

## **Appendix D11**

### **Kensington Expressway Subsurface Boring Report and Addendum**

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## Kensington Expressway Preliminary Boring Report

Prepared For:

Geotechnical Exploration and Sampling  
PIN 5512.52 – Kensington Expressway, NYS Route 33  
City of Buffalo, Erie County  
LaBella Project No. 2230860



300 State Street  
Rochester, New York 14609

Prepared By:



15 Hazelwood Dr., Suite 112  
Amherst, NY, 14228

MJW Project No. 23.2021

## Site Background

A portion of the Kensington Expressway is being reconstructed and redesigned, including conversion to a tunnel and a bridge replacement at Best Street. Borings were conducted with the intent to characterize soils and identify geotechnical specifications. MJW was contracted to provide radiological support and additional radiological characterization of soils. MJW provided radiological support and sampling activities at five (5) predetermined boring locations.

## Field Work Narrative

On the days of September 6<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup>, and 13<sup>th</sup> 2023 MJW Personnel Paul Koch (PK) covered the LaBella Kensington project, for the purpose of borehole drilling radiological support. The boreholes were drilled for an environmental impact assessment done at the behest of LaBella for NYDOT. Drilling was conducted by CME Associates, with Watts Environmental covering air quality monitoring and LaBella providing the site engineer. Drilling began at approximately 0900 following field safety briefings all four (4) days; all drilling was covered by MJW (PK). Drilling was conducted at four (4) separate bore sites covering approximately 3280 feet. Two (2) borings were performed at each borehole except for borehole designation FH-X-32e where bedrock was encountered at three feet. All other boreholes were drilled first from one (1) to three (3) feet and then from three (3) to five (5) feet with a split spoon taken for each borehole. Each split spoon was then scanned using a Ludlum Model 2241-2/ 44-10. All readings were within the established background range, composite samples were gathered from split spoons and placed in Ziploc bags for transfer to sample jars and subsequent laboratory shipment. Gloves were utilized during sampling activities to reduce contact with the sample material. All drilling equipment was scanned at the end of the drilling process each day using a Ludlum Model 3/44-9, no elevated radiological levels were detected when scanning equipment. The job concluded without incident.

## Sample Data Results

A total of ten (10) samples were sent for analysis at GEL Laboratories. Observations and descriptions of the material by MJW staff presented no concerns regarding radiological contamination. All ten (10) samples were analyzed using DOE HASL-300, 4.5.2.3/Ga-01-R for broad gamma spectroscopy. One (1) sample was additionally analyzed using DOE EML HASL-300, U-02-RC Modified and DOE EML HASL-300, Th-01-RC Modified for alpha spectroscopy of isotopic thorium and uranium.

The laboratory analysis results presented no issues with QA/QC. All samples, duplicates, spikes, and method blanks returned acceptable results.

GEL Laboratories provides qualifiers based on the relationship between the reported result and the minimum detectable concentration (based upon analysis parameters), qualified results indicate a failure to positively identify the radioisotope in the sample. Only non-qualified sample results were utilized in this analysis.

The non-qualified data was reviewed for isotopes Radium-226 and Radium-228. There were no results that indicated activity above background. The GEL Labs results for the soil samples analyzed for this site are shown in Table 1 below. Full results from GEL Labs including the Case Narrative and EDD are attached as well.

<b>Table 1. Kensington Soil Sample Data for Ra-226</b>		
<b>Sample Number</b>	<b>[Ra-226] pCi/g</b>	<b>UNC ±</b>
20230906-FH-X-27-1-3	1.04	0.259
20230906-FH-X-27-3-5	0.187	0.125
20230907-FH-X-23e-1-3	1.64	0.24
20230907-FH-X-23e-3-5	1.18	0.209
20230911-FH-X-34c-1-3	2.28	0.277
20230911-FH-X-34c-3-5	2.37	0.273
20230911-FH-X-32c-1-3	1.44	0.188
20230911-FH-X-32c-3-5	1.36	0.192
20230913-FH-X-07e-1-3	0.846	0.183
20230913-FH-X-07e-3-5	1.09	0.194
20230906-FH-X-27-1-3(640278001DUP)	1.12	0.206
<i>Method Blank</i>	<i>-0.0104</i>	<i>0.0384</i>
<b>Average Concentration</b>	<b>1.32</b>	<b>0.21</b>

November 02, 2023

Alex Bartels  
MJW Technical Services  
15 Hazelwood Drive  
Suite 112  
Amherst, New York 14228

Re: Kensington  
Work Order: 640278

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 06, 2023. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

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,



Jacob Crook  
Project Manager

Purchase Order: GELP19-0644  
Enclosures

**MJW Technical Services**  
**Kensington**  
**SDG: 640278**

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# Case Narrative

**Case Narrative  
for  
MJW Technical Services  
SDG: 640278**

**November 02, 2023**

**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 October 06, 2023 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. Samples received with no collection dates or times on containers.

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
640278001	20230906-FH-X-27-1-3
640278002	20230906-FH-X-27-3-5
640278003	20230907-FH-X-23e-1-3
640278004	20230907-FH-X-23e-3-5
640278005	20230911-FH-X-34c-1-3
640278006	20230911-FH-X-34c-3-5
640278007	20230911-FH-X-32c-1-3
640278008	20230911-FH-X-32c-3-5
640278009	20230913-FH-X-07e-1-3
640278010	20230913-FH-X-07e-3-5

**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.

A handwritten signature in black ink that reads "Jacob N. Crook". The signature is written in a cursive style with a large initial 'J' and 'C'.

Jacob Crook  
Project Manager

**List of current GEL Certifications as of 02 November 2023**

<b>State</b>	<b>Certification</b>
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
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	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122024-04
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-23-21
Utah NELAP	SC000122023-38
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

# **Chain of Custody and Supporting Documentation**

**GEL Laboratories LLC**  
 Chemistry | Radiochemistry | Radiobiology | Specialty Analytics  
**Chain of Custody and Analytical Request**  
 GEL Work Order Number: \_\_\_\_\_  
 GEL Project Manager: \_\_\_\_\_  
 Client Name: M. Sh Corporation  
 Project/Site Name: Kensington  
 Address: 15 Hazelwood Dr Ste 112 Amherst, NY 14228  
 Collected By: P. Koch  
 Send Results To: abartels@njcorpc.com

GEL Laboratories, LLC  
 2040 Savage Road  
 Charleston, SC 29407  
 Phone: (843) 556-8171  
 Fax: (843) 766-1178

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (a)	Field Filtered (b)	Sample Matrix (c)	Radiactive (f) Yes, please supply isotopic info)	Should this sample be considered: (7) Known or possible Hazards	Sample Analysis Requested (g) (Fill in the number of containers for each test)				Comments
								Alpha spec	Gamma spec	21-day spec	Preservative Type (6)	
20230906-FHX-27-1-3	09-06-23	0800	N	N	SD	N		1	X	X		Alpha spec
20230906-FHX-27-3-5	09-06-23	0830	N	N	SD	N		1	X	X		Alpha spec for U-238, U-235 and Th-232
20230907-FHX-23e-1-3	09-07-23	0800	N	N	SD	N		1	X	X		21-day ingrowth
20230911-FHX-34c-1-3	09-11-23	0800	N	N	SD	N		1	X	X		
20230911-FHX-34c-3-5	09-11-23	0900	N	N	SD	N		1	X	X		
20230911-FHX-32c-1-3	09-11-23	1130	N	N	SD	N		1	X	X		
20230911-FHX-32c-3-5	09-11-23	1300	N	N	SD	N		1	X	X		
20230913-FHX-07e-1-3	09-13-23	0730	N	N	SD	N		1	X	X		
20230913-FHX-07e-3-5	09-13-23	0900	N	N	SD	N		1	X	X		

Relinquished By (Signed) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by (signed) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 1 M. Sh 10/03/2023  
 2 \_\_\_\_\_  
 3 \_\_\_\_\_

**Chain of Custody Signatures**

TAT Requested: Normal:  Rush: \_\_\_\_\_ Specify: \_\_\_\_\_ (Subject to Surcharge)  
 Fax Results:  Yes  No  
 Select Deliverable:  C of A  QC Summary  Level 1  Level 2  Level 3  Level 4  
 Additional Remarks: \_\_\_\_\_  
 For Lab Receiving Use Only: Custody Seal Intact?  Yes  No Cooler Temp: 20°C  
 Sample Collection Time Zone:  Eastern  Pacific  Central  Mountain  Other: \_\_\_\_\_

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

1.) Chain of Custody Number = Client Determined  
 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite  
 3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.  
 4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, ML = Misc Liquid, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste, O = Oil, F = Filter, P = Wipe, U = Urine, F = Fecal, N = Nasal  
 5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).  
 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate. If no preservative is added = leave field blank  
 7.) **KNOWN OR POSSIBLE HAZARDS**  
 Characteristic Hazards: \_\_\_\_\_  
 FL = Flammable/Ignitable  
 CO = Corrosive  
 RE = Reactive  
 Listed Waste: \_\_\_\_\_  
 LW = Listed Waste (F, K, P and U-listed wastes)  
 Waste code(s): \_\_\_\_\_  
 TSCA Regulated: \_\_\_\_\_  
 PCB = Polychlorinated biphenyls

RCRA Metals: \_\_\_\_\_  
 As = Arsenic Hg = Mercury  
 Ba = Barium Se = Selenium  
 Cd = Cadmium Ag = Silver  
 Cr = Chromium MR = Misc. RCRA metals  
 Pb = Lead

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)



# **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  
SDG #: 640278**

**Product:** Alphaspec U, Solid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 28

**Analytical Batch:** 2513345

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 24

**Preparation Batch:** 2505135

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
640278001	20230906-FH-X-27-1-3
1205555375	Method Blank (MB)
1205555376	640278001(20230906-FH-X-27-1-3) Sample Duplicate (DUP)
1205555377	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" 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:** Alphaspec Th, Solid

**Analytical Method:** DOE EML HASL-300, Th-01-RC Modified

**Analytical Procedure:** GL-RAD-A-038 REV# 18

**Analytical Batch:** 2513346

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 24

**Preparation Batch:** 2505135

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
640278001	20230906-FH-X-27-1-3
1205555378	Method Blank (MB)
1205555379	640278001(20230906-FH-X-27-1-3) Sample Duplicate (DUP)
1205555380	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" 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:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 24

