141E+00	65.50
	794.95	------	4.25	1.512E+00	------	Line Not Found	------
	835.71	------	1.61	1.451E+00	------	Line Not Found	------
	911.20	70	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27
	968.97	53	15.80	1.283E+00	1.604E+00	1.604E+00	44.73
RA-228	105.21	33	1.10	6.614E+00	2.783E+00	2.783E+00	109.24
	338.32	65	11.27	3.117E+00	1.141E+00	1.141E+00	65.50

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	794.95	------	4.25	1.512E+00	------ Line Not Found		------
	835.71	------	1.61	1.451E+00	------ Line Not Found		------
	911.20	70	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27
	968.97	53	15.80	1.283E+00	1.604E+00	1.604E+00	44.73
TH-228	74.82	201	10.28	6.811E+00	1.757E+00	1.757E+00	31.01
	77.11	348	17.10	6.799E+00	1.834E+00	1.834E+00	19.22
	238.63	346	43.60*	4.211E+00	1.152E+00	1.152E+00	14.35
	300.09	------	3.30	3.465E+00	------ Line Not Found		------
TH-230	609.32	154	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56
	1120.29	42	14.92	1.136E+00	1.534E+00	1.534E+00	37.38
	1764.49	23	15.30	7.483E-01	1.212E+00	1.212E+00	57.09
TH-232	105.21	33	1.10	6.614E+00	2.783E+00	2.783E+00	109.24
	338.32	65	11.27	3.117E+00	1.141E+00	1.141E+00	65.50
	835.71	------	1.61	1.451E+00	------ Line Not Found		------
	911.20	70	25.80*	1.351E+00	1.222E+00	1.222E+00	32.27
	968.97	53	15.80	1.283E+00	1.604E+00	1.604E+00	44.73
TH-234	63.29	50	3.70*	6.929E+00	1.200E+00	1.200E+00	127.31
	92.59	112	4.23	6.723E+00	2.409E+00	2.409E+00	58.70
U-234	609.32	154	45.49*	1.882E+00	1.099E+00	1.099E+00	21.56
	1120.29	42	14.92	1.136E+00	1.534E+00	1.534E+00	37.38
	1764.49	23	15.30	7.483E-01	1.212E+00	1.212E+00	57.09
U-235	89.96	------	3.47	6.740E+00	------ Line Not Found		------
	93.35	112	5.60	6.723E+00	1.819E+00	1.819E+00	58.70
	143.76	------	10.96*	5.959E+00	------ Line Not Found		------
	163.33	9	5.08	5.526E+00	2.051E-01	2.051E-01	520.79
	185.72	80	57.20	5.104E+00	1.683E-01	1.683E-01	68.73
	205.31	------	5.01	4.746E+00	------ Line Not Found		------
U-238	63.29	50	3.70*	6.929E+00	1.200E+00	1.200E+00	127.31
	92.59	112	4.23	6.723E+00	2.409E+00	2.409E+00	58.70
AM-243	43.53	------	5.90	6.236E+00	------ Line Not Found		------
	74.66	201	67.20*	6.811E+00	2.688E-01	2.688E-01	31.01
ANH-511	511.00	34	100.00*	2.183E+00	9.647E-02	9.647E-02	114.38

Flag: "*" = Keyline

Sample ID : R405240015 Acquisition date : 3-OCT-2016 05:43:43

Total number of lines in spectrum 40
Number of unidentified lines 6
Number of lines tentatively identified by NID 34 85.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.625E+01	1.625E+01	0.211E+01	12.99	
AS-73	80.30D	12.5	6.166E-01	7.712E+00	5.627E+00	72.97	
SN-126	2.30E+05Y	1.00	1.301E-01	1.301E-01	1.307E-01	100.53	
BA-137M	30.08Y	1.02	2.844E-01	2.897E-01	1.194E-01	41.22	
CS-137	30.08Y	1.02	3.004E-01	3.060E-01	1.261E-01	41.22	
CE-139	137.64D	4.37	1.302E-02	5.686E-02	29.61E-02	520.79	
EU-155	4.75Y	1.12	1.451E-01	1.631E-01	1.781E-01	109.24	
HG-203	46.59D	77.8	1.025E-01	7.978E+00	7.129E+00	89.35	
TL-208	1.41E+10Y	1.00	3.733E-01	3.733E-01	1.447E-01	38.76	
PB-210	22.20Y	1.03	2.250E+00	2.307E+00	1.588E+00	68.85	
BI-211	7.04E+08Y	1.00	3.156E+00	3.156E+00	0.727E+00	23.03	
PB-212	1.41E+10Y	1.00	1.152E+00	1.152E+00	0.165E+00	14.35	
BI-214	1600.00Y	1.00	1.099E+00	1.099E+00	0.237E+00	21.56	
PB-214	1600.00Y	1.00	1.145E+00	1.146E+00	0.264E+00	23.03	
RN-222	1600.00Y	1.00	1.099E+00	1.099E+00	0.237E+00	21.56	
RA-224	1.41E+10Y	1.00	3.993E+00	3.993E+00	2.150E+00	53.85	
RA-226	1600.00Y	1.00	1.099E+00	1.099E+00	0.237E+00	21.56	
AC-228	1.41E+10Y	1.00	1.222E+00	1.222E+00	0.394E+00	32.27	
RA-228	1.41E+10Y	1.00	1.222E+00	1.222E+00	0.394E+00	32.27	
TH-228	1.41E+10Y	1.00	1.152E+00	1.152E+00	0.165E+00	14.35	
TH-230	7.54E+04Y	1.00	1.099E+00	1.099E+00	0.237E+00	21.56	
TH-232	1.41E+10Y	1.00	1.222E+00	1.222E+00	0.394E+00	32.27	
TH-234	4.47E+09Y	1.00	1.200E+00	1.200E+00	1.528E+00	127.31	
U-234	2.45E+05Y	1.00	1.099E+00	1.099E+00	0.237E+00	21.56	
U-235	7.04E+08Y	1.00	1.683E-01	1.683E-01	1.157E-01	68.73	K
U-238	4.47E+09Y	1.00	1.200E+00	1.200E+00	1.528E+00	127.31	
AM-243	7370.00Y	1.00	2.688E-01	2.688E-01	0.834E-01	31.01	
ANH-511	1.00E+09Y	1.00	9.647E-02	9.647E-02	11.03E-02	114.38	
Total Activity :			4.316E+01	5.826E+01			

Grand Total Activity : 4.316E+01 5.826E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240015 Acquisition date : 3-OCT-2016 05:43:43

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	129.13	54	127	1.48	258.10	254	8	1.39E-02	80.2	6.24E+00	T
0	209.05	33	78	0.99	417.94	415	7	8.75E-03	97.0	4.68E+00	
0	271.49	20	85	0.69	542.83	535	10	5.30E-03	****	3.78E+00	T
0	328.94	36	87	1.35	657.72	651	13	9.58E-03	****	3.20E+00	T
0	410.44	38	43	0.66	820.74	816	12	1.03E-02	77.4	2.64E+00	T
0	465.31	78	70	6.73	930.49	919	24	2.14E-02	62.5	2.36E+00	
0	538.89	11	13	0.86	1077.66	1074	7	2.94E-03	****	2.09E+00	
0	727.53	11	16	1.51	1454.97	1451	7	3.03E-03	****	1.63E+00	T
0	740.47	8	21	0.71	1480.84	1471	11	2.37E-03	****	1.60E+00	T
0	757.36	7	33	1.17	1514.64	1509	12	1.97E-03	****	1.57E+00	T
0	935.10	15	31	0.99	1870.16	1865	14	4.15E-03	****	1.32E+00	
0	1046.56	9	3	1.28	2093.11	2090	6	2.50E-03	90.3	1.20E+00	T
0	1155.89	19	19	1.39	2311.79	2304	16	5.40E-03	****	1.11E+00	
0	1236.91	30	4	2.49	2473.86	2468	14	8.61E-03	44.3	1.04E+00	T
0	1438.48	11	3	2.10	2877.07	2869	13	3.12E-03	88.4	9.11E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:46:25.51

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240015.CNF;1    *
* Acquisition date :  3-OCT-2016 05:43:43 Sensitivity     : 3.000            *
* Detector ID      : GAM39                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:06.96     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:02:00 Nuclide Library : SOLID            *
* Sample ID        : R405240015           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.2262E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 27-JUL-2016 13:04:01 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM39_CAN.CNF;4              *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	5.003E-01
AS-73	2.389E+00
SN-126	7.757E-02
BA-137M	3.670E-02
CS-137	3.877E-02
CE-139	1.118E-01
EU-155	1.060E-01
HG-203	2.332E+00
TL-208	3.506E-02
PB-210	5.304E-01
BI-211	2.324E-01
PB-212	5.965E-02
BI-214	7.269E-02
PB-214	2.066E-01
RN-222	7.269E-02
RA-224	6.400E-01
RA-226	7.269E-02
AC-228	1.566E-01
RA-228	1.566E-01
TH-228	5.965E-02
TH-230	7.266E-02
TH-232	1.566E-01
TH-234	6.495E-01
U-234	7.266E-02
U-235	2.182E-01
U-238	6.495E-01
AM-243	3.631E-02
ANH-511	3.329E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.425E+01	NOT IDENT.
NA-22	5.658E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF

AL-26	1.948E-02	NOT IDENT.
SC-46	5.737E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	8.838E-02	NOT IDENT.
CO-56	4.740E-01	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	4.720E-02	NOT IDENT.
CO-58	6.778E-01	NOT IDENT.
FE-59	8.386E+00	NOT IDENT.
CO-60	5.385E-02	NOT IDENT.
ZN-65	2.260E-01	NOT IDENT.
GE-68	3.241E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	2.214E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	6.485E-01	NOT IDENT.
KR-85	9.327E+00	NOT IDENT.
SR-85	9.130E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	2.309E-01	NOT IDENT.
Y-91	6.371E+02	NOT IDENT.
NB-94	3.942E-02	NOT IDENT.
NB-95	1.087E+00	NOT IDENT.
NB-95M	2.664E+00	NOT IDENT.
ZR-95	2.253E+00	FAIL ABUN
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.612E-02	NOT IDENT.
RH-102	7.132E-02	FAIL ABUN
RU-103	5.539E+00	FAIL ABUN
RH-106	6.663E-01	NOT IDENT.
RU-106	6.663E-01	NOT IDENT.
AG-108M	3.667E-02	NOT IDENT.
CD-109	1.192E+00	NOT IDENT.
AG-110M	1.375E-01	NOT IDENT.
SN-113	2.537E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.434E-01	NOT IDENT.
SB-124	1.924E+00	NOT IDENT.
SB-125	1.277E-01	NOT IDENT.
TE-125M	2.560E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.368E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	7.983E-02	NOT IDENT.
CS-135	1.554E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	2.574E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	4.126E-01	NOT IDENT.
PM-144	6.935E-02	NOT IDENT.
PR-144	6.005E+00	NOT IDENT.
PM-146	5.569E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	8.301E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.740E-02	FAIL ABUN
EU-152	1.080E-01	NOT IDENT.
GD-153	1.652E-01	NOT IDENT.
EU-154	1.379E-01	FAIL ABUN
TB-160	1.943E+00	FAIL ABUN
HO-166M	6.199E-02	FAIL ABUN
TM-171	6.656E+00	FAIL ABUN
HF-172	2.471E-01	FAIL ABUN
LU-172	8.808E-02	FAIL ABUN

LU-176	2.854E-02	NOT IDENT.
HF-181	5.135E+00	NOT IDENT.
TA-182	1.260E+00	FAIL ABUN
RE-183	1.183E+00	NOT IDENT.
RE-184	3.160E+01	NOT IDENT.
W-188	1.193E+02	FAIL ABUN
IR-192	4.574E-01	FAIL ABUN
BI-207	6.073E-02	FAIL ABUN
PB-211	7.365E-01	NOT IDENT.
BI-212	7.635E-01	FAIL ABUN
RN-219	4.488E-01	FAIL ABUN
RA-223	6.334E-01	FAIL ABUN
AC-227	2.890E-01	NOT IDENT.
TH-227	2.890E-01	NOT IDENT.
TH-229	5.315E-01	FAIL ABUN
PA-231	5.842E-01	NOT IDENT.
TH-231	6.334E-01	FAIL ABUN
PA-233	7.884E-02	NOT IDENT.
PA-234	3.378E-01	NOT IDENT.
PA-234M	3.990E+00	NOT IDENT.
NP-237	7.884E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.675E-01	FAIL ABUN
PU-239	4.204E+02	FAIL ABUN
AM-241	6.156E-02	NOT IDENT.
CM-243	9.061E-02	NOT IDENT.
BK-247	7.971E-02	FAIL ABUN
CM-247	3.882E-02	NOT IDENT.
CF-249	4.954E-02	NOT IDENT.
CF-251	1.213E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:46:33.17

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**************************************************************************
*                          GEL Laboratories LLC                          *
*                            2040 Savage Road                            *
*                          Charleston, SC 29407                          *
**************************************************************************
*                                                                        *
*                        DETECTOR AND SAMPLE DATA                        *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240015.CNF;1    *
* Acquisition date :  3-OCT-2016 05:43:43 Sensitivity     : 3.000            *
* Detector ID      : GAM39                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:06.96     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:02:00 Nuclide Library : SOLID            *
* Sample ID        : R405240015           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.2262E+02 GRAM  *
*                                         Quantity Err(%) : 1.6311E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**************************************************************************
*                                                                        *
*                        CALIBRATION INFORMATION                         *
*                                                                        *
* Eff. Cal. date   : 27-JUL-2016 13:04:01 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM39_CAN.CNF;4              *
**************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.625E+01	2.236E+00	2.236E+00
AS-73	7.712E+00	5.738E+00	5.738E+00
SN-126	3.211E-02	1.348E-01	1.348E-01
BA-137M	2.897E-01	1.177E-01	1.177E-01
CS-137	3.060E-01	1.243E-01	1.243E-01
CE-139	5.686E-02	2.904E-01	2.904E-01
EU-155	1.631E-01	1.750E-01	1.750E-01
HG-203	7.978E+00	6.996E+00	6.996E+00
TL-208	3.733E-01	1.427E-01	1.427E-01
PB-210	2.307E+00	1.570E+00	1.570E+00
BI-211	2.273E-01	1.402E+00	1.402E+00
PB-212	1.152E+00	1.732E-01	1.732E-01
BI-214	1.099E+00	2.370E-01	2.370E-01
PB-214	1.146E+00	2.629E-01	2.629E-01
RN-222	1.099E+00	2.370E-01	2.370E-01
RA-224	2.114E+00	2.249E+00	2.249E+00
RA-226	1.099E+00	2.370E-01	2.370E-01
AC-228	1.222E+00	3.916E-01	3.916E-01
RA-228	1.222E+00	3.916E-01	3.916E-01
TH-228	1.152E+00	1.732E-01	1.732E-01
TH-230	1.099E+00	2.369E-01	2.369E-01
TH-232	1.222E+00	3.916E-01	3.916E-01
TH-234	1.200E+00	1.520E+00	1.520E+00
U-234	1.099E+00	2.369E-01	2.369E-01
U-235	6.519E-03	2.415E-01	2.415E-01
U-238	1.200E+00	1.520E+00	1.520E+00
AM-243	1.771E-01	9.125E-02	9.125E-02
ANH-511	9.647E-02	1.082E-01	1.082E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.663E+00	1.627E+01	1.646E+01	NOT IDENT.
NA-22	-1.720E-02	7.084E-02	7.127E-02	NOT IDENT.

NA-24	-1.000E+41	6.253E+43	0.000E+00	SHORT HLIF
AL-26	-1.929E-02	3.543E-02	3.648E-02	NOT IDENT.
SC-46	3.446E-01	6.170E-01	6.363E-01	FAIL ABUN
V-48	-9.037E+03	1.757E+04	1.803E+04	SHORT HLIF
CR-51	-5.305E+01	4.077E+02	4.084E+02	SHORT HLIF
MN-54	1.334E-01	8.188E-02	1.016E-01	NOT IDENT.
CO-56	-5.172E-01	6.354E-01	6.768E-01	FAIL ABUN
MN-56	-1.000E+41	1.210E+41	0.000E+00	SHORT HLIF
CO-57	-2.075E-02	5.967E-02	6.040E-02	NOT IDENT.
CO-58	-1.241E-01	7.983E-01	8.003E-01	NOT IDENT.
FE-59	2.462E+00	9.440E+00	9.505E+00	NOT IDENT.
CO-60	2.090E-02	5.975E-02	6.048E-02	NOT IDENT.
ZN-65	2.364E-01	2.401E-01	2.627E-01	NOT IDENT.
GE-68	7.678E-01	3.676E+00	3.692E+00	NOT IDENT.
AS-74	-1.094E+03	6.688E+03	6.706E+03	SHORT HLIF
SE-75	-1.248E-01	2.802E-01	2.858E-01	FAIL ABUN
BR-77	2.558E+37	2.161E+38	0.000E+00	SHORT HLIF
SR-82	-7.676E+02	1.045E+03	1.101E+03	SHORT HLIF
RB-83	-5.596E-01	8.714E-01	9.072E-01	NOT IDENT.
KR-85	5.504E+00	1.154E+01	1.180E+01	NOT IDENT.
SR-85	5.345E-01	1.130E+00	1.155E+00	NOT IDENT.
RB-86	-2.517E+03	3.273E+04	3.275E+04	SHORT HLIF
Y-88	-1.775E-02	2.909E-01	2.910E-01	NOT IDENT.
Y-91	-3.829E+01	7.642E+02	7.644E+02	NOT IDENT.
NB-94	-1.054E-02	4.990E-02	5.013E-02	NOT IDENT.
NB-95	2.375E-01	1.300E+00	1.304E+00	NOT IDENT.
NB-95M	8.041E-01	3.290E+00	3.310E+00	NOT IDENT.
ZR-95	1.189E+00	3.885E+00	3.922E+00	FAIL ABUN
NB-97	-1.000E+41	1.798E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.356E+41	0.000E+00	SHORT HLIF
MO-99	3.085E+31	7.035E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	7.158E+41	0.000E+00	SHORT HLIF
RH-101	-1.503E-02	4.987E-02	5.033E-02	NOT IDENT.
RH-102	-7.499E-02	9.865E-02	1.043E-01	FAIL ABUN
RU-103	4.644E-01	6.527E+00	6.530E+00	FAIL ABUN
RH-106	6.364E-01	7.050E-01	7.612E-01	NOT IDENT.
RU-106	6.364E-01	7.050E-01	7.612E-01	NOT IDENT.
AG-108M	4.540E-02	3.740E-02	4.263E-02	NOT IDENT.
CD-109	-1.402E-01	1.442E+00	1.444E+00	NOT IDENT.
AG-110M	-4.461E-02	1.656E-01	1.668E-01	NOT IDENT.
SN-113	-1.857E-01	3.210E-01	3.317E-01	NOT IDENT.
CD-115	-3.202E+38	4.280E+38	0.000E+00	SHORT HLIF
SN-117M	-5.615E+03	8.166E+04	8.170E+04	SHORT HLIF
TE-123M	1.821E-02	1.589E-01	1.591E-01	NOT IDENT.
SB-124	9.216E-01	1.916E+00	1.960E+00	NOT IDENT.
SB-125	3.788E-03	1.502E-01	1.502E-01	NOT IDENT.
TE-125M	9.548E+01	3.026E+02	3.056E+02	NOT IDENT.
I-126	-1.645E+05	1.062E+06	1.065E+06	SHORT HLIF
SB-126	-5.938E+04	9.951E+05	9.955E+05	SHORT HLIF
SB-127	7.919E+19	9.523E+21	0.000E+00	SHORT HLIF
I-131	-9.918E+08	3.962E+09	3.987E+09	SHORT HLIF
I-132	1.000E+41	1.904E+42	0.000E+00	SHORT HLIF
TE-132	-1.014E+25	1.202E+26	0.000E+00	SHORT HLIF
BA-133	-4.977E-03	5.777E-02	5.782E-02	NOT IDENT.
I-133	1.000E+41	2.319E+41	0.000E+00	SHORT HLIF
CS-134	1.001E-01	7.946E-02	9.137E-02	NOT IDENT.
CS-135	2.122E-02	1.958E-01	1.960E-01	NOT IDENT.
I-135	1.000E+41	8.587E+41	0.000E+00	SHORT HLIF
CS-136	-6.821E+04	3.660E+05	3.673E+05	SHORT HLIF
BA-140	5.830E+05	1.379E+06	1.404E+06	SHORT HLIF
LA-140	-1.362E+05	4.480E+05	4.522E+05	SHORT HLIF
CE-141	4.971E+00	2.824E+01	2.833E+01	NOT IDENT.
CE-143	1.000E+41	1.534E+41	0.000E+00	SHORT HLIF
CE-144	-3.788E-02	4.802E-01	4.805E-01	NOT IDENT.
PM-144	-8.653E-04	8.483E-02	8.483E-02	NOT IDENT.
PR-144	-5.828E-02	7.344E+00	7.344E+00	NOT IDENT.
PM-146	3.141E-02	6.181E-02	6.341E-02	NOT IDENT.
ND-147	3.342E+07	2.506E+07	2.924E+07	SHORT HLIF
PM-147	-4.028E+02	1.053E+03	1.068E+03	NOT IDENT.
PM-149	4.431E+39	6.768E+39	0.000E+00	SHORT HLIF
EU-150	-1.237E-02	4.792E-02	4.824E-02	FAIL ABUN
EU-152	-5.340E-02	1.485E-01	1.504E-01	NOT IDENT.
GD-153	3.237E-02	2.136E-01	2.141E-01	NOT IDENT.
EU-154	-4.601E-02	1.736E-01	1.748E-01	FAIL ABUN
TB-160	-1.069E+00	2.438E+00	2.485E+00	FAIL ABUN
HO-166M	-7.090E-03	7.721E-02	7.728E-02	FAIL ABUN
TM-171	1.804E+01	1.300E+01	1.534E+01	FAIL ABUN
HF-172	-1.866E-02	3.311E-01	3.312E-01	FAIL ABUN

LU-172	-9.928E-02	1.221E-01	1.301E-01	FAIL ABUN
LU-176	-1.011E-02	3.506E-02	3.535E-02	NOT IDENT.
HF-181	2.402E+00	5.787E+00	5.888E+00	NOT IDENT.
TA-182	4.500E-01	1.420E+00	1.435E+00	FAIL ABUN
RE-183	1.075E+00	1.330E+00	1.416E+00	NOT IDENT.
RE-184	-2.645E+00	3.705E+01	3.707E+01	NOT IDENT.
W-188	-9.982E+00	1.546E+02	1.547E+02	FAIL ABUN
IR-192	-4.045E-02	5.347E-01	5.350E-01	FAIL ABUN
BI-207	-1.003E-02	7.298E-02	7.312E-02	FAIL ABUN
PB-211	-8.881E-02	9.222E-01	9.231E-01	NOT IDENT.
BI-212	6.072E-01	8.754E-01	9.172E-01	FAIL ABUN
RN-219	-1.030E-01	5.406E-01	5.426E-01	FAIL ABUN
RA-223	-2.703E-01	8.624E-01	8.709E-01	FAIL ABUN
AC-227	1.610E-01	3.172E-01	3.254E-01	NOT IDENT.
TH-227	1.610E-01	3.172E-01	3.254E-01	NOT IDENT.
TH-229	2.694E-01	5.777E-01	5.903E-01	FAIL ABUN
PA-231	2.220E-01	6.561E-01	6.637E-01	NOT IDENT.
TH-231	-2.703E-01	8.624E-01	8.709E-01	FAIL ABUN
PA-233	6.493E-02	8.486E-02	8.976E-02	NOT IDENT.
PA-234	3.592E-02	3.884E-01	3.887E-01	NOT IDENT.
PA-234M	-5.039E+00	5.556E+00	6.003E+00	NOT IDENT.
NP-237	6.493E-02	8.486E-02	8.976E-02	NOT IDENT.
NP-238	-5.193E+40	7.463E+40	0.000E+00	SHORT HLIF
NP-239	7.257E-02	3.198E-01	3.215E-01	FAIL ABUN
PU-239	8.423E+02	6.634E+02	7.644E+02	FAIL ABUN
AM-241	-7.596E-03	7.970E-02	7.978E-02	NOT IDENT.
CM-243	-2.505E-02	1.223E-01	1.228E-01	NOT IDENT.
BK-247	-8.985E-02	1.151E-01	1.220E-01	FAIL ABUN
CM-247	-7.475E-03	4.664E-02	4.676E-02	NOT IDENT.
CF-249	3.684E-02	5.394E-02	5.643E-02	NOT IDENT.
CF-251	-1.300E-01	1.473E-01	1.585E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	80.5991	87.09	172.6521	136.47	79.4373
45.60	101.5508	87.57	172.7657	140.51	0.0000
46.54	101.7452	88.03	172.8760	143.76	81.7174
49.72	0.0000	88.34	195.8515	144.24	87.6569
51.35	87.0808	88.47	195.8855	145.44	79.3240
51.87	105.7926	89.96	170.9572	152.43	76.4731
52.39	88.3714	1093.63	118.8293	153.25	0.0000
52.97	88.4679	91.11	0.0000	323.87	64.6878
53.44	88.5456	92.59	133.4375	156.02	0.0000
54.07	88.6490	93.35	133.5717	158.56	0.0000
57.36	0.0000	94.56	133.7853	159.00	69.2592
57.53	86.9496	94.65	73.2718	162.33	75.9088
57.98	89.2791	94.67	73.2741	162.66	0.0000
59.27	114.7789	94.87	73.2933	163.33	68.2524
59.32	114.7890	97.43	83.1294	165.86	59.3769
59.54	111.8111	98.43	78.0340	176.31	56.4631
60.96	122.6894	98.44	78.0350	176.60	0.0000
61.17	110.6117	99.53	82.9525	177.52	76.5238
62.93	126.5213	100.11	83.0135	181.07	0.0000
63.29	126.5984	102.03	75.5766	181.52	61.5197
63.58	126.6600	103.18	75.6851	184.41	67.3593
64.28	126.8084	103.37	75.7033	143.76	67.4345
66.73	117.7621	105.21	79.9113	193.51	53.7734
67.24	102.5535	105.31	79.9214	197.03	83.9890
125.81	125.6025	106.12	84.0409	198.01	73.4389
67.75	124.0848	106.47	84.0768	201.83	77.2171
69.67	127.9246	109.28	73.0069	203.43	76.4284
70.83	118.5368	111.00	86.5686	205.31	64.0825
72.81	157.5084	111.76	0.0000	210.85	61.6819
72.87	157.5229	114.06	74.6446	215.65	55.6319
74.66	126.5967	116.30	0.0000	222.11	53.2023
74.82	126.6275	116.74	81.0146	227.09	55.2118
74.97	126.6558	119.76	73.9037	227.38	56.1288
77.11	127.0641	121.12	78.9517	228.16	0.0000
78.74	95.0420	121.22	78.9604	228.18	67.9386
79.69	126.3788	121.78	77.7757	116.74	67.9386
80.12	126.4579	122.06	77.8002	235.69	60.1173
80.19	0.0000	122.92	75.4025	235.96	62.8618
80.57	121.8544	123.07	64.2883	238.63	56.5943
81.00	129.7466	265.00	70.5177	238.98	0.0000
81.07	129.7593	125.81	81.0172	240.99	56.6902
81.75	151.7954	127.23	87.7667	242.00	56.7312
83.79	123.9876	127.91	82.8603	244.70	35.7544
84.00	124.0242	129.30	80.9101	252.40	0.0000
85.43	136.8588	131.20	98.1221	252.80	40.5683
86.55	124.4686	133.02	69.9855	254.15	0.0000
86.79	124.5095	133.52	91.0289	256.23	46.2097
86.94	124.5361	136.00	86.0848	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	49.0778	355.39	0.0000	584.27	16.3550
264.80	55.7764	356.01	29.4727	595.83	0.0000
265.00	57.1783	364.49	0.0000	427.87	23.0405
268.22	40.5299	366.42	0.0000	602.52	0.0000
269.46	61.5447	372.51	39.6484	604.72	32.9663
270.03	61.5675	375.05	34.7394	607.14	31.3458
271.23	61.6172	377.52	36.7719	609.32	18.7127
273.65	0.0000	356.01	33.9032	610.33	18.7203
276.40	38.4075	388.16	27.9823	614.28	18.1966
277.37	38.4317	388.63	0.0000	618.01	16.5649
277.60	38.4375	391.69	38.0456	620.36	23.2114
278.00	38.4475	264.66	27.1560	621.93	13.2715
279.20	38.4775	401.81	33.2101	630.19	0.0000
279.54	38.4859	402.40	29.1935	631.29	29.9630
279.70	38.4901	404.85	27.8184	633.25	16.6583
280.46	38.5092	410.95	30.3296	634.78	0.0000
283.69	48.0013	413.71	27.3340	635.95	18.8974
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	33.9207	423.72	0.0000	645.85	20.0808
285.90	0.0000	427.09	30.5701	657.76	23.5276
287.50	42.4576	427.87	29.5623	657.90	0.0000
290.67	42.5427	433.94	16.3577	661.66	15.7067
293.27	0.0000	439.40	25.6256	664.57	0.0000
351.93	49.3012	453.88	22.7036	666.33	0.0000
295.96	49.3245	463.37	23.8395	666.50	0.0000
879.38	44.1794	468.07	23.8905	667.71	0.0000
299.98	55.6281	473.00	0.0000	677.62	14.6663
300.09	55.6317	475.06	27.0918	685.70	0.0000
300.13	55.6328	476.78	20.8557	695.00	0.0000
301.36	48.5378	477.60	20.8634	696.49	21.5745
302.85	50.4876	482.18	24.0421	696.51	21.5745
256.23	46.7241	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	22.7165
306.78	42.9694	497.08	18.9386	697.49	22.7173
308.46	49.7043	505.52	22.1758	702.65	23.8950
311.90	35.4403	507.63	0.0000	706.68	11.3940
316.51	31.6962	511.00	25.4028	711.68	15.9784
319.41	0.0000	514.00	25.4355	720.70	0.0000
320.08	0.0000	514.00	25.4355	721.93	0.0000
321.04	27.9291	520.40	25.5039	722.78	17.1832
323.87	37.6226	520.69	0.0000	722.91	17.1838
325.23	28.9630	522.65	0.0000	723.31	17.1863
328.76	0.0000	527.90	0.0000	724.19	10.3147
333.37	40.7405	528.26	23.4556	727.33	17.2089
333.97	37.8431	529.59	16.0016	733.00	15.5165
334.37	44.6458	529.87	0.0000	735.93	10.3546
338.28	28.2094	531.02	0.0000	333.97	21.8706
338.32	28.2100	537.26	0.0000	739.50	0.0000
311.90	32.1400	546.56	0.0000	747.24	17.3206
340.48	32.1400	552.55	19.3821	748.06	18.4805
340.55	0.0000	563.25	15.1399	752.31	12.1445
344.28	40.9934	569.33	19.5125	753.82	0.0000
345.93	45.7212	946.00	18.4291	756.73	20.8484
351.06	39.1895	569.70	21.6829	756.80	20.8491
351.93	39.2082	583.19	16.3483	884.68	24.3787

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	22.0700	1274.44	11.1669	1620.50	3.1897
766.42	19.7510	1001.03	13.0438	1621.92	5.3174
766.84	10.4579	1002.74	12.1177	1678.03	0.0000
772.60	0.0000	1004.73	7.4609	1690.97	1.0764
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	5.4495
778.90	13.9966	1028.54	0.0000	1063.66	7.6370
783.70	0.0000	1037.84	12.2264	1771.35	2.4941
785.37	16.6546	1038.76	0.0000	1791.20	0.0000
792.07	21.0806	631.29	7.5405	1808.65	3.2937
794.95	17.5830	1048.07	0.0000	1810.72	0.0000
795.86	14.0703	1049.04	15.0908	1836.06	3.3083
810.06	17.6642	1050.41	12.0766		
810.29	17.6654	1063.66	15.1455		
344.28	17.6666	1077.00	0.0000		
810.76	17.6685	1077.34	14.2465		
815.77	0.0000	1085.87	9.5178		
1048.07	0.0000	1093.63	20.0246		
832.01	16.8923	1099.45	13.3685		
834.85	5.3390	1112.07	19.1553		
835.71	13.3507	1112.84	15.3271		
836.80	0.0000	1115.54	6.1348		
846.75	0.0000	1120.29	16.3141		
846.77	20.5377	1120.55	16.3152		
856.80	0.0000	1221.41	16.3183		
860.56	10.7585	1129.67	11.5415		
871.09	10.7915	1131.51	0.0000		
873.19	14.3975	1147.95	0.0000		
875.33	0.0000	1173.23	19.4324		
879.38	16.2257	1177.95	21.3984		
880.51	18.0341	1189.05	15.6016		
883.24	11.7313	1204.77	14.6786		
884.68	21.6672	1221.41	14.7336		
889.28	17.1753	1231.02	17.3239		
894.76	13.5805	1235.36	0.0000		
898.04	14.4990	1238.28	10.8449		
900.72	14.5103	1260.41	0.0000		
903.28	14.5205	1271.87	8.9385		
911.20	14.5527	1274.44	12.9183		
912.08	14.5562	1274.54	12.9183		
923.98	0.0000	1291.59	9.9731		
926.50	10.9607	1298.22	0.0000		
929.11	10.9684	1312.11	0.0000		
937.49	10.2607	1332.49	8.0479		
944.13	0.0000	1362.66	0.0000		
946.00	12.8554	1365.19	13.1658		
949.00	10.1091	1368.63	0.0000		
667.71	0.0000	1384.29	2.0333		
962.31	19.3677	1408.01	4.0862		
964.08	13.2873	1457.56	0.0000		
966.17	16.2492	1460.82	11.3538		
911.20	22.1741	1489.16	5.1889		
968.97	22.1741	1505.03	3.1229		
983.53	0.0000	1584.12	7.3939		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:52:02.22

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*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240016.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM08.CNF;320
                                        Background date  : 2-OCT-2016 11:00:23.
Sample date      : 15-DEC-2015 14:06:00 Acquisition date : 3-OCT-2016 05:51:23.
Sample ID        : R405240016           Sample quantity  : 1.26690E+02 GRAM
Detector name    : GAM08                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.69  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.80*	8	80	0.87	125.85	125	5	2.18E-03	191.8	
2	2	74.84*	102	136	1.24	149.94	146	18	2.84E-02	20.8	1.64E+00
3	2	77.08*	186	140	1.30	154.41	146	18	5.16E-02	14.1	
4	2	86.98*	56	189	1.33	174.23	169	23	1.56E-02	41.9	2.20E+00
5	2	92.60*	56	138	1.35	185.47	169	23	1.57E-02	43.3	
6	0	104.78	47	105	3.34	209.84	204	11	1.30E-02	45.3	
7	0	112.04	40	95	1.28	224.37	220	8	1.11E-02	45.1	
8	0	178.96	38	69	2.46	358.27	356	8	1.05E-02	40.8	
9	0	185.90*	81	114	1.11	372.15	366	12	2.24E-02	30.4	
10	1	202.83	25	87	1.42	406.04	402	22	7.00E-03	71.0	9.39E-01
11	1	209.33	36	93	1.43	419.03	402	22	9.92E-03	51.4	
12	3	238.61*	312	76	1.12	477.62	470	20	8.66E-02	7.4	1.25E+00
13	3	241.69	84	85	1.79	483.78	470	20	2.33E-02	31.0	
14	1	295.23*	150	32	1.55	590.92	587	16	4.18E-02	10.2	3.36E+00
15	1	299.63	20	37	1.55	599.72	587	16	5.42E-03	53.3	
16	0	338.38*	91	34	1.33	677.25	673	9	2.53E-02	16.0	
17	0	351.86*	175	65	1.08	704.21	698	12	4.87E-02	12.2	
18	0	371.33	12	44	4.05	743.18	736	9	3.39E-03	104.4	
19	0	435.87	21	37	0.46	872.30	863	14	5.75E-03	67.0	
20	0	463.19	32	37	1.04	926.96	923	10	8.89E-03	39.9	
21	0	511.13*	8	73	0.88	1022.88	1017	14	2.34E-03	250.8	
22	0	583.10*	96	50	1.32	1166.89	1161	14	2.66E-02	18.8	
23	0	598.95	31	39	5.57	1198.59	1190	17	8.75E-03	48.4	
24	0	609.43*	123	33	1.39	1219.56	1214	12	3.41E-02	13.5	
25	0	726.55	35	18	2.89	1453.88	1448	12	9.67E-03	29.7	
26	0	786.84	7	21	0.65	1574.50	1568	12	1.83E-03	145.2	
27	0	854.32	7	7	1.37	1709.51	1703	8	1.87E-03	81.6	
28	0	911.32*	76	23	2.02	1823.55	1817	15	2.12E-02	18.0	
29	0	923.79	16	6	0.67	1848.50	1842	12	4.44E-03	39.5	
30	0	969.12*	45	24	1.19	1939.18	1933	11	1.24E-02	26.6	
31	0	972.84	12	2	0.81	1946.63	1944	6	3.23E-03	36.9	
32	0	1001.38*	13	12	2.05	2003.72	1997	12	3.50E-03	64.9	
33	0	1121.08*	30	20	0.88	2243.18	2234	13	8.20E-03	36.8	
34	0	1188.83	17	9	5.30	2378.73	2370	17	4.58E-03	47.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1238.81	27	0	2.67	2478.70	2474	11	7.50E-03	19.2	
36	0	1247.06	16	12	0.64	2495.22	2489	15	4.46E-03	52.2	
37	0	1460.93	337	4	2.31	2923.05	2915	15	9.36E-02	5.6	
38	0	1765.06*	17	7	1.25	3531.44	3523	13	4.74E-03	42.0	
39	0	1891.30	7	3	1.00	3783.97	3774	13	1.81E-03	69.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:52:04

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240016.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 14:06:00 Acquisition date : 3-OCT-2016 05:51:23
Sample ID   : R405240016   Sample quantity : 126.69 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA8   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.69   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	87.09	EU-155	86.55
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	242.00	RA-224	240.99
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	9.670E-01	1.841E+01	1.841E+01	11.18	OK
CD-109	88.03	3.70*	4.281E+00	1.045E+00	1.623E+00	192.24	OK
SN-126	64.28	9.60	2.087E+00	2.668E-01	2.668E-01	383.65	OK
	86.94	8.90	4.281E+00	4.346E-01	4.346E-01	192.24	OK
	87.57	37.00*	4.281E+00	1.045E-01	1.045E-01	192.24	OK
EU-155	86.55	30.70	4.281E+00	1.260E-01	1.416E-01	192.24	OK
	105.31	21.10*	5.124E+00	2.859E-01	3.213E-01	90.53	OK
TL-208	277.37	6.60	3.710E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.007E+00	3.354E-01	3.354E-01	37.59	OK
	860.56	12.50	1.478E+00	----- Line Not Found		-----	Absent
BI-212	727.33	6.67*	1.687E+00	1.824E+00	1.824E+00	59.43	OK
	785.37	1.10	1.585E+00	2.210E+00	2.210E+00	290.33	OK
	1620.50	1.47	8.836E-01	----- Line Not Found		-----	Absent
PB-212	74.82	10.28	3.320E+00	1.204E+00	1.204E+00	71.06	OK
	77.11	17.10	3.521E+00	2.079E+00	2.079E+00	28.16	OK
	238.63	43.60*	4.174E+00	1.081E+00	1.081E+00	14.87	OK
	300.09	3.30	3.483E+00	1.057E+00	1.057E+00	106.59	OK
BI-214	609.32	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03	OK
	1120.29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53	OK
	1764.49	15.30	8.178E-01	7.590E-01	7.592E-01	83.99	OK
PB-214	74.82	5.80	3.318E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	3.521E+00	3.665E+00	3.666E+00	28.16	OK
	87.09	3.41	4.288E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.130E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	3.526E+00	1.442E+00	1.443E+00	20.39	OK
	351.93	35.60*	3.046E+00	9.961E-01	9.964E-01	24.30	OK
RN-222	609.32	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03	OK
	1120.29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53	OK
	1764.49	15.30	8.178E-01	7.590E-01	7.592E-01	83.99	OK
RA-224	240.99	4.10*	4.134E+00	5.682E-01	5.682E-01	352.27	OK
RA-226	609.32	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03	OK
	1120.29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53	OK
	1764.49	15.30	8.178E-01	7.590E-01	7.592E-01	83.99	OK
AC-228	105.21	1.10	5.124E+00	5.484E+00	5.484E+00	90.53	OK
	338.32	11.27	3.148E+00	1.584E+00	1.584E+00	32.08	OK
	794.95	4.25	1.572E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.512E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08	OK
	968.97	15.80	1.348E+00	1.217E+00	1.217E+00	53.18	OK
RA-228	105.21	1.10	5.124E+00	5.484E+00	5.484E+00	90.53	OK
	338.32	11.27	3.148E+00	1.584E+00	1.584E+00	32.08	OK
	794.95	4.25	1.572E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.512E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08	OK
	968.97	15.80	1.348E+00	1.217E+00	1.217E+00	53.18	OK
TH-228	74.82	10.28	3.320E+00	1.204E+00	1.204E+00	71.06	OK
	77.11	17.10	3.521E+00	2.079E+00	2.079E+00	28.16	OK
	238.63	43.60*	4.174E+00	1.081E+00	1.081E+00	14.87	OK
	300.09	3.30	3.483E+00	1.057E+00	1.057E+00	106.59	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
TH-230	609.32	45.49*	1.937E+00	8.297E-01	8.298E-01	27.03	OK
	1120.29	14.92	1.202E+00	9.431E-01	9.431E-01	73.53	OK
	1764.49	15.30	8.178E-01	7.590E-01	7.590E-01	83.99	OK
TH-232	105.21	1.10	5.124E+00	5.484E+00	5.484E+00	90.53	OK
	338.32	11.27	3.148E+00	1.584E+00	1.584E+00	32.08	OK
	835.71	1.61	1.512E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08	OK
	968.97	15.80	1.348E+00	1.217E+00	1.217E+00	53.18	OK
TH-234	63.29	3.70*	2.087E+00	6.922E-01	6.922E-01	383.65	OK
	92.59	4.23	4.615E+00	1.924E+00	1.924E+00	86.67	OK
U-234	609.32	45.49*	1.937E+00	8.297E-01	8.297E-01	27.03	OK
	1120.29	14.92	1.202E+00	9.431E-01	9.431E-01	73.53	OK
	1764.49	15.30	8.178E-01	7.590E-01	7.590E-01	83.99	OK
U-238	63.29	3.70*	2.087E+00	6.922E-01	6.922E-01	383.65	OK
	92.59	4.23	4.615E+00	1.924E+00	1.924E+00	86.67	OK
AM-243	43.53	5.90	2.327E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	3.320E+00	1.841E-01	1.841E-01	71.06	OK
ANH-511	511.00	100.00*	2.233E+00	2.276E-02	2.276E-02	501.53	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:52:05.64

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240016.CNF;1		
Acquisition date	: 3-OCT-2016 05:51:23	Sensitivity	: 3.000
Detector ID	: GAM08	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.69	Half life ratio	: *****
Sample date	: 15-DEC-2015 14:06:00	Analyst initials	: MXR1
Sample ID	: R405240016	Sample Quantity	: 1.2669E+02 GRAM
Batch Number	: 1596386	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	: 21-JUL-2016 06:09:19	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;14		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.841E+01	2.018E+00	8.464E-01
CD-109	1.623E+00	3.057E+00	2.905E+00
SN-126	1.045E-01	1.969E-01	1.884E-01
EU-155	3.213E-01	2.851E-01	2.454E-01
TL-208	3.354E-01	1.236E-01	8.303E-02
BI-212	1.824E+00	1.062E+00	1.165E+00
PB-212	1.081E+00	1.576E-01	1.284E-01
BI-214	8.300E-01	2.199E-01	1.802E-01
PB-214	9.964E-01	2.373E-01	1.511E-01
RN-222	8.300E-01	2.199E-01	1.802E-01
RA-224	5.682E-01	1.962E+00	1.377E+00
RA-226	8.300E-01	2.199E-01	1.802E-01
AC-228	1.218E+00	4.307E-01	3.325E-01
RA-228	1.218E+00	4.307E-01	3.325E-01
TH-228	1.081E+00	1.576E-01	1.284E-01
TH-230	8.298E-01	2.198E-01	1.801E-01
TH-232	1.218E+00	4.307E-01	3.325E-01
TH-234	6.922E-01	2.602E+00	3.374E+00
U-234	8.297E-01	2.198E-01	1.801E-01
U-238	6.922E-01	2.602E+00	3.374E+00
AM-243	1.841E-01	1.282E-01	1.150E-01
ANH-511	2.276E-02	1.119E-01	6.097E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	1.133E+01	1.401E+01	2.937E+01	NOT IDENT.
NA-22	-2.632E-02	4.502E-02	7.797E-02	NOT IDENT.
NA-24	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
AL-26	-4.921E-02	4.665E-02	6.875E-02	NOT IDENT.
SC-46	4.099E-01	5.209E-01	1.125E+00	FAIL ABUN
V-48	0.000E+00	1.419E+04	0.000E+00	SHORT HLIF
CR-51	0.000E+00	4.566E+02	0.000E+00	SHORT HLIF
MN-54	1.255E-02	8.119E-02	1.637E-01	NOT IDENT.

CO-56	3.748E-01	5.920E-01	1.269E+00	FAIL ABUN
MN-56	0.000E+00	1.555E+41	0.000E+00	SHORT HLIF
CO-57	1.064E-03	6.267E-02	1.124E-01	NOT IDENT.
CO-58	6.226E-02	6.938E-01	1.399E+00	NOT IDENT.
FE-59	-1.018E+00	9.025E+00	1.707E+01	NOT IDENT.
CO-60	-1.685E-02	5.807E-02	1.071E-01	NOT IDENT.
ZN-65	1.039E-02	2.414E-01	4.194E-01	NOT IDENT.
GE-68	1.248E+00	2.898E+00	6.148E+00	NOT IDENT.
AS-73	-5.653E+00	1.610E+01	2.913E+01	NOT IDENT.
AS-74	0.000E+00	6.555E+03	0.000E+00	SHORT HLIF
SE-75	4.256E-02	2.074E-01	4.130E-01	NOT IDENT.
BR-77	0.000E+00	3.501E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	7.616E+02	0.000E+00	SHORT HLIF
RB-83	5.219E-01	7.576E-01	1.580E+00	NOT IDENT.
KR-85	9.773E+00	8.892E+00	1.798E+01	NOT IDENT.
SR-85	9.542E-01	8.709E-01	1.760E+00	NOT IDENT.
RB-86	0.000E+00	2.850E+04	0.000E+00	SHORT HLIF
Y-88	-1.860E-03	3.056E-01	6.516E-01	NOT IDENT.
Y-91	-2.971E+02	6.613E+02	1.174E+03	NOT IDENT.
NB-94	-1.909E-02	3.546E-02	6.556E-02	NOT IDENT.
NB-95	-9.519E-02	1.064E+00	2.059E+00	NOT IDENT.
NB-95M	-3.143E-01	3.243E+00	5.490E+00	NOT IDENT.
ZR-95	-1.201E+00	1.712E+00	3.048E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.069E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.844E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-2.099E-02	4.894E-02	8.371E-02	NOT IDENT.
RH-102	1.732E-03	7.245E-02	1.373E-01	NOT IDENT.
RU-103	3.490E+00	6.774E+00	1.360E+01	FAIL ABUN
RH-106	-5.514E-01	6.979E-01	1.129E+00	NOT IDENT.
RU-106	-5.514E-01	6.979E-01	1.129E+00	NOT IDENT.
AG-108M	2.233E-02	3.654E-02	7.403E-02	NOT IDENT.
AG-110M	-1.592E-01	1.403E-01	2.247E-01	NOT IDENT.
SN-113	-5.183E-02	2.848E-01	5.274E-01	NOT IDENT.
CD-115	0.000E+00	4.373E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	9.648E+04	0.000E+00	SHORT HLIF
TE-123M	-2.479E-02	1.801E-01	3.120E-01	NOT IDENT.
SB-124	6.615E-01	2.207E+00	5.276E+00	NOT IDENT.
SB-125	4.253E-02	1.310E-01	2.580E-01	FAIL ABUN
TE-125M	3.083E+01	3.630E+02	6.066E+02	NOT IDENT.
I-126	0.000E+00	7.988E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	1.098E+06	0.000E+00	SHORT HLIF
SB-127	0.000E+00	7.230E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	3.559E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.951E+25	0.000E+00	SHORT HLIF
BA-133	4.957E-03	4.901E-02	8.618E-02	NOT IDENT.
I-133	0.000E+00	1.481E+41	0.000E+00	SHORT HLIF
CS-134	9.164E-02	6.195E-02	1.463E-01	NOT IDENT.
CS-135	-8.818E-02	1.819E-01	3.315E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.743E+05	0.000E+00	SHORT HLIF
BA-137M	3.225E-02	5.562E-02	1.085E-01	NOT IDENT.
CS-137	3.407E-02	5.875E-02	1.146E-01	NOT IDENT.
CE-139	5.385E-02	1.406E-01	2.564E-01	NOT IDENT.
BA-140	0.000E+00	1.126E+06	0.000E+00	SHORT HLIF
LA-140	0.000E+00	4.296E+05	0.000E+00	SHORT HLIF
CE-141	-2.450E+01	2.851E+01	4.633E+01	NOT IDENT.
CE-143	0.000E+00	6.968E+40	0.000E+00	SHORT HLIF
CE-144	2.416E-01	4.407E-01	8.182E-01	NOT IDENT.
PM-144	-5.072E-02	7.067E-02	1.264E-01	NOT IDENT.
PR-144	-4.410E+00	6.112E+00	1.093E+01	NOT IDENT.
PM-146	-1.647E-02	5.997E-02	1.086E-01	NOT IDENT.
ND-147	0.000E+00	2.634E+07	0.000E+00	SHORT HLIF
PM-147	-4.462E+02	1.133E+03	1.955E+03	NOT IDENT.
PM-149	0.000E+00	6.043E+39	0.000E+00	SHORT HLIF
EU-150	-6.502E-03	3.714E-02	6.147E-02	FAIL ABUN
EU-152	-4.922E-02	1.388E-01	2.513E-01	NOT IDENT.
GD-153	-1.717E-01	2.684E-01	4.176E-01	NOT IDENT.
EU-154	-6.143E-02	1.117E-01	1.959E-01	NOT IDENT.
TB-160	-7.923E-01	2.391E+00	4.469E+00	FAIL ABUN
HO-166M	-2.699E-02	7.348E-02	1.385E-01	FAIL ABUN
TM-171	2.663E+01	3.986E+01	7.835E+01	NOT IDENT.
HF-172	-6.550E-02	3.078E-01	5.388E-01	FAIL ABUN
LU-172	7.884E-03	9.022E-02	1.868E-01	FAIL ABUN
LU-176	1.036E-02	3.042E-02	6.001E-02	FAIL ABUN
HF-181	-9.591E-01	5.220E+00	9.562E+00	NOT IDENT.

TA-182	-1.933E-01	1.204E+00	2.250E+00	FAIL ABUN
RE-183	-2.023E+00	4.841E+00	8.710E+00	NOT IDENT.
RE-184	3.863E+00	3.327E+01	6.724E+01	NOT IDENT.
W-188	-7.816E+01	1.384E+02	2.191E+02	FAIL ABUN
IR-192	-1.180E-03	5.084E-01	9.753E-01	FAIL ABUN
HG-203	-3.171E+00	2.942E+00	5.016E+00	NOT IDENT.
BI-207	6.651E-03	5.532E-02	1.132E-01	FAIL ABUN
PB-210	-3.803E+00	7.493E+00	1.355E+01	NOT IDENT.
BI-211	0.000E+00	6.537E-01	1.050E+00	FAIL ABUN
PB-211	-3.312E-01	9.626E-01	1.732E+00	NOT IDENT.
RN-219	4.588E-01	5.119E-01	1.056E+00	NOT IDENT.
RA-223	1.416E-01	7.817E-01	1.473E+00	FAIL ABUN
AC-227	-5.809E-02	2.904E-01	5.457E-01	FAIL ABUN
TH-227	-5.809E-02	2.904E-01	5.457E-01	FAIL ABUN
TH-229	-5.638E-02	5.944E-01	1.137E+00	FAIL ABUN
PA-231	2.263E-01	6.131E-01	1.095E+00	NOT IDENT.
TH-231	1.416E-01	7.817E-01	1.473E+00	FAIL ABUN
PA-233	1.449E-02	7.586E-02	1.472E-01	FAIL ABUN
PA-234	-1.947E-02	3.470E-01	6.821E-01	FAIL ABUN
PA-234M	6.595E+00	8.386E+00	1.399E+01	FAIL ABUN
U-235	-4.250E-02	2.505E-01	4.431E-01	FAIL ABUN
NP-237	1.449E-02	7.586E-02	1.472E-01	FAIL ABUN
NP-238	0.000E+00	6.636E+40	0.000E+00	SHORT HLIF
NP-239	1.035E-01	3.036E-01	5.648E-01	FAIL ABUN
PU-239	2.056E+02	4.398E+02	8.095E+02	NOT IDENT.
AM-241	8.434E-02	2.271E-01	4.345E-01	NOT IDENT.
CM-243	0.000E+00	2.610E-01	2.402E-01	FAIL ABUN
BK-247	1.245E-02	7.810E-02	1.541E-01	NOT IDENT.
CM-247	4.853E-02	4.703E-02	9.824E-02	NOT IDENT.
CF-249	-1.909E-02	4.884E-02	8.808E-02	NOT IDENT.
CF-251	0.000E+00	2.235E-01	2.610E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:52:02.99

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	320	10.66*	9.670E-01	1.841E+01	1.841E+01	11.18
CD-109	88.03	63	3.70*	4.281E+00	2.375E+00	3.686E+00	83.86
SN-126	64.28	9	9.60	2.087E+00	2.668E-01	2.668E-01	383.65
	86.94	63	8.90	4.281E+00	9.872E-01	9.872E-01	83.86
	87.57	63	37.00*	4.281E+00	2.375E-01	2.375E-01	83.86
EU-155	86.55	63	30.70	4.281E+00	2.862E-01	3.217E-01	83.86
	105.31	52	21.10*	5.124E+00	2.859E-01	3.213E-01	90.53
TL-208	277.37	------	6.60	3.710E+00	------ Line Not Found		------
	583.19	97	85.00*	2.007E+00	3.354E-01	3.354E-01	37.59
	860.56	------	12.50	1.478E+00	------ Line Not Found		------
BI-211	72.87	------	1.23	3.135E+00	------ Line Not Found		------
	351.06	182	12.92*	3.046E+00	2.745E+00	2.745E+00	24.30
BI-212	727.33	35	6.67*	1.687E+00	1.824E+00	1.824E+00	59.43
	785.37	7	1.10	1.585E+00	2.210E+00	2.210E+00	290.33
	1620.50	------	1.47	8.836E-01	------ Line Not Found		------
PB-212	74.82	116	10.28	3.320E+00	2.017E+00	2.017E+00	41.59
	77.11	211	17.10	3.521E+00	2.079E+00	2.079E+00	28.16
	238.63	332	43.60*	4.174E+00	1.081E+00	1.081E+00	14.87
	300.09	20	3.30	3.483E+00	1.057E+00	1.057E+00	106.59
BI-214	609.32	123	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03
	1120.29	29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53
	1764.49	16	15.30	8.178E-01	7.590E-01	7.592E-01	83.99
PB-214	74.82	116	5.80	3.320E+00	3.576E+00	3.577E+00	41.59
	77.11	211	9.70	3.521E+00	3.665E+00	3.666E+00	28.16
	87.09	63	3.41	4.281E+00	2.576E+00	2.577E+00	83.86
	242.00	89	7.25	4.134E+00	1.764E+00	1.764E+00	61.99
	295.22	158	18.42	3.526E+00	1.442E+00	1.443E+00	20.39
	351.93	182	35.60*	3.046E+00	9.961E-01	9.964E-01	24.30
RN-222	609.32	123	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03
	1120.29	29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53
	1764.49	16	15.30	8.178E-01	7.590E-01	7.592E-01	83.99
RA-224	240.99	89	4.10*	4.134E+00	3.118E+00	3.118E+00	61.99
RA-226	609.32	123	45.49*	1.937E+00	8.297E-01	8.300E-01	27.03
	1120.29	29	14.92	1.202E+00	9.431E-01	9.434E-01	73.53
	1764.49	16	15.30	8.178E-01	7.590E-01	7.592E-01	83.99
AC-228	105.21	52	1.10	5.124E+00	5.484E+00	5.484E+00	90.53
	338.32	95	11.27	3.148E+00	1.584E+00	1.584E+00	32.08
	794.95	------	4.25	1.572E+00	------ Line Not Found		------
	835.71	------	1.61	1.512E+00	------ Line Not Found		------
	911.20	75	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08
	968.97	44	15.80	1.348E+00	1.217E+00	1.217E+00	53.18
RA-228	105.21	52	1.10	5.124E+00	5.484E+00	5.484E+00	90.53
	338.32	95	11.27	3.148E+00	1.584E+00	1.584E+00	32.08
	794.95	------	4.25	1.572E+00	------ Line Not Found		------
	835.71	------	1.61	1.512E+00	------ Line Not Found		------
	911.20	75	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08
	968.97	44	15.80	1.348E+00	1.217E+00	1.217E+00	53.18

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	116	10.28	3.320E+00	2.017E+00	2.017E+00	41.59
	77.11	211	17.10	3.521E+00	2.079E+00	2.079E+00	28.16
	238.63	332	43.60*	4.174E+00	1.081E+00	1.081E+00	14.87
	300.09	20	3.30	3.483E+00	1.057E+00	1.057E+00	106.59
TH-230	609.32	123	45.49*	1.937E+00	8.297E-01	8.298E-01	27.03
	1120.29	29	14.92	1.202E+00	9.431E-01	9.431E-01	73.53
	1764.49	16	15.30	8.178E-01	7.590E-01	7.590E-01	83.99
TH-232	105.21	52	1.10	5.124E+00	5.484E+00	5.484E+00	90.53
	338.32	95	11.27	3.148E+00	1.584E+00	1.584E+00	32.08
	835.71	------	1.61	1.512E+00	------ Line Not Found		------
	911.20	75	25.80*	1.414E+00	1.218E+00	1.218E+00	36.08
	968.97	44	15.80	1.348E+00	1.217E+00	1.217E+00	53.18
TH-234	63.29	9	3.70*	2.087E+00	6.922E-01	6.922E-01	383.65
	92.59	63	4.23	4.615E+00	1.924E+00	1.924E+00	86.67
U-234	609.32	123	45.49*	1.937E+00	8.297E-01	8.297E-01	27.03
	1120.29	29	14.92	1.202E+00	9.431E-01	9.431E-01	73.53
	1764.49	16	15.30	8.178E-01	7.590E-01	7.590E-01	83.99
U-238	63.29	9	3.70*	2.087E+00	6.922E-01	6.922E-01	383.65
	92.59	63	4.23	4.615E+00	1.924E+00	1.924E+00	86.67
AM-243	43.53	------	5.90	2.327E-01	------ Line Not Found		------
	74.66	116	67.20*	3.320E+00	3.086E-01	3.086E-01	41.59
ANH-511	511.00	9	100.00*	2.233E+00	2.276E-02	2.276E-02	501.53

Flag: "*" = Keyline

Sample ID : R405240016 Acquisition date : 3-OCT-2016 05:51:23

Total number of lines in spectrum 39
Number of unidentified lines 7
Number of lines tentatively identified by NID 32 82.05%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.841E+01	1.841E+01	0.206E+01	11.18	
CD-109	461.40D	1.55	2.375E+00	3.686E+00	3.091E+00	83.86	
SN-126	2.30E+05Y	1.00	2.375E-01	2.375E-01	1.991E-01	83.86	
EU-155	4.75Y	1.12	2.859E-01	3.213E-01	2.909E-01	90.53	
TL-208	1.41E+10Y	1.00	3.354E-01	3.354E-01	1.261E-01	37.59	
BI-211	7.04E+08Y	1.00	2.745E+00	2.745E+00	0.667E+00	24.30	
BI-212	1.41E+10Y	1.00	1.824E+00	1.824E+00	1.084E+00	59.43	
PB-212	1.41E+10Y	1.00	1.081E+00	1.081E+00	0.161E+00	14.87	
BI-214	1600.00Y	1.00	8.297E-01	8.300E-01	2.244E-01	27.03	
PB-214	1600.00Y	1.00	9.961E-01	9.964E-01	2.422E-01	24.30	
RN-222	1600.00Y	1.00	8.297E-01	8.300E-01	2.244E-01	27.03	
RA-224	1.41E+10Y	1.00	3.118E+00	3.118E+00	1.933E+00	61.99	
RA-226	1600.00Y	1.00	8.297E-01	8.300E-01	2.244E-01	27.03	
AC-228	1.41E+10Y	1.00	1.218E+00	1.218E+00	0.440E+00	36.08	
RA-228	1.41E+10Y	1.00	1.218E+00	1.218E+00	0.440E+00	36.08	
TH-228	1.41E+10Y	1.00	1.081E+00	1.081E+00	0.161E+00	14.87	
TH-230	7.54E+04Y	1.00	8.297E-01	8.298E-01	2.243E-01	27.03	
TH-232	1.41E+10Y	1.00	1.218E+00	1.218E+00	0.440E+00	36.08	
TH-234	4.47E+09Y	1.00	6.922E-01	6.922E-01	26.56E-01	383.65	
U-234	2.45E+05Y	1.00	8.297E-01	8.297E-01	2.243E-01	27.03	
U-238	4.47E+09Y	1.00	6.922E-01	6.922E-01	26.56E-01	383.65	
AM-243	7370.00Y	1.00	3.086E-01	3.086E-01	1.284E-01	41.59	
ANH-511	1.00E+09Y	1.00	2.276E-02	2.276E-02	11.41E-02	501.53	
	Total Activity :		4.201E+01	4.336E+01			

Grand Total Activity : 4.201E+01 4.336E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R405240016 Acquisition date : 3-OCT-2016 05:51:23

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	112.04	45	106	1.28	224.37	220	8	1.11E-02	90.2	5.31E+00	T
0	178.96	41	75	2.46	358.27	356	8	1.05E-02	81.6	5.03E+00	T
0	185.90	87	123	1.11	372.15	366	12	2.24E-02	60.9	4.93E+00	T
1	202.83	27	94	1.42	406.04	402	22	7.00E-03	****	4.68E+00	T
1	209.33	38	99	1.43	419.03	402	22	9.92E-03	****	4.58E+00	
0	371.33	13	45	4.05	743.18	736	9	3.39E-03	****	2.91E+00	T
0	435.87	21	38	0.46	872.30	863	14	5.75E-03	****	2.55E+00	
0	463.19	33	38	1.04	926.96	923	10	8.89E-03	79.7	2.42E+00	T
0	598.95	32	39	5.57	1198.59	1190	17	8.75E-03	96.8	1.96E+00	
0	854.32	7	7	1.37	1709.51	1703	8	1.87E-03	****	1.49E+00	
0	923.79	16	6	0.67	1848.50	1842	12	4.44E-03	79.1	1.40E+00	T
0	972.84	11	2	0.81	1946.63	1944	6	3.23E-03	73.9	1.34E+00	
0	1001.38	12	11	2.05	2003.72	1997	12	3.50E-03	****	1.31E+00	T
0	1188.83	16	8	5.30	2378.73	2370	17	4.58E-03	94.8	1.15E+00	T
0	1238.81	26	0	2.67	2478.70	2474	11	7.50E-03	38.5	1.11E+00	T
0	1247.06	15	11	0.64	2495.22	2489	15	4.46E-03	****	1.10E+00	
0	1891.30	6	3	1.00	3783.97	3774	13	1.81E-03	****	7.66E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:52:18.32

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**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240016.CNF;1    *
* Acquisition date :  3-OCT-2016 05:51:23 Sensitivity     : 3.000            *
* Detector ID      : GAM08                Energy tolerance: 1.500            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.69     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:06:00 Nuclide Library : SOLID            *
* Sample ID        : R405240016           Analyst initials: MXR1             *
* Batch Number     : 1596386              Sample Quantity : 1.2669E+02 GRAM  *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 21-JUL-2016 06:09:19 Eff. Geometry   : CAN              *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;14             *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	3.456E-01
CD-109	1.373E+00
SN-126	8.900E-02
EU-155	1.141E-01
TL-208	3.677E-02
BI-212	5.108E-01
PB-212	5.972E-02
BI-214	8.090E-02
PB-214	6.800E-02
RN-222	8.090E-02
RA-224	6.404E-01
RA-226	8.090E-02
AC-228	1.442E-01
RA-228	1.442E-01
TH-228	5.972E-02
TH-230	8.087E-02
TH-232	1.442E-01
TH-234	1.582E+00
U-234	8.087E-02
U-238	1.582E+00
AM-243	5.376E-02
ANH-511	2.685E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.319E+01	NOT IDENT.
NA-22	2.981E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.436E-02	NOT IDENT.
SC-46	4.996E-01	FAIL ABUN
V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	7.166E-02	NOT IDENT.
CO-56	5.600E-01	FAIL ABUN

MN-56	0.000E+00	SHORT HLIF
CO-57	5.246E-02	NOT IDENT.
CO-58	6.080E-01	NOT IDENT.
FE-59	7.423E+00	NOT IDENT.
CO-60	4.501E-02	NOT IDENT.
ZN-65	1.795E-01	NOT IDENT.
GE-68	2.648E+00	NOT IDENT.
AS-73	1.361E+01	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.869E-01	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	7.037E-01	NOT IDENT.
KR-85	8.103E+00	NOT IDENT.
SR-85	7.932E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	2.574E-01	NOT IDENT.
Y-91	4.996E+02	NOT IDENT.
NB-94	2.810E-02	NOT IDENT.
NB-95	9.109E-01	NOT IDENT.
NB-95M	2.559E+00	NOT IDENT.
ZR-95	1.308E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.924E-02	NOT IDENT.
RH-102	5.972E-02	NOT IDENT.
RU-103	6.113E+00	FAIL ABUN
RH-106	4.907E-01	NOT IDENT.
RU-106	4.907E-01	NOT IDENT.
AG-108M	3.350E-02	NOT IDENT.
AG-110M	9.510E-02	NOT IDENT.
SN-113	2.375E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.459E-01	NOT IDENT.
SB-124	2.064E+00	NOT IDENT.
SB-125	1.161E-01	FAIL ABUN
TE-125M	2.833E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.849E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	6.529E-02	NOT IDENT.
CS-135	1.523E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
BA-137M	4.919E-02	NOT IDENT.
CS-137	5.196E-02	NOT IDENT.
CE-139	1.196E-01	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	2.155E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.815E-01	NOT IDENT.
PM-144	5.506E-02	NOT IDENT.
PR-144	4.758E+00	NOT IDENT.
PM-146	4.869E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	9.118E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.802E-02	FAIL ABUN
EU-152	1.154E-01	NOT IDENT.
GD-153	1.951E-01	NOT IDENT.
EU-154	7.538E-02	NOT IDENT.
TB-160	1.930E+00	FAIL ABUN
HO-166M	6.053E-02	FAIL ABUN
TM-171	3.670E+01	NOT IDENT.
HF-172	2.515E-01	FAIL ABUN
LU-172	7.940E-02	FAIL ABUN
LU-176	2.745E-02	FAIL ABUN
HF-181	4.265E+00	NOT IDENT.
TA-182	9.693E-01	FAIL ABUN

RE-183	4.071E+00	NOT IDENT.
RE-184	2.904E+01	NOT IDENT.
W-188	9.910E+01	FAIL ABUN
IR-192	4.414E-01	FAIL ABUN
HG-203	2.297E+00	NOT IDENT.
BI-207	4.783E-02	FAIL ABUN
PB-210	6.310E+00	NOT IDENT.
BI-211	5.045E-01	FAIL ABUN
PB-211	7.864E-01	NOT IDENT.
RN-219	4.830E-01	NOT IDENT.
RA-223	6.741E-01	FAIL ABUN
AC-227	2.511E-01	FAIL ABUN
TH-227	2.511E-01	FAIL ABUN
TH-229	5.298E-01	FAIL ABUN
PA-231	5.037E-01	NOT IDENT.
TH-231	6.741E-01	FAIL ABUN
PA-233	6.731E-02	FAIL ABUN
PA-234	2.922E-01	FAIL ABUN
PA-234M	6.265E+00	FAIL ABUN
U-235	2.078E-01	FAIL ABUN
NP-237	6.731E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.631E-01	FAIL ABUN
PU-239	3.809E+02	NOT IDENT.
AM-241	2.038E-01	NOT IDENT.
CM-243	1.121E-01	FAIL ABUN
BK-247	6.994E-02	NOT IDENT.
CM-247	4.497E-02	NOT IDENT.
CF-249	3.964E-02	NOT IDENT.
CF-251	1.211E-01	FAIL ABUN

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:52:23.81

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R405240016.CNF;1    *
* Acquisition date :  3-OCT-2016 05:51:23 Sensitivity     : 3.000       *
* Detector ID      : GAM08                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.69     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 14:06:00 Nuclide Library : SOLID       *
* Sample ID        : R405240016           Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.2669E+02 GRAM   *
*                                         Quantity Err(%) : 1.5787E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 21-JUL-2016 06:09:19 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;14         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.841E+01	2.235E+00	2.235E+00
CD-109	1.623E+00	3.071E+00	3.071E+00
SN-126	1.045E-01	1.977E-01	1.977E-01
EU-155	3.213E-01	2.860E-01	2.860E-01
TL-208	3.354E-01	1.244E-01	1.244E-01
BI-212	1.824E+00	1.066E+00	1.066E+00
PB-212	1.081E+00	1.677E-01	1.677E-01
BI-214	8.300E-01	2.228E-01	2.228E-01
PB-214	9.964E-01	2.409E-01	2.409E-01
RN-222	8.300E-01	2.228E-01	2.228E-01
RA-224	5.682E-01	1.969E+00	1.969E+00
RA-226	8.300E-01	2.228E-01	2.228E-01
AC-228	1.218E+00	4.352E-01	4.352E-01
RA-228	1.218E+00	4.352E-01	4.352E-01
TH-228	1.081E+00	1.677E-01	1.677E-01
TH-230	8.298E-01	2.227E-01	2.227E-01
TH-232	1.218E+00	4.352E-01	4.352E-01
TH-234	6.922E-01	2.607E+00	2.607E+00
U-234	8.297E-01	2.227E-01	2.227E-01
U-238	6.922E-01	2.607E+00	2.607E+00
AM-243	1.841E-01	1.297E-01	1.297E-01
ANH-511	2.276E-02	1.119E-01	1.119E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.133E+01	1.401E+01	1.492E+01	NOT IDENT.
NA-22	-2.632E-02	4.503E-02	4.657E-02	NOT IDENT.
NA-24	-1.000E+41	2.706E+42	0.000E+00	SHORT HLIF
AL-26	-4.921E-02	4.676E-02	5.175E-02	NOT IDENT.
SC-46	4.099E-01	5.212E-01	5.530E-01	FAIL ABUN
V-48	-1.083E+03	1.419E+04	1.420E+04	SHORT HLIF
CR-51	-2.386E+02	4.567E+02	4.692E+02	SHORT HLIF
MN-54	1.255E-02	8.119E-02	8.139E-02	NOT IDENT.

CO-56	3.748E-01	5.922E-01	6.158E-01	FAIL ABUN
MN-56	1.000E+41	1.556E+41	0.000E+00	SHORT HLIF
CO-57	1.064E-03	6.267E-02	6.268E-02	NOT IDENT.
CO-58	6.226E-02	6.938E-01	6.943E-01	NOT IDENT.
FE-59	-1.018E+00	9.025E+00	9.036E+00	NOT IDENT.
CO-60	-1.685E-02	5.808E-02	5.857E-02	NOT IDENT.
ZN-65	1.039E-02	2.414E-01	2.414E-01	NOT IDENT.
GE-68	1.248E+00	2.898E+00	2.953E+00	NOT IDENT.
AS-73	-5.653E+00	1.615E+01	1.635E+01	NOT IDENT.
AS-74	5.299E+03	6.570E+03	6.991E+03	SHORT HLIF
SE-75	4.256E-02	2.074E-01	2.083E-01	NOT IDENT.
BR-77	2.402E+37	2.029E+38	0.000E+00	SHORT HLIF
SR-82	-6.276E+02	7.622E+02	8.130E+02	SHORT HLIF
RB-83	5.219E-01	7.610E-01	7.965E-01	NOT IDENT.
KR-85	9.773E+00	8.901E+00	9.932E+00	NOT IDENT.
SR-85	9.542E-01	8.718E-01	9.721E-01	NOT IDENT.
RB-86	1.295E+02	2.850E+04	2.850E+04	SHORT HLIF
Y-88	-1.860E-03	3.056E-01	3.056E-01	NOT IDENT.
Y-91	-2.971E+02	6.614E+02	6.749E+02	NOT IDENT.
NB-94	-1.909E-02	3.546E-02	3.649E-02	NOT IDENT.
NB-95	-9.519E-02	1.064E+00	1.065E+00	NOT IDENT.
NB-95M	-3.143E-01	3.243E+00	3.246E+00	NOT IDENT.
ZR-95	-1.201E+00	1.713E+00	1.796E+00	NOT IDENT.
NB-97	-1.000E+41	3.662E+41	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.070E+41	0.000E+00	SHORT HLIF
MO-99	1.857E+31	3.846E+31	0.000E+00	SHORT HLIF
TC-99M	1.000E+41	1.175E+42	0.000E+00	SHORT HLIF
RH-101	-2.099E-02	4.909E-02	4.999E-02	NOT IDENT.
RH-102	1.732E-03	7.245E-02	7.246E-02	NOT IDENT.
RU-103	3.490E+00	6.776E+00	6.956E+00	FAIL ABUN
RH-106	-5.514E-01	6.988E-01	7.417E-01	NOT IDENT.
RU-106	-5.514E-01	6.988E-01	7.417E-01	NOT IDENT.
AG-108M	2.233E-02	3.655E-02	3.791E-02	NOT IDENT.
AG-110M	-1.592E-01	1.406E-01	1.578E-01	NOT IDENT.
SN-113	-5.183E-02	2.848E-01	2.857E-01	NOT IDENT.
CD-115	-2.855E+38	4.402E+38	0.000E+00	SHORT HLIF
SN-117M	-3.739E+04	9.658E+04	9.804E+04	SHORT HLIF
TE-123M	-2.479E-02	1.801E-01	1.804E-01	NOT IDENT.
SB-124	6.615E-01	2.207E+00	2.227E+00	NOT IDENT.
SB-125	4.253E-02	1.310E-01	1.324E-01	FAIL ABUN
TE-125M	3.083E+01	3.631E+02	3.633E+02	NOT IDENT.
I-126	-2.240E+05	7.993E+05	8.057E+05	SHORT HLIF
SB-126	1.883E+05	1.099E+06	1.102E+06	SHORT HLIF
SB-127	4.448E+21	9.376E+21	0.000E+00	SHORT HLIF
I-131	-3.460E+09	3.563E+09	3.889E+09	SHORT HLIF
I-132	-1.000E+41	1.818E+42	0.000E+00	SHORT HLIF
TE-132	-3.367E+25	9.050E+25	0.000E+00	SHORT HLIF
BA-133	4.957E-03	4.901E-02	4.907E-02	NOT IDENT.
I-133	1.000E+41	2.305E+41	0.000E+00	SHORT HLIF
CS-134	9.164E-02	6.208E-02	7.457E-02	NOT IDENT.
CS-135	-8.818E-02	1.820E-01	1.862E-01	NOT IDENT.
I-135	1.000E+41	3.288E+43	0.000E+00	SHORT HLIF
CS-136	-7.614E+04	2.744E+05	2.765E+05	SHORT HLIF
BA-137M	3.225E-02	5.563E-02	5.750E-02	NOT IDENT.
CS-137	3.407E-02	5.877E-02	6.075E-02	NOT IDENT.
CE-139	5.385E-02	1.410E-01	1.431E-01	NOT IDENT.
BA-140	2.016E+05	1.126E+06	1.129E+06	SHORT HLIF
LA-140	5.728E+04	4.296E+05	4.304E+05	SHORT HLIF
CE-141	-2.450E+01	2.853E+01	3.059E+01	NOT IDENT.
CE-143	1.000E+41	7.039E+40	0.000E+00	SHORT HLIF
CE-144	2.416E-01	4.409E-01	4.541E-01	NOT IDENT.
PM-144	-5.072E-02	7.073E-02	7.434E-02	NOT IDENT.
PR-144	-4.410E+00	6.115E+00	6.430E+00	NOT IDENT.
PM-146	-1.647E-02	5.999E-02	6.044E-02	NOT IDENT.
ND-147	1.627E+07	2.636E+07	2.736E+07	SHORT HLIF
PM-147	-4.462E+02	1.133E+03	1.151E+03	NOT IDENT.
PM-149	-5.675E+39	6.166E+39	0.000E+00	SHORT HLIF
EU-150	-6.502E-03	3.714E-02	3.726E-02	FAIL ABUN
EU-152	-4.922E-02	1.388E-01	1.405E-01	NOT IDENT.
GD-153	-1.717E-01	2.686E-01	2.795E-01	NOT IDENT.
EU-154	-6.143E-02	1.118E-01	1.151E-01	NOT IDENT.
TB-160	-7.923E-01	2.391E+00	2.418E+00	FAIL ABUN
HO-166M	-2.699E-02	7.350E-02	7.450E-02	FAIL ABUN
TM-171	2.663E+01	3.993E+01	4.169E+01	NOT IDENT.
HF-172	-6.550E-02	3.080E-01	3.094E-01	FAIL ABUN
LU-172	7.884E-03	9.022E-02	9.029E-02	FAIL ABUN
LU-176	1.036E-02	3.042E-02	3.078E-02	FAIL ABUN
HF-181	-9.591E-01	5.221E+00	5.238E+00	NOT IDENT.

TA-182	-1.933E-01	1.204E+00	1.208E+00	FAIL ABUN
RE-183	-2.023E+00	4.851E+00	4.936E+00	NOT IDENT.
RE-184	3.863E+00	3.328E+01	3.332E+01	NOT IDENT.
W-188	-7.816E+01	1.387E+02	1.431E+02	FAIL ABUN
IR-192	-1.180E-03	5.084E-01	5.084E-01	FAIL ABUN
HG-203	-3.171E+00	2.945E+00	3.274E+00	NOT IDENT.
BI-207	6.651E-03	5.532E-02	5.540E-02	FAIL ABUN
PB-210	-3.803E+00	7.501E+00	7.695E+00	NOT IDENT.
BI-211	2.745E+00	6.651E-01	1.405E+00	FAIL ABUN
PB-211	-3.312E-01	9.627E-01	9.742E-01	NOT IDENT.
RN-219	4.588E-01	5.152E-01	5.551E-01	NOT IDENT.
RA-223	1.416E-01	7.818E-01	7.844E-01	FAIL ABUN
AC-227	-5.809E-02	2.905E-01	2.916E-01	FAIL ABUN
TH-227	-5.809E-02	2.905E-01	2.916E-01	FAIL ABUN
TH-229	-5.638E-02	5.944E-01	5.950E-01	FAIL ABUN
PA-231	2.263E-01	6.150E-01	6.234E-01	NOT IDENT.
TH-231	1.416E-01	7.818E-01	7.844E-01	FAIL ABUN
PA-233	1.449E-02	7.586E-02	7.614E-02	FAIL ABUN
PA-234	-1.947E-02	3.477E-01	3.478E-01	FAIL ABUN
PA-234M	6.595E+00	8.391E+00	8.903E+00	FAIL ABUN
U-235	-4.250E-02	2.505E-01	2.512E-01	FAIL ABUN
NP-237	1.449E-02	7.586E-02	7.614E-02	FAIL ABUN
NP-238	5.239E+39	6.636E+40	0.000E+00	SHORT HLIF
NP-239	1.035E-01	3.037E-01	3.073E-01	FAIL ABUN
PU-239	2.056E+02	4.399E+02	4.495E+02	NOT IDENT.
AM-241	8.434E-02	2.272E-01	2.303E-01	NOT IDENT.
CM-243	2.942E-01	2.624E-01	2.940E-01	FAIL ABUN
BK-247	1.245E-02	7.814E-02	7.834E-02	NOT IDENT.
CM-247	4.853E-02	4.773E-02	5.251E-02	NOT IDENT.
CF-249	-1.909E-02	4.887E-02	4.962E-02	NOT IDENT.
CF-251	2.795E-01	2.257E-01	2.585E-01	FAIL ABUN

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	78.5908	87.09	98.0248	136.47	72.7726
45.60	58.0500	87.57	98.1138	140.51	0.0000
46.54	72.2565	88.03	98.1993	143.76	68.6851
49.72	0.0000	88.34	98.2563	144.24	69.9352
51.35	70.1705	88.47	98.2801	145.44	80.9171
51.87	67.2128	89.96	98.5538	152.43	88.9788
52.39	53.0285	1093.63	98.6780	153.25	0.0000
52.97	66.3868	91.11	0.0000	323.87	53.7539
53.44	71.5813	92.59	99.0311	156.02	0.0000
54.07	63.5044	93.35	99.1683	158.56	0.0000
57.36	0.0000	94.56	65.5121	159.00	72.5193
57.53	60.9646	94.65	65.5224	162.33	76.5246
57.98	78.6182	94.67	65.5251	162.66	0.0000
59.27	67.4525	94.87	65.5484	163.33	65.4971
59.32	67.4610	97.43	85.3017	165.86	55.7838
59.54	67.4969	98.43	53.9692	176.31	53.9737
60.96	72.2440	98.44	53.9703	176.60	0.0000
61.17	94.5203	99.53	73.5992	177.52	38.9662
62.93	68.3948	100.11	61.6447	181.07	0.0000
63.29	75.4375	102.03	52.7973	181.52	73.2425
63.58	76.5369	103.18	58.9459	184.41	59.8009
64.28	84.0126	103.37	58.9650	143.76	59.8895
66.73	80.2606	105.21	59.1479	193.51	64.8463
67.24	83.5246	105.31	59.1578	197.03	55.6736
125.81	87.8405	106.12	57.7186	198.01	56.5898
67.75	87.8538	106.47	56.2324	201.83	64.5699
69.67	81.8513	109.28	58.0193	203.43	64.6797
70.83	88.0976	111.00	63.1569	205.31	64.8079
72.81	85.6195	111.76	0.0000	210.85	57.3599
72.87	85.6305	114.06	69.2358	215.65	51.5284
74.66	68.7646	116.30	0.0000	222.11	61.5327
74.82	68.7876	116.74	54.4632	227.09	45.0509
74.97	68.8091	119.76	59.3746	227.38	45.9475
77.11	69.1152	121.12	73.4970	228.16	0.0000
78.74	69.3457	121.22	73.5085	228.18	42.4458
79.69	69.4790	121.78	58.3893	116.74	42.4458
80.12	69.5386	122.06	65.4238	235.69	65.4662
80.19	0.0000	122.92	59.6598	235.96	58.8014
80.57	69.6016	123.07	62.0131	238.63	58.9498
81.00	69.6611	265.00	62.0702	238.98	0.0000
81.07	92.8945	125.81	70.4910	240.99	59.0807
81.75	98.8333	127.23	85.9429	242.00	59.1364
83.79	75.8815	127.91	68.3520	244.70	39.0741
84.00	75.9127	129.30	73.2135	252.40	0.0000
85.43	97.7145	131.20	74.5991	252.80	46.1513
86.55	97.9243	133.02	64.1085	254.15	0.0000
86.79	97.9684	133.52	48.7100	256.23	48.1089
86.94	97.9970	136.00	72.7251	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	27.4353	355.39	0.0000	584.27	20.1577
264.80	27.4384	356.01	22.0963	595.83	0.0000
265.00	30.1876	364.49	0.0000	427.87	20.3145
268.22	52.2883	366.42	0.0000	602.52	0.0000
269.46	39.4875	372.51	32.7784	604.72	16.9617
270.03	52.3706	375.05	28.8554	607.14	23.7728
271.23	38.6282	377.52	36.8765	609.32	26.0631
273.65	0.0000	356.01	37.0324	610.33	26.0762
276.40	36.9515	388.16	33.1229	614.28	23.8514
277.37	47.1516	388.63	0.0000	618.01	23.8925
277.60	46.2362	391.69	30.1813	620.36	22.7799
278.00	48.1015	264.66	25.2975	621.93	25.0758
279.20	51.8540	401.81	24.3037	630.19	0.0000
279.54	46.3114	402.40	23.2995	631.29	14.8805
279.70	49.0966	404.85	38.5551	633.25	16.0394
280.46	41.7123	410.95	27.5004	634.78	0.0000
283.69	33.4600	413.71	22.4467	635.95	16.0588
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	42.8152	423.72	0.0000	645.85	6.9128
285.90	0.0000	427.09	21.6046	657.76	22.0059
287.50	28.9036	427.87	22.6441	657.90	0.0000
290.67	40.6635	433.94	21.6947	661.66	23.2039
293.27	0.0000	439.40	13.9922	664.57	0.0000
351.93	44.0979	453.88	29.2703	666.33	0.0000
295.96	44.1237	463.37	28.3804	666.50	0.0000
879.38	44.2165	468.07	23.7140	667.71	0.0000
299.98	45.2080	473.00	0.0000	677.62	14.8942
300.09	45.2119	475.06	28.5699	685.70	0.0000
300.13	35.3226	476.78	21.1833	695.00	0.0000
301.36	36.7720	477.60	15.8948	696.49	23.8450
302.85	31.1510	482.18	25.4966	696.51	23.8458
256.23	41.5893	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	15.9022
306.78	33.1415	497.08	18.2088	697.49	15.9033
308.46	26.5479	505.52	24.2102	702.65	17.7087
311.90	35.1753	507.63	0.0000	706.68	12.4166
316.51	30.5299	511.00	18.3459	711.68	20.4409
319.41	0.0000	514.00	12.9707	720.70	0.0000
320.08	0.0000	514.00	12.9707	721.93	0.0000
321.04	29.6781	520.40	14.0992	722.78	17.1410
323.87	33.5794	520.69	0.0000	722.91	17.1422
325.23	54.7421	522.65	0.0000	723.31	12.8588
328.76	0.0000	527.90	0.0000	724.19	10.0047
333.37	26.6676	528.26	26.1357	727.33	16.9938
333.97	39.1487	529.59	14.1669	733.00	22.5394
334.37	39.1602	529.87	0.0000	735.93	21.5405
338.28	41.6974	531.02	0.0000	333.97	21.5537
338.32	41.6982	537.26	0.0000	739.50	0.0000
311.90	40.7926	546.56	0.0000	747.24	13.5237
340.48	40.7926	552.55	16.5387	748.06	16.2334
340.55	0.0000	563.25	17.7357	752.31	10.8406
344.28	48.6959	569.33	23.3473	753.82	0.0000
345.93	40.9532	946.00	23.3499	756.73	19.9086
351.06	27.4019	569.70	23.3516	756.80	19.9093
351.93	27.4189	583.19	20.1475	884.68	14.5200

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	20.8873	1274.44	6.2975	1620.50	5.5362
766.42	22.7089	1001.03	10.8399	1621.92	7.3836
766.84	23.6212	1002.74	6.3102	1678.03	0.0000
772.60	0.0000	1004.73	9.4711	1690.97	2.8085
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	3.8000
778.90	13.6913	1028.54	0.0000	1063.66	4.7551
783.70	0.0000	1037.84	12.9564	1771.35	3.5673
785.37	13.7247	1038.76	0.0000	1791.20	0.0000
792.07	27.8868	631.29	7.9946	1808.65	8.6229
794.95	9.1830	1048.07	0.0000	1810.72	0.0000
795.86	7.3491	1049.04	18.0011	1836.06	4.8157
810.06	13.8528	1050.41	13.0063		
810.29	13.8538	1063.66	9.0401		
344.28	13.8547	1077.00	0.0000		
810.76	13.8560	1077.34	9.0764		
815.77	0.0000	1085.87	11.1215		
1048.07	0.0000	1093.63	8.1064		
832.01	13.9645	1099.45	16.2402		
834.85	14.9111	1112.07	11.2061		
835.71	10.2544	1112.84	10.8691		
836.80	0.0000	1115.54	11.4215		
846.75	0.0000	1120.29	16.3379		
846.77	12.1673	1120.55	16.3389		
856.80	0.0000	1221.41	19.6113		
860.56	10.3461	1129.67	11.2625		
871.09	10.3843	1131.51	0.0000		
873.19	11.3368	1147.95	0.0000		
875.33	0.0000	1173.23	13.4729		
879.38	17.0414	1177.95	11.4149		
880.51	6.6298	1189.05	9.3675		
883.24	16.1165	1204.77	15.6793		
884.68	22.7637	1221.41	14.6990		
889.28	12.3502	1231.02	13.6840		
894.76	10.4696	1235.36	0.0000		
898.04	7.6228	1238.28	13.4992		
900.72	15.2598	1260.41	0.0000		
903.28	12.4093	1271.87	6.3831		
911.20	14.3568	1274.44	7.4520		
912.08	14.3610	1274.54	7.4520		
923.98	0.0000	1291.59	10.6921		
926.50	18.4711	1298.22	0.0000		
929.11	15.4058	1312.11	0.0000		
937.49	18.3454	1332.49	10.8026		
944.13	0.0000	1362.66	0.0000		
946.00	12.5874	1365.19	2.1779		
949.00	10.6613	1368.63	0.0000		
667.71	0.0000	1384.29	8.7515		
962.31	18.9116	1408.01	8.8008		
964.08	14.0247	1457.56	0.0000		
966.17	21.8312	1460.82	6.6823		
911.20	26.5334	1489.16	2.2418		
968.97	26.5334	1505.03	7.8741		
983.53	0.0000	1584.12	10.9875		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:52:53.16

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*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621682.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM09.CNF;335
                                       Background date  : 2-OCT-2016 11:00:29.
Sample date      : 12-SEP-2016 00:00:00 Acquisition date : 3-OCT-2016 05:51:50.
Sample ID        : R1203621682          Sample quantity  : 1.55344E+02 GRAM
Detector name    : GAM09                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.23  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	64.30*	1	39	0.82	128.27	124	9	2.62E-04	****	
2	0	111.89	18	23	1.42	223.49	219	9	5.12E-03	53.4	
3	0	185.73*	13	14	1.08	371.24	367	9	3.66E-03	79.8	
4	0	208.62	12	34	3.47	417.04	406	14	3.21E-03	112.5	
5	0	334.87	11	8	1.04	669.63	665	8	3.04E-03	54.0	
6	0	341.72	7	9	1.07	683.36	680	6	1.94E-03	77.6	
7	2	380.75	13	0	1.50	761.45	756	17	3.58E-03	33.8	1.20E+00
8	2	383.53	11	0	1.24	767.00	756	17	2.93E-03	39.1	
9	0	405.26	18	6	1.51	810.47	804	12	5.10E-03	35.3	
10	0	409.12	7	3	0.80	818.21	815	6	1.94E-03	54.4	
11	0	582.97*	9	0	1.14	1166.07	1162	8	2.60E-03	43.7	
12	0	613.53	9	2	0.95	1227.22	1223	8	2.47E-03	43.5	
13	0	1762.89*	7	0	2.25	3527.10	3520	12	1.83E-03	51.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:52:55

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621682.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4
Sample title   : MXR1
Sample date   : 12-SEP-2016 00:00:00 Acquisition date : 3-OCT-2016 05:51:50
Sample ID   : R1203621682   Sample quantity : 155.34 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA9   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.23   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

No interference correction performed

Sample ID : R1203621682 Acquisition date : 3-OCT-2016 05:51:50

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TL-208	277.37	------	6.60	4.352E+00	------	Line Not Found	------
	583.19	10	85.00*	2.382E+00	2.397E-02	2.397E-02	87.37
	860.56	------	12.50	1.758E+00	------	Line Not Found	------

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:52:55.86

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621682.CNF;1  *
* Acquisition date :  3-OCT-2016 05:51:50 Sensitivity     : 3.000        *
* Detector ID      : GAM09                Energy tolerance: 1.500        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****        *
* Sample date      : 12-SEP-2016 00:00:00 Analyst initials: MXR1         *
* Sample ID        : R1203621682          Sample Quantity : 1.5534E+02 GRAM  *
* Batch Number     : 1596386              Wet Weight      :    0.00000   *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000   *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-JUN-2016 07:32:22 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_CAN.CNF;16         *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
TL-208	2.397E-02	2.052E-02	2.596E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-8.887E-02	1.892E-01	3.674E-01	NOT IDENT.
NA-22	4.253E-03	1.265E-02	3.606E-02	NOT IDENT.
NA-24	0.000E+00	3.678E+08	0.000E+00	SHORT HLIF
AL-26	-4.810E-03	1.716E-02	3.790E-02	NOT IDENT.
K-40	-5.137E-02	2.545E-01	6.217E-01	NOT IDENT.
SC-46	2.017E-02	2.132E-02	5.496E-02	NOT IDENT.
V-48	-2.649E-02	3.671E-02	5.763E-02	NOT IDENT.
CR-51	8.597E-02	2.660E-01	5.355E-01	NOT IDENT.
MN-54	-1.273E-03	2.114E-02	4.308E-02	NOT IDENT.
CO-56	2.336E-03	2.194E-02	4.746E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.730E-03	1.091E-02	2.328E-02	NOT IDENT.
CO-58	3.528E-03	1.974E-02	4.454E-02	NOT IDENT.
FE-59	-2.553E-03	3.479E-02	7.753E-02	NOT IDENT.
CO-60	-2.604E-03	1.961E-02	4.301E-02	NOT IDENT.
ZN-65	-4.563E-03	4.251E-02	8.636E-02	NOT IDENT.
GE-68	-6.737E-02	5.353E-01	1.239E+00	NOT IDENT.
AS-73	-5.583E-02	5.123E-01	1.138E+00	NOT IDENT.
AS-74	6.397E-02	7.486E-02	1.744E-01	NOT IDENT.
SE-75	1.456E-02	2.409E-02	5.166E-02	NOT IDENT.
BR-77	-1.198E+01	2.570E+01	4.906E+01	NOT IDENT.
SR-82	3.031E-03	1.915E-01	4.127E-01	NOT IDENT.
RB-83	2.157E-03	3.150E-02	7.091E-02	NOT IDENT.
KR-85	-1.360E+01	5.707E+00	7.515E+00	NOT IDENT.
SR-85	-7.686E-02	3.226E-02	4.248E-02	NOT IDENT.
RB-86	-3.767E-01	5.176E-01	9.158E-01	NOT IDENT.
Y-88	-5.937E-03	2.738E-02	5.733E-02	NOT IDENT.
Y-91	6.040E-01	1.033E+01	2.324E+01	NOT IDENT.
NB-94	-4.716E-03	1.299E-02	2.598E-02	NOT IDENT.

NB-95	4.728E-03	2.482E-02	5.330E-02	NOT IDENT.
NB-95M	-4.224E-02	5.573E-02	9.623E-02	NOT IDENT.
ZR-95	2.268E-04	3.247E-02	7.184E-02	NOT IDENT.
NB-97	0.000E+00	1.926E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	5.237E+08	0.000E+00	SHORT HLIF
MO-99	5.222E-02	2.695E+01	5.834E+01	NOT IDENT.
TC-99M	0.000E+00	3.803E+23	0.000E+00	SHORT HLIF
RH-101	1.665E-03	1.309E-02	2.774E-02	NOT IDENT.
RH-102	2.303E-03	2.421E-02	5.440E-02	NOT IDENT.
RU-103	1.980E-03	2.462E-02	5.283E-02	NOT IDENT.
RH-106	-7.835E-03	1.567E-01	3.333E-01	NOT IDENT.
RU-106	-7.835E-03	1.567E-01	3.333E-01	NOT IDENT.
AG-108M	1.580E-03	1.354E-02	3.017E-02	FAIL ABUN
CD-109	1.202E-01	2.894E-01	6.596E-01	NOT IDENT.
AG-110M	-1.504E-03	2.635E-02	5.493E-02	NOT IDENT.
SN-113	1.075E-02	2.138E-02	5.007E-02	NOT IDENT.
CD-115	-1.635E+01	3.271E+01	6.398E+01	NOT IDENT.
SN-117M	2.227E-02	2.977E-02	6.780E-02	NOT IDENT.
TE-123M	4.223E-03	1.238E-02	2.653E-02	NOT IDENT.
SB-124	-2.635E-02	6.242E-02	1.204E-01	NOT IDENT.
SB-125	2.006E-02	4.066E-02	9.662E-02	NOT IDENT.
TE-125M	-2.087E+00	4.790E+00	8.656E+00	NOT IDENT.
I-126	4.832E-02	1.328E-01	3.148E-01	NOT IDENT.
SB-126	2.954E-02	8.165E-02	1.983E-01	NOT IDENT.
SN-126	3.442E-03	2.831E-02	6.213E-02	FAIL ABUN
SB-127	-5.546E-01	2.061E+00	4.205E+00	NOT IDENT.
I-131	2.759E-02	9.102E-02	1.940E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	4.469E-01	1.055E+00	2.313E+00	FAIL ABUN
BA-133	-1.677E-02	2.147E-02	3.460E-02	FAIL ABUN
I-133	0.000E+00	2.603E+05	0.000E+00	SHORT HLIF
CS-134	4.983E-03	1.168E-02	3.255E-02	NOT IDENT.
CS-135	-5.467E-02	6.373E-02	1.045E-01	NOT IDENT.
I-135	0.000E+00	1.384E+22	0.000E+00	SHORT HLIF
CS-136	2.204E-02	7.257E-02	1.666E-01	FAIL ABUN
BA-137M	-9.637E-03	1.360E-02	2.389E-02	NOT IDENT.
CS-137	-1.018E-02	1.436E-02	2.524E-02	NOT IDENT.
CE-139	-8.951E-03	1.411E-02	2.595E-02	NOT IDENT.
BA-140	-1.247E-01	1.456E-01	2.503E-01	NOT IDENT.
LA-140	5.731E-04	5.935E-02	1.423E-01	NOT IDENT.
CE-141	-2.870E-03	2.750E-02	5.618E-02	NOT IDENT.
CE-143	0.000E+00	1.271E+03	0.000E+00	SHORT HLIF
CE-144	-7.570E-03	7.354E-02	1.526E-01	NOT IDENT.
PM-144	-3.069E-03	1.827E-02	3.703E-02	NOT IDENT.
PR-144	-2.231E-01	1.373E+00	2.787E+00	NOT IDENT.
PM-146	-1.926E-02	2.075E-02	3.664E-02	NOT IDENT.
ND-147	1.245E-01	2.954E-01	7.481E-01	NOT IDENT.
PM-147	1.980E+02	3.233E+02	7.269E+02	NOT IDENT.
PM-149	9.768E+01	2.236E+02	5.083E+02	NOT IDENT.
EU-150	1.677E-02	1.777E-02	2.792E-02	FAIL ABUN
EU-152	-1.298E-02	5.442E-02	9.214E-02	NOT IDENT.
GD-153	-2.553E-02	3.604E-02	6.739E-02	NOT IDENT.
EU-154	1.890E-03	4.046E-02	1.014E-01	NOT IDENT.
EU-155	3.177E-02	4.367E-02	1.013E-01	NOT IDENT.
TB-160	-2.968E-02	6.502E-02	1.214E-01	NOT IDENT.
HO-166M	4.428E-02	3.227E-02	8.518E-02	FAIL ABUN
TM-171	2.683E-01	1.100E+01	2.483E+01	NOT IDENT.
HF-172	1.428E-02	7.586E-02	1.634E-01	FAIL ABUN
LU-172	7.475E-04	3.347E-02	7.028E-02	NOT IDENT.
LU-176	2.893E-03	1.441E-02	2.906E-02	NOT IDENT.
HF-181	-1.425E-02	2.227E-02	4.210E-02	NOT IDENT.
TA-182	-4.335E-02	7.149E-02	1.347E-01	NOT IDENT.
RE-183	-5.963E-02	1.257E-01	2.591E-01	NOT IDENT.
RE-184	1.595E-02	4.256E-02	1.166E-01	NOT IDENT.
W-188	-1.023E+00	3.250E+00	6.110E+00	FAIL ABUN
IR-192	-2.150E-03	2.028E-02	3.871E-02	NOT IDENT.
HG-203	-5.765E-03	1.885E-02	3.537E-02	NOT IDENT.
BI-207	-2.109E-02	2.520E-02	4.133E-02	NOT IDENT.
PB-210	1.559E-01	3.462E+00	7.493E+00	NOT IDENT.
BI-211	-5.137E-02	1.286E-01	2.357E-01	NOT IDENT.
PB-211	8.195E-01	5.665E-01	8.928E-01	FAIL ABUN
BI-212	3.617E-02	2.568E-01	5.596E-01	NOT IDENT.
PB-212	-1.425E-02	2.732E-02	5.174E-02	NOT IDENT.
BI-214	-3.536E-02	4.715E-02	8.404E-02	NOT IDENT.
PB-214	-3.719E-02	5.159E-02	8.837E-02	NOT IDENT.
RN-219	-7.830E-02	1.962E-01	3.494E-01	NOT IDENT.
RN-222	-3.536E-02	4.715E-02	8.404E-02	NOT IDENT.
RA-223	-2.855E-01	3.921E-01	6.556E-01	NOT IDENT.

RA-224	2.232E-01	2.504E-01	5.771E-01	NOT IDENT.
RA-226	-3.536E-02	4.715E-02	8.404E-02	NOT IDENT.
AC-227	-4.156E-02	1.211E-01	2.258E-01	FAIL ABUN
TH-227	-4.156E-02	1.211E-01	2.258E-01	FAIL ABUN
AC-228	-1.613E-02	7.966E-02	1.759E-01	NOT IDENT.
RA-228	-1.613E-02	7.966E-02	1.759E-01	NOT IDENT.
TH-228	-1.425E-02	2.732E-02	5.174E-02	NOT IDENT.
TH-229	2.060E-01	2.227E-01	5.095E-01	NOT IDENT.
TH-230	-3.536E-02	4.715E-02	8.403E-02	NOT IDENT.
PA-231	6.496E-02	1.971E-01	4.245E-01	NOT IDENT.
TH-231	-2.855E-01	3.921E-01	6.556E-01	NOT IDENT.
TH-232	-1.613E-02	7.966E-02	1.759E-01	NOT IDENT.
PA-233	-2.402E-02	3.298E-02	5.517E-02	FAIL ABUN
PA-234	-1.019E-01	1.089E-01	1.278E-01	FAIL ABUN
PA-234M	7.086E-01	2.458E+00	6.086E+00	NOT IDENT.
TH-234	6.815E-02	1.750E+00	1.783E+00	FAIL ABUN
U-234	-3.536E-02	4.715E-02	8.403E-02	NOT IDENT.
U-235	3.252E-02	8.426E-02	1.815E-01	FAIL ABUN
NP-237	-2.402E-02	3.298E-02	5.517E-02	FAIL ABUN
NP-238	0.000E+00	5.766E+01	0.000E+00	SHORT HLIF
U-238	6.815E-02	1.750E+00	1.783E+00	FAIL ABUN
NP-239	-5.100E-02	1.151E-01	2.259E-01	NOT IDENT.
PU-239	1.603E+01	1.392E+02	2.942E+02	NOT IDENT.
AM-241	4.512E-02	9.181E-02	2.104E-01	NOT IDENT.
AM-243	1.691E-03	2.140E-02	4.698E-02	NOT IDENT.
CM-243	-6.058E-03	3.561E-02	7.563E-02	NOT IDENT.
BK-247	-7.744E-04	4.451E-02	8.648E-02	NOT IDENT.
CM-247	-1.091E-03	1.667E-02	3.284E-02	NOT IDENT.
CF-249	3.096E-03	2.105E-02	3.980E-02	FAIL ABUN
CF-251	2.852E-03	5.222E-02	1.077E-01	NOT IDENT.
ANH-511	-3.538E-02	3.504E-02	7.861E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:52:53.89

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TL-208	277.37	------	6.60	4.352E+00	------	Line Not Found	------
	583.19	10	85.00*	2.382E+00	2.397E-02	2.397E-02	87.37
	860.56	------	12.50	1.758E+00	------	Line Not Found	------

Flag: "*" = Keyline

Sample ID : R1203621682 Acquisition date : 3-OCT-2016 05:51:50

Total number of lines in spectrum 13
Number of unidentified lines 4
Number of lines tentatively identified by NID 9 69.23%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.41E+10Y	1.00	2.397E-02	2.397E-02	2.094E-02	87.37	
Total Activity :			2.397E-02	2.397E-02			
Grand Total Activity :			2.397E-02	2.397E-02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R1203621682 Acquisition date : 3-OCT-2016 05:51:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	64.30	1	52	0.82	128.27	124	9	2.62E-04	****	2.39E+00	T
0	111.89	23	29	1.42	223.49	219	9	5.12E-03	****	6.11E+00	T
0	185.73	16	16	1.08	371.24	367	9	3.66E-03	****	5.74E+00	T
0	208.62	14	41	3.47	417.04	406	14	3.21E-03	****	5.36E+00	
0	334.87	12	9	1.04	669.63	665	8	3.04E-03	****	3.74E+00	T
0	341.72	8	10	1.07	683.36	680	6	1.94E-03	****	3.68E+00	T
2	380.75	14	0	1.50	761.45	756	17	3.58E-03	67.6	3.36E+00	
2	383.53	12	0	1.24	767.00	756	17	2.93E-03	78.2	3.34E+00	T
0	405.26	20	6	1.51	810.47	804	12	5.10E-03	70.5	3.20E+00	T
0	409.12	8	3	0.80	818.21	815	6	1.94E-03	****	3.17E+00	
0	613.53	10	2	0.95	1227.22	1223	8	2.47E-03	86.9	2.29E+00	T
0	1762.89	6	0	2.25	3527.10	3520	12	1.83E-03	****	9.66E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:53:07.82

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621682.CNF;1   *
* Acquisition date :  3-OCT-2016 05:51:50 Sensitivity     : 3.000          *
* Detector ID      : GAM09                Energy tolerance: 1.500          *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****          *
* Sample date      : 12-SEP-2016 00:00:00 Nuclide Library : SOLID          *
* Sample ID        : R1203621682          Analyst initials: MXR1           *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000     *
*                                         Dry Weight      :    0.00000     *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  3-JUN-2016 07:32:22 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_CAN.CNF;16          *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
TL-208	9.641E-03

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	1.530E-01	NOT IDENT.
NA-22	1.280E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.198E-02	NOT IDENT.
K-40	2.569E-01	NOT IDENT.
SC-46	2.283E-02	NOT IDENT.
V-48	1.822E-02	NOT IDENT.
CR-51	2.374E-01	NOT IDENT.
MN-54	1.765E-02	NOT IDENT.
CO-56	1.918E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.026E-02	NOT IDENT.
CO-58	1.777E-02	NOT IDENT.
FE-59	2.747E-02	NOT IDENT.
CO-60	1.613E-02	NOT IDENT.
ZN-65	3.346E-02	NOT IDENT.
GE-68	4.715E-01	NOT IDENT.
AS-73	4.888E-01	NOT IDENT.
AS-74	7.601E-02	NOT IDENT.
SE-75	2.290E-02	NOT IDENT.
BR-77	2.151E+01	NOT IDENT.
SR-82	1.646E-01	NOT IDENT.
RB-83	2.860E-02	NOT IDENT.
KR-85	3.163E+00	NOT IDENT.
SR-85	1.788E-02	NOT IDENT.
RB-86	3.428E-01	NOT IDENT.
Y-88	2.051E-02	NOT IDENT.
Y-91	9.185E+00	NOT IDENT.
NB-94	9.715E-03	NOT IDENT.
NB-95	2.226E-02	NOT IDENT.

NB-95M	4.099E-02	NOT IDENT.
ZR-95	2.792E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	2.319E+01	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	1.222E-02	NOT IDENT.
RH-102	2.176E-02	NOT IDENT.
RU-103	2.241E-02	NOT IDENT.
RH-106	1.354E-01	NOT IDENT.
RU-106	1.354E-01	NOT IDENT.
AG-108M	1.259E-02	FAIL ABUN
CD-109	2.897E-01	NOT IDENT.
AG-110M	2.180E-02	NOT IDENT.
SN-113	2.140E-02	NOT IDENT.
CD-115	2.484E+01	NOT IDENT.
SN-117M	3.003E-02	NOT IDENT.
TE-123M	1.174E-02	NOT IDENT.
SB-124	4.267E-02	NOT IDENT.
SB-125	4.072E-02	NOT IDENT.
TE-125M	3.769E+00	NOT IDENT.
I-126	1.276E-01	NOT IDENT.
SB-126	7.875E-02	NOT IDENT.
SN-126	2.715E-02	FAIL ABUN
SB-127	1.701E+00	NOT IDENT.
I-131	8.193E-02	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	1.000E+00	FAIL ABUN
BA-133	1.418E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	1.199E-02	NOT IDENT.
CS-135	4.260E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	6.638E-02	FAIL ABUN
BA-137M	8.465E-03	NOT IDENT.
CS-137	8.942E-03	NOT IDENT.
CE-139	1.137E-02	NOT IDENT.
BA-140	9.041E-02	NOT IDENT.
LA-140	5.048E-02	NOT IDENT.
CE-141	2.447E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	6.583E-02	NOT IDENT.
PM-144	1.512E-02	NOT IDENT.
PR-144	1.138E+00	NOT IDENT.
PM-146	1.470E-02	NOT IDENT.
ND-147	2.969E-01	NOT IDENT.
PM-147	3.236E+02	NOT IDENT.
PM-149	2.132E+02	NOT IDENT.
EU-150	1.205E-02	FAIL ABUN
EU-152	3.901E-02	NOT IDENT.
GD-153	2.902E-02	NOT IDENT.
EU-154	3.592E-02	NOT IDENT.
EU-155	4.493E-02	NOT IDENT.
TB-160	4.493E-02	NOT IDENT.
HO-166M	3.650E-02	FAIL ABUN
TM-171	1.074E+01	NOT IDENT.
HF-172	7.164E-02	FAIL ABUN
LU-172	2.775E-02	NOT IDENT.
LU-176	1.270E-02	NOT IDENT.
HF-181	1.674E-02	NOT IDENT.
TA-182	4.639E-02	NOT IDENT.
RE-183	1.134E-01	NOT IDENT.
RE-184	4.258E-02	NOT IDENT.
W-188	2.551E+00	FAIL ABUN
IR-192	1.677E-02	NOT IDENT.
HG-203	1.501E-02	NOT IDENT.
BI-207	1.467E-02	NOT IDENT.
PB-210	3.308E+00	NOT IDENT.
BI-211	1.031E-01	NOT IDENT.
PB-211	3.901E-01	FAIL ABUN
BI-212	2.295E-01	NOT IDENT.
PB-212	2.263E-02	NOT IDENT.
BI-214	3.558E-02	NOT IDENT.
PB-214	3.883E-02	NOT IDENT.
RN-219	1.426E-01	NOT IDENT.
RN-222	3.558E-02	NOT IDENT.
RA-223	2.831E-01	NOT IDENT.
RA-224	2.538E-01	NOT IDENT.

RA-226	3.558E-02	NOT IDENT.
AC-227	9.723E-02	FAIL ABUN
TH-227	9.723E-02	FAIL ABUN
AC-228	7.258E-02	NOT IDENT.
RA-228	7.258E-02	NOT IDENT.
TH-228	2.263E-02	NOT IDENT.
TH-229	2.267E-01	NOT IDENT.
TH-230	3.557E-02	NOT IDENT.
PA-231	1.807E-01	NOT IDENT.
TH-231	2.831E-01	NOT IDENT.
TH-232	7.258E-02	NOT IDENT.
PA-233	2.309E-02	FAIL ABUN
PA-234	2.980E-02	FAIL ABUN
PA-234M	2.536E+00	NOT IDENT.
TH-234	8.066E-01	FAIL ABUN
U-234	3.557E-02	NOT IDENT.
U-235	8.067E-02	FAIL ABUN
NP-237	2.309E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	8.066E-01	FAIL ABUN
NP-239	9.871E-02	NOT IDENT.
PU-239	1.296E+02	NOT IDENT.
AM-241	9.405E-02	NOT IDENT.
AM-243	2.059E-02	NOT IDENT.
CM-243	3.201E-02	NOT IDENT.
BK-247	3.815E-02	NOT IDENT.
CM-247	1.347E-02	NOT IDENT.
CF-249	1.678E-02	FAIL ABUN
CF-251	4.699E-02	NOT IDENT.
ANH-511	3.676E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:53:13.57

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*****************************************************************************
*                            GEL Laboratories LLC                           *
*                              2040 Savage Road                             *
*                            Charleston, SC 29407                           *
*****************************************************************************
*                                                                           *
*                          DETECTOR AND SAMPLE DATA                         *
*                                                                           *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621682.CNF;1  *
* Acquisition date :  3-OCT-2016 05:51:50 Sensitivity     : 3.000           *
* Detector ID      : GAM09                Energy tolerance: 1.500           *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000          *
* Elapsed real time:    0 01:00:00.23     Half life ratio : *****           *
* Sample date      : 12-SEP-2016 00:00:00 Nuclide Library : SOLID           *
* Sample ID        : R1203621682          Analyst initials: MXR1            *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM *
*                                         Quantity Err(%) : 1.2875E-03 %    *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000      *
*                                         Dry Weight      :    0.00000      *
*****************************************************************************
*                                                                           *
*                          CALIBRATION INFORMATION                          *
*                                                                           *
* Eff. Cal. date   :  3-JUN-2016 07:32:22 Eff. Geometry   : CAN             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM09_CAN.CNF;16            *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
TL-208	2.397E-02	2.055E-02	2.055E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-8.887E-02	1.893E-01	1.935E-01	NOT IDENT.
NA-22	4.253E-03	1.265E-02	1.280E-02	NOT IDENT.
NA-24	-2.518E+08	3.680E+08	3.851E+08	SHORT HLIF
AL-26	-4.810E-03	1.716E-02	1.729E-02	NOT IDENT.
K-40	-5.137E-02	2.545E-01	2.555E-01	NOT IDENT.
SC-46	2.017E-02	2.133E-02	2.319E-02	NOT IDENT.
V-48	-2.649E-02	3.672E-02	3.862E-02	NOT IDENT.
CR-51	8.597E-02	2.660E-01	2.688E-01	NOT IDENT.
MN-54	-1.273E-03	2.114E-02	2.115E-02	NOT IDENT.
CO-56	2.336E-03	2.194E-02	2.197E-02	NOT IDENT.
MN-56	1.000E+41	9.394E+41	0.000E+00	SHORT HLIF
CO-57	1.730E-03	1.091E-02	1.093E-02	NOT IDENT.
CO-58	3.528E-03	1.974E-02	1.980E-02	NOT IDENT.
FE-59	-2.553E-03	3.479E-02	3.481E-02	NOT IDENT.
CO-60	-2.604E-03	1.961E-02	1.964E-02	NOT IDENT.
ZN-65	-4.563E-03	4.251E-02	4.256E-02	NOT IDENT.
GE-68	-6.737E-02	5.353E-01	5.362E-01	NOT IDENT.
AS-73	-5.583E-02	5.124E-01	5.130E-01	NOT IDENT.
AS-74	6.397E-02	7.502E-02	8.038E-02	NOT IDENT.
SE-75	1.456E-02	2.410E-02	2.497E-02	NOT IDENT.
BR-77	-1.198E+01	2.674E+01	2.728E+01	NOT IDENT.
SR-82	3.031E-03	1.915E-01	1.915E-01	NOT IDENT.
RB-83	2.157E-03	3.150E-02	3.151E-02	NOT IDENT.
KR-85	-1.360E+01	5.734E+00	8.393E+00	NOT IDENT.
SR-85	-7.686E-02	3.242E-02	4.745E-02	NOT IDENT.
RB-86	-3.767E-01	5.178E-01	5.449E-01	NOT IDENT.
Y-88	-5.937E-03	2.739E-02	2.752E-02	NOT IDENT.
Y-91	6.040E-01	1.033E+01	1.033E+01	NOT IDENT.
NB-94	-4.716E-03	1.299E-02	1.316E-02	NOT IDENT.

NB-95	4.728E-03	2.482E-02	2.492E-02	NOT IDENT.
NB-95M	-4.224E-02	5.583E-02	5.899E-02	NOT IDENT.
ZR-95	2.268E-04	3.247E-02	3.247E-02	NOT IDENT.
NB-97	1.000E+41	1.926E+41	0.000E+00	SHORT HLIF
ZR-97	-6.946E+08	5.244E+08	6.108E+08	SHORT HLIF
MO-99	5.222E-02	2.695E+01	2.695E+01	NOT IDENT.
TC-99M	-1.279E+23	3.805E+23	0.000E+00	SHORT HLIF
RH-101	1.665E-03	1.309E-02	1.311E-02	NOT IDENT.
RH-102	2.303E-03	2.421E-02	2.423E-02	NOT IDENT.
RU-103	1.980E-03	2.462E-02	2.464E-02	NOT IDENT.
RH-106	-7.835E-03	1.567E-01	1.568E-01	NOT IDENT.
RU-106	-7.835E-03	1.567E-01	1.568E-01	NOT IDENT.
AG-108M	1.580E-03	1.354E-02	1.356E-02	FAIL ABUN
CD-109	1.202E-01	2.896E-01	2.946E-01	NOT IDENT.
AG-110M	-1.504E-03	2.635E-02	2.636E-02	NOT IDENT.
SN-113	1.075E-02	2.138E-02	2.192E-02	NOT IDENT.
CD-115	-1.635E+01	3.272E+01	3.354E+01	NOT IDENT.
SN-117M	2.227E-02	2.978E-02	3.143E-02	NOT IDENT.
TE-123M	4.223E-03	1.238E-02	1.253E-02	NOT IDENT.
SB-124	-2.635E-02	6.243E-02	6.355E-02	NOT IDENT.
SB-125	2.006E-02	4.067E-02	4.166E-02	NOT IDENT.
TE-125M	-2.087E+00	4.792E+00	4.883E+00	NOT IDENT.
I-126	4.832E-02	1.328E-01	1.346E-01	NOT IDENT.
SB-126	2.954E-02	8.170E-02	8.278E-02	NOT IDENT.
SN-126	3.442E-03	2.831E-02	2.835E-02	FAIL ABUN
SB-127	-5.546E-01	2.062E+00	2.077E+00	NOT IDENT.
I-131	2.759E-02	9.103E-02	9.188E-02	NOT IDENT.
I-132	1.000E+41	3.649E+41	0.000E+00	SHORT HLIF
TE-132	4.469E-01	1.056E+00	1.075E+00	FAIL ABUN
BA-133	-1.677E-02	2.148E-02	2.278E-02	FAIL ABUN
I-133	-3.141E+04	2.603E+05	2.607E+05	SHORT HLIF
CS-134	4.983E-03	1.168E-02	1.189E-02	NOT IDENT.
CS-135	-5.467E-02	6.384E-02	6.843E-02	NOT IDENT.
I-135	-1.289E+22	1.519E+22	0.000E+00	SHORT HLIF
CS-136	2.204E-02	7.259E-02	7.327E-02	FAIL ABUN
BA-137M	-9.637E-03	1.360E-02	1.428E-02	NOT IDENT.
CS-137	-1.018E-02	1.437E-02	1.509E-02	NOT IDENT.
CE-139	-8.951E-03	1.423E-02	1.479E-02	NOT IDENT.
BA-140	-1.247E-01	1.457E-01	1.562E-01	NOT IDENT.
LA-140	5.731E-04	5.935E-02	5.935E-02	NOT IDENT.
CE-141	-2.870E-03	2.750E-02	2.753E-02	NOT IDENT.
CE-143	-1.278E+02	1.271E+03	1.272E+03	SHORT HLIF
CE-144	-7.570E-03	7.355E-02	7.362E-02	NOT IDENT.
PM-144	-3.069E-03	1.827E-02	1.832E-02	NOT IDENT.
PR-144	-2.231E-01	1.373E+00	1.377E+00	NOT IDENT.
PM-146	-1.926E-02	2.079E-02	2.253E-02	NOT IDENT.
ND-147	1.245E-01	2.954E-01	3.007E-01	NOT IDENT.
PM-147	1.980E+02	3.234E+02	3.355E+02	NOT IDENT.
PM-149	9.768E+01	2.240E+02	2.283E+02	NOT IDENT.
EU-150	1.677E-02	1.778E-02	1.932E-02	FAIL ABUN
EU-152	-1.298E-02	5.443E-02	5.474E-02	NOT IDENT.
GD-153	-2.553E-02	3.607E-02	3.786E-02	NOT IDENT.
EU-154	1.890E-03	4.046E-02	4.047E-02	NOT IDENT.
EU-155	3.177E-02	4.373E-02	4.601E-02	NOT IDENT.
TB-160	-2.968E-02	6.504E-02	6.641E-02	NOT IDENT.
HO-166M	4.428E-02	3.236E-02	3.802E-02	FAIL ABUN
TM-171	2.683E-01	1.100E+01	1.100E+01	NOT IDENT.
HF-172	1.428E-02	7.589E-02	7.617E-02	FAIL ABUN
LU-172	7.475E-04	3.347E-02	3.348E-02	NOT IDENT.
LU-176	2.893E-03	1.441E-02	1.447E-02	NOT IDENT.
HF-181	-1.425E-02	2.228E-02	2.319E-02	NOT IDENT.
TA-182	-4.335E-02	7.151E-02	7.413E-02	NOT IDENT.
RE-183	-5.963E-02	1.258E-01	1.287E-01	NOT IDENT.
RE-184	1.595E-02	4.258E-02	4.318E-02	NOT IDENT.
W-188	-1.023E+00	3.252E+00	3.285E+00	FAIL ABUN
IR-192	-2.150E-03	2.028E-02	2.031E-02	NOT IDENT.
HG-203	-5.765E-03	1.885E-02	1.903E-02	NOT IDENT.
BI-207	-2.109E-02	2.521E-02	2.694E-02	NOT IDENT.
PB-210	1.559E-01	3.462E+00	3.463E+00	NOT IDENT.
BI-211	-5.137E-02	1.287E-01	1.307E-01	NOT IDENT.
PB-211	8.195E-01	5.680E-01	6.776E-01	FAIL ABUN
BI-212	3.617E-02	2.568E-01	2.573E-01	NOT IDENT.
PB-212	-1.425E-02	2.733E-02	2.808E-02	NOT IDENT.
BI-214	-3.536E-02	4.718E-02	4.980E-02	NOT IDENT.
PB-214	-3.719E-02	5.161E-02	5.426E-02	NOT IDENT.
RN-219	-7.830E-02	1.965E-01	1.996E-01	NOT IDENT.
RN-222	-3.536E-02	4.718E-02	4.980E-02	NOT IDENT.
RA-223	-2.855E-01	3.925E-01	4.131E-01	NOT IDENT.

RA-224	2.232E-01	2.507E-01	2.701E-01	NOT IDENT.
RA-226	-3.536E-02	4.718E-02	4.980E-02	NOT IDENT.
AC-227	-4.156E-02	1.212E-01	1.226E-01	FAIL ABUN
TH-227	-4.156E-02	1.212E-01	1.226E-01	FAIL ABUN
AC-228	-1.613E-02	7.966E-02	7.999E-02	NOT IDENT.
RA-228	-1.613E-02	7.966E-02	7.999E-02	NOT IDENT.
TH-228	-1.425E-02	2.733E-02	2.808E-02	NOT IDENT.
TH-229	2.060E-01	2.229E-01	2.415E-01	NOT IDENT.
TH-230	-3.536E-02	4.718E-02	4.980E-02	NOT IDENT.
PA-231	6.496E-02	1.976E-01	1.998E-01	NOT IDENT.
TH-231	-2.855E-01	3.925E-01	4.131E-01	NOT IDENT.
TH-232	-1.613E-02	7.966E-02	7.999E-02	NOT IDENT.
PA-233	-2.402E-02	3.300E-02	3.473E-02	FAIL ABUN
PA-234	-1.019E-01	1.595E-01	1.660E-01	FAIL ABUN
PA-234M	7.086E-01	2.458E+00	2.479E+00	NOT IDENT.
TH-234	6.815E-02	1.750E+00	1.751E+00	FAIL ABUN
U-234	-3.536E-02	4.718E-02	4.980E-02	NOT IDENT.
U-235	3.252E-02	8.427E-02	8.554E-02	FAIL ABUN
NP-237	-2.402E-02	3.300E-02	3.473E-02	FAIL ABUN
NP-238	-5.091E+01	5.770E+01	6.210E+01	SHORT HLIF
U-238	6.815E-02	1.750E+00	1.751E+00	FAIL ABUN
NP-239	-5.100E-02	1.152E-01	1.175E-01	NOT IDENT.
PU-239	1.603E+01	1.392E+02	1.394E+02	NOT IDENT.
AM-241	4.512E-02	9.188E-02	9.410E-02	NOT IDENT.
AM-243	1.691E-03	2.140E-02	2.141E-02	NOT IDENT.
CM-243	-6.058E-03	3.562E-02	3.572E-02	NOT IDENT.
BK-247	-7.744E-04	4.451E-02	4.451E-02	NOT IDENT.
CM-247	-1.091E-03	1.667E-02	1.668E-02	NOT IDENT.
CF-249	3.096E-03	2.105E-02	2.110E-02	FAIL ABUN
CF-251	2.852E-03	5.222E-02	5.223E-02	NOT IDENT.
ANH-511	-3.538E-02	3.507E-02	3.853E-02	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	14.7458	87.09	12.2447	136.47	23.9822
45.60	18.7603	87.57	14.8843	140.51	22.2058
46.54	9.4101	88.03	13.1464	143.76	10.6742
49.72	11.0940	88.34	11.4013	144.24	13.5954
51.35	19.1175	88.47	11.4046	145.44	16.5393
51.87	14.3616	89.96	16.7223	152.43	24.5808
52.39	13.5858	90.64	40.5448	153.25	22.6417
52.97	16.0121	91.11	43.2324	154.21	13.8013
53.44	13.6300	92.59	14.1613	156.02	22.7340
54.07	13.6563	93.35	21.2759	158.56	11.9050
57.36	0.0000	94.56	41.7712	159.00	15.8833
57.53	16.2333	94.65	41.7787	162.33	16.9564
57.98	21.9436	94.67	41.7805	162.66	17.9624
59.27	17.9468	94.87	24.0117	163.33	11.9863
59.32	17.9494	97.43	16.0924	165.86	25.0603
59.54	17.9606	98.43	16.1252	176.31	16.2688
60.96	25.1371	98.44	16.1255	176.60	20.3439
61.17	25.1519	99.53	10.7740	177.52	15.2767
62.93	19.7808	100.11	12.5843	181.07	11.2555
63.29	19.8004	102.03	12.6325	181.52	13.6509
63.58	19.8161	103.18	12.6611	184.41	11.3043
64.28	19.8539	103.37	11.7611	185.72	11.3234
66.73	23.3157	105.21	14.5272	193.51	11.4356
67.24	18.9000	105.31	12.7138	197.03	14.6178
67.68	10.0175	106.12	13.6432	198.01	16.7263
67.75	18.9253	106.47	17.2930	201.83	19.6049
69.67	14.2650	109.28	20.7407	203.43	14.0306
70.83	19.3569	111.00	21.1136	205.31	15.8199
72.81	11.8414	111.76	21.1435	210.85	12.7388
72.87	11.8433	114.06	12.3091	215.65	7.4724
74.66	16.1443	116.30	17.6119	222.11	12.9044
74.82	13.6006	116.74	21.3365	227.09	15.1388
74.97	13.6056	119.76	19.5862	227.38	19.4705
77.11	17.9501	121.12	14.9586	228.16	9.7436
78.74	20.5942	121.22	14.9612	228.18	9.7439
79.69	11.1802	121.78	17.7838	235.69	19.6477
80.12	12.9133	122.06	16.8560	235.96	20.7453
80.19	12.9153	122.92	18.7569	238.63	15.3296
80.57	12.9268	123.07	19.6998	238.98	15.3354
81.00	10.3518	123.68	20.6597	240.99	8.7817
81.07	10.3535	125.81	15.0802	242.00	17.5823
81.75	9.5057	127.23	17.0061	244.70	5.5100
83.79	11.2864	127.91	17.9717	252.40	13.3297
84.00	11.2918	129.30	17.0653	252.80	11.1127
85.43	10.4568	131.20	16.1684	254.15	0.0000
86.55	18.3450	133.02	19.0787	256.23	16.7271
86.79	11.3625	133.52	14.3207	260.90	7.8425
86.94	11.3663	136.00	22.0470	264.66	13.4945

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.80	12.3716	364.49	7.3577	600.60	4.7380
265.00	19.1234	366.42	7.3685	602.52	0.0000
268.22	14.6702	372.51	4.9352	604.72	9.4963
269.46	7.9090	375.05	8.6532	607.14	10.4589
270.03	6.7828	377.52	9.9077	609.32	8.5668
271.23	11.3177	383.85	4.9772	610.33	11.4282
273.65	7.9410	388.16	8.3217	614.28	8.5884
276.40	12.5116	388.63	8.7408	618.01	4.5893
277.37	7.9692	391.69	7.5090	620.36	6.7004
277.60	9.1096	400.66	8.8173	621.93	6.7058
278.00	12.5304	401.81	10.0850	630.19	0.0000
279.20	13.6853	402.40	7.5670	631.29	4.8122
279.54	12.5489	404.85	5.0535	633.25	8.6704
279.70	14.8325	410.95	7.6128	634.78	4.8206
280.46	13.7014	413.71	10.1699	635.95	4.8234
283.69	17.1790	414.70	12.7213	636.99	5.7910
284.31	16.0427	423.72	8.5337	645.85	3.8774
285.41	8.0297	427.09	7.6981	657.76	5.8499
285.90	5.7381	427.87	5.9906	657.90	0.0000
287.50	11.4932	433.94	7.7338	661.66	5.8608
290.67	11.5268	439.40	6.8996	664.57	0.0000
293.27	0.0000	453.88	13.0600	666.33	3.9160
295.22	11.5747	463.37	4.3800	666.50	3.9162
295.96	11.5823	468.07	7.0288	667.71	0.0000
298.58	10.4488	473.00	8.8135	677.62	7.8737
299.98	12.7869	475.06	11.4723	685.70	6.9154
300.09	12.7879	476.78	8.8342	695.00	7.9375
300.13	12.7886	477.60	10.6064	696.49	7.9430
301.36	8.1472	482.18	9.7503	696.51	7.9430
302.85	15.1503	487.02	6.2231	697.00	8.9377
304.50	15.1725	492.35	7.1354	697.30	5.9595
304.85	16.3447	497.08	9.8392	697.49	5.9600
306.78	14.0336	505.52	8.9901	702.65	4.9782
308.46	16.3969	507.63	0.0000	706.68	2.9924
311.90	16.4460	511.00	14.4307	711.68	1.9995
316.51	15.3324	514.00	41.5621	720.70	3.0114
319.41	17.7351	514.00	41.5621	721.93	0.0000
320.08	16.5622	520.40	5.4414	722.78	6.0283
321.04	17.7594	520.69	7.2565	722.91	6.0286
323.87	22.5492	522.65	0.0000	723.31	7.0347
325.23	17.8226	527.90	7.2865	724.19	7.0373
328.76	10.7251	528.26	8.1991	727.33	6.0405
333.37	3.1900	529.59	4.5585	733.00	8.0742
333.97	7.1810	529.87	0.0000	735.93	7.0741
334.37	7.1834	531.02	2.7374	737.46	4.0449
338.28	12.0108	537.26	7.3255	739.50	5.0606
338.32	12.0111	546.56	0.0000	747.24	1.0155
340.48	8.0214	552.55	8.3123	748.06	2.0318
340.55	9.6265	563.25	6.5030	752.31	2.0356
344.28	12.8740	569.33	8.3888	753.82	3.0553
345.93	7.2512	569.50	8.3895	756.73	4.0788
351.06	15.7751	569.70	7.4580	756.80	4.0789
351.93	21.8578	583.19	2.8170	763.94	7.1601
355.39	0.0000	584.27	2.8186	765.81	7.1655
356.01	14.6188	595.83	7.5622	766.42	9.2153

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
766.84	9.2168	1002.74	6.7175	1678.03	0.0000
772.60	0.0000	1004.73	4.4813	1690.97	4.0400
776.52	5.1414	1021.30	0.0000	1750.46	0.0000
777.92	5.1444	1025.87	0.0000	1764.49	1.6415
778.90	3.0880	1028.54	0.0000	1770.23	1.0272
783.70	5.1569	1037.84	1.1328	1771.35	1.0274
785.37	5.1605	1038.76	0.0000	1791.20	0.0000
792.07	2.0699	1046.59	5.6803	1808.65	0.0000
794.95	2.0723	1048.07	3.4097	1810.72	0.0000
795.86	1.0366	1049.04	4.5479	1836.06	3.1234
801.95	3.1176	1050.41	6.8247		
810.06	7.2982	1063.66	4.5693		
810.29	6.2561	1077.00	5.7361		
810.45	6.2566	1077.34	2.2948		
810.76	4.1715	1085.87	3.4514		
815.77	4.1800	1093.63	4.6133		
818.51	5.2307	1099.45	2.3109		
832.01	4.2072	1112.07	6.9600		
834.85	7.3708	1112.84	3.4807		
835.71	9.4801	1115.54	4.6449		
836.80	0.0000	1120.29	2.3258		
846.75	0.0000	1120.55	2.3260		
846.77	5.2895	1121.30	2.3265		
856.80	10.6205	1129.67	6.9976		
860.56	2.1272	1131.51	0.0000		
871.09	4.2715	1147.95	0.0000		
873.19	4.2749	1173.23	0.8863		
875.33	0.0000	1177.95	0.8875		
879.38	5.3562	1189.05	6.2331		
880.51	5.3585	1204.77	4.4727		
883.24	6.4368	1221.41	4.4940		
884.68	5.3670	1231.02	1.8026		
889.28	2.1505	1235.36	4.5120		
894.76	3.2323	1238.28	0.9031		
898.04	3.2363	1260.41	0.0000		
900.72	6.4790	1271.87	5.4701		
903.28	1.0809	1274.44	1.8247		
911.20	3.2521	1274.54	0.9124		
912.08	8.6751	1291.59	2.7501		
923.98	0.0000	1298.22	0.0000		
926.50	9.8108	1312.11	4.6088		
929.11	5.4555	1332.49	3.7073		
937.49	3.2832	1362.66	0.0000		
944.13	5.4850	1365.19	0.0000		
946.00	4.3910	1368.63	0.0000		
949.00	0.0000	1384.29	1.8790		
954.55	0.0000	1408.01	0.9452		
962.31	3.3123	1457.56	0.0000		
964.08	4.4191	1460.82	1.9155		
966.17	8.8447	1489.16	3.8577		
968.97	3.3199	1505.03	1.9363		
983.53	4.4491	1584.12	0.0000		
984.45	0.0000	1596.21	1.9779		
996.26	1.1171	1620.50	3.9778		
1001.03	1.1189	1621.92	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:53:42.89

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621683.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM19.CNF;561
                                     Background date  : 2-OCT-2016 11:01:07.
Sample date      : 15-DEC-2015 10:14:00 Acquisition date : 3-OCT-2016 05:52:21.
Sample ID        : R1203621683          Sample quantity  : 1.55344E+02 GRAM
Detector name    : GAM19                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.72  0.0%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
*************************************************************************
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.89*	39	117	1.10	94.56	90	10	1.09E-02	54.8	
2	0	63.68*	45	122	2.56	128.14	124	9	1.25E-02	48.3	
3	1	74.72*	110	152	1.30	150.24	144	16	3.06E-02	22.2	2.42E+00
4	1	76.99*	195	152	1.27	154.78	144	16	5.41E-02	13.6	
5	1	87.18	66	93	1.33	175.17	172	20	1.83E-02	26.2	2.28E+00
6	1	92.57*	59	124	1.34	185.96	172	20	1.65E-02	37.8	
7	0	162.75	30	100	1.55	326.36	323	8	8.44E-03	60.1	
8	0	185.58*	87	135	1.22	372.05	366	11	2.41E-02	28.9	
9	5	238.57*	319	93	1.19	478.07	472	17	8.86E-02	7.4	3.85E+00
10	5	241.42	79	120	1.83	483.78	472	17	2.20E-02	35.9	
11	0	263.75	38	59	2.97	528.45	523	10	1.05E-02	41.6	
12	0	270.93	47	83	1.76	542.83	538	11	1.31E-02	40.4	
13	0	295.09*	123	79	1.14	591.17	587	10	3.42E-02	16.6	
14	0	300.20	31	44	1.16	601.39	597	8	8.55E-03	42.0	
15	0	313.45	30	53	0.81	627.89	623	11	8.29E-03	51.3	
16	0	338.49	99	58	1.20	677.99	672	13	2.75E-02	18.8	
17	0	351.84*	228	92	1.24	704.70	698	14	6.32E-02	11.2	
18	0	374.59	15	71	3.43	750.22	741	13	4.06E-03	124.0	
19	0	464.25	40	43	0.78	929.63	923	16	1.10E-02	40.6	
20	0	511.10*	39	35	2.72	1023.37	1016	16	1.09E-02	45.6	
21	0	561.84	22	17	0.46	1124.89	1119	11	6.20E-03	41.1	
22	0	583.43*	90	33	1.31	1168.08	1161	12	2.49E-02	16.9	
23	0	609.18*	161	30	1.56	1219.60	1214	10	4.46E-02	10.4	
24	0	641.78	13	14	1.91	1284.83	1280	8	3.67E-03	58.1	
25	0	662.22	15	30	0.81	1325.74	1317	11	4.20E-03	74.8	
26	0	664.43	16	12	2.81	1330.16	1327	8	4.44E-03	45.1	
27	0	680.15*	9	24	3.01	1361.61	1354	11	2.44E-03	117.9	
28	0	729.88	26	85	6.08	1461.12	1440	27	7.09E-03	103.9	
29	1	856.75	11	2	1.69	1714.97	1713	15	3.07E-03	30.0	2.32E+00
30	1	859.96	36	9	2.07	1721.38	1713	15	1.01E-02	22.9	
31	0	911.21*	56	28	1.13	1823.93	1817	14	1.55E-02	24.8	
32	0	969.78	26	27	1.20	1941.11	1934	11	7.31E-03	43.1	
33	0	986.14	18	7	5.01	1973.86	1966	14	5.00E-03	39.1	
34	0	1063.53*	5	17	1.04	2128.71	2122	14	1.43E-03	277.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1120.28	34	25	0.71	2242.25	2236	14	9.46E-03	35.3	
36	0	1133.88	15	17	1.60	2269.47	2263	12	4.12E-03	62.5	
37	0	1155.08	18	11	1.16	2311.89	2306	11	5.00E-03	42.8	
38	0	1196.03	13	26	3.55	2393.81	2381	18	3.60E-03	97.6	
39	0	1219.64	14	11	3.86	2441.05	2435	13	3.99E-03	52.4	
40	0	1233.98	10	12	1.35	2469.75	2463	11	2.69E-03	79.9	
41	0	1240.44	21	27	8.35	2482.67	2473	21	5.93E-03	63.8	
42	0	1259.20	16	7	0.89	2520.23	2514	13	4.31E-03	42.4	
43	0	1407.89	10	8	0.97	2817.73	2811	10	2.90E-03	58.0	
44	0	1460.58	391	0	2.08	2923.17	2916	15	1.09E-01	5.1	
45	0	1546.00	6	5	0.50	3094.08	3088	10	1.67E-03	80.8	
46	0	1730.41	8	7	1.12	3463.06	3454	14	2.22E-03	78.6	
47	0	1764.31*	33	0	1.68	3530.89	3525	12	9.12E-03	18.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 06:53:45

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621683.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title   : MXR1
Sample date   : 15-DEC-2015 10:14:00 Acquisition date : 3-OCT-2016 05:52:21
Sample ID   : R1203621683   Sample quantity : 155.34 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA19   Detector geometry: CAN
Elapsed live time: 0 01:00:00.00   Elapsed real time: 0 01:00:00.72   0.0%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	242.00	RA-224	240.99
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	74.82	AM-243	74.66
PB-214	74.82	TH-228	74.82
PB-214	74.82	PB-212	74.82
PB-214	351.93	BI-211	351.06

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	1.161E+00	1.478E+01	1.478E+01	10.11	OK
CD-109	88.03	3.70*	5.483E+00	1.215E+00	1.886E+00	90.41	OK
SN-126	64.28	9.60	3.353E+00	8.934E-01	8.934E-01	96.66	OK
	86.94	8.90	5.483E+00	5.049E-01	5.049E-01	90.41	OK
	87.57	37.00*	5.483E+00	1.215E-01	1.215E-01	90.41	OK
BA-137M	661.66	89.90*	2.162E+00	3.982E-02	4.056E-02	149.63	OK
CS-137	661.66	85.10*	2.162E+00	4.207E-02	4.285E-02	149.63	OK
TL-208	277.37	6.60	4.415E+00	----- Line Not Found		-----	Absent
	583.19	85.00*	2.391E+00	2.284E-01	2.284E-01	33.86	OK
	860.56	12.50	1.764E+00	8.193E-01	8.193E-01	45.70	OK
PB-210	46.54	4.25*	9.636E-01	6.312E+00	6.472E+00	109.55	OK
BI-211	72.87	1.23	4.361E+00	----- Line Not Found		-----	Absent
	351.06	12.92*	3.630E+00	2.114E-01	2.114E-01	475.72	OK
PB-212	74.82	10.28	4.535E+00	9.956E-01	9.956E-01	68.61	OK
	77.11	17.10	4.737E+00	1.516E+00	1.516E+00	27.10	OK
	238.63	43.60*	4.961E+00	8.375E-01	8.375E-01	14.79	OK
	300.09	3.30	4.141E+00	1.250E+00	1.250E+00	83.99	OK
BI-214	609.32	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77	OK
	1120.29	14.92	1.437E+00	7.661E-01	7.664E-01	70.67	OK
	1764.49	15.30	9.862E-01	9.947E-01	9.950E-01	37.33	OK
PB-214	74.82	5.80	4.544E+00	----- Line Not Found		-----	<<INT Reject
	77.11	9.70	4.737E+00	2.672E+00	2.673E+00	27.10	OK
	87.09	3.41	5.478E+00	----- Line Not Found		-----	<<INT Reject
	242.00	7.25	4.908E+00	----- Line Not Found		-----	<<INT Reject
	295.22	18.42	4.199E+00	8.854E-01	8.857E-01	33.27	OK
	351.93	35.60*	3.629E+00	----- Line Not Found		-----	<<INT Reject
RN-222	609.32	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77	OK
	1120.29	14.92	1.437E+00	7.661E-01	7.664E-01	70.67	OK
	1764.49	15.30	9.862E-01	9.947E-01	9.950E-01	37.33	OK
RA-224	240.99	4.10*	4.917E+00	6.643E-01	6.643E-01	253.45	OK
RA-226	609.32	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77	OK
	1120.29	14.92	1.437E+00	7.661E-01	7.664E-01	70.67	OK
	1764.49	15.30	9.862E-01	9.947E-01	9.950E-01	37.33	OK
AC-228	105.21	1.10	6.259E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.749E+00	1.287E+00	1.287E+00	37.60	OK
	794.95	4.25	1.875E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.803E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62	OK
	968.97	15.80	1.608E+00	5.081E-01	5.081E-01	86.18	OK
RA-228	105.21	1.10	6.259E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.749E+00	1.287E+00	1.287E+00	37.60	OK
	794.95	4.25	1.875E+00	----- Line Not Found		-----	Absent
	835.71	1.61	1.803E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62	OK
	968.97	15.80	1.608E+00	5.081E-01	5.081E-01	86.18	OK
TH-228	74.82	10.28	4.535E+00	9.956E-01	9.956E-01	68.61	OK
	77.11	17.10	4.737E+00	1.516E+00	1.516E+00	27.10	OK
	238.63	43.60*	4.961E+00	8.375E-01	8.375E-01	14.79	OK
	300.09	3.30	4.141E+00	1.250E+00	1.250E+00	83.99	OK

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
TH-230	609.32	45.49*	2.310E+00	7.886E-01	7.886E-01	20.77	OK
	1120.29	14.92	1.437E+00	7.661E-01	7.661E-01	70.67	OK
	1764.49	15.30	9.862E-01	9.947E-01	9.947E-01	37.33	OK
PA-231	283.69	1.70	4.336E+00	----- Line Not Found		-----	Absent
	301.36	5.35*	4.141E+00	7.713E-01	7.713E-01	83.99	OK
TH-232	105.21	1.10	6.259E+00	----- Line Not Found		-----	Absent
	338.32	11.27	3.749E+00	1.287E+00	1.287E+00	37.60	OK
	835.71	1.61	1.803E+00	----- Line Not Found		-----	Absent
	911.20	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62	OK
	968.97	15.80	1.608E+00	5.081E-01	5.081E-01	86.18	OK
TH-234	63.29	3.70*	3.353E+00	2.318E+00	2.318E+00	96.66	OK
	92.59	4.23	5.782E+00	1.502E+00	1.502E+00	75.65	OK
U-234	609.32	45.49*	2.310E+00	7.886E-01	7.886E-01	20.77	OK
	1120.29	14.92	1.437E+00	7.661E-01	7.661E-01	70.67	OK
	1764.49	15.30	9.862E-01	9.947E-01	9.947E-01	37.33	OK
U-235	89.96	3.47	5.645E+00	----- Line Not Found		-----	Absent
	93.35	5.60	5.782E+00	1.135E+00	1.135E+00	75.65	OK
	143.76	10.96*	6.462E+00	----- Line Not Found		-----	Absent
	163.33	5.08	6.225E+00	5.663E-01	5.663E-01	120.25	OK
	185.72	57.20	5.849E+00	1.511E-01	1.511E-01	57.70	OK
	205.31	5.01	5.506E+00	----- Line Not Found		-----	Absent
U-238	63.29	3.70*	3.353E+00	2.318E+00	2.318E+00	96.66	OK
	92.59	4.23	5.782E+00	1.502E+00	1.502E+00	75.65	OK
AM-243	43.53	5.90	5.190E-01	----- Line Not Found		-----	Absent
	74.66	67.20*	4.535E+00	1.523E-01	1.523E-01	68.61	OK
ANH-511	511.00	100.00*	2.661E+00	7.741E-02	7.741E-02	91.19	OK

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:53:46.30

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

DETECTOR AND SAMPLE DATA

Configuration	: DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621683.CNF;1		
Acquisition date	: 3-OCT-2016 05:52:21	Sensitivity	: 3.000
Detector ID	: GAM19	Energy tolerance	: 1.500
Elapsed live time	: 0 01:00:00.00	Abundance limit	: 75.000
Elapsed real time	: 0 01:00:00.72	Half life ratio	: *****
Sample date	: 15-DEC-2015 10:14:00	Analyst initials	: MXR1
Sample ID	: R1203621683	Sample Quantity	: 1.5534E+02 GRAM
Batch Number	: 1596386	Wet Weight	: 0.00000
Wet wt corr	: 1.00000	Dry Weight	: 0.00000
Nuclide Library	: SOLID.NLB;6		

CALIBRATION INFORMATION

Eff. Cal. date	: 15-JUN-2016 10:35:16	Eff. Geometry	: CAN
Eff. File	: DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;17		

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	1.478E+01	1.465E+00	4.379E-01
CD-109	1.886E+00	1.671E+00	1.847E+00
SN-126	1.215E-01	1.076E-01	1.195E-01
BA-137M	4.056E-02	5.948E-02	8.590E-02
CS-137	4.285E-02	6.284E-02	9.075E-02
TL-208	2.284E-01	7.581E-02	6.514E-02
PB-210	6.472E+00	6.949E+00	5.578E+00
BI-211	2.114E-01	9.857E-01	3.197E-01
PB-212	8.375E-01	1.214E-01	9.323E-02
BI-214	7.889E-01	1.605E-01	1.337E-01
PB-214	9.625E-01	2.113E-01	3.070E-01
RN-222	7.889E-01	1.605E-01	1.337E-01
RA-224	6.643E-01	1.650E+00	9.993E-01
RA-226	7.889E-01	1.605E-01	1.337E-01
AC-228	6.328E-01	3.077E-01	2.093E-01
RA-228	6.328E-01	3.077E-01	2.093E-01
TH-228	8.375E-01	1.214E-01	9.323E-02
TH-230	7.886E-01	1.605E-01	1.337E-01
PA-231	7.713E-01	6.349E-01	7.516E-01
TH-232	6.328E-01	3.077E-01	2.093E-01
TH-234	2.318E+00	2.196E+00	2.008E+00
U-234	7.886E-01	1.605E-01	1.337E-01
U-235	-1.569E-02	1.852E-01	3.562E-01
U-238	2.318E+00	2.196E+00	2.008E+00
AM-243	1.523E-01	1.024E-01	8.309E-02
ANH-511	7.741E-02	6.917E-02	4.729E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	3.314E+00	1.077E+01	2.130E+01	NOT IDENT.
NA-22	-1.406E-02	3.645E-02	6.751E-02	NOT IDENT.
NA-24	0.000E+00	1.944E+41	0.000E+00	SHORT HLIF
AL-26	-1.751E-04	1.855E-02	4.526E-02	NOT IDENT.

SC-46	-1.705E-01	3.690E-01	6.810E-01	FAIL ABUN
V-48	0.000E+00	9.541E+03	0.000E+00	SHORT HLIF
CR-51	0.000E+00	3.314E+02	0.000E+00	SHORT HLIF
MN-54	3.767E-02	7.156E-02	1.475E-01	NOT IDENT.
CO-56	5.172E-02	4.288E-01	8.667E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.521E-03	4.160E-02	8.379E-02	NOT IDENT.
CO-58	-4.803E-01	5.426E-01	9.419E-01	NOT IDENT.
FE-59	-1.647E+00	5.529E+00	1.040E+01	NOT IDENT.
CO-60	2.053E-02	3.768E-02	8.225E-02	NOT IDENT.
ZN-65	4.309E-02	1.803E-01	3.272E-01	NOT IDENT.
GE-68	-1.073E+00	2.335E+00	4.240E+00	NOT IDENT.
AS-73	5.338E+00	7.473E+00	1.503E+01	NOT IDENT.
AS-74	0.000E+00	4.805E+03	0.000E+00	SHORT HLIF
SE-75	0.000E+00	3.485E-01	3.726E-01	FAIL ABUN
BR-77	0.000E+00	2.826E+36	0.000E+00	SHORT HLIF
SR-82	0.000E+00	5.820E+02	0.000E+00	SHORT HLIF
RB-83	5.738E-01	6.676E-01	1.380E+00	NOT IDENT.
KR-85	2.039E+00	7.298E+00	1.285E+01	NOT IDENT.
SR-85	1.983E-01	7.162E-01	1.261E+00	NOT IDENT.
RB-86	0.000E+00	2.205E+04	0.000E+00	SHORT HLIF
Y-88	1.123E-01	2.181E-01	5.169E-01	NOT IDENT.
Y-91	-3.155E+01	5.089E+02	9.708E+02	NOT IDENT.
NB-94	1.064E-02	2.909E-02	6.072E-02	NOT IDENT.
NB-95	-4.601E-01	7.669E-01	1.401E+00	NOT IDENT.
NB-95M	6.454E-01	2.299E+00	4.099E+00	NOT IDENT.
ZR-95	8.271E-02	1.172E+00	2.392E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.304E+41	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.733E+31	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	1.458E-02	3.197E-02	6.551E-02	NOT IDENT.
RH-102	8.140E-03	4.934E-02	9.737E-02	NOT IDENT.
RU-103	7.870E-01	4.890E+00	9.485E+00	FAIL ABUN
RH-106	-9.937E-02	4.267E-01	7.827E-01	NOT IDENT.
RU-106	-9.937E-02	4.267E-01	7.827E-01	NOT IDENT.
AG-108M	-5.318E-03	2.955E-02	5.472E-02	NOT IDENT.
AG-110M	6.053E-02	1.078E-01	2.264E-01	NOT IDENT.
SN-113	-4.512E-02	2.253E-01	4.191E-01	NOT IDENT.
CD-115	0.000E+00	3.315E+38	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	7.074E+04	0.000E+00	SHORT HLIF
TE-123M	2.768E-02	1.322E-01	2.394E-01	NOT IDENT.
SB-124	-1.263E+00	1.582E+00	2.695E+00	NOT IDENT.
SB-125	1.776E-02	8.992E-02	1.776E-01	FAIL ABUN
TE-125M	-2.209E+01	2.696E+02	4.858E+02	NOT IDENT.
I-126	0.000E+00	6.410E+05	0.000E+00	SHORT HLIF
SB-126	0.000E+00	9.210E+05	0.000E+00	SHORT HLIF
SB-127	0.000E+00	6.183E+21	0.000E+00	SHORT HLIF
I-131	0.000E+00	2.608E+09	0.000E+00	SHORT HLIF
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	8.487E+25	0.000E+00	SHORT HLIF
BA-133	2.487E-02	3.920E-02	7.410E-02	NOT IDENT.
I-133	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-134	3.701E-02	5.179E-02	1.103E-01	FAIL ABUN
CS-135	7.550E-02	1.782E-01	2.948E-01	NOT IDENT.
I-135	0.000E+00	8.304E+40	0.000E+00	SHORT HLIF
CS-136	0.000E+00	2.009E+05	0.000E+00	SHORT HLIF
CE-139	-8.301E-02	1.139E-01	1.878E-01	NOT IDENT.
BA-140	0.000E+00	7.854E+05	0.000E+00	SHORT HLIF
LA-140	0.000E+00	2.633E+05	0.000E+00	SHORT HLIF
CE-141	1.371E+01	2.068E+01	4.242E+01	NOT IDENT.
CE-143	0.000E+00	7.289E+40	0.000E+00	SHORT HLIF
CE-144	-2.750E-02	3.441E-01	6.801E-01	NOT IDENT.
PM-144	-3.707E-03	4.791E-02	9.655E-02	NOT IDENT.
PR-144	-3.916E-01	4.135E+00	8.317E+00	NOT IDENT.
PM-146	-5.127E-03	4.791E-02	8.903E-02	NOT IDENT.
ND-147	0.000E+00	2.187E+07	0.000E+00	SHORT HLIF
PM-147	-3.959E+02	7.671E+02	1.486E+03	NOT IDENT.
PM-149	0.000E+00	5.005E+39	0.000E+00	SHORT HLIF
EU-150	5.669E-03	2.525E-02	4.489E-02	FAIL ABUN
EU-152	7.295E-03	8.949E-02	1.658E-01	FAIL ABUN
GD-153	-1.528E-01	1.908E-01	2.968E-01	NOT IDENT.
EU-154	-3.459E-02	8.967E-02	1.661E-01	NOT IDENT.
EU-155	-2.909E-03	1.122E-01	2.039E-01	FAIL ABUN
TB-160	7.745E-01	1.337E+00	3.017E+00	FAIL ABUN
HO-166M	2.364E-02	5.606E-02	1.170E-01	FAIL ABUN
TM-171	-3.701E+00	1.994E+01	3.728E+01	NOT IDENT.
HF-172	-8.116E-02	2.175E-01	4.239E-01	FAIL ABUN

LU-172	-2.952E-03	7.783E-02	1.512E-01	FAIL ABUN
LU-176	2.119E-02	2.302E-02	4.810E-02	FAIL ABUN
HF-181	-3.284E+00	3.694E+00	6.151E+00	NOT IDENT.
TA-182	5.285E-01	9.429E-01	1.801E+00	FAIL ABUN
RE-183	1.885E+00	2.477E+00	4.969E+00	FAIL ABUN
RE-184	-4.287E+00	2.618E+01	5.062E+01	NOT IDENT.
W-188	-2.768E+01	1.096E+02	1.824E+02	FAIL ABUN
IR-192	3.444E-02	4.304E-01	7.538E-01	FAIL ABUN
HG-203	-6.650E-01	2.113E+00	3.952E+00	NOT IDENT.
BI-207	2.275E-02	1.235E-01	2.421E-01	FAIL ABUN
PB-211	1.264E-01	6.678E-01	1.294E+00	NOT IDENT.
BI-212	5.771E-01	5.341E-01	1.158E+00	NOT IDENT.
RN-219	-3.900E-02	3.668E-01	6.909E-01	FAIL ABUN
RA-223	3.872E-02	5.569E-01	1.077E+00	FAIL ABUN
AC-227	-5.665E-02	2.135E-01	4.043E-01	FAIL ABUN
TH-227	-5.665E-02	2.135E-01	4.043E-01	FAIL ABUN
TH-229	-1.583E-01	4.269E-01	8.126E-01	FAIL ABUN
TH-231	3.872E-02	5.569E-01	1.077E+00	FAIL ABUN
PA-233	4.362E-02	6.106E-02	1.151E-01	FAIL ABUN
PA-234	2.645E-02	2.441E-01	4.983E-01	NOT IDENT.
PA-234M	1.203E+00	4.431E+00	9.116E+00	NOT IDENT.
NP-237	4.362E-02	6.106E-02	1.151E-01	FAIL ABUN
NP-238	0.000E+00	4.316E+40	0.000E+00	SHORT HLIF
NP-239	-2.037E-01	2.312E-01	4.375E-01	NOT IDENT.
PU-239	9.139E+01	3.106E+02	6.269E+02	FAIL ABUN
AM-241	6.528E-02	1.291E-01	2.361E-01	NOT IDENT.
CM-243	5.331E-02	9.914E-02	1.893E-01	NOT IDENT.
BK-247	0.000E+00	1.257E-01	1.307E-01	FAIL ABUN
CM-247	1.511E-02	3.430E-02	6.838E-02	NOT IDENT.
CF-249	2.169E-02	3.407E-02	7.007E-02	NOT IDENT.
CF-251	5.004E-02	1.069E-01	2.167E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 06:53:43.72

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	378	10.66*	1.161E+00	1.478E+01	1.478E+01	10.11
CD-109	88.03	85	3.70*	5.483E+00	2.031E+00	3.153E+00	52.40
SN-126	64.28	60	9.60	3.353E+00	8.934E-01	8.934E-01	96.66
	86.94	85	8.90	5.483E+00	8.442E-01	8.442E-01	52.40
	87.57	85	37.00*	5.483E+00	2.031E-01	2.031E-01	52.40
BA-137M	661.66	16	89.90*	2.162E+00	3.982E-02	4.056E-02	149.63
CS-137	661.66	16	85.10*	2.162E+00	4.207E-02	4.285E-02	149.63
TL-208	277.37	------	6.60	4.415E+00	------ Line Not Found		------
	583.19	96	85.00*	2.391E+00	2.284E-01	2.284E-01	33.86
	860.56	37	12.50	1.764E+00	8.193E-01	8.193E-01	45.70
PB-210	46.54	53	4.25*	9.636E-01	6.312E+00	6.472E+00	109.55
BI-211	72.87	------	1.23	4.361E+00	------ Line Not Found		------
	351.06	257	12.92*	3.630E+00	2.651E+00	2.651E+00	22.40
PB-212	74.82	144	10.28	4.535E+00	1.495E+00	1.495E+00	44.32
	77.11	254	17.10	4.737E+00	1.516E+00	1.516E+00	27.10
	238.63	375	43.60*	4.961E+00	8.375E-01	8.375E-01	14.79
	300.09	35	3.30	4.141E+00	1.250E+00	1.250E+00	83.99
BI-214	609.32	171	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77
	1120.29	34	14.92	1.437E+00	7.661E-01	7.664E-01	70.67
	1764.49	31	15.30	9.862E-01	9.947E-01	9.950E-01	37.33
PB-214	74.82	144	5.80	4.535E+00	2.650E+00	2.651E+00	44.32
	77.11	254	9.70	4.737E+00	2.672E+00	2.673E+00	27.10
	87.09	85	3.41	5.483E+00	2.203E+00	2.204E+00	52.40
	242.00	93	7.25	4.917E+00	1.261E+00	1.262E+00	71.79
	295.22	142	18.42	4.199E+00	8.854E-01	8.857E-01	33.27
	351.93	257	35.60*	3.630E+00	9.622E-01	9.625E-01	22.40
RN-222	609.32	171	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77
	1120.29	34	14.92	1.437E+00	7.661E-01	7.664E-01	70.67
	1764.49	31	15.30	9.862E-01	9.947E-01	9.950E-01	37.33
RA-224	240.99	93	4.10*	4.917E+00	2.230E+00	2.230E+00	71.79
RA-226	609.32	171	45.49*	2.310E+00	7.886E-01	7.889E-01	20.77
	1120.29	34	14.92	1.437E+00	7.661E-01	7.664E-01	70.67
	1764.49	31	15.30	9.862E-01	9.947E-01	9.950E-01	37.33
AC-228	105.21	------	1.10	6.259E+00	------ Line Not Found		------
	338.32	113	11.27	3.749E+00	1.287E+00	1.287E+00	37.60
	794.95	------	4.25	1.875E+00	------ Line Not Found		------
	835.71	------	1.61	1.803E+00	------ Line Not Found		------
	911.20	57	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62
	968.97	27	15.80	1.608E+00	5.081E-01	5.081E-01	86.18
RA-228	105.21	------	1.10	6.259E+00	------ Line Not Found		------
	338.32	113	11.27	3.749E+00	1.287E+00	1.287E+00	37.60
	794.95	------	4.25	1.875E+00	------ Line Not Found		------
	835.71	------	1.61	1.803E+00	------ Line Not Found		------
	911.20	57	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62
	968.97	27	15.80	1.608E+00	5.081E-01	5.081E-01	86.18
TH-228	74.82	144	10.28	4.535E+00	1.495E+00	1.495E+00	44.32
	77.11	254	17.10	4.737E+00	1.516E+00	1.516E+00	27.10

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	375	43.60*	4.961E+00	8.375E-01	8.375E-01	14.79
	300.09	35	3.30	4.141E+00	1.250E+00	1.250E+00	83.99
TH-230	609.32	171	45.49*	2.310E+00	7.886E-01	7.886E-01	20.77
	1120.29	34	14.92	1.437E+00	7.661E-01	7.661E-01	70.67
	1764.49	31	15.30	9.862E-01	9.947E-01	9.947E-01	37.33
PA-231	283.69	------	1.70	4.336E+00	------ Line Not Found		------
	301.36	35	5.35*	4.141E+00	7.713E-01	7.713E-01	83.99
TH-232	105.21	------	1.10	6.259E+00	------ Line Not Found		------
	338.32	113	11.27	3.749E+00	1.287E+00	1.287E+00	37.60
	835.71	------	1.61	1.803E+00	------ Line Not Found		------
	911.20	57	25.80*	1.687E+00	6.328E-01	6.328E-01	49.62
	968.97	27	15.80	1.608E+00	5.081E-01	5.081E-01	86.18
TH-234	63.29	60	3.70*	3.353E+00	2.318E+00	2.318E+00	96.66
	92.59	76	4.23	5.782E+00	1.502E+00	1.502E+00	75.65
U-234	609.32	171	45.49*	2.310E+00	7.886E-01	7.886E-01	20.77
	1120.29	34	14.92	1.437E+00	7.661E-01	7.661E-01	70.67
	1764.49	31	15.30	9.862E-01	9.947E-01	9.947E-01	37.33
U-235	89.96	------	3.47	5.645E+00	------ Line Not Found		------
	93.35	76	5.60	5.782E+00	1.135E+00	1.135E+00	75.65
	143.76	------	10.96*	6.462E+00	------ Line Not Found		------
	163.33	37	5.08	6.225E+00	5.663E-01	5.663E-01	120.25
	185.72	105	57.20	5.849E+00	1.511E-01	1.511E-01	57.70
	205.31	------	5.01	5.506E+00	------ Line Not Found		------
U-238	63.29	60	3.70*	3.353E+00	2.318E+00	2.318E+00	96.66
	92.59	76	4.23	5.782E+00	1.502E+00	1.502E+00	75.65
AM-243	43.53	------	5.90	5.190E-01	------ Line Not Found		------
	74.66	144	67.20*	4.535E+00	2.287E-01	2.287E-01	44.32
ANH-511	511.00	43	100.00*	2.661E+00	7.741E-02	7.741E-02	91.19

Flag: "*" = Keyline

Sample ID : R1203621683 Acquisition date : 3-OCT-2016 05:52:21

Total number of lines in spectrum 47
Number of unidentified lines 12
Number of lines tentatively identified by NID 35 74.47%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.478E+01	1.478E+01	0.149E+01	10.11	
CD-109	461.40D	1.55	2.031E+00	3.153E+00	1.652E+00	52.40	
SN-126	2.30E+05Y	1.00	2.031E-01	2.031E-01	1.064E-01	52.40	
BA-137M	30.08Y	1.02	3.982E-02	4.056E-02	6.070E-02	149.63	
CS-137	30.08Y	1.02	4.207E-02	4.285E-02	6.412E-02	149.63	
TL-208	1.41E+10Y	1.00	2.284E-01	2.284E-01	0.774E-01	33.86	
PB-210	22.20Y	1.03	6.312E+00	6.472E+00	7.090E+00	109.55	
BI-211	7.04E+08Y	1.00	2.651E+00	2.651E+00	0.594E+00	22.40	
PB-212	1.41E+10Y	1.00	8.375E-01	8.375E-01	1.239E-01	14.79	
BI-214	1600.00Y	1.00	7.886E-01	7.889E-01	1.638E-01	20.77	
PB-214	1600.00Y	1.00	9.622E-01	9.625E-01	2.156E-01	22.40	
RN-222	1600.00Y	1.00	7.886E-01	7.889E-01	1.638E-01	20.77	
RA-224	1.41E+10Y	1.00	2.230E+00	2.230E+00	1.601E+00	71.79	
RA-226	1600.00Y	1.00	7.886E-01	7.889E-01	1.638E-01	20.77	
AC-228	1.41E+10Y	1.00	6.328E-01	6.328E-01	3.139E-01	49.62	
RA-228	1.41E+10Y	1.00	6.328E-01	6.328E-01	3.139E-01	49.62	
TH-228	1.41E+10Y	1.00	8.375E-01	8.375E-01	1.239E-01	14.79	
TH-230	7.54E+04Y	1.00	7.886E-01	7.886E-01	1.638E-01	20.77	
PA-231	7.04E+08Y	1.00	7.713E-01	7.713E-01	6.478E-01	83.99	
TH-232	1.41E+10Y	1.00	6.328E-01	6.328E-01	3.139E-01	49.62	
TH-234	4.47E+09Y	1.00	2.318E+00	2.318E+00	2.241E+00	96.66	
U-234	2.45E+05Y	1.00	7.886E-01	7.886E-01	1.638E-01	20.77	
U-235	7.04E+08Y	1.00	1.511E-01	1.511E-01	0.872E-01	57.70	K
U-238	4.47E+09Y	1.00	2.318E+00	2.318E+00	2.241E+00	96.66	
AM-243	7370.00Y	1.00	2.287E-01	2.287E-01	1.014E-01	44.32	
ANH-511	1.00E+09Y	1.00	7.741E-02	7.741E-02	7.059E-02	91.19	
Total Activity :			4.286E+01	4.414E+01			

Grand Total Activity : 4.286E+01 4.414E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R1203621683 Acquisition date : 3-OCT-2016 05:52:21

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	263.75	44	69	2.97	528.45	523	10	1.05E-02	83.3	4.59E+00	T
0	270.93	55	96	1.76	542.83	538	11	1.31E-02	80.7	4.50E+00	T
0	313.45	34	61	0.81	627.89	623	11	8.29E-03	****	4.00E+00	
0	374.59	16	80	3.43	750.22	741	13	4.06E-03	****	3.44E+00	T
0	464.25	44	48	0.78	929.63	923	16	1.10E-02	81.3	2.88E+00	T
0	561.84	24	18	0.46	1124.89	1119	11	6.20E-03	82.3	2.46E+00	T
0	641.78	14	15	1.91	1284.83	1280	8	3.67E-03	****	2.22E+00	
0	664.43	17	13	2.81	1330.16	1327	8	4.44E-03	90.1	2.16E+00	T
0	680.15	9	26	3.01	1361.61	1354	11	2.44E-03	****	2.12E+00	
0	729.88	27	90	6.08	1461.12	1440	27	7.09E-03	****	2.00E+00	
1	856.75	11	2	1.69	1714.97	1713	15	3.07E-03	59.9	1.77E+00	T
0	986.14	18	7	5.01	1973.86	1966	14	5.00E-03	78.2	1.59E+00	
0	1063.53	5	17	1.04	2128.71	2122	14	1.43E-03	****	1.50E+00	T
0	1133.88	15	17	1.60	2269.47	2263	12	4.12E-03	****	1.42E+00	
0	1155.08	18	11	1.16	2311.89	2306	11	5.00E-03	85.5	1.40E+00	
0	1196.03	13	26	3.55	2393.81	2381	18	3.60E-03	****	1.36E+00	
0	1219.64	14	10	3.86	2441.05	2435	13	3.99E-03	****	1.34E+00	
0	1233.98	10	12	1.35	2469.75	2463	11	2.69E-03	****	1.33E+00	T
0	1240.44	21	26	8.35	2482.67	2473	21	5.93E-03	****	1.33E+00	
0	1259.20	15	6	0.89	2520.23	2514	13	4.31E-03	84.7	1.31E+00	T
0	1407.89	10	7	0.97	2817.73	2811	10	2.90E-03	****	1.20E+00	T
0	1546.00	6	5	0.50	3094.08	3088	10	1.67E-03	****	1.11E+00	
0	1730.41	8	7	1.12	3463.06	3454	14	2.22E-03	****	1.00E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:54:00.18

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621683.CNF;1   *
* Acquisition date :  3-OCT-2016 05:52:21 Sensitivity     : 3.000       *
* Detector ID      : GAM19                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.72     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : SOLID       *
* Sample ID        : R1203621683          Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-JUN-2016 10:35:16 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;17        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	1.656E-01
CD-109	8.702E-01
SN-126	5.631E-02
BA-137M	3.944E-02
CS-137	4.166E-02
TL-208	2.926E-02
PB-210	2.600E+00
BI-211	1.453E-01
PB-212	4.344E-02
BI-214	6.046E-02
PB-214	1.483E-01
RN-222	6.046E-02
RA-224	4.656E-01
RA-226	6.046E-02
AC-228	8.933E-02
RA-228	8.933E-02
TH-228	4.344E-02
TH-230	6.044E-02
PA-231	3.448E-01
TH-232	8.933E-02
TH-234	9.460E-01
U-234	6.044E-02
U-235	1.683E-01
U-238	9.460E-01
AM-243	3.922E-02
ANH-511	2.110E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	9.606E+00	NOT IDENT.
NA-22	2.744E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.582E-02	NOT IDENT.
SC-46	2.968E-01	FAIL ABUN

V-48	0.000E+00	SHORT HLIF
CR-51	0.000E+00	SHORT HLIF
MN-54	6.668E-02	NOT IDENT.
CO-56	3.815E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	3.925E-02	NOT IDENT.
CO-58	4.070E-01	NOT IDENT.
FE-59	4.429E+00	NOT IDENT.
CO-60	3.526E-02	NOT IDENT.
ZN-65	1.427E-01	NOT IDENT.
GE-68	1.826E+00	NOT IDENT.
AS-73	7.068E+00	NOT IDENT.
AS-74	0.000E+00	SHORT HLIF
SE-75	1.724E-01	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	0.000E+00	SHORT HLIF
RB-83	6.297E-01	NOT IDENT.
KR-85	5.806E+00	NOT IDENT.
SR-85	5.694E-01	NOT IDENT.
RB-86	0.000E+00	SHORT HLIF
Y-88	2.119E-01	NOT IDENT.
Y-91	4.252E+02	NOT IDENT.
NB-94	2.711E-02	NOT IDENT.
NB-95	6.180E-01	NOT IDENT.
NB-95M	1.918E+00	NOT IDENT.
ZR-95	1.046E+00	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	SHORT HLIF
RH-101	3.090E-02	NOT IDENT.
RH-102	4.248E-02	NOT IDENT.
RU-103	4.262E+00	FAIL ABUN
RH-106	3.398E-01	NOT IDENT.
RU-106	3.398E-01	NOT IDENT.
AG-108M	2.490E-02	NOT IDENT.
AG-110M	1.012E-01	NOT IDENT.
SN-113	1.911E-01	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	0.000E+00	SHORT HLIF
TE-123M	1.125E-01	NOT IDENT.
SB-124	9.548E-01	NOT IDENT.
SB-125	7.975E-02	FAIL ABUN
TE-125M	2.289E+02	NOT IDENT.
I-126	0.000E+00	SHORT HLIF
SB-126	0.000E+00	SHORT HLIF
SB-127	0.000E+00	SHORT HLIF
I-131	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.383E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.968E-02	FAIL ABUN
CS-135	1.379E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	0.000E+00	SHORT HLIF
CE-139	8.778E-02	NOT IDENT.
BA-140	0.000E+00	SHORT HLIF
LA-140	0.000E+00	SHORT HLIF
CE-141	2.006E+01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	3.204E-01	NOT IDENT.
PM-144	4.260E-02	NOT IDENT.
PR-144	3.667E+00	NOT IDENT.
PM-146	4.059E-02	NOT IDENT.
ND-147	0.000E+00	SHORT HLIF
PM-147	6.964E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.054E-02	FAIL ABUN
EU-152	7.567E-02	FAIL ABUN
GD-153	1.390E-01	NOT IDENT.
EU-154	6.751E-02	NOT IDENT.
EU-155	9.597E-02	FAIL ABUN
TB-160	1.297E+00	FAIL ABUN
HO-166M	5.246E-02	FAIL ABUN
TM-171	1.751E+01	NOT IDENT.
HF-172	1.992E-01	FAIL ABUN
LU-172	6.593E-02	FAIL ABUN

LU-176	2.226E-02	FAIL ABUN
HF-181	2.713E+00	NOT IDENT.
TA-182	7.929E-01	FAIL ABUN
RE-183	2.340E+00	FAIL ABUN
RE-184	2.212E+01	NOT IDENT.
W-188	8.383E+01	FAIL ABUN
IR-192	3.443E-01	FAIL ABUN
HG-203	1.827E+00	NOT IDENT.
BI-207	1.151E-01	FAIL ABUN
PB-211	5.915E-01	NOT IDENT.
BI-212	5.291E-01	NOT IDENT.
RN-219	3.137E-01	FAIL ABUN
RA-223	4.947E-01	FAIL ABUN
AC-227	1.868E-01	FAIL ABUN
TH-227	1.868E-01	FAIL ABUN
TH-229	3.788E-01	FAIL ABUN
TH-231	4.947E-01	FAIL ABUN
PA-233	5.313E-02	FAIL ABUN
PA-234	2.153E-01	NOT IDENT.
PA-234M	4.054E+00	NOT IDENT.
NP-237	5.313E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.052E-01	NOT IDENT.
PU-239	2.965E+02	FAIL ABUN
AM-241	1.110E-01	NOT IDENT.
CM-243	8.913E-02	NOT IDENT.
BK-247	6.034E-02	FAIL ABUN
CM-247	3.128E-02	NOT IDENT.
CF-249	3.195E-02	NOT IDENT.
CF-251	1.017E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 06:54:06.32

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621683.CNF;1   *
* Acquisition date :  3-OCT-2016 05:52:21 Sensitivity     : 3.000       *
* Detector ID      : GAM19                Energy tolerance: 1.500       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.72     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : SOLID       *
* Sample ID        : R1203621683          Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.5534E+02 GRAM   *
*                                         Quantity Err(%) : 1.2875E-03 %      *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 15-JUN-2016 10:35:16 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;17        *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	1.478E+01	1.657E+00	1.657E+00
CD-109	1.886E+00	1.685E+00	1.685E+00
SN-126	1.215E-01	1.084E-01	1.084E-01
BA-137M	4.056E-02	5.951E-02	5.951E-02
CS-137	4.285E-02	6.286E-02	6.286E-02
TL-208	2.284E-01	7.643E-02	7.643E-02
PB-210	6.472E+00	6.972E+00	6.972E+00
BI-211	2.114E-01	9.970E-01	9.970E-01
PB-212	8.375E-01	1.293E-01	1.293E-01
BI-214	7.889E-01	1.641E-01	1.641E-01
PB-214	9.625E-01	2.151E-01	2.151E-01
RN-222	7.889E-01	1.641E-01	1.641E-01
RA-224	6.643E-01	1.654E+00	1.654E+00
RA-226	7.889E-01	1.641E-01	1.641E-01
AC-228	6.328E-01	3.094E-01	3.094E-01
RA-228	6.328E-01	3.094E-01	3.094E-01
TH-228	8.375E-01	1.293E-01	1.293E-01
TH-230	7.886E-01	1.641E-01	1.641E-01
PA-231	7.713E-01	6.559E-01	6.559E-01
TH-232	6.328E-01	3.094E-01	3.094E-01
TH-234	2.318E+00	2.255E+00	2.255E+00
U-234	7.886E-01	1.641E-01	1.641E-01
U-235	-1.569E-02	1.853E-01	1.853E-01
U-238	2.318E+00	2.255E+00	2.255E+00
AM-243	1.523E-01	1.033E-01	1.033E-01
ANH-511	7.741E-02	6.925E-02	6.925E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	3.314E+00	1.077E+01	1.088E+01	NOT IDENT.
NA-22	-1.406E-02	3.645E-02	3.700E-02	NOT IDENT.
NA-24	-1.000E+41	1.990E+41	0.000E+00	SHORT HLIF
AL-26	-1.751E-04	1.855E-02	1.855E-02	NOT IDENT.