**Preparation Batch:** 2505135

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
640278001	20230906-FH-X-27-1-3
640278002	20230906-FH-X-27-3-5
640278003	20230907-FH-X-23e-1-3
640278004	20230907-FH-X-23e-3-5
640278005	20230911-FH-X-34c-1-3
640278006	20230911-FH-X-34c-3-5
640278007	20230911-FH-X-32c-1-3
640278008	20230911-FH-X-32c-3-5
640278009	20230913-FH-X-07e-1-3
640278010	20230913-FH-X-07e-3-5

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: Gammascpec, Gamma, Solid (Standard List)**

**Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R

**Analytical Procedure:** GL-RAD-A-013 REV# 28

**Analytical Batch:** 2505440

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 24

**Preparation Batch:** 2505135

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
------------------------------	--

640278001	20230906-FH-X-27-1-3
640278002	20230906-FH-X-27-3-5
640278003	20230907-FH-X-23e-1-3
640278004	20230907-FH-X-23e-3-5
640278005	20230911-FH-X-34c-1-3
640278006	20230911-FH-X-34c-3-5
640278007	20230911-FH-X-32c-1-3
640278008	20230911-FH-X-32c-3-5
640278009	20230913-FH-X-07e-1-3
640278010	20230913-FH-X-07e-3-5
1205540615	Method Blank (MB)
1205540616	640278001(20230906-FH-X-27-1-3) Sample Duplicate (DUP)
1205540617	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**

**Duplication Criteria between QC Sample and Duplicate Sample**

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1205540616 (20230906-FH-X-27-1-3DUP)	Potassium-40	RPD 20.8* (0.00%-20.00%) RER 0.875 (0-3)

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Americium-241	640278008	20230911-FH-X-32c-3-5
		Lead-210	1205540616	20230906-FH-X-27-1-3(640278001DUP)
		Thorium-234	640278001	20230906-FH-X-27-1-3
		Thorium-234	640278005	20230911-FH-X-34c-1-3
		Uranium-235	640278008	20230911-FH-X-32c-3-5

		Uranium-238	640278001	20230906-FH-X-27-1-3
		Uranium-238	640278005	20230911-FH-X-34c-1-3
UI	Results are considered a false positive due to high peak-width.	Bismuth-212	640278006	20230911-FH-X-34c-3-5
		Cesium-137	640278008	20230911-FH-X-32c-3-5
UI	Results are considered a false positive due to interference.	Europium-155	640278010	20230913-FH-X-07e-3-5
UI	Results are considered a false positive due to low abundance.	Barium-140	640278007	20230911-FH-X-32c-1-3
		Cesium-134	640278009	20230913-FH-X-07e-1-3
		Cesium-134	640278010	20230913-FH-X-07e-3-5

### **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.



# Moisture LogBook

Batch: 2505135

Analyst: JM12

Date/Time: 08-OCT-2023

Procedure Code: \_\_PREPD

Procedure Description: Dry Soil Prep GL-RAD-A-021

Lab Sop: GL-RAD-A-021

Sample St      Sample Id      Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
640217001	SAMPLE		SP- C238839655	13:11	12.03	462.99	360.5	450.96	348.47	22.727
640278001	SAMPLE		SP- C238839655	13:11	12.01	347.51	338.11	335.5	326.1	2.801
640278002	SAMPLE		SP- C238839655	13:11	12.3	197.46	197.3	185.16	185	.086
640278003	SAMPLE		SP- C238839655	13:11	12.25	364.3	347.21	352.05	334.96	4.854
640278004	SAMPLE		SP- C238839655	13:11	12.29	308.81	284.52	296.52	272.23	8.191
640278005	SAMPLE		SP- C238839655	13:11	12.28	549.92	499.57	537.64	487.29	9.365
640278006	SAMPLE		SP- C238839655	13:11	12.35	510.91	475.37	498.56	463.02	7.128
640278007	SAMPLE		SP- C238839655	13:11	12.44	405.84	377.98	393.4	365.54	7.081
640278008	SAMPLE		SP- C238839655	13:11	12.37	591.86	560.22	579.49	547.85	5.459
640278009	SAMPLE		SP- C238839655	13:11	12.33	467.91	431.34	455.58	419.01	8.027
640278010	SAMPLE		SP- C238839655	13:11	12.32	404.76	362.36	392.44	350.04	10.804
640349001	SAMPLE		SP- C238839655	13:11	12.2	286.34	222.06	274.14	209.86	23.447
640349002	SAMPLE		SP- C238839655	13:11	12.25	315.38	257.34	303.13	245.09	19.146
640349003	SAMPLE		SP- C238839655	13:11	12.13	322.69	267.36	310.56	255.23	17.816
640351001	SAMPLE		SP- C238839655	13:11	12.14	296.01	240.34	283.87	228.2	19.611
640351002	SAMPLE		SP- C238839655	13:11	12.26	286.44	237.82	274.18	225.56	17.732
640351003	SAMPLE		SP- C238839655	13:11	12.17	250.98	168.39	238.81	156.22	34.583

**Comments:**

A) Result = (Net Initial - Net Final) / Net Initial \* 100

**Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS**

GEL Laboratories LLC

# GEL LABORATORIES LLC

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

## Qualifier Definition Report for

MJWC001 MJW Technical Services

Client SDG: 640278 GEL Work Order: 640278

### 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
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification

### 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 NOV 2023

Title: Analyst III - Data Validator

# 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  
 Amherst, New York 14228  
 Contact: Alex Bartels  
 Project: Kensington

Report Date: November 2, 2023

Client Sample ID: 20230906-FH-X-27-1-3  
 Sample ID: 640278001  
 Matrix: Solid  
 Collect Date: 06-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 2.8%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>														
Thorium-228	U	0.195	+/-0.494	0.895	+/-0.495	1.00	pCi/g			EJ1	11/02/23	0829	2513346	1
Thorium-230		1.28	+/-0.769	0.697	+/-0.800	1.00	pCi/g							
Thorium-232	U	0.295	+/-0.397	0.392	+/-0.400	1.00	pCi/g							
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>														
Uranium-233/234	U	0.316	+/-0.348	0.510	+/-0.351	1.00	pCi/g			EJ1	11/02/23	0818	2513345	2
Uranium-235/236		0.202	+/-0.266	0.202	+/-0.268	1.00	pCi/g							
Uranium-238		0.971	+/-0.482	0.383	+/-0.500	1.00	pCi/g							
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228	U	0.184	+/-0.218	0.475	+/-0.233		pCi/g			MXR1	10/30/23	0852	2505440	3
Americium-241	U	0.0756	+/-0.254	0.513	+/-0.257		pCi/g							
Antimony-124	U	-0.0759	+/-0.105	0.0988	+/-0.111		pCi/g							
Antimony-125	U	0.0853	+/-0.124	0.261	+/-0.130		pCi/g							
Barium-133	U	-0.0177	+/-0.0579	0.0974	+/-0.0584		pCi/g							
Barium-140	U	-0.664	+/-2.87	4.83	+/-2.89		pCi/g							
Beryllium-7	U	-0.329	+/-0.631	1.14	+/-0.649		pCi/g							
Bismuth-212	U	0.941	+/-0.620	1.24	+/-0.626		pCi/g							
Bismuth-214		0.822	+/-0.194	0.135	+/-0.206		pCi/g							
Cerium-139	U	-0.0225	+/-0.0401	0.0685	+/-0.0417		pCi/g							
Cerium-141	U	-0.0981	+/-0.178	0.304	+/-0.184		pCi/g							
Cerium-144	U	-0.0441	+/-0.225	0.408	+/-0.226		pCi/g							
Cesium-134	U	0.00177	+/-0.0468	0.0938	+/-0.0468		pCi/g							
Cesium-136	U	-0.582	+/-1.07	1.79	+/-1.11		pCi/g							
Cesium-137	U	0.000160	+/-0.0389	0.0781	+/-0.0389	0.100	pCi/g							
Chromium-51	U	-0.653	+/-1.14	1.84	+/-1.18		pCi/g							
Cobalt-56	U	0.0268	+/-0.0579	0.130	+/-0.0592		pCi/g							
Cobalt-57	U	0.00109	+/-0.0293	0.0550	+/-0.0293		pCi/g							
Cobalt-58	U	-0.00185	+/-0.0477	0.0910	+/-0.0477		pCi/g							
Cobalt-60	U	-0.0332	+/-0.0419	0.0688	+/-0.0447		pCi/g							
Europium-152	U	-0.0284	+/-0.114	0.218	+/-0.114		pCi/g							
Europium-154	U	-0.0526	+/-0.150	0.289	+/-0.152		pCi/g							
Europium-155	U	0.00323	+/-0.111	0.211	+/-0.111		pCi/g							
Iridium-192	U	-0.00251	+/-0.0564	0.102	+/-0.0564		pCi/g							
Iron-59	U	-0.00112	+/-0.183	0.387	+/-0.183		pCi/g							
Lead-210	U	12.9	+/-17.7	22.6	+/-17.7		pCi/g							
Lead-212		0.246	+/-0.116	0.113	+/-0.119		pCi/g							
Lead-214		1.04	+/-0.259	0.169	+/-0.277		pCi/g							
Manganese-54	U	-0.00432	+/-0.0367	0.0732	+/-0.0368		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels

Project: Kensington

Client Sample ID: 20230906-FH-X-27-1-3

Sample ID: 640278001

Project: MJWC00923

Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Mercury-203	U	0.00130	+/-0.0839	0.151	+/-0.0839		pCi/g							
Neodymium-147	U	0.235	+/-7.20	14.5	+/-7.21		pCi/g							
Neptunium-239	U	0.0686	+/-0.279	0.536	+/-0.280		pCi/g							
Niobium-94	U	0.0271	+/-0.0393	0.0862	+/-0.0412		pCi/g							
Niobium-95	U	0.0336	+/-0.0730	0.156	+/-0.0746		pCi/g							
Potassium-40		5.26	+/-1.61	1.03	+/-1.70		pCi/g							
Promethium-144	U	0.0244	+/-0.0373	0.0847	+/-0.0390		pCi/g							
Promethium-146	U	0.0313	+/-0.0514	0.110	+/-0.0534		pCi/g							
Radium-226		1.04	+/-0.259	0.169	+/-0.277		pCi/g							
Radium-228	U	0.184	+/-0.218	0.475	+/-0.233		pCi/g							
Ruthenium-106	U	0.165	+/-0.382	0.817	+/-0.390		pCi/g							
Silver-110m	U	-0.0177	+/-0.0523	0.0976	+/-0.0530		pCi/g							
Sodium-22	U	-0.00569	+/-0.0495	0.102	+/-0.0496		pCi/g							
Thallium-208		0.106	+/-0.0623	0.0903	+/-0.0630		pCi/g							
Thorium-234	UI	0.000	+/-4.86	3.98	+/-5.01		pCi/g							
Tin-113	U	-0.0147	+/-0.0607	0.117	+/-0.0611		pCi/g							
Uranium-235	U	0.171	+/-0.258	0.495	+/-0.270		pCi/g							
Uranium-238	UI	0.000	+/-4.86	3.98	+/-5.01		pCi/g							
Yttrium-88	U	0.0266	+/-0.0683	0.166	+/-0.0694		pCi/g							
Zinc-65	U	0.0444	+/-0.111	0.233	+/-0.113		pCi/g							
Zirconium-95	U	-0.0330	+/-0.155	0.255	+/-0.156		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

**The following Analytical Methods were performed**

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"	2513346	62.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"	2513345	91.4	(15%-125%)

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels

Project: Kensington

Client Sample ID: 20230906-FH-X-27-1-3

Sample ID: 640278001

Project: MJWC00923

Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test													
								Batch ID	Recovery%				Acceptable Limits	

### 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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 Amherst, New York 14228

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230906-FH-X-27-3-5  
 Sample ID: 640278002  
 Matrix: Solid  
 Collect Date: 06-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: <0.1%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228	U	-0.0551	+/-0.139	0.272	+/-0.142		pCi/g			MXR1	10/30/23	0853	2505440	1
Americium-241	U	-0.0396	+/-0.105	0.205	+/-0.107		pCi/g							
Antimony-124	U	-0.0241	+/-0.0892	0.200	+/-0.0899		pCi/g							
Antimony-125	U	0.0112	+/-0.0564	0.123	+/-0.0566		pCi/g							
Barium-133	U	-0.00405	+/-0.0313	0.0561	+/-0.0313		pCi/g							
Barium-140	U	-0.364	+/-1.51	2.94	+/-1.52		pCi/g							
Beryllium-7	U	-0.262	+/-0.398	0.699	+/-0.416		pCi/g							
Bismuth-212	U	0.149	+/-0.382	0.827	+/-0.388		pCi/g							
Bismuth-214		0.376	+/-0.147	0.0984	+/-0.150		pCi/g							
Cerium-139	U	-0.00394	+/-0.0223	0.0417	+/-0.0224		pCi/g							
Cerium-141	U	-0.0488	+/-0.0953	0.170	+/-0.0979		pCi/g							
Cerium-144	U	0.0853	+/-0.161	0.324	+/-0.166		pCi/g							
Cesium-134	U	0.00407	+/-0.0287	0.0639	+/-0.0288		pCi/g							
Cesium-136	U	0.0439	+/-0.408	0.995	+/-0.408		pCi/g							
Cesium-137	U	-0.00836	+/-0.0306	0.0569	+/-0.0309	0.100	pCi/g							
Chromium-51	U	-0.0840	+/-0.682	1.37	+/-0.683		pCi/g							
Cobalt-56	U	0.0279	+/-0.0440	0.104	+/-0.0459		pCi/g							
Cobalt-57	U	0.00130	+/-0.0161	0.0321	+/-0.0162		pCi/g							
Cobalt-58	U	0.00350	+/-0.0368	0.0827	+/-0.0368		pCi/g							
Cobalt-60	U	-0.0310	+/-0.0410	0.0662	+/-0.0434		pCi/g							
Europium-152	U	0.0846	+/-0.0796	0.180	+/-0.0885		pCi/g							
Europium-154	U	0.0295	+/-0.0784	0.192	+/-0.0796		pCi/g							
Europium-155	U	0.0102	+/-0.0458	0.0975	+/-0.0460		pCi/g							
Iridium-192	U	-0.0197	+/-0.0350	0.0655	+/-0.0361		pCi/g							
Iron-59	U	0.119	+/-0.146	0.348	+/-0.156		pCi/g							
Lead-210	U	1.48	+/-2.96	6.50	+/-3.04		pCi/g							
Lead-212	U	0.0694	+/-0.0822	0.0903	+/-0.0824		pCi/g							
Lead-214		0.187	+/-0.125	0.110	+/-0.126		pCi/g							
Manganese-54	U	0.0183	+/-0.0370	0.0816	+/-0.0379		pCi/g							
Mercury-203	U	0.00926	+/-0.0504	0.0963	+/-0.0506		pCi/g							
Neodymium-147	U	0.577	+/-4.10	8.63	+/-4.11		pCi/g							
Neptunium-239	U	-0.127	+/-0.173	0.304	+/-0.183		pCi/g							
Niobium-94	U	0.0201	+/-0.0335	0.0720	+/-0.0348		pCi/g							
Niobium-95	U	0.0454	+/-0.0547	0.123	+/-0.0586		pCi/g							
Potassium-40	U	0.412	+/-0.531	0.523	+/-0.532		pCi/g							
Promethium-144	U	-0.0134	+/-0.0350	0.0622	+/-0.0355		pCi/g							
Promethium-146	U	-0.00882	+/-0.0304	0.0517	+/-0.0306		pCi/g							
Radium-226		0.187	+/-0.125	0.110	+/-0.126		pCi/g							
Radium-228	U	-0.0551	+/-0.139	0.272	+/-0.142		pCi/g							



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

Report Date: November 2, 2023

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: 20230906-FH-X-27-3-5  
Sample ID: 640278002

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	-0.291	+/-0.318	0.395	+/-0.346		pCi/g							
Silver-110m	U	0.0448	+/-0.0438	0.110	+/-0.0484		pCi/g							
Sodium-22	U	0.0110	+/-0.0284	0.0697	+/-0.0288		pCi/g							
Thallium-208	U	-0.00619	+/-0.0344	0.0691	+/-0.0346		pCi/g							
Thorium-234	U	-0.318	+/-0.970	1.91	+/-0.983		pCi/g							
Tin-113	U	0.0224	+/-0.0374	0.0844	+/-0.0387		pCi/g							
Uranium-235	U	-0.0819	+/-0.141	0.243	+/-0.146		pCi/g							
Uranium-238	U	-0.318	+/-0.970	1.91	+/-0.983		pCi/g							
Yttrium-88	U	0.000559	+/-0.0405	0.0968	+/-0.0405		pCi/g							
Zinc-65	U	0.0185	+/-0.0703	0.147	+/-0.0709		pCi/g							
Zirconium-95	U	-0.0301	+/-0.104	0.189	+/-0.105		pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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	Mtd.: Method
DL: Detection Limit	PF: Prep Factor
Lc/LC: Critical Level	RL: Reporting Limit
MDA: Minimum Detectable Activity	TPU: Total Propagated Uncertainty
MDC: Minimum Detectable Concentration	

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230907-FH-X-23e-1-3  
 Sample ID: 640278003  
 Matrix: Solid  
 Collect Date: 07-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 4.85%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.688	+/-0.262	0.260	+/-0.271		pCi/g							
Americium-241	U	0.0229	+/-0.223	0.385	+/-0.223		pCi/g							
Antimony-124	U	0.000617	+/-0.163	0.347	+/-0.163		pCi/g							
Antimony-125	U	-0.000293	+/-0.121	0.222	+/-0.121		pCi/g							
Barium-133	U	0.0270	+/-0.0495	0.0911	+/-0.0511		pCi/g							
Barium-140	U	-1.29	+/-2.51	3.95	+/-2.58		pCi/g							
Beryllium-7	U	-0.0618	+/-0.631	1.15	+/-0.632		pCi/g							
Bismuth-212	U	-0.0454	+/-0.540	1.05	+/-0.541		pCi/g							
Bismuth-214		1.55	+/-0.249	0.166	+/-0.283		pCi/g							
Cerium-139	U	0.0204	+/-0.0419	0.0824	+/-0.0431		pCi/g							
Cerium-141	U	-0.0665	+/-0.150	0.277	+/-0.153		pCi/g							
Cerium-144	U	-0.238	+/-0.227	0.402	+/-0.251		pCi/g							
Cesium-134	U	-0.00700	+/-0.0594	0.110	+/-0.0595		pCi/g							
Cesium-136	U	0.241	+/-0.955	1.93	+/-0.962		pCi/g							
Cesium-137	U	0.00550	+/-0.0434	0.0781	+/-0.0435	0.100	pCi/g							
Chromium-51	U	-0.0308	+/-1.08	2.01	+/-1.08		pCi/g							
Cobalt-56	U	-0.00528	+/-0.0514	0.102	+/-0.0515		pCi/g							
Cobalt-57	U	-0.00451	+/-0.0318	0.0552	+/-0.0319		pCi/g							
Cobalt-58	U	0.0538	+/-0.0526	0.127	+/-0.0581		pCi/g							
Cobalt-60	U	-0.0403	+/-0.0489	0.0819	+/-0.0523		pCi/g							
Europium-152	U	-0.0514	+/-0.125	0.220	+/-0.127		pCi/g							
Europium-154	U	0.00896	+/-0.152	0.308	+/-0.152		pCi/g							
Europium-155	U	-0.0515	+/-0.133	0.225	+/-0.135		pCi/g							
Iridium-192	U	-0.0682	+/-0.0589	0.0943	+/-0.0667		pCi/g							
Iron-59	U	0.125	+/-0.173	0.388	+/-0.182		pCi/g							
Lead-210	U	3.23	+/-7.25	14.0	+/-7.40		pCi/g							
Lead-212		0.718	+/-0.137	0.110	+/-0.152		pCi/g							
Lead-214		1.64	+/-0.240	0.157	+/-0.278		pCi/g							
Manganese-54	U	-0.00439	+/-0.0471	0.0899	+/-0.0472		pCi/g							
Mercury-203	U	-0.0832	+/-0.0851	0.143	+/-0.0933		pCi/g							
Neodymium-147	U	-0.992	+/-7.72	13.9	+/-7.73		pCi/g							
Neptunium-239	U	-0.0715	+/-0.290	0.499	+/-0.292		pCi/g							
Niobium-94	U	-0.00883	+/-0.0309	0.0588	+/-0.0311		pCi/g							
Niobium-95	U	0.0458	+/-0.0686	0.138	+/-0.0717		pCi/g							
Potassium-40		4.32	+/-1.24	0.808	+/-1.31		pCi/g							
Promethium-144	U	0.00600	+/-0.0413	0.0827	+/-0.0414		pCi/g							
Promethium-146	U	-0.00674	+/-0.0543	0.0980	+/-0.0543		pCi/g							
Radium-226		1.64	+/-0.240	0.157	+/-0.278		pCi/g							
Radium-228		0.688	+/-0.262	0.260	+/-0.271		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: 20230907-FH-X-23e-1-3  
Sample ID: 640278003