SC-46	-1.705E-01	3.691E-01	3.770E-01	FAIL ABUN
V-48	-5.324E+02	9.541E+03	9.544E+03	SHORT HLIF
CR-51	-1.067E+02	3.315E+02	3.349E+02	SHORT HLIF
MN-54	3.767E-02	7.158E-02	7.357E-02	NOT IDENT.
CO-56	5.172E-02	4.288E-01	4.294E-01	NOT IDENT.
MN-56	1.000E+41	8.061E+41	0.000E+00	SHORT HLIF
CO-57	1.521E-03	4.160E-02	4.161E-02	NOT IDENT.
CO-58	-4.803E-01	5.429E-01	5.845E-01	NOT IDENT.
FE-59	-1.647E+00	5.530E+00	5.580E+00	NOT IDENT.
CO-60	2.053E-02	3.769E-02	3.881E-02	NOT IDENT.
ZN-65	4.309E-02	1.803E-01	1.814E-01	NOT IDENT.
GE-68	-1.073E+00	2.335E+00	2.385E+00	NOT IDENT.
AS-73	5.338E+00	7.554E+00	7.928E+00	NOT IDENT.
AS-74	9.348E+02	4.805E+03	4.824E+03	SHORT HLIF
SE-75	4.270E-01	3.491E-01	3.986E-01	FAIL ABUN
BR-77	1.950E+37	1.648E+38	0.000E+00	SHORT HLIF
SR-82	-1.067E+02	5.820E+02	5.840E+02	SHORT HLIF
RB-83	5.738E-01	6.723E-01	7.203E-01	NOT IDENT.
KR-85	2.039E+00	7.299E+00	7.356E+00	NOT IDENT.
SR-85	1.983E-01	7.162E-01	7.218E-01	NOT IDENT.
RB-86	-1.014E+04	2.206E+04	2.252E+04	SHORT HLIF
Y-88	1.123E-01	2.182E-01	2.240E-01	NOT IDENT.
Y-91	-3.155E+01	5.089E+02	5.091E+02	NOT IDENT.
NB-94	1.064E-02	2.910E-02	2.949E-02	NOT IDENT.
NB-95	-4.601E-01	7.671E-01	7.947E-01	NOT IDENT.
NB-95M	6.454E-01	2.300E+00	2.318E+00	NOT IDENT.
ZR-95	8.271E-02	1.172E+00	1.172E+00	NOT IDENT.
NB-97	-1.000E+41	3.620E+42	0.000E+00	SHORT HLIF
ZR-97	1.000E+41	1.305E+41	0.000E+00	SHORT HLIF
MO-99	-4.545E+30	2.733E+31	0.000E+00	SHORT HLIF
TC-99M	-1.000E+41	1.524E+42	0.000E+00	SHORT HLIF
RH-101	1.458E-02	3.208E-02	3.274E-02	NOT IDENT.
RH-102	8.140E-03	4.934E-02	4.948E-02	NOT IDENT.
RU-103	7.870E-01	4.890E+00	4.903E+00	FAIL ABUN
RH-106	-9.937E-02	4.267E-01	4.290E-01	NOT IDENT.
RU-106	-9.937E-02	4.267E-01	4.290E-01	NOT IDENT.
AG-108M	-5.318E-03	2.955E-02	2.965E-02	NOT IDENT.
AG-110M	6.053E-02	1.079E-01	1.113E-01	NOT IDENT.
SN-113	-4.512E-02	2.254E-01	2.263E-01	NOT IDENT.
CD-115	-1.346E+37	3.315E+38	0.000E+00	SHORT HLIF
SN-117M	1.211E+04	7.075E+04	7.097E+04	SHORT HLIF
TE-123M	2.768E-02	1.323E-01	1.328E-01	NOT IDENT.
SB-124	-1.263E+00	1.583E+00	1.683E+00	NOT IDENT.
SB-125	1.776E-02	8.992E-02	9.028E-02	FAIL ABUN
TE-125M	-2.209E+01	2.696E+02	2.698E+02	NOT IDENT.
I-126	-3.605E+05	6.428E+05	6.630E+05	SHORT HLIF
SB-126	2.005E+05	9.218E+05	9.262E+05	SHORT HLIF
SB-127	-5.356E+21	9.484E+21	0.000E+00	SHORT HLIF
I-131	-1.207E+09	2.609E+09	2.665E+09	SHORT HLIF
I-132	1.000E+41	1.829E+42	0.000E+00	SHORT HLIF
TE-132	-5.959E+25	8.811E+25	0.000E+00	SHORT HLIF
BA-133	2.487E-02	3.922E-02	4.079E-02	NOT IDENT.
I-133	-1.000E+41	1.357E+42	0.000E+00	SHORT HLIF
CS-134	3.701E-02	5.182E-02	5.444E-02	FAIL ABUN
CS-135	7.550E-02	1.783E-01	1.815E-01	NOT IDENT.
I-135	1.000E+41	6.668E+41	0.000E+00	SHORT HLIF
CS-136	-6.309E+04	2.010E+05	2.030E+05	SHORT HLIF
CE-139	-8.301E-02	1.151E-01	1.210E-01	NOT IDENT.
BA-140	5.720E+05	7.858E+05	8.270E+05	SHORT HLIF
LA-140	1.067E+04	2.633E+05	2.634E+05	SHORT HLIF
CE-141	1.371E+01	2.069E+01	2.159E+01	NOT IDENT.
CE-143	1.000E+41	7.358E+40	0.000E+00	SHORT HLIF
CE-144	-2.750E-02	3.441E-01	3.443E-01	NOT IDENT.
PM-144	-3.707E-03	4.791E-02	4.794E-02	NOT IDENT.
PR-144	-3.916E-01	4.135E+00	4.138E+00	NOT IDENT.
PM-146	-5.127E-03	4.792E-02	4.797E-02	NOT IDENT.
ND-147	2.769E+07	2.193E+07	2.523E+07	SHORT HLIF
PM-147	-3.959E+02	7.673E+02	7.878E+02	NOT IDENT.
PM-149	4.328E+39	5.091E+39	0.000E+00	SHORT HLIF
EU-150	5.669E-03	2.525E-02	2.538E-02	FAIL ABUN
EU-152	7.295E-03	8.949E-02	8.955E-02	FAIL ABUN
GD-153	-1.528E-01	1.910E-01	2.031E-01	NOT IDENT.
EU-154	-3.459E-02	8.968E-02	9.103E-02	NOT IDENT.
EU-155	-2.909E-03	1.122E-01	1.122E-01	FAIL ABUN
TB-160	7.745E-01	1.338E+00	1.382E+00	FAIL ABUN
HO-166M	2.364E-02	5.607E-02	5.708E-02	FAIL ABUN
TM-171	-3.701E+00	1.994E+01	2.001E+01	NOT IDENT.
HF-172	-8.116E-02	2.179E-01	2.209E-01	FAIL ABUN

LU-172	-2.952E-03	7.783E-02	7.784E-02	FAIL ABUN
LU-176	2.119E-02	2.303E-02	2.494E-02	FAIL ABUN
HF-181	-3.284E+00	3.697E+00	3.982E+00	NOT IDENT.
TA-182	5.285E-01	9.432E-01	9.728E-01	FAIL ABUN
RE-183	1.885E+00	2.494E+00	2.635E+00	FAIL ABUN
RE-184	-4.287E+00	2.620E+01	2.627E+01	NOT IDENT.
W-188	-2.768E+01	1.096E+02	1.103E+02	FAIL ABUN
IR-192	3.444E-02	4.304E-01	4.307E-01	FAIL ABUN
HG-203	-6.650E-01	2.113E+00	2.135E+00	NOT IDENT.
BI-207	2.275E-02	1.235E-01	1.239E-01	FAIL ABUN
PB-211	1.264E-01	6.679E-01	6.703E-01	NOT IDENT.
BI-212	5.771E-01	5.349E-01	5.948E-01	NOT IDENT.
RN-219	-3.900E-02	3.668E-01	3.672E-01	FAIL ABUN
RA-223	3.872E-02	5.570E-01	5.572E-01	FAIL ABUN
AC-227	-5.665E-02	2.137E-01	2.152E-01	FAIL ABUN
TH-227	-5.665E-02	2.137E-01	2.152E-01	FAIL ABUN
TH-229	-1.583E-01	4.269E-01	4.328E-01	FAIL ABUN
TH-231	3.872E-02	5.570E-01	5.572E-01	FAIL ABUN
PA-233	4.362E-02	6.110E-02	6.419E-02	FAIL ABUN
PA-234	2.645E-02	2.460E-01	2.463E-01	NOT IDENT.
PA-234M	1.203E+00	4.431E+00	4.464E+00	NOT IDENT.
NP-237	4.362E-02	6.110E-02	6.419E-02	FAIL ABUN
NP-238	1.654E+40	4.317E+40	0.000E+00	SHORT HLIF
NP-239	-2.037E-01	2.318E-01	2.493E-01	NOT IDENT.
PU-239	9.139E+01	3.106E+02	3.133E+02	FAIL ABUN
AM-241	6.528E-02	1.292E-01	1.325E-01	NOT IDENT.
CM-243	5.331E-02	9.927E-02	1.021E-01	NOT IDENT.
BK-247	1.541E-01	1.295E-01	1.470E-01	FAIL ABUN
CM-247	1.511E-02	3.440E-02	3.506E-02	NOT IDENT.
CF-249	2.169E-02	3.412E-02	3.549E-02	NOT IDENT.
CF-251	5.004E-02	1.070E-01	1.094E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	62.6052	87.09	88.3032	136.47	87.6127
45.60	62.8962	87.57	88.3661	140.51	0.0000
46.54	63.0263	88.03	88.4263	143.76	96.1076
49.72	0.0000	88.34	88.4664	144.24	89.2271
51.35	78.8318	88.47	88.4837	145.44	84.1369
51.87	76.2603	89.96	88.6764	152.43	98.7382
52.39	84.3170	1093.63	88.7644	153.25	0.0000
52.97	77.5716	91.11	0.0000	323.87	66.5302
53.44	66.2266	92.59	89.0133	156.02	0.0000
54.07	67.4535	93.35	89.1097	158.56	0.0000
57.36	0.0000	94.56	73.3667	159.00	75.2126
57.53	64.4588	94.65	76.6370	162.33	76.7879
57.98	67.9703	94.67	76.6394	162.66	0.0000
59.27	92.3891	94.87	76.6609	163.33	76.8640
59.32	92.3978	97.43	90.0302	165.86	87.6834
59.54	69.3269	98.43	78.6802	176.31	69.7806
60.96	84.9578	98.44	78.6816	176.60	0.0000
61.17	71.0835	99.53	77.5676	177.52	66.2774
62.93	88.3663	100.11	76.3969	181.07	0.0000
63.29	88.4241	102.03	90.1851	181.52	75.5140
63.58	88.4705	103.18	73.0014	184.41	84.7285
64.28	88.5818	103.37	73.0199	143.76	84.8299
66.73	71.7983	105.21	86.8452	193.51	71.7923
67.24	73.4246	105.31	86.8565	197.03	63.8106
125.81	84.4250	106.12	95.6443	198.01	73.9015
67.75	103.1982	106.47	95.6878	201.83	62.2455
69.67	87.8526	109.28	91.0484	203.43	71.4976
70.83	80.1664	111.00	93.7489	205.31	67.9395
72.81	94.6265	111.76	0.0000	210.85	66.4124
72.87	94.6362	114.06	82.8182	215.65	61.1210
74.66	94.9158	116.30	0.0000	222.11	62.3736
74.82	94.9402	116.74	97.3629	227.09	67.2957
74.97	94.9634	119.76	70.7648	227.38	69.1815
77.11	95.2930	121.12	86.9136	228.16	0.0000
78.74	98.7248	121.22	86.9241	228.18	75.7735
79.69	74.9521	121.78	72.6264	116.74	75.7735
80.12	75.0028	122.06	72.6509	235.69	63.5168
80.19	0.0000	122.92	69.3431	235.96	67.7651
80.57	87.8308	123.07	79.5047	238.63	62.2456
81.00	108.6635	265.00	83.7946	238.98	0.0000
81.07	102.2826	125.81	90.7939	240.99	62.3584
81.75	107.9901	127.23	80.7450	242.00	62.4061
83.79	69.0089	127.91	86.7639	244.70	62.5336
84.00	69.0312	129.30	94.5709	252.40	0.0000
85.43	115.8369	131.20	104.1699	252.80	44.8017
86.55	106.3624	133.02	88.9846	254.15	0.0000
86.79	88.2637	133.52	90.7476	256.23	54.4708
86.94	88.2837	136.00	84.1330	260.90	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	53.3614	355.39	0.0000	584.27	22.1938
264.80	53.3670	356.01	25.9991	595.83	0.0000
265.00	57.7014	364.49	0.0000	427.87	29.7864
268.22	59.7623	366.42	0.0000	602.52	0.0000
269.46	69.4614	372.51	33.9648	604.72	29.2613
270.03	57.9077	375.05	30.9210	607.14	24.1206
271.23	57.9565	377.52	27.8674	609.32	29.8890
273.65	0.0000	356.01	33.1445	610.33	29.3256
276.40	44.2065	388.16	25.9552	614.28	20.7327
277.37	50.4448	388.63	0.0000	618.01	19.6099
277.60	50.4533	391.69	39.5277	620.36	8.0818
278.00	55.3196	264.66	43.9004	621.93	17.3291
279.20	51.4796	401.81	34.5140	630.19	0.0000
279.54	49.5484	402.40	31.3867	631.29	13.9131
279.70	49.5546	404.85	34.5704	633.25	19.7254
280.46	50.5527	410.95	33.6302	634.78	0.0000
283.69	51.6381	413.71	28.4167	635.95	18.1194
284.31	0.0000	414.70	0.0000	636.99	0.0000
285.41	39.0177	423.72	0.0000	645.85	24.4838
285.90	0.0000	427.09	27.5541	657.76	11.2426
287.50	48.8413	427.87	23.3240	657.90	0.0000
290.67	42.5831	433.94	37.2210	661.66	42.2212
293.27	0.0000	439.40	25.5928	664.57	0.0000
351.93	50.0765	453.88	37.5912	666.33	0.0000
295.96	50.1004	463.37	28.0535	666.50	0.0000
879.38	44.2831	468.07	40.5533	667.71	0.0000
299.98	39.8911	473.00	0.0000	677.62	11.3250
300.09	39.8944	475.06	28.2106	685.70	0.0000
300.13	39.8952	476.78	31.4910	695.00	0.0000
301.36	41.4061	477.60	23.8991	696.49	16.9254
302.85	38.4858	482.18	31.5712	696.51	16.9254
256.23	48.6034	487.02	0.0000	697.00	0.0000
304.85	0.0000	492.35	0.0000	697.30	22.2763
306.78	34.6269	497.08	24.1158	697.49	24.9512
308.46	47.5391	505.52	21.4579	702.65	18.7480
311.90	34.2445	507.63	0.0000	706.68	17.8802
316.51	35.8374	511.00	23.1653	711.68	19.7032
319.41	0.0000	514.00	24.8529	720.70	0.0000
320.08	0.0000	514.00	24.8529	721.93	0.0000
321.04	38.9349	520.40	23.2627	722.78	21.5779
323.87	41.0033	520.69	0.0000	722.91	21.5786
325.23	56.0524	522.65	0.0000	723.31	21.5815
328.76	0.0000	527.90	0.0000	724.19	21.5881
333.37	45.2673	528.26	18.8967	727.33	21.6116
333.97	34.7176	529.59	25.5811	733.00	12.9924
334.37	42.2751	529.87	0.0000	735.93	14.4507
338.28	30.2679	531.02	0.0000	333.97	18.0725
338.32	30.2692	537.26	0.0000	739.50	0.0000
311.90	27.2774	546.56	0.0000	747.24	19.0396
340.48	27.2774	552.55	19.0953	748.06	22.6723
340.55	0.0000	563.25	18.6169	752.31	13.6226
344.28	35.2375	569.33	24.8861	753.82	0.0000
345.93	30.4071	946.00	23.7566	756.73	15.4623
351.06	33.5492	569.70	23.7583	756.80	14.5527
351.93	33.5660	583.19	26.1651	884.68	20.0583

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	26.4565	1274.44	19.5502	1620.50	2.2465
766.42	23.7244	1001.03	13.7031	1621.92	4.4941
766.84	20.0771	1002.74	20.5636	1678.03	0.0000
772.60	0.0000	1004.73	12.7370	1690.97	6.3714
776.52	0.0000	507.63	0.0000	1750.46	0.0000
739.50	0.0000	1025.87	0.0000	1764.49	8.2986
778.90	11.9110	1028.54	0.0000	1063.66	3.0767
783.70	0.0000	1037.84	11.8616	1771.35	4.6157
785.37	11.9364	1038.76	0.0000	1791.20	0.0000
792.07	26.6857	631.29	11.8887	1808.65	1.8581
794.95	13.8158	1048.07	0.0000	1810.72	0.0000
795.86	18.4259	1049.04	11.8960	1836.06	3.7334
810.06	17.5846	1050.41	14.8755		
810.29	18.5114	1063.66	11.9414		
344.28	22.2151	1077.00	0.0000		
810.76	24.0687	1077.34	17.9747		
815.77	0.0000	1085.87	9.0071		
1048.07	0.0000	1093.63	16.0439		
832.01	28.8903	1099.45	14.0598		
834.85	22.3865	1112.07	13.0968		
835.71	21.4593	1112.84	13.0992		
836.80	0.0000	1115.54	12.9063		
846.75	0.0000	1120.29	14.1324		
846.77	16.8514	1120.55	14.1333		
856.80	0.0000	1221.41	14.1367		
860.56	17.8629	1129.67	19.4273		
871.09	15.0903	1131.51	0.0000		
873.19	8.4938	1147.95	0.0000		
875.33	0.0000	1173.23	9.2032		
879.38	7.5640	1177.95	18.4274		
880.51	13.2416	1189.05	14.7806		
883.24	17.9853	1204.77	17.5146		
884.68	17.0458	1221.41	11.5835		
889.28	20.8627	1231.02	14.9265		
894.76	13.2976	1235.36	0.0000		
898.04	12.3597	1238.28	14.9511		
900.72	16.1756	1260.41	0.0000		
903.28	18.0920	1271.87	5.2313		
911.20	11.4529	1274.44	9.4219		
912.08	11.4558	1274.54	9.4219		
923.98	0.0000	1291.59	6.3051		
926.50	18.2143	1298.22	0.0000		
929.11	14.3907	1312.11	0.0000		
937.49	20.1951	1332.49	7.4221		
944.13	0.0000	1362.66	0.0000		
946.00	12.5319	1365.19	10.6781		
949.00	13.5074	1368.63	0.0000		
667.71	0.0000	1384.29	8.5767		
962.31	25.4555	1408.01	5.1718		
964.08	12.4020	1457.56	0.0000		
966.17	18.6135	1460.82	3.2673		
911.20	23.2852	1489.16	4.3811		
968.97	23.2852	1505.03	4.3950		
983.53	0.0000	1584.12	3.3468		
984.45	0.0000	1596.21	0.0000		

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:26:22.52

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*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621684.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;517
                                       Background date  : 2-OCT-2016 11:00:34.
Sample date      : 12-SEP-2016 00:00:00 Acquisition date : 3-OCT-2016 05:10:39.
Sample ID        : R1203621684          Sample quantity  : 1.15000E+02 GRAM
Detector name    : GAM11                Detector geometry: CAN
Elapsed live time: 0 00:15:00.00        Elapsed real time: 0 00:15:06.49  0.7%
Energy tolerance : 1.50000 keV          Analyst Initials : MXR1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1596386              Detector SN#     :
Matrix Spike ID  :                      LCS ID           : 1556
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	10	45.21*	970	4648	1.98	90.29	87	11	1.08E+00	12.6	6.51E+00
2	10	46.49*	11093	3456	0.84	92.86	87	11	1.23E+01	1.3	
3	0	49.47	114	2942	2.10	98.82	98	5	1.26E-01	72.0	
4	0	59.48	24249	4616	0.82	118.86	114	10	2.69E+01	0.8	
5	0	79.29	99	1176	0.82	158.51	155	7	1.10E-01	58.4	
6	0	87.94	3341	1640	0.82	175.81	171	10	3.71E+00	2.9	
7	0	122.06	253	1070	0.74	244.10	240	9	2.81E-01	24.2	
8	0	131.07	33	550	1.29	262.14	261	5	3.62E-02	109.5	
9	0	165.75	27	566	0.62	331.54	331	6	3.03E-02	139.1	
10	0	301.02	52	383	0.57	602.25	600	5	5.80E-02	58.3	
11	0	320.82	60	569	1.38	641.87	638	8	6.68E-02	70.3	
12	0	362.52	40	416	1.31	725.32	722	6	4.49E-02	81.9	
13	0	509.87*	46	612	3.68	1020.19	1015	12	5.08E-02	109.9	
14	0	519.13	27	805	2.52	1038.71	1028	15	3.04E-02	227.0	
15	0	646.21	31	288	1.51	1292.99	1291	8	3.40E-02	97.3	
16	0	661.64*	14812	555	1.42	1323.86	1316	16	1.65E+01	0.9	
17	0	746.34	84	292	1.70	1493.32	1488	11	9.28E-02	41.1	
18	0	973.03	53	307	1.51	1946.83	1943	8	5.94E-02	58.4	
19	0	1000.38	87	524	6.90	2001.54	1993	16	9.69E-02	59.7	
20	1	1109.77	79	163	1.99	2220.36	2217	20	8.73E-02	27.4	2.34E+00
21	1	1115.41	74	299	1.99	2231.64	2217	20	8.27E-02	44.9	
22	0	1173.28	9606	256	1.73	2347.39	2338	19	1.07E+01	1.1	
23	0	1236.65	24	99	4.66	2474.15	2463	17	2.70E-02	97.3	
24	0	1272.26	19	43	1.62	2545.37	2537	11	2.12E-02	70.8	
25	0	1319.51	15	32	1.20	2639.89	2636	7	1.67E-02	67.1	
26	0	1332.59*	8304	108	1.86	2666.03	2657	18	9.23E+00	1.1	
27	0	1401.75	36	16	2.62	2804.36	2797	16	4.00E-02	29.9	
28	0	1461.45*	18	19	3.35	2923.77	2917	11	1.96E-02	54.1	
29	0	1576.60	10	13	1.06	3154.05	3149	9	1.14E-02	71.2	
30	0	1609.23	11	15	0.92	3219.30	3212	12	1.17E-02	79.7	
31	0	1628.12	12	11	3.18	3257.08	3250	11	1.33E-02	60.8	
32	0	1846.52	20	0	4.26	3693.80	3688	13	2.22E-02	22.4	
33	0	1861.33	6	10	1.13	3723.41	3717	9	7.15E-03	105.8	
34	0	1937.76	12	12	0.62	3876.24	3872	11	1.37E-02	59.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1951.74	13	4	1.67	3904.19	3900	8	1.48E-02	37.4	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 3-OCT-2016 05:26:24

Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621684.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4
Sample title   : MXR1
Sample date   : 12-SEP-2016 00:00:00 Acquisition date : 3-OCT-2016 05:10:39
Sample ID   : R1203621684   Sample quantity : 115.00 GRAM
Sample type   : SOLID   Sample geometry :
Detector name   : GAMMA11   Detector geometry: CAN
Elapsed live time: 0 00:15:00.00   Elapsed real time: 0 00:15:06.49   0.7%
Energy tolerance :   1.50 keV   Half life ratio :   10.00
Errors propagated: No   Systematic Error :   0.00 %
Efficiency type : Linear   Efficiencies at : Peak Energy
Abundance limit :   75.00

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	17	10.66*	1.237E+00	3.295E+00	3.295E+00	108.14
CR-51	320.08	61	9.91*	4.190E+00	3.809E+00	6.477E+00	140.68
CO-57	122.06	265	85.60*	7.219E+00	1.119E+00	1.182E+00	48.45
	136.47	------	10.68	7.146E+00	------ Line Not Found		------
CO-60	1173.23	9149	99.85	1.491E+00	1.605E+02	1.617E+02	2.19
	1332.49	7864	99.98*	1.340E+00	1.532E+02	1.544E+02	2.27
ZN-65	1115.54	71	50.60*	1.553E+00	2.360E+00	2.506E+00	89.83
CD-109	88.03	3548	3.70*	6.296E+00	3.977E+02	4.105E+02	5.72
SN-126	64.28	------	9.60	4.012E+00	------ Line Not Found		------
	86.94	3548	8.90	6.296E+00	1.653E+02	1.653E+02	5.72
	87.57	3548	37.00*	6.296E+00	3.977E+01	3.977E+01	5.72
BA-137M	661.66	14467	89.90*	2.339E+00	1.797E+02	1.799E+02	1.79
CS-137	661.66	14467	85.10*	2.339E+00	1.898E+02	1.900E+02	1.79
CE-139	165.86	28	80.00*	6.685E+00	1.379E-01	1.534E-01	278.16
PM-147	121.22	265	0.00*	7.219E+00	3.362E+04	3.414E+04	48.45
PB-210	46.54	12078	4.25*	1.369E+00	5.421E+03	5.430E+03	2.52
PA-231	283.69	------	1.70	4.630E+00	------ Line Not Found		------
	301.36	53	5.35*	4.414E+00	5.827E+00	5.827E+00	116.52
AM-241	59.54	26150	35.90*	3.353E+00	5.673E+02	5.673E+02	1.67
ANH-511	511.00	45	100.00*	2.873E+00	4.104E-01	4.104E-01	219.81

Flag: "*" = Keyline

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:26:25.43

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621684.CNF;1   *
* Acquisition date :  3-OCT-2016 05:10:39 Sensitivity     : 3.000        *
* Detector ID      : GAM11                Energy tolerance: 1.500        *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:15:06.49     Half life ratio : *****        *
* Sample date      : 12-SEP-2016 00:00:00 Analyst initials: MXR1         *
* Sample ID        : R1203621684          Sample Quantity : 1.1500E+02 GRAM   *
* Batch Number     : 1596386              Wet Weight      :    0.00000   *
* Wet wt corr      :    1.00000           Dry Weight      :    0.00000   *
* Nuclide Library  : SOLID.NLB;6                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  2-AUG-2016 10:31:39 Eff. Geometry   : CAN          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;14         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
K-40	3.295E+00	3.492E+00	4.724E+00
CR-51	6.477E+00	8.930E+00	9.957E+00
CO-57	1.182E+00	5.610E-01	4.821E-01
CO-60	1.544E+02	3.438E+00	6.911E-01
ZN-65	2.506E+00	2.206E+00	2.661E+00
CD-109	4.105E+02	2.301E+01	1.357E+01
SN-126	3.977E+01	2.229E+00	1.320E+00
BA-137M	1.799E+02	3.157E+00	9.186E-01
CS-137	1.900E+02	3.336E+00	9.704E-01
CE-139	1.534E-01	4.182E-01	5.366E-01
PM-147	3.414E+04	1.621E+04	1.392E+04
PB-210	5.430E+03	1.342E+02	1.086E+02
PA-231	5.827E+00	6.654E+00	1.049E+01
AM-241	5.673E+02	9.303E+00	4.323E+00
ANH-511	4.104E-01	8.840E-01	8.120E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	4.161E-01	6.255E+00	1.107E+01	NOT IDENT.
NA-22	-1.624E-01	3.638E-01	5.555E-01	NOT IDENT.
NA-24	0.000E+00	4.315E+09	0.000E+00	SHORT HLIF
AL-26	2.066E-02	2.541E-01	4.927E-01	NOT IDENT.
SC-46	-5.500E-02	8.308E-01	1.395E+00	NOT IDENT.
V-48	-3.165E-01	1.832E+00	3.036E+00	NOT IDENT.
MN-54	3.186E-01	6.405E-01	1.112E+00	NOT IDENT.
CO-56	1.685E-01	7.416E-01	1.271E+00	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-58	6.579E-02	7.131E-01	1.221E+00	NOT IDENT.
FE-59	1.335E+00	1.788E+00	3.271E+00	NOT IDENT.
GE-68	1.456E+01	2.289E+01	4.183E+01	NOT IDENT.
AS-73	-7.149E+00	1.591E+01	2.858E+01	NOT IDENT.
AS-74	-1.034E+00	1.699E+00	2.898E+00	NOT IDENT.
SE-75	1.619E-02	6.198E-01	1.035E+00	FAIL ABUN

BR-77	8.625E+02	6.343E+02	1.118E+03	NOT IDENT.
SR-82	1.161E-01	6.348E+00	1.089E+01	NOT IDENT.
RB-83	6.561E-01	2.919E+00	2.050E+00	FAIL ABUN
KR-85	-7.661E+01	1.458E+02	1.756E+02	NOT IDENT.
SR-85	-4.322E-01	8.241E-01	9.924E-01	NOT IDENT.
RB-86	1.563E+01	1.772E+01	3.269E+01	NOT IDENT.
Y-88	-1.122E-01	3.475E-01	6.155E-01	NOT IDENT.
Y-91	3.351E+01	2.057E+02	3.787E+02	NOT IDENT.
NB-94	2.247E-01	4.586E-01	8.143E-01	NOT IDENT.
NB-95	-4.132E-01	6.877E-01	1.146E+00	NOT IDENT.
NB-95M	-2.365E-01	1.495E+00	2.501E+00	NOT IDENT.
ZR-95	-3.577E-01	1.170E+00	1.983E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.108E+10	0.000E+00	SHORT HLIF
MO-99	-1.765E+02	8.668E+02	1.480E+03	NOT IDENT.
TC-99M	0.000E+00	7.216E+24	0.000E+00	SHORT HLIF
RH-101	9.716E-02	3.237E-01	5.723E-01	NOT IDENT.
RH-102	-1.312E-02	8.110E-01	1.415E+00	NOT IDENT.
RU-103	4.976E-02	7.113E-01	1.261E+00	NOT IDENT.
RH-106	8.786E-01	4.772E+00	8.399E+00	NOT IDENT.
RU-106	8.786E-01	4.772E+00	8.399E+00	NOT IDENT.
AG-108M	-2.619E-01	4.999E-01	8.759E-01	NOT IDENT.
AG-110M	2.403E-01	9.853E-01	1.679E+00	NOT IDENT.
SN-113	-6.735E-01	7.009E-01	1.221E+00	NOT IDENT.
CD-115	-1.340E+02	1.176E+03	2.066E+03	NOT IDENT.
SN-117M	-2.545E-01	7.574E-01	1.295E+00	NOT IDENT.
TE-123M	2.503E-02	2.945E-01	5.110E-01	NOT IDENT.
SB-124	2.065E-01	6.823E-01	1.363E+00	FAIL ABUN
SB-125	-1.199E+00	1.498E+00	2.606E+00	FAIL ABUN
TE-125M	1.109E+02	1.040E+02	1.897E+02	NOT IDENT.
I-126	3.307E+00	4.665E+00	7.585E+00	NOT IDENT.
SB-126	-2.723E-01	2.889E+00	4.975E+00	NOT IDENT.
SB-127	-1.992E+01	5.528E+01	9.438E+01	NOT IDENT.
I-131	-2.062E+00	3.019E+00	4.772E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	7.528E+00	3.462E+01	5.869E+01	FAIL ABUN
BA-133	2.876E-01	6.144E-01	1.125E+00	NOT IDENT.
I-133	0.000E+00	1.195E+07	0.000E+00	SHORT HLIF
CS-134	4.131E-02	6.599E-01	1.132E+00	NOT IDENT.
CS-135	2.053E+00	2.021E+00	3.493E+00	NOT IDENT.
I-135	0.000E+00	2.043E+23	0.000E+00	SHORT HLIF
CS-136	-2.634E-01	2.534E+00	4.517E+00	FAIL ABUN
BA-140	-1.755E+00	5.455E+00	9.501E+00	NOT IDENT.
LA-140	-3.100E-01	8.041E-01	1.439E+00	NOT IDENT.
CE-141	6.334E-01	7.123E-01	1.274E+00	NOT IDENT.
CE-143	0.000E+00	3.357E+04	0.000E+00	SHORT HLIF
CE-144	-2.237E+00	2.285E+00	3.548E+00	FAIL ABUN
PM-144	4.597E-01	4.859E-01	8.801E-01	NOT IDENT.
PR-144	3.474E+01	3.649E+01	6.611E+01	NOT IDENT.
PM-146	2.995E-01	7.403E-01	1.328E+00	FAIL ABUN
ND-147	1.060E+01	1.262E+01	2.297E+01	FAIL ABUN
PM-149	-1.879E+01	8.246E+03	1.368E+04	NOT IDENT.
EU-150	-1.298E-02	3.426E-01	6.225E-01	NOT IDENT.
EU-152	1.538E-03	1.278E+00	2.320E+00	FAIL ABUN
GD-153	-3.579E-01	8.662E-01	1.521E+00	NOT IDENT.
EU-154	-4.911E-01	1.024E+00	1.556E+00	FAIL ABUN
EU-155	4.585E-01	1.077E+00	1.930E+00	FAIL ABUN
TB-160	1.470E+00	2.744E+00	4.735E+00	FAIL ABUN
HO-166M	5.081E-01	8.771E-01	1.560E+00	FAIL ABUN
TM-171	-1.465E+02	3.313E+02	5.535E+02	NOT IDENT.
HF-172	5.732E-01	2.114E+00	3.465E+00	FAIL ABUN
LU-172	-3.005E-01	1.159E+00	2.044E+00	FAIL ABUN
LU-176	-1.346E-01	3.742E-01	6.087E-01	FAIL ABUN
HF-181	-3.096E-01	8.057E-01	1.408E+00	NOT IDENT.
TA-182	-4.632E-01	1.666E+00	2.976E+00	NOT IDENT.
RE-183	0.000E+00	1.201E+01	9.322E+00	FAIL ABUN
RE-184	1.153E+00	2.763E+00	4.731E+00	NOT IDENT.
W-188	-2.310E+01	1.026E+02	1.686E+02	NOT IDENT.
IR-192	-1.577E-01	5.850E-01	8.728E-01	NOT IDENT.
HG-203	7.156E-01	5.510E-01	9.606E-01	NOT IDENT.
BI-207	-4.590E-02	9.454E-01	1.684E+00	NOT IDENT.
TL-208	3.149E-01	5.132E-01	9.247E-01	NOT IDENT.
BI-211	-2.873E+00	2.780E+00	4.879E+00	NOT IDENT.
PB-211	2.575E-01	1.103E+01	1.977E+01	NOT IDENT.
BI-212	-8.678E-02	7.295E+00	1.260E+01	NOT IDENT.
PB-212	9.123E-01	6.843E-01	1.206E+00	FAIL ABUN
BI-214	8.025E-01	9.795E-01	1.775E+00	NOT IDENT.
PB-214	-8.581E-01	1.003E+00	1.770E+00	FAIL ABUN

RN-219	4.839E+00	6.335E+00	1.160E+01	NOT IDENT.
RN-222	8.025E-01	9.795E-01	1.775E+00	NOT IDENT.
RA-223	-5.458E-01	8.804E+00	1.445E+01	NOT IDENT.
RA-224	-3.654E+00	7.678E+00	1.266E+01	NOT IDENT.
RA-226	8.025E-01	9.795E-01	1.775E+00	NOT IDENT.
AC-227	1.346E+00	3.211E+00	5.456E+00	FAIL ABUN
TH-227	1.346E+00	3.211E+00	5.456E+00	FAIL ABUN
AC-228	-1.017E+00	2.833E+00	4.691E+00	NOT IDENT.
RA-228	-1.017E+00	2.833E+00	4.691E+00	NOT IDENT.
TH-228	9.123E-01	6.843E-01	1.206E+00	FAIL ABUN
TH-229	2.521E+00	6.143E+00	1.060E+01	FAIL ABUN
TH-230	8.025E-01	9.795E-01	1.775E+00	NOT IDENT.
TH-231	-5.458E-01	8.804E+00	1.445E+01	NOT IDENT.
TH-232	-1.017E+00	2.833E+00	4.691E+00	NOT IDENT.
PA-233	-4.581E-01	9.483E-01	1.532E+00	FAIL ABUN
PA-234	-3.394E+00	6.848E+00	1.121E+01	FAIL ABUN
PA-234M	0.000E+00	1.795E+02	1.436E+02	FAIL ABUN
TH-234	1.728E-01	1.285E+01	2.171E+01	NOT IDENT.
U-234	8.025E-01	9.795E-01	1.775E+00	NOT IDENT.
U-235	-1.696E+00	2.050E+00	3.470E+00	NOT IDENT.
NP-237	-4.581E-01	9.483E-01	1.532E+00	FAIL ABUN
NP-238	0.000E+00	2.943E+03	0.000E+00	SHORT HLIF
U-238	1.728E-01	1.285E+01	2.171E+01	NOT IDENT.
NP-239	1.459E-01	2.786E+00	4.911E+00	NOT IDENT.
PU-239	-5.725E+02	3.714E+03	5.977E+03	NOT IDENT.
AM-243	-1.014E-01	5.119E-01	9.153E-01	NOT IDENT.
CM-243	5.696E-01	1.120E+00	2.012E+00	NOT IDENT.
BK-247	-4.866E-01	1.083E+00	1.776E+00	NOT IDENT.
CM-247	6.208E-01	5.769E-01	1.066E+00	NOT IDENT.
CF-249	4.641E-01	5.918E-01	1.089E+00	NOT IDENT.
CF-251	-4.437E-01	1.370E+00	2.325E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 3-OCT-2016 05:26:23.23

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
K-40	1460.82	17	10.66*	1.237E+00	3.295E+00	3.295E+00	108.14
CR-51	320.08	61	9.91*	4.190E+00	3.809E+00	6.477E+00	140.68
CO-57	122.06	265	85.60*	7.219E+00	1.119E+00	1.182E+00	48.45
	136.47	------	10.68	7.146E+00	------ Line Not Found		------
CO-60	1173.23	9149	99.85	1.491E+00	1.605E+02	1.617E+02	2.19
	1332.49	7864	99.98*	1.340E+00	1.532E+02	1.544E+02	2.27
ZN-65	1115.54	71	50.60*	1.553E+00	2.360E+00	2.506E+00	89.83
CD-109	88.03	3548	3.70*	6.296E+00	3.977E+02	4.105E+02	5.72
SN-126	64.28	------	9.60	4.012E+00	------ Line Not Found		------
	86.94	3548	8.90	6.296E+00	1.653E+02	1.653E+02	5.72
	87.57	3548	37.00*	6.296E+00	3.977E+01	3.977E+01	5.72
BA-137M	661.66	14467	89.90*	2.339E+00	1.797E+02	1.799E+02	1.79
CS-137	661.66	14467	85.10*	2.339E+00	1.898E+02	1.900E+02	1.79
CE-139	165.86	28	80.00*	6.685E+00	1.379E-01	1.534E-01	278.16
PM-147	121.22	265	0.00*	7.219E+00	3.362E+04	3.414E+04	48.45
PB-210	46.54	12078	4.25*	1.369E+00	5.421E+03	5.430E+03	2.52
PA-231	283.69	------	1.70	4.630E+00	------ Line Not Found		------
	301.36	53	5.35*	4.414E+00	5.827E+00	5.827E+00	116.52
AM-241	59.54	26150	35.90*	3.353E+00	5.673E+02	5.673E+02	1.67
ANH-511	511.00	45	100.00*	2.873E+00	4.104E-01	4.104E-01	219.81

Flag: "*" = Keyline

Sample ID : R1203621684 Acquisition date : 3-OCT-2016 05:10:39

Total number of lines in spectrum 35
Number of unidentified lines 12
Number of lines tentatively identified by NID 23 65.71%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	3.295E+00	3.295E+00	3.563E+00	108.14	
CR-51	27.70D	1.70	3.809E+00	6.477E+00	9.112E+00	140.68	
CO-57	271.74D	1.06	1.119E+00	1.182E+00	0.572E+00	48.45	
CO-60	5.27Y	1.01	1.532E+02	1.544E+02	0.035E+02	2.27	
ZN-65	244.06D	1.06	2.360E+00	2.506E+00	2.251E+00	89.83	
CD-109	461.40D	1.03	3.977E+02	4.105E+02	0.235E+02	5.72	
SN-126	2.30E+05Y	1.00	3.977E+01	3.977E+01	0.227E+01	5.72	
BA-137M	30.08Y	1.00	1.797E+02	1.799E+02	0.032E+02	1.79	
CS-137	30.08Y	1.00	1.898E+02	1.900E+02	0.034E+02	1.79	
CE-139	137.64D	1.11	1.379E-01	1.534E-01	4.267E-01	278.16	
PM-147	2.62Y	1.02	3.362E+04	3.414E+04	1.654E+04	48.45	
PB-210	22.20Y	1.00	5.421E+03	5.430E+03	0.137E+03	2.52	
PA-231	7.04E+08Y	1.00	5.827E+00	5.827E+00	6.790E+00	116.52	
AM-241	432.60Y	1.00	5.673E+02	5.673E+02	0.095E+02	1.67	
ANH-511	1.00E+09Y	1.00	4.104E-01	4.104E-01	9.021E-01	219.81	
	Total Activity :		4.059E+04	4.113E+04			

Grand Total Activity : 4.059E+04 4.113E+04

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : R1203621684 Acquisition date : 3-OCT-2016 05:10:39

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	45.21	1057	5066	1.98	90.29	87	11	1.08E+00	25.2	1.17E+00	T
0	49.47	124	3196	2.10	98.82	98	5	1.26E-01	****	1.83E+00	T
0	79.29	105	1254	0.82	158.51	155	7	1.10E-01	****	5.65E+00	T
0	131.07	34	575	1.29	262.14	261	5	3.62E-02	****	7.19E+00	T
0	362.52	40	416	1.31	725.32	722	6	4.49E-02	****	3.79E+00	
0	519.13	27	794	2.52	1038.71	1028	15	3.04E-02	****	2.83E+00	T
0	646.21	30	282	1.51	1292.99	1291	8	3.40E-02	****	2.38E+00	T
0	746.34	81	283	1.70	1493.32	1488	11	9.28E-02	82.2	2.13E+00	T
0	973.03	51	294	1.51	1946.83	1943	8	5.94E-02	****	1.73E+00	
0	1000.38	84	502	6.90	2001.54	1993	16	9.69E-02	****	1.69E+00	T
1	1109.77	75	156	1.99	2220.36	2217	20	8.73E-02	54.8	1.56E+00	
0	1236.65	23	94	4.66	2474.15	2463	17	2.70E-02	****	1.43E+00	T
0	1272.26	18	41	1.62	2545.37	2537	11	2.12E-02	****	1.39E+00	T
0	1319.51	14	30	1.20	2639.89	2636	7	1.67E-02	****	1.35E+00	
0	1401.75	34	15	2.62	2804.36	2797	16	4.00E-02	59.8	1.28E+00	
0	1576.60	10	12	1.06	3154.05	3149	9	1.14E-02	****	1.16E+00	
0	1609.23	10	14	0.92	3219.30	3212	12	1.17E-02	****	1.13E+00	
0	1628.12	11	10	3.18	3257.08	3250	11	1.33E-02	****	1.12E+00	
0	1846.52	19	0	4.26	3693.80	3688	13	2.22E-02	44.7	9.95E-01	
0	1861.33	6	9	1.13	3723.41	3717	9	7.15E-03	****	9.87E-01	
0	1937.76	12	11	0.62	3876.24	3872	11	1.37E-02	****	9.47E-01	
0	1951.74	12	3	1.67	3904.19	3900	8	1.48E-02	74.9	9.40E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:26:37.55

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621684.CNF;1   *
* Acquisition date :  3-OCT-2016 05:10:39 Sensitivity     : 3.000       *
* Detector ID      : GAM11                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:06.49     Half life ratio : *****       *
* Sample date      : 12-SEP-2016 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : R1203621684          Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.1500E+02 GRAM   *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000  *
*                                         Dry Weight      :    0.00000  *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  2-AUG-2016 10:31:39 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;14        *
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Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
K-40	2.096E+00
CR-51	4.835E+00
CO-57	2.350E-01
CO-60	3.192E-01
ZN-65	1.283E+00
CD-109	6.627E+00
SN-126	6.446E-01
BA-137M	4.426E-01
CS-137	4.676E-01
CE-139	2.610E-01
PM-147	6.788E+03
PB-210	5.370E+01
PA-231	5.097E+00
AM-241	2.132E+00
ANH-511	3.938E-01

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	5.391E+00	NOT IDENT.
NA-22	2.521E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.117E-01	NOT IDENT.
SC-46	6.754E-01	NOT IDENT.
V-48	1.467E+00	NOT IDENT.
MN-54	5.372E-01	NOT IDENT.
CO-56	6.138E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-58	5.889E-01	NOT IDENT.
FE-59	1.581E+00	NOT IDENT.
GE-68	2.020E+01	NOT IDENT.
AS-73	1.412E+01	NOT IDENT.
AS-74	1.396E+00	NOT IDENT.
SE-75	5.036E-01	FAIL ABUN
BR-77	5.451E+02	NOT IDENT.

SR-82	5.245E+00	NOT IDENT.
RB-83	9.924E-01	FAIL ABUN
KR-85	8.497E+01	NOT IDENT.
SR-85	4.802E-01	NOT IDENT.
RB-86	1.579E+01	NOT IDENT.
Y-88	2.672E-01	NOT IDENT.
Y-91	1.775E+02	NOT IDENT.
NB-94	3.914E-01	NOT IDENT.
NB-95	5.521E-01	NOT IDENT.
NB-95M	1.217E+00	NOT IDENT.
ZR-95	9.529E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	7.115E+02	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.789E-01	NOT IDENT.
RH-102	6.813E-01	NOT IDENT.
RU-103	6.115E-01	NOT IDENT.
RH-106	4.050E+00	NOT IDENT.
RU-106	4.050E+00	NOT IDENT.
AG-108M	4.262E-01	NOT IDENT.
AG-110M	8.124E-01	NOT IDENT.
SN-113	5.935E-01	NOT IDENT.
CD-115	9.994E+02	NOT IDENT.
SN-117M	6.299E-01	NOT IDENT.
TE-123M	2.485E-01	NOT IDENT.
SB-124	5.945E-01	FAIL ABUN
SB-125	1.267E+00	FAIL ABUN
TE-125M	9.250E+01	NOT IDENT.
I-126	3.650E+00	NOT IDENT.
SB-126	2.390E+00	NOT IDENT.
SB-127	4.528E+01	NOT IDENT.
I-131	2.315E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	2.862E+01	FAIL ABUN
BA-133	5.476E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.452E-01	NOT IDENT.
CS-135	1.701E+00	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	2.177E+00	FAIL ABUN
BA-140	4.586E+00	NOT IDENT.
LA-140	6.174E-01	NOT IDENT.
CE-141	6.207E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.727E+00	FAIL ABUN
PM-144	4.238E-01	NOT IDENT.
PR-144	3.183E+01	NOT IDENT.
PM-146	6.471E-01	FAIL ABUN
ND-147	1.112E+01	FAIL ABUN
PM-149	6.652E+03	NOT IDENT.
EU-150	3.022E-01	NOT IDENT.
EU-152	1.126E+00	FAIL ABUN
GD-153	7.412E-01	NOT IDENT.
EU-154	7.055E-01	FAIL ABUN
EU-155	9.411E-01	FAIL ABUN
TB-160	2.292E+00	FAIL ABUN
HO-166M	7.507E-01	FAIL ABUN
TM-171	2.735E+02	NOT IDENT.
HF-172	1.689E+00	FAIL ABUN
LU-172	9.863E-01	FAIL ABUN
LU-176	2.957E-01	FAIL ABUN
HF-181	6.834E-01	NOT IDENT.
TA-182	1.386E+00	NOT IDENT.
RE-183	4.622E+00	FAIL ABUN
RE-184	2.290E+00	NOT IDENT.
W-188	8.193E+01	NOT IDENT.
IR-192	4.242E-01	NOT IDENT.
HG-203	4.678E-01	NOT IDENT.
BI-207	8.132E-01	NOT IDENT.
TL-208	4.464E-01	NOT IDENT.
BI-211	2.370E+00	NOT IDENT.
PB-211	9.619E+00	NOT IDENT.
BI-212	6.058E+00	NOT IDENT.
PB-212	5.877E-01	FAIL ABUN
BI-214	8.568E-01	NOT IDENT.
PB-214	8.597E-01	FAIL ABUN
RN-219	5.649E+00	NOT IDENT.

RN-222	8.568E-01	NOT IDENT.
RA-223	7.013E+00	NOT IDENT.
RA-224	6.170E+00	NOT IDENT.
RA-226	8.568E-01	NOT IDENT.
AC-227	2.654E+00	FAIL ABUN
TH-227	2.654E+00	FAIL ABUN
AC-228	2.272E+00	NOT IDENT.
RA-228	2.272E+00	NOT IDENT.
TH-228	5.877E-01	FAIL ABUN
TH-229	5.171E+00	FAIL ABUN
TH-230	8.568E-01	NOT IDENT.
TH-231	7.013E+00	NOT IDENT.
TH-232	2.272E+00	NOT IDENT.
PA-233	7.450E-01	FAIL ABUN
PA-234	5.440E+00	FAIL ABUN
PA-234M	6.934E+01	FAIL ABUN
TH-234	1.061E+01	NOT IDENT.
U-234	8.568E-01	NOT IDENT.
U-235	1.690E+00	NOT IDENT.
NP-237	7.450E-01	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.061E+01	NOT IDENT.
NP-239	2.394E+00	NOT IDENT.
PU-239	2.911E+03	NOT IDENT.
AM-243	4.476E-01	NOT IDENT.
CM-243	9.817E-01	NOT IDENT.
BK-247	8.643E-01	NOT IDENT.
CM-247	5.191E-01	NOT IDENT.
CF-249	5.297E-01	NOT IDENT.
CF-251	1.131E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 03-OCT-2016 05:26:43.02

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*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]R1203621684.CNF;1  *
* Acquisition date :  3-OCT-2016 05:10:39 Sensitivity     : 3.000       *
* Detector ID      : GAM11                Energy tolerance: 1.500       *
* Elapsed live time:    0 00:15:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:15:06.49     Half life ratio : *****       *
* Sample date      : 12-SEP-2016 00:00:00 Nuclide Library : SOLID       *
* Sample ID        : R1203621684          Analyst initials: MXR1        *
* Batch Number     : 1596386              Sample Quantity : 1.1500E+02 GRAM  *
*                                         Quantity Err(%) : 1.7391E-03 %     *
* Wet wt corr      :    1.00000           Wet Weight      :    0.00000       *
*                                         Dry Weight      :    0.00000       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  2-AUG-2016 10:31:39 Eff. Geometry   : CAN         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;14        *
*************************************************************************
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
K-40	3.295E+00	3.496E+00	3.496E+00
CR-51	6.477E+00	8.935E+00	8.935E+00
CO-57	1.182E+00	5.637E-01	5.637E-01
CO-60	1.544E+02	6.640E+00	6.640E+00
ZN-65	2.506E+00	2.208E+00	2.208E+00
CD-109	4.105E+02	4.064E+01	4.064E+01
SN-126	3.977E+01	3.325E+00	3.325E+00
BA-137M	1.799E+02	8.353E+00	8.353E+00
CS-137	1.900E+02	8.805E+00	8.805E+00
CE-139	1.534E-01	4.193E-01	4.193E-01
PM-147	3.414E+04	1.628E+04	1.628E+04
PB-210	5.430E+03	4.851E+02	4.851E+02
PA-231	5.827E+00	6.770E+00	6.770E+00
AM-241	5.673E+02	4.278E+01	4.278E+01
ANH-511	4.104E-01	8.842E-01	8.842E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	4.161E-01	6.255E+00	6.257E+00	NOT IDENT.
NA-22	-1.624E-01	3.638E-01	3.711E-01	NOT IDENT.
NA-24	-6.562E+08	4.315E+09	4.325E+09	SHORT HLIF
AL-26	2.066E-02	2.541E-01	2.543E-01	NOT IDENT.
SC-46	-5.500E-02	8.308E-01	8.312E-01	NOT IDENT.
V-48	-3.165E-01	1.832E+00	1.837E+00	NOT IDENT.
MN-54	3.186E-01	6.406E-01	6.565E-01	NOT IDENT.
CO-56	1.685E-01	7.416E-01	7.455E-01	NOT IDENT.
MN-56	1.000E+41	4.524E+41	0.000E+00	SHORT HLIF
CO-58	6.579E-02	7.131E-01	7.137E-01	NOT IDENT.
FE-59	1.335E+00	1.790E+00	1.889E+00	NOT IDENT.
GE-68	1.456E+01	2.289E+01	2.382E+01	NOT IDENT.
AS-73	-7.149E+00	1.598E+01	1.630E+01	NOT IDENT.
AS-74	-1.034E+00	1.701E+00	1.763E+00	NOT IDENT.
SE-75	1.619E-02	6.198E-01	6.198E-01	FAIL ABUN

BR-77	8.625E+02	8.266E+02	9.134E+02	NOT IDENT.
SR-82	1.161E-01	6.348E+00	6.348E+00	NOT IDENT.
RB-83	6.561E-01	2.921E+00	2.936E+00	FAIL ABUN
KR-85	-7.661E+01	1.459E+02	1.499E+02	NOT IDENT.
SR-85	-4.322E-01	8.242E-01	8.470E-01	NOT IDENT.
RB-86	1.563E+01	1.773E+01	1.908E+01	NOT IDENT.
Y-88	-1.122E-01	3.476E-01	3.512E-01	NOT IDENT.
Y-91	3.351E+01	2.057E+02	2.062E+02	NOT IDENT.
NB-94	2.247E-01	4.587E-01	4.697E-01	NOT IDENT.
NB-95	-4.132E-01	6.879E-01	7.127E-01	NOT IDENT.
NB-95M	-2.365E-01	1.495E+00	1.499E+00	NOT IDENT.
ZR-95	-3.577E-01	1.170E+00	1.181E+00	NOT IDENT.
NB-97	1.000E+41	1.139E+42	0.000E+00	SHORT HLIF
ZR-97	-2.764E+08	1.108E+10	1.108E+10	SHORT HLIF
MO-99	-1.765E+02	8.669E+02	8.705E+02	NOT IDENT.
TC-99M	-4.717E+24	7.231E+24	0.000E+00	SHORT HLIF
RH-101	9.716E-02	3.242E-01	3.271E-01	NOT IDENT.
RH-102	-1.312E-02	8.110E-01	8.110E-01	NOT IDENT.
RU-103	4.976E-02	7.113E-01	7.117E-01	NOT IDENT.
RH-106	8.786E-01	4.772E+00	4.789E+00	NOT IDENT.
RU-106	8.786E-01	4.772E+00	4.789E+00	NOT IDENT.
AG-108M	-2.619E-01	5.000E-01	5.138E-01	NOT IDENT.
AG-110M	2.403E-01	9.854E-01	9.914E-01	NOT IDENT.
SN-113	-6.735E-01	7.014E-01	7.643E-01	NOT IDENT.
CD-115	-1.340E+02	1.176E+03	1.178E+03	NOT IDENT.
SN-117M	-2.545E-01	7.575E-01	7.661E-01	NOT IDENT.
TE-123M	2.503E-02	2.945E-01	2.947E-01	NOT IDENT.
SB-124	2.065E-01	6.824E-01	6.887E-01	FAIL ABUN
SB-125	-1.199E+00	1.499E+00	1.593E+00	FAIL ABUN
TE-125M	1.109E+02	1.042E+02	1.155E+02	NOT IDENT.
I-126	3.307E+00	4.669E+00	4.901E+00	NOT IDENT.
SB-126	-2.723E-01	2.889E+00	2.892E+00	NOT IDENT.
SB-127	-1.992E+01	5.532E+01	5.604E+01	NOT IDENT.
I-131	-2.062E+00	3.020E+00	3.160E+00	FAIL ABUN
I-132	1.000E+41	9.646E+41	0.000E+00	SHORT HLIF
TE-132	7.528E+00	3.462E+01	3.479E+01	FAIL ABUN
BA-133	2.876E-01	6.145E-01	6.281E-01	NOT IDENT.
I-133	-3.711E+06	1.196E+07	1.208E+07	SHORT HLIF
CS-134	4.131E-02	6.599E-01	6.602E-01	NOT IDENT.
CS-135	2.053E+00	2.026E+00	2.227E+00	NOT IDENT.
I-135	1.033E+23	2.104E+23	0.000E+00	SHORT HLIF
CS-136	-2.634E-01	2.534E+00	2.537E+00	FAIL ABUN
BA-140	-1.755E+00	5.456E+00	5.513E+00	NOT IDENT.
LA-140	-3.100E-01	8.042E-01	8.163E-01	NOT IDENT.
CE-141	6.334E-01	7.128E-01	7.679E-01	NOT IDENT.
CE-143	2.007E+04	3.358E+04	3.478E+04	SHORT HLIF
CE-144	-2.237E+00	2.288E+00	2.500E+00	FAIL ABUN
PM-144	4.597E-01	4.863E-01	5.286E-01	NOT IDENT.
PR-144	3.474E+01	3.652E+01	3.974E+01	NOT IDENT.
PM-146	2.995E-01	7.406E-01	7.528E-01	FAIL ABUN
ND-147	1.060E+01	1.263E+01	1.350E+01	FAIL ABUN
PM-149	-1.879E+01	8.246E+03	8.246E+03	NOT IDENT.
EU-150	-1.298E-02	3.426E-01	3.427E-01	NOT IDENT.
EU-152	1.538E-03	1.278E+00	1.278E+00	FAIL ABUN
GD-153	-3.579E-01	8.665E-01	8.814E-01	NOT IDENT.
EU-154	-4.911E-01	1.024E+00	1.048E+00	FAIL ABUN
EU-155	4.585E-01	1.077E+00	1.097E+00	FAIL ABUN
TB-160	1.470E+00	2.745E+00	2.824E+00	FAIL ABUN
HO-166M	5.081E-01	8.775E-01	9.069E-01	FAIL ABUN
TM-171	-1.465E+02	3.315E+02	3.380E+02	NOT IDENT.
HF-172	5.732E-01	2.116E+00	2.132E+00	FAIL ABUN
LU-172	-3.005E-01	1.160E+00	1.168E+00	FAIL ABUN
LU-176	-1.346E-01	3.742E-01	3.791E-01	FAIL ABUN
HF-181	-3.096E-01	8.058E-01	8.178E-01	NOT IDENT.
TA-182	-4.632E-01	1.667E+00	1.680E+00	NOT IDENT.
RE-183	7.326E+02	7.612E+01	3.389E+02	FAIL ABUN
RE-184	1.153E+00	2.764E+00	2.813E+00	NOT IDENT.
W-188	-2.310E+01	1.027E+02	1.032E+02	NOT IDENT.
IR-192	-1.577E-01	5.850E-01	5.893E-01	NOT IDENT.
HG-203	7.156E-01	5.520E-01	6.393E-01	NOT IDENT.
BI-207	-4.590E-02	9.454E-01	9.456E-01	NOT IDENT.
TL-208	3.149E-01	5.133E-01	5.326E-01	NOT IDENT.
BI-211	-2.873E+00	2.783E+00	3.070E+00	NOT IDENT.
PB-211	2.575E-01	1.103E+01	1.104E+01	NOT IDENT.
BI-212	-8.678E-02	7.295E+00	7.295E+00	NOT IDENT.
PB-212	9.123E-01	6.860E-01	7.998E-01	FAIL ABUN
BI-214	8.025E-01	9.801E-01	1.045E+00	NOT IDENT.
PB-214	-8.581E-01	1.004E+00	1.076E+00	FAIL ABUN

RN-219	4.839E+00	6.364E+00	6.728E+00	NOT IDENT.
RN-222	8.025E-01	9.801E-01	1.045E+00	NOT IDENT.
RA-223	-5.458E-01	8.804E+00	8.808E+00	NOT IDENT.
RA-224	-3.654E+00	7.681E+00	7.855E+00	NOT IDENT.
RA-226	8.025E-01	9.801E-01	1.045E+00	NOT IDENT.
AC-227	1.346E+00	3.216E+00	3.272E+00	FAIL ABUN
TH-227	1.346E+00	3.216E+00	3.272E+00	FAIL ABUN
AC-228	-1.017E+00	2.834E+00	2.871E+00	NOT IDENT.
RA-228	-1.017E+00	2.834E+00	2.871E+00	NOT IDENT.
TH-228	9.123E-01	6.860E-01	7.998E-01	FAIL ABUN
TH-229	2.521E+00	6.144E+00	6.248E+00	FAIL ABUN
TH-230	8.025E-01	9.801E-01	1.045E+00	NOT IDENT.
TH-231	-5.458E-01	8.804E+00	8.808E+00	NOT IDENT.
TH-232	-1.017E+00	2.834E+00	2.871E+00	NOT IDENT.
PA-233	-4.581E-01	9.485E-01	9.707E-01	FAIL ABUN
PA-234	-3.394E+00	7.872E+00	8.019E+00	FAIL ABUN
PA-234M	1.534E+02	1.796E+02	1.924E+02	FAIL ABUN
TH-234	1.728E-01	1.285E+01	1.285E+01	NOT IDENT.
U-234	8.025E-01	9.801E-01	1.045E+00	NOT IDENT.
U-235	-1.696E+00	2.051E+00	2.189E+00	NOT IDENT.
NP-237	-4.581E-01	9.485E-01	9.707E-01	FAIL ABUN
NP-238	1.050E+03	2.943E+03	2.981E+03	SHORT HLIF
U-238	1.728E-01	1.285E+01	1.285E+01	NOT IDENT.
NP-239	1.459E-01	2.786E+00	2.787E+00	NOT IDENT.
PU-239	-5.725E+02	3.714E+03	3.723E+03	NOT IDENT.
AM-243	-1.014E-01	5.119E-01	5.139E-01	NOT IDENT.
CM-243	5.696E-01	1.121E+00	1.150E+00	NOT IDENT.
BK-247	-4.866E-01	1.088E+00	1.110E+00	NOT IDENT.
CM-247	6.208E-01	5.862E-01	6.496E-01	NOT IDENT.
CF-249	4.641E-01	5.930E-01	6.288E-01	NOT IDENT.
CF-251	-4.437E-01	1.371E+00	1.385E+00	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	2584.7026	87.09	579.0603	136.47	470.6823
45.60	2508.3713	87.57	579.6384	140.51	472.5082
46.54	2515.8337	88.03	580.1882	143.76	494.4756
49.72	2025.1082	88.34	580.5548	144.24	478.2270
51.35	2148.6409	88.47	580.7099	145.44	417.7522
51.87	2249.6865	89.96	524.4814	152.43	434.5307
52.39	2186.2893	1093.63	535.3008	153.25	419.2678
52.97	2324.9653	91.11	526.9639	323.87	480.8556
53.44	2318.8687	92.59	487.6498	156.02	435.6490
54.07	2327.3843	93.35	515.9901	158.56	433.9984
57.36	0.0000	94.56	492.4109	159.00	408.8351
57.53	2695.0366	94.65	492.4975	162.33	414.9344
57.98	1695.5189	94.67	492.5172	162.66	415.1189
59.27	1701.4371	94.87	488.8906	163.33	431.8232
59.32	1701.6655	97.43	512.4318	165.86	411.8979
59.54	1702.6678	98.43	484.5663	176.31	390.0476
60.96	599.1856	98.44	484.5778	176.60	390.1904
61.17	599.5164	99.53	468.2392	177.52	437.3008
62.93	595.1522	100.11	500.5797	181.07	456.6829
63.29	592.1437	102.03	502.3813	181.52	468.9346
63.58	611.5835	103.18	472.4092	184.41	480.4510
64.28	605.8365	103.37	498.7767	143.76	509.7219
66.73	640.9941	105.21	496.5644	193.51	487.9491
67.24	627.4183	105.31	471.3343	197.03	502.1893
125.81	599.3045	106.12	431.0674	198.01	499.4248
67.75	603.9061	106.47	461.5929	201.83	483.7488
69.67	602.2160	109.28	427.6274	203.43	480.1572
70.83	638.3438	111.00	503.6953	205.31	494.6446
72.81	599.4250	111.76	456.0941	210.85	487.5623
72.87	599.5103	114.06	499.4557	215.65	548.0107
74.66	648.6599	116.30	483.5000	222.11	528.9925
74.82	651.6436	116.74	483.8604	227.09	509.9672
74.97	670.1828	119.76	504.6278	227.38	511.2720
77.11	675.8976	121.12	492.4204	228.16	496.7380
78.74	641.7371	121.22	492.4992	228.18	496.7512
79.69	643.0839	121.78	492.9534	116.74	496.7512
80.12	626.0963	122.06	493.1824	235.69	443.8372
80.19	626.1943	122.92	493.8768	235.96	454.3925
80.57	613.1178	123.07	493.9969	238.63	402.1638
81.00	623.5913	265.00	458.3066	238.98	406.9546
81.07	623.6836	125.81	455.8520	240.99	497.4912
81.75	661.7854	127.23	457.8973	242.00	465.3376
83.79	629.8337	127.91	469.5260	244.70	437.3625
84.00	662.4889	129.30	466.4996	252.40	440.6781
85.43	680.7289	131.20	486.8835	252.80	446.7430
86.55	578.4117	133.02	486.9039	254.15	0.0000
86.79	578.6984	133.52	509.0530	256.23	398.5523
86.94	578.8817	136.00	426.2832	260.90	483.4864

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
264.66	433.9385	355.39	0.0000	584.27	245.5856
264.80	433.9940	356.01	424.5950	595.83	249.9902
265.00	451.9709	364.49	384.5465	427.87	215.7815
268.22	398.3033	366.42	364.7769	602.52	0.0000
269.46	427.5001	372.51	382.8962	604.72	232.1657
270.03	430.1251	375.05	389.6849	607.14	274.3510
271.23	430.5962	377.52	388.6349	609.32	217.7161
273.65	390.6883	356.01	391.2614	610.33	230.8120
276.40	431.4289	388.16	375.7713	614.28	220.2507
277.37	407.6877	388.63	403.9974	618.01	229.6709
277.60	419.8345	391.69	440.0635	620.36	236.9699
278.00	441.7176	264.66	435.7051	621.93	234.1282
279.20	373.3216	401.81	406.8078	630.19	0.0000
279.54	435.0806	402.40	391.0071	631.29	226.1055
279.70	435.1355	404.85	420.9701	633.25	235.4081
280.46	412.4510	410.95	428.0566	634.78	233.5566
283.69	430.6303	413.71	411.8724	635.95	231.6650
284.31	422.3727	414.70	422.8727	636.99	251.0072
285.41	421.5720	423.72	419.0985	645.85	221.0577
285.90	398.6589	427.09	422.7221	657.76	256.0143
287.50	399.2195	427.87	449.0936	657.90	0.0000
290.67	401.5511	433.94	454.4779	661.66	232.4127
293.27	0.0000	439.40	454.2440	664.57	0.0000
351.93	410.4895	453.88	440.0586	666.33	184.6875
295.96	376.4235	463.37	516.4095	666.50	190.8589
879.38	419.4688	468.07	514.1914	667.71	0.0000
299.98	400.2827	473.00	480.4716	677.62	211.4229
300.09	400.3125	475.06	465.2842	685.70	199.7695
300.13	400.3324	476.78	436.0139	695.00	203.7201
301.36	383.0934	477.60	442.7346	696.49	185.1270
302.85	383.1663	482.18	385.1877	696.51	185.1342
256.23	373.0024	487.02	381.6035	697.00	172.6870
304.85	373.1038	492.35	346.2078	697.30	195.6039
306.78	404.6485	497.08	333.0490	697.49	198.7407
308.46	387.8686	505.52	319.0636	702.65	185.6339
311.90	429.9975	507.63	0.0000	706.68	192.2282
316.51	410.8325	511.00	341.3928	711.68	193.6945
319.41	395.1350	514.00	330.5688	720.70	200.7536
320.08	371.1592	514.00	330.5688	721.93	0.0000
321.04	371.4580	520.40	301.7285	722.78	191.4644
323.87	362.6788	520.69	278.8962	722.91	193.5833
325.23	355.7890	522.65	0.0000	723.31	205.1880
328.76	370.4070	527.90	294.8533	724.19	216.8465
333.37	365.8520	528.26	273.8390	727.33	207.6532
333.97	368.5587	529.59	303.7530	733.00	214.4898
334.37	379.6417	529.87	0.0000	735.93	195.7119
338.28	362.1873	531.02	262.7506	333.97	203.2500
338.32	362.1960	537.26	267.4913	739.50	215.0762
311.90	389.9312	546.56	0.0000	747.24	222.1560
340.48	389.9312	552.55	226.0411	748.06	228.0808
340.55	389.9500	563.25	221.4672	752.31	236.4712
344.28	370.6692	569.33	218.2544	753.82	214.2332
345.93	392.4203	946.00	221.2181	756.73	215.5620
351.06	430.7051	569.70	227.1100	756.80	215.5702
351.93	419.0202	583.19	229.6722	884.68	201.2188

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
765.81	251.7147	1274.44	277.9492	1620.50	4.7176
766.42	242.1389	1001.03	266.1299	1621.92	16.5176
766.84	255.0346	1002.74	222.8329	1678.03	0.0000
772.60	0.0000	1004.73	242.6055	1690.97	12.5728
776.52	224.8434	507.63	0.0000	1750.46	0.0000
739.50	222.8181	1025.87	0.0000	1764.49	11.7023
778.90	223.9792	1028.54	0.0000	1063.66	14.9109
783.70	211.4640	1037.84	244.4985	1771.35	17.0449
785.37	225.6428	1038.76	0.0000	1791.20	0.0000
792.07	217.5864	631.29	222.0917	1808.65	11.8063
794.95	225.4264	1048.07	239.0856	1810.72	0.0000
795.86	228.7551	1049.04	257.8210	1836.06	18.3458
810.06	239.8462	1050.41	243.6968		
810.29	236.6021	1063.66	261.6863		
344.28	236.6109	1077.00	228.6969		
810.76	239.9178	1077.34	235.8878		
815.77	227.2715	1085.87	237.4131		
1048.07	287.6776	1093.63	261.4142		
832.01	257.2800	1099.45	243.8141		
834.85	247.6593	1112.07	244.7534		
835.71	248.8428	1112.84	244.8029		
836.80	0.0000	1115.54	245.0006		
846.75	0.0000	1120.29	207.9086		
846.77	248.7762	1120.55	193.3825		
856.80	255.2639	1221.41	201.5375		
860.56	252.2899	1129.67	166.7596		
871.09	291.2036	1131.51	0.0000		
873.19	283.6106	1147.95	0.0000		
875.33	0.0000	1173.23	117.2099		
879.38	275.3086	1177.95	136.0324		
880.51	265.3424	1189.05	105.6921		
883.24	324.9992	1204.77	70.7722		
884.68	280.3243	1221.41	67.3594		
889.28	303.2556	1231.02	63.0369		
894.76	304.9742	1235.36	46.9604		
898.04	298.5779	1238.28	46.6211		
900.72	292.1022	1260.41	0.0000		
903.28	282.2062	1271.87	34.9065		
911.20	326.0156	1274.44	41.0063		
912.08	346.5037	1274.54	41.0063		
923.98	0.0000	1291.59	51.4918		
926.50	344.8573	1298.22	0.0000		
929.11	314.4082	1312.11	37.3909		
937.49	334.7515	1332.49	49.1541		
944.13	367.5774	1362.66	0.0000		
946.00	389.5833	1365.19	26.2419		
949.00	377.3674	1368.63	0.0000		
667.71	0.0000	1384.29	21.4844		
962.31	303.0450	1408.01	14.1460		
964.08	335.5096	1457.56	0.0000		
966.17	311.5173	1460.82	20.8962		
911.20	294.4806	1489.16	22.0376		
968.97	294.4806	1505.03	21.1141		
983.53	280.8366	1584.12	17.4036		
984.45	0.0000	1596.21	16.4238		

Radiochemistry Batch Checklist

09/29/16

Batch# 1598666 Product: I-129 / MJWC Date: 09/29/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			n/a
Samples have been blank corrected (if required). Blank correction reported included (if required).			n/a
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			n/a
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.		✓	DER 1562907
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.	✓		
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)	✓		
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER 1562907
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		
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.)	✓		

Primary Review Performed By: 9/29/16

Secondary Review Performed By: B. Wall 9/29/16

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
29-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GAMMA SPECTROMETER	DOE EML HASL-300,I-01 Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1598666	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Sample Analyzed out of Holding: QC 1203627536DUP,1203627537MS 2. Sample Logged out of Holding: 405240 001,002,003,004,005,006,007,008,009, 010,011,012,013,014,015,016	1. Samples were analyzed in a timely manner upon receipt. Reporting results. 2. Samples were analyzed in a timely manner upon receipt. Reporting results.

Originator's Name:

Spencer Collins 29-SEP-16

Data Validator/Group Leader:

Bryan Williams 30-SEP-16

I-129 Queue Sheet

09/28/2016

BSW 9-28-16

Batch #:1598666 Analyst: ~~MJH~~ BSW First Client Due Date:10/04/2016 Internal Due Date: 09/30/2016

Spike Isotope: I-129 Spike Code: 1470-K Expiration Date: 3/30/17 Vol: 0.1 mL Nominal Concentration: see LIMS

LCS Isotope: I-129 LCS Code: 1470-K Expiration Date: 3/3/17 Vol: 0.1 mL Nominal Concentration: see LIMS

Prep Date: 9/28/16 Initials: BW Pipette ID: 14232-3 / 1543592 Witness: NBP 9-28-16

Sample ID	Client Description	Type	Hazard Code	RDL	Client	Matrix	Collect Date	Aliquot (mL or g) DRY WEIGHT	Detector
405240001-1	HO.1.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 10:14 F1	3.10	X2
405240002-1	HO.1.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 10:19 F2	1.38	X4
405240003-1	HO.1.5	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 10:18 F3	1.82	X5
405240004-1	HO.1.6	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 10:21 F4	1.98	X6
405240005-1	HO.2.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 11:42 F5	2.75	5
405240006-1	HO.2.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 11:46 F6	2.93	X2
405240007-1	HO.3.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:17 F7	2.95	X4
405240008-1	HO.3.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:20 F8	3.0	X5
405240009-1	HO.4.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:31 F9	2.60	X6
405240010-1	HO.4.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:35 F10	2.94	5
405240011-1	HO.5.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:53 F11	2.72	X2
405240012-1	HO.5.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 12:56 F12	3.05	X4
405240013-1	REACH7.1.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 11:04 F13	2.61	X5
405240014-1	REACH7.1.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 11:08 F14	3.11	X6
405240015-1	REACH21.1.1	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 14:02 F15	2.82	X1
405240016-1	REACH21.1.2	SAMPLE		1 pCi/g	MJWC001	SOIL	15-DEC-15 14:06 F16	2.69	X2
1203627535-1	MB for batch 1598666	MB		1 pCi/g	QC ACCOUNT	SOIL	9/28/16 F17	3.39	X4
1203627536-1	HO.1.1(405240001DUP)	DUP		1 pCi/g	QC ACCOUNT	SOIL	15-DEC-15 10:14 F18	3.05	X5
1203627537-1	HO.1.1(405240001MS)	MS		1 pCi/g	QC ACCOUNT	SOIL	15-DEC-15 10:14 F19	3.04	X6
1203627538-1	LCS for batch 1598666	LCS		1 pCi/g	QC ACCOUNT	SOIL	9/28/16 F20	3.38	5

9/29/16

1	3.11
2	3.39
3	2.83
4	2.98
5	2.76
6	2.93
7	2.95
8	3.09
9	2.61
10	2.94
11	2.72
12	3.05
13	2.61
14	3.11
15	2.82
16	2.70
17	3.39
18	3.06
19	3.06
20	3.39

GEL Laboratories LLC, Radiochemistry Division

Data Reviewed By: 9/29/16

Weight/Loss Aliquot Correction Report

Select What to Correct Aliquot to

○ Ash Dry Weight ◉ Dry Weight ○ Wet Weight

Submit

Batch ID: 1598666

Calculate Corrected Aliquot

Aliquot Correction to Dry Weight for Batch 1598666

Sample Id	Aliquot (G)	Sample Type	Parent Sample Id	Loss (Dec)	Corrected Aliquot (G)
405240001	3.69	SAMPLE	NA	.1580	3.106701466396511
405240002	4.01	SAMPLE	NA	.1553	3.386942228366801
405240003	3.40	SAMPLE	NA	.1684	2.827129149693467
405240004	3.50	SAMPLE	NA	.1485	2.980234106433715
405240005	3.48	SAMPLE	NA	.2082	2.755145688449339
405240006	3.60	SAMPLE	NA	.1855	2.932138436500393
405240007	3.47	SAMPLE	NA	.1487	2.953937782939356
405240008	3.60	SAMPLE	NA	.1421	3.088367944961141
405240009	3.35	SAMPLE	NA	.2219	2.606506015510873
405240010	3.57	SAMPLE	NA	.1756	2.943021283525073
405240011	3.49	SAMPLE	NA	.2192	2.724965646848393
405240012	3.80	SAMPLE	NA	.1968	3.051869200424323
405240013	3.50	SAMPLE	NA	.2537	2.611715749039692
405240014	3.67	SAMPLE	NA	.1527	3.109324196555199
405240015	4.01	SAMPLE	NA	.2964	2.821090405892982
405240016	3.44	SAMPLE	NA	.2157	2.697833128319662
1203627535		MB	NA	NA	
1203627536	3.63	DUP	405240001	.1580	3.056185995398194
1203627537	3.64	MS	405240001	.1580	3.06460524056458
1203627538		LCS	NA	NA	

GEL Laboratories LLC

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:54.59

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY2.CNF;379
                                    Background date  : 25-SEP-2016 12:22:59
Sample date      : 15-DEC-2015 10:14:00 Acquisition date : 29-SEP-2016 08:37:37
Sample ID        : I405240001           Sample quantity  : 3.11000E+00 GRAM
Detector name    : XRAY2                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.10  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	82.34	6	0	0.55	411.17	406	9	3.33E-03	40.8	
2	0	92.70*	4	8	1.02	463.00	455	16	2.05E-03	198.1	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:55.39

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240001.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:37 Sensitivity     : 3.000            *
* Detector ID      : XRAY2                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 10:14:00 Analyst initials: BSW1             *
* Sample ID        : I405240001           Sample Quantity : 3.1100E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	4.211E-01	5.906E+00	1.391E+01	NOT IDENT.
I-129	3.557E-01	3.808E-01	9.226E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:53.91

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	82.34	6	0	0.55	411.17	406	9	3.33E-03	40.8	
2	0	92.70	12	8	1.02	463.00	455	16	6.67E-03	60.1	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:54.96

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240001 Acquisition date : 29-SEP-2016 08:37:37

Total number of lines in spectrum	2	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240001 Acquisition date : 29-SEP-2016 08:37:37

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	82.34	6	0	0.55	411.17	406	9	3.33E-03	81.6	5.02E-06	
0	92.70	4	8	1.02	463.00	455	16	2.05E-03	****	3.90E-08	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:56.90

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240001.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:37 Sensitivity     : 3.000          *
* Detector ID      : XRAY2                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE         *
* Sample ID        : I405240001           Analyst initials: BSW1           *
* Batch Number     : 1598666              Sample Quantity : 3.1100E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000     *
*                                         Standard Weight :    0.00000     *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15          *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	5.059E+00	NOT IDENT.
I-129	3.894E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:36:58.00

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240001.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:37 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE       *
* Sample ID        : I405240001           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.1100E+00 GRAM   *
*                                         Quantity Err(%) : 3.2154E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	4.211E-01	5.907E+00	5.910E+00	NOT IDENT.
I-129	3.557E-01	3.825E-01	4.147E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	2.1038				
29.62	3.2110				
27.34	10.8088				
29.62	1.1008				
35.49	2.2293				
39.58	5.7170				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:48.91

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240002.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY4.CNF;433
                                     Background date  : 25-SEP-2016 12:23:10
Sample date      : 15-DEC-2015 10:19:00 Acquisition date : 29-SEP-2016 08:37:58
Sample ID        : I405240002           Sample quantity  : 3.39000E+00 GRAM
Detector name    : XRAY4                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.11  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
**********************************************************************

                  BACKGROUND CORRECTED SAMPLE PEAK REPORT
No peaks were found
```

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:49.68

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240002.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:58 Sensitivity     : 3.000          *
* Detector ID      : XRAY4                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 10:19:00 Analyst initials: BSW1           *
* Sample ID        : I405240002           Sample Quantity : 3.3900E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000     *
* Recovery         :    1.00000           Standard Weight :    0.00000     *
* Nuclide Library  : IODINE.NLB;1                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	2.475E+00	4.839E+00	1.191E+01	NOT IDENT.
I-129	-1.038E-01	2.436E-01	4.547E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:48.22

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

No peaks were found

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:49.26

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240002 Acquisition date : 29-SEP-2016 08:37:58

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:51.14

```
**************************************************************************
*                            GEL Laboratories LLC                        *
*                              2040 Savage Road                          *
*                            Charleston, SC 29407                        *
**************************************************************************
*                                                                        *
*                          DETECTOR AND SAMPLE DATA                      *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240002.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:58 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:19:00 Nuclide Library : IODINE       *
* Sample ID        : I405240002           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
**************************************************************************
*                                                                        *
*                          CALIBRATION INFORMATION                       *
*                                                                        *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
**************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	4.714E+00	NOT IDENT.
I-129	1.530E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:39:52.14

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240002.CNF;1    *
* Acquisition date : 29-SEP-2016 08:37:58 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:19:00 Nuclide Library : IODINE       *
* Sample ID        : I405240002           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
*                                         Quantity Err(%) : 2.9499E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	2.475E+00	4.858E+00	4.984E+00	NOT IDENT.
I-129	-1.038E-01	2.438E-01	2.483E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	2.1715				
29.62	3.3266				
27.34	1.1221				
29.62	1.1470				
35.49	0.0000				
39.58	0.0000				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:04.50

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY5.CNF;58
                                        Background date  : 25-SEP-2016 12:23:15
Sample date      : 15-DEC-2015 10:18:00 Acquisition date : 29-SEP-2016 08:38:23
Sample ID        : I405240003           Sample quantity  : 2.83000E+00 GRAM
Detector name    : XRAY5                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.03  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.48*	9	0	0.40	231.09	227	8	5.01E-03	37.4	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:05.30

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240003.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:23 Sensitivity     : 3.000            *
* Detector ID      : XRAY5                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 10:18:00 Analyst initials: BSW1             *
* Sample ID        : I405240003           Sample Quantity : 2.8300E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5             *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	6.906E-01	2.151E+00	9.832E+00	NOT IDENT.
I-129	1.324E-01	3.504E-01	1.004E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:03.80

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.48	11	0	0.40	231.09	227	8	6.11E-03	30.2	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:04.86

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240003 Acquisition date : 29-SEP-2016 08:38:23

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240003 Acquisition date : 29-SEP-2016 08:38:23

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.48	9	0	0.40	231.09	227	8	5.01E-03	74.8	7.91E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:07.14

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240003.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:23 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:18:00 Nuclide Library : IODINE       *
* Sample ID        : I405240003           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.8300E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	2.554E+00	NOT IDENT.
I-129	3.582E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:08.20

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240003.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:23 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:18:00 Nuclide Library : IODINE       *
* Sample ID        : I405240003           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.8300E+00 GRAM   *
*                                         Quantity Err(%) : 3.5336E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	6.906E-01	2.155E+00	2.177E+00	NOT IDENT.
I-129	1.324E-01	3.506E-01	3.557E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	0.8547				
27.34	0.8784				
29.62	0.9231				
35.49	0.9543				
39.58	1.0189				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:33.31

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240004.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY6.CNF;215
                                    Background date  : 25-SEP-2016 12:23:20
Sample date      : 15-DEC-2015 10:21:00 Acquisition date : 29-SEP-2016 08:38:49
Sample ID        : I405240004           Sample quantity  : 2.98000E+00 GRAM
Detector name    : XRAY6                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.04  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
**********************************************************************

                  BACKGROUND CORRECTED SAMPLE PEAK REPORT
No peaks were found
```

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:34.08

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240004.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:49 Sensitivity     : 3.000            *
* Detector ID      : XRAY6                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 10:21:00 Analyst initials: BSW1             *
* Sample ID        : I405240004           Sample Quantity : 2.9800E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5             *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-2.153E+00	4.219E+00	4.121E+00	NOT IDENT.
I-129	-2.768E-01	3.836E-01	2.561E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:32.61

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

No peaks were found

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:33.63

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240004 Acquisition date : 29-SEP-2016 08:38:49

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:35.51

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240004.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:49 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:21:00 Nuclide Library : IODINE       *
* Sample ID        : I405240004           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9800E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	0.000E+00	NOT IDENT.
I-129	0.000E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:41:36.51

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240004.CNF;1    *
* Acquisition date : 29-SEP-2016 08:38:49 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:21:00 Nuclide Library : IODINE       *
* Sample ID        : I405240004           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9800E+00 GRAM   *
*                                         Quantity Err(%) : 3.3557E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-2.153E+00	4.223E+00	4.333E+00	NOT IDENT.
I-129	-2.768E-01	3.846E-01	4.043E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	1.4157				
29.62	2.9286				
27.34	0.0000				
29.62	0.0000				
35.49	0.0000				
39.58	1.6568				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:46.51

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240005.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM05.CNF;476
                                        Background date  : 25-SEP-2016 12:20:17
Sample date      : 15-DEC-2015 11:42:00 Acquisition date : 29-SEP-2016 09:06:19
Sample ID        : I405240005           Sample quantity  : 2.76000E+00 GRAM
Detector name    : GAM05                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.14  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	50.00	9	16	1.03	101.81	98	6	4.72E-03	80.2	
2	0	62.70*	37	5	1.00	127.19	123	10	2.08E-02	23.0	
3	0	77.82	10	20	1.68	157.42	152	7	5.69E-03	81.5	
4	0	79.91	21	2	0.78	161.59	159	7	1.14E-02	26.2	
5	0	83.68*	20	7	0.81	169.14	166	8	1.10E-02	34.1	
6	0	92.86*	3	35	1.32	187.48	182	14	1.93E-03	383.6	
7	2	121.64	17	4	1.15	244.99	242	21	9.17E-03	31.6	1.26E+00
8	2	126.44	8	5	1.16	254.60	242	21	4.62E-03	63.8	
9	2	128.17	10	5	1.06	258.04	242	21	5.71E-03	51.3	
10	0	132.47	12	10	1.33	266.64	263	8	6.43E-03	56.0	
11	0	139.99*	14	12	2.01	281.67	278	9	7.97E-03	51.3	
12	0	146.10	23	24	5.07	293.89	286	17	1.28E-02	53.9	
13	0	159.07*	9	16	1.00	319.80	315	9	4.83E-03	92.7	
14	0	169.61	19	13	2.98	340.86	336	11	1.03E-02	44.9	
15	0	186.11*	3	18	0.59	373.85	368	9	1.74E-03	274.8	
16	0	208.46	17	4	1.01	418.51	414	9	9.42E-03	32.9	
17	0	212.46	7	3	0.57	426.50	424	6	3.89E-03	54.4	
18	0	262.80	7	10	1.26	527.12	522	7	4.10E-03	80.6	
19	0	296.21*	4	13	1.28	593.89	587	11	2.05E-03	204.7	
20	0	477.67	7	2	1.26	956.57	953	8	3.77E-03	53.2	
21	0	488.96	8	0	0.73	979.13	975	8	4.44E-03	35.4	
22	1	509.41	13	5	1.41	1020.00	1016	16	7.33E-03	46.7	1.36E+00

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:47.28

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240005.CNF;1    *
* Acquisition date : 29-SEP-2016 09:06:19 Sensitivity     : 3.000          *
* Detector ID      : GAM05                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.14     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:42:00 Analyst initials: BSW1           *
* Sample ID        : I405240005           Sample Quantity : 2.7600E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000     *
* Recovery         :    1.00000           Standard Weight :    0.00000     *
* Nuclide Library  : IODINE.NLB;1                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	5.629E+00	7.856E+00	1.738E+01	NOT IDENT.
I-129	4.227E-01	3.692E-01	8.525E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:45.82

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	50.00	9	16	1.03	101.81	98	6	4.72E-03	80.2	
2	0	62.70	54	5	1.00	127.19	123	10	3.00E-02	15.7	
3	0	77.82	10	20	1.68	157.42	152	7	5.69E-03	81.5	
4	0	79.91	21	2	0.78	161.59	159	7	1.14E-02	26.2	
5	0	83.68	25	7	0.81	169.14	166	8	1.39E-02	26.4	
6	0	92.86	29	35	1.32	187.48	182	14	1.63E-02	45.0	
7	2	121.64	17	4	1.15	244.99	242	21	9.17E-03	31.6	1.26E+00
8	2	126.44	8	5	1.16	254.60	242	21	4.62E-03	63.8	
9	2	128.17	10	5	1.06	258.04	242	21	5.71E-03	51.3	
10	0	132.47	12	10	1.33	266.64	263	8	6.43E-03	56.0	
11	0	139.99	16	12	2.01	281.67	278	9	8.86E-03	45.8	
12	0	146.10	23	24	5.07	293.89	286	17	1.28E-02	53.9	
13	0	159.07	12	16	1.00	319.80	315	9	6.90E-03	64.1	
14	0	169.61	19	13	2.98	340.86	336	11	1.03E-02	44.9	
15	0	186.11	14	18	0.59	373.85	368	9	7.92E-03	59.8	
16	0	208.46	17	4	1.01	418.51	414	9	9.42E-03	32.9	
17	0	212.46	7	3	0.57	426.50	424	6	3.89E-03	54.4	
18	0	262.80	7	10	1.26	527.12	522	7	4.10E-03	80.6	
19	0	296.21	5	13	1.28	593.89	587	11	2.53E-03	164.0	
20	0	477.67	7	2	1.26	956.57	953	8	3.77E-03	53.2	
21	0	488.96	8	0	0.73	979.13	975	8	4.44E-03	35.4	
22	1	509.41	13	5	1.41	1020.00	1016	16	7.33E-03	46.7	1.36E+00
23	1	511.41	10	6	1.42	1024.00	1016	16	5.33E-03	75.2	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:46.86

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240005 Acquisition date : 29-SEP-2016 09:06:19

Total number of lines in spectrum	22	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240005 Acquisition date : 29-SEP-2016 09:06:19

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	50.00	9	16	1.03	101.81	98	6	4.72E-03	****	2.90E+00	
0	62.70	37	5	1.00	127.19	123	10	2.08E-02	46.0	5.10E-02	
0	77.82	10	20	1.68	157.42	152	7	5.69E-03	****	1.47E-04	
0	79.91	21	2	0.78	161.59	159	7	1.14E-02	52.5	6.18E-05	
0	83.68	20	7	0.81	169.14	166	8	1.10E-02	68.3	1.26E-05	
0	92.86	3	35	1.32	187.48	182	14	1.93E-03	****	2.37E-07	
2	121.64	17	4	1.15	244.99	242	21	9.17E-03	63.2	4.57E-13	
2	126.44	8	5	1.16	254.60	242	21	4.62E-03	****	4.74E-14	
2	128.17	10	5	1.06	258.04	242	21	5.71E-03	****	2.09E-14	
0	132.47	12	10	1.33	266.64	263	8	6.43E-03	****	2.71E-15	
0	139.99	14	12	2.01	281.67	278	9	7.97E-03	****	7.43E-17	
0	146.10	23	24	5.07	293.89	286	17	1.28E-02	****	3.92E-18	
0	159.07	9	16	1.00	319.80	315	9	4.83E-03	****	7.31E-21	
0	169.61	19	13	2.98	340.86	336	11	1.03E-02	89.7	4.25E-23	
0	186.11	3	18	0.59	373.85	368	9	1.74E-03	****	1.27E-26	
0	208.46	17	4	1.01	418.51	414	9	9.42E-03	65.8	1.98E-31	
0	212.46	7	3	0.57	426.50	424	6	3.89E-03	****	2.72E-32	
0	262.80	7	10	1.26	527.12	522	7	4.10E-03	****	0.00E+00	
0	296.21	4	13	1.28	593.89	587	11	2.05E-03	****	0.00E+00	
0	477.67	7	2	1.26	956.57	953	8	3.77E-03	****	0.00E+00	
0	488.96	8	0	0.73	979.13	975	8	4.44E-03	70.7	0.00E+00	
1	509.41	13	5	1.41	1020.00	1016	16	7.33E-03	93.5	0.00E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:48.80

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240005.CNF;1    *
* Acquisition date : 29-SEP-2016 09:06:19 Sensitivity     : 3.000          *
* Detector ID      : GAM05                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.14     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:42:00 Nuclide Library : IODINE         *
* Sample ID        : I405240005           Analyst initials: BSW1           *
* Batch Number     : 1598666              Sample Quantity : 2.7600E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000     *
*                                         Standard Weight :    0.00000     *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	7.336E+00	NOT IDENT.
I-129	3.715E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:42:49.81

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240005.CNF;1    *
* Acquisition date : 29-SEP-2016 09:06:19 Sensitivity     : 3.000        *
* Detector ID      : GAM05                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.14     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:42:00 Nuclide Library : IODINE       *
* Sample ID        : I405240005           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.7600E+00 GRAM   *
*                                         Quantity Err(%) : 3.6232E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	5.629E+00	7.916E+00	8.313E+00	NOT IDENT.
I-129	4.227E-01	3.716E-01	4.176E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	4.2729				
29.62	2.8832				
27.34	18.8699				
29.62	14.7021				
35.49	22.2494				
39.58	9.0617				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:01.70

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240006.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY2.CNF;379
                                    Background date  : 25-SEP-2016 12:22:59
Sample date      : 15-DEC-2015 11:46:00 Acquisition date : 29-SEP-2016 09:12:21
Sample ID        : I405240006           Sample quantity  : 2.93000E+00 GRAM
Detector name    : XRAY2                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.10  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
**********************************************************************

                  BACKGROUND CORRECTED SAMPLE PEAK REPORT
No peaks were found
```

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:02.46

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240006.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:21 Sensitivity     : 3.000          *
* Detector ID      : XRAY2                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:46:00 Analyst initials: BSW1           *
* Sample ID        : I405240006           Sample Quantity : 2.9300E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000     *
* Recovery         :    1.00000           Standard Weight :    0.00000     *
* Nuclide Library  : IODINE.NLB;1                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-1.275E+01	1.136E+01	1.602E+01	NOT IDENT.
I-129	-2.966E-02	3.956E-01	7.908E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:01.07

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

No peaks were found

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:02.05

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240006 Acquisition date : 29-SEP-2016 09:12:21

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:03.90

```
**************************************************************************
*                            GEL Laboratories LLC                        *
*                              2040 Savage Road                          *
*                            Charleston, SC 29407                        *
**************************************************************************
*                                                                        *
*                          DETECTOR AND SAMPLE DATA                      *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240006.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:21 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:46:00 Nuclide Library : IODINE       *
* Sample ID        : I405240006           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9300E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
**************************************************************************
*                                                                        *
*                          CALIBRATION INFORMATION                       *
*                                                                        *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
**************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	5.995E+00	NOT IDENT.
I-129	3.191E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:04.92

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240006.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:21 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:46:00 Nuclide Library : IODINE       *
* Sample ID        : I405240006           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9300E+00 GRAM   *
*                                         Quantity Err(%) : 3.4130E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-1.275E+01	1.158E+01	1.293E+01	NOT IDENT.
I-129	-2.966E-02	3.956E-01	3.958E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	11.5710				
29.62	6.4220				
27.34	3.2426				
29.62	1.1008				
35.49	3.3440				
39.58	3.4302				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:23.38

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240007.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY4.CNF;433
                                     Background date  : 25-SEP-2016 12:23:10
Sample date      : 15-DEC-2015 12:17:00 Acquisition date : 29-SEP-2016 09:12:45
Sample ID        : I405240007           Sample quantity  : 2.95000E+00 GRAM
Detector name    : XRAY4                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.10  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	18.81*	6	2	0.53	93.53	90	7	3.45E-03	56.8	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:24.10

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240007.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:45 Sensitivity     : 3.000            *
* Detector ID      : XRAY4                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:17:00 Analyst initials: BSW1             *
* Sample ID        : I405240007           Sample Quantity : 2.9500E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-2.310E-01	2.957E+00	7.424E+00	NOT IDENT.
I-129	-2.748E-02	3.693E-01	7.578E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:22.73

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	18.81	7	2	0.53	93.53	90	7	4.14E-03	46.7	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:23.71

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240007 Acquisition date : 29-SEP-2016 09:12:45

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240007 Acquisition date : 29-SEP-2016 09:12:45

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	18.81	6	2	0.53	93.53	90	7	3.45E-03	****	3.17E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:25.46

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240007.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:45 Sensitivity     : 3.000       *
* Detector ID      : XRAY4                Energy tolerance: 1.000       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 12:17:00 Nuclide Library : IODINE      *
* Sample ID        : I405240007           Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 2.9500E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000  *
*                                         Standard Weight :    0.00000  *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	2.284E+00	NOT IDENT.
I-129	2.936E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:26.47

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240007.CNF;1    *
* Acquisition date : 29-SEP-2016 09:12:45 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:17:00 Nuclide Library : IODINE       *
* Sample ID        : I405240007           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9500E+00 GRAM   *
*                                         Quantity Err(%) : 3.3898E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-2.310E-01	2.957E+00	2.959E+00	NOT IDENT.
I-129	-2.748E-02	3.693E-01	3.695E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	1.0858				
29.62	4.4355				
27.34	1.1221				
29.62	2.2941				
35.49	1.1645				
39.58	1.2005				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:43.83

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240008.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY5.CNF;58
                                     Background date  : 25-SEP-2016 12:23:15
Sample date      : 15-DEC-2015 12:20:00 Acquisition date : 29-SEP-2016 09:13:06
Sample ID        : I405240008           Sample quantity  : 3.09000E+00 GRAM
Detector name    : XRAY5                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.02  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
**********************************************************************

                  BACKGROUND CORRECTED SAMPLE PEAK REPORT
No peaks were found
```

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:44.59

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240008.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:06 Sensitivity     : 3.000            *
* Detector ID      : XRAY5                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:20:00 Analyst initials: BSW1             *
* Sample ID        : I405240008           Sample Quantity : 3.0900E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5             *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	9.302E-01	4.488E+00	1.310E+01	NOT IDENT.
I-129	2.390E-02	2.581E-01	7.384E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:43.15

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

No peaks were found

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:44.13

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240008 Acquisition date : 29-SEP-2016 09:13:06

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:45.97

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240008.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:06 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:20:00 Nuclide Library : IODINE       *
* Sample ID        : I405240008           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.0900E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	4.388E+00	NOT IDENT.
I-129	2.375E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:43:46.97

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240008.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:06 Sensitivity     : 3.000          *
* Detector ID      : XRAY5                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:20:00 Nuclide Library : IODINE         *
* Sample ID        : I405240008           Analyst initials: BSW1           *
* Batch Number     : 1598666              Sample Quantity : 3.0900E+00 GRAM   *
*                                         Quantity Err(%) : 3.2362E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000        *
*                                         Standard Weight :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5           *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	9.302E-01	4.491E+00	4.511E+00	NOT IDENT.
I-129	2.390E-02	2.581E-01	2.583E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.8133				
29.62	0.8547				
27.34	0.8784				
29.62	0.9231				
35.49	0.9543				
39.58	0.0000				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:04.99

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240009.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY6.CNF;215
                                        Background date  : 25-SEP-2016 12:23:20
Sample date      : 15-DEC-2015 12:31:00 Acquisition date : 29-SEP-2016 09:13:27
Sample ID        : I405240009           Sample quantity  : 2.61000E+00 GRAM
Detector name    : XRAY6                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.04  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.34*	8	0	0.50	316.09	313	7	4.61E-03	40.6	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:05.70

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240009.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:27 Sensitivity     : 3.000          *
* Detector ID      : XRAY6                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 12:31:00 Analyst initials: BSW1           *
* Sample ID        : I405240009           Sample Quantity : 2.6100E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000     *
* Recovery         :    1.00000           Standard Weight :    0.00000     *
* Nuclide Library  : IODINE.NLB;1                                         *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5          *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	0.000E+00	3.400E+00	4.701E+00	NOT IDENT.
I-129	1.762E-01	4.842E-01	1.175E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:04.32

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.34	11	0	0.50	316.09	313	7	6.11E-03	30.2	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:05.28

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240009 Acquisition date : 29-SEP-2016 09:13:27

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240009 Acquisition date : 29-SEP-2016 09:13:27

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	63.34	8	0	0.50	316.09	313	7	4.61E-03	81.3	3.08E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:07.08

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240009.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:27 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:31:00 Nuclide Library : IODINE       *
* Sample ID        : I405240009           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.6100E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	0.000E+00	NOT IDENT.
I-129	4.418E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:08.07

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240009.CNF;1    *
* Acquisition date : 29-SEP-2016 09:13:27 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:31:00 Nuclide Library : IODINE       *
* Sample ID        : I405240009           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.6100E+00 GRAM   *
*                                         Quantity Err(%) : 3.8314E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	0.000E+00	0.000E+00	0.000E+00	NOT IDENT.
I-129	1.762E-01	4.845E-01	4.910E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	1.4643				
27.34	1.4921				
29.62	0.0000				
35.49	0.7906				
39.58	0.0000				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:12.23

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240010.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM05.CNF;476
                                        Background date  : 25-SEP-2016 12:20:17
Sample date      : 15-DEC-2015 12:35:00 Acquisition date : 29-SEP-2016 09:39:38
Sample ID        : I405240010           Sample quantity  : 2.94000E+00 GRAM
Detector name    : GAM05                Detector geometry: I129
Elapsed live time: 0 01:00:00.00        Elapsed real time: 0 01:00:00.34  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	46.10*	12	29	0.85	94.02	89	14	3.36E-03	98.2	8.34E-01
2	1	48.08	13	25	0.86	97.99	89	14	3.74E-03	69.4	
3	5	83.15*	16	43	1.40	168.06	162	19	4.47E-03	80.8	1.27E+00
4	5	86.65*	12	41	1.41	175.07	162	19	3.20E-03	108.5	
5	0	92.42*	6	46	1.46	186.60	181	12	1.61E-03	279.2	
6	0	112.12*	7	26	0.60	225.96	223	7	1.84E-03	140.7	
7	3	169.90	26	18	1.37	341.45	338	25	7.13E-03	29.6	2.73E+00
8	3	177.91	16	21	1.39	357.45	338	25	4.41E-03	59.1	
9	0	185.65*	1	34	0.99	372.93	369	8	4.11E-04	780.3	
10	0	219.05	13	28	3.88	439.69	433	10	3.71E-03	78.5	
11	0	238.76*	5	38	2.08	479.08	474	9	1.28E-03	267.8	
12	0	265.67	5	14	1.43	532.86	527	7	1.28E-03	143.2	
13	1	270.13	16	20	1.28	541.77	538	13	4.42E-03	54.5	4.62E+00
14	1	272.36	16	20	1.29	546.23	538	13	4.58E-03	54.6	
15	0	283.04	12	15	1.08	567.57	563	8	3.26E-03	65.4	
16	0	295.13*	17	23	0.98	591.73	588	9	4.66E-03	58.5	
17	0	314.13	24	22	4.74	629.71	622	17	6.57E-03	49.4	
18	0	472.92	7	14	0.71	947.08	940	9	1.94E-03	107.7	
19	0	486.79	10	17	0.69	974.80	970	13	2.72E-03	91.4	
20	0	511.29*	8	22	2.31	1023.77	1016	16	2.10E-03	199.4	
21	0	673.63*	7	1	1.28	1348.23	1345	6	1.95E-03	53.0	
22	0	933.29	9	0	0.67	1867.22	1864	7	2.50E-03	33.3	
23	0	943.51	5	6	0.84	1887.65	1881	8	1.39E-03	95.9	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:13.14

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240010.CNF;1    *
* Acquisition date : 29-SEP-2016 09:39:38 Sensitivity     : 3.000            *
* Detector ID      : GAM05                Energy tolerance: 1.000            *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:35:00 Analyst initials: BSW1             *
* Sample ID        : I405240010           Sample Quantity : 2.9400E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-9.668E-01	7.932E+00	1.312E+01	NOT IDENT.
I-129	-3.470E-01	2.823E-01	3.597E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:11.18

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	46.10	61	29	0.85	94.02	89	14	1.69E-02	18.6	8.34E-01
2	1	48.08	13	25	0.86	97.99	89	14	3.74E-03	69.4	
3	0	63.30	25	62	1.01	128.40	125	7	6.85E-03	56.5	
4	5	83.15	27	43	1.40	168.06	162	19	7.38E-03	47.8	1.27E+00
5	5	86.65	16	41	1.41	175.07	162	19	4.46E-03	76.5	
6	0	92.42	58	46	1.46	186.60	181	12	1.60E-02	27.4	
7	0	112.12	12	26	0.60	225.96	223	7	3.38E-03	75.4	
8	3	169.90	26	18	1.37	341.45	338	25	7.13E-03	29.6	2.73E+00
9	3	177.91	16	21	1.39	357.45	338	25	4.41E-03	59.1	
10	0	185.65	24	34	0.99	372.93	369	8	6.59E-03	47.3	
11	0	219.05	13	28	3.88	439.69	433	10	3.71E-03	78.5	
12	0	238.76	18	38	2.08	479.08	474	9	4.89E-03	69.0	
13	0	265.67	5	14	1.43	532.86	527	7	1.28E-03	143.2	
14	1	270.13	16	20	1.28	541.77	538	13	4.42E-03	54.5	4.62E+00
15	1	272.36	16	20	1.29	546.23	538	13	4.58E-03	54.6	
16	0	283.04	12	15	1.08	567.57	563	8	3.26E-03	65.4	
17	0	295.13	19	23	0.98	591.73	588	9	5.14E-03	51.7	
18	0	314.13	24	22	4.74	629.71	622	17	6.57E-03	49.4	
19	0	472.92	7	14	0.71	947.08	940	9	1.94E-03	107.7	
20	0	486.79	10	17	0.69	974.80	970	13	2.72E-03	91.4	
21	0	511.29	92	22	2.31	1023.77	1016	16	2.55E-02	15.8	
22	0	673.63	9	1	1.28	1348.23	1345	6	2.37E-03	40.9	
23	0	933.29	9	0	0.67	1867.22	1864	7	2.50E-03	33.3	
24	0	943.51	5	6	0.84	1887.65	1881	8	1.39E-03	95.9	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:12.60

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240010 Acquisition date : 29-SEP-2016 09:39:38

Total number of lines in spectrum	23	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240010 Acquisition date : 29-SEP-2016 09:39:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.10	12	29	0.85	94.02	89	14	3.36E-03	****	7.66E+00	
1	48.08	13	25	0.86	97.99	89	14	3.74E-03	****	4.77E+00	
5	83.15	16	43	1.40	168.06	162	19	4.47E-03	****	1.59E-05	
5	86.65	12	41	1.41	175.07	162	19	3.20E-03	****	3.55E-06	
0	92.42	6	46	1.46	186.60	181	12	1.61E-03	****	2.88E-07	
0	112.12	7	26	0.60	225.96	223	7	1.84E-03	****	3.88E-11	
3	169.90	26	18	1.37	341.45	338	25	7.13E-03	59.2	3.68E-23	
3	177.91	16	21	1.39	357.45	338	25	4.41E-03	****	7.23E-25	
0	185.65	1	34	0.99	372.93	369	8	4.11E-04	****	1.60E-26	
0	219.05	13	28	3.88	439.69	433	10	3.71E-03	****	1.02E-33	
0	238.76	5	38	2.08	479.08	474	9	1.28E-03	****	0.00E+00	
0	265.67	5	14	1.43	532.86	527	7	1.28E-03	****	0.00E+00	
1	270.13	16	20	1.28	541.77	538	13	4.42E-03	****	0.00E+00	
1	272.36	16	20	1.29	546.23	538	13	4.58E-03	****	0.00E+00	
0	283.04	12	15	1.08	567.57	563	8	3.26E-03	****	0.00E+00	
0	295.13	17	23	0.98	591.73	588	9	4.66E-03	****	0.00E+00	
0	314.13	24	22	4.74	629.71	622	17	6.57E-03	98.8	0.00E+00	
0	472.92	7	14	0.71	947.08	940	9	1.94E-03	****	0.00E+00	
0	486.79	10	17	0.69	974.80	970	13	2.72E-03	****	0.00E+00	
0	511.29	8	22	2.31	1023.77	1016	16	2.10E-03	****	0.00E+00	
0	673.63	7	1	1.28	1348.23	1345	6	1.95E-03	****	0.00E+00	
0	933.29	9	0	0.67	1867.22	1864	7	2.50E-03	66.7	0.00E+00	
0	943.51	5	6	0.84	1887.65	1881	8	1.39E-03	****	0.00E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:15.01

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240010.CNF;1    *
* Acquisition date : 29-SEP-2016 09:39:38 Sensitivity     : 3.000       *
* Detector ID      : GAM05                Energy tolerance: 1.000       *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 12:35:00 Nuclide Library : IODINE      *
* Sample ID        : I405240010           Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 2.9400E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000  *
*                                         Standard Weight :    0.00000  *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	5.926E+00	NOT IDENT.
I-129	1.541E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:40:16.08

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240010.CNF;1    *
* Acquisition date : 29-SEP-2016 09:39:38 Sensitivity     : 3.000        *
* Detector ID      : GAM05                Energy tolerance: 1.000        *
* Elapsed live time:    0 01:00:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 01:00:00.34     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:35:00 Nuclide Library : IODINE       *
* Sample ID        : I405240010           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.9400E+00 GRAM   *
*                                         Quantity Err(%) : 3.4014E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-9.668E-01	7.934E+00	7.945E+00	NOT IDENT.
I-129	-3.470E-01	2.844E-01	3.246E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	31.3347				
29.62	25.9492				
27.34	24.6761				
29.62	10.2915				
35.49	22.2494				
39.58	21.1439				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:37.67

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240011.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY2.CNF;379
                                    Background date  : 25-SEP-2016 12:22:59
Sample date      : 15-DEC-2015 12:53:00 Acquisition date : 29-SEP-2016 09:53:15
Sample ID        : I405240011           Sample quantity  : 2.72000E+00 GRAM
Detector name    : XRAY2                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.12  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.13*	7	30	1.43	64.60	54	17	3.69E-03	195.6	
2	0	19.21	7	2	0.32	95.05	92	6	3.64E-03	56.0	
3	0	23.89	8	0	0.27	118.50	113	9	4.44E-03	35.4	
4	0	183.55	7	0	0.38	918.00	913	10	3.89E-03	37.8	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:38.41

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240011.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:15 Sensitivity     : 3.000            *
* Detector ID      : XRAY2                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.12     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:53:00 Analyst initials: BSW1             *
* Sample ID        : I405240011           Sample Quantity : 2.7200E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-2.167E+00	9.650E+00	1.907E+01	NOT IDENT.
I-129	7.995E-02	3.365E-01	7.667E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:37.00

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.13	11	30	1.43	64.60	54	17	6.16E-03	116.7	
2	0	19.21	7	2	0.32	95.05	92	6	3.64E-03	56.0	
3	0	23.89	8	0	0.27	118.50	113	9	4.44E-03	35.4	
4	0	183.55	7	0	0.38	918.00	913	10	3.89E-03	37.8	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:38.01

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240011 Acquisition date : 29-SEP-2016 09:53:15

Total number of lines in spectrum	4	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240011 Acquisition date : 29-SEP-2016 09:53:15

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	13.13	7	30	1.43	64.60	54	17	3.69E-03	****	9.27E-08	
0	19.21	7	2	0.32	95.05	92	6	3.64E-03	****	2.80E-02	
0	23.89	8	0	0.27	118.50	113	9	4.44E-03	70.7	1.80E+00	
0	183.55	7	0	0.38	918.00	913	10	3.89E-03	75.6	1.55E-28	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:40.00

```
**************************************************************************
*                            GEL Laboratories LLC                        *
*                              2040 Savage Road                          *
*                            Charleston, SC 29407                        *
**************************************************************************
*                                                                        *
*                          DETECTOR AND SAMPLE DATA                      *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240011.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:15 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.12     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:53:00 Nuclide Library : IODINE       *
* Sample ID        : I405240011           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.7200E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
**************************************************************************
*                                                                        *
*                          CALIBRATION INFORMATION                       *
*                                                                        *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
**************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	7.369E+00	NOT IDENT.
I-129	3.011E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:23:41.14

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240011.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:15 Sensitivity     : 3.000            *
* Detector ID      : XRAY2                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.12     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:53:00 Nuclide Library : IODINE           *
* Sample ID        : I405240011           Analyst initials: BSW1             *
* Batch Number     : 1598666              Sample Quantity : 2.7200E+00 GRAM  *
*                                         Quantity Err(%) : 3.6765E-03 %     *
* Recovery         :    1.00000           Carrier Weight  :    0.00000       *
*                                         Standard Weight :    0.00000       *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-2.167E+00	9.657E+00	9.707E+00	NOT IDENT.
I-129	7.995E-02	3.366E-01	3.385E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	5.2595				
29.62	3.2110				
27.34	4.3235				
29.62	4.4030				
35.49	5.5733				
39.58	4.5736				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:08.97

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240012.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY4.CNF;433
                                     Background date  : 25-SEP-2016 12:23:10
Sample date      : 15-DEC-2015 12:56:00 Acquisition date : 29-SEP-2016 09:53:38
Sample ID        : I405240012           Sample quantity  : 3.05000E+00 GRAM
Detector name    : XRAY4                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.10  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.29*	4	4	0.26	50.83	47	6	2.35E-03	104.5	
2	0	13.21*	2	0	0.70	65.44	63	6	8.88E-04	216.1	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:09.77

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240012.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:38 Sensitivity     : 3.000            *
* Detector ID      : XRAY4                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:56:00 Analyst initials: BSW1             *
* Sample ID        : I405240012           Sample Quantity : 3.0500E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	3.896E+00	3.908E+00	1.204E+01	NOT IDENT.
I-129	6.568E-02	3.403E-01	7.608E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:08.23

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.29	8	4	0.26	50.83	47	6	4.19E-03	57.4	
2	0	13.21	9	0	0.70	65.44	63	6	5.00E-03	33.3	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:09.35

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240012 Acquisition date : 29-SEP-2016 09:53:38

Total number of lines in spectrum	2	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240012 Acquisition date : 29-SEP-2016 09:53:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	10.29	4	4	0.26	50.83	47	6	2.35E-03	****	2.05E-02	
0	13.21	2	0	0.70	65.44	63	6	8.88E-04	****	2.71E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:11.33

```
**************************************************************************
*                            GEL Laboratories LLC                        *
*                              2040 Savage Road                          *
*                            Charleston, SC 29407                        *
**************************************************************************
*                                                                        *
*                          DETECTOR AND SAMPLE DATA                      *
*                                                                        *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240012.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:38 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 12:56:00 Nuclide Library : IODINE       *
* Sample ID        : I405240012           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.0500E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
**************************************************************************
*                                                                        *
*                          CALIBRATION INFORMATION                       *
*                                                                        *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
**************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	4.638E+00	NOT IDENT.
I-129	2.979E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 10:24:12.40

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240012.CNF;1    *
* Acquisition date : 29-SEP-2016 09:53:38 Sensitivity     : 3.000            *
* Detector ID      : XRAY4                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.10     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 12:56:00 Nuclide Library : IODINE           *
* Sample ID        : I405240012           Analyst initials: BSW1             *
* Batch Number     : 1598666              Sample Quantity : 3.0500E+00 GRAM  *
*                                         Quantity Err(%) : 3.2787E-03 %     *
* Recovery         :    1.00000           Carrier Weight  :    0.00000       *
*                                         Standard Weight :    0.00000       *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	3.896E+00	3.966E+00	4.338E+00	NOT IDENT.
I-129	6.568E-02	3.403E-01	3.416E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	3.3266				
27.34	3.3663				
29.62	0.0000				
35.49	3.4934				
39.58	3.6015				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:54.88

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240013.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY5.CNF;58
                                    Background date  : 25-SEP-2016 12:23:15
Sample date      : 15-DEC-2015 11:04:00 Acquisition date : 29-SEP-2016 09:54:01
Sample ID        : I405240013           Sample quantity  : 2.61000E+00 GRAM
Detector name    : XRAY5                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.04  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.10*	9	0	0.60	313.83	310	8	4.83E-03	40.9	
2	0	185.68*	5	0	0.38	924.29	917	12	2.56E-03	59.3	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:55.65

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240013.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:01 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:04:00 Analyst initials: BSW1         *
* Sample ID        : I405240013           Sample Quantity : 2.6100E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000   *
* Recovery         :    1.00000           Standard Weight :    0.00000   *
* Nuclide Library  : IODINE.NLB;1                                        *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	0.000E+00	3.708E+00	5.127E+00	NOT IDENT.
I-129	0.000E+00	2.258E-01	3.122E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:54.18

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.10	12	0	0.60	313.83	310	8	6.67E-03	28.9	
2	0	185.68	7	0	0.38	924.29	917	12	3.89E-03	37.8	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:55.18

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240013 Acquisition date : 29-SEP-2016 09:54:01

Total number of lines in spectrum	2	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240013 Acquisition date : 29-SEP-2016 09:54:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	63.10	9	0	0.60	313.83	310	8	4.83E-03	81.8	3.24E+00	
0	185.68	5	0	0.38	924.29	917	12	2.56E-03	****	9.62E-05	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:57.06

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240013.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:01 Sensitivity     : 3.000       *
* Detector ID      : XRAY5                Energy tolerance: 1.000       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 11:04:00 Nuclide Library : IODINE      *
* Sample ID        : I405240013           Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 2.6100E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000  *
*                                         Standard Weight :    0.00000  *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	0.000E+00	NOT IDENT.
I-129	0.000E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:44:58.08

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240013.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:01 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:04:00 Nuclide Library : IODINE       *
* Sample ID        : I405240013           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.6100E+00 GRAM   *
*                                         Quantity Err(%) : 3.8314E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	0.000E+00	0.000E+00	0.000E+00	NOT IDENT.
I-129	0.000E+00	0.000E+00	0.000E+00	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	0.0000				
27.34	0.0000				
29.62	2.7692				
35.49	0.9543				
39.58	1.0189				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:19.36

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240014.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY6.CNF;215
                                    Background date  : 25-SEP-2016 12:23:20
Sample date      : 15-DEC-2015 11:08:00 Acquisition date : 29-SEP-2016 09:54:25
Sample ID        : I405240014           Sample quantity  : 3.11000E+00 GRAM
Detector name    : XRAY6                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.03  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	92.88*	5	0	0.64	463.89	460	8	2.98E-03	58.5	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:20.11

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240014.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:25 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:08:00 Analyst initials: BSW1         *
* Sample ID        : I405240014           Sample Quantity : 3.1100E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000   *
* Recovery         :    1.00000           Standard Weight :    0.00000   *
* Nuclide Library  : IODINE.NLB;1                                        *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	1.457E+00	2.856E+00	1.073E+01	NOT IDENT.
I-129	1.811E-01	2.510E-01	8.409E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:18.73

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	92.88	9	0	0.64	463.89	460	8	5.00E-03	33.3	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:19.66

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240014 Acquisition date : 29-SEP-2016 09:54:25

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240014 Acquisition date : 29-SEP-2016 09:54:25

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.88	5	0	0.64	463.89	460	8	2.98E-03	****	4.05E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:21.91

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240014.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:25 Sensitivity     : 3.000        *
* Detector ID      : XRAY6                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 11:08:00 Nuclide Library : IODINE       *
* Sample ID        : I405240014           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.1100E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	3.390E+00	NOT IDENT.
I-129	2.979E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:23.01

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240014.CNF;1    *
* Acquisition date : 29-SEP-2016 09:54:25 Sensitivity     : 3.000          *
* Detector ID      : XRAY6                Energy tolerance: 1.000          *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000         *
* Elapsed real time:    0 00:30:00.03     Half life ratio : *****          *
* Sample date      : 15-DEC-2015 11:08:00 Nuclide Library : IODINE         *
* Sample ID        : I405240014           Analyst initials: BSW1           *
* Batch Number     : 1598666              Sample Quantity : 3.1100E+00 GRAM   *
*                                         Quantity Err(%) : 3.2154E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000        *
*                                         Standard Weight :    0.00000        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5           *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	1.457E+00	2.859E+00	2.934E+00	NOT IDENT.
I-129	1.811E-01	2.517E-01	2.646E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	0.0000				
27.34	1.4921				
29.62	1.5445				
35.49	0.7906				
39.58	0.0000				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:39.56

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240015.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY1.CNF;415
                                       Background date  : 25-SEP-2016 12:22:54
Sample date      : 15-DEC-2015 14:02:00 Acquisition date : 29-SEP-2016 11:04:08
Sample ID        : I405240015           Sample quantity  : 2.82000E+00 GRAM
Detector name    : XRAY1                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.16  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	48.69	6	0	0.38	244.67	240	8	3.33E-03	40.8	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:40.40

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240015.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:08 Sensitivity     : 3.000            *
* Detector ID      : XRAY1                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.16     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:02:00 Analyst initials: BSW1             *
* Sample ID        : I405240015           Sample Quantity : 2.8200E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   :  9-JUN-2016 11:39:23 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY1_I129.CNF;6             *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	8.249E-01	5.372E+00	1.068E+01	NOT IDENT.
I-129	1.258E-01	2.755E-01	6.495E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:38.87

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	48.69	6	0	0.38	244.67	240	8	3.33E-03	40.8	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:39.95

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240015 Acquisition date : 29-SEP-2016 11:04:08

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I405240015 Acquisition date : 29-SEP-2016 11:04:08

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	48.69	6	0	0.38	244.67	240	8	3.33E-03	81.6	2.04E+01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:42.04

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240015.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:08 Sensitivity     : 3.000        *
* Detector ID      : XRAY1                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.16     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 14:02:00 Nuclide Library : IODINE       *
* Sample ID        : I405240015           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.8200E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  9-JUN-2016 11:39:23 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY1_I129.CNF;6        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	4.457E+00	NOT IDENT.
I-129	2.669E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:34:43.34

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240015.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:08 Sensitivity     : 3.000        *
* Detector ID      : XRAY1                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.16     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 14:02:00 Nuclide Library : IODINE       *
* Sample ID        : I405240015           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.8200E+00 GRAM   *
*                                         Quantity Err(%) : 3.5461E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  9-JUN-2016 11:39:23 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY1_I129.CNF;6        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	8.249E-01	5.374E+00	5.387E+00	NOT IDENT.
I-129	1.258E-01	2.758E-01	2.816E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	7.3593				
29.62	4.2409				
27.34	6.0593				
29.62	4.4924				
35.49	4.6075				
39.58	3.8759				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:58.48

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240016.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY2.CNF;379
                                     Background date  : 25-SEP-2016 12:22:59
Sample date      : 15-DEC-2015 14:06:00 Acquisition date : 29-SEP-2016 11:04:32
Sample ID        : I405240016           Sample quantity  : 2.70000E+00 GRAM
Detector name    : XRAY2                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.08  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
**********************************************************************

                  BACKGROUND CORRECTED SAMPLE PEAK REPORT
No peaks were found
```

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:59.51

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                        DETECTOR AND SAMPLE DATA                    *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240016.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:32 Sensitivity     : 3.000            *
* Detector ID      : XRAY2                Energy tolerance: 1.000            *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000           *
* Elapsed real time:    0 00:30:00.08     Half life ratio : *****            *
* Sample date      : 15-DEC-2015 14:06:00 Analyst initials: BSW1             *
* Sample ID        : I405240016           Sample Quantity : 2.7000E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000       *
* Recovery         :    1.00000           Standard Weight :    0.00000       *
* Nuclide Library  : IODINE.NLB;1                                           *
**********************************************************************
*                                                                    *
*                        CALIBRATION INFORMATION                     *
*                                                                    *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129             *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15            *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-2.033E+00	9.769E+00	1.939E+01	NOT IDENT.
I-129	4.282E-02	4.123E-01	8.671E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:57.88

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

No peaks were found

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:45:58.91

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I405240016 Acquisition date : 29-SEP-2016 11:04:32

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:01.01

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240016.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:32 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.08     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 14:06:00 Nuclide Library : IODINE       *
* Sample ID        : I405240016           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.7000E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	7.511E+00	NOT IDENT.
I-129	3.507E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:02.00

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I405240016.CNF;1    *
* Acquisition date : 29-SEP-2016 11:04:32 Sensitivity     : 3.000        *
* Detector ID      : XRAY2                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.08     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 14:06:00 Nuclide Library : IODINE       *
* Sample ID        : I405240016           Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 2.7000E+00 GRAM   *
*                                         Quantity Err(%) : 3.7037E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 27-JUL-2016 12:15:07 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY2_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-2.033E+00	9.775E+00	9.818E+00	NOT IDENT.
I-129	4.282E-02	4.123E-01	4.127E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	5.2595				
29.62	5.3517				
27.34	4.3235				
29.62	2.2015				
35.49	5.5733				
39.58	3.4302				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:55.72

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627535.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY4.CNF;433
                                     Background date  : 25-SEP-2016 12:23:10
Sample date      : 28-SEP-2016 00:00:00 Acquisition date : 29-SEP-2016 11:05:01
Sample ID        : I1203627535          Sample quantity  : 3.39000E+00 GRAM
Detector name    : XRAY4                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.11  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	14.50	18	21	2.36	71.92	63	20	9.97E-03	65.7	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:56.53

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627535.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:01 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****        *
* Sample date      : 28-SEP-2016 00:00:00 Analyst initials: BSW1         *
* Sample ID        : I1203627535          Sample Quantity : 3.3900E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000   *
* Recovery         :    1.00000           Standard Weight :    0.00000   *
* Nuclide Library  : IODINE.NLB;1                                        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	6.141E-02	1.285E-01	3.453E-01	NOT IDENT.
I-129	-3.773E-01	3.703E-01	5.099E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:54.68

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	14.50	18	21	2.36	71.92	63	20	9.97E-03	65.7	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:56.11

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I1203627535 Acquisition date : 29-SEP-2016 11:05:01

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I1203627535 Acquisition date : 29-SEP-2016 11:05:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	14.50	18	21	2.36	71.92	63	20	9.97E-03	****	5.88E-01	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:57.94

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627535.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:01 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****        *
* Sample date      : 28-SEP-2016 00:00:00 Nuclide Library : IODINE       *
* Sample ID        : I1203627535          Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	1.293E-01	NOT IDENT.
I-129	1.806E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:46:58.92

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627535.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:01 Sensitivity     : 3.000        *
* Detector ID      : XRAY4                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.11     Half life ratio : *****        *
* Sample date      : 28-SEP-2016 00:00:00 Nuclide Library : IODINE       *
* Sample ID        : I1203627535          Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
*                                         Quantity Err(%) : 2.9499E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000        *
*                                         Standard Weight :    0.00000        *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 17-JUN-2016 08:18:14 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY4_I129.CNF;14        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	6.141E-02	1.290E-01	1.319E-01	NOT IDENT.
I-129	-3.773E-01	3.722E-01	4.092E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	1.0858				
29.62	8.8710				
27.34	2.2442				
29.62	5.7351				
35.49	0.0000				
39.58	3.6015				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:17.80

```
*********************************************************************************
*                              GEL Laboratories LLC                             *
*                                2040 Savage Road                               *
*                              Charleston, SC 29407                             *
*********************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627536.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY5.CNF;58
                                        Background date  : 25-SEP-2016 12:23:15
Sample date      : 15-DEC-2015 10:14:00 Acquisition date : 29-SEP-2016 11:05:29
Sample ID        : I1203627536          Sample quantity  : 3.06000E+00 GRAM
Detector name    : XRAY5                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.02  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.15*	8	0	0.35	314.09	310	7	4.27E-03	44.3	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:18.57

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627536.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:29 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:14:00 Analyst initials: BSW1         *
* Sample ID        : I1203627536          Sample Quantity : 3.0600E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000   *
* Recovery         :    1.00000           Standard Weight :    0.00000   *
* Nuclide Library  : IODINE.NLB;1                                       *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)	

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	1.279E+00	2.817E+00	1.106E+01	NOT IDENT.
I-129	1.296E-01	2.211E-01	7.910E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:17.12

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.15	11	0	0.35	314.09	310	7	6.11E-03	30.2	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:18.12

Nuclide Line Activity Report

Flag: "*" = Keyline

Sample ID : I1203627536 Acquisition date : 29-SEP-2016 11:05:29

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I1203627536 Acquisition date : 29-SEP-2016 11:05:29

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	63.15	8	0	0.35	314.09	310	7	4.27E-03	88.7	3.23E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:20.02

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627536.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:29 Sensitivity     : 3.000        *
* Detector ID      : XRAY5                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****        *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE       *
* Sample ID        : I1203627536          Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.0600E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5         *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	3.344E+00	NOT IDENT.
I-129	2.625E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:21.02

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627536.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:29 Sensitivity     : 3.000       *
* Detector ID      : XRAY5                Energy tolerance: 1.000       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:00.02     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE      *
* Sample ID        : I1203627536          Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 3.0600E+00 GRAM   *
*                                         Quantity Err(%) : 3.2680E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000  *
*                                         Standard Weight :    0.00000  *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 30-AUG-2016 11:41:11 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY5_I129.CNF;5        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	1.279E+00	2.826E+00	2.884E+00	NOT IDENT.
I-129	1.296E-01	2.215E-01	2.291E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	0.0000				
29.62	0.0000				
27.34	0.0000				
29.62	0.0000				
35.49	0.0000				
39.58	1.0189				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:25.27

```
*********************************************************************
*                          GEL Laboratories LLC                     *
*                            2040 Savage Road                       *
*                          Charleston, SC 29407                     *
*********************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627537.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_XRAY6.CNF;215
                                     Background date  : 25-SEP-2016 12:23:20
Sample date      : 15-DEC-2015 10:14:00 Acquisition date : 29-SEP-2016 11:05:53
Sample ID        : I1203627537          Sample quantity  : 3.06000E+00 GRAM
Detector name    : XRAY6                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.04  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*********************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	29.69	136	14	0.70	147.77	144	10	7.55E-02	10.2	
2	0	33.53	26	8	0.46	166.98	163	8	1.43E-02	27.4	
3	0	39.54	28	2	0.30	197.04	194	7	1.56E-02	20.5	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:26.08

```
**********************************************************************
*                          GEL Laboratories LLC                      *
*                            2040 Savage Road                        *
*                          Charleston, SC 29407                      *
**********************************************************************
*                                                                    *
*                       DETECTOR AND SAMPLE DATA                     *
*                                                                    *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627537.CNF;1  *
* Acquisition date : 29-SEP-2016 11:05:53 Sensitivity     : 3.000    *
* Detector ID      : XRAY6                Energy tolerance: 1.000    *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000   *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****    *
* Sample date      : 15-DEC-2015 10:14:00 Analyst initials: BSW1     *
* Sample ID        : I1203627537          Sample Quantity : 3.0600E+00 GRAM  *
* Batch Number     : 1598666              Carrier Weight  :    0.00000  *
* Recovery         :    1.00000           Standard Weight :    0.00000  *
* Nuclide Library  : IODINE.NLB;1                                    *
**********************************************************************
*                                                                    *
*                       CALIBRATION INFORMATION                      *
*                                                                    *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129     *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5     *
**********************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
I-129	1.248E+01	2.504E+00	1.407E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	-5.122E-01	1.189E+01	2.191E+01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:24.45

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	29.69	136	14	0.70	147.77	144	10	7.55E-02	10.2	
2	0	33.53	26	8	0.46	166.98	163	8	1.43E-02	27.4	
3	0	39.54	28	2	0.30	197.04	194	7	1.56E-02	20.5	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:25.65

Nuclide Line Activity Report

Nuclide Type: FISSION

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
I-129	29.62	136	56.60*	9.444E+00	1.248E+01	1.248E+01	20.48
	33.59	26	10.04	1.022E+01	1.232E+01	1.232E+01	54.89
	39.58	28	7.51	9.709E+00	1.885E+01	1.885E+01	41.05

Flag: "*" = Keyline

Sample ID : I1203627537 Acquisition date : 29-SEP-2016 11:05:53

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
I-129	1.57E+07Y	1.00	1.248E+01	1.248E+01	0.256E+01	20.48	
Total Activity :			1.248E+01	1.248E+01			
Grand Total Activity :			1.248E+01	1.248E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:27.91

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627537.CNF;1   *
* Acquisition date : 29-SEP-2016 11:05:53 Sensitivity     : 3.000       *
* Detector ID      : XRAY6                Energy tolerance: 1.000       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****       *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE      *
* Sample ID        : I1203627537          Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 3.0600E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000  *
*                                         Standard Weight :    0.00000  *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5        *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-129	5.793E-01	

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	8.950E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 11:36:29.02

```
*********************************************************************************
*                            GEL Laboratories LLC                                 *
*                              2040 Savage Road                                   *
*                            Charleston, SC 29407                                 *
*********************************************************************************
*                                                                                 *
*                          DETECTOR AND SAMPLE DATA                               *
*                                                                                 *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627537.CNF;1       *
* Acquisition date : 29-SEP-2016 11:05:53 Sensitivity     : 3.000                 *
* Detector ID      : XRAY6                Energy tolerance: 1.000                 *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000                *
* Elapsed real time:    0 00:30:00.04     Half life ratio : *****                 *
* Sample date      : 15-DEC-2015 10:14:00 Nuclide Library : IODINE                *
* Sample ID        : I1203627537          Analyst initials: BSW1                  *
* Batch Number     : 1598666              Sample Quantity : 3.0600E+00 GRAM       *
*                                         Quantity Err(%) : 3.2680E-03 %          *
* Recovery         :    1.00000           Carrier Weight  :    0.00000            *
*                                         Standard Weight :    0.00000            *
*********************************************************************************
*                                                                                 *
*                          CALIBRATION INFORMATION                                *
*                                                                                 *
* Eff. Cal. date   : 26-JAN-2016 10:07:09 Eff. Geometry   : I129                  *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_XRAY6_I129.CNF;5                  *
*********************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
I-129	1.248E+01	2.799E+00	2.799E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	-5.122E-01	1.189E+01	1.190E+01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	7.0786				
29.62	7.3215				
27.34	4.4763				
29.62	6.9501				
35.49	0.7906				
39.58	1.6568				

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:42.54

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627538.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM05.CNF;476
                                       Background date  : 25-SEP-2016 12:20:17
Sample date      : 28-SEP-2016 00:00:00 Acquisition date : 29-SEP-2016 11:06:19
Sample ID        : I1203627538          Sample quantity  : 3.39000E+00 GRAM
Detector name    : GAM05                Detector geometry: I129
Elapsed live time: 0 00:30:00.00        Elapsed real time: 0 00:30:00.17  0.0%
Energy tolerance : 1.00000 keV          Analyst Initials : BSW1
Abundance limit  : 75.00000             Sensitivity      : 3.00000
Batch ID         : 1598666              Detector SN#     :
Matrix Spike ID  : 1470-K               LCS ID           : 1470-K
*************************************************************************
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	29.25*	371	103	0.99	60.34	56	8	2.06E-01	7.1	
2	0	33.36	69	51	0.83	68.57	65	8	3.82E-02	21.8	
3	0	39.26	38	22	0.76	80.34	76	8	2.12E-02	26.8	
4	0	46.21*	12	9	0.70	94.24	89	9	6.92E-03	66.9	
5	2	60.68	10	4	0.99	123.16	122	16	5.65E-03	34.1	1.41E+00
6	2	63.13*	24	12	1.00	128.07	122	16	1.31E-02	36.6	
7	0	130.60	23	5	1.58	262.91	258	10	1.28E-02	27.7	
8	0	134.95	20	10	2.34	271.60	268	9	1.08E-02	36.0	
9	0	139.83*	12	8	0.94	281.36	278	7	6.66E-03	51.5	
10	0	182.31	3	19	0.61	366.26	360	8	1.69E-03	250.1	
11	0	186.63	20	19	0.62	374.88	370	11	1.11E-02	50.0	
12	0	298.78	17	8	3.95	599.02	593	12	9.62E-03	41.6	
13	0	315.53	14	0	1.66	632.50	628	9	7.78E-03	26.7	
14	0	325.92	6	3	1.46	653.26	650	6	3.27E-03	62.4	
15	0	368.39	7	4	1.39	738.16	733	8	3.99E-03	60.7	
16	0	494.25	9	2	0.69	989.72	987	6	4.80E-03	45.6	
17	0	608.40*	12	0	3.55	1217.86	1212	11	6.52E-03	32.9	
18	0	847.71	6	0	1.37	1696.17	1693	6	3.33E-03	40.8	

Flag: "*" = Peak area was modified by background subtraction

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:43.32

```
*************************************************************************
*                          GEL Laboratories LLC                         *
*                            2040 Savage Road                           *
*                          Charleston, SC 29407                         *
*************************************************************************
*                                                                       *
*                        DETECTOR AND SAMPLE DATA                       *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627538.CNF;1   *
* Acquisition date : 29-SEP-2016 11:06:19 Sensitivity     : 3.000        *
* Detector ID      : GAM05                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.17     Half life ratio : *****        *
* Sample date      : 28-SEP-2016 00:00:00 Analyst initials: BSW1         *
* Sample ID        : I1203627538          Sample Quantity : 3.3900E+00 GRAM   *
* Batch Number     : 1598666              Carrier Weight  :    0.00000   *
* Recovery         :    1.00000           Standard Weight :    0.00000   *
* Nuclide Library  : IODINE.NLB;1                                        *
*************************************************************************
*                                                                       *
*                        CALIBRATION INFORMATION                        *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129         *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15        *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM)
I-129	1.314E+01	1.819E+00	1.048E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
I-125	3.342E-01	6.094E-01	1.069E+00	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:41.81

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	29.25	373	103	0.99	60.34	56	8	2.07E-01	7.0	
2	0	33.36	69	51	0.83	68.57	65	8	3.82E-02	21.8	
3	0	39.26	38	22	0.76	80.34	76	8	2.12E-02	26.8	
4	0	46.21	37	9	0.70	94.24	89	9	2.05E-02	22.1	
5	2	60.68	10	4	0.99	123.16	122	16	5.65E-03	34.1	1.41E+00
6	2	63.13	40	12	1.00	128.07	122	16	2.23E-02	21.1	
7	0	92.41	25	28	0.67	186.58	183	8	1.39E-02	41.8	
8	0	130.60	23	5	1.58	262.91	258	10	1.28E-02	27.7	
9	0	134.95	20	10	2.34	271.60	268	9	1.08E-02	36.0	
10	0	139.83	14	8	0.94	281.36	278	7	7.55E-03	44.9	
11	0	182.31	3	19	0.61	366.26	360	8	1.69E-03	250.1	
12	0	186.63	20	19	0.62	374.88	370	11	1.11E-02	50.0	
13	0	298.78	17	8	3.95	599.02	593	12	9.62E-03	41.6	
14	0	315.53	14	0	1.66	632.50	628	9	7.78E-03	26.7	
15	0	325.92	6	3	1.46	653.26	650	6	3.27E-03	62.4	
16	0	368.39	7	4	1.39	738.16	733	8	3.99E-03	60.7	
17	0	494.25	9	2	0.69	989.72	987	6	4.80E-03	45.6	
18	0	510.35	29	25	0.79	1021.89	1017	10	1.64E-02	36.6	
19	0	608.40	14	0	3.55	1217.86	1212	11	7.78E-03	26.7	
20	0	847.71	6	0	1.37	1696.17	1693	6	3.33E-03	40.8	

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:42.90

Nuclide Line Activity Report

Nuclide Type: FISSION

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
I-129	29.62	371	56.60*	2.208E+01	1.314E+01	1.314E+01	14.13
	33.59	69	10.04	3.446E+01	8.799E+00	8.799E+00	43.55
	39.58	38	7.51	2.571E+01	8.734E+00	8.734E+00	53.57

Flag: "*" = Keyline

Sample ID : I1203627538 Acquisition date : 29-SEP-2016 11:06:19

Total number of lines in spectrum 18
Number of unidentified lines 15
Number of lines tentatively identified by NID 3 16.67%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
I-129	1.57E+07Y	1.00	1.314E+01	1.314E+01	0.186E+01	14.13	
	Total Activity :		1.314E+01	1.314E+01			
	Grand Total Activity :		1.314E+01	1.314E+01			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : I1203627538 Acquisition date : 29-SEP-2016 11:06:19

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.21	12	9	0.70	94.24	89	9	6.92E-03	****	7.46E+00	
2	60.68	10	4	0.99	123.16	122	16	5.65E-03	68.1	1.04E-01	
2	63.13	24	12	1.00	128.07	122	16	1.31E-02	73.3	4.37E-02	
0	130.60	23	5	1.58	262.91	258	10	1.28E-02	55.3	6.59E-15	
0	134.95	20	10	2.34	271.60	268	9	1.08E-02	72.0	8.29E-16	
0	139.83	12	8	0.94	281.36	278	7	6.66E-03	****	8.02E-17	
0	182.31	3	19	0.61	366.26	360	8	1.69E-03	****	8.26E-26	
0	186.63	20	19	0.62	374.88	370	11	1.11E-02	****	9.85E-27	
0	298.78	17	8	3.95	599.02	593	12	9.62E-03	83.3	0.00E+00	
0	315.53	14	0	1.66	632.50	628	9	7.78E-03	53.5	0.00E+00	
0	325.92	6	3	1.46	653.26	650	6	3.27E-03	****	0.00E+00	
0	368.39	7	4	1.39	738.16	733	8	3.99E-03	****	0.00E+00	
0	494.25	9	2	0.69	989.72	987	6	4.80E-03	91.2	0.00E+00	
0	608.40	12	0	3.55	1217.86	1212	11	6.52E-03	65.8	0.00E+00	
0	847.71	6	0	1.37	1696.17	1693	6	3.33E-03	81.6	0.00E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:44.92

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627538.CNF;1   *
* Acquisition date : 29-SEP-2016 11:06:19 Sensitivity     : 3.000        *
* Detector ID      : GAM05                Energy tolerance: 1.000        *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000       *
* Elapsed real time:    0 00:30:00.17     Half life ratio : *****        *
* Sample date      : 28-SEP-2016 00:00:00 Nuclide Library : IODINE       *
* Sample ID        : I1203627538          Analyst initials: BSW1         *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
* Recovery         :    1.00000           Carrier Weight  :    0.00000   *
*                                         Standard Weight :    0.00000   *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15       *
*************************************************************************
```

Combined Critical Level Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)
I-129	4.797E-01

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
I-125	4.961E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 29-SEP-2016 13:47:45.93

```
*************************************************************************
*                            GEL Laboratories LLC                       *
*                              2040 Savage Road                         *
*                            Charleston, SC 29407                       *
*************************************************************************
*                                                                       *
*                          DETECTOR AND SAMPLE DATA                     *
*                                                                       *
* Configuration    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]I1203627538.CNF;1   *
* Acquisition date : 29-SEP-2016 11:06:19 Sensitivity     : 3.000       *
* Detector ID      : GAM05                Energy tolerance: 1.000       *
* Elapsed live time:    0 00:30:00.00     Abundance limit : 75.000      *
* Elapsed real time:    0 00:30:00.17     Half life ratio : *****       *
* Sample date      : 28-SEP-2016 00:00:00 Nuclide Library : IODINE      *
* Sample ID        : I1203627538          Analyst initials: BSW1        *
* Batch Number     : 1598666              Sample Quantity : 3.3900E+00 GRAM   *
*                                         Quantity Err(%) : 2.9499E-03 %      *
* Recovery         :    1.00000           Carrier Weight  :    0.00000        *
*                                         Standard Weight :    0.00000        *
*************************************************************************
*                                                                       *
*                          CALIBRATION INFORMATION                      *
*                                                                       *
* Eff. Cal. date   :  6-SEP-2016 11:51:40 Eff. Geometry   : I129        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM05_I129.CNF;15       *
*************************************************************************
```

Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/GRAM)	Act Error (1.96-sigma)	TPU (1.96-sigma)
I-129	1.314E+01	2.301E+00	2.301E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
I-125	3.342E-01	6.121E-01	6.304E-01	NOT IDENT.

GEL Laboratories LLC
2040 Savage Road
Charleston, SC 29407

GAMMA SPECTROSCOPY BACKGROUND REPORT

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
27.34	44.1535				
29.62	38.9238				
27.34	20.3215				
29.62	22.0532				
35.49	19.2828				
39.58	12.0822				

Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
29-SEP-2016 08:42:59.81

Run Date	Detector		Parameter	Flag
29-SEP-2016	GAM01	Cal Check	PSFWHM-1332	Investigate OK
29-SEP-2016	GAM02	Cal Check	PSFWHM-662	Investigate OK
5-JUL-2016	GAM03	Cal Check may not have run since 29-SEP-2016		☆
18-SEP-2016	GAM03	Bkg Check may not have run since 29-SEP-2016		
29-SEP-2016	GAM05	Cal Check	PSFWHM-59	Action Below, OK
29-SEP-2016	GAM06	All Parameters Passed		
29-SEP-2016	GAM07	All Parameters Passed		
29-SEP-2016	GAM08	Cal Check	PSFWHM-662	Investigate OK
29-SEP-2016	GAM08	Cal Check	NLACTVTY-59	Investigate OK
29-SEP-2016	GAM08	Cal Check	PSFWHM-59	Investigate OK
29-SEP-2016	GAM09	Cal Check	PSFWHM-662	Investigate OK
29-SEP-2016	GAM10	Bkg Check	BACKRATE	Investigate OK
29-SEP-2016	GAM11	All Parameters Passed		
29-SEP-2016	GAM12	All Parameters Passed		
----------	GAM13	Cal Check may not have run since 29-SEP-2016		☆
3-JUL-2016	GAM13	Bkg Check may not have run since 29-SEP-2016		
29-SEP-2016	GAM14	All Parameters Passed		
29-SEP-2016	GAM16	Cal Check	NLACTVTY-1332	Investigate OK
10-AUG-2016	GAM17	Cal Check may not have run since 29-SEP-2016		
25-SEP-2016	GAM17	Bkg Check may not have run since 29-SEP-2016		☆
29-SEP-2016	GAM18	All Parameters Passed		
29-SEP-2016	GAM19	All Parameters Passed		
29-SEP-2016	GAM20	All Parameters Passed		
----------	GAM21	Cal Check may not have run since 29-SEP-2016		
25-SEP-2016	GAM21	Bkg Check may not have run since 29-SEP-2016		☆
8-JUL-2016	GAM22	Cal Check may not have run since 29-SEP-2016		
7-AUG-2016	GAM22	Bkg Check may not have run since 29-SEP-2016		☆
29-SEP-2016	GAM24	All Parameters Passed		
29-SEP-2016	GAM25	All Parameters Passed		

29-SEP-2016	GAM26	All Parameters Passed		
29-SEP-2016	GAM27	All Parameters Passed		
29-SEP-2016	GAM28	All Parameters Passed		
29-SEP-2016	GAM29	Cal Check	NLACTVTY-59	Investigate OK
29-SEP-2016	GAM30	All Parameters Passed		
29-SEP-2016	GAM31	All Parameters Passed		
29-SEP-2016	GAM32	All Parameters Passed		
29-SEP-2016	GAM33	All Parameters Passed		
29-SEP-2016	GAM36	All Parameters Passed		
29-SEP-2016	GAM39	All Parameters Passed		
----------	GAM40	Cal Check may not have run since 29-SEP-2016		
26-JUN-2016	GAM40	Bkg Check may not have run since 29-SEP-2016		
29-SEP-2016	GAM41	All Parameters Passed		
29-SEP-2016	GAM43	All Parameters Passed		
29-SEP-2016	GAM44	All Parameters Passed		
29-SEP-2016	WELL	All Parameters Passed		
29-SEP-2016	XRAY1	All Parameters Passed		
29-SEP-2016	XRAY2	All Parameters Passed		
27-SEP-2016	XRAY3	Cal Check may not have run since 29-SEP-2016		
25-SEP-2016	XRAY3	Bkg Check may not have run since 29-SEP-2016		
29-SEP-2016	XRAY4	All Parameters Passed		
29-SEP-2016	XRAY5	All Parameters Passed		
29-SEP-2016	XRAY6	Cal Check	PSFWHM-210	Investigate OK
29-SEP-2016	XRAY6	Bkg Check	BACKRATE	Investigate OK

APPROVAL DATE: 9/29/16 APPROVAL TIME: 9:17

APPROVED BY: RF PROCEDURE # GL-RAD-I-001

Report completed at 29-SEP-2016 08:47:14.82

★ = Locked out

Review of Gamma Spectrometer QA results (Daily calibration & background checks)
3-OCT-2016 09:29:18.00

Run Date	Detector		Parameter	Flag
3-OCT-2016	GAM01	Cal Check	NLACTVTY-662	Investigate OK
3-OCT-2016	GAM02	Cal Check	PSFWHM-59	Investigate OK
5-JUL-2016	GAM03	Cal Check may not have run since 3-OCT-2016		
18-SEP-2016	GAM03	Bkg Check may not have run since 3-OCT-2016		★
3-OCT-2016	GAM05	Cal Check	NLACTVTY-662	Investigate OK
3-OCT-2016	GAM05	Cal Check	PSFWHM-59	Action Below, OK
3-OCT-2016	GAM06	Cal Check	NLACTVTY-662	InvestigateOK
3-OCT-2016	GAM06	Cal Check	NLACTVTY-1332	Investigate OK
3-OCT-2016	GAM07	All Parameters Passed		
	Weekly Background check completed on 3-OCT-2016 .			
	No daily Bkg Check necessary.			
3-OCT-2016	GAM08	Cal Check	NLACTVTY-662	Investigate OK
3-OCT-2016	GAM09	All Parameters Passed		
	Weekly Background check completed on 3-OCT-2016 .			
	No daily Bkg Check necessary.			
3-OCT-2016	GAM10	Cal Check	NLACTVTY-662	Investigate OK
3-OCT-2016	GAM11	All Parameters Passed		
	Weekly Background check completed on 3-OCT-2016 .			
	No daily Bkg Check necessary.			
3-OCT-2016	GAM12	Cal Check	PSFWHM-59	Investigate OK
----------	GAM13	Cal Check may not have run since 3-OCT-2016		
3-JUL-2016	GAM13	Bkg Check may not have run since 3-OCT-2016		★
3-OCT-2016	GAM14	Cal Check	PSFWHM-59	Action Bounds were adjusted OK
3-OCT-2016	GAM16	Cal Check	NLACTVTY-1332	InvestigateOK
10-AUG-2016	GAM17	Cal Check may not have run since 3-OCT-2016		★
3-OCT-2016	GAM18	Cal Check	PSFWHM-1332	Investigate OK
3-OCT-2016	GAM18	Cal Check	PSFWHM-59	Investigate OK
3-OCT-2016	GAM19	All Parameters Passed		
	Weekly Background check completed on 3-OCT-2016 .			
	No daily Bkg Check necessary.			
3-OCT-2016	GAM20	All Parameters Passed		
	Weekly Background check completed on 3-OCT-2016 .			
	No daily Bkg Check necessary.			

```
-----------     GAM21       Cal Check may not have run since 3-OCT-2016 *
25-SEP-2016     GAM21       Bkg Check may not have run since 3-OCT-2016 *

 8-JUL-2016     GAM22       Cal Check may not have run since 3-OCT-2016 *
 7-AUG-2016     GAM22       Bkg Check may not have run since 3-OCT-2016 *

 3-OCT-2016     GAM24            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     GAM25       Cal Check     PSFWHM-662        Action Below, OK

 3-OCT-2016     GAM26            All Parameters Passed

 3-OCT-2016     GAM27       Cal Check     PSFWHM-662        Investigate OK

 3-OCT-2016     GAM28            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     GAM29       Cal Check     NLACTVTY-1332     Investigate OK

 3-OCT-2016     GAM30       Cal Check     NLACTVTY-59       Investigate OK

 3-OCT-2016     GAM31       Cal Check     PSFWHM-662        Investigate OK

 3-OCT-2016     GAM32            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     GAM33       Cal Check     PSFWHM-662        Investigate OK

 3-OCT-2016     GAM36       Cal Check     PSFWHM-662        Investigate OK

 3-OCT-2016     GAM39            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

-----------     GAM40       Cal Check may not have run since 3-OCT-2016 *
26-JUN-2016     GAM40       Bkg Check may not have run since 3-OCT-2016 *

 3-OCT-2016     GAM41            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     GAM43            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     GAM44            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.