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	-0.156	+/-0.386	0.715	+/-0.393		pCi/g							
Silver-110m	U	0.0261	+/-0.0607	0.129	+/-0.0619		pCi/g							
Sodium-22	U	0.00347	+/-0.0546	0.111	+/-0.0547		pCi/g							
Thallium-208		0.131	+/-0.0618	0.0820	+/-0.0629		pCi/g							
Thorium-234	U	2.40	+/-3.10	3.28	+/-3.15		pCi/g							
Tin-113	U	0.0144	+/-0.0637	0.122	+/-0.0640		pCi/g							
Uranium-235	U	-0.00327	+/-0.232	0.441	+/-0.232		pCi/g							
Uranium-238	U	2.40	+/-3.10	3.28	+/-3.15		pCi/g							
Yttrium-88	U	-0.0118	+/-0.0231	0.0298	+/-0.0237		pCi/g							
Zinc-65	U	0.00913	+/-0.131	0.223	+/-0.131		pCi/g							
Zirconium-95	U	0.0249	+/-0.121	0.245	+/-0.121		pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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  
 Amherst, New York 14228

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230907-FH-X-23e-3-5  
 Sample ID: 640278004  
 Matrix: Solid  
 Collect Date: 07-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 8.19%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.792	+/-0.391	0.321	+/-0.398		pCi/g							
Americium-241	U	-0.0459	+/-0.120	0.198	+/-0.122		pCi/g							
Antimony-124	U	0.111	+/-0.136	0.368	+/-0.145		pCi/g							
Antimony-125	U	0.00205	+/-0.0916	0.163	+/-0.0916		pCi/g							
Barium-133	U	-0.0108	+/-0.0444	0.0750	+/-0.0447		pCi/g							
Barium-140	U	-1.24	+/-1.89	3.31	+/-1.98		pCi/g							
Beryllium-7	U	0.278	+/-0.524	1.09	+/-0.540		pCi/g							
Bismuth-212	U	0.152	+/-0.575	1.14	+/-0.579		pCi/g							
Bismuth-214		1.01	+/-0.208	0.106	+/-0.230		pCi/g							
Cerium-139	U	-0.0123	+/-0.0335	0.0576	+/-0.0341		pCi/g							
Cerium-141	U	-0.0910	+/-0.144	0.220	+/-0.150		pCi/g							
Cerium-144	U	0.0207	+/-0.164	0.304	+/-0.164		pCi/g							
Cesium-134	U	0.0411	+/-0.0811	0.0993	+/-0.0833		pCi/g							
Cesium-136	U	0.573	+/-0.628	1.52	+/-0.682		pCi/g							
Cesium-137	U	-0.000383	+/-0.0356	0.0666	+/-0.0356	0.100	pCi/g							
Chromium-51	U	-0.253	+/-1.12	1.74	+/-1.13		pCi/g							
Cobalt-56	U	0.0410	+/-0.0645	0.136	+/-0.0672		pCi/g							
Cobalt-57	U	0.0297	+/-0.0283	0.0308	+/-0.0284		pCi/g							
Cobalt-58	U	0.0205	+/-0.0543	0.114	+/-0.0551		pCi/g							
Cobalt-60	U	0.0499	+/-0.0381	0.102	+/-0.0444		pCi/g							
Europium-152	U	-0.0670	+/-0.0794	0.139	+/-0.0852		pCi/g							
Europium-154	U	0.0868	+/-0.138	0.310	+/-0.143		pCi/g							
Europium-155	U	0.0201	+/-0.0987	0.182	+/-0.0992		pCi/g							
Iridium-192	U	-0.0109	+/-0.0485	0.0829	+/-0.0488		pCi/g							
Iron-59	U	-0.0398	+/-0.226	0.359	+/-0.227		pCi/g							
Lead-210	U	0.526	+/-4.29	3.88	+/-4.29		pCi/g							
Lead-212		0.691	+/-0.105	0.0929	+/-0.119		pCi/g							
Lead-214		1.18	+/-0.209	0.139	+/-0.230		pCi/g							
Manganese-54	U	0.000930	+/-0.0552	0.0758	+/-0.0552		pCi/g							
Mercury-203	U	-0.0398	+/-0.0652	0.105	+/-0.0676		pCi/g							
Neodymium-147	U	-2.11	+/-5.83	10.8	+/-5.91		pCi/g							
Neptunium-239	U	-0.180	+/-0.252	0.425	+/-0.265		pCi/g							
Niobium-94	U	-0.0152	+/-0.0362	0.0644	+/-0.0369		pCi/g							
Niobium-95	U	-0.00380	+/-0.0611	0.106	+/-0.0612		pCi/g							
Potassium-40		15.3	+/-1.96	0.847	+/-2.38		pCi/g							
Promethium-144	U	-0.0386	+/-0.0399	0.0635	+/-0.0437		pCi/g							
Promethium-146	U	0.00496	+/-0.0442	0.0865	+/-0.0442		pCi/g							
Radium-226		1.18	+/-0.209	0.139	+/-0.230		pCi/g							
Radium-228		0.792	+/-0.391	0.321	+/-0.398		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: 20230907-FH-X-23e-3-5  
Sample ID: 640278004

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	-0.0393	+/-0.308	0.593	+/-0.309		pCi/g							
Silver-110m	U	-0.00117	+/-0.0548	0.107	+/-0.0548		pCi/g							
Sodium-22	U	0.0288	+/-0.0490	0.110	+/-0.0507		pCi/g							
Thallium-208		0.237	+/-0.0830	0.0760	+/-0.0861		pCi/g							
Thorium-234	U	0.551	+/-1.94	1.86	+/-1.94		pCi/g							
Tin-113	U	-0.0462	+/-0.0511	0.0879	+/-0.0553		pCi/g							
Uranium-235	U	0.0580	+/-0.387	0.348	+/-0.387		pCi/g							
Uranium-238	U	0.551	+/-1.94	1.86	+/-1.94		pCi/g							
Yttrium-88	U	-0.000681	+/-0.0443	0.102	+/-0.0443		pCi/g							
Zinc-65	U	0.0259	+/-0.110	0.210	+/-0.110		pCi/g							
Zirconium-95	U	-0.00711	+/-0.0926	0.181	+/-0.0927		pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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  
 Amherst, New York 14228

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-34c-1-3  
 Sample ID: 640278005  
 Matrix: Solid  
 Collect Date: 11-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 9.37%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		1.03	+/-0.372	0.269	+/-0.389		pCi/g							
Americium-241	U	0.128	+/-0.215	0.410	+/-0.223		pCi/g							
Antimony-124	U	0.0231	+/-0.0915	0.230	+/-0.0921		pCi/g							
Antimony-125	U	0.0459	+/-0.106	0.211	+/-0.108		pCi/g							
Barium-133	U	0.0118	+/-0.0540	0.0959	+/-0.0543		pCi/g							
Barium-140	U	-0.0903	+/-1.58	3.03	+/-1.58		pCi/g							
Beryllium-7	U	0.0110	+/-0.541	1.04	+/-0.541		pCi/g							
Bismuth-212	U	0.346	+/-0.681	1.39	+/-0.699		pCi/g							
Bismuth-214		2.02	+/-0.254	0.125	+/-0.306		pCi/g							
Cerium-139	U	-0.0190	+/-0.0420	0.0736	+/-0.0431		pCi/g							
Cerium-141	U	0.0588	+/-0.159	0.278	+/-0.161		pCi/g							
Cerium-144	U	0.157	+/-0.264	0.506	+/-0.274		pCi/g							
Cesium-134	U	0.0735	+/-0.0768	0.114	+/-0.0840		pCi/g							
Cesium-136	U	-0.0507	+/-0.711	1.38	+/-0.711		pCi/g							
Cesium-137	U	-0.0170	+/-0.0520	0.0891	+/-0.0526	0.100	pCi/g							
Chromium-51	U	0.332	+/-0.962	1.93	+/-0.974		pCi/g							
Cobalt-56	U	0.0226	+/-0.0598	0.124	+/-0.0607		pCi/g							
Cobalt-57	U	0.0175	+/-0.0301	0.0586	+/-0.0311		pCi/g							
Cobalt-58	U	-0.0316	+/-0.0482	0.0876	+/-0.0504		pCi/g							
Cobalt-60	U	-0.0349	+/-0.0408	0.0645	+/-0.0439		pCi/g							
Europium-152	U	0.0582	+/-0.109	0.221	+/-0.112		pCi/g							
Europium-154	U	-0.0177	+/-0.114	0.219	+/-0.114		pCi/g							
Europium-155	U	0.0108	+/-0.131	0.229	+/-0.131		pCi/g							
Iridium-192	U	-0.0235	+/-0.0518	0.0967	+/-0.0529		pCi/g							
Iron-59	U	-0.0359	+/-0.150	0.285	+/-0.151		pCi/g							
Lead-210	U	-0.463	+/-7.14	14.0	+/-7.14		pCi/g							
Lead-212		1.23	+/-0.206	0.123	+/-0.230		pCi/g							
Lead-214		2.28	+/-0.277	0.158	+/-0.333		pCi/g							
Manganese-54	U	-0.00809	+/-0.0393	0.0762	+/-0.0394		pCi/g							
Mercury-203	U	0.0207	+/-0.0765	0.152	+/-0.0771		pCi/g							
Neodymium-147	U	-0.531	+/-5.29	9.93	+/-5.29		pCi/g							
Neptunium-239	U	0.0147	+/-0.291	0.546	+/-0.291		pCi/g							
Niobium-94	U	0.00828	+/-0.0368	0.0708	+/-0.0370		pCi/g							
Niobium-95	U	-0.00178	+/-0.0692	0.121	+/-0.0692		pCi/g							
Potassium-40		3.34	+/-0.847	0.620	+/-0.925		pCi/g							
Promethium-144	U	-0.00283	+/-0.0448	0.0818	+/-0.0448		pCi/g							
Promethium-146	U	0.00923	+/-0.0455	0.0896	+/-0.0457		pCi/g							
Radium-226		2.28	+/-0.277	0.158	+/-0.333		pCi/g							
Radium-228		1.03	+/-0.372	0.269	+/-0.389		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels

Project: Kensington

Client Sample ID: 20230911-FH-X-34c-1-3

Project: MJWC00923

Sample ID: 640278005

Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	0.0404	+/-0.330	0.643	+/-0.331		pCi/g							
Silver-110m	U	0.00141	+/-0.0563	0.110	+/-0.0563		pCi/g							
Sodium-22	U	-0.00734	+/-0.0406	0.0780	+/-0.0408		pCi/g							
Thallium-208		0.341	+/-0.0924	0.0782	+/-0.0969		pCi/g							
Thorium-234	UI	0.000	+/-4.53	3.14	+/-4.59		pCi/g							
Tin-113	U	0.00104	+/-0.0641	0.123	+/-0.0641		pCi/g							
Uranium-235	U	0.247	+/-0.421	0.418	+/-0.421		pCi/g							
Uranium-238	UI	0.000	+/-4.53	3.14	+/-4.59		pCi/g							
Yttrium-88	U	0.0374	+/-0.0415	0.114	+/-0.0449		pCi/g							
Zinc-65	U	-0.00443	+/-0.0928	0.162	+/-0.0928		pCi/g							
Zirconium-95	U	0.0824	+/-0.111	0.241	+/-0.117		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

**The following Analytical Methods were performed**

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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                   | Mtd.: Method                      |
| DL: Detection Limit                   | PF: Prep Factor                   |
| Lc/LC: Critical Level                 | RL: Reporting Limit               |
| MDA: Minimum Detectable Activity      | TPU: Total Propagated Uncertainty |
| MDC: Minimum Detectable Concentration |                                   |

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-34c-3-5  
 Sample ID: 640278006  
 Matrix: Solid  
 Collect Date: 11-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 7.13%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.976	+/-0.296	0.239	+/-0.311		pCi/g			MXR1	10/30/23	0946	2505440	1
Americium-241	U	0.232	+/-0.256	0.466	+/-0.278		pCi/g							
Antimony-124	U	0.104	+/-0.126	0.318	+/-0.134		pCi/g							
Antimony-125	U	-0.0941	+/-0.114	0.186	+/-0.122		pCi/g							
Barium-133	U	-0.0466	+/-0.0530	0.0749	+/-0.0572		pCi/g							
Barium-140	U	0.936	+/-1.74	3.32	+/-1.79		pCi/g							
Beryllium-7	U	-0.142	+/-0.486	0.926	+/-0.490		pCi/g							
Bismuth-212	UI	0.000	+/-0.917	1.02	+/-0.928		pCi/g							
Bismuth-214		2.06	+/-0.235	0.140	+/-0.295		pCi/g							
Cerium-139	U	-0.0181	+/-0.0435	0.0798	+/-0.0444		pCi/g							
Cerium-141	U	-0.0246	+/-0.152	0.287	+/-0.152		pCi/g							
Cerium-144	U	0.0353	+/-0.238	0.460	+/-0.239		pCi/g							
Cesium-134	U	0.0817	+/-0.0477	0.0921	+/-0.0607		pCi/g							
Cesium-136	U	-0.113	+/-0.521	0.982	+/-0.523		pCi/g							
Cesium-137	U	0.0116	+/-0.0410	0.0741	+/-0.0414	0.100	pCi/g							
Chromium-51	U	0.559	+/-1.04	1.98	+/-1.07		pCi/g							
Cobalt-56	U	0.0337	+/-0.0553	0.116	+/-0.0574		pCi/g							
Cobalt-57	U	-0.00948	+/-0.0294	0.0556	+/-0.0297		pCi/g							
Cobalt-58	U	0.0129	+/-0.0563	0.102	+/-0.0566		pCi/g							
Cobalt-60	U	0.0206	+/-0.0355	0.0821	+/-0.0367		pCi/g							
Europium-152	U	-0.116	+/-0.115	0.175	+/-0.127		pCi/g							
Europium-154	U	-0.0453	+/-0.114	0.214	+/-0.116		pCi/g							
Europium-155	U	0.0235	+/-0.127	0.238	+/-0.127		pCi/g							
Iridium-192	U	0.00271	+/-0.0504	0.0942	+/-0.0504		pCi/g							
Iron-59	U	0.169	+/-0.175	0.366	+/-0.192		pCi/g							
Lead-210	U	3.27	+/-9.15	17.3	+/-9.28		pCi/g							
Lead-212		0.913	+/-0.161	0.133	+/-0.181		pCi/g							
Lead-214		2.37	+/-0.273	0.165	+/-0.341		pCi/g							
Manganese-54	U	0.0324	+/-0.0474	0.0971	+/-0.0497		pCi/g							
Mercury-203	U	-0.0582	+/-0.0757	0.130	+/-0.0803		pCi/g							
Neodymium-147	U	-0.166	+/-5.25	9.08	+/-5.26		pCi/g							
Neptunium-239	U	-0.259	+/-0.290	0.528	+/-0.314		pCi/g							
Niobium-94	U	0.0242	+/-0.0321	0.0687	+/-0.0340		pCi/g							
Niobium-95	U	0.0336	+/-0.0818	0.145	+/-0.0833		pCi/g							
Potassium-40		2.45	+/-0.850	0.948	+/-0.879		pCi/g							
Promethium-144	U	0.00249	+/-0.0377	0.0733	+/-0.0377		pCi/g							
Promethium-146	U	0.0122	+/-0.0446	0.0899	+/-0.0449		pCi/g							
Radium-226		2.37	+/-0.273	0.165	+/-0.341		pCi/g							
Radium-228		0.976	+/-0.296	0.239	+/-0.311		pCi/g							



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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-34c-3-5  
 Sample ID: 640278006

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	0.161	+/-0.309	0.652	+/-0.318		pCi/g							
Silver-110m	U	-0.00653	+/-0.0684	0.127	+/-0.0684		pCi/g							
Sodium-22	U	-0.0164	+/-0.0409	0.0767	+/-0.0415		pCi/g							
Thallium-208		0.315	+/-0.0998	0.0754	+/-0.104		pCi/g							
Thorium-234	U	3.48	+/-4.74	3.49	+/-4.83		pCi/g							
Tin-113	U	0.00432	+/-0.0551	0.103	+/-0.0551		pCi/g							
Uranium-235	U	0.0828	+/-0.242	0.470	+/-0.242		pCi/g							
Uranium-238	U	3.48	+/-4.74	3.49	+/-4.83		pCi/g							
Yttrium-88	U	0.0133	+/-0.0575	0.123	+/-0.0578		pCi/g							
Zinc-65	U	0.0106	+/-0.0897	0.166	+/-0.0898		pCi/g							
Zirconium-95	U	0.0497	+/-0.0999	0.209	+/-0.103		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

**The following Analytical Methods were performed**

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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                   | Mtd.: Method                      |
| DL: Detection Limit                   | PF: Prep Factor                   |
| Lc/LC: Critical Level                 | RL: Reporting Limit               |
| MDA: Minimum Detectable Activity      | TPU: Total Propagated Uncertainty |
| MDC: Minimum Detectable Concentration |                                   |

# 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  
 Amherst, New York 14228

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-32c-1-3  
 Sample ID: 640278007  
 Matrix: Solid  
 Collect Date: 11-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 7.08%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.718	+/-0.338	0.228	+/-0.346		pCi/g							
Americium-241	U	0.0188	+/-0.0394	0.0757	+/-0.0404		pCi/g							
Antimony-124	U	-0.0298	+/-0.0733	0.152	+/-0.0746		pCi/g							
Antimony-125	U	-0.0156	+/-0.0780	0.148	+/-0.0783		pCi/g							
Barium-133	U	0.00276	+/-0.0275	0.0513	+/-0.0275		pCi/g							
Barium-140	UI	0.000	+/-2.66	2.88	+/-3.04		pCi/g							
Beryllium-7	U	0.0869	+/-0.432	0.858	+/-0.434		pCi/g							
Bismuth-212		0.837	+/-0.613	0.711	+/-0.620		pCi/g							
Bismuth-214		1.21	+/-0.189	0.113	+/-0.233		pCi/g							
Cerium-139	U	-0.0332	+/-0.0284	0.0469	+/-0.0330		pCi/g							
Cerium-141	U	-0.0399	+/-0.0931	0.168	+/-0.0950		pCi/g							
Cerium-144	U	0.0936	+/-0.158	0.312	+/-0.164		pCi/g							
Cesium-134	U	0.0695	+/-0.0367	0.0803	+/-0.0488		pCi/g							
Cesium-136	U	-0.182	+/-0.472	0.893	+/-0.479		pCi/g							
Cesium-137	U	0.0254	+/-0.0366	0.0752	+/-0.0385	0.100	pCi/g							
Chromium-51	U	-0.172	+/-0.781	1.35	+/-0.785		pCi/g							
Cobalt-56	U	0.00229	+/-0.0432	0.0836	+/-0.0432		pCi/g							
Cobalt-57	U	-0.00465	+/-0.0179	0.0334	+/-0.0180		pCi/g							
Cobalt-58	U	0.0111	+/-0.0469	0.0931	+/-0.0472		pCi/g							
Cobalt-60	U	-0.0238	+/-0.0365	0.0622	+/-0.0381		pCi/g							
Europium-152	U	0.0141	+/-0.0704	0.143	+/-0.0707		pCi/g							
Europium-154	U	-0.0298	+/-0.0883	0.167	+/-0.0893		pCi/g							
Europium-155	U	0.000498	+/-0.0664	0.127	+/-0.0664		pCi/g							
Iridium-192	U	0.00968	+/-0.0410	0.0755	+/-0.0413		pCi/g							
Iron-59	U	0.0312	+/-0.137	0.280	+/-0.137		pCi/g							
Lead-210		0.935	+/-0.701	0.587	+/-0.706		pCi/g							
Lead-212		0.817	+/-0.109	0.0883	+/-0.137		pCi/g							
Lead-214		1.44	+/-0.188	0.0999	+/-0.220		pCi/g							
Manganese-54	U	-0.0261	+/-0.0360	0.0581	+/-0.0379		pCi/g							
Mercury-203	U	-0.0351	+/-0.0568	0.0941	+/-0.0590		pCi/g							
Neodymium-147	U	1.92	+/-3.66	7.49	+/-3.76		pCi/g							
Neptunium-239	U	-0.116	+/-0.180	0.325	+/-0.188		pCi/g							
Niobium-94	U	-0.00131	+/-0.0362	0.0667	+/-0.0362		pCi/g							
Niobium-95	U	0.0238	+/-0.0547	0.102	+/-0.0558		pCi/g							
Potassium-40		4.39	+/-0.864	0.418	+/-0.943		pCi/g							
Promethium-144	U	-0.0410	+/-0.0375	0.0584	+/-0.0421		pCi/g							
Promethium-146	U	0.00339	+/-0.0357	0.0641	+/-0.0357		pCi/g							
Radium-226		1.44	+/-0.188	0.0999	+/-0.220		pCi/g							
Radium-228		0.718	+/-0.338	0.228	+/-0.346		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-32c-1-3  
 Sample ID: 640278007