 3-OCT-2016     WELL        Cal Check     PSFWHM-1332       Investigate OK

 3-OCT-2016     XRAY1            All Parameters Passed
    Weekly Background check completed on 3-OCT-2016 .
    No daily Bkg Check necessary.
```

3-OCT-2016 XRAY2 All Parameters Passed
Weekly Background check completed on 3-OCT-2016 .
No daily Bkg Check necessary.

3-OCT-2016 XRAY3 All Parameters Passed
Weekly Background check completed on 3-OCT-2016 .
No daily Bkg Check necessary.

3-OCT-2016 XRAY4 All Parameters Passed
Weekly Background check completed on 3-OCT-2016 .
No daily Bkg Check necessary.

3-OCT-2016 XRAY5 All Parameters Passed
Weekly Background check completed on 3-OCT-2016 .
No daily Bkg Check necessary.

3-OCT-2016 XRAY6 All Parameters Passed
Weekly Background check completed on 3-OCT-2016 .
No daily Bkg Check necessary.

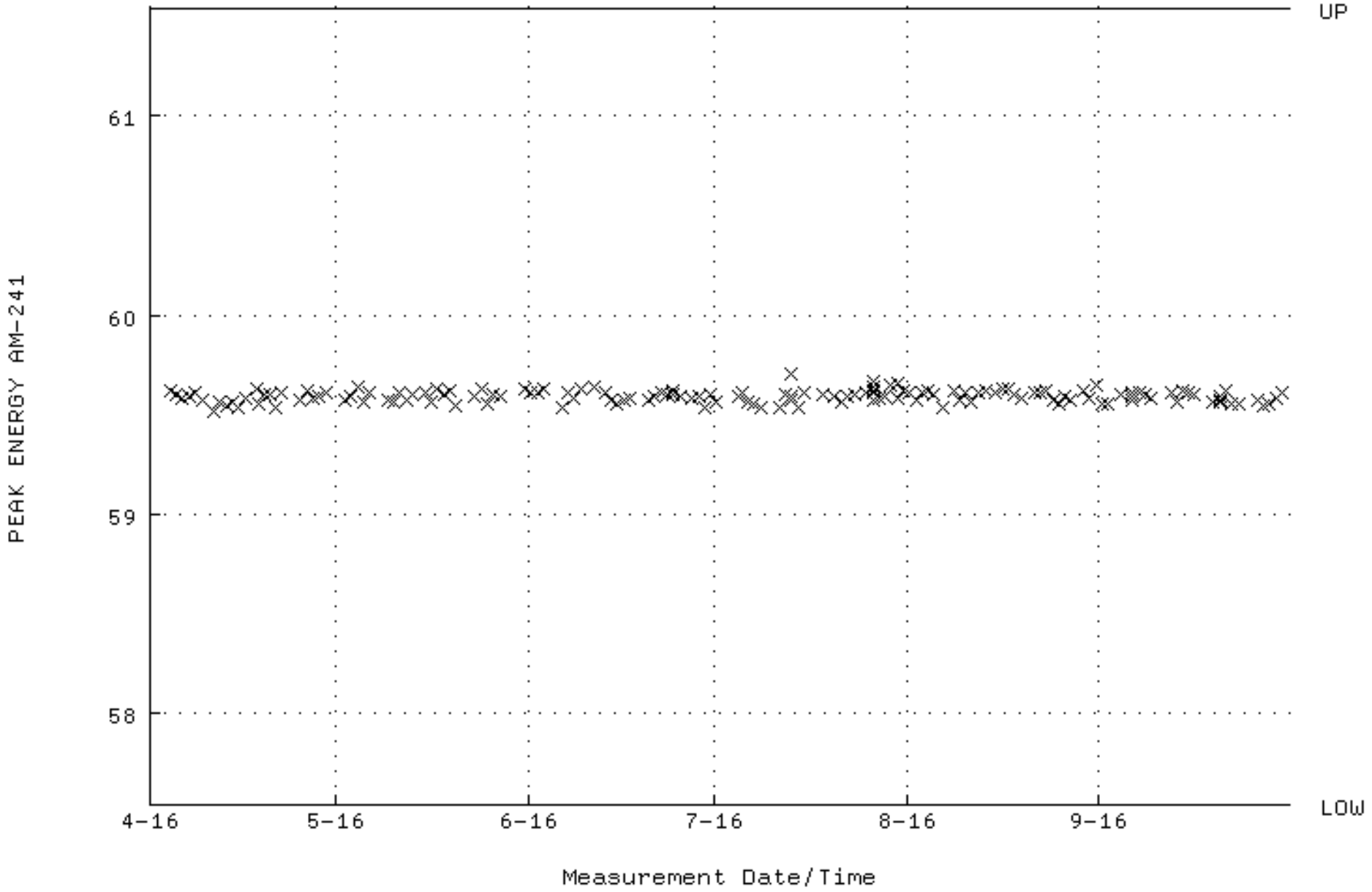
APPROVAL DATE: 10/3/16 APPROVAL TIME: 12:11

APPROVED BY: RF PROCEDURE # GL-RAD-I-001

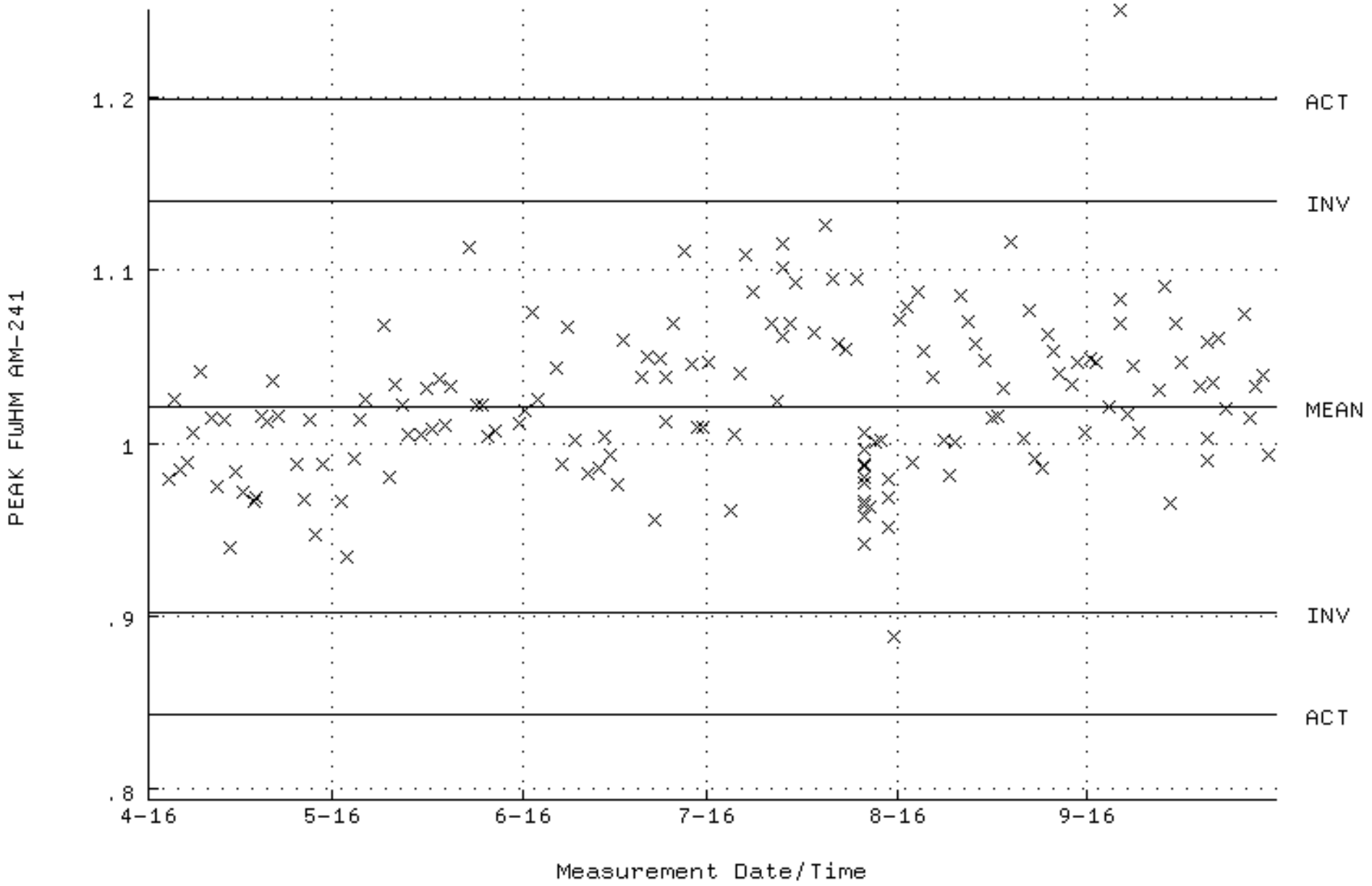
Report completed at 3-OCT-2016 09:33:35.49

Background and Efficiency Data

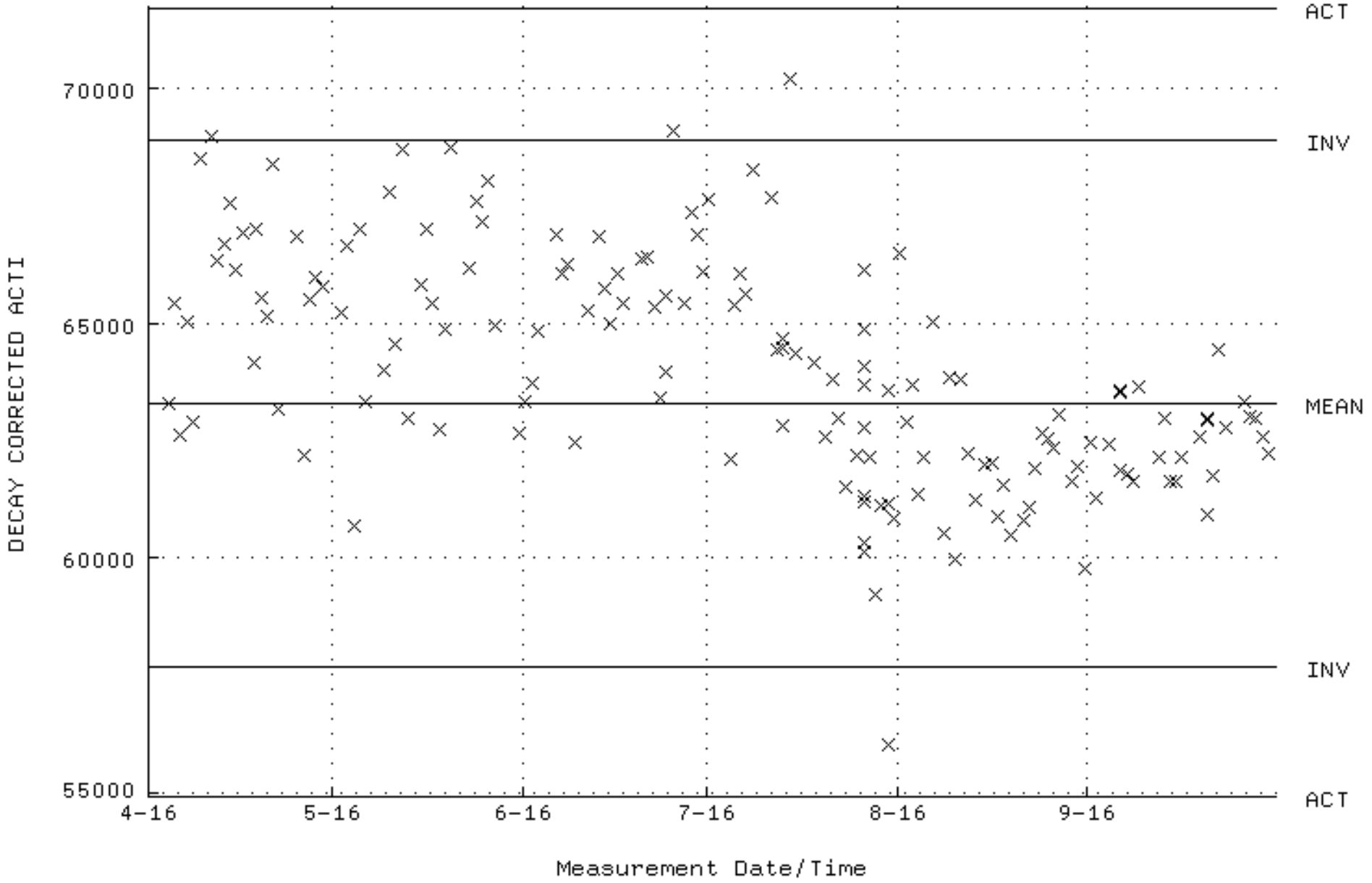
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:18 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



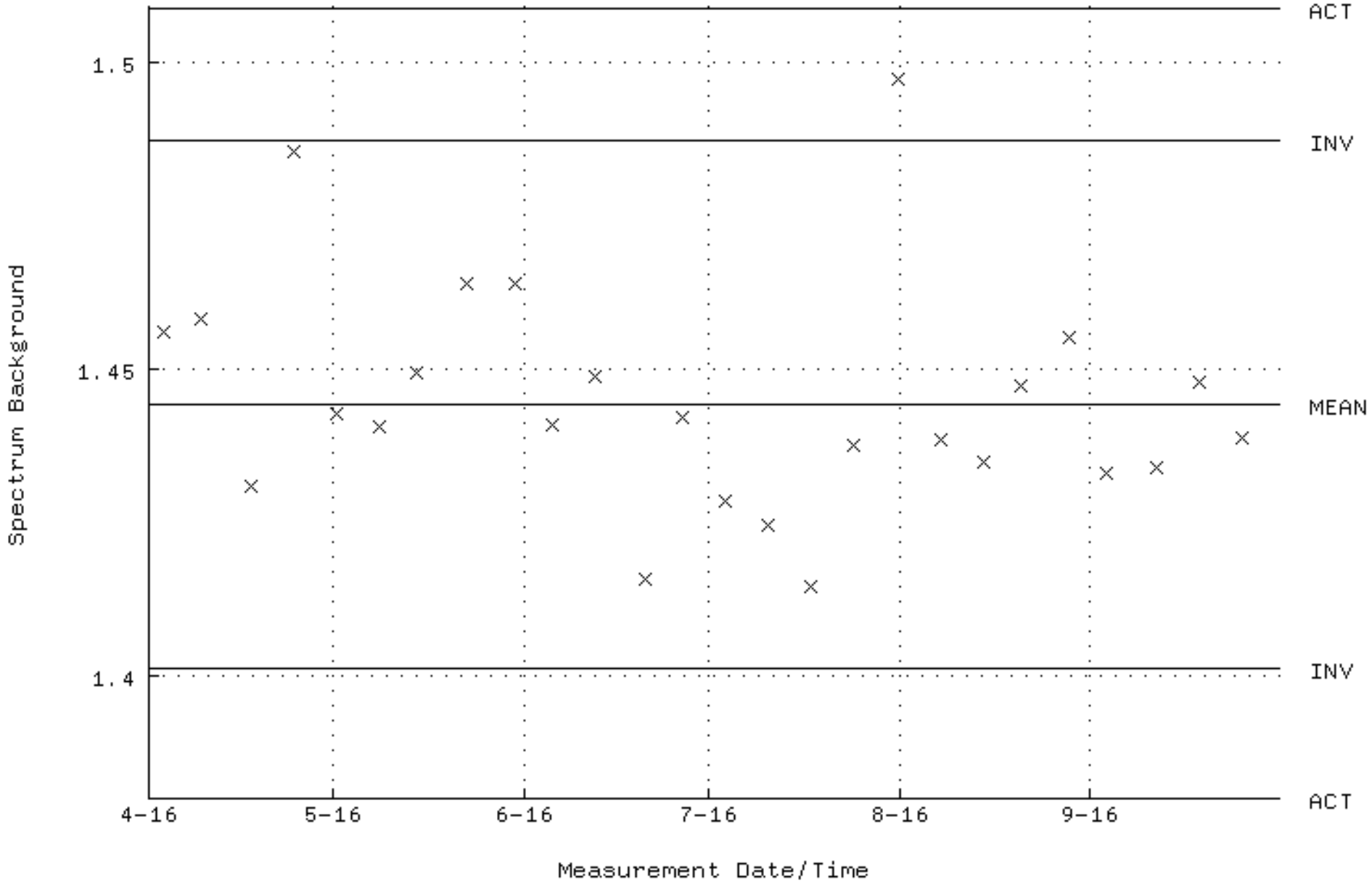
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:18 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.02147 +- 5.951646E-02 (5.83 %)



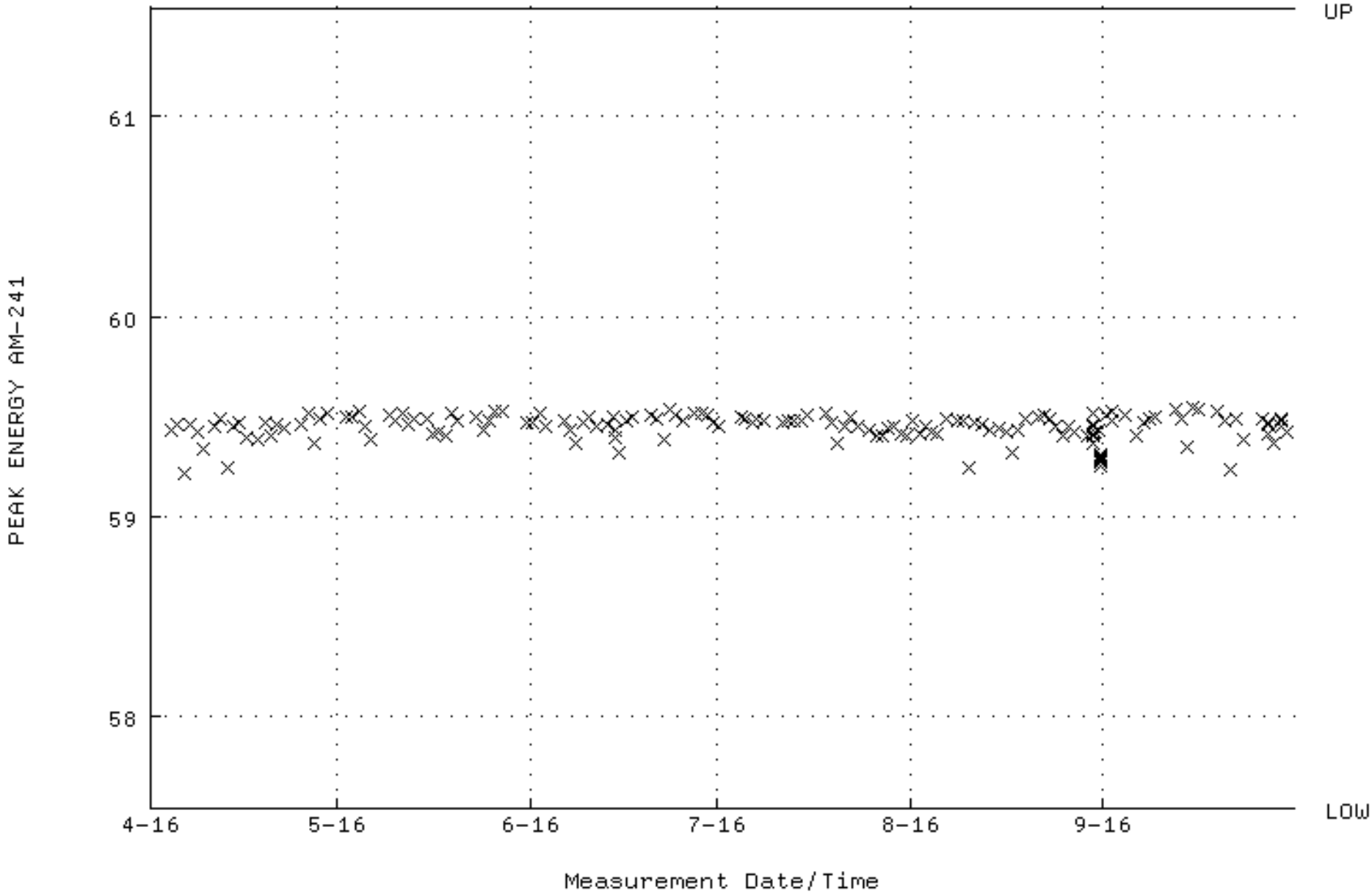
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM01_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:18 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 63306.3 +- 2800.78 (4.42 %)



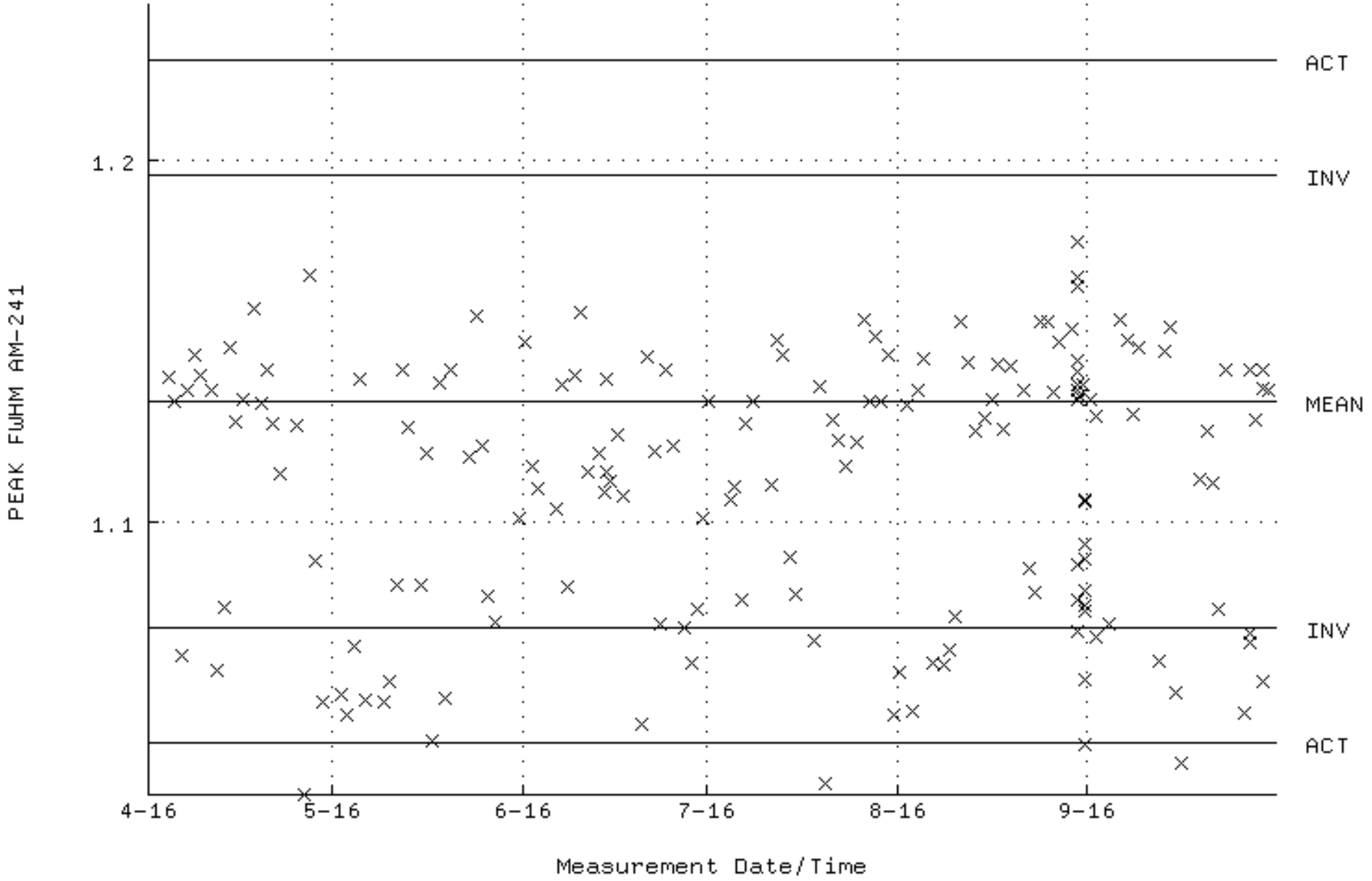
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM01.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:17:38 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.44447 +- 2.145394E-02 (1.49 %)



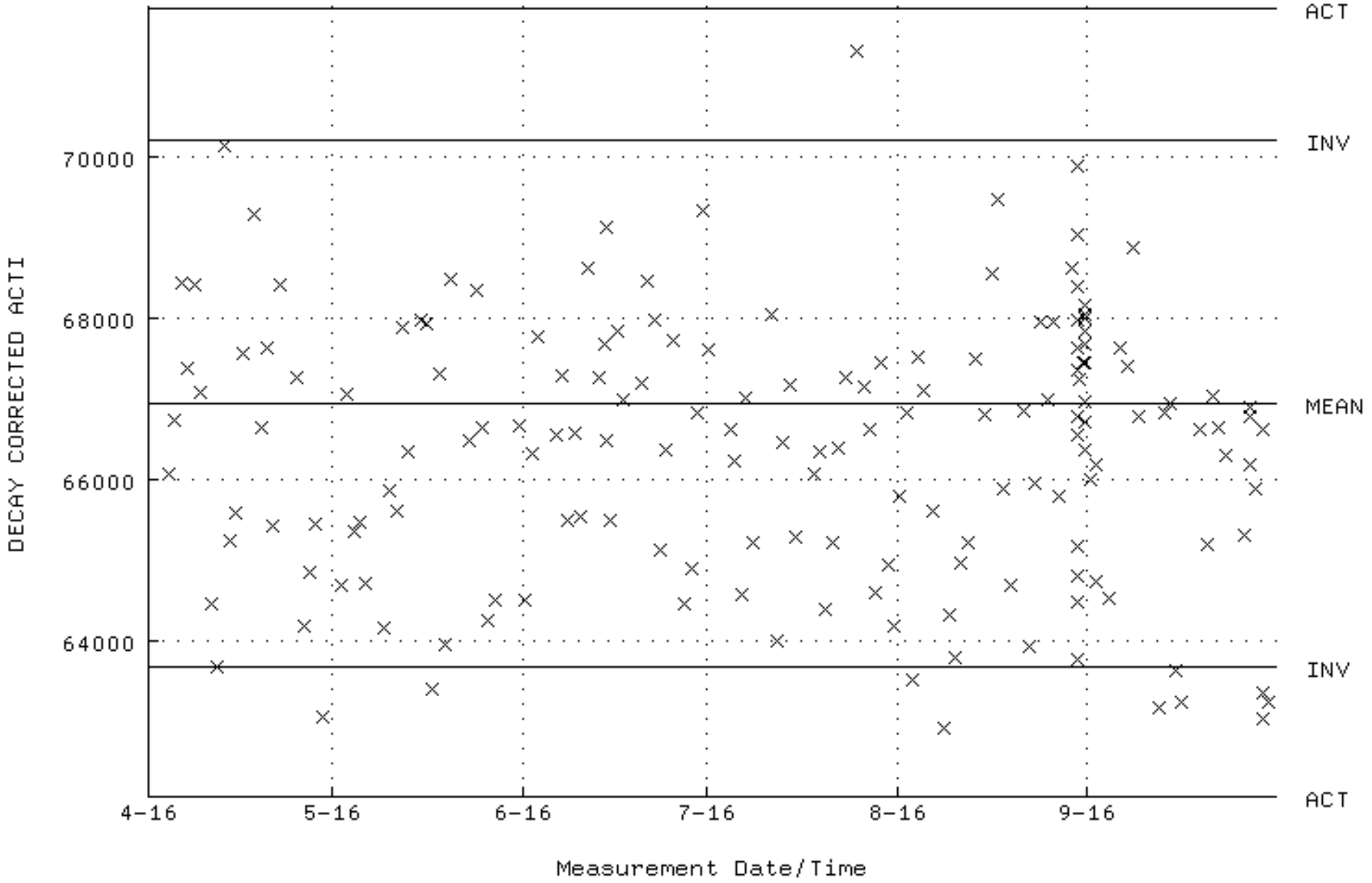
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM02_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 07:17:47 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



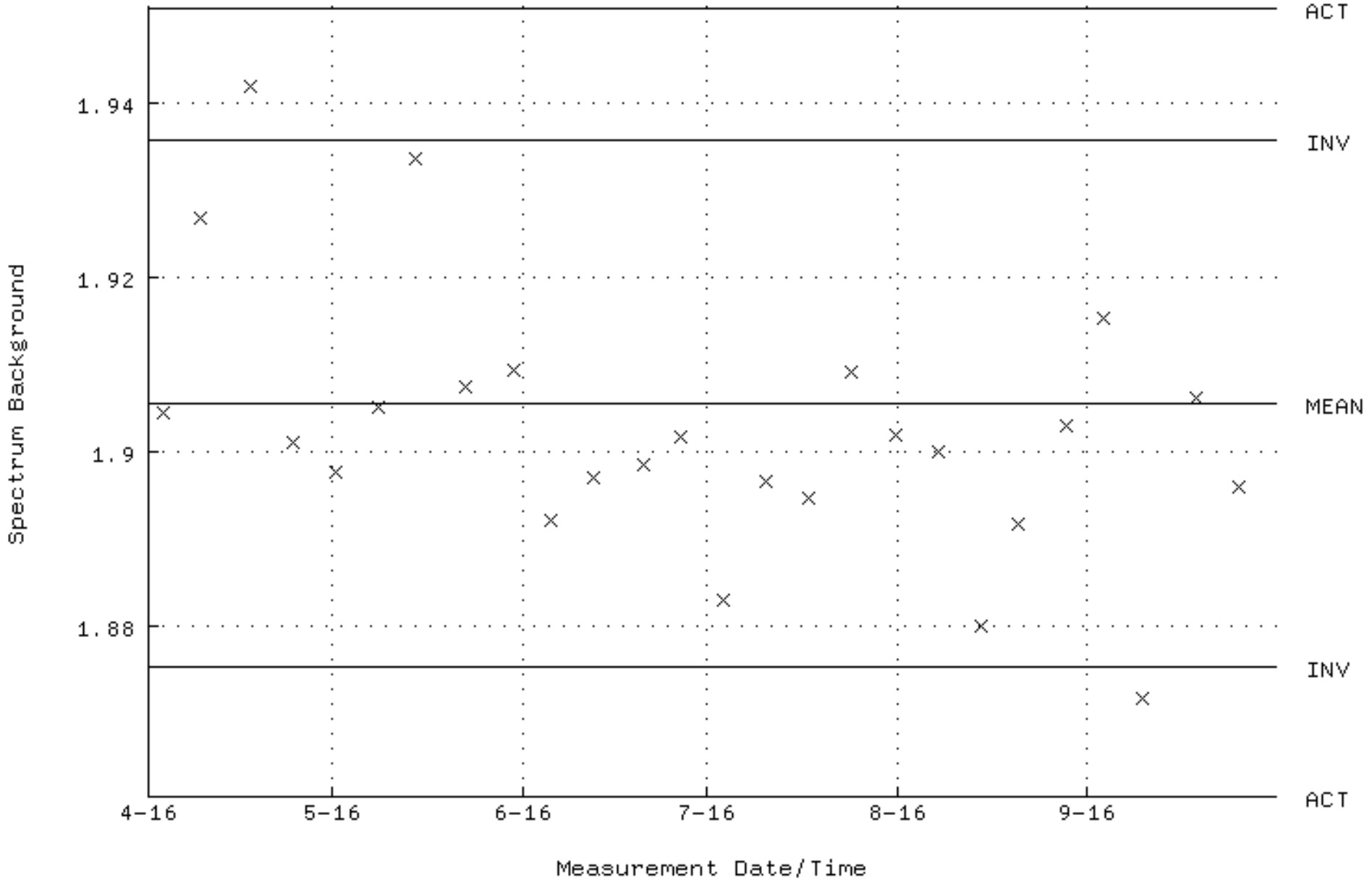
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Mean +- Std Dev : 1.13371 +- 3.136154E-02 (2.77 %)



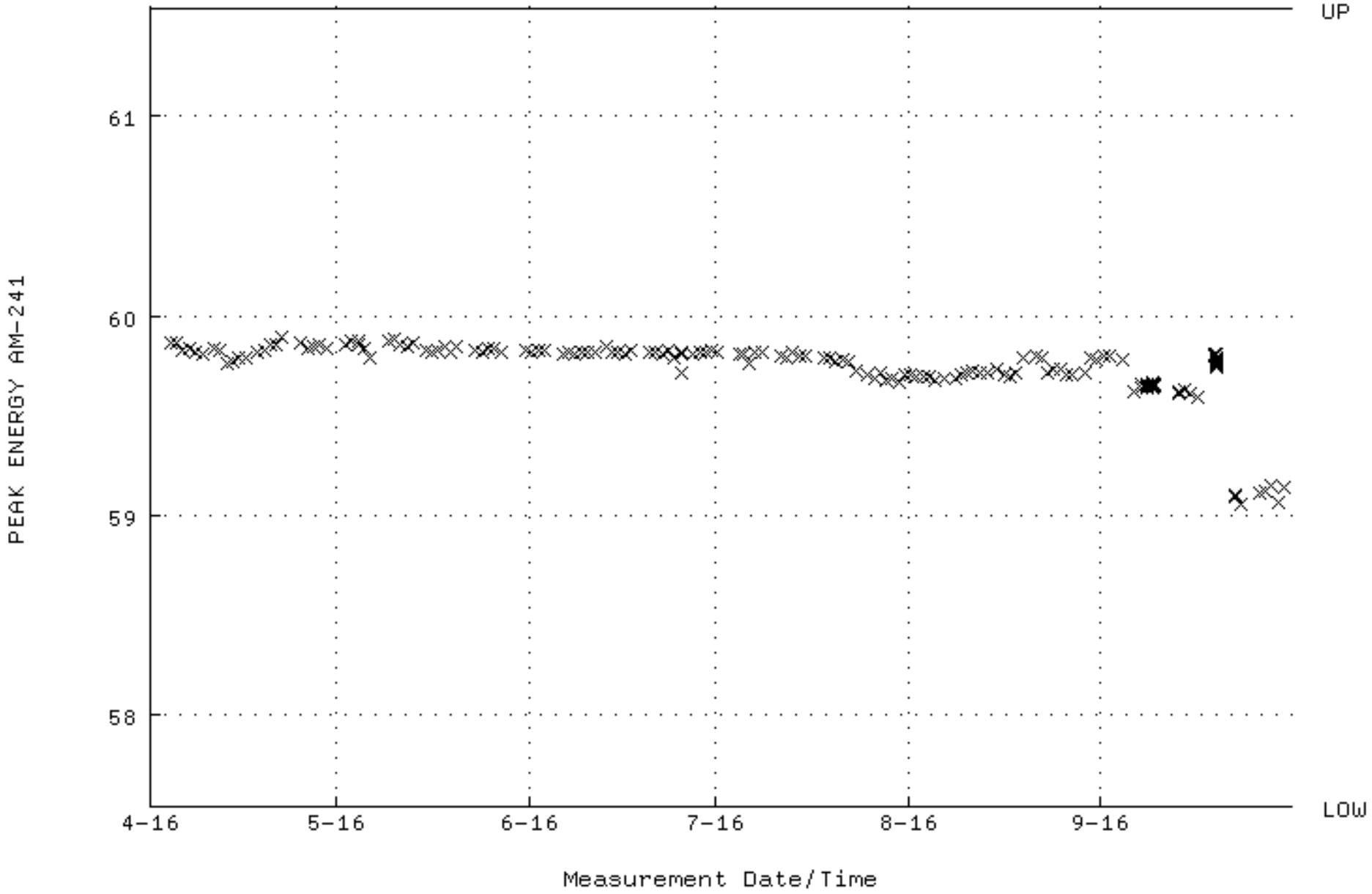
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Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 07:17:47 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 66952.9 +- 1625.05 (2.43 %)



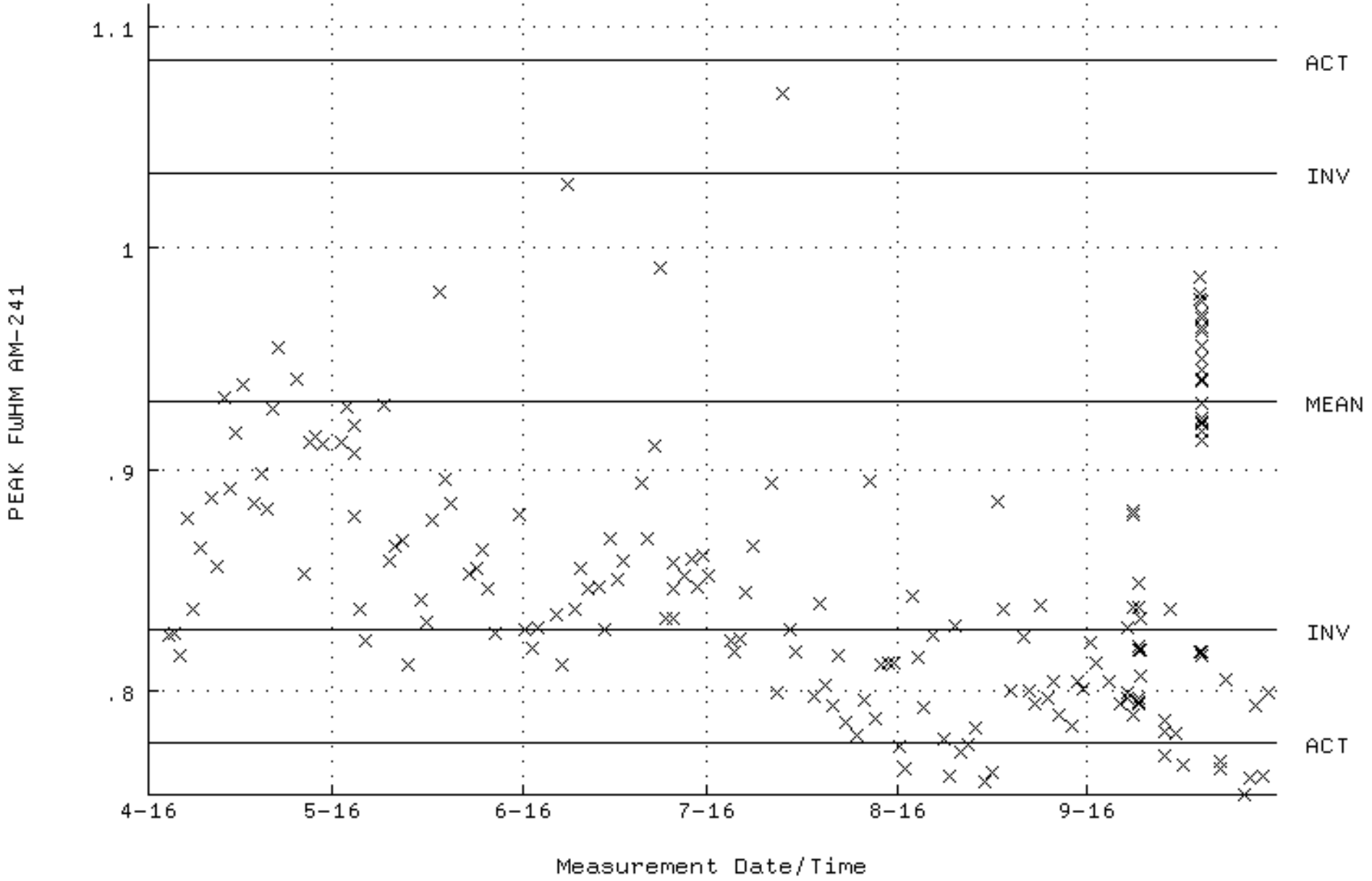
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Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:17:44 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.90568 +- 1.505658E-02 (0.79 %)



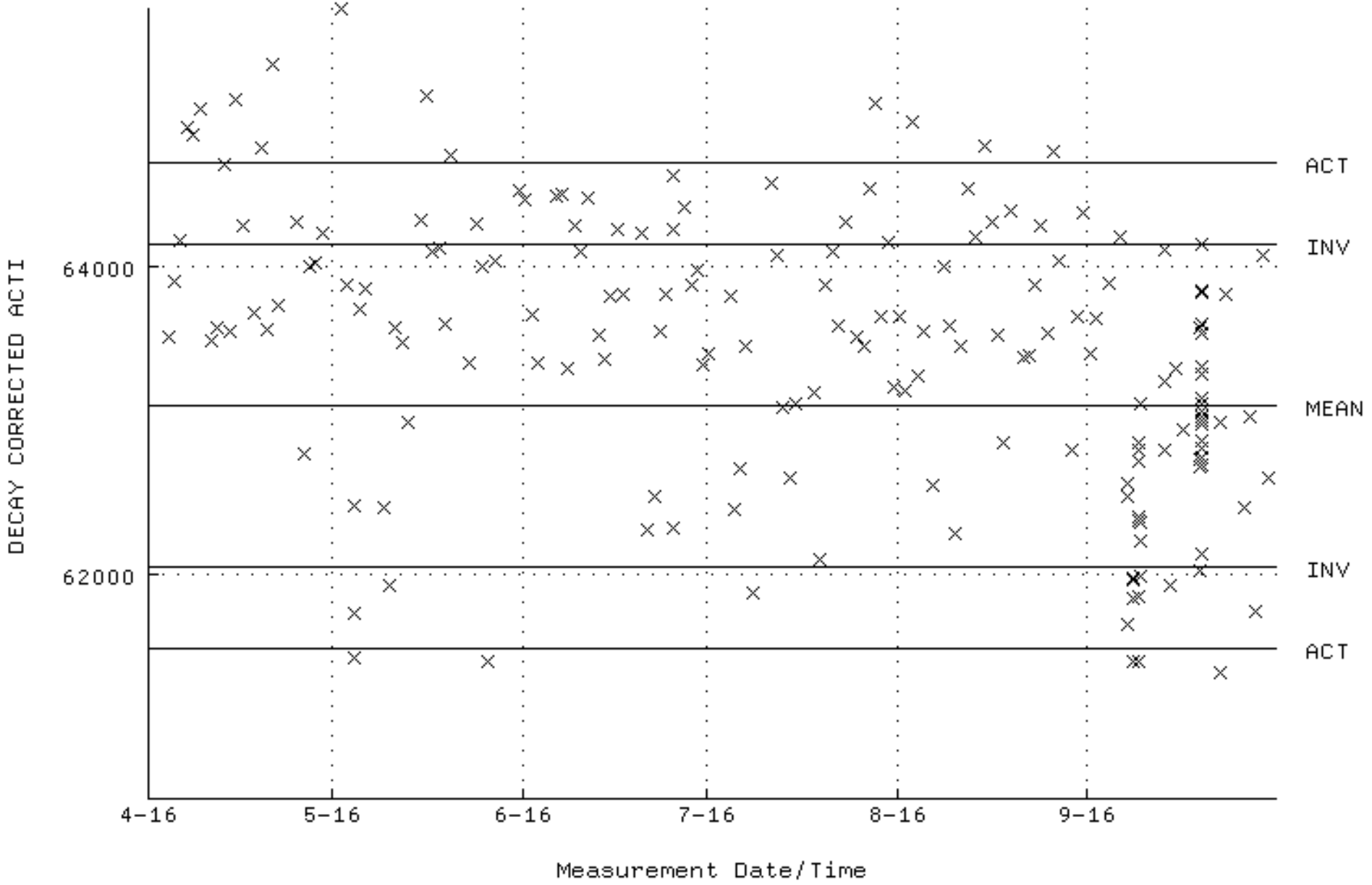
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM05_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:24:06 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



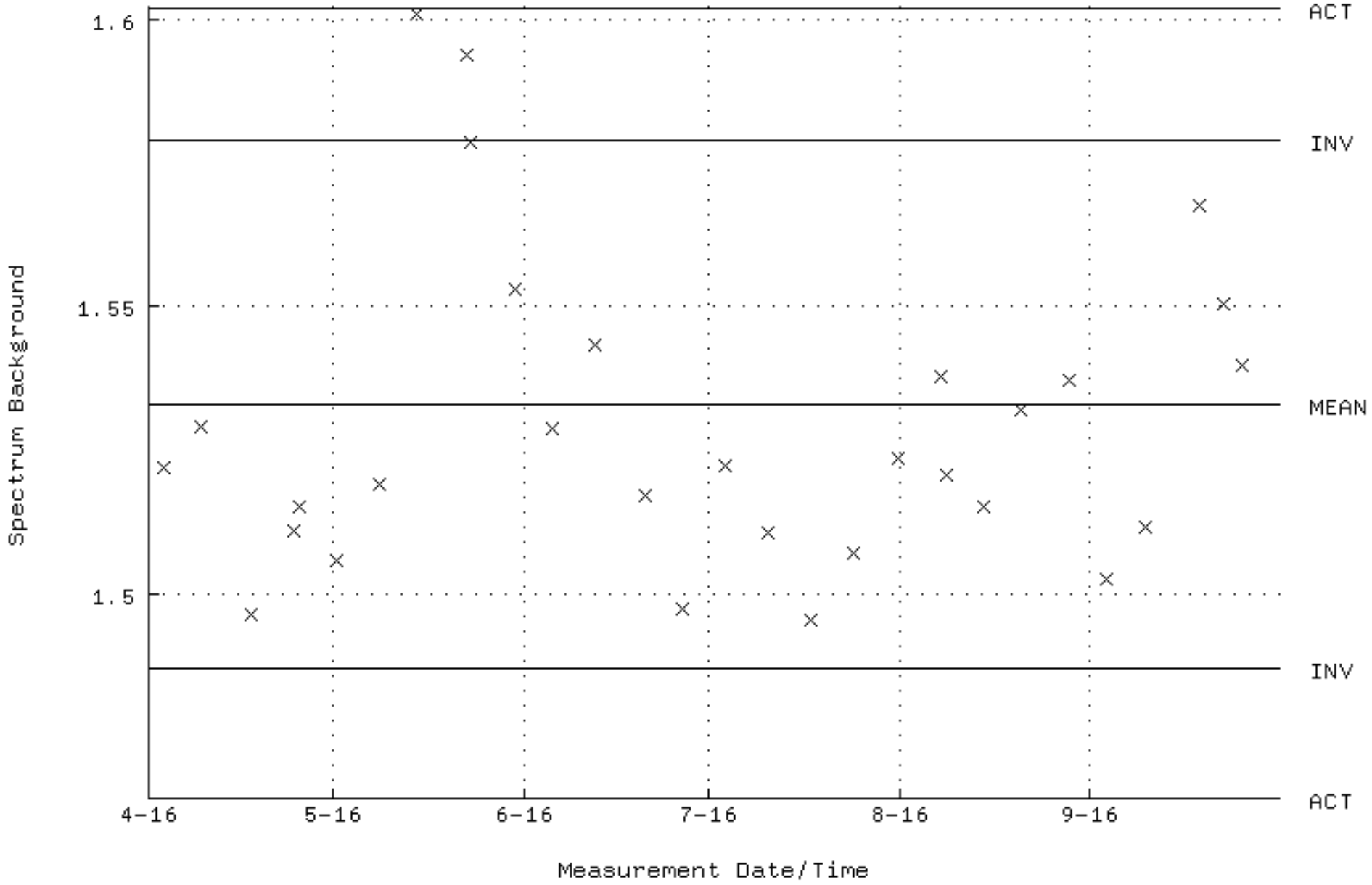
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM05_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:24:06 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.931135 +- 5.131084E-02 (5.51 %)



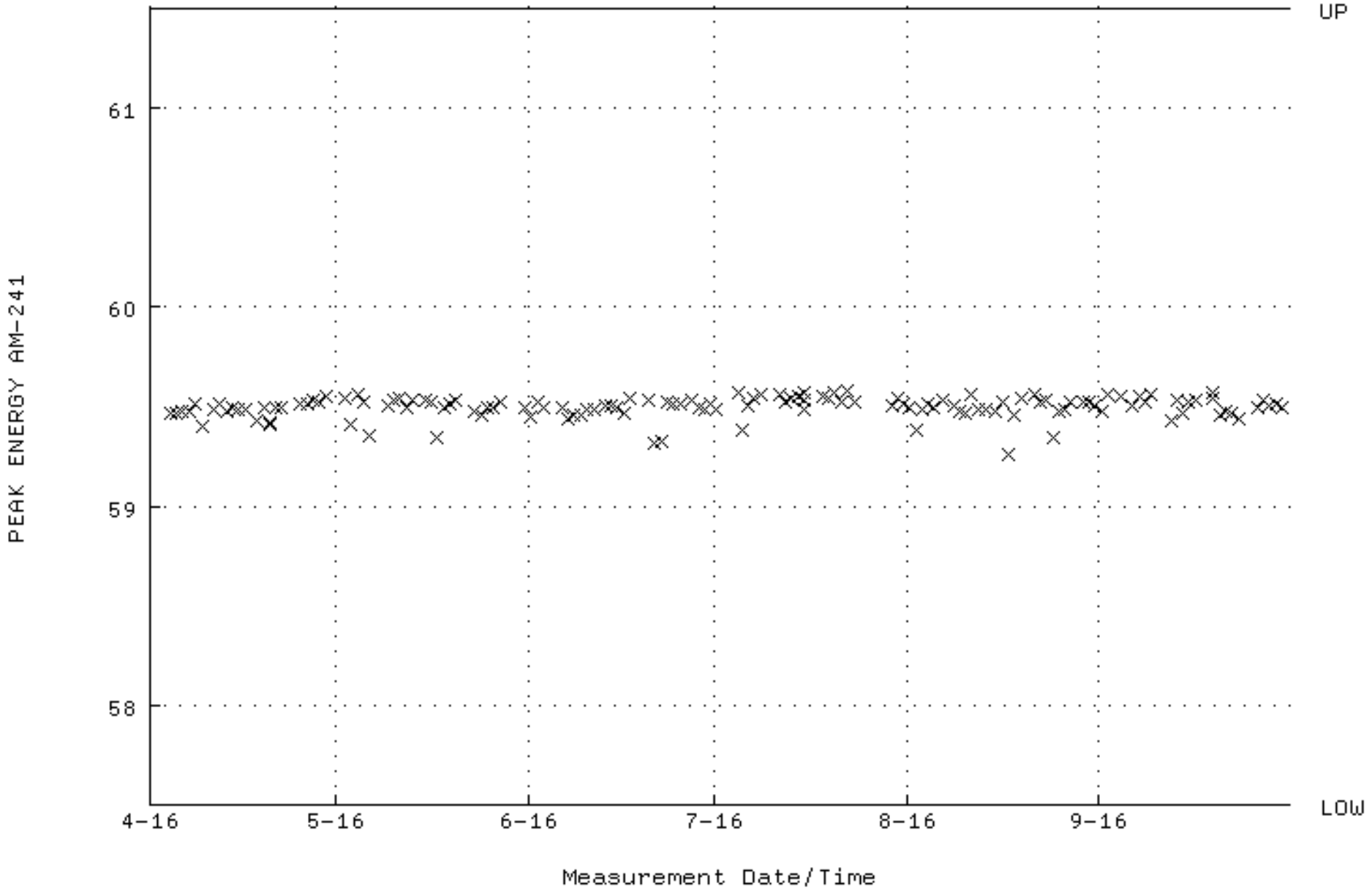
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Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:24:06 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 63104.2 +- 525.196 (0.83 %)



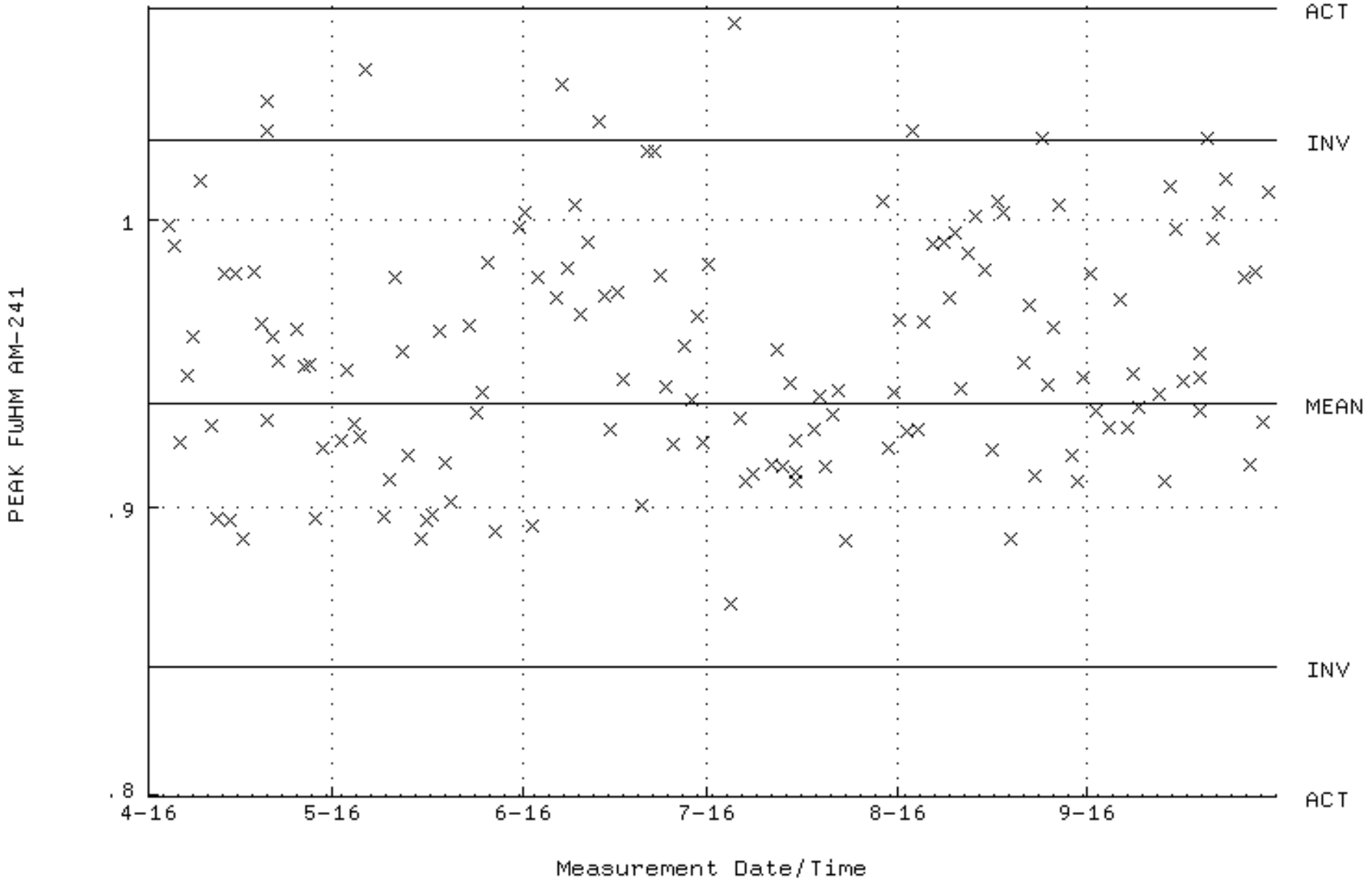
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM05.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:01 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.53310 +- 2.296009E-02 (1.50 %)



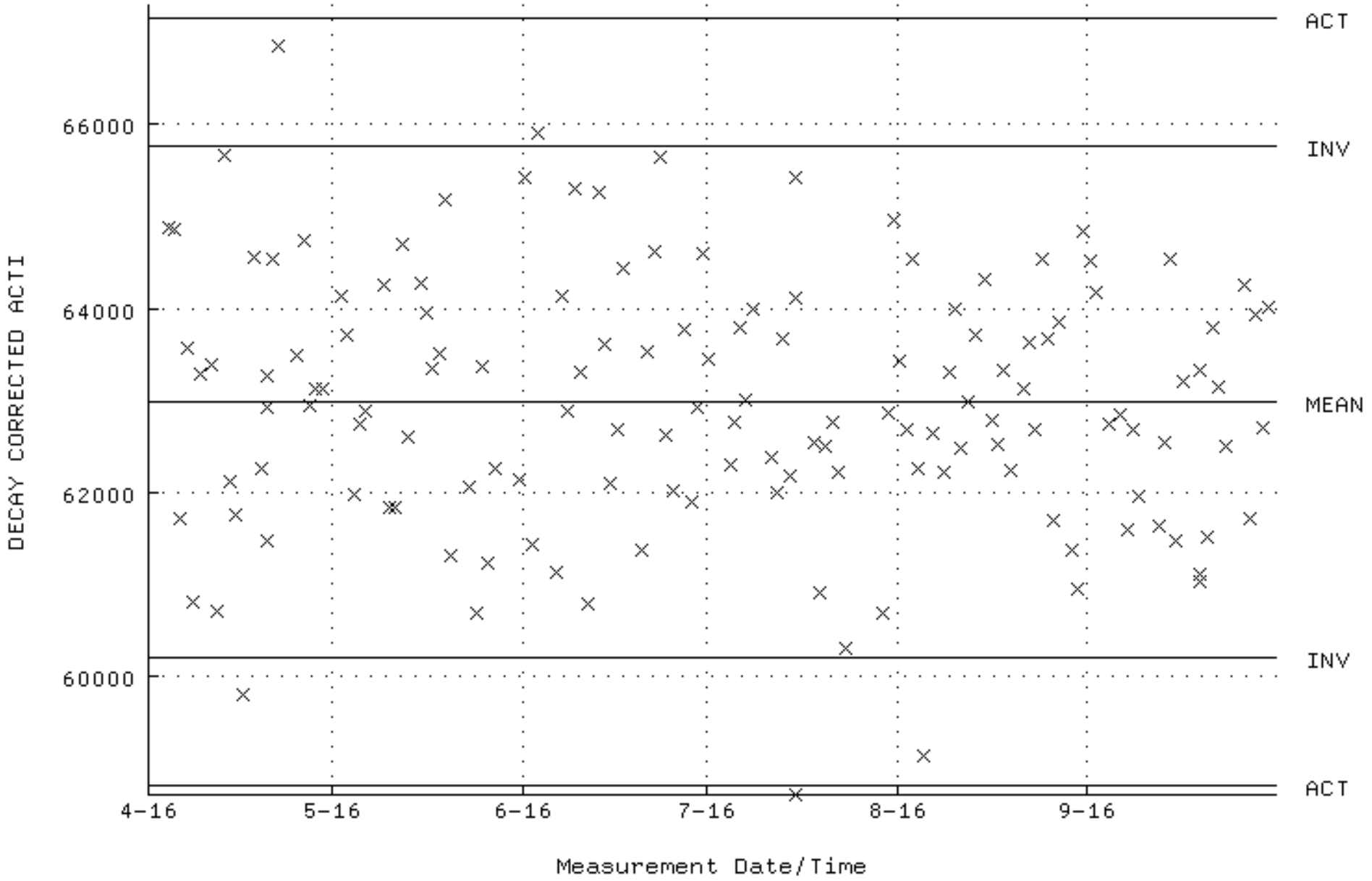
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:24 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



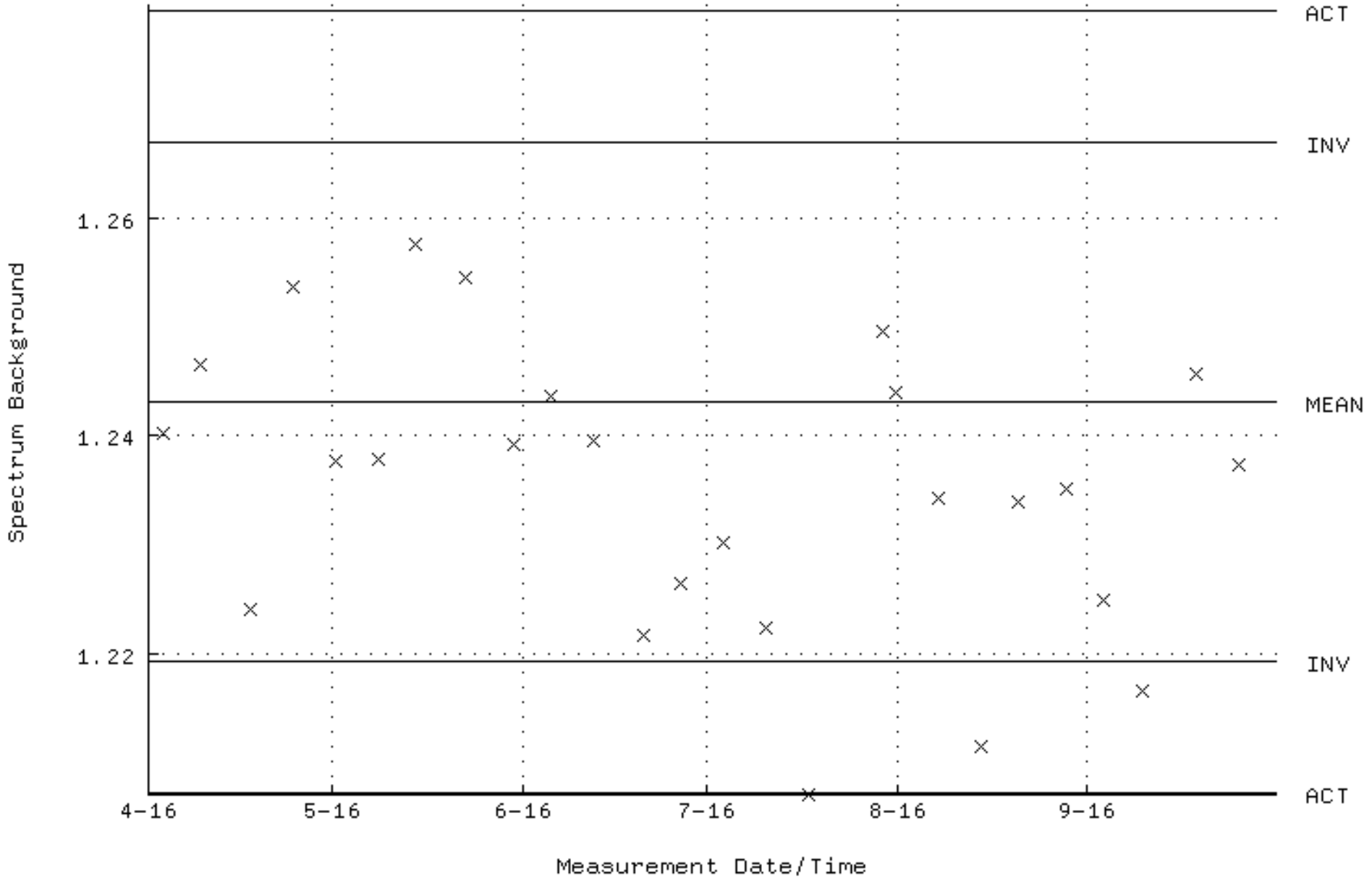
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:24 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.936438 +- 4.566342E-02 (4.88 %)



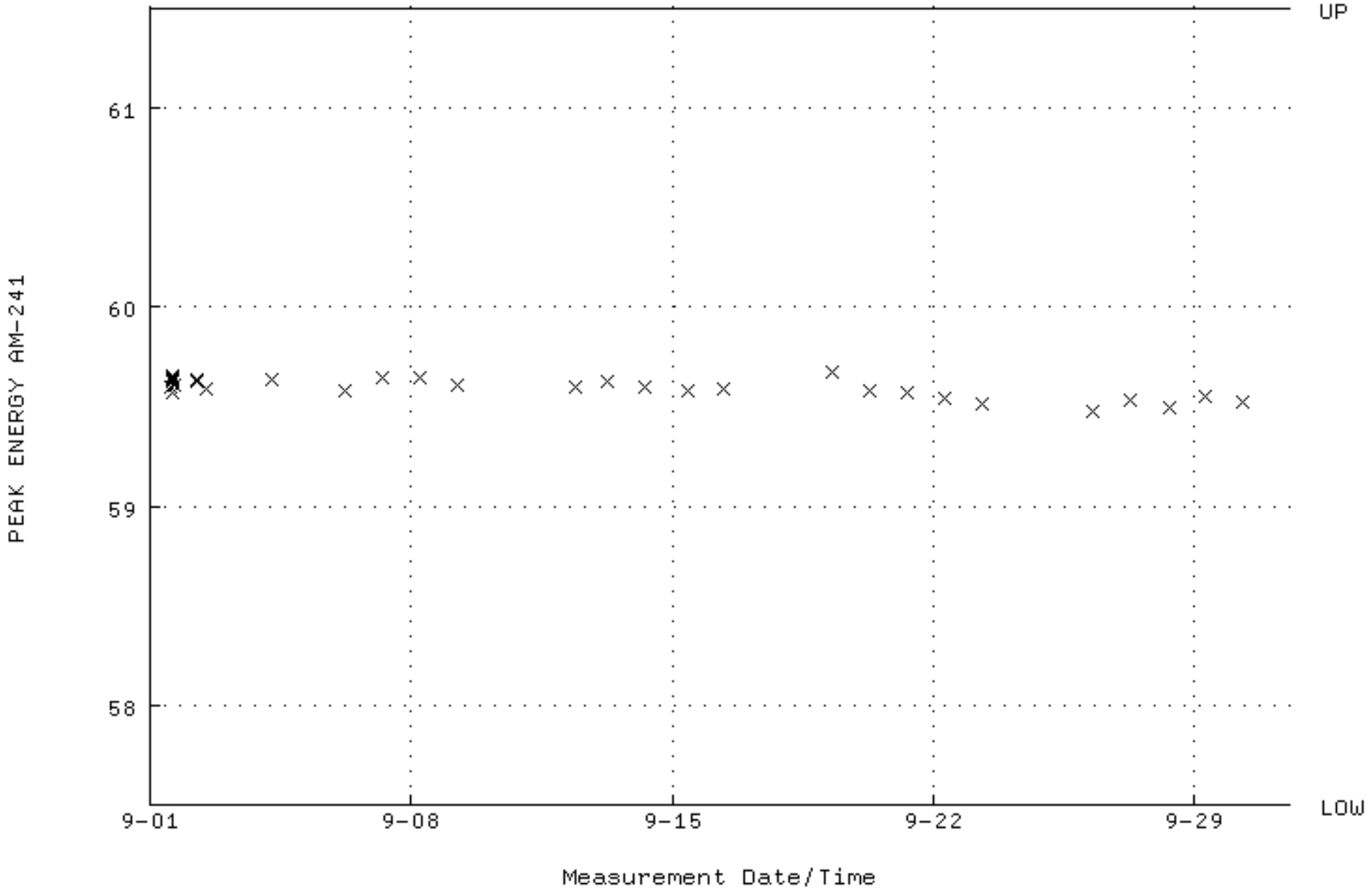
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM06_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:24 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 62995.7 +- 1389.67 (2.21 %)



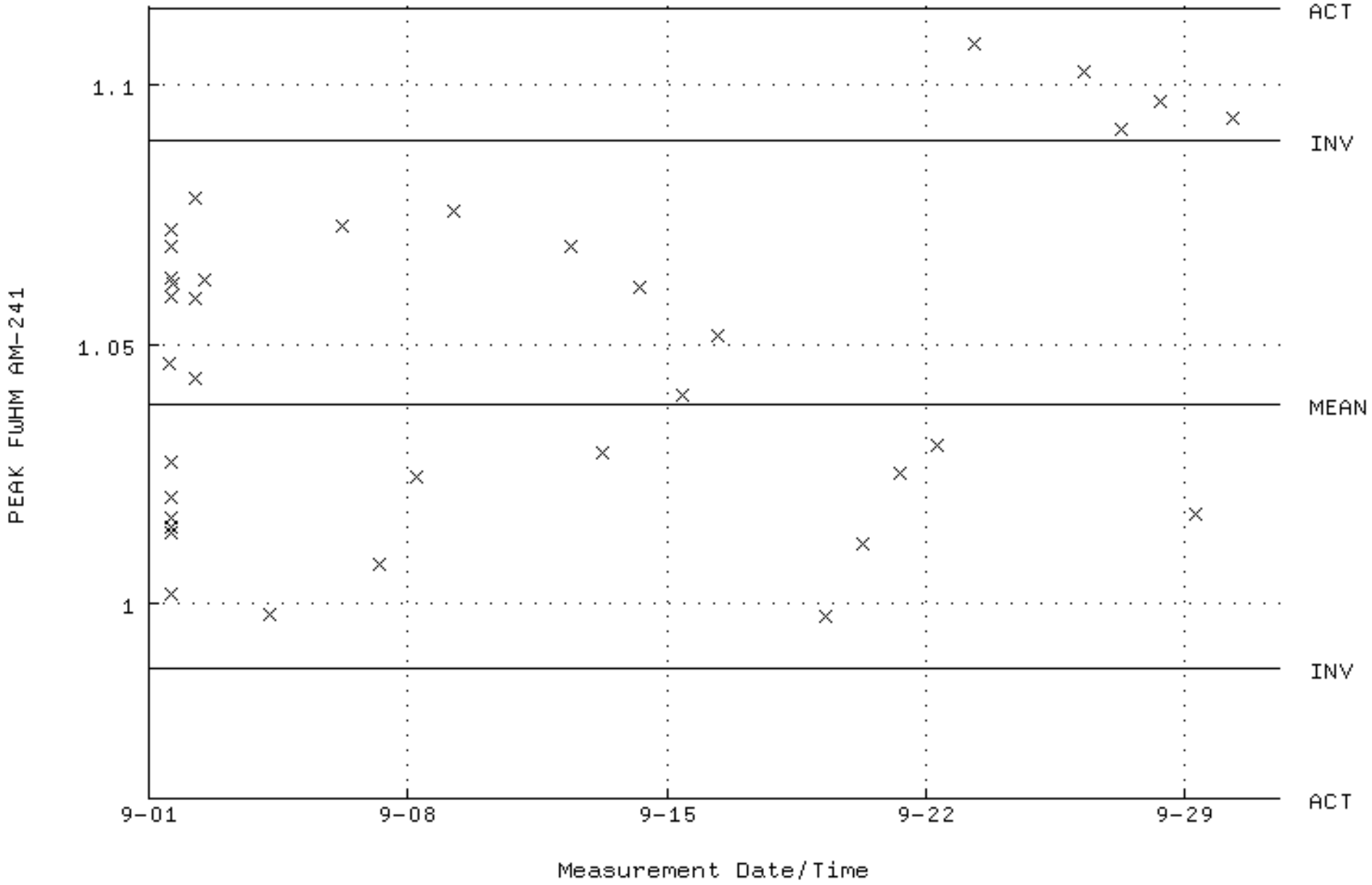
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM06.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:07 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.24317 +- 1.196123E-02 (0.96 %)



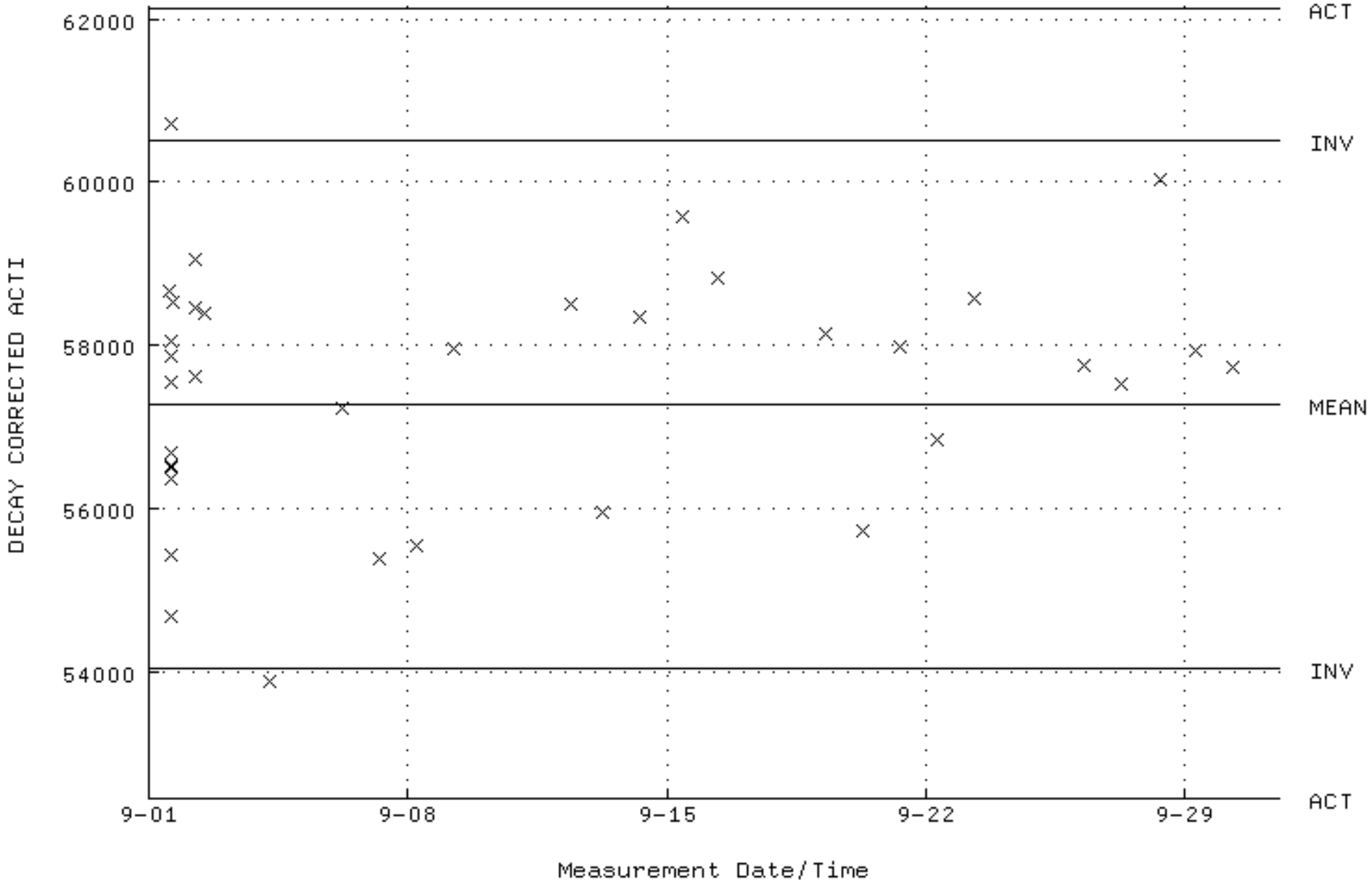
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 1-SEP-2016 13:47:02 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



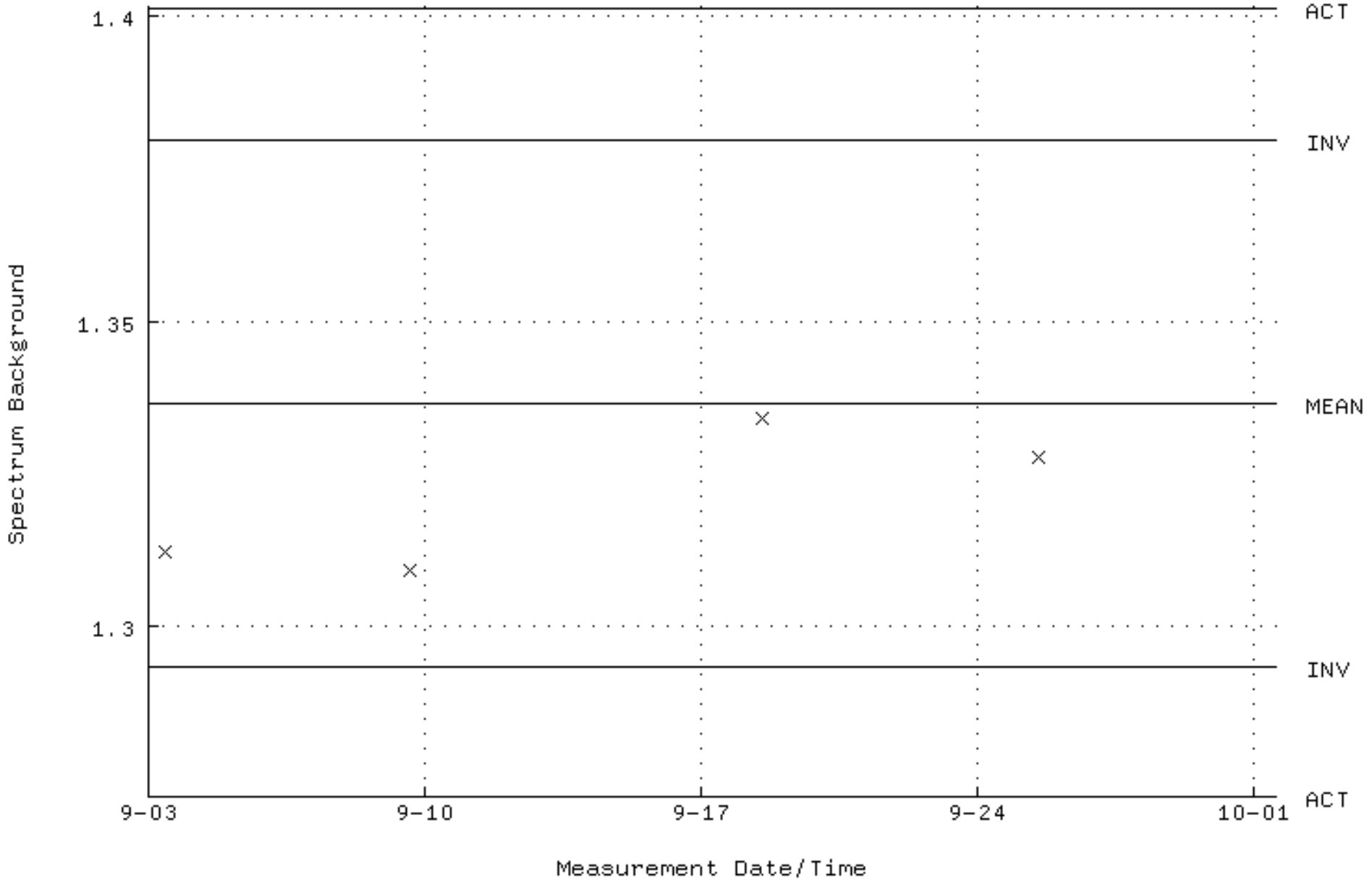
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM07_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 1-SEP-2016 13:47:02 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.03858 +- 2.533066E-02 (2.44 %)



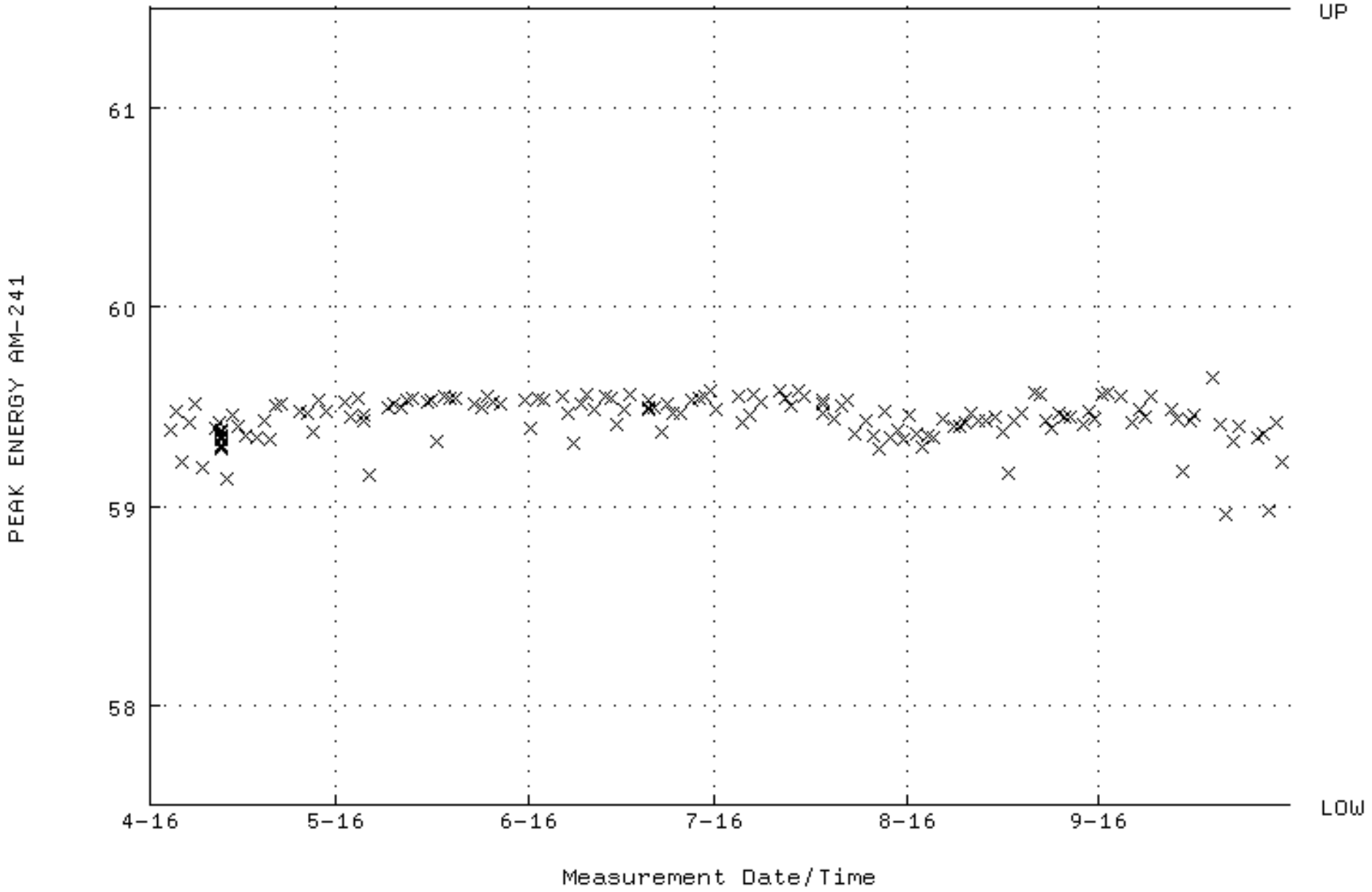
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Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 1-SEP-2016 13:47:02 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 57291.8 +- 1611.56 (2.81 %)



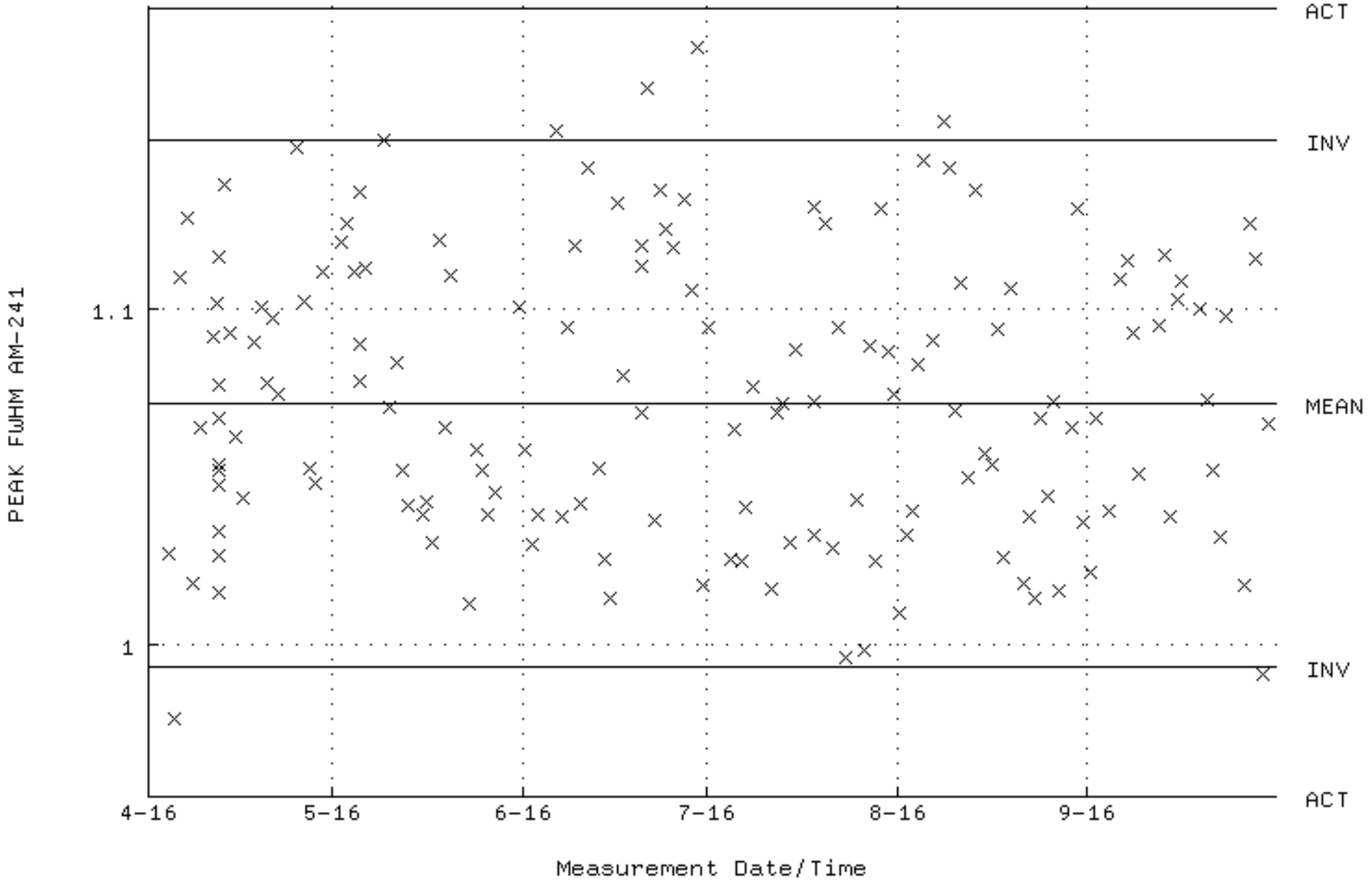
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Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-SEP-2016 10:23:03 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.33664 +- 2.151268E-02 (1.61 %)



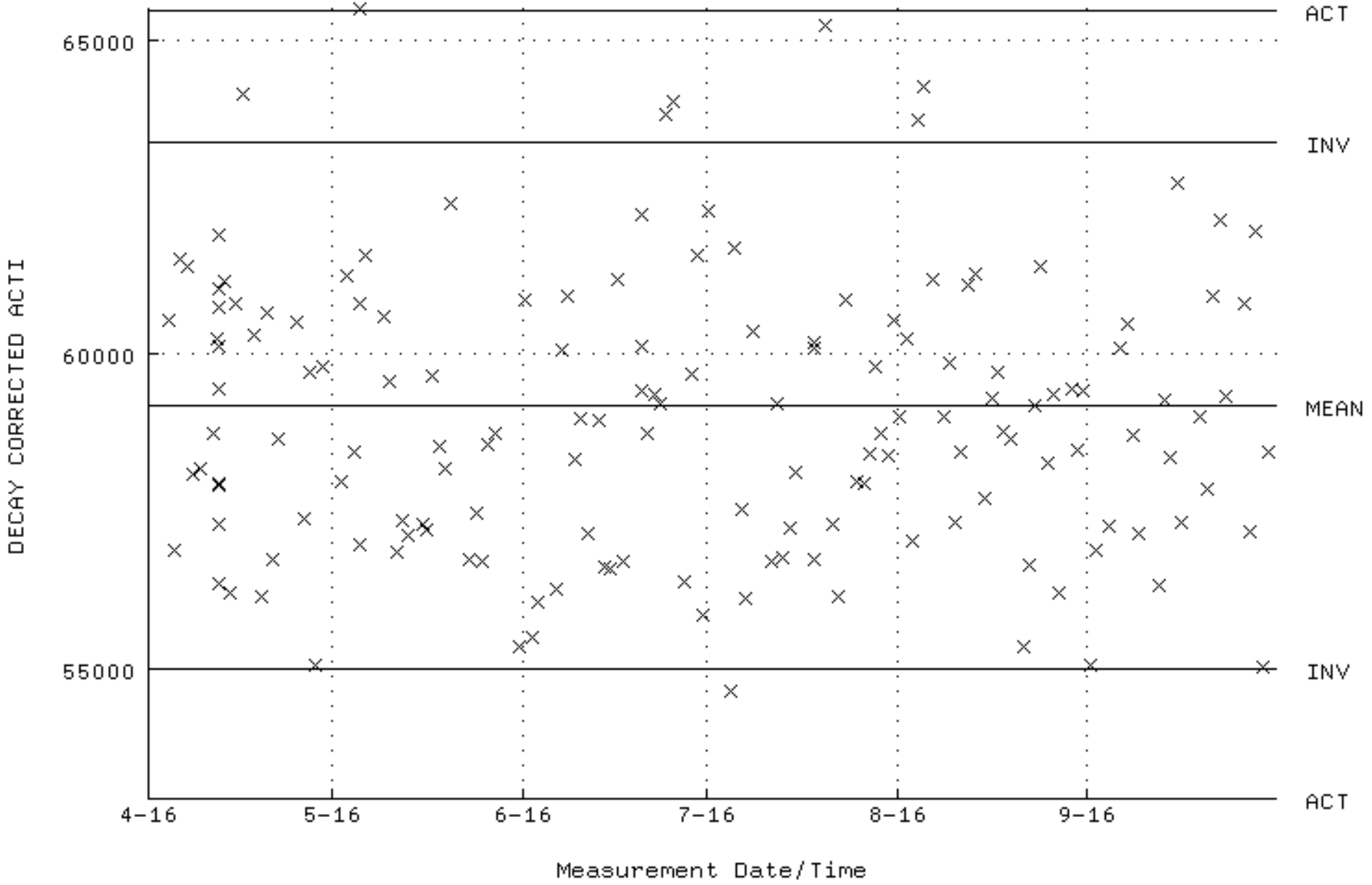
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:29 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



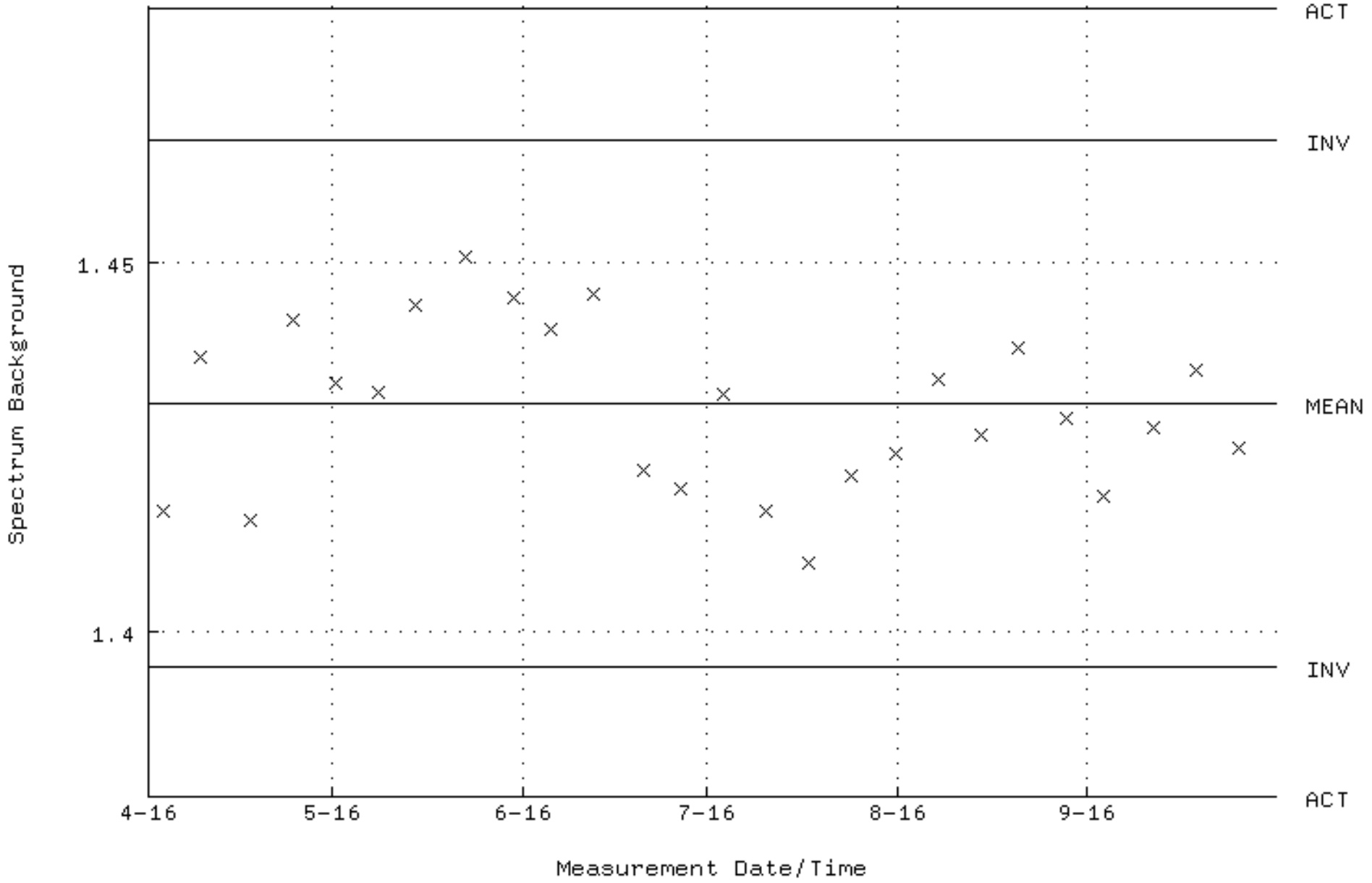
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:29 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.07206 +- 3.912322E-02 (3.65 %)



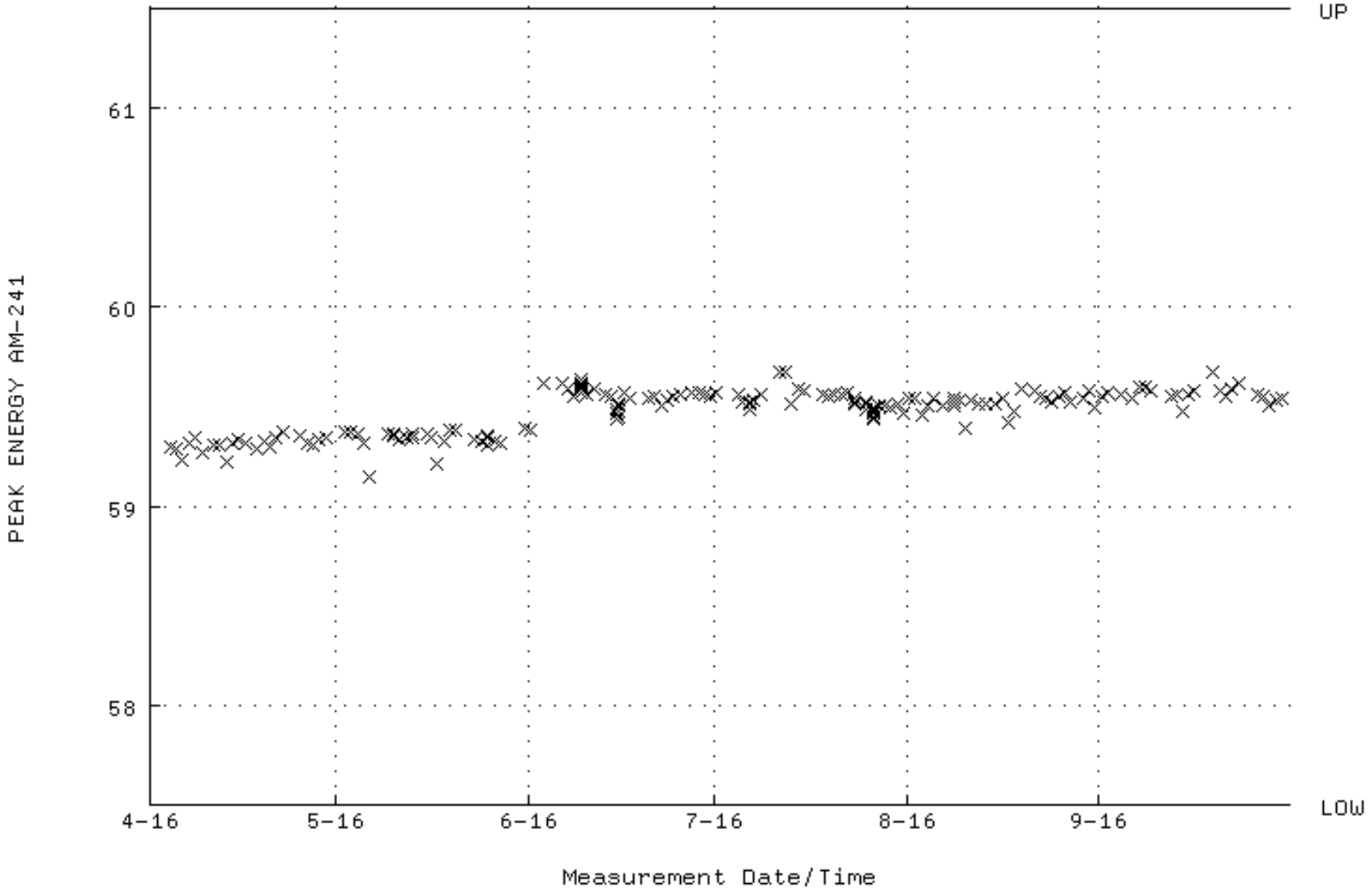
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM08_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:29 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 59199.1 +- 2092.11 (3.53 %)



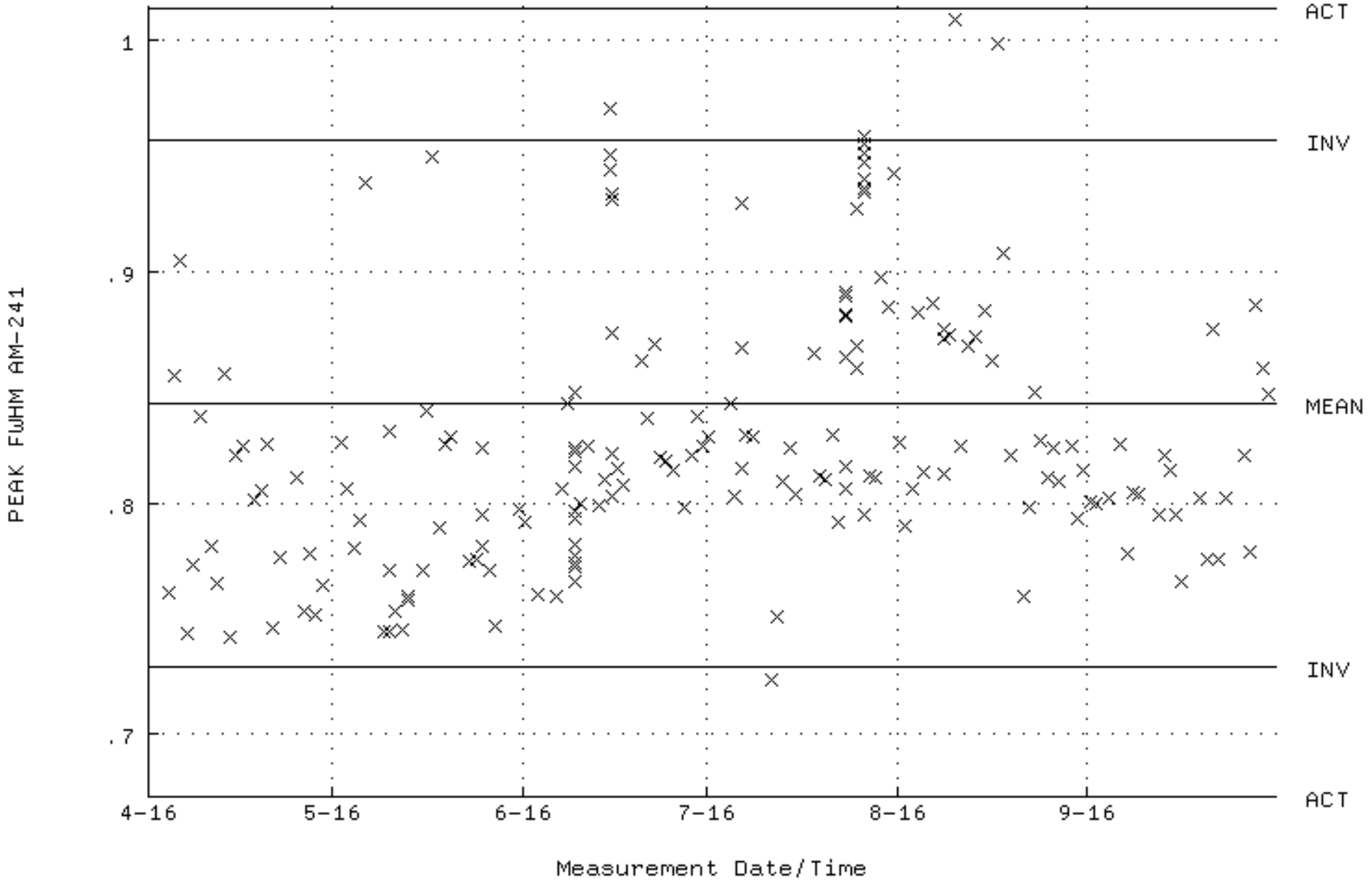
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM08.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:12 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.43104 +- 1.778290E-02 (1.24 %)



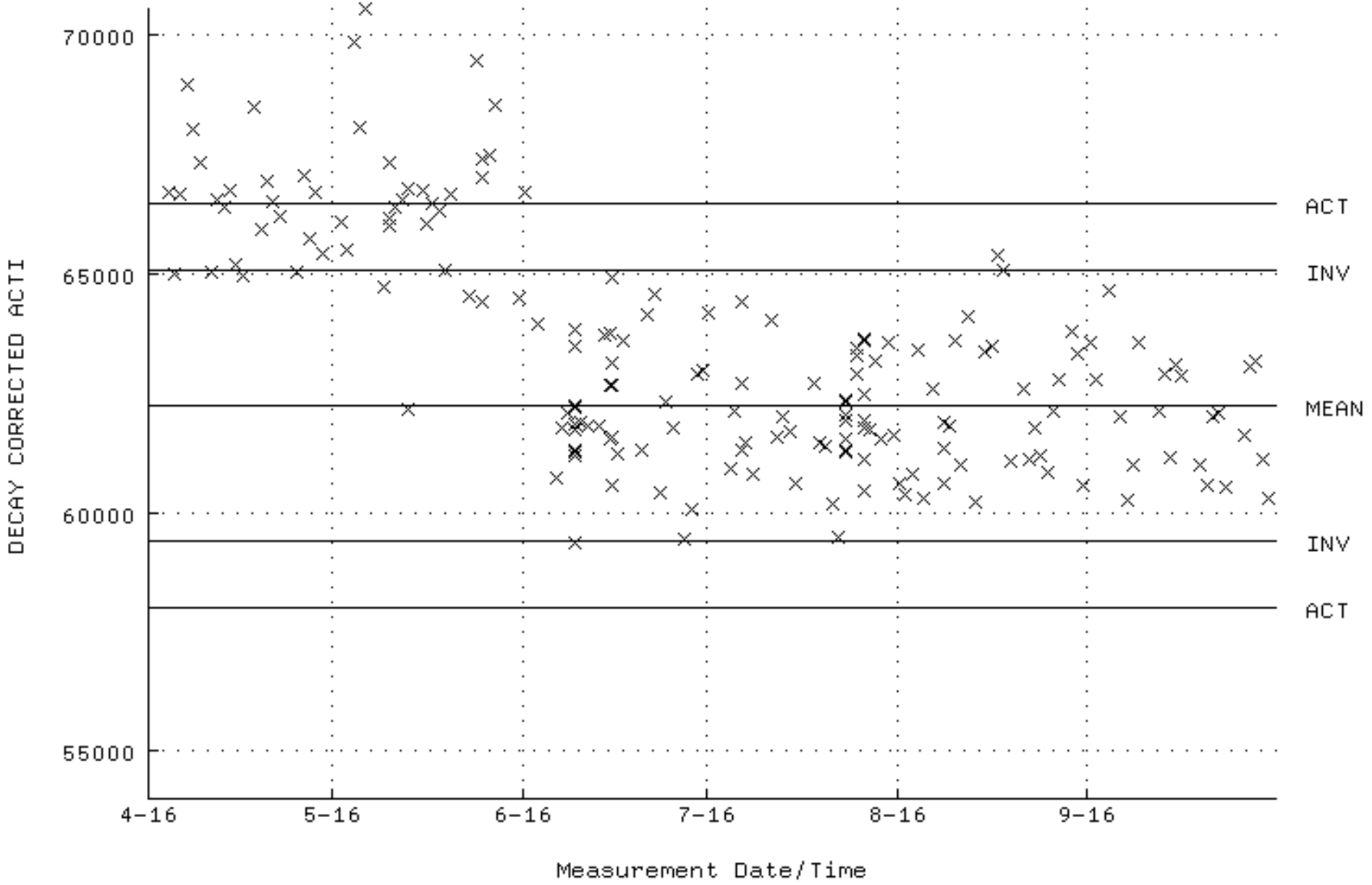
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Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:24:11 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



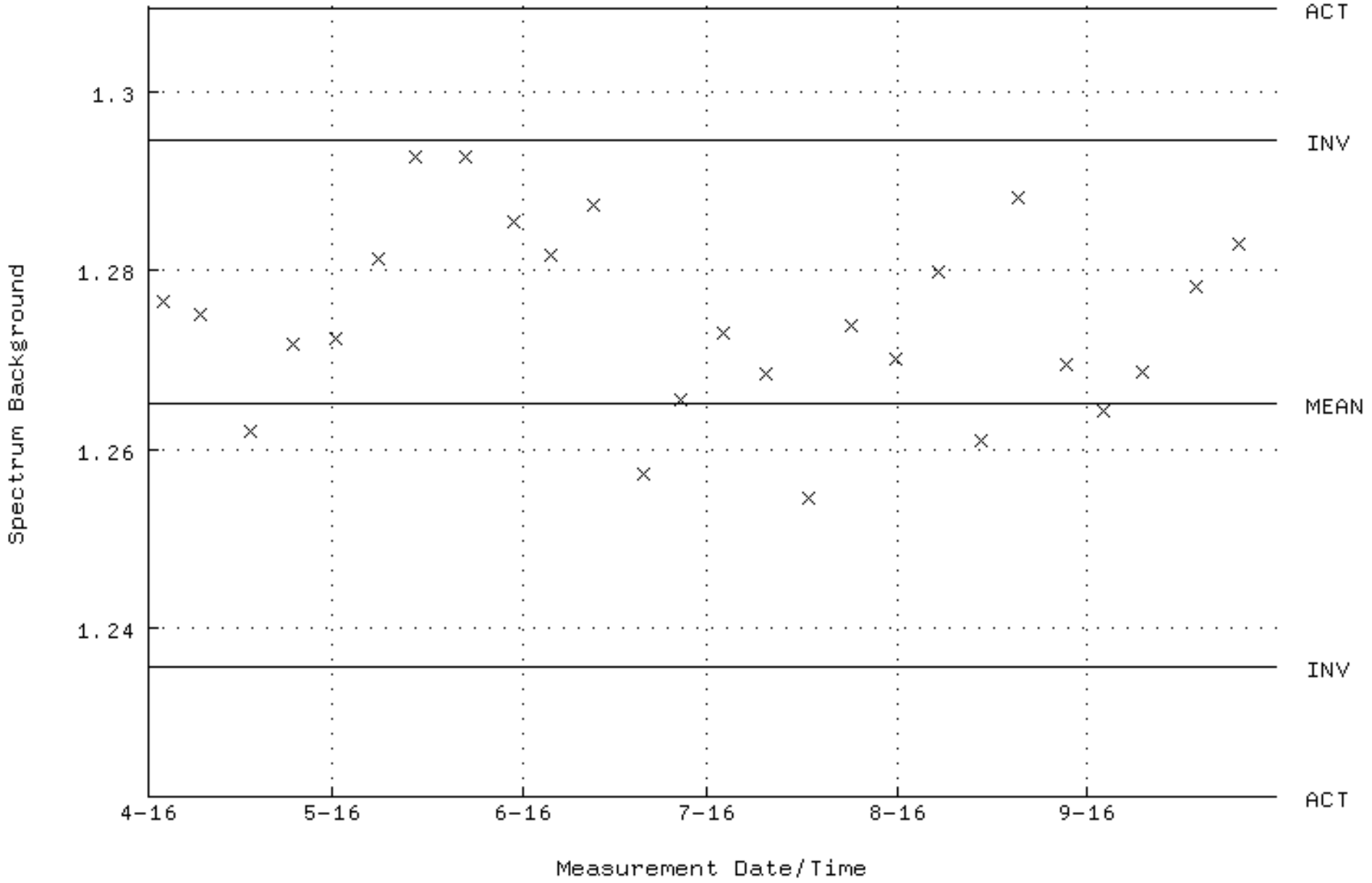
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:24:11 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.843482 +- 5.677858E-02 (6.73 %)



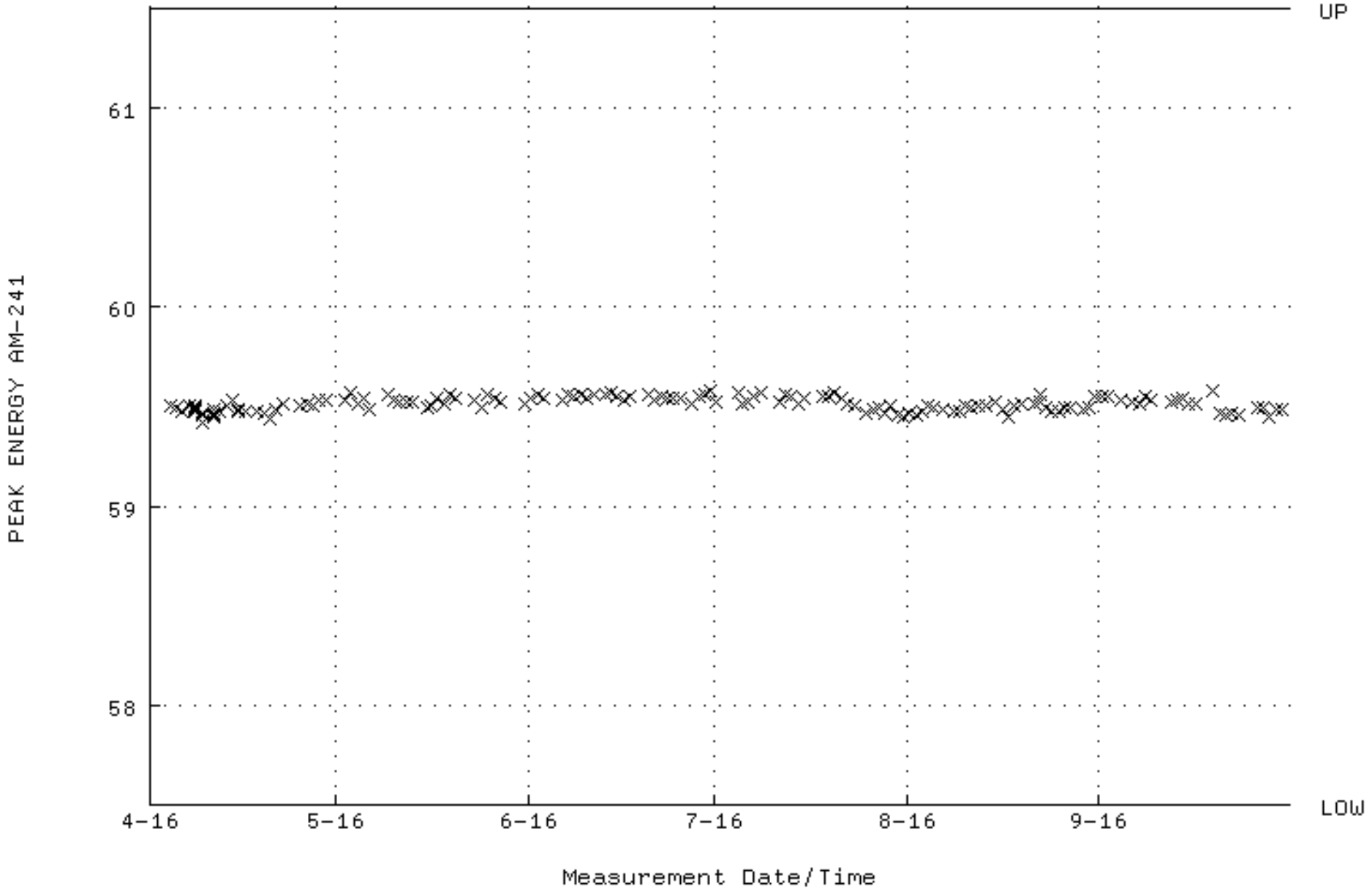
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM09_500MLMB.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:24:11 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 62249.4 +- 1409.24 (2.26 %)



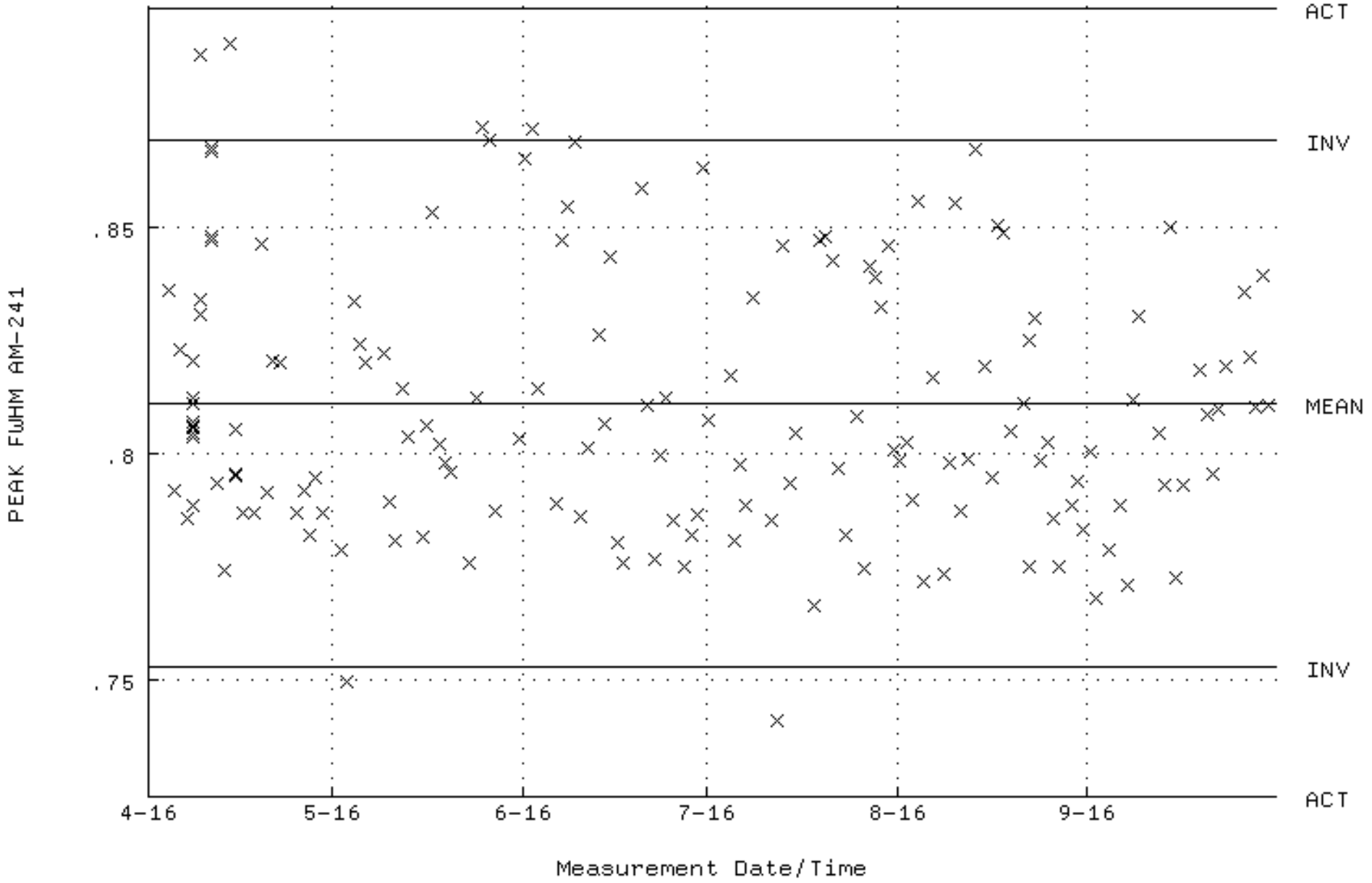
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM09.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:18 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.26523 +- 1.466291E-02 (1.16 %)



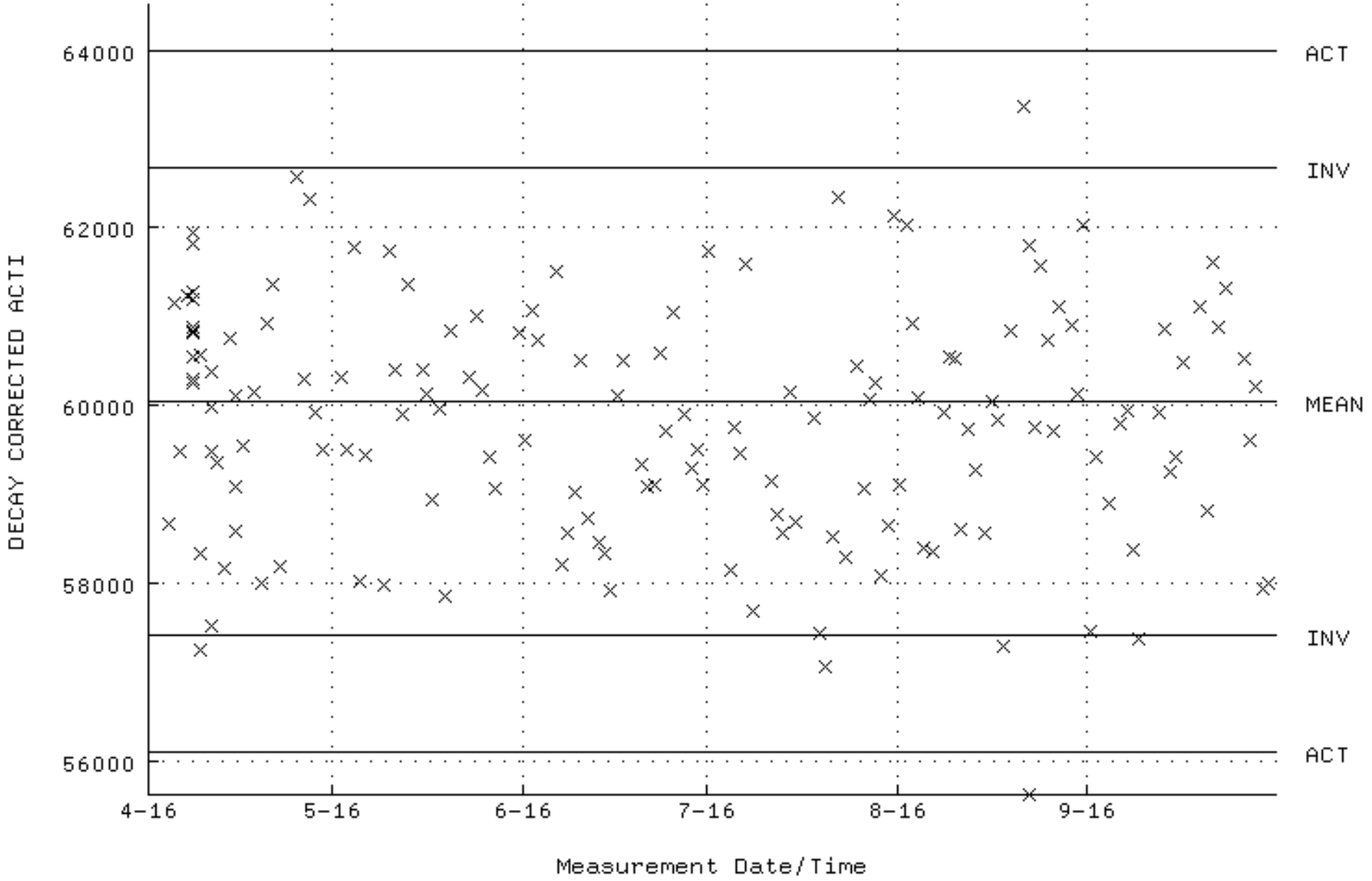
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:24:16 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



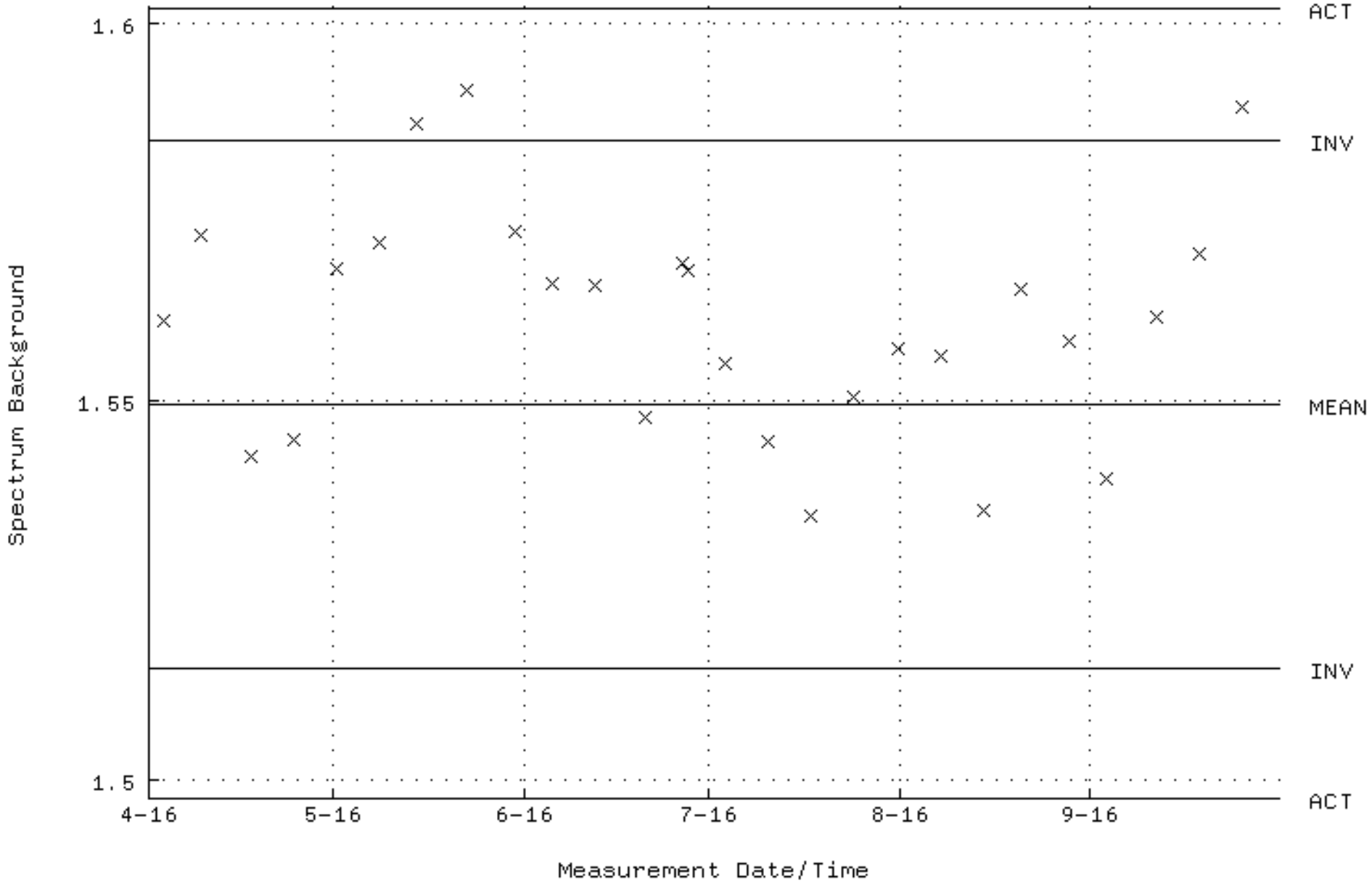
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:24:16 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.811280 +- 2.896658E-02 (3.57 %)



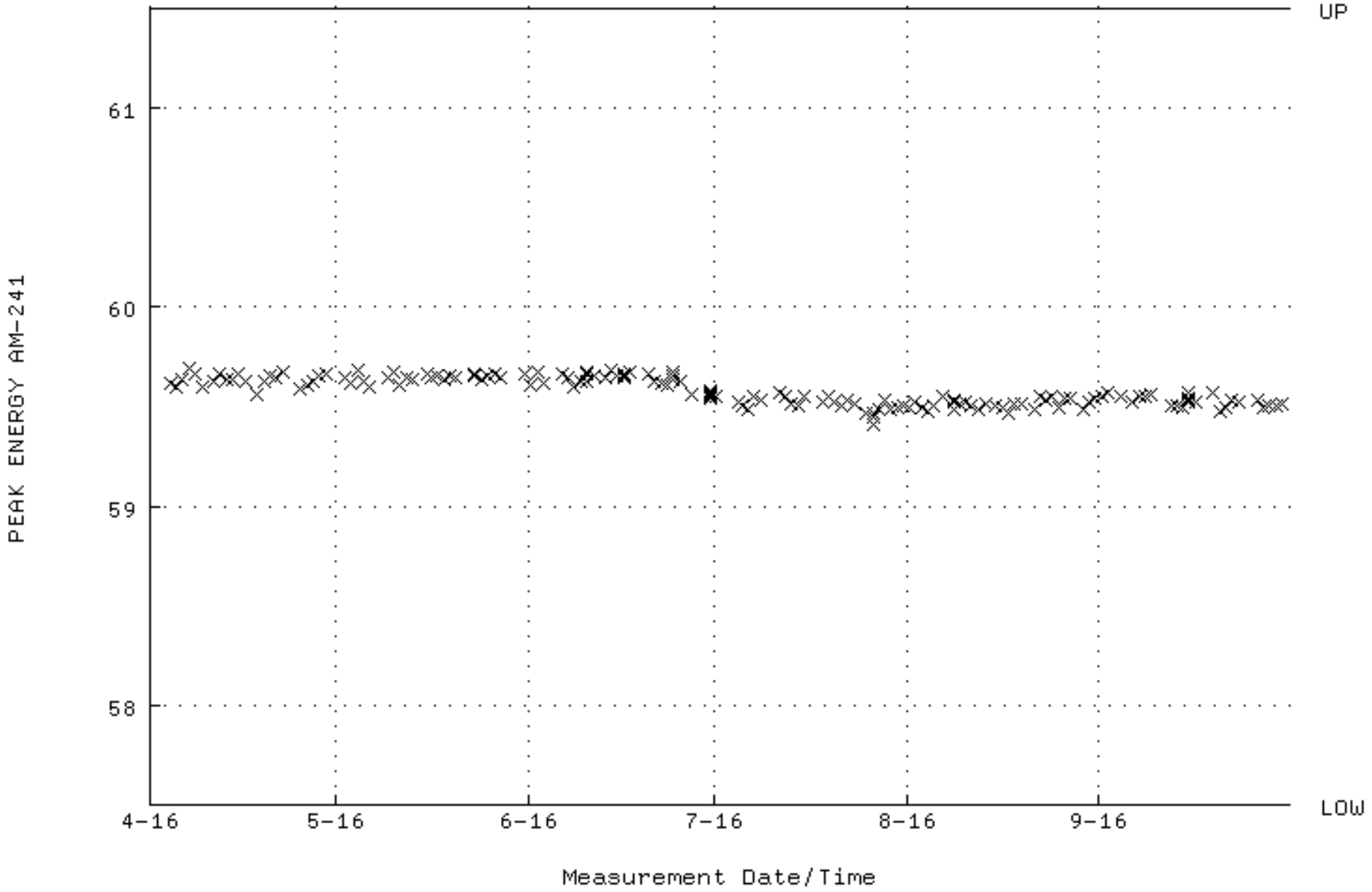
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM11_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:24:16 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 60054.4 +- 1312.98 (2.19 %)



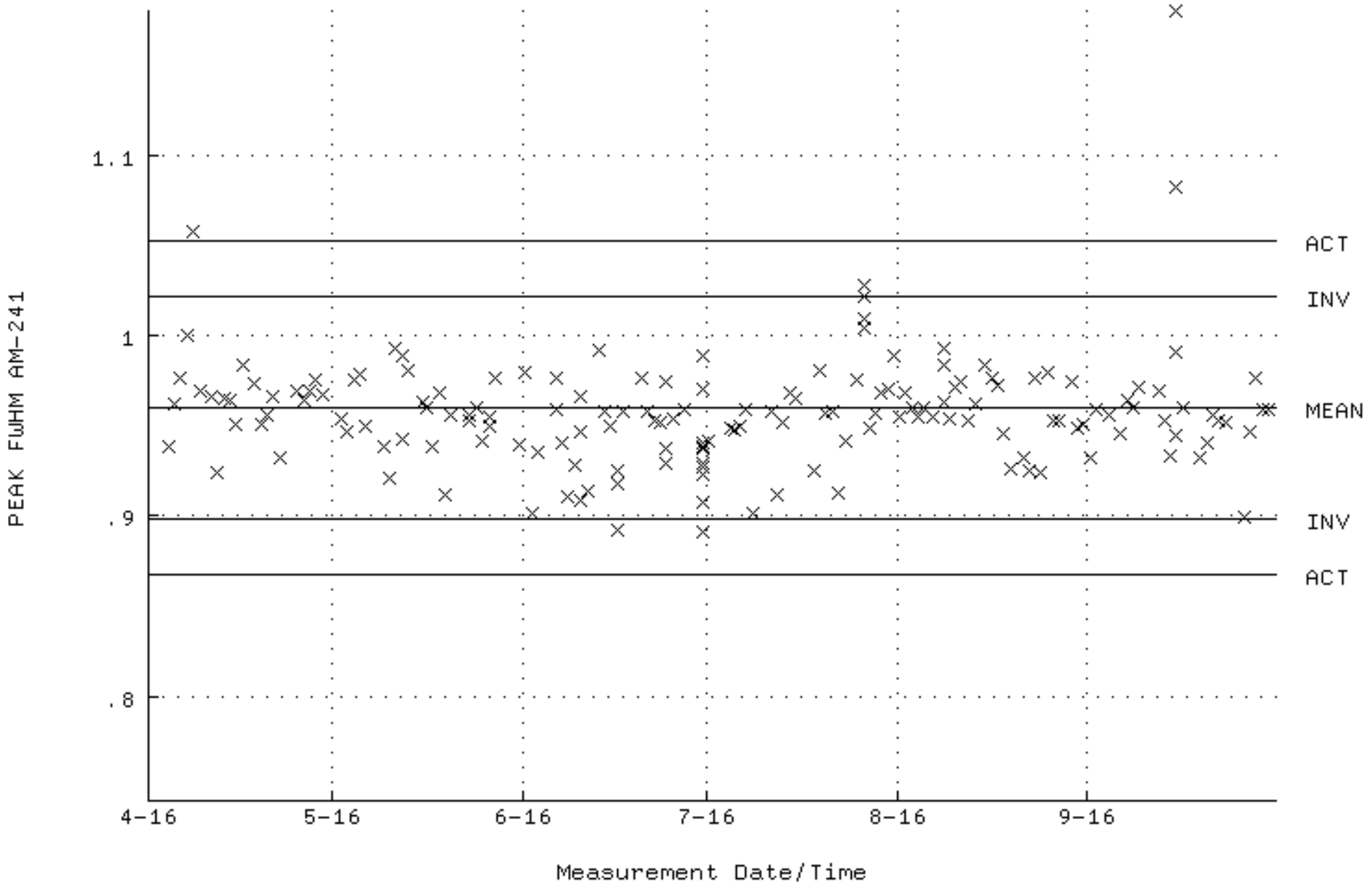
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM11.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:24 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.54973 +- 1.740346E-02 (1.12 %)



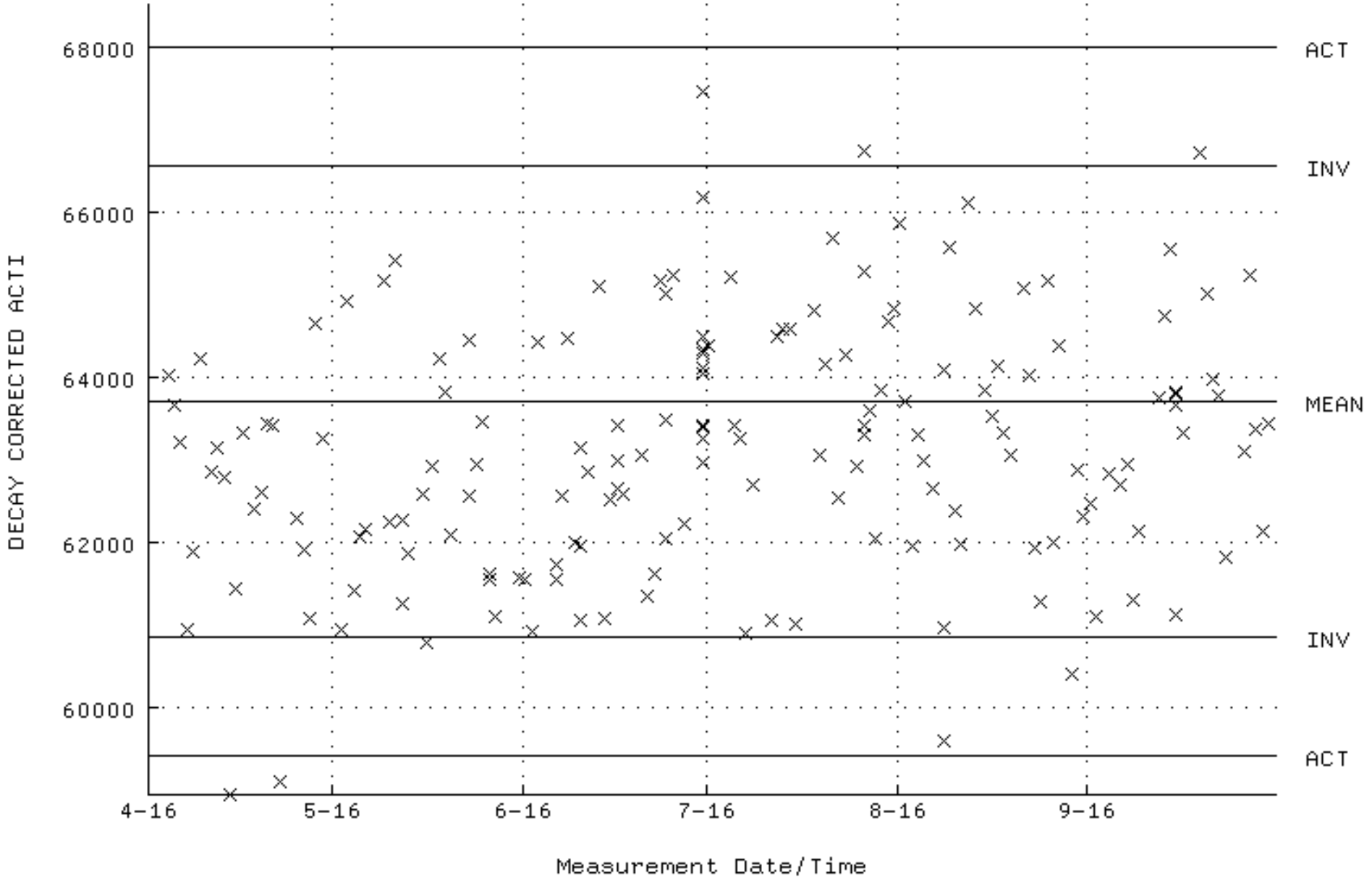
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:40 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



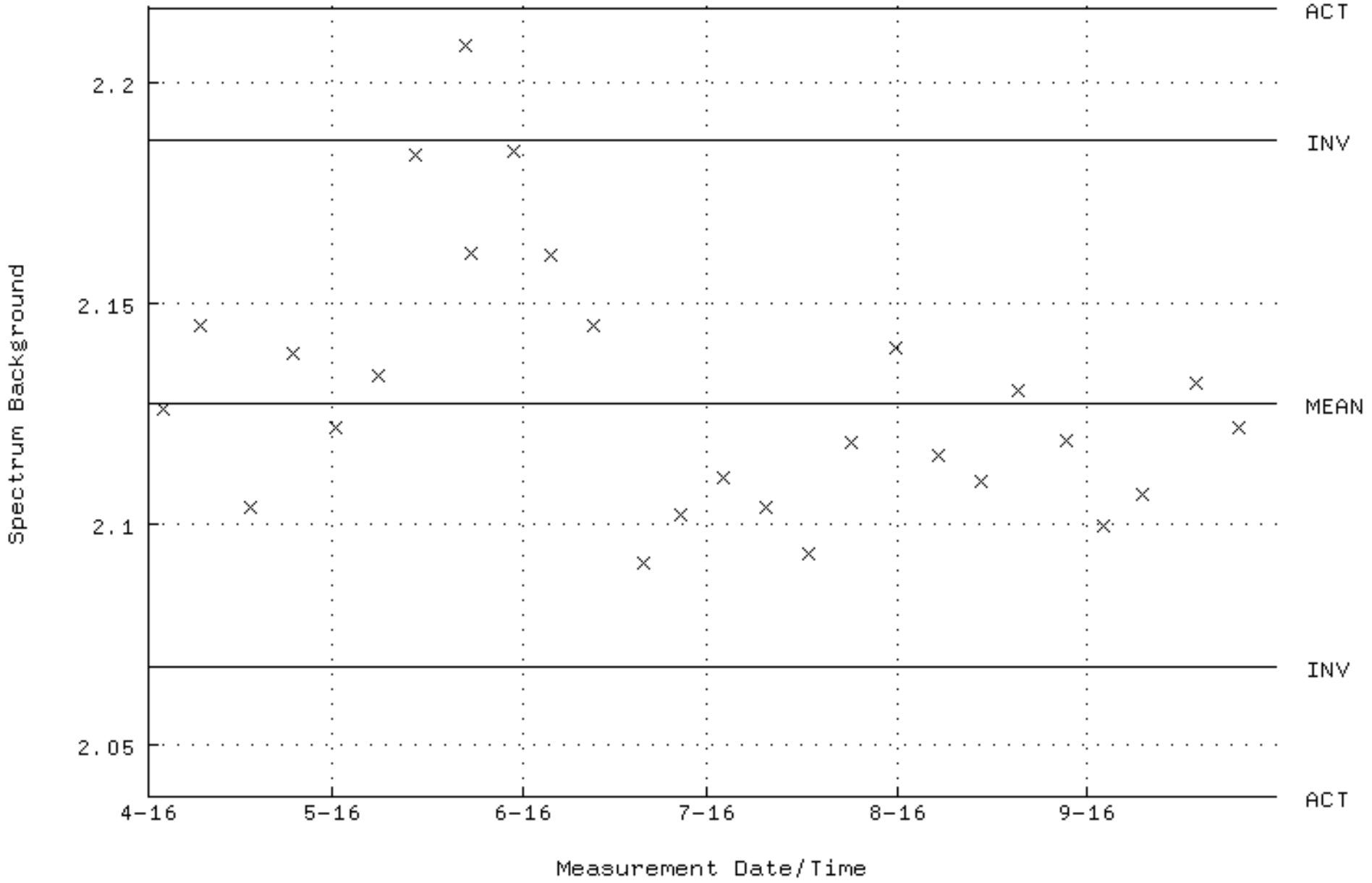
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:40 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.960465 +- 3.090899E-02 (3.22 %)



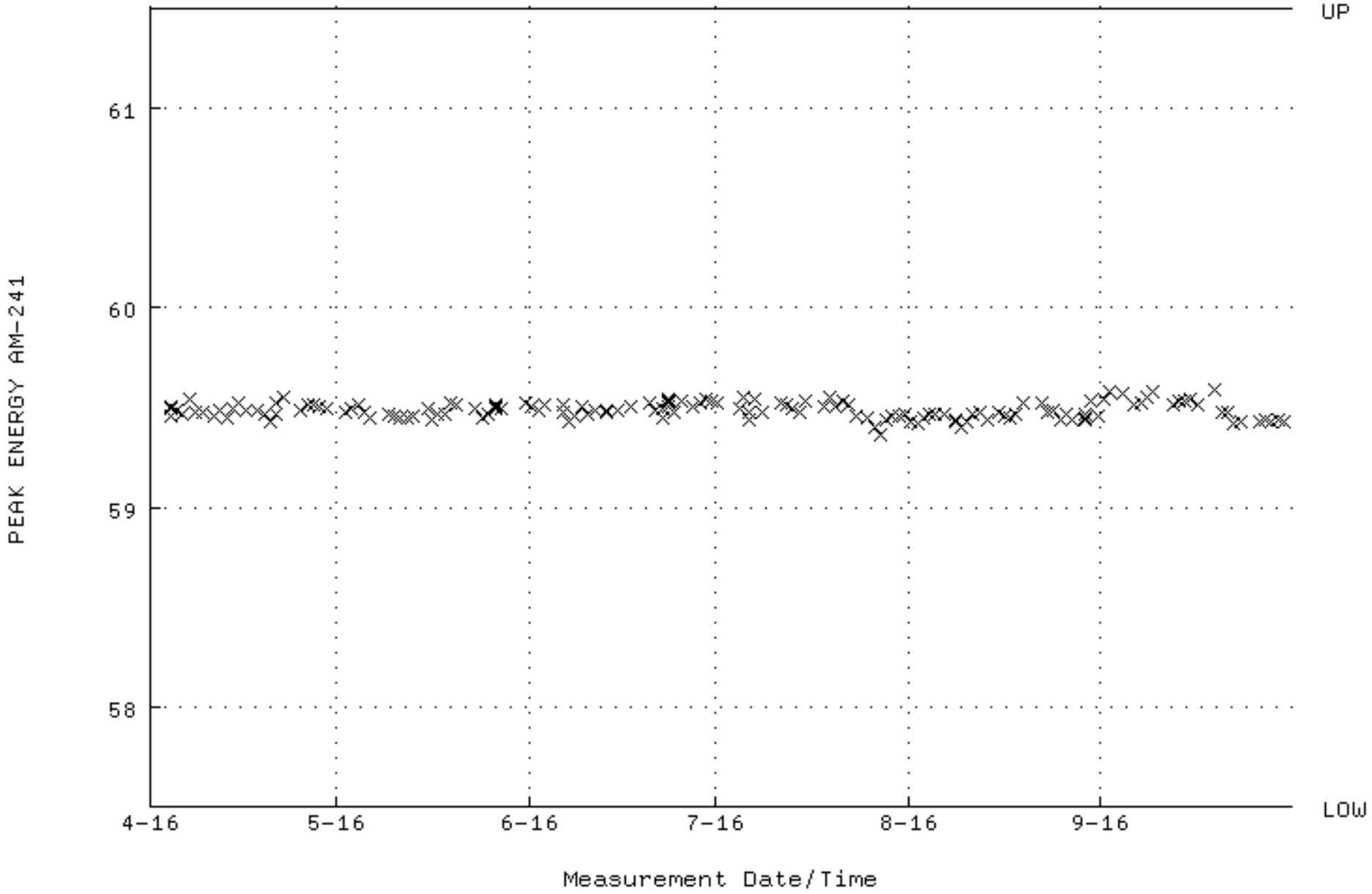
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM18_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:40 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 63719.3 +- 1431.59 (2.25 %)



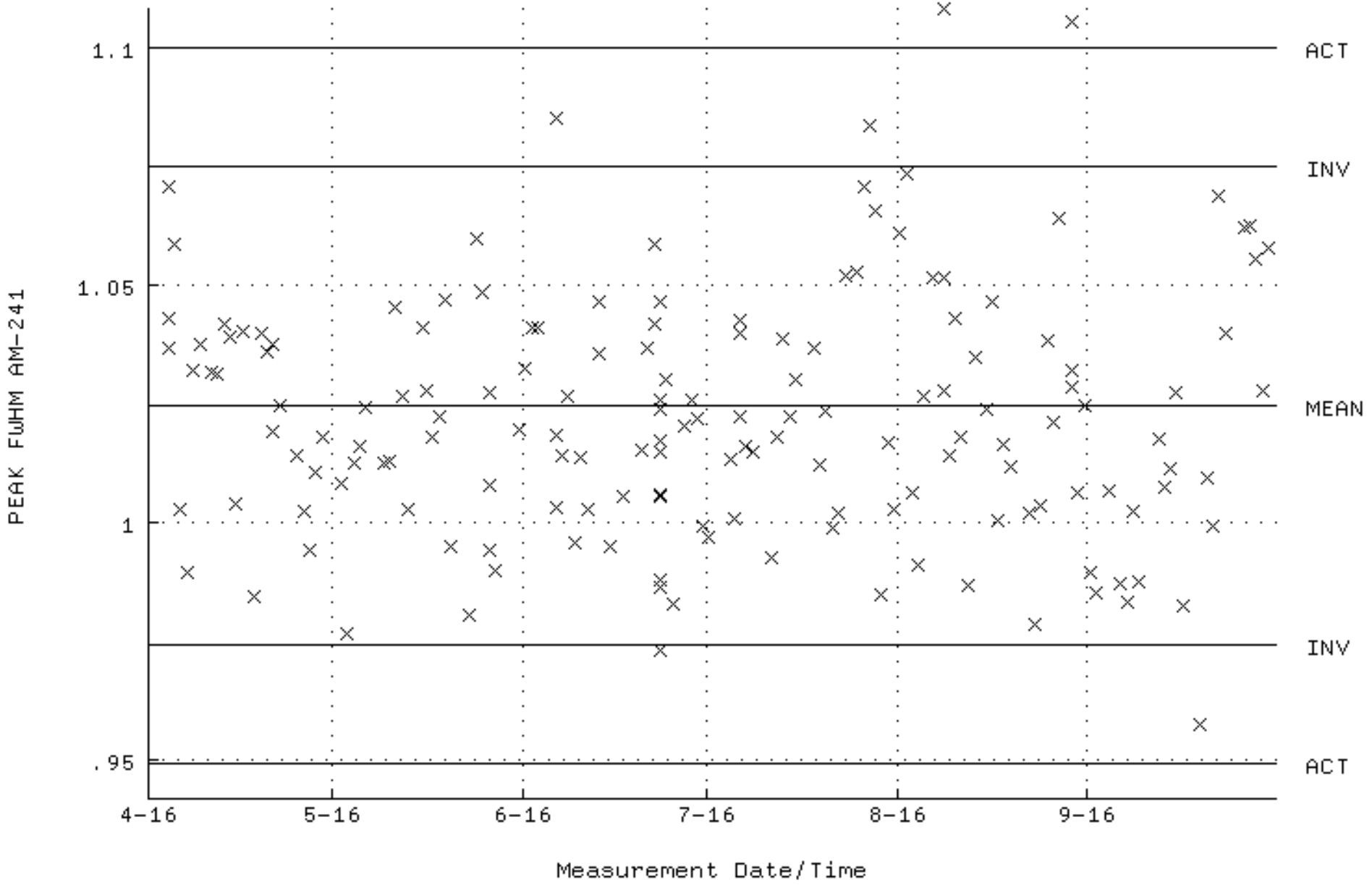
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM18.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:51 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 2.12760 +- 2.980382E-02 (1.40 %)



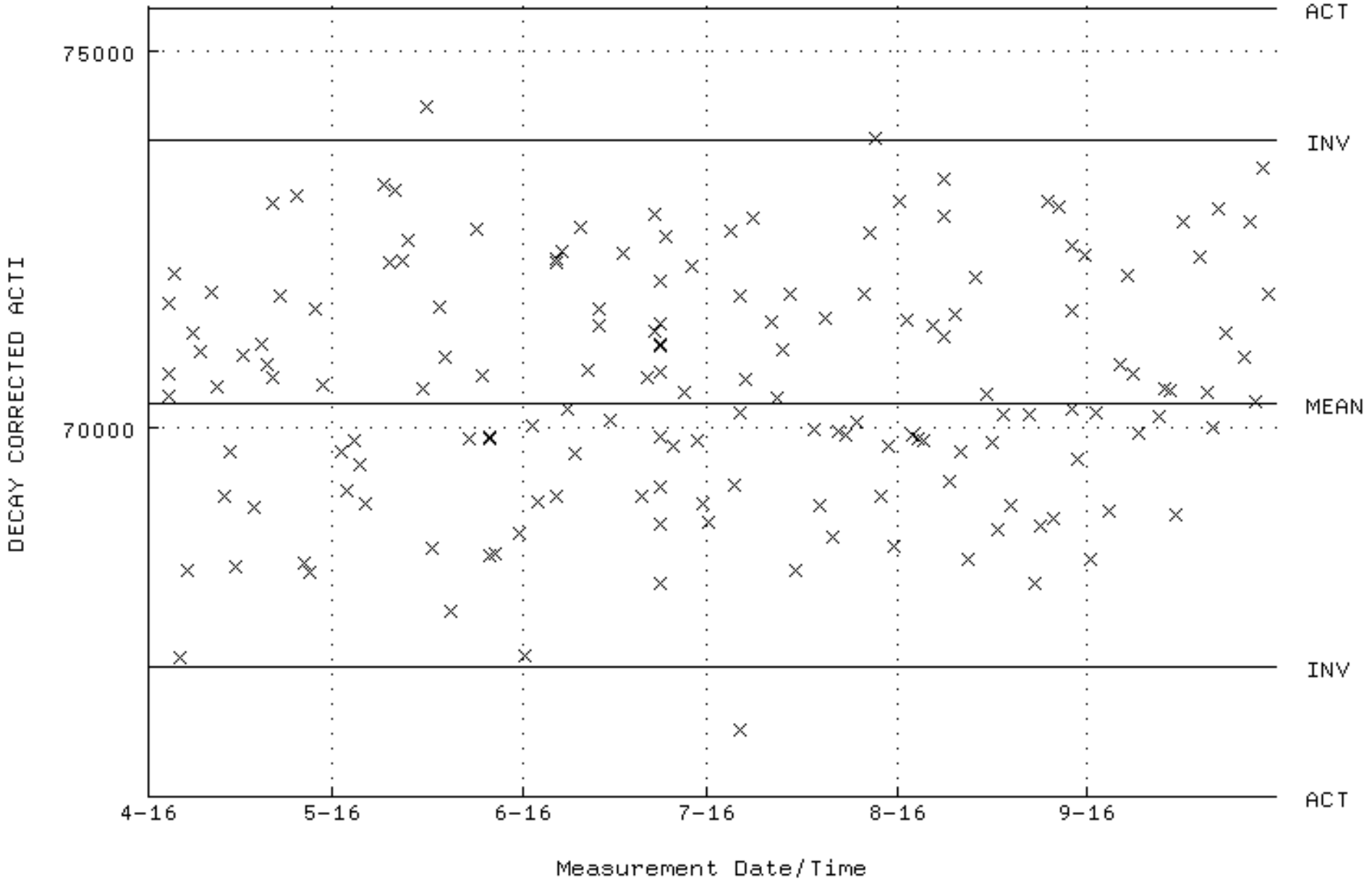
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:54:25 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5000 through 61.5000



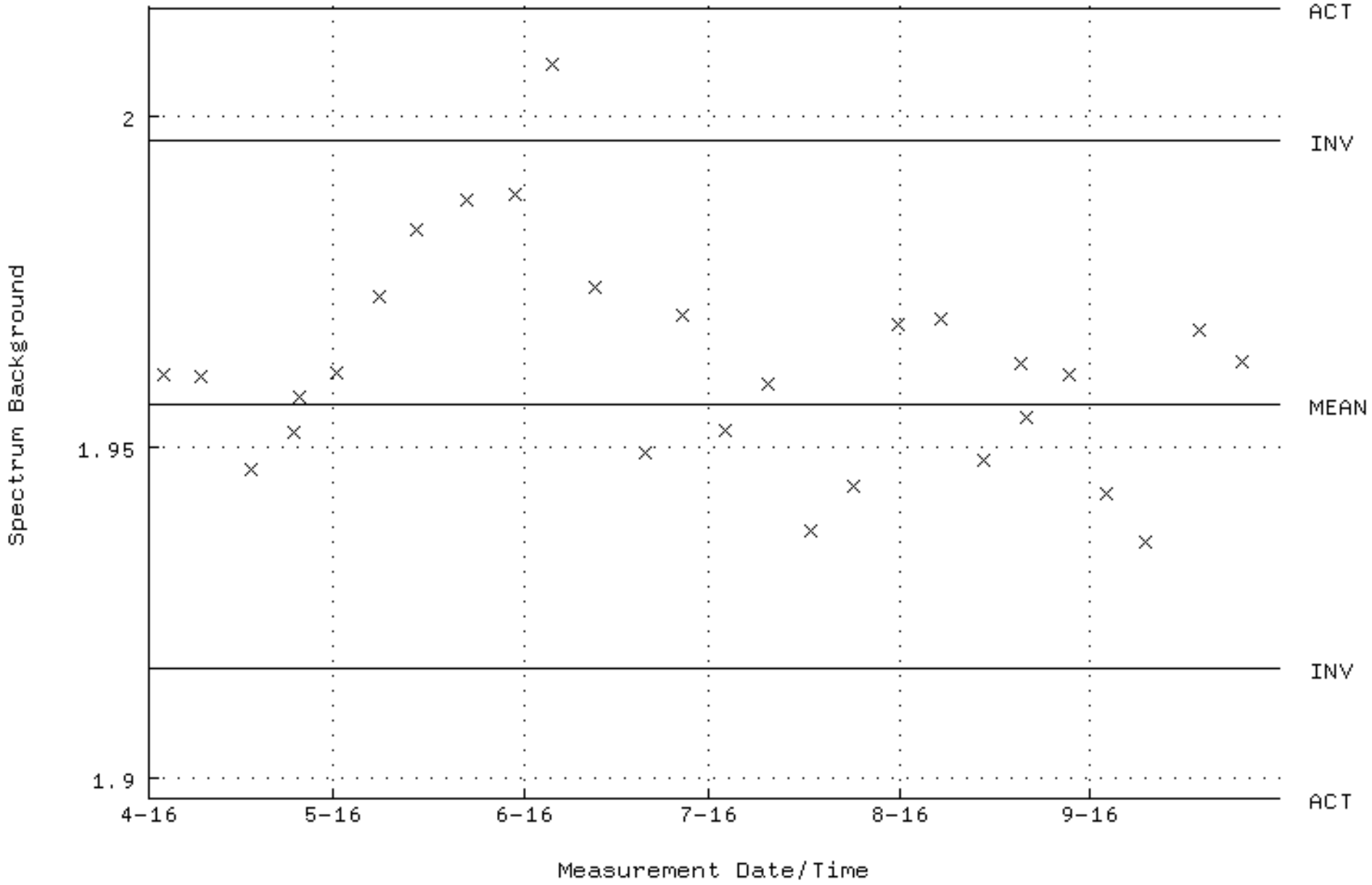
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:54:25 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.02481 +- 2.522724E-02 (2.46 %)



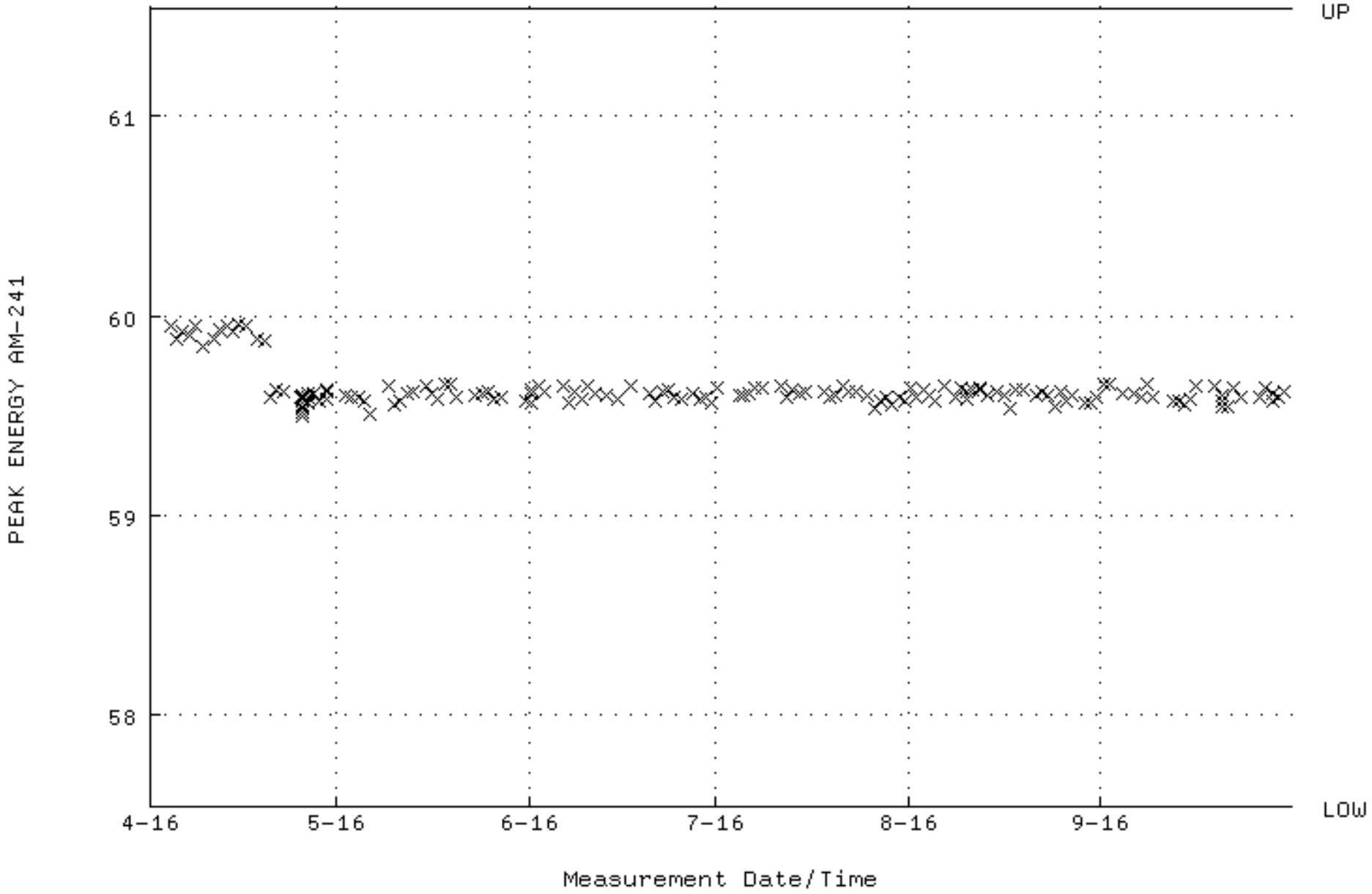
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM19_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:54:25 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 70341.0 +- 1743.47 (2.48 %)



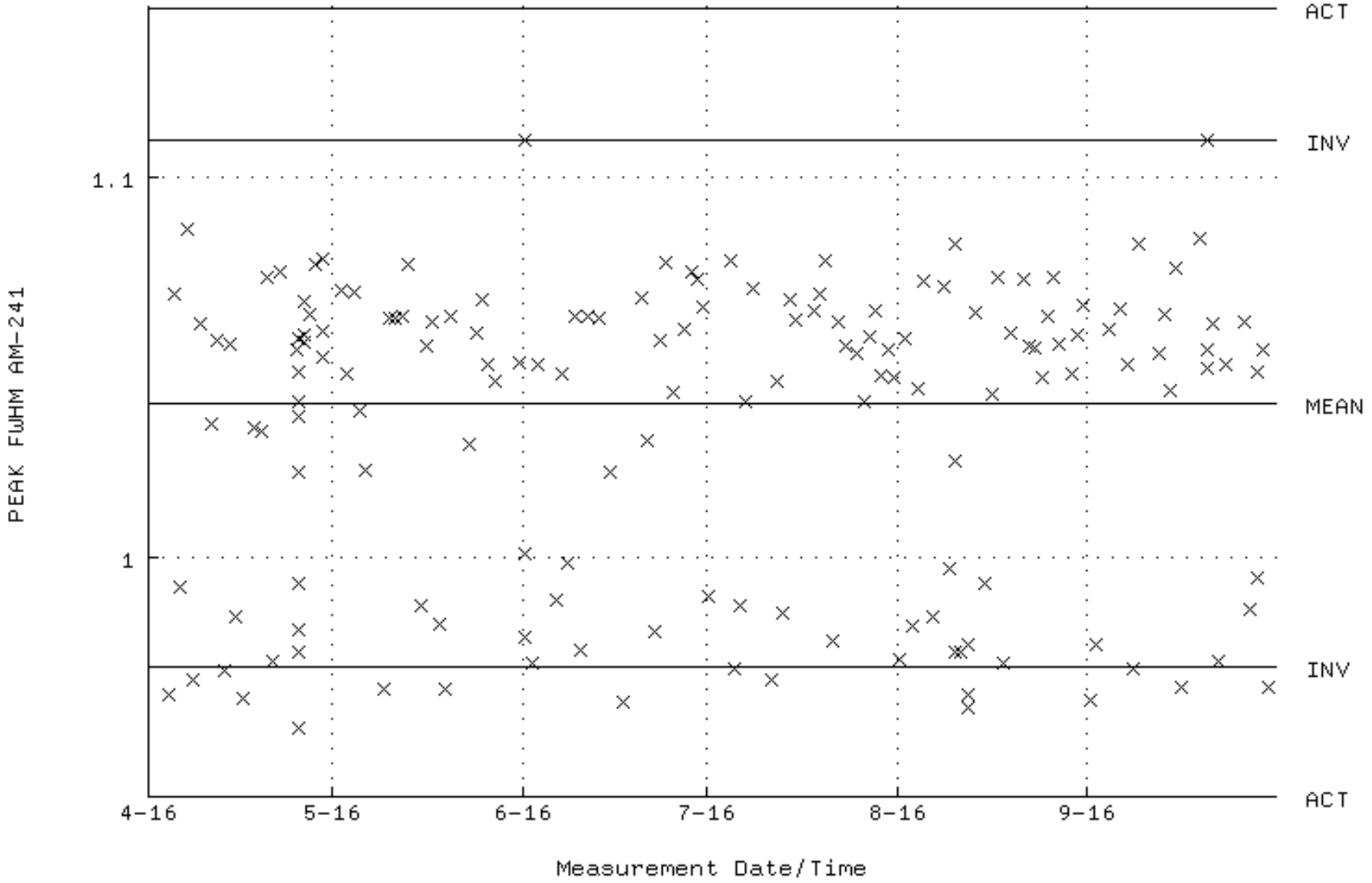
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM19.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:18:56 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.95658 +- 1.990679E-02 (1.02 %)



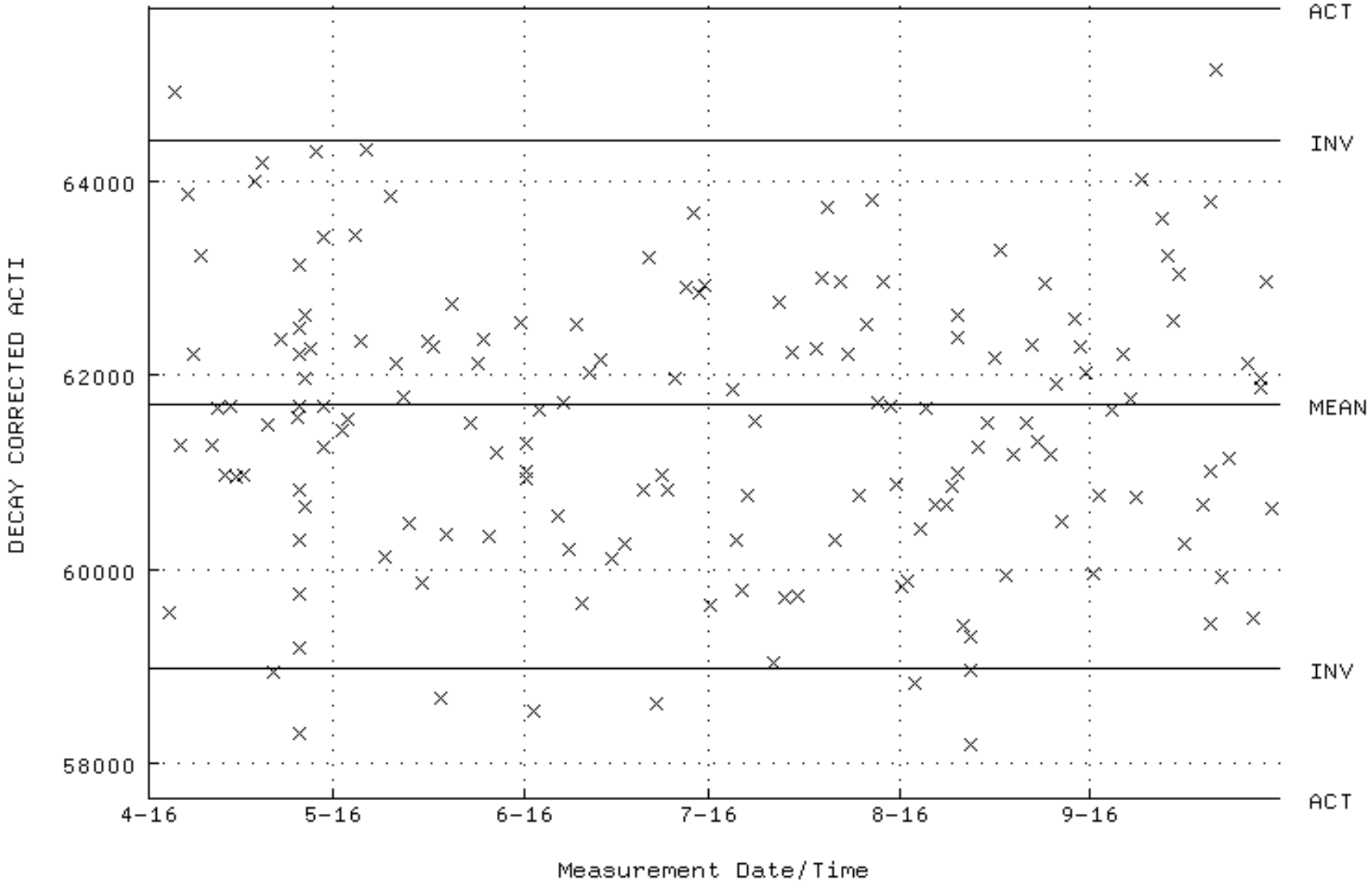
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:51 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



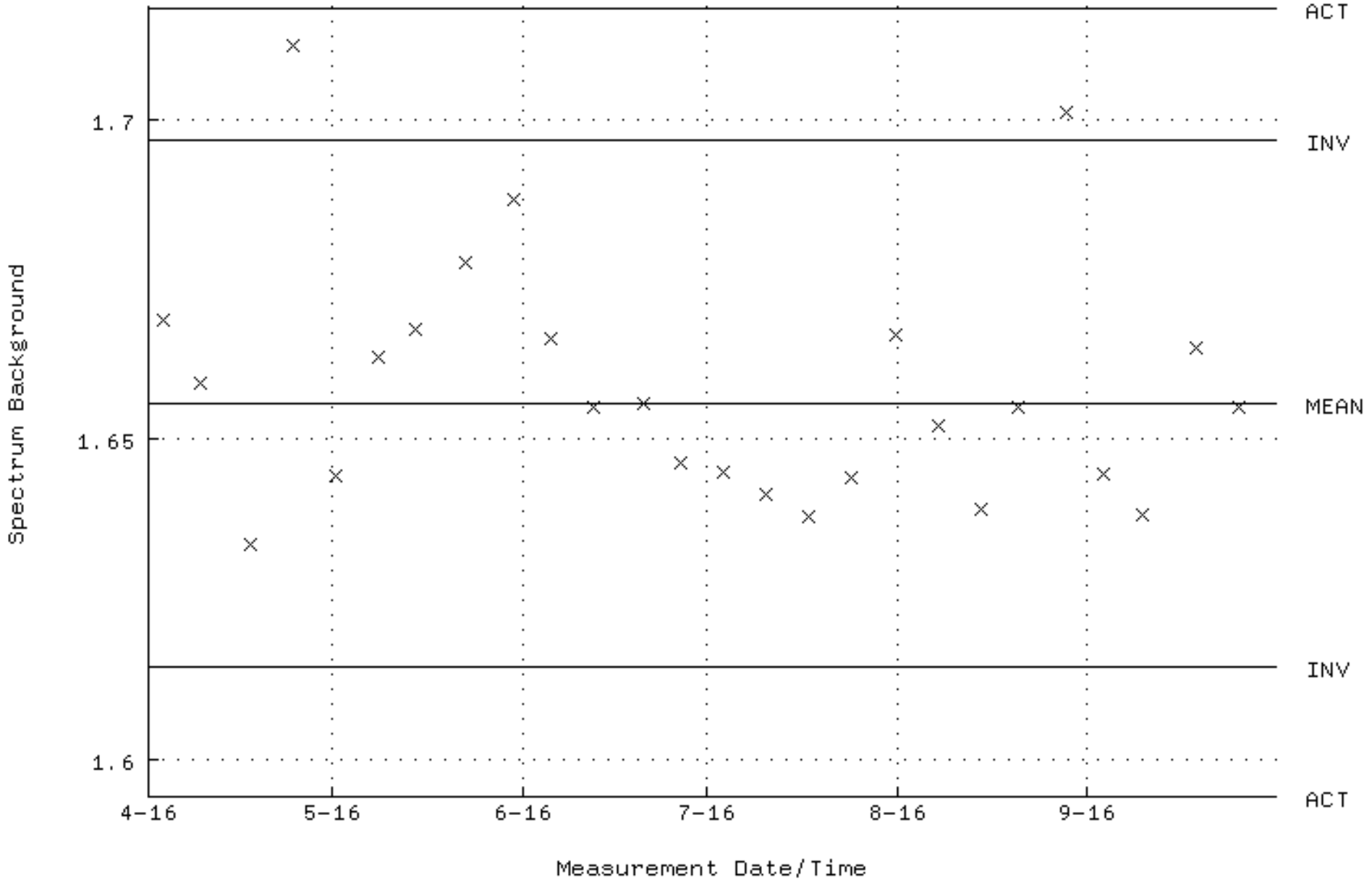
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:51 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.04071 +- 3.445093E-02 (3.31 %)



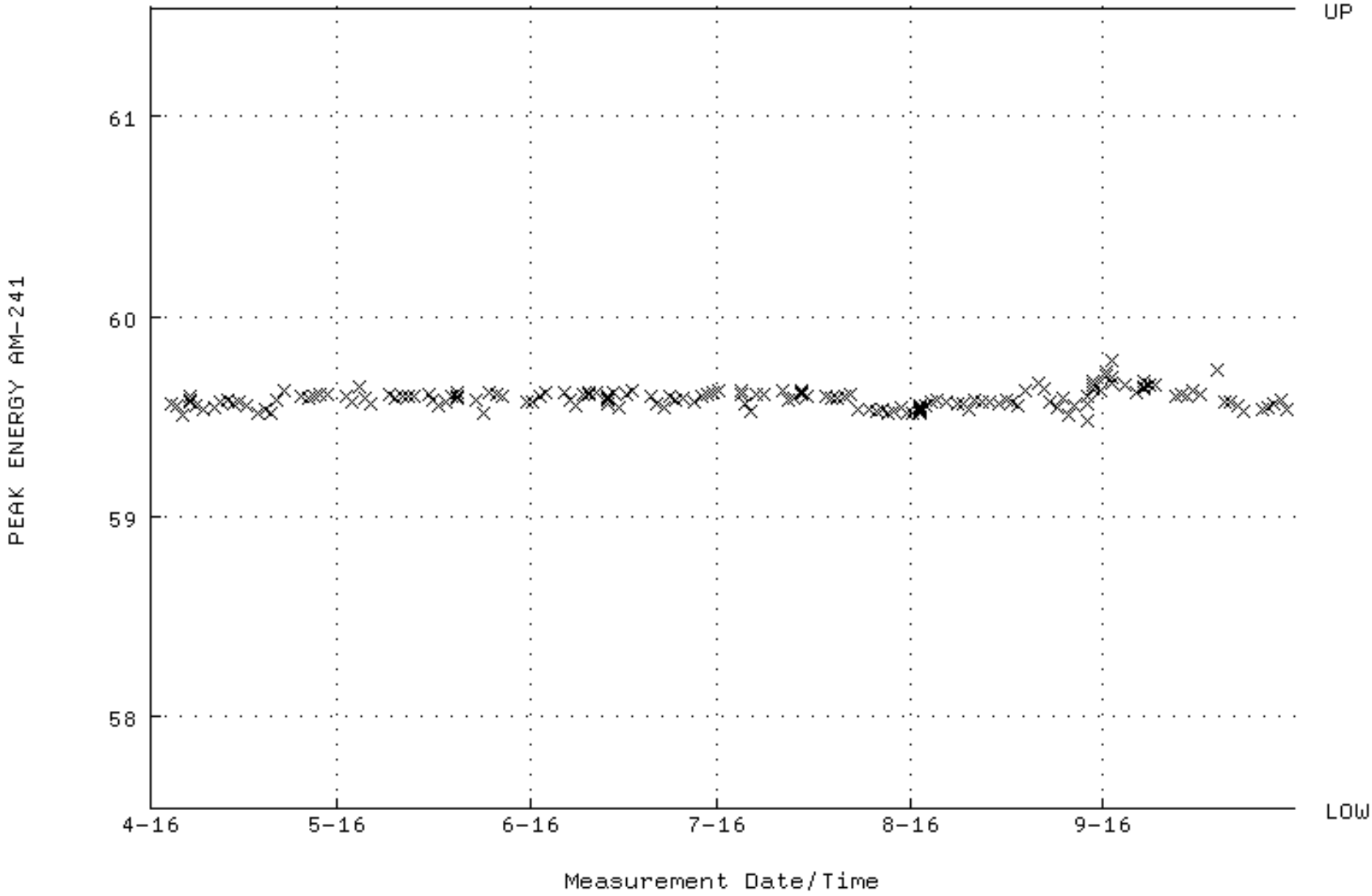
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM24_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:51 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 61710.4 +- 1354.76 (2.20 %)



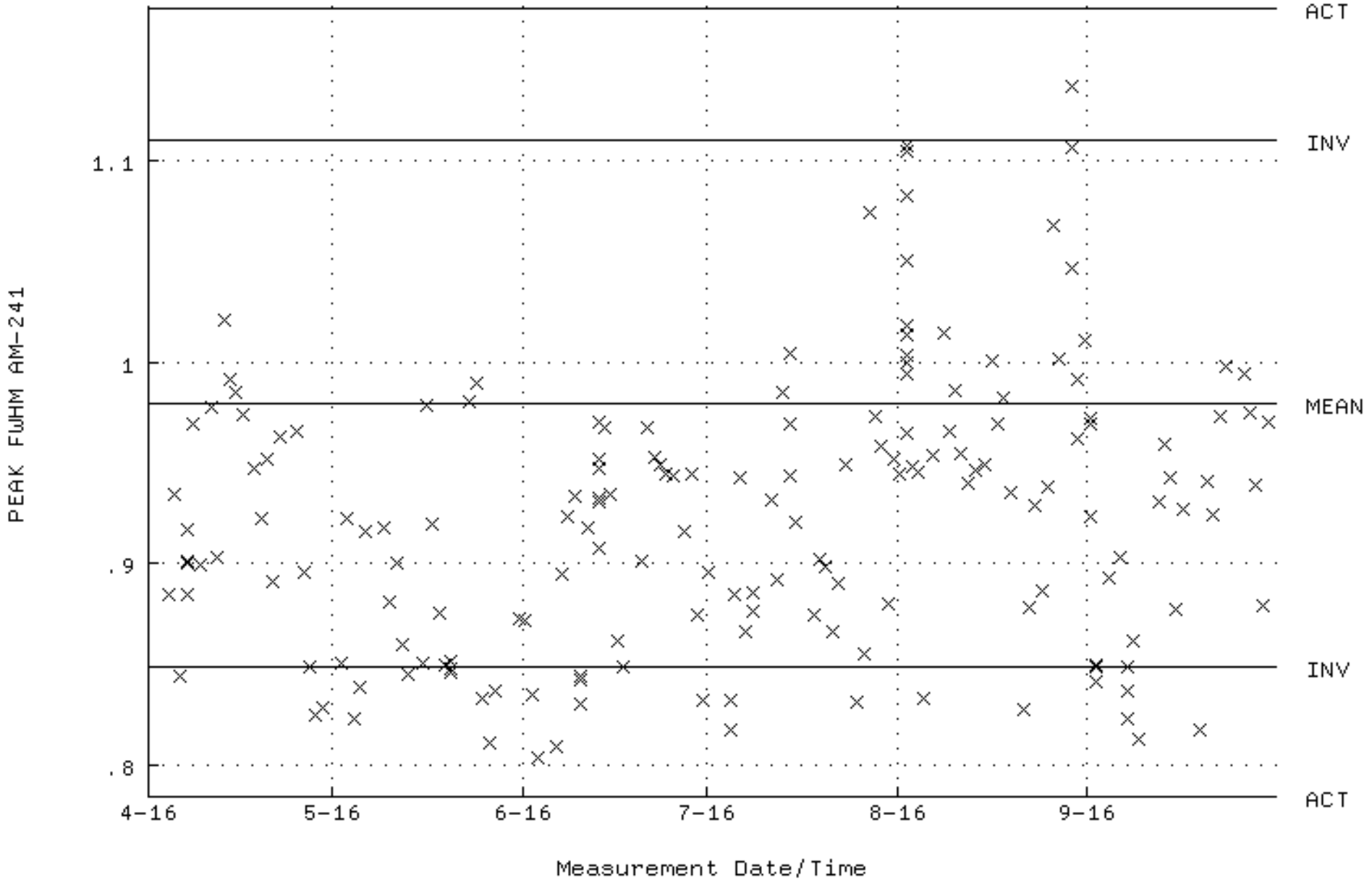
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM24.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:19:22 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.65570 +- 2.053930E-02 (1.24 %)



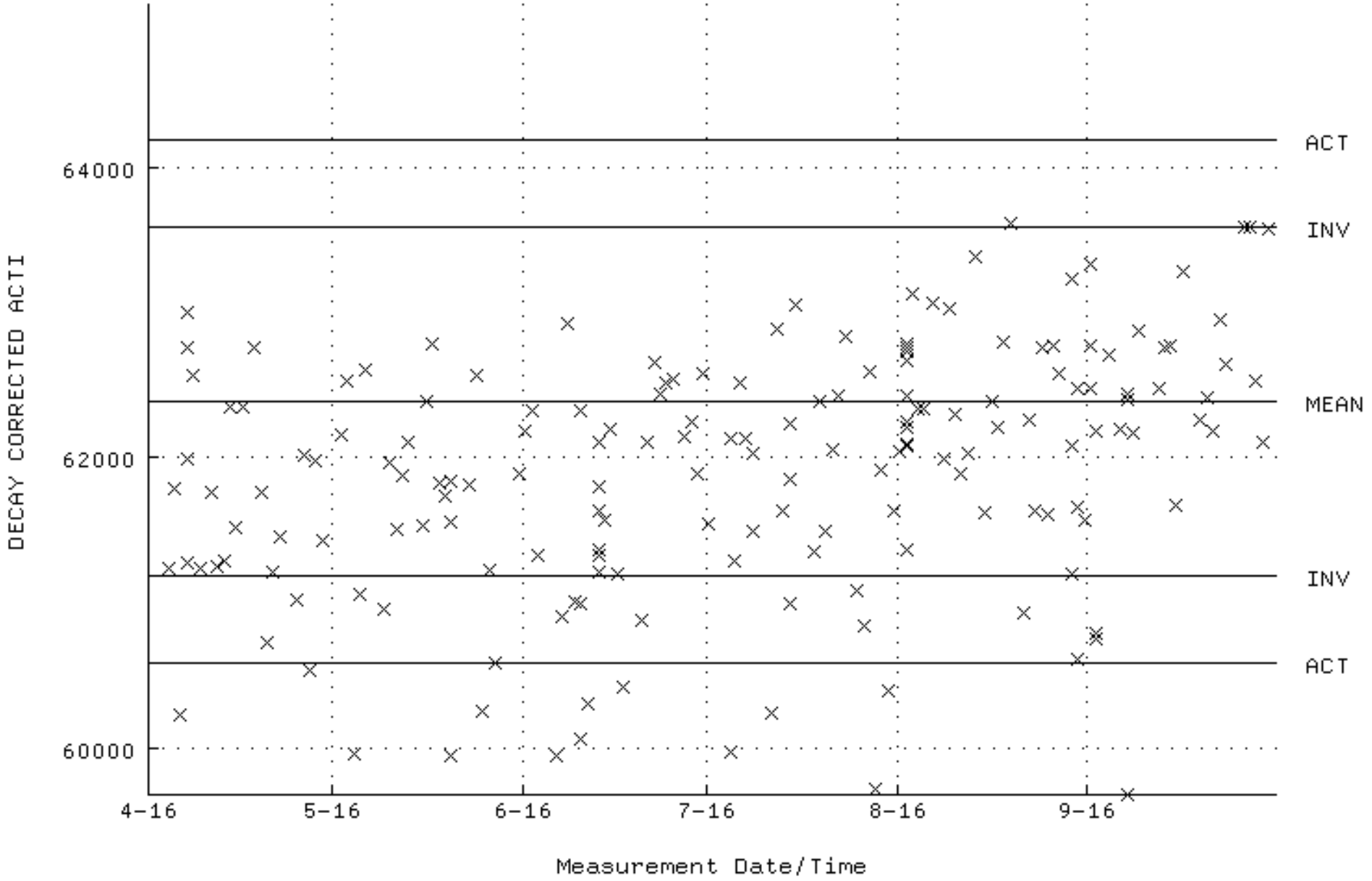
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:39:44 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



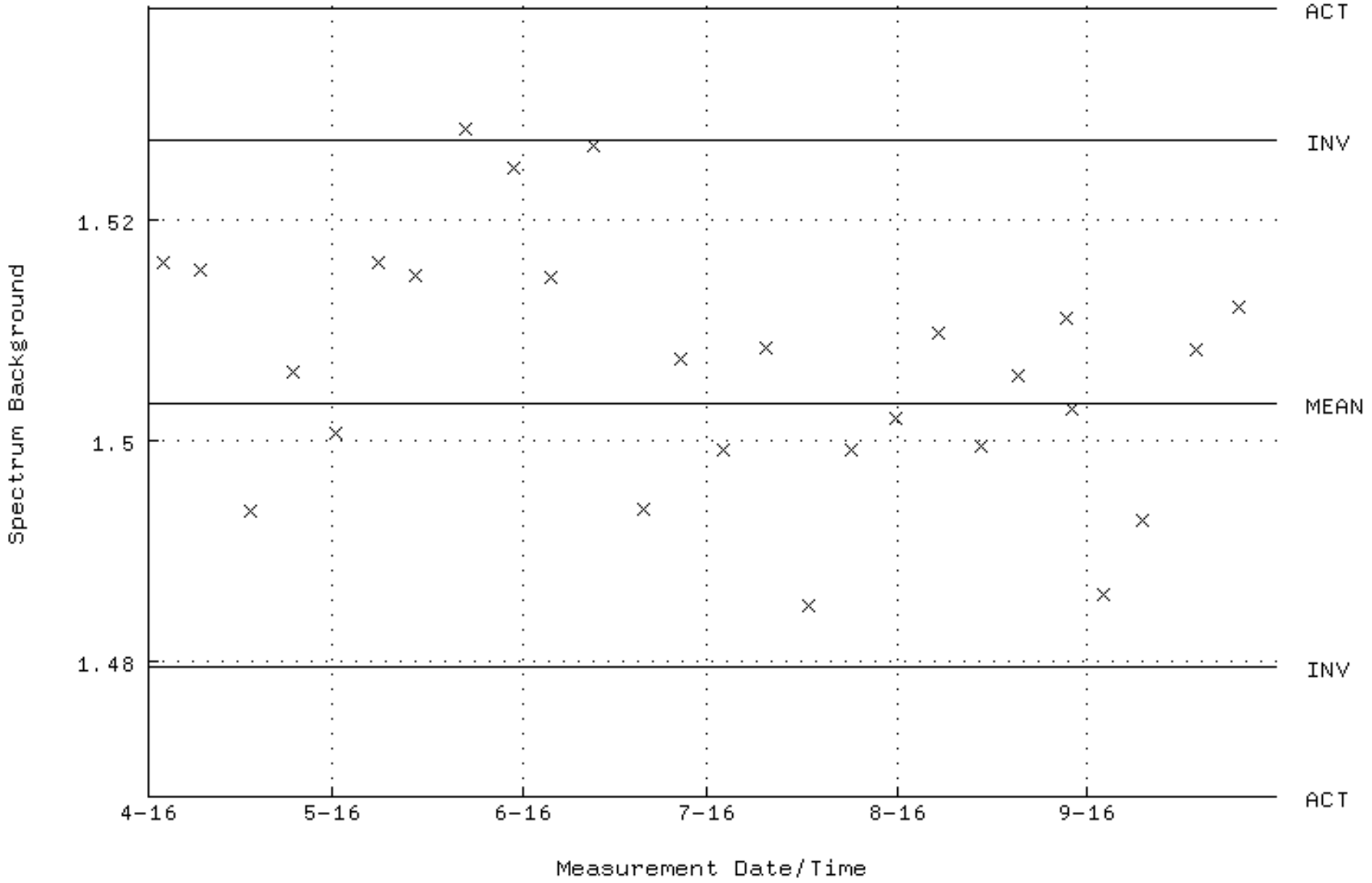
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:39:44 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.980027 +- 6.517756E-02 (6.65 %)



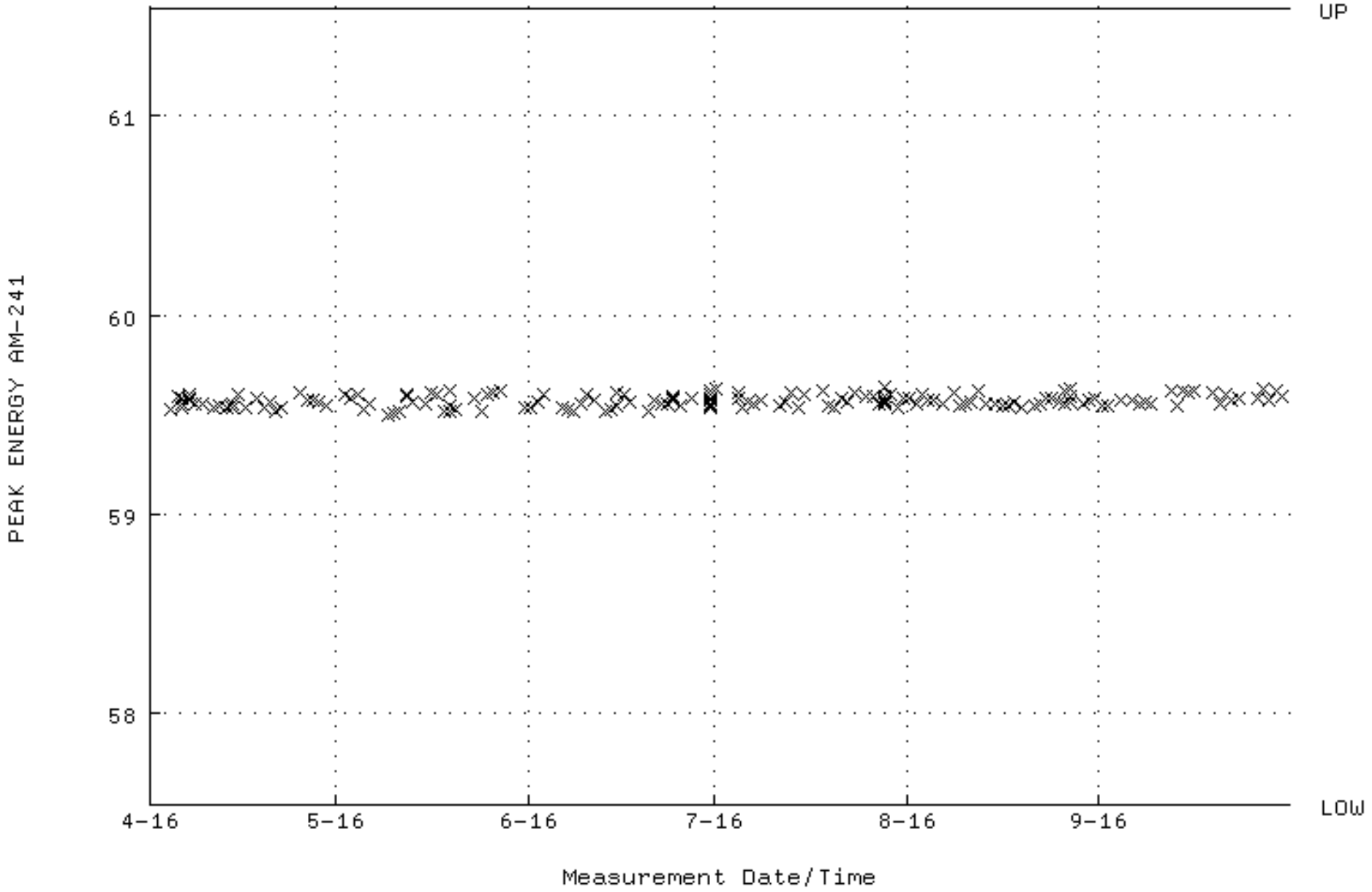
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM25_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:39:44 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 62396.6 +- 604.147 (0.97 %)



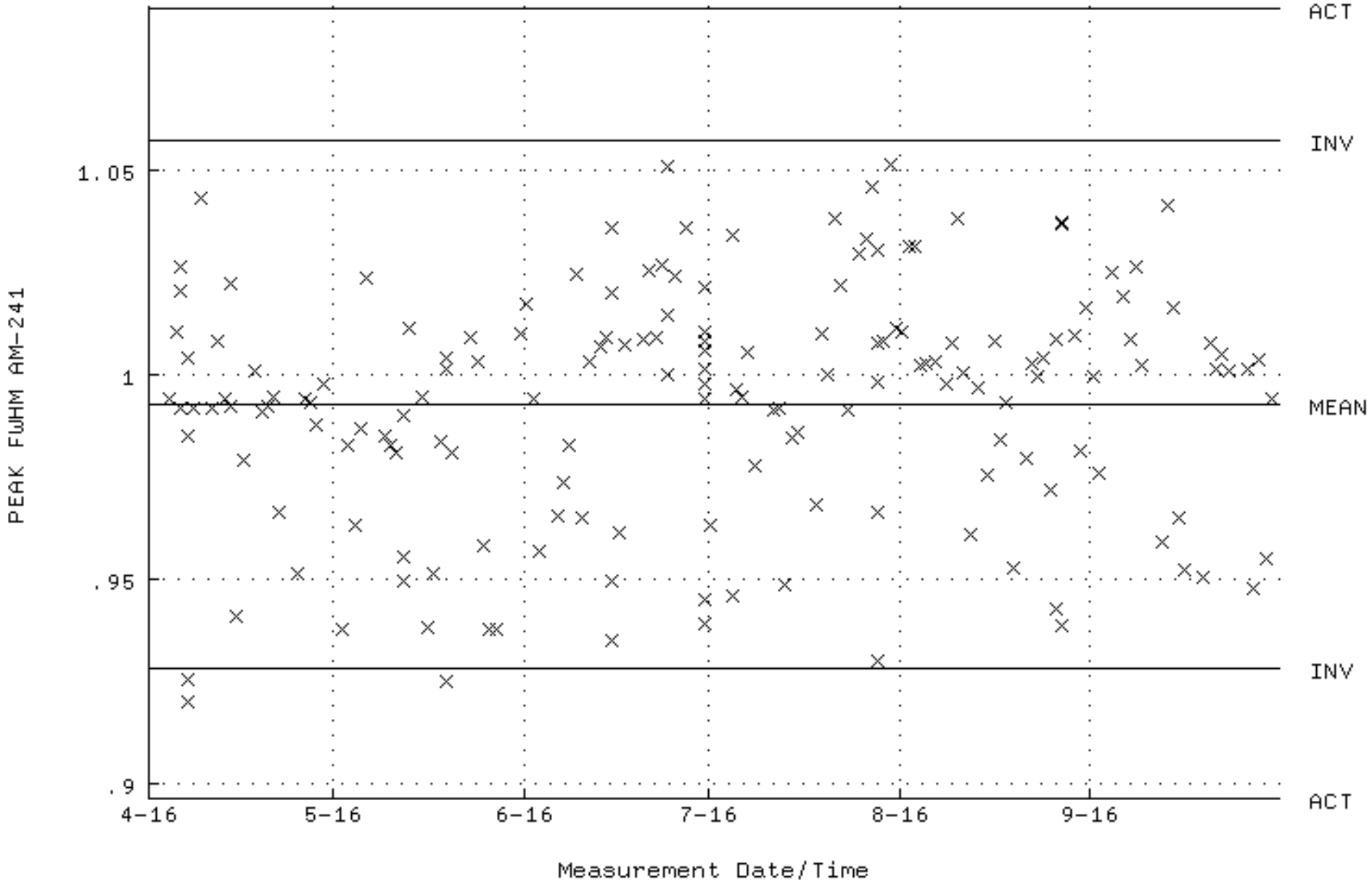
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM25.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:19:27 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.50341 +- 1.187922E-02 (0.79 %)



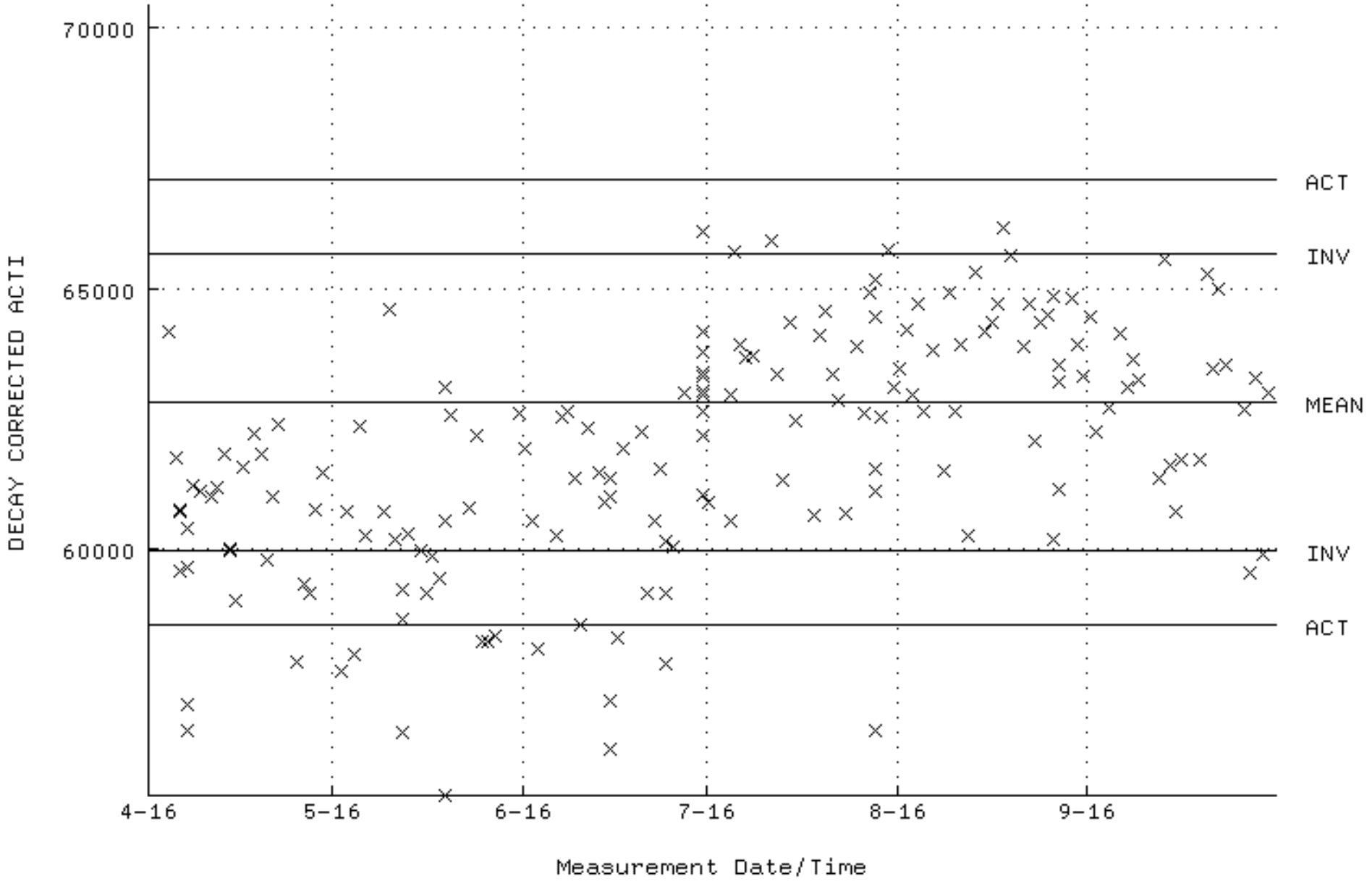
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:13:57 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



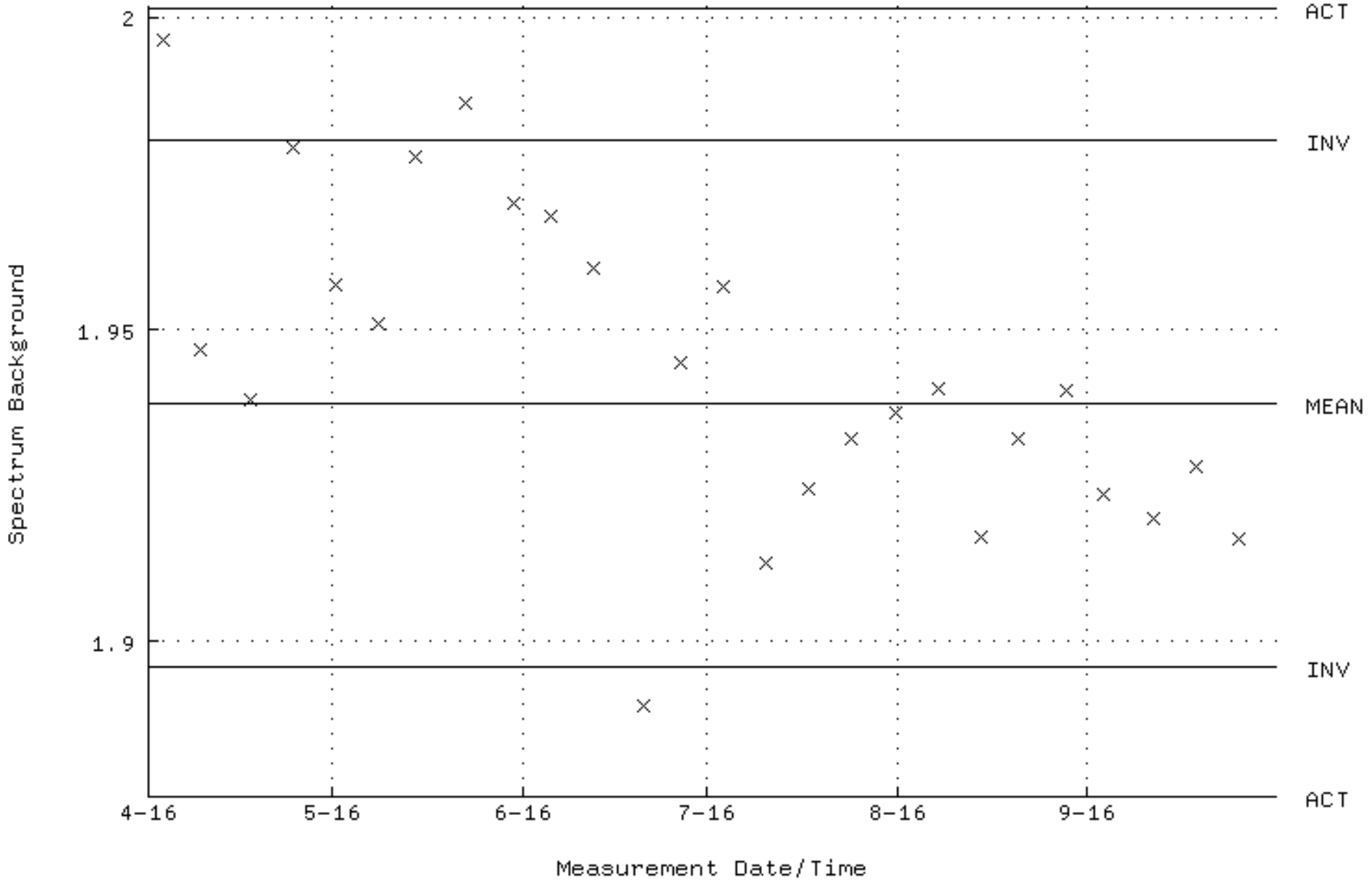
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:13:57 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.992983 +- 3.213267E-02 (3.24 %)



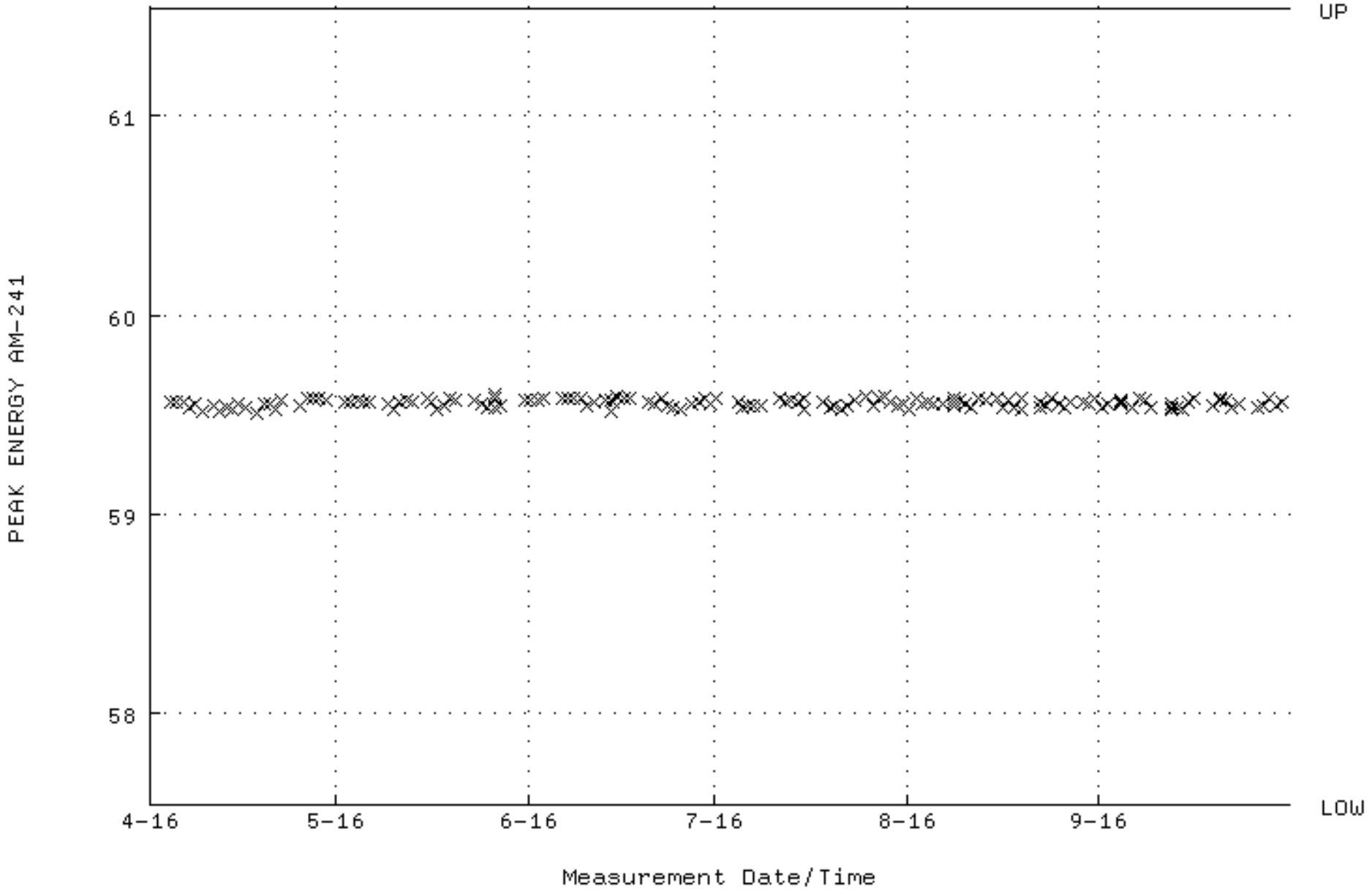
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM29_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:13:57 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 62841.9 +- 1422.21 (2.26 %)



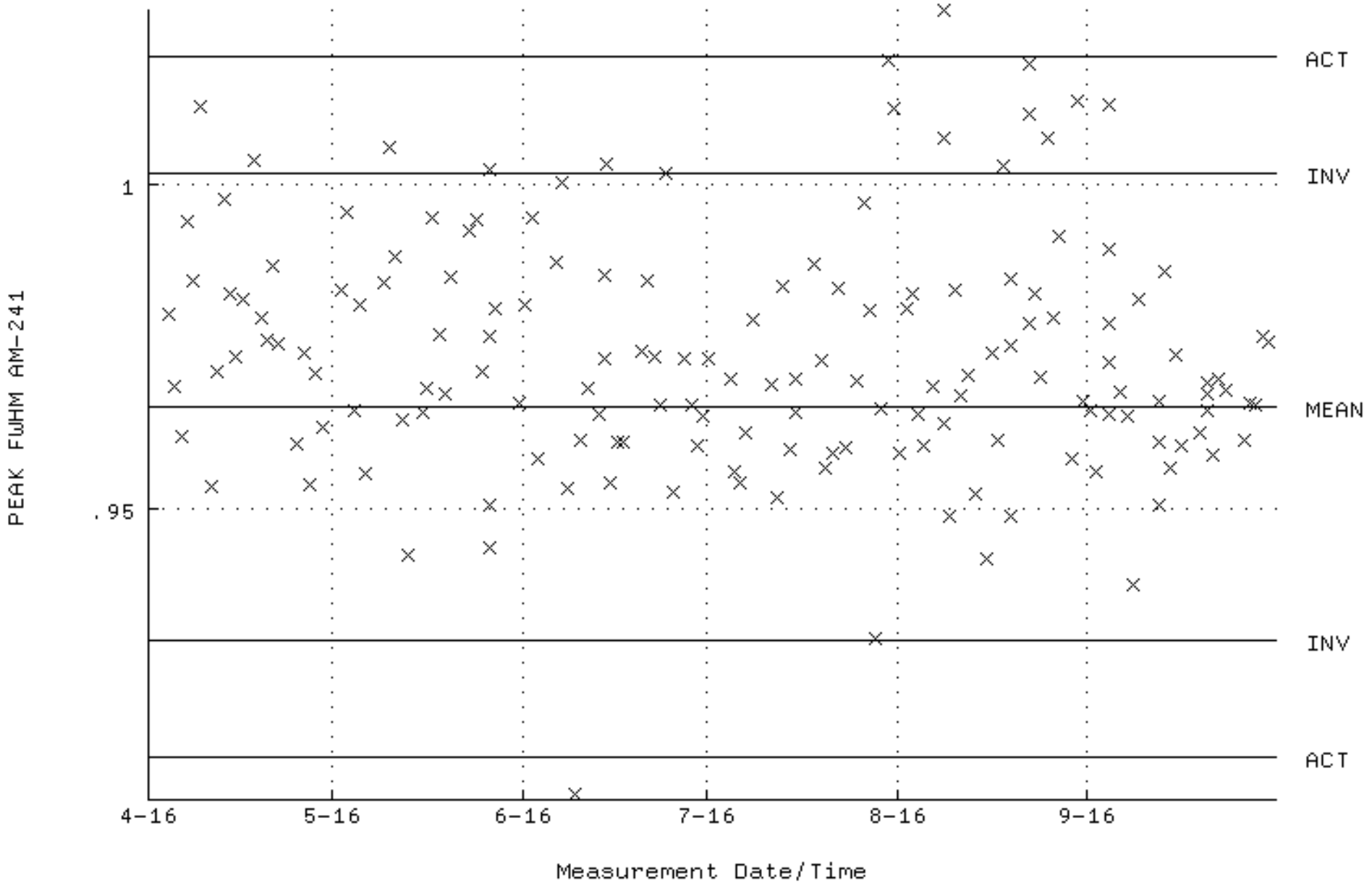
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM29.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:19:43 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.93820 +- 2.105615E-02 (1.09 %)



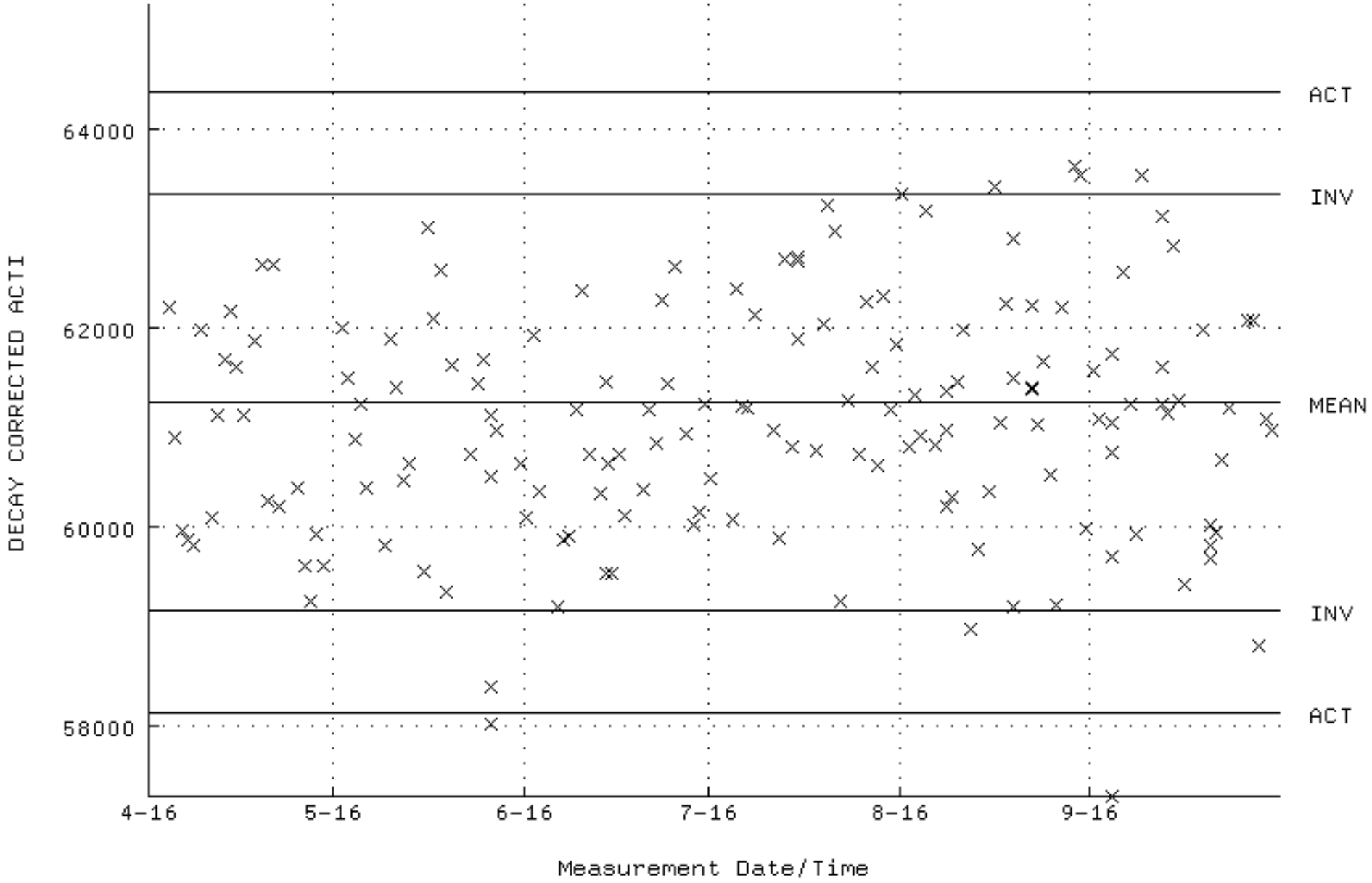
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:14:02 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



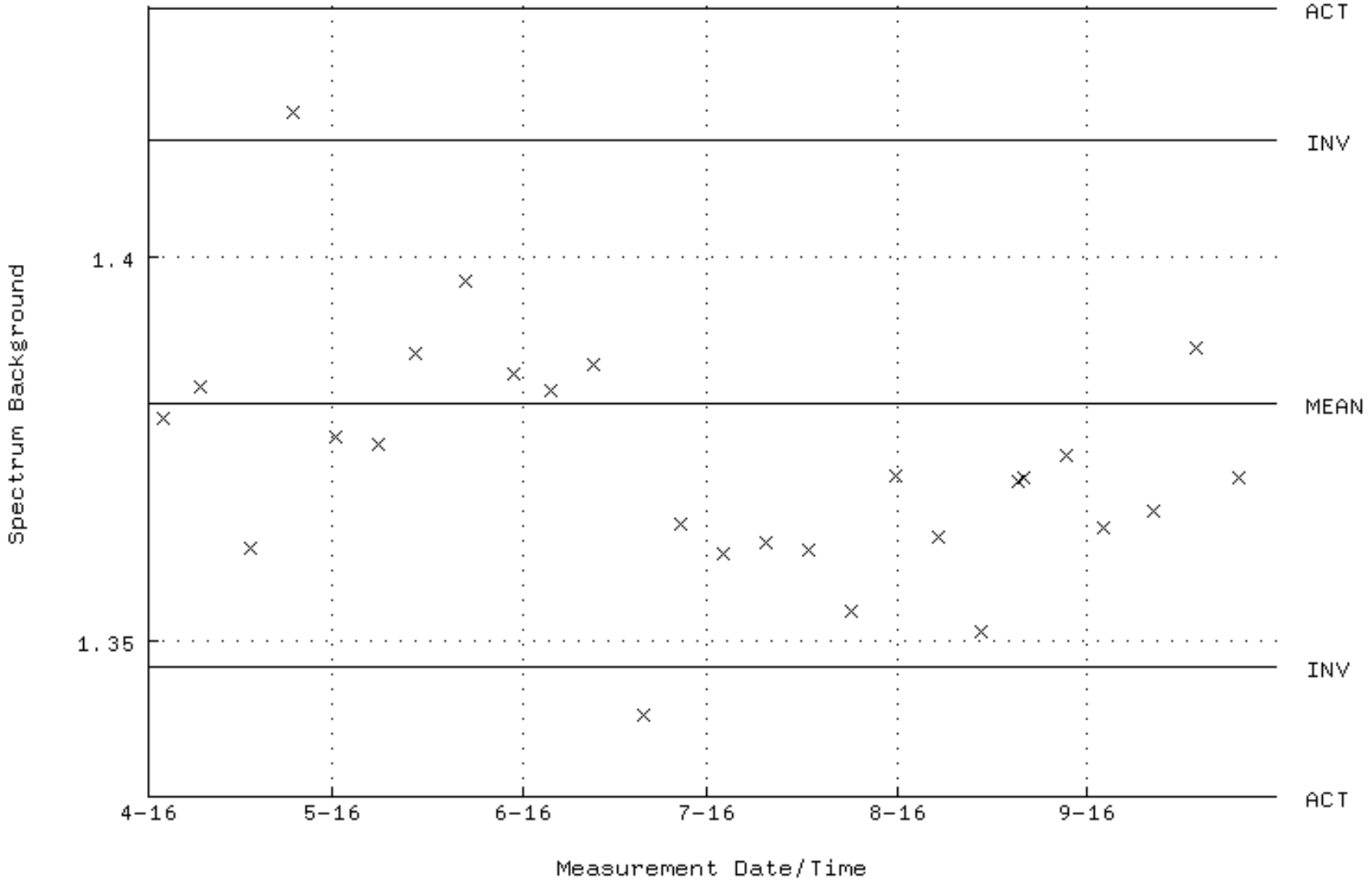
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:14:02 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.965876 +- 1.796214E-02 (1.86 %)



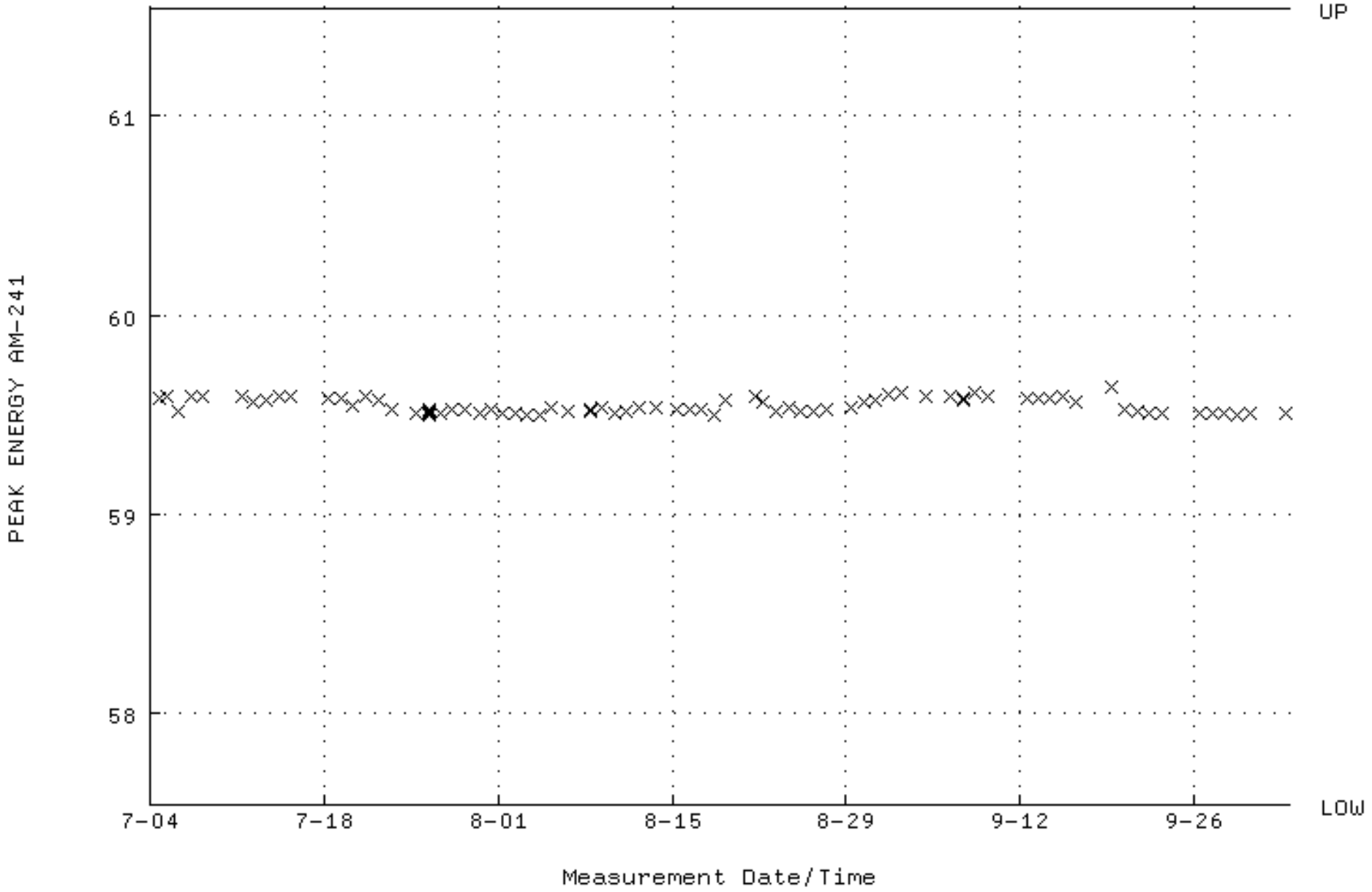
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM30_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:14:02 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 61266.4 +- 1042.70 (1.70 %)



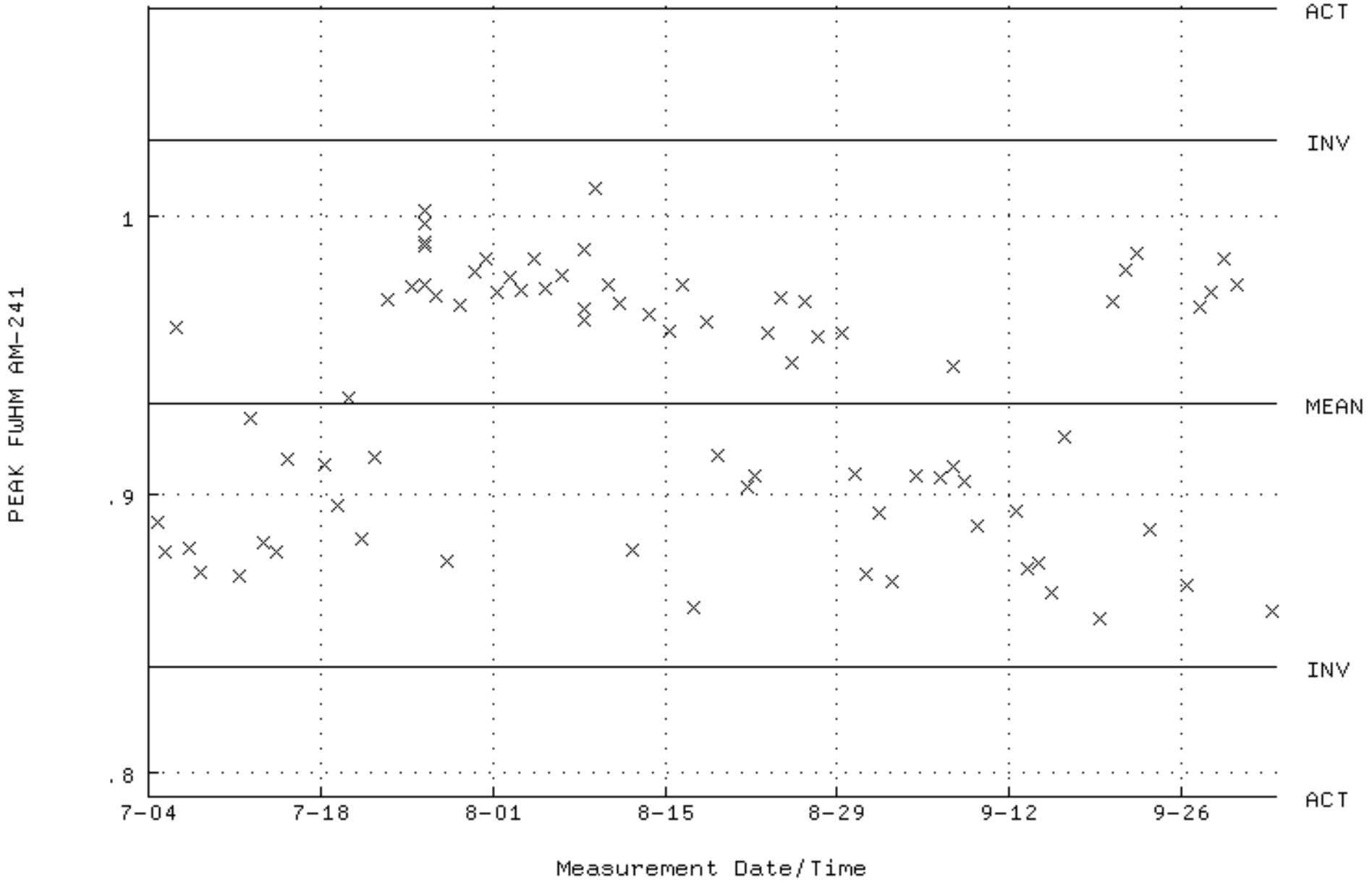
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM30.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:19:48 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.38100 +- 1.713672E-02 (1.24 %)



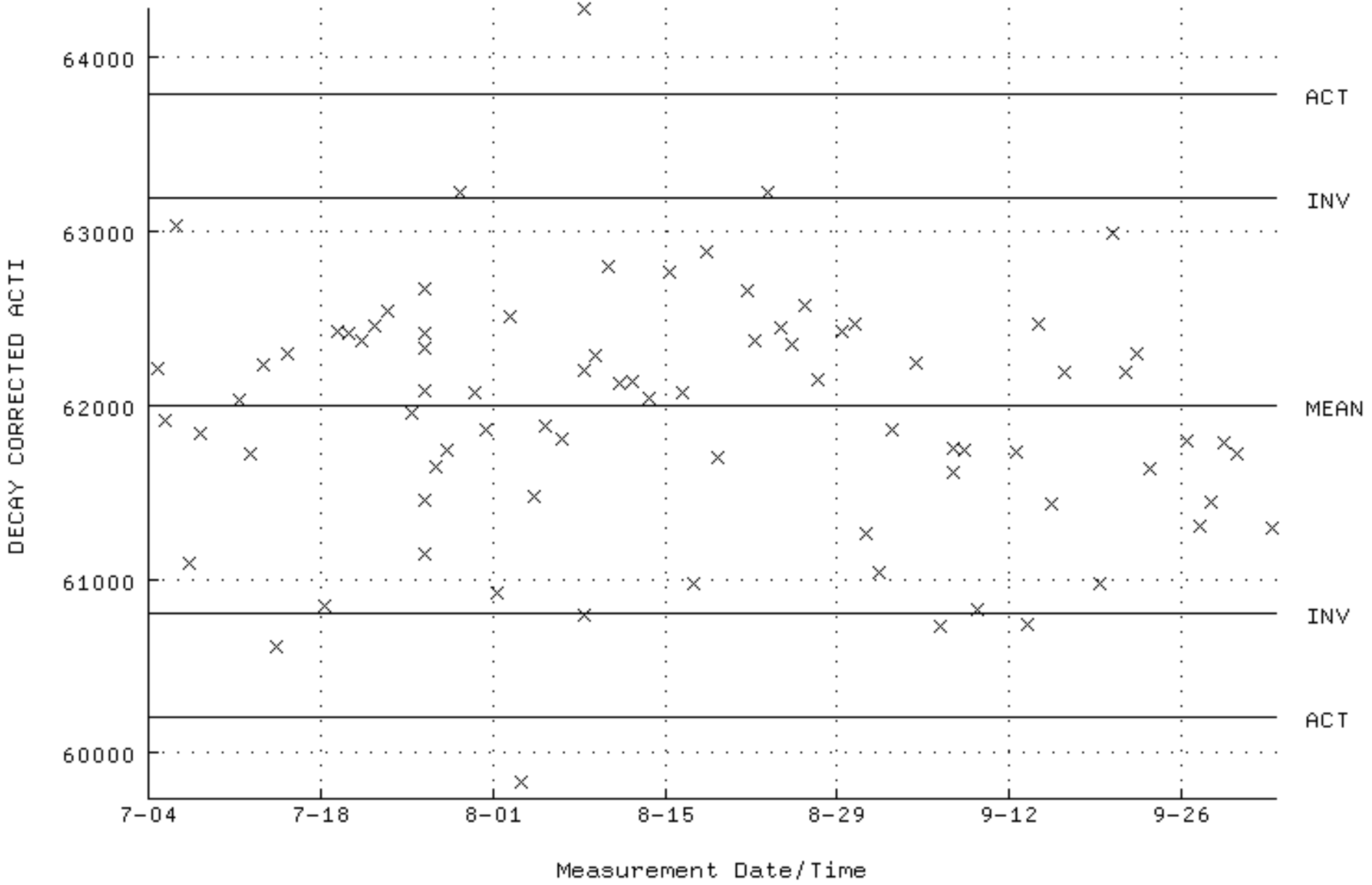
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-JUL-2016 18:05:12 through 3-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



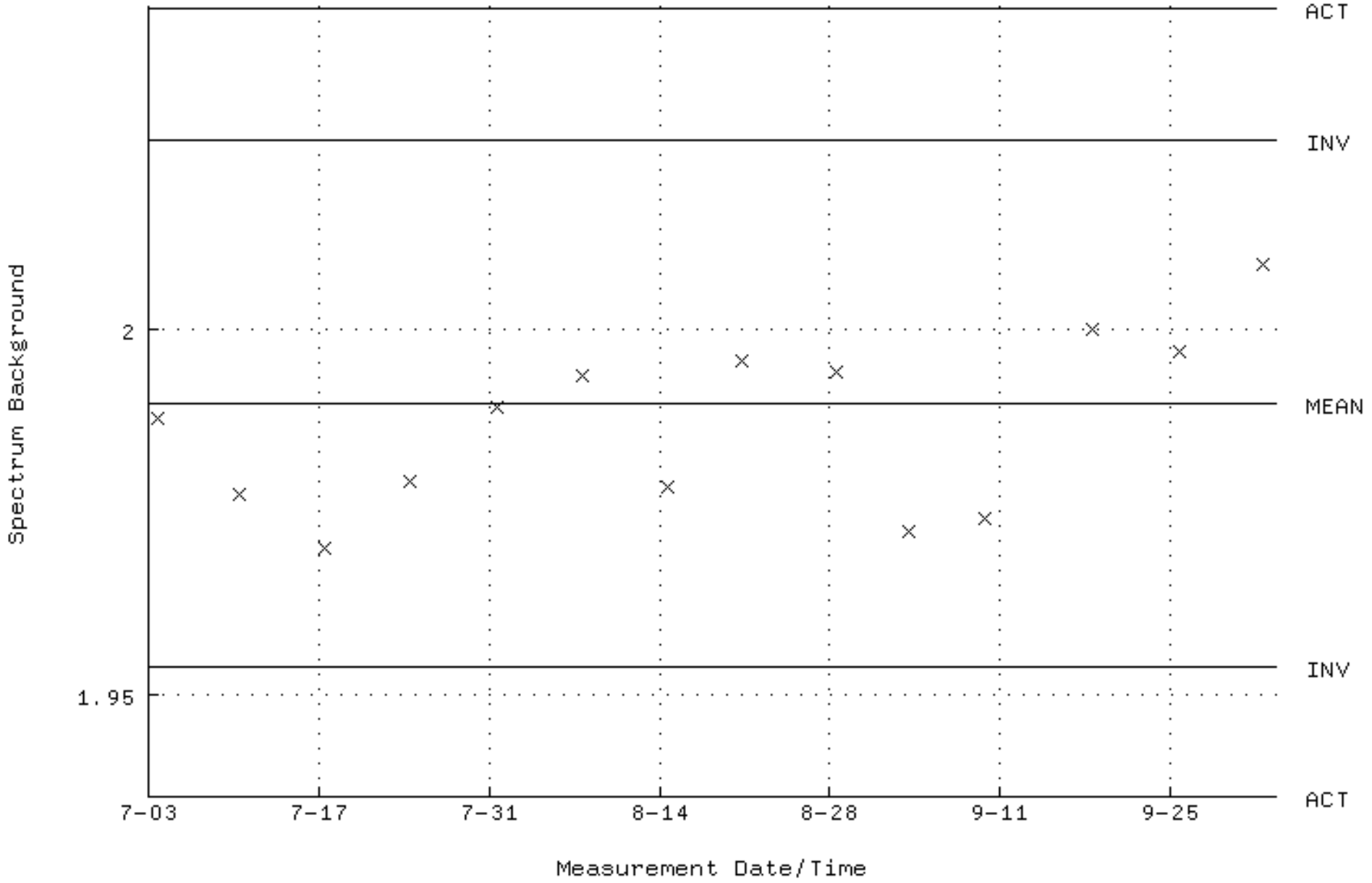
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-JUL-2016 18:05:12 through 3-OCT-2016 12:00:00
Mean +- Std Dev : 0.933242 +- 4.723132E-02 (5.06 %)



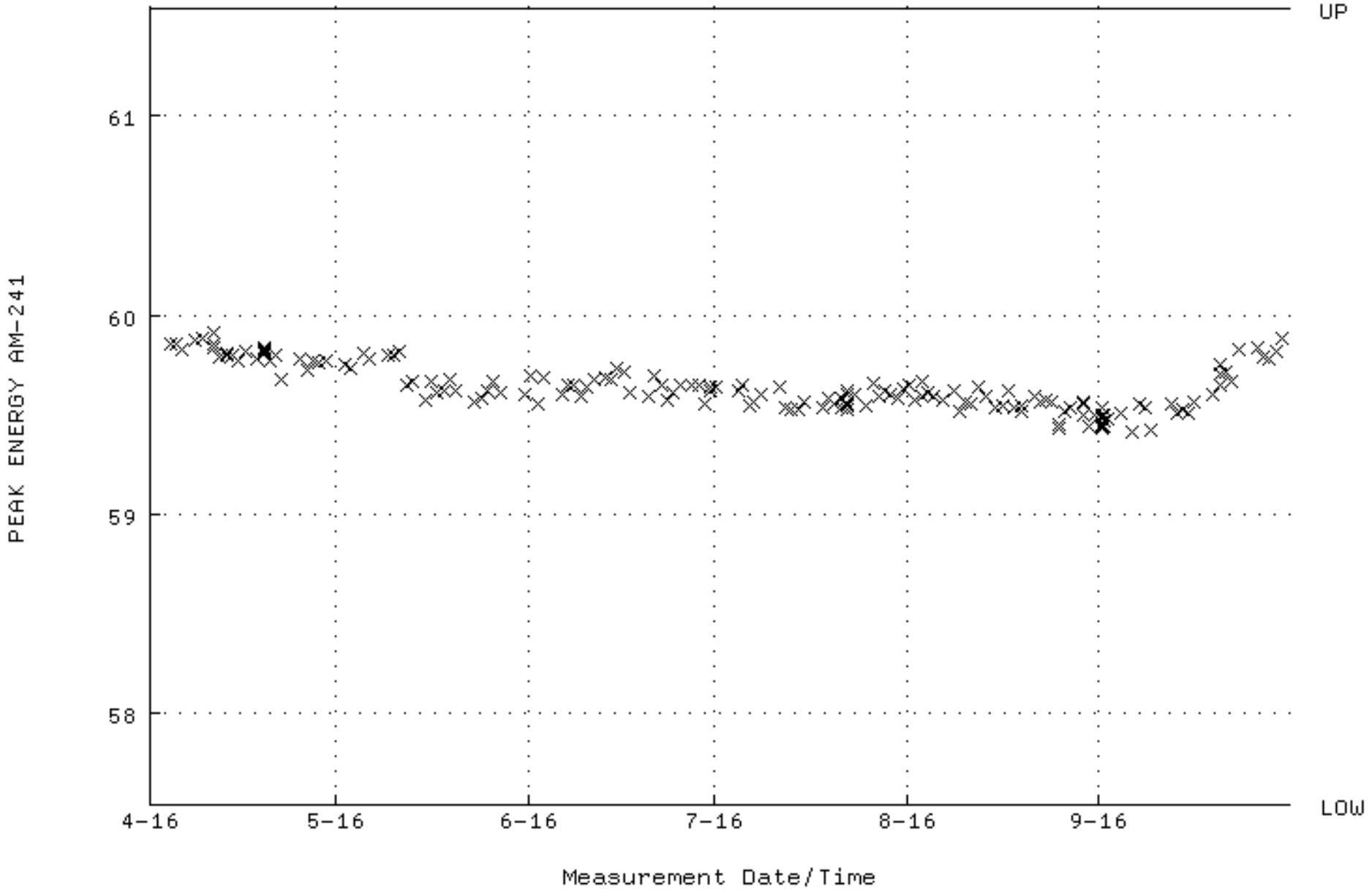
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM31_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-JUL-2016 18:05:12 through 3-OCT-2016 12:00:00
Mean +- Std Dev : 62002.8 +- 596.550 (0.96 %)



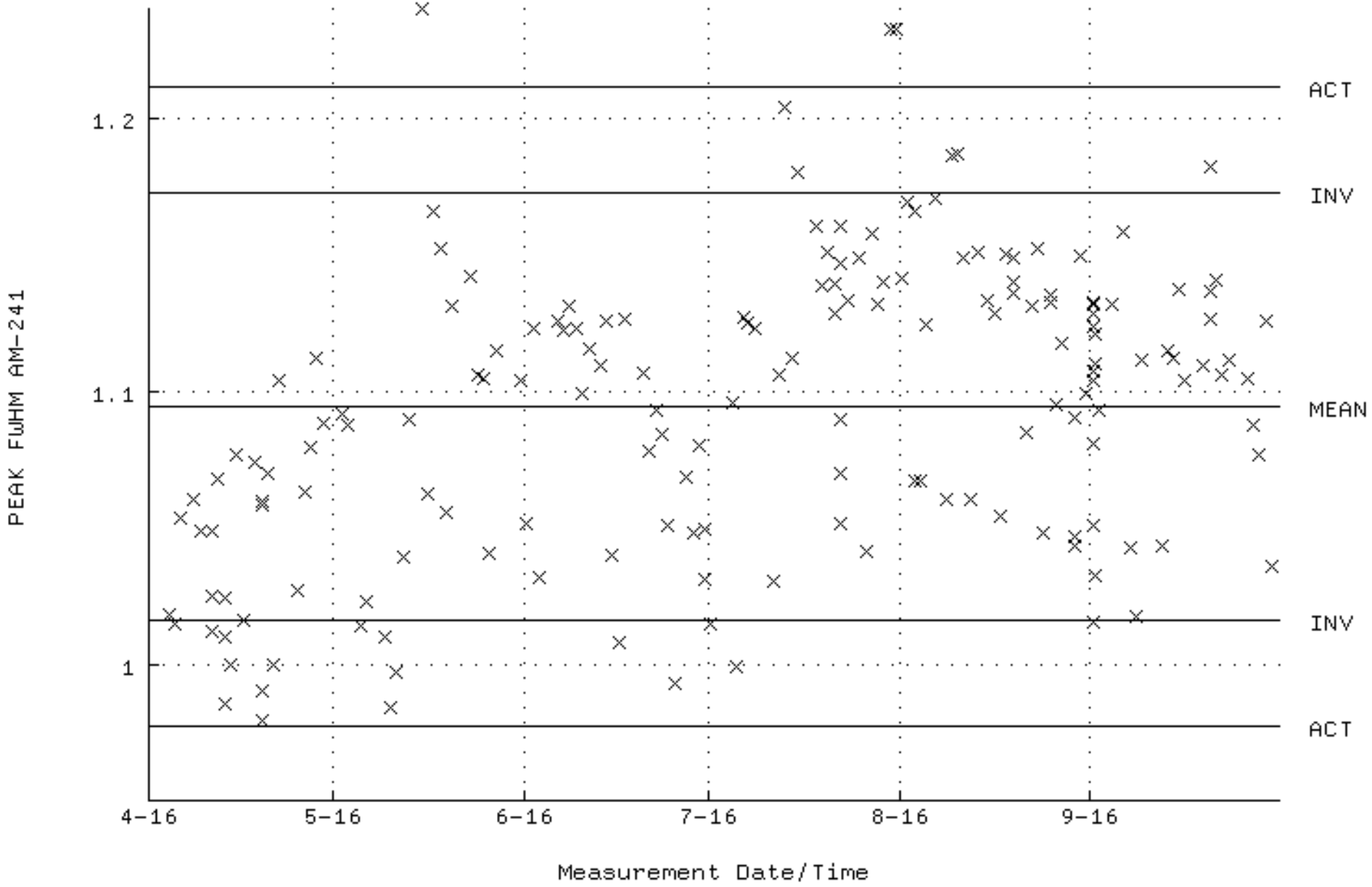
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM31.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-JUL-2016 16:51:20 through 3-OCT-2016 12:00:00
Mean +- Std Dev : 1.98998 +- 1.794291E-02 (0.90 %)



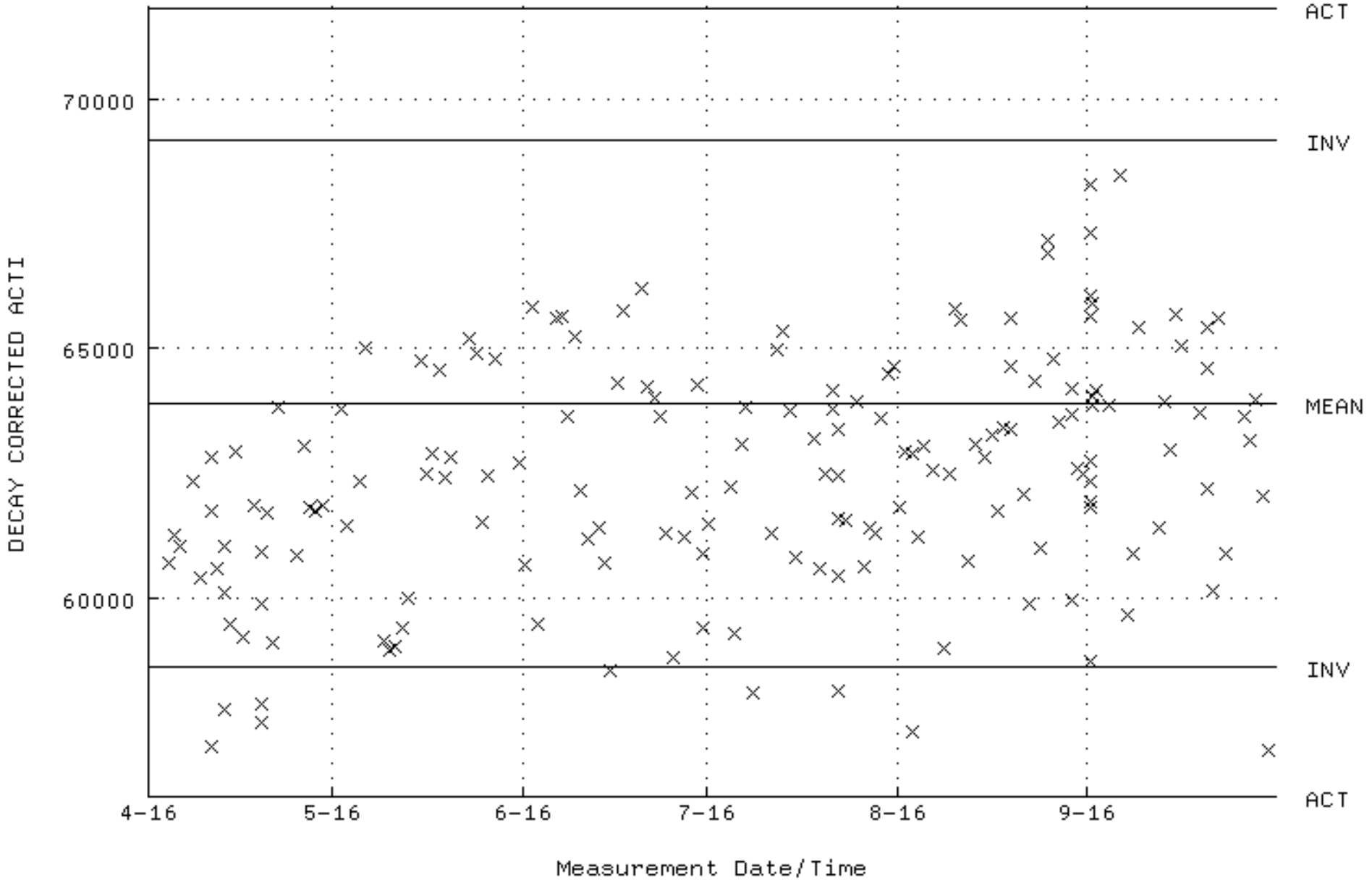
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:14:08 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



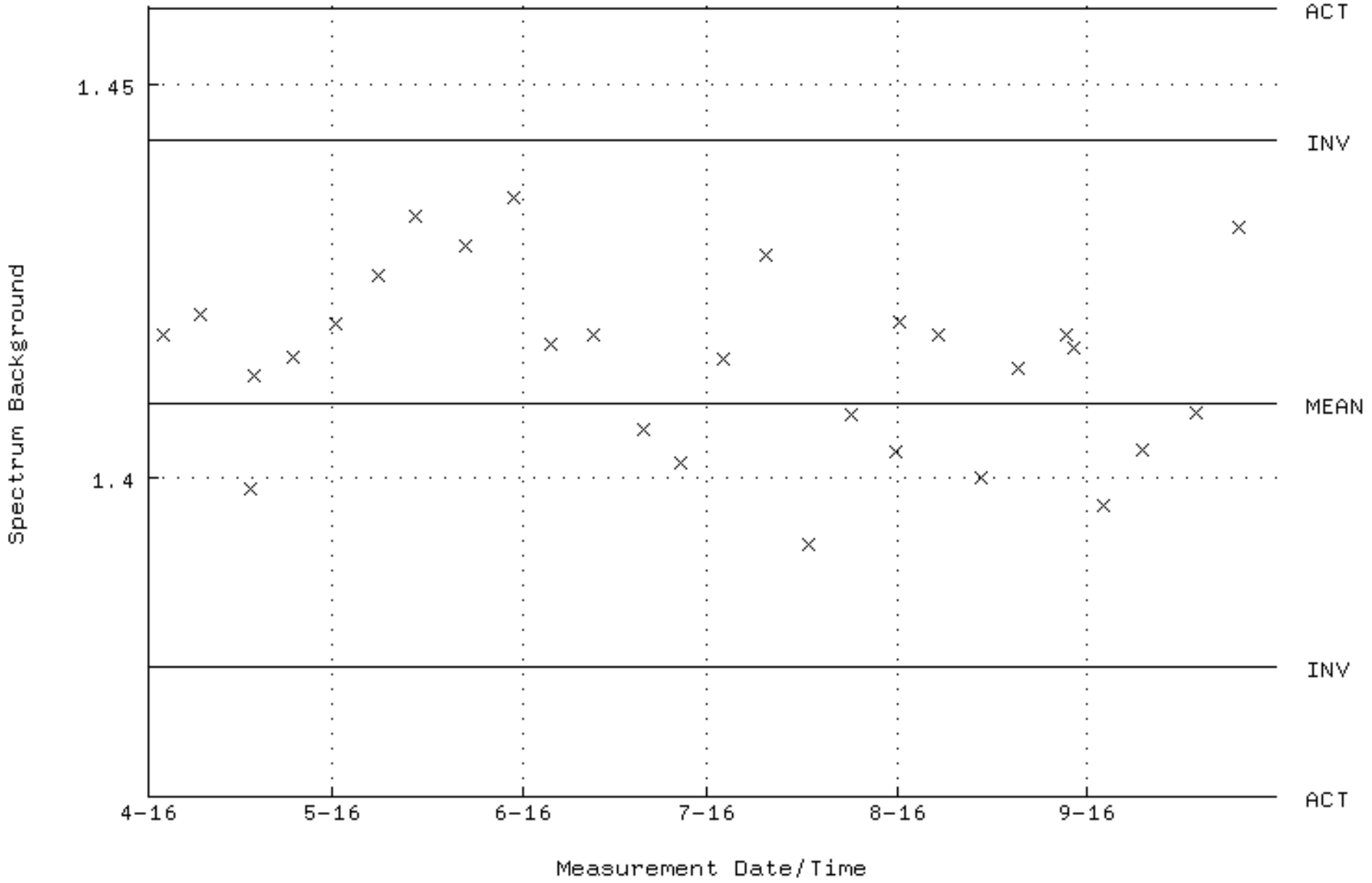
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:14:08 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.09494 +- 3.883722E-02 (3.55 %)



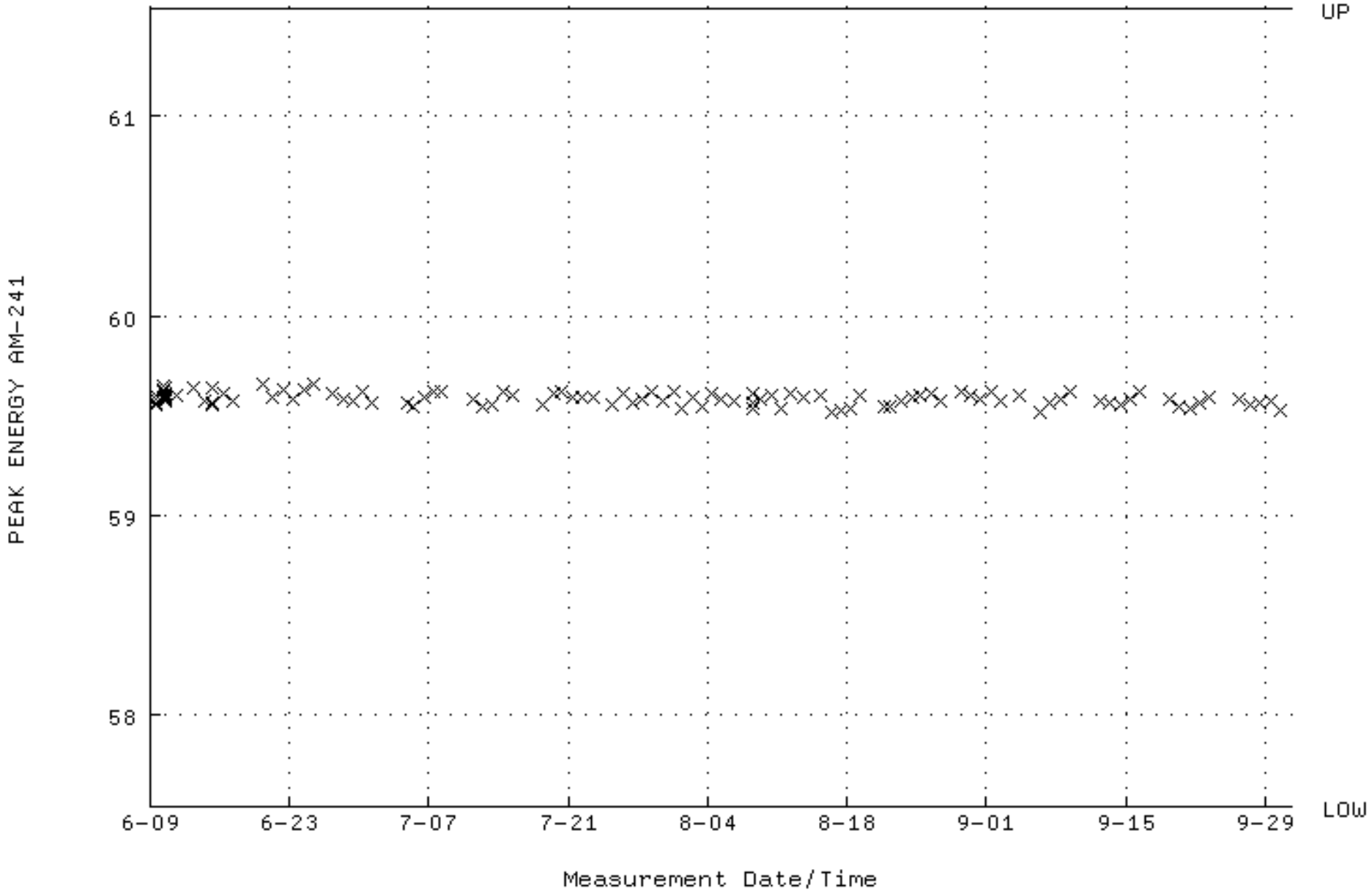
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM32_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:14:08 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 63906.6 +- 2634.05 (4.12 %)



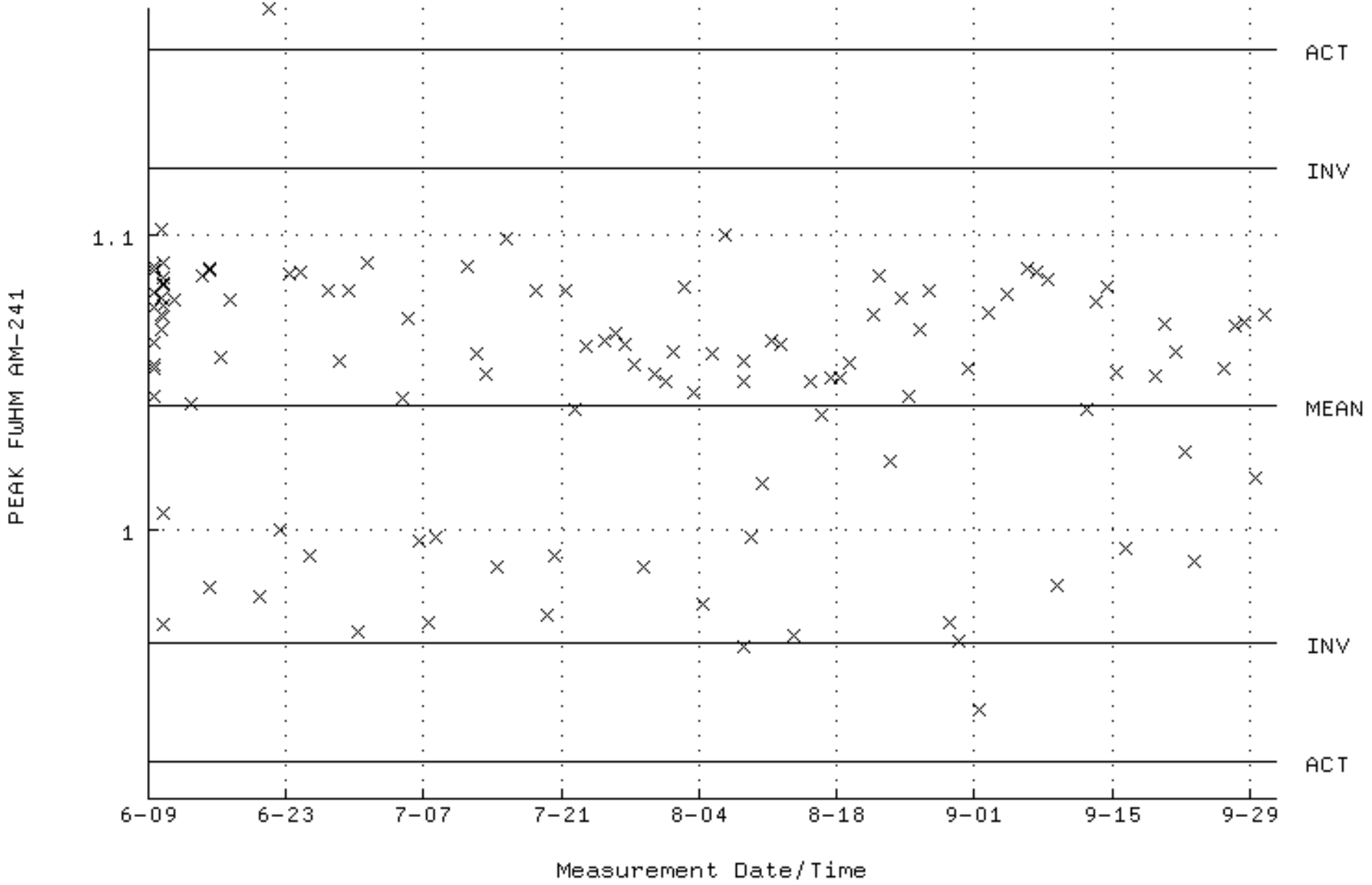
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM32.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:19:59 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.40960 +- 1.667514E-02 (1.18 %)



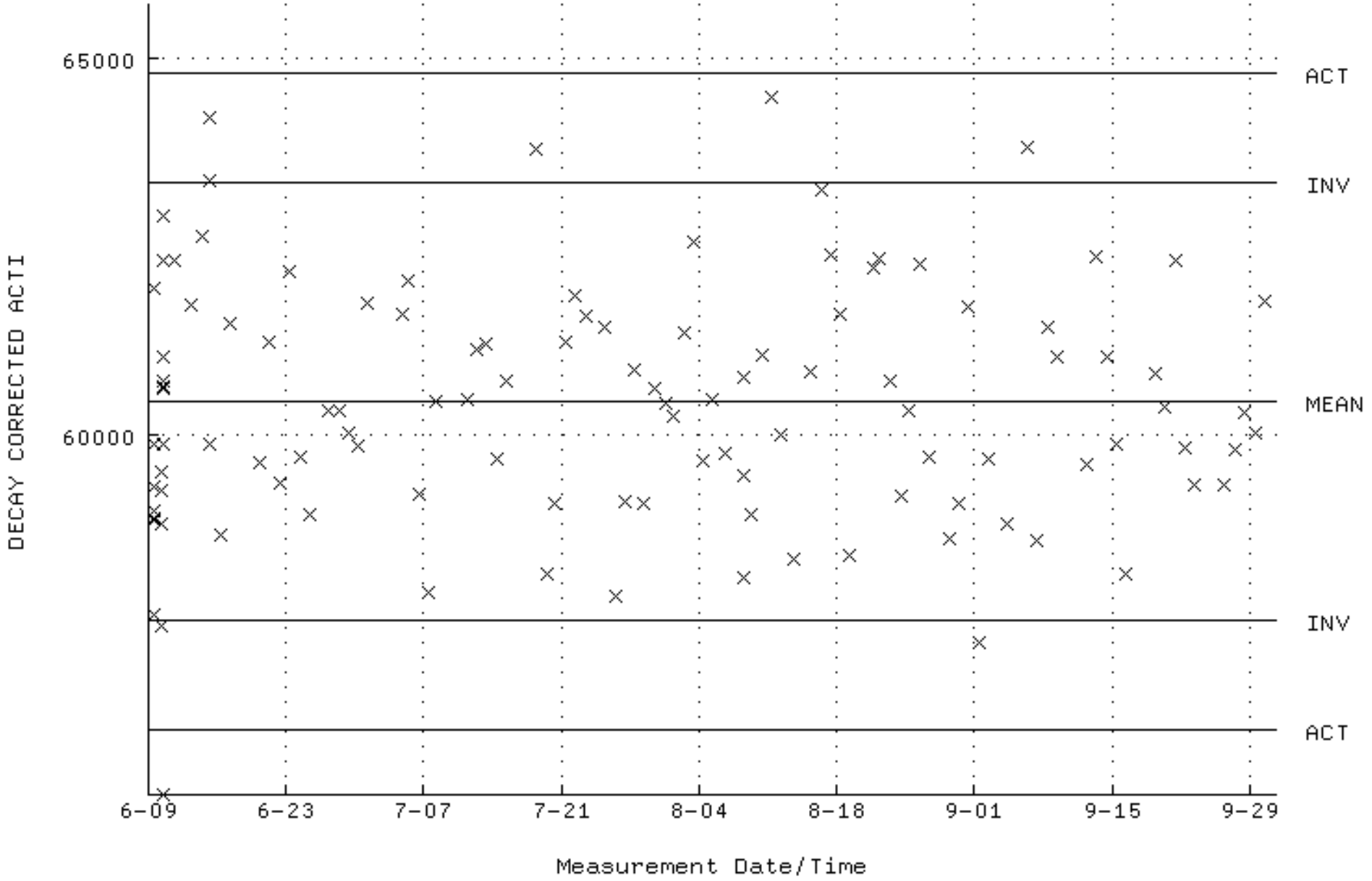
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 9-JUN-2016 11:42:11 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



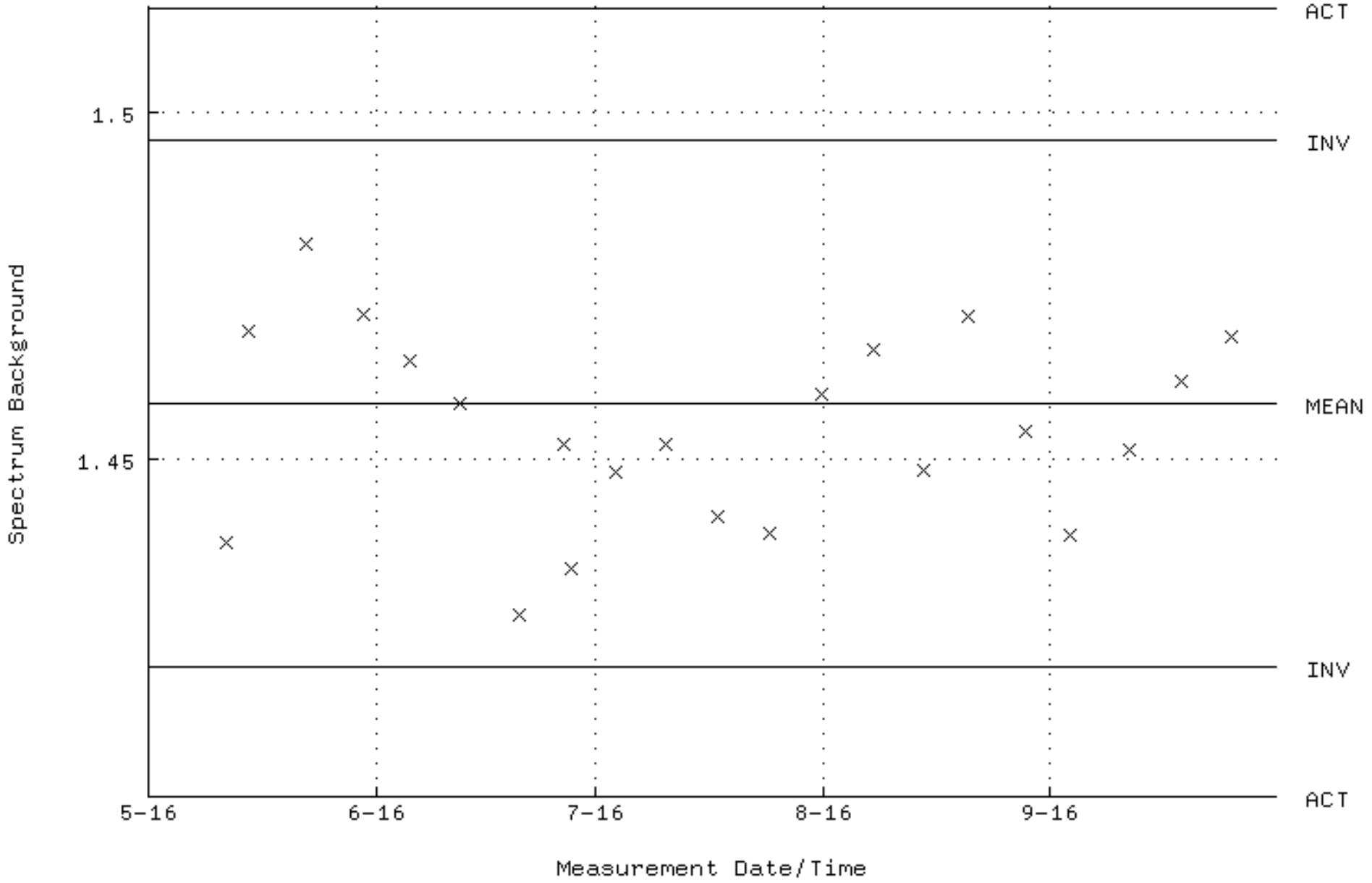
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 9-JUN-2016 11:42:11 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.04259 +- 4.028326E-02 (3.86 %)



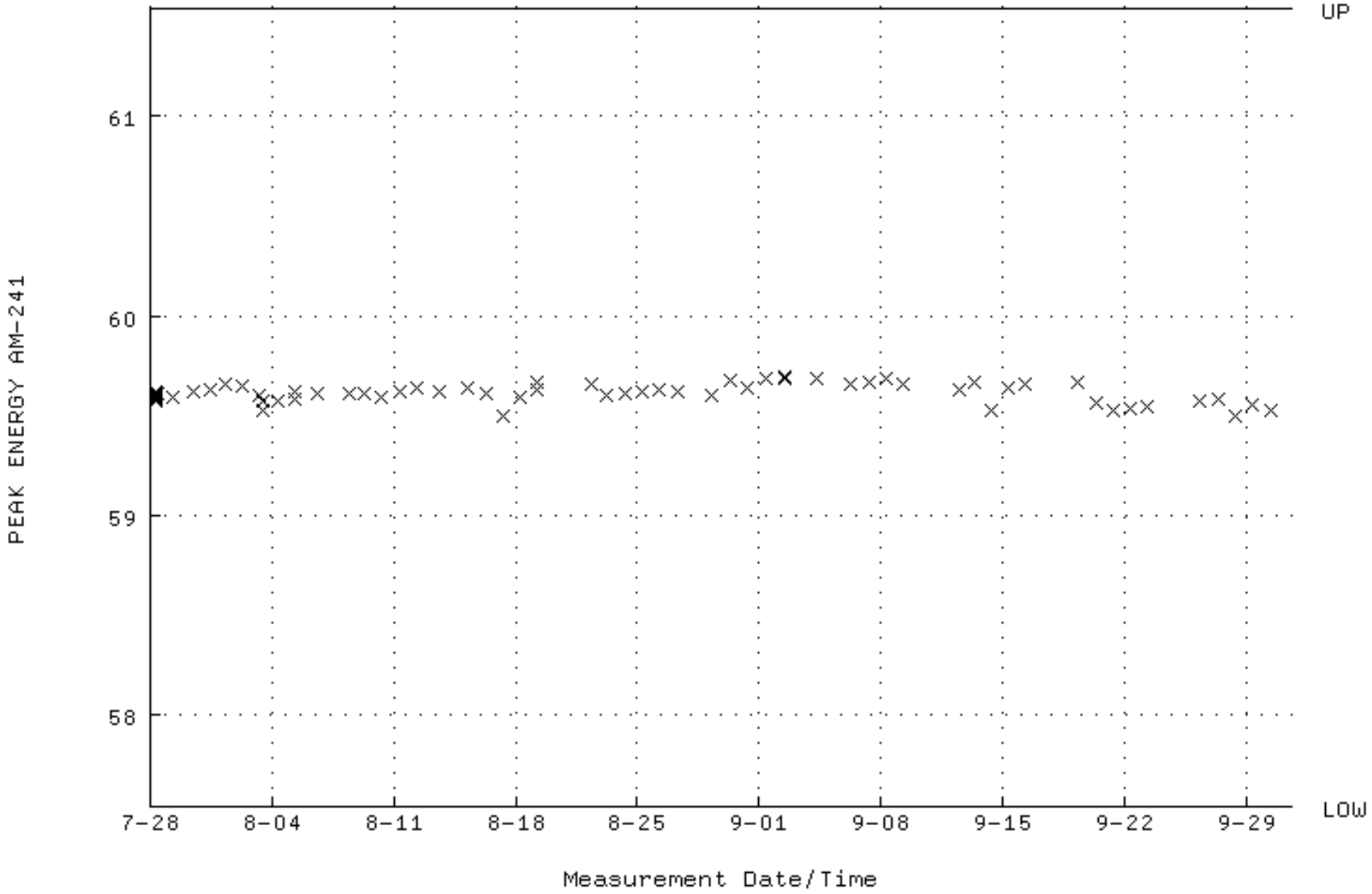
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM33_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 9-JUN-2016 11:42:11 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 60458.0 +- 1456.56 (2.41 %)



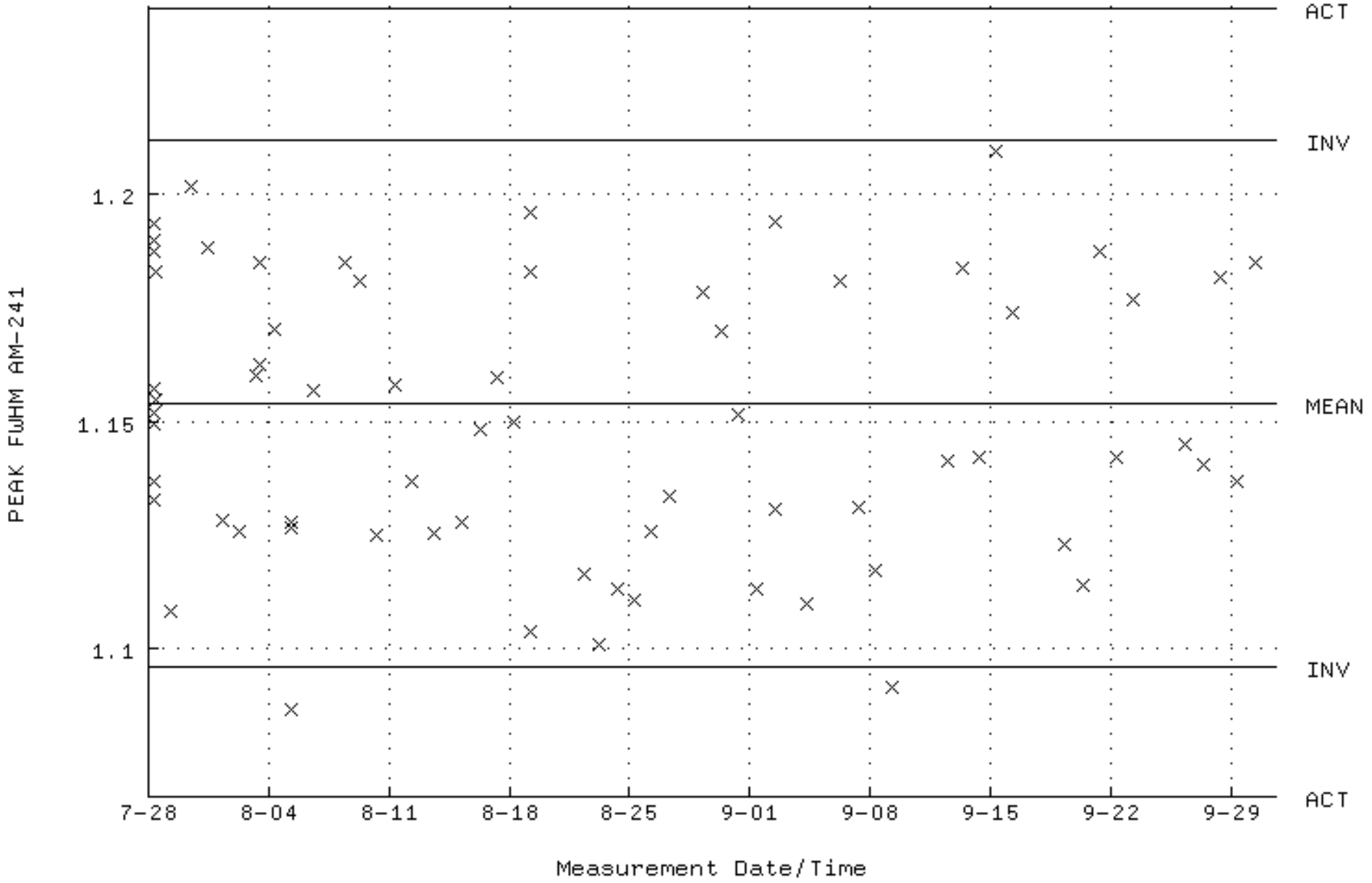
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM33.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 11-MAY-2016 13:17:48 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.45809 +- 1.896396E-02 (1.30 %)



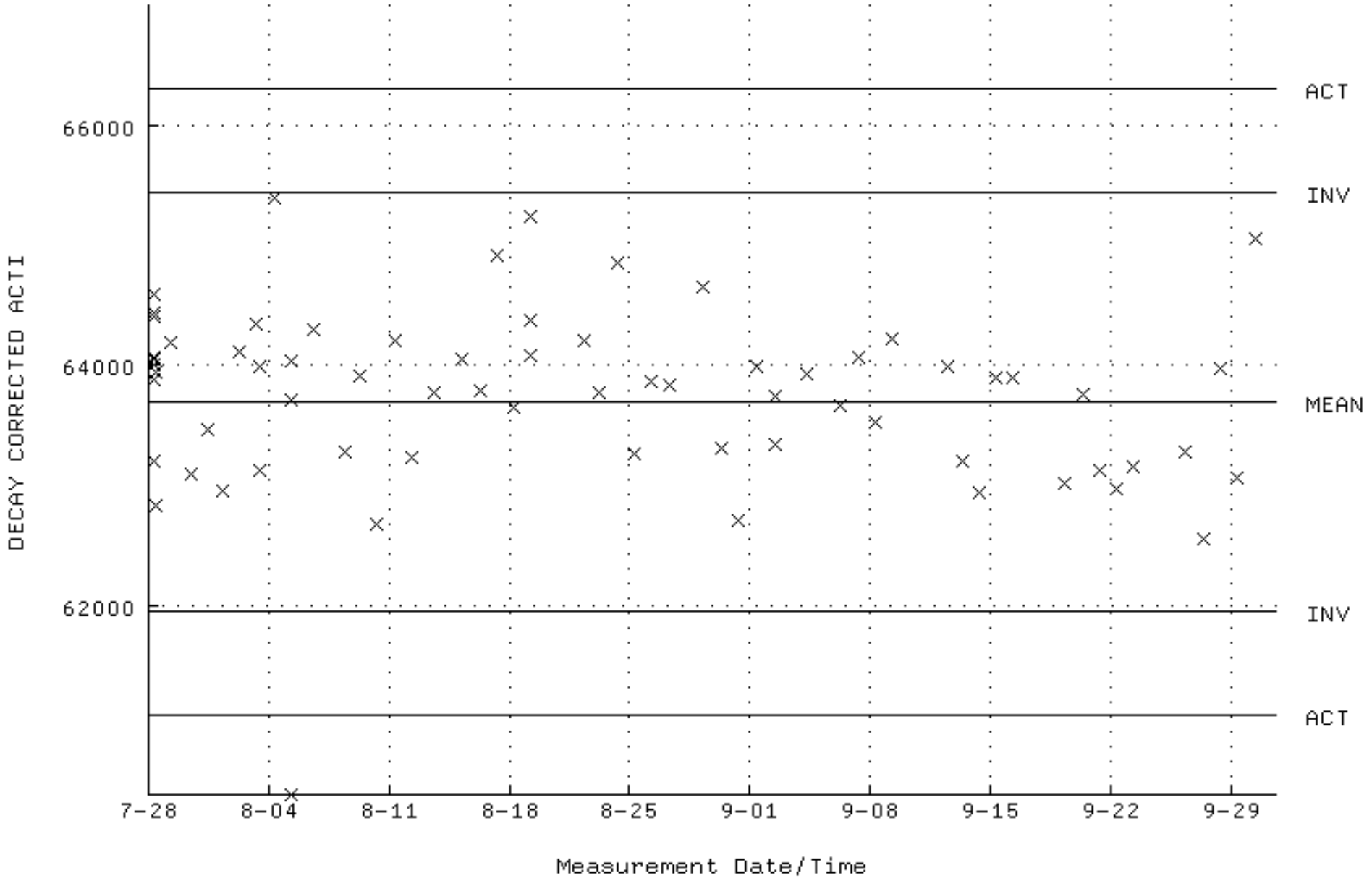
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM39_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 28-JUL-2016 07:23:30 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



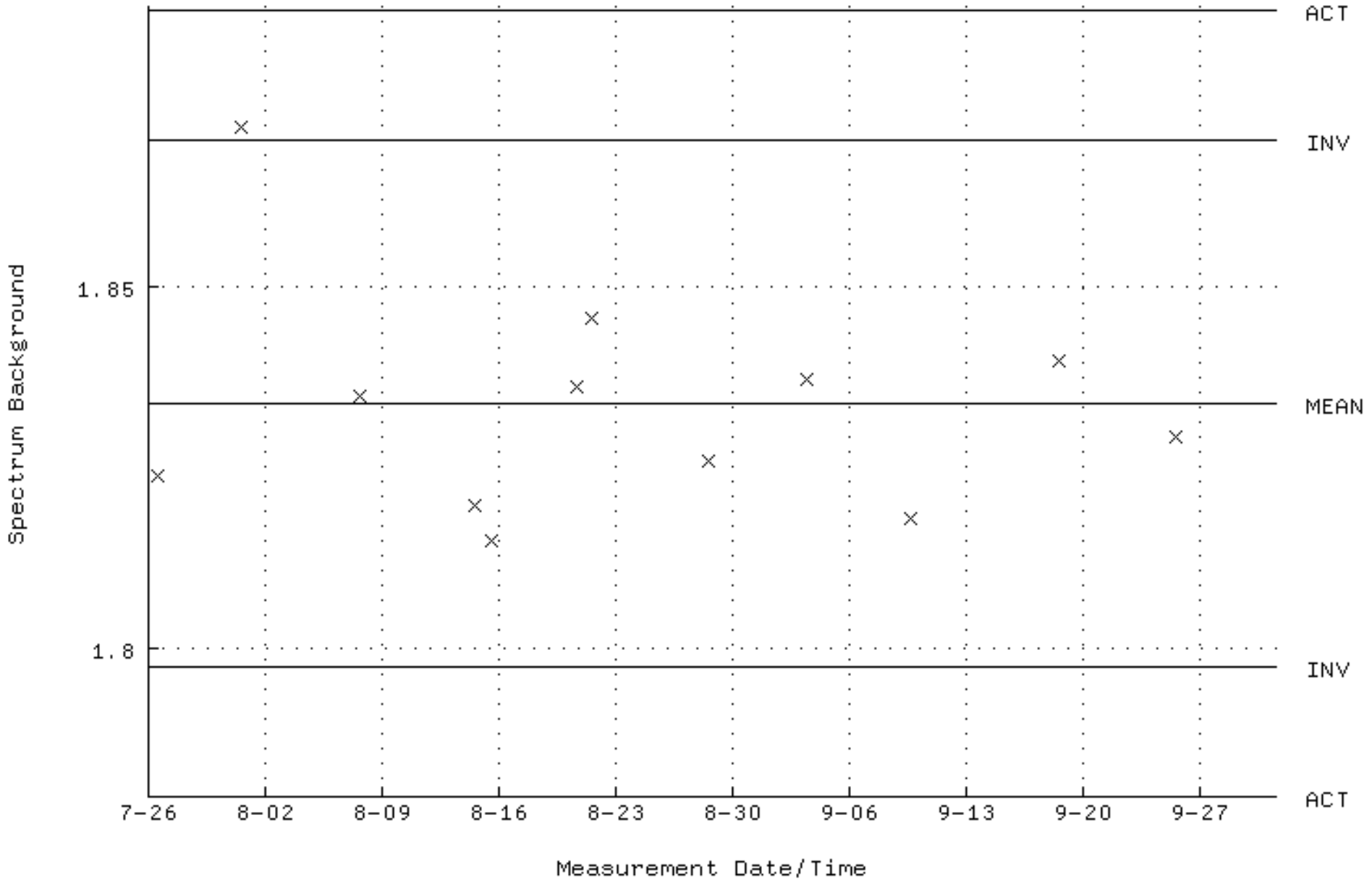
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM39_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 28-JUL-2016 07:23:30 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.15408 +- 2.882958E-02 (2.50 %)



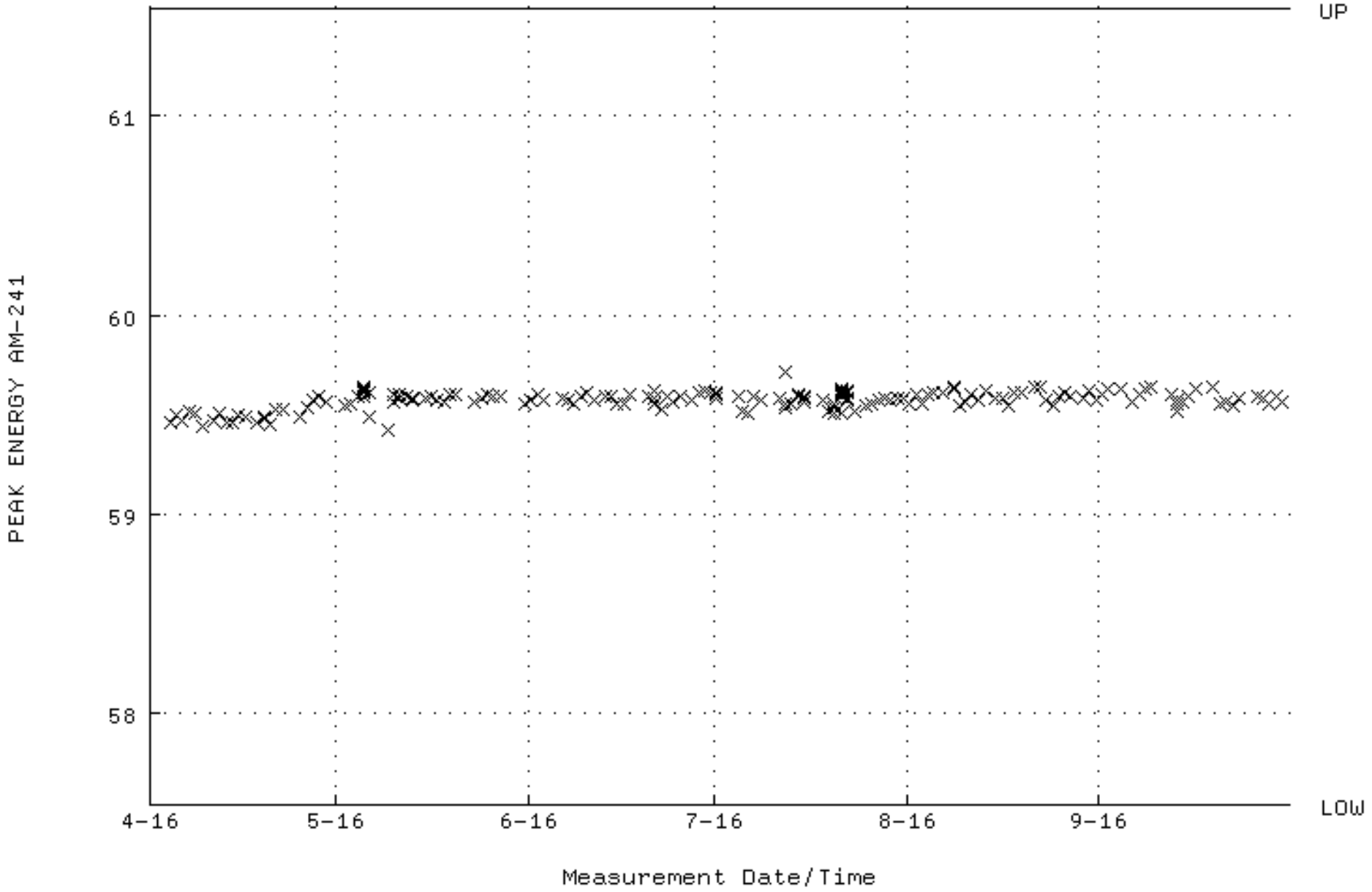
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM39_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 28-JUL-2016 07:23:30 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 63705.5 +- 872.341 (1.37 %)



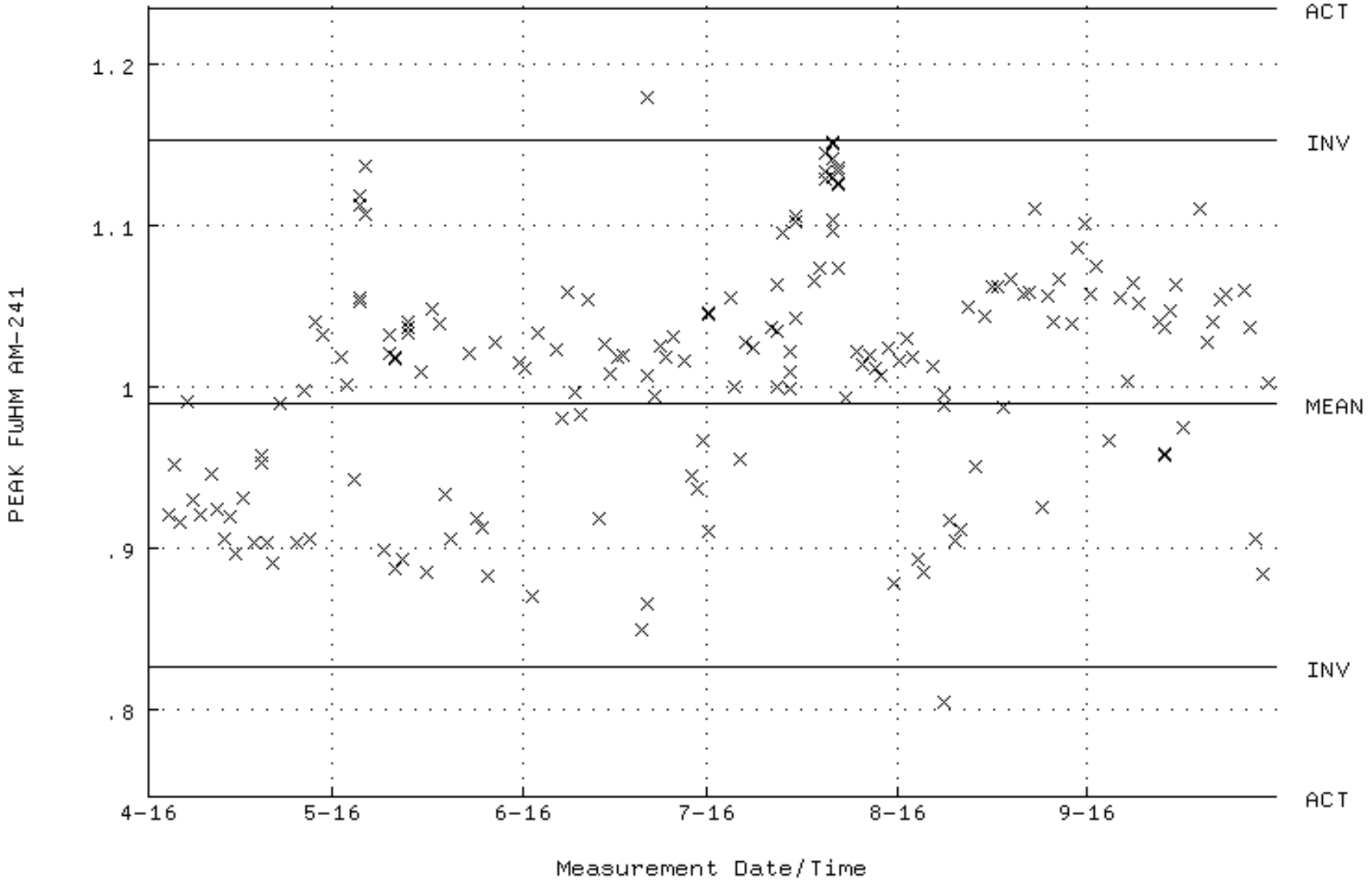
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM39.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 26-JUL-2016 14:23:41 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.83408 +- 1.817269E-02 (0.99 %)



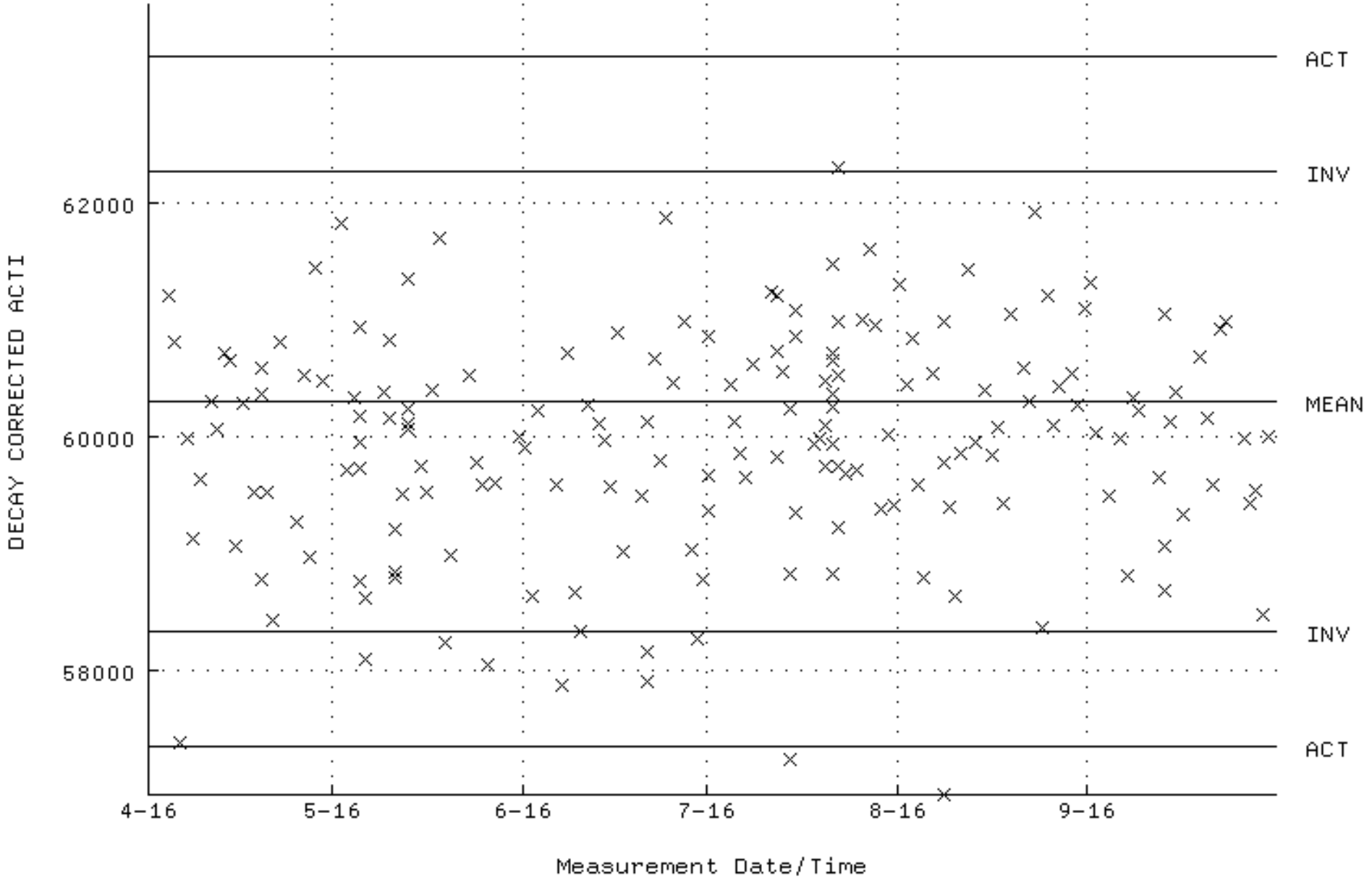
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:14:13 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



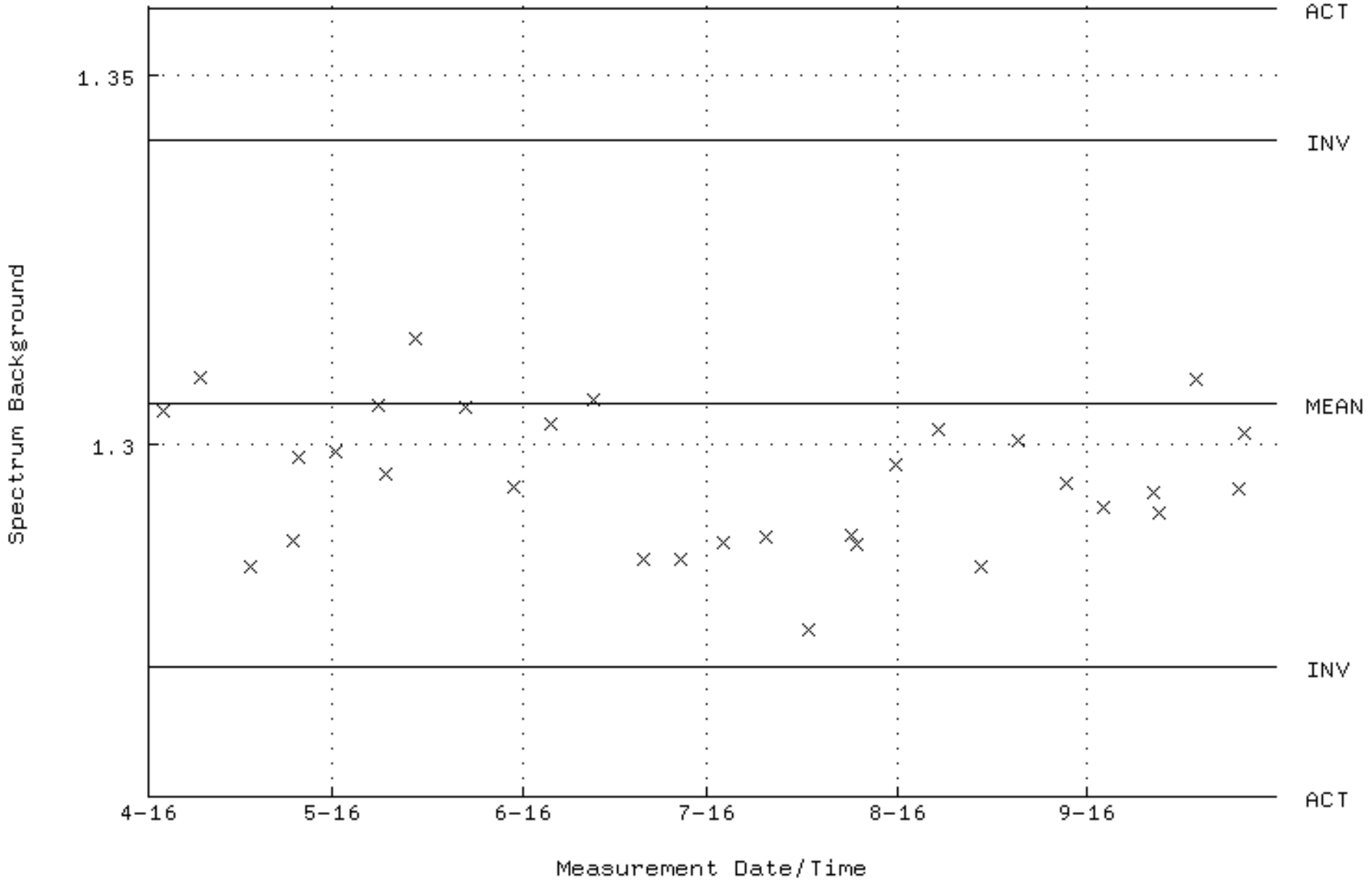
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:14:13 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.990192 +- 8.157611E-02 (8.24 %)



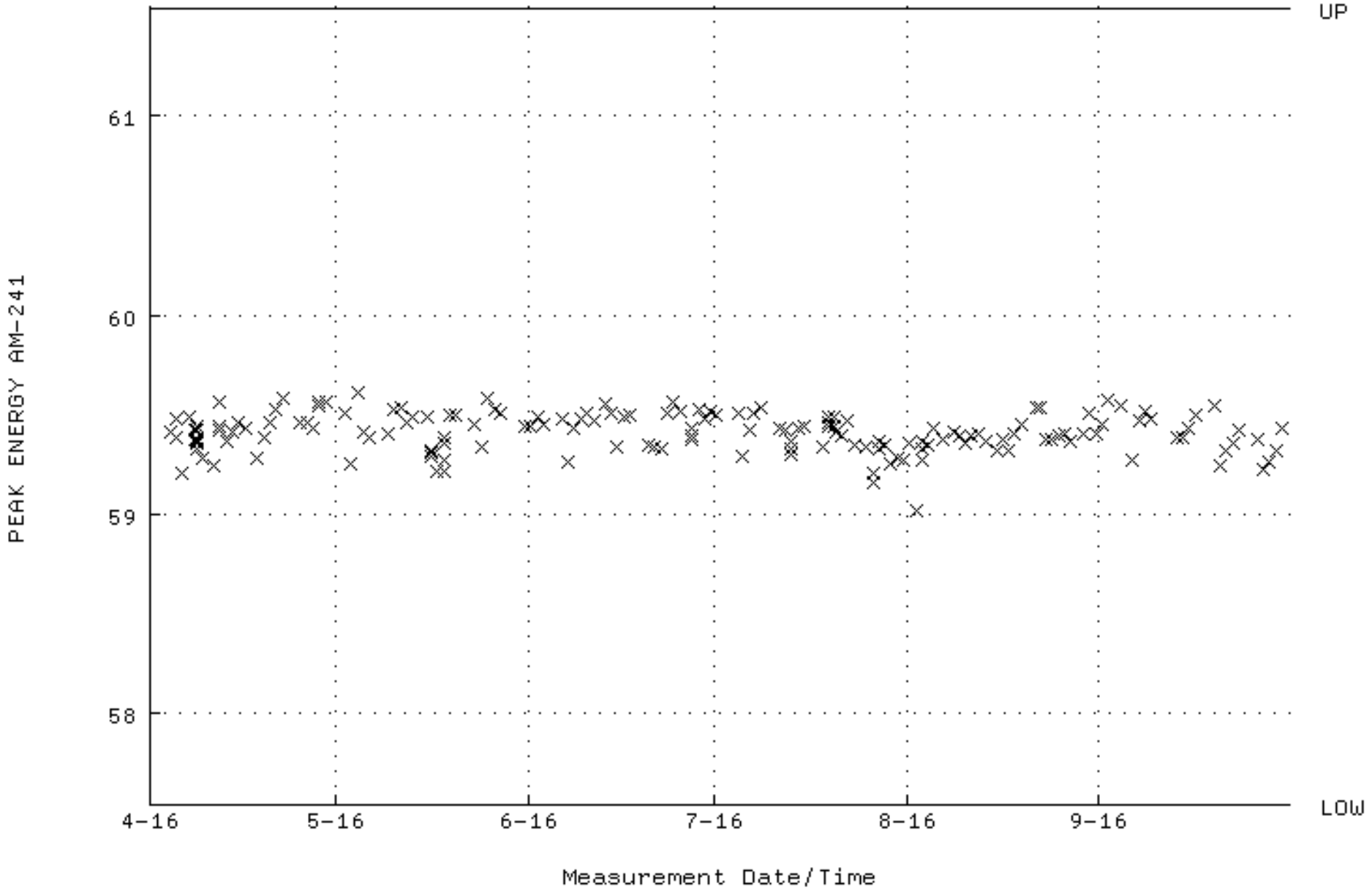
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM41_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:14:13 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 60310.9 +- 980.348 (1.63 %)



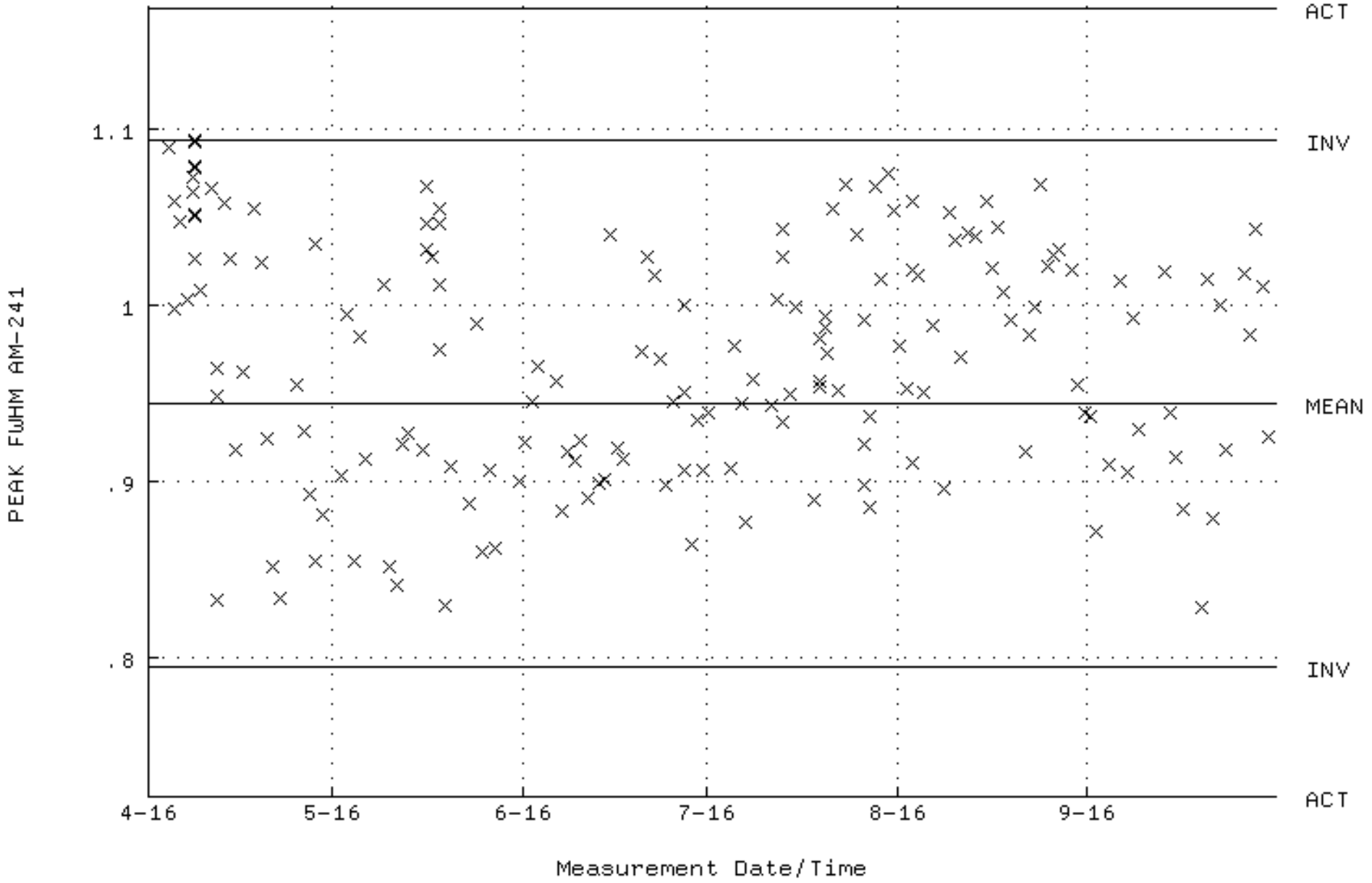
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM41.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:11 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.30554 +- 1.779819E-02 (1.36 %)



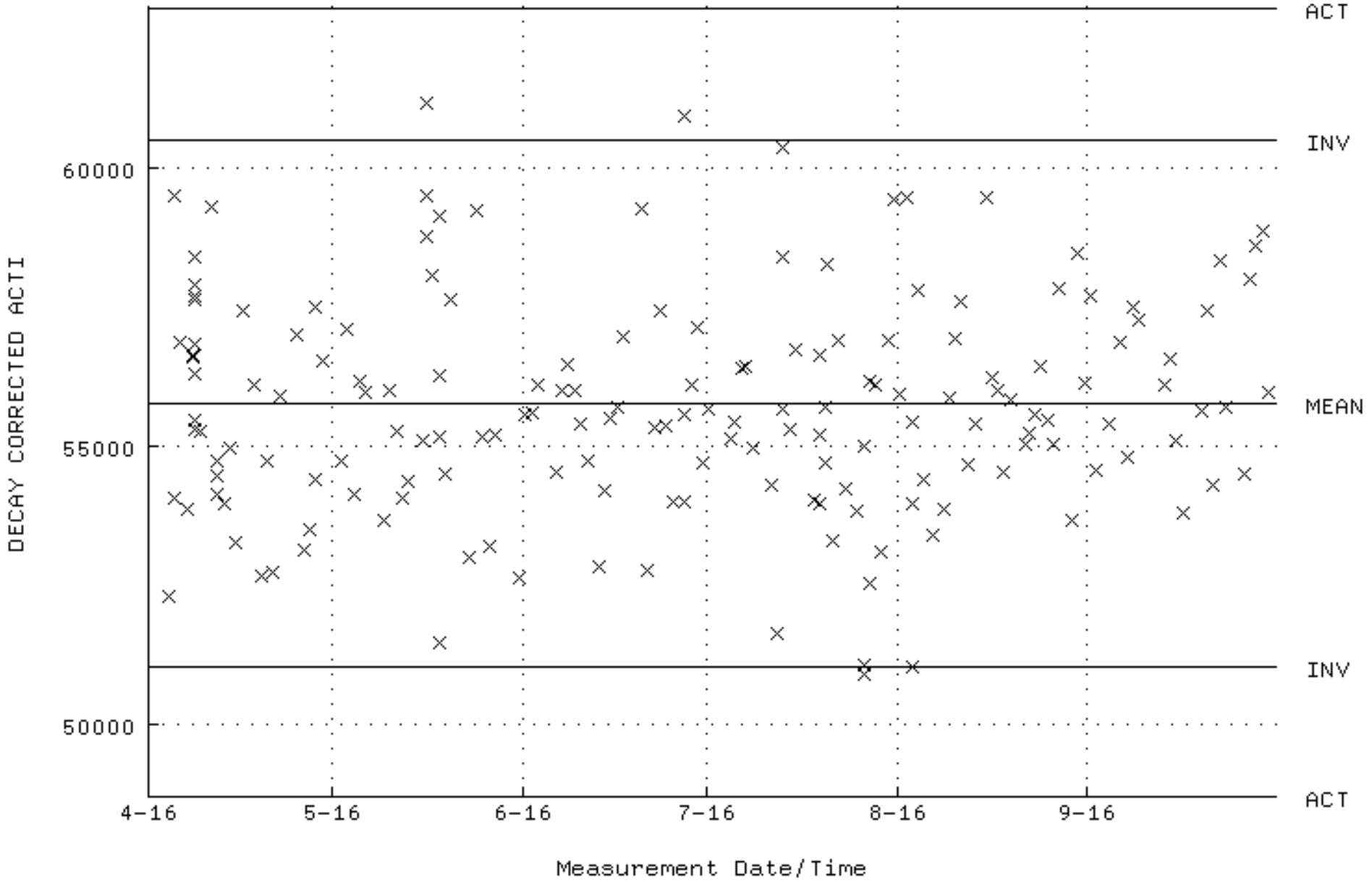
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM43_JAR.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:40:21 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 57.5400 through 61.5400



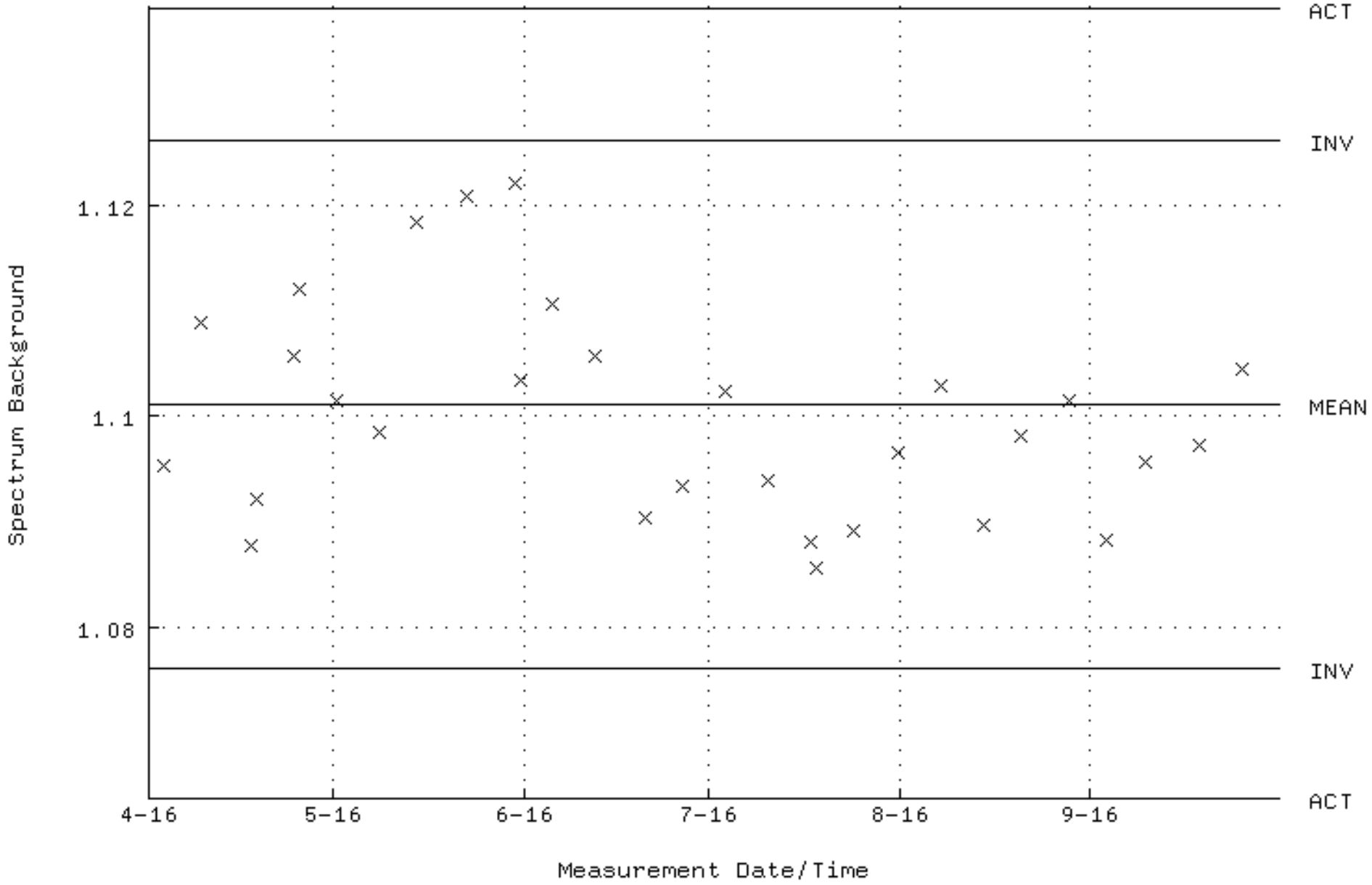
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM43_JAR.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:40:21 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.944669 +- 7.461934E-02 (7.90 %)



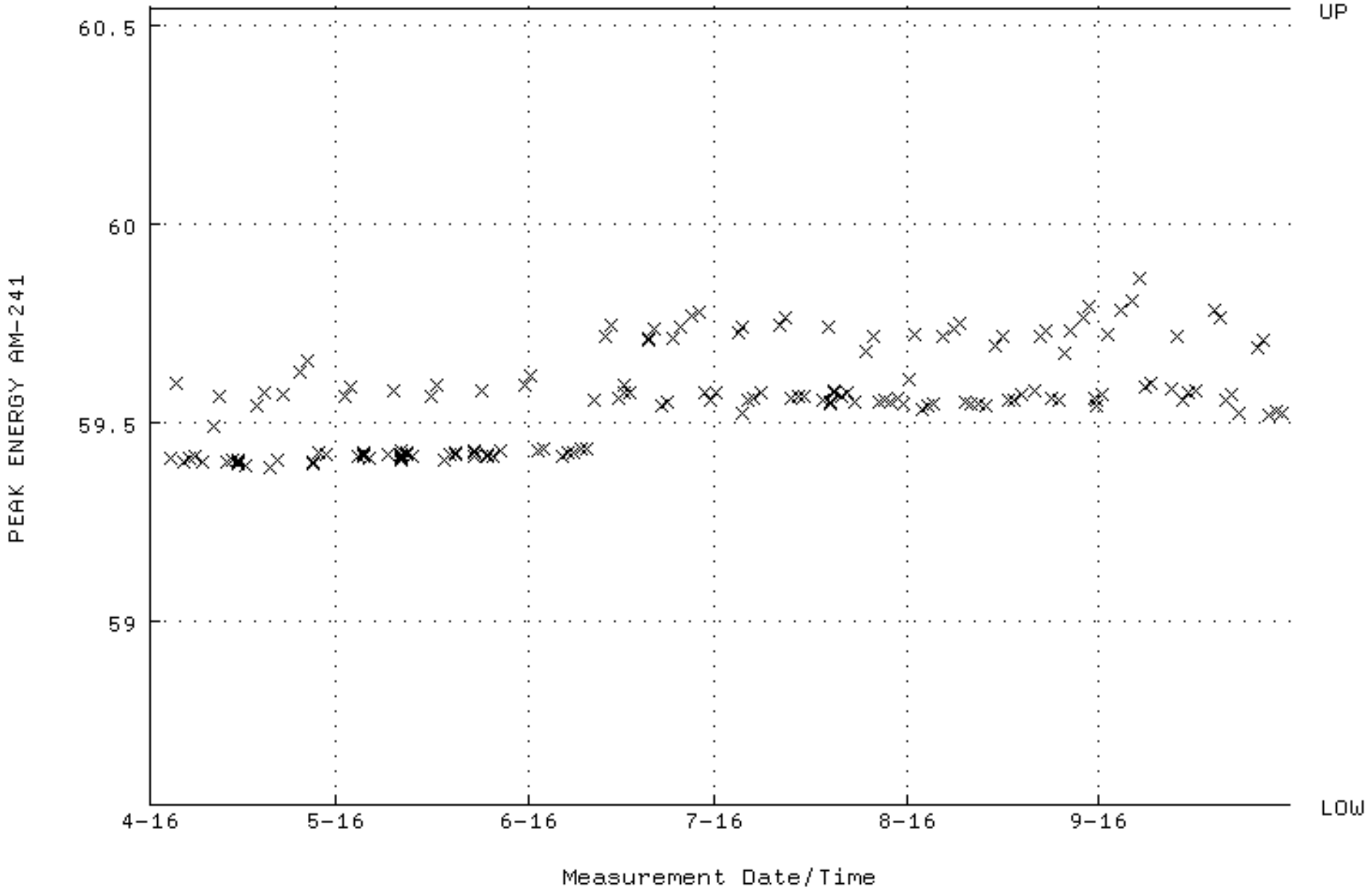
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_GAM43_JAR.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:40:21 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 55780.6 +- 2366.70 (4.24 %)



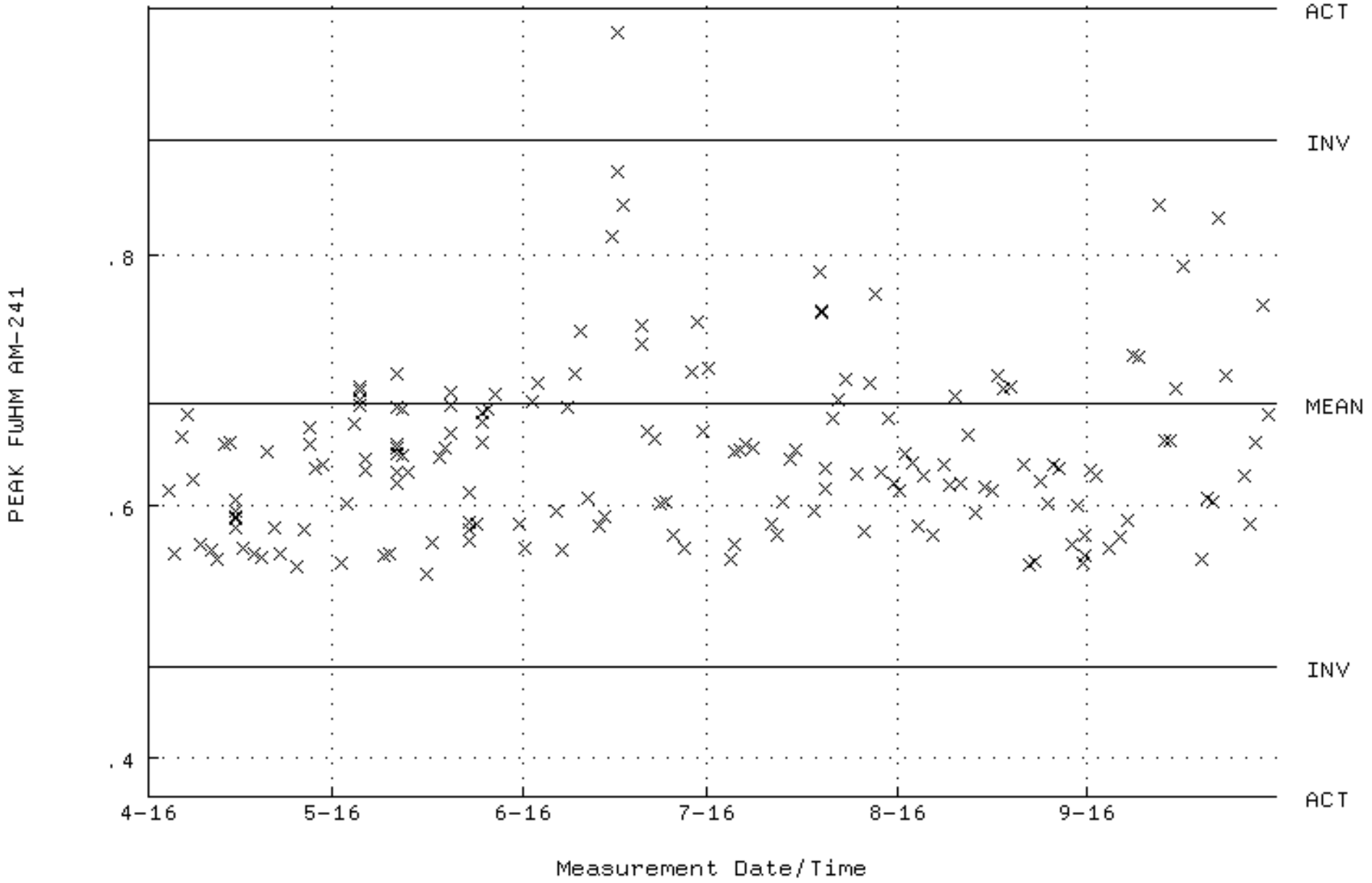
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_GAM43.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:16 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 1.10118 +- 1.247801E-02 (1.13 %)



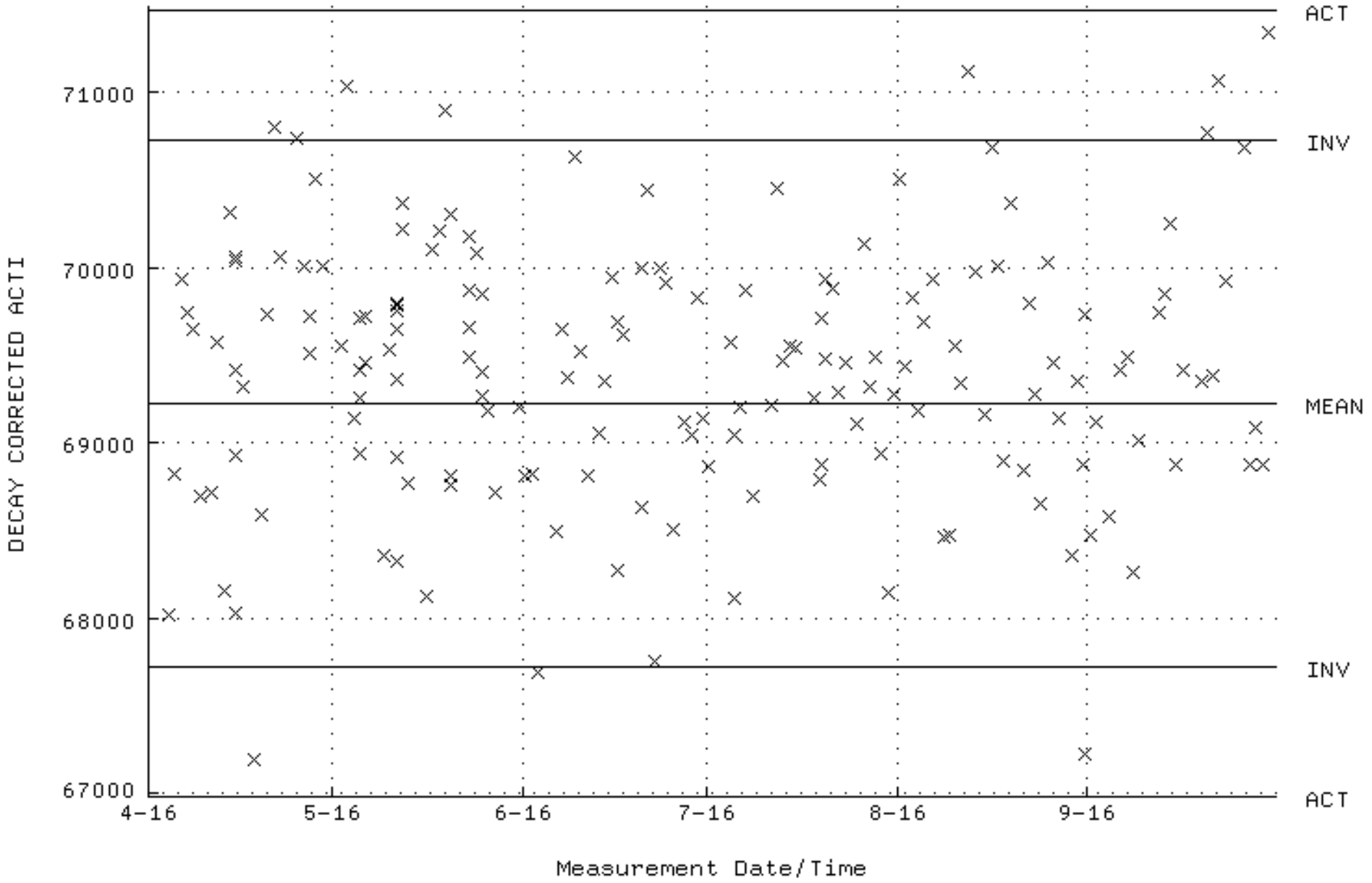
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY1_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:24:58 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 58.5400 through 60.5400



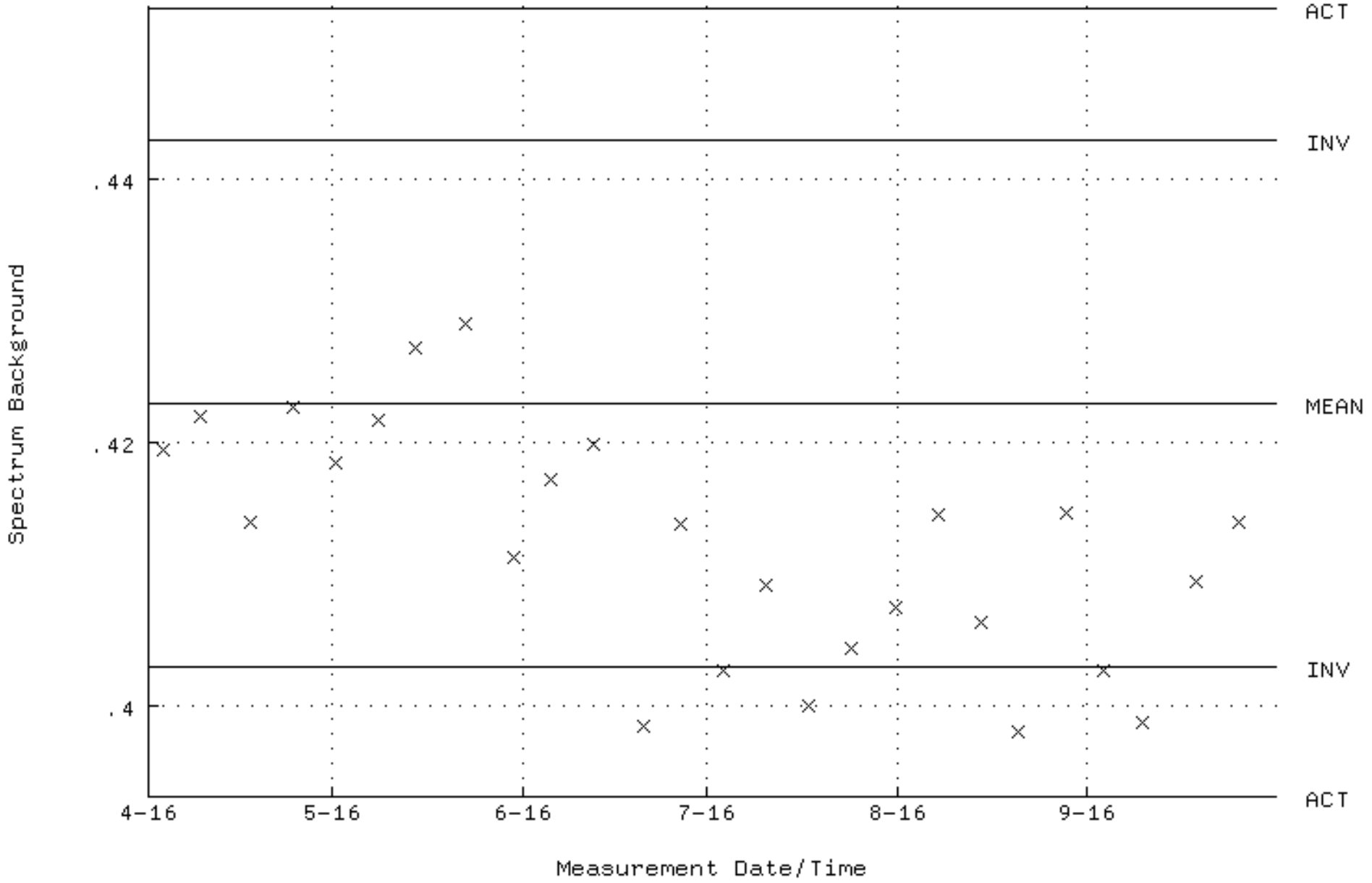
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY1_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:24:58 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.682410 +- 0.104470 (15.31 %)



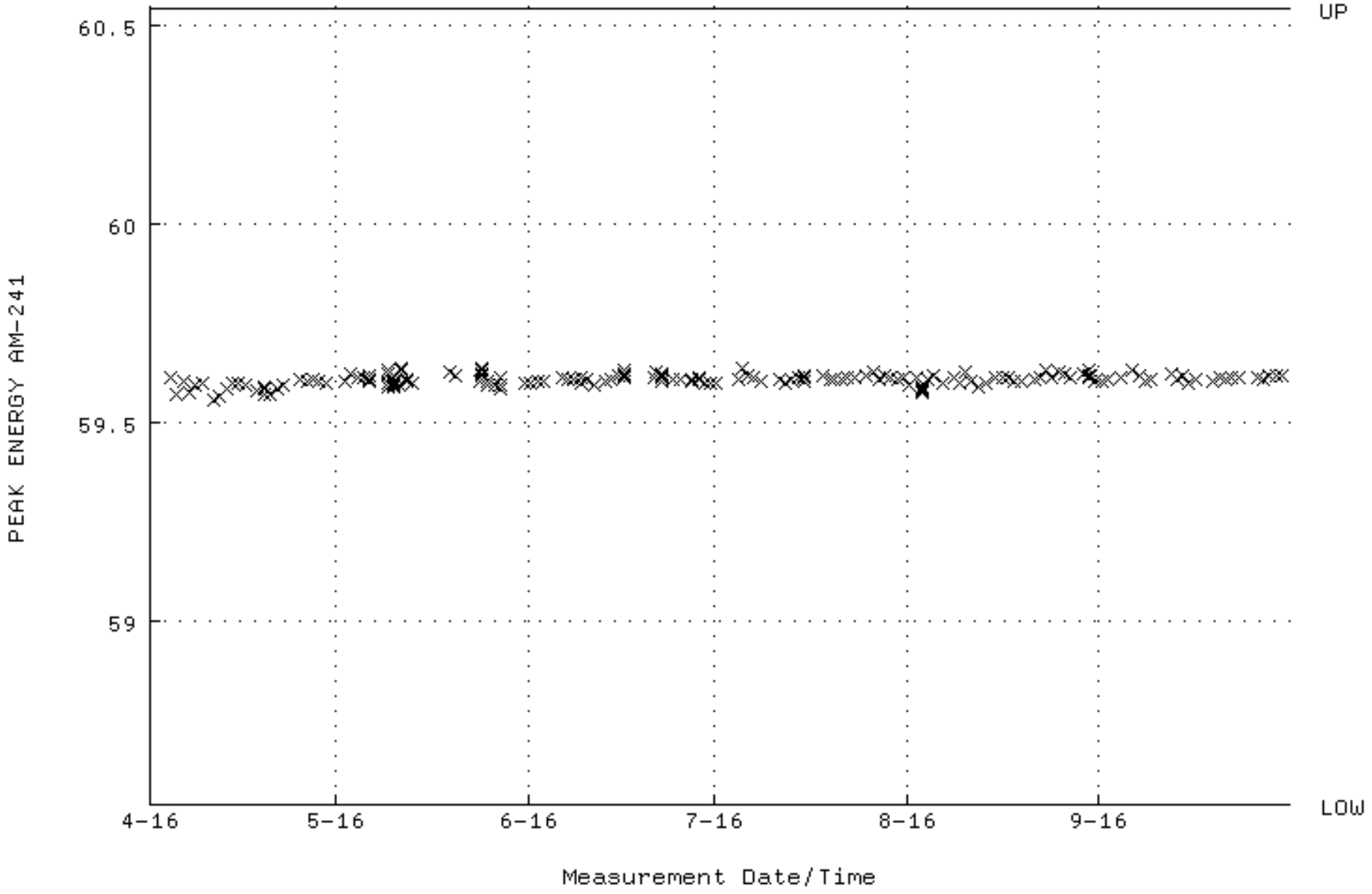
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY1_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:24:58 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 69229.4 +- 750.214 (1.08 %)

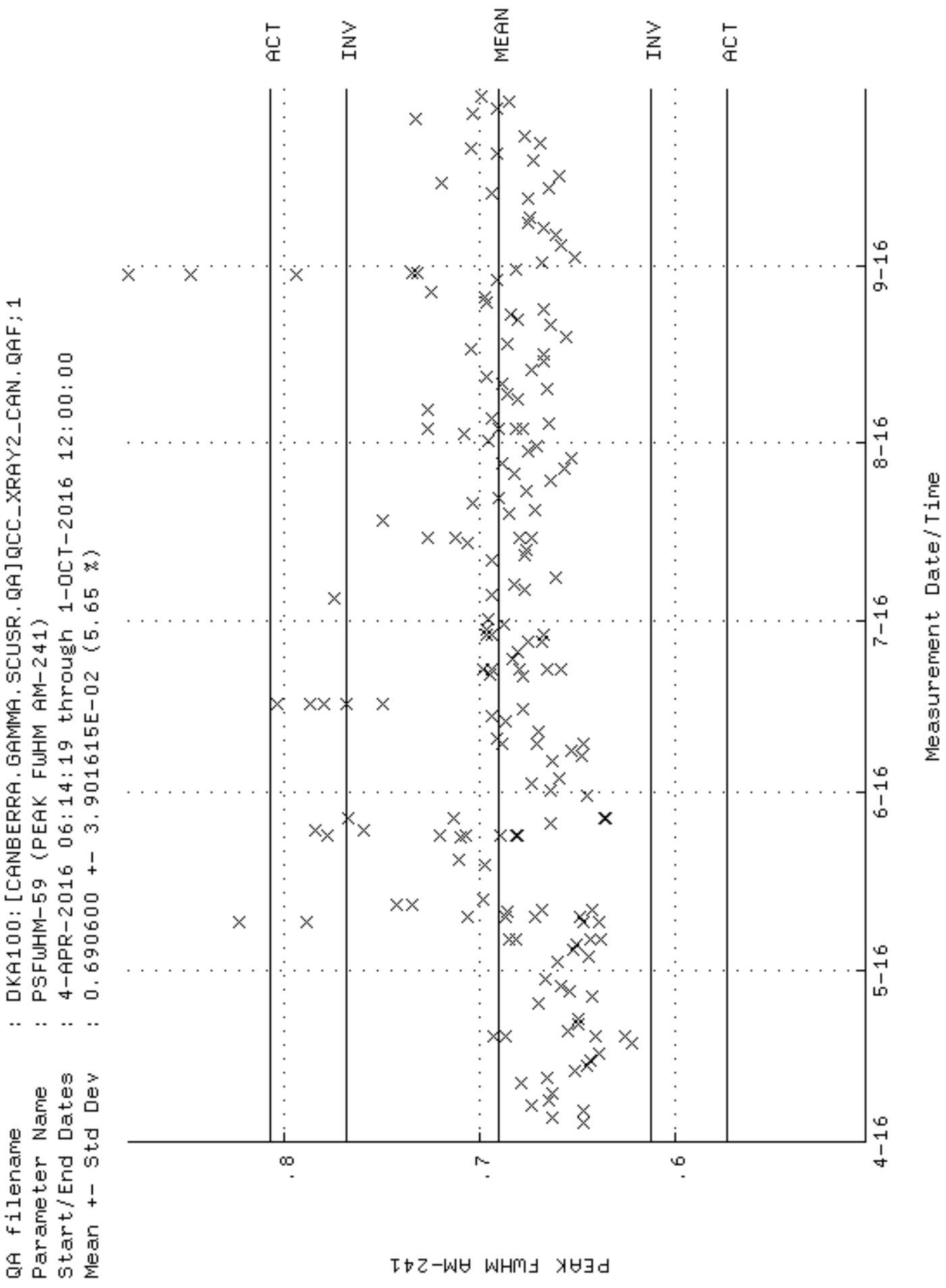


QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_XRAY1.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:31 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.423006 +- 9.957177E-03 (2.35 %)

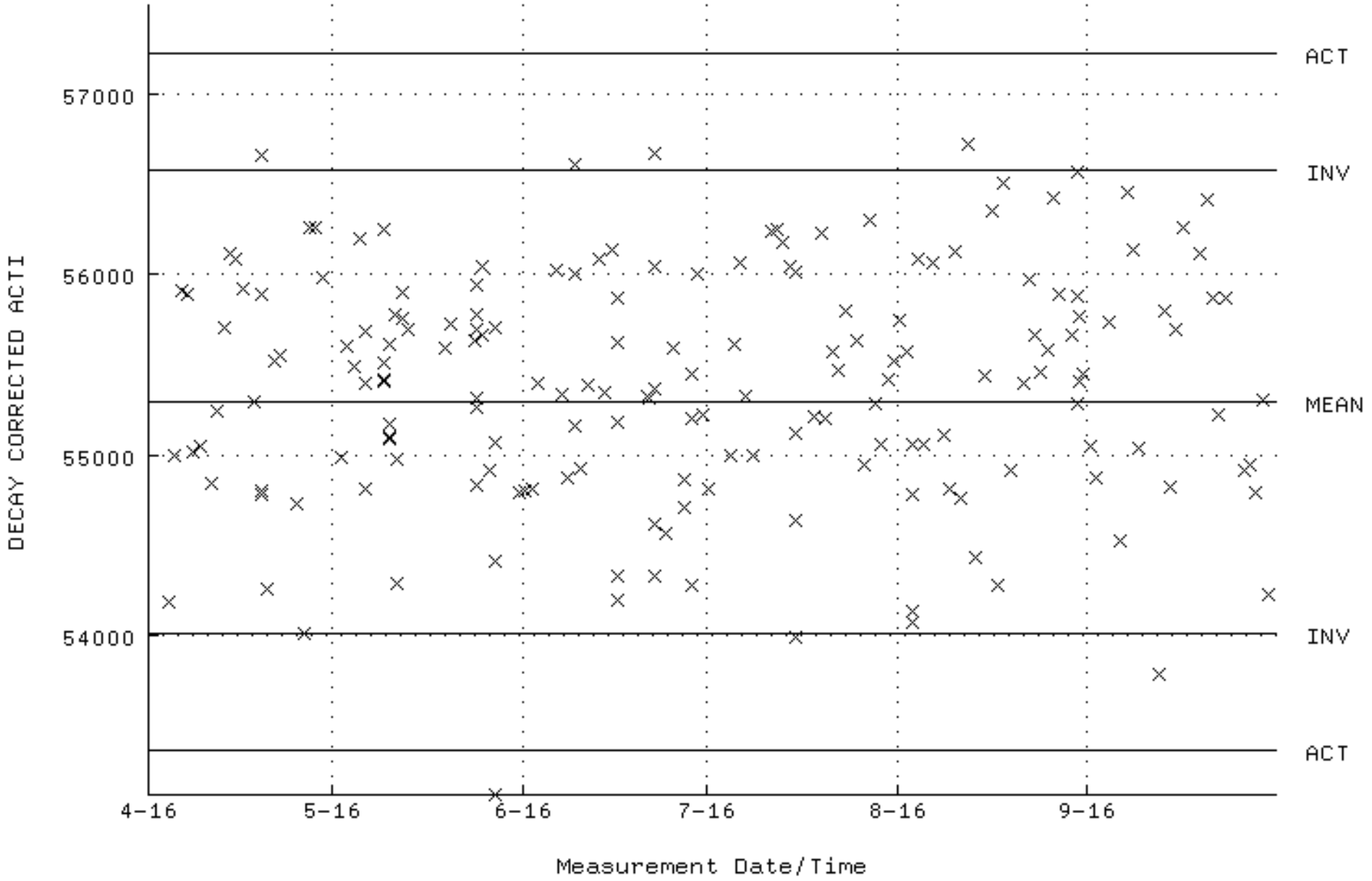


QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY2_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:14:19 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 58.5400 through 60.5400

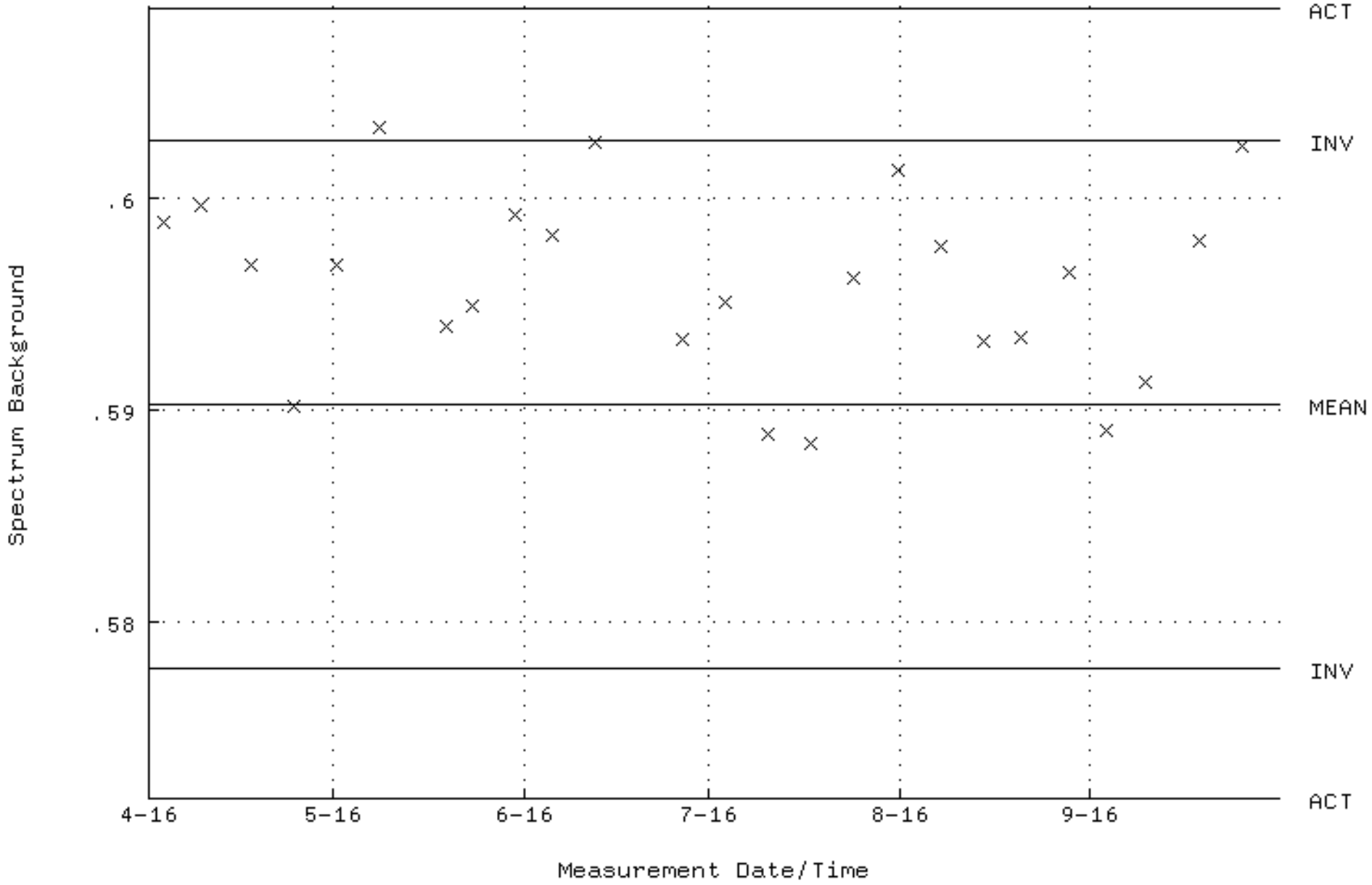



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY2_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:14:19 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.690600 +- 3.9016615E-02 (5.65 %)
ACT
INV
MEAN
INV
ACT
.8
.7
.6
4-16
5-16
6-16
7-16
8-16
9-16
PEAK FWHM AM-241
Measurement Date/Time

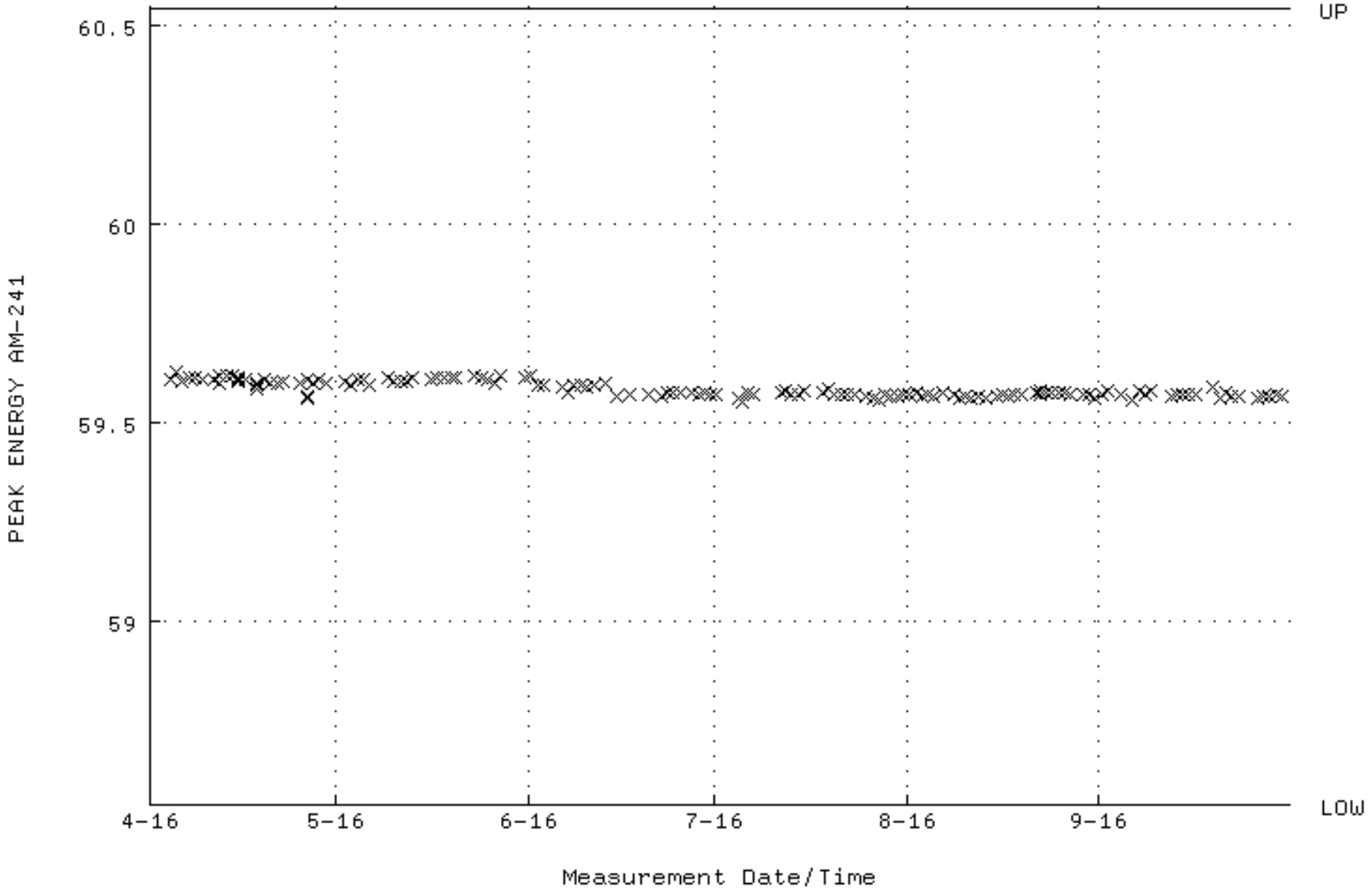
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY2_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:14:19 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 55300.2 +- 643.502 (1.16 %)



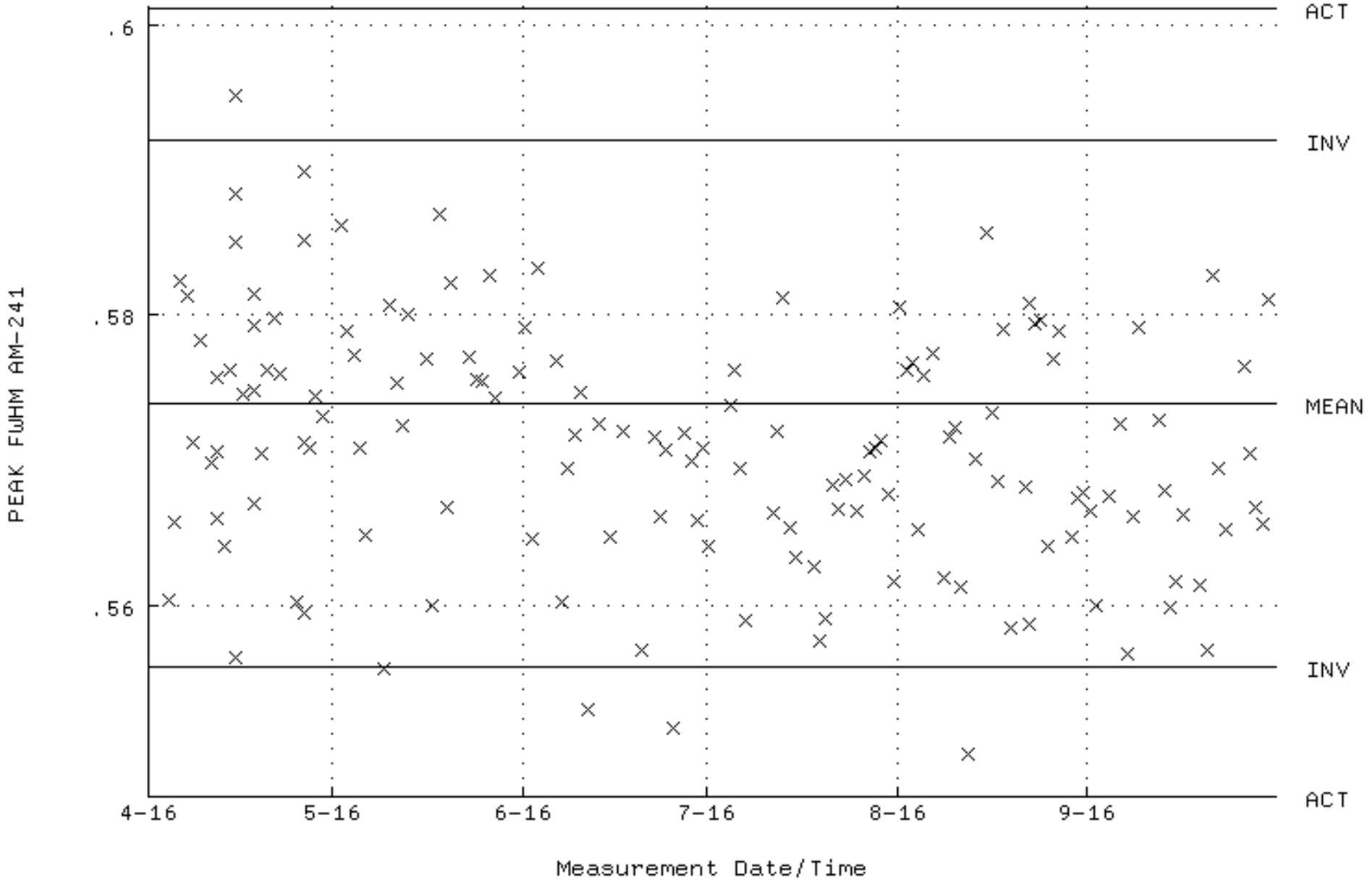
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_XRAY2.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:37 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.590295 +- 6.231779E-03 (1.06 %)



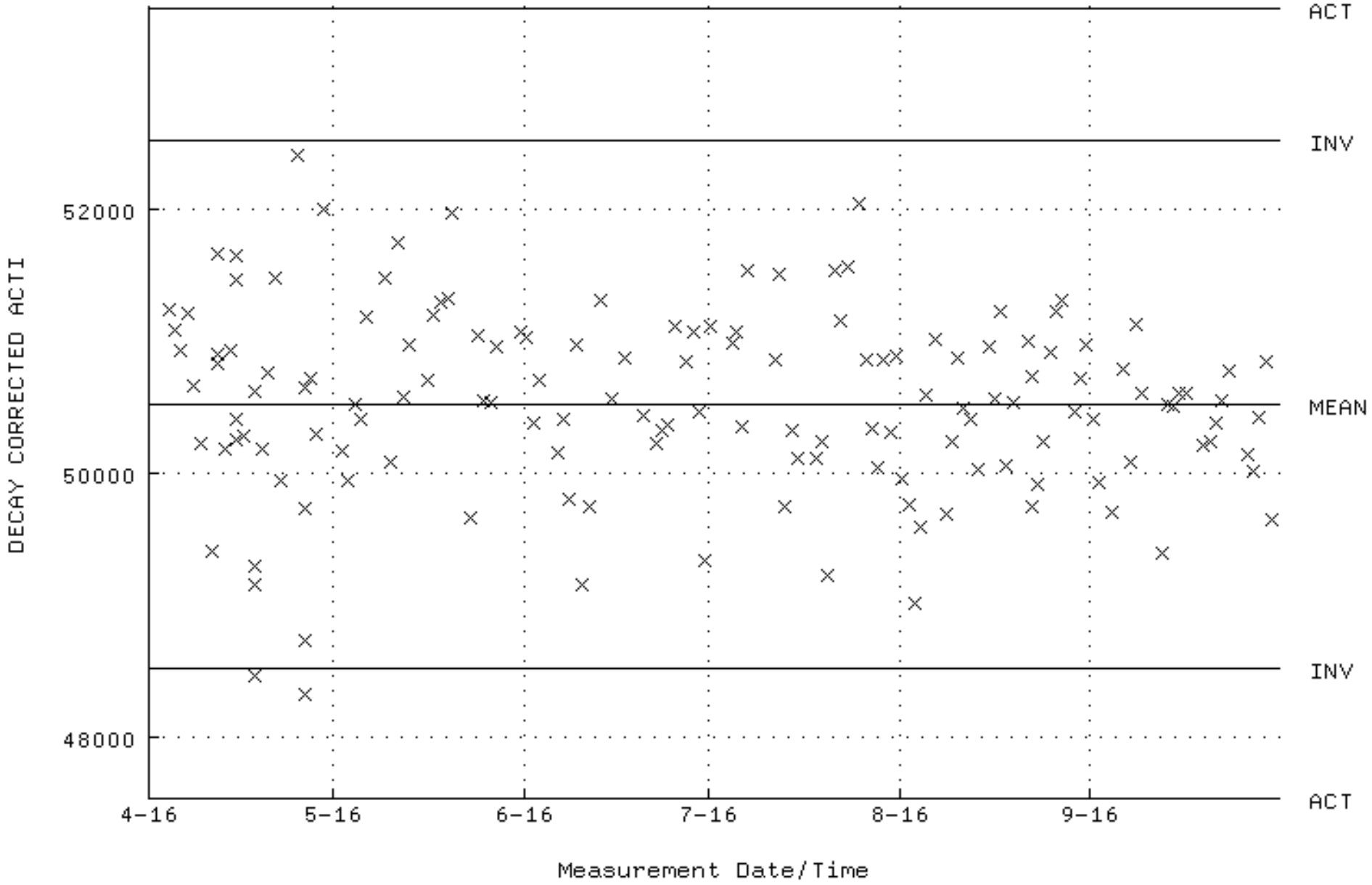
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY4_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:40:26 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 58.5400 through 60.5400



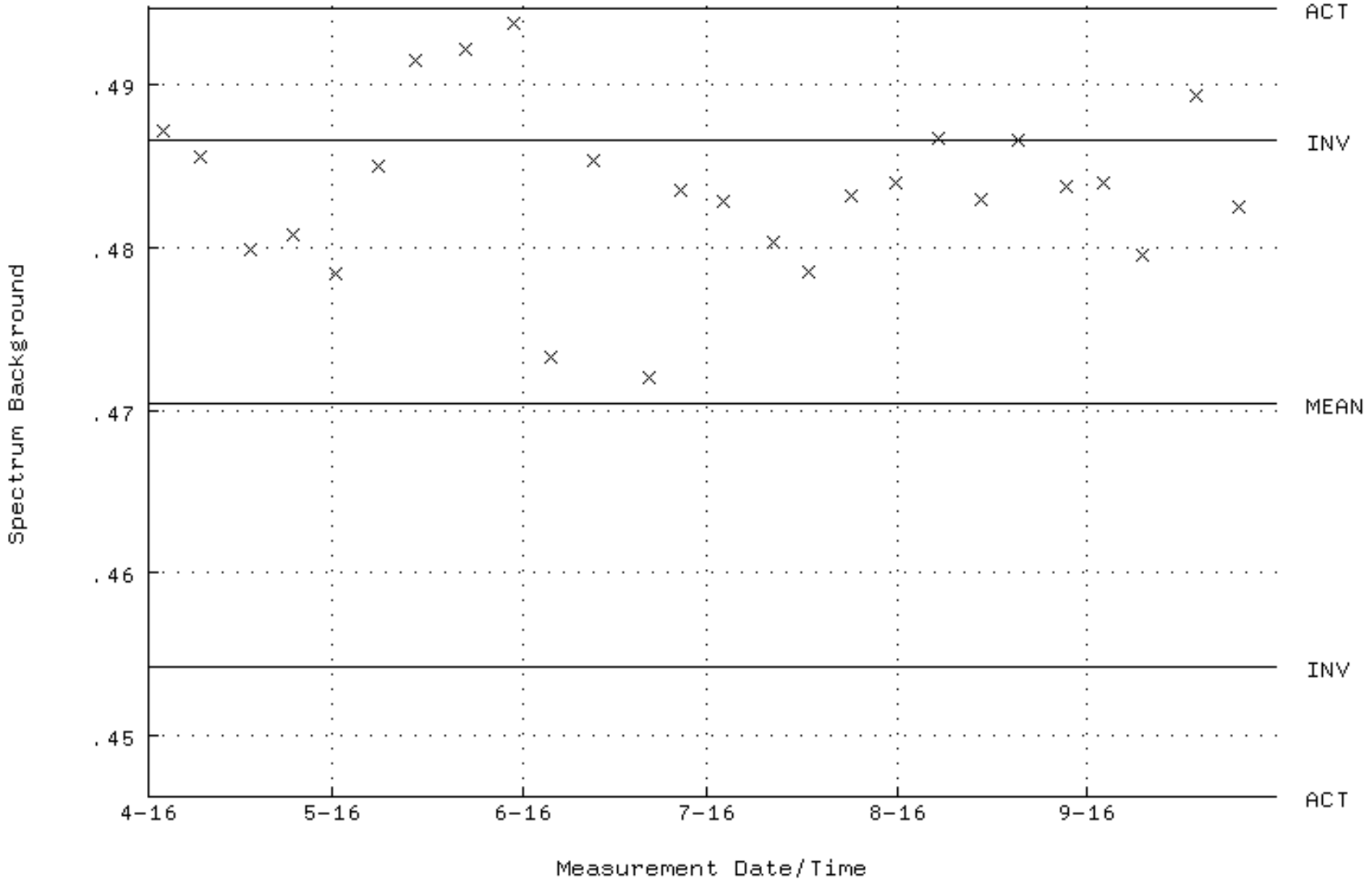
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY4_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:40:26 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.573974 +- 9.060334E-03 (1.58 %)



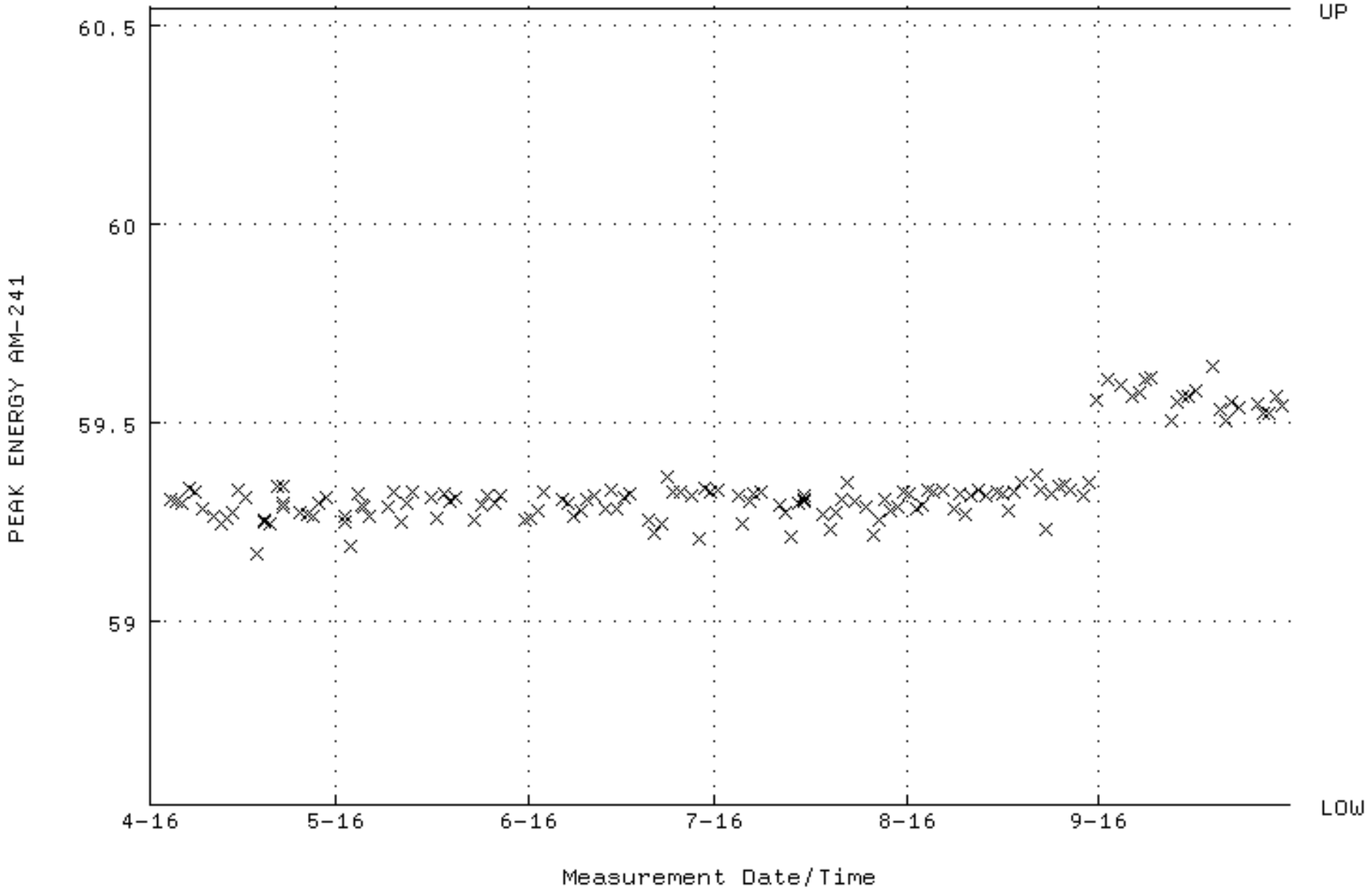
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY4_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:40:26 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 50523.4 +- 997.040 (1.97 %)



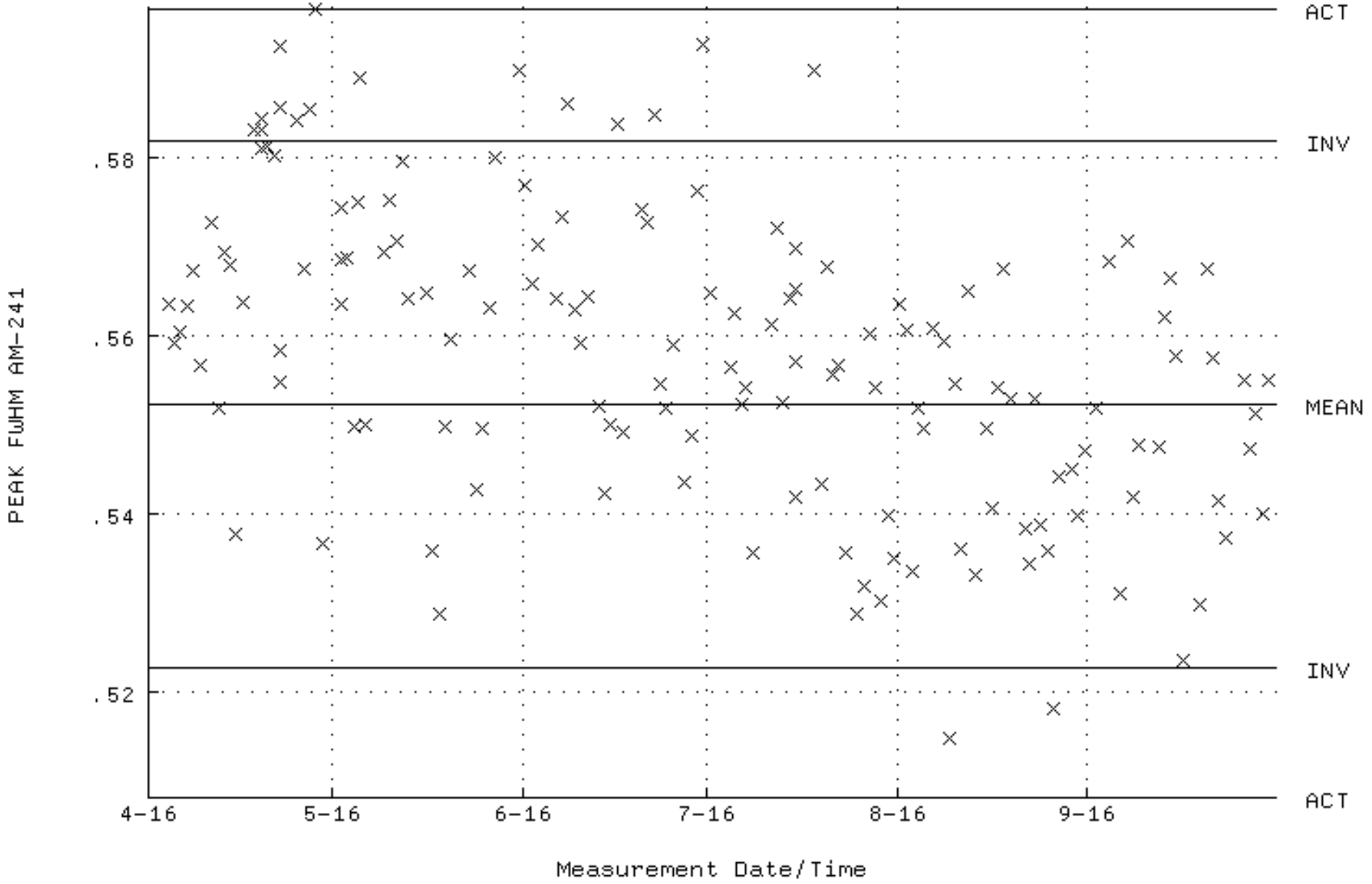
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_XRAY4.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:43 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.470476 +- 8.069619E-03 (1.72 %)



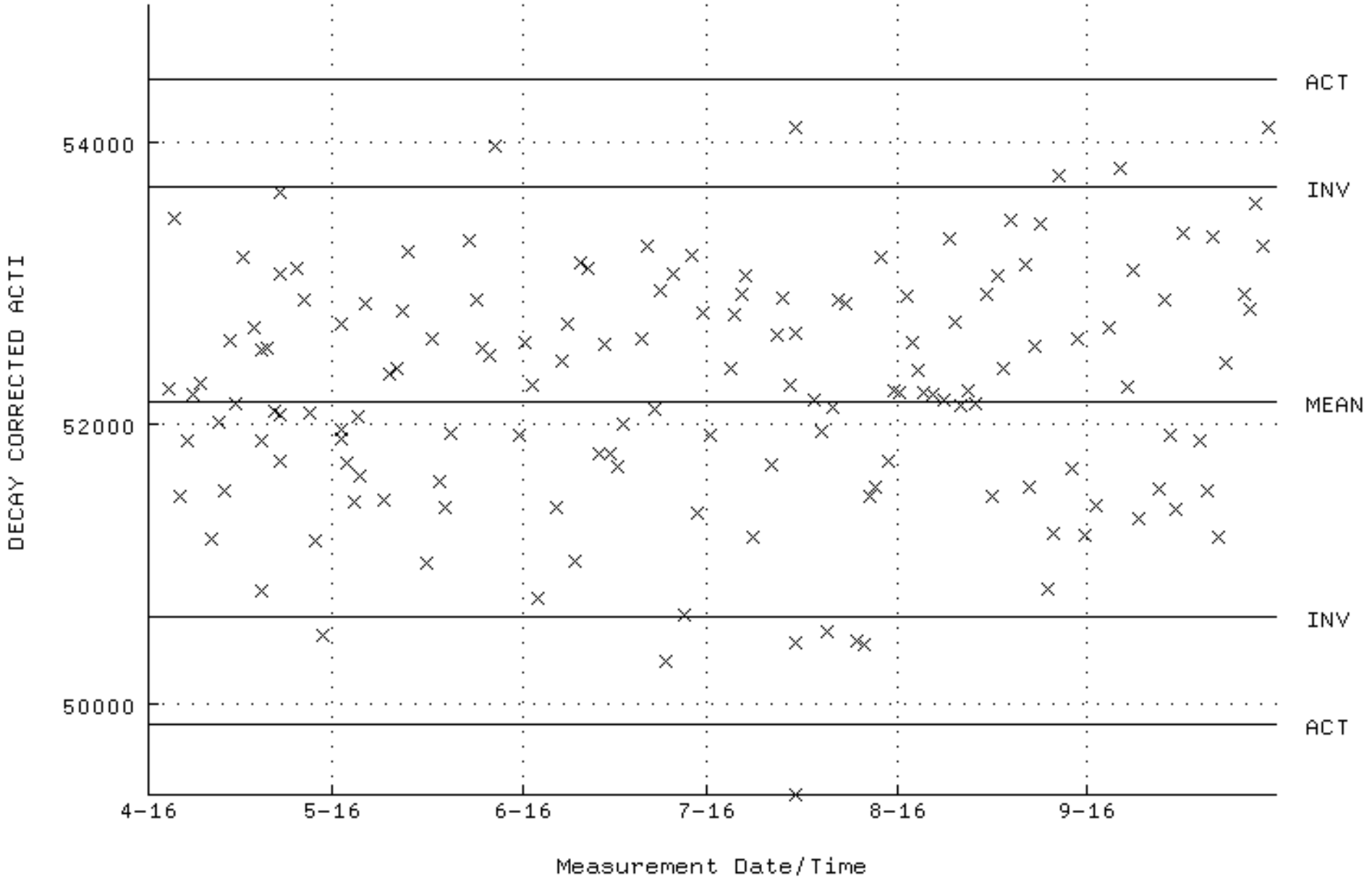
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY5_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 07:10:14 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 58.5400 through 60.5400



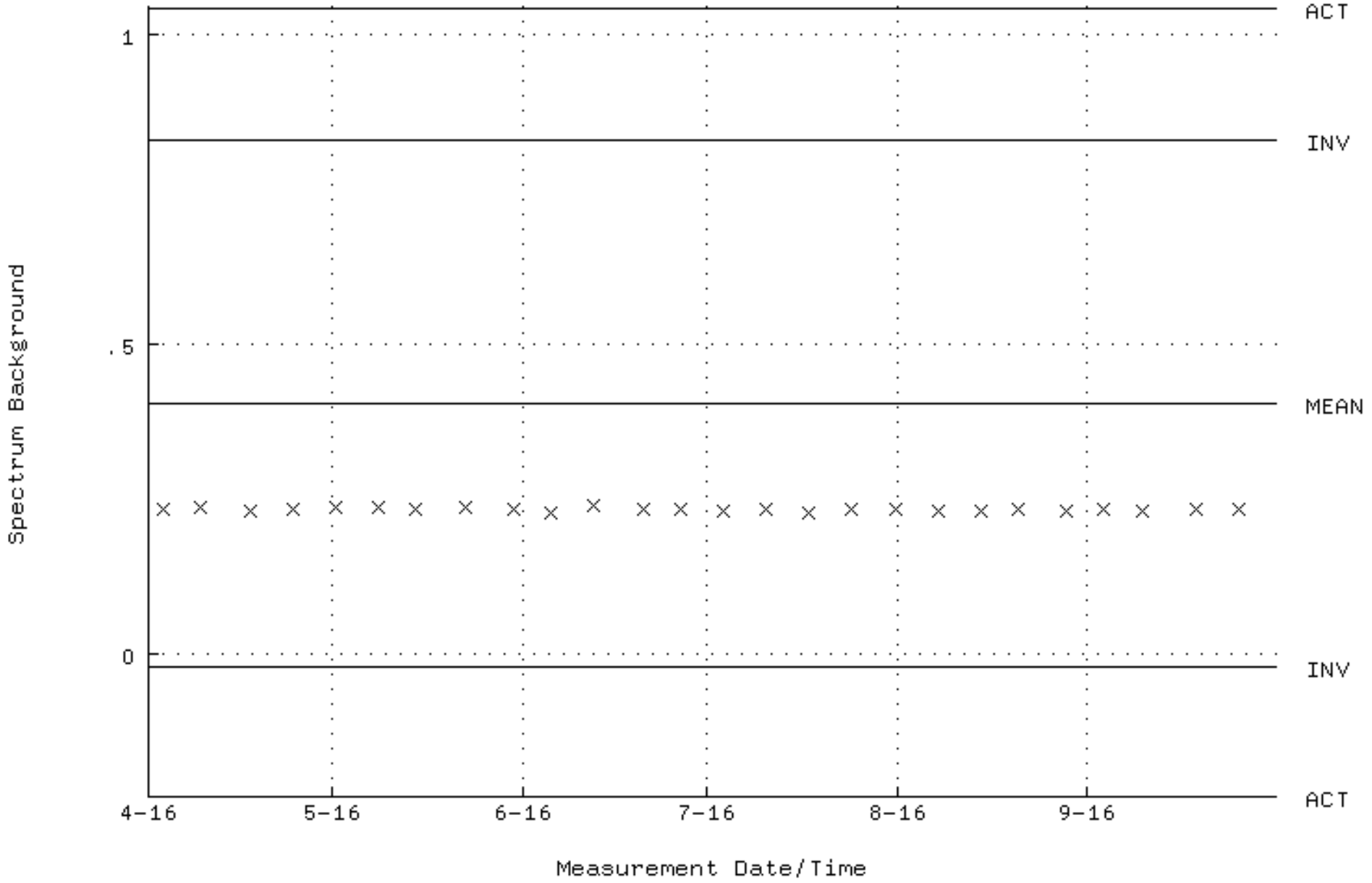
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY5_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 07:10:14 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.552396 +- 1.478481E-02 (2.68 %)



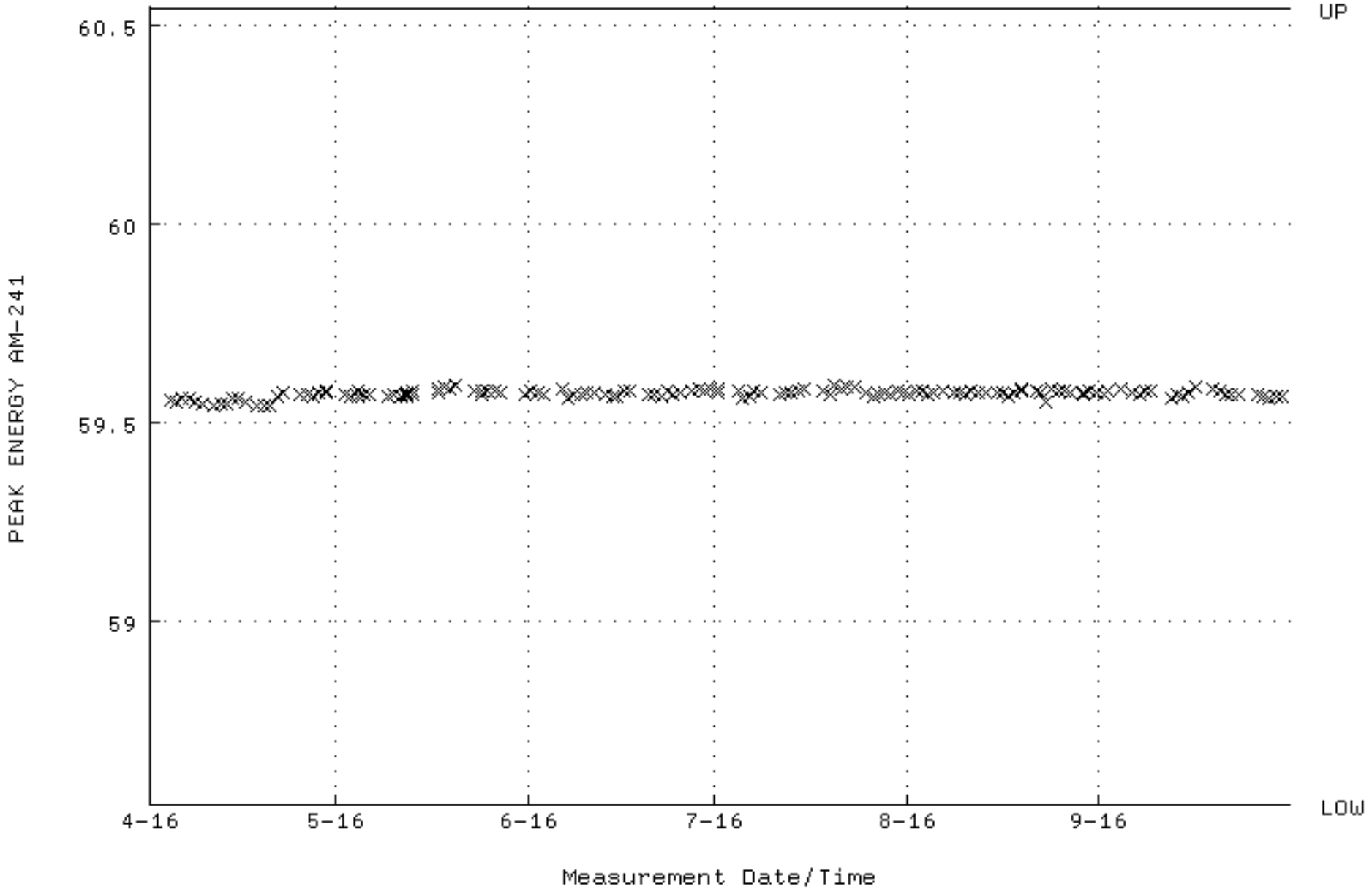
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY5_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 07:10:14 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 52163.7 +- 766.450 (1.47 %)



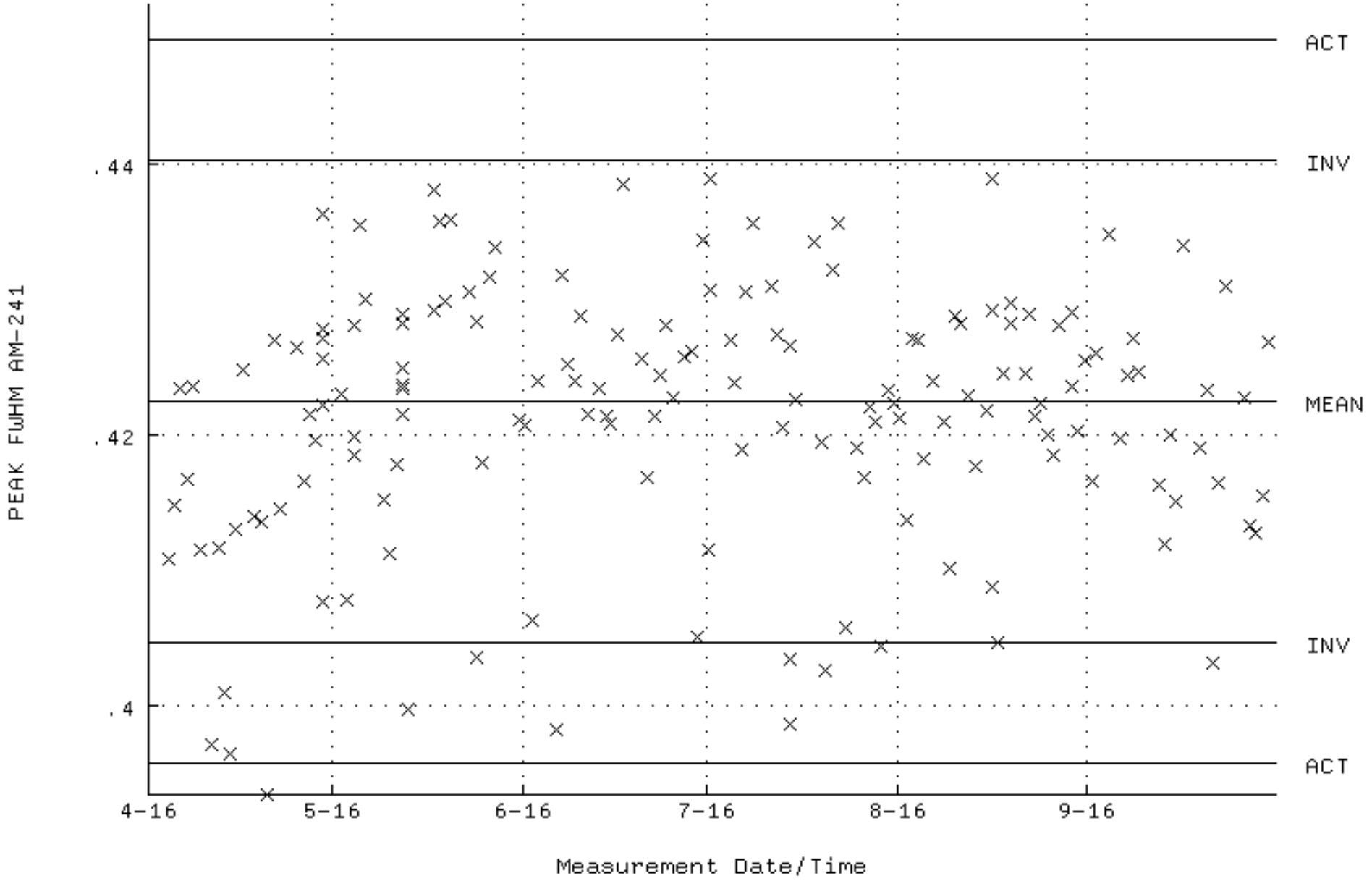
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_XRAY5.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:48 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.405888 +- 0.212256 (52.29 %)



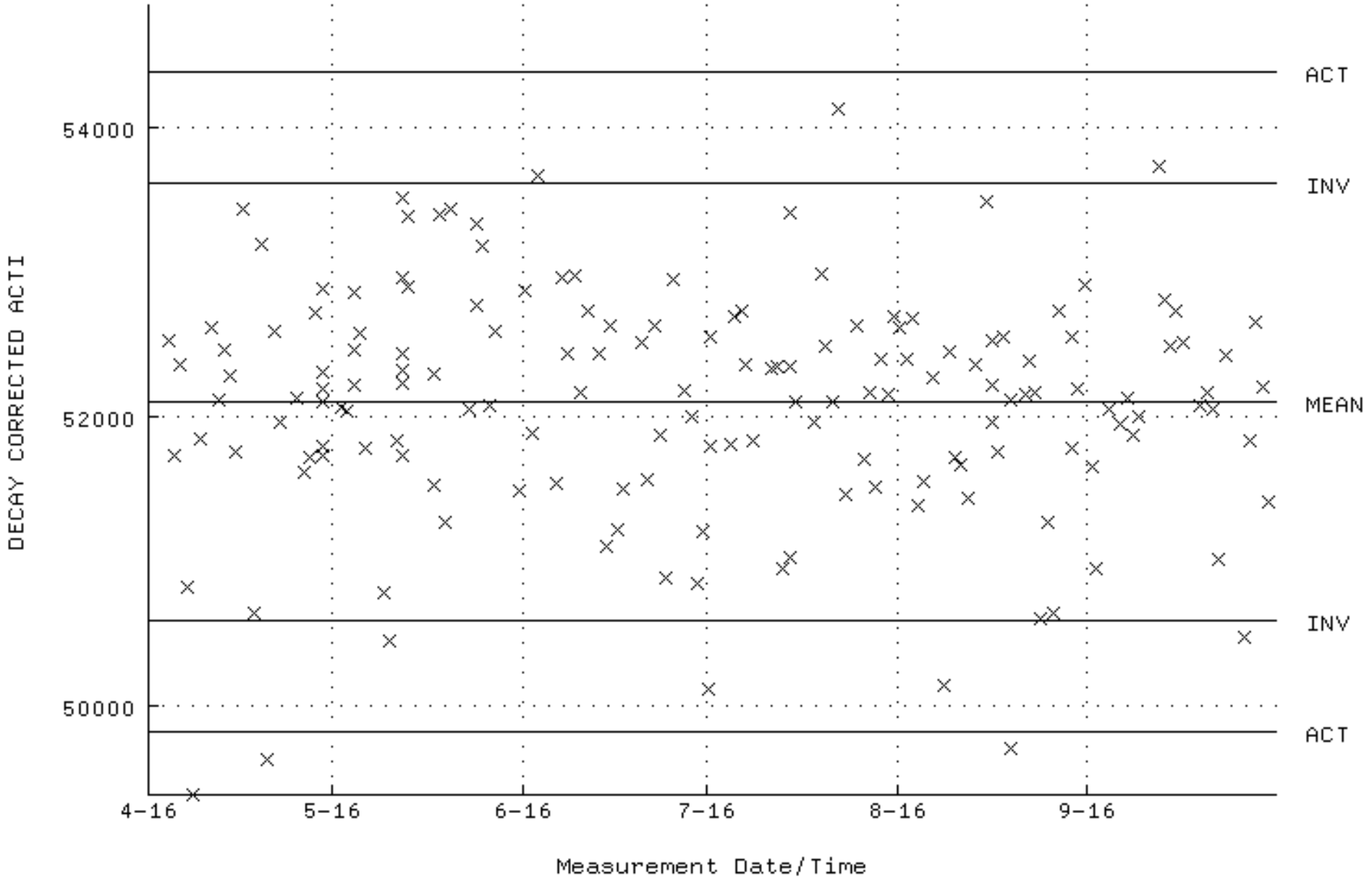
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY6_CAN.QAF;1
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)
Start/End Dates : 4-APR-2016 06:54:31 through 1-OCT-2016 12:00:00
Lower/Upper Lmts: 58.5400 through 60.5400



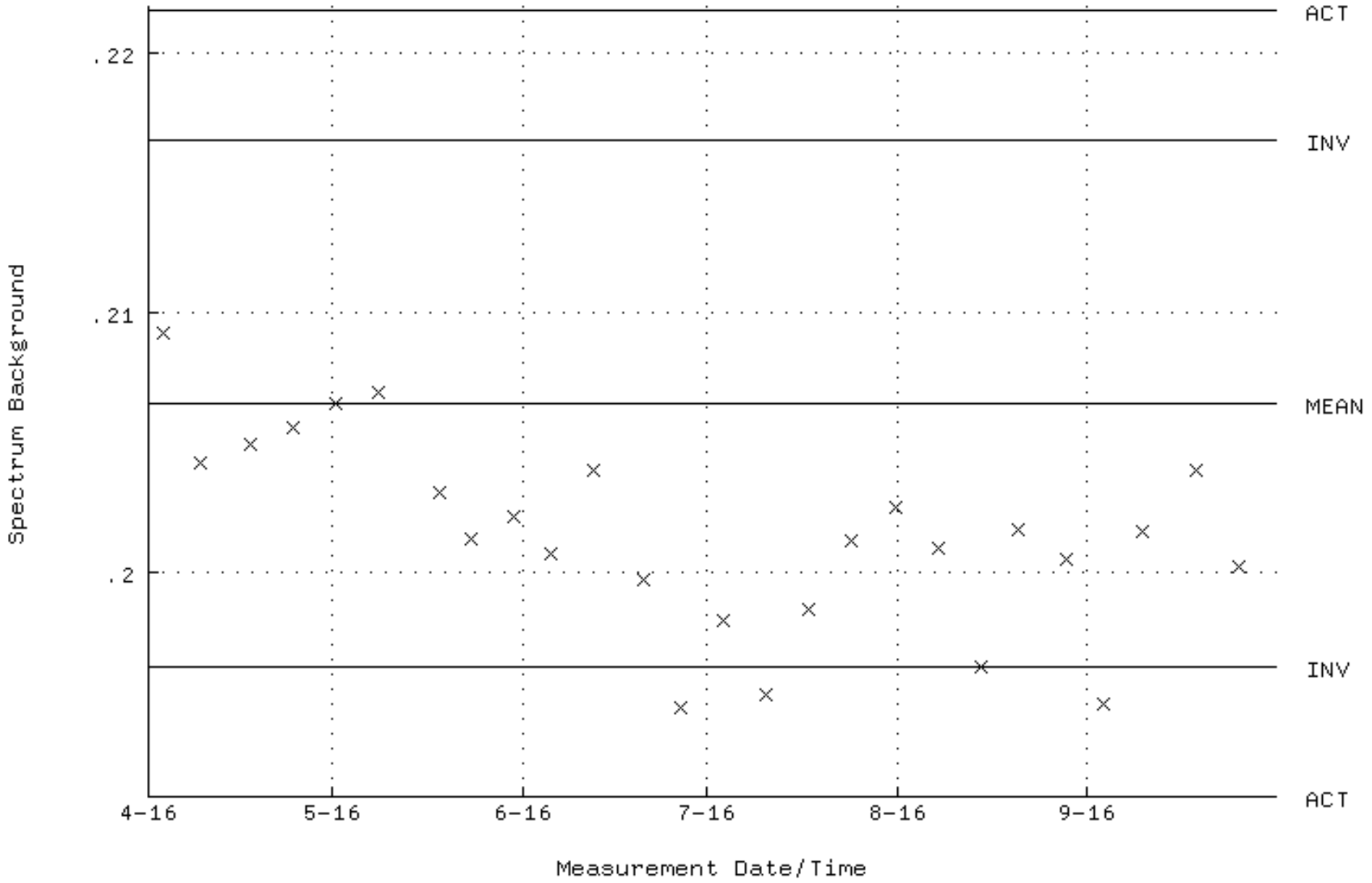
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY6_CAN.QAF;1
Parameter Name : PSFWHM-59 (PEAK FWHM AM-241)
Start/End Dates : 4-APR-2016 06:54:31 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.422584 +- 8.876291E-03 (2.10 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC_XRAY6_CAN.QAF;1
Parameter Name : NLACTVTY-59 (DECAY CORRECTED ACTIVITY AM-241)
Start/End Dates : 4-APR-2016 06:54:31 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 52108.9 +- 758.036 (1.45 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC_XRAY6.QAF;1
Parameter Name : BACKRATE (Spectrum Background Rate)
Start/End Dates : 3-APR-2016 12:20:53 through 1-OCT-2016 12:00:00
Mean +- Std Dev : 0.206552 +- 5.056256E-03 (2.45 %)



RAD Standards Traceability

National Institute of Standards & Technology

Certificate

Standard Reference Material 4949C
Iodine-129 Radioactivity Standard

1470

This Standard Reference Material (SRM) consists of radioactive iodine-129 as sodium iodide, sodium hydroxide, and sodium sulphite 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 beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard: The SRM ampoule contains iodine-129 with a total activity of approximately 17 kBq. Iodine-129 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process, X-rays and gamma rays with energies from 4 keV to 40 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 significant radiation hazard. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard: The SRM ampoule contains sodium hydroxide (NaOH) with a concentration of 0.01 mole per liter of water. The solution is mildly 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 alkaline 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 for at least five (5) years after receipt. 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) because of both the radioactivity and the strong base.

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, formerly 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.

Lisa R. Karam, Deputy Chief
Ionizing Radiation Division

Gaithersburg, Maryland 20899
July 1995
Text revised and expiration date extended April 2006

Robert L. Watters, Jr., Chief
Measurement Services Division

Paid 4-9-10

RC-5-060-017

Silica in the SRM Ampoule

The solution in the SRM ampoule has a pH of approximately 11 and will slowly etch microgram quantities of silica from the glass ampoule. You may be able to see this silica at times, as it has a density greater than that of the SRM solution and tends to settle. Tests have shown that this silica does not affect the iodine-129 concentration. If desired, the silica may be redispersed in the SRM solution by shaking well. Alternatively, if desired, the silica may be filtered out in the transfer process.

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 base 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 around its entire circumference 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. 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.

PROPERTIES OF SRM 4949C

Certified values

Radionuclide	**Iodine-129**
Reference time	**1200 EST, 21 March 1993**
Massic activity of the solution [a]*	**3451 Bq •g^{-1}**
Relative expanded uncertainty (k=2)	**0.64%** [b][c]

Uncertified values

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	(1.003 ± 0.002) g • mL^{-1} at 21.2°C [d]		
Solution mass	Approximately 5.0 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L^{-1})	Mass Fraction (g·g^{-1})
	H_2O NaOH Na_2SO_3 $Na^{129}I$	55 0.01 0.006 0.004	1.00 0.0004 0.0008 0.0006
Radiological Properties:			
Photon-emitting impurities	None detected [e]		
Half lives used	Iodine-129: (1.57 ± 0.04) × 10^7 a [5][f]		
Calibration method and measuring instrument	NIST 4πβ(LS)-γ-anticoincidence counting system.		

*Notes and references are on pages 5 and 6.

RC-S-066-017A

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [b]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [g]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [h]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [i]
Massic liquid-scintillation count rate, corrected for background and decay	Standard deviation of the mean for 6 sets of repeated measurements. (A)	0.12	1.0	0.12
Background	Standard deviation of the mean for 6 sets of repeated measurements. (A)	1.0	[j] 0.01	0.01
Mass calibration of the balance	Estimated from manufacturer's data (B)	0.05	1.0	0.05
Decay correction for iodine-129	Standard uncertainty of the half life	2.55 [k]	0.00 [m]	0.00
Decay-scheme data	Standard uncertainty of the probability of beta-particle emission to the excited state (B)	0.10	1.0	0.10
Live time [n]	Estimated (B)	0.10	1.0	0.10
Extrapolation of beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.25	1.0	0.25
Photon-emitting impurities	Limit of detection (B) [p]	100	0.00002	0.002
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.32
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				0.64

*Notes and references are on pages 5 and 6.

NOTES

[a] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[b] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process. The value, x_i, used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) \equiv |\partial y/\partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y. The **combined standard uncertainty** of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty. The combined standard uncertainty is multiplied by a **coverage factor** of $k = 2$ to obtain U, the **expanded uncertainty** of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[c] The value of each component of combined standard uncertainty, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic response is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[d] The stated uncertainty is two times the standard uncertainty.

[e] The estimated limit of detection for photon-emitting impurities, expressed as massic photon emission rates, is:
$0.07\ s^{-1} \cdot g^{-1}$ for energies between 43 keV and 2700 keV.

[f] The stated uncertainty is the standard uncertainty.

[g] Relative standard uncertainty of the input quantity x_i.

[h] 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.

[i] 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.

[j] $|\partial y/\partial x_i| \cdot (x_i/y)$ = (average background count rate)/(average net sample count rate)

EC-S-060-017B

[k] 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.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] 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 iodine-129)}·{(Bq of impurity)/(Bq of iodine-129)}. 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 Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993 (corrected and reprinted, 1995). Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[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), July 1995.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1470
Prepared By:	Bethany Fiem
Carrier Conc:	Aqueous NaOH
Reference Date:	03/21/1993
Ampoule Mass (g):	4.9632 g
Uncertainty:	+/- .64 %
LogBook No:	RC-S-060-017

A Solution Material Info			
Isotope:	Iodine-129		
Prepared By:	Michael Hilton		
Prep Date:	04/04/2011		
Verification Date:	03/30/2015		
Expiration Date:	03/30/2016		
Primary Code:	1470-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.4624 g		
Density(g/mL):	1.0125	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.4624 g) * (3451 Bq/g) * (60 dpm/Bq) / (100 mL) = 9239.8454 dpm/mL
(4.4624 g) * (3451 Bq/g) * (60 dpm/Bq) / (1.0125 g/mL) / (100 mL) = 9125.6201 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/11/2011	Michael Hilton	2.9988	100	1470-B	277.8282 dpm/mL	04/11/2011	04/11/2012
04/11/2011	Michael Hilton	1.0002	100	1470-C	92.6066 dpm/mL	04/11/2011	04/11/2012
08/18/2011	Andrew Willis	10.8742	100	1470-D	992.3382 dpm/mL	08/31/2011	08/31/2012
09/16/2011	Michael Hilton	10.112	100	1470-E	923.98454 dpm/mL	09/21/2012	09/21/2013
08/13/2012	Michael Hilton	.9995	100	1470-F	92.1545 dpm/mL	09/15/2011	09/15/2012
08/14/2012	Michael Hilton	10.0979	100	1470-G	936.206 dpm/mL	08/14/2012	08/13/2013
09/11/2012	Michael Hilton	10.0683	100	1470-H	923.98454 dpm/mL	09/08/2014	09/07/2015
05/13/2013	Michael Hilton	10.095	100	1470-I	923.98454 dpm/mL	05/27/2016	05/27/2017

06/10/2014	Michael Hilton	5.0681	1	1470-J	9239.8454 dpm/mL	06/13/2016	06/13/2017
03/27/2015	Michael Hilton	9.9722	100	1470-K	923.98454 dpm/mL	03/30/2016	03/30/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for I-129 Standard 1470-K

v1.1.2
Noah Postell
3/30/2016

Isotope	Result
I-129	pCi/L
I-129 N1	40
I-129 N2	43
I-129 N3	44

Mean Value (Counting) =	42.17	pCi/L	**101.327**	**Pass**
Stdev =	1.771	pCi/L		**Rule B (Pass/Fail)**
Certificate Value =	41.6	pCi/L		
Two sigma =	3.541769802			
10 % of Mean =	4.217333333			
Rule A (Pass/Fail)	**Pass**			

mm 9td
3-31-16

HBtampr
4/1/16

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
Rule B = The determined mean value shall be within 5% of the certificate value.

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

1556

Standard Radionuclide Source

84680-278
100 mL Solid in Aluminum Can

Customer: GEL Labs
P.O. No.: 489884RD, Item 3
Reference Date: 01-Apr-2011 12:00 PM EST **Grams of Master Source:** 0.0066498

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	1.129E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	7.538E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.659E+05	1.103E+03	0.6	2.3	4.8	HPGe
Co-57	122.1	2.718E+02	8.949E+04	5.951E+02	0.6	2.0	4.2	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	8.292E+02	0.6	1.9	4.0	HPGe
Hg-203	279.2	4.661E+01	2.899E+05	1.928E+03	0.6	1.9	4.0	HPGe
Sn-113	391.7	1.151E+02	1.739E+05	1.156E+03	0.6	1.9	4.0	HPGe
Cs-137	661.7	1.098E+04	1.107E+05	7.361E+02	0.8	1.9	4.1	HPGe
Y-88	898.0	1.066E+02	4.246E+05	2.824E+03	0.6	1.9	4.0	HPGe
Zn-65	1115.6	2.441E+02	———	1.445E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.118E+05	1.408E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.495E+05	2.989E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

RC-S-060-101

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

This standard will expire one year after the reference date.

Source Prepared by: M Williford
M. Williford, Radiochemist

QA Approved:
J. D. McCorvey, QA Manager Alternate

Date: 6/27/11



ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1968

Standard Logbook

Serial ID:	1556	**Open/Reference Date:**	01-APR-11	**Aliquot :**	1 mL
Name:	Mixed Gamma LCS CAN	**Received:**	01-APR-11	**Density :**	Hand Calculated
Type:	Source Material	**Expires:**	01-APR-37	**Lot Number :**	84680-278
Employee:	Maggie Stamps	**Verified:**	14-JUL-11		
Supplier:	Eckert & Zeigler Analytics				
Description:	84680-278				
Comments:	None				

Analyte	Concentration	Analyte	Concentration
Americium-241	125983.3 dpm/mL	Cesium-137	51898.9 dpm/mL
Cobalt-60	84496.9 dpm/mL		

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Pb-210**	**pCi/L**			
	Mixed Gamma N1	722900		Isotopic Abundance:	0.0425
	Mixed Gamma N2	752300		Certificate Value (dps):	1129
	Mixed Gamma N3	692100			
Mean Value (Counting) =	722433.33	pCi/L	100.622	**Pass**	
Stdev =	30102.713	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	717965.0	pCi/L			
Lower Limit =	662227.9072	pCi/L			
Upper Limit =	782638.7594	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	60205.42611				
10 % of Mean =	72243.33333				
Rule 2 (Pass/Fail)	**Pass**				

Verification Rules

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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.

mgH 7/20/11

H.Stamper 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Am-241	pCi/L
Mixed Gamma N1	58390
Mixed Gamma N2	60740
Mixed Gamma N3	57770

Isotopic Abundance: 0.359
Certificate Value (dps): 753.8

Mean Value (Counting) =	58966.67	pCi/L	**103.9074**	**Pass**
Stdev =	1566.727	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	56749.2	pCi/L		
Lower Limit =	55833.21277	pCi/L		
Upper Limit =	62100.12057	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	3133.453898			
10 % of Mean =	5896.666667			
Rule 2 (Pass/Fail)	**Pass**			

Verification Rules

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Rule 3 = The determined mean value shall be within 5% of the certificate value.

mgH 7/20/11
M. Stamps 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cd-109**	**pCi/L**			
	Mixed Gamma N1	818400		Isotopic Abundance:	0.037
	Mixed Gamma N2	798000		Certificate Value (dps):	1103
	Mixed Gamma N3	764700			
Mean Value (Counting) =	793700.00	pCi/L	**98.51091**	**Pass**	
Stdev =	27107.010	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	805697.6	pCi/L			
Lower Limit =	739485.9797	pCi/L			
Upper Limit =	847914.0203	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	54214.02033				
10 % of Mean =	79370				
Rule 2 (Pass/Fail)	**Pass**				

mgh 7/20/11

MStamps 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-57**	**pCi/L**			
	Mixed Gamma N1	19090		Isotopic Abundance:	0.856
	Mixed Gamma N2	18820		Certificate Value (dps):	595.1
	Mixed Gamma N3	18830			
Mean Value (Counting) =	18913.33	pCi/L	**100.6592**	**Pass**	
Stdev =	153.080	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	18789.5	pCi/L			
Lower Limit =	18607.17433	pCi/L			
Upper Limit =	19219.49233	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	306.1590001				
10 % of Mean =	1891.333333				
Rule 2 (Pass/Fail)	**Pass**				

mgh 7/20/11

MStamper 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Ce-139**	**pCi/L**			
	Mixed Gamma N1	28740		Isotopic Abundance:	0.8
	Mixed Gamma N2	29410		Certificate Value (dps):	829.2
	Mixed Gamma N3	27560			
Mean Value (Counting) =	28570.00	pCi/L	**101.9865**	**Pass**	
Stdev =	936.643	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	28013.5	pCi/L			
Lower Limit =	26696.71412	pCi/L			
Upper Limit =	30443.28588	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	1873.285883				
10 % of Mean =	2857				
Rule 2 (Pass/Fail)	**Pass**				

mgH 7/20/11

Verification Rules

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MStamps 7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Hg-203	**pCi/L**
Mixed Gamma N1	66300
Mixed Gamma N2	68180
Mixed Gamma N3	64480

Isotopic Abundance: 0.8156
Certificate Value (dps): 1928

Mean Value (Counting) =	66320.00	pCi/L	**103.8046**	**Pass**
Stdev =	1850.081	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	63889.3	pCi/L		
Lower Limit =	62619.83784	pCi/L		
Upper Limit =	70020.16216	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	3700.162159			
10 % of Mean =	6632			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

MStamper 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Sn-113**	**pCi/L**			
	Mixed Gamma N1	49560		Isotopic Abundance:	0.6497
	Mixed Gamma N2	49620		Certificate Value (dps):	1156
	Mixed Gamma N3	48300			
Mean Value (Counting) =	49160.00	pCi/L	**102.2277**	**Pass**	
Stdev =	745.386	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	48088.7	pCi/L			
Lower Limit =	47669.22839	pCi/L			
Upper Limit =	50650.77161	pCi/L			
Rule 1 Pass/Fail	**Pass**				
Two sigma =	1490.771612				
10 % of Mean =	4916				
Rule 2 (Pass/Fail)	**Pass**				

mgH 7/20/11

Hoffampl 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Cs-137**	**pCi/L**			
	Mixed Gamma N1	23710		Isotopic Abundance:	0.851
	Mixed Gamma N2	23950		Certificate Value (dps):	736.1
	Mixed Gamma N3	24040			
Mean Value (Counting) =	23900.00	pCi/L	**102.2333**	**Pass**	
Stdev =	170.587	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	23377.9	pCi/L			
Lower Limit =	23558.82556	pCi/L			
Upper Limit =	24241.17444	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	341.1744422				
10 % of Mean =	2390				
Rule 2 (Pass/Fail)	**Pass**				

7/20/11

Verification Rules

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M Stamps
7/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Y-88 (898)	pCi/L
Mixed Gamma N1	82690
Mixed Gamma N2	81320
Mixed Gamma N3	80940

Isotopic Abundance: 0.937
Certificate Value (dps): 2824

Mean Value (Counting) =	81650.00	pCi/L	**100.2381**	**Pass**
Stdev =	920.489	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	81456.1	pCi/L		
Lower Limit =	79809.022	pCi/L		
Upper Limit =	83490.978	pCi/L		
Rule 1 Pass/Fail	**Pass**			
Two sigma =	1840.978001			
10 % of Mean =	8165			
Rule 2 (Pass/Fail)	**Pass**			

mgN 7/20/11

Mystamp 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-60 (1173)**	**pCi/L**			
	Mixed Gamma N1	38910		Isotopic Abundance:	0.9985
	Mixed Gamma N2	39750		Certificate Value (dps):	1408
	Mixed Gamma N3	38840			
Mean Value (Counting) =	39166.67	pCi/L	**102.7694**	**Pass**	
Stdev =	506.392	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	38111.2	pCi/L			
Lower Limit =	38153.88173	pCi/L			
Upper Limit =	40179.45161	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	1012.784939				
10 % of Mean =	3916.666667				
Rule 2 (Pass/Fail)	**Pass**				

msgd 7/20/11

Mstamper 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton	**Isotope**	**Result**			
7/14/2011	**Co-60 (1332.50)**	**pCi/L**			
	Mixed Gamma N1	38940		Isotopic Abundance:	0.9998
	Mixed Gamma N2	40200		Certificate Value (dps):	1408
	Mixed Gamma N3	39150			
Mean Value (Counting) =	39430.00	pCi/L	**103.595**	**Pass**	
Stdev =	675.056	pCi/L		**Rule 3 (Pass/Fail)**	
Certificate Value =	38061.7	pCi/L			
Lower Limit =	38079.88889	pCi/L			
Upper Limit =	40780.11111	pCi/L			
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**			
Two sigma =	1350.111107				
10 % of Mean =	3943				
Rule 2 (Pass/Fail)	**Pass**				

mgw 7/20/11

MStamps 7/20/11

Verification Rules

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Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton
7/14/2011

Isotope	Result
Y-88 (1836.1)	pCi/L
Mixed Gamma N1	82870
Mixed Gamma N2	83080
Mixed Gamma N3	84640

Isotopic Abundance: 0.992
Certificate Value (dps): 2989

Mean Value (Counting) =	83530.00	pCi/L	**102.5723**	**Pass**
Stdev =	967.006	pCi/L		**Rule 3 (Pass/Fail)**
Certificate Value =	81435.3	pCi/L		
Lower Limit =	81595.98862	pCi/L		
Upper Limit =	85464.01138	pCi/L		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	1934.011375			
10 % of Mean =	8353			
Rule 2 (Pass/Fail)	**Pass**			

mgh 7/20/11

MStamper 7/20/11

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Runlogs

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 1596386**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXR1	GAM02	OCT-03-16 04:37:20	DONE	CAN	22-AUG-16 00:00
405240002	SAMPLE	MXR1	GAM25	OCT-03-16 04:54:22	DONE	CAN	01-AUG-16 00:00
405240003	SAMPLE	MXR1	GAM33	OCT-03-16 04:54:43	DONE	CAN	10-JUN-16 00:00
405240004	SAMPLE	MXR1	GAM41	OCT-03-16 04:55:28	DONE	CAN	26-JAN-16 00:00
405240005	SAMPLE	MXR1	GAM31	OCT-03-16 05:03:08	DONE	CAN	15-JUN-16 00:00
405240006	SAMPLE	MXR1	GAM43	OCT-03-16 05:03:30	DONE	CAN	06-SEP-16 00:00
1203621684	LCS	MXR1	GAM11	OCT-03-16 05:10:39	DONE	CAN	02-AUG-16 00:00
405240007	SAMPLE	MXR1	GAM01	OCT-03-16 05:38:25	DONE	CAN	20-JUL-16 00:00
405240008	SAMPLE	MXR1	GAM06	OCT-03-16 05:38:51	DONE	CAN	08-MAR-16 00:00
405240009	SAMPLE	MXR1	GAM07	OCT-03-16 05:39:22	DONE	CAN	19-AUG-16 00:00
405240010	SAMPLE	MXR1	GAM18	OCT-03-16 05:39:46	DONE	CAN	25-JUN-16 00:00
405240011	SAMPLE	MXR1	GAM24	OCT-03-16 05:40:12	DONE	CAN	17-JUN-16 00:00
405240012	SAMPLE	MXR1	GAM29	OCT-03-16 05:40:36	DONE	CAN	25-JUN-16 00:00
405240013	SAMPLE	MXR1	GAM30	OCT-03-16 05:41:01	DONE	CAN	11-MAR-16 00:00
405240014	SAMPLE	MXR1	GAM32	OCT-03-16 05:43:20	DONE	CAN	23-AUG-16 00:00
405240015	SAMPLE	MXR1	GAM39	OCT-03-16 05:43:43	DONE	CAN	27-JUL-16 00:00
405240016	SAMPLE	MXR1	GAM08	OCT-03-16 05:51:23	DONE	CAN	21-JUL-16 00:00
1203621682	MB	MXR1	GAM09	OCT-03-16 05:51:50	DONE	CAN	03-JUN-16 00:00
1203621683	DUP	MXR1	GAM19	OCT-03-16 05:52:21	DONE	CAN	15-JUN-16 00:00

Instrument Run Log

Instrument Type: GAMMA SPECTROMETER **Batch ID: 1598666**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	BSW1	XRAY2	SEP-29-16 08:37:37	DONE	I129	27-JUL-16 00:00
405240002	SAMPLE	BSW1	XRAY4	SEP-29-16 08:37:58	DONE	I129	17-JUN-16 00:00
405240003	SAMPLE	BSW1	XRAY5	SEP-29-16 08:38:23	DONE	I129	30-AUG-16 00:00
405240004	SAMPLE	BSW1	XRAY6	SEP-29-16 08:38:49	DONE	I129	26-JAN-16 00:00
405240005	SAMPLE	BSW1	GAM05	SEP-29-16 09:06:19	DONE	I129	06-SEP-16 00:00
405240006	SAMPLE	BSW1	XRAY2	SEP-29-16 09:12:21	DONE	I129	27-JUL-16 00:00
405240007	SAMPLE	BSW1	XRAY4	SEP-29-16 09:12:45	DONE	I129	17-JUN-16 00:00
405240008	SAMPLE	BSW1	XRAY5	SEP-29-16 09:13:06	DONE	I129	30-AUG-16 00:00
405240009	SAMPLE	BSW1	XRAY6	SEP-29-16 09:13:27	DONE	I129	26-JAN-16 00:00
405240010	SAMPLE	BSW1	GAM05	SEP-29-16 09:39:38	DONE	I129	06-SEP-16 00:00
405240011	SAMPLE	BSW1	XRAY2	SEP-29-16 09:53:15	DONE	I129	27-JUL-16 00:00
405240012	SAMPLE	BSW1	XRAY4	SEP-29-16 09:53:38	DONE	I129	17-JUN-16 00:00
405240013	SAMPLE	BSW1	XRAY5	SEP-29-16 09:54:01	DONE	I129	30-AUG-16 00:00
405240014	SAMPLE	BSW1	XRAY6	SEP-29-16 09:54:25	DONE	I129	26-JAN-16 00:00