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	-0.0747	+/-0.328	0.535	+/-0.330		pCi/g							
Silver-110m	U	0.00320	+/-0.0538	0.108	+/-0.0539		pCi/g							
Sodium-22	U	-0.0116	+/-0.0315	0.0589	+/-0.0319		pCi/g							
Thallium-208		0.230	+/-0.0682	0.0518	+/-0.0727		pCi/g							
Thorium-234		1.66	+/-1.07	0.728	+/-1.14		pCi/g							
Tin-113	U	-0.0196	+/-0.0466	0.0867	+/-0.0475		pCi/g							
Uranium-235	U	-0.0186	+/-0.157	0.290	+/-0.157		pCi/g							
Uranium-238		1.66	+/-1.07	0.728	+/-1.14		pCi/g							
Yttrium-88	U	0.0317	+/-0.0371	0.102	+/-0.0399		pCi/g							
Zinc-65	U	-0.0334	+/-0.0659	0.100	+/-0.0677		pCi/g							
Zirconium-95	U	-0.0182	+/-0.0800	0.148	+/-0.0804		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

**The following Analytical Methods were performed**

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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                   | Mtd.: Method                      |
| DL: Detection Limit                   | PF: Prep Factor                   |
| Lc/LC: Critical Level                 | RL: Reporting Limit               |
| MDA: Minimum Detectable Activity      | TPU: Total Propagated Uncertainty |
| MDC: Minimum Detectable Concentration |                                   |

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230911-FH-X-32c-3-5  
 Sample ID: 640278008  
 Matrix: Solid  
 Collect Date: 11-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 5.46%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		1.13	+/-0.241	0.171	+/-0.265		pCi/g			MXR1	10/30/23	0947	2505440	1
Americium-241	UI	0.000	+/-0.221	0.180	+/-0.221		pCi/g							
Antimony-124	U	-0.0355	+/-0.0956	0.217	+/-0.0969		pCi/g							
Antimony-125	U	0.000627	+/-0.0872	0.166	+/-0.0872		pCi/g							
Barium-133	U	-0.0492	+/-0.0451	0.0649	+/-0.0504		pCi/g							
Barium-140	U	0.118	+/-1.61	3.06	+/-1.61		pCi/g							
Beryllium-7	U	-0.127	+/-0.440	0.808	+/-0.444		pCi/g							
Bismuth-212		1.34	+/-0.697	0.800	+/-0.711		pCi/g							
Bismuth-214		1.20	+/-0.188	0.112	+/-0.224		pCi/g							
Cerium-139	U	0.00606	+/-0.0339	0.0573	+/-0.0341		pCi/g							
Cerium-141	U	0.0100	+/-0.112	0.190	+/-0.112		pCi/g							
Cerium-144	U	0.106	+/-0.185	0.354	+/-0.192		pCi/g							
Cesium-134	U	0.0748	+/-0.0405	0.0930	+/-0.0532		pCi/g							
Cesium-136	U	-0.157	+/-0.554	1.05	+/-0.559		pCi/g							
Cesium-137	UI	0.000	+/-0.0686	0.0595	+/-0.0691	0.100	pCi/g							
Chromium-51	U	0.260	+/-0.743	1.49	+/-0.752		pCi/g							
Cobalt-56	U	-0.0107	+/-0.0446	0.0864	+/-0.0449		pCi/g							
Cobalt-57	U	0.0124	+/-0.0220	0.0426	+/-0.0227		pCi/g							
Cobalt-58	U	0.0141	+/-0.0417	0.0831	+/-0.0422		pCi/g							
Cobalt-60	U	0.00755	+/-0.0443	0.0798	+/-0.0444		pCi/g							
Europium-152	U	-0.0190	+/-0.0857	0.155	+/-0.0862		pCi/g							
Europium-154	U	0.0853	+/-0.0888	0.217	+/-0.0970		pCi/g							
Europium-155	U	0.0189	+/-0.0929	0.162	+/-0.0933		pCi/g							
Iridium-192	U	0.0107	+/-0.0406	0.0807	+/-0.0409		pCi/g							
Iron-59	U	-0.0288	+/-0.105	0.202	+/-0.106		pCi/g							
Lead-210	U	2.95	+/-3.92	3.99	+/-3.93		pCi/g							
Lead-212		0.940	+/-0.124	0.0922	+/-0.146		pCi/g							
Lead-214		1.36	+/-0.192	0.127	+/-0.221		pCi/g							
Manganese-54	U	-0.0272	+/-0.0322	0.0556	+/-0.0346		pCi/g							
Mercury-203	U	-0.00749	+/-0.0657	0.112	+/-0.0658		pCi/g							
Neodymium-147	U	0.117	+/-4.06	7.81	+/-4.06		pCi/g							
Neptunium-239	U	0.0883	+/-0.219	0.417	+/-0.223		pCi/g							
Niobium-94	U	-0.0134	+/-0.0293	0.0507	+/-0.0300		pCi/g							
Niobium-95	U	-0.0159	+/-0.0603	0.114	+/-0.0607		pCi/g							
Potassium-40		2.87	+/-0.722	0.503	+/-0.769		pCi/g							
Promethium-144	U	0.0149	+/-0.0300	0.0616	+/-0.0308		pCi/g							
Promethium-146	U	0.00950	+/-0.0413	0.0804	+/-0.0416		pCi/g							
Radium-226		1.36	+/-0.192	0.127	+/-0.221		pCi/g							
Radium-228		1.13	+/-0.241	0.171	+/-0.265		pCi/g							

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels

Project: Kensington

Client Sample ID: 20230911-FH-X-32c-3-5

Project: MJWC00923

Sample ID: 640278008

Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	-0.252	+/-0.302	0.489	+/-0.324		pCi/g							
Silver-110m	U	0.0400	+/-0.0356	0.0884	+/-0.0401		pCi/g							
Sodium-22	U	0.0306	+/-0.0319	0.0778	+/-0.0348		pCi/g							
Thallium-208		0.305	+/-0.0717	0.0510	+/-0.0779		pCi/g							
Thorium-234		2.44	+/-2.22	1.66	+/-2.30		pCi/g							
Tin-113	U	-0.00466	+/-0.0415	0.0798	+/-0.0416		pCi/g							
Uranium-235	UI	0.000	+/-0.358	0.314	+/-0.360		pCi/g							
Uranium-238		2.44	+/-2.22	1.66	+/-2.30		pCi/g							
Yttrium-88	U	0.00994	+/-0.0449	0.102	+/-0.0452		pCi/g							
Zinc-65	U	0.0227	+/-0.0748	0.146	+/-0.0755		pCi/g							
Zirconium-95	U	0.0482	+/-0.0786	0.175	+/-0.0817		pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: 20230913-FH-X-07e-1-3  
Sample ID: 640278009  
Matrix: Solid  
Collect Date: 13-SEP-23  
Receive Date: 06-OCT-23  
Collector: Client  
Moisture: 8.03%

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.785	+/-0.287	0.259	+/-0.298		pCi/g			MXR1	10/30/23	0947	2505440	1
Americium-241	U	-0.00924	+/-0.151	0.287	+/-0.151		pCi/g							
Antimony-124	U	-0.0636	+/-0.138	0.258	+/-0.141		pCi/g							
Antimony-125	U	-0.0920	+/-0.0981	0.163	+/-0.107		pCi/g							
Barium-133	U	0.0124	+/-0.0441	0.0785	+/-0.0445		pCi/g							
Barium-140	U	-0.898	+/-1.67	2.87	+/-1.72		pCi/g							
Beryllium-7	U	0.185	+/-0.513	1.00	+/-0.520		pCi/g							
Bismuth-212	U	0.124	+/-0.580	1.06	+/-0.583		pCi/g							
Bismuth-214		0.529	+/-0.183	0.131	+/-0.189		pCi/g							
Cerium-139	U	0.00904	+/-0.0345	0.0587	+/-0.0348		pCi/g							
Cerium-141	U	-0.118	+/-0.126	0.205	+/-0.137		pCi/g							
Cerium-144	U	0.0258	+/-0.197	0.361	+/-0.198		pCi/g							
Cesium-134	UI	0.000	+/-0.0417	0.0880	+/-0.0582		pCi/g							
Cesium-136	U	-0.331	+/-0.557	0.968	+/-0.577		pCi/g							
Cesium-137	U	0.0373	+/-0.0434	0.0883	+/-0.0467	0.100	pCi/g							
Chromium-51	U	0.275	+/-0.798	1.57	+/-0.808		pCi/g							
Cobalt-56	U	0.0753	+/-0.0504	0.110	+/-0.0611		pCi/g							
Cobalt-57	U	0.00593	+/-0.0258	0.0479	+/-0.0260		pCi/g							
Cobalt-58	U	0.00403	+/-0.0456	0.0933	+/-0.0456		pCi/g							
Cobalt-60	U	-0.0178	+/-0.0335	0.0579	+/-0.0344		pCi/g							
Europium-152	U	0.0626	+/-0.0952	0.193	+/-0.0995		pCi/g							
Europium-154	U	0.00773	+/-0.154	0.293	+/-0.154		pCi/g							
Europium-155	U	-0.0462	+/-0.0994	0.172	+/-0.102		pCi/g							
Iridium-192	U	-0.0494	+/-0.0428	0.0713	+/-0.0485		pCi/g							
Iron-59	U	-0.246	+/-0.211	0.248	+/-0.240		pCi/g							
Lead-210	U	0.807	+/-4.63	8.87	+/-4.65		pCi/g							
Lead-212		0.644	+/-0.112	0.102	+/-0.127		pCi/g							
Lead-214		0.846	+/-0.183	0.132	+/-0.199		pCi/g							
Manganese-54	U	0.0161	+/-0.0428	0.0872	+/-0.0435		pCi/g							
Mercury-203	U	-0.00179	+/-0.0608	0.116	+/-0.0608		pCi/g							
Neodymium-147	U	1.44	+/-4.47	8.68	+/-4.52		pCi/g							
Neptunium-239	U	-0.0569	+/-0.256	0.456	+/-0.257		pCi/g							
Niobium-94	U	-0.0202	+/-0.0310	0.0557	+/-0.0324		pCi/g							
Niobium-95	U	-0.0176	+/-0.0659	0.123	+/-0.0664		pCi/g							
Potassium-40		14.7	+/-1.70	0.751	+/-2.28		pCi/g							
Promethium-144	U	0.0254	+/-0.0397	0.0829	+/-0.0414		pCi/g							
Promethium-146	U	0.0433	+/-0.0443	0.0923	+/-0.0486		pCi/g							
Radium-226		0.846	+/-0.183	0.132	+/-0.199		pCi/g							
Radium-228		0.785	+/-0.287	0.259	+/-0.298		pCi/g							

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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230913-FH-X-07e-1-3  
 Sample ID: 640278009