405240015	SAMPLE	BSW1	XRAY1	SEP-29-16 11:04:08	DONE	I129	09-JUN-16 00:00
405240016	SAMPLE	BSW1	XRAY2	SEP-29-16 11:04:32	DONE	I129	27-JUL-16 00:00
1203627535	MB	BSW1	XRAY4	SEP-29-16 11:05:01	DONE	I129	17-JUN-16 00:00
1203627536	DUP	BSW1	XRAY5	SEP-29-16 11:05:29	DONE	I129	30-AUG-16 00:00
1203627537	MS	BSW1	XRAY6	SEP-29-16 11:05:53	DONE	I129	26-JAN-16 00:00
1203627538	LCS	BSW1	GAM05	SEP-29-16 11:06:19	DONE	I129	06-SEP-16 00:00

Gas Flow Raw Data

Batch# 1597807 Product: Sr Date: 9/29/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NV
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.			DER 1562922
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.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.			DER 1562922
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER 1562922
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.)	✓		

Primary Review Performed By: [signature] 1014 MJWC

Secondary Review Performed By: Amanda Tesh

1597807

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
29-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GFPC	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1597807	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 1203625429DUP, 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, and 405240016 were logged and analyzed out of holding.	1. Reporting results

Originator's Name:

Nat Long 29-SEP-16

Data Validator/Group Leader:

Theresa Austin 03-OCT-16

Prep Logbook

The Determination of Strontium 89/90 in Water, Soil, Milk, Filters, Vegetation and Tissues

Batch ID: **1597807**
Analyst: Bethany Fiem
Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
Lab SOP: GL-RAD-A-004 REV# 17
Instrument: BAL-18550299

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203625430	Strontium-90 SPIKE	1243-O	.1	mL

Sample ID	Prep Date	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Initial Wt (g)	Final Wt (g)	Net Wt (mg)	Sr Separation (date)	Strontium Carrier Yield (percent)
405240001	23-SEP-2016 13:13	D	0.333	0.333	0.0227	0.0304	7.7	09/27/16 11:45	105
405240002	23-SEP-2016 13:13	D	0.307	0.307	0.0231	0.0305	7.4	09/27/16 11:45	100
405240003	23-SEP-2016 13:13	D	0.331	0.331	0.0226	0.0297	7.1	09/27/16 11:45	96
405240004	23-SEP-2016 13:13	D	0.318	0.318	0.0226	0.0299	7.3	09/27/16 11:45	99
405240005	23-SEP-2016 13:13	D	0.338	0.338	0.0225	0.03	7.5	09/27/16 11:45	102
405240006	23-SEP-2016 13:13	D	0.306	0.306	0.0232	0.0302	7	09/27/16 11:45	95
405240007	23-SEP-2016 13:13	D	0.353	0.353	0.0232	0.0302	7	09/27/16 11:45	95
405240008	23-SEP-2016 13:13	D	0.326	0.326	0.0232	0.0304	7.2	09/27/16 11:45	98
405240009	23-SEP-2016 13:13	D	0.351	0.351	0.0233	0.0303	7	09/27/16 11:45	95
405240010	23-SEP-2016 13:13	D	0.362	0.362	0.0232	0.0304	7.2	09/27/16 11:45	98
405240011	23-SEP-2016 13:13	D	0.376	0.376	0.0235	0.0304	6.9	09/27/16 11:45	94
405240012	23-SEP-2016 13:13	D	0.317	0.317	0.0234	0.0306	7.2	09/27/16 11:45	98
405240013	23-SEP-2016 13:13	D	0.327	0.327	0.0229	0.0298	6.9	09/27/16 11:45	94
405240014	23-SEP-2016 13:13	D	0.36	0.36	0.0232	0.0302	7	09/27/16 11:45	95
405240015	23-SEP-2016 13:13	D	0.309	0.309	0.0228	0.03	7.2	09/27/16 11:45	98
405240016	23-SEP-2016 13:13	D	0.325	0.325	0.0232	0.0302	7	09/27/16 11:45	95
1203625428 MB	23-SEP-2016 13:13	D	0.376	0.376	0.0233	0.0302	6.9	09/27/16 11:45	94
1203625429 DUP (405240005)	23-SEP-2016 13:13	D	0.337	0.337	0.0228	0.0295	6.7	09/27/16 11:45	91
1203625430 LCS	23-SEP-2016 13:13	D	0.376	0.376	0.023	0.0293	6.3	09/27/16 11:45	86

Reagent/Solvent Lot ID	Description	Amount
2213530	0.05M HNO3	15 mL
2243751	RGF-6M Sodium Hydroxide	6 mL
2243757	RGF-0.75M Sodium Carbonate	13 mL
2280154.26	R-Hydrogen Peroxide	10 mL
2334614	Thymol Blue Indicator	.5 mL
2388714	RGF-80% Ethanol	3 mL
2414995	Sr 0.5mL=7.37, 2.0 mL=29.46 mg	.5 mL
2424020	RGF-3M Nitric/0.05M Oxalic	10 mL
2433863.1	SR SPEC RESIN Cleaned	2 g
2434028	RGF-Sr Filters	1 L
2434079	RGF-8M Nitric Acid	25 mL

Comments:
Spike Pipet ID: RAD-GFC-1795419
Carrier Pipet ID: RAD-GFC-2154115
Data Entry Date2: 23-SEP-2016 14:39 GFC-F30560 Bethany Fiem
Data Entry Date3: 27-SEP-2016 13:35 GFC-F30560 Bethany Fiem
Data Entry Date4: 23-SEP-2016 00:00

S1597807r2.xls

Strontium-90 Solid

Filename : SR90.XLS
File type : Excel
Version # : 1.3.10

Carrier S/N : 2414995
Carrier Exp Date : 6/3/2017
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 14.73
Carrier Weight StDev.: 0.10

Batch : 1597807
Analyst : BET01177
Prep Date : 9/23/2016
Method Uncertainty : 0.089724205

Geometry: Tuffryn Filter

Procedure Code :	GFC90SRS	
Parmname :	Strontium-90	
Required MDA :	2	pCi/G
Sr-90 Abundance :	1.00	
Halflife of Sr-90 :	28.90	years
Halflife of Y-90 :	64.053	hours

Sample Characteristics					Carrier Calculations				
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Carrier Weight (mg) (Standard)	Net Weight (mg) (Sample)	Net Weight StDev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
1	405240001.1	0.3330	3.2538E-03	12/15/2015 10:14	14.73	7.70	0.040425	0.5	0.001000
2	405240002.1	0.3070	3.2511E-03	12/15/2015 10:19	14.73	7.40	0.039135	0.5	0.001000
3	405240003.1	0.3310	3.2536E-03	12/15/2015 10:18	14.73	7.10	0.037846	0.5	0.001000
4	405240004.1	0.3180	3.2522E-03	12/15/2015 10:21	14.73	7.30	0.038705	0.5	0.001000
5	405240005.1	0.3380	3.2543E-03	12/15/2015 11:42	14.73	7.50	0.039565	0.5	0.001000
6	405240006.1	0.3060	3.2510E-03	12/15/2015 11:46	14.73	7.00	0.037416	0.5	0.001000
7	405240007.1	0.3530	3.2559E-03	12/15/2015 12:17	14.73	7.00	0.037416	0.5	0.001000
8	405240008.1	0.3260	3.2531E-03	12/15/2015 12:20	14.73	7.20	0.038276	0.5	0.001000
9	405240009.1	0.3510	3.2557E-03	12/15/2015 12:31	14.73	7.00	0.037416	0.5	0.001000
10	405240010.1	0.3620	3.2568E-03	12/15/2015 12:35	14.73	7.20	0.038276	0.5	0.001000
11	405240011.1	0.3760	3.2583E-03	12/15/2015 12:53	14.73	6.90	0.036986	0.5	0.001000
12	405240012.1	0.3170	3.2521E-03	12/15/2015 12:56	14.73	7.20	0.038276	0.5	0.001000
13	405240013.1	0.3270	3.2532E-03	12/15/2015 11:04	14.73	6.90	0.036986	0.5	0.001000
14	405240014.1	0.3600	3.2566E-03	12/15/2015 11:08	14.73	7.00	0.037416	0.5	0.001000
15	405240015.1	0.3090	3.2513E-03	12/15/2015 14:02	14.73	7.20	0.038276	0.5	0.001000
16	405240016.1	0.3250	3.2530E-03	12/15/2015 14:06	14.73	7.00	0.037416	0.5	0.001000
17	1203625428.1	0.3760	3.2583E-03	9/23/2016 0:00	14.73	6.90	0.036986	0.5	0.001000
18	1203625429.1	0.3370	3.2542E-03	12/15/2015 11:42	14.73	6.70	0.036127	0.5	0.001000
19	1203625430.1	0.3760	3.2583E-03	9/23/2016 0:00	14.73	6.30	0.034407	0.5	0.001000

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml

Analytical SOP: GL-RAD-A-004
Instrument SOP: GL-RAD-I-016

Count Raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Beta CPM	Count Start Date/Time	Strontium Separation Date/Time	Yttrium Ingrowth	Sr-90 Decay	Calculated Sample Recovery %	Sample Recovery Error %
1	1B	60	12	50	0.816	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	105%	1.03%
2	4D	60	7	60	0.995	9/29/2016 13:14	9/27/2016 11:45	0.418	0.981	100%	1.03%
3	7A	60	3	47	0.779	9/28/2016 8:05	9/27/2016 11:45	0.202	0.981	96.4%	1.03%
4	2B	60	5	19	0.293	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	99.1%	1.03%
5	2C	60	12	43	0.704	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	102%	1.03%
6	4A	60	10	47	0.775	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	95.0%	1.04%
7	4B	80	16	123	1.510	9/27/2016 14:32	9/27/2016 11:45	0.037	0.981	95.0%	1.04%
8	4C	60	7	31	0.511	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	97.8%	1.03%
9	4D	60	8	43	0.711	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	95.0%	1.04%
10	6A	60	7	48	0.793	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	97.8%	1.03%
11	6B	80	4	133	1.660	9/27/2016 14:31	9/27/2016 11:45	0.036	0.981	93.7%	1.04%
12	6C	60	7	50	0.828	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	97.8%	1.03%
13	8A	60	8	56	0.925	9/28/2016 8:06	9/27/2016 11:45	0.202	0.981	93.7%	1.04%
14	7B	60	3	25	0.414	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	95.0%	1.04%
15	7C	60	10	26	0.414	9/27/2016 14:31	9/27/2016 11:45	0.035	0.981	97.8%	1.03%
16	9D	60	6	64	1.061	9/28/2016 8:06	9/27/2016 11:45	0.202	0.981	95.0%	1.04%
17	8B	60	2	28	0.464	9/27/2016 14:30	9/27/2016 11:45	0.035	1.000	93.7%	1.04%
18	5A	60	7	80	1.327	9/29/2016 13:14	9/27/2016 11:45	0.418	0.981	91.0%	1.04%
19	8D	60	18	1302	21.685	9/27/2016 14:30	9/27/2016 11:45	0.035	1.000	85.5%	1.05%

Calibration Data

Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm) Sr-90	Detector Efficiency (cpm/dpm) Y-90	Detector Efficiency Error (cpm/dpm)	Alpha X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
1	PIC	4/1/2016	2/28/2017	0.4242	0.5497	0.00711	0.08494	1.118	9/23/2016 18:17	500
2	PIC	4/1/2016	2/28/2017	0.4128	0.5536	0.00773	0.04141	0.716	9/23/2016 18:18	500
3	PIC	4/1/2016	2/28/2017	0.4200	0.5546	0.00594	0.07889	0.824	9/23/2016 18:13	500
4	PIC	4/1/2016	2/28/2017	0.4007	0.5091	0.02111	0.27815	0.464	9/23/2016 18:17	500
5	PIC	4/1/2016	2/28/2017	0.4093	0.5331	0.01274	0.06492	0.526	9/23/2016 18:17	500
6	PIC	4/1/2016	2/28/2017	0.4185	0.5503	0.01123	0.04798	0.770	9/23/2016 18:18	500
7	PIC	4/1/2016	2/28/2017	0.4237	0.5578	0.01519	0.13583	1.540	9/23/2016 18:18	500
8	PIC	4/1/2016	2/28/2017	0.4255	0.5613	0.00889	0.04617	0.748	9/23/2016 18:18	500
9	PIC	4/1/2016	2/28/2017	0.4132	0.5536	0.00773	0.04062	0.716	9/23/2016 18:18	500
10	PIC	4/1/2016	2/28/2017	0.4129	0.5572	0.02228	0.06415	0.782	9/23/2016 18:13	500
11	PIC	4/1/2016	2/28/2017	0.4215	0.5616	0.00851	0.04529	1.642	9/23/2016 18:13	500
12	PIC	4/1/2016	2/28/2017	0.4223	0.5617	0.01970	0.04646	1.100	9/23/2016 18:13	500
13	PIC	4/1/2016	2/28/2017	0.4123	0.5573	0.01579	0.06451	1.076	9/23/2016 18:14	500
14	PIC	4/1/2016	2/28/2017	0.4301	0.5632	0.00627	0.05360	0.556	9/23/2016 18:14	500
15	PIC	4/1/2016	2/28/2017	0.4147	0.5415	0.00790	0.11787	0.444	9/23/2016 18:14	500
16	PIC	4/1/2016	2/28/2017	0.4211	0.5596	0.02610	0.05966	1.200	9/23/2016 18:15	500
17	PIC	4/1/2016	2/28/2017	0.4293	0.5567	0.02148	0.07595	0.376	9/23/2016 18:14	500
18	PIC	4/1/2016	2/28/2017	0.4332	0.5685	0.00851	0.05052	1.382	9/23/2016 18:18	500
19	PIC	4/1/2016	2/28/2017	0.4260	0.5674	0.00609	0.05135	0.868	9/23/2016 18:14	500

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

* - RPD changed to 0% due to sample & dup activity below MDA

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

LCS S/N : 1243-O
LCS Exp Date : 12/18/2016
LCS Activity (dpm/ml): 483.26
LCS Volume Added: 0.10

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 %	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	1.0010	0.7067	2	1.5621	**-0.8971**	41.75%	-0.3017	0.1259	0.7336	0.7337		SAMPLE				
2	0.6224	0.4394	2	0.9944	**0.6451**	48.11%	0.2792	0.1342	0.6079	0.6188		SAMPLE				
3	0.7815	0.5517	2	1.2386	**-0.1206**	271.21%	-0.0446	0.1210	0.6413	0.6413		SAMPLE				
4	0.7548	0.5329	2	1.2398	**-0.5935**	44.81%	-0.1705	0.0763	0.5204	0.5206		SAMPLE				
5	0.7197	0.5081	2	1.1721	**0.5539**	63.65%	0.1777	0.1130	0.6907	0.6980		SAMPLE				
6	1.0073	0.7111	2	1.6026	**0.0192**	2253.46%	0.0053	0.1203	0.8499	0.8500		SAMPLE				
7	1.0724	0.7571	2	1.6297	**-0.0914**	499.52%	-0.0297	0.1482	0.8946	0.8946		SAMPLE				
8	0.8910	0.6290	2	1.4199	**-0.7661**	42.31%	-0.2367	0.1001	0.6348	0.6349		SAMPLE				
9	0.8569	0.6050	2	1.3690	**-0.0151**	2427.32%	-0.0047	0.1153	0.7187	0.7187		SAMPLE				
10	0.8448	0.5964	2	1.3429	**0.0316**	1155.86%	0.0105	0.1215	0.7149	0.7150		SAMPLE				
11	1.0600	0.7483	2	1.6073	**0.0538**	850.21%	0.0182	0.1550	0.8959	0.8960		SAMPLE				
12	1.1194	0.7903	2	1.7483	**-0.9123**	46.55%	-0.2721	0.1265	0.8312	0.8313		SAMPLE				
13	0.9428	0.6656	2	1.4740	**-0.4319**	87.64%	-0.1513	0.1325	0.7416	0.7417		SAMPLE				
14	0.7081	0.4999	2	1.1490	**-0.4236**	63.05%	-0.1420	0.0895	0.5233	0.5234		SAMPLE				
15	0.7435	0.5249	2	1.2251	**-0.1062**	291.04%	-0.0303	0.0882	0.6061	0.6062		SAMPLE				
16	0.9702	0.6850	2	1.5090	**-0.3875**	101.77%	-0.1393	0.1417	0.7727	0.7727		SAMPLE				
17	0.5566	0.3929	2	0.9284	**0.2513**	104.56%	0.0881	0.0921	0.5149	0.5170		MB				
18	0.8355	0.5899	2	1.2914	**-0.1218**	289.15%	-0.0546	0.1578	0.6903	0.6904	405240005.1	DUP	* 0.0%			
19	0.9324	0.6583	2	1.4737	**65.4405**	3.26%	20.8166	0.6026	3.7131	12.2674		LCS			57.8952	113.0%

1597807r2.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
405240001	1B	60	12	50	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240002	4D	60	7	60	9/29/2016 13:14	9/29/2016 14:14	PIC	1597807
405240003	7A	60	3	47	9/28/2016 8:05	9/28/2016 9:05	PIC	1597807
405240004	2B	60	5	19	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240005	2C	60	12	43	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240006	4A	60	10	47	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240007	4B	80	16	123	9/27/2016 14:32	9/27/2016 15:52	PIC	1597807
405240008	4C	60	7	31	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240009	4D	60	8	43	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240010	6A	60	7	48	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240011	6B	80	4	133	9/27/2016 14:31	9/27/2016 15:51	PIC	1597807
405240012	6C	60	7	50	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240013	8A	60	8	56	9/28/2016 8:06	9/28/2016 9:06	PIC	1597807
405240014	7B	60	3	25	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240015	7C	60	10	26	9/27/2016 14:31	9/27/2016 15:31	PIC	1597807
405240016	9D	60	6	64	9/28/2016 8:06	9/28/2016 9:06	PIC	1597807
1203625428	8B	60	2	28	9/27/2016 14:30	9/27/2016 15:30	PIC	1597807
1203625429	5A	60	7	80	9/29/2016 13:14	9/29/2016 14:14	PIC	1597807
1203625430	8D	60	18	1302	9/27/2016 14:30	9/27/2016 15:30	PIC	1597807

Radiochemistry Batch Checklist

26-Sep-2016

Batch# 1597818 Product: GMB Date: 9/26/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.	/		
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	/		See case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			NA
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	/		
Sample was run within hold time.	9/27/16	✓	DER 1561539
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.	/		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER 1561539
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		
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.)	/		

Primary Review Performed By: [signature] 10/4 MJWC

Secondary Review Performed By: KOst 9/27/16

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
26-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GFPC	EPA 900.0/SW846 9310/SM 7110B Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1597818	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203625465, 1203625466, and 1203625467 were logged and analyzed out of holding.	1. Reporting results

Originator's Name:

Nat Long 26-SEP-16

Data Validator/Group Leader:

Kenshalla Oston 27-SEP-16

Logbook

The Determination of Gross Alpha And Gross Non-Volatile Beta in Soil, Filters, Solid Matrices And Direct Count Air Filters

Batch ID: 1597818

Due Dates for Lab: 30-SEP-2016 Hold: 12-JUN-2016 Package: 02-OCT-2016 SDG: 04-OCT-2016

Analyst: Jasmine Conley

Lab SOP: GL-RAD-A-001B REV# 17

Instrument: BAL-16107662

Method: EPA 900.0/SW846 9310/SM 7110B Modified

Sample ID	Run Date	#	Dry or Wet	Intermediate Aliquot	Unadjusted Aliquot (g)	Aliquot (g)	Initial Weight (g)	Final Weight (g)	Residue Weight (mg)	Detector
405240001	22-SEP-2016 11:09	1	D		0.101	0.101	7.6107	7.6313	20.6	7C
405240002	22-SEP-2016 11:09	2	D		0.102	0.102	7.5329	7.5574	24.5	6B
405240003	22-SEP-2016 11:09	3	D		0.11	0.11	7.5773	7.599	21.7	8C
405240004	22-SEP-2016 11:09	4	D		0.103	0.103	7.4908	7.5141	23.3	3D
405240005	22-SEP-2016 11:09	5	D		0.104	0.104	7.5496	7.5728	23.2	9C
405240006	22-SEP-2016 11:09	6	D		0.1	0.1	7.5739	7.6015	27.6	2B
405240007	22-SEP-2016 11:09	7	D		0.104	0.104	7.621	7.6421	21.1	3B
405240008	22-SEP-2016 11:09	8	D		0.1	0.1	7.6316	7.6535	21.9	6A
405240009	22-SEP-2016 11:09	9	D		0.102	0.102	7.6869	7.7094	22.5	5D
405240010	22-SEP-2016 11:09	10	D		0.103	0.103	7.5906	7.6128	22.2	8D
405240011	22-SEP-2016 11:09	11	D		0.099	0.099	7.5516	7.5725	20.9	7B
405240012	22-SEP-2016 11:09	12	D		0.103	0.103	7.5441	7.567	22.9	6C
405240013	22-SEP-2016 11:09	13	D		0.107	0.107	7.6306	7.6548	24.2	8A
405240014	22-SEP-2016 11:09	14	D		0.107	0.107	7.6002	7.6247	24.5	2C
405240015	22-SEP-2016 11:09	15	D		0.107	0.107	7.6431	7.6698	26.7	5A
405240016	22-SEP-2016 11:09	16	D		0.1	0.1	7.5798	7.6054	25.6	5C
1203625464 MB	22-SEP-2016 11:09	17	D		0.11	0.11	7.7309	7.7309	0	9A
1203625465 DUP (405240003)	22-SEP-2016 11:09	18	D		0.11	0.11	7.6044	7.626	21.6	4A
1203625466 MS (405240003)	22-SEP-2016 11:09	19	D		0.101	0.101	7.643	7.6576	14.6	3C
1203625467 MSD (405240003)	22-SEP-2016 11:09	20	D		0.101	0.101	7.6576	7.6766	19	4B
1203625468 LCS	22-SEP-2016 11:09	21	D		0.11	0.11	7.5765	7.5765	0	4C

Type	Name	Serial Number	Spike Amount	Spike Units
RGNT	RGF-Hydrochloric Acid	2361975.18	5	mL
RGNT	RGF-Hydrofluoric Acid	2429436.1	10	mL
RGNT	RGF-1M Nitric Acid	2438701	5	mL

Spike Pipet ID: RAD-GFC-4497063
Planchets Flamed: Yes

Logbook

The Determination of Gross Alpha And Gross Non-Volatile Beta in Soil, Filters, Solid Matrices And Direct Count Air Filters

Batch ID: 1597818

Analyst: Jasmine Conley

Instrument: BAL-16107662

Lab SOP: GL-RAD-A-001B REV# 17

Method: EPA 900.0/SW846 9310/SM 7110B Modified

Sample ID	Run Date	#	Dry or Wet	Intermediate Aliquot	Unadjusted Aliquot (g)	Aliquot (g)	Initial Weight (g)	Final Weight (g)	Residue Weight (mg)	Detector
RGNT	RGF-Nitric Acid		2454847.11		25	mL				
SPIKE	Strontium-90 SPIKE		1243-O		.1	mL				
SPIKE	Thorium-230 SPIKE		1493-B		.1	mL				

Spike Pipet ID: RAD-GFC-4497063
Planchets Flamed: Yes

Gross Alpha/Beta Solid

Filename : GAB.XLS
File type : Excel
Version # : 1.3.10

Batch : 1597818
Analyst : JAS02031
Prep Date : 9/22/2016
Alpha Method Uncertainty : 0.0928
Beta Method Uncertainty : 0.0628

Geometry: 2 inch Planchett

Procedure Code : GFCGANBS
Parmname1 : Alpha
Parmname2 : Beta
Required Alpha MDA : 4 pCi/G
Required Beta MDA : 10 pCi/G

Sample Characteristics						Count Raw Data				
Pos.	Sample ID	Sample Aliquot G	Sample Residue Wt. (mg)	Sample Aliquot StDev. G	Sample Date/Time	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Count Start Date/Time
1	405240001.1	0.1010	20.6	3.2296E-03	12/15/2015 10:14	7C	160	99	451	9/23/2016 15:23
2	405240002.1	0.1020	24.5	3.2297E-03	12/15/2015 10:19	6B	110	48	403	9/23/2016 15:23
3	405240003.1	0.1100	21.7	3.2305E-03	12/15/2015 10:18	8C	160	120	621	9/23/2016 15:23
4	405240004.1	0.1030	23.3	3.2298E-03	12/15/2015 10:21	3D	120	52	272	9/23/2016 15:24
5	405240005.1	0.1040	23.2	3.2299E-03	12/15/2015 11:42	9C	140	105	501	9/23/2016 15:23
6	405240006.1	0.1000	27.6	4.3713E-04	12/15/2015 11:46	2B	100	66	284	9/23/2016 15:24
7	405240007.1	0.1040	21.1	3.2299E-03	12/15/2015 12:17	3B	160	103	545	9/23/2016 15:24
8	405240008.1	0.1000	21.9	4.3713E-04	12/15/2015 12:20	6A	110	84	383	9/23/2016 15:23
9	405240009.1	0.1020	22.5	3.2297E-03	12/15/2015 12:31	5D	120	73	364	9/23/2016 15:24
10	405240010.1	0.1030	22.2	3.2298E-03	12/15/2015 12:35	8D	150	126	424	9/23/2016 15:23
11	405240011.1	0.0990	20.9	4.3283E-04	12/15/2015 12:53	7B	120	85	304	9/23/2016 15:23
12	405240012.1	0.1030	22.9	3.2298E-03	12/15/2015 12:56	6C	120	61	431	9/23/2016 15:24
13	405240013.1	0.1070	24.2	3.2302E-03	12/15/2015 11:04	8A	140	140	560	9/23/2016 15:24
14	405240014.1	0.1070	24.5	3.2302E-03	12/15/2015 11:08	2C	140	112	487	9/23/2016 15:24
15	405240015.1	0.1070	26.7	3.2302E-03	12/15/2015 14:02	5A	120	107	538	9/23/2016 15:24
16	405240016.1	0.1000	25.6	4.3713E-04	12/15/2015 14:06	5C	110	78	716	9/23/2016 15:24
17	1203625464.1	0.1100	0	3.2305E-03	9/22/2016 0:00	9A	60	11	62	9/23/2016 15:23
18	1203625465.1	0.1100	21.6	3.2305E-03	12/15/2015 10:18	4A	140	135	455	9/23/2016 15:23
19	1203625466.1	0.1010	14.6	3.2296E-03	12/15/2015 10:18	3C	60	350	2401	9/23/2016 15:23
20	1203625467.1	0.1010	19	3.2296E-03	12/15/2015 10:18	4B	60	339	2888	9/23/2016 15:23
21	1203625468.1	0.1100	0	3.2305E-03	9/22/2016 0:00	4C	60	478	3205	9/23/2016 15:23

Pipet, 0.1 ml Stdev : +/- 0.000200 ml
Pipet, 0.5 ml Stdev : +/- 0.001000 ml
Pipet, 1 ml Stdev : +/- 0.002000 ml

Analytical SOP: GL-RAD-A-001B
Instrument SOP: GL-RAD-I-016

Calibration Data		Alpha						Beta						Weekly Background			
														CPM			
Pos.	Counted on	Calibration Date	Calibration Due Date	Calibration Source Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Calibration Date	Calibration Due Date	Calibration Source Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Alpha	Beta	Count Start Date/Time	Count Time (min.)
1	PIC	12/1/2015	11/30/2016	Th230	0.1635	0.00790	0.13707	12/1/2015	11/30/2016	Sr90	0.4800	0.00790	0.00065	0.176	0.398	9/16/2016 17:58	500
2	PIC	12/1/2015	11/30/2016	Th230	0.1817	0.01195	0.06538	12/1/2015	11/30/2016	Sr90	0.4581	0.00851	0.00636	0.152	1.214	9/16/2016 17:58	500
3	PIC	12/1/2015	11/30/2016	Th230	0.1621	0.01321	0.19255	12/1/2015	11/30/2016	Sr90	0.4760	0.01955	0.00046	0.208	1.518	9/16/2016 17:58	500
4	PIC	12/1/2015	11/30/2016	Th230	0.1543	0.00657	0.07451	12/1/2015	11/30/2016	Sr90	0.4627	0.02297	0.00259	0.112	0.582	9/16/2016 17:25	500
5	PIC	12/1/2015	11/30/2016	Th230	0.1617	0.01265	0.08477	12/1/2015	11/30/2016	Sr90	0.4876	0.00584	0.00209	0.158	0.690	9/16/2016 17:59	500
6	PIC	12/1/2015	11/30/2016	Th230	0.1091	0.02011	0.33024	12/1/2015	11/30/2016	Sr90	0.4528	0.02111	0.00019	0.030	0.360	9/16/2016 17:24	500
7	PIC	12/1/2015	11/30/2016	Th230	0.1648	0.00853	0.06052	12/1/2015	11/30/2016	Sr90	0.4669	0.01614	0.01009	0.198	1.400	9/16/2016 17:25	500
8	PIC	12/1/2015	11/30/2016	Th230	0.1760	0.02108	0.08685	12/1/2015	11/30/2016	Sr90	0.4141	0.02228	0.00287	0.134	0.878	9/16/2016 17:58	500
9	PIC	12/1/2015	11/30/2016	Th230	0.1858	0.00639	0.06759	12/1/2015	11/30/2016	Sr90	0.4944	0.00925	0.00363	0.174	0.748	9/16/2016 17:26	500
10	PIC	12/1/2015	11/30/2016	Th230	0.1825	0.00794	0.06865	12/1/2015	11/30/2016	Sr90	0.4951	0.00609	0.00243	0.226	0.790	9/16/2016 17:58	500
11	PIC	12/1/2015	11/30/2016	Th230	0.1812	0.00479	0.07144	12/1/2015	11/30/2016	Sr90	0.5026	0.00627	0.00155	0.158	0.466	9/16/2016 17:58	500
12	PIC	12/1/2015	11/30/2016	Th230	0.1766	0.01553	0.03729	12/1/2015	11/30/2016	Sr90	0.4603	0.01970	0.00732	0.162	0.978	9/16/2016 17:58	500
13	PIC	12/1/2015	11/30/2016	Th230	0.1658	0.01473	0.08577	12/1/2015	11/30/2016	Sr90	0.4875	0.01579	0.00165	0.186	0.818	9/16/2016 17:58	500
14	PIC	12/1/2015	11/30/2016	Th230	0.1452	0.01156	0.08275	12/1/2015	11/30/2016	Sr90	0.4262	0.01274	0.00315	0.132	0.506	9/16/2016 17:24	500
15	PIC	12/1/2015	11/30/2016	Th230	0.1684	0.00491	0.07410	12/1/2015	11/30/2016	Sr90	0.4930	0.00851	0.00290	0.148	1.386	9/16/2016 17:25	500
16	PIC	12/1/2015	11/30/2016	Th230	0.1770	0.01161	0.06067	12/1/2015	11/30/2016	Sr90	0.4986	0.00657	0.00367	0.132	0.856	9/16/2016 17:25	500
17	PIC	12/1/2015	11/30/2016	Th230	0.2777	0.00726	0.09988	12/1/2015	11/30/2016	Sr90	0.5008	0.00758	0.00085	0.188	0.846	9/16/2016 17:58	500
18	PIC	12/1/2015	11/30/2016	Th230	0.1606	0.01036	0.06871	12/1/2015	11/30/2016	Sr90	0.4707	0.01123	0.00431	0.176	0.700	9/16/2016 17:25	500
19	PIC	12/1/2015	11/30/2016	Th230	0.1965	0.00568	0.05101	12/1/2015	11/30/2016	Sr90	0.4773	0.00988	0.00835	0.240	0.556	9/16/2016 17:25	500
20	PIC	12/1/2015	11/30/2016	Th230	0.1542	0.00704	0.16199	12/1/2015	11/30/2016	Sr90	0.4876	0.01519	0.00026	0.182	1.560	9/16/2016 17:25	500
21	PIC	12/1/2015	11/30/2016	Th230	0.2856	0.01587	0.02894	12/1/2015	11/30/2016	Sr90	0.4874	0.00889	0.00300	0.234	0.738	9/16/2016 17:25	500

Notes:
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Alpha Spike S/N : 1493-B
Spike Exp Date : 6/8/2017
Spike Activity (dpm/ml): 266.08
Spike Volume Added: 0.10
Spike Nuclide: Th-230

Alpha LCS S/N : 1493-B
LCS Exp Date : 6/8/2017
LCS Activity (dpm/ml): 266.08
LCS Volume Added: 0.10
LCS Nuclide: Th-230

Alpha 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 %	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	2.4213	1.7094	4	3.9302	**12.0243**	15.04%	0.4428	0.0650	3.4719	4.1815		SAMPLE				
2	2.3254	1.6417	4	3.9464	**6.3460**	23.23%	0.2844	0.0654	3.1135	3.3889		SAMPLE				
3	2.4383	1.7215	4	3.9166	**13.6472**	13.57%	0.5420	0.0714	3.5372	4.4115		SAMPLE				
4	2.2467	1.5862	4	3.8810	**8.9412**	19.54%	0.3213	0.0619	3.4404	3.8610		SAMPLE				
5	2.3719	1.6746	4	3.9231	**15.6559**	13.16%	0.5920	0.0753	3.9540	5.0038		SAMPLE				
6	1.8261	1.2892	4	3.8176	**26.0000**	13.12%	0.6300	0.0816	6.6069	8.1949		SAMPLE				
7	2.4756	1.7478	4	3.9885	**10.8148**	15.26%	0.4458	0.0665	3.4253	4.1016		SAMPLE				
8	2.2990	1.6231	4	3.9443	**15.8599**	13.66%	0.6296	0.0849	4.2597	5.2153		SAMPLE				
9	2.3478	1.6576	4	3.9092	**10.0594**	17.25%	0.4343	0.0736	3.4282	3.9628		SAMPLE				
10	2.4717	1.7450	4	3.9694	**14.5526**	13.08%	0.6140	0.0778	3.6547	4.6253		SAMPLE				
11	2.3639	1.6690	4	3.9656	**13.7199**	14.34%	0.5503	0.0789	3.8810	4.6271		SAMPLE				
12	2.3603	1.6664	4	3.9518	**7.9241**	19.81%	0.3463	0.0675	3.2770	3.6766		SAMPLE				
13	2.4394	1.7223	4	3.9886	**20.4985**	11.17%	0.8140	0.0867	4.3137	5.8813		SAMPLE				
14	2.3471	1.6571	4	3.9356	**19.0524**	12.02%	0.6680	0.0773	4.3944	5.7645		SAMPLE				
15	2.2781	1.6084	4	3.8418	**18.2684**	12.21%	0.7437	0.0879	4.3074	5.5886		SAMPLE				
16	2.2682	1.6014	4	3.8967	**14.0756**	14.25%	0.5771	0.0819	4.0849	4.8935		SAMPLE				
17	2.0353	1.4370	4	3.6112	**-0.0818**	1255.28%	-0.0047	0.0586	1.6931	1.6937		MB				
18	2.3837	1.6829	4	3.9123	**19.7464**	11.23%	0.7883	0.0851	4.2532	5.7416	405240003.1	DUP	36.5%	1.6510		
19	3.5400	2.4992	4	6.1334	**119.3805**	6.46%	5.5933	0.3126	13.9063	28.1422	405240003.1	MS			118.6691	89.1%
20	3.9287	2.7737	4	6.9937	**157.8168**	6.51%	5.4680	0.3075	17.4326	35.1382	405240003.1	MSD	27.7%	1.6734	118.6691	121.5%
21	2.2082	1.5590	4	3.8350	**108.5882**	5.78%	7.7327	0.3650	10.2594	23.7624		LCS			108.9598	99.7%

Notes:
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Beta Spike S/N : 1243-O
Spike Exp Date : 12/18/2016
Spike Activity (dpm/ml): 483.29
Spike Volume Added: 0.10
Spike Nuclide: Sr-90

Beta LCS S/N : 1243-O
LCS Exp Date : 12/18/2016
LCS Activity (dpm/ml): 483.29
LCS Volume Added: 0.10
LCS Nuclide: Sr-90

Beta 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 %	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	1.2405	0.8758	10	1.9258	**21.7035**	6.50%	2.4208	0.1357	2.4711	3.9848		SAMPLE				
2	2.6065	1.8402	10	3.9433	**23.3407**	8.38%	2.4496	0.1890	3.5719	4.8488		SAMPLE				
3	2.2430	1.5835	10	3.3284	**19.0865**	7.83%	2.3633	0.1652	2.7854	3.9995		SAMPLE				
4	1.7079	1.2058	10	2.6479	**15.6184**	9.26%	1.6847	0.1416	2.6234	3.4923		SAMPLE				
5	1.6438	1.1605	10	2.5113	**25.0918**	6.50%	2.8886	0.1641	2.8575	4.5457		SAMPLE				
6	1.5233	1.0755	10	2.4494	**22.5009**	7.21%	2.4800	0.1706	3.3270	4.6233		SAMPLE				
7	2.3230	1.6401	10	3.4541	**18.2504**	8.49%	2.0063	0.1552	2.8221	3.8526		SAMPLE				
8	2.5012	1.7658	10	3.8284	**27.6033**	7.38%	2.6038	0.1828	3.8971	5.3788		SAMPLE				
9	1.8299	1.2919	10	2.8072	**20.0475**	7.88%	2.2853	0.1636	2.8649	4.0329		SAMPLE				
10	1.7031	1.2024	10	2.5815	**17.4822**	7.71%	2.0367	0.1429	2.4745	3.5066		SAMPLE				
11	1.4636	1.0333	10	2.2929	**18.2558**	7.22%	2.0673	0.1485	2.6342	3.5105		SAMPLE				
12	2.2255	1.5712	10	3.3800	**24.6532**	7.77%	2.6137	0.1786	3.3254	4.8632		SAMPLE				
13	1.7400	1.2284	10	2.6419	**26.7360**	6.44%	3.1820	0.1738	2.9416	4.8433		SAMPLE				
14	1.5653	1.1051	10	2.4219	**28.7062**	6.32%	2.9726	0.1608	3.1131	5.1290		SAMPLE				
15	2.3812	1.6811	10	3.5757	**25.8853**	7.19%	3.0973	0.2003	3.3530	4.9483		SAMPLE				
16	2.0511	1.4481	10	3.1425	**50.6837**	4.44%	5.6531	0.2467	4.3693	7.6964		SAMPLE				
17	2.3943	1.6904	10	3.7897	**1.3822**	73.48%	0.1873	0.1375	2.2043	2.2142		MB				
18	1.6217	1.1450	10	2.4763	**21.6092**	6.91%	2.5500	0.1569	2.6754	4.0601	405240003.1	DUP	12.4%			
19	2.2179	1.5658	10	3.5988	**365.9189**	3.94%	39.4607	0.8173	14.9682	53.5583	405240003.1	MS			431.0893	80.5%
20	3.6367	2.5676	10	5.5925	**417.6175**	4.03%	46.5733	0.8974	16.0882	62.3046	405240003.1	MSD	13.2%		431.0893	92.4%
21	2.2978	1.6223	10	3.6646	**440.6785**	3.55%	52.6787	0.9443	15.5514	62.5982		LCS			395.8183	111.3%

1597818.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
405240001	7C	160	99	451	9/23/2016 15:23	9/23/2016 18:03	PIC	1597818
405240002	6B	110	48	403	9/23/2016 15:23	9/23/2016 17:13	PIC	1597818
405240003	8C	160	120	621	9/23/2016 15:23	9/23/2016 18:03	PIC	1597818
405240004	3D	120	52	272	9/23/2016 15:24	9/23/2016 17:24	PIC	1597818
405240005	9C	140	105	501	9/23/2016 15:23	9/23/2016 17:43	PIC	1597818
405240006	2B	100	66	284	9/23/2016 15:24	9/23/2016 17:04	PIC	1597818
405240007	3B	160	103	545	9/23/2016 15:24	9/23/2016 18:04	PIC	1597818
405240008	6A	110	84	383	9/23/2016 15:23	9/23/2016 17:13	PIC	1597818
405240009	5D	120	73	364	9/23/2016 15:24	9/23/2016 17:24	PIC	1597818
405240010	8D	150	126	424	9/23/2016 15:23	9/23/2016 17:53	PIC	1597818
405240011	7B	120	85	304	9/23/2016 15:23	9/23/2016 17:23	PIC	1597818
405240012	6C	120	61	431	9/23/2016 15:24	9/23/2016 17:24	PIC	1597818
405240013	8A	140	140	560	9/23/2016 15:24	9/23/2016 17:44	PIC	1597818
405240014	2C	140	112	487	9/23/2016 15:24	9/23/2016 17:44	PIC	1597818
405240015	5A	120	107	538	9/23/2016 15:24	9/23/2016 17:24	PIC	1597818
405240016	5C	110	78	716	9/23/2016 15:24	9/23/2016 17:14	PIC	1597818
1203625464	9A	60	11	62	9/23/2016 15:23	9/23/2016 16:23	PIC	1597818
1203625465	4A	140	135	455	9/23/2016 15:23	9/23/2016 17:43	PIC	1597818
1203625466	3C	60	350	2401	9/23/2016 15:23	9/23/2016 16:23	PIC	1597818
1203625467	4B	60	339	2888	9/23/2016 15:23	9/23/2016 16:23	PIC	1597818
1203625468	4C	60	478	3205	9/23/2016 15:23	9/23/2016 16:23	PIC	1597818

Continuing Calibration Data

Gas Flow Proportional Counter Checks for 23-Sep-2016

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A3	Below	Alpha eff	23-Sep 11:36	5	8874	9142	11120	-3.81
LB4100B2	Below	Alpha eff	23-Sep 07:02	5	7531	9043	10550	-9.02
LB4100B2	Above	Beta bkg	23-Sep 11:44	60	7.650	0.992	2.051	+34.73
LB4100B3	Below	Alpha bkg	23-Sep 05:49	60	0.117	0.121	0.383	-3.10
LB4100B3	Below	Alpha eff	23-Sep 07:02	5	9981	13770	17610	-8.92
LB4100B3	Above	Alpha XTalk	23-Sep 07:02	5	0.567	0.308	0.393	+15.15
LB4100B3	Above	Beta bkg	23-Sep 05:49	60	71.683	0.965	1.943	+430.94
LB4100B4	Below	Alpha eff	23-Sep 07:02	5	11712	12260	14720	-4.34
LB4100B4	Above	Alpha XTalk	23-Sep 07:02	5	0.361	0.273	0.337	+5.27
LB4100C1	Above	Alpha bkg	23-Sep 05:53	60	0.350	0.149	0.367	+2.52
LB4100C3	Below	Alpha eff	23-Sep 11:18	5	5257	6624	9128	-6.28
LB4100C3	Above	Alpha XTalk	23-Sep 11:18	5	0.464	0.248	0.368	+7.79
LB4100C4	need 2nd	Alpha bkg	23-Sep 05:53	60	0.250	4.08E-6	0.304	+1.93
LB4100C4	Above	Beta bkg	23-Sep 05:53	60	128	0.686	2.113	+533.03
LB4100E1	Above	Beta bkg	23-Sep 10:56	60	15.517	0.637	2.392	+47.87
LB4100E2	Above	Beta bkg	23-Sep 10:56	60	3.933	1.061	2.316	+10.73
LB4100E3	need 2nd	Beta bkg	23-Sep 10:56	60	1.833	0.463	2.359	+1.34
LB4100E4	Above	Alpha bkg	23-Sep 10:56	60	0.367	-6.65E-2	0.309	+3.92
LB4100E4	Above	Beta bkg	23-Sep 10:56	60	4.750	0.650	2.302	+11.89
LB4100F1	Below	Alpha eff	23-Sep 10:45	5	10371	10840	11730	-6.16
LB4100F1	Above	Alpha XTalk	23-Sep 10:45	5	0.269	0.224	0.265	+3.54
LB4100F1	need 2nd	Beta eff	23-Sep 10:37	5	45920	45650	49940	-2.62
LB4100F2	Above	Beta bkg	23-Sep 10:57	60	2.133	0.575	1.803	+4.61
LB4100H4	Below	Alpha eff	23-Sep 10:37	5	10800	11490	13890	-4.73
LB4100H4	Above	Alpha XTalk	23-Sep 10:37	5	0.400	0.307	0.379	+4.75
LB4100H4	Below	Beta eff	23-Sep 10:45	5	34315	35210	36600	-6.86
LB4100I3	Above	Beta bkg	23-Sep 11:09	60	2.183	0.091	2.093	+3.27
LB4100I4	Below	Alpha eff	23-Sep 12:12	5	11515	12310	13620	-6.64
LB4100I4	Below	Alpha XTalk	23-Sep 12:12	5	0.188	0.189	0.219	-3.05
LB4100I4	need 2nd	Beta bkg	23-Sep 05:49	60	1.083	0.958	1.734	-2.03

LB4100I4	Below	Beta eff	23-Sep 07:02	5	20276	20380	21610	-3.51
PIC2D	Above	Alpha bkg	23-Sep 10:36	60	0.583	0.006	0.407	+5.64
PIC2D	Below	Alpha eff	23-Sep 05:53	5	14713	16200	17080	-13.14
PIC2D	Above	Alpha XTalk	23-Sep 05:53	5	0.426	0.242	0.304	+14.87
PIC2D	Below	Beta eff	23-Sep 06:00	5	33508	39480	42300	-15.71
PIC3A	Above	Alpha XTalk	23-Sep 06:00	5	0.286	0.240	0.267	+7.29
PIC3A	Below	Beta XTalk	23-Sep 05:53	5	7.60E-4	0.011	0.029	-6.62
PIC5B	Above	Alpha bkg	23-Sep 10:34	60	0.317	0.107	0.374	+1.72
PIC10D	Below	Alpha eff	23-Sep 11:51	5	11968	15350	16570	-19.63
PIC10D	Above	Alpha XTalk	23-Sep 11:51	5	0.756	0.303	0.427	+18.85
PIC10D	Below	Beta eff	23-Sep 10:58	5	30970	40190	43320	-20.67
PIC12C	need 2nd	Alpha bkg	23-Sep 12:08	60	0.267	0.010	0.413	+0.83
PIC14D	Above	Beta eff	23-Sep 12:41	5	42592	40480	42120	+4.73

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by _____

Date 9/23/16

GEL Laboratories LLC

Gas Flow Proportional Counter Checks for 27-Sep-2016

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A3	Below	Alpha eff	27-Sep 06:17	5	8876	9142	11120	-3.81
LB4100B2	need 2nd	Beta bkg	27-Sep 05:03	60	1.917	0.992	2.051	+2.24
LB4100B3	Above	Alpha bkg	27-Sep 05:03	60	0.383	0.121	0.383	+3.00
LB4100C3	Below	Alpha eff	27-Sep 06:46	5	5995	6624	9128	-4.51
LB4100C3	Above	Alpha XTalk	27-Sep 06:46	5	0.416	0.248	0.368	+5.36
LB4100C4	Above	Beta bkg	27-Sep 05:06	60	13.633	0.686	2.113	+51.42
LB4100E1	Above	Beta bkg	27-Sep 05:03	60	8.733	0.637	2.392	+24.68
LB4100E2	Above	Beta bkg	27-Sep 05:03	60	3.217	1.061	2.316	+7.31
LB4100E3	Above	Alpha bkg	27-Sep 05:03	60	0.350	-8.16E-2	0.346	+3.05
LB4100E3	Above	Beta bkg	27-Sep 05:03	60	3.983	0.463	2.359	+8.14
LB4100E4	Above	Beta bkg	27-Sep 05:03	60	2.417	0.650	2.302	+3.42
LB4100F1	Below	Alpha eff	27-Sep 06:59	5	10464	10840	11730	-5.53
LB4100F1	Above	Alpha XTalk	27-Sep 06:59	5	0.268	0.224	0.265	+3.42
LB4100H4	Below	Alpha eff	27-Sep 06:24	5	10622	11490	13890	-5.17
LB4100H4	Above	Alpha XTalk	27-Sep 06:24	5	0.418	0.307	0.379	+6.23
LB4100H4	Below	Beta eff	27-Sep 06:31	5	34394	35210	36600	-6.52
LB4100I3	Above	Beta bkg	27-Sep 05:03	60	2.450	0.091	2.093	+4.07
LB4100I3	Below	Beta eff	27-Sep 06:17	5	17122	17160	17920	-3.30
LB4100I4	Below	Alpha eff	27-Sep 06:10	5	11565	12310	13620	-6.41
LB4100I4	need 2nd	Alpha XTalk	27-Sep 06:10	5	0.191	0.189	0.219	-2.52
LB4100I4	Below	Beta bkg	27-Sep 05:03	60	0.767	0.958	1.734	-4.48
LB4100I4	Below	Beta eff	27-Sep 06:17	5	20345	20380	21610	-3.17
PIC3A	need 2nd	Alpha XTalk	27-Sep 05:09	5	0.265	0.240	0.267	+2.75
PIC3A	Below	Beta XTalk	27-Sep 05:03	5	0.001	0.011	0.029	-6.40
PIC3D	Above	Alpha bkg	27-Sep 06:30	60	0.317	-6.75E-2	0.338	+2.69
PIC5B	Above	Alpha bkg	27-Sep 06:38	60	0.383	0.107	0.374	+3.22
PIC5C	Above	Alpha bkg	27-Sep 06:39	60	0.350	-1.81E-2	0.382	+2.52
PIC7D	Above	Alpha bkg	27-Sep 07:40	60	0.383	-1.11E-2	0.349	+3.58

PIC10A	need 2nd	Alpha eff	27-Sep 05:27	5	8986	8854	10610	-2.55
PIC10A	Below	Beta eff	27-Sep 05:34	5	44152	44740	53240	-3.42
PIC10D	Below	Alpha eff	27-Sep 05:27	5	11828	15350	16570	-20.32
PIC10D	Above	Alpha XTalk	27-Sep 05:27	5	0.771	0.303	0.427	+19.62
PIC10D	Below	Beta eff	27-Sep 05:34	5	31335	40190	43320	-19.97
PIC11A	Above	Alpha bkg	27-Sep 07:01	60	0.383	0.029	0.365	+3.34
PIC12A	Above	Alpha bkg	27-Sep 07:02	60	0.333	0.067	0.379	+2.12
PIC12C	need 2nd	Alpha bkg	27-Sep 05:51	60	0.283	0.010	0.413	+1.07
PIC12C	need 2nd	Beta bkg	27-Sep 05:51	60	0.917	-3.86E-2	2.074	-0.29

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by R. Brink Hannon

Date 9-27-16

GEL Laboratories LLC

Gas Flow Proportional Counter Checks for 28-Sep-2016

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A3	Below	Alpha eff	28-Sep 05:51	5	8875	9142	11120	-3.81
LB4100B3	need 2nd	Alpha bkg	28-Sep 04:42	60	0.283	0.121	0.383	+0.71
LB4100C1	Above	Alpha bkg	28-Sep 04:44	60	0.500	0.149	0.367	+6.64
LB4100C3	Below	Alpha eff	28-Sep 06:22	5	6093	6624	9128	-4.27
LB4100C3	Above	Alpha XTalk	28-Sep 06:22	5	0.409	0.248	0.368	+5.03
LB4100C4	Above	Alpha bkg	28-Sep 04:44	60	0.483	4.08E-6	0.304	+6.54
LB4100C4	Above	Beta bkg	28-Sep 04:44	60	10.667	0.686	2.113	+38.95
LB4100E1	Above	Beta bkg	28-Sep 04:42	60	6.400	0.637	2.392	+16.70
LB4100E2	Above	Beta bkg	28-Sep 04:42	60	2.667	1.061	2.316	+4.68
LB4100E3	need 2nd	Alpha bkg	28-Sep 04:42	60	0.067	-8.16E-2	0.346	-0.92
LB4100E3	Above	Beta bkg	28-Sep 04:42	60	2.167	0.463	2.359	+2.39
LB4100E4	Above	Beta bkg	28-Sep 04:42	60	2.433	0.650	2.302	+3.48
LB4100F1	Below	Alpha bkg	28-Sep 04:42	60	0.033	0.059	0.384	-3.47
LB4100F1	Below	Alpha eff	28-Sep 06:06	5	10556	10840	11730	-4.92
LB4100F1	Above	Alpha XTalk	28-Sep 06:06	5	0.267	0.224	0.265	+3.21
LB4100F1	Below	Beta eff	28-Sep 05:58	5	45647	45650	49940	-3.00
LB4100F2	Below	Beta eff	28-Sep 06:40	5	18321	18400	19480	-3.44
LB4100H4	Below	Alpha eff	28-Sep 05:58	5	10597	11490	13890	-5.23
LB4100H4	Above	Alpha XTalk	28-Sep 05:58	5	0.416	0.307	0.379	+6.05
LB4100H4	Below	Beta eff	28-Sep 06:06	5	34282	35210	36600	-7.00
LB4100I3	Below	Beta eff	28-Sep 07:38	5	17015	17160	17920	-4.14
LB4100I4	Below	Alpha eff	28-Sep 05:45	5	11386	12310	13620	-7.23
LB4100I4	Below	Beta bkg	28-Sep 04:42	60	0.867	0.958	1.734	-3.70
LB4100I4	Below	Beta eff	28-Sep 05:51	5	20161	20380	21610	-4.07
PIC2D	Above	Alpha bkg	28-Sep 04:57	60	0.350	0.006	0.407	+2.15
PIC3A	Above	Alpha XTalk	28-Sep 04:50	5	0.269	0.240	0.267	+3.61
PIC3A	Below	Beta XTalk	28-Sep 04:43	5	0.001	0.011	0.029	-6.43
PIC6B	Above	Beta bkg	28-Sep 07:34	60	2.083	0.657	2.252	+2.37

PIC8D	Above	Alpha bkg	28-Sep 06:20	60	0.317	0.004	0.401	+1.72
PIC9C	Above	Alpha bkg	28-Sep 06:44	60	0.333	-2.53E-2	0.365	+2.52
PIC9C	Below	Alpha eff	28-Sep 05:08	5	9732	9741	10420	-3.08
PIC10A	Below	Beta eff	28-Sep 05:16	5	44641	44740	53240	-3.07
PIC10D	Below	Alpha eff	28-Sep 05:08	5	12062	15350	16570	-19.17
PIC10D	Above	Alpha XTalk	28-Sep 05:08	5	0.737	0.303	0.427	+17.97
PIC10D	Below	Beta eff	28-Sep 05:16	5	32143	40190	43320	-18.42
PIC12C	Above	Alpha bkg	28-Sep 05:33	60	0.317	0.010	0.413	+1.57

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by R. Dirk-Hansen

Date 9-28-16

GEL Laboratories LLC

Gas Flow Proportional Counter Checks for 29-Sep-2016

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A3	Below	Alpha eff	29-Sep 06:35	5	8809	9142	11120	-4.01
LB4100B1	need 2nd	Alpha bkg	29-Sep 06:49	60	0.233	-7.77E-2	0.363	+1.23
LB4100B1	Above	Beta bkg	29-Sep 06:49	60	1.700	0.703	1.635	+3.42
LB4100B2	Above	Alpha bkg	29-Sep 05:20	60	0.317	0.096	0.359	+2.03
LB4100B3	Above	Alpha bkg	29-Sep 05:20	60	0.383	0.121	0.383	+3.00
LB4100B3	Above	Beta bkg	29-Sep 05:20	60	2.083	0.965	1.943	+3.86
LB4100C1	Above	Alpha bkg	29-Sep 05:22	60	0.533	0.149	0.367	+7.55
LB4100C3	Below	Alpha eff	29-Sep 07:05	5	5838	6624	9128	-4.88
LB4100C3	Above	Alpha XTalk	29-Sep 07:05	5	0.421	0.248	0.368	+5.65
LB4100C4	need 2nd	Alpha bkg	29-Sep 05:22	60	0.283	4.08E-6	0.304	+2.59
LB4100C4	Above	Beta bkg	29-Sep 05:22	60	7.850	0.686	2.113	+27.11
LB4100E1	Above	Beta bkg	29-Sep 05:20	60	5.400	0.637	2.392	+13.28
LB4100E2	Above	Beta bkg	29-Sep 05:20	60	2.517	1.061	2.316	+3.96
LB4100E3	need 2nd	Beta bkg	29-Sep 05:20	60	1.817	0.463	2.359	+1.28
LB4100E4	Above	Beta bkg	29-Sep 05:20	60	2.333	0.650	2.302	+3.11
LB4100F1	need 2nd	Alpha bkg	29-Sep 05:20	60	0.150	0.059	0.384	-1.32
LB4100F1	Below	Alpha eff	29-Sep 06:52	5	10585	10840	11730	-4.72
LB4100F1	need 2nd	Alpha XTalk	29-Sep 06:52	5	0.265	0.224	0.265	+2.97
LB4100F1	Below	Beta eff	29-Sep 06:44	5	45465	45650	49940	-3.26
LB4100F2	Below	Beta eff	29-Sep 06:44	5	18323	18400	19480	-3.43
LB4100H4	Below	Alpha eff	29-Sep 06:44	5	10469	11490	13890	-5.55
LB4100H4	Above	Alpha XTalk	29-Sep 06:44	5	0.413	0.307	0.379	+5.83
LB4100H4	Below	Beta eff	29-Sep 06:52	5	34209	35210	36600	-7.32
LB4100I3	Below	Beta eff	29-Sep 07:14	5	17033	17160	17920	-4.00
LB4100I4	Below	Alpha eff	29-Sep 06:26	5	11442	12310	13620	-6.98
LB4100I4	Below	Beta bkg	29-Sep 05:20	60	0.700	0.958	1.734	-4.99
LB4100I4	Below	Beta eff	29-Sep 06:35	5	20152	20380	21610	-4.11
PIC1C	Below	Beta eff	29-Sep 07:00	5	21059	21130	22410	-3.33

PIC2D	Above	Alpha bkg	29-Sep 05:35	60	0.350	0.006	0.407	+2.15
PIC3A	need 2nd	Alpha XTalk	29-Sep 05:28	5	0.266	0.240	0.267	+2.90
PIC3A	Below	Beta XTalk	29-Sep 05:20	5	0.001	0.011	0.029	-6.40
PIC5B	Above	Alpha bkg	29-Sep 06:57	60	0.350	0.107	0.374	+2.47
PIC6B	Below	Alpha eff	29-Sep 05:33	5	9422	9451	9758	-3.57
PIC6B	Above	Beta bkg	29-Sep 08:31	60	2.150	0.657	2.252	+2.62
PIC9C	Above	Alpha bkg	29-Sep 07:16	60	0.400	-2.53E-2	0.365	+3.55
PIC9C	need 2nd	Alpha eff	29-Sep 05:47	5	9861	9741	10420	-1.94
PIC10D	Below	Alpha eff	29-Sep 05:47	5	12052	15350	16570	-19.22
PIC10D	Above	Alpha XTalk	29-Sep 05:47	5	0.747	0.303	0.427	+18.43
PIC10D	Below	Beta eff	29-Sep 05:55	5	32414	40190	43320	-17.91
PIC11D	Above	Alpha bkg	29-Sep 07:19	60	0.367	0.001	0.361	+3.10
PIC11D	need 2nd	Beta bkg	29-Sep 07:19	60	1.200	-2.33E-1	2.356	+0.32
PIC12C	Above	Alpha bkg	29-Sep 06:13	60	0.417	0.010	0.413	+3.06
PIC14B	Above	Alpha bkg	29-Sep 06:13	60	0.350	-8.43E-2	0.377	+2.65
PIC14D	Above	Alpha bkg	29-Sep 08:34	60	0.317	0.120	0.376	+1.61

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

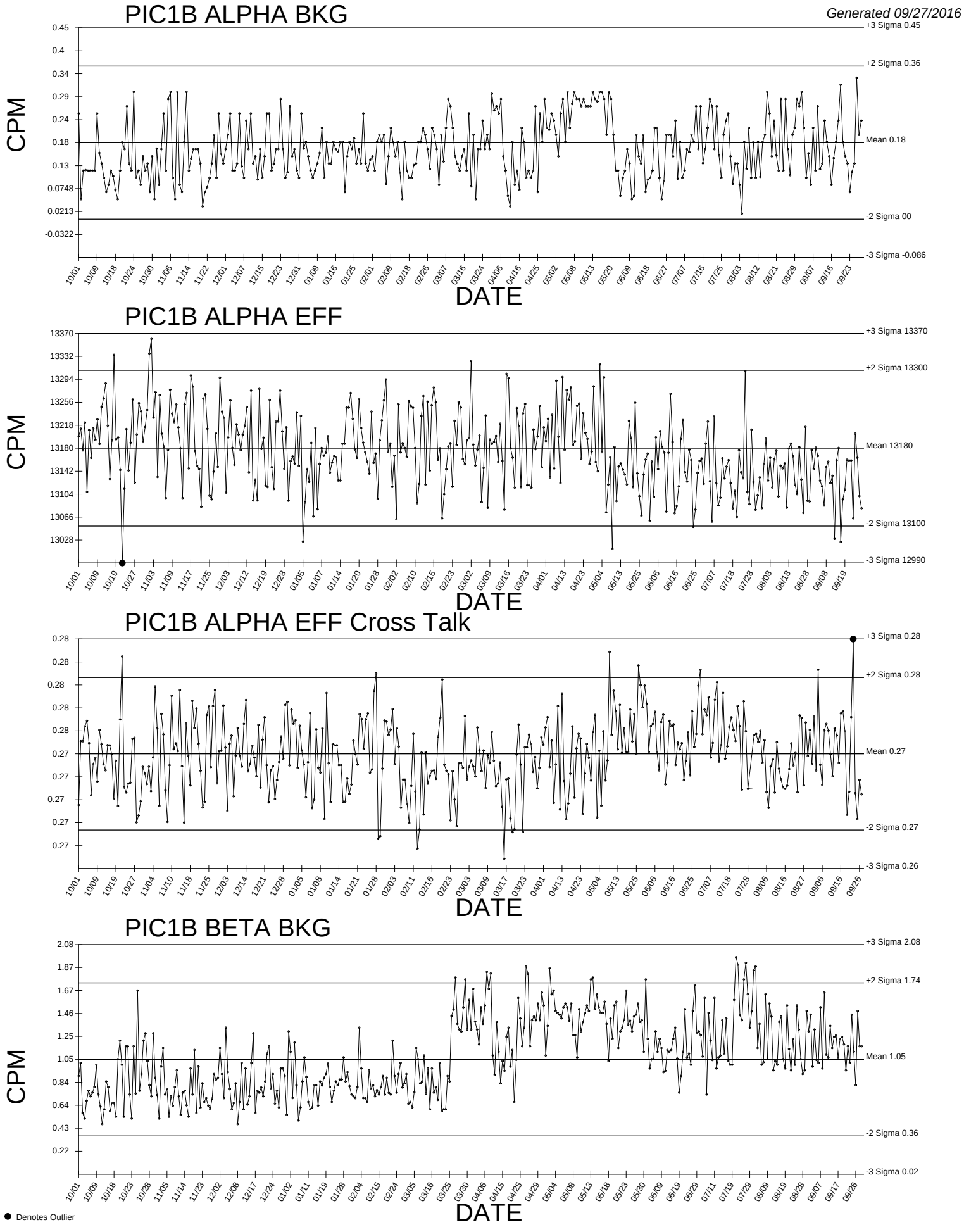
LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

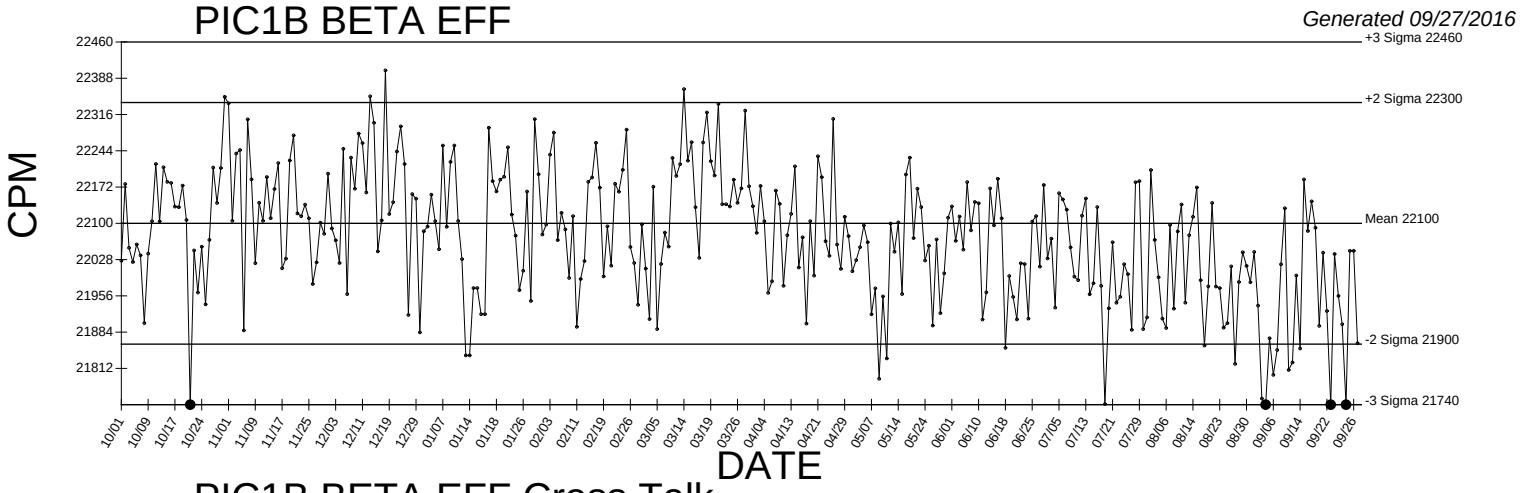
Reviewed by R. Brink-Waarnaar

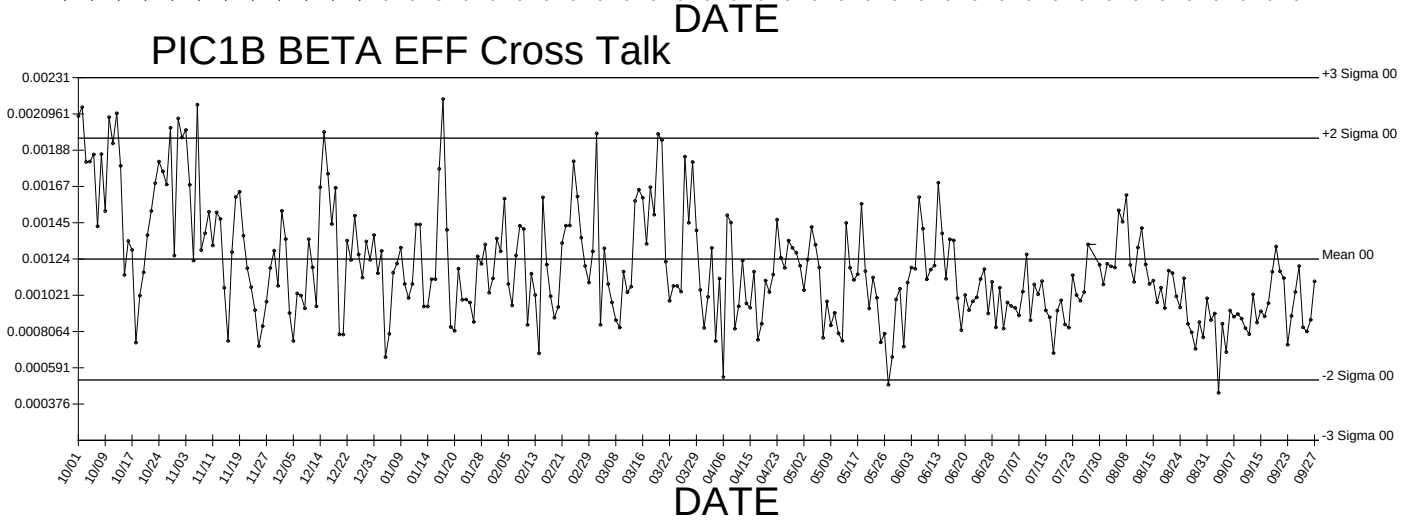
Date 9-29-16

GEL Laboratories LLC

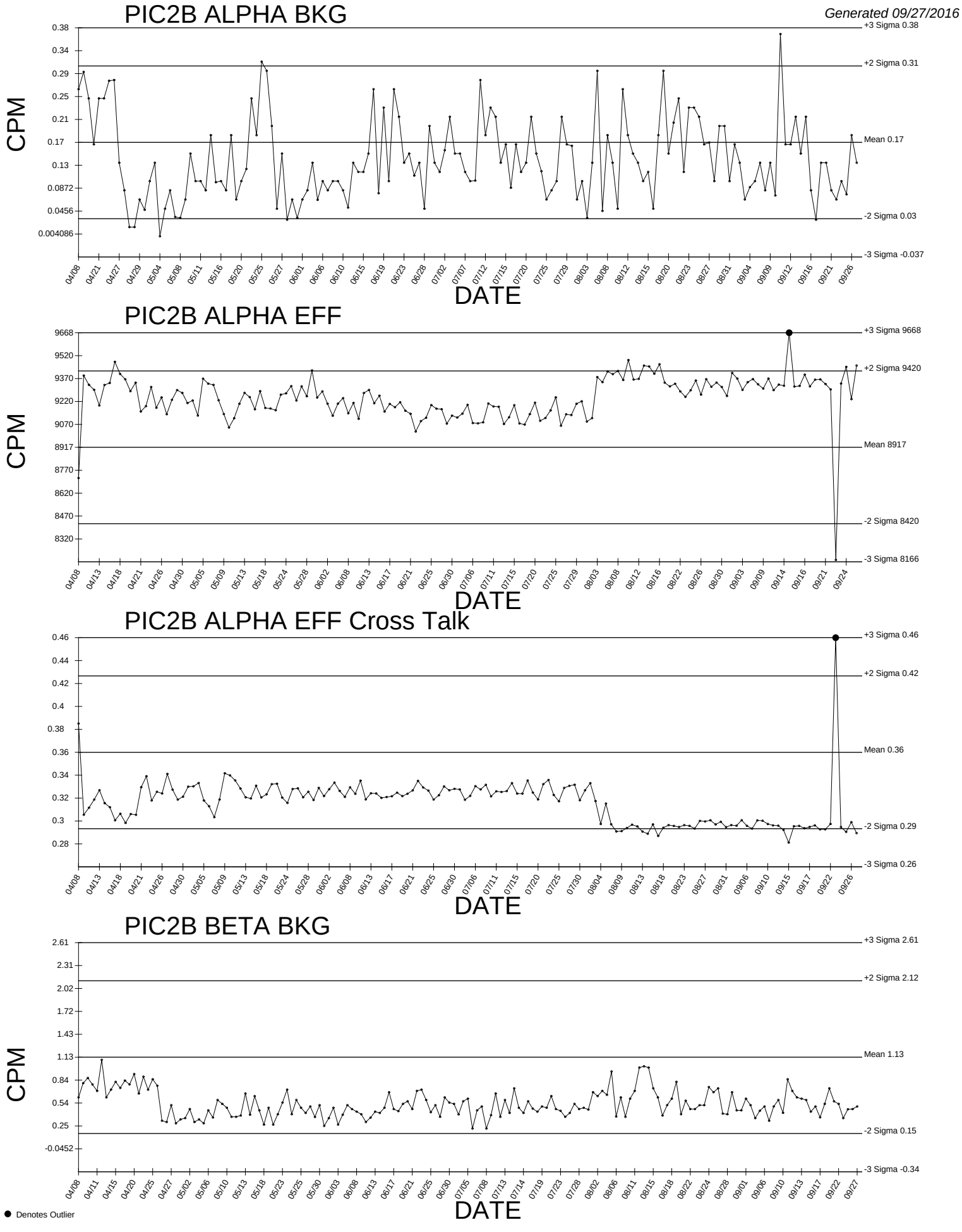
Background and Efficiency Data

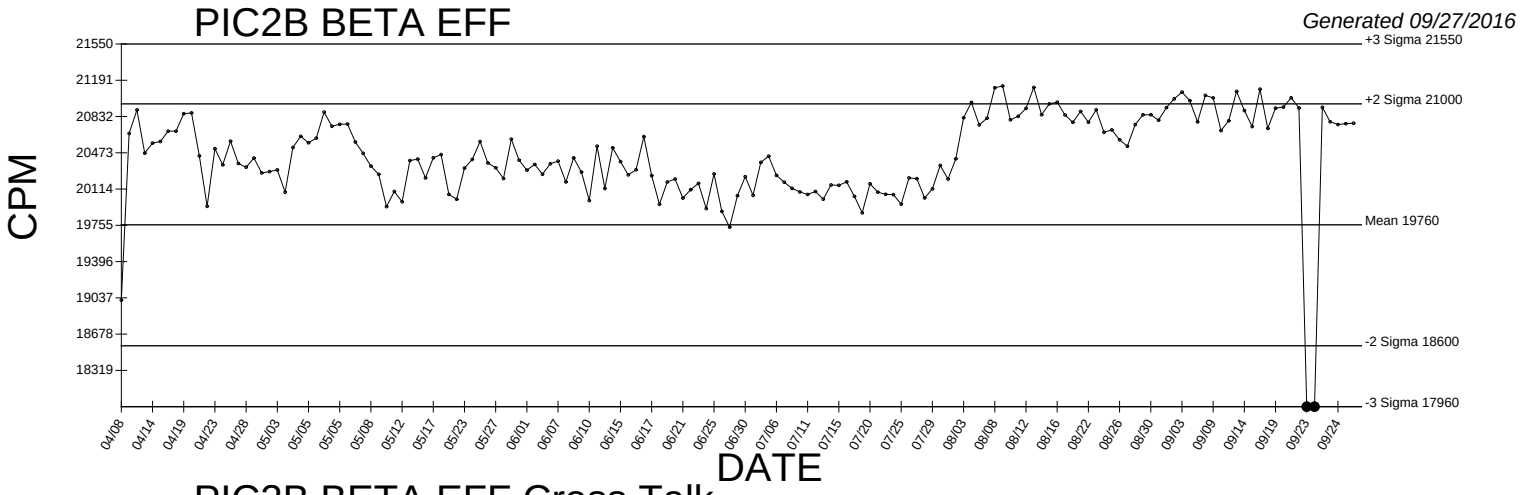

PIC1B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.45
+2 Sigma 0.36
Mean 0.18
-2 Sigma 00
-3 Sigma -0.086
PIC1B ALPHA EFF
+3 Sigma 13370
+2 Sigma 13300
Mean 13180
-2 Sigma 13100
-3 Sigma 12990
PIC1B ALPHA EFF Cross Talk
+3 Sigma 0.28
+2 Sigma 0.28
Mean 0.27
-2 Sigma 0.27
-3 Sigma 0.26
PIC1B BETA BKG
+3 Sigma 2.08
+2 Sigma 1.74
Mean 1.05
-2 Sigma 0.36
-3 Sigma 0.02
Denotes Outlier

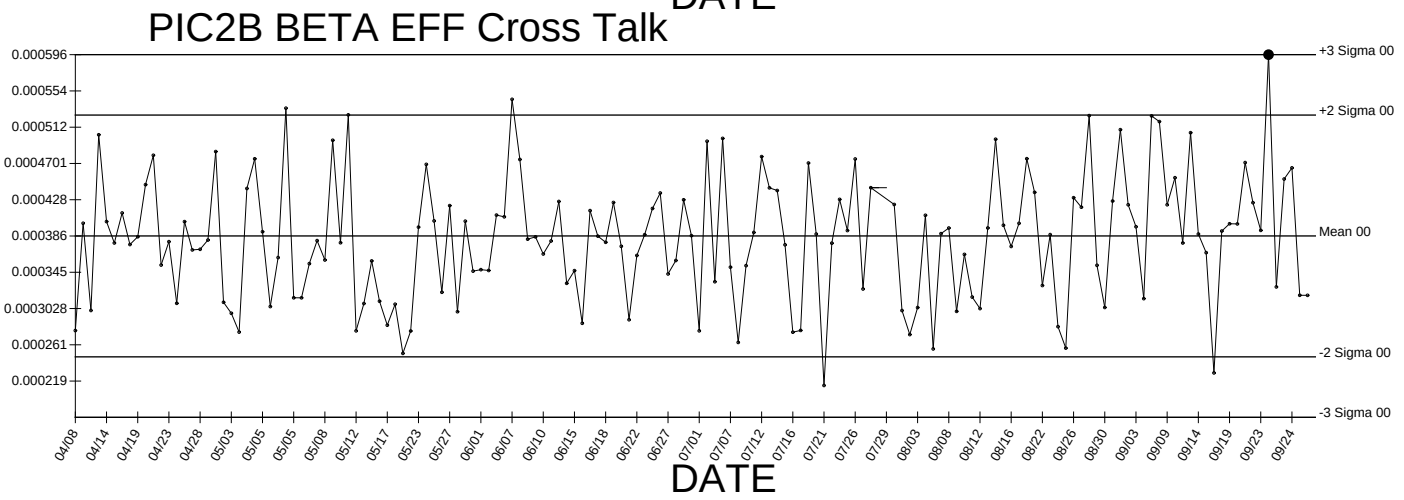




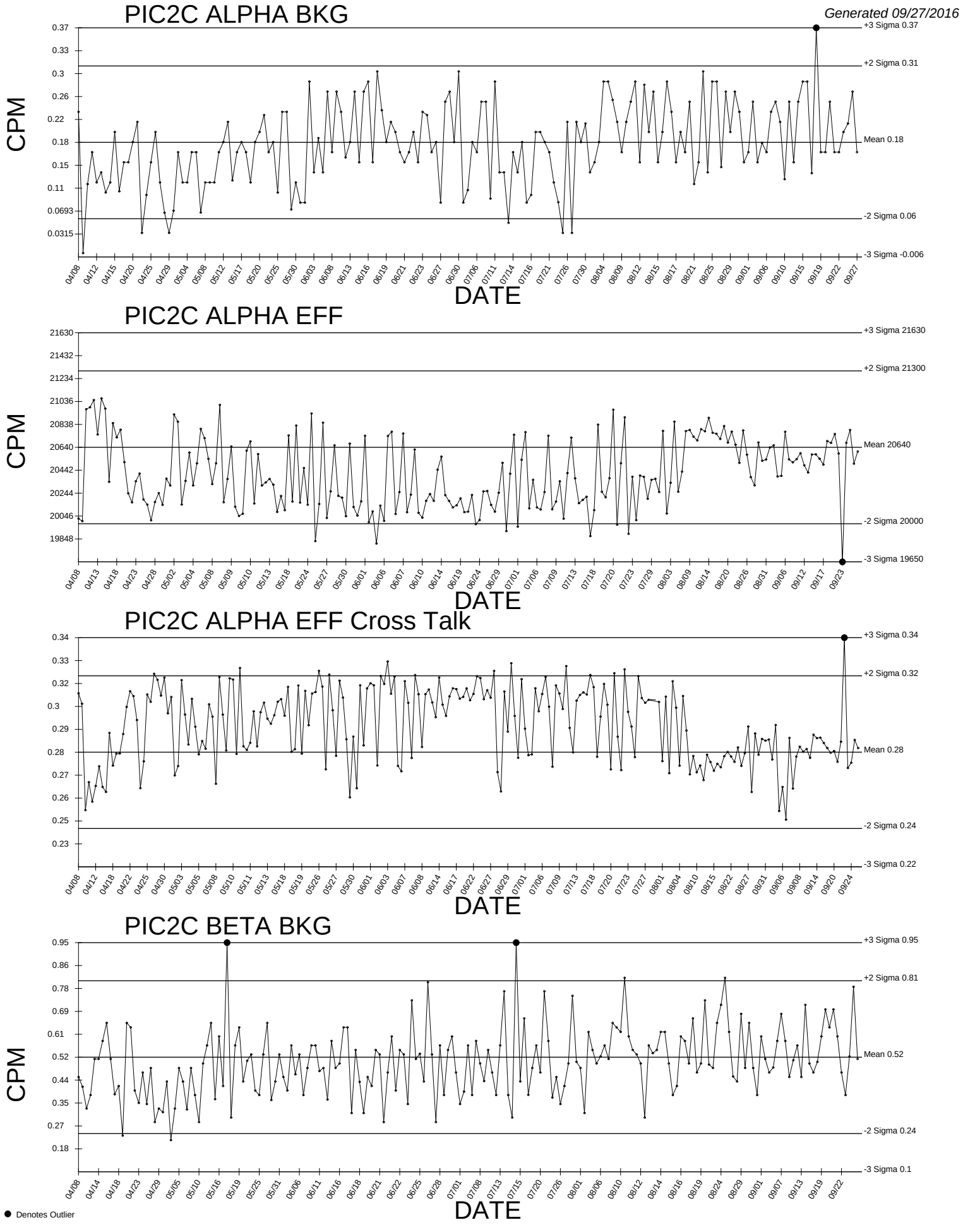
● Denotes Outlier

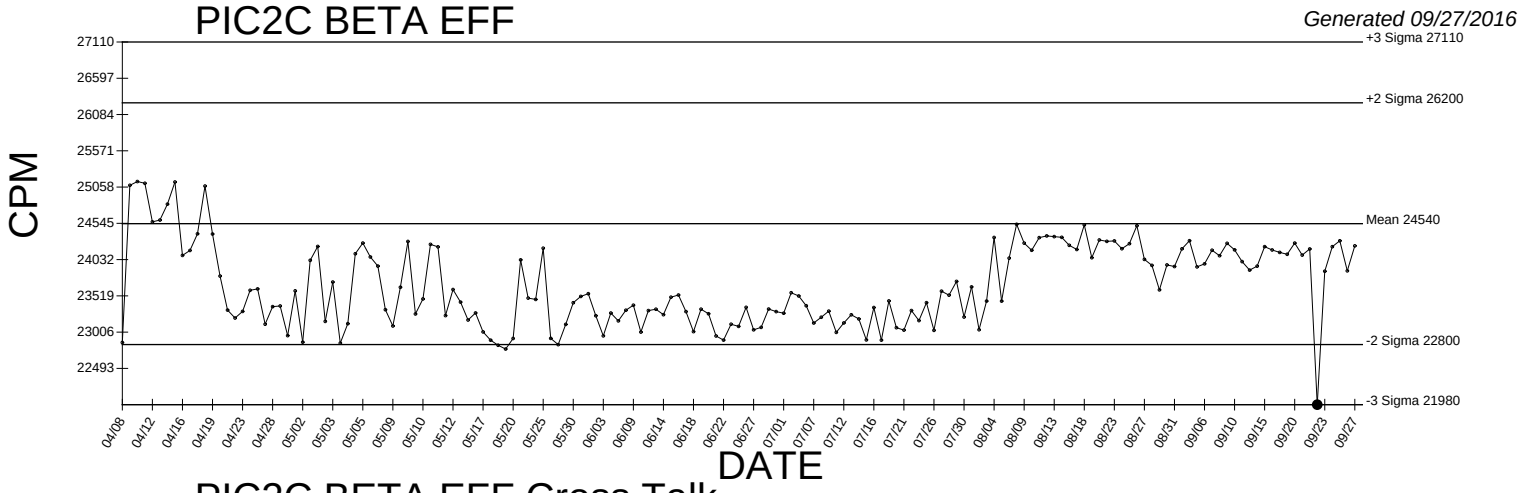

PIC2B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.31
Mean 0.17
-2 Sigma 0.03
-3 Sigma -0.037
PIC2B ALPHA EFF
+3 Sigma 9668
+2 Sigma 9420
Mean 8917
-2 Sigma 8420
-3 Sigma 8166
PIC2B ALPHA EFF Cross Talk
+3 Sigma 0.46
+2 Sigma 0.42
Mean 0.36
-2 Sigma 0.29
-3 Sigma 0.26
PIC2B BETA BKG
+3 Sigma 2.61
+2 Sigma 2.12
Mean 1.13
-2 Sigma 0.15
-3 Sigma -0.34
Denotes Outlier

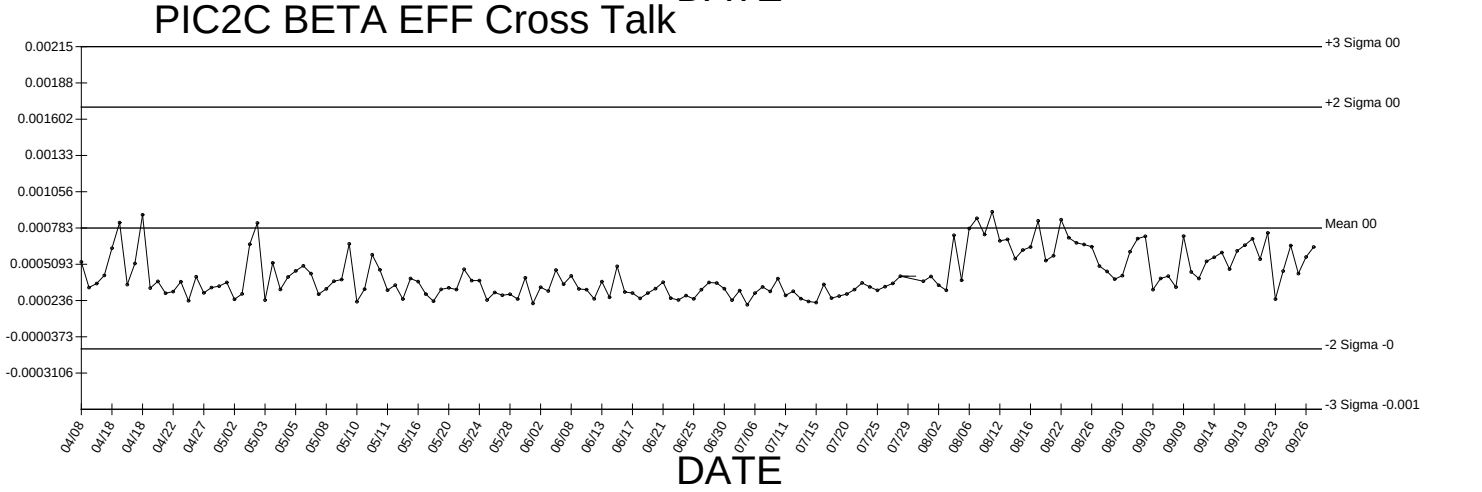




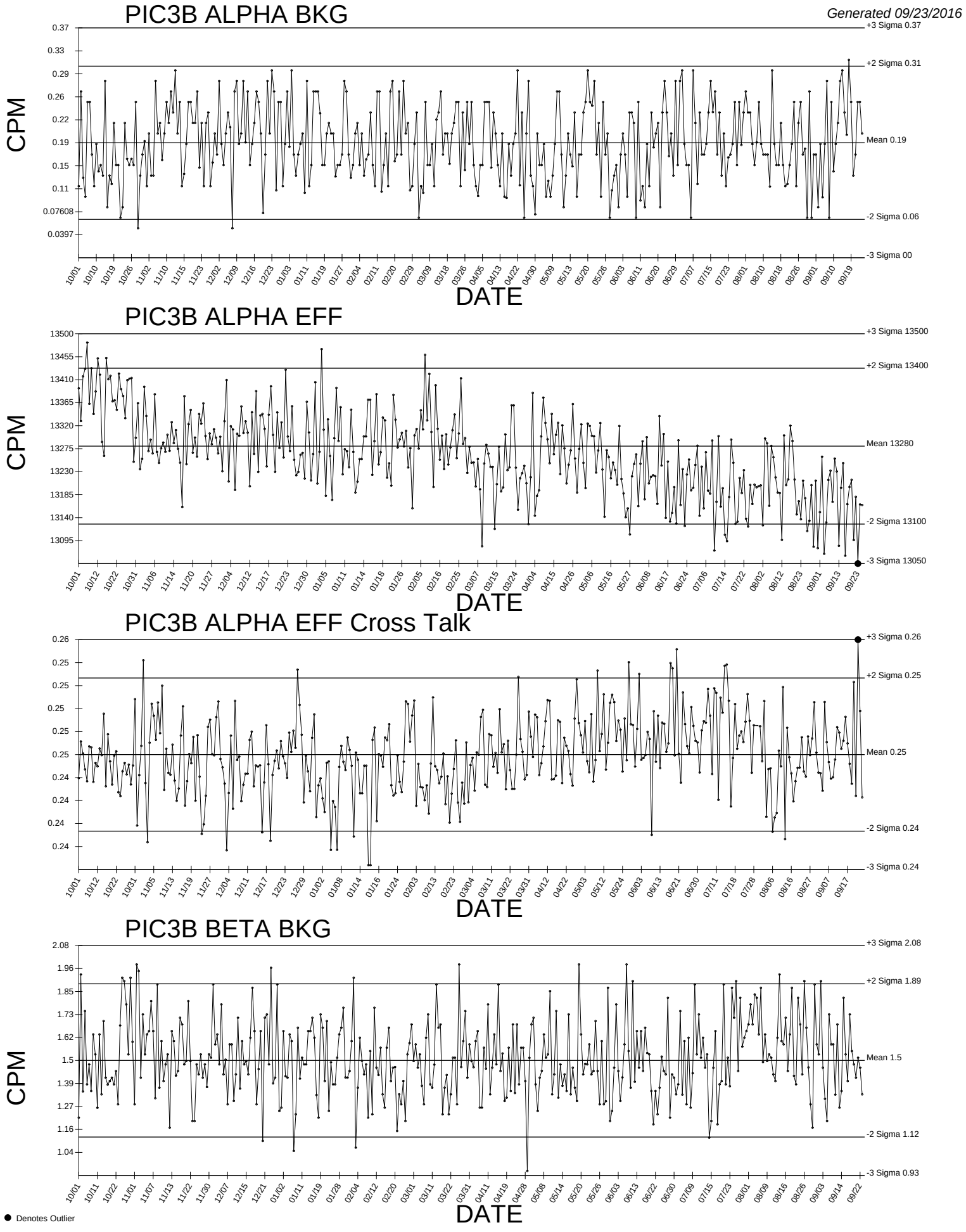
● Denotes Outlier

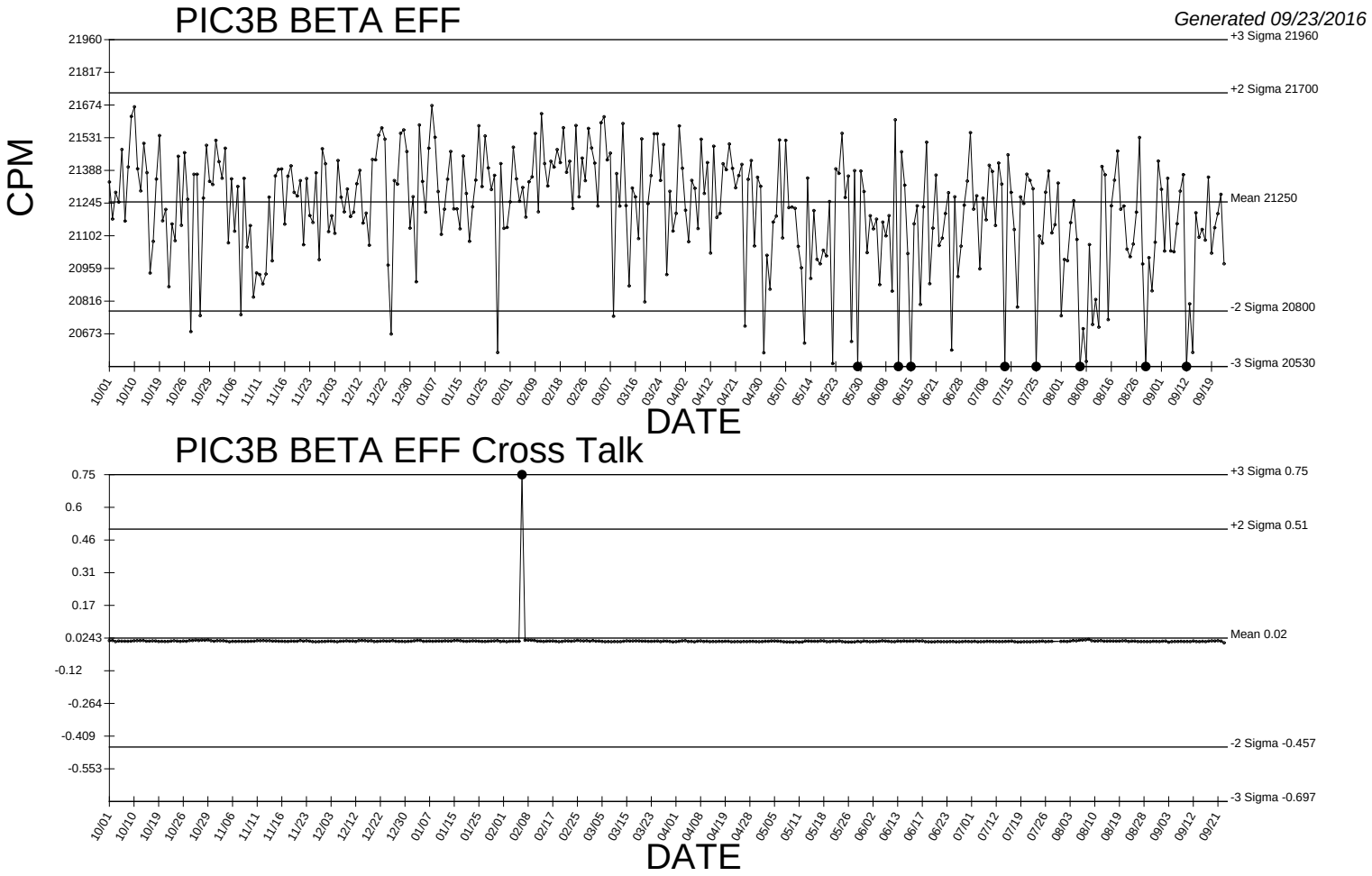

PIC2C ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.18
-2 Sigma 0.06
-3 Sigma -0.006
PIC2C ALPHA EFF
+3 Sigma 21630
+2 Sigma 21300
Mean 20640
-2 Sigma 20000
-3 Sigma 19650
PIC2C ALPHA EFF Cross Talk
+3 Sigma 0.34
+2 Sigma 0.32
Mean 0.28
-2 Sigma 0.24
-3 Sigma 0.22
PIC2C BETA BKG
+3 Sigma 0.95
+2 Sigma 0.81
Mean 0.52
-2 Sigma 0.24
-3 Sigma 0.1
Denotes Outlier



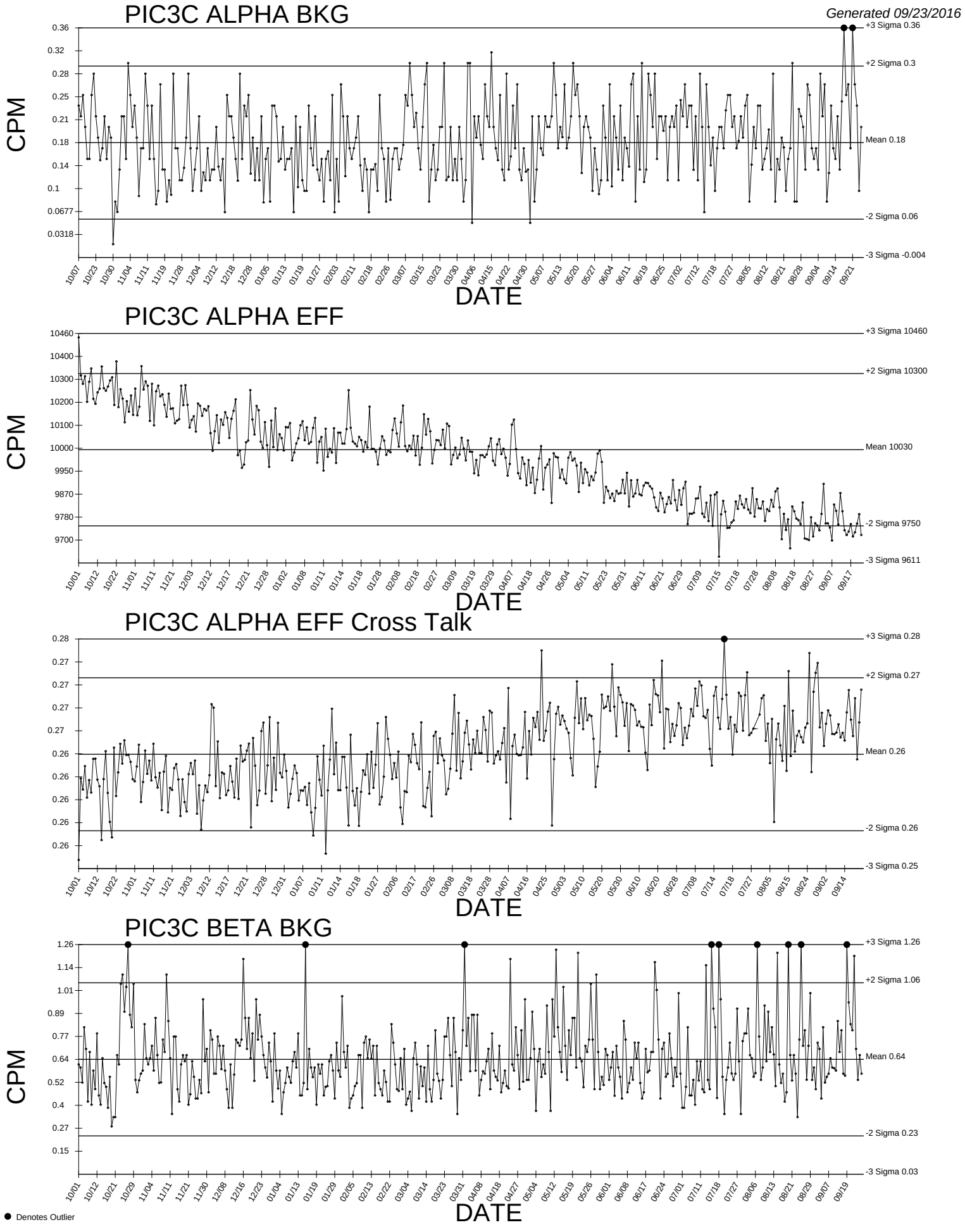


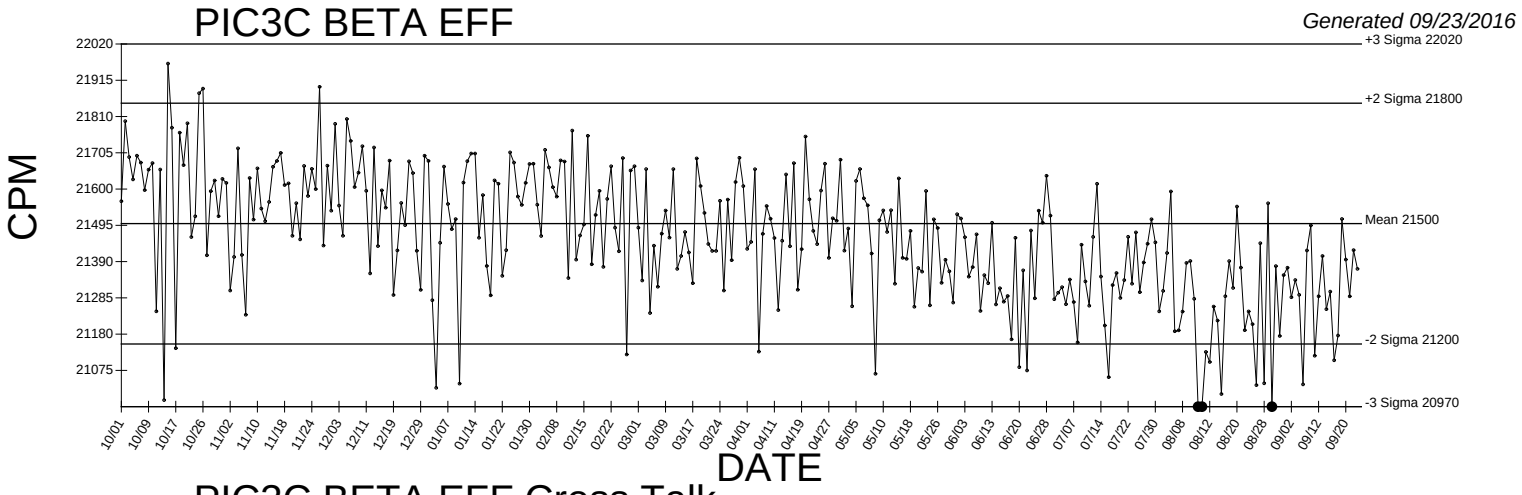
● Denotes Outlier

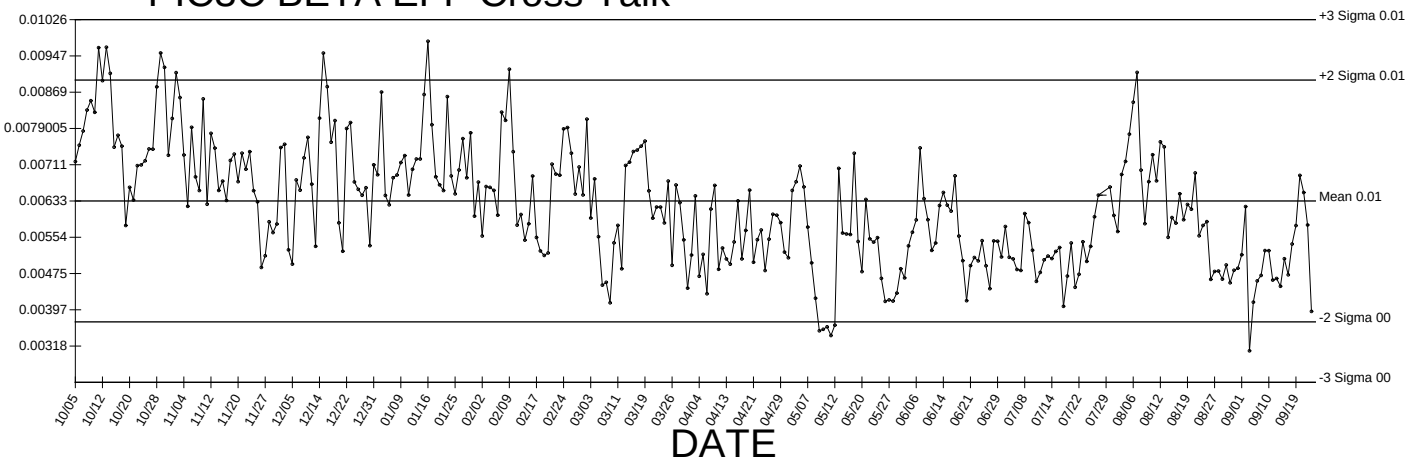

PIC3B ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.06
-3 Sigma 00
PIC3B ALPHA EFF
+3 Sigma 13500
+2 Sigma 13400
Mean 13280
-2 Sigma 13100
-3 Sigma 13050
PIC3B ALPHA EFF Cross Talk
+3 Sigma 0.26
+2 Sigma 0.25
Mean 0.25
-2 Sigma 0.24
-3 Sigma 0.24
PIC3B BETA BKG
+3 Sigma 2.08
+2 Sigma 1.89
Mean 1.5
-2 Sigma 1.12
-3 Sigma 0.93
Denotes Outlier



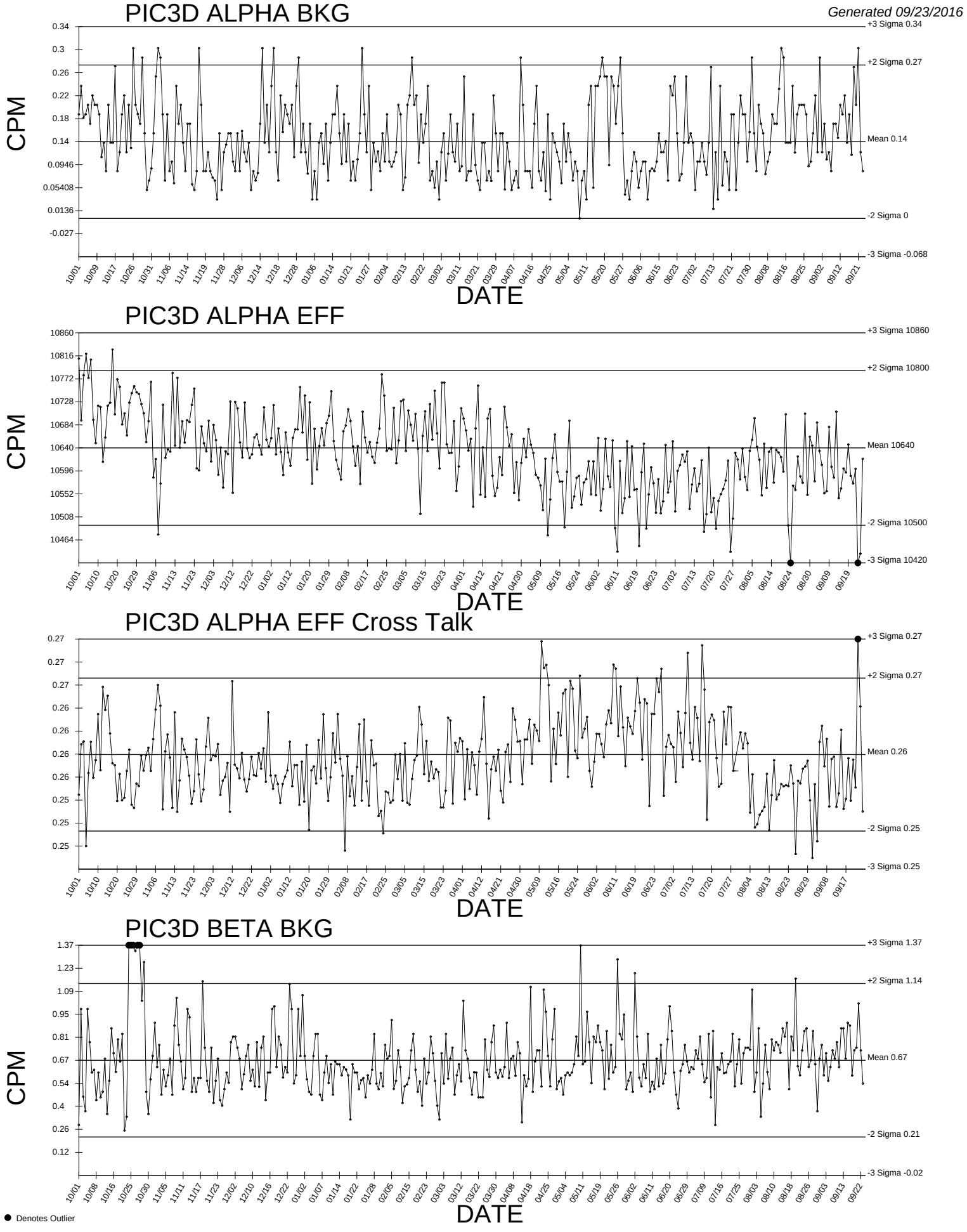
● Denotes Outlier

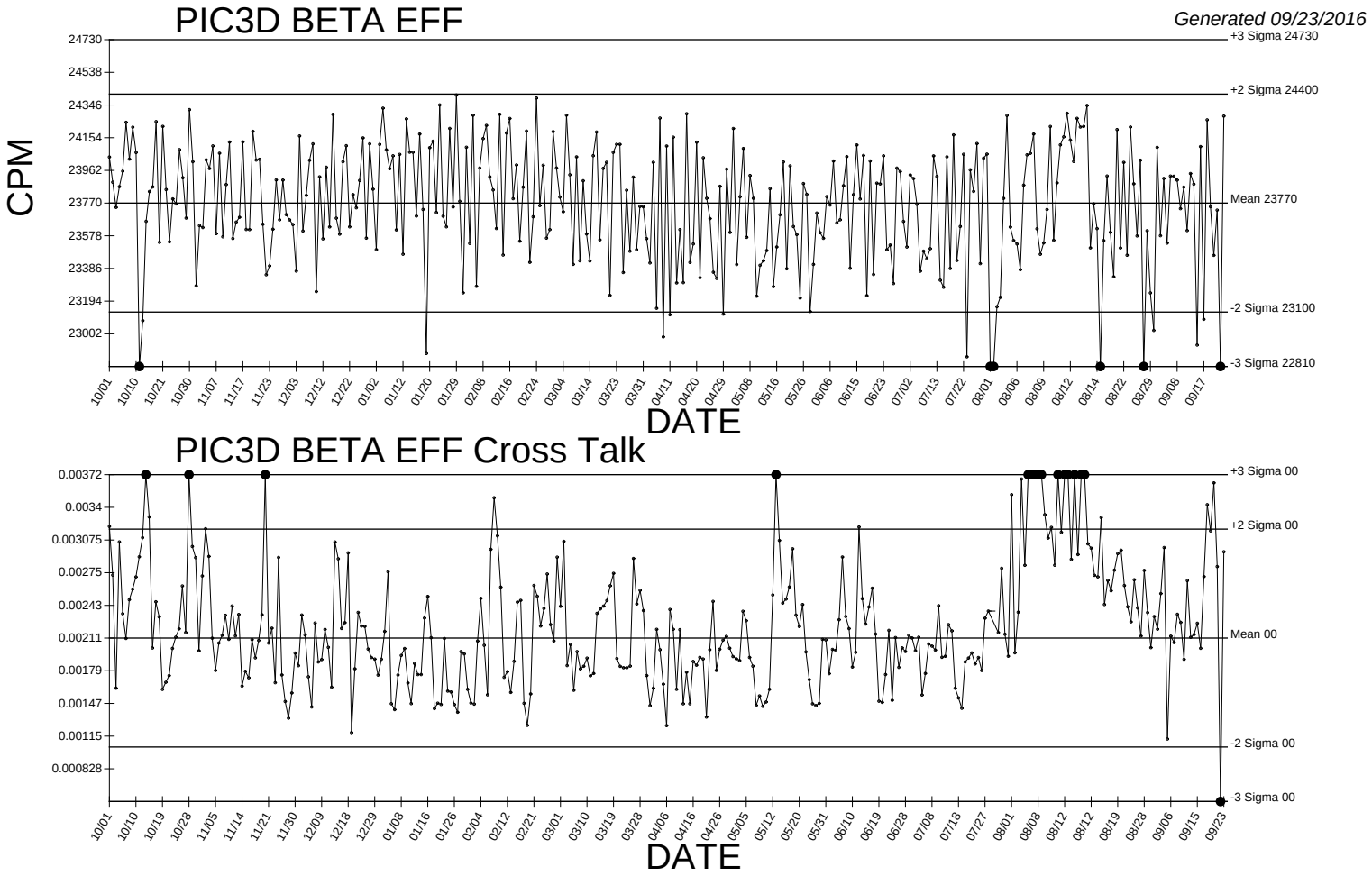

PIC3C ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.36
+2 Sigma 0.3
Mean 0.18
-2 Sigma 0.06
-3 Sigma -0.004
PIC3C ALPHA EFF
+3 Sigma 10460
+2 Sigma 10300
Mean 10030
-2 Sigma 9750
-3 Sigma 9611
PIC3C ALPHA EFF Cross Talk
+3 Sigma 0.28
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.26
-3 Sigma 0.25
PIC3C BETA BKG
+3 Sigma 1.26
+2 Sigma 1.06
Mean 0.64
-2 Sigma 0.23
-3 Sigma 0.03
● Denotes Outlier



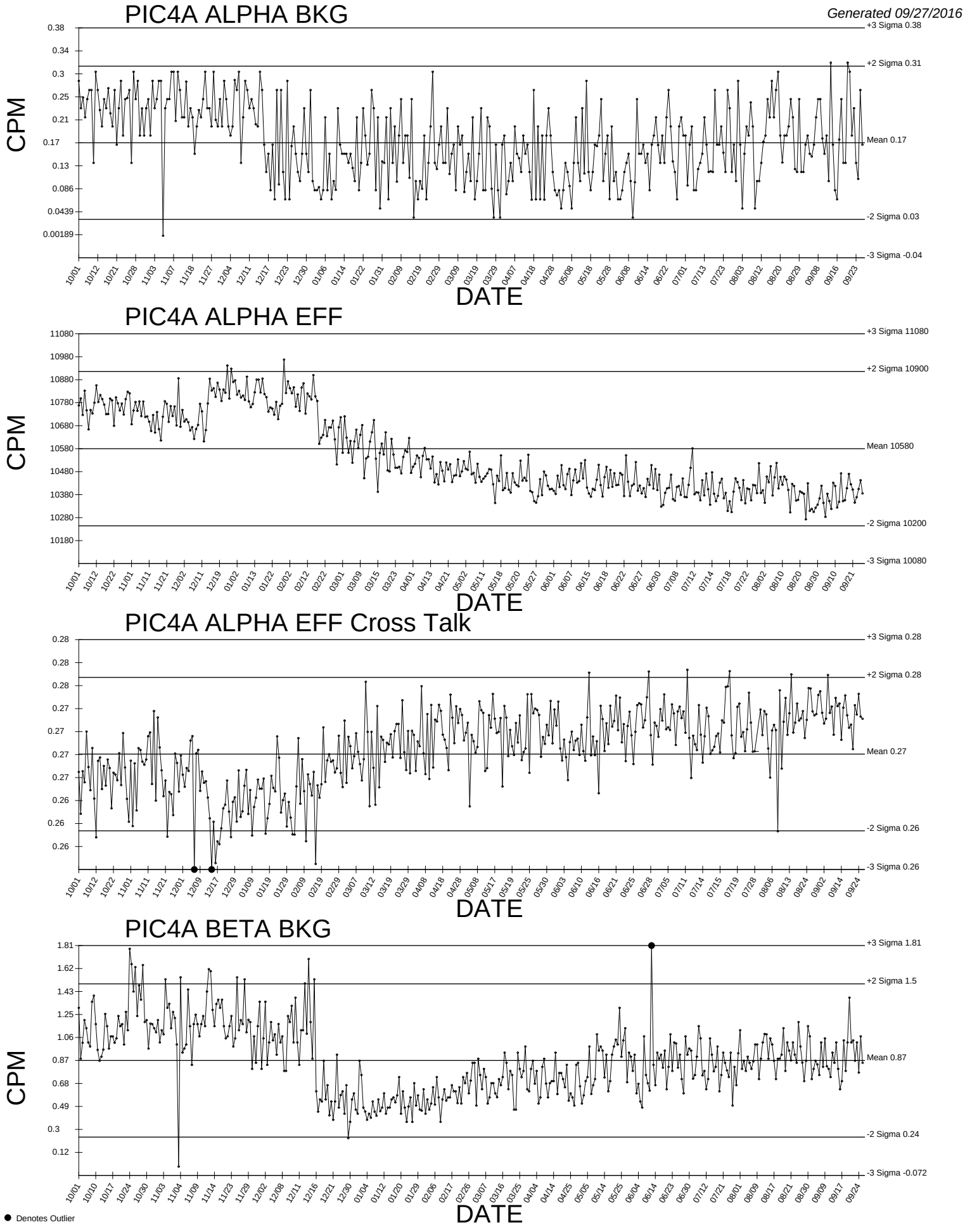


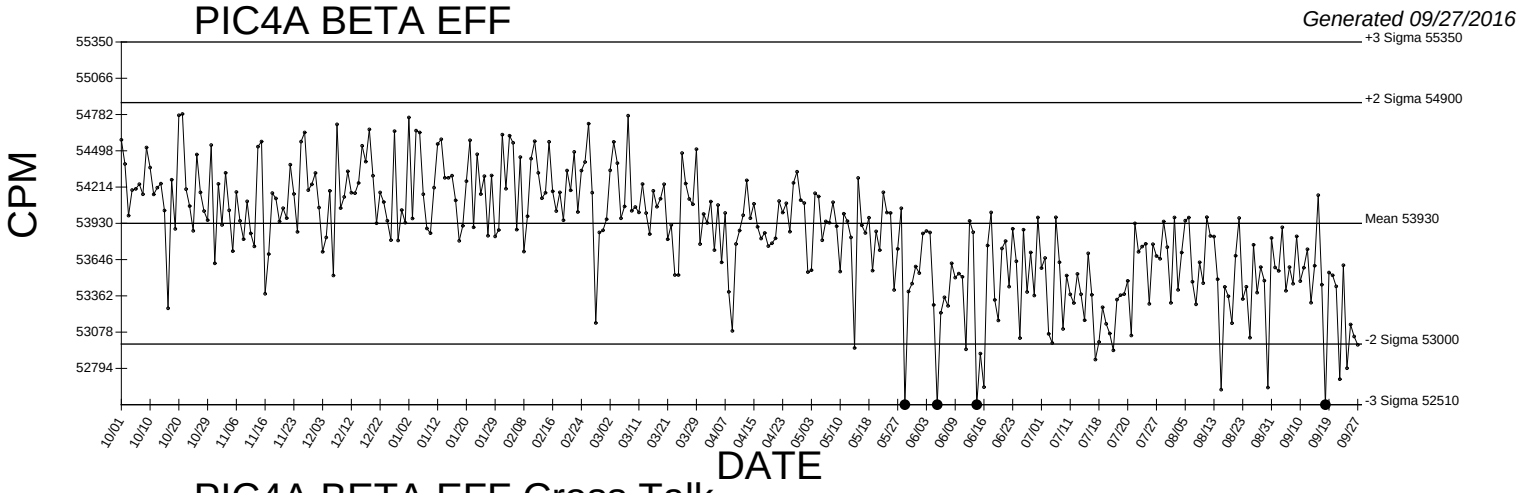
● Denotes Outlier

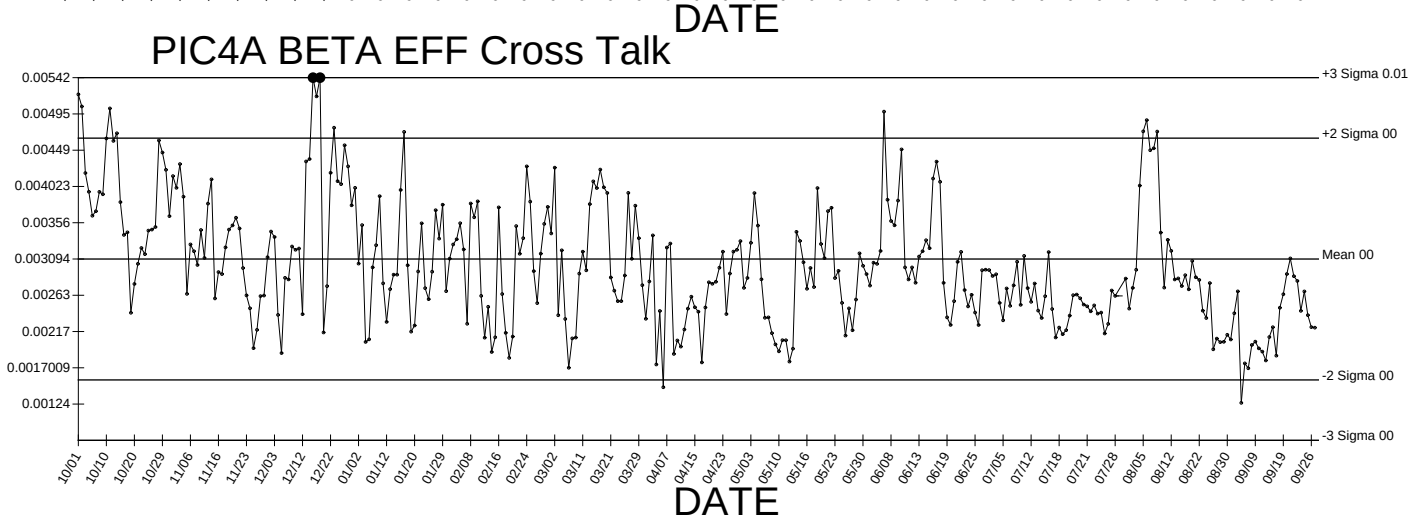

PIC3D ALPHA BKG
Generated 09/23/2016
CPM
0.34
0.3
0.26
0.22
0.18
0.14
0.0946
0.05408
0.0136
-0.027
+3 Sigma 0.34
+2 Sigma 0.27
Mean 0.14
-2 Sigma 0
-3 Sigma -0.068
10/01 10/09 10/17 10/26 10/31 11/06 11/14 11/19 11/28 12/06 12/14 12/18 12/28 01/06 01/14 01/21 01/27 02/04 02/13 02/22 03/02 03/11 03/21 03/29 04/07 04/16 04/25 05/04 05/11 05/20 05/27 06/06 06/15 06/23 07/02 07/13 07/21 07/30 08/08 08/16 08/25 09/02 09/12 09/21