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	0.199	+/-0.361	0.718	+/-0.372		pCi/g							
Silver-110m	U	0.0100	+/-0.0530	0.108	+/-0.0532		pCi/g							
Sodium-22	U	0.00277	+/-0.0552	0.105	+/-0.0552		pCi/g							
Thallium-208		0.219	+/-0.0819	0.0653	+/-0.0840		pCi/g							
Thorium-234	U	0.0976	+/-1.40	2.66	+/-1.40		pCi/g							
Tin-113	U	0.0106	+/-0.0554	0.107	+/-0.0557		pCi/g							
Uranium-235	U	-0.0169	+/-0.208	0.366	+/-0.208		pCi/g							
Uranium-238	U	0.0976	+/-1.40	2.66	+/-1.40		pCi/g							
Yttrium-88	U	-0.0174	+/-0.0340	0.0632	+/-0.0349		pCi/g							
Zinc-65	U	0.120	+/-0.0976	0.216	+/-0.112		pCi/g							
Zirconium-95	U	0.0123	+/-0.101	0.202	+/-0.101		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

**The following Analytical Methods were performed**

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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                   | Mtd.: Method                      |
| DL: Detection Limit                   | PF: Prep Factor                   |
| Lc/LC: Critical Level                 | RL: Reporting Limit               |
| MDA: Minimum Detectable Activity      | TPU: Total Propagated Uncertainty |
| MDC: Minimum Detectable Concentration |                                   |

# 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  
 Amherst, New York 14228

Report Date: November 2, 2023

Contact: Alex Bartels  
 Project: Kensington

Client Sample ID: 20230913-FH-X-07e-3-5  
 Sample ID: 640278010  
 Matrix: Solid  
 Collect Date: 13-SEP-23  
 Receive Date: 06-OCT-23  
 Collector: Client  
 Moisture: 10.8%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.596	+/-0.345	0.271	+/-0.351		pCi/g			MXR1	10/30/23	0948	2505440	1
Americium-241	U	0.0873	+/-0.131	0.252	+/-0.138		pCi/g							
Antimony-124	U	-0.0378	+/-0.0977	0.189	+/-0.0992		pCi/g							
Antimony-125	U	0.0656	+/-0.0750	0.164	+/-0.0808		pCi/g							
Barium-133	U	-0.0148	+/-0.0362	0.0608	+/-0.0369		pCi/g							
Barium-140	U	0.610	+/-1.18	2.52	+/-1.22		pCi/g							
Beryllium-7	U	-0.0199	+/-0.430	0.759	+/-0.430		pCi/g							
Bismuth-212	U	0.322	+/-0.596	1.18	+/-0.614		pCi/g							
Bismuth-214		0.908	+/-0.154	0.118	+/-0.174		pCi/g							
Cerium-139	U	0.00840	+/-0.0293	0.0554	+/-0.0296		pCi/g							
Cerium-141	U	-0.127	+/-0.105	0.171	+/-0.120		pCi/g							
Cerium-144	U	0.0629	+/-0.167	0.324	+/-0.170		pCi/g							
Cesium-134	UI	0.000	+/-0.0586	0.0872	+/-0.0784		pCi/g							
Cesium-136	U	0.311	+/-0.431	0.984	+/-0.455		pCi/g							
Cesium-137	U	0.0206	+/-0.0322	0.0684	+/-0.0335	0.100	pCi/g							
Chromium-51	U	0.138	+/-0.698	1.41	+/-0.701		pCi/g							
Cobalt-56	U	0.0223	+/-0.0495	0.0987	+/-0.0505		pCi/g							
Cobalt-57	U	0.00118	+/-0.0220	0.0414	+/-0.0220		pCi/g							
Cobalt-58	U	0.0203	+/-0.0568	0.113	+/-0.0576		pCi/g							
Cobalt-60	U	-0.00779	+/-0.0281	0.0564	+/-0.0283		pCi/g							
Europium-152	U	0.0613	+/-0.0840	0.177	+/-0.0886		pCi/g							
Europium-154	U	-0.0220	+/-0.112	0.218	+/-0.112		pCi/g							
Europium-155	UI	0.000	+/-0.161	0.142	+/-0.162		pCi/g							
Iridium-192	U	0.00279	+/-0.0430	0.0850	+/-0.0430		pCi/g							
Iron-59	U	-0.101	+/-0.125	0.219	+/-0.133		pCi/g							
Lead-210	U	0.651	+/-3.04	6.04	+/-3.06		pCi/g							
Lead-212		0.683	+/-0.114	0.0886	+/-0.127		pCi/g							
Lead-214		1.09	+/-0.194	0.121	+/-0.213		pCi/g							
Manganese-54	U	0.0394	+/-0.0435	0.0913	+/-0.0472		pCi/g							
Mercury-203	U	-0.0430	+/-0.0622	0.102	+/-0.0653		pCi/g							
Neodymium-147	U	2.25	+/-4.03	8.33	+/-4.16		pCi/g							
Neptunium-239	U	0.0943	+/-0.228	0.442	+/-0.233		pCi/g							
Niobium-94	U	0.0216	+/-0.0277	0.0602	+/-0.0294		pCi/g							
Niobium-95	U	-0.0103	+/-0.0559	0.103	+/-0.0561		pCi/g							
Potassium-40		14.0	+/-1.67	0.552	+/-2.16		pCi/g							
Promethium-144	U	-0.0345	+/-0.0371	0.0609	+/-0.0404		pCi/g							
Promethium-146	U	0.0149	+/-0.0378	0.0773	+/-0.0384		pCi/g							
Radium-226		1.09	+/-0.194	0.121	+/-0.213		pCi/g							
Radium-228		0.596	+/-0.345	0.271	+/-0.351		pCi/g							



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## Certificate of Analysis

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

Report Date: November 2, 2023

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: 20230913-FH-X-07e-3-5  
Sample ID: 640278010

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Ruthenium-106	U	0.0766	+/-0.272	0.558	+/-0.274		pCi/g							
Silver-110m	U	-0.0129	+/-0.0495	0.0906	+/-0.0498		pCi/g							
Sodium-22	U	-0.00360	+/-0.0392	0.0783	+/-0.0392		pCi/g							
Thallium-208		0.248	+/-0.0786	0.0479	+/-0.0816		pCi/g							
Thorium-234	U	1.15	+/-2.24	1.82	+/-2.26		pCi/g							
Tin-113	U	0.0117	+/-0.0492	0.0986	+/-0.0495		pCi/g							
Uranium-235	U	-0.0251	+/-0.164	0.298	+/-0.164		pCi/g							
Uranium-238	U	1.15	+/-2.24	1.82	+/-2.26		pCi/g							
Yttrium-88	U	0.0391	+/-0.0342	0.102	+/-0.0386		pCi/g							
Zinc-65	U	-0.0493	+/-0.0899	0.165	+/-0.0927		pCi/g							
Zirconium-95	U	0.172	+/-0.181	0.174	+/-0.198		pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	JM12	10/08/23	1311	2505135

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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**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 Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: November 2, 2023

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

**Contact:** Alex Bartels

**Workorder:** 640278

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	2513345										
QC120555376	640278001 DUP										
Uranium-233/234	U	0.316		1.03	pCi/g	67.8		(0% - 100%)	EJ1	11/02/23	08:18
	Uncert:	+/-0.348		+/-0.511							
	TPU:	+/-0.351		+/-0.532							
Uranium-235/236		0.202	U	0.0355	pCi/g	60.5		N/A			
	Uncert:	+/-0.266		+/-0.197							
	TPU:	+/-0.268		+/-0.197							
Uranium-238		0.971		0.431	pCi/g	77.1		(0% - 100%)			
	Uncert:	+/-0.482		+/-0.348							
	TPU:	+/-0.500		+/-0.353							
QC120555377	LCS										
Uranium-233/234				21.0	pCi/g				EJ1	11/02/23	08:18
	Uncert:			+/-2.04							
	TPU:			+/-3.45							
Uranium-235/236				1.67	pCi/g						
	Uncert:			+/-0.654							
	TPU:			+/-0.690							
Uranium-238		22.7		23.5	pCi/g		103	(75%-125%)			
	Uncert:			+/-2.15							
	TPU:			+/-3.77							
QC120555375	MB										
Uranium-233/234			U	-0.141	pCi/g				EJ1	11/02/23	08:18
	Uncert:			+/-0.164							
	TPU:			+/-0.165							
Uranium-235/236			U	0.0961	pCi/g						
	Uncert:			+/-0.221							
	TPU:			+/-0.221							
Uranium-238			U	0.0409	pCi/g						
	Uncert:			+/-0.183							
	TPU:			+/-0.183							
Batch	2513346										
QC120555379	640278001 DUP										
Thorium-228	U	0.195	U	0.0134	pCi/g	0		N/A	EJ1	11/02/23	08:24
	Uncert:	+/-0.494		+/-0.374							
	TPU:	+/-0.495		+/-0.374							
Thorium-230		1.28		1.20	pCi/g	6.29		(0% - 100%)			
	Uncert:	+/-0.769		+/-0.607							
	TPU:	+/-0.800		+/-0.632							
Thorium-232	U	0.295	U	0.161	pCi/g	0		N/A			
	Uncert:	+/-0.397		+/-0.269							
	TPU:	+/-0.400		+/-0.270							
QC120555380	LCS										

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	2513346										
Thorium-228				18.0	pCi/g				EJ1	11/02/23	08:24
	Uncert:			+/-1.70							
	TPU:			+/-2.64							
Thorium-230				2.41	pCi/g			(75%-125%)			
	Uncert:			+/-0.644							
	TPU:			+/-0.704							
Thorium-232	17.1			16.5	pCi/g		96.2	(75%-125%)			
	Uncert:			+/-1.62							
	TPU:			+/-2.46							
QC120555378	MB										
Thorium-228			U	-0.0106	pCi/g				EJ1	11/02/23	08:24
	Uncert:			+/-0.148							
	TPU:			+/-0.148							
Thorium-230			U	0.183	pCi/g						
	Uncert:			+/-0.256							
	TPU:			+/-0.259							
Thorium-232			U	0.0906	pCi/g						
	Uncert:			+/-0.168							
	TPU:			+/-0.168							
<b>Rad Gamma Spec</b>											
Batch	2505440										
QC1205540616	640278001 DUP										
Actinium-228		U	0.184	U	0.272	pCi/g	0		N/AMXR1	10/30/23	11:35
	Uncert:		+/-0.218		+/-0.203						
	TPU:		+/-0.233		+/-0.238						
Americium-241		U	0.0756	U	0.180	pCi/g	0		N/A		
	Uncert:		+/-0.254		+/-0.218						
	TPU:		+/-0.257		+/-0.219						
Antimony-124		U	-0.0759	U	-0.0221	pCi/g	0		N/A		
	Uncert:		+/-0.105		+/-0.120						
	TPU:		+/-0.111		+/-0.121						
Antimony-125		U	0.0853	U	0.0221	pCi/g	0		N/A		
	Uncert:		+/-0.124		+/-0.0932						
	TPU:		+/-0.130		+/-0.0937						
Barium-133		U	-0.0177	U	0.0140	pCi/g	0		N/A		
	Uncert:		+/-0.0579		+/-0.0322						
	TPU:		+/-0.0584		+/-0.0329						
Barium-140		U	-0.664	U	2.63	pCi/g	0		N/A		
	Uncert:		+/-2.87		+/-2.13						
	TPU:		+/-2.89		+/-2.44						
Beryllium-7		U	-0.329	U	0.138	pCi/g	0		N/A		
	Uncert:		+/-0.631		+/-0.624						
	TPU:		+/-0.649		+/-0.627						
Bismuth-212		U	0.941	U	0.277	pCi/g	0		N/A		
	Uncert:		+/-0.620		+/-0.650						
	TPU:		+/-0.626		+/-0.663						