DATE
PIC3D ALPHA EFF
CPM
10860
10816
10772
10728
10684
10640
10596
10552
10508
10464
+3 Sigma 10860
+2 Sigma 10800
Mean 10640
-2 Sigma 10500
-3 Sigma 10420
10/01 10/10 10/20 10/29 11/06 11/13 11/23 12/03 12/12 12/22 01/02 01/12 01/20 01/29 02/08 02/17 02/25 03/05 03/15 03/23 04/01 04/12 04/21 04/30 05/09 05/16 05/24 06/02 06/11 06/19 06/23 07/02 07/13 07/20 07/27 08/05 08/14 08/24 08/30 09/09 09/19
DATE
PIC3D ALPHA EFF Cross Talk
0.27
0.27
0.27
0.26
0.26
0.26
0.26
0.25
0.25
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.25
-3 Sigma 0.25
10/01 10/10 10/20 10/29 11/06 11/13 11/23 12/03 12/12 12/22 01/02 01/12 01/20 01/29 02/08 02/17 02/25 03/05 03/15 03/23 04/01 04/12 04/21 04/30 05/09 05/16 05/24 06/02 06/11 06/19 06/23 07/02 07/13 07/20 07/27 08/04 08/13 08/23 08/29 09/08 09/17
DATE
PIC3D BETA BKG
CPM
1.37
1.23
1.09
0.95
0.81
0.67
0.54
0.4
0.26
0.12
+3 Sigma 1.37
+2 Sigma 1.14
Mean 0.67
-2 Sigma 0.21
-3 Sigma -0.02
10/01 10/08 10/16 10/25 10/30 11/05 11/11 11/17 11/23 12/02 12/10 12/16 12/22 01/02 01/07 01/14 01/22 01/28 02/05 02/15 02/23 03/03 03/12 03/22 03/30 04/08 04/18 04/25 05/04 05/11 05/19 05/26 06/02 06/11 06/20 06/29 07/09 07/16 07/25 08/03 08/10 08/18 08/26 09/03 09/13 09/22
DATE
● Denotes Outlier



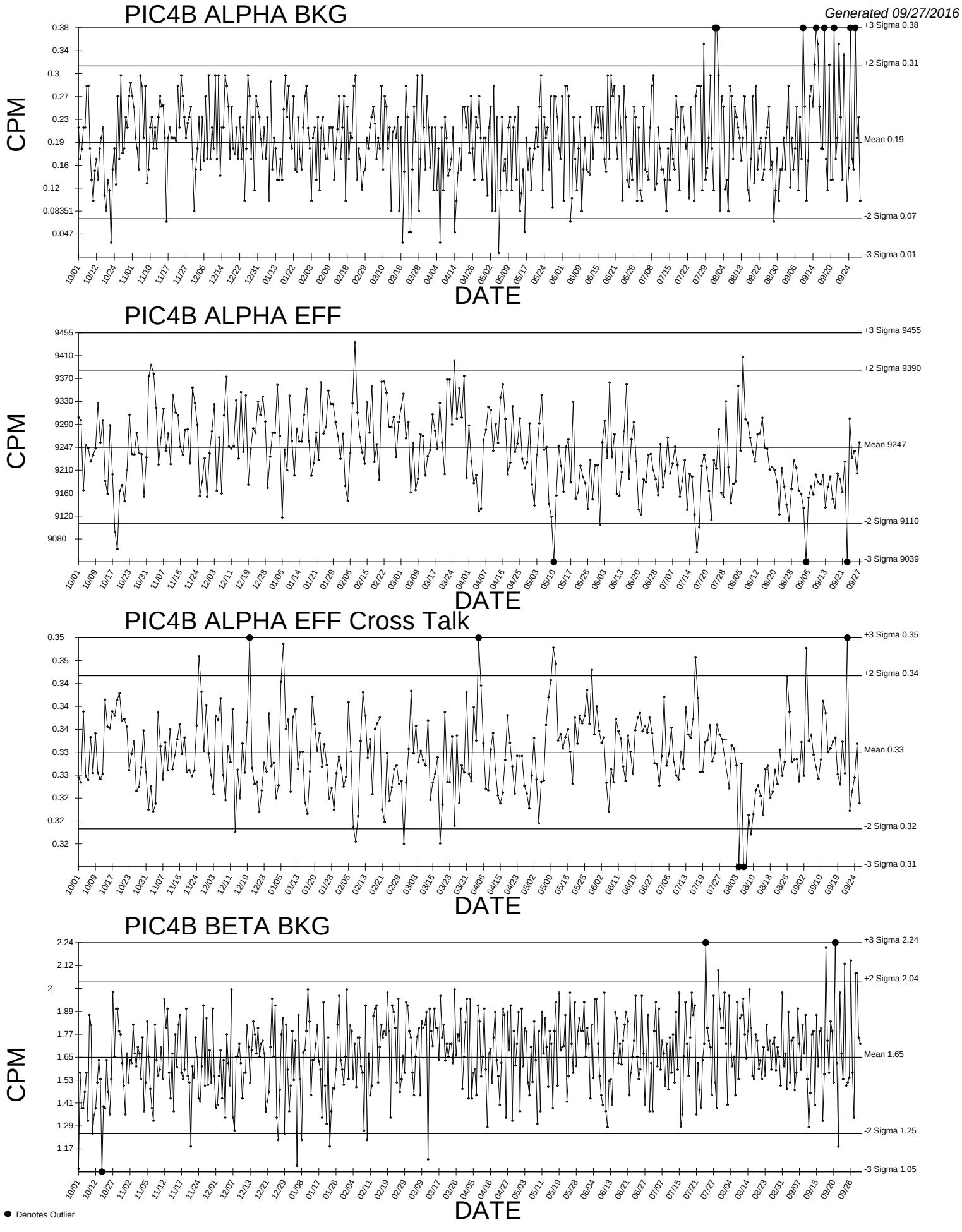
● Denotes Outlier

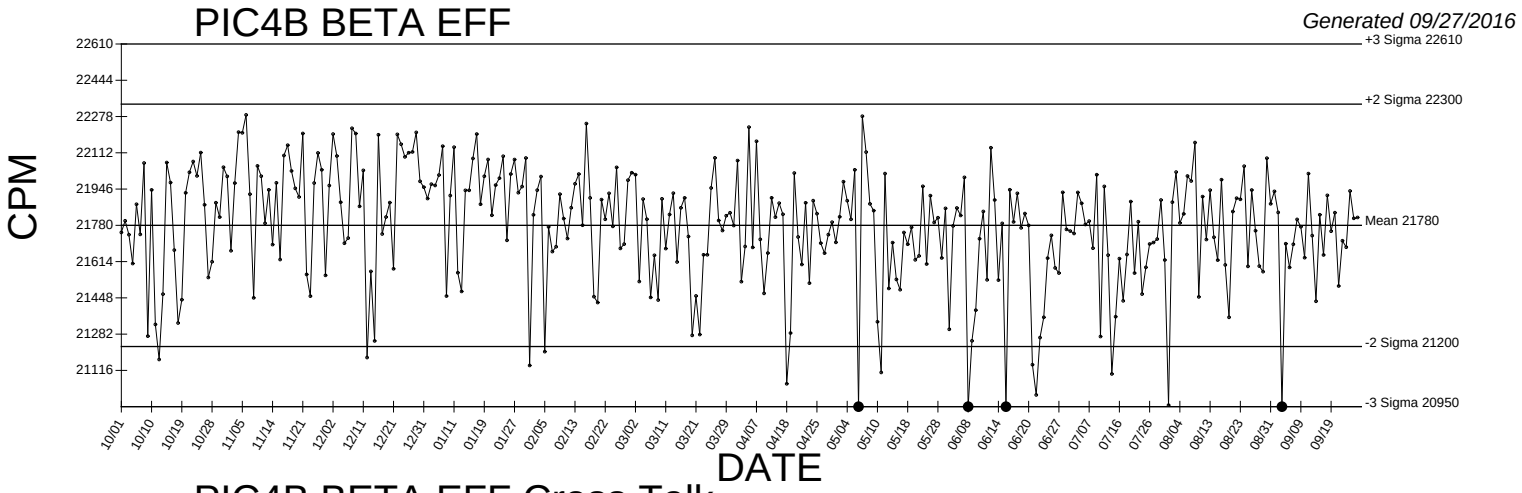

PIC4A ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.31
Mean 0.17
-2 Sigma 0.03
-3 Sigma -0.04
PIC4A ALPHA EFF
+3 Sigma 11080
+2 Sigma 10900
Mean 10580
-2 Sigma 10200
-3 Sigma 10080
PIC4A ALPHA EFF Cross Talk
+3 Sigma 0.28
+2 Sigma 0.28
Mean 0.27
-2 Sigma 0.26
-3 Sigma 0.26
PIC4A BETA BKG
+3 Sigma 1.81
+2 Sigma 1.5
Mean 0.87
-2 Sigma 0.24
-3 Sigma -0.072
Denotes Outlier

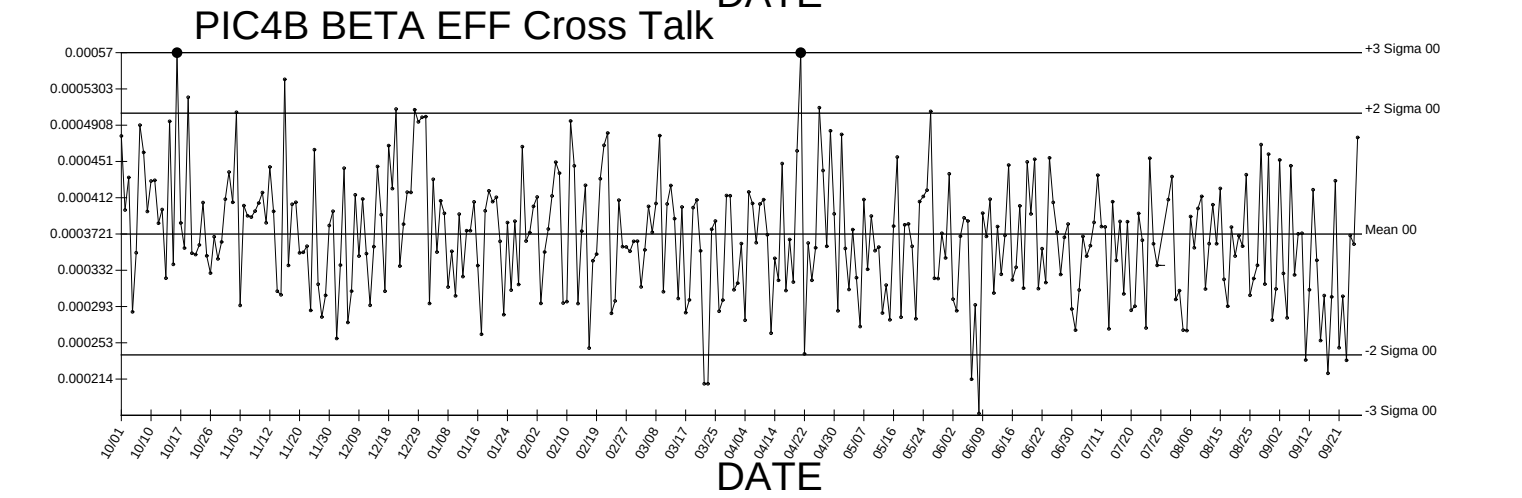




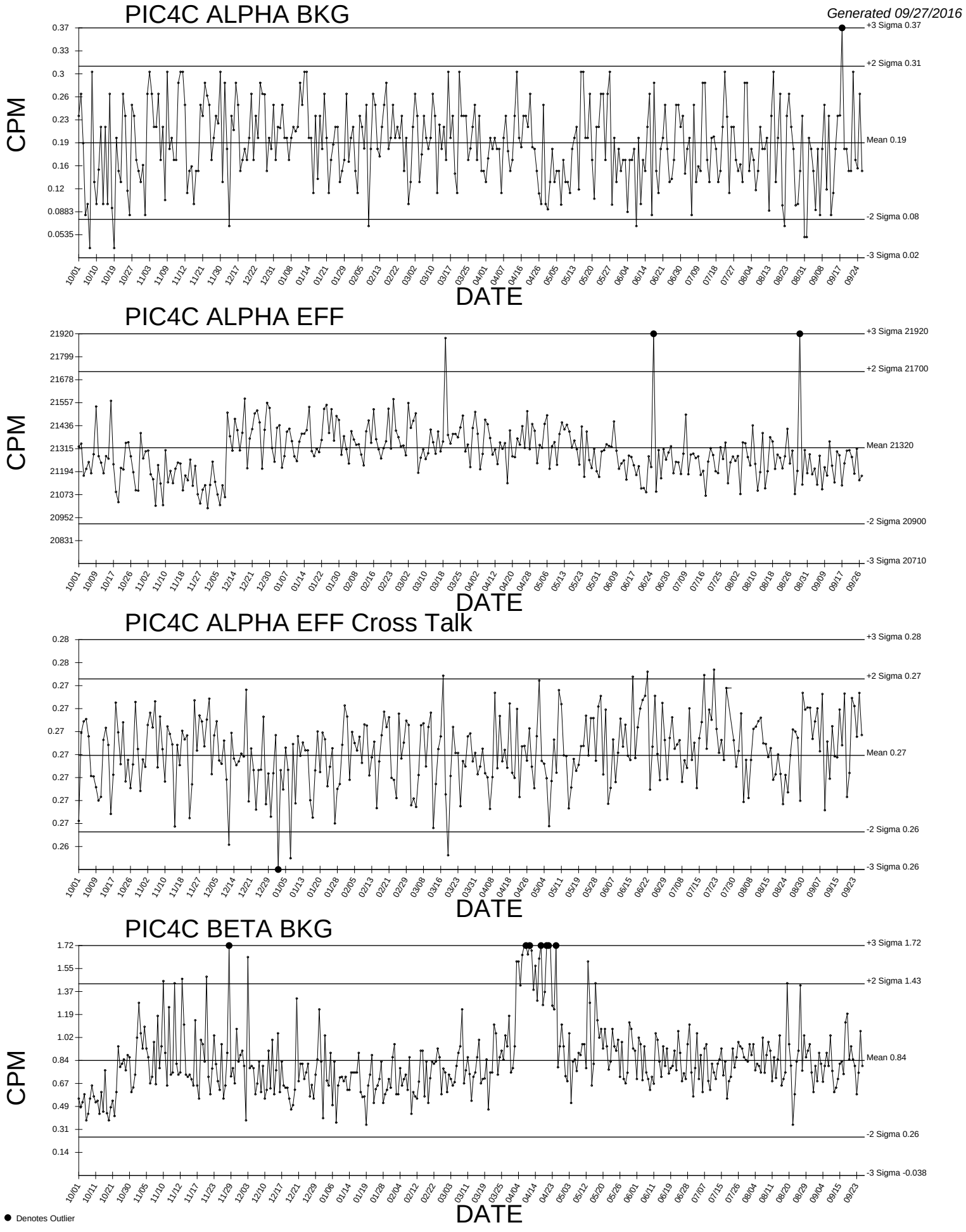
● Denotes Outlier

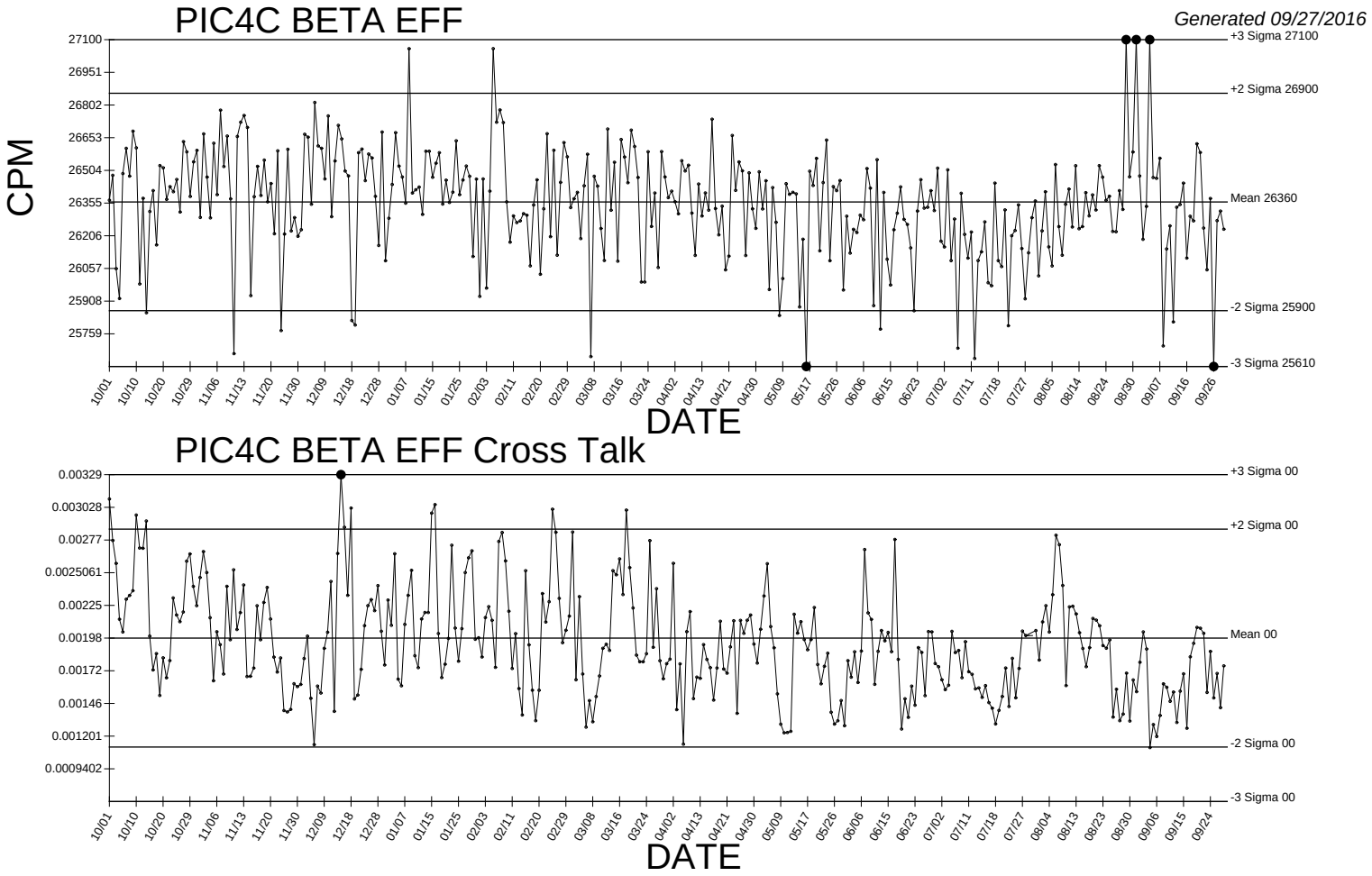

PIC4B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.07
-3 Sigma 0.01
PIC4B ALPHA EFF
+3 Sigma 9455
+2 Sigma 9390
Mean 9247
-2 Sigma 9110
-3 Sigma 9039
PIC4B ALPHA EFF Cross Talk
+3 Sigma 0.35
+2 Sigma 0.34
Mean 0.33
-2 Sigma 0.32
-3 Sigma 0.31
PIC4B BETA BKG
+3 Sigma 2.24
+2 Sigma 2.04
Mean 1.65
-2 Sigma 1.25
-3 Sigma 1.05
Denotes Outlier



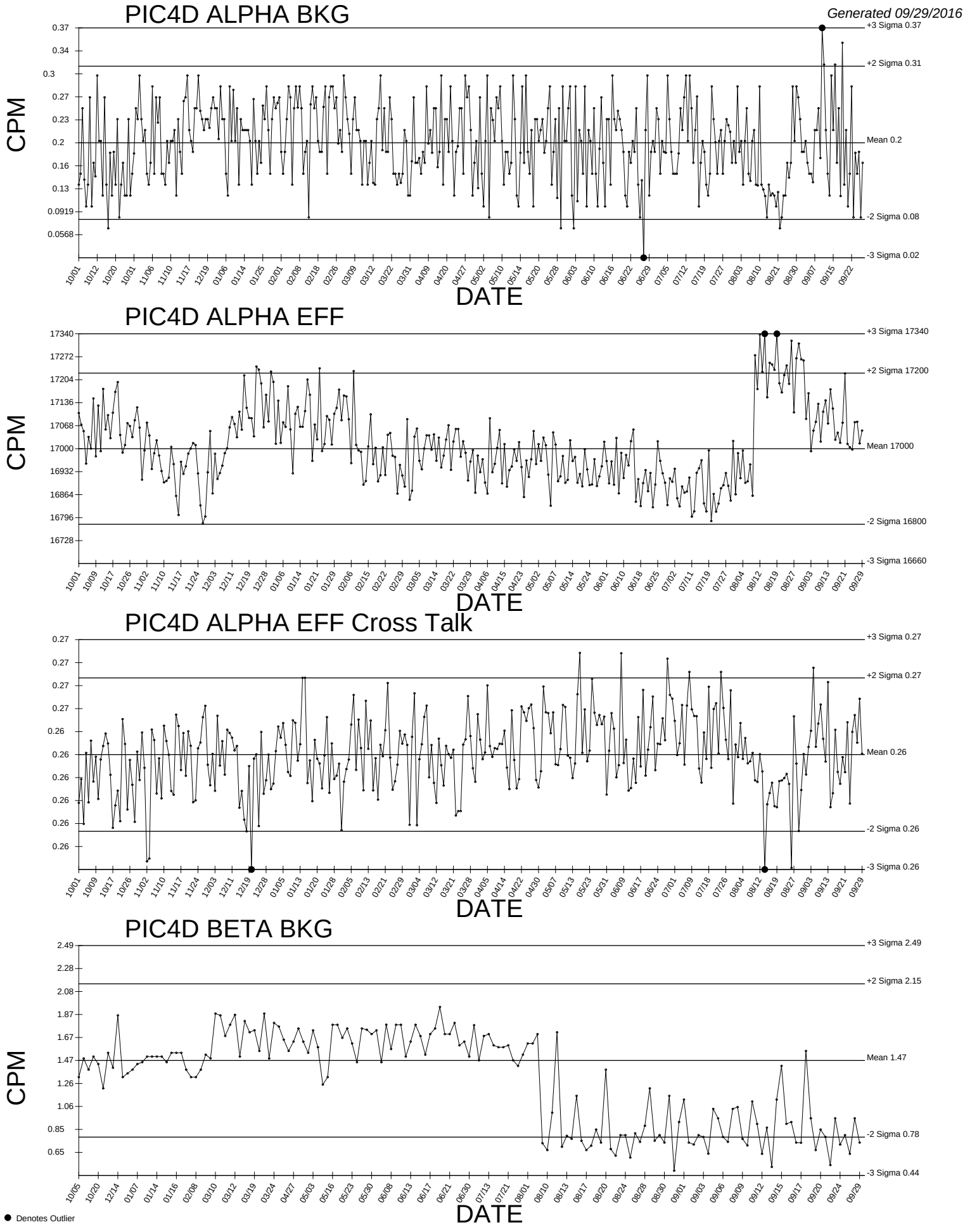


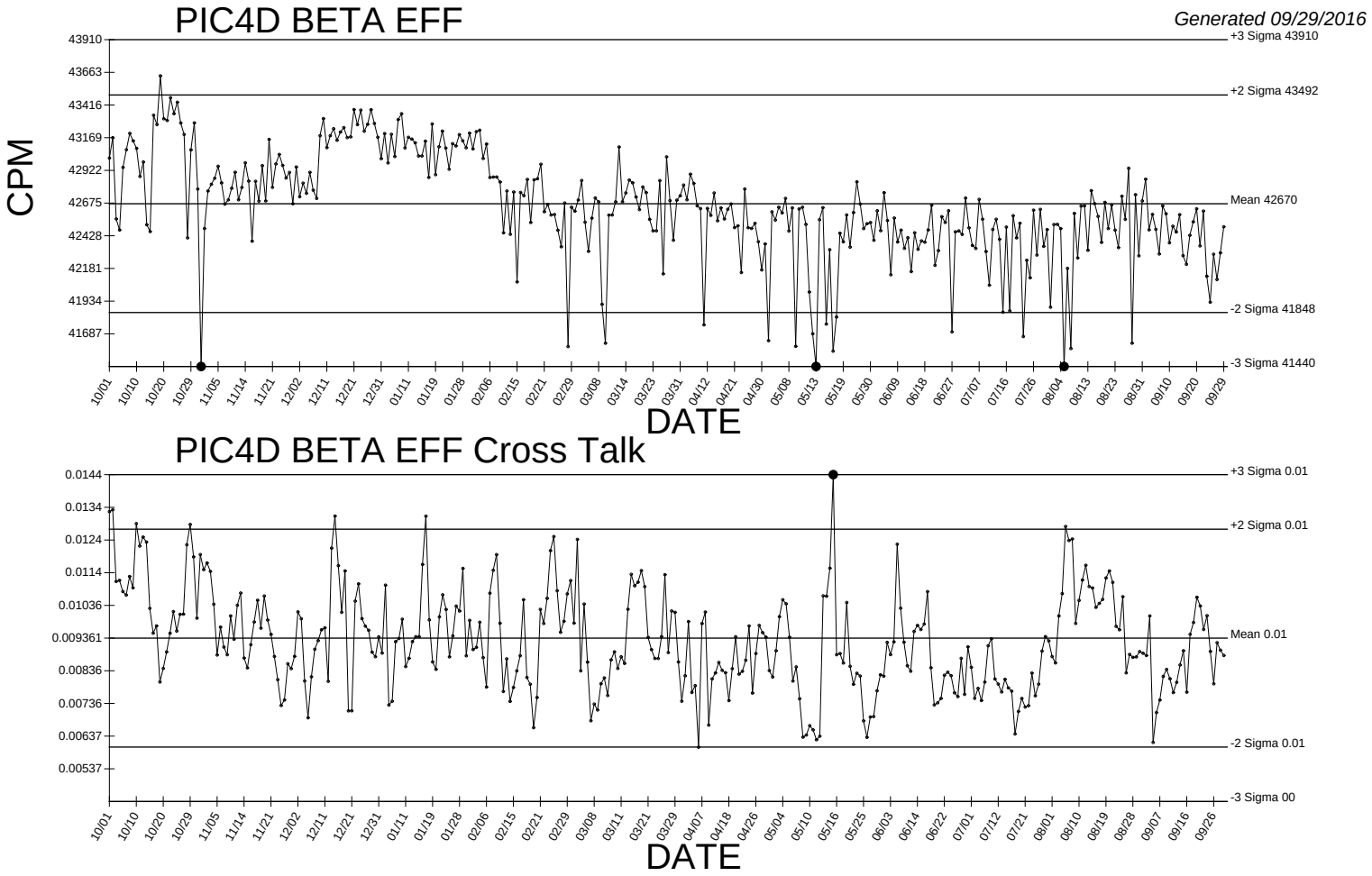
● Denotes Outlier


PIC4C ALPHA BKG
Generated 09/27/2016
CPM
0.37
0.33
0.3
0.26
0.23
0.19
0.16
0.12
0.0883
0.0535
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.08
-3 Sigma 0.02
10/01 10/10 10/19 10/27 11/03 11/09 11/12 11/21 11/30 12/17 12/22 12/31 01/08 01/14 01/21 01/29 02/05 02/13 02/22 03/02 03/10 03/17 03/25 04/01 04/07 04/16 04/26 05/05 05/13 05/20 05/27 06/04 06/14 06/21 06/30 07/09 07/18 07/27 08/04 08/13 08/23 08/31 09/08 09/17 09/24
DATE
PIC4C ALPHA EFF
CPM
21920
21799
21678
21557
21436
21315
21194
21073
20952
20831
+3 Sigma 21920
+2 Sigma 21700
Mean 21320
-2 Sigma 20900
-3 Sigma 20710
10/01 10/09 10/17 10/26 11/02 11/10 11/18 11/27 12/05 12/14 12/21 12/30 01/07 01/14 01/22 01/30 02/08 02/16 02/23 03/02 03/10 03/18 03/25 04/02 04/12 04/20 04/28 05/06 05/13 05/23 05/31 06/09 06/17 06/24 06/30 07/09 07/16 07/25 08/02 08/10 08/18 08/26 08/31 09/09 09/17 09/26
DATE
PIC4C ALPHA EFF Cross Talk
0.28
0.28
0.27
0.27
0.27
0.27
0.27
0.27
0.27
0.26
+3 Sigma 0.28
+2 Sigma 0.27
Mean 0.27
-2 Sigma 0.26
-3 Sigma 0.26
10/01 10/09 10/17 10/26 11/02 11/10 11/18 11/27 12/05 12/14 12/21 12/29 01/05 01/13 01/20 01/28 02/05 02/13 02/21 02/29 03/08 03/16 03/23 03/31 04/08 04/18 04/26 05/04 05/11 05/19 05/28 06/07 06/15 06/22 06/29 07/08 07/15 07/23 07/30 08/08 08/15 08/24 08/30 09/07 09/15 09/23
DATE
PIC4C BETA BKG
CPM
1.72
1.55
1.37
1.19
1.02
0.84
0.67
0.49
0.31
0.14
+3 Sigma 1.72
+2 Sigma 1.43
Mean 0.84
-2 Sigma 0.26
-3 Sigma -0.038
10/01 10/11 10/21 10/30 11/05 11/10 11/12 11/17 11/23 11/29 12/03 12/10 12/17 12/21 12/29 01/06 01/14 01/19 01/28 02/04 02/12 02/22 03/03 03/11 03/19 03/25 04/04 04/14 04/23 05/03 05/12 05/20 05/26 06/01 06/11 06/19 06/28 07/07 07/15 07/26 08/04 08/11 08/20 08/29 09/04 09/15 09/23
DATE
● Denotes Outlier

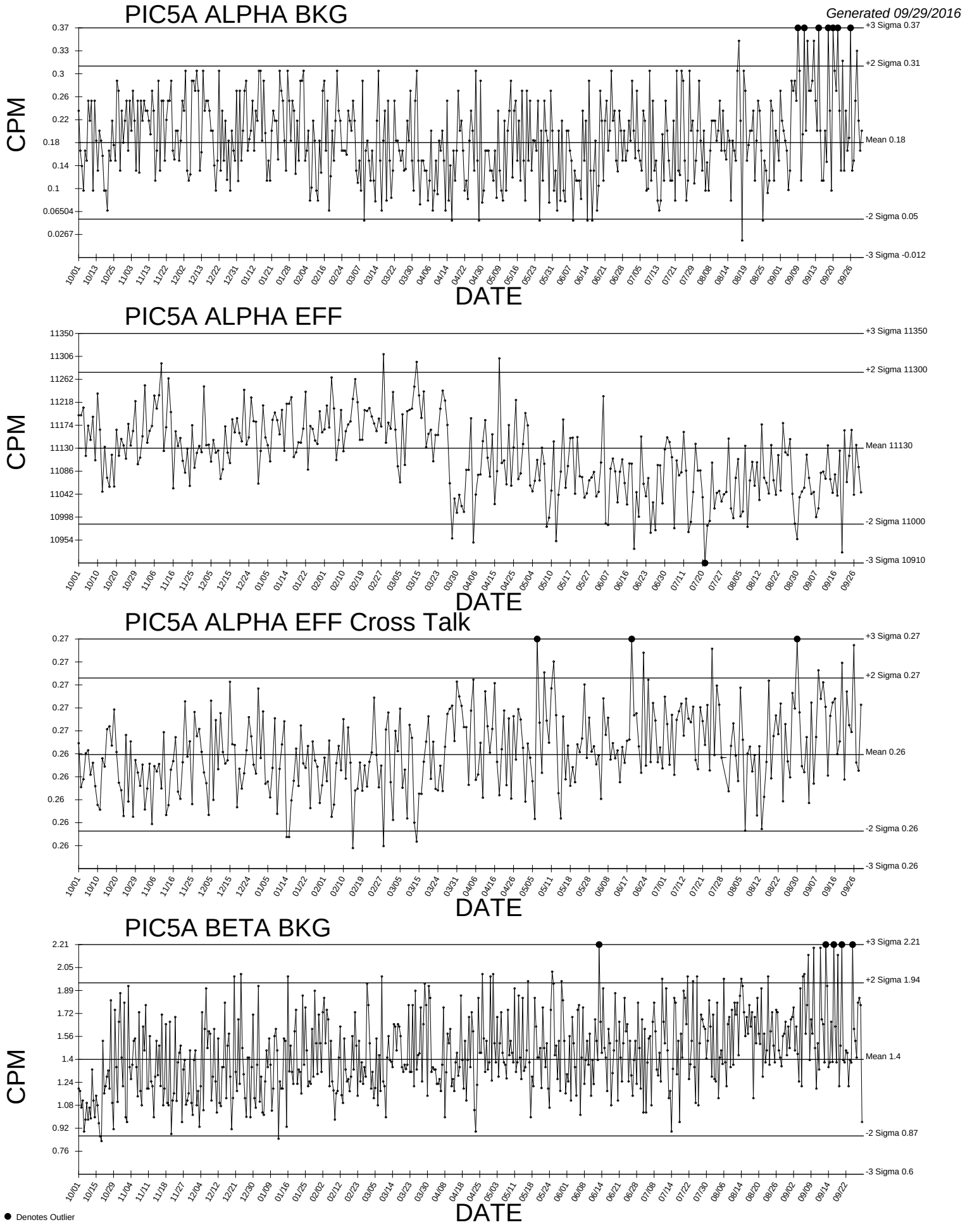


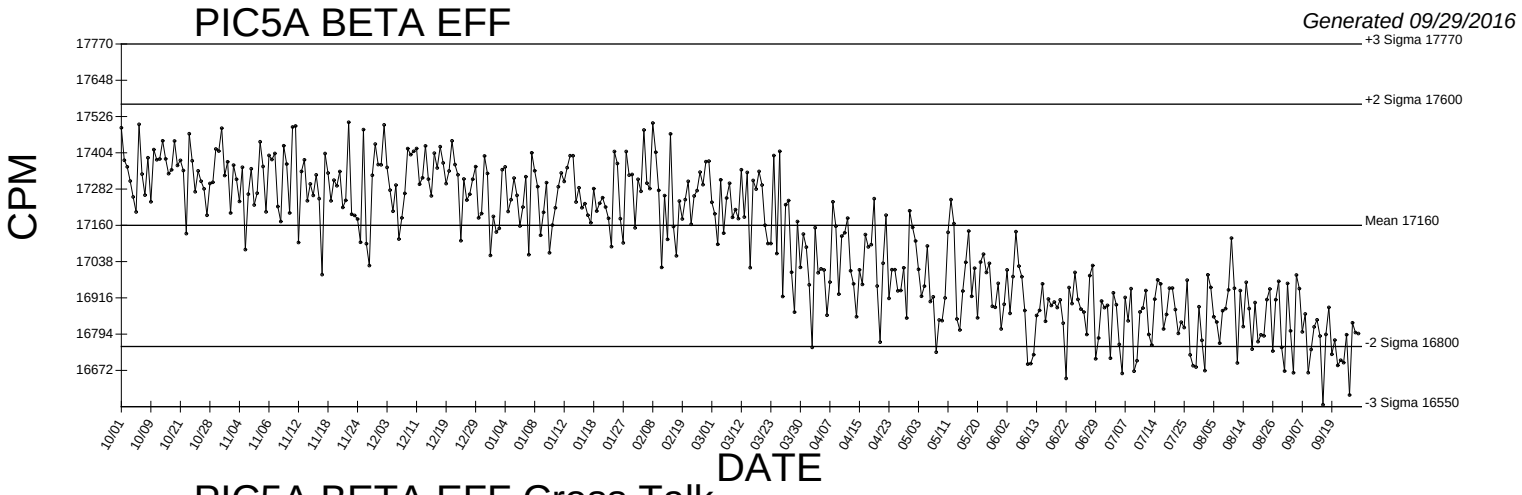
● Denotes Outlier

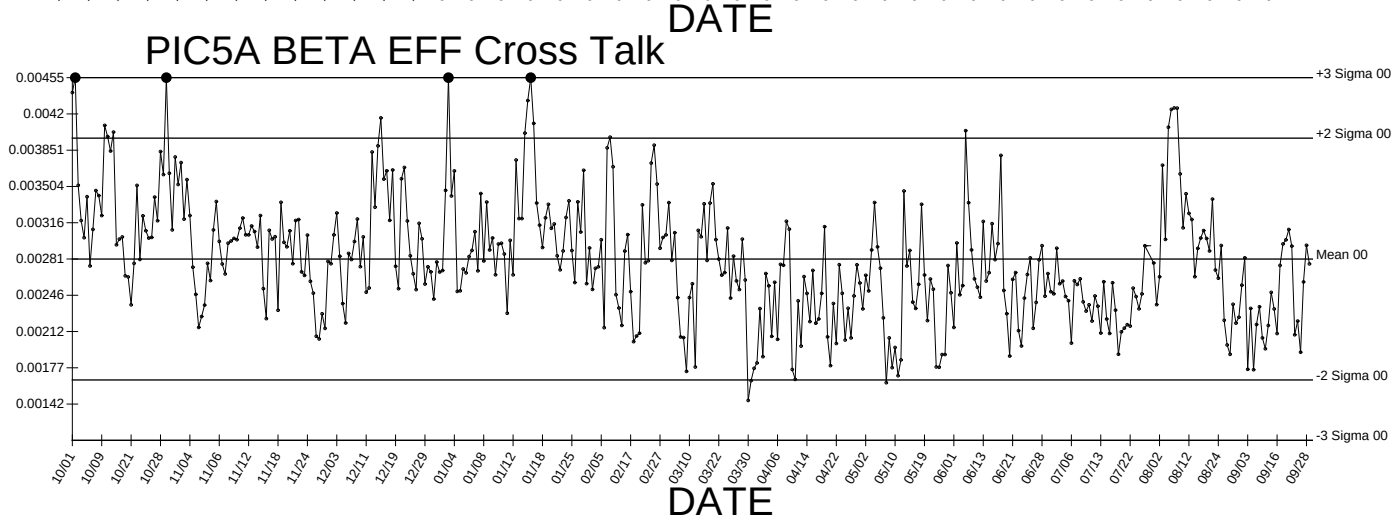

PIC4D ALPHA BKG
Generated 09/29/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.2
-2 Sigma 0.08
-3 Sigma 0.02
PIC4D ALPHA EFF
+3 Sigma 17340
+2 Sigma 17200
Mean 17000
-2 Sigma 16800
-3 Sigma 16660
PIC4D ALPHA EFF Cross Talk
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.26
-3 Sigma 0.26
PIC4D BETA BKG
+3 Sigma 2.49
+2 Sigma 2.15
Mean 1.47
-2 Sigma 0.78
-3 Sigma 0.44
Denotes Outlier



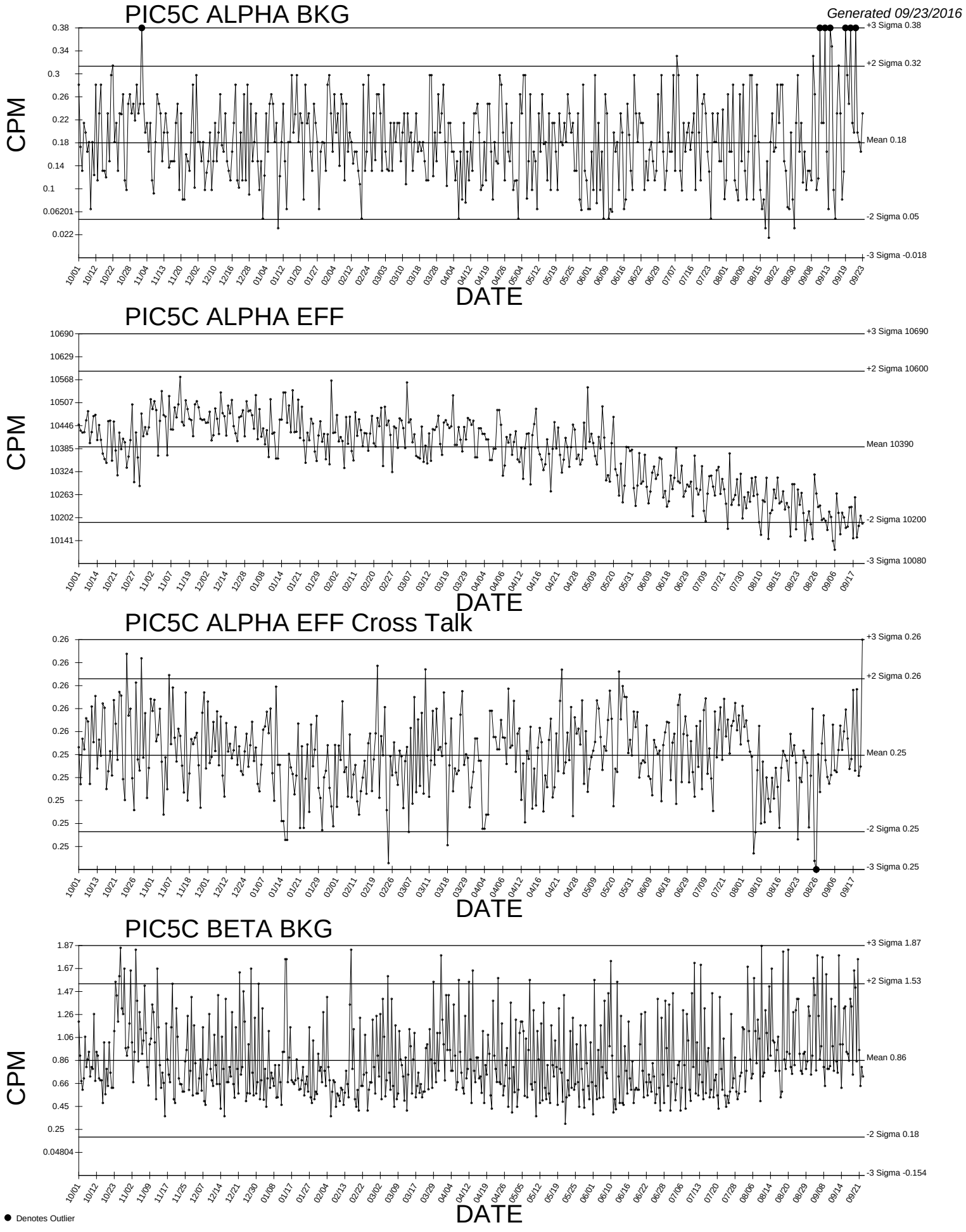
● Denotes Outlier

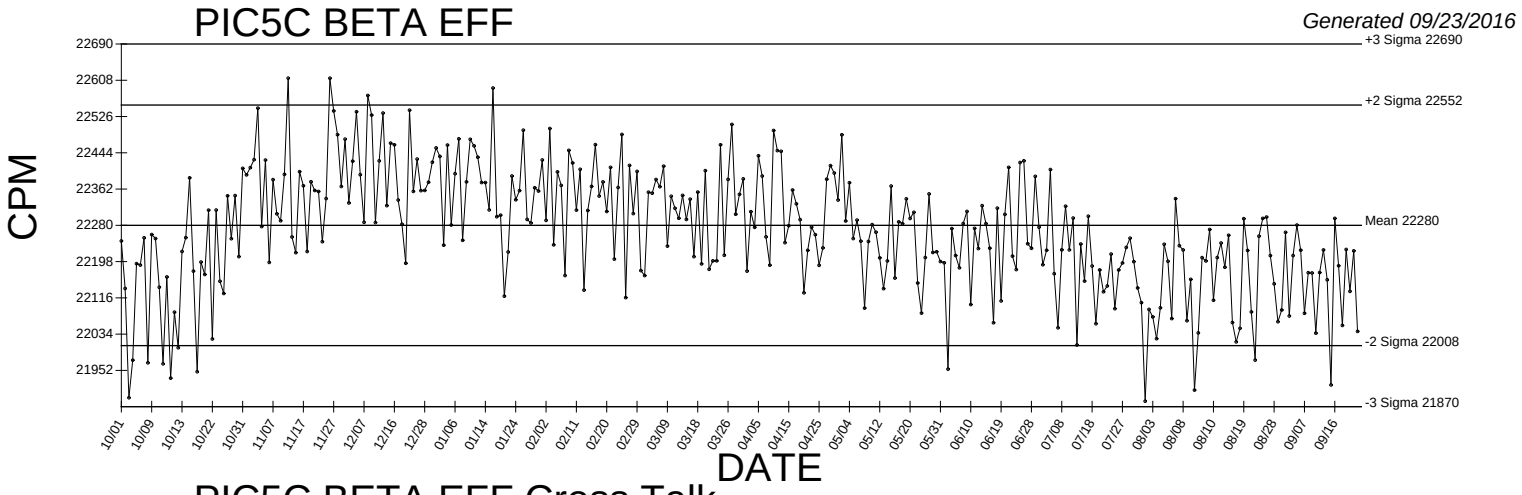

PIC5A ALPHA BKG
Generated 09/29/2016
CPM
0.37
0.33
0.3
0.26
0.22
0.18
0.14
0.1
0.06504
0.0267
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.18
-2 Sigma 0.05
-3 Sigma -0.012
10/01 10/13 10/25 11/03 11/13 11/22 12/02 12/13 12/22 12/31 01/12 01/21 01/28 02/04 02/16 02/24 03/07 03/14 03/22 03/30 04/06 04/14 04/22 04/30 05/09 05/16 05/23 05/31 06/07 06/14 06/21 06/28 07/05 07/13 07/21 07/29 08/08 08/14 08/19 08/25 09/01 09/09 09/13 09/20 09/26
DATE
PIC5A ALPHA EFF
CPM
11350
11306
11262
11218
11174
11130
11086
11042
10998
10954
+3 Sigma 11350
+2 Sigma 11300
Mean 11130
-2 Sigma 11000
-3 Sigma 10910
10/01 10/10 10/20 10/29 11/06 11/16 11/25 12/05 12/15 12/24 01/05 01/14 01/22 02/01 02/10 02/19 02/27 03/05 03/15 03/23 03/30 04/06 04/15 04/25 05/04 05/10 05/17 05/27 06/07 06/16 06/23 06/30 07/11 07/20 07/27 08/05 08/12 08/22 08/30 09/07 09/16 09/26
DATE
PIC5A ALPHA EFF Cross Talk
0.27
0.27
0.27
0.27
0.27
0.26
0.26
0.26
0.26
0.26
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.26
-3 Sigma 0.26
10/01 10/10 10/20 10/29 11/06 11/16 11/25 12/05 12/15 12/24 01/05 01/14 01/22 02/01 02/10 02/19 02/27 03/05 03/15 03/24 03/31 04/06 04/16 04/26 05/05 05/11 05/18 05/28 06/08 06/17 06/24 07/01 07/12 07/21 07/28 08/05 08/12 08/22 08/30 09/07 09/16 09/26
DATE
PIC5A BETA BKG
CPM
2.21
2.05
1.89
1.72
1.56
1.4
1.24
1.08
0.92
0.76
+3 Sigma 2.21
+2 Sigma 1.94
Mean 1.4
-2 Sigma 0.87
-3 Sigma 0.6
10/01 10/15 10/29 11/04 11/11 11/18 11/27 12/04 12/12 12/21 12/30 01/09 01/16 01/25 02/02 02/12 02/23 03/05 03/14 03/23 03/30 04/08 04/18 04/25 05/03 05/11 05/18 05/24 06/01 06/08 06/14 06/21 06/28 07/08 07/14 07/22 07/30 08/06 08/14 08/20 08/26 09/02 09/09 09/14 09/22
DATE
Denotes Outlier

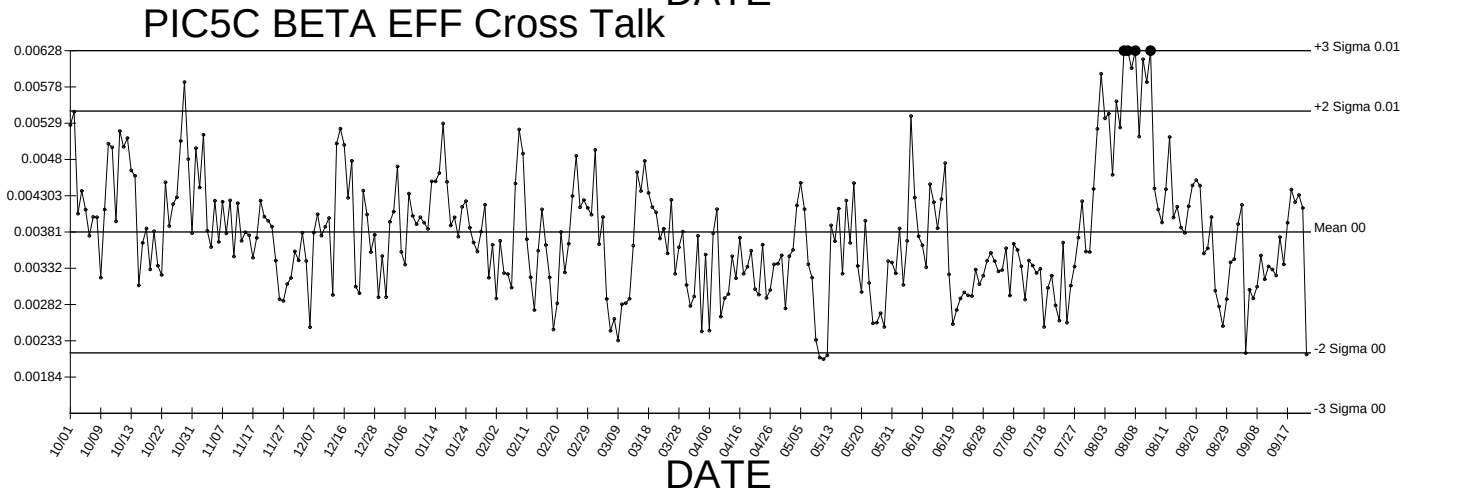




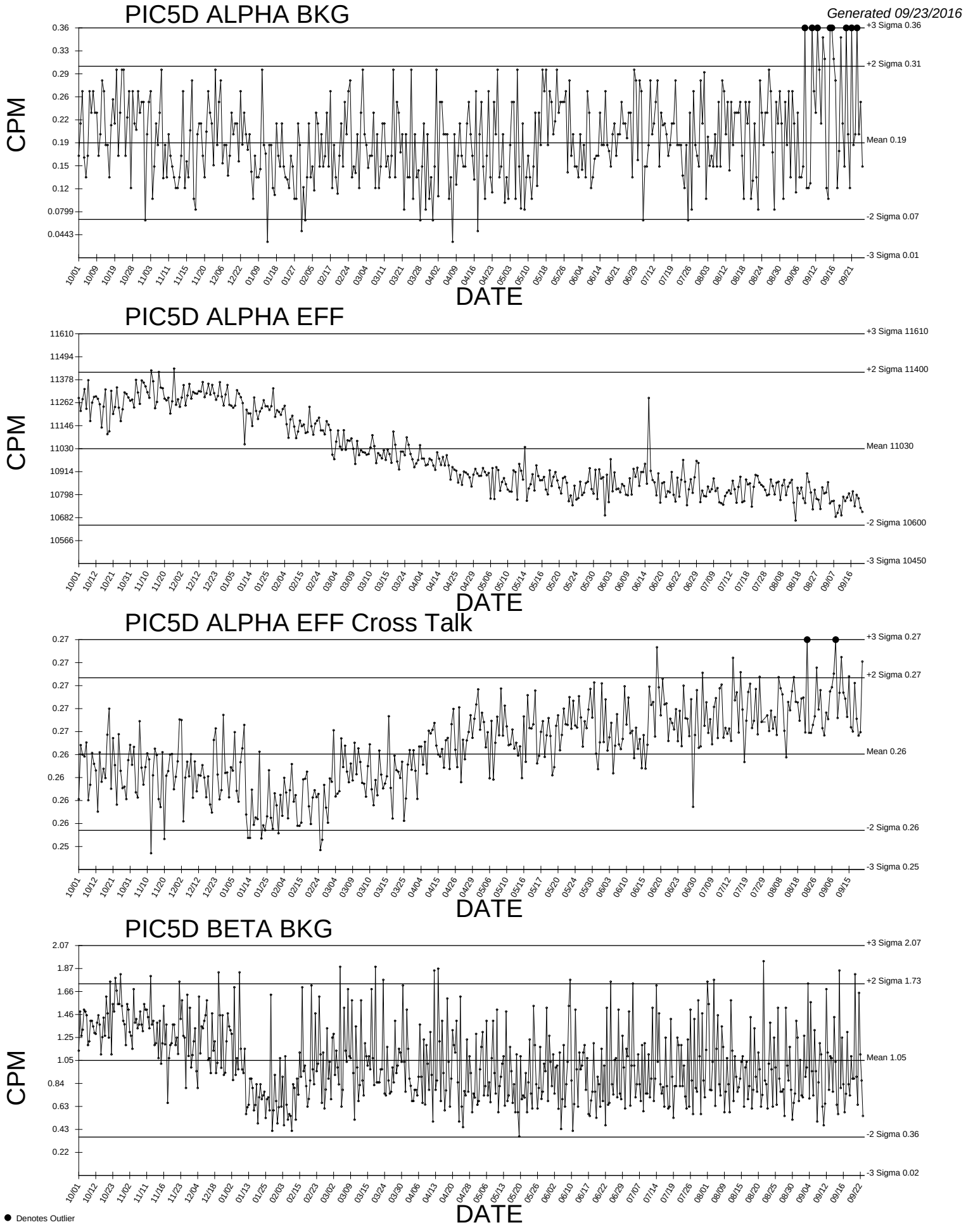
● Denotes Outlier

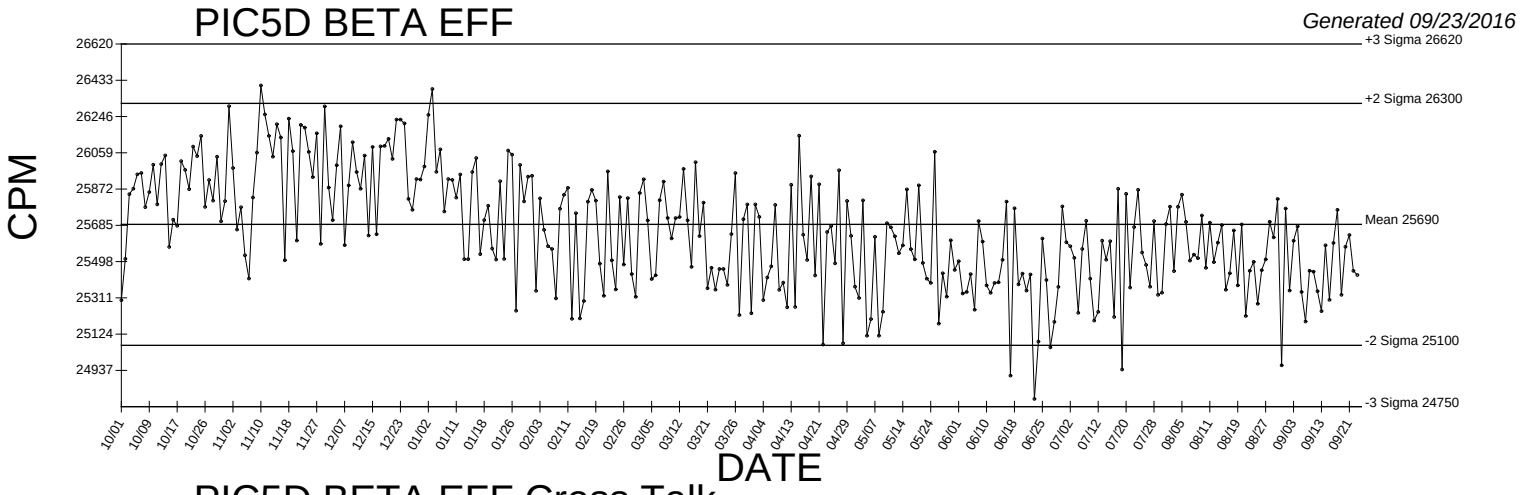

PIC5C ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.32
Mean 0.18
-2 Sigma 0.05
-3 Sigma -0.018
PIC5C ALPHA EFF
+3 Sigma 10690
+2 Sigma 10600
Mean 10390
-2 Sigma 10200
-3 Sigma 10080
PIC5C ALPHA EFF Cross Talk
+3 Sigma 0.26
+2 Sigma 0.26
Mean 0.25
-2 Sigma 0.25
-3 Sigma 0.25
PIC5C BETA BKG
+3 Sigma 1.87
+2 Sigma 1.53
Mean 0.86
-2 Sigma 0.18
-3 Sigma -0.154
Denotes Outlier

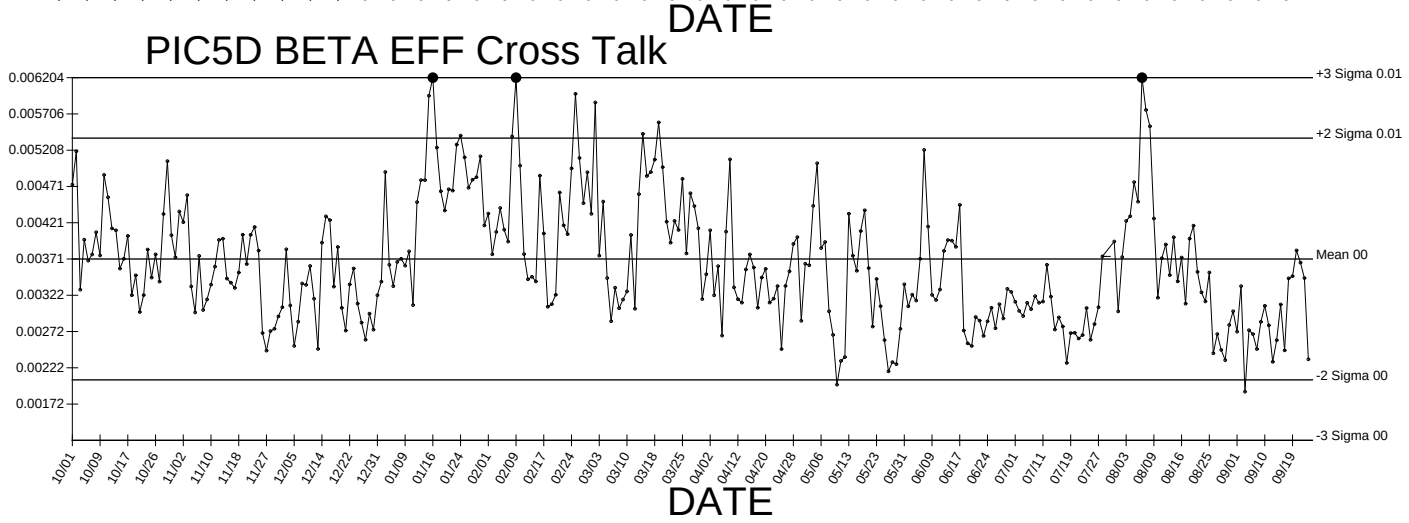




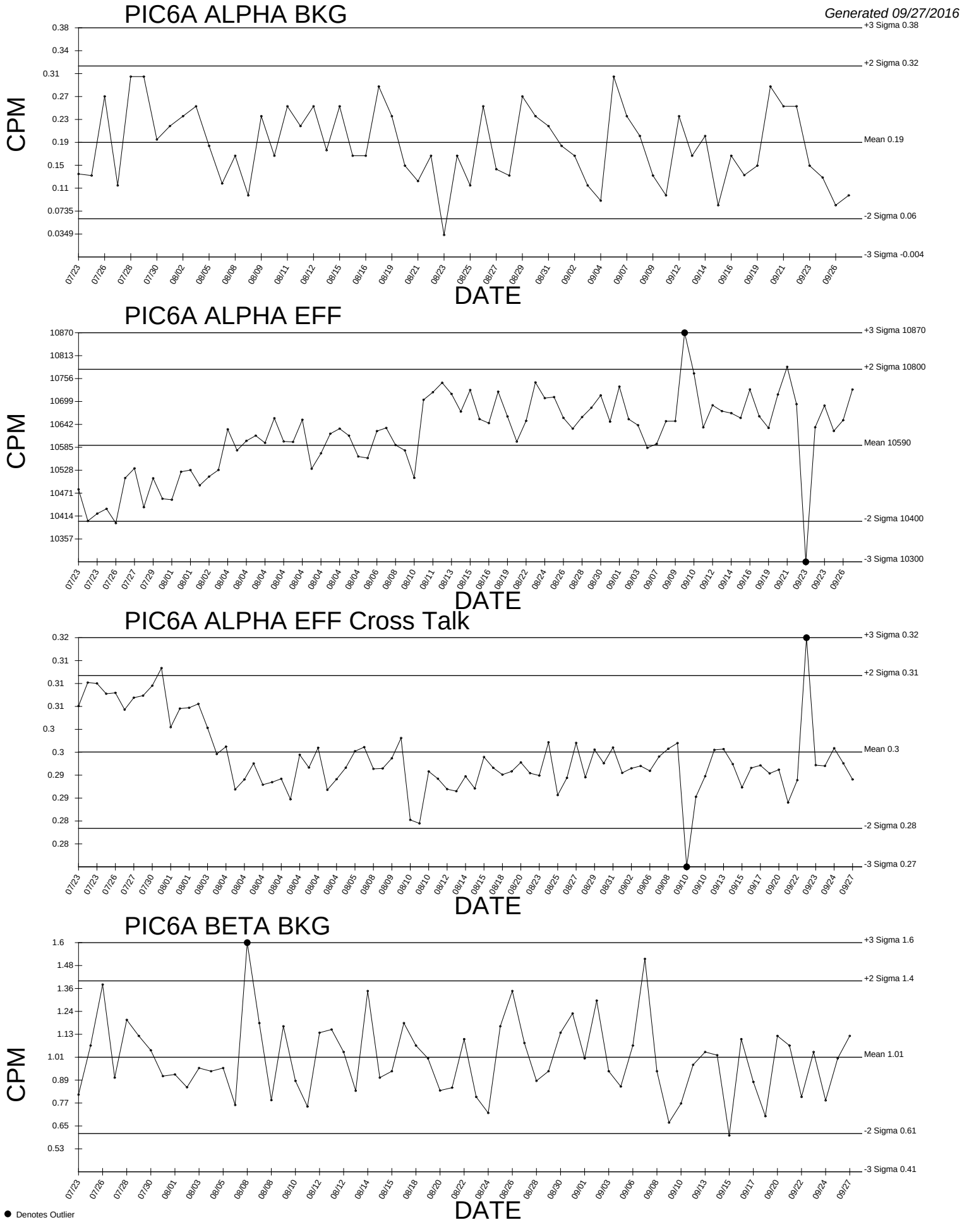
● Denotes Outlier

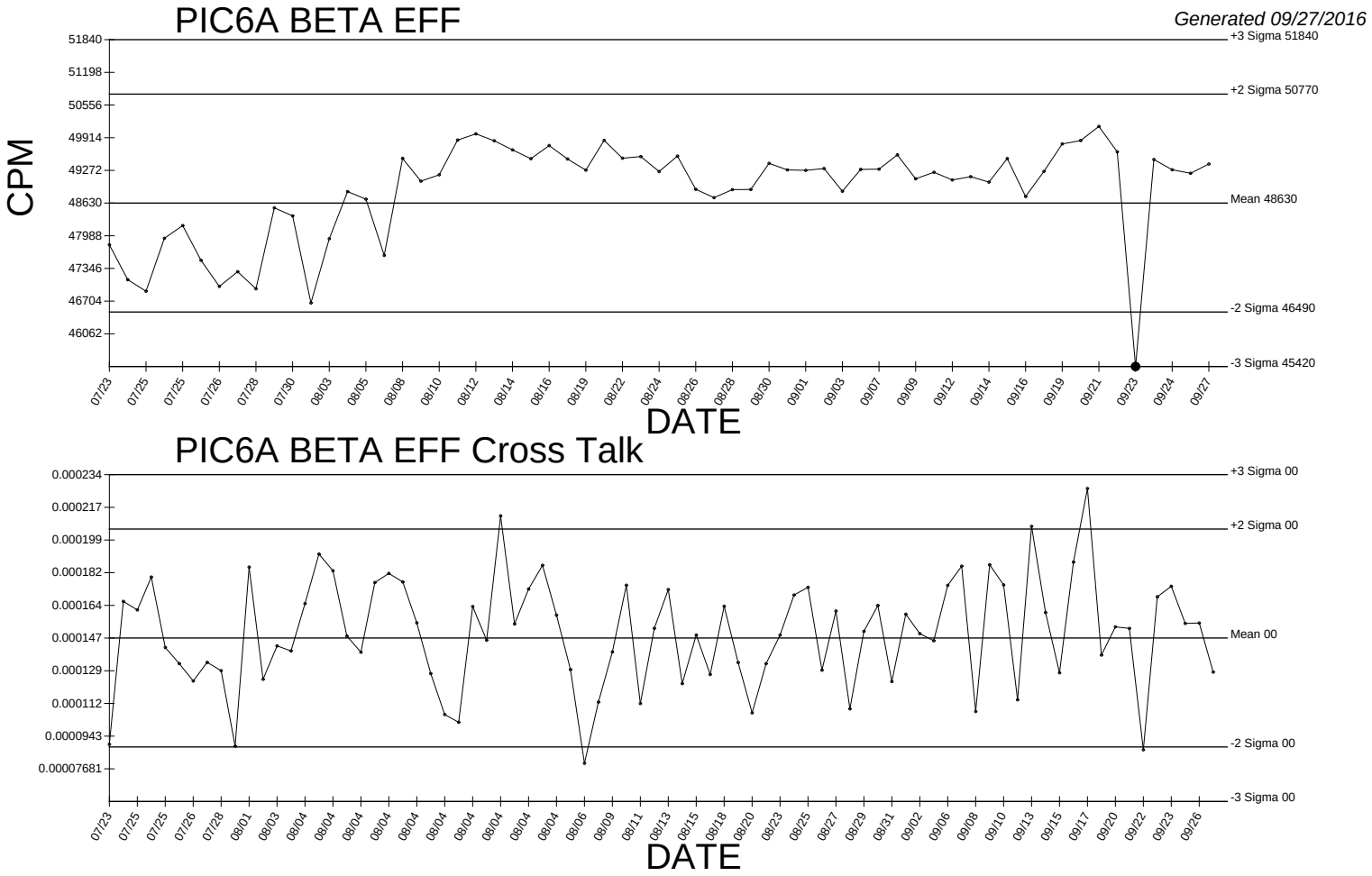

PIC5D ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.36
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.07
-3 Sigma 0.01
PIC5D ALPHA EFF
+3 Sigma 11610
+2 Sigma 11400
Mean 11030
-2 Sigma 10600
-3 Sigma 10450
PIC5D ALPHA EFF Cross Talk
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.26
-3 Sigma 0.25
PIC5D BETA BKG
+3 Sigma 2.07
+2 Sigma 1.73
Mean 1.05
-2 Sigma 0.36
-3 Sigma 0.02
● Denotes Outlier



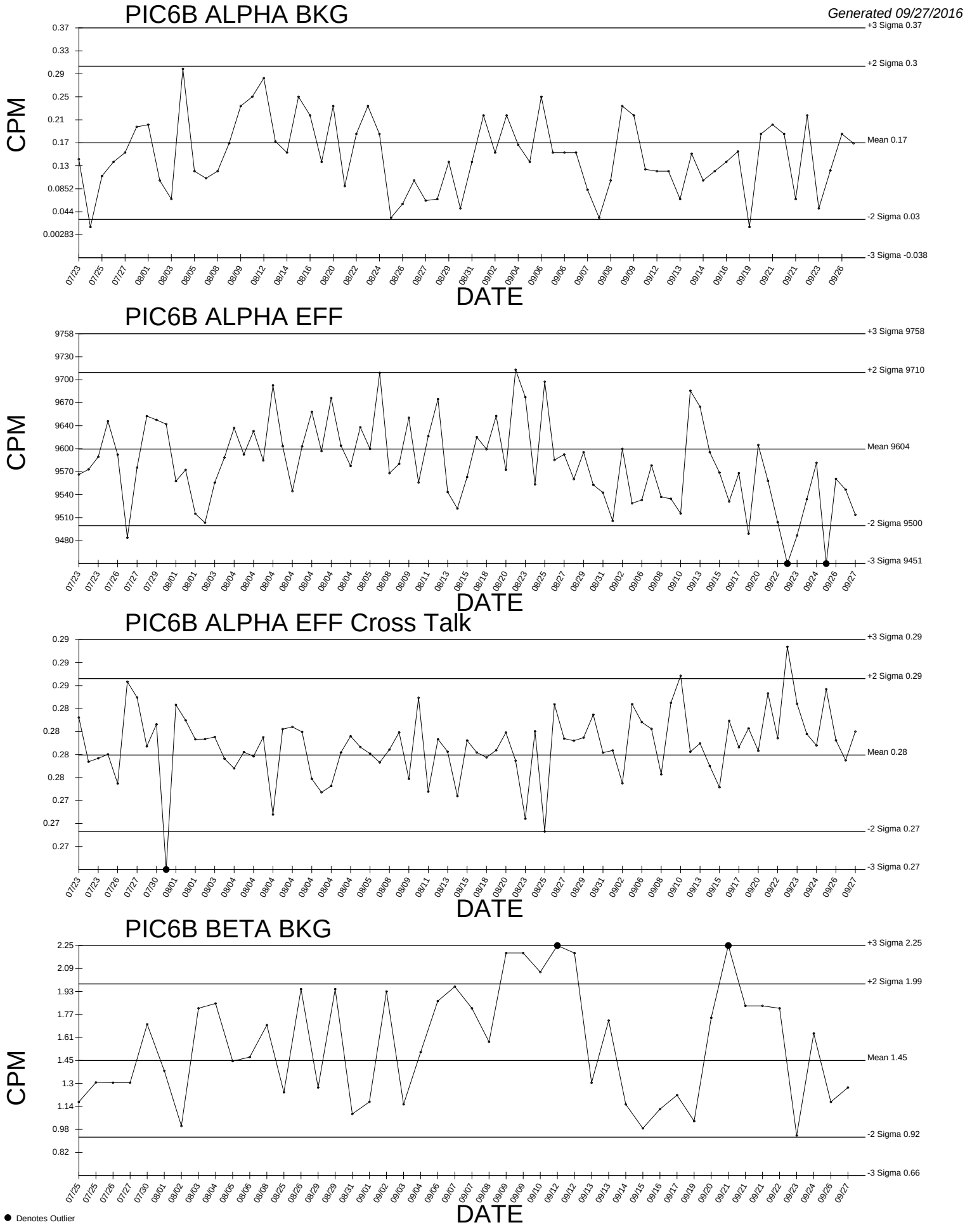


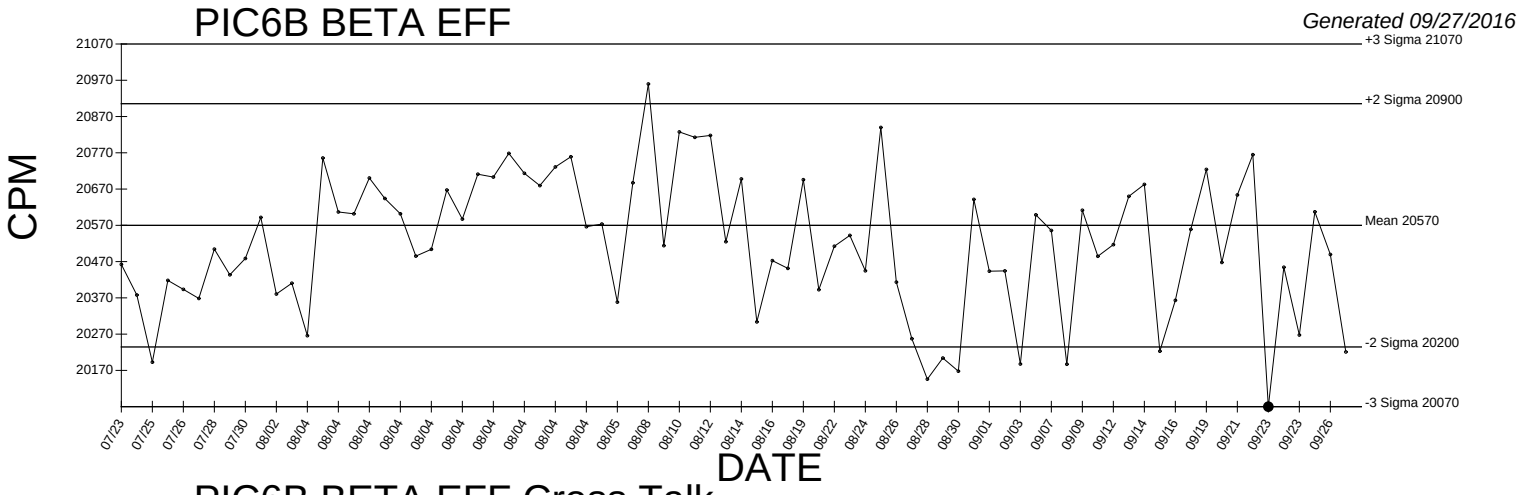
● Denotes Outlier

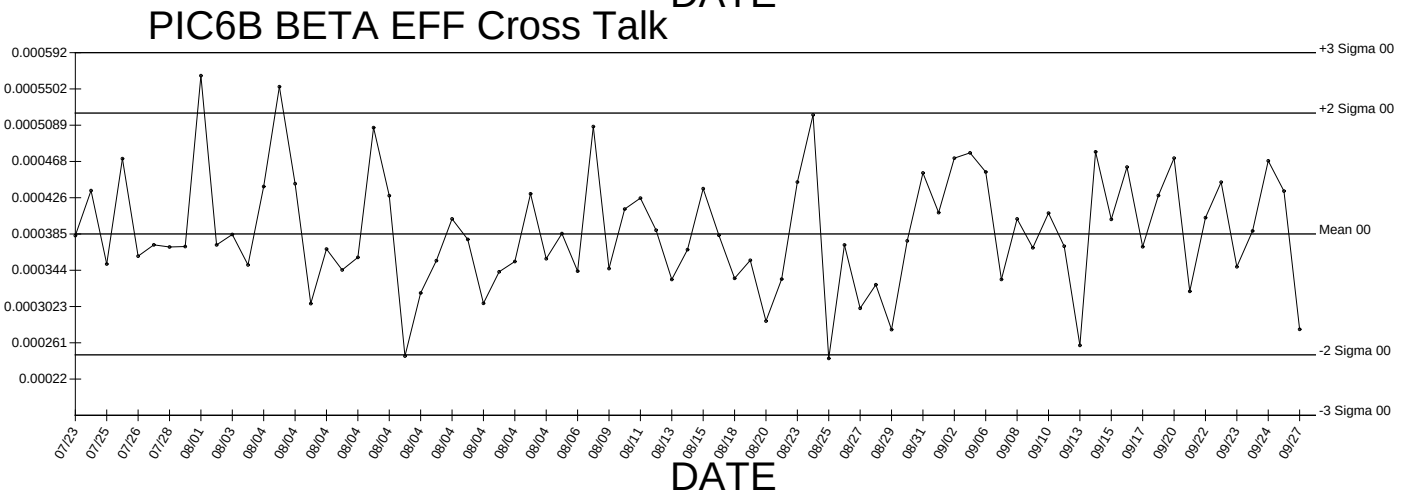

PIC6A ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.32
Mean 0.19
-2 Sigma 0.06
-3 Sigma -0.004
PIC6A ALPHA EFF
+3 Sigma 10870
+2 Sigma 10800
Mean 10590
-2 Sigma 10400
-3 Sigma 10300
PIC6A ALPHA EFF Cross Talk
+3 Sigma 0.32
+2 Sigma 0.31
Mean 0.3
-2 Sigma 0.28
-3 Sigma 0.27
PIC6A BETA BKG
+3 Sigma 1.6
+2 Sigma 1.4
Mean 1.01
-2 Sigma 0.61
-3 Sigma 0.41
Denotes Outlier



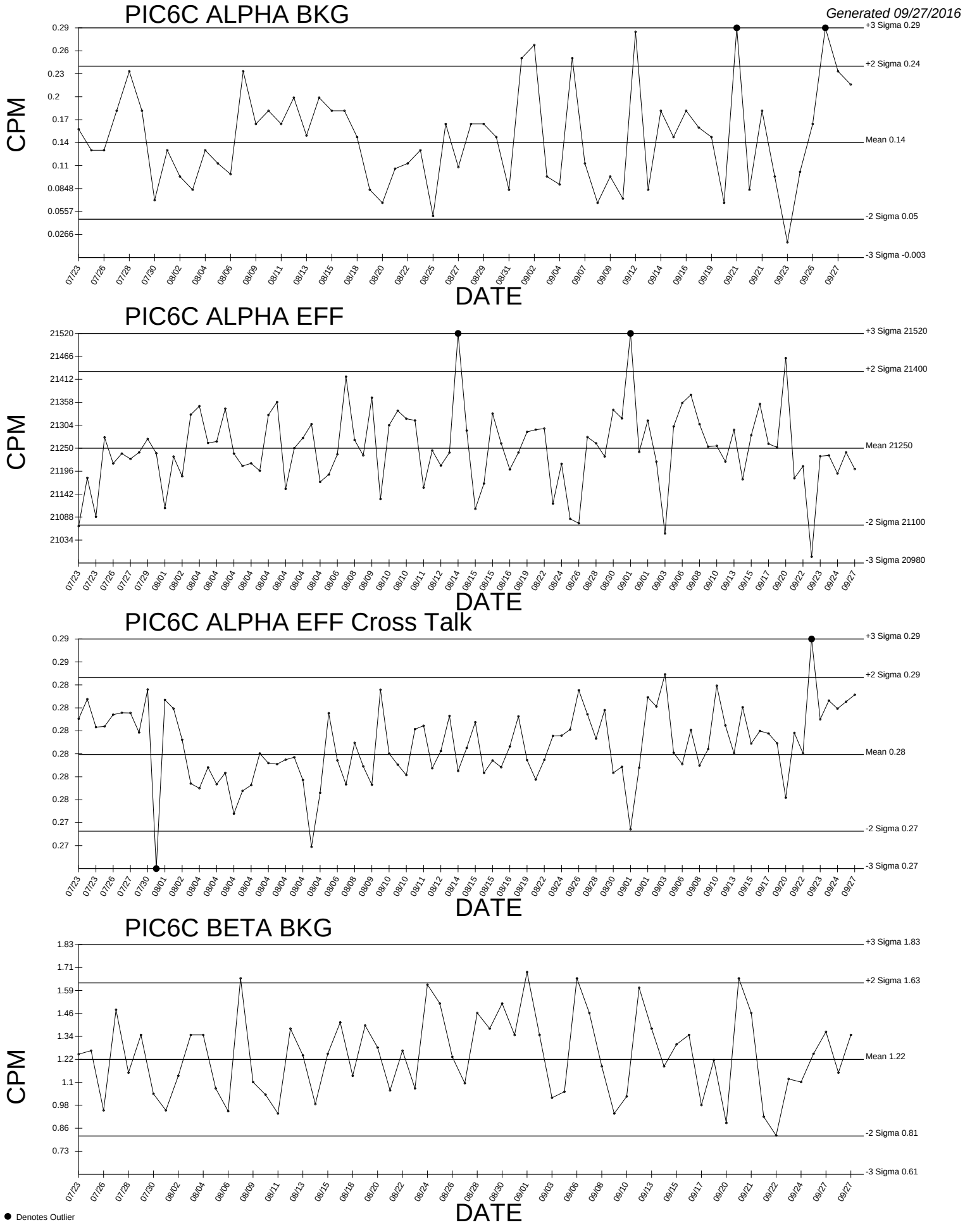
● Denotes Outlier

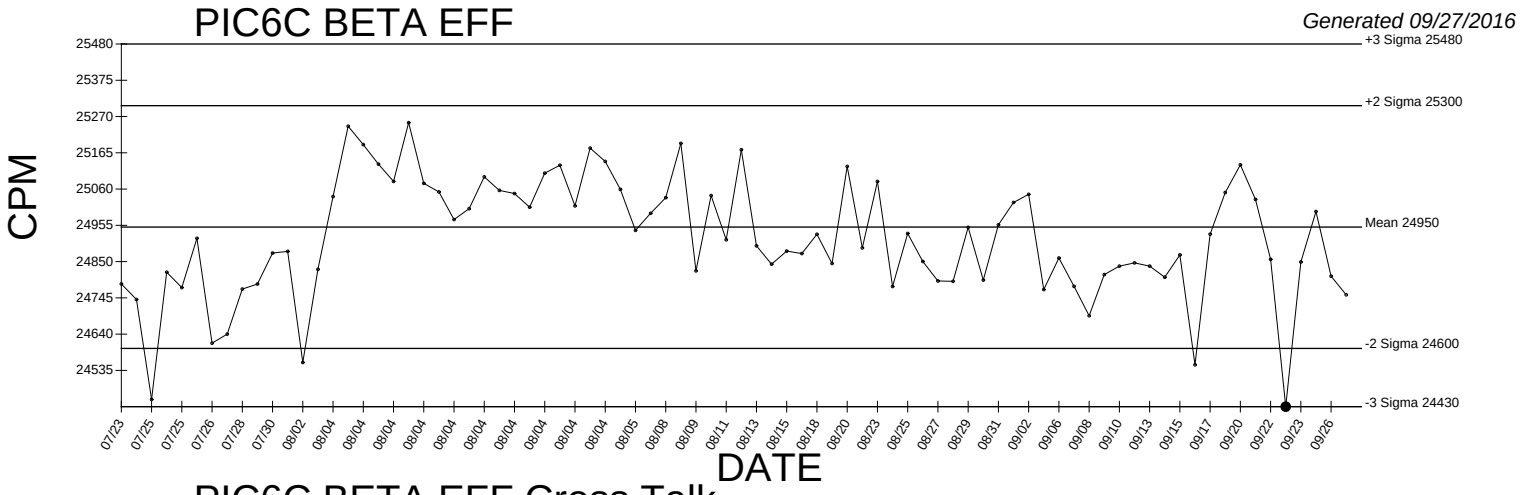

PIC6B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.3
Mean 0.17
-2 Sigma 0.03
-3 Sigma -0.038
PIC6B ALPHA EFF
+3 Sigma 9758
+2 Sigma 9710
Mean 9604
-2 Sigma 9500
-3 Sigma 9451
PIC6B ALPHA EFF Cross Talk
+3 Sigma 0.29
+2 Sigma 0.29
Mean 0.28
-2 Sigma 0.27
-3 Sigma 0.27
PIC6B BETA BKG
+3 Sigma 2.25
+2 Sigma 1.99
Mean 1.45
-2 Sigma 0.92
-3 Sigma 0.66
Denotes Outlier

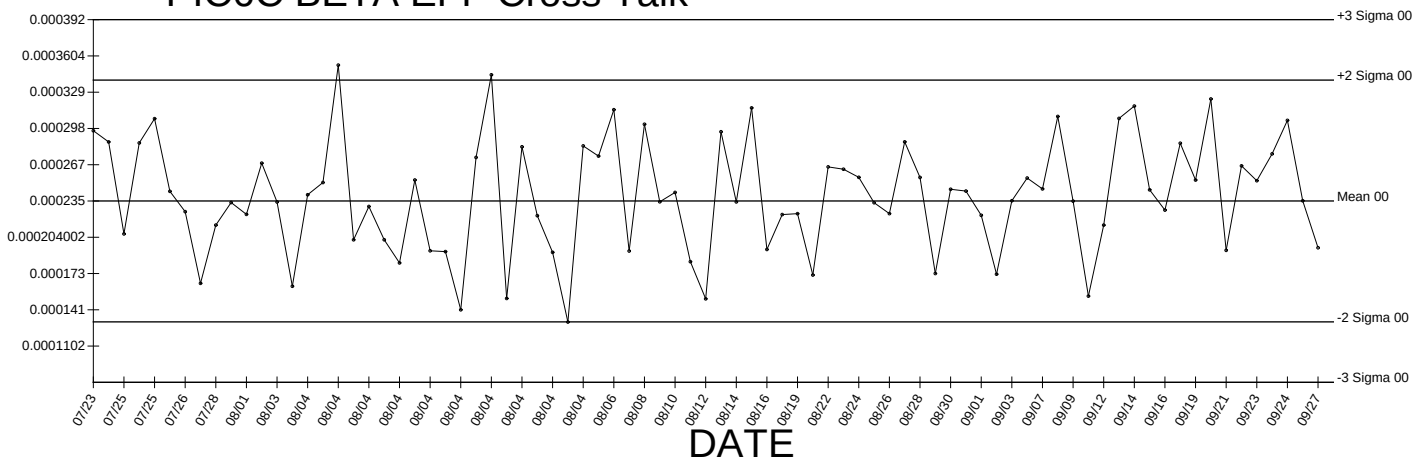




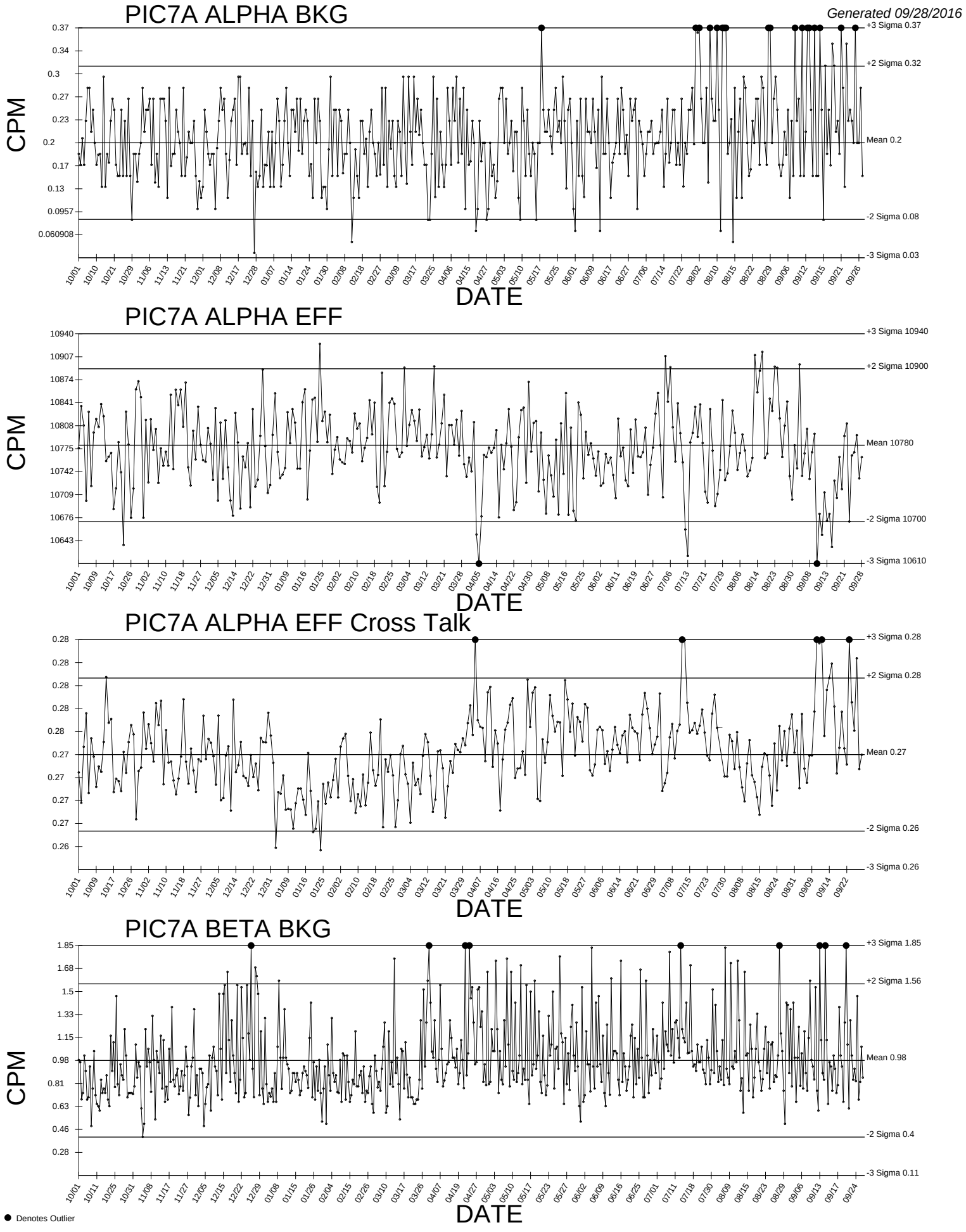
● Denotes Outlier

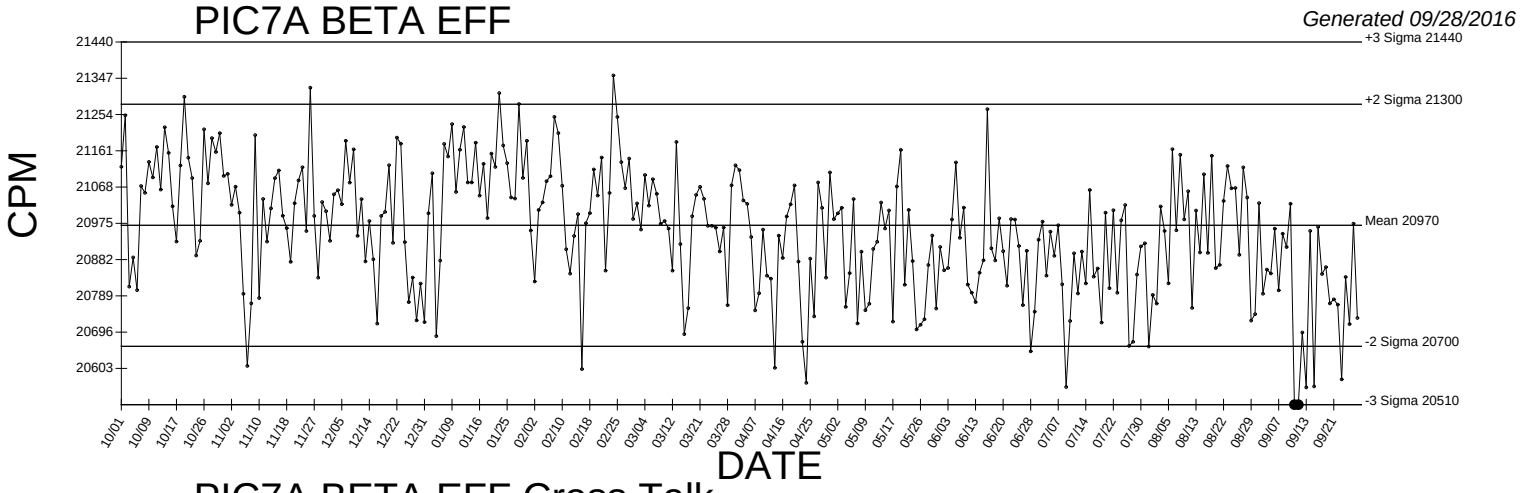

PIC6C ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.29
+2 Sigma 0.24
Mean 0.14
-2 Sigma 0.05
-3 Sigma -0.003
PIC6C ALPHA EFF
+3 Sigma 21520
+2 Sigma 21400
Mean 21250
-2 Sigma 21100
-3 Sigma 20980
PIC6C ALPHA EFF Cross Talk
+3 Sigma 0.29
+2 Sigma 0.29
Mean 0.28
-2 Sigma 0.27
-3 Sigma 0.27
PIC6C BETA BKG
+3 Sigma 1.83
+2 Sigma 1.63
Mean 1.22
-2 Sigma 0.81
-3 Sigma 0.61
● Denotes Outlier

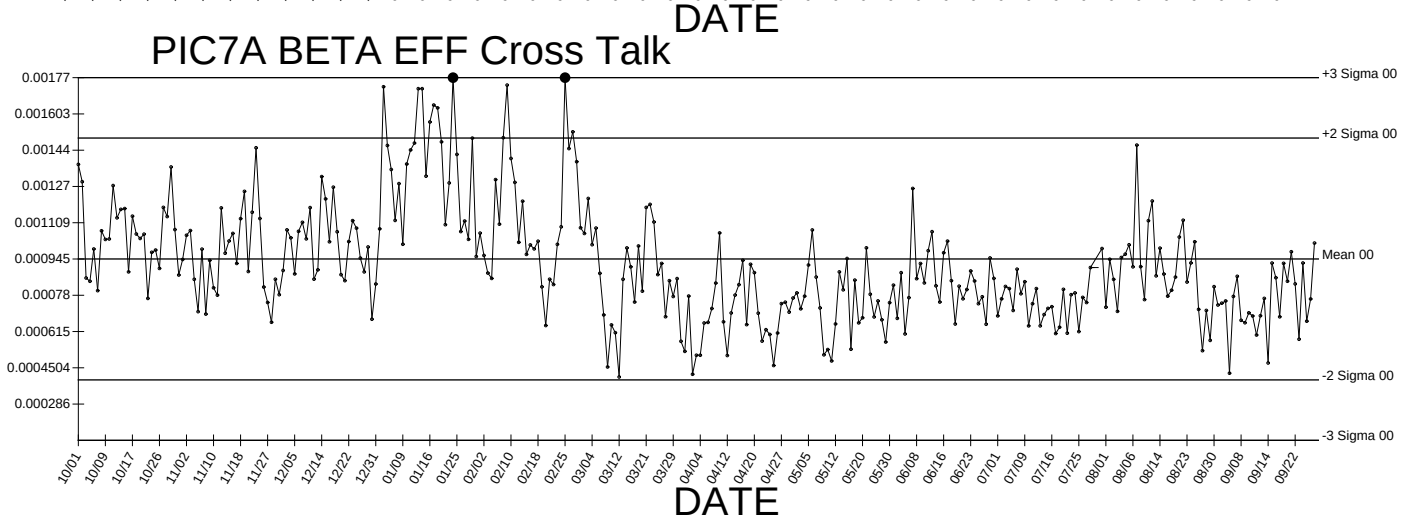




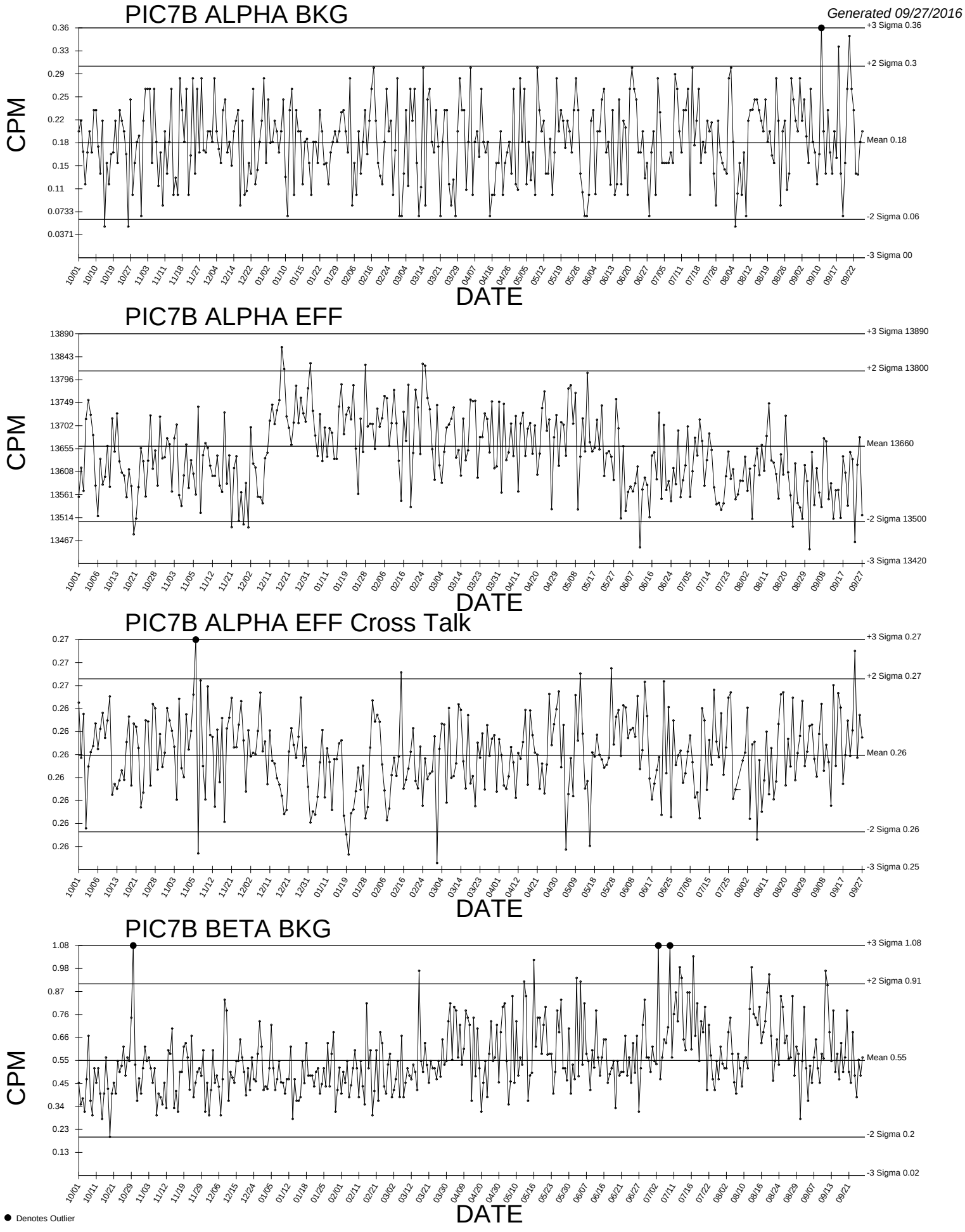
● Denotes Outlier

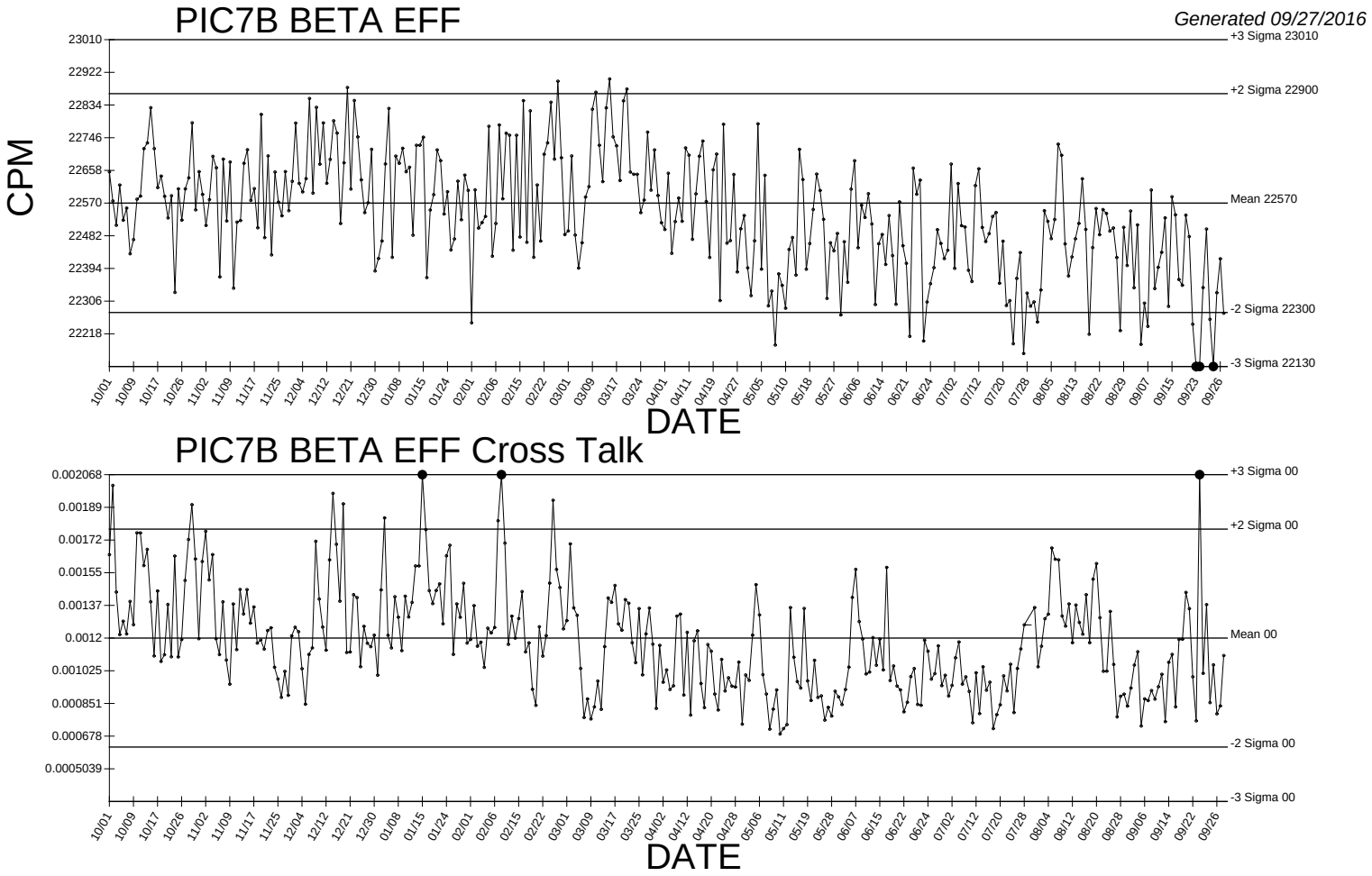

PIC7A ALPHA BKG
Generated 09/28/2016
CPM
0.37
0.34
0.3
0.27
0.23
0.2
0.17
0.13
0.0957
0.060908
+3 Sigma 0.37
+2 Sigma 0.32
Mean 0.2
-2 Sigma 0.08
-3 Sigma 0.03
DATE
PIC7A ALPHA EFF
CPM
10940
10907
10874
10841
10808
10775
10742
10709
10676
10643
+3 Sigma 10940
+2 Sigma 10900
Mean 10780
-2 Sigma 10700
-3 Sigma 10610
DATE
PIC7A ALPHA EFF Cross Talk
0.28
0.27
0.26
+3 Sigma 0.28
+2 Sigma 0.28
Mean 0.27
-2 Sigma 0.26
-3 Sigma 0.26
DATE
PIC7A BETA BKG
CPM
1.85
1.68
1.5
1.33
1.15
0.98
0.81
0.63
0.46
0.28
+3 Sigma 1.85
+2 Sigma 1.56
Mean 0.98
-2 Sigma 0.4
-3 Sigma 0.11
DATE
Denotes Outlier



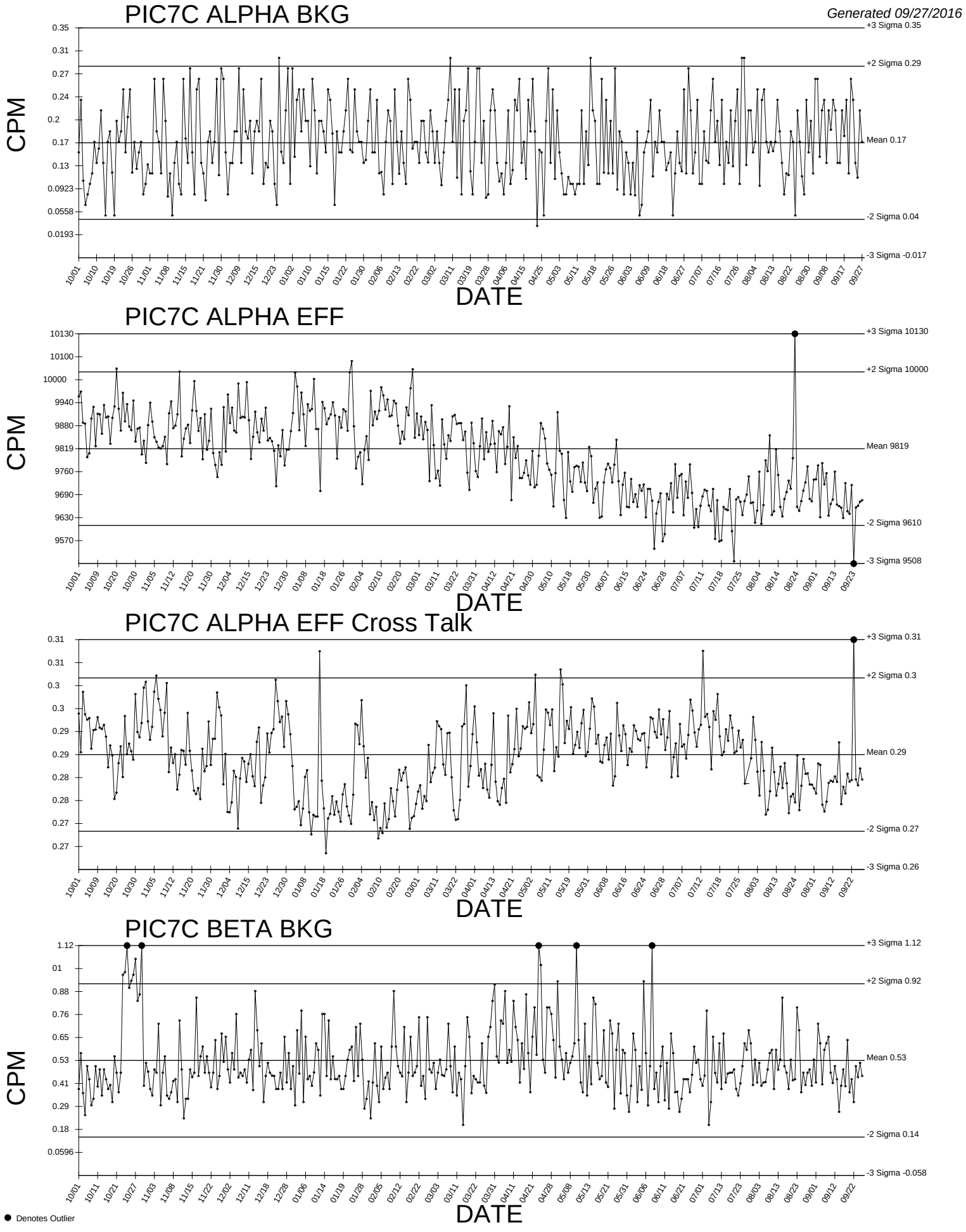


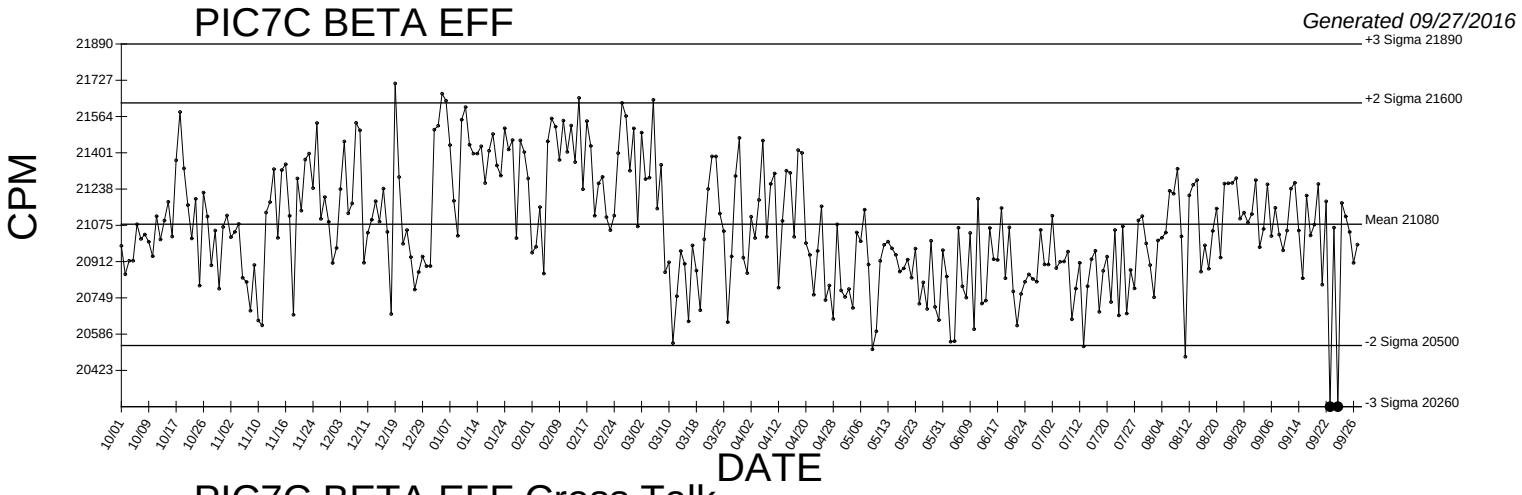
● Denotes Outlier

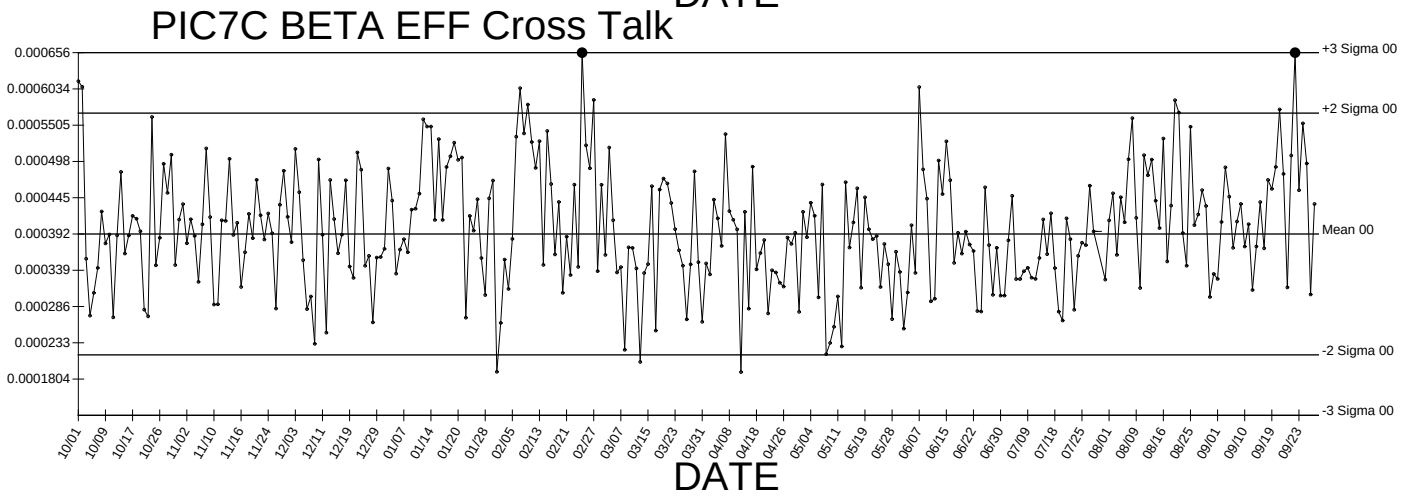

PIC7B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.36
+2 Sigma 0.3
Mean 0.18
-2 Sigma 0.06
-3 Sigma 00
PIC7B ALPHA EFF
+3 Sigma 13890
+2 Sigma 13800
Mean 13660
-2 Sigma 13500
-3 Sigma 13420
PIC7B ALPHA EFF Cross Talk
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.26
-3 Sigma 0.25
PIC7B BETA BKG
+3 Sigma 1.08
+2 Sigma 0.91
Mean 0.55
-2 Sigma 0.2
-3 Sigma 0.02
Denotes Outlier



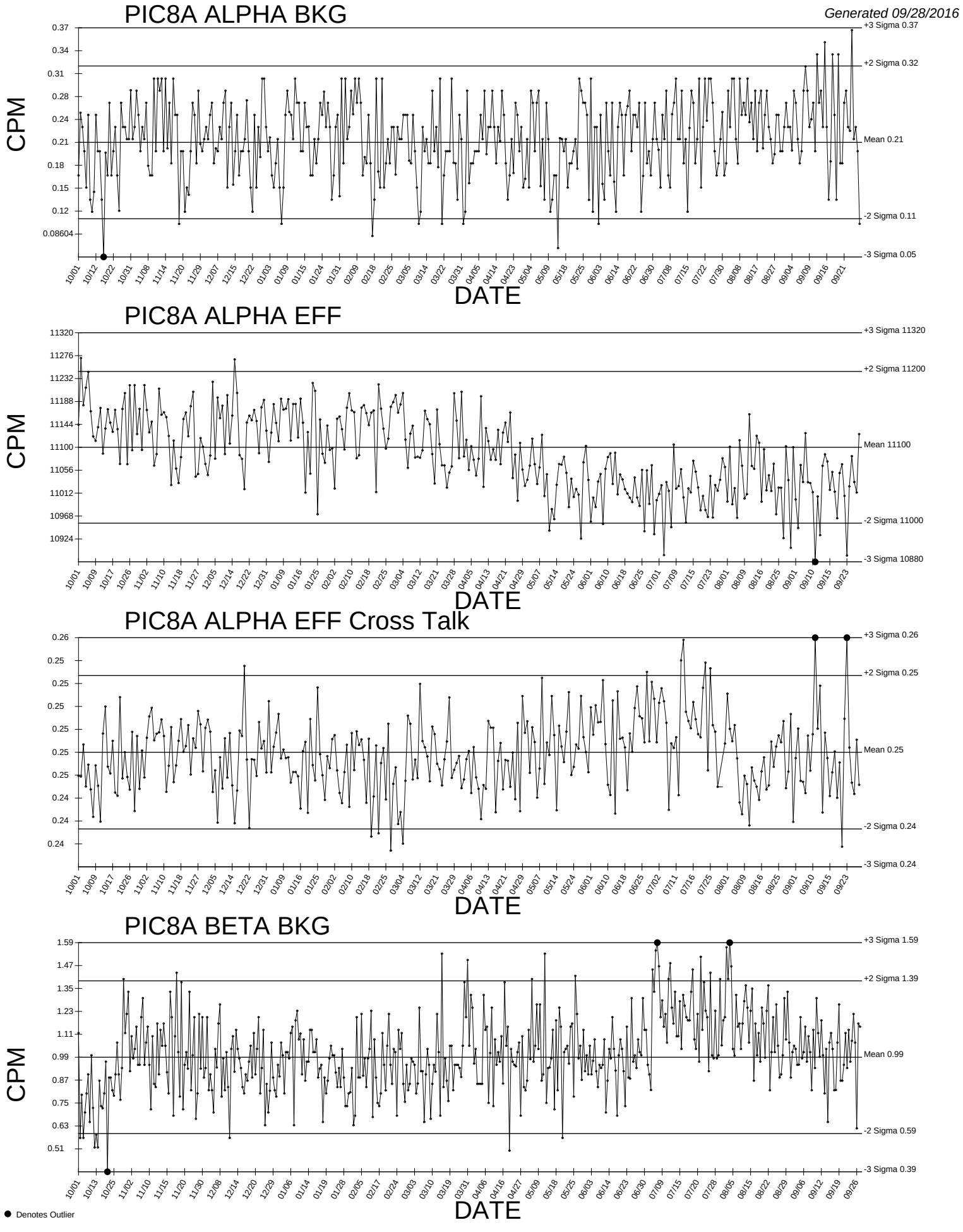
● Denotes Outlier

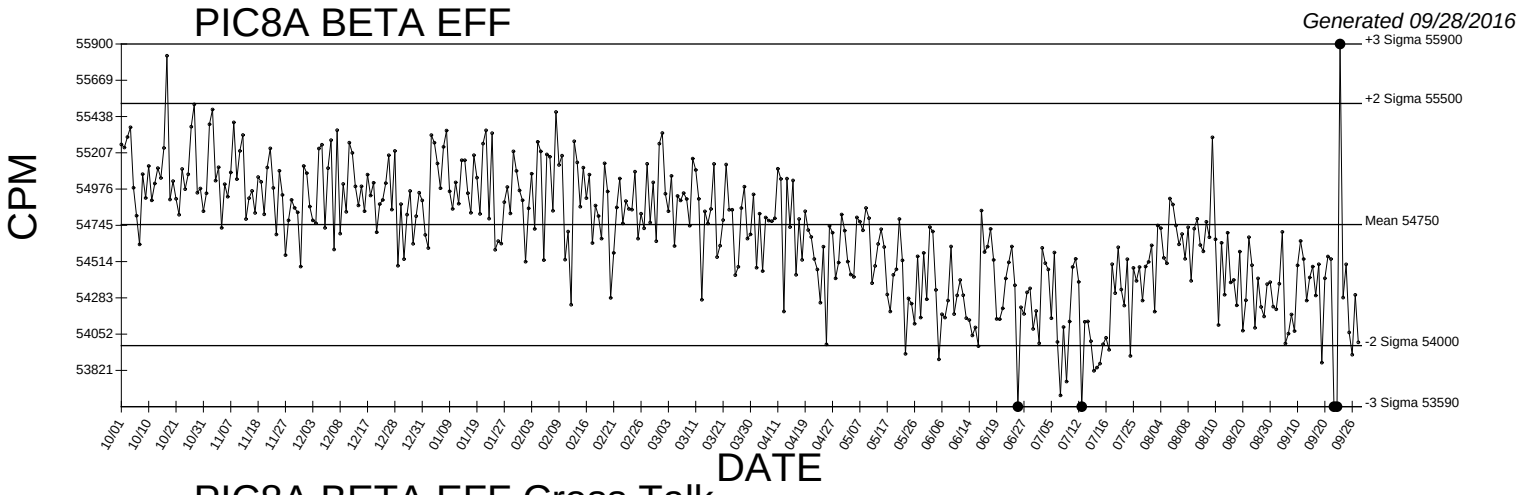

PIC7C ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.35
+2 Sigma 0.29
Mean 0.17
-2 Sigma 0.04
-3 Sigma -0.017
PIC7C ALPHA EFF
+3 Sigma 10130
+2 Sigma 10000
Mean 9819
-2 Sigma 9610
-3 Sigma 9508
PIC7C ALPHA EFF Cross Talk
+3 Sigma 0.31
+2 Sigma 0.3
Mean 0.29
-2 Sigma 0.27
-3 Sigma 0.26
PIC7C BETA BKG
+3 Sigma 1.12
+2 Sigma 0.92
Mean 0.53
-2 Sigma 0.14
-3 Sigma -0.058
● Denotes Outlier

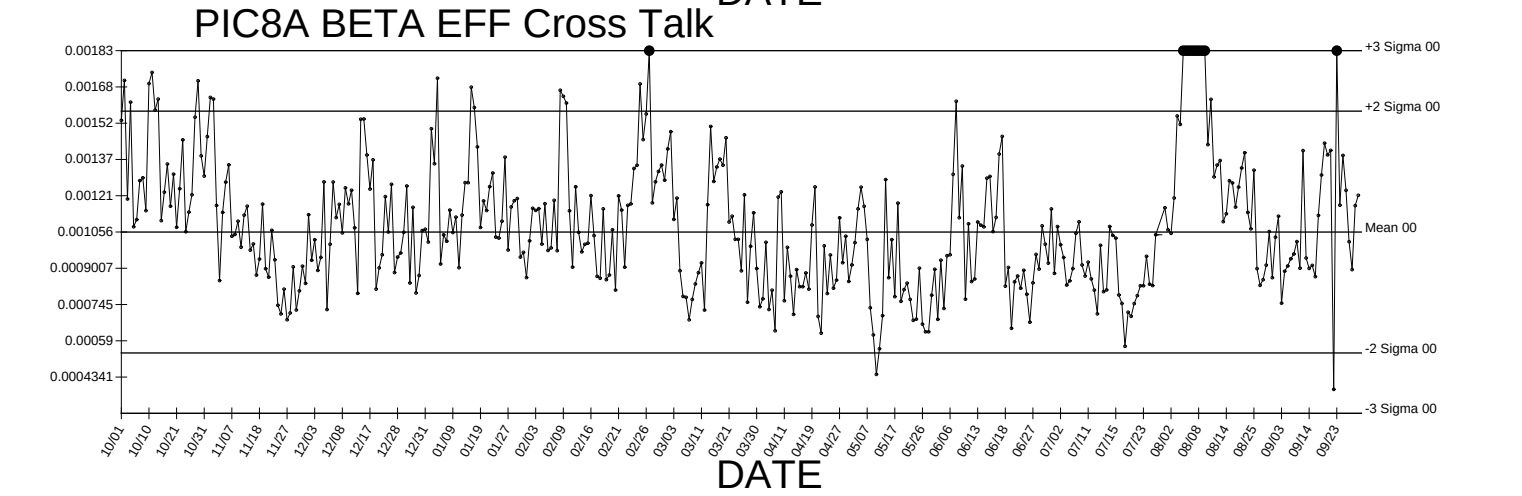




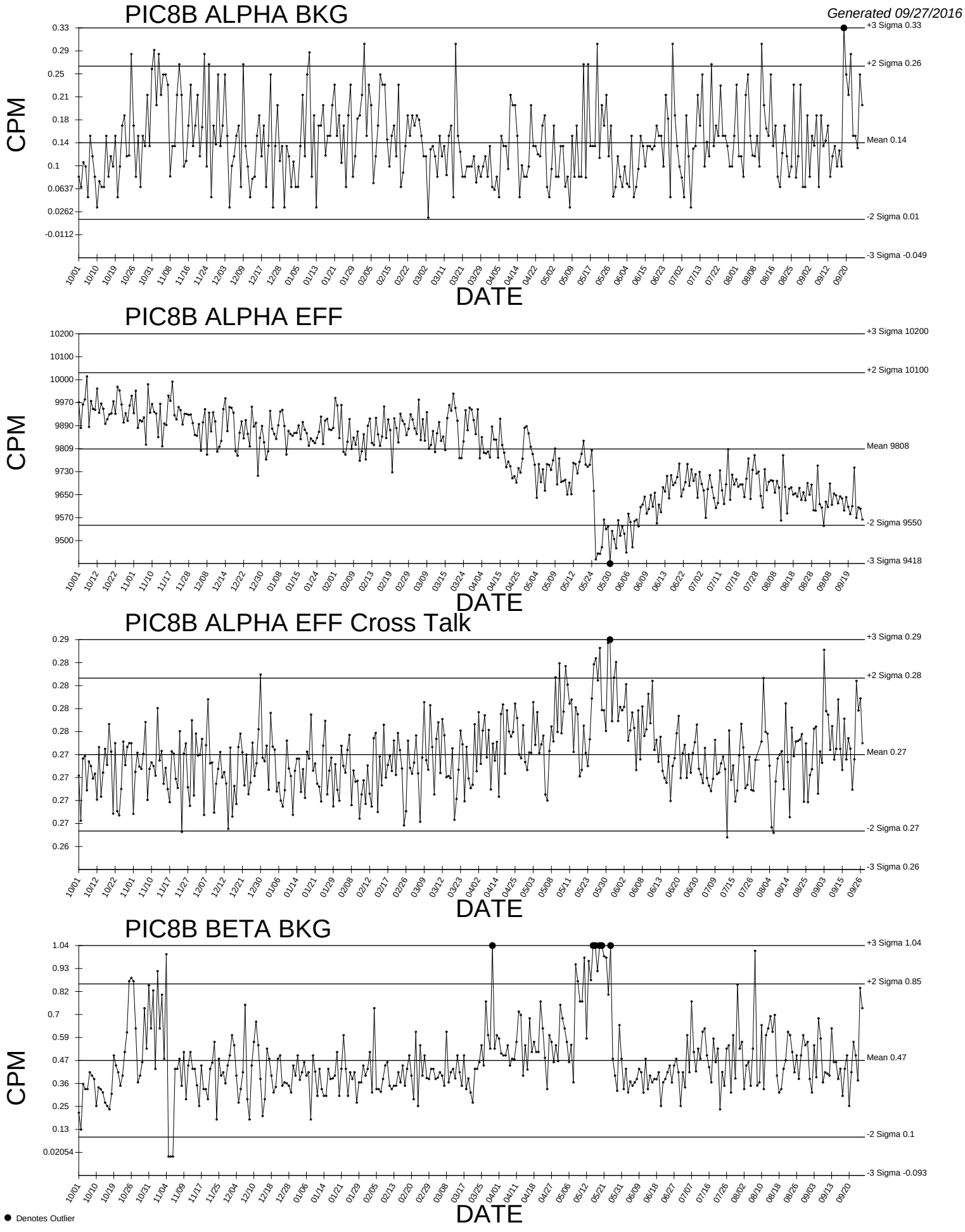
● Denotes Outlier

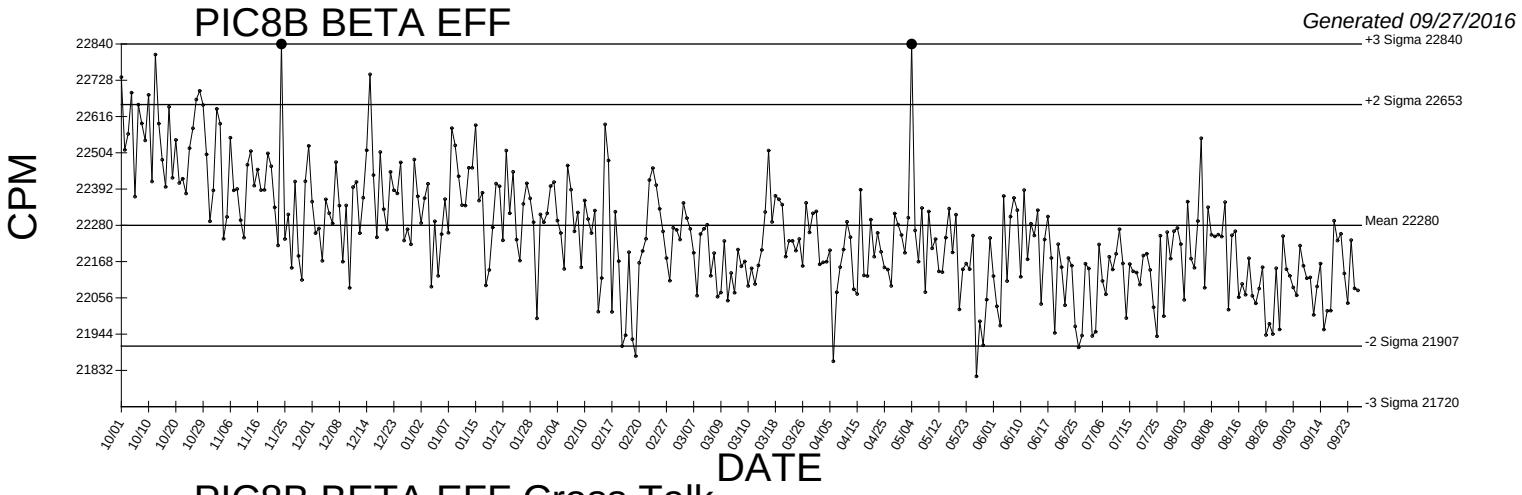

PIC8A ALPHA BKG
Generated 09/28/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.32
Mean 0.21
-2 Sigma 0.11
-3 Sigma 0.05
PIC8A ALPHA EFF
+3 Sigma 11320
+2 Sigma 11200
Mean 11100
-2 Sigma 11000
-3 Sigma 10880
PIC8A ALPHA EFF Cross Talk
+3 Sigma 0.26
+2 Sigma 0.25
Mean 0.25
-2 Sigma 0.24
-3 Sigma 0.24
PIC8A BETA BKG
+3 Sigma 1.59
+2 Sigma 1.39
Mean 0.99
-2 Sigma 0.59
-3 Sigma 0.39
Denotes Outlier

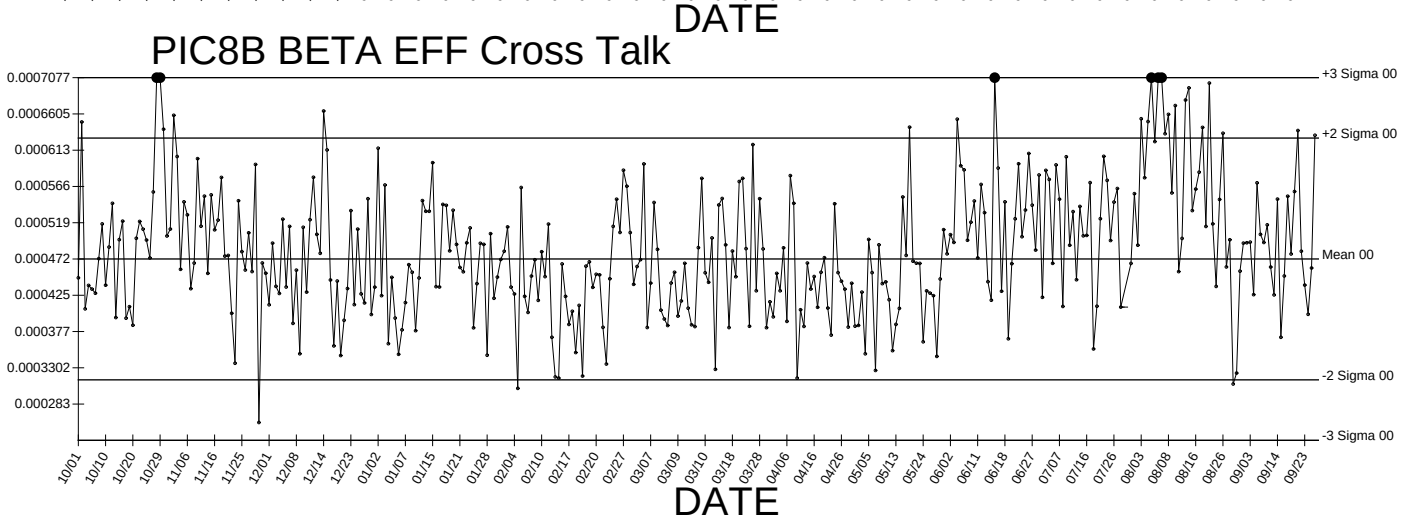




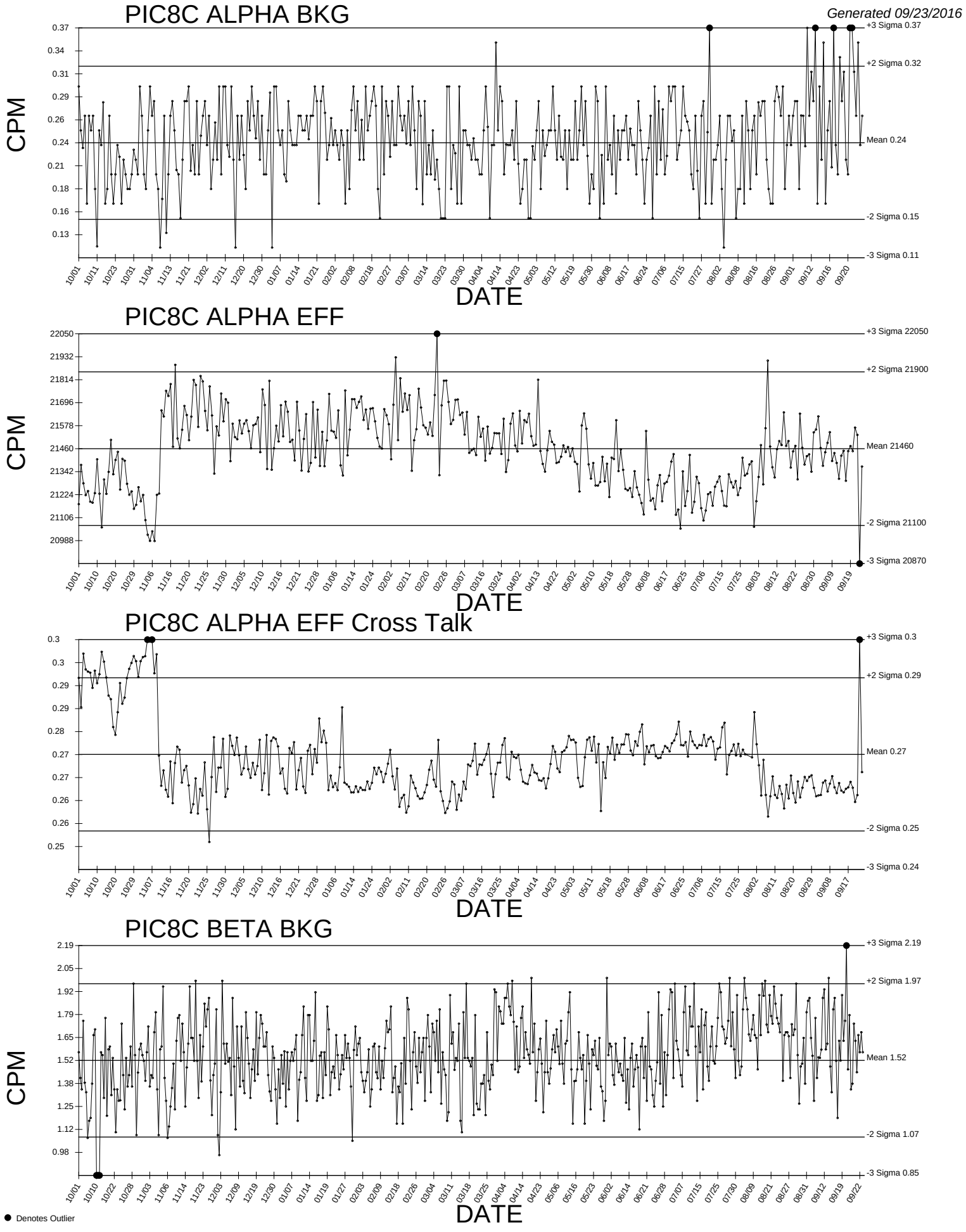
● Denotes Outlier

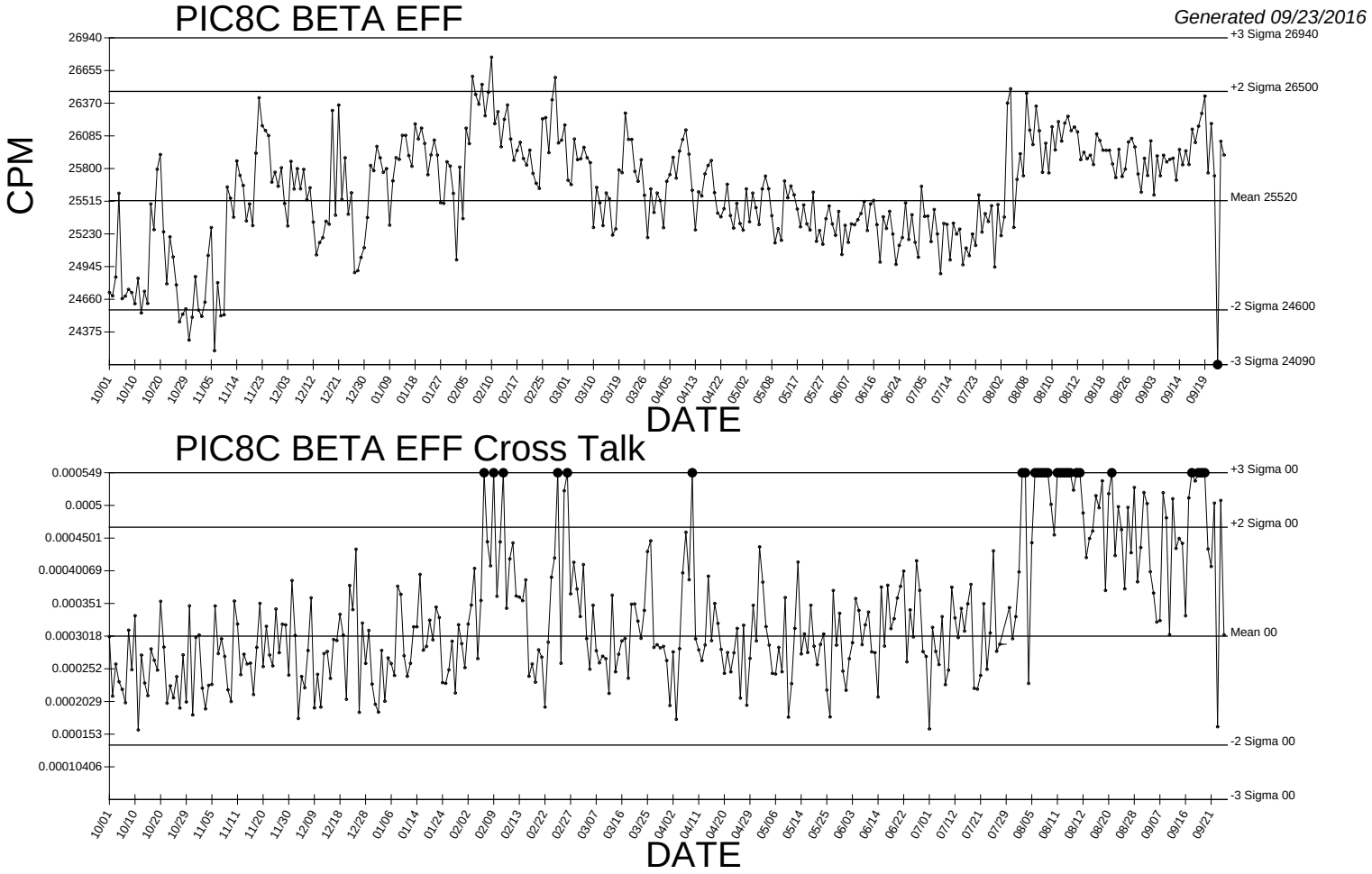

PIC8B ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.33
+2 Sigma 0.26
Mean 0.14
-2 Sigma 0.01
-3 Sigma -0.049
PIC8B ALPHA EFF
+3 Sigma 10200
+2 Sigma 10100
Mean 9808
-2 Sigma 9550
-3 Sigma 9418
PIC8B ALPHA EFF Cross Talk
+3 Sigma 0.29
+2 Sigma 0.28
Mean 0.27
-2 Sigma 0.27
-3 Sigma 0.26
PIC8B BETA BKG
+3 Sigma 1.04
+2 Sigma 0.85
Mean 0.47
-2 Sigma 0.1
-3 Sigma -0.093
Denotes Outlier



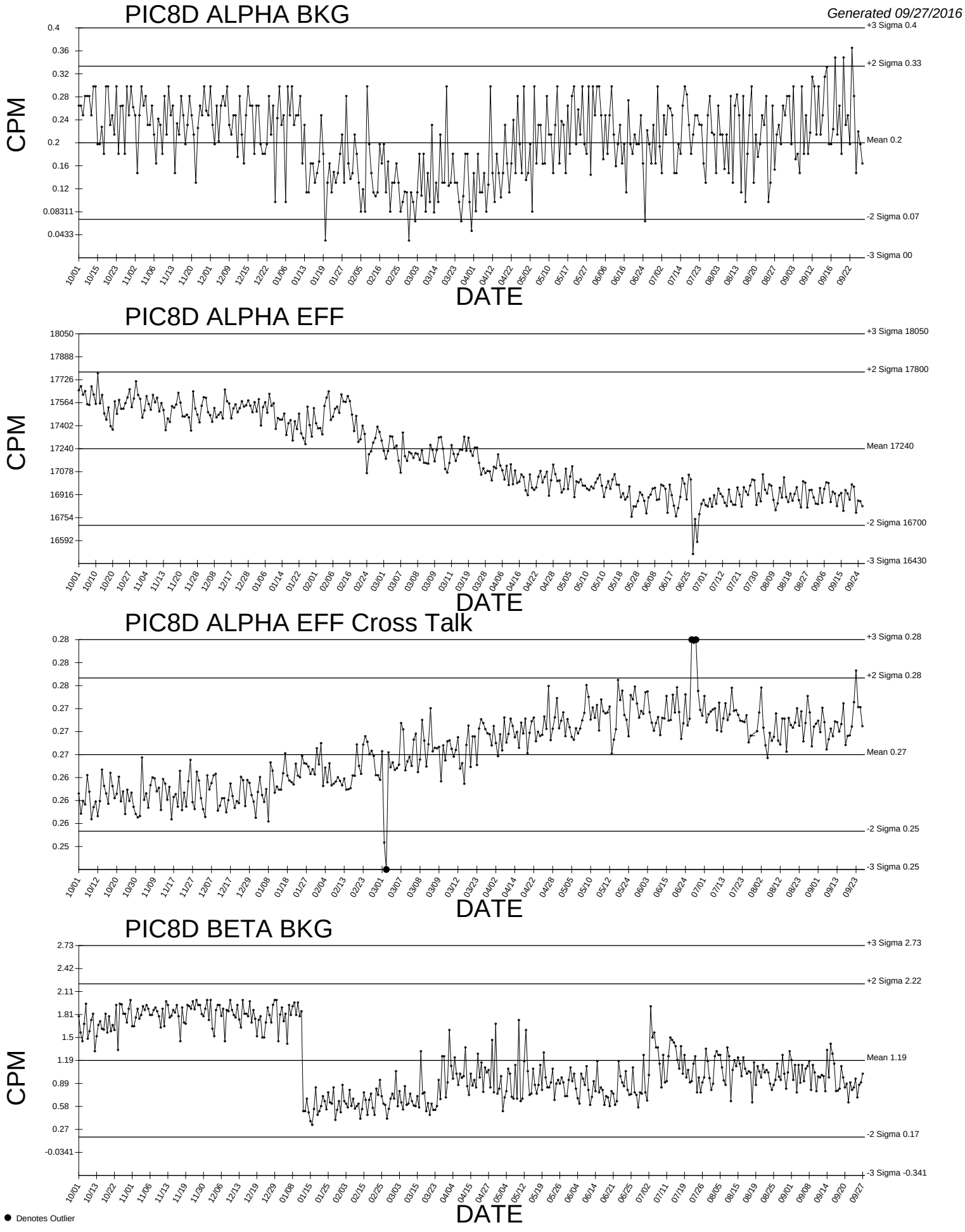


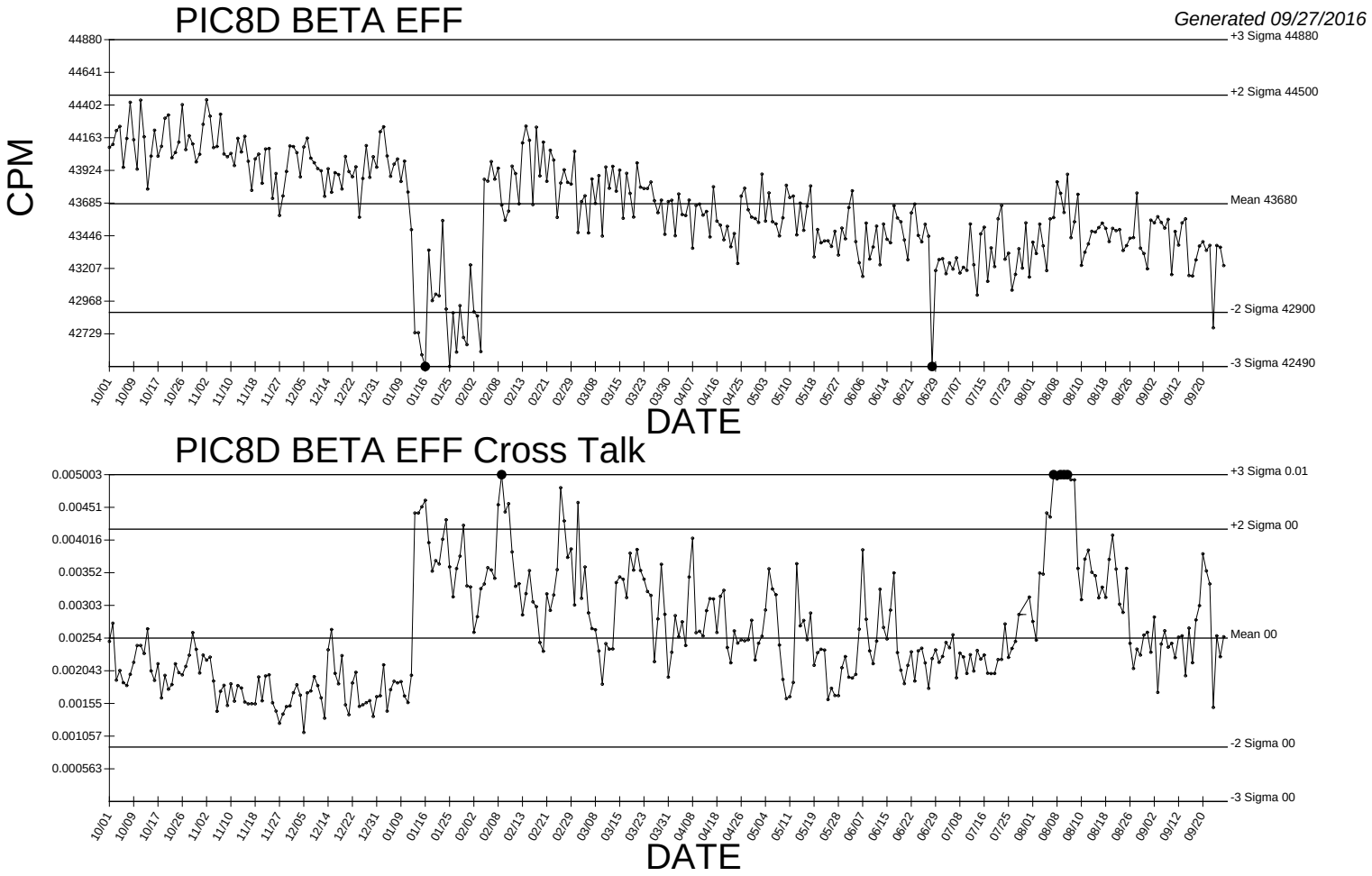
● Denotes Outlier


PIC8C ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.37
+2 Sigma 0.32
Mean 0.24
-2 Sigma 0.15
-3 Sigma 0.11
PIC8C ALPHA EFF
+3 Sigma 22050
+2 Sigma 21900
Mean 21460
-2 Sigma 21100
-3 Sigma 20870
PIC8C ALPHA EFF Cross Talk
+3 Sigma 0.3
+2 Sigma 0.29
Mean 0.27
-2 Sigma 0.25
-3 Sigma 0.24
PIC8C BETA BKG
+3 Sigma 2.19
+2 Sigma 1.97
Mean 1.52
-2 Sigma 1.07
-3 Sigma 0.85
Denotes Outlier

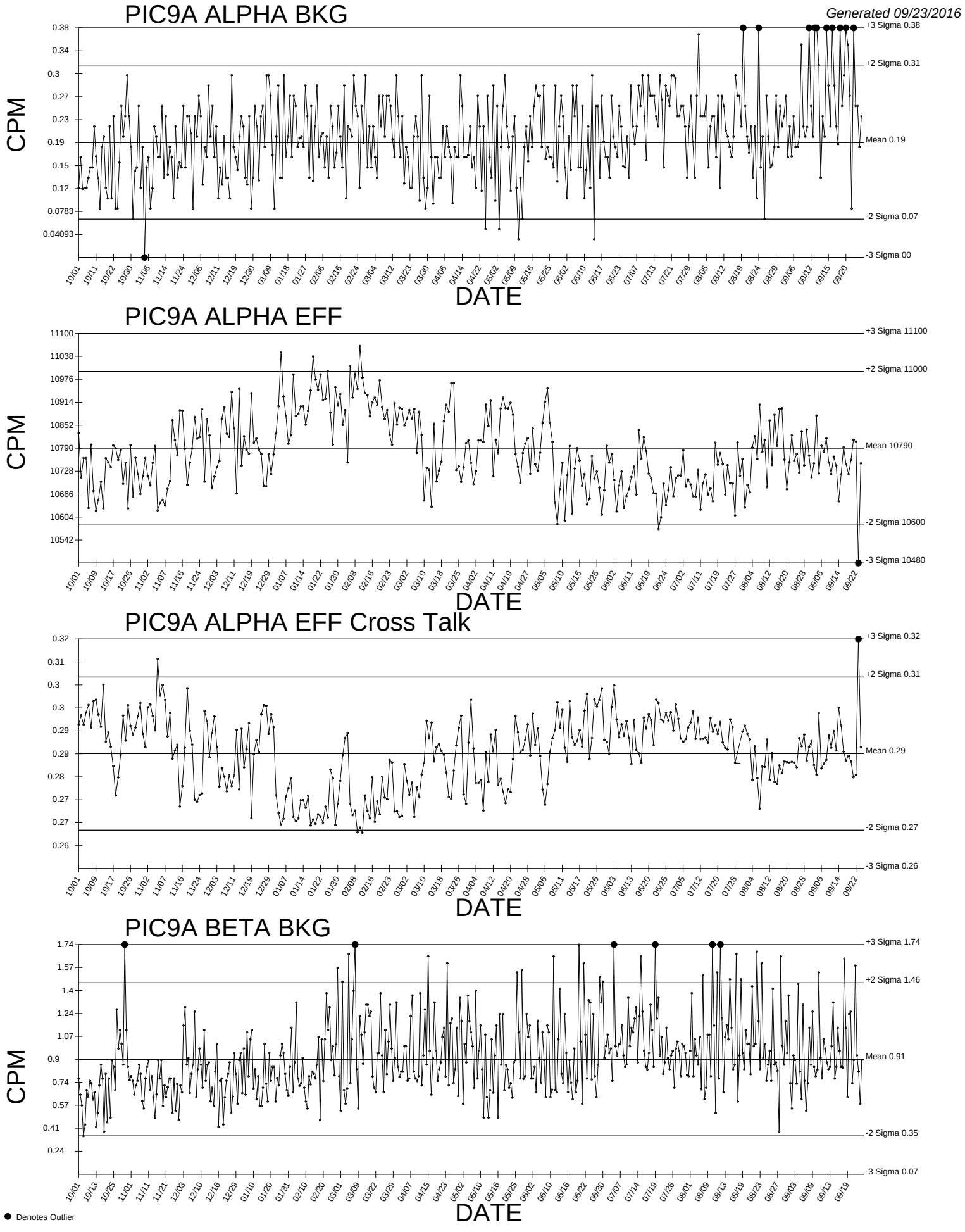


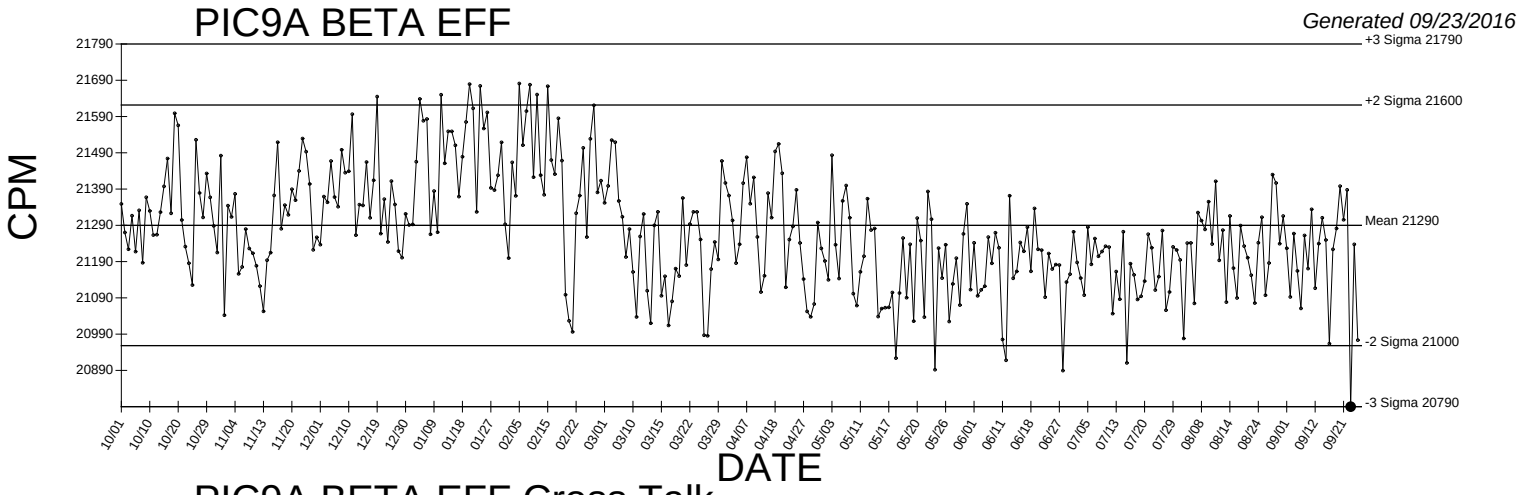
● Denotes Outlier

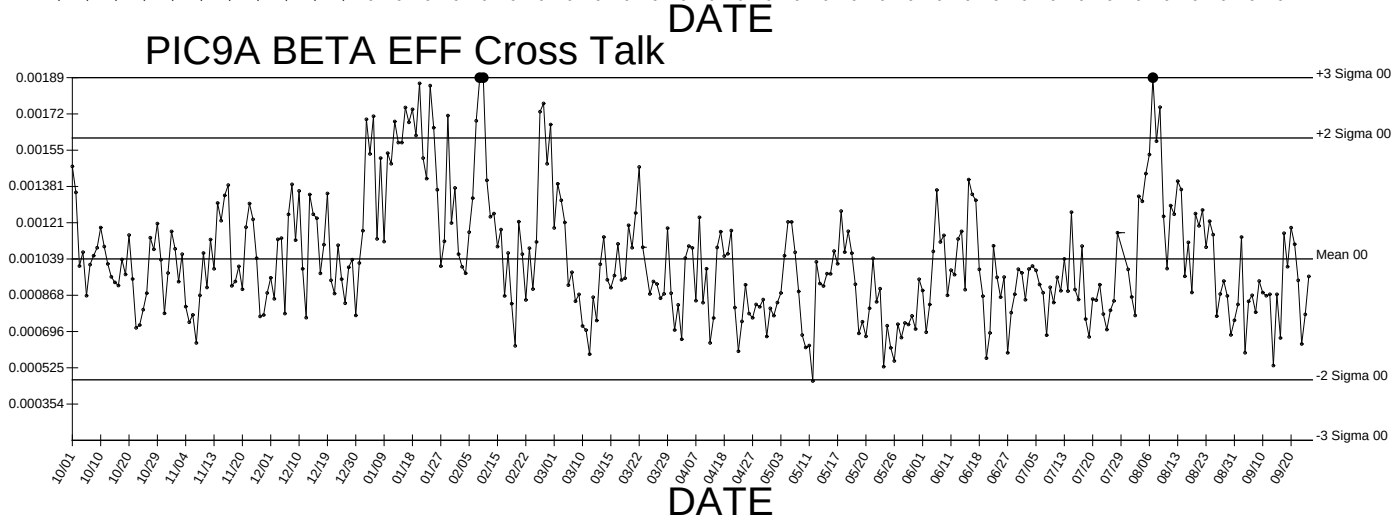

PIC8D ALPHA BKG
Generated 09/27/2016
CPM
DATE
+3 Sigma 0.4
+2 Sigma 0.33
Mean 0.2
-2 Sigma 0.07
-3 Sigma 00
PIC8D ALPHA EFF
+3 Sigma 18050
+2 Sigma 17800
Mean 17240
-2 Sigma 16700
-3 Sigma 16430
PIC8D ALPHA EFF Cross Talk
+3 Sigma 0.28
+2 Sigma 0.28
Mean 0.27
-2 Sigma 0.25
-3 Sigma 0.25
PIC8D BETA BKG
+3 Sigma 2.73
+2 Sigma 2.22
Mean 1.19
-2 Sigma 0.17
-3 Sigma -0.341
Denotes Outlier



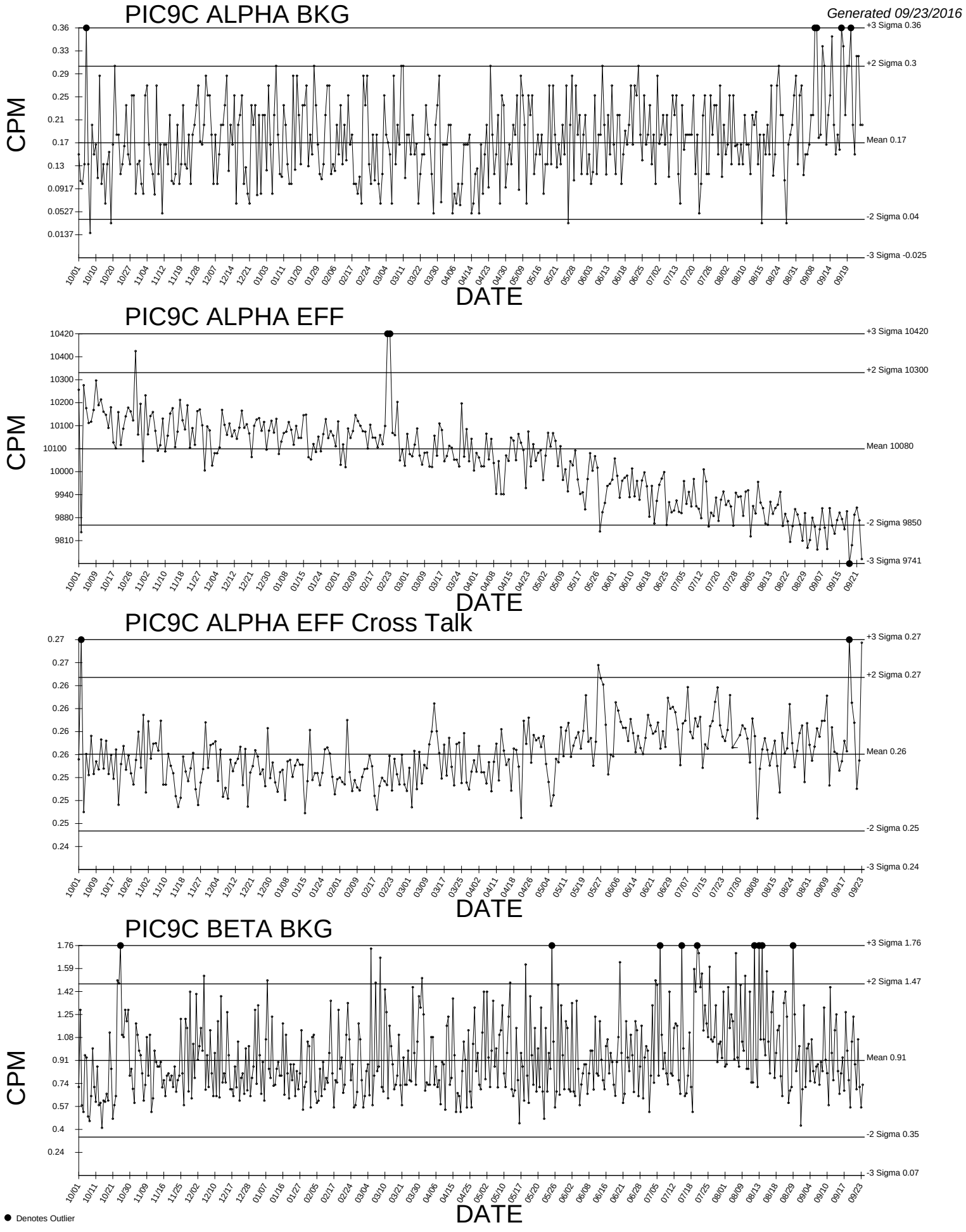
● Denotes Outlier

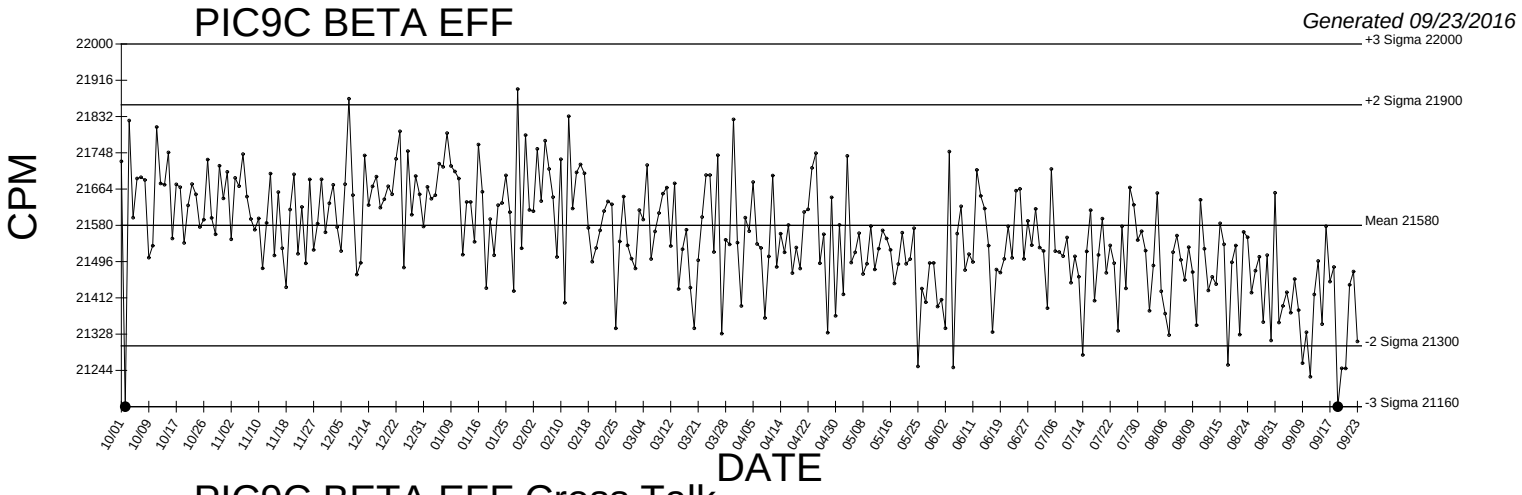

PIC9A ALPHA BKG
Generated 09/23/2016
CPM
DATE
+3 Sigma 0.38
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.07
-3 Sigma 00
PIC9A ALPHA EFF
+3 Sigma 11100
+2 Sigma 11000
Mean 10790
-2 Sigma 10600
-3 Sigma 10480
PIC9A ALPHA EFF Cross Talk
+3 Sigma 0.32
+2 Sigma 0.31
Mean 0.29
-2 Sigma 0.27
-3 Sigma 0.26
PIC9A BETA BKG
+3 Sigma 1.74
+2 Sigma 1.46
Mean 0.91
-2 Sigma 0.35
-3 Sigma 0.07
Denotes Outlier

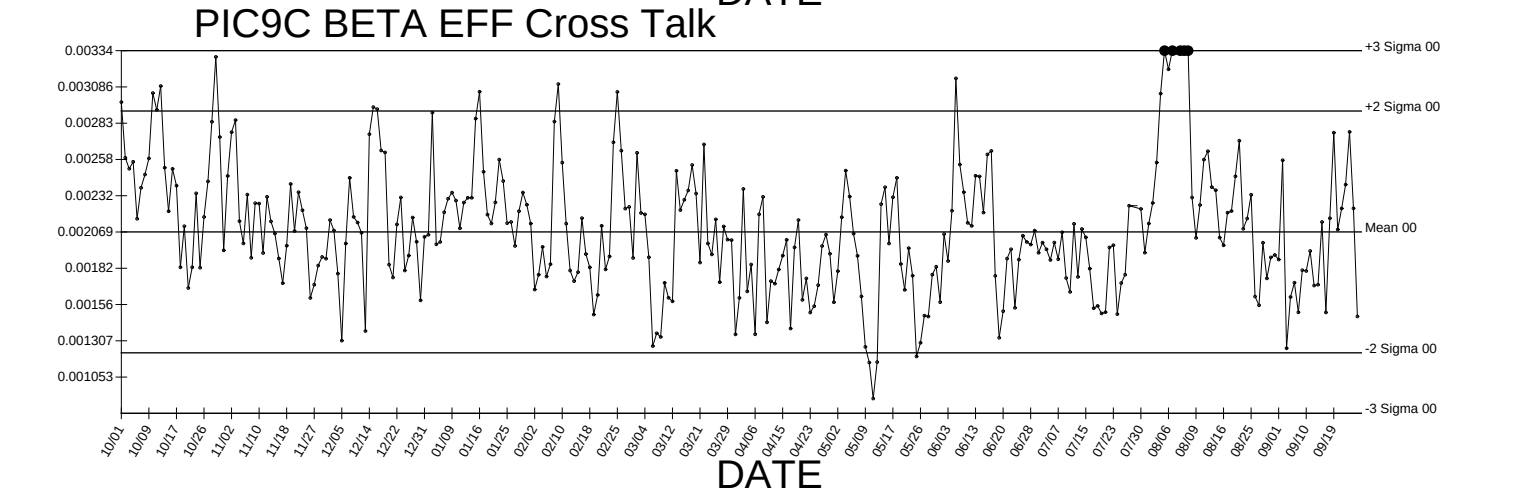




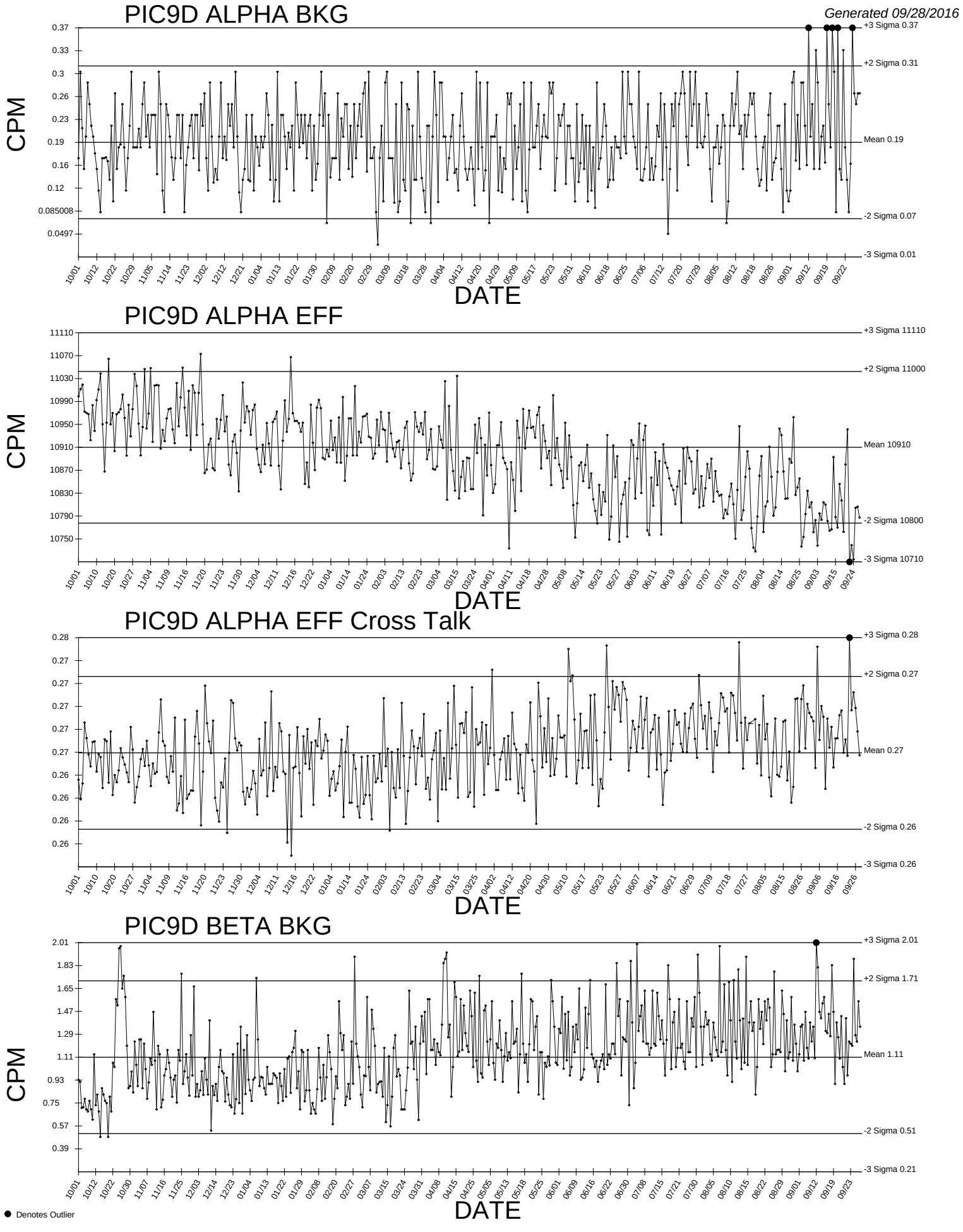
● Denotes Outlier

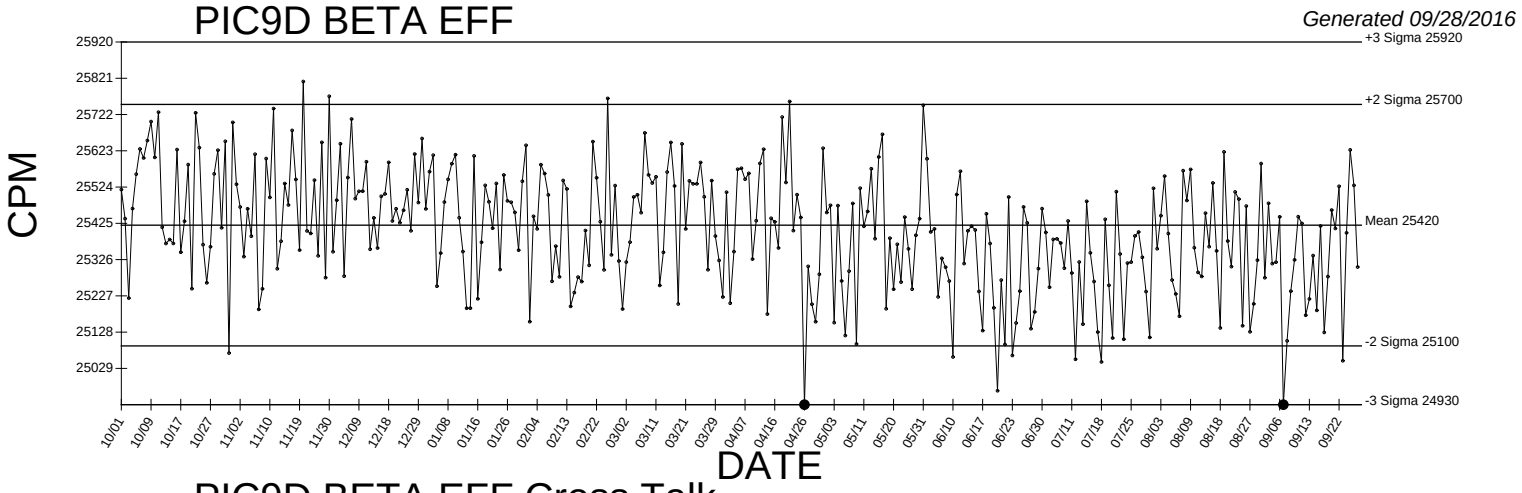

PIC9C ALPHA BKG
Generated 09/23/2016
CPM
0.36
0.33
0.29
0.25
0.21
0.17
0.13
0.0917
0.0527
0.0137
+3 Sigma 0.36
+2 Sigma 0.3
Mean 0.17
-2 Sigma 0.04
-3 Sigma -0.025
DATE
PIC9C ALPHA EFF
CPM
10420
10400
10300
10200
10100
10100
10000
9940
9880
9810
+3 Sigma 10420
+2 Sigma 10300
Mean 10080
-2 Sigma 9850
-3 Sigma 9741
DATE
PIC9C ALPHA EFF Cross Talk
0.27
0.27
0.26
0.26
0.26
0.26
0.25
0.25
0.24
+3 Sigma 0.27
+2 Sigma 0.27
Mean 0.26
-2 Sigma 0.25
-3 Sigma 0.24
DATE
PIC9C BETA BKG
CPM
1.76
1.59
1.42
1.25
1.08
0.91
0.74
0.57
0.4
0.24
+3 Sigma 1.76
+2 Sigma 1.47
Mean 0.91
-2 Sigma 0.35
-3 Sigma 0.07
DATE
Denotes Outlier

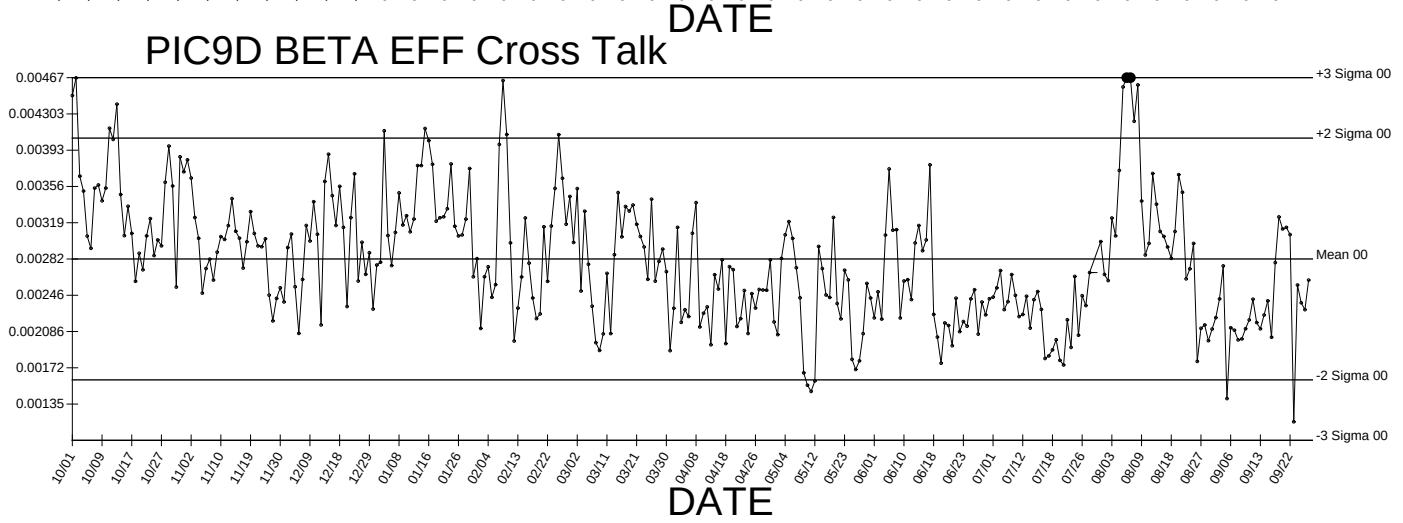




● Denotes Outlier


PIC9D ALPHA BKG
Generated 09/28/2016
CPM
0.37
0.33
0.3
0.26
0.23
0.19
0.16
0.12
0.085008
0.0497
+3 Sigma 0.37
+2 Sigma 0.31
Mean 0.19
-2 Sigma 0.07
-3 Sigma 0.01
10/01 10/12 10/22 10/29 11/05 11/14 11/23 12/02 12/12 12/21 01/04 01/13 01/22 01/30 02/09 02/20 02/29 03/09 03/18 03/28 04/04 04/12 04/20 04/29 05/09 05/17 05/23 05/31 06/10 06/18 06/25 07/06 07/12 07/20 07/29 08/05 08/12 08/18 08/26 09/01 09/12 09/19 09/22
DATE
PIC9D ALPHA EFF
CPM
11110
11070
11030
10990
10950
10910
10870
10830
10790
10750
+3 Sigma 11110
+2 Sigma 11000
Mean 10910
-2 Sigma 10800
-3 Sigma 10710
10/01 10/10 10/20 10/27 11/04 11/09 11/16 11/20 11/23 11/30 12/04 12/11 12/16 12/22 01/04 01/14 01/24 02/03 02/13 02/23 03/04 03/15 03/24 04/01 04/11 04/18 04/28 05/08 05/14 05/23 05/27 06/03 06/11 06/19 06/27 07/07 07/16 07/25 08/04 08/14 08/25 09/03 09/15 09/24
DATE
PIC9D ALPHA EFF Cross Talk
0.28
0.27
0.27
0.27
0.27
0.27
0.26
0.26
0.26
0.26
+3 Sigma 0.28
+2 Sigma 0.27
Mean 0.27
-2 Sigma 0.26
-3 Sigma 0.26
10/01 10/10 10/20 10/27 11/04 11/09 11/16 11/20 11/23 11/30 12/04 12/11 12/16 12/22 01/04 01/14 01/24 02/03 02/13 02/23 03/04 03/15 03/25 04/02 04/12 04/20 04/30 05/10 05/17 05/23 05/27 06/07 06/14 06/21 06/29 07/09 07/18 07/27 08/05 08/15 08/26 09/06 09/16 09/26
DATE
PIC9D BETA BKG
CPM
2.01
1.83
1.65
1.47
1.29
1.11
0.93
0.75
0.57
0.39
+3 Sigma 2.01
+2 Sigma 1.71
Mean 1.11
-2 Sigma 0.51
-3 Sigma 0.21
10/01 10/12 10/22 10/30 11/07 11/16 11/25 12/03 12/14 12/23 01/04 01/13 01/22 01/29 02/08 02/20 02/27 03/07 03/15 03/24 03/31 04/08 04/15 04/25 05/05 05/13 05/18 05/25 06/01 06/09 06/16 06/22 06/30 07/08 07/15 07/21 07/30 08/05 08/10 08/15 08/22 08/29 09/01 09/12 09/19 09/23
DATE
Denotes Outlier





● Denotes Outlier

RAD Standards Traceability

Standardization of Strontium Carrier 2414995

v1.2.1

Analyst	KSD1

Standard Information	
Isotope	Strontium
Serial Number	2414995
Amount of Std. (mL)	1.0
Standard Prepared	6/3/2016

Parent Information	
Parent Serial #	2130147.5
Parent Exp. Date	6/3/2018

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Strontium/mL	mg Strontium/g
1	1.0104	0.0242	0.0388	0.0146	14.60	14.45
2	1.0136	0.0244	0.0392	0.0148	14.80	14.60
3	1.0191	0.0242	0.0390	0.0148	14.80	14.52
4	1.0214	0.0244	0.0391	0.0147	14.70	14.39

Mean Value (mg/mL) =	14.73
Stdev (mg/mL) =	± 0.10
1.0% of Mean Value =	0.147250
	Pass
Expiration Date	**6/3/2017**
Mean Value (mg/1.0mL) =	14.73

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

KD 6/7/16

LW

nc 6/7/16

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs/Charleston, SC
P.O. No.: 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. 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:	Sr-90
Activity (Bq):	3.856 E5
Half-Life:	28.79 years
Calibration Date:	October 1, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	1.7%

Comments:
Impurities: γ-impurities <0.1%
10.41484 grams 0.1M HCl solution with 30 μg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 10/3/08
D. M. Montgomery, QA Manager

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Standard Traceability Log Rad

Source Material Info	
Parent Code:	1243
Prepared By:	Daniel Roy
Carrier Conc:	0.1M HCL
Reference Date:	10/01/2008
Ampoule Mass (g):	10.41484 g
Uncertainty:	+/- .85 %
LogBook No:	RC-S-048-124

A Solution Material Info			
Isotope:	Strontium-90		
Prepared By:	Daniel Roy		
Prep Date:	12/19/2008		
Verification Date:	09/27/2016		
Expiration Date:	09/27/2017		
Primary Code:	1243-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	10.2164 g		
Density(g/mL):	0.9991	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (10.41484 g * 100 mL) = 226951.7634 dpm/mL
(10.2164 g) * (385600 Bq) * (60 dpm/Bq) / (0.9991 g/mL)/ (10.41484 g * 100 mL) = 227146.2010 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/21/2010	Bethany Fiem	2.2467	1000	1243-B	510.329369 dpm/mL	01/21/2010	01/21/2011
08/03/2010	Bethany Fiem	2.5604	1000	1243-C	581.5851 dpm/mL	08/03/2010	08/03/2011
01/12/2011	Bethany Fiem	2.4946	1000	1243-D	566.6389 dpm/mL	01/12/2011	01/12/2012
08/12/2011	Tim Chandler	3.3115	100	1243-G	18.7877 dpm/mL	03/26/2014	03/25/2015
08/17/2011	Tim Chandler	2.5541	100	1243-H	14.49064 dpm/mL	03/26/2014	03/25/2015
06/21/2011	Tim Chandler	.0235	100	1243-E	53.37936 dpm/mL	03/19/2014	06/20/2014
07/05/2011	Bethany Fiem	2.6072	1000	1243-F	592.2156 dpm/mL	07/05/2011	07/05/2012
01/31/2012	Gregory Ramsay	2.6792	1000	1243-I	608.5701 dpm/ml	01/31/2012	01/31/2013

08/29/2012	Bethany Fiem	2.6799	1000	1243-J	608.729104 dpm/mL	09/14/2012	09/11/2013
02/12/2013	Gregory Ramsay	2.6526	1000	1243-K	602.528 dpm/ml	01/15/2014	01/15/2015
12/04/2013	Gregory Ramsay	2.5347	1000	1243-L	575.747476 dpm/ml	12/04/2013	12/04/2014
08/11/2014	Gregory Ramsay	2.7006	1000	1243-M	613.431 dpm/mL	08/12/2014	08/12/2015
05/06/2015	Gregory Ramsay	2.5102	1000	1243-N	570.1824 dpm/mL	05/06/2015	05/06/2016
12/18/2015	Gregory Ramsay	2.5762	1000	1243-O	585.174 dpm/mL	12/18/2015	12/18/2016
08/30/2016	Christina Kimball	.068	250	1243-P	61.7838 dpm/mL	09/07/2016	09/07/2017
09/27/2016	Bethany Fiem	2.6337	1000	1243-Q	598.235 dpm/mL	09/27/2016	09/27/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Sr-90 Standard 1243-O

v1.0.2

Instrument	BLUE
Analyst	BXF1
Verification Prep Date	12/18/2015

Standard Information	
Isotope	Sr-90
Serial Number	1243-O
Isotope Halflife	28.9000 Y
Reference Date	10/1/2008
Ref. Act. (DPM/mL)	585.174
Amount of Std. (mL)	1.0
Standard Prep Date	12/18/2015

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	12/30/2015	88.50	1073.20	39.80
2	12/30/2015	90.20	1062.80	39.80
3	12/30/2015	89.60	1064.60	39.80

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	1033.40	2.017144	512.31	512.31
2	1023.00	2.017144	507.15	507.15
3	1024.80	2.017144	508.04	508.04

	dpm/mL
Mean Value =	509.17
Stdev =	2.755468033
Certificate Value* =	**491.8**
Two sigma =	5.511
10 % of Mean =	50.917
Rule A (Pass/Fail)	**Pass**
% Recovery	103.52%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**12/18/2016**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Sr-90 source 1243-O by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra 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 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBLUE for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 12/18/2015 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

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

where:

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

RAD-M-001

12-30-15

Amanda Tehr

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

1493

82898-278

5 mL Liquid in Flame Sealed Vial

Customer: GEL Labs, LLC
P.O. No.: 7344 RD, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	3.942E+04	0.1	0.9	1.8	07/29/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities < 0.1 %, α-impurities < 0.04 %. 5.10422 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7-29-10
D. M. Montgomery, QA Manager Alternate

RECEIVED 8/3/10

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

RC-S-060-040

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1493
Prepared By:	Gregory Ramsay
Carrier Conc:	0.5M HNO3
Reference Date:	07/29/2010
Ampoule Mass (g):	5.10422 g
Uncertainty:	+/- 1.8 %
LogBook No:	RC-S-060-040

A Solution Material Info			
Isotope:	Thorium-230		
Prepared By:	Bethany Fiem		
Prep Date:	06/24/2015		
Verification Date:	09/27/2016		
Expiration Date:	09/27/2017		
Primary Code:	1493-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.0802 g		
Density(g/mL):	1.0011	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(5.0802 g) * (39420 Bq) * (60 dpm/Bq) / (5.10422 g * 100 mL) = 23540.6958 dpm/mL
(5.0802 g) * (39420 Bq) * (60 dpm/Bq) / (1.0011 g/mL)/ (5.10422 g * 100 mL) = 23515.7691 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
06/24/2015	Bethany Fiem	11.3156	1000	1493-B	266.095 dpm/mL	06/08/2016	06/08/2017
09/27/2016	Bethany Fiem	11.4091	1000	1493-C	268.294 dpm/mL	09/27/2016	09/27/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Th-230 Standard 1493-B

v1.0.2

Instrument	BLUE
Analyst	TC1
Verification Prep Date	6/8/2016

Standard Information	
Isotope	Th-230
Serial Number	1493-B
Isotope Halflife	7.5380E+04 Y
Reference Date	7/29/2010
Ref. Act. (DPM/mL)	266.095
Amount of Std. (mL)	1.0
Standard Prep Date	6/24/2015

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	6/8/2016	95.10	312.60	38.67
2	6/8/2016	95.30	306.40	38.67
3	6/8/2016	95.20	312.20	38.67

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	273.93	1.007294	271.95	271.95
2	267.73	1.007294	265.79	265.79
3	273.53	1.007294	271.55	271.55

	dpm/mL
Mean Value =	269.76
Stdev =	3.444745088
Certificate Value* =	**266.1**
Two sigma =	6.889
10 % of Mean =	26.976
Rule A (Pass/Fail)	**Pass**
% Recovery	101.38%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**6/8/2017**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Th-230 source 1493-B by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra 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 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBLUE for Th-230 source standard verification. The Th-230 efficiency calibration which was used for verification calculations was performed on 6/8/2016 using Th-230 source 1759-A.

Standard results for each verification source was calculated as follows:

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

where:

A = Ver. source cpm,

B = BKG cpm,

C = System efficiency (cpm/dpm), and

D = volume used for standard verification.

RAD-M-001

TC 6-8-16

Runlogs

Instrument Run Log

Instrument Type: GFPC **Batch ID: 1597807**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1203625428	MB	BXF1	PIC8B	SEP-27-16 14:30:42	DONE	Tuffryn Filter	01-APR-16 00:00
1203625430	LCS	BXF1	PIC8D	SEP-27-16 14:30:51	DONE	Tuffryn Filter	01-APR-16 00:00
405240010	SAMPLE	BXF1	PIC6A	SEP-27-16 14:31:00	DONE	Tuffryn Filter	01-APR-16 00:00
405240011	SAMPLE	BXF1	PIC6B	SEP-27-16 14:31:03	DONE	Tuffryn Filter	01-APR-16 00:00
405240012	SAMPLE	BXF1	PIC6C	SEP-27-16 14:31:06	DONE	Tuffryn Filter	01-APR-16 00:00
405240014	SAMPLE	BXF1	PIC7B	SEP-27-16 14:31:12	DONE	Tuffryn Filter	01-APR-16 00:00
405240015	SAMPLE	BXF1	PIC7C	SEP-27-16 14:31:16	DONE	Tuffryn Filter	01-APR-16 00:00
405240001	SAMPLE	BXF1	PIC1B	SEP-27-16 14:31:25	DONE	Tuffryn Filter	01-APR-16 00:00
405240004	SAMPLE	BXF1	PIC2B	SEP-27-16 14:31:32	DONE	Tuffryn Filter	01-APR-16 00:00
405240005	SAMPLE	BXF1	PIC2C	SEP-27-16 14:31:35	DONE	Tuffryn Filter	01-APR-16 00:00
405240006	SAMPLE	BXF1	PIC4A	SEP-27-16 14:31:44	DONE	Tuffryn Filter	01-APR-16 00:00
405240008	SAMPLE	BXF1	PIC4C	SEP-27-16 14:31:49	DONE	Tuffryn Filter	01-APR-16 00:00
405240009	SAMPLE	BXF1	PIC4D	SEP-27-16 14:31:52	DONE	Tuffryn Filter	01-APR-16 00:00
405240007	SAMPLE	BXF1	PIC4B	SEP-27-16 14:32:12	DONE	Tuffryn Filter	01-APR-16 00:00
405240003	SAMPLE	BXF1	PIC7A	SEP-28-16 08:05:45	DONE	Tuffryn Filter	01-APR-16 00:00
405240013	SAMPLE	BXF1	PIC8A	SEP-28-16 08:06:11	DONE	Tuffryn Filter	01-APR-16 00:00
405240016	SAMPLE	BXF1	PIC9D	SEP-28-16 08:06:17	DONE	Tuffryn Filter	01-APR-16 00:00
1203625429	DUP	BXF1	PIC5A	SEP-29-16 13:14:17	DONE	Tuffryn Filter	01-APR-16 00:00
405240002	SAMPLE	BXF1	PIC4D	SEP-29-16 13:14:21	DONE	Tuffryn Filter	01-APR-16 00:00

Instrument Run Log

Instrument Type: GFPC **Batch ID: 1597818**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1203625464	MB	JXC9	PIC9A	SEP-23-16 15:23:07	DONE	2 inch Planchett	01-DEC-15 00:01
405240001	SAMPLE	JXC9	PIC7C	SEP-23-16 15:23:19	DONE	2 inch Planchett	01-DEC-15 00:01
405240002	SAMPLE	JXC9	PIC6B	SEP-23-16 15:23:21	DONE	2 inch Planchett	01-DEC-15 00:01
405240003	SAMPLE	JXC9	PIC8C	SEP-23-16 15:23:28	DONE	2 inch Planchett	01-DEC-15 00:01
405240005	SAMPLE	JXC9	PIC9C	SEP-23-16 15:23:33	DONE	2 inch Planchett	01-DEC-15 00:01
405240008	SAMPLE	JXC9	PIC6A	SEP-23-16 15:23:37	DONE	2 inch Planchett	01-DEC-15 00:01
1203625465	DUP	JXC9	PIC4A	SEP-23-16 15:23:47	DONE	2 inch Planchett	01-DEC-15 00:01
1203625466	MS	JXC9	PIC3C	SEP-23-16 15:23:48	DONE	2 inch Planchett	01-DEC-15 00:01
1203625467	MSD	JXC9	PIC4B	SEP-23-16 15:23:50	DONE	2 inch Planchett	01-DEC-15 00:01
405240010	SAMPLE	JXC9	PIC8D	SEP-23-16 15:23:52	DONE	2 inch Planchett	01-DEC-15 00:01
1203625468	LCS	JXC9	PIC4C	SEP-23-16 15:23:53	DONE	2 inch Planchett	01-DEC-15 00:01
405240011	SAMPLE	JXC9	PIC7B	SEP-23-16 15:23:56	DONE	2 inch Planchett	01-DEC-15 00:01
405240004	SAMPLE	JXC9	PIC3D	SEP-23-16 15:24:00	DONE	2 inch Planchett	01-DEC-15 00:01
405240012	SAMPLE	JXC9	PIC6C	SEP-23-16 15:24:03	DONE	2 inch Planchett	01-DEC-15 00:01
405240006	SAMPLE	JXC9	PIC2B	SEP-23-16 15:24:04	DONE	2 inch Planchett	01-DEC-15 00:01
405240013	SAMPLE	JXC9	PIC8A	SEP-23-16 15:24:10	DONE	2 inch Planchett	01-DEC-15 00:01
405240007	SAMPLE	JXC9	PIC3B	SEP-23-16 15:24:11	DONE	2 inch Planchett	01-DEC-15 00:01
405240009	SAMPLE	JXC9	PIC5D	SEP-23-16 15:24:15	DONE	2 inch Planchett	01-DEC-15 00:01
405240014	SAMPLE	JXC9	PIC2C	SEP-23-16 15:24:24	DONE	2 inch Planchett	01-DEC-15 00:01
405240015	SAMPLE	JXC9	PIC5A	SEP-23-16 15:24:26	DONE	2 inch Planchett	01-DEC-15 00:01
405240016	SAMPLE	JXC9	PIC5C	SEP-23-16 15:24:31	DONE	2 inch Planchett	01-DEC-15 00:01

Liquid Scintillation Raw Data

Radiochemistry Batch Checklist

23-Sep-2016

Batch# 1597418 Product: T99 Date: 9/28/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.	~~✓~~	✓	see DSR 1562049
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.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		~~NA~~ DSR 1562049
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER 1562049
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.)	✓		

SKC 9/28/16

Primary Review Performed By: [signature] 9/28/16

Secondary Review Performed By: MSWC 10/4

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
28-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LSC	DOE EML HASL-300, Tc-02-RC Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1597418	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016 and 1203624315 were received and analyzed out of the method specified hold time.	1. Reporting results.

Originator's Name:

Elizabeth Krouse 28-SEP-16

Data Validator/Group Leader:

Lyndsey Pace 28-SEP-16

Prep Logbook

MJWC 10/4/16

50

The Determination of Technetium-99 Using Analytical Grade 1X8 Resin

Batch ID: **1597418**
Analyst: Gregory Ramsay
Method: DOE EML HASL-300, Tc-02-RC Modified
Lab SOP: GL-RAD-A-059 REV# 4
Instrument: BAL-18550299

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203624316	Technetium-99 SPIKE	1621-B	.1	mL

Sample ID	Prep Date	Matrix	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)
405240001	22-SEP-2016 13:11:21	Soil	W	1.545	1.301
405240002	22-SEP-2016 13:11:21	Soil	W	1.456	1.23
405240003	22-SEP-2016 13:11:21	Soil	W	1.562	1.299
405240004	22-SEP-2016 13:11:21	Soil	W	1.787	1.522
405240005	22-SEP-2016 13:11:21	Soil	W	1.459	1.155
405240006	22-SEP-2016 13:11:21	Soil	W	1.814	1.477
405240007	22-SEP-2016 13:11:21	Soil	W	1.389	1.182
405240008	22-SEP-2016 13:11:21	Soil	W	1.644	1.41
405240009	22-SEP-2016 13:11:21	Soil	W	1.398	1.088
405240010	22-SEP-2016 13:11:21	Soil	W	1.507	1.242
405240011	22-SEP-2016 13:11:21	Soil	W	1.569	1.225
405240012	22-SEP-2016 13:11:21	Soil	W	1.929	1.549
405240013	22-SEP-2016 13:11:21	Soil	W	1.264	0.943
405240014	22-SEP-2016 13:11:21	Soil	W	1.421	1.204
405240015	22-SEP-2016 13:11:21	Soil	W	1.922	1.352
405240016	22-SEP-2016 13:11:21	Soil	W	1.442	1.131
1203624314 MB	22-SEP-2016 13:11:21	Soil	W		1.549
1203624315 DUP (405240001)	22-SEP-2016 13:11:21	Soil	W	1.766	1.487
1203624316 LCS	22-SEP-2016 13:11:21	Soil	W		1.549

Reagent/Solvent Lot ID	Description	Amount
2280154.26	Hydrogen Peroxide 30% ACS Reagent 120LBS 30 Gallons	10 mL
2402130.4	Ecoscint GL Scintillation Solution	15 mL
2418926	Quenching Agent	.1 uL
2429641	RL-0.1M Hydrochloric Acid	100 mL
2441205	RL-0.01M Nitric Acid	20 mL
2451825	RL-0.1M Nitric Acid	25 mL
TC2076-A	tracer	1 mL

Comments:
Spike Pipet ID: RAD-LSC-2272418
Tracer Pipet ID: RAD-LSC-4099802

E1597418

Technetium-99 Solid

Filename : TC99.XLS
File type : Excel
Version # : 1.2.16

Tracer S/N : TC2076-A
Tracer Exp Date : 9/23/2016
Tracer Volume Added: 1.00

Batch : 1597418
Analyst : GRE01358
Prep Date : 9/22/2016
Tc-99 Method Uncertainty : 0.0576

Procedure Code : LSC99TCS
Parmname : Technetium-99
Required MDA : 5 pCi/G
Tc-99 Abundance : 1.00
Halflife of Tc-99 : 211100 years

Geometry:
15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin

Samp	Sample Characteristics				Tracer Calculations					
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Tracer Ref. Activity (CPM)	Tracer Ref. Count Uncertainty (%)	Tracer Samp. Activity (CPM)	Tracer Samp. Count Uncertainty (%)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	405240001.1	1.3010	3.3546E-03	12/15/2015 10:14	409024	0.62%	310498	0.63%	1.0	0.002000
2	405240002.1	1.2300	3.3473E-03	12/15/2015 10:19	409024	0.62%	277235	0.67%	1.0	0.002000
3	405240003.1	1.2990	3.3544E-03	12/15/2015 10:18	409024	0.62%	263484	0.69%	1.0	0.002000
4	405240004.1	1.5220	3.3776E-03	12/15/2015 10:21	409024	0.62%	239112	0.72%	1.0	0.002000
5	405240005.1	1.1550	3.3395E-03	12/15/2015 11:42	409024	0.62%	264554	0.69%	1.0	0.002000
6	405240006.1	1.4770	3.3729E-03	12/15/2015 11:46	409024	0.62%	271054	0.68%	1.0	0.002000
7	405240007.1	1.1820	3.3423E-03	12/15/2015 12:17	409024	0.62%	278087	0.67%	1.0	0.002000
8	405240008.1	1.4100	3.3660E-03	12/15/2015 12:20	409024	0.62%	247438	0.71%	1.0	0.002000
9	405240009.1	1.0880	3.3325E-03	12/15/2015 12:31	409024	0.62%	279873	0.67%	1.0	0.002000
10	405240010.1	1.2420	3.3485E-03	12/15/2015 12:35	409024	0.62%	303704	0.64%	1.0	0.002000
11	405240011.1	1.2250	3.3467E-03	12/15/2015 12:53	409024	0.62%	242991	0.72%	1.0	0.002000
12	405240012.1	1.5490	3.3804E-03	12/15/2015 12:56	409024	0.62%	271818	0.68%	1.0	0.002000
13	405240013.1	0.9430	3.3174E-03	12/15/2015 11:04	409024	0.62%	247951	0.71%	1.0	0.002000
14	405240014.1	1.2040	3.3446E-03	12/15/2015 11:08	409024	0.62%	246502	0.71%	1.0	0.002000
15	405240015.1	1.3520	3.3599E-03	12/15/2015 14:02	409024	0.62%	253202	0.70%	1.0	0.002000
16	405240016.1	1.1310	3.3370E-03	12/15/2015 14:06	409024	0.62%	242189	0.72%	1.0	0.002000
17	1203624314.1	1.5490	3.3804E-03	9/22/2016 0:00	409024	0.62%	383149	0.64%	1.0	0.002000
18	1203624315.1	1.4870	3.3740E-03	12/15/2015 10:14	409024	0.62%	270174	0.68%	1.0	0.002000
19	1203624316.1	1.5490	3.3804E-03	9/22/2016 0:00	409024	0.62%	383608	0.64%	1.0	0.002000

Pipet, 0.1 ml Stdev : +/- 0.000200 ml
Pipet, 0.5 ml Stdev : +/- 0.001000 ml
Pipet, 1 ml Stdev : +/- 0.002000 ml

Analytical SOP: GL-RAD-A-059
Instrument SOP: GL-RAD-I-004

Count raw Data													**Calibration Data**						
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	Sample Decay	Calculated Sample Recovery %	Sample Recovery Error %	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Position #	Background Count Start Date/Time
1	52-2	50	203	16.5	16.82	50	165.7	17.1496	9/27/2016 8:09	1.000	75.9%	0.52%	LSCBLUE	7/4/2016	6/30/2017	0.5566	0.00792	52-1	9/27/2016 7:17
2	52-3	50	192.7	16.58	16.82	50	165.7	17.1171	9/27/2016 9:02	1.000	67.8%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5644	0.00792	52-1	9/27/2016 7:17
3	52-4	50	208.1	17.44	16.82	50	165.7	17.1515	9/27/2016 9:54	1.000	64.4%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5516	0.00792	52-1	9/27/2016 7:17
4	52-5	50	193.1	17.44	16.82	50	165.7	17.1191	9/27/2016 10:46	1.000	58.5%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5642	0.00792	52-1	9/27/2016 7:17
5	52-6	50	194.7	17.34	16.82	50	165.7	17.1266	9/27/2016 11:39	1.000	64.7%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5632	0.00792	52-1	9/27/2016 7:17
6	52-7	50	206.6	17	16.82	50	165.7	17.1519	9/27/2016 12:31	1.000	66.3%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5532	0.00792	52-1	9/27/2016 7:17
7	52-8	50	222.7	16.38	16.82	50	165.7	17.1117	9/27/2016 13:23	1.000	68.0%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5330	0.00792	52-1	9/27/2016 7:17
8	52-9	50	188.9	16.98	16.82	50	165.7	17.0948	9/27/2016 14:16	1.000	60.5%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5665	0.00792	52-1	9/27/2016 7:17
9	52-10	50	217.4	17.12	16.82	50	165.7	17.1334	9/27/2016 15:08	1.000	68.4%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5405	0.00792	52-1	9/27/2016 7:17
10	52-11	50	194.7	17.12	16.82	50	165.7	17.1266	9/27/2016 16:00	1.000	74.3%	0.53%	LSCBLUE	7/4/2016	6/30/2017	0.5632	0.00792	52-1	9/27/2016 7:17
11	52-12	50	183.8	16.14	16.82	50	165.7	17.0554	9/27/2016 16:52	1.000	59.4%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5685	0.00792	52-1	9/27/2016 7:17
12	36-1	50	197.6	17.6	16.82	50	165.7	17.1375	9/27/2016 17:45	1.000	66.5%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5611	0.00792	52-1	9/27/2016 7:17
13	36-2	50	213.8	16.38	16.82	50	165.7	17.1436	9/27/2016 18:37	1.000	60.6%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5451	0.00792	52-1	9/27/2016 7:17
14	36-3	50	182.9	17.88	16.82	50	165.7	17.0472	9/27/2016 19:29	1.000	60.3%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5688	0.00792	52-1	9/27/2016 7:17
15	36-4	50	231.7	16.7	16.82	50	165.7	17.0581	9/27/2016 20:22	1.000	61.9%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5187	0.00792	52-1	9/27/2016 7:17
16	36-5	50	185.9	17.32	16.82	50	165.7	17.0729	9/27/2016 21:14	1.000	59.2%	0.55%	LSCBLUE	7/4/2016	6/30/2017	0.5678	0.00792	52-1	9/27/2016 7:17
17	36-6	50	162.7	16.84	16.82	50	165.7	16.7654	9/27/2016 22:06	1.000	93.7%	0.53%	LSCBLUE	7/4/2016	6/30/2017	0.5676	0.00792	52-1	9/27/2016 7:17
18	36-7	50	197.5	15.82	16.82	50	165.7	17.1372	9/27/2016 22:59	1.000	66.1%	0.54%	LSCBLUE	7/4/2016	6/30/2017	0.5612	0.00792	52-1	9/27/2016 7:17
19	36-8	50	163.1	124.28	16.82	50	165.7	16.7729	9/27/2016 23:51	1.000	93.8%	0.53%	LSCBLUE	7/4/2016	6/30/2017	0.5677	0.00792	52-1	9/27/2016 7:17

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

* - RPD changed to 0% due to sample & dup activity below MDA

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

LCS S/N : 1621-B
LCS Exp Date : 1/5/2017
LCS Activity (dpm/ml): 1911.38
LCS Volume Added (ml): 0.10

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 %	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	1.5813	1.1164	5	2.2819	**-0.5322**	126.30%	-0.6496	0.8204	1.3175	1.3175		SAMPLE				
2	1.8456	1.3030	5	2.6635	**-0.5142**	152.85%	-0.5371	0.8209	1.5403	1.5403		SAMPLE				
3	1.8834	1.3297	5	2.7180	**0.2815**	288.32%	0.2885	0.8318	1.5910	1.5913		SAMPLE				
4	1.7302	1.2215	5	2.4968	**0.2879**	259.10%	0.3209	0.8314	1.4622	1.4626		SAMPLE				
5	2.0648	1.4578	5	2.9798	**0.2285**	388.99%	0.2134	0.8303	1.7423	1.7425		SAMPLE				
6	1.6057	1.1336	5	2.3171	**-0.1263**	544.25%	-0.1519	0.8265	1.3477	1.3477		SAMPLE				
7	2.0271	1.4311	5	2.9254	**-0.7695**	111.85%	-0.7317	0.8184	1.6868	1.6868		SAMPLE				
8	1.7962	1.2681	5	2.5922	**-0.1070**	719.30%	-0.1148	0.8255	1.5084	1.5084		SAMPLE				
9	2.1595	1.5246	5	3.1164	**-0.0150**	6163.18%	-0.0134	0.8277	1.8162	1.8162		SAMPLE				
10	1.6727	1.1809	5	2.4139	**-5.689E-03**	12618.48%	-0.0066	0.8276	1.4069	1.4069		SAMPLE				
11	2.0954	1.4794	5	3.0241	**-0.9966**	89.02%	-0.9154	0.8148	1.7389	1.7389		SAMPLE				
12	1.5044	1.0621	5	2.1710	**0.3607**	180.22%	0.4625	0.8335	1.2740	1.2747		SAMPLE				
13	2.7894	1.9693	5	4.0254	**-1.1039**	107.24%	-0.7636	0.8188	2.3202	2.3202		SAMPLE				
14	2.1001	1.4827	5	3.0309	**0.9090**	100.37%	0.8328	0.8358	1.7881	1.7911		SAMPLE				
15	1.9970	1.4099	5	2.8820	**-0.3716**	229.44%	-0.3581	0.8217	1.6710	1.6710		SAMPLE				
16	2.2812	1.6105	5	3.2921	**0.2927**	335.67%	0.2471	0.8294	1.9259	1.9261		SAMPLE				
17	1.0437	0.7368	5	1.5065	**0.0408**	1098.84%	0.0746	0.8198	0.8789	0.8789		MB				
18	1.5764	1.1130	5	2.2750	**-1.0764**	61.65%	-1.3172	0.8119	1.3004	1.3004	405240001.1	DUP	* 0.0%			
19	1.0424	0.7359	5	1.5046	**58.7169**	1.84%	107.5071	1.6796	1.7980	6.9597		LCS			55.5830	105.6%

ASSAY 22-Sep-16 16:39:45

Protocol	id	12	TC99_REC
Time	limit	500	
Count	limit	10000	
Isotope	Tc-99m		
Protocol	date	23-Sep-13	14:21:59
Run	id.	34	

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	63	1	4	25984	409024.1	0.62		16:39:52
2	63	2	5	24926	310497.7	0.63	75.91	16:40:08
3	63	3	5	22331	277234.7	0.67	67.78	16:40:25
4	63	4	5	21248	263483.7	0.69	64.42	16:40:42
5	63	5	5	19327	239112.2	0.72	58.46	16:40:59
6	37	6	5	21301	264554.3	0.69	64.68	16:41:29
7	37	7	5	21795	271053.5	0.68	66.27	16:41:46
8	37	8	5	22330	278087.4	0.67	67.99	16:42:03
9	37	9	5	19930	247437.8	0.71	60.49	16:42:20
10	37	10	5	22448	279872.7	0.67	68.42	16:42:37
11	74	11	5	24267	303703.9	0.64	74.25	16:43:07
12	74	12	5	19543	242990.9	0.72	59.41	16:43:24
13	74	13	5	21777	271818.2	0.68	66.46	16:43:41
14	74	14	5	19907	247951.1	0.71	60.62	16:43:58
15	74	15	5	19785	246502	0.71	60.27	16:44:15
16	66	16	5	20289	253202.2	0.7	61.90	16:44:45
17	66	17	5	19423	242188.9	0.72	59.21	16:45:02
18	66	18	4	24163	383149.4	0.64	93.67	16:45:19
19	66	19	5	21575	270174	0.68	66.05	16:45:35
20	66	20	4	24166	383608.3	0.64	93.79	16:45:52

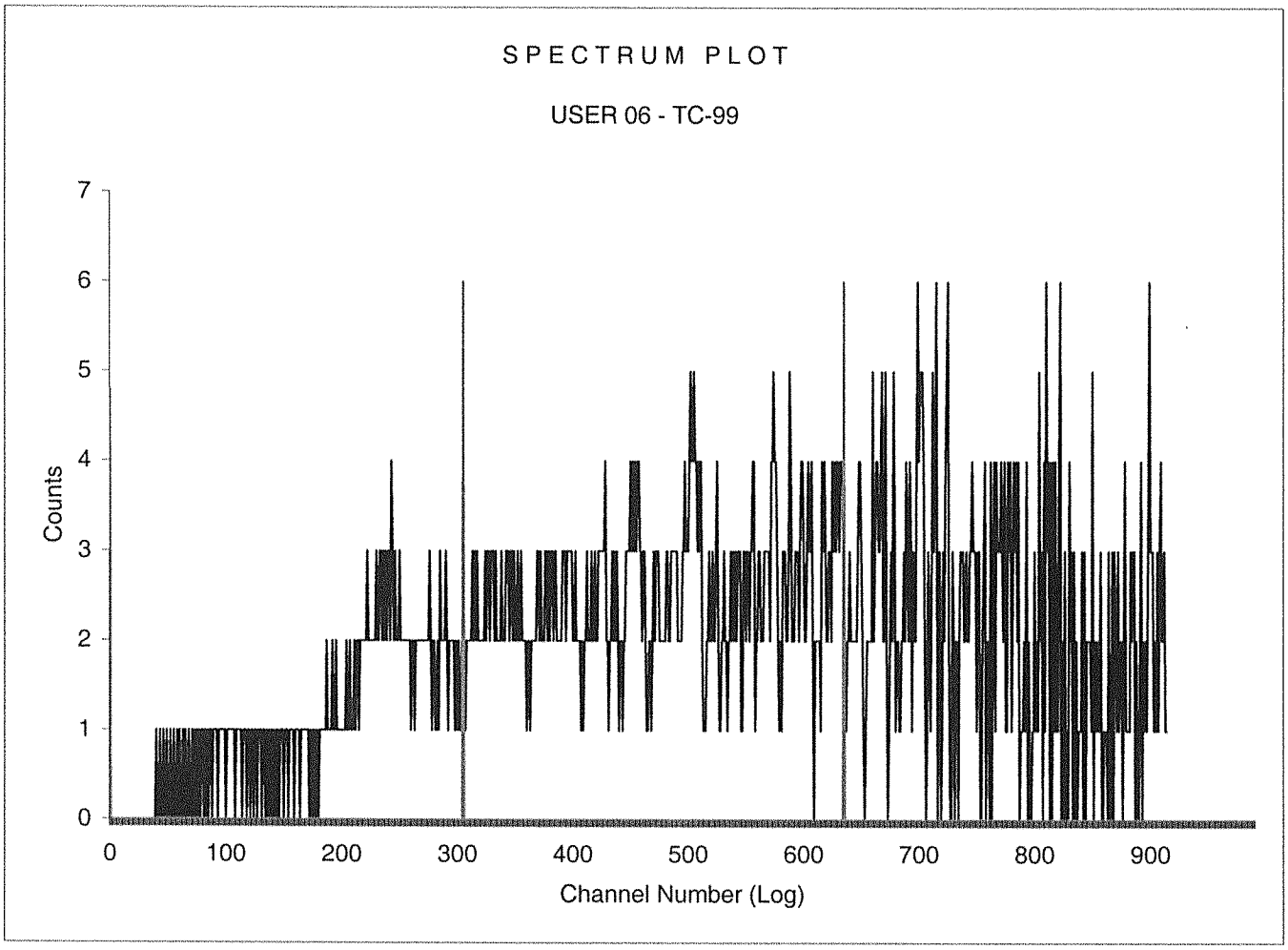
END OF ASSAY

Filename: 6:45 AMab

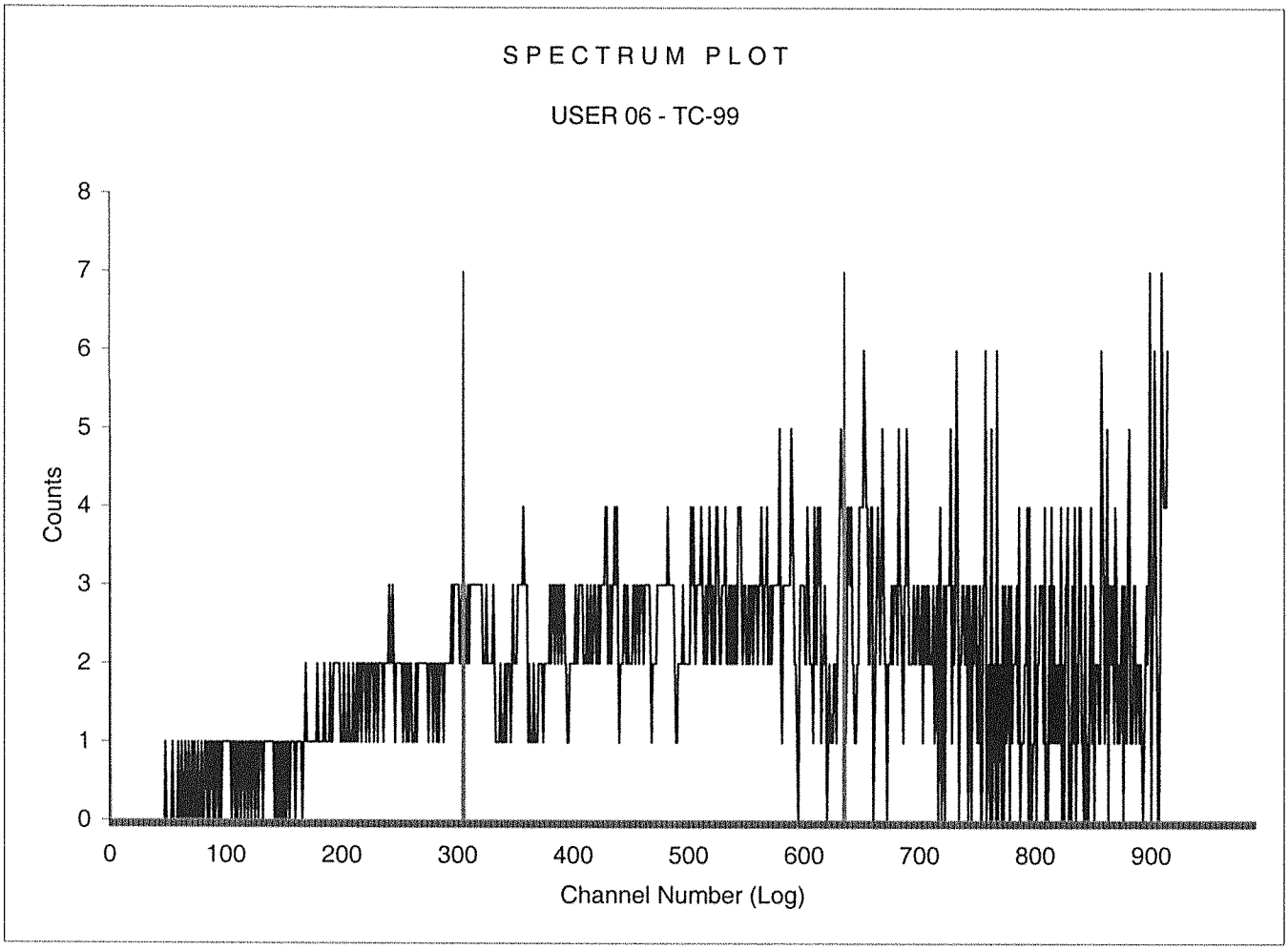
Instrument Type	LS 6000
Data Capture Date	27 Sep 2016 07:15:38
User Filename	C:\LSCCAPTURE\RED\USER06\UN092701.BSF
User Number	6
User Id	TC-99
User Comments	BLUE
Scintillator Choice:	LIQUID

Sam	Rack	Time	H#	Raw CPM1	Raw CPM2	CPM Iso1	%Err1	CPM Iso2	%Err2	LumEx	ElTime
1	52-1	50.00	165.7	16.82	36.44	16.82	6.90	34.66	4.93	4.21	51.92
2	52-2	50.00	203.0	16.50	35.50	16.50	6.96	34.16	4.93	3.34	104.26
3	52-3	50.00	192.7	16.58	34.20	16.58	6.95	33.02	5.01	3.15	156.59
4	52-4	50.00	208.1	17.44	36.16	17.44	6.77	35.00	4.86	2.91	208.88
5	52-5	50.00	193.1	17.44	36.30	17.44	6.77	35.20	4.84	2.77	261.19
6	52-6	50.00	194.7	17.34	35.90	17.34	6.79	34.78	4.87	2.83	313.51
7	52-7	50.00	206.6	17.00	35.42	17.00	6.86	34.30	4.91	2.89	365.82
8	52-8	50.00	222.7	16.38	34.70	16.38	6.99	33.62	4.96	2.85	418.12
9	52-9	50.00	188.9	16.98	35.54	16.98	6.86	34.50	4.89	2.58	470.40
10	52-10	50.00	217.4	17.12	34.34	17.12	6.84	33.28	4.98	2.83	522.69
11	52-11	50.00	194.7	17.12	35.38	17.12	6.84	34.14	4.93	3.14	575.03
12	52-12	50.00	183.8	16.14	34.90	16.14	7.04	33.88	4.93	2.63	627.31
13	36-1	50.00	197.6	17.60	35.68	17.60	6.74	34.60	4.88	2.74	679.71
14	36-2	50.00	213.8	16.38	34.62	16.38	6.99	33.60	4.95	2.81	732.00
15	36-3	50.00	182.9	17.88	37.20	17.88	6.69	36.14	4.77	2.58	784.28
16	36-4	50.00	231.7	16.70	35.46	16.70	6.92	34.40	4.90	2.81	836.58
17	36-5	50.00	185.9	17.32	34.88	17.32	6.80	34.00	4.91	2.26	888.86
18	36-6	50.00	162.7	16.84	36.42	16.84	6.89	34.96	4.88	3.46	941.21
19	36-7	50.00	197.5	15.82	33.66	15.82	7.11	32.72	5.02	2.55	993.50
20	36-8	50.00	163.1	124.28	158.64	124.28	2.54	157.38	2.26	0.79	1045.83

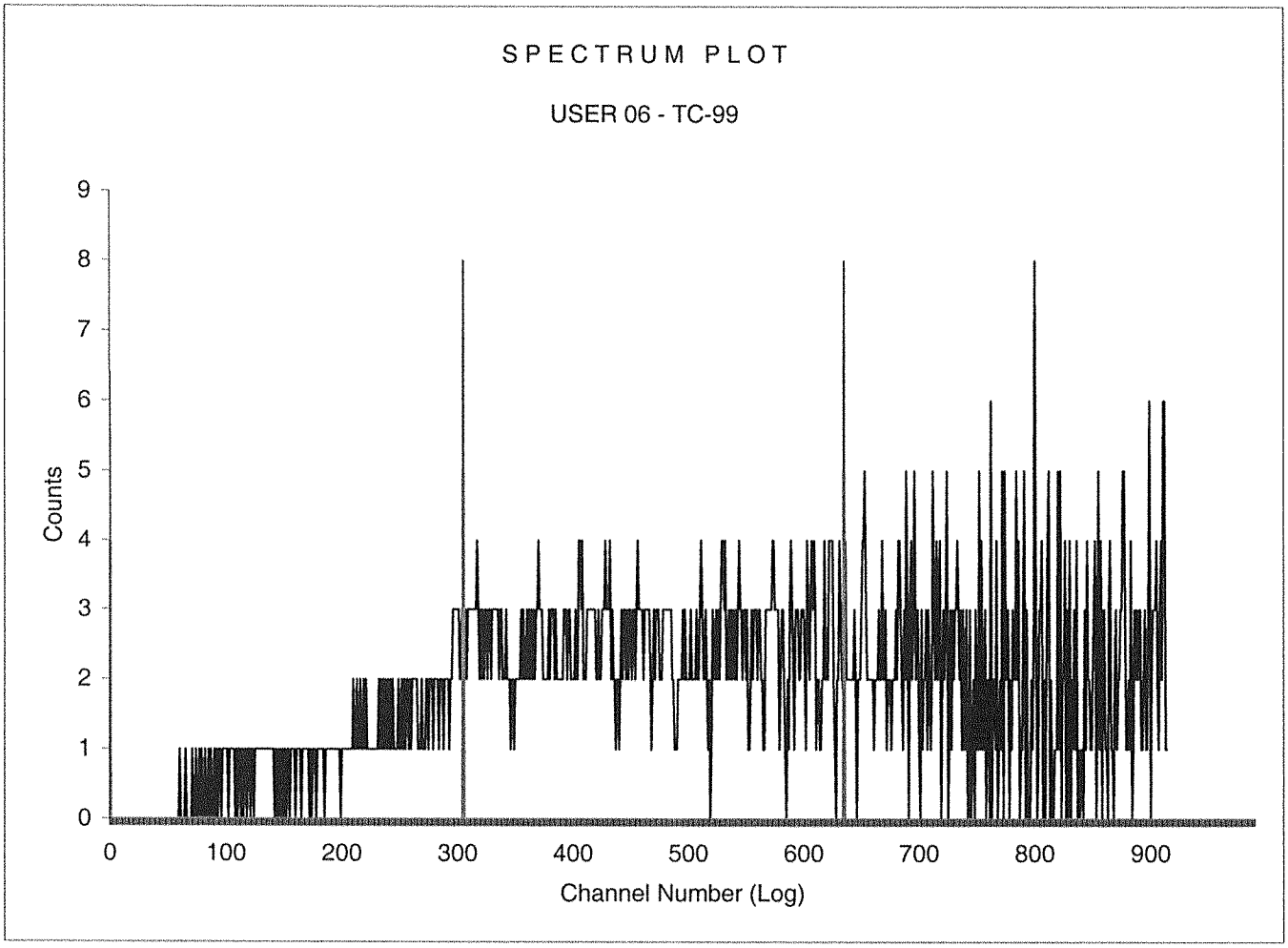
Sample Count Start Time:	27 Sep 2016 07:17:33		
Data Capture Date	27 Sep 2016 08:07:40		
User Filename	S06092752-1A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	52-1	50.00
H#, Total Counts:	150.7	1763	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



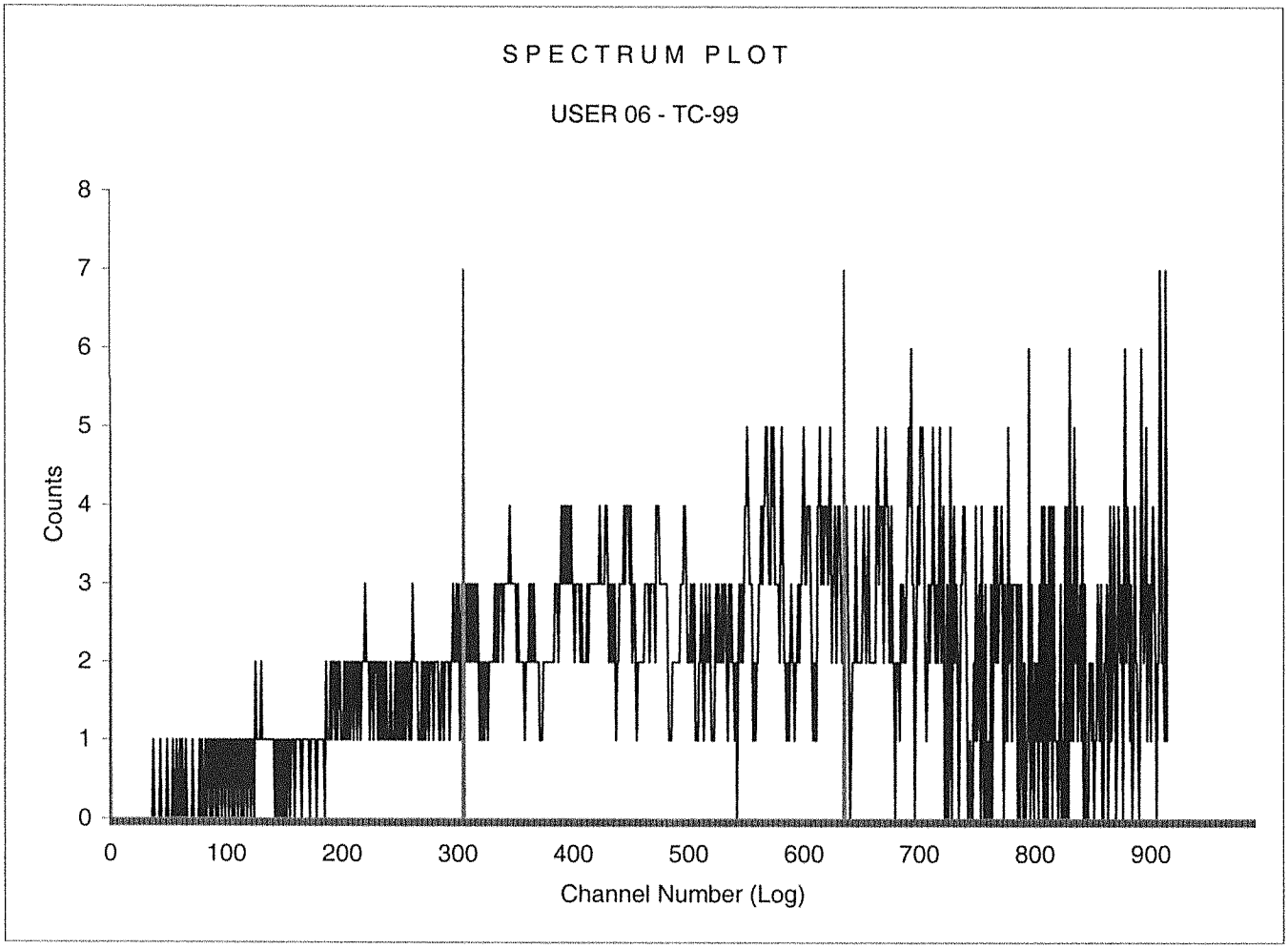
Sample Count Start Time:	27 Sep 2016 08:09:54		
Data Capture Date	27 Sep 2016 09:00:00		
User Filename	S06092752-2A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	52-2	50.00
H#, Total Counts:	203.0	1757	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



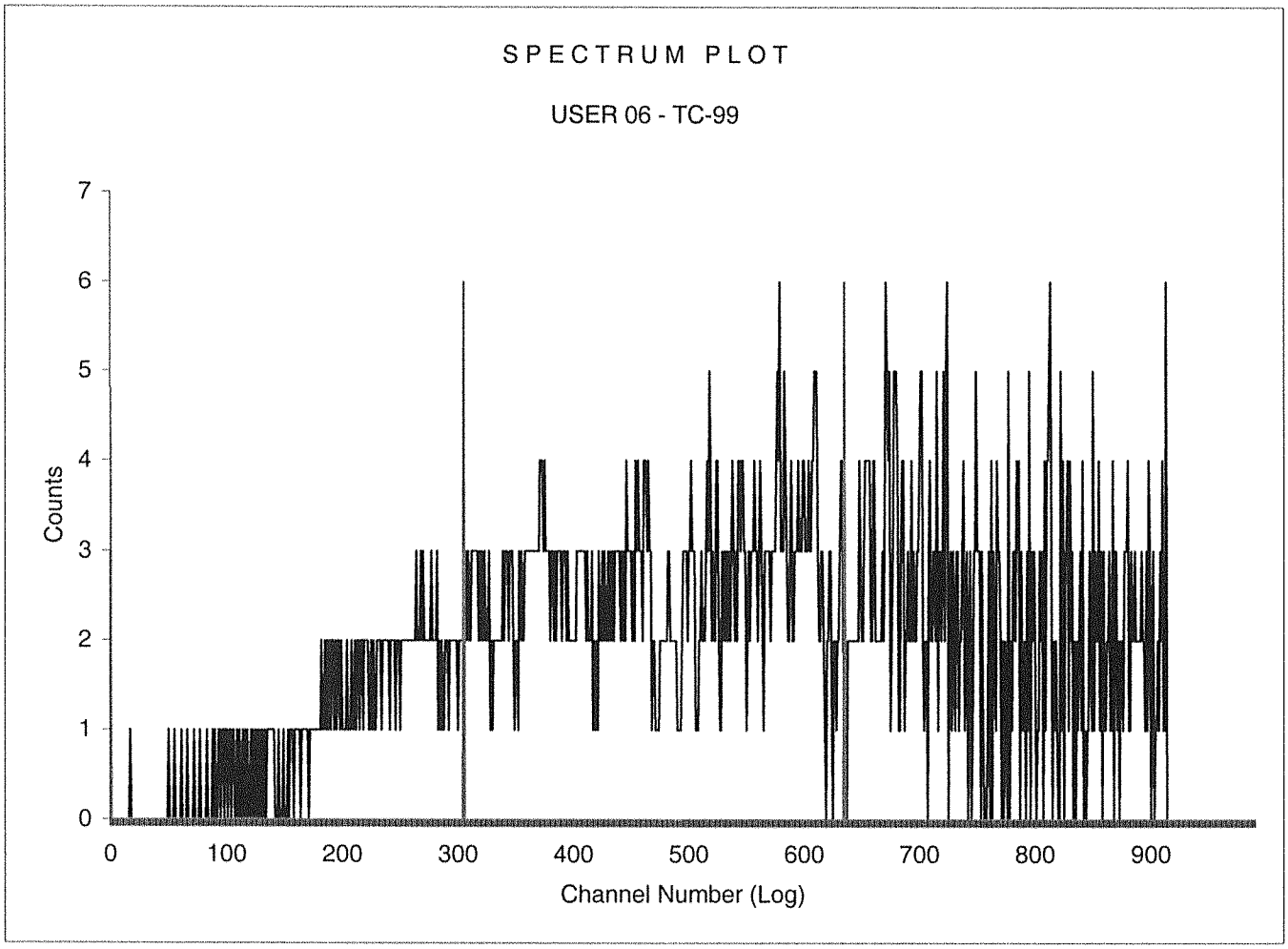
Sample Count Start Time:	27 Sep 2016 09:02:13		
Data Capture Date	27 Sep 2016 09:52:18		
User Filename	S06092752-3A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	52-3	50.00
H#, Total Counts:	192.7	1692	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



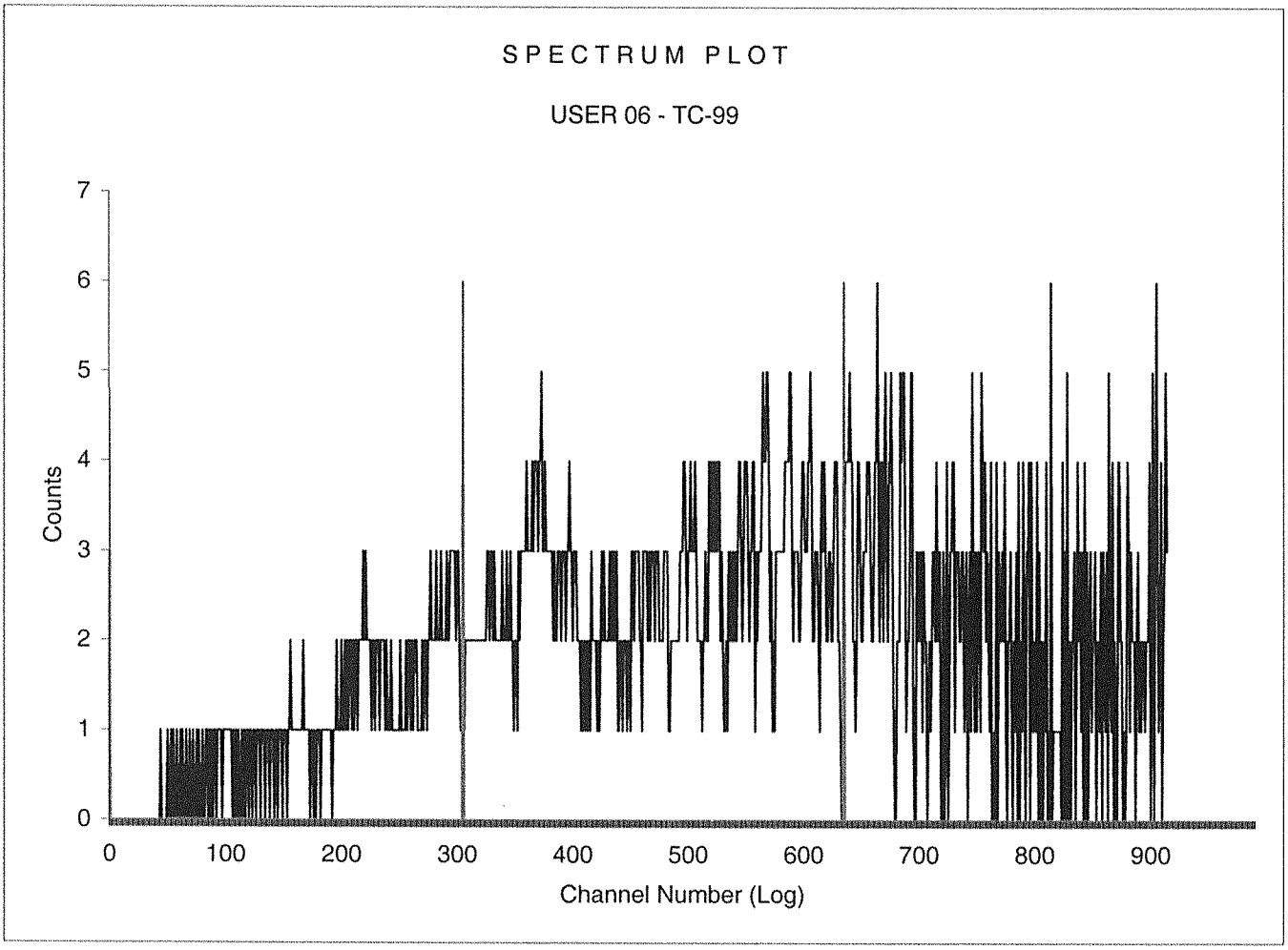
Sample Count Start Time:	27 Sep 2016 09:54:31		
Data Capture Date	27 Sep 2016 10:44:36		
User Filename	S06092752-4A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	52-4	50.00
H#, Total Counts:	208.1	1791	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



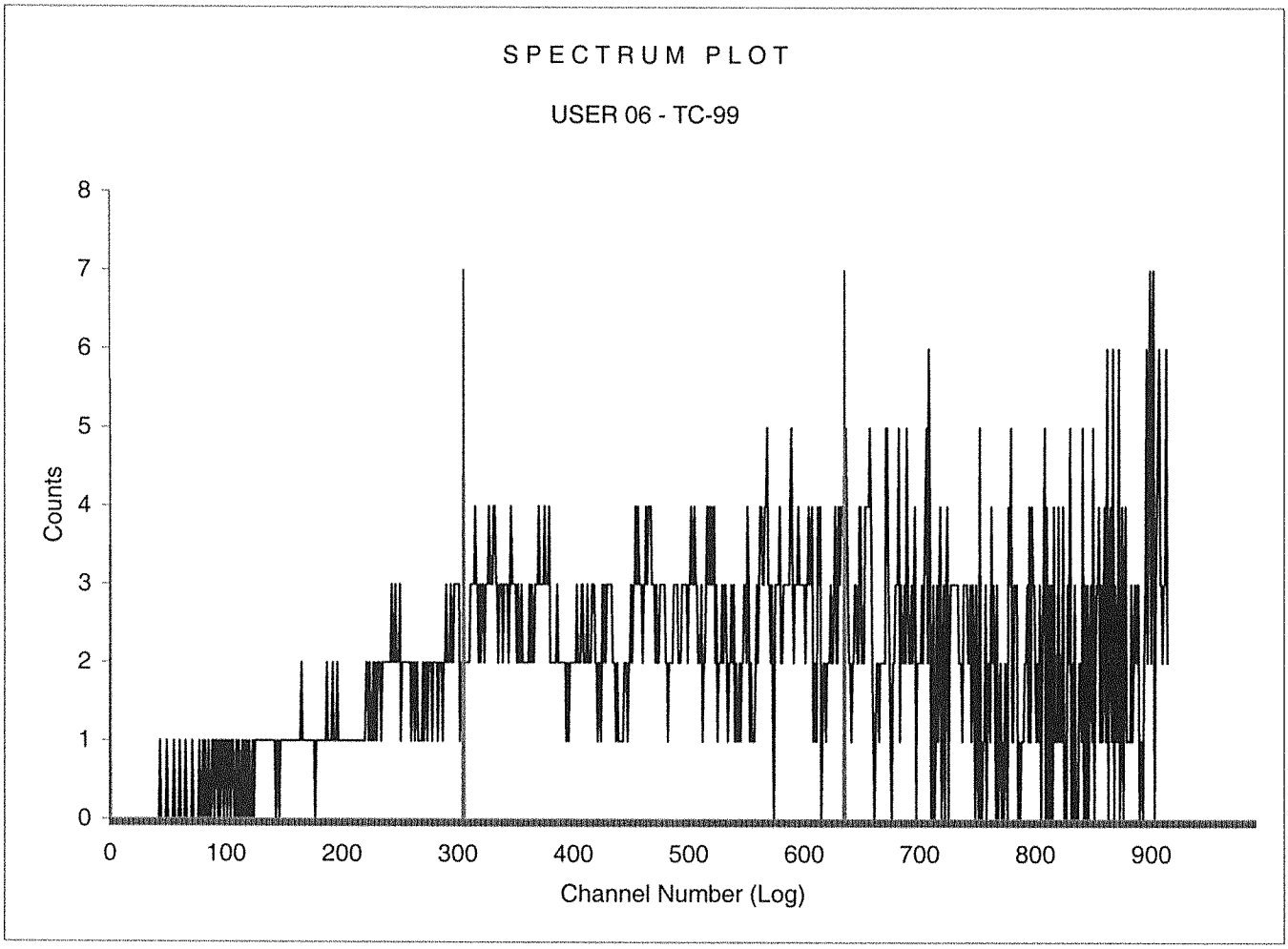
Sample Count Start Time:	27 Sep 2016 10:46:49		
Data Capture Date	27 Sep 2016 11:37:20		
User Filename	S06092752-5A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	52-5	50.00
H#, Total Counts:	193.1	1787	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



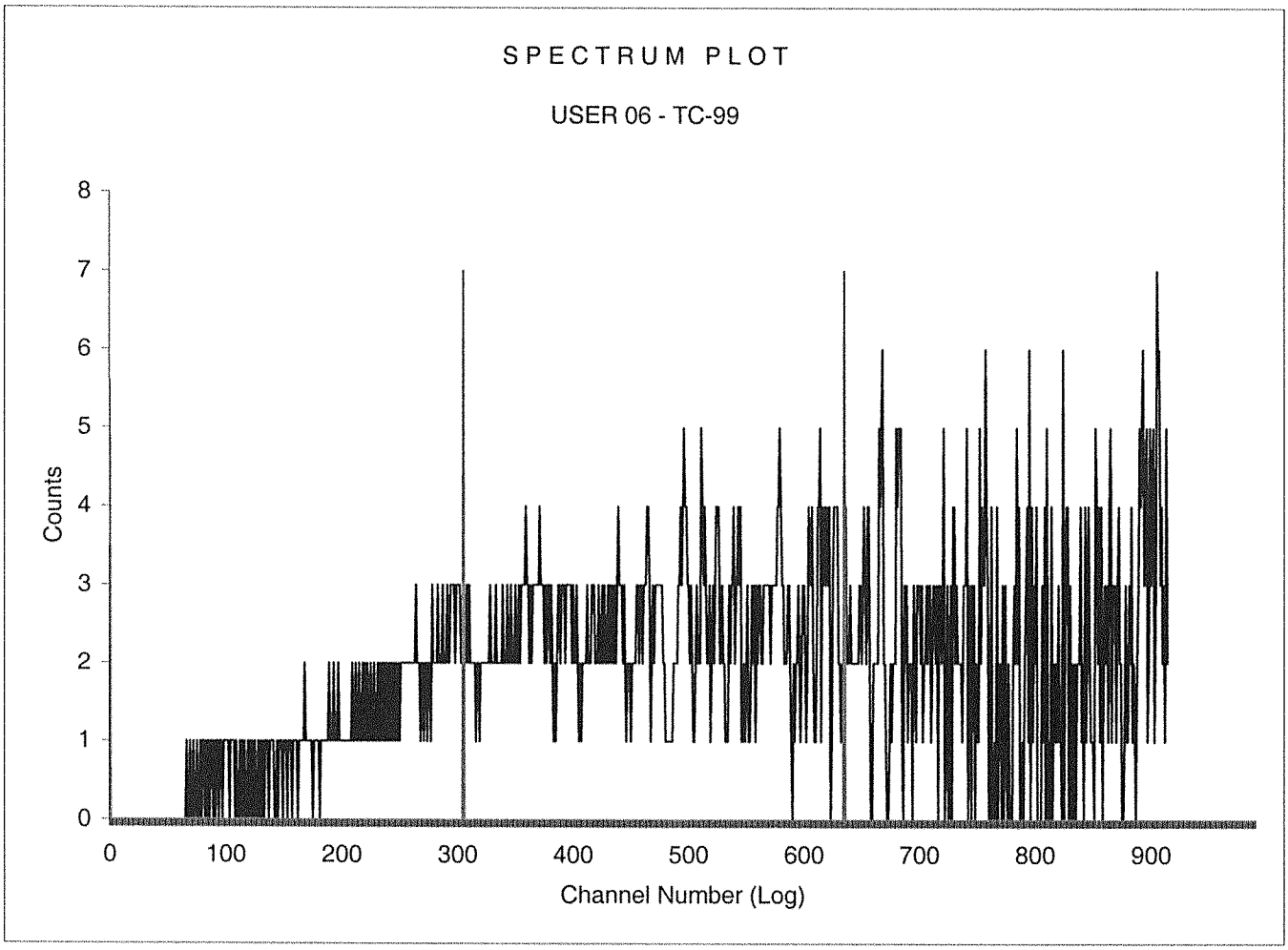
Sample Count Start Time:	27 Sep 2016 11:39:09		
Data Capture Date	27 Sep 2016 12:29:13		
User Filename	S06092752-6A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	52-6	50.00
H#, Total Counts:	194.7	1778	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



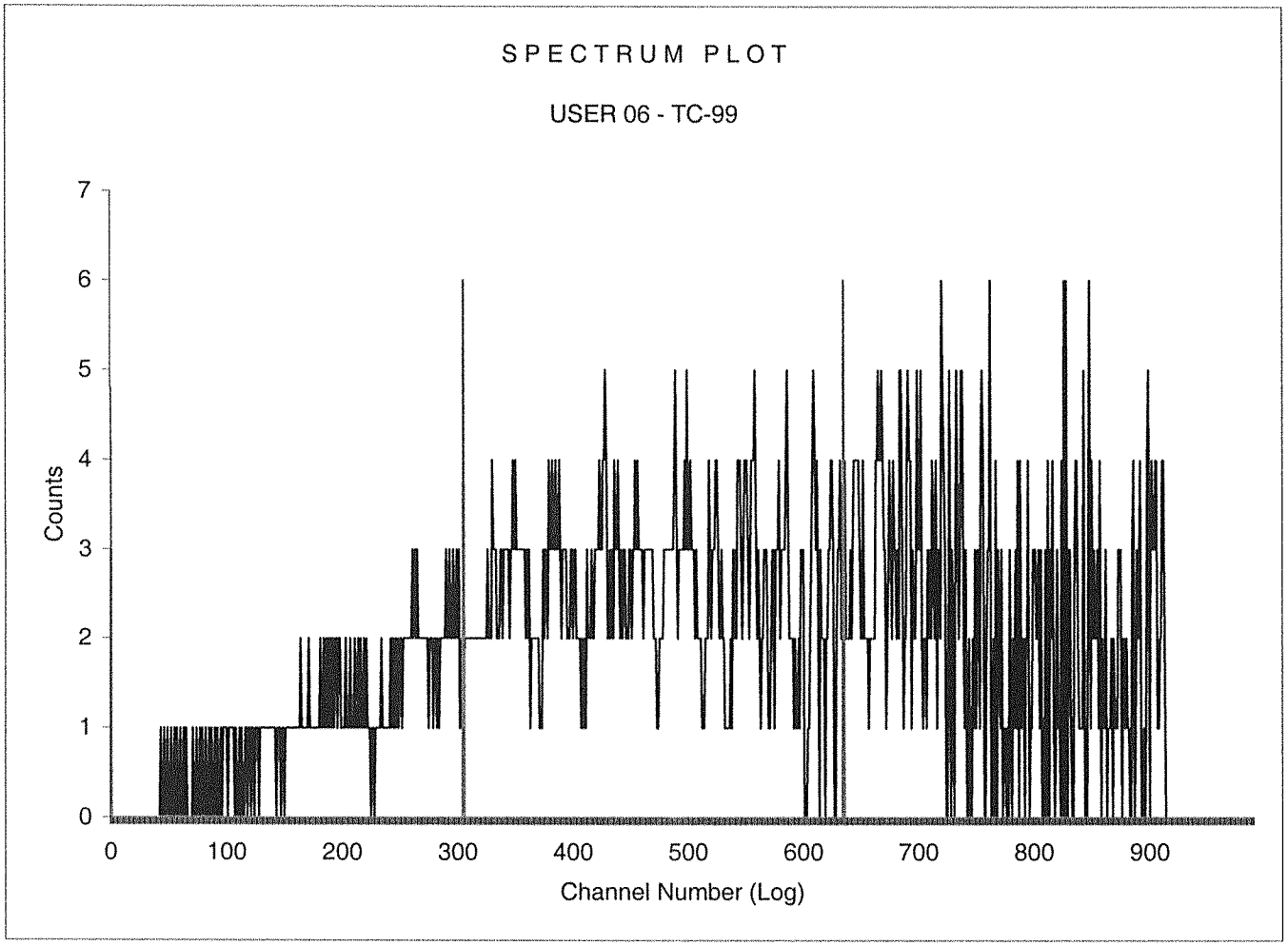
Sample Count Start Time:	27 Sep 2016 12:31:27		
Data Capture Date	27 Sep 2016 13:21:31		
User Filename	S06092752-7A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	7	52-7	50.00
H#, Total Counts:	206.6	1768	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



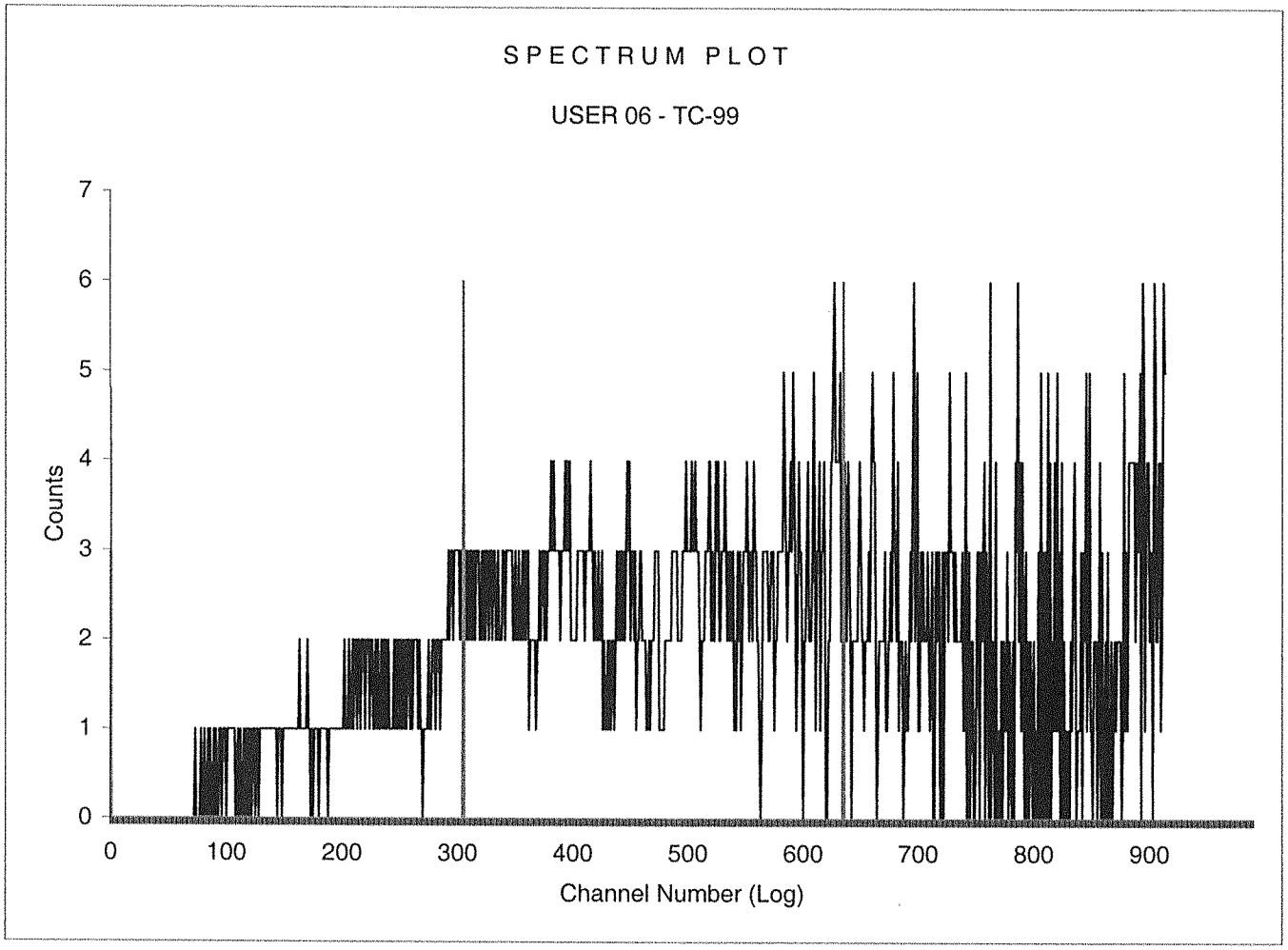
Sample Count Start Time:	27 Sep 2016 13:23:45		
Data Capture Date	27 Sep 2016 14:13:49		
User Filename	S06092752-8A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	8	52-8	50.00
H#, Total Counts:	222.7	1733	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



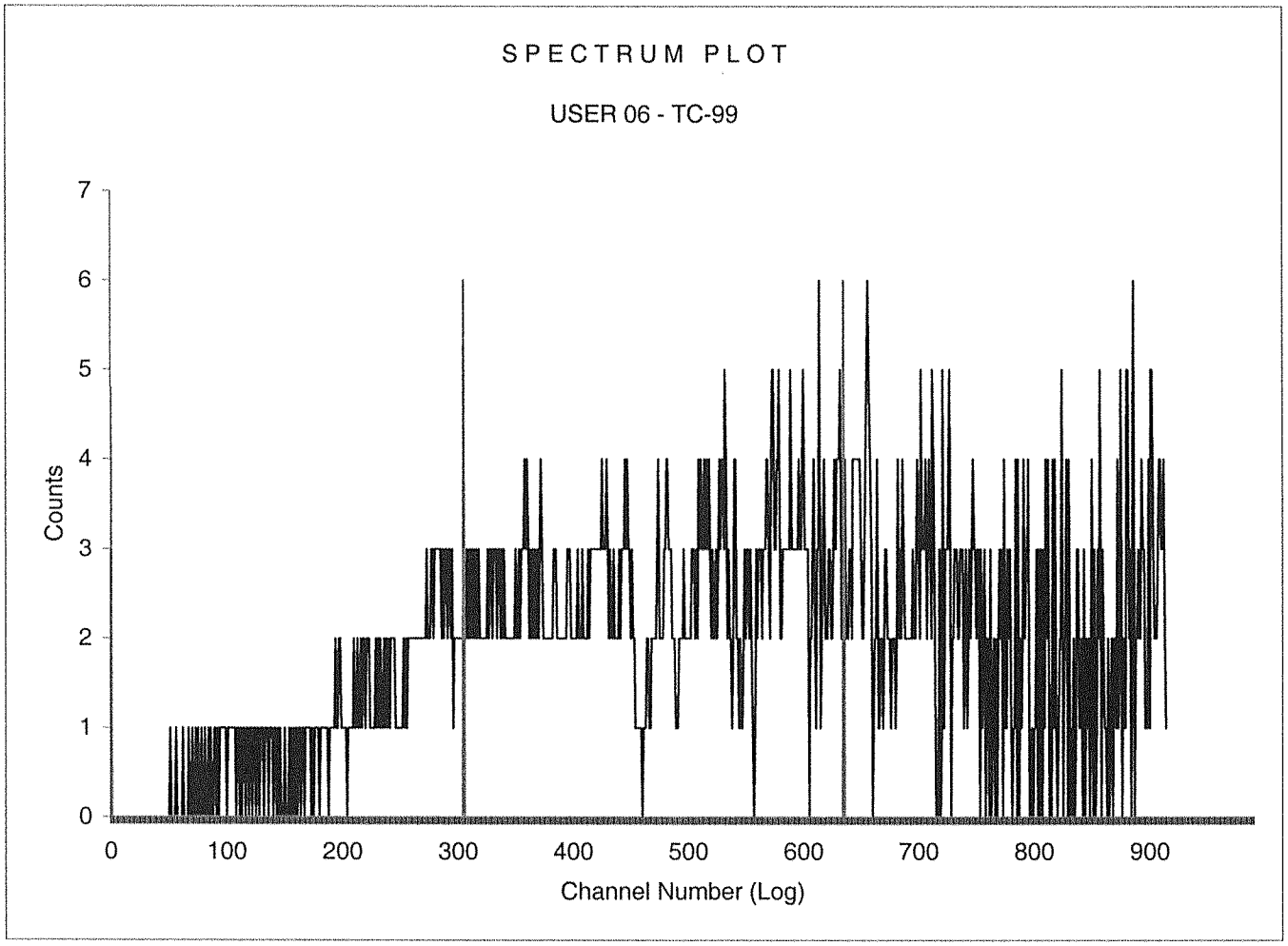
Sample Count Start Time:	27 Sep 2016 14:16:02		
Data Capture Date	27 Sep 2016 15:06:06		
User Filename	S06092752-9A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	9	52-9	50.00
H#, Total Counts:	188.9	1762	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



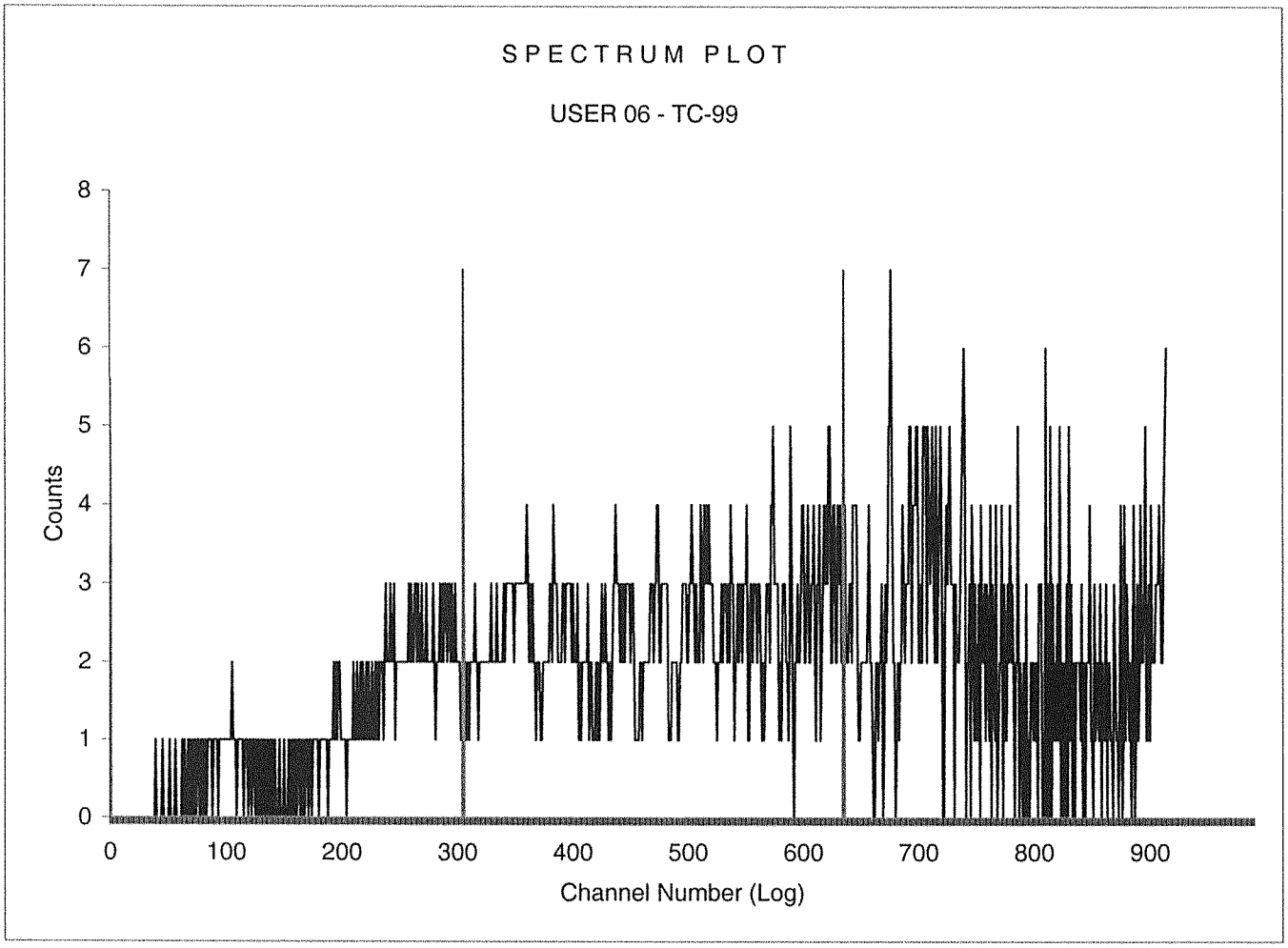
Sample Count Start Time:	27 Sep 2016 15:08:19		
Data Capture Date	27 Sep 2016 15:58:23		
User Filename	S06092752-10A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	10	52-10	50.00
H#, Total Counts:	217.4	1712	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



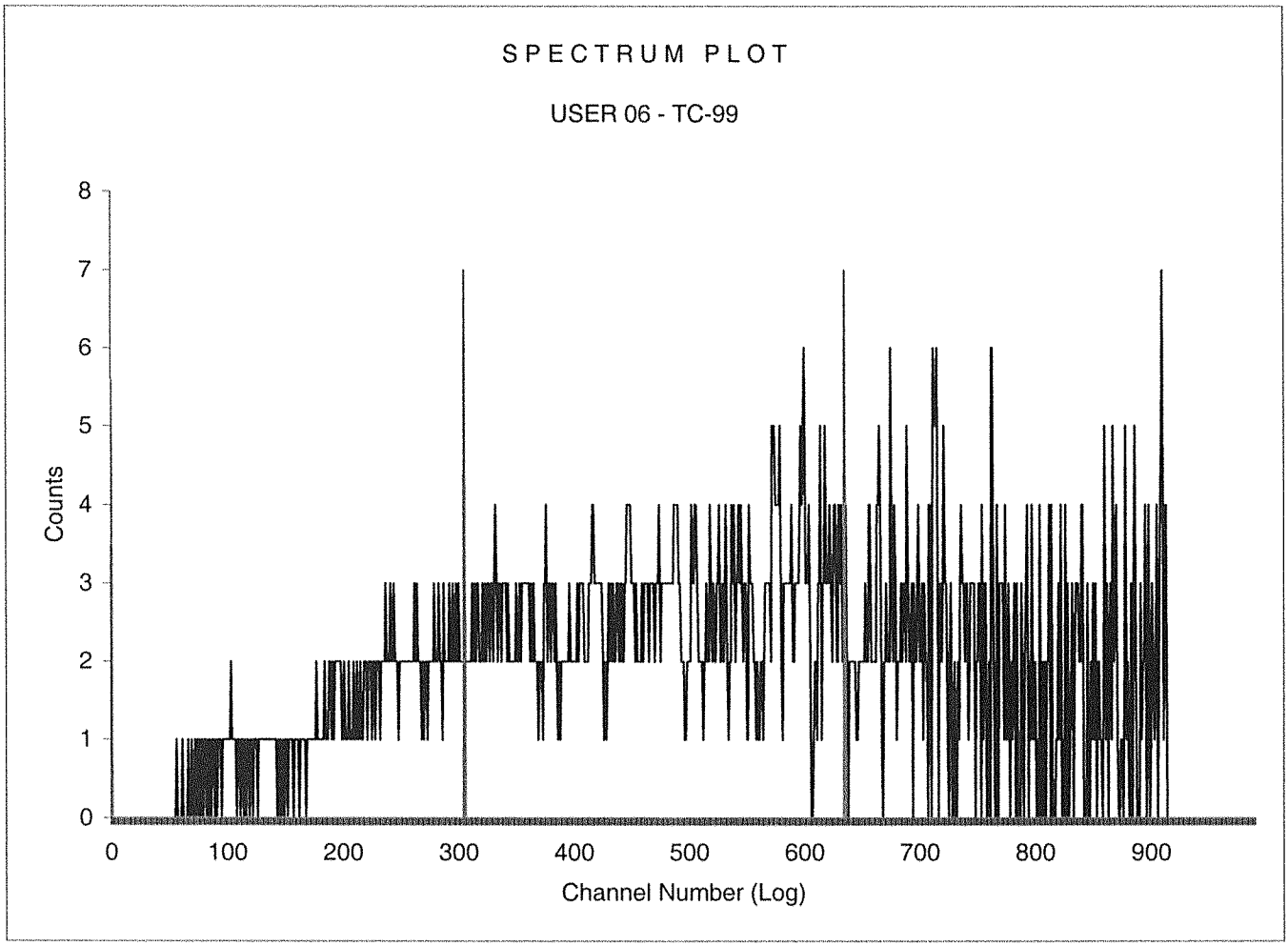
Sample Count Start Time:	27 Sep 2016 16:00:40		
Data Capture Date	27 Sep 2016 16:50:42		
User Filename	S06092752-11A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	11	52-11	50.00
H#, Total Counts:	194.7	1750	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



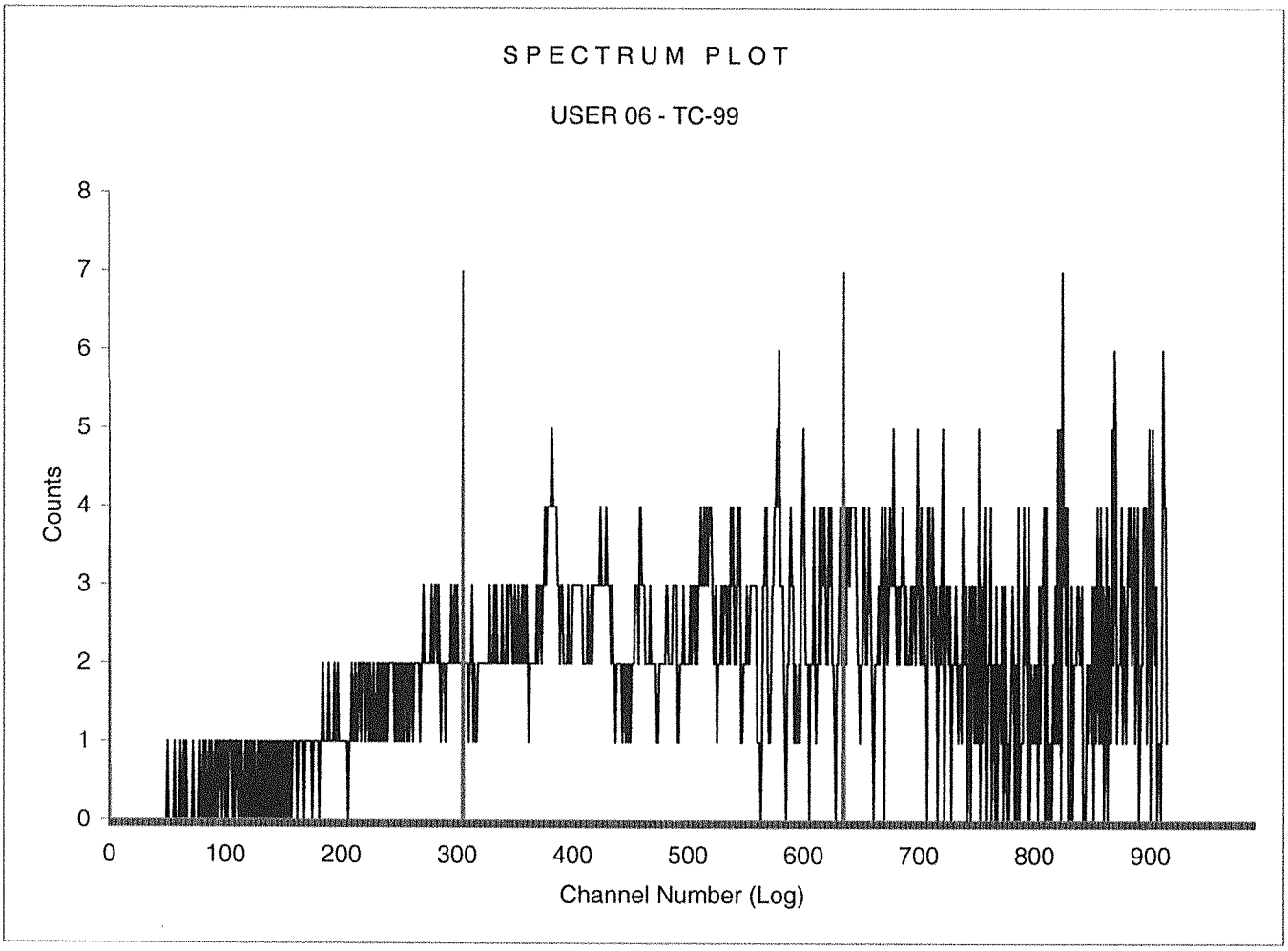
Sample Count Start Time:	27 Sep 2016 16:52:57		
Data Capture Date	27 Sep 2016 17:42:59		
User Filename	S06092752-12A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	12	52-12	50.00
H#, Total Counts:	183.8	1739	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



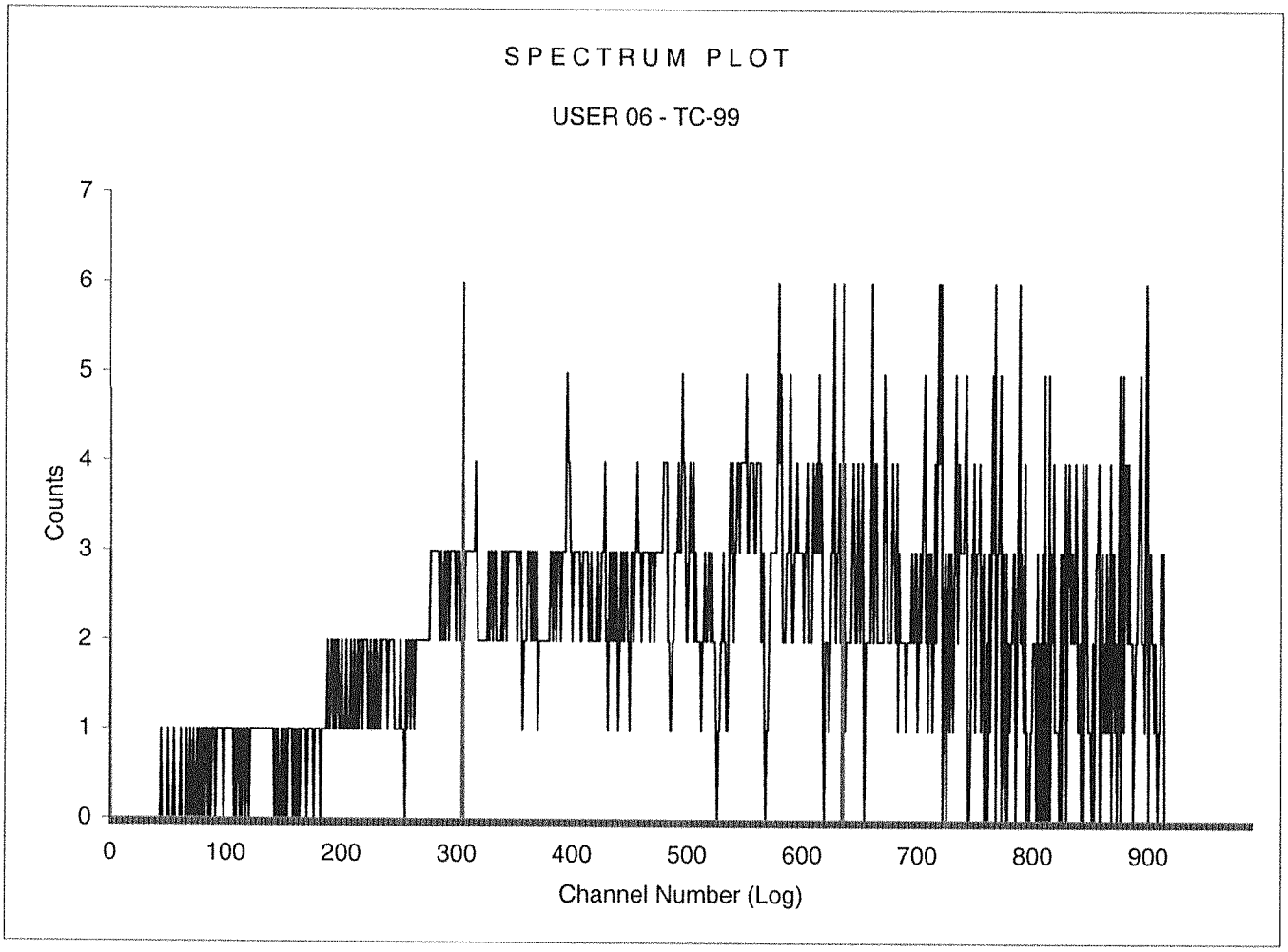
Sample Count Start Time:	27 Sep 2016 17:45:21		
Data Capture Date	27 Sep 2016 18:35:23		
User Filename	S06092736-1A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	13	36-1	50.00
H#, Total Counts:	197.6	1769	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



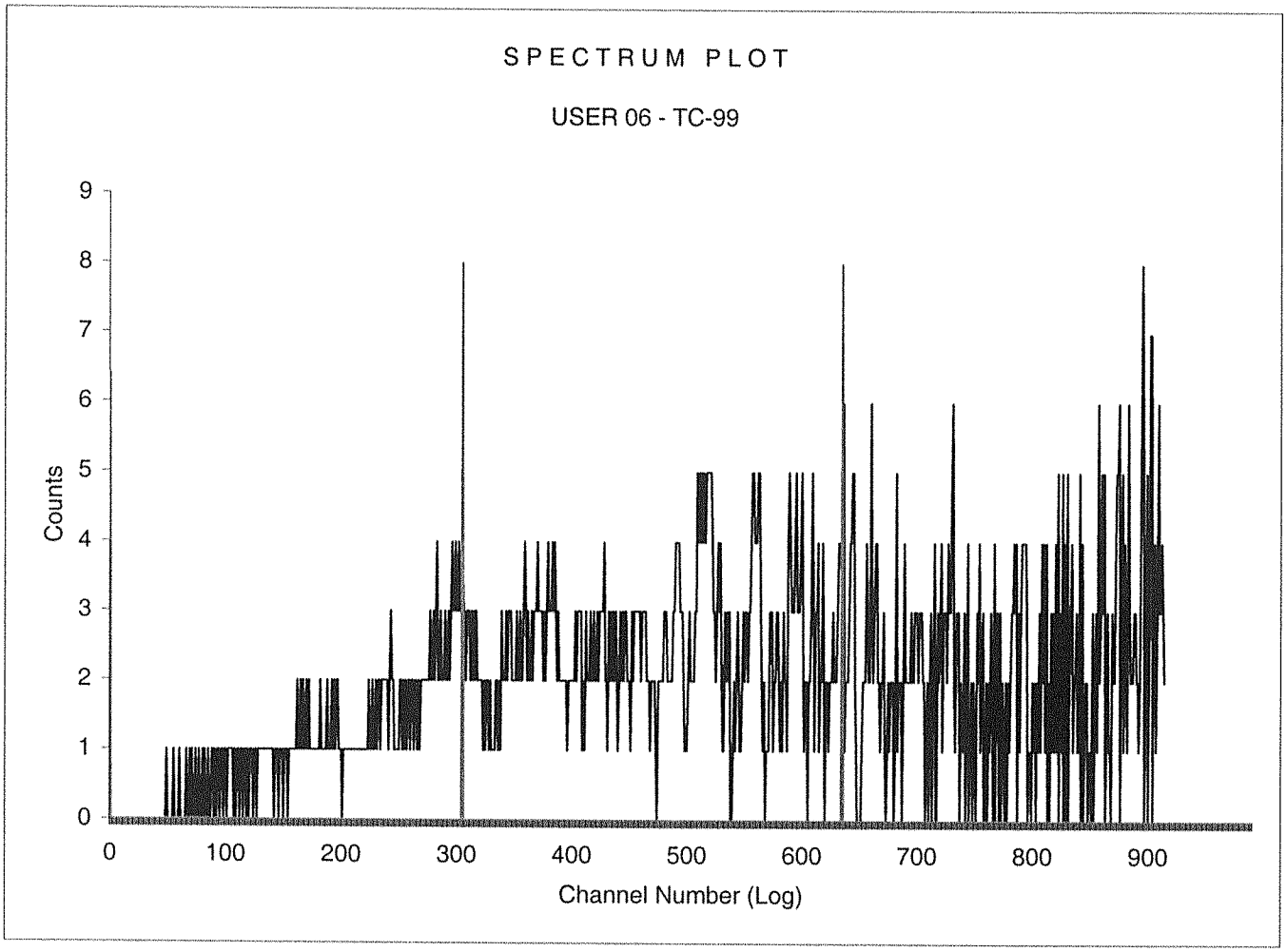
Sample Count Start Time:	27 Sep 2016 18:37:38		
Data Capture Date	27 Sep 2016 19:27:40		
User Filename	S06092736-2A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	14	36-2	50.00
H#, Total Counts:	213.8	1714	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



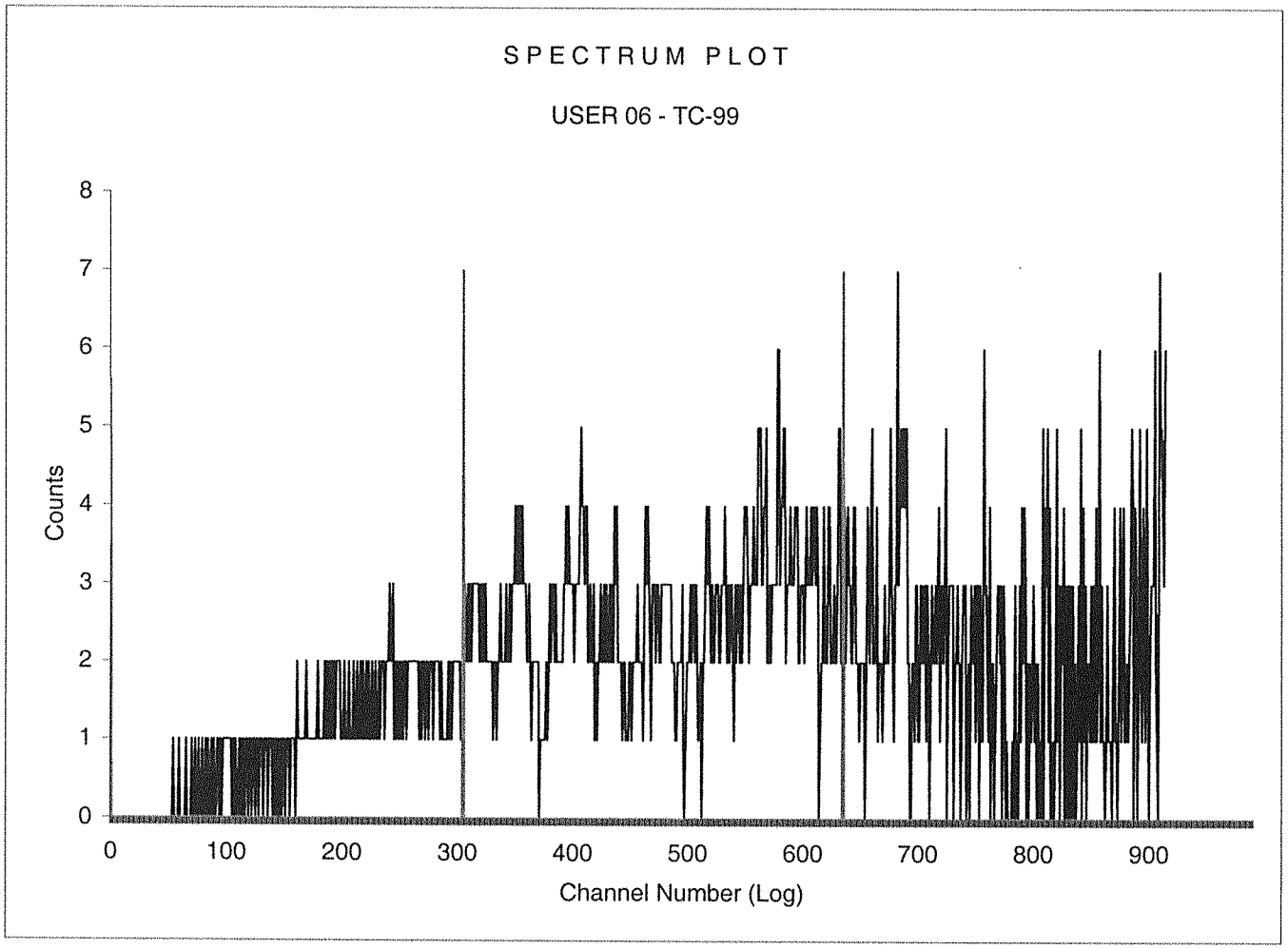
Sample Count Start Time:	27 Sep 2016 19:29:55		
Data Capture Date	27 Sep 2016 20:19:56		
User Filename	S06092736-3A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	15	36-3	50.00
H#, Total Counts:	182.9	1830	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



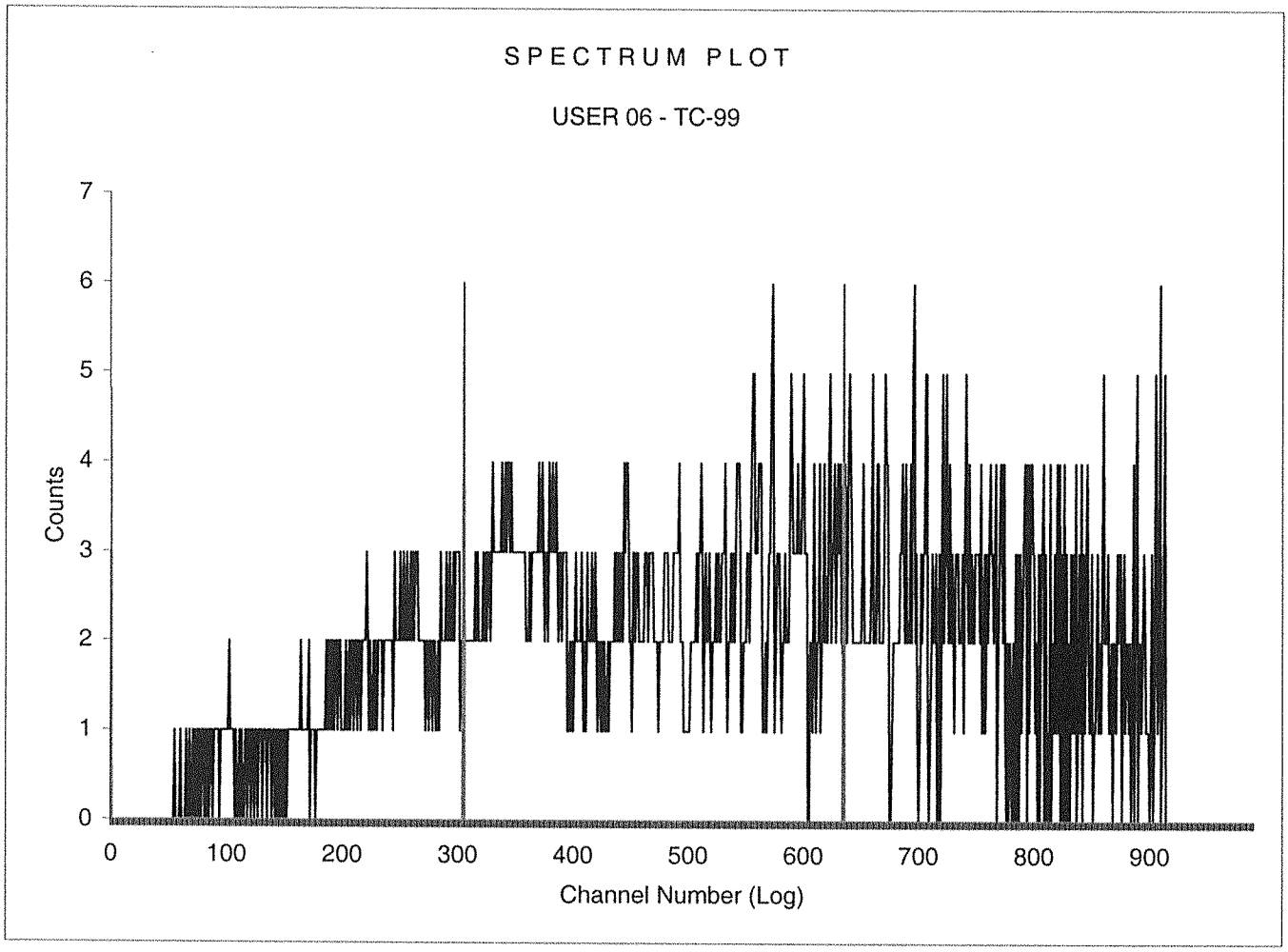
Sample Count Start Time:	27 Sep 2016 20:22:13		
Data Capture Date	27 Sep 2016 21:12:15		
User Filename	S06092736-4A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	16	36-4	50.00
H#, Total Counts:	231.7	1769	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



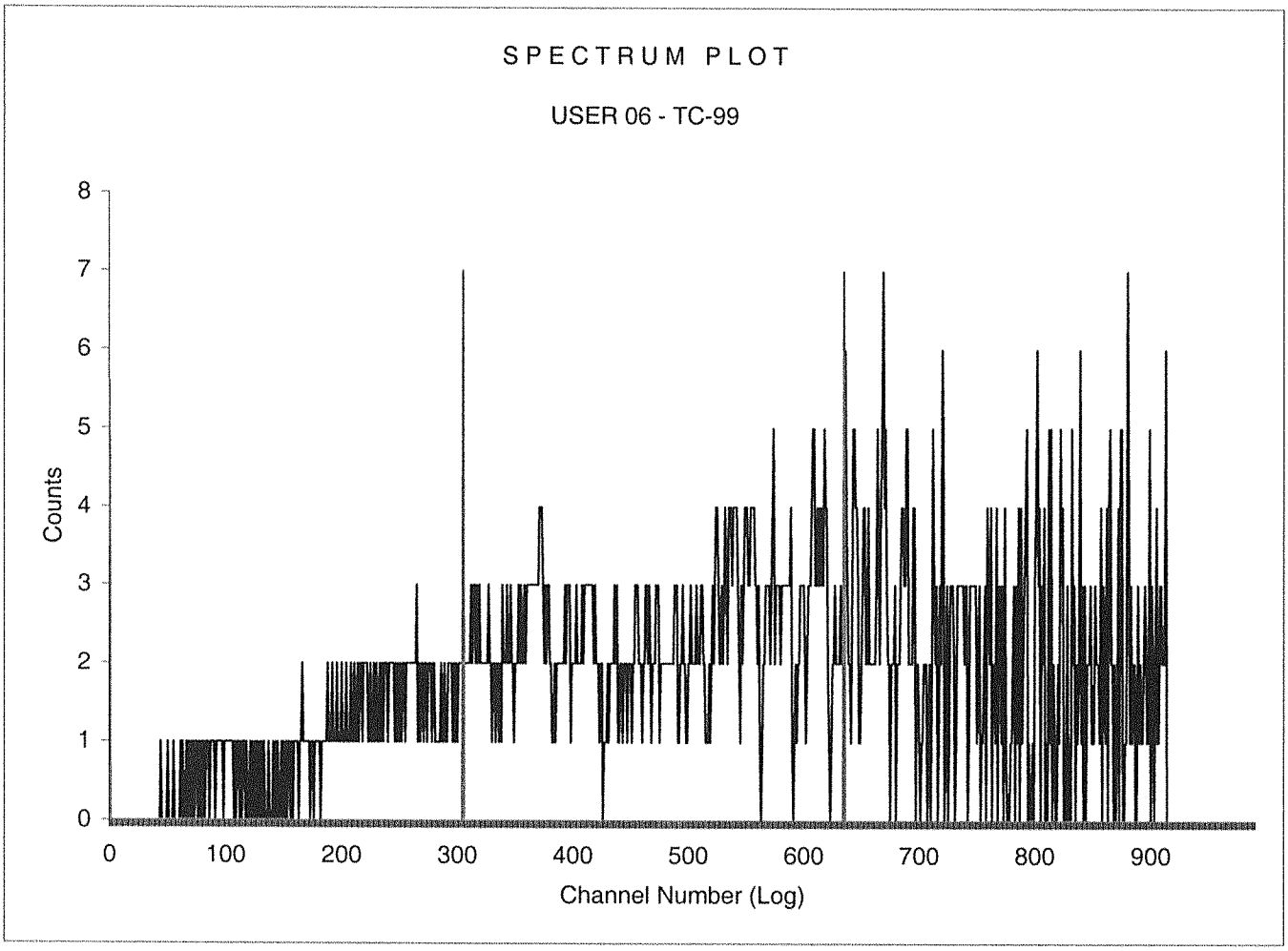
Sample Count Start Time:	27 Sep 2016 21:14:30		
Data Capture Date	27 Sep 2016 22:04:30		
User Filename	S06092736-5A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	17	36-5	50.00
H#, Total Counts:	185.9	1750	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



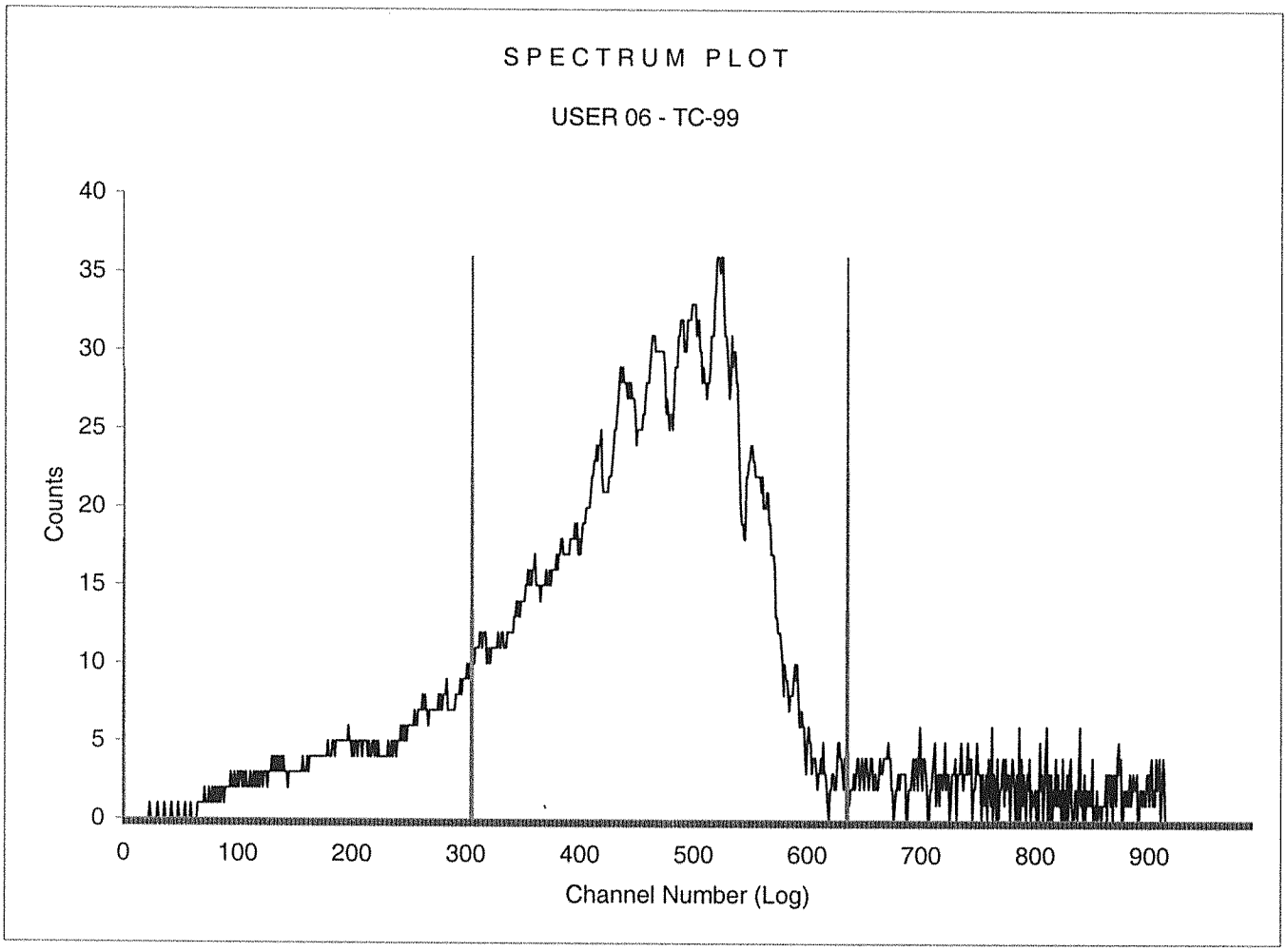
Sample Count Start Time:	27 Sep 2016 22:06:51		
Data Capture Date	27 Sep 2016 22:56:51		
User Filename	S06092736-6A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	18	36-6	50.00
H#, Total Counts:	162.7	1779	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



Sample Count Start Time:	27 Sep 2016 22:59:08		
Data Capture Date	27 Sep 2016 23:49:08		
User Filename	S06092736-7A.XLS		
	U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	19	36-7	50.00
H#, Total Counts:	197.5	1667	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



Sample Count Start Time:	27 Sep 2016 23:51:28		
Data Capture Date	28 Sep 2016 00:41:28		
User Filename	S06092836-8A.XLS U06092752-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	BLUE		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	20	36-8	50.00
H#, Total Counts:	163.1	7902	
Win1: Tc-99 - Start, End:	305	635	
Win2: - Start, End:	0	990	



Radiochemistry Batch Checklist

22-Sep-2016

Batch# 1597481 Product: H3 Date: 9/22/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			NA
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.		✓	See DER 1560439
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.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER 1560439
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER 1560439
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.)	✓		

Primary Review Performed By: MJWC

Secondary Review Performed By: [signature] 9/22/16

104

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
22-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LSC	EPA 906.0 Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1597481	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203624534, and 1203624535 were received and analyzed out of the method specified hold time.	1. Reporting results.

Originator's Name:

Elizabeth Krouse 22-SEP-16

Data Validator/Group Leader:

Lyndsey Pace 22-SEP-16

MJWC 10/4/16

35 P/O

Prep Logbook

The Determination of Tritium

Batch ID: **1597481**
Analyst: Terry Phillips
Method: EPA 906.0 Modified
Lab SOP: GL-RAD-A-002 REV# 21
Instrument: REMP-2154355-0.5mL

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203624536	Tritium SPIKE	1753-B	.1	mL
MS	1203624535	Tritium SPIKE	1753-B	.1	mL

Sample ID	Prep Date	Matrix	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Rig #	Volume Added (mL)	Aliquot in vial (mL)
405240001	20-SEP-2016 05:48:13	Soil	W	3.4	2.8625	1	50	10
405240002	20-SEP-2016 05:48:13	Soil	W	3.27	2.7619	5	50	10
405240003	20-SEP-2016 05:48:13	Soil	W	3.42	2.8438	8	50	10
405240004	20-SEP-2016 05:48:13	Soil	W	3.48	2.9632	9	50	10
405240005	20-SEP-2016 05:48:13	Soil	W	3.36	2.6601	11	50	10
405240006	20-SEP-2016 05:48:13	Soil	W	3.37	2.7448	13	50	10
405240007	20-SEP-2016 05:48:13	Soil	W	3.42	2.9114	15	50	10
405240008	20-SEP-2016 05:48:13	Soil	W	3.36	2.8825	16	50	10
405240009	20-SEP-2016 05:48:13	Soil	W	3.3	2.5676	17	50	10
405240010	20-SEP-2016 05:48:13	Soil	W	3.45	2.8441	18	50	10
405240011	20-SEP-2016 05:48:13	Soil	W	3.37	2.6313	20	50	10
405240012	20-SEP-2016 05:48:13	Soil	W	3.45	2.7708	21	50	10
405240013	20-SEP-2016 05:48:13	Soil	W	3.36	2.5072	23	50	10
405240014	20-SEP-2016 05:48:13	Soil	W	3.4	2.8806	24	50	10
405240015	20-SEP-2016 05:48:13	Soil	W	3.32	2.3357	25	50	10
405240016	20-SEP-2016 05:48:13	Soil	W	3.42	2.6821	26	50	10
1203624533 MB	20-SEP-2016 05:48:13	Soil	W		2.9632	28	50	10
1203624534 DUP (405240001)	20-SEP-2016 05:48:13	Soil	W	3.37	2.8373	30	50	10
1203624535 MS (405240001)	20-SEP-2016 05:48:13	Soil	W	3.42	2.8794	31	50	10
1203624536 LCS	20-SEP-2016 05:48:13	Soil	W		2.9632	32	50	10

Reagent/Solvent Lot ID	Description	Amount
2352257.5	Ecoscint Ultra Scintillation Solution	13 mL
2373671	Sodium Hydroxide, Pellet ACS	2 g
2418926	Quenching Agent	20 uL
2447042.3	Ecoscint Ultra Scintillation Solution	13 mL
2452415	RL-Potassium Permanganate	2 mL

Comments:
Spike Pipet ID: RAD-LSC-2970968
Vial Pipet ID: RAD-LSC-8036326
Bkg prepared with dead water: Yes

T1597481R

Tritium Solid

Filename : H3DST.XLS
File type : Excel
Version # : 1.2.13

Batch : 1597481
Analyst : TER02081
Prep Date : 9/20/2016
Method Uncertainty : 0

Geometry:
10mL DW/13mL Ecoscint Ultra

Procedure Code : LSCDSH3DS
Parmname : Tritium
Required MDA : 6 pCi/G
H-3 Abundance : 1.00
Halflife of Tritium : 12.32 years

Sample Characteristics

Pos.	Sample ID	Total Sample Volume (L)	Sample Aliquot G	Sample Aliquot StDev. G	Distilled Sample Counted L	Sample Counted StDev. L	Rig number	Sample Date/Time
1	405240001.1	0.0500	2.8625	3.5163E-03	0.0100	1.0000E-05	1	12/15/2015 10:14
2	405240002.1	0.0500	2.7619	3.5059E-03	0.0100	1.0000E-05	5	12/15/2015 10:19
3	405240003.1	0.0500	2.8438	3.5143E-03	0.0100	1.0000E-05	8	12/15/2015 10:18
4	405240004.1	0.0500	2.9632	3.5267E-03	0.0100	1.0000E-05	9	12/15/2015 10:21
5	405240005.1	0.0500	2.6601	3.4954E-03	0.0100	1.0000E-05	11	12/15/2015 11:42
6	405240006.1	0.0500	2.7448	3.5041E-03	0.0100	1.0000E-05	13	12/15/2015 11:46
7	405240007.1	0.0500	2.9114	3.5213E-03	0.0100	1.0000E-05	15	12/15/2015 12:17
8	405240008.1	0.0500	2.8825	3.5183E-03	0.0100	1.0000E-05	16	12/15/2015 12:20
9	405240009.1	0.0500	2.5676	3.4858E-03	0.0100	1.0000E-05	17	12/15/2015 12:31
10	405240010.1	0.0500	2.8441	3.5144E-03	0.0100	1.0000E-05	18	12/15/2015 12:35
11	405240011.1	0.0500	2.6313	3.4924E-03	0.0100	1.0000E-05	20	12/15/2015 12:53
12	405240012.1	0.0500	2.7708	3.5068E-03	0.0100	1.0000E-05	21	12/15/2015 12:56
13	405240013.1	0.0500	2.5072	3.4796E-03	0.0100	1.0000E-05	23	12/15/2015 11:04
14	405240014.1	0.0500	2.8806	3.5181E-03	0.0100	1.0000E-05	24	12/15/2015 11:08
15	405240015.1	0.0500	2.3357	3.4619E-03	0.0100	1.0000E-05	25	12/15/2015 14:02
16	405240016.1	0.0500	2.6821	3.4977E-03	0.0100	1.0000E-05	26	12/15/2015 14:06
17	1203624533.1	0.0500	2.9632	3.5267E-03	0.0100	1.0000E-05	28	9/20/2016 0:00
18	1203624534.1	0.0500	2.8373	3.5137E-03	0.0100	1.0000E-05	30	12/15/2015 10:14
19	1203624535.1	0.0500	2.8794	3.5180E-03	0.0100	1.0000E-05	31	12/15/2015 10:14
20	1203624536.1	0.0500	2.9632	3.5267E-03	0.0100	1.0000E-05	32	9/20/2016 0:00

Pipet, 0.1 ml Stdev : +/- 0.000200 ml
Pipet, 0.5 ml Stdev : +/- 0.001000 ml
Pipet, 1.0 ml Stdev : +/- 0.002000 ml
Pipet, 5.0 ml Stdev : +/- 0.010000 ml

Analytical SOP: GL-RAD-A-002
Instrument SOP: GL-RAD-I-017

Count raw Data											Calibration Data						
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	Sample Decay	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Rack Position #	Background Count Start Date/Time
1	22	35.013	669.76	1.75	1.57	35	669.63	1.5701	9/20/2016 22:21	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2365	0.00792	21	9/20/2016 21:43
2	23	35.0297	668.85	1.69	1.57	35	669.63	1.5694	9/20/2016 22:58	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2346	0.00792	21	9/20/2016 21:43
3	24	35.0297	639.09	2.01	1.57	35	669.63	1.4863	9/20/2016 23:36	0.958	LSCORANGE	6/15/2016	6/30/2017	0.1757	0.00792	21	9/20/2016 21:43
4	25	35.0297	670.47	1.46	1.57	35	669.63	1.5705	9/21/2016 0:14	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2379	0.00792	21	9/20/2016 21:43
5	26	35.0297	670.66	1.51	1.57	35	669.63	1.5706	9/21/2016 0:51	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2383	0.00792	21	9/20/2016 21:43
6	27	35.0297	666.91	1.63	1.57	35	669.63	1.5676	9/21/2016 2:44	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2305	0.00792	21	9/20/2016 21:43
7	28	35.013	668.06	1.28	1.57	35	669.63	1.5687	9/21/2016 3:21	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2329	0.00792	21	9/20/2016 21:43
8	29	35.0297	666.71	1.49	1.57	35	669.63	1.5674	9/21/2016 3:59	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2301	0.00792	21	9/20/2016 21:43
9	30	35.0297	668.32	1.87	1.57	35	669.63	1.5690	9/21/2016 4:36	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2334	0.00792	21	9/20/2016 21:43
10	31	35.0297	668.85	1.16	1.57	35	669.63	1.5694	9/21/2016 5:14	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2346	0.00792	21	9/20/2016 21:43
11	32	35.0297	669.13	1.78	1.57	35	669.63	1.5696	9/21/2016 5:51	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2351	0.00792	21	9/20/2016 21:43
12	33	35.0297	670.53	2.1	1.57	35	669.63	1.5705	9/21/2016 6:29	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2381	0.00792	21	9/20/2016 21:43
13	34	35.0297	669.56	1.87	1.57	35	669.63	1.5700	9/21/2016 7:06	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2360	0.00792	21	9/20/2016 21:43
14	35	35.0295	669.12	1.46	1.57	35	669.63	1.5696	9/21/2016 7:44	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2351	0.00792	21	9/20/2016 21:43
15	36	35.0297	669.02	1.63	1.57	35	669.63	1.5696	9/21/2016 8:21	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2349	0.00792	21	9/20/2016 21:43
16	37	35.0297	670.23	1.63	1.57	35	669.63	1.5704	9/21/2016 8:59	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2374	0.00792	21	9/20/2016 21:43
17	38	35.0295	668.96	1.31	1.57	35	669.63	1.5695	9/21/2016 9:37	1.000	LSCORANGE	6/15/2016	6/30/2017	0.2348	0.00792	21	9/20/2016 21:43
18	39	35.0297	660.76	1.75	1.57	35	669.63	1.5580	9/21/2016 10:14	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2179	0.00792	21	9/20/2016 21:43
19	40	15.0296	671.68	11.44	1.57	35	669.63	1.5710	9/21/2016 10:52	0.958	LSCORANGE	6/15/2016	6/30/2017	0.2405	0.00792	21	9/20/2016 21:43
20	22	15.0296	668.8	11.64	1.02	15	667.88	1.0208	9/21/2016 18:26	1.000	LSCORANGE	6/15/2016	6/30/2017	0.2344	0.00792	21	9/21/2016 18:08

T1597481R

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

* - RPD changed to 0% due to sample & dup activity below MDA

Spike S/N : 1753-B
Spike Exp Date : 11/2/2016
Spike Activity (dpm/ml): 2550.04
Spike Volume Added: 0.10

LCS S/N : 1753-B
LCS Exp Date : 11/2/2016
LCS Activity (dpm/ml): 2550.04
LCS Volume Added: 0.10

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 %	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	2.4241	1.7114	6	3.7206	**0.6251**	171.14%	0.1799	0.3079	2.0968	2.0968		SAMPLE				
2	2.5320	1.7876	6	3.8861	**0.4377**	252.99%	0.1206	0.3050	2.1704	2.1705		SAMPLE				
3	3.1946	2.2554	6	4.9139	**2.4646**	60.34%	0.5237	0.3159	2.9144	2.9147		SAMPLE				
4	2.3271	1.6430	6	3.5716	**-0.3686**	266.17%	-0.1105	0.2941	1.9228	1.9228		SAMPLE				
5	2.5880	1.8271	6	3.9719	**-0.2248**	489.32%	-0.0606	0.2966	2.1559	2.1559		SAMPLE				
6	2.5910	1.8293	6	3.9769	**0.2320**	484.08%	0.0624	0.3021	2.2011	2.2011		SAMPLE				
7	2.4188	1.7077	6	3.7126	**-1.0015**	98.78%	-0.2887	0.2852	1.9388	1.9388		SAMPLE				
8	2.4715	1.7449	6	3.7935	**-0.2743**	381.87%	-0.0774	0.2954	2.0532	2.0532		SAMPLE				
9	2.7362	1.9318	6	4.1996	**1.1811**	104.09%	0.3010	0.3133	2.4096	2.4096		SAMPLE				
10	2.4589	1.7360	6	3.7739	**-1.4434**	68.18%	-0.4094	0.2791	1.9288	1.9288		SAMPLE				
11	2.6513	1.8718	6	4.0692	**0.7996**	147.01%	0.2104	0.3092	2.3038	2.3038		SAMPLE				
12	2.4875	1.7562	6	3.8177	**1.8876**	61.14%	0.5295	0.3237	2.2619	2.2621		SAMPLE				
13	2.7722	1.9572	6	4.2548	**1.1924**	104.44%	0.3000	0.3134	2.4409	2.4410		SAMPLE				
14	2.4221	1.7100	6	3.7175	**-0.3807**	268.24%	-0.1096	0.2941	2.0016	2.0016		SAMPLE				
15	2.9897	2.1108	6	4.5886	**0.2591**	500.04%	0.0604	0.3022	2.5391	2.5391		SAMPLE				
16	2.5764	1.8190	6	3.9542	**0.2202**	506.93%	0.0596	0.3023	2.1878	2.1878		SAMPLE				
17	2.2585	1.5945	6	3.4664	**-0.8403**	110.48%	-0.2595	0.2867	1.8196	1.8196		MB				
18	2.6439	1.8666	6	4.0591	**0.7305**	160.06%	0.1920	0.3073	2.2916	2.2916	405240001.1	DUP	* 0.0%			
19	3.0584	2.1593	6	4.9965	**33.5175**	9.13%	9.8690	0.8978	5.9762	6.0001	405240001.1	MS			41.6480	80.5%
20	2.7848	1.9661	6	4.5795	**34.4368**	8.68%	10.6192	0.9178	5.8337	5.8595		LCS			38.7644	88.8%

REGISTRY

TUE 20 SEP 2016 21:42

*** DIRECTORY PATH :M:\LSC\O\DA\597481A0 ***

PARAMETER GROUP: 8
ID: H-3 (1)

00A PROGRAM MODE 6 ->

ORDER	POS	ID	CTIME	COUNTS	CUCNTS	MCW	REP	STD	STMS	STIME
1	21	BKG	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
2	22	405240001	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
3	23	405240002	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
4	24	405240003	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
5	25	405240004	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
6	26	405240005	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00

NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA	INPUT	TRIGG.	INHIBIT	MEMORY SPLIT
1	LRSUM	DCOS	G	L*R
2	GSUM	G		L*R

WINDOW	CHANNELS	MCA	HALF
1	50- 175	1	2
2	5- 320	1	2
3	1- 1024	1	2
4	50- 320	1	1
5	50- 270	1	1
6	60- 220	1	1
7	1- 1024	2	1
8	1- 1024	2	2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

SELECTED PRINTOUT FOR TERMINAL 2 (B)

1.	2.	3.	4.	5.	6.	7.
POS	ID	CTIME	SQP	CPM1	CPM2	CPM3

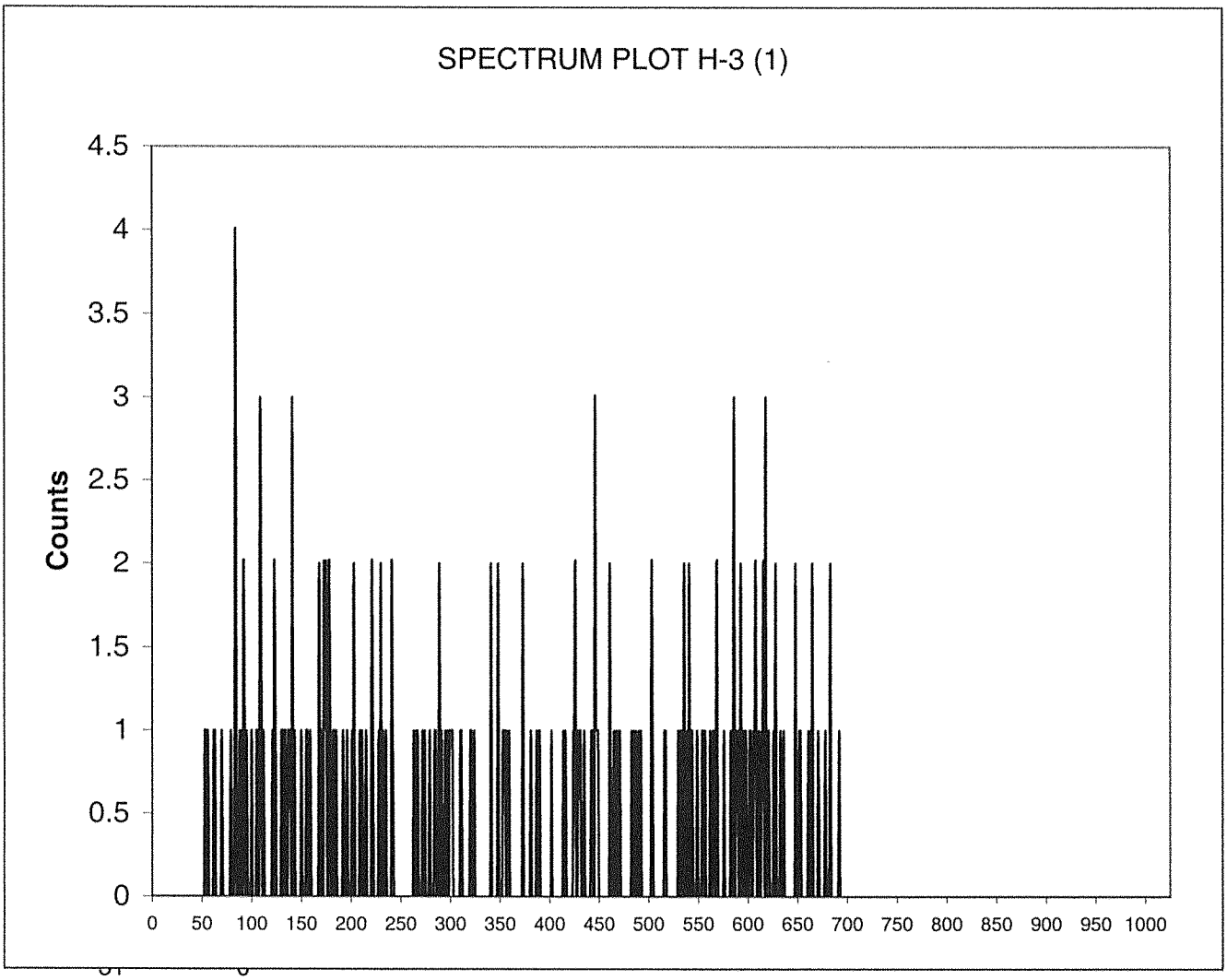
SEND SPECTRA 12
RESOLUTION OF SPECTRA 1024
LISTING Y
INSTRUMENT NUMBER 1

POS	ID	CTIME	SQP	CPM1	CPM2	CPM3
Q012101N.001 20 SEP 2016 22:19						
21	BKG	35:01.780	669.63	1.57	2.89	6.36
Q022201N.001 20 SEP 2016 22:57						
22	405240001	35:00.780	669.76	1.75	3.18	6.78
Q032301N.001 20 SEP 2016 23:34						
23	405240002	35:01.780	668.85	1.69	2.83	5.98
Q042401N.001 21 SEP 2016 0:12						
24	405240003	35:01.780	639.09	2.01	3.56	6.28
Q052501N.001 21 SEP 2016 0:50						

			REGISTRY			
25	405240004	35:01.780	670.47	1.46	3.09	6.66
Q062601N.001 21 SEP 2016 1:27						
26	405240005	35:01.780	670.66	1.51	3.00	6.57

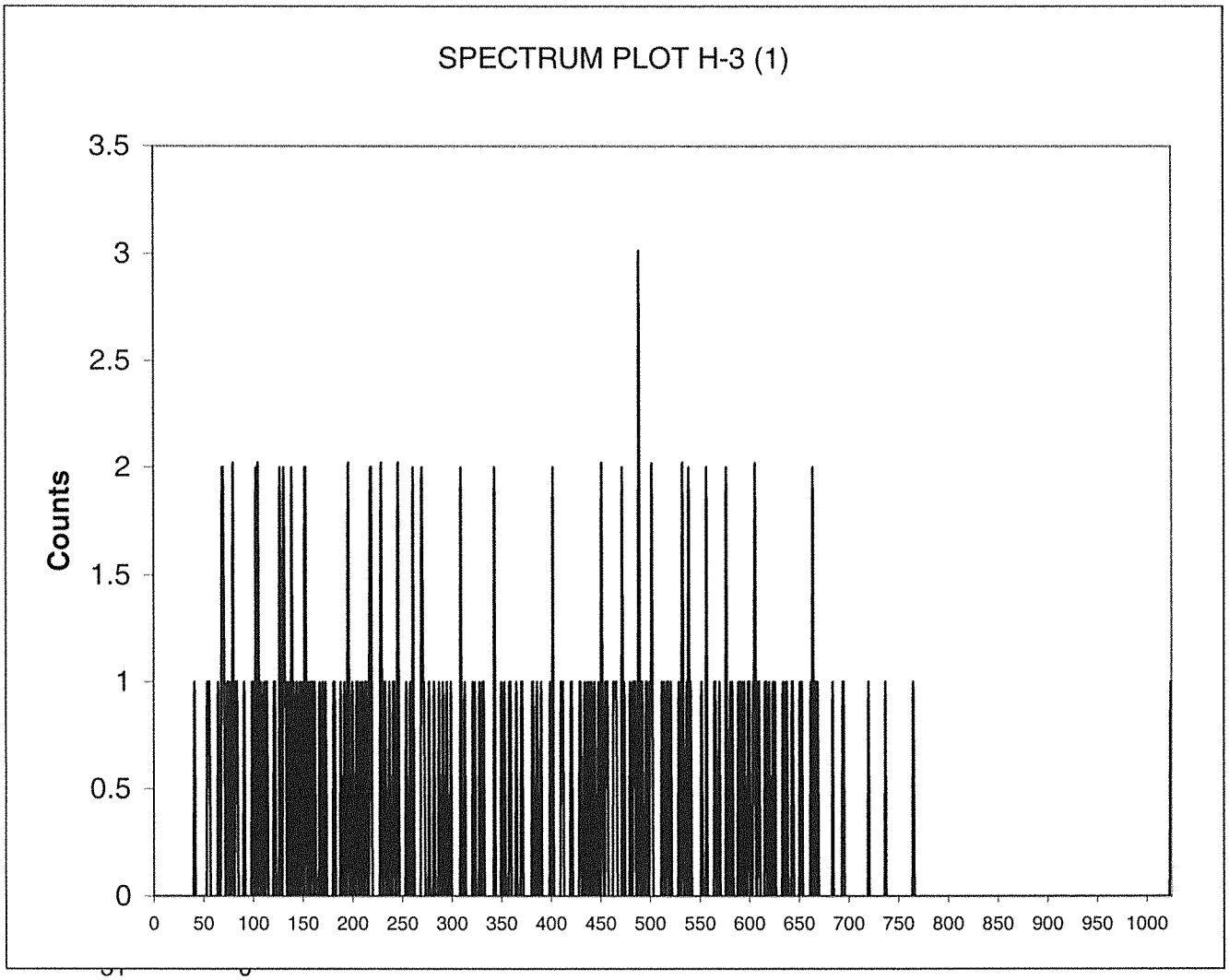
Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ012101N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	1, BKG, 35.02967:
Quench:	669.63
Start, End, X-Axis	50-175

Channel Counts



32	0
33	0
34	0
35	0

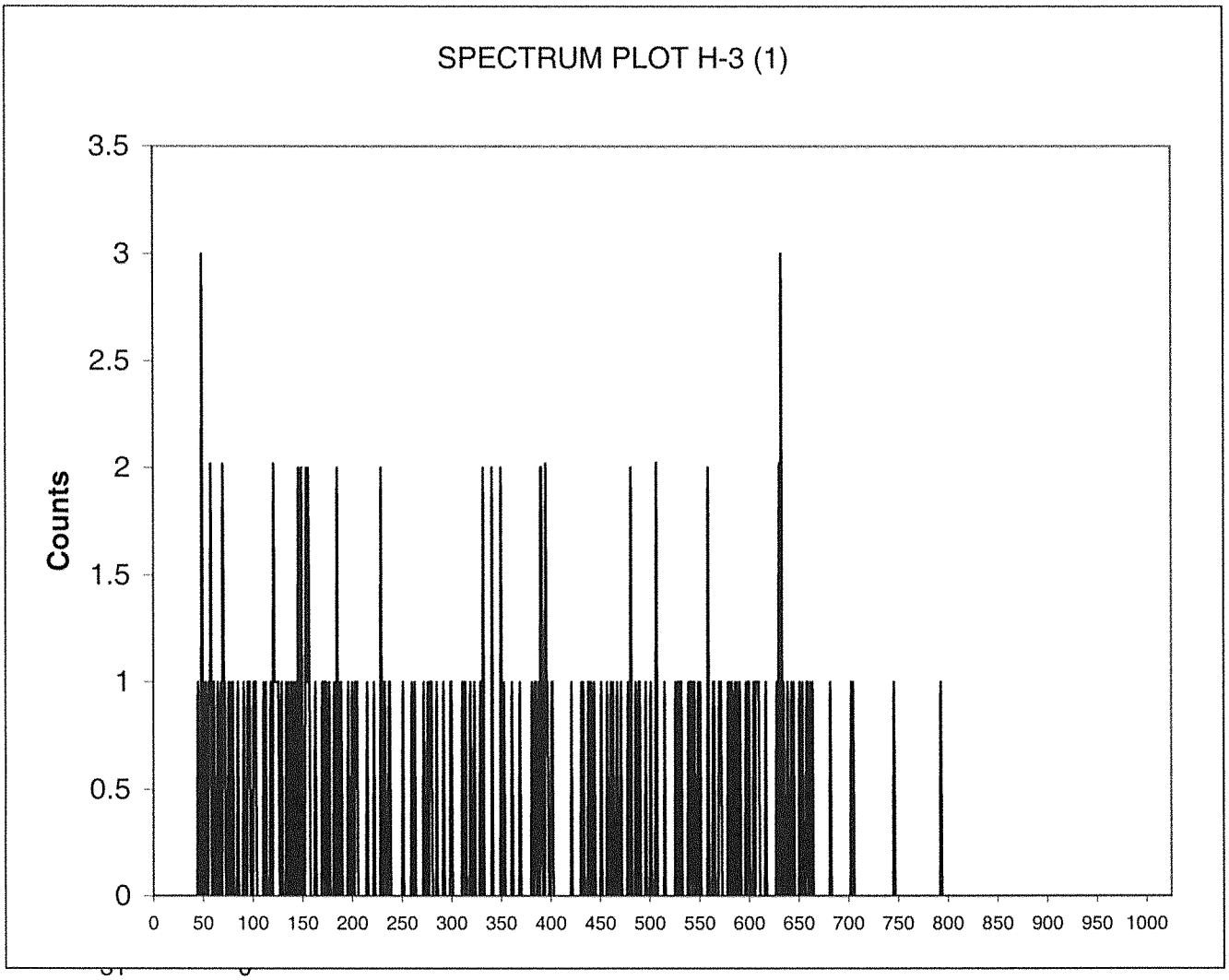
Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ022201N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	2, 405240001, 35.013:
Quench:	669.76
Start, End, X-Axis	50-175



Channel	Counts
32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ032301N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	3, 405240002, 35.02967:
Quench:	668.85
Start, End, X-Axis	50-175

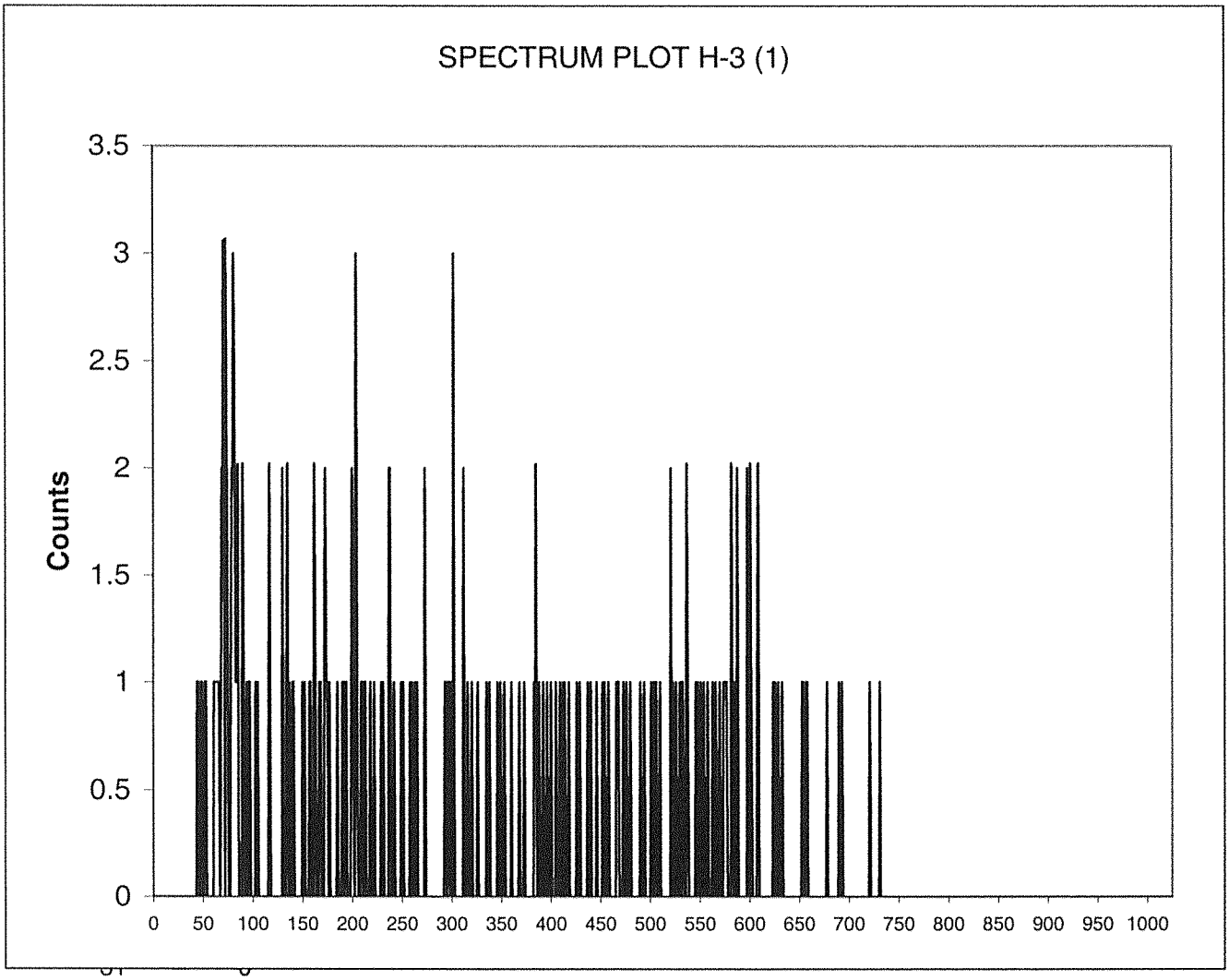
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ042401N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	4, 405240003, 35.02967:
Quench:	639.09
Start, End, X-Axis	50-175

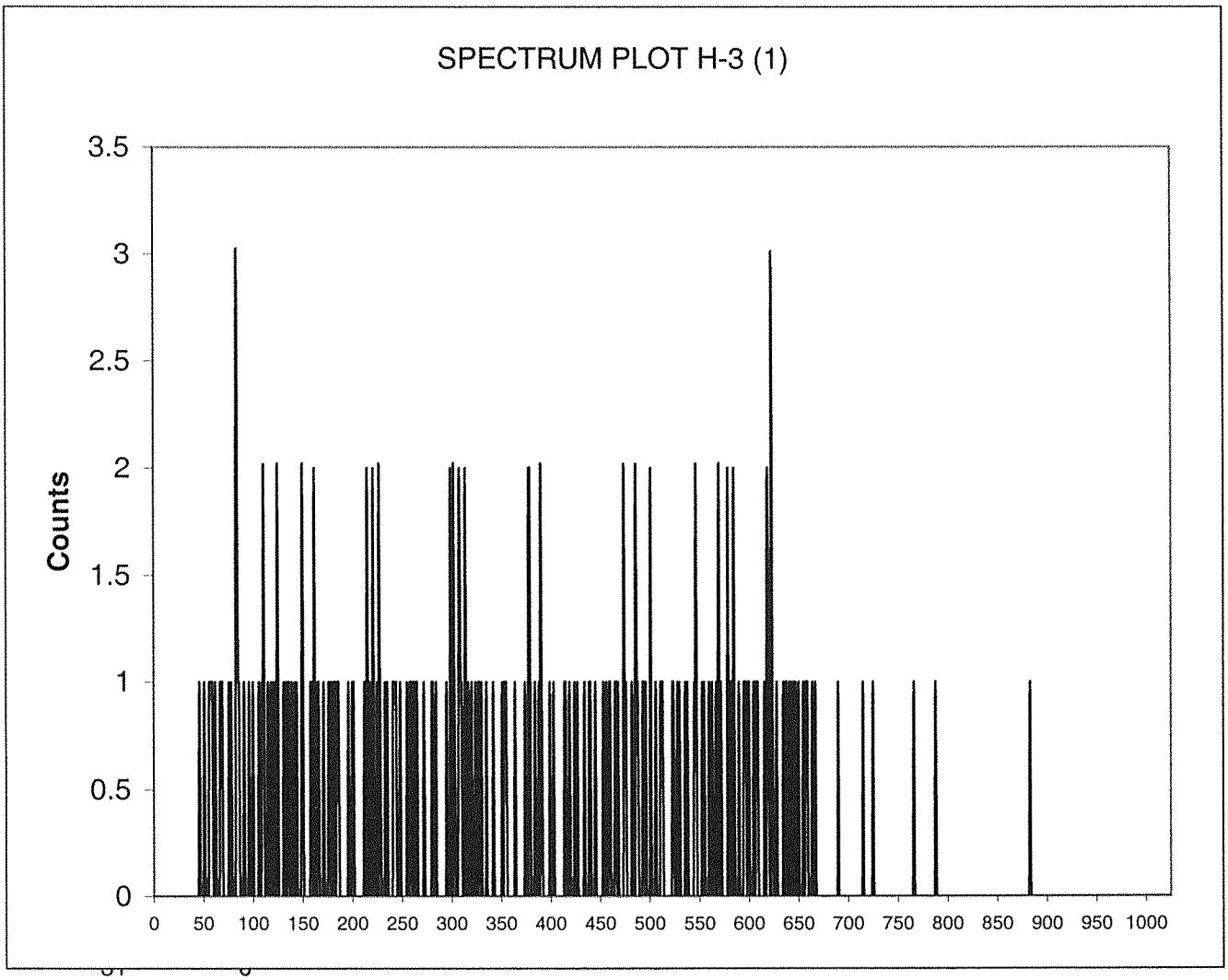
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ052501N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	5, 405240004, 35.02967:
Quench:	670.47
Start, End, X-Axis	50-175

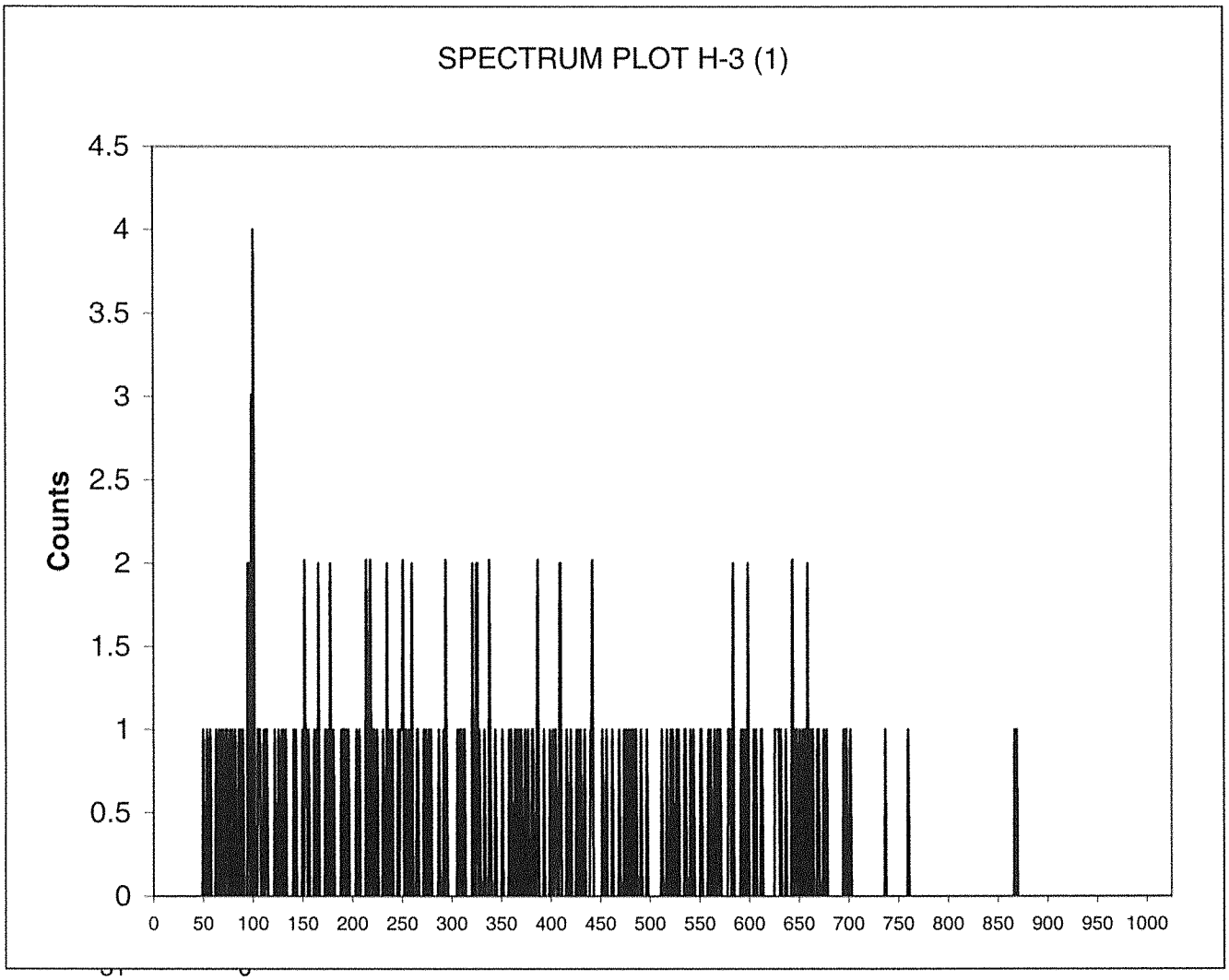
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	TUE 20 SEP 2016 21:42
FileName:	M:\LSC\FILES\orange\597481A0\SQ062601N.001.xls
File Info:	M:\LSC\FILES\orange\597481A0\U597481A0.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	6, 405240005, 35.02967:
Quench:	670.66
Start, End, X-Axis	50-175

Channel Counts



32	0
33	0
34	0
35	0

REGISTRY

WED 21 SEP 2016 2:42

*** DIRECTORY PATH :M:\LSC\O\DA\597481A1 ***

PARAMETER GROUP: 8
ID: H-3 (2)

00A PROGRAM MODE 6 ->

ORDER	POS	ID	CTIME	COUNTS	CUCNTS	MCW	REP	STD	STMS	STIME
1	27	405240006	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
2	28	405240007	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
3	29	405240008	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
4	30	405240009	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
5	31	405240010	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
6	32	405240011	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
7	33	405240012	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
8	34	405240013	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
9	35	405240014	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
10	36	405240015	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
11	37	405240016	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
12	38	1203624533	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
13	39	1203624534	35:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
14	40	1203624535	15:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
~~15~~	~~41~~	~~1203624536~~	~~15:00~~	~~1.0E04~~	~~NO LIM~~	~~1~~	~~1~~	~~Y~~	~~1/10~~	~~1:00~~

9/22/16

NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA	INPUT	TRIGG.	INHIBIT	MEMORY SPLIT
1	LRSUM	DCOS	G	L*R
2	GSUM	G		L*R

WINDOW	CHANNELS	MCA	HALF
1	50- 175	1	2
2	5- 320	1	2
3	1- 1024	1	2
4	50- 320	1	1
5	50- 270	1	1
6	60- 220	1	1
7	1- 1024	2	1
8	1- 1024	2	2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

SELECTED PRINTOUT FOR TERMINAL 2 (B)

1.	2.	3.	4.	5.	6.	7.
POS	ID	CTIME	SQP	CPM1	CPM2	CPM3

SEND SPECTRA 12
RESOLUTION OF SPECTRA 1024
LISTING Y
INSTRUMENT NUMBER 1

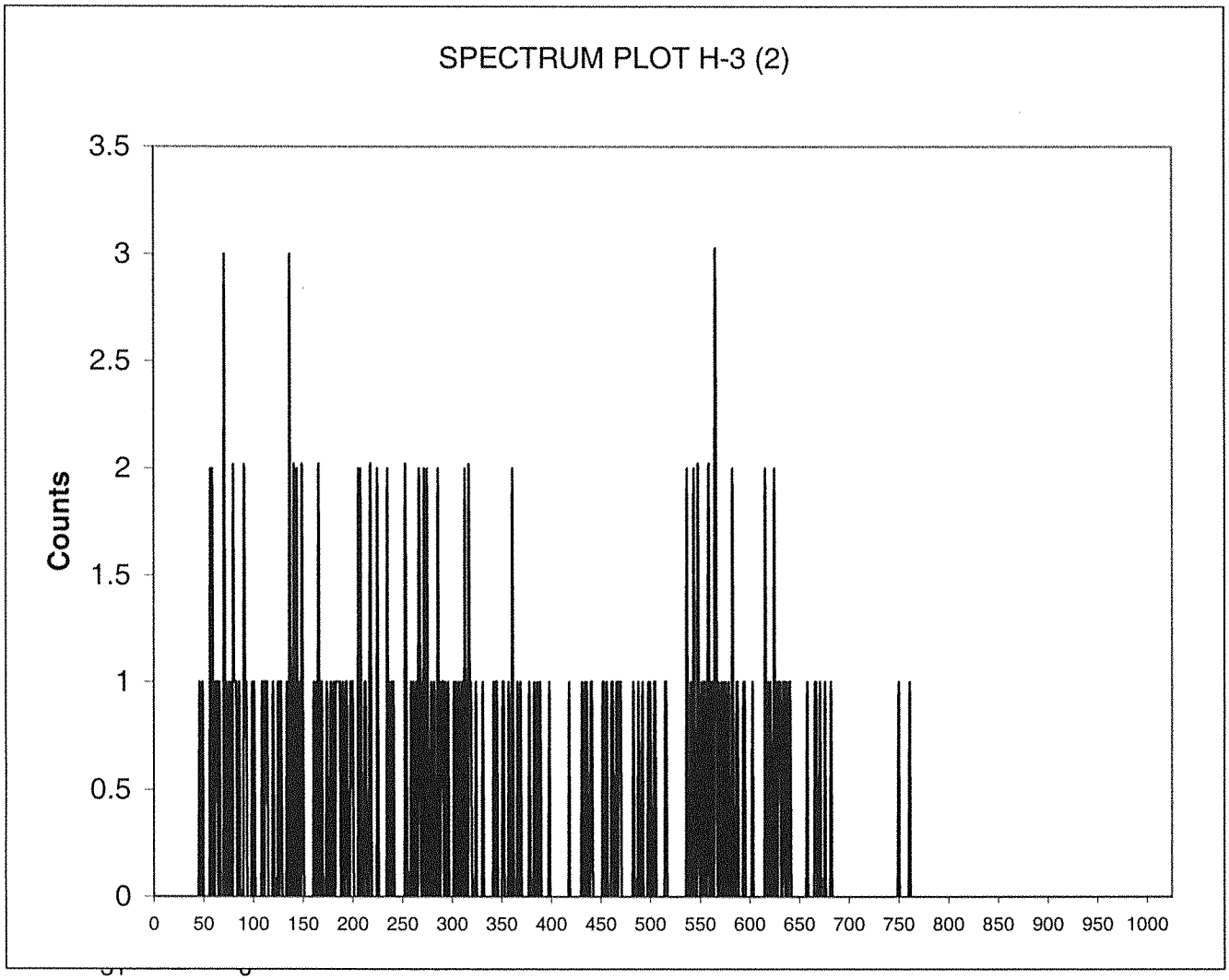
POS	ID	CTIME	SQP	CPM1	CPM2	CPM3

Q012701N.001 21 SEP 2016 3:20						
27	405240006	35:01.780	666.91	1.63	3.59	6.45
Q022801N.001 21 SEP 2016 3:57						
28	405240007	35:00.780	668.06	1.28	2.71	5.58
Q032901N.001 21 SEP 2016 4:35						
29	405240008	35:01.780	666.71	1.49	2.92	5.87
Q043001N.001 21 SEP 2016 5:12						
30	405240009	35:01.780	668.32	1.87	3.24	7.15
Q053101N.001 21 SEP 2016 5:50						
31	405240010	35:01.780	668.85	1.16	2.65	5.84
Q063201N.001 21 SEP 2016 6:27						
32	405240011	35:01.780	669.13	1.78	3.53	7.10
Q073301N.001 21 SEP 2016 7:05						
33	405240012	35:01.780	670.53	2.10	3.33	6.36
Q083401N.001 21 SEP 2016 7:42						
34	405240013	35:01.780	669.56	1.87	3.21	6.63
Q093501N.001 21 SEP 2016 8:20						
35	405240014	35:01.772	669.12	1.46	2.89	6.36
Q103601N.001 21 SEP 2016 8:57						
36	405240015	35:01.779	669.02	1.63	3.27	6.83
Q113701N.001 21 SEP 2016 9:35						
37	405240016	35:01.779	670.23	1.63	3.21	6.07
Q123801N.001 21 SEP 2016 10:13						
38	1203624533	35:01.772	668.96	1.31	2.36	5.93
Q133901N.001 21 SEP 2016 10:50						
39	1203624534	35:01.779	660.76	1.75	2.86	6.39
Q144001N.001 21 SEP 2016 11:08						
40	1203624535	15:01.778	671.68	11.44	12.66	16.34
~~Q154101N.001 21 SEP 2016 11:26~~						
~~41~~	~~1203624536~~	~~15:01.778~~	~~669.82~~	~~10.14~~	~~11.57~~	~~14.77~~

gp q|22|14

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ012701N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	1, 405240006, 35.02967:
Quench:	666.91
Start, End, X-Axis	50-175

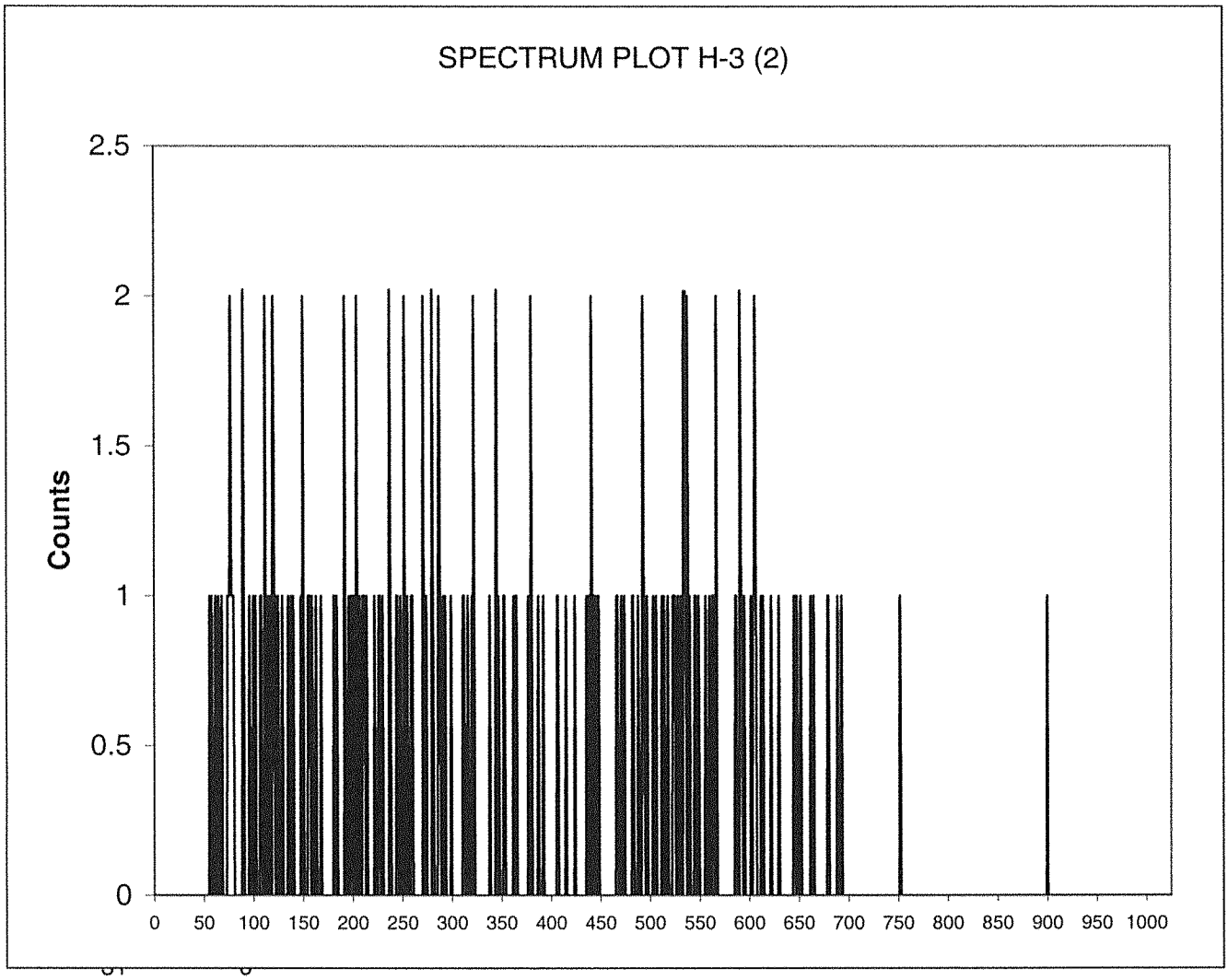
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ022801N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	2, 405240007, 35.013:
Quench:	668.06
Start, End, X-Axis	50-175

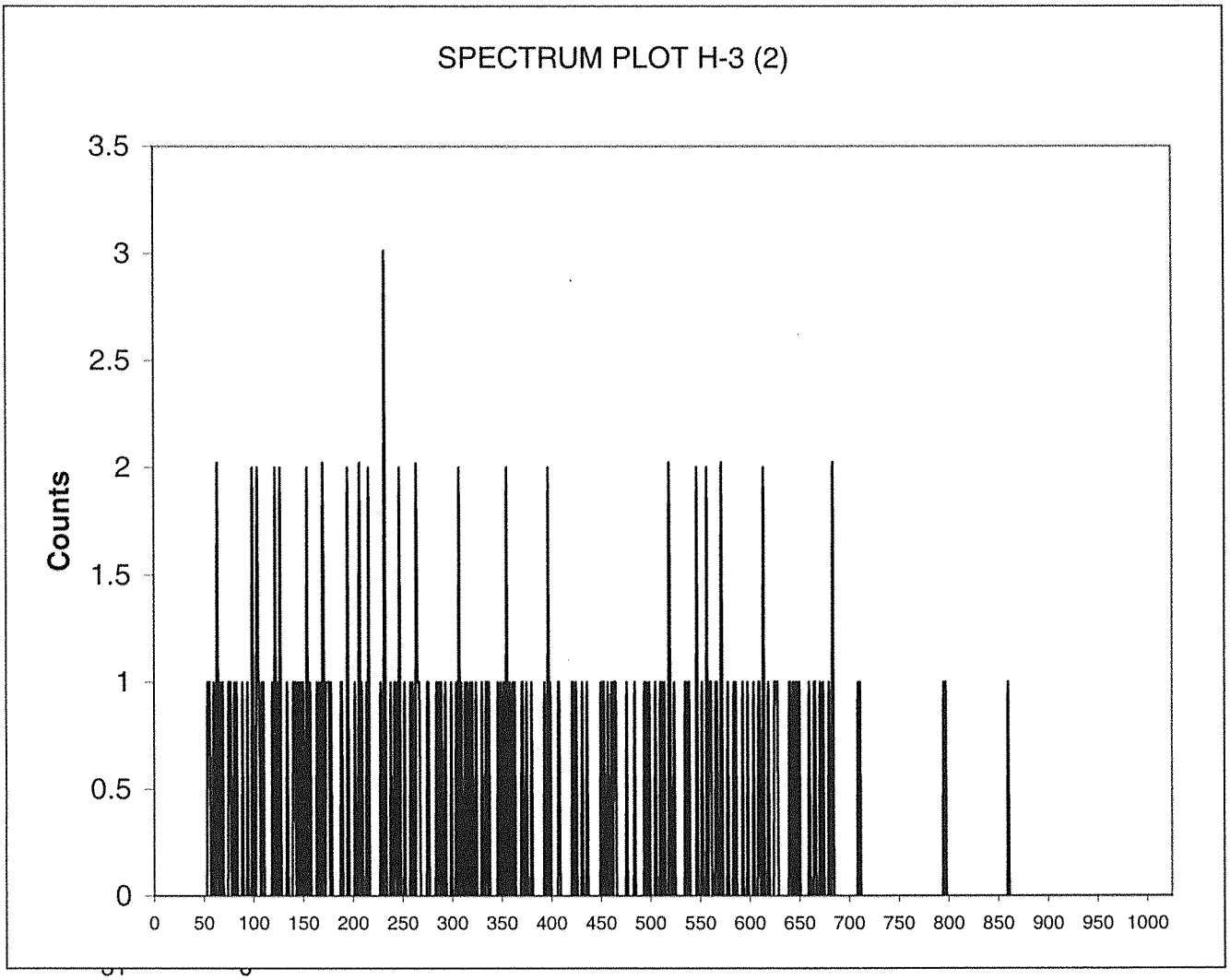
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ032901N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	3, 405240008, 35.02967:
Quench:	666.71
Start, End, X-Axis	50-175

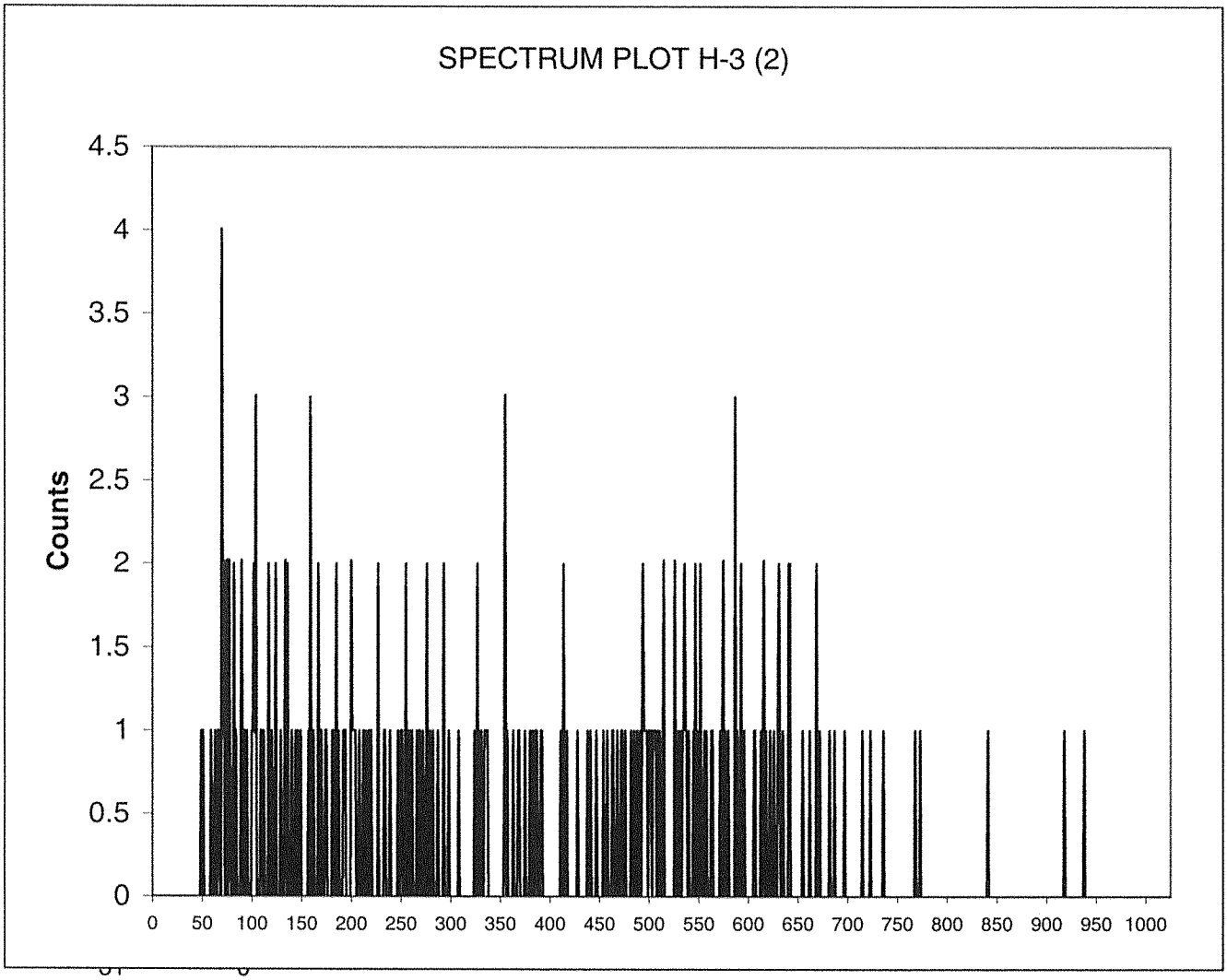
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ043001N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	4, 405240009, 35.02967:
Quench:	668.32
Start, End, X-Axis	50-175

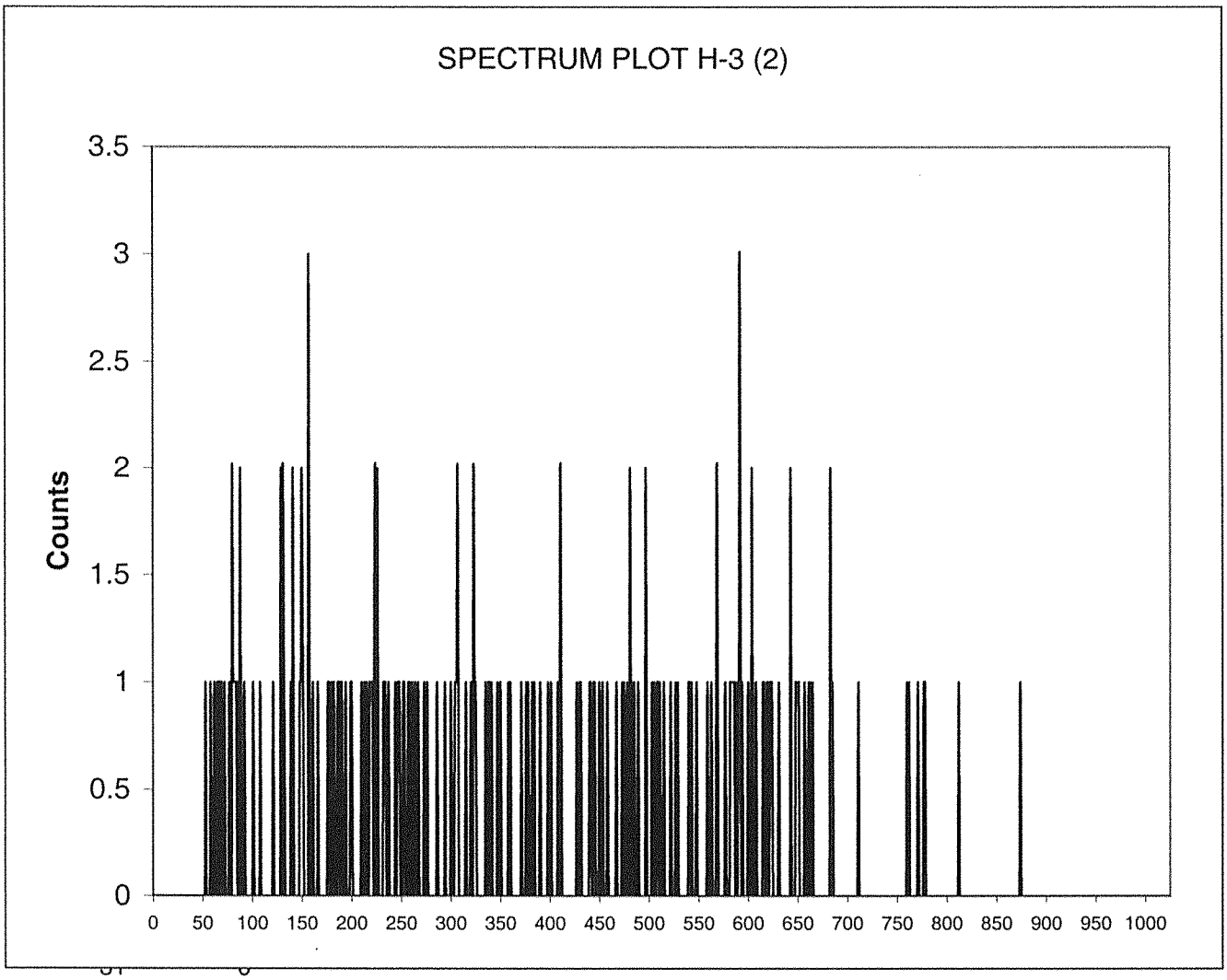
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ053101N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	5, 405240010, 35.02967:
Quench:	668.85
Start, End, X-Axis	50-175

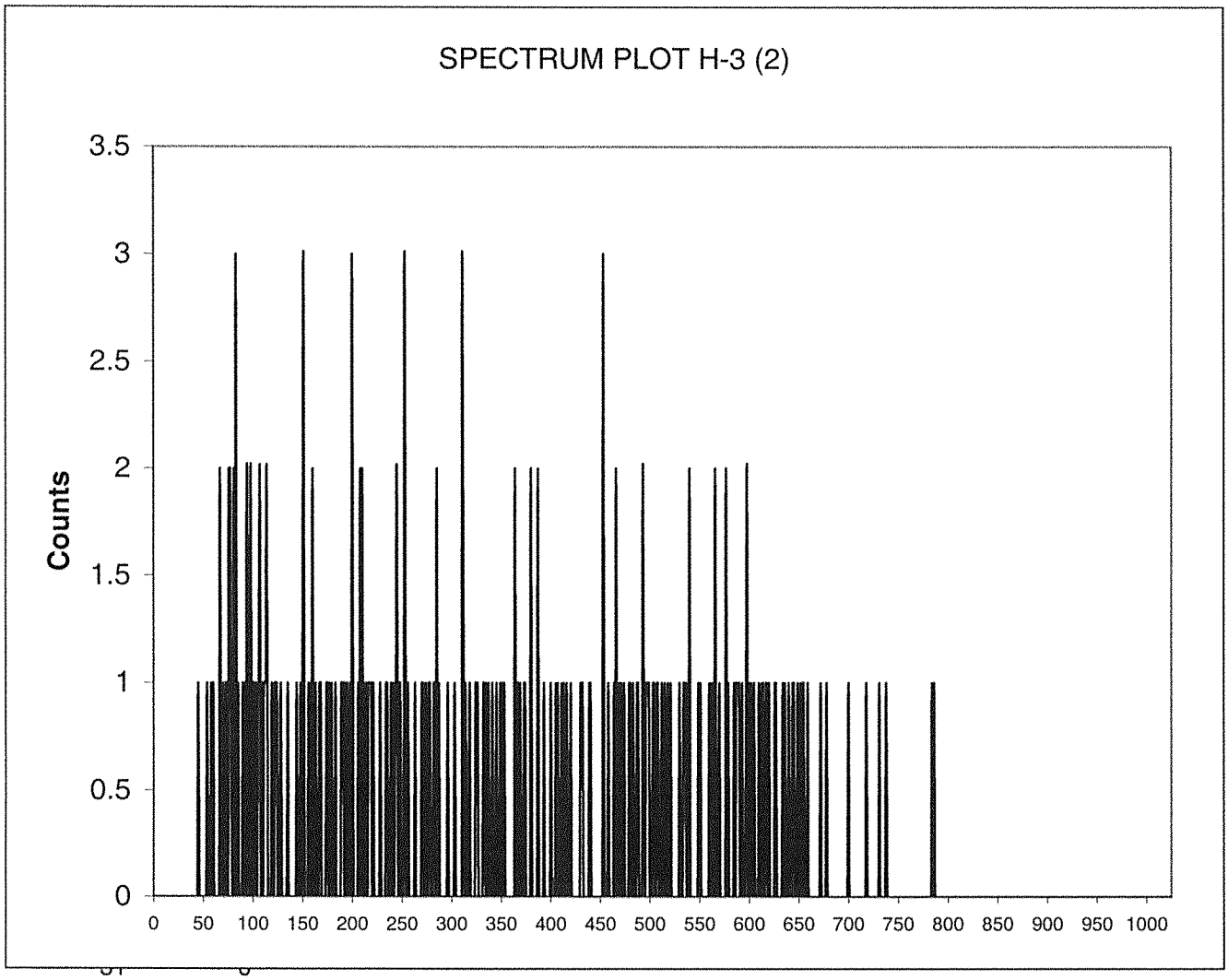
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ063201N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	6, 405240011, 35.02967:
Quench:	669.13
Start, End, X-Axis	50-175

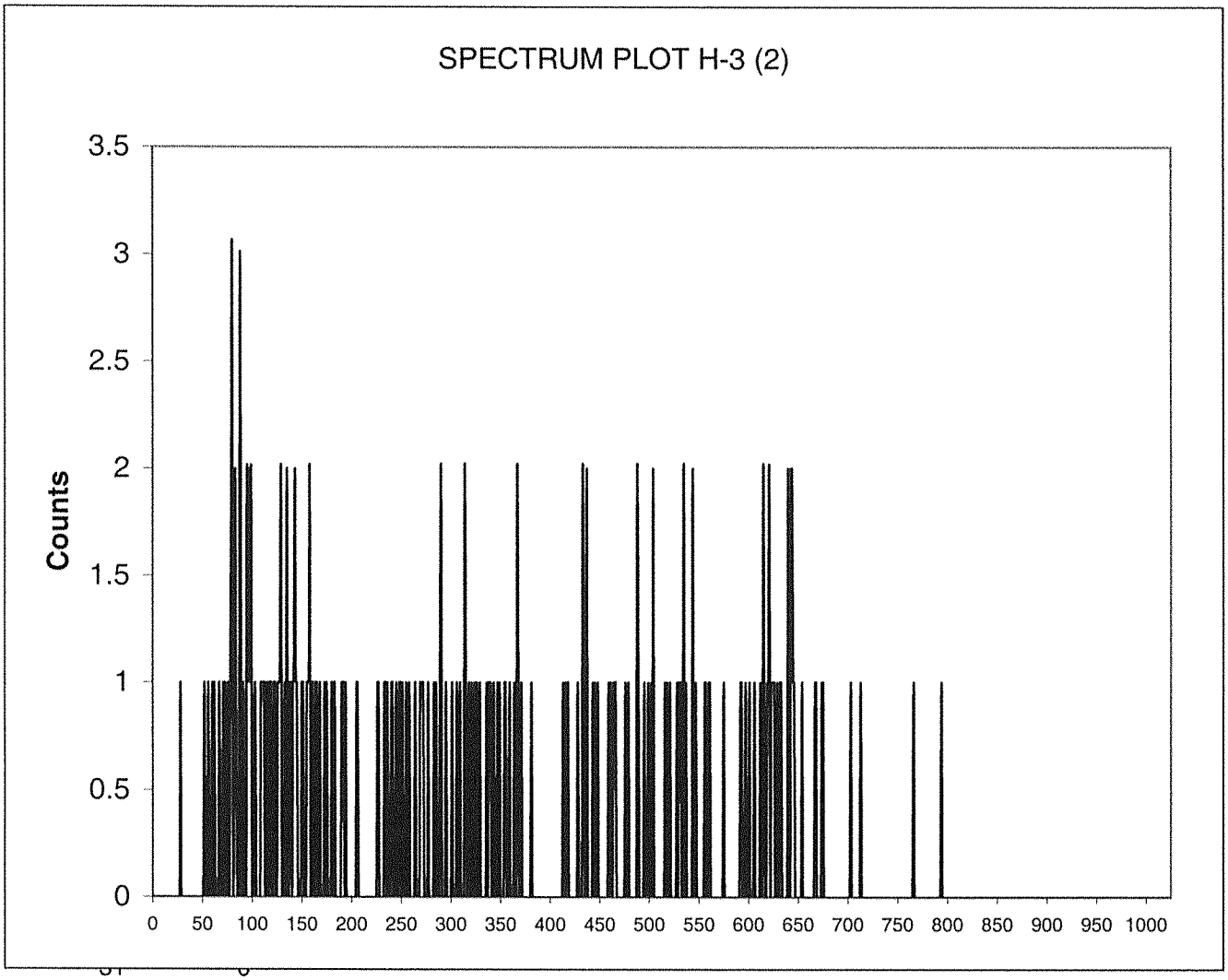
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ073301N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	7, 405240012, 35.02967:
Quench:	670.53
Start, End, X-Axis	50-175

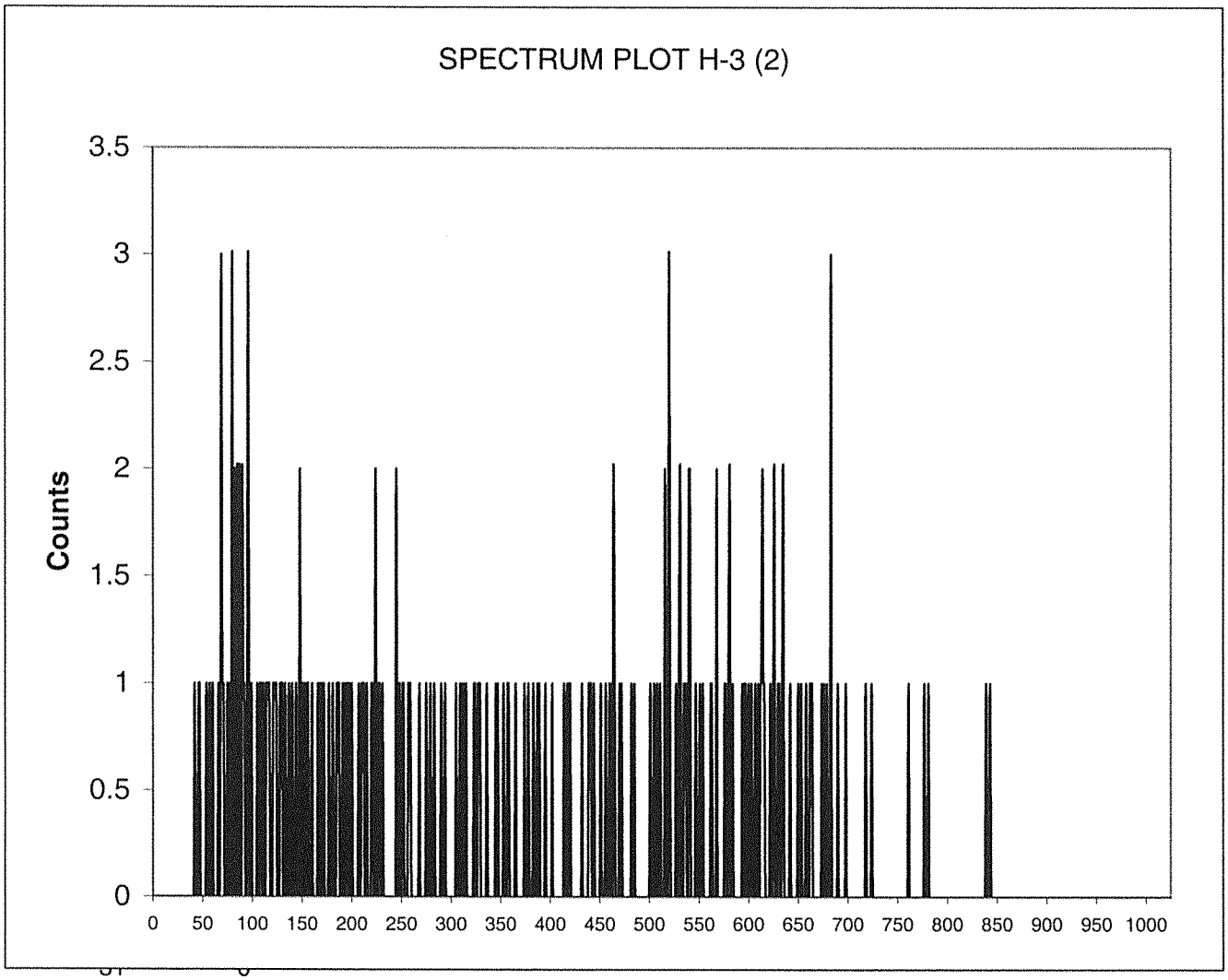
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ083401N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	8, 405240013, 35.02967:
Quench:	669.56
Start, End, X-Axis	50-175

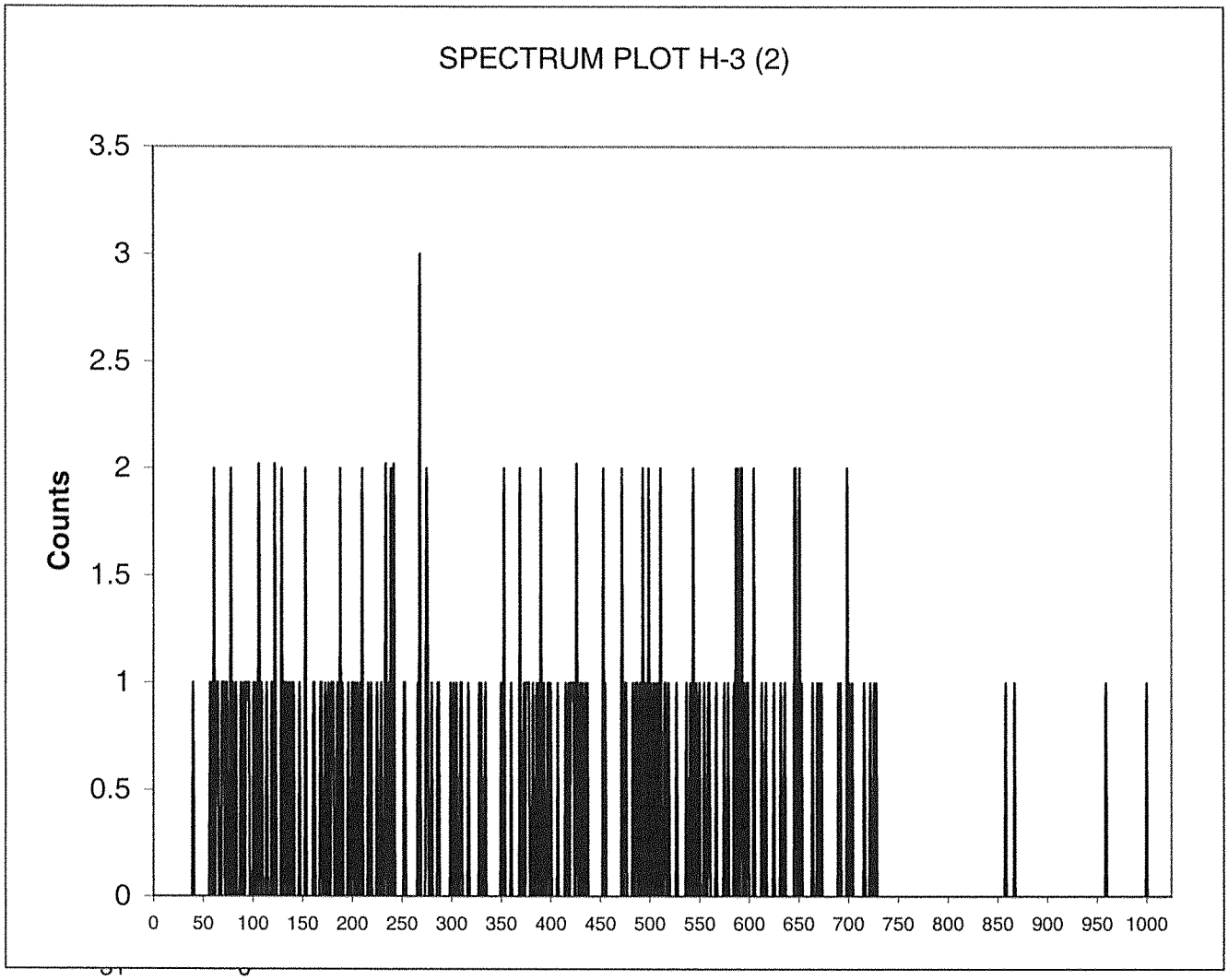
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ093501N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	9, 405240014, 35.02953:
Quench:	669.12
Start, End, X-Axis	50-175

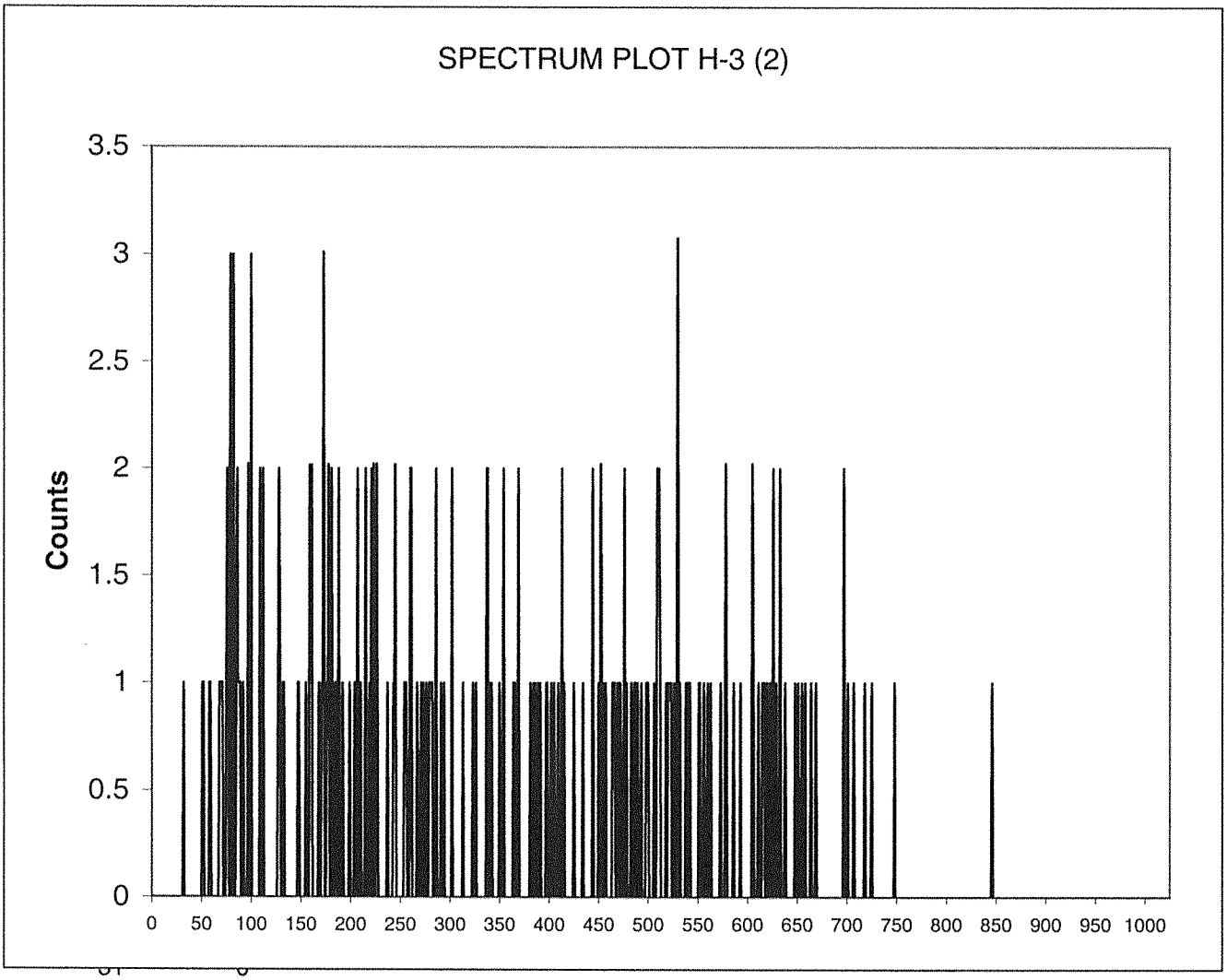
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ103601N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	10, 405240015, 35.02965:
Quench:	669.02
Start, End, X-Axis	50-175

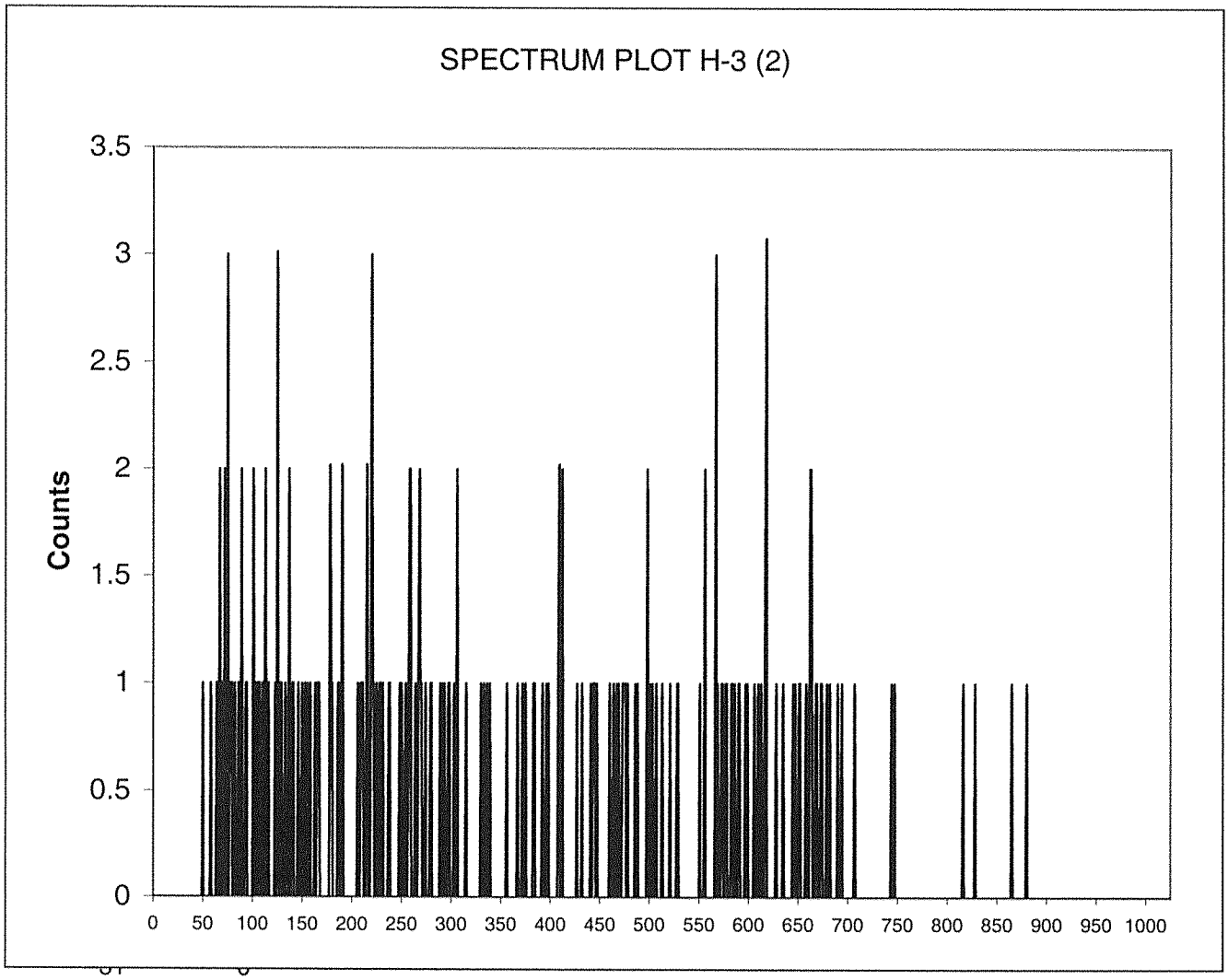
Channel Counts



32	1
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ113701N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	11, 405240016, 35.02965:
Quench:	670.23
Start, End, X-Axis	50-175

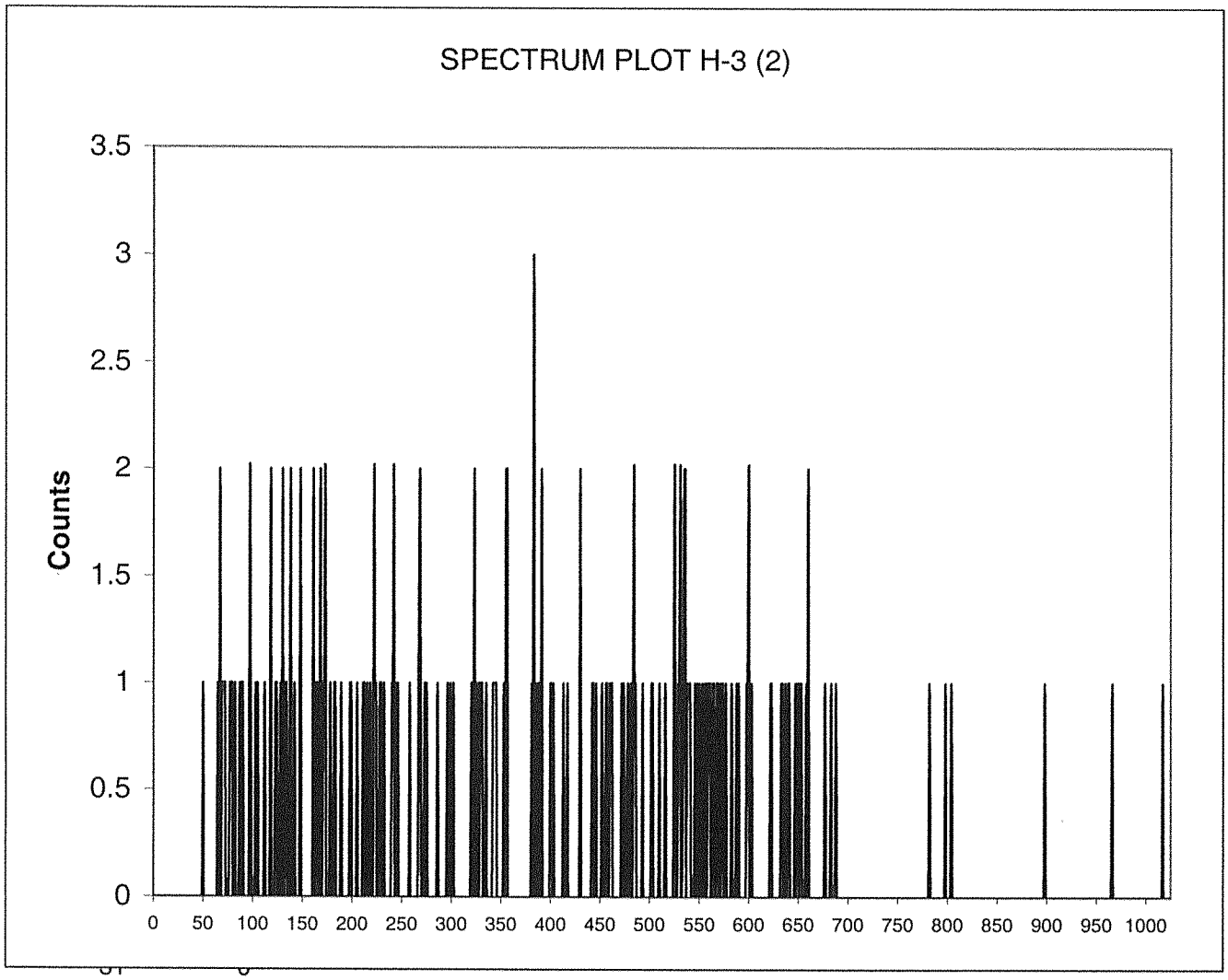
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ123801N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	12, 1203624533, 35.02953:
Quench:	668.96
Start, End, X-Axis	50-175

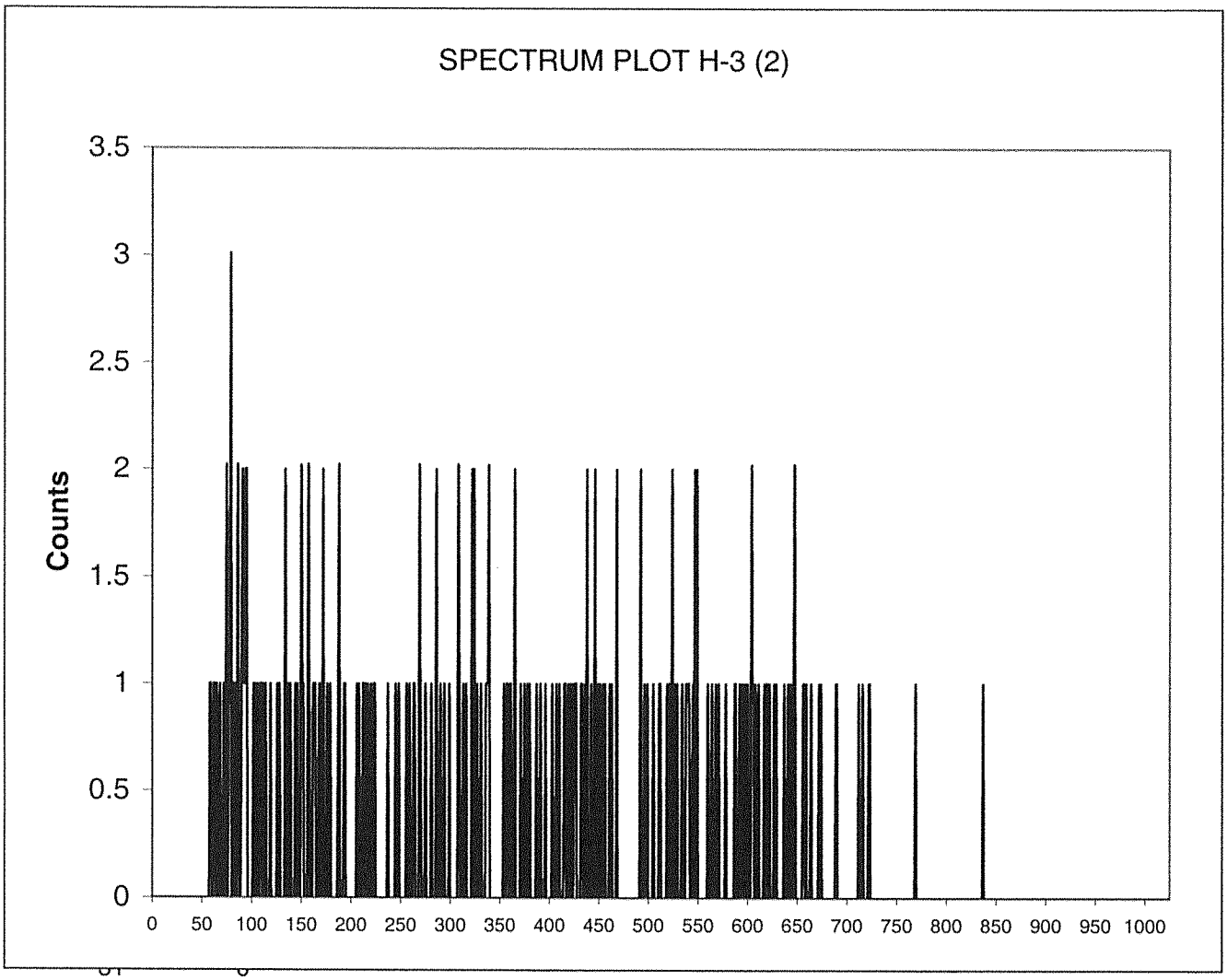
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ133901N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	13, 1203624534, 35.02965:
Quench:	660.76
Start, End, X-Axis	50-175

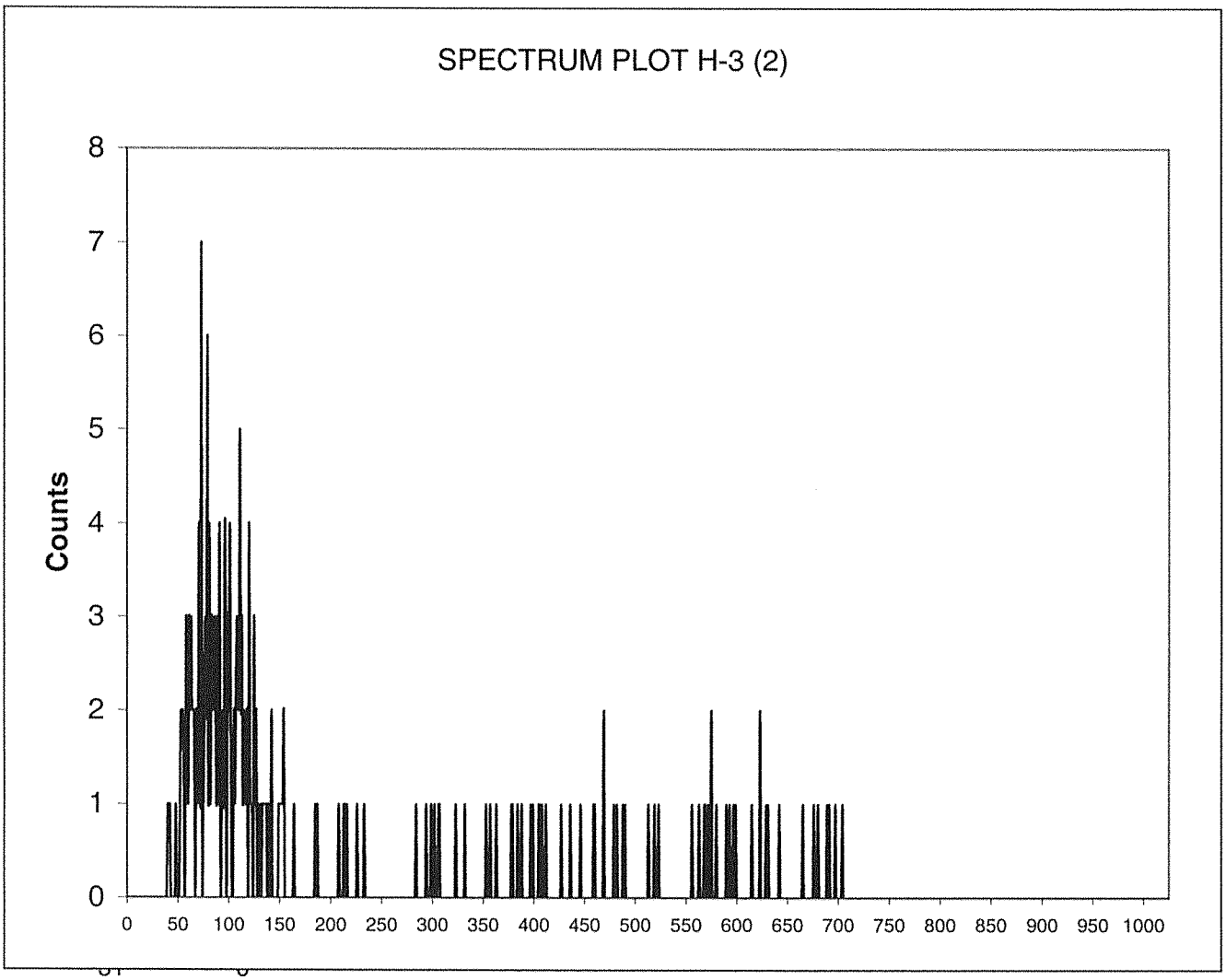
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 2:42
FileName:	M:\LSC\FILES\orange\597481A1\SQ144001N.001.xls
File Info:	M:\LSC\FILES\orange\597481A1\U597481A1.xls
ID:	H-3 (2)
Comments:	ORANGE
Sample, Rack-Pos, Time:	14, 1203624535, 15.02963:
Quench:	671.68
Start, End, X-Axis	50-175

Channel Counts



32	0
33	0
34	0
35	0

REGISTRY

WED 21 SEP 2016 18:07

*** DIRECTORY PATH :M:\LSC\O\DA\597481A2 ***

PARAMETER GROUP: 8
ID: H-3 (1)

00A PROGRAM MODE 6 ->

ORDER	POS	ID	CTIME	COUNTS	CUCNTS	MCW	REP	STD	STMS	STIME
1	21	BKG	15:00	1.0E04	NO LIM	1	1	Y	1/10	1:00
2	22	1203624536	15:00	1.0E04	NO LIM	1	1	Y	1/10	1:00

NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA	INPUT	TRIGG.	INHIBIT	MEMORY SPLIT
1	LRSUM	DCOS	G	L*R
2	GSUM	G		L*R

WINDOW	CHANNELS	MCA	HALF
1	50- 175	1	2
2	5- 320	1	2
3	1- 1024	1	2
4	50- 320	1	1
5	50- 270	1	1
6	60- 220	1	1
7	1- 1024	2	1
8	1- 1024	2	2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

SELECTED PRINTOUT FOR TERMINAL 2 (B)

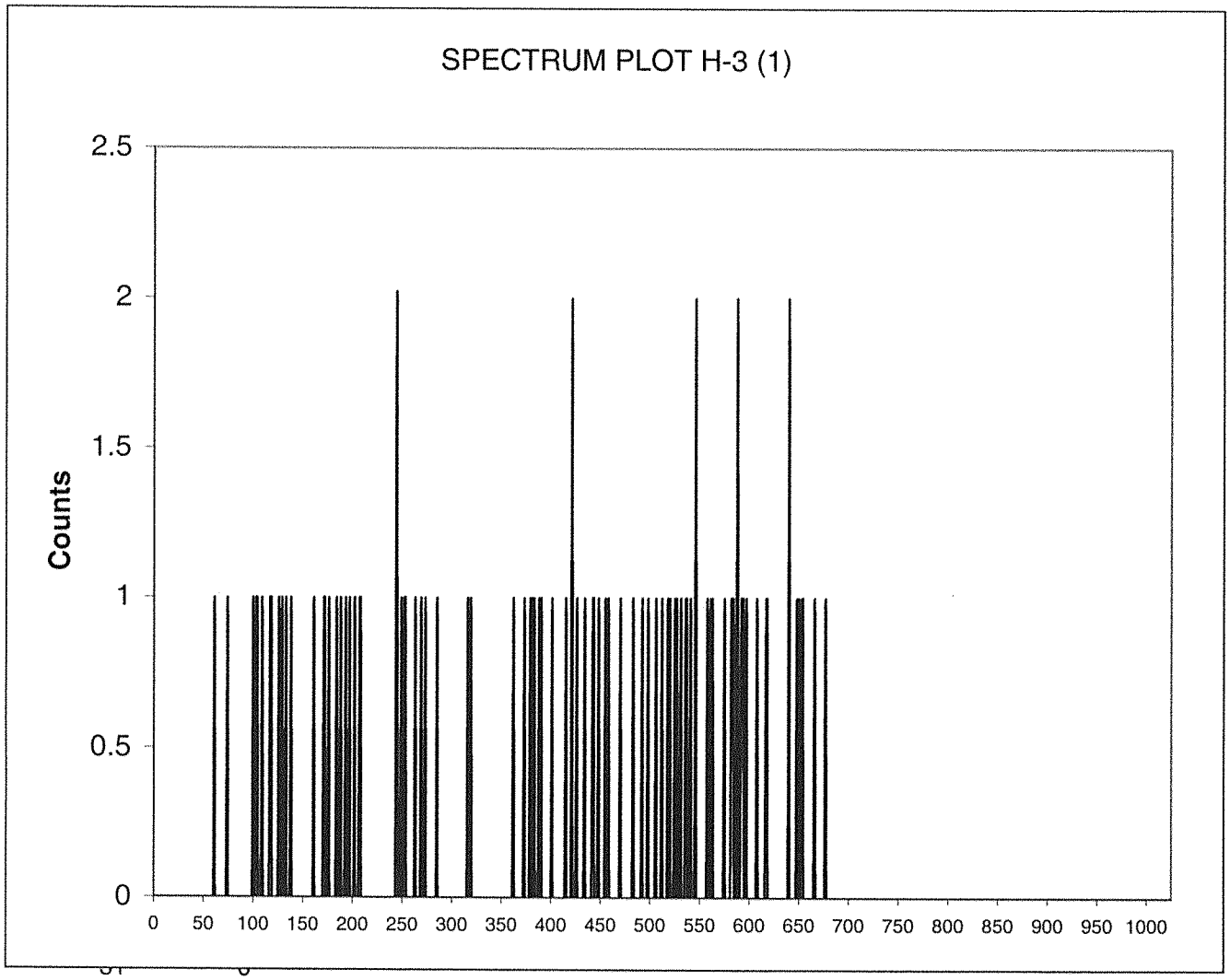
1.	2.	3.	4.	5.	6.	7.
POS	ID	CTIME	SQP	CPM1	CPM2	CPM3

SEND SPECTRA 12
RESOLUTION OF SPECTRA 1024
LISTING Y
INSTRUMENT NUMBER 1

POS	ID	CTIME	SQP	CPM1	CPM2	CPM3
Q012101N.001 21 SEP 2016 18:24						
21	BKG	15:01.780	667.88	1.02	2.38	6.33
Q022201N.001 21 SEP 2016 18:42						
22	1203624536	15:01.774	668.80	11.64	13.41	17.09

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 18:07
FileName:	M:\LSC\FILES\orange\597481A2\SQ012101N.001.xls
File Info:	M:\LSC\FILES\orange\597481A2\U597481A2.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	1, BKG, 15.02967:
Quench:	667.88
Start, End, X-Axis	50-175

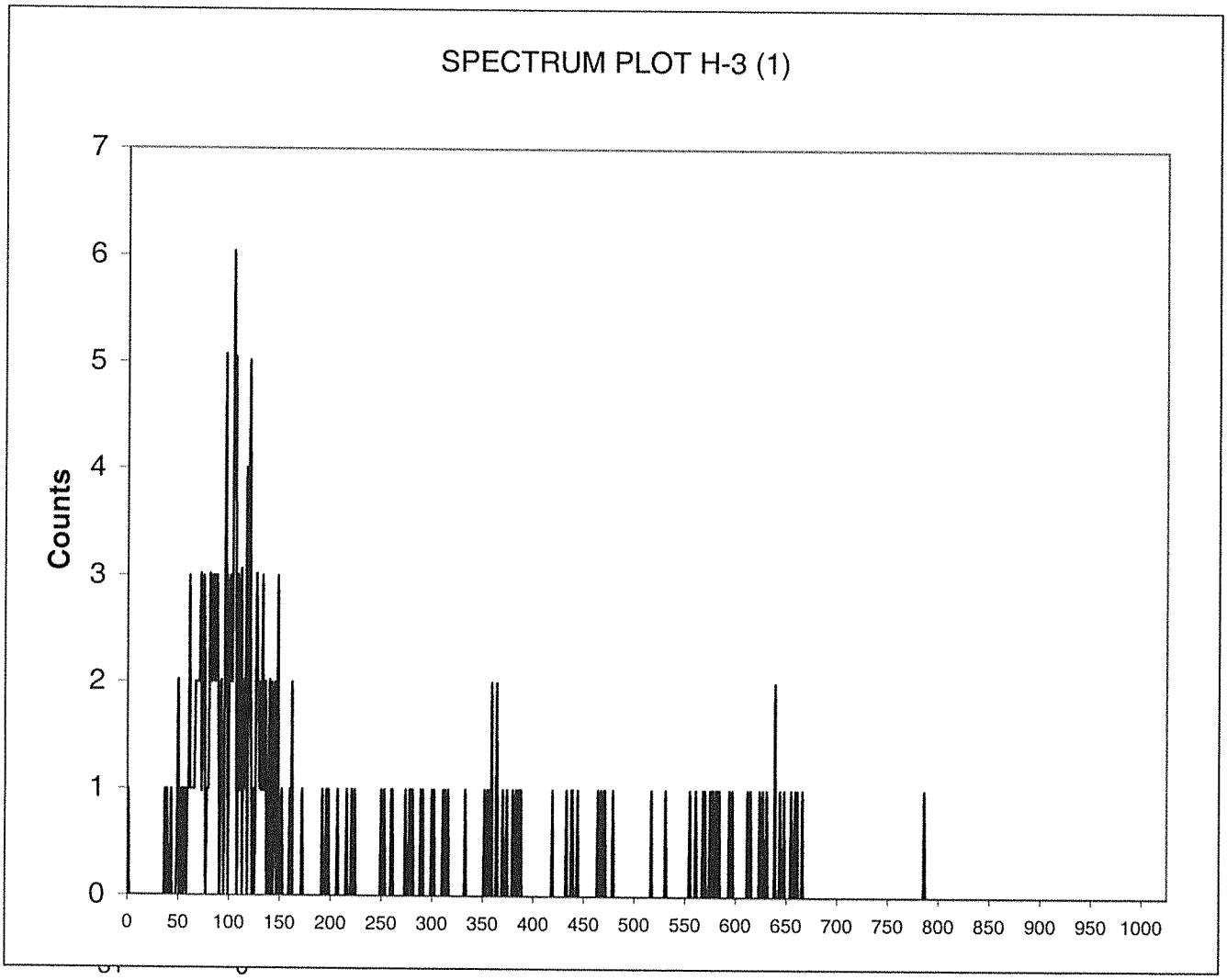
Channel Counts



32	0
33	0
34	0
35	0

Instrument Type:	Quantulus
Data Capture Date:	WED 21 SEP 2016 18:07
FileName:	M:\LSC\FILES\orange\597481A2\SQ022201N.001.xls
File Info:	M:\LSC\FILES\orange\597481A2\U597481A2.xls
ID:	H-3 (1)
Comments:	ORANGE
Sample, Rack-Pos, Time:	2, 1203624536, 15.02957:
Quench:	668.8
Start, End, X-Axis	50-175

Channel Counts



32	0
33	0
34	0
35	0

Radiochemistry Batch Checklist

19-Sep-2016

Batch# 1596448 Product: Pu-241 Date: 9/20/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			ND
Samples have been blank corrected (if required). Blank correction reported included (if required).			ND
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 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.		✓	DER# 1559399
Sample was correctly preserved if required.			ND
Smears Taken for Radioactive batches.			ND
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.	✓		
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			ND
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DER# 1559399
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER# 1559399
Aliquot Correction completed if required.			ND
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

Primary Review Performed By: [signature] 9/20/16

Secondary Review Performed By: [signature] 10/02/16

(10/4)
MJWC

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
20-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LSC	DOE EML HASL-300, Pu-11-RC Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1596448	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Other

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, and 1203621852 were logged in and analyzed out of holding. 2. Samples 405240001, 405240005, 405240015, and 1203621853 do not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer.	1. Reporting results. 2. The samples do meet the tracer yield requirement, the detection limits, and their tracer peaks are within the Pu-242 region of interest. Reporting results

Originator's Name:

Melanie Aycock 20-SEP-16

Data Validator/Group Leader:

Jessica Davis 02-OCT-16

Pu-241 Queue Sheet

90

07-SEP-16

Batch #: 1596448 Analyst:MXS2 First Client Due Date: 04-OCT-16 Internal Due Date30-SEP-16

Tracer Isotope: Pu-242/Pu-236 Tracer Code: 1770-A Expiration Date: 8-3-17 Vol: 0.1

LCS Isotope: Pu-241 LCS Code: 1610-B Expiration Date: 10-28-16 Vol: 0.1

Spike Isotope: Pu-241 Spike Code: Expiration Date: Vol: —

Prep Date: 9-13-16 Initials: MSD Pipet ID: 1840022 Balance ID: 1610766Z

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

Cocktail Used: Ultima gold LLT or Ecoscint Ultra

Witness: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g) l / f	LSC Rack#	Alpha Spec Det #
405240001-1	HO.1.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	1	1	0.506	9-2	70
405240002-1	HO.1.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	2	2	0.503	9-3	71
405240003-1	HO.1.5	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	3	3	0.508	9-4	231
405240004-1	HO.1.6	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	4	4	0.519	9-5	73
405240005-1	HO.2.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	5	5	0.514	9-6	74
405240006-1	HO.2.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	6	6	0.500	9-7	75
405240007-1	HO.3.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	7	7	0.503	9-8	78
405240008-1	HO.3.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	8	8	0.516	33-1	80
405240009-1	HO.4.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	9	9	0.507	33-2	81
405240010-1	HO.4.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	10	10	0.508	33-3	82
405240011-1	HO.5.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	11	11	0.510	33-4	83
405240012-1	HO.5.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	12	12	0.501	33-5	84
405240013-1	REACH7.1.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	13	13	0.511	33-6	85
405240014-1	REACH7.1.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	14	14	0.505	33-7	86
405240015-1	REACH21.1.1	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	15	15	0.508	33-8	88
405240016-1	REACH21.1.2	SAMPLE		15 pCi/g	SOIL	MJWC001	15-DEC-15	16	16	0.509	33-9	89
1203621851-1	MB for batch 1596448	MB		15 pCi/g	SOIL	QC ACCOUNT		17	17	0.519	33-10	90
1203621852-1	HO.1.1(405240001DUP)	DUP		15 pCi/g	SOIL	QC ACCOUNT	15-DEC-15	18	18	0.502	1-2	91
1203621853-1	LCS for batch 1596448	LCS		15 pCi/g	SOIL	QC ACCOUNT		19	20	0.519	33-12	93

AN 9-13-16

Bkg Rack #: 9-1 | 1-1

Instrument Used: LS6000 (Red) 7065155, LS6500 (Blue) 7067083, LS6500 (Green) 7067404, Wallac (Yellow) 4140127, LS6000 (Brown) 7060655, LS6500 (Gold) 7070506, Purple 7069123, Silver 7060656, Wallac (White) 4140299, Wallac (Teal) 4140421, Wallac (Gray) 4150033, 7069693 (Mocha)

Data Reviewed By: 9/20/16

GEL Laboratories LLC, Radiochemistry Division

PU1596448R

Plutonium-241 Solid

Filename : PU241.XLS
File type : Excel
Version # : 1.3.4

Batch : 1596448
Analyst : MXS2
Prep Date : 9/13/2016
Method Uncertainty : 0.0839

Tracer S/N : 1770-A
Tracer Exp Date : 8/3/2017
Tracer Volume Added: 0.10
Tracer Error: 0.44%

Procedure Code : LSC41PUS
Parmname : Plutonium-241
Required MDA : 15 pCi/G
Halflife of Pu-241 : 14.290 years
Pu-241 Abundance : 1.00
Tracer Abundance : 1.00
Halflife of Tracer : 373500.000 years

Geometry: 2mL DI/1 drop HNO3/13mL Ecoscint Ultra

Sample Characteristics					Tracer Calculations									
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Tracer Concentration DPM	Tracer Counts	Tracer Bkg Counts	Tracer Net CPM	Tracer Count Start Date/Time	Tracer Count Time (sec.)	Tracer Decay	Detector Serial #	Detector Efficiency (cpm/dpm)	Detector Efficiency StDev. (cpm/dpm)
1	405240001.1	0.5060	3.2719E-03	12/15/2015 10:14	4.3831	103	0.653	0.784	9/15/2016 9:05	7836	1.000	78262	0.312964	0.006038
2	405240002.1	0.5030	3.2715E-03	12/15/2015 10:19	4.3831	101	0.918	0.763	9/15/2016 9:05	7868	1.000	80020	0.321394	0.006198
3	405240003.1	0.5080	3.2721E-03	12/15/2015 10:18	4.3831	57	0.120	0.474	9/15/2016 11:51	7200	1.000	87919	0.224877	0.004374
4	405240004.1	0.5190	3.2732E-03	12/15/2015 10:21	4.3831	133	0.656	1.008	9/15/2016 9:05	7876	1.000	78775	0.335965	0.006474
5	405240005.1	0.5140	3.2727E-03	12/15/2015 11:42	4.3831	155	0.788	1.174	9/15/2016 9:05	7880	1.000	83296	0.303767	0.005864
6	405240006.1	0.5000	3.2712E-03	12/15/2015 11:46	4.3831	131	2.103	0.981	9/15/2016 9:05	7886	1.000	80010	0.323452	0.006238
7	405240007.1	0.5030	3.2715E-03	12/15/2015 12:17	4.3831	135	0.266	1.011	9/15/2016 9:05	7994	1.000	38633	0.334433	0.006444
8	405240008.1	0.5160	3.2729E-03	12/15/2015 12:20	4.3831	156	0.933	1.163	9/15/2016 9:05	7999	1.000	78197	0.344422	0.006633
9	405240009.1	0.5070	3.2720E-03	12/15/2015 12:31	4.3831	150	0.402	1.118	9/15/2016 9:05	8031	1.000	79996	0.330506	0.006369
10	405240010.1	0.5080	3.2721E-03	12/15/2015 12:35	4.3831	116	2.277	0.849	9/15/2016 9:05	8037	1.000	79997	0.319848	0.006168
11	405240011.1	0.5100	3.2723E-03	12/15/2015 12:53	4.3831	140	1.081	1.028	9/15/2016 9:05	8109	1.000	78785	0.353477	0.006805
12	405240012.1	0.5010	3.2713E-03	12/15/2015 12:56	4.3831	140	1.487	1.024	9/15/2016 9:05	8113	1.000	78265	0.347248	0.006686
13	405240013.1	0.5110	3.2724E-03	12/15/2015 11:04	4.3831	126	1.218	0.922	9/15/2016 9:05	8118	1.000	78776	0.329780	0.006356
14	405240014.1	0.5050	3.2718E-03	12/15/2015 11:08	4.3831	90	1.218	0.656	9/15/2016 9:05	8122	1.000	78198	0.311951	0.006019
15	405240015.1	0.5080	3.2721E-03	12/15/2015 14:02	4.3831	145	1.084	1.062	9/15/2016 9:05	8129	1.000	83291	0.312191	0.006024
16	405240016.1	0.5090	3.2722E-03	12/15/2015 14:06	4.3831	144	4.074	1.030	9/15/2016 9:05	8148	1.000	79988	0.292461	0.005651
17	1203621851.1	0.5190	3.2732E-03	9/13/2016 0:00	4.3831	131	0.272	0.961	9/15/2016 9:05	8160	1.000	78263	0.334344	0.006443
18	1203621852.1	0.5020	3.2714E-03	12/15/2015 10:14	4.3831	117	0.680	0.855	9/15/2016 9:05	8163	1.000	78259	0.347245	0.006687
19	1203621853.1	0.5190	3.2732E-03	9/13/2016 0:00	4.3831	179	1.440	0.740	9/15/2016 9:05	14400	1.000	33206	0.330892	0.006377

Pipet, 0.1 ml Stdev : +/- 0.000200 ml
Pipet, 0.5 ml Stdev : +/- 0.001000 ml
Pipet, 1 ml Stdev : +/- 0.002000 ml

Analytical SOP: GL-RAD-A-035
Instrument SOP: GL-RAD-I-004

Count raw Data													Calibration Data						
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	Sample Decay	Calculated Sample Recovery %	Sample Recovery Error %	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Rack Position #	Background Count Start Date/Time
1	9-2	90	121.7	15.01	13.76	90	127.3	14.1313	9/16/2016 14:29	0.964	57.1%	10.16%	LSCRED	2/1/2016	1/31/2017	0.2694	0.00792	9-1	9/16/2016 12:56
2	9-3	90	117.8	13.96	13.76	90	127.3	14.4140	9/16/2016 16:03	0.964	54.2%	10.29%	LSCRED	2/1/2016	1/31/2017	0.2773	0.00792	9-1	9/16/2016 12:56
3	9-4	90	116.2	14.27	13.76	90	127.3	14.5364	9/16/2016 17:36	0.964	48.1%	13.54%	LSCRED	2/1/2016	1/31/2017	0.2805	0.00792	9-1	9/16/2016 12:56
4	9-5	90	118.1	13.57	13.76	90	127.3	14.3915	9/16/2016 19:09	0.964	68.5%	8.97%	LSCRED	2/1/2016	1/31/2017	0.2767	0.00792	9-1	9/16/2016 12:56
5	9-6	90	115.8	14.3	13.76	90	127.3	14.5676	9/16/2016 20:42	0.964	88.2%	8.34%	LSCRED	2/1/2016	1/31/2017	0.2813	0.00792	9-1	9/16/2016 12:56
6	9-7	90	115.3	14.73	13.76	90	127.3	14.6070	9/16/2016 22:15	0.964	69.2%	9.14%	LSCRED	2/1/2016	1/31/2017	0.2824	0.00792	9-1	9/16/2016 12:56
7	9-8	90	116	14.81	13.76	90	127.3	14.5520	9/16/2016 23:48	0.964	69.0%	8.88%	LSCRED	2/1/2016	1/31/2017	0.2809	0.00792	9-1	9/16/2016 12:56
8	33-1	90	117.7	13.94	13.76	90	127.3	14.4215	9/17/2016 3:17	0.964	77.0%	8.32%	LSCRED	2/1/2016	1/31/2017	0.2775	0.00792	9-1	9/16/2016 12:56
9	33-2	90	113.3	13.79	13.76	90	127.3	14.7686	9/17/2016 4:50	0.964	77.2%	8.45%	LSCRED	2/1/2016	1/31/2017	0.2865	0.00792	9-1	9/16/2016 12:56
10	33-3	90	114.5	13.93	13.76	90	127.3	14.6708	9/17/2016 6:23	0.964	60.6%	9.73%	LSCRED	2/1/2016	1/31/2017	0.2840	0.00792	9-1	9/16/2016 12:56
11	33-4	90	118.1	13.92	13.76	90	127.3	14.3915	9/17/2016 7:56	0.964	66.3%	8.78%	LSCRED	2/1/2016	1/31/2017	0.2767	0.00792	9-1	9/16/2016 12:56
12	33-5	90	116.1	14.21	13.76	90	127.3	14.5442	9/17/2016 9:29	0.964	67.3%	8.80%	LSCRED	2/1/2016	1/31/2017	0.2807	0.00792	9-1	9/16/2016 12:56
13	33-6	90	114.1	14.38	13.76	90	127.3	14.7032	9/17/2016 11:02	0.964	63.8%	9.25%	LSCRED	2/1/2016	1/31/2017	0.2848	0.00792	9-1	9/16/2016 12:56
14	33-7	90	114.3	13.18	13.76	90	127.3	14.6870	9/17/2016 12:35	0.964	48.0%	10.94%	LSCRED	2/1/2016	1/31/2017	0.2844	0.00792	9-1	9/16/2016 12:56
15	33-8	90	112	15.07	13.76	90	127.3	14.8772	9/17/2016 14:08	0.964	77.6%	8.63%	LSCRED	2/1/2016	1/31/2017	0.2891	0.00792	9-1	9/16/2016 12:56
16	33-9	90	115.4	14.23	13.76	90	127.3	14.5991	9/17/2016 15:41	0.964	80.4%	8.85%	LSCRED	2/1/2016	1/31/2017	0.2822	0.00792	9-1	9/16/2016 12:56
17	33-10	90	113.1	14.62	13.76	90	127.3	14.7851	9/17/2016 17:14	0.999	65.6%	9.01%	LSCRED	2/1/2016	1/31/2017	0.2869	0.00792	9-1	9/16/2016 12:56
18	1-2	90	128.9	12.98	13.42	90	128.5	13.3954	9/19/2016 14:15	0.964	56.2%	9.55%	LSCRED	2/1/2016	1/31/2017	0.2552	0.00792	1-1	9/19/2016 12:43
19	33-12	90	112.8	38.41	13.76	90	127.3	14.8100	9/17/2016 20:20	0.999	51.0%	7.82%	LSCRED	2/1/2016	1/31/2017	0.2875	0.00792	9-1	9/16/2016 12:56

PU1596448R

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

* - RPD changed to 0% due to sample & dup activity below MDA

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

LCS S/N : 1610-B
LCS Exp Date : 10/28/2016
LCS Activity (dpm/ml): 1694.07
LCS Volume Added: 0.10

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 %	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	7.8336	5.5306	15	11.2612	**5.2719**	65.56%	0.8787	0.5690	6.6913	6.8293		SAMPLE				
2	8.1547	5.7573	15	11.7207	**-2.8073**	124.11%	-0.4540	0.5615	6.8055	6.8055		SAMPLE				
3	9.0295	6.3749	15	12.9771	**-1.8163**	212.81%	-0.2664	0.5657	7.5607	7.5608		SAMPLE				
4	6.2629	4.4217	15	9.0018	**-3.9044**	68.45%	-0.8215	0.5574	5.1927	5.1927		SAMPLE				
5	4.8574	3.4294	15	6.9809	**-0.9805**	211.80%	-0.2676	0.5663	4.0673	4.0673		SAMPLE				
6	6.3517	4.4844	15	9.1282	**0.5886**	464.22%	0.1230	0.5709	5.3543	5.3562		SAMPLE				
7	6.3511	4.4840	15	9.1277	**1.2369**	221.54%	0.2580	0.5712	5.3662	5.3744		SAMPLE				
8	5.5873	3.9447	15	8.0306	**-2.0397**	116.88%	-0.4815	0.5614	4.6607	4.6607		SAMPLE				
9	5.5667	3.9302	15	7.9993	**-4.0811**	58.19%	-0.9786	0.5633	4.6045	4.6045		SAMPLE				
10	7.1157	5.0238	15	10.2258	**-3.9625**	76.72%	-0.7408	0.5637	5.9097	5.9097		SAMPLE				
11	6.5776	4.6439	15	9.4541	**-2.3535**	119.29%	-0.4715	0.5609	5.4876	5.4876		SAMPLE				
12	6.5394	4.6169	15	9.3983	**-1.6497**	169.38%	-0.3342	0.5652	5.4692	5.4693		SAMPLE				
13	6.7025	4.7320	15	9.6318	**-1.6263**	176.15%	-0.3232	0.5685	5.6071	5.6071		SAMPLE				
14	9.0294	6.3749	15	12.9758	**-10.2223**	38.52%	-1.5070	0.5564	7.3982	7.3982		SAMPLE				
15	5.4909	3.8766	15	7.8898	**0.7900**	299.39%	0.1928	0.5768	4.6339	4.6377		SAMPLE				
16	5.3725	3.7930	15	7.7209	**-1.4941**	153.60%	-0.3691	0.5660	4.4907	4.4907		SAMPLE				
17	6.1641	4.3519	15	8.8576	**-0.7621**	346.29%	-0.1651	0.5716	5.1707	5.1707		MB				
18	8.2579	5.8302	15	11.8769	**-2.6982**	130.68%	-0.4154	0.5413	6.8925	6.8925	405240001.1	DUP	* 0.0%			
19	7.9158	5.5886	15	11.3747	**139.7589**	8.53%	23.6000	0.7690	8.9257	32.7753		LCS			147.0321	95.1%

1556448

ID:PU-241 PAGE: 1
USER:10
COMMENT:RED 16 SEP 2016 13:08

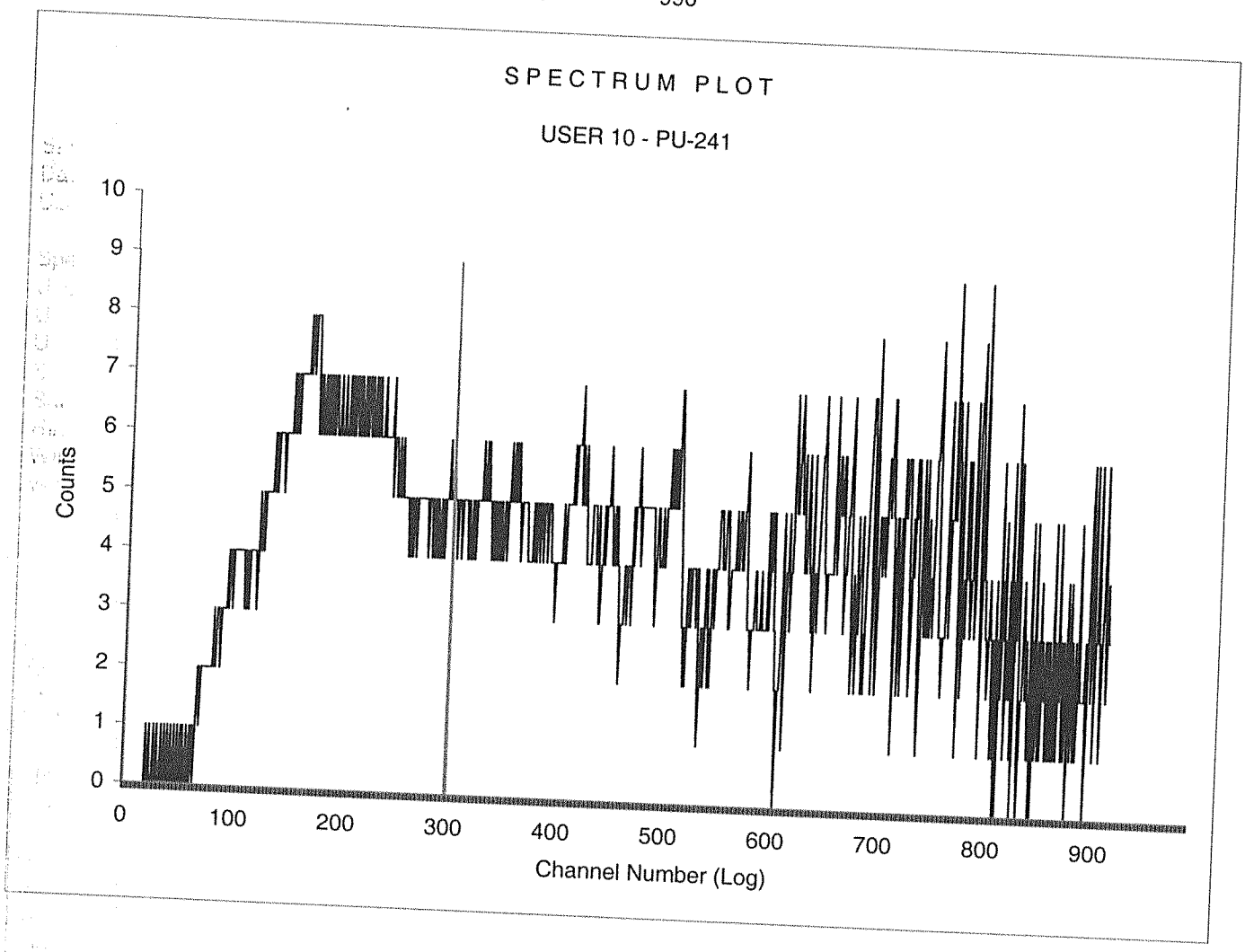
PRESET TIME :	90.00							
DATA CALC :	CPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	:EDIT		
COUNT BLANK :	NO	ICN : NO	REPLICATES :	1	RS232	:EDIT		
TWO PHASE :	NO	ADC : NO	CYCLE REPEATS :	1	DISK	: OFF		
SCINTILLATOR:	LIQUID	LUMEX:YES	LOW SAMPLE REQ:	0				
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none				

CHAN: 0.0 - 300.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
CHAN: 0.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

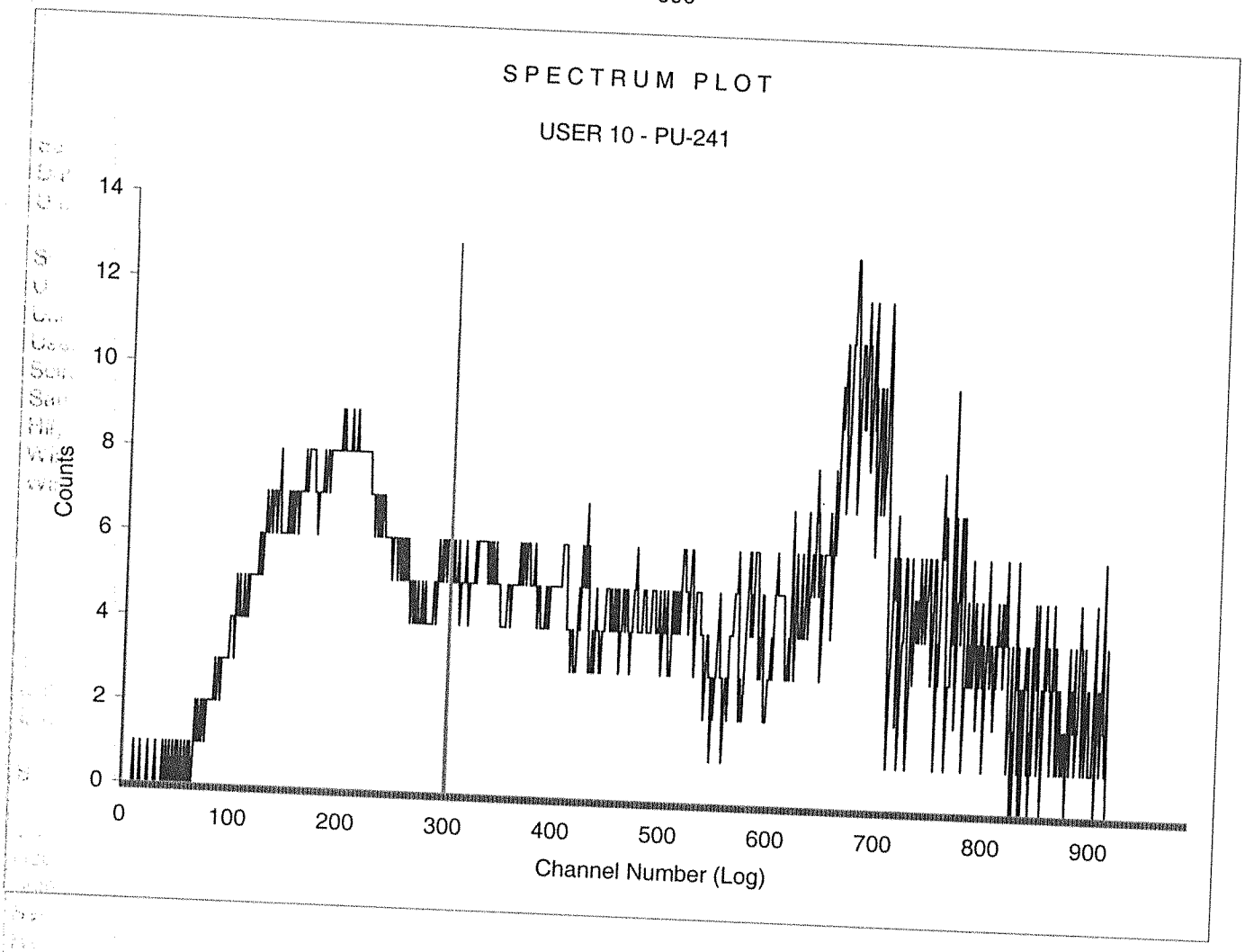
ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	H#	WIND1 RAW CPM	WIND2 RAW CPM	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	LUMEX %	ELAPSED TIME
BKG 1	9-1	90.00	127.3	14.18	41.49	13.76	5.77	41.07	3.31	0.94	92.58
2	9-2	90.00	121.7	15.44	46.42	15.01	5.52	45.99	3.12	0.87	185.65
3	9-3	90.00	117.8	14.38	45.24	13.96	5.73	44.82	3.16	0.88	278.72
4	9-4	90.00	116.2	14.68	44.30	14.27	5.66	43.89	3.20	0.86	371.80
5	9-5	90.00	118.1	13.97	44.58	13.57	5.81	44.18	3.19	0.86	464.87
6	9-6	90.00	115.8	14.74	45.60	14.30	5.66	45.16	3.15	0.91	557.97
7	9-7	90.00	115.3	15.13	47.52	14.73	5.57	47.12	3.08	0.79	651.01
8	9-8	90.00	116.0	15.14	47.96	14.81	5.54	47.62	3.07	0.66	744.03

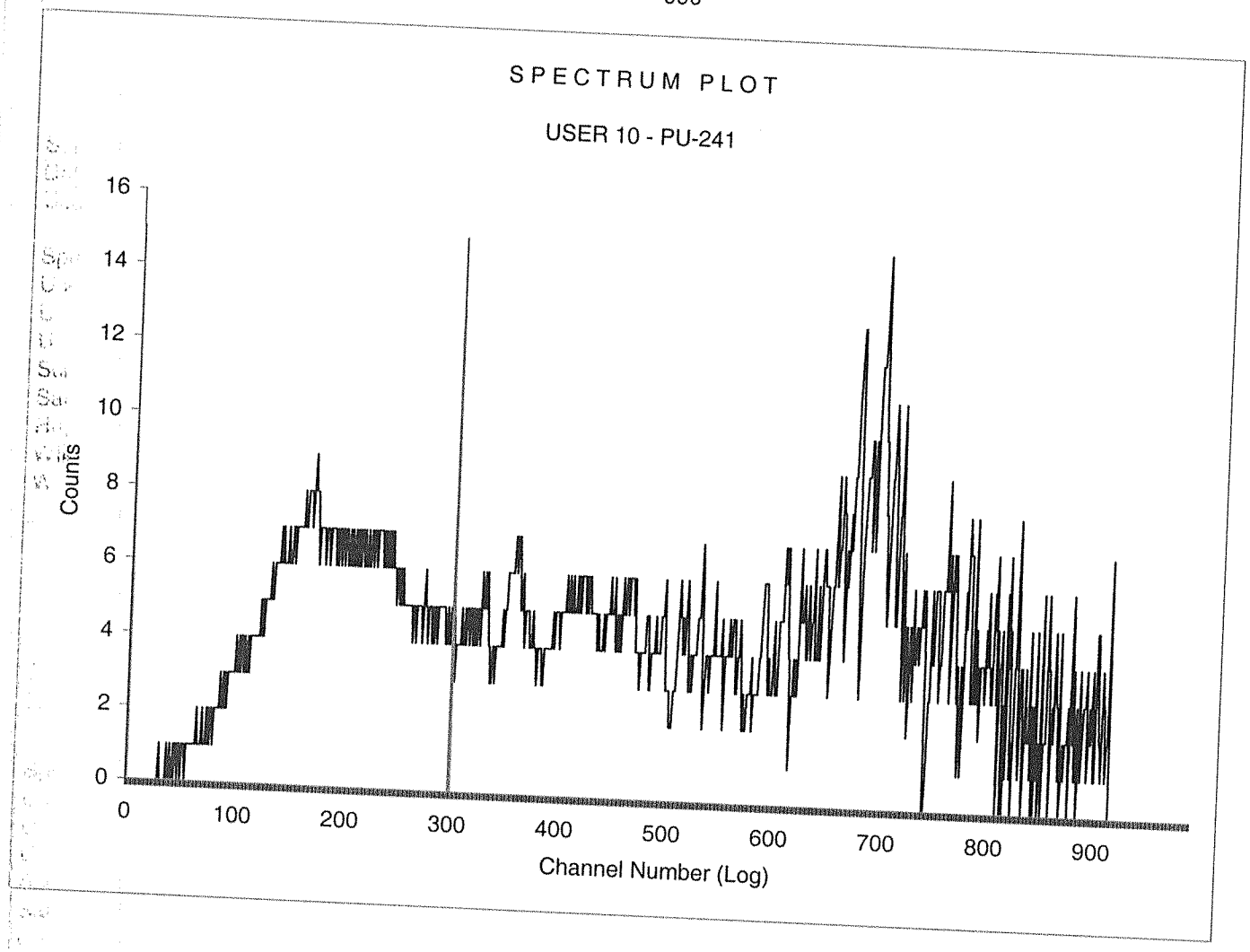
Sample Count Start Time:	16 Sep 2016 12:56:52		
Data Capture Date	16 Sep 2016 14:27:04		
User Filename	S10091609-1A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	9-1	90.00
H#, Total Counts:	127.3	3743	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



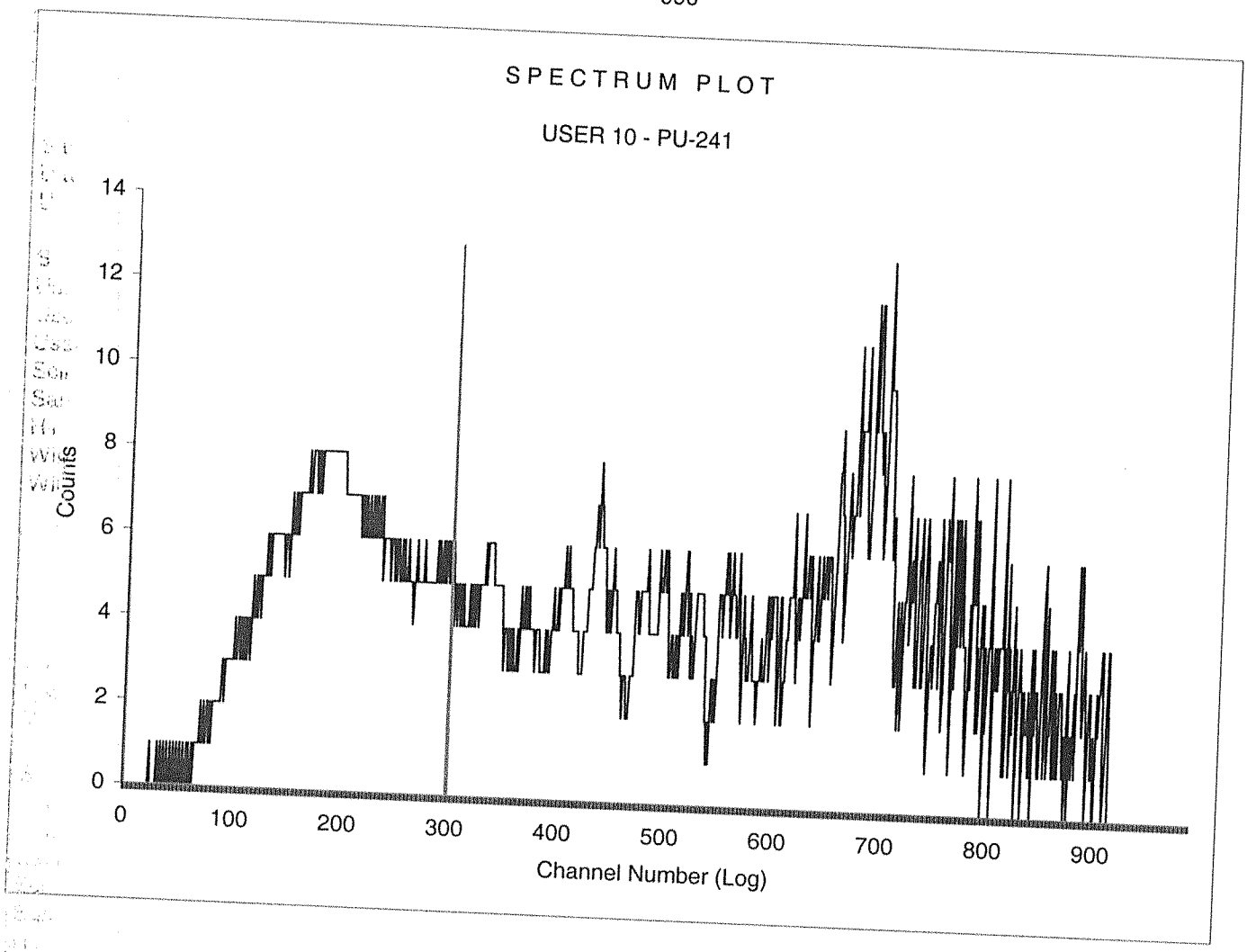
Sample Count Start Time:	16 Sep 2016 14:29:56		
Data Capture Date	16 Sep 2016 16:00:08		
User Filename	S10091609-2A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	9-2	90.00
H#, Total Counts:	121.7	4174	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



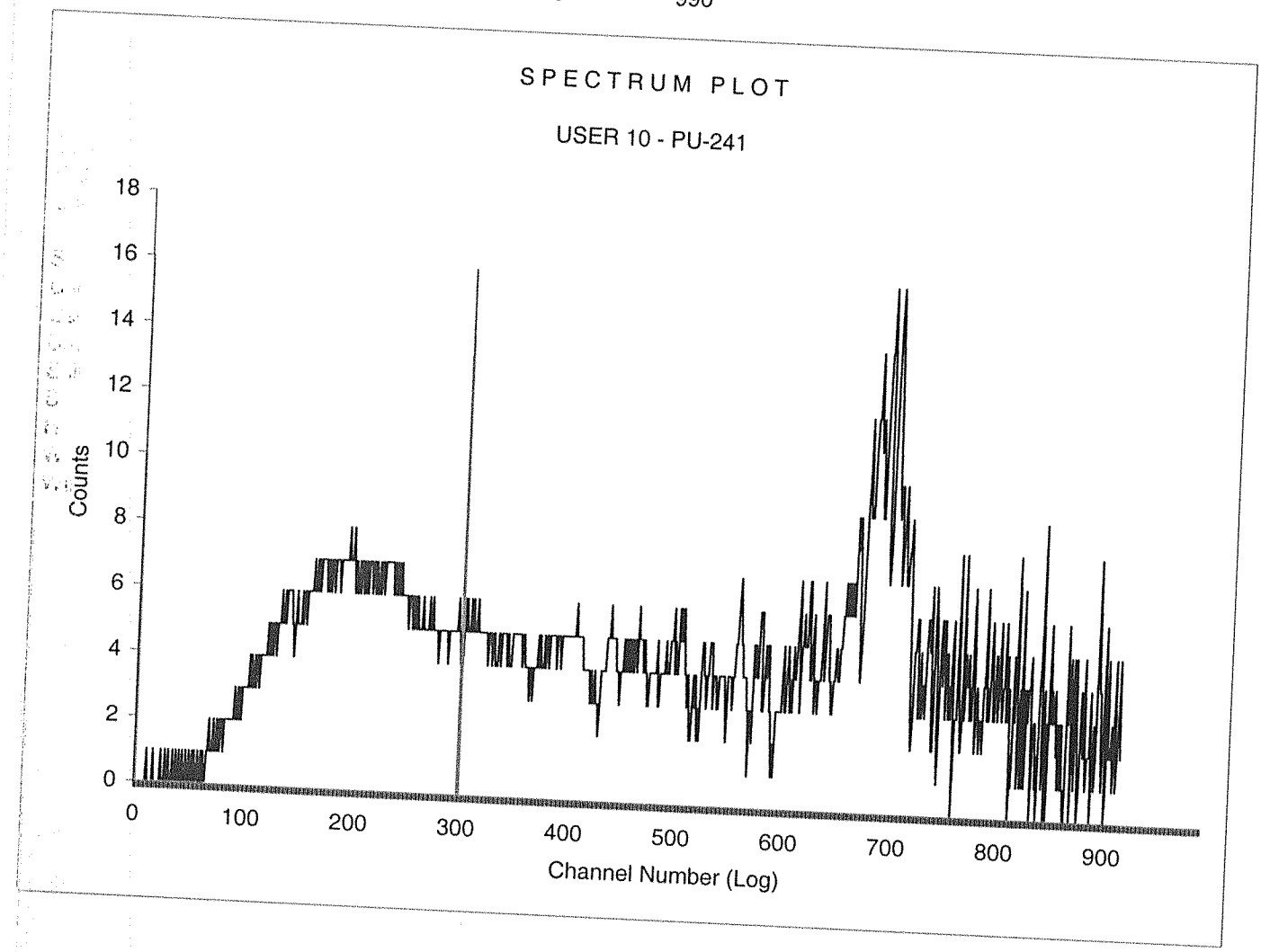
Sample Count Start Time:	16 Sep 2016 16:03:00		
Data Capture Date	16 Sep 2016 17:33:11		
User Filename	S10091609-3A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	9-3	90.00
H#, Total Counts:	117.8	4074	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



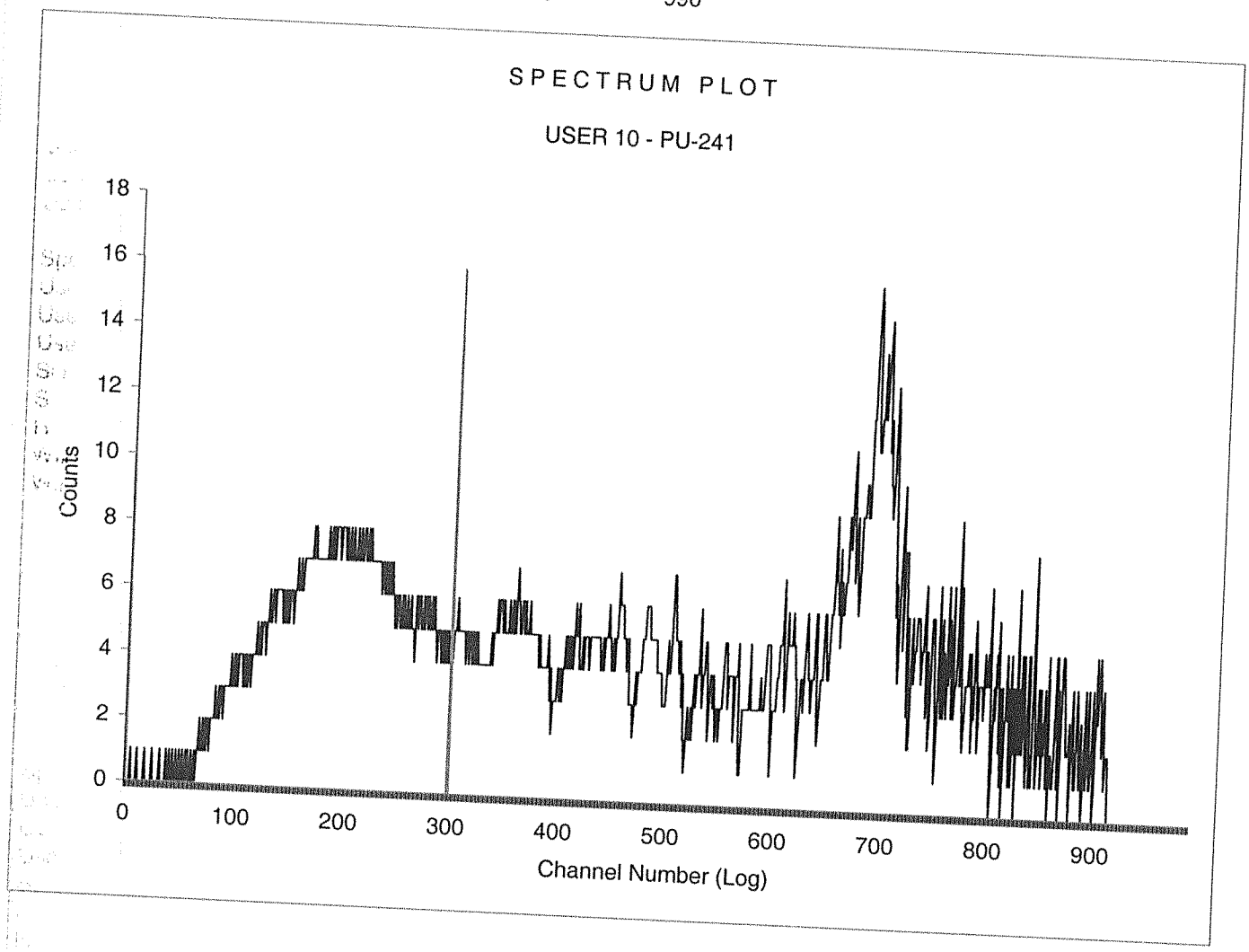
Sample Count Start Time:	16 Sep 2016 17:36:05		
Data Capture Date	16 Sep 2016 19:06:15		
User Filename	S10091609-4A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	9-4	90.00
H#, Total Counts:	116.2	3981	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



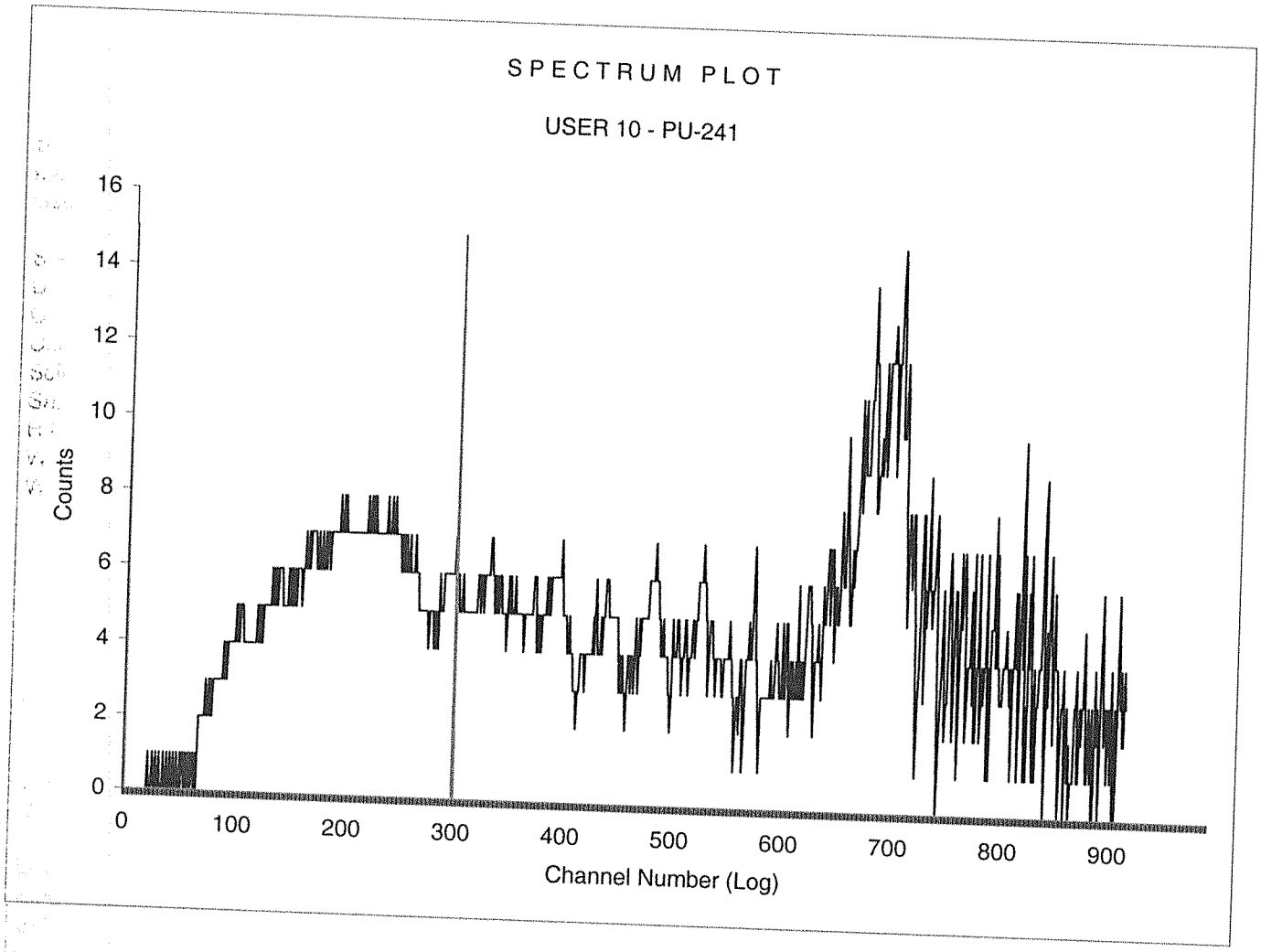
Sample Count Start Time:	16 Sep 2016 19:09:09		
Data Capture Date	16 Sep 2016 20:39:20		
User Filename	S10091609-5A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	9-5	90.00
H#, Total Counts:	118.1	4013	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



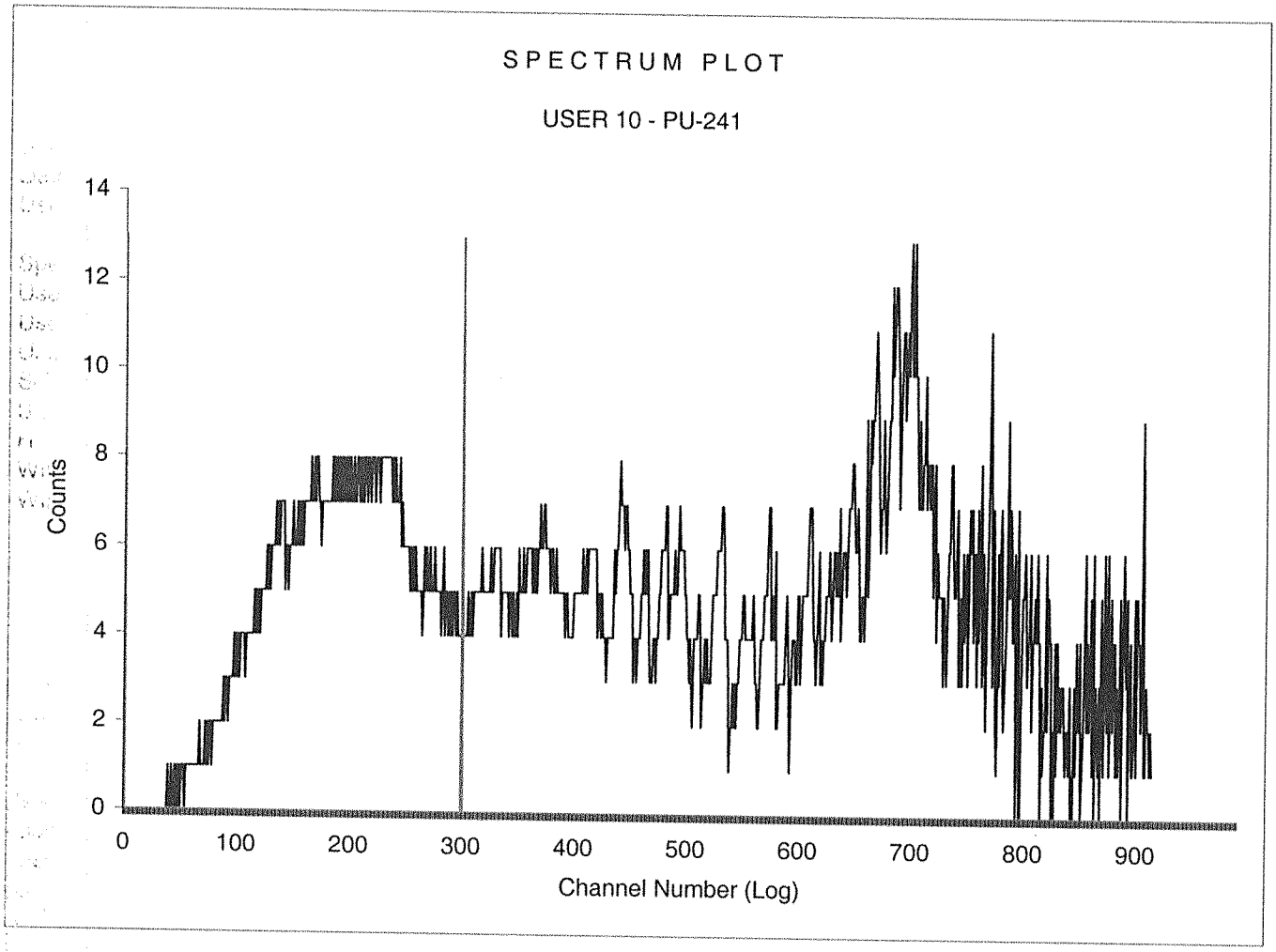
Sample Count Start Time:	16 Sep 2016 20:42:15		
Data Capture Date	16 Sep 2016 22:12:25		
User Filename	S10091609-6A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	9-6	90.00
H#, Total Counts:	115.8	4102	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Sample Count Start Time:	16 Sep 2016 22:15:18		
Data Capture Date	16 Sep 2016 23:45:50		
User Filename	S10091609-7A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	7	9-7	90.00
H#, Total Counts:	115.3	4280	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Sample Count Start Time:	16 Sep 2016 23:48:19		
Data Capture Date	17 Sep 2016 01:18:28		
User Filename	S10091709-8A.XLS		
	U10091609-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	8	9-8	90.00
H#, Total Counts:	116.0	4326	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



1590448

ID:PU-241
USER:10 COMMENT:RED 17 SEP 2016 03:29

PRESET TIME :	90.00							
DATA CALC :	CPM	HW :YES	SAMPLE REPEATS:	1	PRINTER	:EDIT
COUNT BLANK :	NO	IC# : NO	REPLICATES :	1	RS232	:EDIT
TWO PHASE :	NO	ARC : NO	CYCLE REPEATS :	1	DISK	: OFF
SCINTILLATOR:	LIQUID	LUMEX:YES	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none	

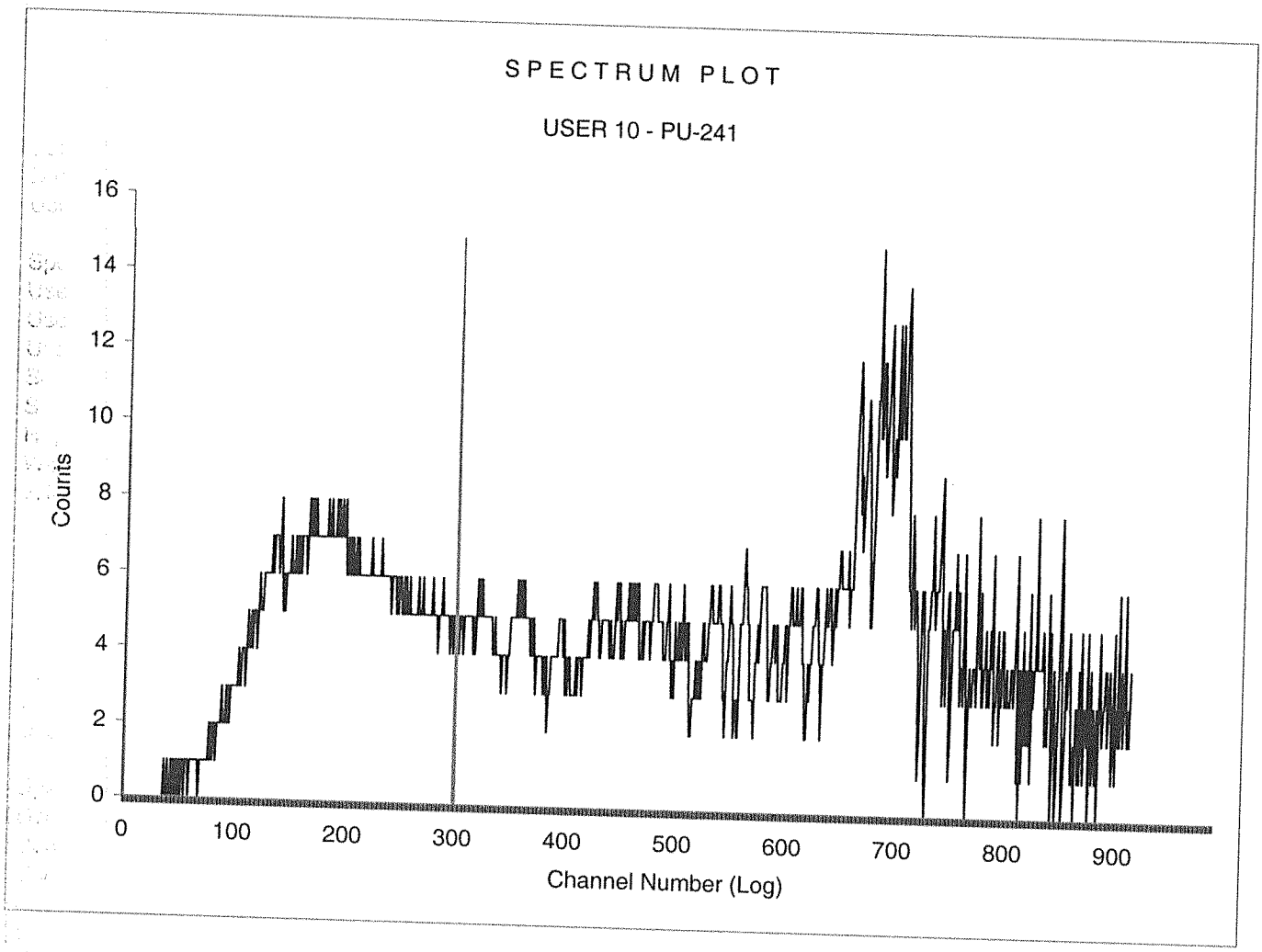
CHAN: 0.0 - 300.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
CHAN: 0.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

ALPHA-BETA DISCRIMINATION: NO

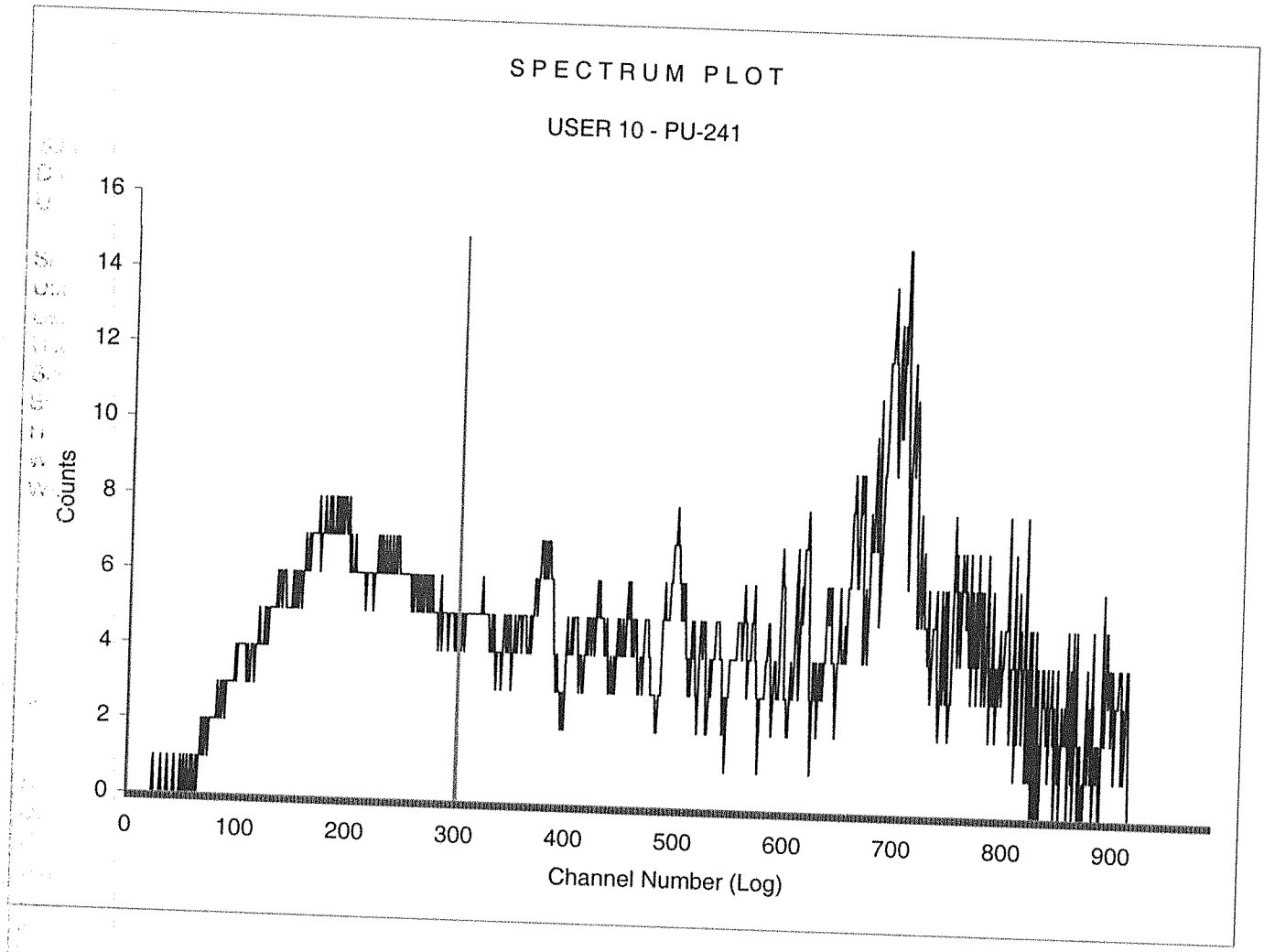
SAM NO	POS	TIME MIN	HW	WIND1 RAW CPM	WIND2 RAW CPM	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	LUMEX %	ELAPSED TIME
1	33-1	90.00	117.7	14.26	46.08	13.94	5.71	45.77	3.13	0.63	92.50
2	33-2	90.00	113.3	14.07	44.94	13.79	5.73	44.67	3.16	0.63	185.50
3	33-3	90.00	114.5	14.30	46.07	13.93	5.72	45.70	3.13	0.76	278.56
4	33-4	90.00	118.1	14.17	45.08	13.92	5.70	44.83	3.14	0.52	371.50
5	33-5	90.00	116.1	14.46	44.46	14.21	5.64	44.21	3.18	0.52	464.45
6	33-6	90.00	114.1	14.64	46.49	14.38	5.61	46.22	3.11	0.56	557.44
7	33-7	90.00	114.3	13.41	45.23	13.18	5.86	45.00	3.15	0.50	650.39
8	33-8	90.00	112.0	15.30	46.66	15.07	5.47	46.42	3.10	0.51	743.36
9	33-9	90.00	115.4	14.50	47.26	14.23	5.64	46.99	3.08	0.56	836.35
10	33-10	90.00	113.1	14.88	46.62	14.62	5.56	46.37	3.10	0.52	929.33
~~11~~	~~33-11~~	~~90.00~~	~~111.4~~	~~14.77~~	~~45.69~~	~~14.52~~	~~5.58~~	~~45.45~~	~~3.14~~	~~0.54~~	~~1022.30~~
12	33-12	90.00	112.8	38.62	70.24	38.41	3.41	70.03	2.52	0.31	1115.26

xmb9/20/16

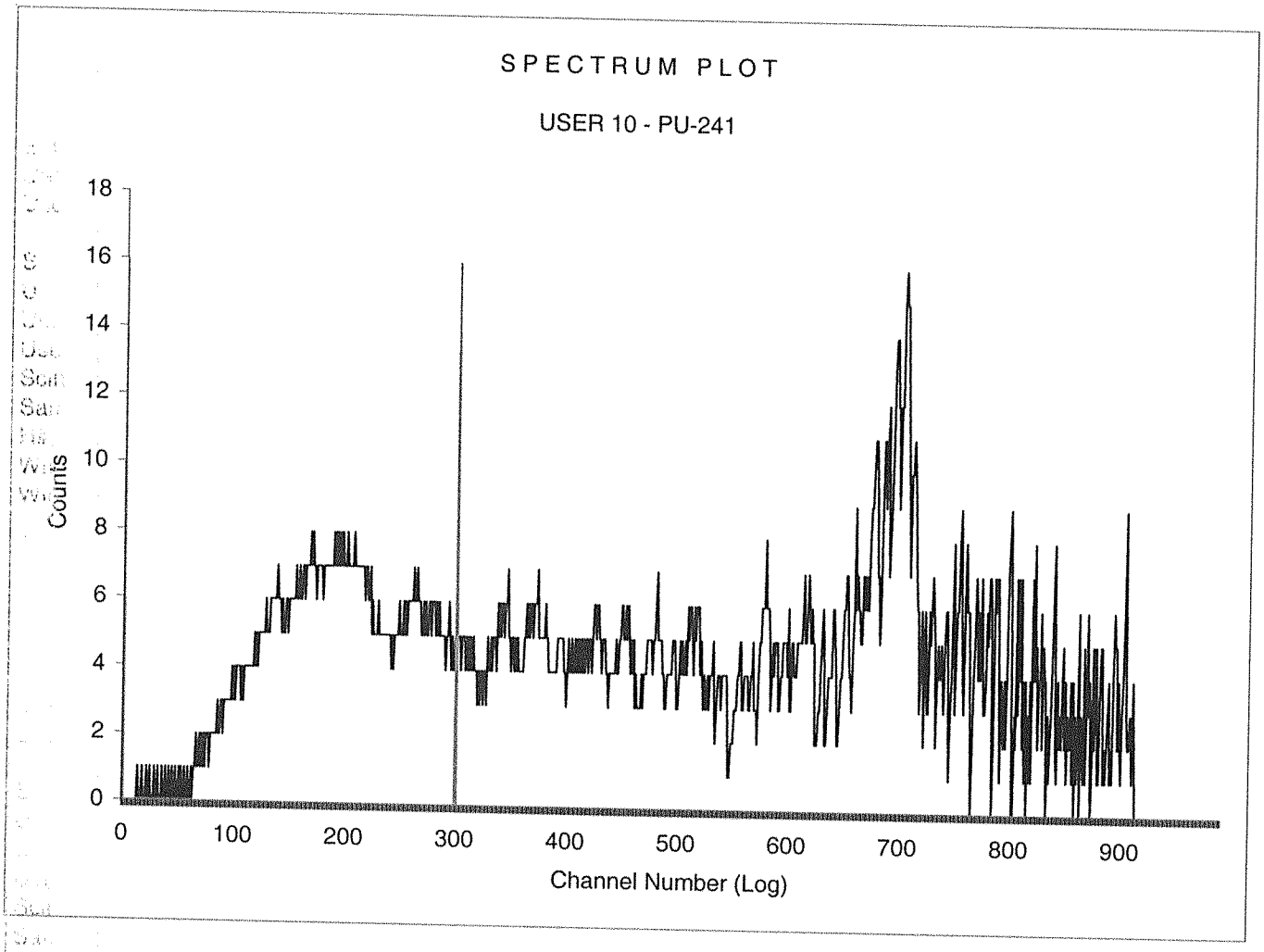
Sample Count Start Time:	17 Sep 2016 03:17:23		
Data Capture Date	17 Sep 2016 04:47:46		
User Filename	S10091733-1A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	33-1	90.00
H#, Total Counts:	117.7	4164	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



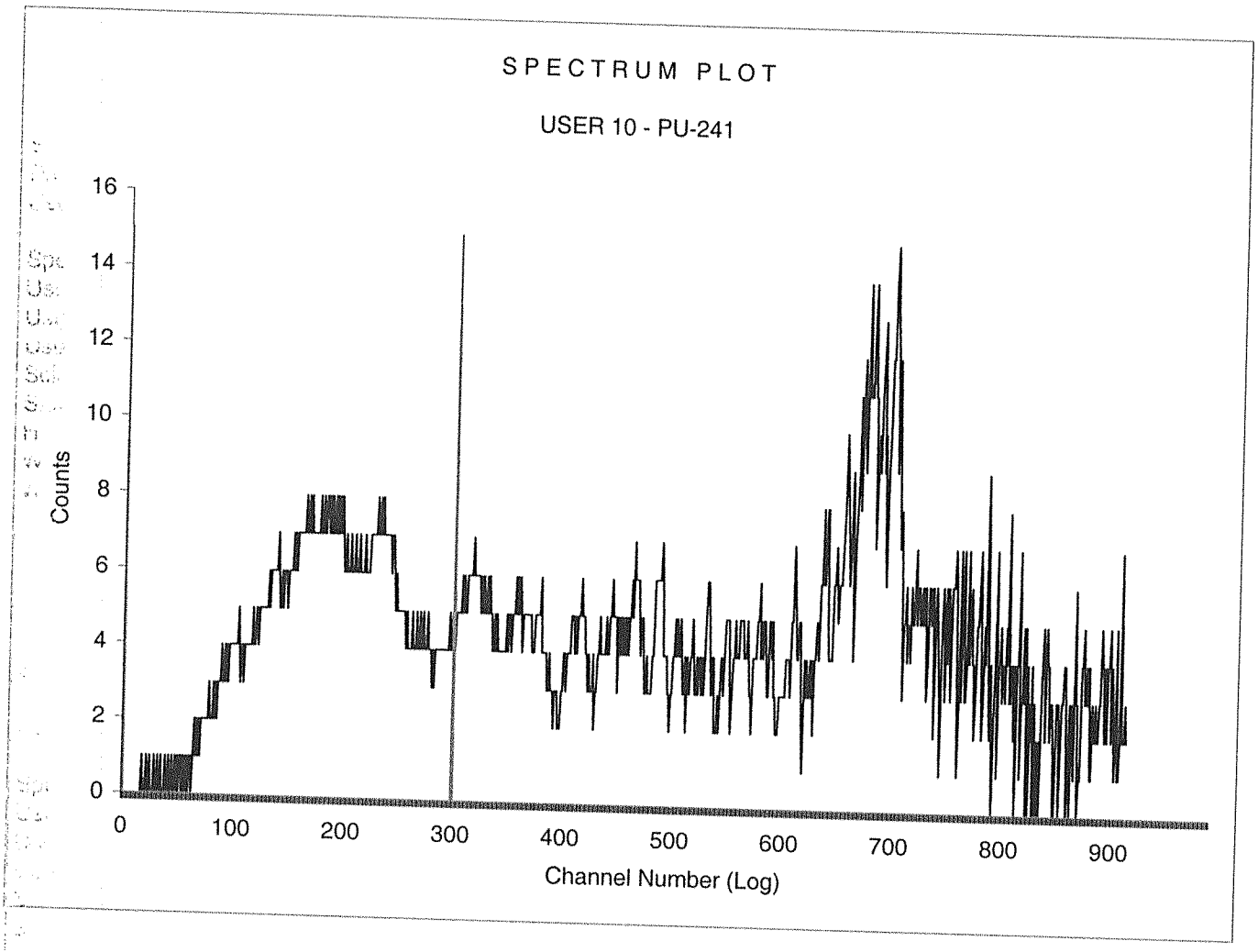
Sample Count Start Time:	17 Sep 2016 04:50:23		
Data Capture Date	17 Sep 2016 06:21:47		
User Filename	S10091733-2A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	33-2	90.00
H#, Total Counts:	113.3	4058	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



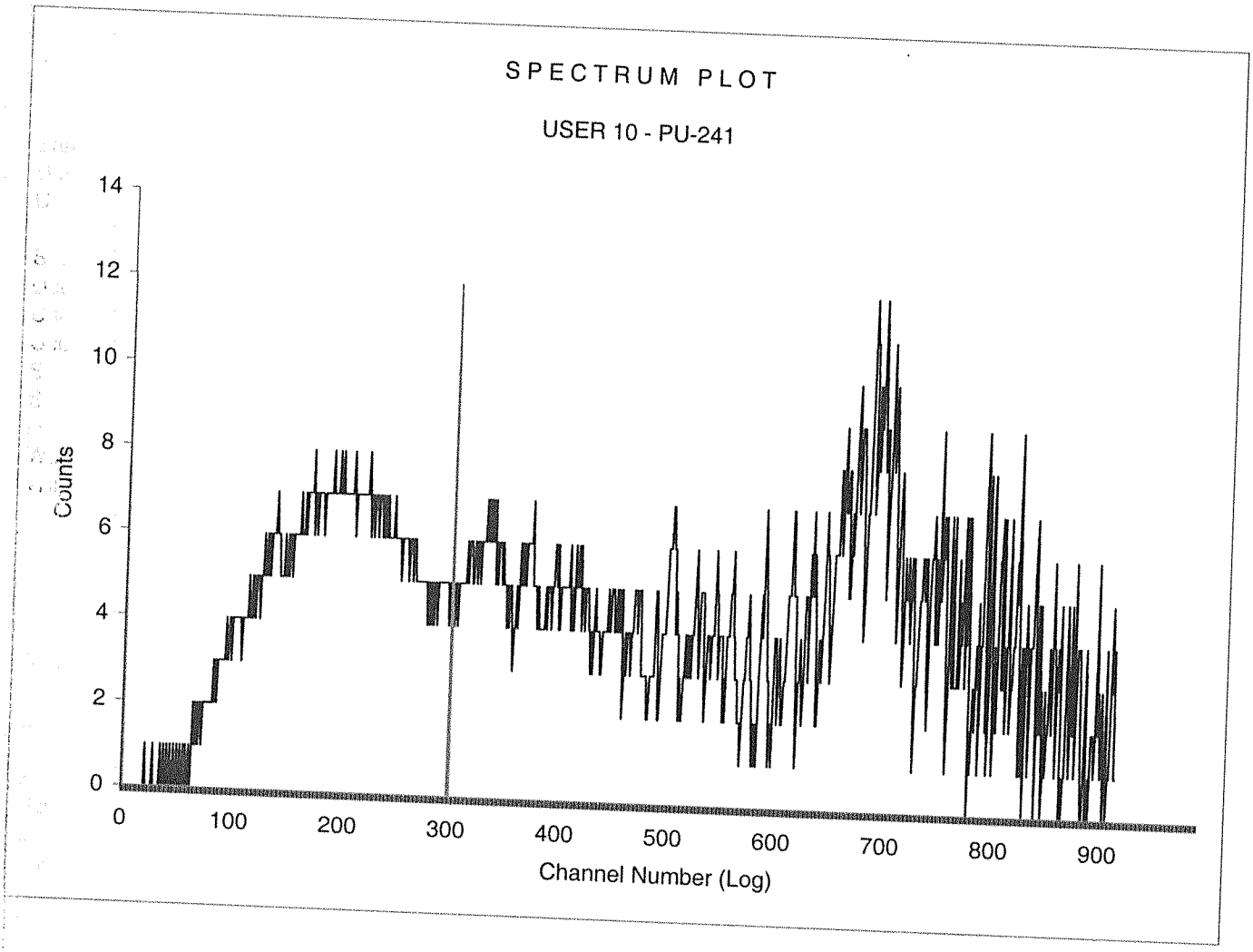
Sample Count Start Time:	17 Sep 2016 06:23:27		
Data Capture Date	17 Sep 2016 07:54:49		
User Filename	S10091733-3A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	33-3	90.00
H#, Total Counts:	114.5	4155	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



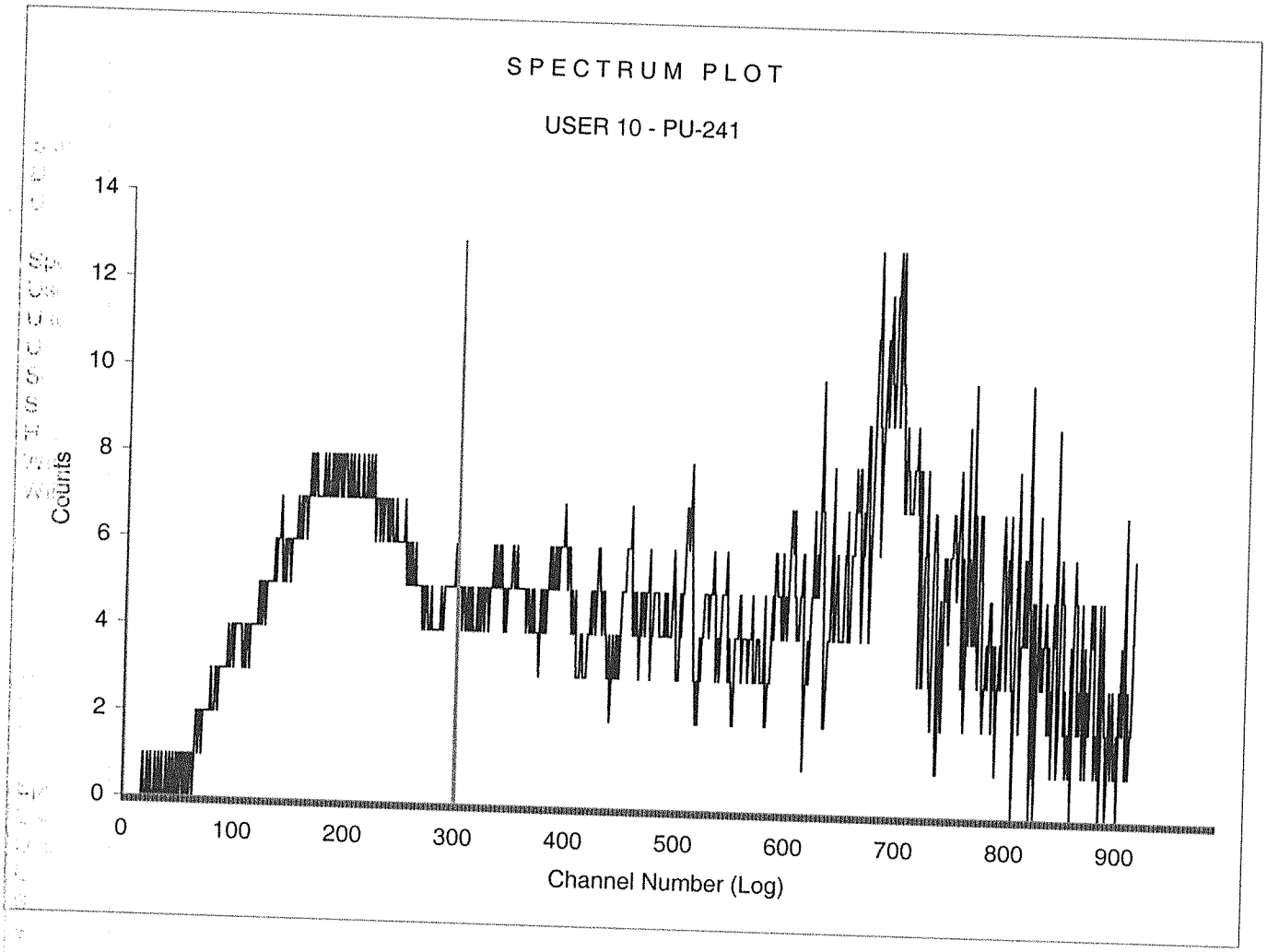
Sample Count Start Time:	17 Sep 2016 07:56:23		
Data Capture Date	17 Sep 2016 09:27:46		
User Filename	S10091733-4A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	33-4	90.00
H#, Total Counts:	118.1	4072	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



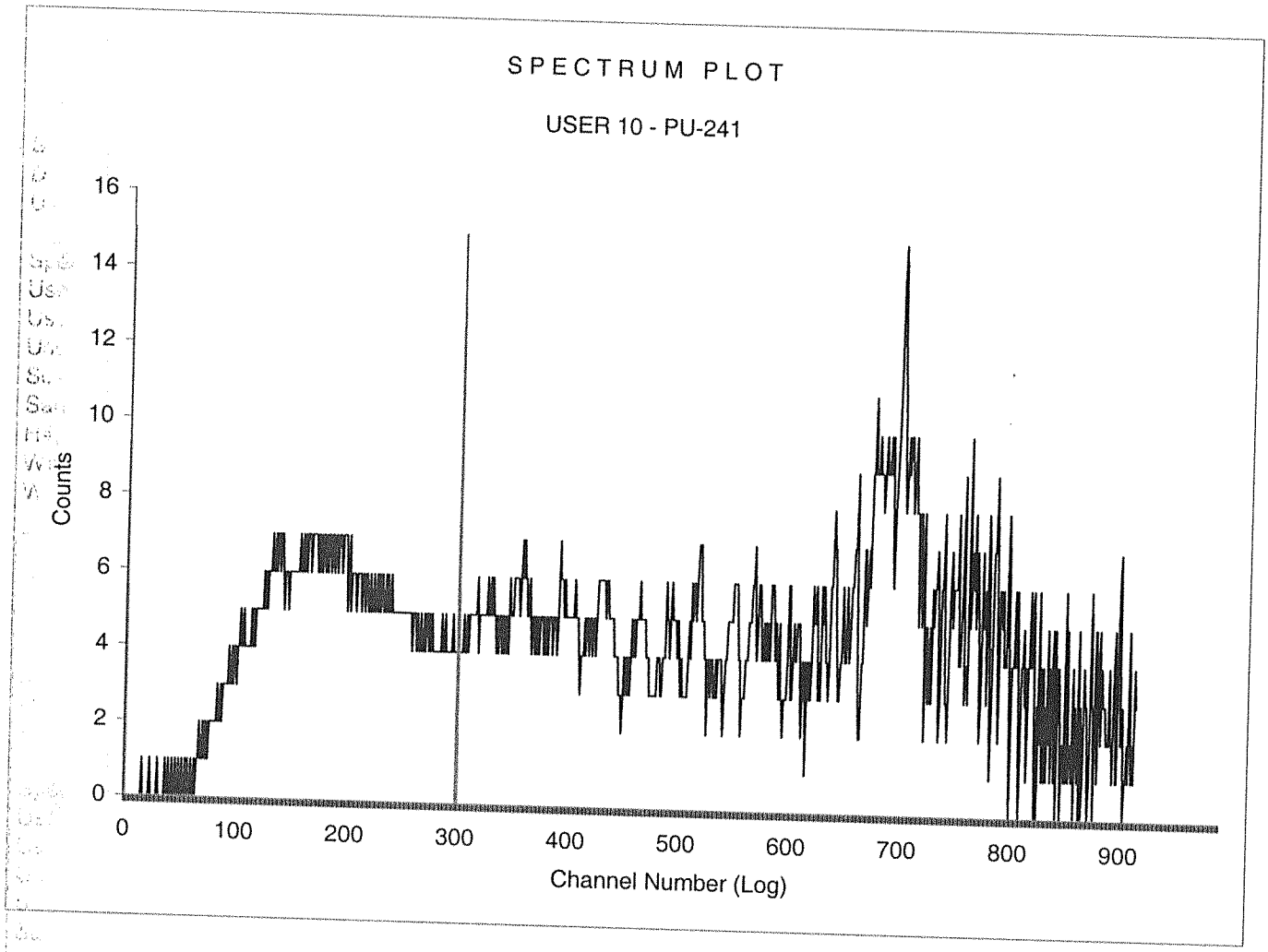
Sample Count Start Time:	17 Sep 2016 09:29:20		
Data Capture Date	17 Sep 2016 11:00:43		
User Filename	S10091733-5A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	33-5	90.00
H#, Total Counts:	116.1	4008	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



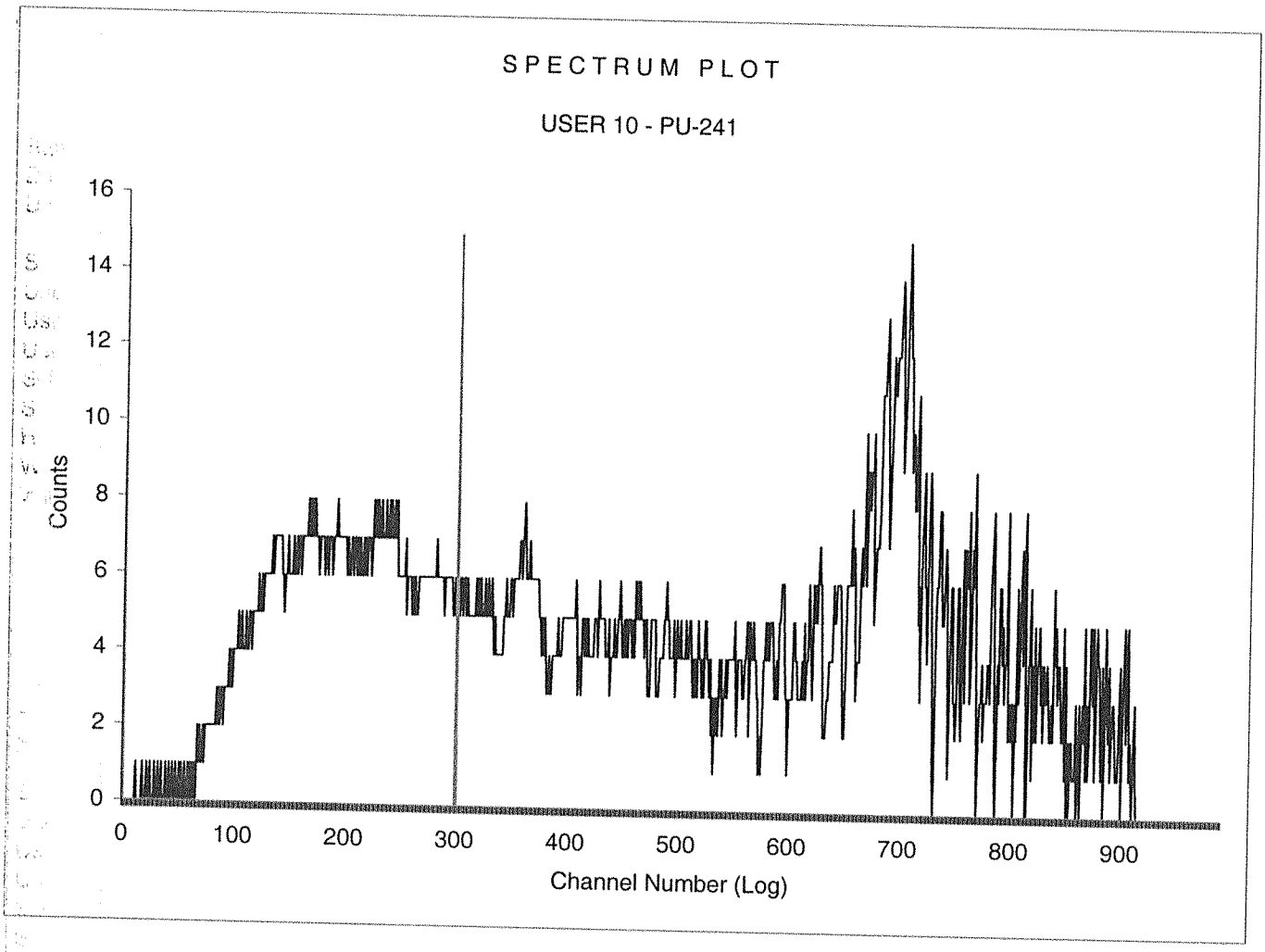
Sample Count Start Time:	17 Sep 2016 11:02:19		
Data Capture Date	17 Sep 2016 12:33:40		
User Filename	S10091733-6A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	33-6	90.00
H#, Total Counts:	114.1	4200	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



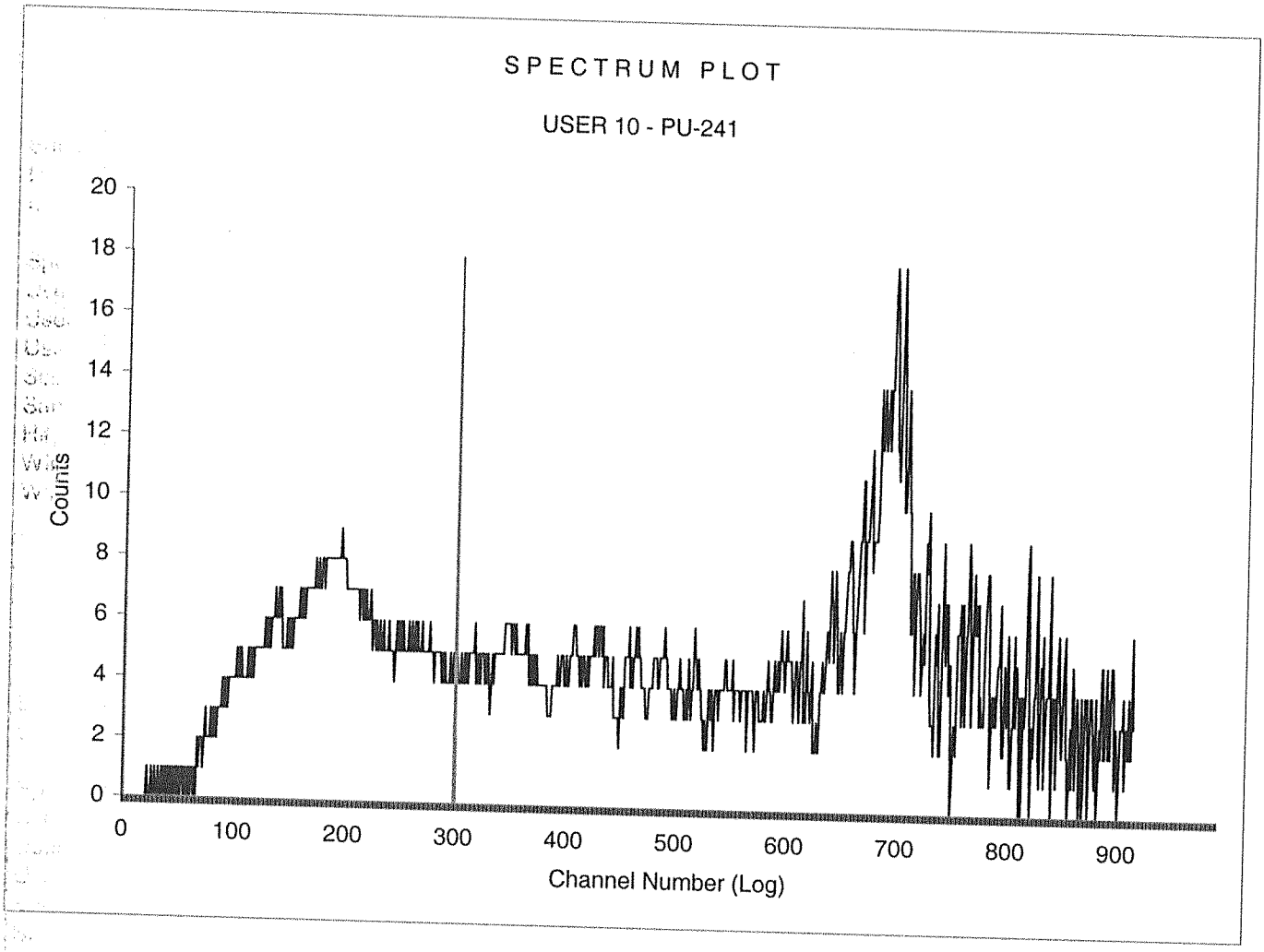
Sample Count Start Time:	17 Sep 2016 12:35:16		
Data Capture Date	17 Sep 2016 14:06:38		
User Filename	S10091733-7A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	7	33-7	90.00
H#, Total Counts:	114.3	4080	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



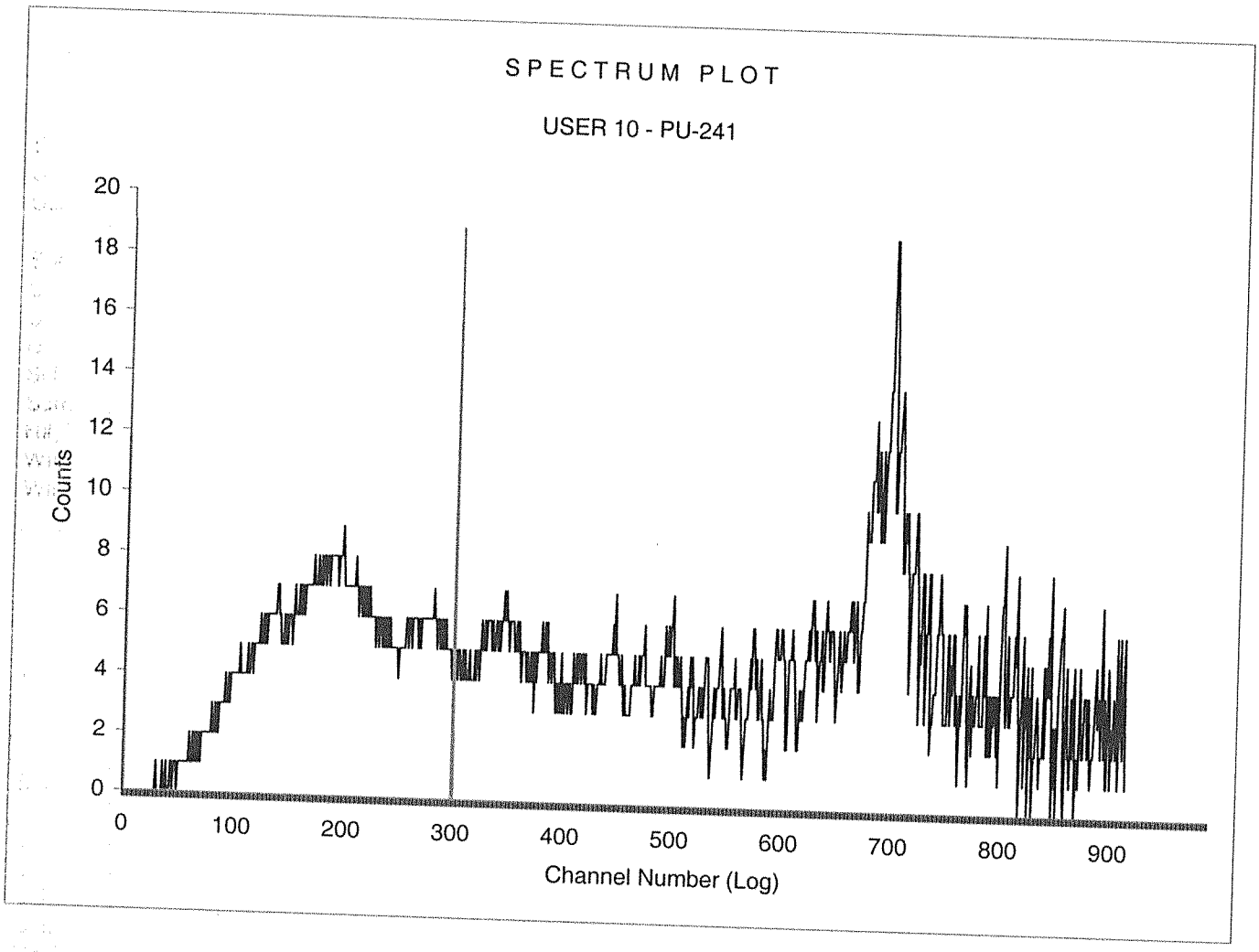
Sample Count Start Time:	17 Sep 2016 14:08:15		
Data Capture Date	17 Sep 2016 15:39:35		
User Filename	S10091733-8A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	8	33-8	90.00
H#, Total Counts:	112.0	4210	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



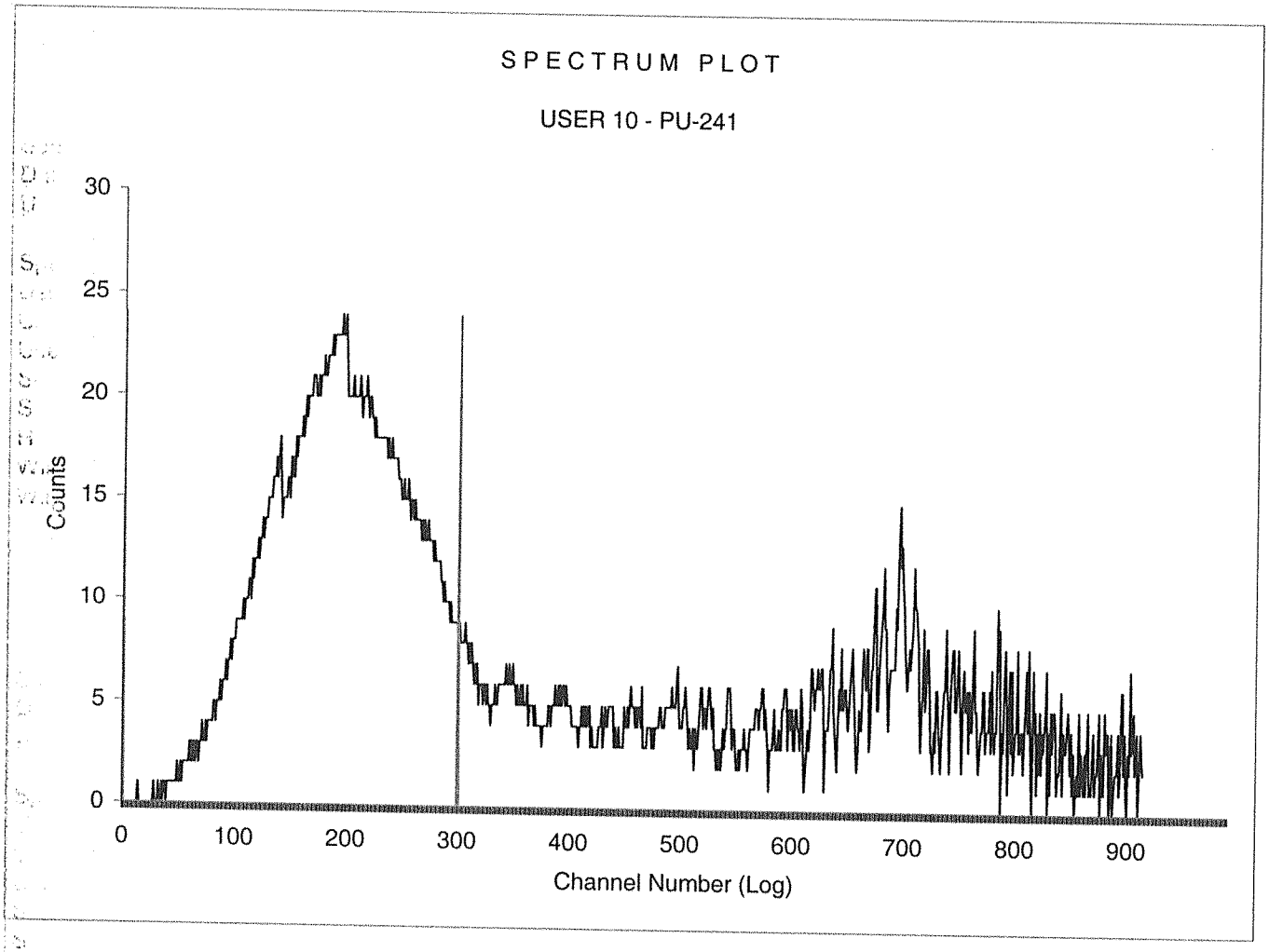
Sample Count Start Time:	17 Sep 2016 15:41:14		
Data Capture Date	17 Sep 2016 17:12:34		
User Filename	S10091733-9A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	9	33-9	90.00
Hi, Total Counts:	115.4	4269	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Sample Count Start Time:	17 Sep 2016 17:14:13		
Data Capture Date	17 Sep 2016 18:45:32		
User Filename	S10091733-10A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	10	33-10	90.00
H#, Total Counts:	113.1	4220	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Sample Count Start Time:	17 Sep 2016 20:20:09		
Data Capture Date	17 Sep 2016 21:51:26		
User Filename	S10091733-12A.XLS		
	U10091733-1B.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	12	33-12	90.00
H#, Total Counts:	112.8	6347	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



1596448

ID:PU-241 19 SEP 2016 12:54
USER:10 COMMENT:RED
PRESET TIME : 90.00

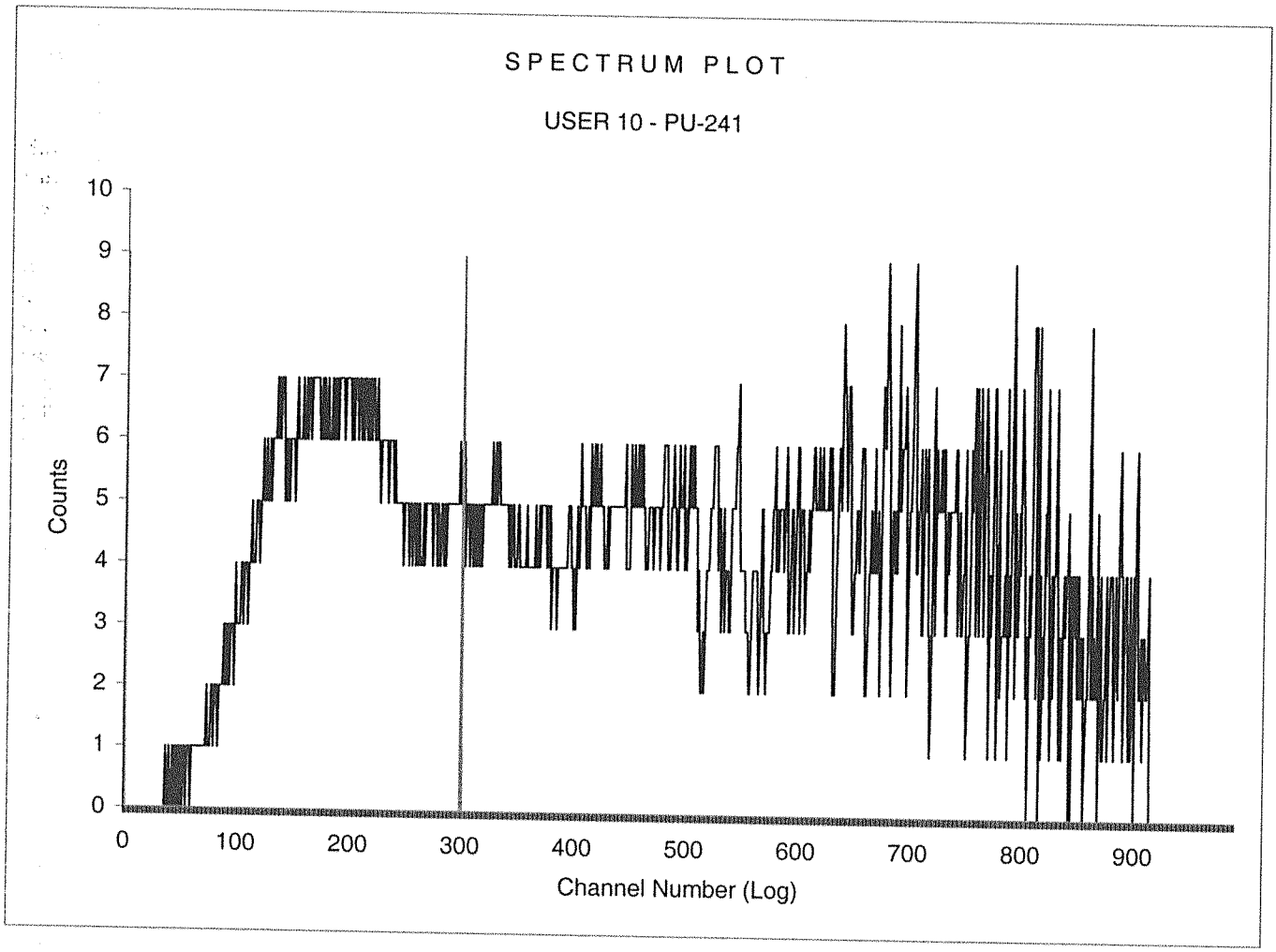
DATA CALC :	CPM	HV :YES	SAMPLE REPEATS:	1	PRINTER	:EDIT
COUNT BLANK :	NO	ICW : NO	REPLICATES :	1	RS232	:EDIT
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1	DISK	: OFF
SCINTILLATOR:	LIQUID	LUMEX:YES	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none		

CHAN: 0.0 - 300.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
CHAN: 0.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

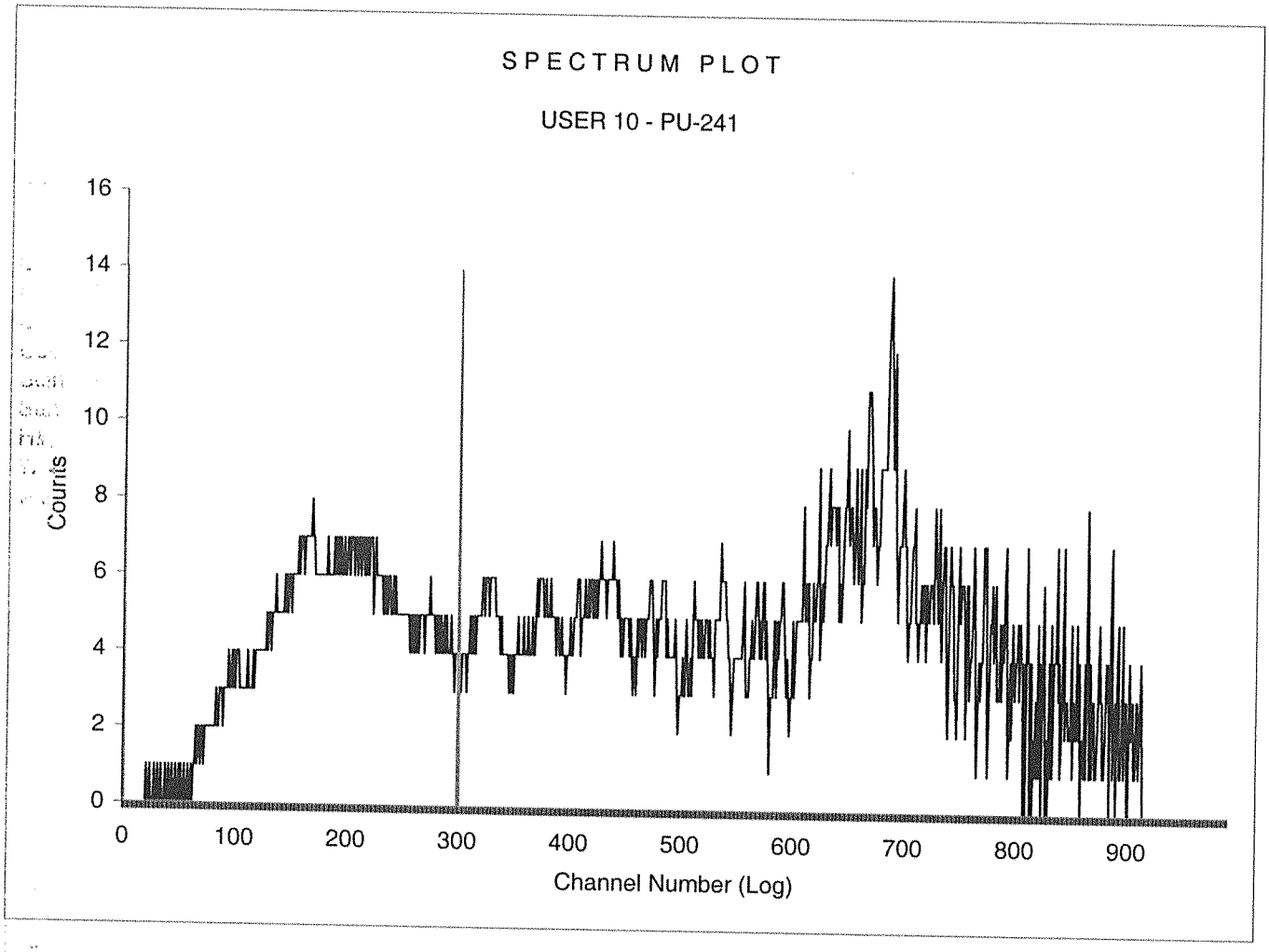
ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	HV	WIND1 RAW CPM	WIND2 RAW CPM	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	LUMEX %	ELAPSED TIME
DLL 1	1-1	90.00	128.5	13.58	42.84	13.42	5.79	42.69	3.23	0.36	92.40
18 2	1-2	90.00	128.9	13.16	45.21	12.98	5.89	45.03	3.15	0.39	185.31

Sample Count Start Time:	19 Sep 2016 12:43:03		
Data Capture Date	19 Sep 2016 14:13:11		
User Filename	S10091901-1A.XLS		
	U10091901-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	1-1	90.00
H#, Total Counts:	128.5	3881	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Sample Count Start Time:	19 Sep 2016 14:15:58		
Data Capture Date	19 Sep 2016 15:46:05		
User Filename	S10091901-2A.XLS		
	U10091901-1A.XLS		
Spectrum Type	Log Counts		
User Number	10		
User Id	PU-241		
User Comment	RED		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	1-2	90.00
##, Total Counts:	128.9	4082	
Win1: Pu-241 - Start, End:	0	300	
Win2: - Start, End:	0	990	



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240001_PU
SAMPLE QTY : 0.506 G +/-0.198 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 57.1 +/-10.163 %

CHAMBER : 070
DETECTOR S/N : 78262
AVERAGE %EFFICIENCY : 31.2964
AVERAGE %EFF ERROR : 0.6038
COUNT DATE : 15-Sep-2016 09:05:52
ELAPSED LIVE TIME(SEC) : 7835.90

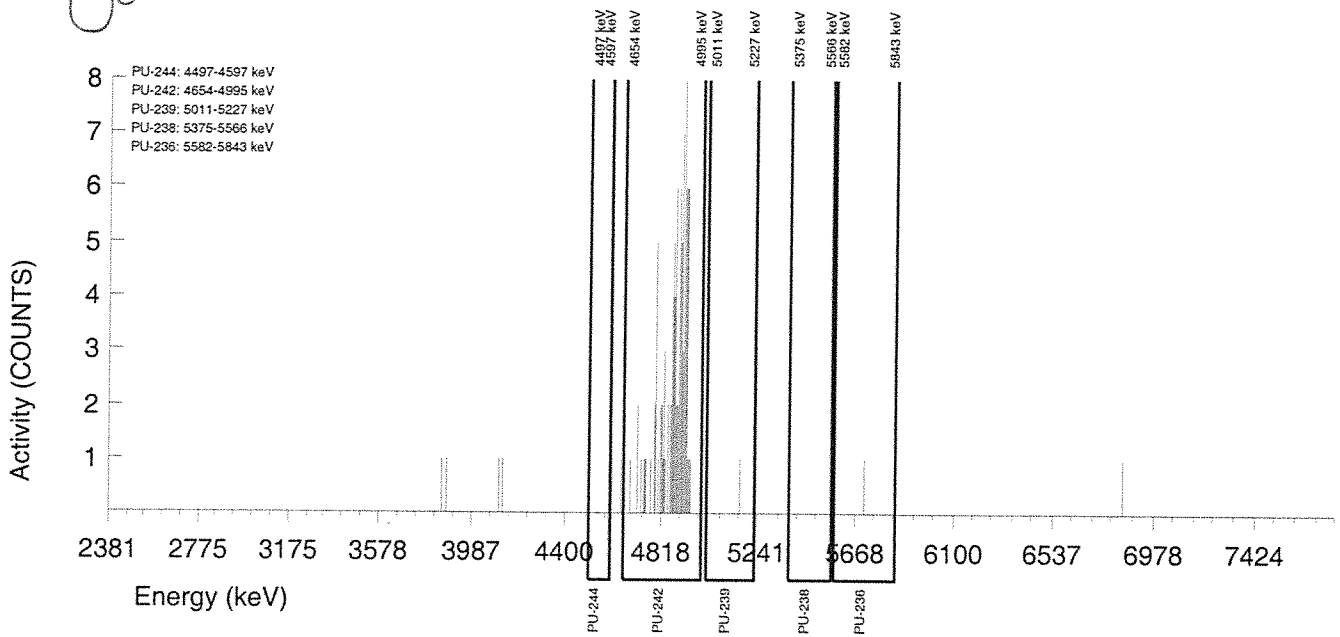
LIB FILE : PU
BKG FILE : B070.CNF;1819
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W070.CNF;500
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.5041E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5710.90	4.900	1.000	0.739	0.261	0.5111	100.000	3.38E-02	1.29E-01	2.19E-01	4.09E-02	1.28E-01
PU-238	5486.00	5470.34	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.63E-02	1.15E-01	0.00E+00	7.59E-02
PU-239	5155.00	5160.99	4.900	1.000	0.478	0.522	0.7228	99.900	1.82E-02	1.08E-01	2.11E-01	4.82E-02	1.08E-01
PU-242	4890.00	4866.71	130.993	103.000	102.347	0.653	0.8081	100.000	3.90E+00	1.10E+00	2.22E-01	5.39E-02	7.62E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.58E-02	1.14E-01	0.00E+00	7.54E-02

AD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240002_PU
SAMPLE QTY : 0.503 G +/-0.199 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 54.2 +/-10.290 %

CHAMBER : 071
DETECTOR S/N : 80020
AVERAGE %EFFICIENCY : 32.1394
AVERAGE %EFF ERROR : 0.6198
COUNT DATE : 15-Sep-2016 09:05:53
ELAPSED LIVE TIME(SEC) : 7868.40

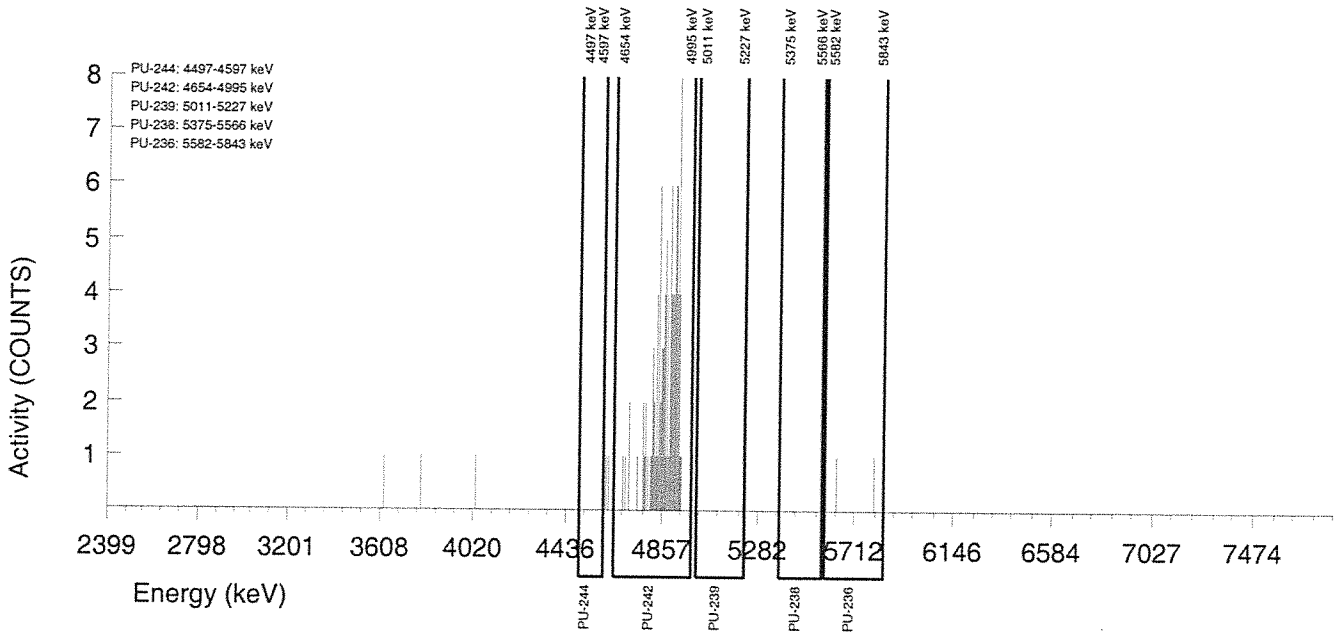
LIB FILE : PU
BKG FILE : B071.CNF;1812
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 60000.00
EFF FILE : W071.CNF;464
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.3746E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5714.38	158.509	2.000	1.607	0.393	0.6272	100.000	7.57E-02	1.62E-01	2.45E-01	5.17E-02	1.62E-01
PU-238	5486.00	5470.34	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.85E-02	1.18E-01	0.00E+00	7.81E-02
PU-239	5155.00	5118.68	0.000	0.000	-0.393	0.393	0.6272	99.900	-1.54E-02	8.00E-02	2.04E-01	4.31E-02	7.96E-02
PU-242	4890.00	4872.52	86.189	101.000	100.082	0.918	0.9581	100.000	3.93E+00	1.12E+00	2.49E-01	6.57E-02	7.77E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	7.80E-02	1.18E-01	0.00E+00	7.76E-02

9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240003_PU
SAMPLE QTY : 0.508 G +/-0.197 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 48.1 +/-13.540 %

CHAMBER : 231
DETECTOR S/N : 87919
AVERAGE %EFFICIENCY : 22.4877
AVERAGE %EFF ERROR : 0.4374
COUNT DATE : 15-Sep-2016 11:51:11
ELAPSED LIVE TIME(SEC) : 7200.00

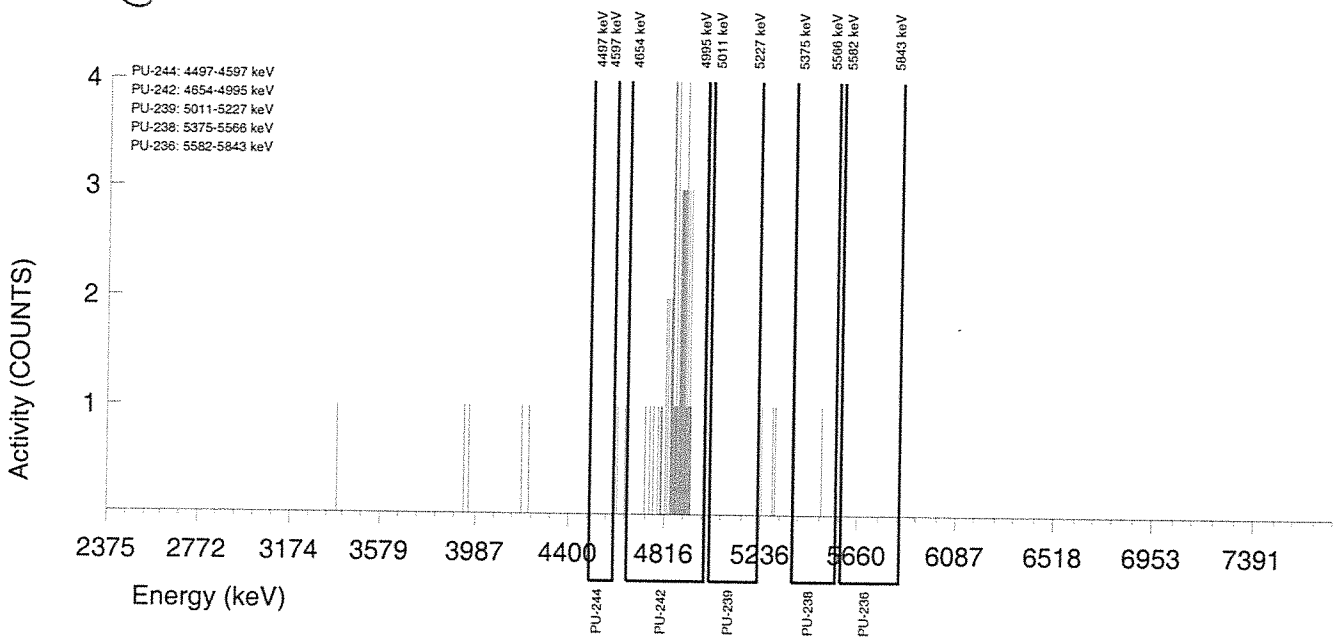
LIB FILE : PU
BKG FILE : B231.CNF;419
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 60000.00
EFF FILE : W231.CNF;107
CAL DATE : 16-Aug-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.1078E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.28	0.000	0.000	-0.120	0.120	0.3464	100.000	-9.85E-03	1.65E-01	3.45E-01	4.95E-02	1.63E-01
PU-238	5486.00	5500.38	4.947	1.000	0.520	0.480	0.6928	99.900	3.58E-02	1.95E-01	3.72E-01	8.30E-02	1.94E-01
PU-239	5155.00	5118.70	0.000	0.000	-0.240	0.240	0.4899	99.900	-1.64E-02	1.38E-01	3.22E-01	5.83E-02	1.37E-01
PU-242	4890.00	4860.89	81.621	57.000	56.880	0.120	0.3464	100.000	3.89E+00	1.46E+00	2.87E-01	4.12E-02	1.02E+00
PU-244	4589.00	4546.97	0.000	0.000	-0.120	0.120	0.3464	99.900	-8.21E-03	1.37E-01	2.88E-01	4.12E-02	1.36E-01

9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240004_PU
SAMPLE QTY : 0.519 G +/-0.193 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 68.5 +/-8.970 %

CHAMBER : 073
DETECTOR S/N : 78775
AVERAGE %EFFICIENCY : 33.5965
AVERAGE %EFF ERROR : 0.6474
COUNT DATE : 15-Sep-2016 09:05:53
ELAPSED LIVE TIME(SEC) : 7875.59

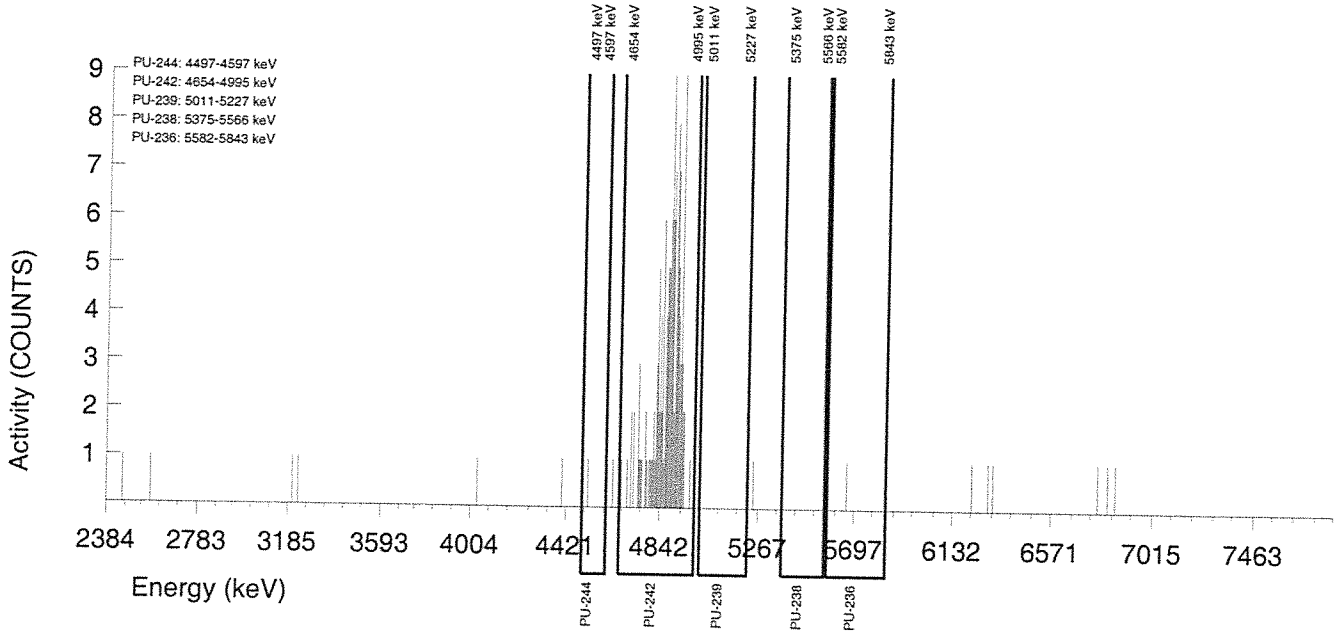
LIB FILE : PU
BKG FILE : B073.CNF;1818
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 60000.00
EFF FILE : W073.CNF;495
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0011E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5664.77	4.947	1.000	0.212	0.788	0.8874	100.000	7.33E-03	9.87E-02	2.11E-01	5.36E-02	9.85E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.131	0.131	0.3623	99.900	-3.80E-03	5.79E-02	1.24E-01	1.83E-02	5.77E-02
PU-239	5155.00	5118.68	0.000	0.000	-0.788	0.788	0.8874	99.900	-2.27E-02	5.99E-02	1.76E-01	4.47E-02	5.97E-02
PU-242	4890.00	4863.00	98.944	133.000	132.344	0.656	0.8101	100.000	3.80E+00	9.45E-01	1.68E-01	4.07E-02	6.52E-01
PU-244	4589.00	4520.26	4.947	1.000	0.737	0.263	0.5124	99.900	2.12E-02	8.09E-02	1.38E-01	2.58E-02	8.08E-02

QD 9/13/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240005_PU
SAMPLE QTY : 0.514 G +/-0.195 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 88.2 +/-8.341 %

CHAMBER : 074
DETECTOR S/N : 83296
AVERAGE %EFFICIENCY : 30.3767
AVERAGE %EFF ERROR : 0.5864
COUNT DATE : 15-Sep-2016 09:05:53
ELAPSED LIVE TIME(SEC) : 7879.69

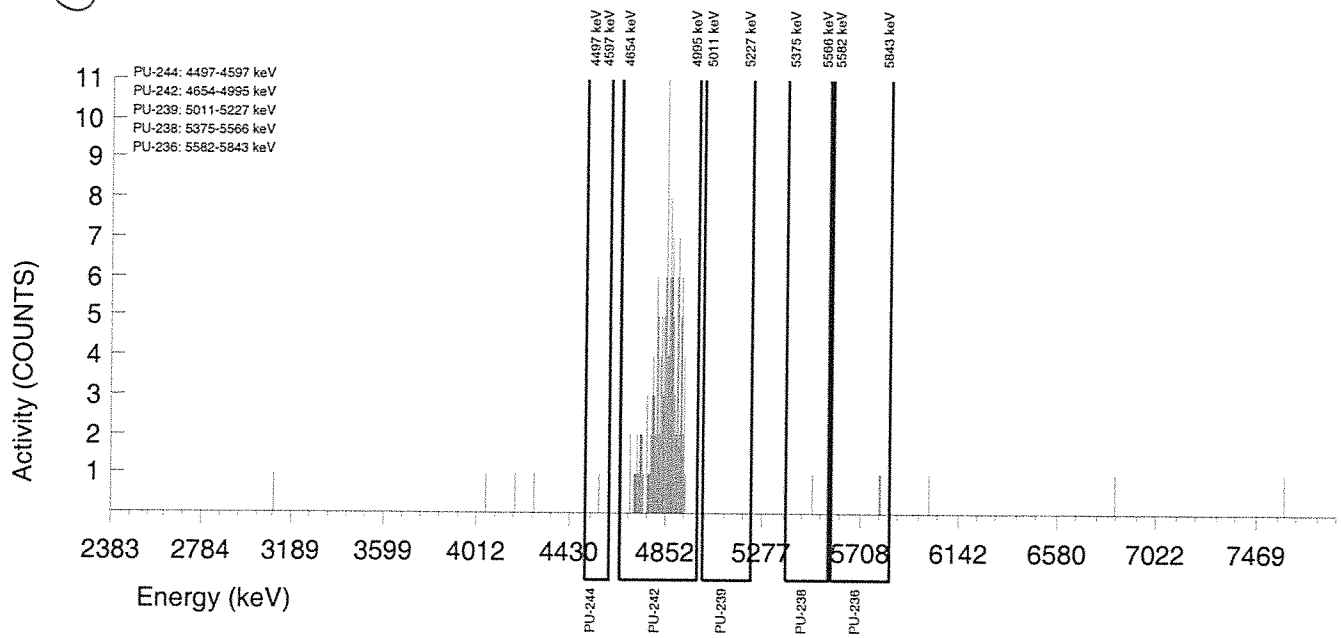
LIB FILE : PU
BKG FILE : B074.CNF;1836
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 60000.00
EFF FILE : W074.CNF;511
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.8656E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5796.71	9.976	2.000	0.555	1.445	1.2019	100.000	1.66E-02	1.05E-01	2.16E-01	6.29E-02	1.05E-01
PU-238	5486.00	5497.35	4.988	1.000	0.475	0.525	0.7248	99.900	1.19E-02	7.11E-02	1.39E-01	3.18E-02	7.10E-02
PU-239	5155.00	5118.69	0.000	0.000	-0.394	0.394	0.6277	99.900	-9.82E-03	5.07E-02	1.30E-01	2.74E-02	5.05E-02
PU-242	4890.00	4845.05	105.997	155.000	154.212	0.788	0.8877	100.000	3.84E+00	8.88E-01	1.52E-01	3.87E-02	6.10E-01
PU-244	4589.00	4576.96	0.000	2.000	1.606	0.394	0.6277	99.900	4.00E-02	8.59E-02	1.30E-01	2.74E-02	8.56E-02

JD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

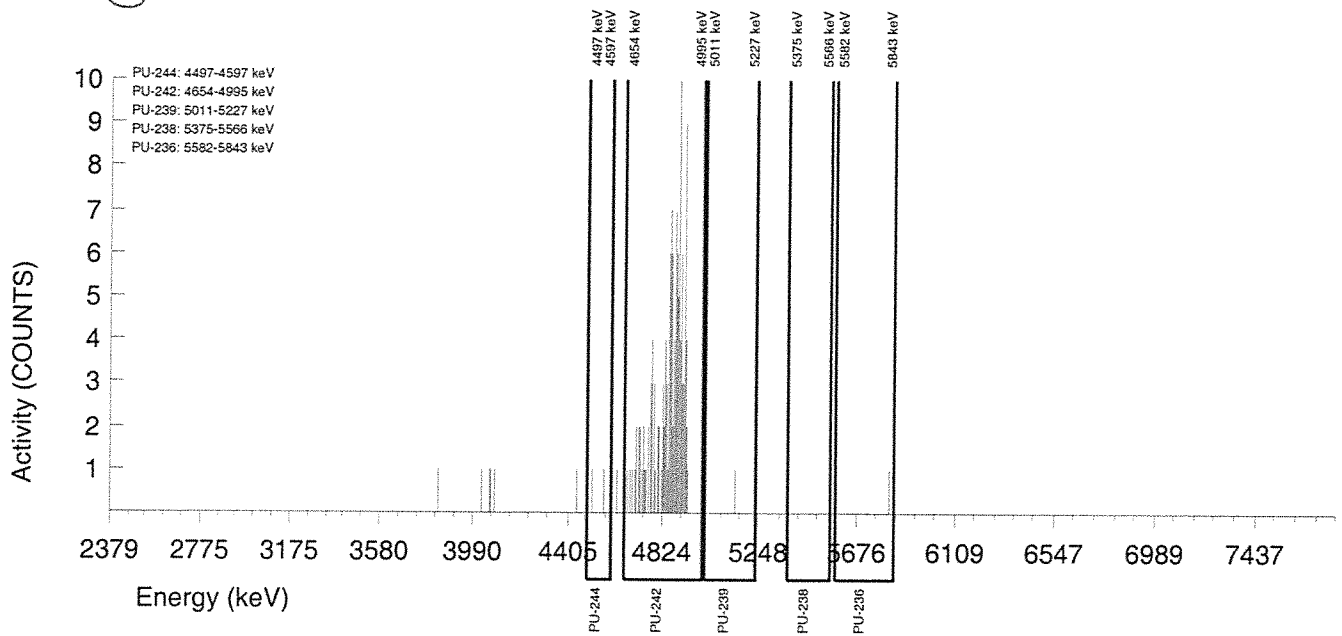
BATCH NUMBER : 1596448	CHAMBER : 075	LIB FILE : PU
SAMPLE ID : R0405240006_PU	DETECTOR S/N : 80010	BKG FILE : B075.CNF;1819
SAMPLE QTY : 0.500 G +/-0.200 %	AVERAGE %EFFICIENCY : 32.3452	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6238	BKG LIVE TIME(SEC) : 60000.00
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:53	EFF FILE : W075.CNF;478
% YIELD : 69.2 +/-9.140 %	ELAPSED LIVE TIME(SEC) : 7885.98	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0320E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5821.65	4.917	1.000	0.211	0.789	0.8880	100.000	7.78E-03	1.05E-01	2.25E-01	5.72E-02	1.05E-01
PU-238	5486.00	5470.34	0.000	0.000	-0.263	0.263	0.5127	99.900	-8.11E-03	6.23E-02	1.48E-01	2.77E-02	6.20E-02
PU-239	5155.00	5141.14	4.917	1.000	0.080	0.920	0.9592	99.900	2.45E-03	8.81E-02	1.95E-01	5.15E-02	8.79E-02
PU-242	4890.00	4848.80	68.842	131.000	128.897	2.103	1.4501	100.000	3.95E+00	1.00E+00	2.47E-01	7.77E-02	6.91E-01
PU-244	4589.00	4540.31	54.090	2.000	1.869	0.131	0.3625	99.900	5.73E-02	1.05E-01	1.31E-01	1.95E-02	1.05E-01

GD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240007_PU
SAMPLE QTY : 0.503 G +/-0.199 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 69.0 +/-8.880 %

CHAMBER : 078
DETECTOR S/N : 38633
AVERAGE %EFFICIENCY : 33.4433
AVERAGE %EFF ERROR : 0.6444
COUNT DATE : 15-Sep-2016 09:05:54
ELAPSED LIVE TIME(SEC) : 7993.74

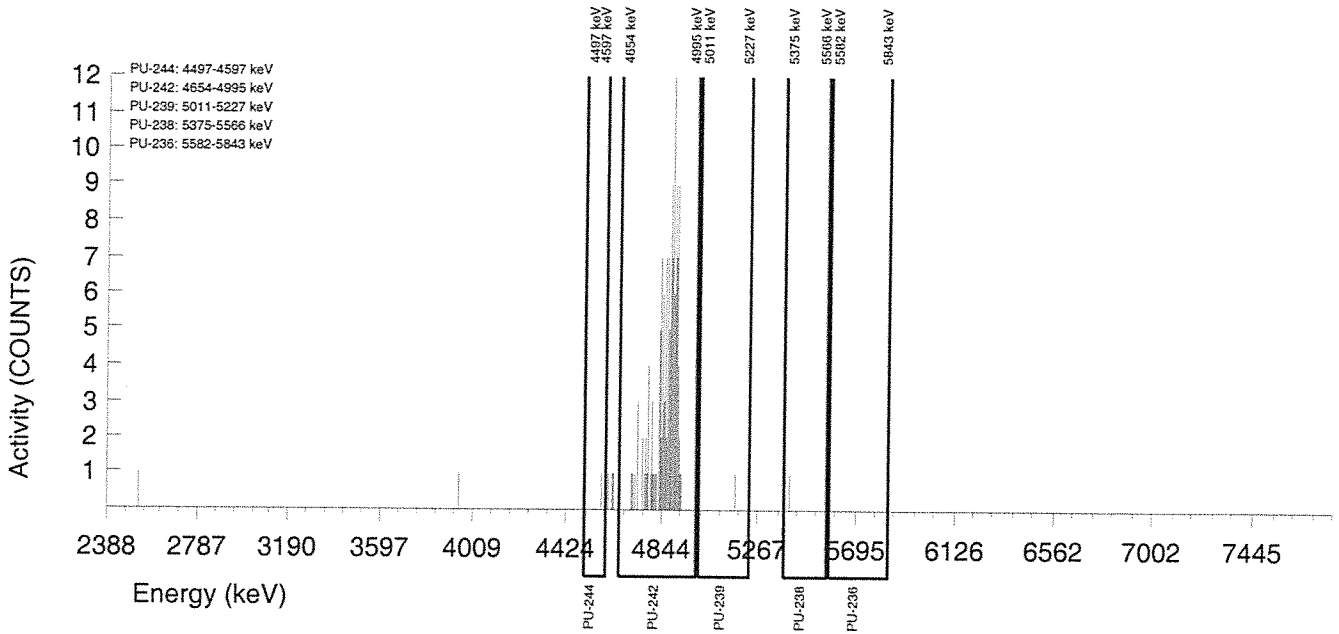
LIB FILE : PU
BKG FILE : B078.CNF;1724
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W078.CNF;447
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.0239E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.27	0.000	0.000	-0.266	0.266	0.5162	100.000	-9.32E-03	7.06E-02	1.68E-01	3.16E-02	7.04E-02
PU-238	5486.00	5405.58	4.964	1.000	0.867	0.133	0.3650	99.900	2.54E-02	8.22E-02	1.26E-01	1.88E-02	8.20E-02
PU-239	5155.00	5166.13	4.964	1.000	0.734	0.266	0.5162	99.900	2.14E-02	8.21E-02	1.40E-01	2.64E-02	8.19E-02
PU-242	4890.00	4857.08	74.949	135.000	134.734	0.266	0.5162	100.000	3.93E+00	9.66E-01	1.40E-01	2.63E-02	6.66E-01
PU-244	4589.00	4575.72	4.964	1.000	1.000	0.000	0.0000	99.900	2.92E-02	8.14E-02	8.75E-02	0.00E+00	8.12E-02

9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240008_PU
SAMPLE QTY : 0.516 G +/-0.194 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 77.0 +/-8.322 %

CHAMBER : 080
DETECTOR S/N : 78197
AVERAGE %EFFICIENCY : 34.4422
AVERAGE %EFF ERROR : 0.6633
COUNT DATE : 15-Sep-2016 09:05:54
ELAPSED LIVE TIME(SEC) : 7999.20

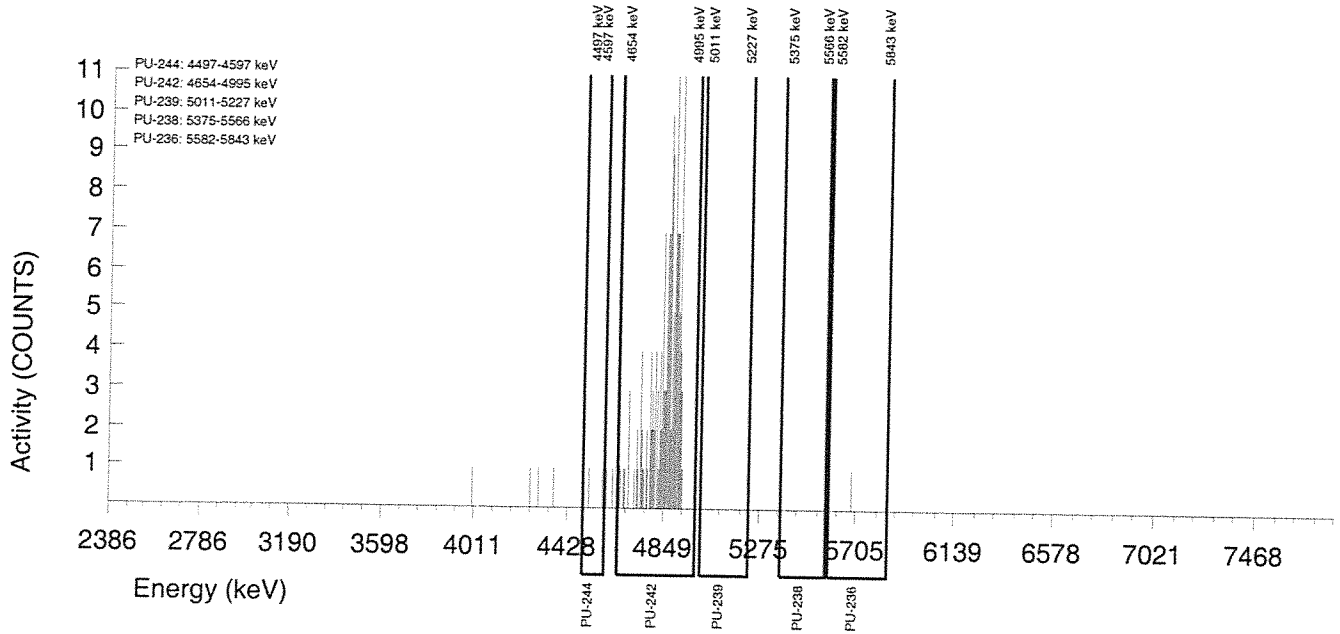
LIB FILE : PU
BKG FILE : B080.CNF;1726
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W080.CNF;446
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.3770E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5683.10	4.969	1.000	0.600	0.400	0.6324	100.000	1.78E-02	8.37E-02	1.55E-01	3.28E-02	8.36E-02
PU-238	5486.00	5470.35	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	4.93E-02	7.45E-02	0.00E+00	4.91E-02
PU-239	5155.00	5018.80	4.969	1.000	0.467	0.533	0.7303	99.900	1.15E-02	7.01E-02	1.37E-01	3.16E-02	7.00E-02
PU-242	4890.00	4852.88	74.955	156.000	155.067	0.933	0.9660	100.000	3.83E+00	8.82E-01	1.58E-01	4.17E-02	6.06E-01
PU-244	4589.00	4551.03	59.623	2.000	1.733	0.267	0.5164	99.900	4.28E-02	8.49E-02	1.19E-01	2.23E-02	8.46E-02

9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240009_PU
SAMPLE QTY : 0.507 G +/-0.197 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 77.1 +/-8.450 %

CHAMBER : 081
DETECTOR S/N : 79996
AVERAGE %EFFICIENCY : 33.0506
AVERAGE %EFF ERROR : 0.6369
COUNT DATE : 15-Sep-2016 09:05:54
ELAPSED LIVE TIME(SEC) : 8031.35

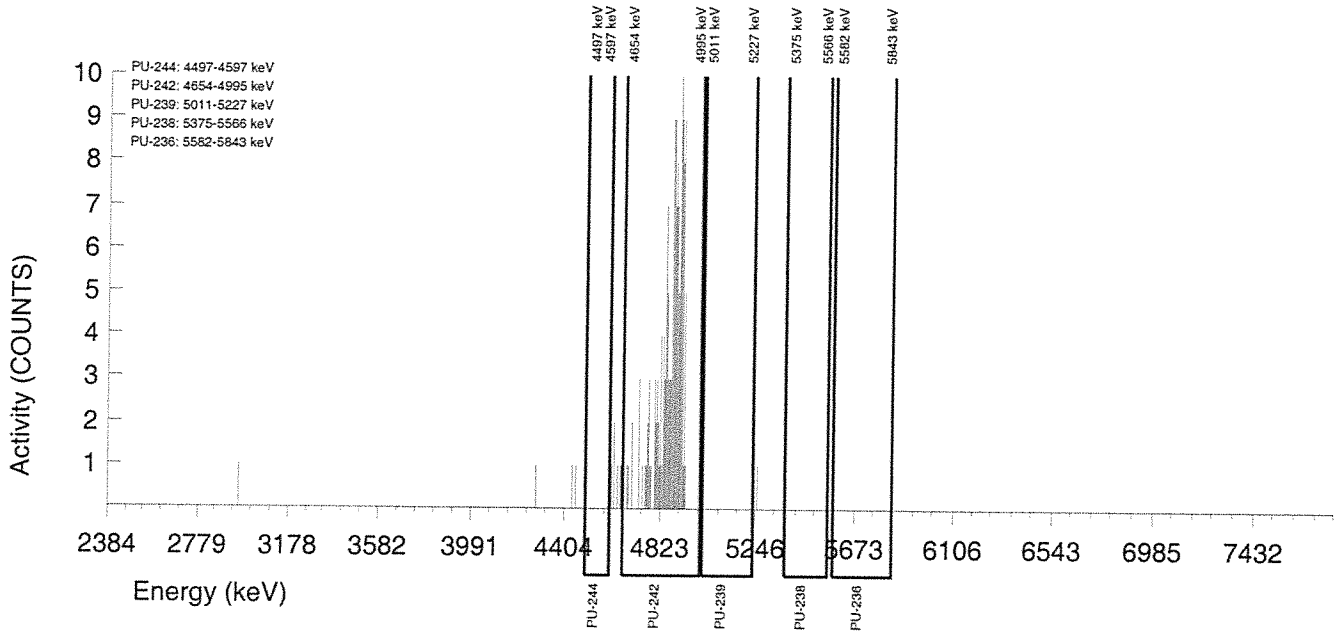
LIB FILE : PU
BKG FILE : B081.CNF;1732
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W081.CNF;446
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.3815E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.23	0.000	0.000	-0.535	0.535	0.7317	100.000	-1.67E-02	6.42E-02	1.74E-01	4.01E-02	6.39E-02
PU-238	5486.00	5470.33	0.000	0.000	-0.268	0.268	0.5174	99.900	-7.02E-03	5.29E-02	1.26E-01	2.38E-02	5.27E-02
PU-239	5155.00	5118.67	0.000	0.000	-0.402	0.402	0.6337	99.900	-1.05E-02	5.31E-02	1.36E-01	2.89E-02	5.29E-02
PU-242	4890.00	4858.92	73.517	150.000	149.598	0.402	0.6337	100.000	3.89E+00	9.12E-01	1.36E-01	2.89E-02	6.27E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.17E-02	7.82E-02	0.00E+00	5.15E-02

GD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240010_PU
SAMPLE QTY : 0.508 G +/-0.197 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 60.6 +/-9.728 %

CHAMBER : 082
DETECTOR S/N : 79997
AVERAGE %EFFICIENCY : 31.9848
AVERAGE %EFF ERROR : 0.6168
COUNT DATE : 15-Sep-2016 09:05:54
ELAPSED LIVE TIME(SEC) : 8036.95

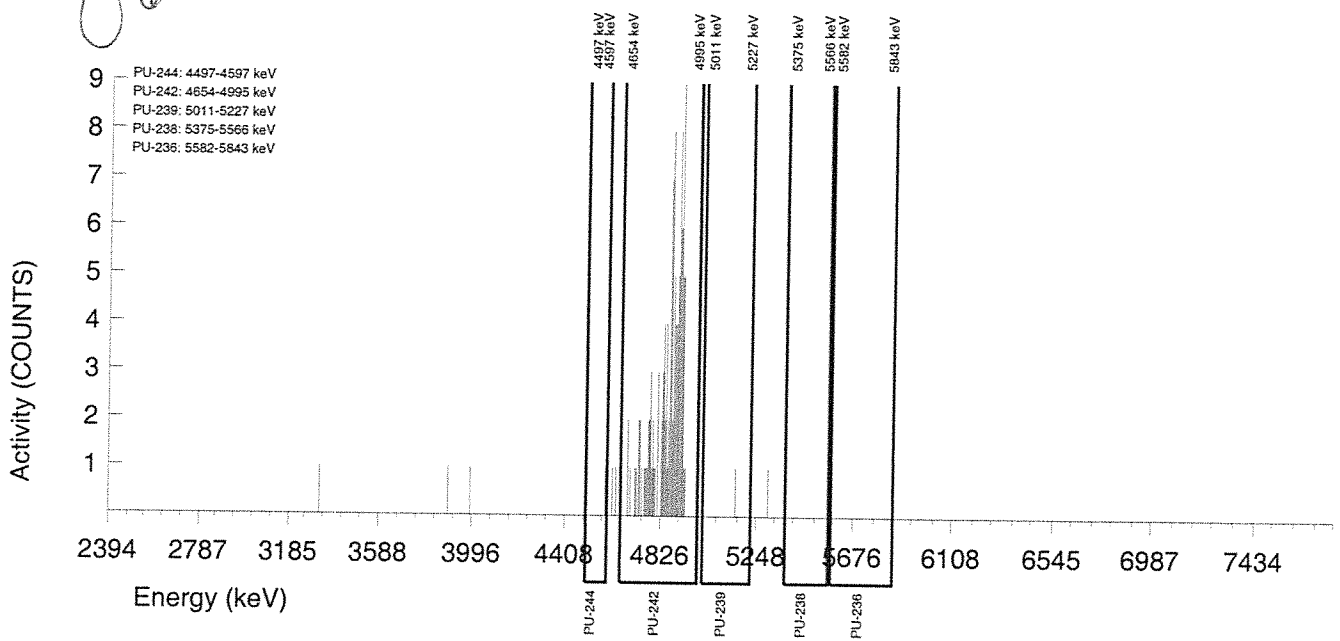
LIB FILE : PU
BKG FILE : B082.CNF;1722
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W082.CNF;423
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.6544E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.23	0.000	0.000	-0.804	0.804	0.8965	100.000	-3.30E-02	8.57E-02	2.52E-01	6.44E-02	8.53E-02
PU-238	5486.00	5470.33	0.000	0.000	-0.402	0.402	0.6339	99.900	-1.38E-02	7.02E-02	1.80E-01	3.82E-02	6.98E-02
PU-239	5155.00	5158.16	4.883	1.000	-0.206	1.206	1.0980	99.900	-7.03E-03	9.92E-02	2.34E-01	6.58E-02	9.90E-02
PU-242	4890.00	4857.52	56.763	116.000	113.723	2.277	1.5090	100.000	3.89E+00	1.05E+00	2.83E-01	9.03E-02	7.26E-01
PU-244	4589.00	4585.16	4.883	1.000	0.866	0.134	0.3660	99.900	2.96E-02	9.59E-02	1.46E-01	2.19E-02	9.57E-02

8DDalis1u



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

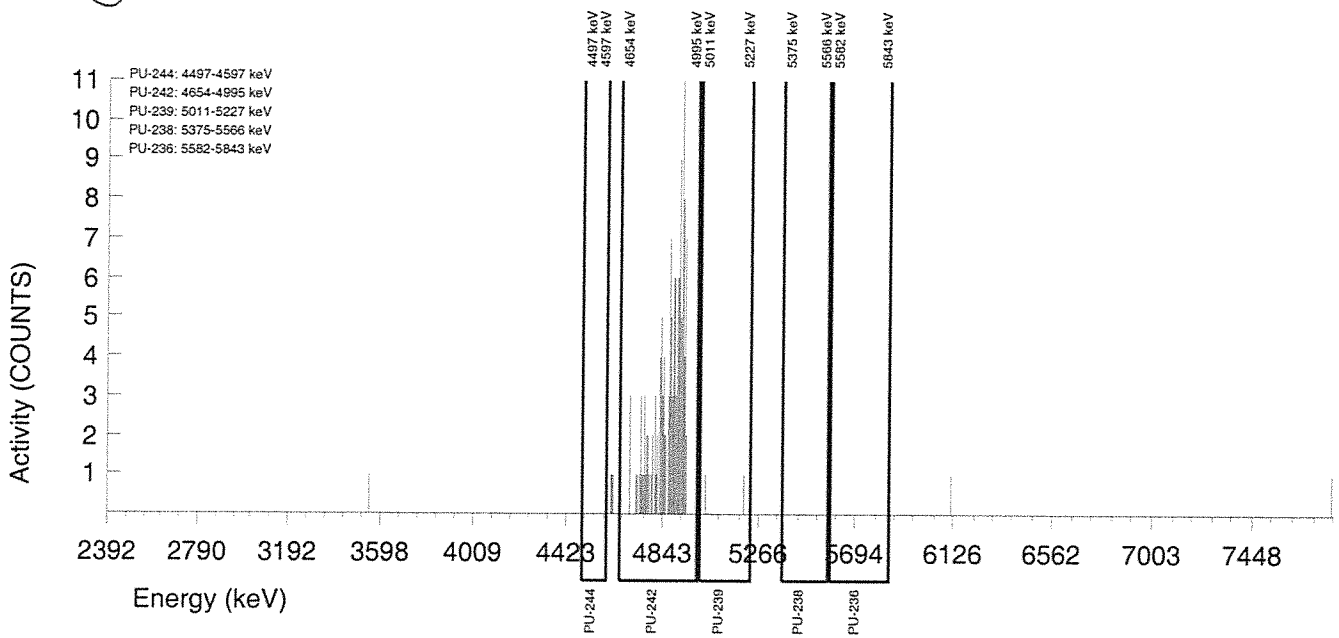
Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448	CHAMBER : 083	LIB FILE : PU
SAMPLE ID : R0405240011_PU	DETECTOR S/N : 78785	BKG FILE : B083.CNF;1738
SAMPLE QTY : 0.510 G +/-0.196 %	AVERAGE %EFFICIENCY : 35.3477	BKG DATE : 09-Sep-2016
SAMPLE DATE : 15-Dec-2015 00:00:00	AVERAGE %EFF ERROR : 0.6805	BKG LIVE TIME(SEC) : 59999.99
ANALYST : MXS2	COUNT DATE : 15-Sep-2016 09:05:55	EFF FILE : W083.CNF;485
% YIELD : 66.3 +/-8.777 %	ELAPSED LIVE TIME(SEC) : 8108.65	CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.9081E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.270	0.270	0.5199	100.000	-9.04E-03	6.76E-02	1.61E-01	3.05E-02	6.74E-02
PU-238	5486.00	5470.35	0.000	0.000	-0.676	0.676	0.8220	99.900	-1.90E-02	5.81E-02	1.65E-01	4.04E-02	5.79E-02
PU-239	5155.00	5117.33	163.129	2.000	0.649	1.351	1.1625	99.900	1.81E-02	9.79E-02	1.97E-01	5.68E-02	9.78E-02
PU-242	4890.00	4871.39	67.600	140.000	138.919	1.081	1.0398	100.000	3.87E+00	9.41E-01	1.85E-01	5.08E-02	6.49E-01
PU-244	4589.00	4546.97	0.000	0.000	0.000	0.000	0.0000	99.900	0.00E+00	5.54E-02	8.37E-02	0.00E+00	5.52E-02



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240012_PU
SAMPLE QTY : 0.501 G +/-0.200 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 67.3 +/-8.804 %

CHAMBER : 084
DETECTOR S/N : 78265
AVERAGE %EFFICIENCY : 34.7248
AVERAGE %EFF ERROR : 0.6686
COUNT DATE : 15-Sep-2016 09:05:55
ELAPSED LIVE TIME(SEC) : 8113.37

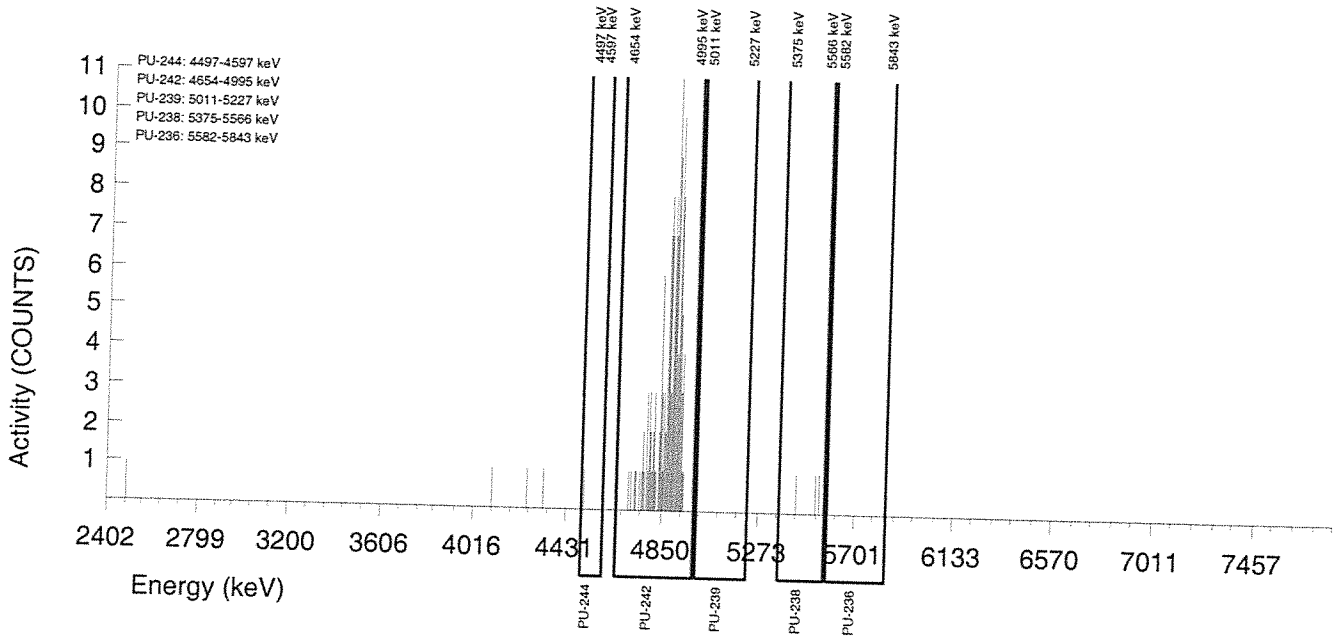
LIB FILE : PU
BKG FILE : B084.CNF;1727
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W084.CNF;476
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.9499E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.25	0.000	0.000	-0.811	0.811	0.9007	100.000	-2.77E-02	7.14E-02	2.10E-01	5.39E-02	7.11E-02
PU-238	5486.00	5506.25	98.663	3.000	2.594	0.406	0.6369	99.900	7.43E-02	1.14E-01	1.50E-01	3.20E-02	1.13E-01
PU-239	5155.00	5118.68	0.000	0.000	-0.676	0.676	0.8223	99.900	-1.93E-02	5.90E-02	1.68E-01	4.10E-02	5.88E-02
PU-242	4890.00	4873.65	78.725	140.000	138.513	1.487	1.2196	100.000	3.94E+00	9.61E-01	2.07E-01	6.08E-02	6.63E-01
PU-244	4589.00	4514.17	4.933	1.000	0.865	0.135	0.3677	99.900	2.46E-02	7.98E-02	1.22E-01	1.84E-02	7.97E-02

GD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240013_PU
SAMPLE QTY : 0.511 G +/-0.196 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 63.8 +/-9.251 %

CHAMBER : 085
DETECTOR S/N : 78776
AVERAGE %EFFICIENCY : 32.9780
AVERAGE %EFF ERROR : 0.6356
COUNT DATE : 15-Sep-2016 09:05:55
ELAPSED LIVE TIME(SEC) : 8117.88

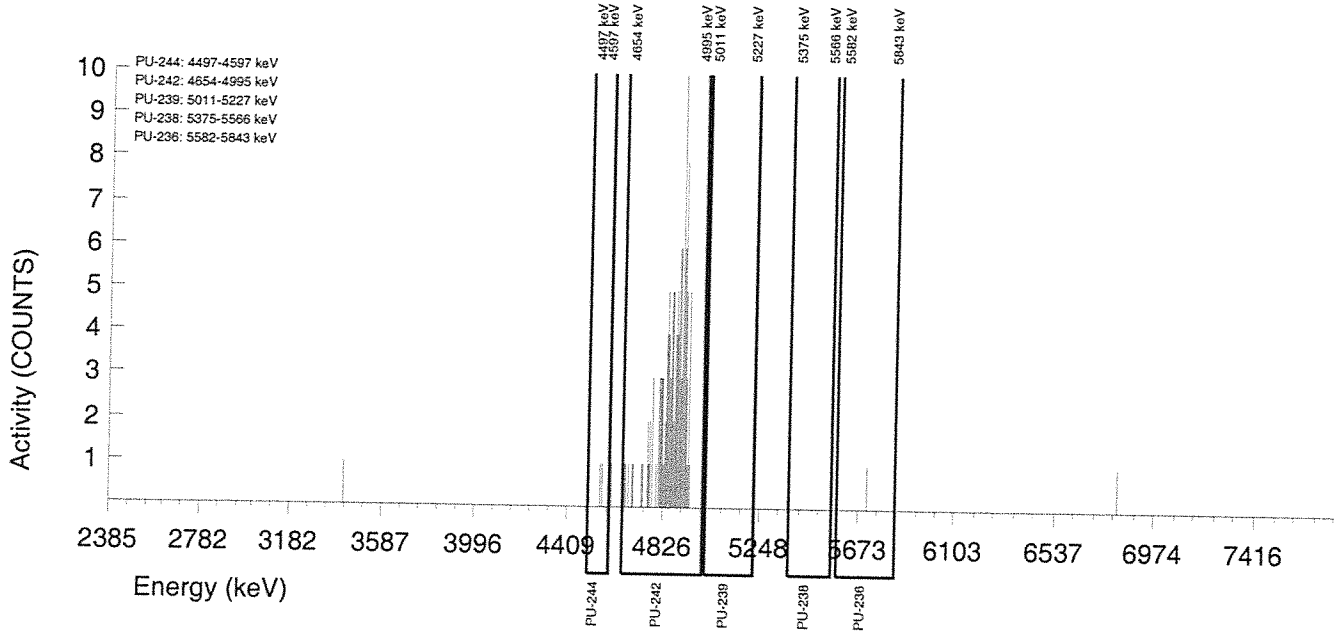
LIB FILE : PU
BKG FILE : B085.CNF;1730
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W085.CNF;479
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.7966E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5715.95	4.931	1.000	0.865	0.135	0.3678	100.000	3.21E-02	1.04E-01	1.59E-01	2.40E-02	1.04E-01
PU-238	5486.00	5470.35	0.000	0.000	-0.271	0.271	0.5202	99.900	-8.44E-03	6.30E-02	1.50E-01	2.84E-02	6.28E-02
PU-239	5155.00	5118.69	0.000	0.000	-1.218	1.218	1.1035	99.900	-3.77E-02	6.63E-02	2.13E-01	5.99E-02	6.61E-02
PU-242	4890.00	4861.07	32.051	126.000	124.782	1.218	1.1035	100.000	3.86E+00	9.90E-01	2.13E-01	5.99E-02	6.84E-01
PU-244	4589.00	4554.70	14.793	2.000	1.729	0.271	0.5202	99.900	5.36E-02	1.07E-01	1.50E-01	2.83E-02	1.06E-01

QD 9/15/16



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240014_PU
SAMPLE QTY : 0.505 G +/-0.198 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 48.0 +/-10.936 %

CHAMBER : 086
DETECTOR S/N : 78198
AVERAGE %EFFICIENCY : 31.1951
AVERAGE %EFF ERROR : 0.6019
COUNT DATE : 15-Sep-2016 09:05:55
ELAPSED LIVE TIME(SEC) : 8122.21

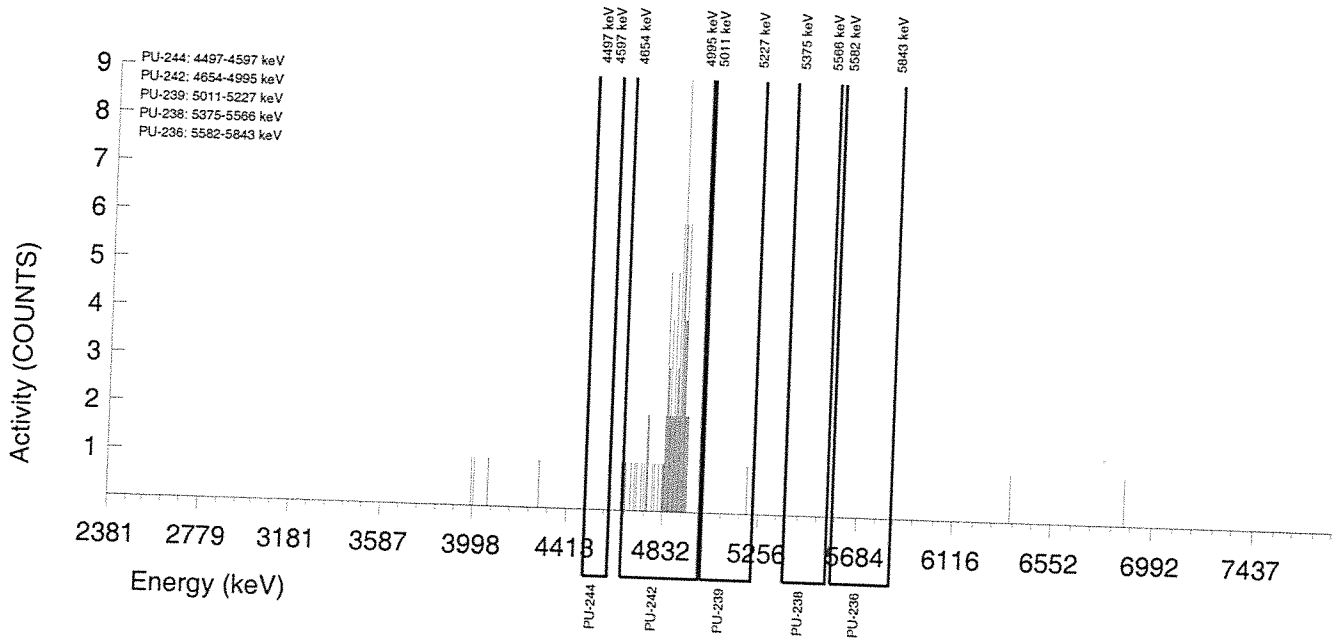
LIB FILE : PU
BKG FILE : B086.CNF;1731
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W086.CNF;455
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 2.1024E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5712.26	0.000	0.000	-0.271	0.271	0.5203	100.000	-1.43E-02	1.07E-01	2.55E-01	4.82E-02	1.06E-01
PU-238	5486.00	5470.35	0.000	0.000	-0.812	0.812	0.9012	99.900	-3.60E-02	9.28E-02	2.73E-01	7.01E-02	9.23E-02
PU-239	5155.00	5202.78	4.948	1.000	-0.218	1.218	1.1038	99.900	-9.62E-03	1.28E-01	3.03E-01	8.53E-02	1.28E-01
PU-242	4890.00	4862.66	76.899	90.000	88.782	1.218	1.1038	100.000	3.91E+00	1.18E+00	3.03E-01	8.52E-02	8.24E-01
PU-244	4589.00	4596.09	0.000	1.000	0.865	0.135	0.3679	99.900	3.81E-02	1.24E-01	1.89E-01	2.84E-02	1.23E-01

9/15/14



Alpha Spectroscopy Software Version 3.5.3
effective date: 02-Mar-2015

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009
Analytical SOP: GL-RAD-A-035

BATCH NUMBER : 1596448
SAMPLE ID : R0405240015_PU
SAMPLE QTY : 0.508 G +/-0.197 %
SAMPLE DATE : 15-Dec-2015 00:00:00
ANALYST : MXS2
% YIELD : 77.6 +/-8.630 %

CHAMBER : 088
DETECTOR S/N : 83291
AVERAGE %EFFICIENCY : 31.2191
AVERAGE %EFF ERROR : 0.6024
COUNT DATE : 15-Sep-2016 09:05:55
ELAPSED LIVE TIME(SEC) : 8128.86

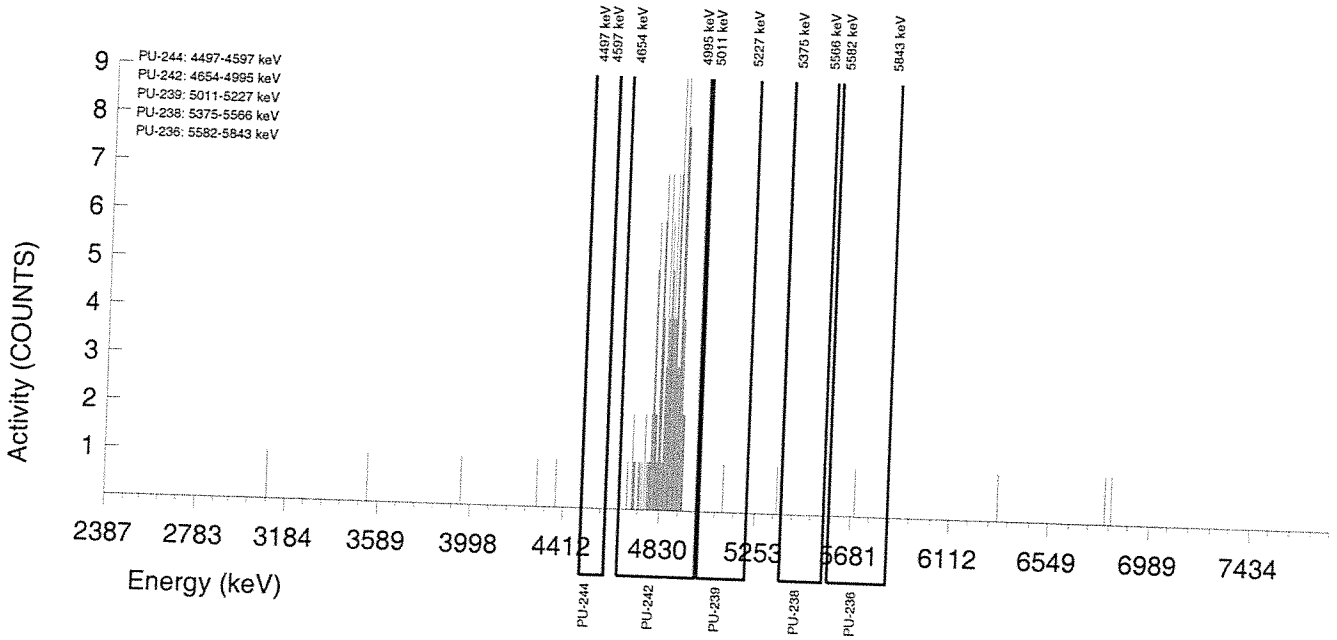
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BKG FILE : B088.CNF;1726
BKG DATE : 09-Sep-2016
BKG LIVE TIME(SEC) : 59999.99
EFF FILE : W088.CNF;463
CAL DATE : 03-Sep-2016

TRACER
ID : 1770-A
NUCLIDE : PU-242
NOMINAL : 4.3831E+00 dpm
RESULTS : 3.4026E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/G	1.96-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc pCi/G
PU-236	5749.00	5696.65	4.923	1.000	0.594	0.406	0.6375	100.000	1.92E-02	9.17E-02	1.70E-01	3.62E-02	9.15E-02
PU-238	5486.00	5470.34	0.000	0.000	-0.542	0.542	0.7362	99.900	-1.47E-02	5.59E-02	1.52E-01	3.51E-02	5.57E-02
PU-239	5155.00	5115.33	4.923	1.000	0.594	0.406	0.6375	99.900	1.60E-02	7.64E-02	1.42E-01	3.02E-02	7.63E-02
PU-242	4890.00	4857.46	118.351	145.000	143.916	1.084	1.0411	100.000	3.89E+00	9.29E-01	1.80E-01	4.93E-02	6.40E-01
PU-244	4589.00	4546.97	0.000	0.000	-0.135	0.135	0.3681	99.900	-3.66E-03	5.42E-02	1.16E-01	1.74E-02	5.39E-02

GWO 9/15/16



Batch# 1598055 Product: C14 Date: 9/29/16

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 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 than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			NA
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.		✓	See DSR 1562538
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.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DSR 1562538
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		DER 1562538
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.)	✓		

Primary Review Performed By: [signature] 9/29/16

Secondary Review Performed By: [signature] 9/29/16

MJC 10/4

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
29-SEP-16	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LSC	EPA EERF C-01 Modified	Solid	MJWC
Batch ID:	**Sample Numbers:**		
1598055	See Below		

Potentially affected work order(s)(SDG): 405240

Application Issues:

Sample Analyzed out of Holding

Sample Logged out of Holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 405240001, 405240002, 405240003, 405240004, 405240005, 405240006, 405240007, 405240008, 405240009, 405240010, 405240011, 405240012, 405240013, 405240014, 405240015, 405240016, 1203626058, and 1203626059 were received and analyzed out of the method specified hold time.	1. Reporting results.

Originator's Name:

Elizabeth Krouse 29-SEP-16

Data Validator/Group Leader:

Lyndsey Pace 29-SEP-16

MJWC 10/4/16 TO 10/4

Prep Logbook

The Determination of Carbon-14 in Water, Soil, Vegetation and Other Solid Matrices

Batch ID: **1598055**
Analyst: Tiffany Jordan
Method: EPA EERF C-01 Modified
Lab SOP: GL-RAD-A-003 REV# 15
Instrument: BAL-16107662

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203626060	Carbon-14 SPIKE	1646-B	.1	mL
MS	1203626059	Carbon-14 SPIKE	1646-B	.1	mL

Sample ID	Prep Date	Matrix	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Flask #
405240001	27-SEP-2016 13:15:01	Soil	W	1.288	1.084	1
405240002	27-SEP-2016 13:15:01	Soil	W	1.3	1.098	2
405240003	27-SEP-2016 13:15:01	Soil	W	1.351	1.123	3
405240004	27-SEP-2016 13:15:01	Soil	W	1.255	1.069	4
405240005	27-SEP-2016 13:15:01	Soil	W	1.255	0.994	5
405240006	27-SEP-2016 13:15:01	Soil	W	1.343	1.094	6
405240007	27-SEP-2016 13:15:01	Soil	W	1.361	1.159	8
405240008	27-SEP-2016 13:15:01	Soil	W	1.297	1.113	83
405240009	27-SEP-2016 13:15:01	Soil	W	1.346	1.047	84
405240010	27-SEP-2016 13:15:01	Soil	W	1.372	1.131	86
405240011	27-SEP-2016 13:15:01	Soil	W	1.335	1.042	400
405240012	27-SEP-2016 13:15:01	Soil	W	1.373	1.103	402
405240013	27-SEP-2016 13:15:01	Soil	W	1.256	0.937	404
405240014	27-SEP-2016 13:15:01	Soil	W	1.252	1.061	405
405240015	27-SEP-2016 13:15:01	Soil	W	1.308	0.92	406
405240016	27-SEP-2016 13:15:01	Soil	W	1.279	1.003	506
1203626057 MB	27-SEP-2016 13:15:01	Soil	W		1.159	507
1203626058 DUP (405240001)	27-SEP-2016 13:15:01	Soil	W	1.365	1.149	514
1203626059 MS(405240001)	27-SEP-2016 13:15:01	Soil	W	1.356	1.142	519
1203626060 LCS	27-SEP-2016 13:15:01	Soil	W		1.159	530

Reagent/Solvent Lot ID	Description	Amount
2242305.2	Ecoscint A Scintillation Solution	10 mL
2431394.13	16M Nitric Acid Poly Coated Bottle	25 mL
2440076.3	Potassium Persulfate 99+%	5 g
2444293.4	Methanol 4L Plastic Bottle	9 mL
2455949	RL-1M Silver Nitrate	2 mL
2458954	RL-0.4M Hydrochloric Acid	50 mL

Comments:
Spike Pipet ID: RAD-LSC-2970968

C1598055

Carbon-14 Solid

Filename : C14.XLS
File type : Excel
Version # : 1.3.10

Batch : 1598055
Analyst : TIF02034
Prep Date : 9/27/2016
Method Uncertainty : 0.0363

Procedure Code : LSC_14CS
Parmname : Carbon-14
Required MDA : 2 pCi/G
C-14 Abundance : 1.00
Halflife of Carbon-14 : 5700.00 years

Geometry: 3mL Ethanolamine/9mL Methanol/10mL EcoScint A

Sample Characteristics					Count raw Data										
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	C-14 Normalization Factor	Sample Decay
1	405240001.1	1.0840	3.3321E-03	12/15/2015 10:14	59-2	70	631.39	10.97	11.54	70	623.35	11.4984	9/27/2016 22:22	1.00000	1.000
2	405240002.1	1.0980	3.3335E-03	12/15/2015 10:19	59-3	70	634.96	12.08	11.54	70	623.35	11.4434	9/27/2016 23:33	1.00000	1.000
3	405240003.1	1.1230	3.3361E-03	12/15/2015 10:18	59-4	70	628.65	11.99	11.54	70	623.35	11.5249	9/28/2016 0:44	1.00000	1.000
4	405240004.1	1.0690	3.3305E-03	12/15/2015 10:21	91-1	70	633.18	11.39	11.54	70	623.35	11.4738	9/28/2016 3:08	1.00000	1.000
5	405240005.1	0.9940	3.3227E-03	12/15/2015 11:42	91-2	70	630.32	11.93	11.54	70	623.35	11.5103	9/28/2016 4:19	1.00000	1.000
6	405240006.1	1.0940	3.3331E-03	12/15/2015 11:46	91-3	70	628.89	12.2	11.54	70	623.35	11.5231	9/28/2016 5:30	1.00000	1.000
7	405240007.1	1.1590	3.3399E-03	12/15/2015 12:17	91-4	70	634.84	12.41	11.54	70	623.35	11.4457	9/28/2016 6:42	1.00000	1.000
8	405240008.1	1.1130	3.3351E-03	12/15/2015 12:20	91-5	70	629.61	11.13	11.54	70	623.35	11.5171	9/28/2016 7:53	1.00000	1.000
9	405240009.1	1.0470	3.3282E-03	12/15/2015 12:31	91-6	70	634.96	12.09	11.54	70	623.35	11.4434	9/28/2016 9:04	1.00000	1.000
10	405240010.1	1.1310	3.3370E-03	12/15/2015 12:35	91-7	70	631.63	11.89	11.54	70	623.35	11.4954	9/28/2016 10:15	1.00000	1.000
11	405240011.1	1.0420	3.3277E-03	12/15/2015 12:53	91-8	70	632.23	11.49	11.54	70	623.35	11.4876	9/28/2016 11:27	1.00000	1.000
12	405240012.1	1.1030	3.3341E-03	12/15/2015 12:56	91-9	70	639.54	12.51	11.54	70	623.35	11.3371	9/28/2016 12:38	1.00000	1.000
13	405240013.1	0.9370	3.3168E-03	12/15/2015 11:04	91-10	70	630.98	12.11	11.54	70	623.35	11.5032	9/28/2016 13:49	1.00000	1.000
14	405240014.1	1.0610	3.3297E-03	12/15/2015 11:08	91-11	70	631.75	11.89	11.54	70	623.35	11.4939	9/28/2016 15:00	1.00000	1.000
15	405240015.1	0.9200	3.3150E-03	12/15/2015 14:02	91-12	70	631.04	11.52	11.54	70	623.35	11.5025	9/28/2016 16:11	1.00000	1.000
16	405240016.1	1.0030	3.3237E-03	12/15/2015 14:06	0-1	70	633.53	12.07	11.54	70	623.35	11.4683	9/28/2016 17:23	1.00000	1.000
17	1203626057.1	1.1590	3.3399E-03	9/27/2016 0:00	0-2	70	627.88	12.26	11.54	70	623.35	11.5300	9/28/2016 18:34	1.00000	1.000
18	1203626058.1	1.1490	3.3388E-03	12/15/2015 10:14	0-3	70	632.94	12.55	11.54	70	623.35	11.4774	9/28/2016 19:45	1.00000	1.000
19	1203626059.1	1.1420	3.3381E-03	12/15/2015 10:14	0-4	70	634.84	126.69	11.54	70	623.35	11.4457	9/28/2016 20:57	1.00000	1.000
20	1203626060.1	1.1590	3.3399E-03	9/27/2016 0:00	0-5	70	626.39	124.24	11.54	70	623.35	11.5370	9/28/2016 22:08	1.00000	1.000

Pipet, 0.1 ml Stdev : +/- 0.000200 ml
Pipet, 0.5 ml Stdev : +/- 0.001000 ml

Analytical SOP: GL-RAD-A-003
Instrument SOP: GL-RAD-I-014

Calibration Data

Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Rack Position #	Background Count Start Date/Time
1	LSCYELLOW	6/1/2016	5/31/2017	0.6893	0.00792	59-1	9/27/2016 21:10
2	LSCYELLOW	6/1/2016	5/31/2017	0.6922	0.00792	59-1	9/27/2016 21:10
3	LSCYELLOW	6/1/2016	5/31/2017	0.6868	0.00792	59-1	9/27/2016 21:10
4	LSCYELLOW	6/1/2016	5/31/2017	0.6908	0.00792	59-1	9/27/2016 21:10
5	LSCYELLOW	6/1/2016	5/31/2017	0.6884	0.00792	59-1	9/27/2016 21:10
6	LSCYELLOW	6/1/2016	5/31/2017	0.6871	0.00792	59-1	9/27/2016 21:10
7	LSCYELLOW	6/1/2016	5/31/2017	0.6921	0.00792	59-1	9/27/2016 21:10
8	LSCYELLOW	6/1/2016	5/31/2017	0.6877	0.00792	59-1	9/27/2016 21:10
9	LSCYELLOW	6/1/2016	5/31/2017	0.6922	0.00792	59-1	9/27/2016 21:10
10	LSCYELLOW	6/1/2016	5/31/2017	0.6895	0.00792	59-1	9/27/2016 21:10
11	LSCYELLOW	6/1/2016	5/31/2017	0.6901	0.00792	59-1	9/27/2016 21:10
12	LSCYELLOW	6/1/2016	5/31/2017	0.6951	0.00792	59-1	9/27/2016 21:10
13	LSCYELLOW	6/1/2016	5/31/2017	0.6890	0.00792	59-1	9/27/2016 21:10
14	LSCYELLOW	6/1/2016	5/31/2017	0.6896	0.00792	59-1	9/27/2016 21:10
15	LSCYELLOW	6/1/2016	5/31/2017	0.6890	0.00792	59-1	9/27/2016 21:10
16	LSCYELLOW	6/1/2016	5/31/2017	0.6911	0.00792	59-1	9/27/2016 21:10
17	LSCYELLOW	6/1/2016	5/31/2017	0.6861	0.00792	59-1	9/27/2016 21:10
18	LSCYELLOW	6/1/2016	5/31/2017	0.6906	0.00792	59-1	9/27/2016 21:10
19	LSCYELLOW	6/1/2016	5/31/2017	0.6921	0.00792	59-1	9/27/2016 21:10
20	LSCYELLOW	6/1/2016	5/31/2017	0.6846	0.00792	59-1	9/27/2016 21:10

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

* - RPD changed to 0% due to sample & dup activity below MDA

Spike S/N : 1646-B
Spike Exp Date : 1/5/2017
Spike Activity (dpm/ml): 1681.40
Spike Volume Added: 0.10

LCS S/N : 1646-B
LCS Exp Date : 1/5/2017
LCS Activity (dpm/ml): 1681.40
LCS Volume Added: 0.10

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 %	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	0.8051	0.5684	2	1.1627	**-0.3185**	107.23%	-0.5284	0.5665	0.6694	0.6694		SAMPLE				
2	0.7897	0.5575	2	1.1405	**0.3773**	91.07%	0.6366	0.5797	0.6735	0.6740		SAMPLE				
3	0.7809	0.5513	2	1.1277	**0.2716**	124.62%	0.4651	0.5796	0.6635	0.6638		SAMPLE				
4	0.8138	0.5746	2	1.1752	**-0.0511**	682.11%	-0.0838	0.5715	0.6833	0.6833		SAMPLE				
5	0.8797	0.6211	2	1.2703	**0.2763**	137.89%	0.4197	0.5787	0.7467	0.7470		SAMPLE				
6	0.8013	0.5657	2	1.1571	**0.4057**	86.01%	0.6769	0.5822	0.6839	0.6845		SAMPLE				
7	0.7483	0.5283	2	1.0807	**0.5416**	60.54%	0.9643	0.5838	0.6426	0.6438		SAMPLE				
8	0.7866	0.5554	2	1.1359	**-0.2278**	146.94%	-0.3871	0.5688	0.6561	0.6561		SAMPLE				
9	0.8282	0.5847	2	1.1960	**0.4019**	89.68%	0.6466	0.5798	0.7064	0.7070		SAMPLE				
10	0.7713	0.5446	2	1.1139	**0.2279**	146.49%	0.3946	0.5780	0.6544	0.6546		SAMPLE				
11	0.8363	0.5905	2	1.2078	**1.521E-03**	23598.41%	0.0024	0.5729	0.7036	0.7036		SAMPLE				
12	0.7792	0.5501	2	1.1254	**0.6892**	49.77%	1.1729	0.5837	0.6722	0.6741		SAMPLE				
13	0.9321	0.6581	2	1.3461	**0.4234**	95.72%	0.6068	0.5808	0.7944	0.7950		SAMPLE				
14	0.8221	0.5804	2	1.1871	**0.2439**	145.92%	0.3961	0.5780	0.6974	0.6977		SAMPLE				
15	0.9492	0.6702	2	1.3708	**0.0124**	3279.82%	0.0175	0.5735	0.7988	0.7988		SAMPLE				
16	0.8668	0.6120	2	1.2518	**0.3911**	96.38%	0.6017	0.5799	0.7387	0.7392		SAMPLE				
17	0.7576	0.5349	2	1.0940	**0.4135**	79.86%	0.7300	0.5830	0.6473	0.6480		MB				
18	0.7575	0.5348	2	1.0939	**0.6089**	54.63%	1.0726	0.5859	0.6519	0.6534	405240001.1	DUP	* 0.0%			
19	0.7595	0.5362	2	1.0968	**65.6871**	1.48%	115.2443	1.4048	1.5694	5.0484	405240001.1	MS			66.3273	99.0%
20	0.7595	0.5362	2	1.0967	**63.9859**	1.50%	112.7030	1.3927	1.5498	4.9238		LCS			65.3482	97.9%

PROTOCOL : 5 C-14 70 min
DATE : 2016/09/27
TIME : 21:10
ID : P05AS358

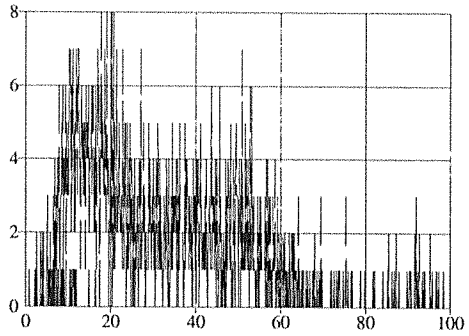
C-14

Wallac 1414 WinSpectral v1.40 S/N 4140127
Counting mode : DPM
Quench index : SQP(E)
Isotope(s) : C14
C14 = ,5730.00 y
Protocol name : C-14 70 min
Counting time : 4200
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 2.00
Minimum cpm : 0.00 Checking time: 10
Sp. library of isotope C14 : Wallac
Vial type : Diffuse
Liquid system : HiSafe
Advanced modes : Chemilum
Output to Display :
POS,DPM1,CPMw2,CLMM,FNCT2,
RACK,RACKPOS,FNCT1,SQPE,DATE,
TIME,CPMw1,CPM,CPM1,CTIME
Additions to Display : Listing,Header,Spectrum
Header : C-14
Spectrum : Rnd.Cos,Beta
Window 1 : 35- 300 /Beta
Window 2 : 35- 300 /Rnd.Cos
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 : CTIME/60
FNCT2 = FNCT2 : CPMW1-CPMW2
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total activity:

C14	54.3 DPM	0.001 kBq

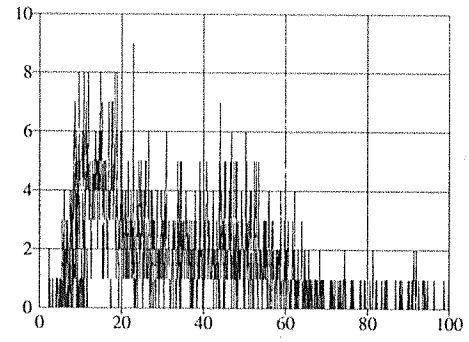
Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
59	1	70.00	623.35	11.54	9/27/2016 9:10 PM



Gross_B_CPM	LUMEX
12.00	0.00

Lumex_CPM	DPM
0.40	14.20

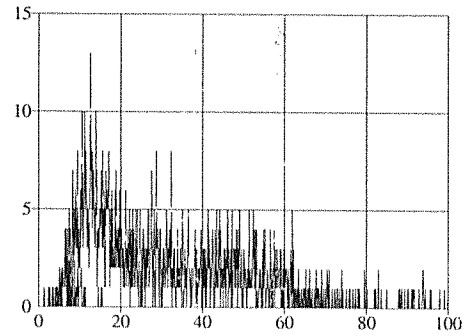
Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
59	2	70.00	631.39	10.97	9/27/2016 10:22 PM



Gross_B_CPM	LUMEX
11.70	0.00

Lumex_CPM	DPM
0.70	12.90

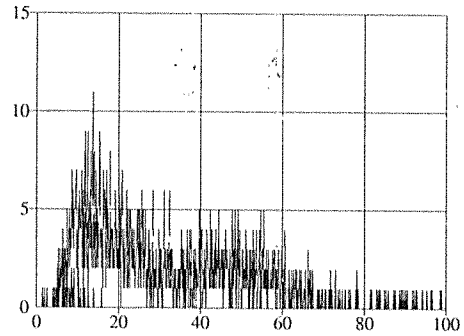
Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
59	3	70.00	634.96	12.08	9/27/2016 11:33 PM



Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.50	13.20

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
59	4	70.00	628.65	11.99	9/28/2016 0:44 AM



Gross_B_CPM	LUMEX
12.50	0.00

Lumex_CPM	DPM
0.50	14.10

PROTOCOL : 5 C-14 70 min
DATE : 2016/09/28
TIME : 03:07
ID : P05AS359

C-14

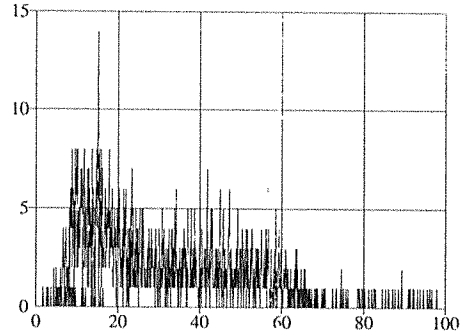
Wallac 1414 WinSpectral v1.40 S/N 4140127
Counting mode : DPM
Quench index : SQP(E)
Isotope(s) : C14
C14 = ,5730.00 y
Protocol name : C-14 70 min
Counting time : 4200
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 2.00
Minimum cpm : 0.00 Checking time: 10
Sp. library of isotope C14 : Wallac
Vial type : Diffuse
Liquid system : HiSafe
Advanced modes : Chemilum
Output to Display :
POS,DPM1,CPMw2,CLMM,FNCT2,
RACK,RACKPOS,FNCT1,SQPE,DATE,
TIME,CPMw1,CPM,CPM1,CTIME
Additions to Display : Listing,Header,Spectrum
Header : C-14
Spectrum : Rnd.Cos,Beta
Window 1 : 35- 300 /Beta
Window 2 : 35- 300 /Rnd.Cos
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 : CTIME/60
FNCT2 = FNCT2 : CPMW1-CPMW2
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total activity:

C14 524.7 DPM 0.009 kBq

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	1	70.00	633.18	11.39	9/28/2016 3:08 AM

4

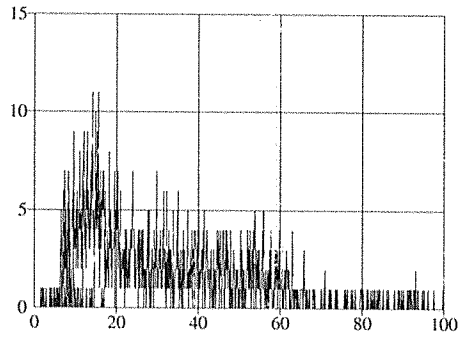


Gross_B_CPM	LUMEX
11.90	0.00

Lumex_CPM	DPM
0.50	13.40

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	2	70.00	630.32	11.93	9/28/2016 4:19 AM

5

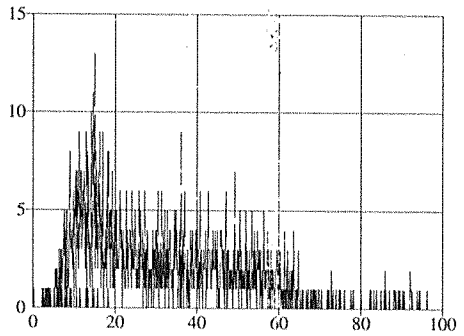


Gross_B_CPM	LUMEX
12.50	0.00

Lumex_CPM	DPM
0.50	13.60

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	3	70.00	628.89	12.20	9/28/2016 5:30 AM

6

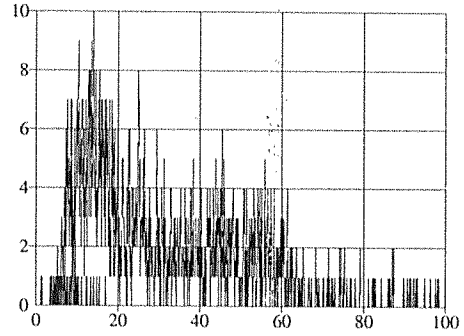


Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.40	14.50

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	4	70.00	634.84	12.41	9/28/2016 6:42 AM

7

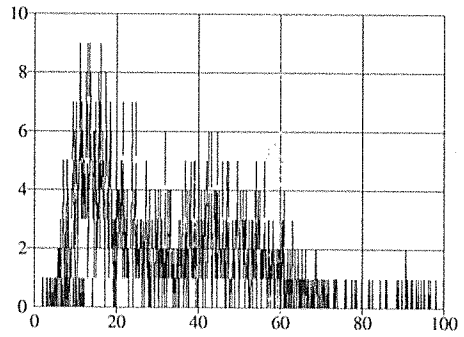


Gross_B_CPM	LUMEX
12.90	0.00

Lumex_CPM	DPM
0.50	13.70

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	5	70.00	629.61	11.13	9/28/2016 7:53 AM

8

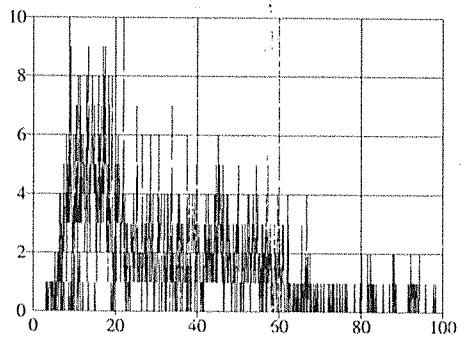


Gross_B_CPM	LUMEX
11.50	0.00

Lumex_CPM	DPM
0.40	12.80

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	6	70.00	634.96	12.09	9/28/2016 9:04 AM

9

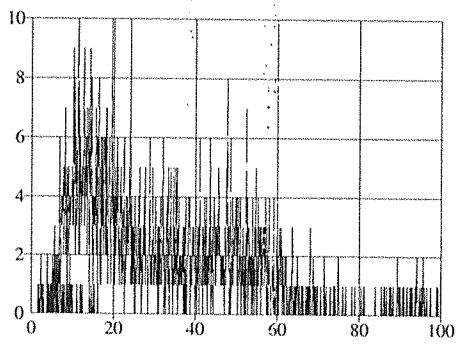


Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.50	13.30

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	7	70.00	631.63	11.89 9/28/2016 10:15 AM

10

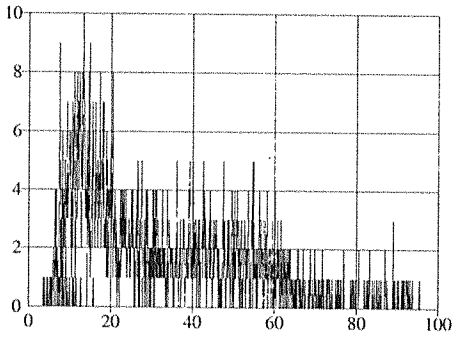


Gross_B_CPM	LUMEX
12.40	0.00

Lumex_CPM	DPM
0.50	13.80

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	8	70.00	632.23	11.49 9/28/2016 11:27 AM

11

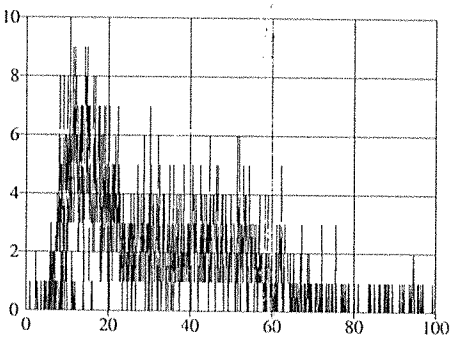


Gross_B_CPM	LUMEX
12.00	0.00

Lumex_CPM	DPM
0.50	12.70

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	9	70.00	639.54	12.51 9/28/2016 12:38 PM

12

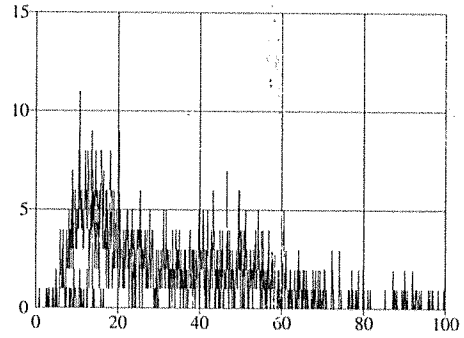


Gross_B_CPM	LUMEX
13.10	0.00

Lumex_CPM	DPM
0.60	13.70

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	10	70.00	630.98	12.11	9/28/2016 1:49 PM

13

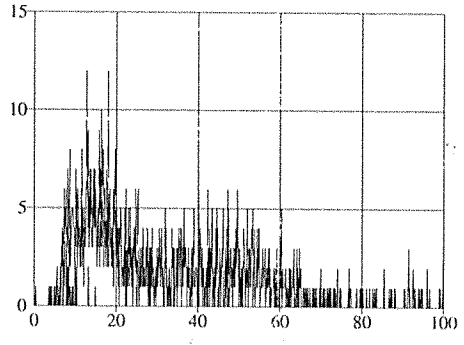


Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.50	14.00

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	11	70.00	631.75	11.89	9/28/2016 3:00 PM

14

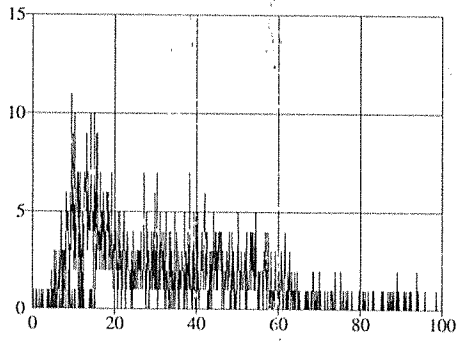


Gross_B_CPM	LUMEX
12.20	0.00

Lumex_CPM	DPM
0.30	13.10

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
91	12	70.00	631.04	11.52	9/28/2016 4:11 PM

15

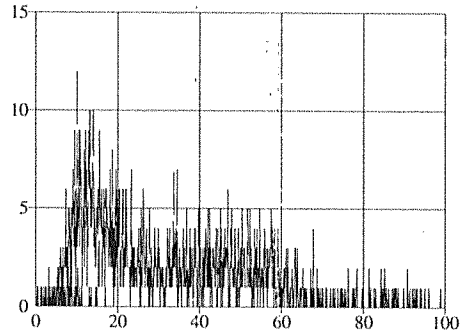


Gross_B_CPM	LUMEX
12.10	0.00

Lumex_CPM	DPM
0.50	12.60

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
0 1	70.00	633.53	12.07	9/28/2016 5:23 PM

16

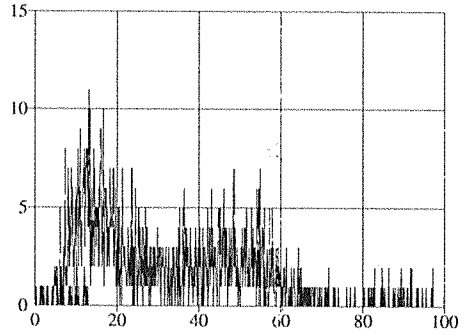


Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.60	13.00

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
0 2	70.00	627.88	12.26	9/28/2016 6:34 PM

17

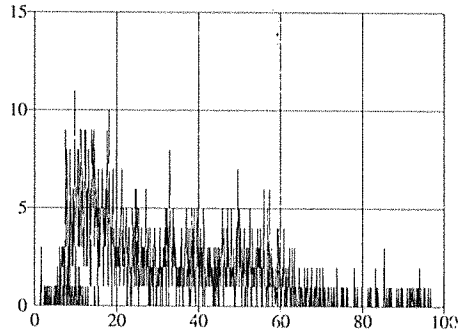


Gross_B_CPM	LUMEX
12.60	0.00

Lumex_CPM	DPM
0.30	13.40

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
0 3	70.00	632.94	12.55	9/28/2016 7:45 PM

18

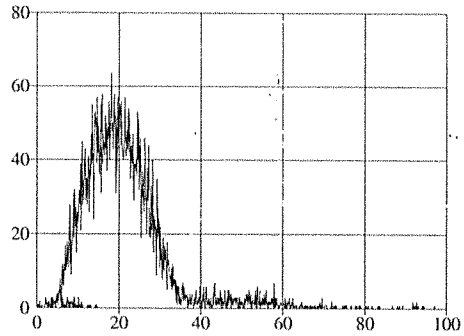


Gross_B_CPM	LUMEX
13.30	0.00

Lumex_CPM	DPM
0.70	13.90

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
0 4	70.00	634.84	126.69	9/28/2016 8:57 PM

19

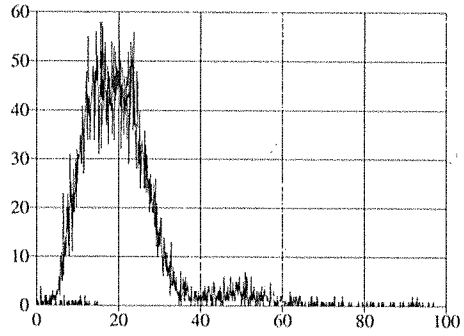


Gross_B_CPM	LUMEX
127.50	0.00

Lumex_CPM	DPM
0.80	164.20

Rack_position	Count_Time(min)	Quench_number	C14_CPM	Run_Date
0 5	70.00	626.39	124.24	9/28/2016 10:08 PM

20



Gross_B_CPM	LUMEX
124.70	0.00

Lumex_CPM	DPM
0.40	159.10

Continuing Calibration Data

Liquid Scintillation Counter Checks for 16-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	03:30	1.4		114868	0.25		
	Carbon-14	03:31	1.4		114459	-1.3		
	Tritium	03:33	1.35		160911	-0.2		
	Tritium	03:35	1.35		161075	0.17		
	BKG	03:37	30		25	-0.95		
	BKG	04:08	30		28	0.79		
LSCBROWN	Carbon-14	03:19	1.4		114539	-2.7		
	Carbon-14	03:20	1.4		115711	1.44		
	Tritium	03:22	1.3		167178	-0.34		
	Tritium	03:24	1.3		167421	0.34		
	BKG	03:26	30		27	0.43		
	BKG	03:57	30		25	-1.2		
LSCGOLD	Carbon-14	03:42	1.3		125158	-2.5		
	Carbon-14	03:43	1.3		125721	-0.84		
	Tritium	03:45	1.35		151410	0.68		
	Tritium	03:47	1.35		151467	0.81		
	BKG	03:49	30		23	1.32		
	BKG	04:19	30		22	0.01		
LSCGREEN	Carbon-14	01:46	1.4		114689	-1.8		
	Carbon-14	01:48	1.4		115067	-0.46		
	Tritium	01:50	1.25		173102	0.22		
	Tritium	01:51	1.25		172607	-0.84		
	BKG	01:53	30		27	0.79		
	BKG	02:24	30		26	-0.68		
LSCORANGE	Carbon-14	02:56	1.012433		108271	1.94		
	Tritium	03:00	1.012433		179674	-0.06		
	BKG	03:32	30.01243		12	0.75		
	Carbon-14	03:34	1.012433		107667	0.19		
	Tritium	03:35	1.01235		179579	-0.3		
	BKG	04:05	30.01243		11	-0.1		

LSCPINK	Carbon-14	04:04	1.012433	119610	1.59	
	Tritium	04:07	1.012433	137581	-0.67	
	BKG	04:40	30.01243	8.06	-1.5	
	Carbon-14	04:41	1.012433	119062	0.16	
	Tritium	04:43	1.01235	138001	0.21	
	BKG	05:13	30.01243	9.24	0.57	
LSCRED	Carbon-14	03:27	1.4	114835	-0.22	
	Carbon-14	03:29	1.4	114755	-0.48	
	Tritium	03:31	1.3	164829	-0.83	
	Tritium	03:33	1.3	165019	-0.41	
	BKG	03:35	30	26	0.26	
	BKG	04:05	30	27	1.04	
LSCSILVER	Carbon-14	00:36	1.35	121077	-0.4	
	Carbon-14	00:37	1.35	121191	-0.03	
	Tritium	00:40	1.25	170742	1.57	
	Tritium	00:41	1.25	169603	-0.84	
	BKG	00:43	30	26	0.09	
	BKG	01:14	30	24	-1.5	
LSCTEAL	Carbon-14	02:00	1.583	106178	0.31	
	Carbon-14	02:02	1.583	105652	-1.8	
	Tritium	02:05	1.217	144881	-1.4	
	Tritium	02:07	1.217	143970	-3.2	Outside Three Sigma
	BKG	02:09	30	17	2.63	
	BKG	02:40	30	14	-0.89	
	Tritium	06:12	1.25	144384	-2.4	
	Tritium	06:14	1.217	144483	-2.2	
LSCYELLOW	Carbon-14	02:24	1.483	114213	-0.61	
	Carbon-14	02:27	1.483	114081	-1	
	Tritium	02:29	1.483	150117	1.43	
	Tritium	02:31	1.483	149438	-0.14	
	BKG	02:34	30	14	-0.95	
	BKG	03:05	30	15	-0.23	

LSCTEAL: CLEARED BY RERUN

Reviewed by:  **Date:** 16-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 17-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	03:24	1.4		115018	0.81		
	Carbon-14	03:26	1.4		114711	-0.33		
	Tritium	03:28	1.35		161627	1.4		
	Tritium	03:30	1.35		160834	-0.37		
	BKG	03:32	30		25	-1.1		
	BKG	04:03	30		27	0.17		
LSCBROWN	Carbon-14	03:11	1.4		115184	-0.41		
	Carbon-14	03:12	1.4		114715	-2		
	Tritium	03:14	1.3		166440	-2.4		
	Tritium	03:16	1.3		167812	1.43		
	BKG	03:18	30		27	-0.05		
	BKG	03:49	30		27	0.66		
LSCGOLD	Carbon-14	00:59	1.3		125361	-1.9		
	Carbon-14	01:01	1.3		125678	-0.97		
	Tritium	01:03	1.35		151166	0.14		
	Tritium	01:04	1.35		151786	1.51		
	BKG	01:07	30		22	0.04		
	BKG	01:37	30		22	0.26		
	Carbon-14	02:56	1.3		125689	-0.94		
	Carbon-14	02:57	1.3		125752	-0.75		
	Tritium	02:59	1.35		151112	0.03		
	Tritium	03:01	1.35		151752	1.44		
	BKG	03:03	30		22	0.15		
	BKG	03:34	30		23	1.13		
LSCGREEN	Carbon-14	03:10	1.4		114957	-0.84		
	Carbon-14	03:12	1.4		115514	1.08		
	Tritium	03:14	1.25		171639	-2.9		
	Tritium	03:16	1.25		172498	-1.1		
	BKG	03:18	30		27	0.61		
	BKG	03:48	30		26	0.35		

LSCORANGE	Carbon-14	02:59	1.012433	107818	0.63
	Tritium	03:02	1.012433	179520	-0.44
	BKG	03:35	30.01243	11	-0.81
	Carbon-14	03:36	1.012433	107864	0.76
	Tritium	03:38	1.012433	179508	-0.47
	BKG	04:08	30.01243	11	-0.33
LSCPINK	Carbon-14	01:12	1.012433	118896	-0.27
	Tritium	01:15	1.012433	138330	0.9
	BKG	01:48	30.01243	8.97	0.09
	Carbon-14	01:49	1.012433	118644	-0.93
	Tritium	01:50	1.01235	138460	1.17
	BKG	02:21	30.01243	8.23	-1.2
LSCRED	Carbon-14	01:19	1.4	114960	0.2
	Carbon-14	01:21	1.4	114917	0.06
	Tritium	01:23	1.3	164261	-2.1
	Tritium	01:25	1.3	165122	-0.18
	BKG	01:27	30	28	2.06
	BKG	01:57	30	26	0.26
LSCSILVER	Carbon-14	03:13	1.35	121400	0.64
	Carbon-14	03:14	1.35	121602	1.3
	Tritium	03:17	1.25	170706	1.49
	Tritium	03:18	1.25	169667	-0.71
	BKG	03:20	30	25	-0.25
	BKG	03:51	30	26	-0.04
LSCTEAL	Carbon-14	03:54	1.583	106193	0.37
	Carbon-14	03:57	1.583	106125	0.1
	Tritium	03:59	1.217	145365	-0.46
	Tritium	04:01	1.217	145275	-0.63
	BKG	04:03	30	15	-0.47
	BKG	04:34	30	15	0.24
LSCYELLOW	Carbon-14	04:20	1.467	114922	1.71
	Carbon-14	04:22	1.483	113848	-1.8
	Tritium	04:25	1.483	149532	0.07
	Tritium	04:27	1.5	148797	-1.6

BKG	04:29	30	16	0.61
BKG	05:00	30	15	-0.11

Reviewed by:  **Date:** 18-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 19-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	03:45	1.45		114334	-1.7		
	Carbon-14	03:47	1.4		115141	1.27		
	Tritium	03:49	1.35		161254	0.56		
	Tritium	03:50	1.35		160859	-0.32		
	BKG	03:52	30		26	-0.12		
	BKG	04:23	30		26	-0.29		
LSCBROWN	Carbon-14	03:27	1.4		115593	1.02		
	Carbon-14	03:29	1.4		115230	-0.25		
	Tritium	03:31	1.3		167287	-0.04		
	Tritium	03:33	1.3		167561	0.73		
	BKG	03:35	30		27	0.72		
	BKG	04:05	30		27	0.09		
LSCGOLD	Carbon-14	03:14	1.3		125555	-1.3		
	Carbon-14	03:16	1.3		125753	-0.74		
	Tritium	03:18	1.35		151637	1.18		
	Tritium	03:20	1.35		151895	1.76		
	BKG	03:22	30		24	2.48		
	BKG	03:52	30		23	1.21		
LSCGREEN	Carbon-14	03:28	1.4		114947	-0.87		
	Carbon-14	03:29	1.4		114820	-1.3		
	Tritium	03:32	1.25		173540	1.15		
	Tritium	03:33	1.25		172408	-1.3		
	BKG	03:35	30		27	0.46		
	BKG	04:06	30		25	-1.5		
LSCORANGE	Carbon-14	00:52	1.012433		107636	0.1		
	Tritium	00:56	1.012433		179933	0.58		
	BKG	01:28	30.01243		10	-1.3		
	Carbon-14	01:30	1.012433		107423	-0.51		
	Tritium	01:31	1.012333		179440	-0.64		
	BKG	02:01	30.01243		12	0.61		

LSCPINK	Carbon-14	04:25	1.012433	119744	1.94
	Tritium	04:28	1.012433	138218	0.66
	BKG	05:01	30.01243	9.01	0.16
	Carbon-14	05:02	1.012433	119671	1.75
	Tritium	05:04	1.012433	137937	0.08
	BKG	05:34	30.01243	9.31	0.69
LSCRED	Carbon-14	03:48	1.4	115290	1.3
	Carbon-14	03:50	1.4	114472	-1.4
	Tritium	03:52	1.3	164778	-0.94
	Tritium	03:54	1.3	165587	0.86
	BKG	03:56	30	27	1.34
	BKG	04:26	30	27	1.04
LSCSILVER	Carbon-14	03:18	1.35	121331	0.42
	Carbon-14	03:19	1.35	121534	1.08
	Tritium	03:21	1.25	170276	0.58
	Tritium	03:23	1.25	170725	1.54
	BKG	03:25	30	26	0.36
	BKG	03:56	30	26	0.48
LSCTEAL	Carbon-14	04:14	1.617	106499	1.6
	Carbon-14	04:16	1.583	105776	-1.3
	Tritium	04:19	1.217	145016	-1.1
	Tritium	04:21	1.217	145361	-0.47
	BKG	04:23	30	14	-0.75
	BKG	04:54	30	15	-0.61
LSCYELLOW	Carbon-14	03:33	1.483	114173	-0.74
	Carbon-14	03:36	1.483	114451	0.17
	Tritium	03:38	1.483	149477	-0.05
	Tritium	03:40	1.483	149617	0.27
	BKG	03:43	30	16	0.85
	BKG	04:14	30	15	-0.23

Reviewed by:  **Date:** 19-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 20-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	02:22	1.4		115022	0.83		
	Carbon-14	02:23	1.4		114977	0.66		
	Tritium	02:26	1.35		161375	0.83		
	Tritium	02:27	1.35		161082	0.18		
	BKG	02:29	30		27	0.5		
	BKG	03:00	30		25	-0.96		
LSCBROWN	Carbon-14	03:08	1.4		115056	-0.85		
	Carbon-14	03:10	1.4		114978	-1.1		
	Tritium	03:12	1.3		167546	0.68		
	Tritium	03:14	1.3		166833	-1.3		
	BKG	03:16	30		27	-0.01		
	BKG	03:46	30		27	-0.01		
LSCGOLD	Carbon-14	02:24	1.3		125533	-1.4		
	Carbon-14	02:25	1.3		126069	0.21		
	Tritium	02:27	1.35		150855	-0.54		
	Tritium	02:29	1.35		151136	0.08		
	BKG	02:31	30		23	0.48		
	BKG	03:02	30		22	-0.28		
LSCGREEN	Carbon-14	04:54	1.4		115524	1.12		
	Carbon-14	04:56	1.4		114743	-1.6		
	Tritium	04:58	1.25		172769	-0.49		
	Tritium	04:59	1.25		171985	-2.2		
	BKG	05:01	30		29	2.59		
	BKG	05:32	30		27	0.53		
LSCORANGE	Carbon-14	03:40	1.012433		108483	2.55		
	Tritium	03:43	1.012433		180246	1.35		
	BKG	04:16	30.01243		9.78	-1.8		
	Carbon-14	04:17	1.012433		108001	1.16		
	Tritium	04:18	1.01235		179827	0.31		
	BKG	04:49	30.01243		11	-0.47		

LSCPINK	Carbon-14	03:58	1.012433	119412	1.07
	Tritium	04:01	1.012433	138148	0.52
	BKG	04:34	30.01243	8.53	-0.69
	Carbon-14	04:35	1.012433	118707	-0.76
	Tritium	04:37	1.012333	138085	0.39
	BKG	05:07	30.01243	8.84	-0.14
LSCRED	Carbon-14	03:23	1.4	114705	-0.65
	Carbon-14	03:25	1.4	114932	0.11
	Tritium	03:27	1.3	164582	-1.4
	Tritium	03:28	1.3	165089	-0.25
	BKG	03:31	30	26	0.16
	BKG	04:01	30	26	-0.11
LSCSILVER	Carbon-14	02:53	1.35	121094	-0.34
	Carbon-14	02:55	1.35	120555	-2.1
	Tritium	02:57	1.25	169537	-0.98
	Tritium	02:59	1.25	169712	-0.61
	BKG	03:01	30	26	0.21
	BKG	03:31	30	26	0.64
LSCTEAL	Carbon-14	03:50	1.617	106086	-0.06
	Carbon-14	03:53	1.583	105622	-1.9
	Tritium	03:55	1.217	144638	-1.9
	Tritium	03:57	1.217	144505	-2.1
	BKG	03:59	30	15	0.52
	BKG	04:30	30	15	-0.32
LSCYELLOW	Carbon-14	03:10	1.517	114246	-0.51
	Carbon-14	03:13	1.467	114575	0.57
	Tritium	03:15	1.483	149889	0.9
	Tritium	03:18	1.483	149963	1.08
	BKG	03:20	30	14	-1.3
	BKG	03:51	30	16	1.22

Reviewed by:  **Date:** 20-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 21-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	02:43	1.4		115058	0.96		
	Carbon-14	02:44	1.4		114669	-0.49		
	Tritium	02:47	1.35		161307	0.68		
	Tritium	02:48	1.35		161425	0.95		
	BKG	02:50	30		26	-0.14		
	BKG	03:21	30		25	-0.72		
LSCBROWN	Carbon-14	03:13	1.4		114936	-1.3		
	Carbon-14	03:15	1.4		114765	-1.9		
	Tritium	03:17	1.3		166676	-1.7		
	Tritium	03:19	1.3		166849	-1.3		
	BKG	03:21	30		28	1.49		
	BKG	03:51	30		25	-1.3		
LSCGOLD	Carbon-14	02:58	1.3		125863	-0.41		
	Carbon-14	03:00	1.3		125511	-1.5		
	Tritium	03:02	1.35		151057	-0.1		
	Tritium	03:03	1.35		151270	0.38		
	BKG	03:05	30		23	1.13		
	BKG	03:36	30		20	-2.5		
LSCGREEN	Carbon-14	01:14	1.4		115237	0.13		
	Carbon-14	01:16	1.4		115132	-0.23		
	Tritium	01:18	1.25		172328	-1.4		
	Tritium	01:20	1.25		171870	-2.4		
	BKG	01:22	30		28	1.96		
	BKG	01:52	30		26	-0.57		
LSCORANGE	Carbon-14	01:32	1.01245		107464	-0.39		
	Tritium	01:35	1.012433		179632	-0.17		
	BKG	02:08	30.01243		11	0.1		
	Carbon-14	02:09	1.012433		107717	0.34		
	Tritium	02:11	1.01235		180069	0.91		
	BKG	02:41	30.01243		10	-1.2		

LSCPINK	Carbon-14	04:03	1.012433	118816	-0.48
	Tritium	04:06	1.012433	137783	-0.25
	BKG	04:39	30.01243	9.11	0.33
	Carbon-14	04:40	1.012433	118422	-1.5
	Tritium	04:42	1.012333	137656	-0.51
	BKG	05:12	30.01243	8.94	0.03
LSCRED	Carbon-14	03:27	1.4	114866	-0.11
	Carbon-14	03:28	1.4	114673	-0.76
	Tritium	03:30	1.3	164972	-0.51
	Tritium	03:32	1.3	165211	0.02
	BKG	03:34	30	28	2
	BKG	04:05	30	27	0.94
LSCSILVER	Carbon-14	02:59	1.35	121455	0.82
	Carbon-14	03:00	1.35	121168	-0.1
	Tritium	03:02	1.25	170391	0.83
	Tritium	03:04	1.25	168865	-2.4
	BKG	03:06	30	25	-0.67
	BKG	03:37	30	25	-0.86
LSCTEAL	Carbon-14	03:56	1.617	105606	-2
	Carbon-14	03:59	1.583	105739	-1.5
	Tritium	04:01	1.217	144994	-1.2
	Tritium	04:03	1.217	144459	-2.2
	BKG	04:05	30	14	-0.89
	BKG	04:36	30	15	0.1
LSCYELLOW	Carbon-14	03:16	1.467	114999	1.96
	Carbon-14	03:19	1.483	114319	-0.27
	Tritium	03:21	1.483	150151	1.51
	Tritium	03:24	1.483	149876	0.87
	BKG	03:26	30	15	-0.35
	BKG	03:57	30	15	-0.23

Reviewed by:  **Date:** 21-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 27-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	04:42	1.4		114741	-0.22		
	Carbon-14	04:43	1.4		114681	-0.45		
	Tritium	04:45	1.35		161264	0.59		
	Tritium	04:47	1.35		160845	-0.35		
	BKG	04:49	30		25	-0.77		
	BKG	05:20	30		25	-0.68		
LSCBROWN	Carbon-14	00:55	1.4		114679	-2.2		
	Carbon-14	00:57	1.4		114982	-1.1		
	Tritium	00:59	1.3		167151	-0.42		
	Tritium	01:01	1.3		167469	0.47		
	BKG	01:03	30		27	0.69		
	BKG	01:33	30		25	-1.5		
LSCGOLD	Carbon-14	02:58	1.3		126462	1.39		
	Carbon-14	03:00	1.3		125826	-0.52		
	Tritium	03:02	1.35		150691	-0.9		
	Tritium	03:03	1.35		151249	0.33		
	BKG	03:05	30		22	0.3		
	BKG	03:36	30		23	0.88		
LSCGREEN	Carbon-14	02:03	1.4		115229	0.1		
	Carbon-14	02:05	1.4		114521	-2.3		
	Tritium	02:07	1.25		172325	-1.4		
	Tritium	02:09	1.25		172659	-0.73		
	BKG	02:11	30		27	0.9		
	BKG	02:41	30		27	1.41		
LSCORANGE	Carbon-14	02:44	1.012433		107710	0.32		
	Tritium	02:48	1.012433		178996	-1.7		
	BKG	03:20	30.01243		11	-0.29		
	Carbon-14	03:22	1.012433		107395	-0.59		
	Tritium	03:23	1.012433		179324	-0.93		
	BKG	03:53	30.01243		11	0.24		

LSCPINK	Carbon-14	02:33	1.012433	118221	-2
	Tritium	02:36	1.012433	138042	0.3
	BKG	03:09	30.01243	9.01	0.16
	Carbon-14	03:10	1.012433	119488	1.27
	Tritium	03:11	1.012417	138168	0.56
	BKG	03:42	30.01243	9.01	0.16
LSCRED	Carbon-14	01:50	1.4	115263	1.21
	Carbon-14	01:52	1.4	114979	0.27
	Tritium	01:54	1.3	164824	-0.84
	Tritium	01:55	1.3	164771	-0.96
	BKG	01:58	30	26	0.13
	BKG	02:28	30	26	-0.24
LSCSILVER	Carbon-14	02:58	1.35	120884	-1
	Carbon-14	03:00	1.35	121886	2.21
	Tritium	03:02	1.25	169186	-1.7
	Tritium	03:04	1.25	169493	-1.1
	BKG	03:06	30	24	-1.7
	BKG	03:36	30	25	-1.1
LSCTEAL	Carbon-14	03:57	1.583	105907	-0.78
	Carbon-14	03:59	1.583	105667	-1.7
	Tritium	04:02	1.217	145199	-0.78
	Tritium	04:04	1.217	145483	-0.23
	BKG	04:06	30	16	1.79
	BKG	04:37	30	15	0.24
LSCYELLOW	Carbon-14	00:08	1.483	114093	-1
	Carbon-14	00:11	1.467	114523	0.4
	Tritium	00:13	1.483	149436	-0.15
	Tritium	00:15	1.483	149889	0.9
	BKG	00:18	30	14	-1.6
	BKG	00:49	30	16	0.49
	Carbon-14	03:17	1.483	114114	-0.94
	Carbon-14	03:20	1.483	114040	-1.2
	Tritium	03:22	1.5	149018	-1.1
	Tritium	03:25	1.5	149063	-1

BKG	03:27	30	14	-0.95
BKG	03:58	30	15	-0.47

Reviewed by: **Date:** 27-SEP-16

Lyndsey Pace

GEL Laboratories LLC

Liquid Scintillation Counter Checks for 28-SEP-2016

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	01:48	1.4		115521	2.69		
	Carbon-14	01:49	1.4		114439	-1.3		
	Tritium	01:51	1.35		161162	0.36		
	Tritium	01:53	1.35		161914	2.03		
	BKG	01:55	30		27	0.09		
	BKG	02:26	30		26	-0.45		
LSCBROWN	Carbon-14	03:22	1.4		114977	-1.1		
	Carbon-14	03:23	1.4		114752	-1.9		
	Tritium	03:25	1.3		167219	-0.23		
	Tritium	03:27	1.3		167102	-0.55		
	BKG	03:29	30		27	0.12		
	BKG	04:00	30		26	-0.91		
LSCGOLD	Carbon-14	03:05	1.3		125416	-1.8		
	Carbon-14	03:07	1.3		125584	-1.3		
	Tritium	03:09	1.4		150452	-1.4		
	Tritium	03:11	1.35		150922	-0.39		
	BKG	03:13	30		24	1.57		
	BKG	03:43	30		23	1.21		
LSCGREEN	Carbon-14	02:37	1.4		115346	0.5		
	Carbon-14	02:39	1.4		115265	0.22		
	Tritium	02:41	1.25		172643	-0.76		
	Tritium	02:43	1.25		173588	1.25		
	BKG	02:45	30		27	1.46		
	BKG	03:15	30		26	0.28		
LSCORANGE	Carbon-14	01:05	1.01245		108762	3.36	Outside Three Sigma	
	Tritium	01:09	1.012433		179550	-0.37		
	BKG	01:41	30.01243		11	0.33		
	Carbon-14	01:42	1.012433		107260	-0.98		
	Tritium	01:44	1.01235		179063	-1.6		
	BKG	02:14	30.01243		12	1.04		

	Carbon-14	05:49	1.012433	107209	-1.1
	Tritium	05:52	1.012433	179463	-0.59
	BKG	06:25	30.01243	12	1.61
	Carbon-14	06:26	1.012433	107590	-0.03
	Tritium	06:27	1.012333	179422	-0.69
	BKG	06:58	30.01243	13	2.13
LSCPINK	Carbon-14	04:07	1.012433	118824	-0.46
	Tritium	04:10	1.012433	137837	-0.13
	BKG	04:43	30.01243	9.11	0.33
	Carbon-14	04:44	1.012433	119359	0.94
	Tritium	04:46	1.012333	137374	-1.1
	BKG	05:16	30.01243	9.78	1.52
LSCRED	Carbon-14	03:34	1.4	114564	-1.1
	Carbon-14	03:36	1.4	114909	0.03
	Tritium	03:38	1.3	164730	-1
	Tritium	03:40	1.3	164358	-1.9
	BKG	03:42	30	27	1.5
	BKG	04:12	30	26	-0.17
LSCSILVER	Carbon-14	00:24	1.35	121336	0.44
	Carbon-14	00:26	1.35	121211	0.04
	Tritium	00:28	1.25	170645	1.37
	Tritium	00:29	1.25	170205	0.43
	BKG	00:32	30	27	0.78
	BKG	01:02	30	26	0.42
LSCTEAL	Carbon-14	04:03	1.617	106220	0.48
	Carbon-14	04:05	1.583	106078	-0.09
	Tritium	04:08	1.217	145076	-1
	Tritium	04:10	1.217	144818	-1.5
	BKG	04:12	30	14	-0.89
	BKG	04:43	30	15	-0.47
LSCYELLOW	Carbon-14	01:56	1.483	114479	0.26
	Carbon-14	01:58	1.483	114349	-0.17
	Tritium	02:01	1.483	149679	0.42
	Tritium	02:03	1.5	149021	-1.1

BKG	02:05	30	14	-1.6
BKG	02:36	30.017	14	-1.2

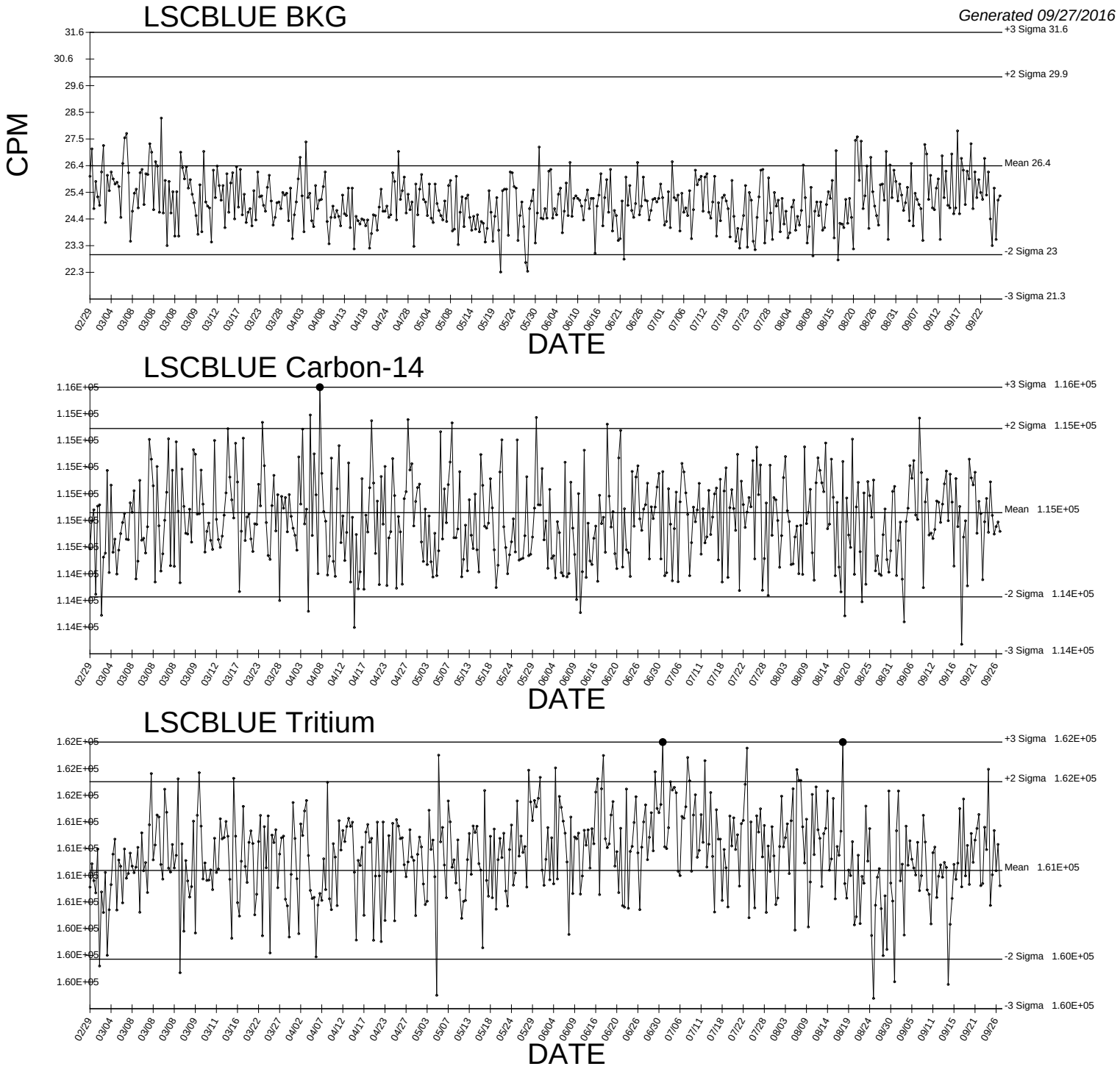
LSCORANGE: CLEARED BY RERUN

Reviewed by: **Date:** 28-SEP-16

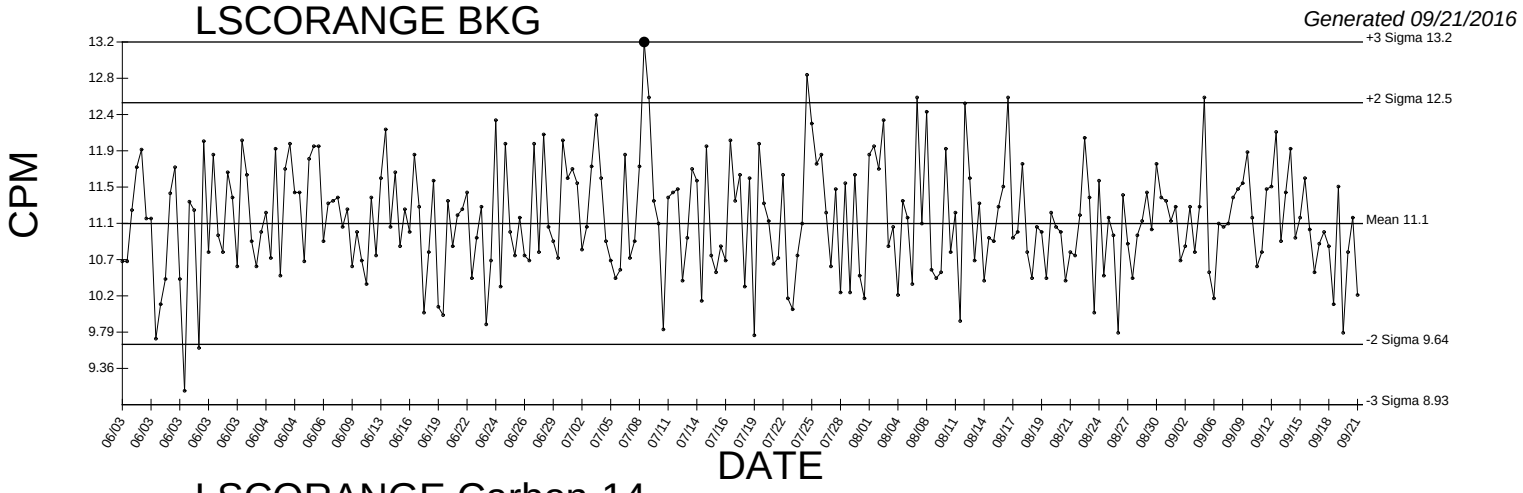
Lyndsey Pace

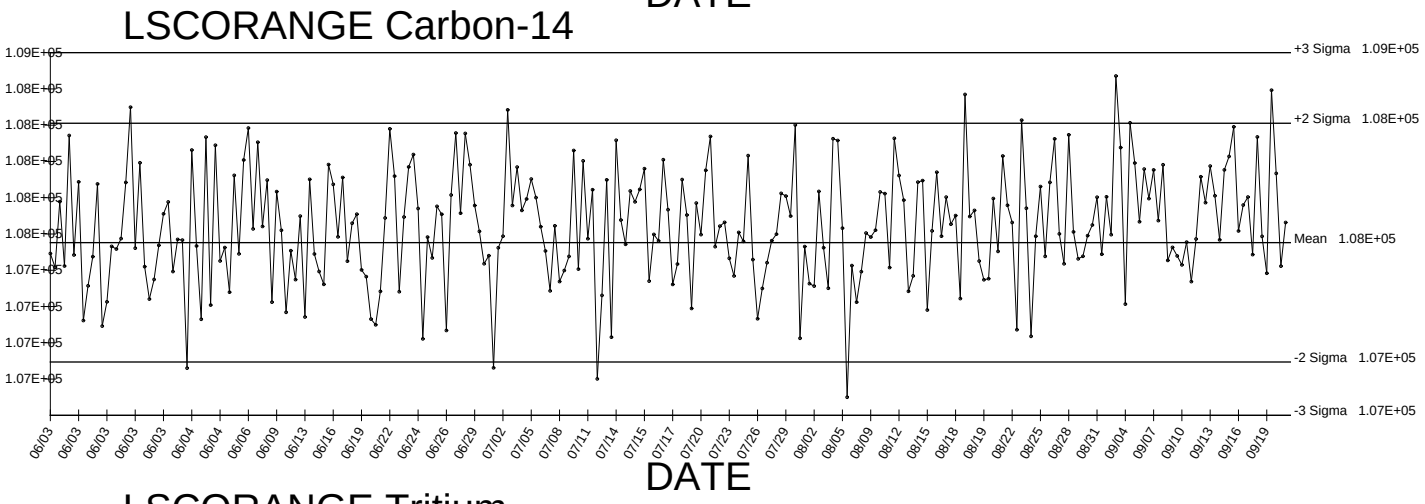
GEL Laboratories LLC

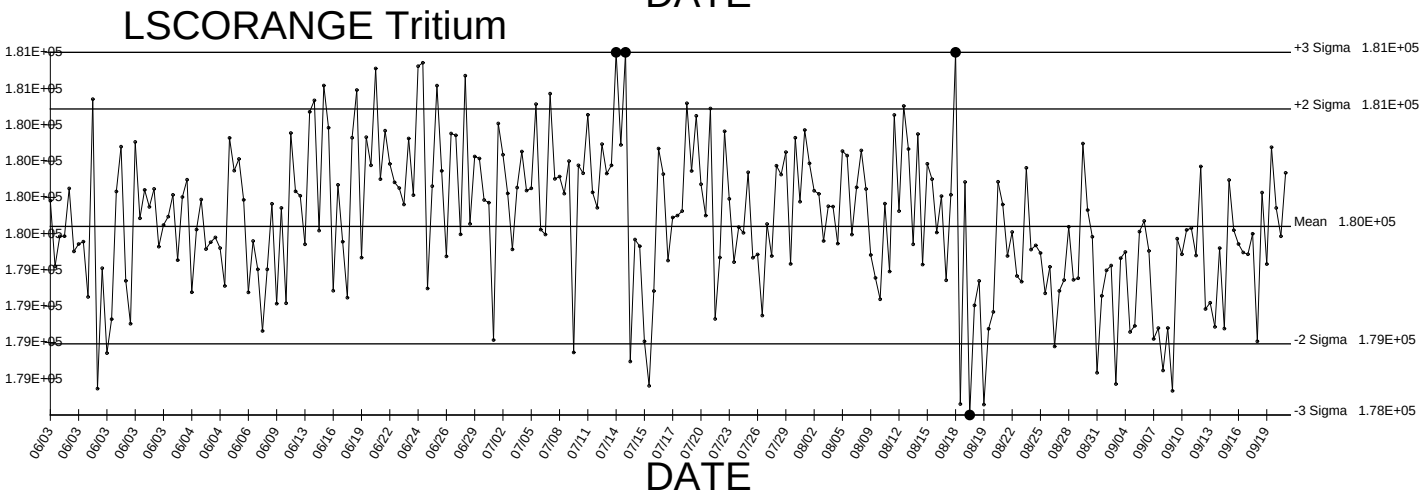
Background and Efficiency Data



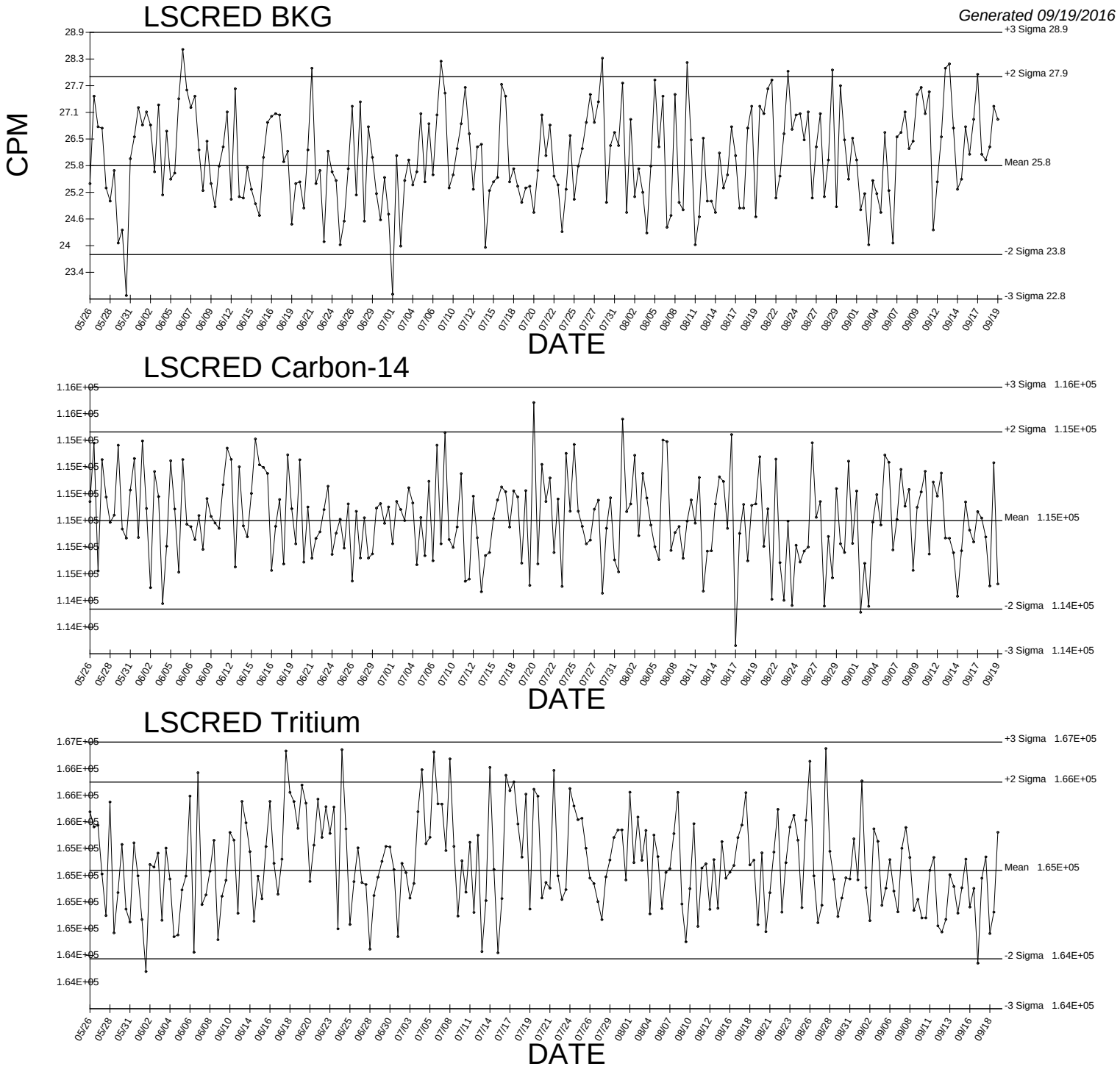
● Denotes Outlier



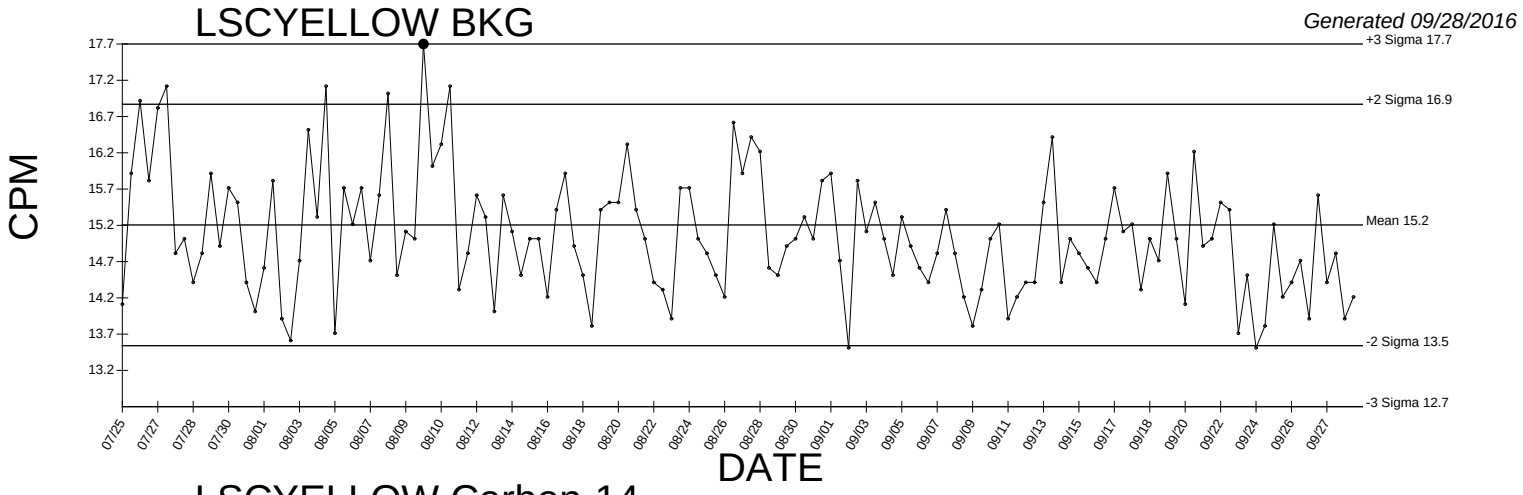


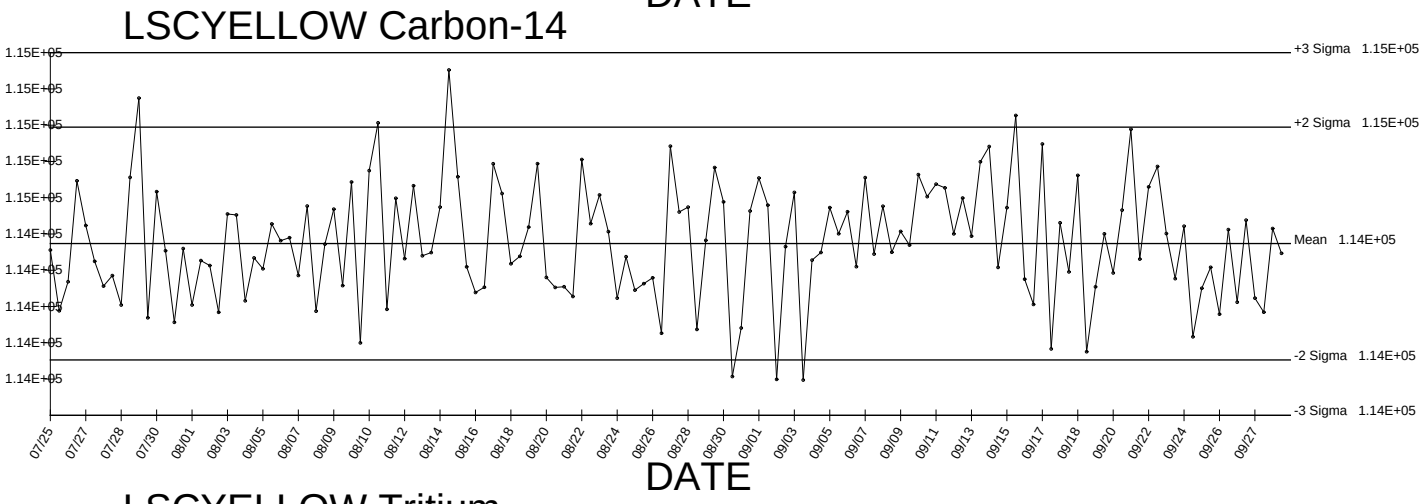


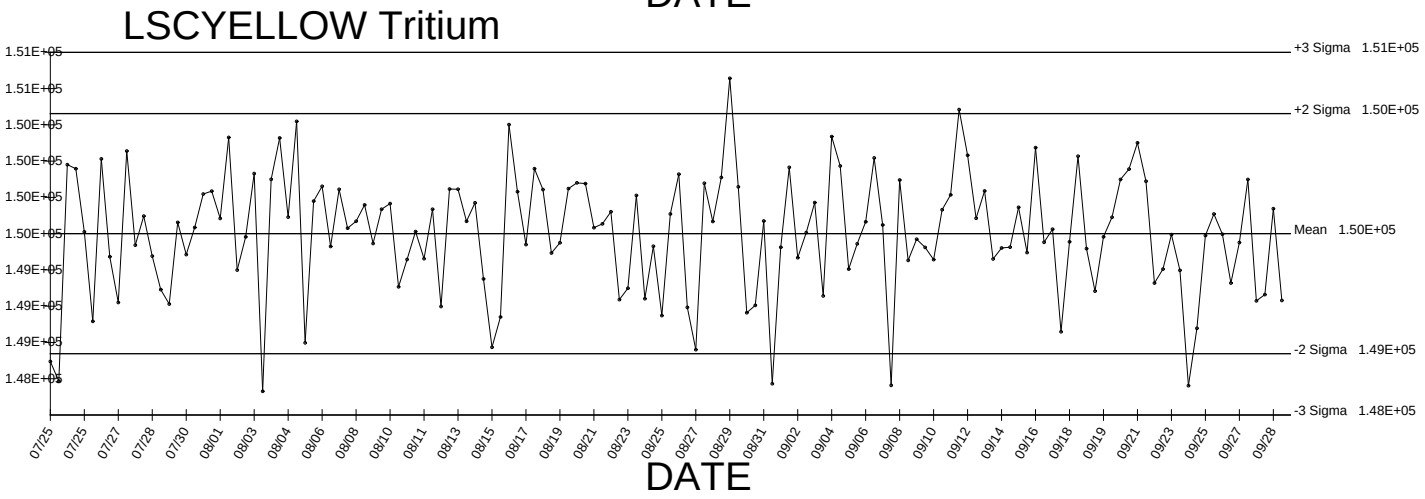
● Denotes Outlier



● Denotes Outlier







● Denotes Outlier

RAD Standards Traceability

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

1646

92408

C-14 5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs
P.O. No.: GEL 1303160, Item 1 Product Code: 8014G-5FSA-37kBq

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
C-14	2.082E+06	4.004E+04	0.2	2.0	4.0	02/01/2013

*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities<0.1%.
5.08352 g of solution 50 μg/g glucose + 1 mg/g formaldehyde in H2O.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 28JAN13
J.D. McCorvey, Counting Room Manager

RECEIVED

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1955

ANA Form005 Rev. —

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1646
Prepared By:	Ashley Drochter
Carrier Conc:	formaldehyde/glucose/water
Reference Date:	02/01/2013
Ampoule Mass (g):	5.08352 g
Uncertainty:	+/- 4 %
LogBook No:	RC-S-065-075

A Solution Material Info			
Isotope:	Carbon-14		
Prepared By:	Gregory Ramsay		
Prep Date:	02/04/2013		
Verification Date:	01/05/2016		
Expiration Date:	01/05/2017		
Primary Code:	1646-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.9916 g		
Density(g/mL):	0.9996	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.9916 g) * (40040 Bq) * (60 dpm/Bq) / (5.08352 g * 100 mL) = 23589.5990 dpm/mL
(4.9916 g) * (40040 Bq) * (60 dpm/Bq) / (0.9996 g/mL)/ (5.08352 g * 100 mL) = 23597.9527 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
02/06/2013	Gregory Ramsay	35.6417	500	1646-B	1682.1423 dpm/ml	01/05/2016	01/05/2017
08/13/2013	Christina Kimball	.996	250	1646-C	94.0142 dpm/ml	09/15/2016	09/15/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for C-14 Standard 1646-B

v1.0.2

Instrument	Red
Analyst	GXR1
Verification Prep Date	1/5/2016

Standard Information	
Isotope	C-14
Serial Number	1646-B
Isotope Halflife	5.7000E+03 Y
Reference Date	2/1/2013
Ref. Act. (DPM/mL)	1682.1423
Amount of Std. (mL)	0.2
Standard Prep Date	2/6/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/6/2016	64.40	367.60	44.60
2	1/6/2016	64.80	358.60	44.60
3	1/6/2016	64.90	355.20	44.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	323.00	0.935480	1726.39	345.28
2	314.00	0.935480	1678.28	335.66
3	310.60	0.935480	1660.11	332.02

	dpm/mL
Mean Value =	1688.26
Stdev =	34.24599987
Certificate Value* =	**1681.5**
Two sigma =	68.492
10 % of Mean =	168.826
Rule A (Pass/Fail)	**Pass**
% Recovery	100.40%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**1/5/2017**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for C-14 source 1646-B by transferring 0.2 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra 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 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRed for C-14 source standard verification. The C-14 efficiency calibration which was used for verification calculations was performed on 1/5/2016 using C-14 source A2926-A.

Standard results for each verification source was calculated as follows:

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

where:

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

RAD-M-001

1/6/16

1/8/16

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

1610

90784

Pu-241 5 mL Liquid in Flame Sealed Vial

RECEIVED 5/1/12

Customer: GEL Laboratories, LLC
P.O. No.: 936825RD, Item 4

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Pu-241	5.241E+03	3.855E+04	0.2	1.6	3.2	04/27/2012

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities (other than decay products)<0.1%; Am-241 1807 Bq; other α-impurities 0.05%.
5.51992 g 3M HNO3 solution. Carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 27 APR 12
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1610
Prepared By:	Gregory Ramsay
Carrier Conc:	3M HNO3
Reference Date:	04/27/2012
Ampoule Mass (g):	5.51992 g
Uncertainty:	+/- 3.2 %
LogBook No:	RC-S-065-040

A Solution Material Info			
Isotope:	Plutonium-241		
Prepared By:	Gregory Ramsay		
Prep Date:	06/13/2012		
Verification Date:	01/07/2016		
Expiration Date:	01/07/2017		
Primary Code:	1610-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.3865 g		
Density(g/mL):	1.0966	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(5.3865 g) * (38550 Bq) * (60 dpm/Bq) / (5.51992 g * 100 mL) = 22570.9331 dpm/mL
(5.3865 g) * (38550 Bq) * (60 dpm/Bq) / (1.0966 g/mL)/ (5.51992 g * 100 mL) = 20582.9307 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/04/2013	Gregory Ramsay	50.895	500	1610-B	2095.1365 dpm/mL	10/28/2015	10/28/2016
08/23/2013	Christina Kimball	5.538	250	1610-C	455.9531 dpm/mL	08/25/2014	08/25/2015

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Pu-241 Standard 1610-B

v1.0.2

Instrument	GOLD
Analyst	TC1
Verification Prep Date	10/28/2015

Standard Information	
Isotope	Pu-241
Serial Number	1610-B
Isotope Halflife	14.2900 Y
Reference Date	4/27/2012
Ref. Act. (DPM/mL)	2095.1365
Amount of Std. (mL)	0.5
Standard Prep Date	1/4/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	10/28/2015	110.10	205.47	8.60
2	10/28/2015	109.00	209.27	8.60
3	10/28/2015	110.90	208.47	8.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	196.87	0.218983	1798.04	899.02
2	200.67	0.218983	1832.75	916.37
3	199.87	0.218983	1825.44	912.72

	dpm/mL
Mean Value =	1818.74
Stdev =	18.29670867
Certificate Value* =	**1767.9**
Two sigma =	36.593
10 % of Mean =	181.874
Rule A (Pass/Fail)	**Pass**
% Recovery	102.88%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**10/28/2016**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Pu-241 source 1610-B by transferring 0.5 mL portions of the standard into glass liquid scintillation vials. 15 mL of Ecoscint Ultra 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 15 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Pu-241 source standard verification. The Pu-241 efficiency calibration which was used for verification calculations was performed on 10/28/2015 using Pu-241 source 1628-A.

Standard results for each verification source was calculated as follows:

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

where:

A = Ver. source cpm,

B = BKG cpm,

C = System efficiency (cpm/dpm), and

D = volume used for standard verification.

RAD-M-001

TPC
10-29-15

National Institute of Standards & Technology

Certificate

Standard Reference Material® 4334I 1770

Plutonium-242 Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of a standardized and certified quantity of radioactive plutonium-242 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit consists of a solution, whose composition is specified in Table 1, contained in a flame-sealed 5 mL borosilicate-glass ampoule (see Note 1)*.

The certified **Plutonium-242** massic activity value, at a **Reference Time of 1200 EST, 01 January 2010**, is:

(26.77 ± 0.18) Bq•g^{-1}.

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Table 1. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO Guide (see Note 2). Table 2 contains a specification of the components that comprise the uncertainty analyses.

Expiration of Certification: The certification of **SRM 4334I** is valid indefinitely provided the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Storage and Handling"). The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

This SRM may represent a radiological hazard and a chemical hazard. Consult the Material Safety Data Sheet (MSDS), enclosed with the SRM shipment, for details.

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, M.P. Unterweger, Group Leader. The overall technical direction and physical measurement leading to certification were provided by L. Lucas of the NIST Radioactivity Group.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

INSTRUCTIONS FOR STORAGE AND HANDLING

Storage: SRM 4334I should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

Handling: 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) because of both the radioactivity and the strong acid. The ampoule should be opened only by persons qualified to handle both radioactive material and alkaline and/or acidic solutions. Appropriate shielding and/or distance should be used to minimize personnel exposure. Refer to MSDS for further information.

Lisa R. Karam, Chief
Ionizing Radiation Division

Gaithersburg, MD 20899
Certificate Issue Date: 30 June 2010

Robert L. Watters, Jr., Chief
Measurement Services Division

RECEIVED 3/9/16

GL-CED-297-063

* Notes and references may be found on pages 4 and 5.

Table 1. Properties of SRM 4334I

Certified values

Radionuclide	**Plutonium-242**
Reference time	**1200 EST, 1 January 2010 (See Note 3) ***
Massic activity of the solution	**26.77 Bq•g^{-1}**
Relative expanded uncertainty ($k = 2$)	**0.68 %** (see Note 2)

Uncertified information

Source description	Liquid in a flame-sealed 5 mL borosilicate-glass ampoule (see Note 1)
Solution composition	3.2 mol L^{-1} HNO_3
Solution density	(1.105 ± 0.002) g mL^{-1} at 22 °C (see Note 4)
Solution mass	Approximately 5.5 g
Alpha-particle- emitting impurities	^{241}Am : (0.0016 ± 0.0003) Bq g^{-1} (See Note 3, 5 and 6)
Beta-particle- emitting impurities	^{241}Pu : (0.044 ± 0.009) Bq g^{-1} (see Note 4)
Photon-emitting impurities	None detected (see Note 7)
Half-lifes used	^{242}Pu : (373 500 ± 1100) a (see Note 8) [1] ^{241}Pu : (14.290 ± 0.006) a ^{240}Pu: (6 561 ± 7) a ^{239}Pu: (24 110 ± 30) a ^{238}Pu: (87.7 ± 0.1) a ^{241}Am : (432.6 ± 0.6) a
Calibration methods (and instruments)	The certified massic activity for ^{242}Pu was obtained by 4πα liquid scintillation (LS) spectrometry using four commercial LS counters, a calibrated germanium detector system, and a silicon surface-barrier detector.

* Notes and references may be found on pages 4 and 5.

Table 2. Uncertainty evaluation for the massic activity of SRM 4334I

	Uncertainty component	Assessment Type †	Relative standard uncertainty contribution on massic activity of ^{242}Pu (%)
1	Massic alpha-particle emission rate, corrected for background and decay. Standard deviation of the mean for 180 $4\pi\alpha$ liquid-scintillation measurements.	A	0.06
2	Half life of ^{242}Pu; standard uncertainty of the half life	B	3×10^{-6}
3	Decay-scheme data; standard uncertainty of the probability of decay by alpha-particle emission	B	0.001
4	Extrapolation of the alpha-particle-count-rate-versus-energy to zero energy	B	0.25
5	Gravimetric measurements	B	0.10
6	Live time	B	0.10
7	Alpha-particle detection efficiency of scintillators	B	0.10
8	^{241}Pu detection efficiency of scintillators	B	0.04
9	Alpha-particle emitting impurities; limit of detection	B	0.10
10	^{241}Pu impurity	B	0.02
11	Photon emitting impurities; limit of detection	B	0.10
Relative combined standard uncertainty			**0.34**
Relative expanded uncertainty ($k = 2$)			**0.68**

† = (A) denotes evaluation by statistical methods; (B) denotes evaluation by other methods.

Note 1. Refer to http://physics.nist.gov/Divisions/Div846/srm.html (accessed Jun 2010) for assistance and instructions on how to properly open an ampoule. Information on additional storage and handling requirements is also included on the website. This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

Note 2. The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO Guides [2-3]. The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain an approximate 95 % level of confidence.

Note 3. The ^{242}Pu was chemically purified 07 June 1994 at the Lawrence Livermore National Laboratory (LLNL). Americium-241, the daughter of ^{241}Pu, was removed but has been growing in since that time.

Note 4. The stated uncertainty is two times the standard uncertainty. See reference 3.

Note 5. The estimated limits of detection for alpha-particle-emitting impurities, expressed as massic alpha-particle emission rates (number of alpha-particles emission rates per second per gram), are:

$0.003\ s^{-1}\ g^{-1}$ for energies less than 3.1 MeV,
$0.03\ s^{-1}\ g^{-1}$ for energies between 3.1 MeV and 4.4 keV, and
$0.003\ s^{-1}\ g^{-1}$ for energies greater than 5.0 MeV

Note 6. The ^{242}Pu was chemically purified 07 June 1994. The relative massic activities of radionuclidic impurities after purification follow;

Radionuclide	Relative Activity As Determined By	
	LLNL	NIST
^{242}Pu	1	1
^{241}Pu	--	$(3.5 \pm 0.4) \times 10^{-3}$ (a)
^{240}Pu + ^{239}Pu	$< 10^{-6}$ (b)	$(2.0 \pm 2.1) \times 10^{-5}$ (c)
^{238}Pu + ^{241}Am	$< 1.6 \times 10^{-5}$ (b)	$(9 \pm 16) \times 10^{-6}$ (c)
^{241}Am	--	assumed 0 (a)

(a) The stated uncertainty is the standard uncertainty. The ^{241}Pu activity was calculated from a gamma-ray measurement of the ^{241}Am ingrowth as of 25 November 1998, assuming that ^{241}Am was completely removed at the time of chemical purification.
(b) Using alpha-particle spectrometry. The value shown is an estimated upper limit based upon background and counting statistics. Measurements were made at the Lawrence Livermore National Laboratory (LLNL) in July of 1994.
(c) Using alpha-particle spectrometry. The stated uncertainty is the standard uncertainty. Measurements were made at the National Institute of Standards and Technology (NIST) in June and July 1999.

Note 7. The estimated limits of detection for photon-emitting impurities, expressed as massic photon emission rates (numbers of photons per second per gram), are:

$5 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 19 keV and 39 keV,
$7 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 49 keV and 92 keV,
$2 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 106 keV and 507 keV,
$1 \times 10^{-5}\ s^{-1}\ g^{-1}$ for energies between 515 keV and 1456 keV, and
$5 \times 10^{-6}\ s^{-1}\ g^{-1}$ for energies between 1465 keV and 2750 keV.

provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of ^{242}Pu, ^{241}Pu, or ^{241}Am.

Note 8. The stated uncertainty is the standard uncertainty. See reference 2.

REFERENCES

[1] Evaluated Nuclear Structure Data File (ENSDF), online database, National Nuclear Center, Brookhaven National Laboratory (Upton, NY), accessed November 2009. Refer to http://www.nndc.bnl.gov/nudat2/ (accessed Jun 2010).

[2] JCGM 100:2008; *Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement* (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed May 2010); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at http://www.nist.gov/physlab/pubs/index.cfm (accessed Jun 2010).

[3] Thompson, A.; Taylor, B.N.; *Guide for the Use of the International System of Units (SI)*; NIST Special Publication 811; U.S. Government Printing Office: Washington, DC (2008); available at: http://ts.nist.gov/WeightsAndMeasures/Metric/mpo_pubs.cfm (accessed Jun 2010).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1770
Prepared By:	Gregory Ramsay
Carrier Conc:	3.2M HNO3
Reference Date:	01/01/2010
Ampoule Mass (g):	5.5 g
Uncertainty:	+/- .34 %
LogBook No:	GL-CED-297-063

A Solution Material Info			
Isotope:	Plutonium-242		
Prepared By:	Tim Chandler		
Prep Date:	08/03/2016		
Verification Date:	08/03/2016		
Expiration Date:	08/03/2017		
Primary Code:	1770-A		
Dilution(mL):	200 mL		
Mass of Parent(g):	5.4578 g		
Density(g/mL):	1.0312	Balance ID:	C31514

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

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.4578 g) * (26.77 Bq/g) * (60 dpm/Bq) / (200 mL) = 43.8316 dpm/mL
(5.4578 g) * (26.77 Bq/g) * (60 dpm/Bq) / (1.0312 g/mL) / (200 mL) = 42.5054 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

Verification for Pu-242 Standard 1770-A

v1.2

Analyst	TC1
Verification Prep Date	8/3/2016

Tracer Information	
Isotope	Pu-239
Serial Number	0338-MM
Amount of Std. (mL)	0.5
Expiration Date	7/20/2017

Standard Information	
Isotope	Pu-242
Serial Number	1770-A
Isotope Halflife	3.7350E+05 Y
Reference Date	1/1/2010
Ref. Act. (dpm/mL)	43.8316
Amount of Std. (mL)	0.5
Standard Prep Date	8/3/2016

Std #	Count Date	Activity pCi	Standard dpm/mL
1	8/4/2016	9.460	42.00
2	8/4/2016	9.440	41.91
3	8/4/2016	9.830	43.65
Mean Value =		9.577	42.520
Stdev =		0.219620885	0.975116731

	pCi	dpm/mL
Certificate Value* =	**9.8719**	**43.8311**
Two sigma =	0.4392	1.9502
10 % of Mean =	0.9577	4.2520
Rule A (Pass/Fail)	**Pass**	**Pass**
% Recovery	97.01%	97.01%
Rule B (Pass/Fail)	**Pass**	**Pass**
Expiration Date	**8/3/2017**	

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Verification Prep Date.**

The analyst prepared three standard verification sources for Pu-242 standard 1770-A using 0.5 mL for each source. Each standard was combined with 0.5 mL of Pu-239 standard 0338-MM and was diluted in a 50 mL plastic centrifuge tube containing 10 mL of 2M HCl. Five drops of 25% hydrazine dichloride, 100 micrograms of neodymium carrier and three mL of 48% HF was added to precipitate neodymium (and Plutonium) 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. DPM values for Pu-242 were calculated by comparison to Pu-239 certified values.

8-5-16

Eckert & Ziegler
Analytics

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Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

1621

91973

Tc-99 5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs
P.O. No.: GEL 1202297, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Tc-99	7.710E+07	4.025E+04	0.3	1.3	2.7	09/28/2012

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities<0.1%.
5.01799 g 0.001M NaOH solution. Carrier free.

Source Prepared by: M. I. Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: J.D. McCorvey
J.D. McCorvey, Counting Room Manager

Date: 27 SEP 12

RECEIVED 10/4/12 AMO.

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

NC-S-065-051

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1621
Prepared By:	Ashley Drochter
Carrier Conc:	0.001M NaOH
Reference Date:	09/28/2012
Ampoule Mass (g):	5.01799 g
Uncertainty:	+/- 2.7 %
LogBook No:	RC-S-065-051

A Solution Material Info			
Isotope:	Technetium-99		
Prepared By:	Gregory Ramsay		
Prep Date:	06/06/2013		
Verification Date:	01/05/2016		
Expiration Date:	01/05/2017		
Primary Code:	1621-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.887 g		
Density(g/mL):	0.9959	Balance ID:	38080204

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.887 g) * (40250 Bq) * (60 dpm/Bq) / (5.01799 g * 100 mL) = 23519.5865 dpm/mL
(4.887 g) * (40250 Bq) * (60 dpm/Bq) / (0.9959 g/mL)/ (5.01799 g * 100 mL) = 23616.2004 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/13/2015	Gregory Ramsay	40.468	500	1621-B	1911.4008 dpm/mL	01/05/2016	01/05/2017

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Tc-99 Standard 1621-B

v1.0.2

Instrument	Red
Analyst	GXR1
Verification Prep Date	1/5/2016

Standard Information	
Isotope	Tc-99
Serial Number	1621-B
Isotope Halflife	2.1110E+05 Y
Reference Date	9/28/2012
Ref. Act. (DPM/mL)	1911.4008
Amount of Std. (mL)	0.2
Standard Prep Date	1/13/2015

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/6/2016	63.30	420.20	46.20
2	1/6/2016	63.30	393.80	46.20
3	1/6/2016	62.40	417.40	46.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	374.00	0.984256	1899.91	379.98
2	347.60	0.984256	1765.80	353.16
3	371.20	0.984256	1885.69	377.14

	dpm/mL
Mean Value =	1850.47
Stdev =	73.66731519
Certificate Value* =	**1911.4**
Two sigma =	147.335
10 % of Mean =	185.047
Rule A (Pass/Fail)	**Pass**
% Recovery	96.81%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**1/5/2017**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Tc-99 source 1621-B by transferring 0.2 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra 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 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRed for Tc-99 source standard verification. The Tc-99 efficiency calibration which was used for verification calculations was performed on 1/5/2016 using Tc-99 source 1297-A.

Standard results for each verification source was calculated as follows:

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

where:

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

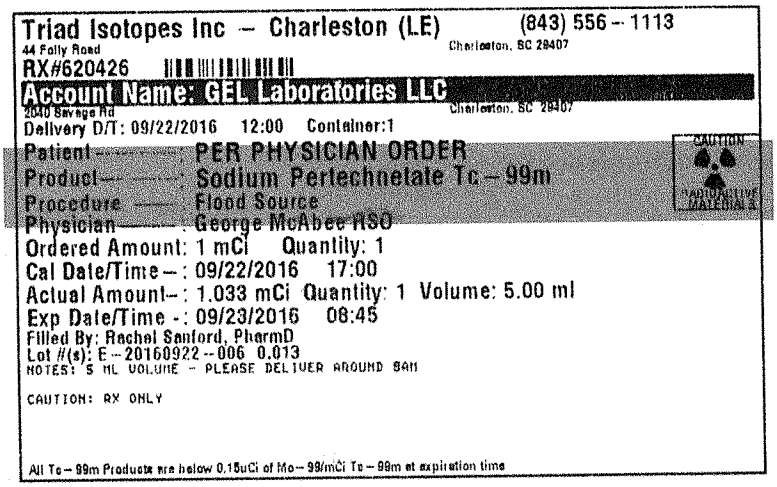
RAD-M-001

1/6/16

1/8/16

Tracer Log

Isotope	Tc-99m
Prep Date	9/22/16
Source Code	TC20766 mm 9/22/16
Prepared By	RL
Expiration Date	9/23/16



Triad Isotopes Inc – Charleston (LE) (843) 556 – 1113
44 Folly Road Charleston, SC 29407
RX#620426
Account Name: GEL Laboratories LLC
2040 Savage Rd Charleston, SC 29407
Delivery D/T: 09/22/2016 12:00 Container:1
Patient ..... PER PHYSICIAN ORDER
Product ..... Sodium Pertechnetate Tc – 99m
Procedure ..... Flood Source
Physician ..... George McAbee NSO
Ordered Amount: 1 mCi Quantity: 1
Cal Date/Time – : 09/22/2016 17:00
Actual Amount – : 1.033 mCi Quantity: 1 Volume: 5.00 ml
Exp Date/Time - : 09/23/2016 08:45
Filled By: Rachel Sanford, PharmD
Lot #(s): E – 20160922 – 006 0.013
NOTES: 5 ML VOLUME - PLEASE DELIVER AROUND 8AM

CAUTION: RX ONLY

All Tc – 99m Products are below 0.15uCi of Mo – 99/mCi Tc – 99m at expiration time

CAUTION RADIOACTIVE MATERIALS

Reviewed by: _____ Date: 9/22/16

Standard Traceability Log Rad

Source Material Info	
Parent Code:	TC2076
Prepared By:	Christina Sanchez
Carrier Conc:	Deionized Water
Reference Date:	09/22/2016
Ampoule Mass (g):	5 g
Uncertainty:	+/-
LogBook No:	

A Solution Material Info			
Isotope:	Technetium-99m TRACER		
Prepared By:	Christina Sanchez		
Prep Date:	09/22/2016		
Verification Date:	09/23/2015		
Expiration Date:	09/23/2016		
Primary Code:	TC2076-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	.1345 g		
Density(g/mL):	1.0000	Balance ID:	C31514

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

(Mass of parent(g)) * (Parm Activity (mci)) * (conversion dpm to mci) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (mci)) * (conversion dpm to mci) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(.1345 g) * (1.033 mci) * (2220000000 dpm/mci) / (5 g * 100 mL) = 616886.9400 dpm/mL
(.1345 g) * (1.033 mci) * (2220000000 dpm/mci) / (1.0000 g/mL)/ (5 g * 100 mL) = 616886.9400 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

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION

Standard Reference Source

1753

100124

H-3 5 mL Liquid in Flame Sealed Vial

RECEIVED 9/1/15

Customer: GEL Laboratories, LLC
P.O. No.: GEL1511998, Item 3 Product Code: 8003-5FSA-185kBq

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
H-3	4.500E+03	1.847E+05	0.1	1.5	3.0	09/01/2015

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities<0.1%.
5.00138 g of tritiated water.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QC Approved: _____ Date: 28 Aug 15
J. S. Lahr, Spectroscopist

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1753
Prepared By:	Gregory Ramsay
Carrier Conc:	Water
Reference Date:	09/01/2015
Ampoule Mass (g):	5.00138 g
Uncertainty:	+/- 1.5 %
LogBook No:	GL-CED-297-046

A Solution Material Info			
Isotope:	Tritium		
Prepared By:	Gregory Ramsay		
Prep Date:	11/02/2015		
Verification Date:	11/02/2015		
Expiration Date:	11/02/2016		
Primary Code:	1753-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.9357 g		
Density(g/mL):	0.9967	Balance ID:	C31514

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

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.9357 g) * (184700 Bq) * (60 dpm/Bq) / (5.00138 g * 100 mL) = 109364.6702 dpm/mL
(4.9357 g) * (184700 Bq) * (60 dpm/Bq) / (0.9967 g/mL)/ (5.00138 g * 100 mL) = 109726.7685 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
11/02/2015	Gregory Ramsay	12.3299	500	1753-B	2705.8402 dpm/mL	11/02/2015	11/02/2016

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for H-3 Standard 1753-B

v1.0.2

Instrument	GOLD
Analyst	GXR1
Verification Prep Date	11/2/2015

Standard Information	
Isotope	H-3
Serial Number	1753-B
Isotope Halflife	12.3200 Y
Reference Date	9/1/2015
Ref. Act. (DPM/mL)	2705.8402
Amount of Std. (mL)	0.5
Standard Prep Date	11/2/2015

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	11/2/2015	70.60	548.20	43.80
2	11/2/2015	70.70	545.00	43.80
3	11/2/2015	71.00	533.60	43.80

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	504.40	0.371451	2715.84	1357.92
2	501.20	0.371451	2698.61	1349.30
3	489.80	0.371451	2637.23	1318.61

	dpm/mL
Mean Value =	2683.89
Stdev =	41.32014609
Certificate Value* =	**2680.1**
Two sigma =	82.640
10 % of Mean =	268.389
Rule A (Pass/Fail)	**Pass**
% Recovery	100.14%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**11/2/2016**

Verification Rules

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

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for H-3 source 1753-B by transferring 0.5 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra 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 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for H-3 source standard verification. The H-3 efficiency calibration which was used for verification calculations was performed on 11/2/2015 using H-3 source 1712-A.

Standard results for each verification source was calculated as follows:

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

where:

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

RAD-M-001

11/3/15

11/2/15

Runlogs

Instrument Run Log

Instrument Type: LSC **Batch ID: 1596448**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	MXS2	LSCRED	SEP-16-16 14:29:56	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240002	SAMPLE	MXS2	LSCRED	SEP-16-16 16:03:00	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240003	SAMPLE	MXS2	LSCRED	SEP-16-16 17:36:05	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240004	SAMPLE	MXS2	LSCRED	SEP-16-16 19:09:09	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240005	SAMPLE	MXS2	LSCRED	SEP-16-16 20:42:15	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240006	SAMPLE	MXS2	LSCRED	SEP-16-16 22:15:18	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240007	SAMPLE	MXS2	LSCRED	SEP-16-16 23:48:19	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240008	SAMPLE	MXS2	LSCRED	SEP-17-16 03:17:23	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240009	SAMPLE	MXS2	LSCRED	SEP-17-16 04:50:23	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240010	SAMPLE	MXS2	LSCRED	SEP-17-16 06:23:27	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240011	SAMPLE	MXS2	LSCRED	SEP-17-16 07:56:23	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240012	SAMPLE	MXS2	LSCRED	SEP-17-16 09:29:20	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240013	SAMPLE	MXS2	LSCRED	SEP-17-16 11:02:19	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240014	SAMPLE	MXS2	LSCRED	SEP-17-16 12:35:16	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240015	SAMPLE	MXS2	LSCRED	SEP-17-16 14:08:15	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
405240016	SAMPLE	MXS2	LSCRED	SEP-17-16 15:41:14	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
1203621851	MB	MXS2	LSCRED	SEP-17-16 17:14:13	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00

Instrument Run Log

Instrument Type: LSC

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1203621853	LCS	MXS2	LSCRED	SEP-17-16 20:20:09	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00
1203621852	DUP	MXS2	LSCRED	SEP-19-16 14:15:58	DONE	2mL DI/1 drop HNO3/13mL Ecoscint Ultra	01-FEB-16 00:00

Instrument Run Log

Instrument Type: LSC **Batch ID: 1597418**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	GXR1	LSCBLUE	SEP-27-16 08:09:54	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240002	SAMPLE	GXR1	LSCBLUE	SEP-27-16 09:02:13	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240003	SAMPLE	GXR1	LSCBLUE	SEP-27-16 09:54:31	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240004	SAMPLE	GXR1	LSCBLUE	SEP-27-16 10:46:49	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240005	SAMPLE	GXR1	LSCBLUE	SEP-27-16 11:39:09	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240006	SAMPLE	GXR1	LSCBLUE	SEP-27-16 12:31:27	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240007	SAMPLE	GXR1	LSCBLUE	SEP-27-16 13:23:45	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240008	SAMPLE	GXR1	LSCBLUE	SEP-27-16 14:16:02	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240009	SAMPLE	GXR1	LSCBLUE	SEP-27-16 15:08:19	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240010	SAMPLE	GXR1	LSCBLUE	SEP-27-16 16:00:40	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240011	SAMPLE	GXR1	LSCBLUE	SEP-27-16 16:52:57	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240012	SAMPLE	GXR1	LSCBLUE	SEP-27-16 17:45:21	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240013	SAMPLE	GXR1	LSCBLUE	SEP-27-16 18:37:38	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240014	SAMPLE	GXR1	LSCBLUE	SEP-27-16 19:29:55	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240015	SAMPLE	GXR1	LSCBLUE	SEP-27-16 20:22:13	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
405240016	SAMPLE	GXR1	LSCBLUE	SEP-27-16 21:14:30	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
1203624314	MB	GXR1	LSCBLUE	SEP-27-16 22:06:51	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
1203624315	DUP	GXR1	LSCBLUE	SEP-27-16 22:59:08	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00
1203624316	LCS	GXR1	LSCBLUE	SEP-27-16 23:51:28	DONE	15mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	04-JUL-16 00:00

Instrument Run Log

Instrument Type: LSC **Batch ID: 1597481**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	TXP3	LSCORANGE	SEP-20-16 22:21:59	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240002	SAMPLE	TXP3	LSCORANGE	SEP-20-16 22:58:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240003	SAMPLE	TXP3	LSCORANGE	SEP-20-16 23:36:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240004	SAMPLE	TXP3	LSCORANGE	SEP-21-16 00:14:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240005	SAMPLE	TXP3	LSCORANGE	SEP-21-16 00:51:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240006	SAMPLE	TXP3	LSCORANGE	SEP-21-16 02:44:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240007	SAMPLE	TXP3	LSCORANGE	SEP-21-16 03:21:59	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240008	SAMPLE	TXP3	LSCORANGE	SEP-21-16 03:59:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240009	SAMPLE	TXP3	LSCORANGE	SEP-21-16 04:36:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240010	SAMPLE	TXP3	LSCORANGE	SEP-21-16 05:14:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240011	SAMPLE	TXP3	LSCORANGE	SEP-21-16 05:51:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240012	SAMPLE	TXP3	LSCORANGE	SEP-21-16 06:29:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240013	SAMPLE	TXP3	LSCORANGE	SEP-21-16 07:06:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240014	SAMPLE	TXP3	LSCORANGE	SEP-21-16 07:44:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240015	SAMPLE	TXP3	LSCORANGE	SEP-21-16 08:21:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
405240016	SAMPLE	TXP3	LSCORANGE	SEP-21-16 08:59:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
1203624533	MB	TXP3	LSCORANGE	SEP-21-16 09:37:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
1203624534	DUP	TXP3	LSCORANGE	SEP-21-16 10:14:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
1203624535	MS	TXP3	LSCORANGE	SEP-21-16 10:52:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00
1203624536	LCS	TXP3	LSCORANGE	SEP-21-16 18:26:58	DONE	10mL DW/13mL Ecoscint Ultra	15-JUN-16 00:00

Instrument Run Log

Instrument Type: LSC **Batch ID: 1598055**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240001	SAMPLE	TXJ1	LSCYELLOW	SEP-27-16 22:22:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240002	SAMPLE	TXJ1	LSCYELLOW	SEP-27-16 23:33:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240003	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 00:44:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240004	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 03:08:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240005	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 04:19:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240006	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 05:30:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240007	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 06:42:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240008	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 07:53:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240009	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 09:04:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240010	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 10:15:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240011	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 11:27:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240012	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 12:38:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240013	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 13:49:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00

Instrument Run Log

Instrument Type: LSC

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
405240014	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 15:00:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240015	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 16:11:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
405240016	SAMPLE	TXJ1	LSCYELLOW	SEP-28-16 17:23:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
1203626057	MB	TXJ1	LSCYELLOW	SEP-28-16 18:34:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
1203626058	DUP	TXJ1	LSCYELLOW	SEP-28-16 19:45:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
1203626059	MS	TXJ1	LSCYELLOW	SEP-28-16 20:57:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00
1203626060	LCS	TXJ1	LSCYELLOW	SEP-28-16 22:08:00	DONE	3mL Ethanolamine/9mL Methanol/10mL EcoScint A	01-JUN-16 00:00