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	2505440										
Bismuth-214		0.822		0.968	pCi/g	16.3		(0%-20%)			
		Uncert:		+/-0.194							
		TPU:		+/-0.206							
Cerium-139	U	-0.0225	U	0.0111	pCi/g	0			N/A		
		Uncert:		+/-0.0401							
		TPU:		+/-0.0417							
Cerium-141	U	-0.0981	U	0.0407	pCi/g	0			N/A		
		Uncert:		+/-0.178							
		TPU:		+/-0.184							
Cerium-144	U	-0.0441	U	-0.177	pCi/g	0			N/A		
		Uncert:		+/-0.225							
		TPU:		+/-0.226							
Cesium-134	U	0.00177	U	0.0376	pCi/g	0			N/A		
		Uncert:		+/-0.0468							
		TPU:		+/-0.0468							
Cesium-136	U	-0.582	U	0.0704	pCi/g	0			N/A		
		Uncert:		+/-1.07							
		TPU:		+/-1.11							
Cesium-137	U	0.000160	U	-0.0385	pCi/g	0			N/A		
		Uncert:		+/-0.0389							
		TPU:		+/-0.0389							
Chromium-51	U	-0.653	U	-0.122	pCi/g	0			N/A		
		Uncert:		+/-1.14							
		TPU:		+/-1.18							
Cobalt-56	U	0.0268	U	0.0378	pCi/g	0			N/A		
		Uncert:		+/-0.0579							
		TPU:		+/-0.0592							
Cobalt-57	U	0.00109	U	0.0108	pCi/g	0			N/A		
		Uncert:		+/-0.0293							
		TPU:		+/-0.0293							
Cobalt-58	U	-0.00185	U	0.0223	pCi/g	0			N/A		
		Uncert:		+/-0.0477							
		TPU:		+/-0.0477							
Cobalt-60	U	-0.0332	U	-0.00244	pCi/g	0			N/A		
		Uncert:		+/-0.0419							
		TPU:		+/-0.0447							
Europium-152	U	-0.0284	U	-0.0147	pCi/g	0			N/A		
		Uncert:		+/-0.114							
		TPU:		+/-0.114							
Europium-154	U	-0.0526	U	0.0226	pCi/g	0			N/A		
		Uncert:		+/-0.150							
		TPU:		+/-0.152							
Europium-155	U	0.00323	U	0.0317	pCi/g	0			N/A		
		Uncert:		+/-0.111							
		TPU:		+/-0.111							
Iridium-192	U	-0.00251	U	-0.00748	pCi/g	0			N/A		

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## QC Summary

Workorder: 640278

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	2505440										
		Uncert:	+/-0.0564								
		TPU:	+/-0.0564								
Iron-59	U		-0.00112	U	-0.00598	pCi/g	0				N/A
		Uncert:	+/-0.183		+/-0.139						
		TPU:	+/-0.183		+/-0.139						
Lead-210	U		12.9	UI	0.000	pCi/g	0				N/A
		Uncert:	+/-17.7		+/-10.1						
		TPU:	+/-17.7		+/-10.2						
Lead-212			0.246		0.265	pCi/g	7.42				(0% - 100%)
		Uncert:	+/-0.116		+/-0.116						
		TPU:	+/-0.119		+/-0.118						
Lead-214			1.04		1.12	pCi/g	7.53				(0%-20%)
		Uncert:	+/-0.259		+/-0.206						
		TPU:	+/-0.277		+/-0.224						
Manganese-54	U		-0.00432	U	0.0131	pCi/g	0				N/A
		Uncert:	+/-0.0367		+/-0.0397						
		TPU:	+/-0.0368		+/-0.0402						
Mercury-203	U		0.00130	U	-0.00332	pCi/g	0				N/A
		Uncert:	+/-0.0839		+/-0.0734						
		TPU:	+/-0.0839		+/-0.0734						
Neodymium-147	U		0.235	U	2.58	pCi/g	0				N/A
		Uncert:	+/-7.20		+/-7.70						
		TPU:	+/-7.21		+/-7.79						
Neptunium-239	U		0.0686	U	0.0594	pCi/g	0				N/A
		Uncert:	+/-0.279		+/-0.193						
		TPU:	+/-0.280		+/-0.195						
Niobium-94	U		0.0271	U	-0.000652	pCi/g	0				N/A
		Uncert:	+/-0.0393		+/-0.0408						
		TPU:	+/-0.0412		+/-0.0408						
Niobium-95	U		0.0336	U	0.0405	pCi/g	0				N/A
		Uncert:	+/-0.0730		+/-0.0713						
		TPU:	+/-0.0746		+/-0.0737						
Potassium-40			5.26		4.27	pCi/g	20.8*				(0%-20%)
		Uncert:	+/-1.61		+/-1.37						
		TPU:	+/-1.70		+/-1.42						
Promethium-144	U		0.0244	U	-0.0205	pCi/g	0				N/A
		Uncert:	+/-0.0373		+/-0.0411						
		TPU:	+/-0.0390		+/-0.0421						
Promethium-146	U		0.0313	U	-0.0134	pCi/g	0				N/A
		Uncert:	+/-0.0514		+/-0.0416						
		TPU:	+/-0.0534		+/-0.0421						
Radium-226			1.04		1.12	pCi/g	7.53				(0%-20%)
		Uncert:	+/-0.259		+/-0.206						
		TPU:	+/-0.277		+/-0.224						
Radium-228	U		0.184	U	0.272	pCi/g	0				N/A
		Uncert:	+/-0.218		+/-0.203						

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	2505440										
Ruthenium-106		TPU:	+/-0.233								
		U	0.165	U	0.0536	pCi/g	0				N/A
		Uncert:	+/-0.382		+/-0.368						
Silver-110m		TPU:	+/-0.390		+/-0.368						
		U	-0.0177	U	0.00590	pCi/g	0				N/A
		Uncert:	+/-0.0523		+/-0.0605						
Sodium-22		TPU:	+/-0.0530		+/-0.0606						
		U	-0.00569	U	0.00956	pCi/g	0				N/A
		Uncert:	+/-0.0495		+/-0.0436						
Thallium-208		TPU:	+/-0.0496		+/-0.0438						
			0.106		0.0767	pCi/g	31.7	(0% - 100%)			
		Uncert:	+/-0.0623		+/-0.0715						
Thorium-234		TPU:	+/-0.0630		+/-0.0718						
		UI	0.000	U	2.15	pCi/g	0				N/A
		Uncert:	+/-4.86		+/-2.41						
Tin-113		TPU:	+/-5.01		+/-2.47						
		U	-0.0147	U	-0.0501	pCi/g	0				N/A
		Uncert:	+/-0.0607		+/-0.0563						
Uranium-235		TPU:	+/-0.0611		+/-0.0608						
		U	0.171	U	-0.0746	pCi/g	0				N/A
		Uncert:	+/-0.258		+/-0.187						
Uranium-238		TPU:	+/-0.270		+/-0.190						
		UI	0.000	U	2.15	pCi/g	0				N/A
		Uncert:	+/-4.86		+/-2.41						
Yttrium-88		TPU:	+/-5.01		+/-2.47						
		U	0.0266	U	0.0505	pCi/g	0				N/A
		Uncert:	+/-0.0683		+/-0.0495						
Zinc-65		TPU:	+/-0.0694		+/-0.0546						
		U	0.0444	U	0.0144	pCi/g	0				N/A
		Uncert:	+/-0.111		+/-0.120						
Zirconium-95		TPU:	+/-0.113		+/-0.120						
		U	-0.0330	U	0.0185	pCi/g	0				N/A
		Uncert:	+/-0.155		+/-0.117						
		TPU:	+/-0.156		+/-0.118						
QC1205540617	LCS										
Actinium-228				U	-0.339	pCi/g					MXR1 10/30/2309:12
		Uncert:			+/-1.73						
Americium-241	484	TPU:			+/-1.74						
					520	pCi/g	107	(75%-125%)			
		Uncert:			+/-4.96						
Antimony-124		TPU:			+/-43.1						
				U	0.183	pCi/g					
		Uncert:			+/-0.449						
Antimony-125		TPU:			+/-0.457						
				U	-1.07	pCi/g					
		Uncert:			+/-1.17						

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Barium-133	TPU:		+/-1.27							
		U	-0.0758	pCi/g						
	Uncert:		+/-0.449							
Barium-140	TPU:		+/-0.451							
		U	-2.75	pCi/g						
	Uncert:		+/-3.64							
Beryllium-7	TPU:		+/-3.86							
		U	0.147	pCi/g						
	Uncert:		+/-5.47							
Bismuth-212	TPU:		+/-5.47							
		U	-2.61	pCi/g						
	Uncert:		+/-4.47							
Bismuth-214	TPU:		+/-4.64							
		U	0.420	pCi/g						
	Uncert:		+/-0.643							
Cerium-139	TPU:		+/-0.672							
		U	-0.206	pCi/g						
	Uncert:		+/-0.259							
Cerium-141	TPU:		+/-0.280							
		U	0.00510	pCi/g						
	Uncert:		+/-0.584							
Cerium-144	TPU:		+/-0.584							
		U	-0.698	pCi/g						
	Uncert:		+/-1.65							
Cesium-134	TPU:		+/-1.68							
		U	0.0981	pCi/g						
	Uncert:		+/-0.426							
Cesium-136	TPU:		+/-0.428							
		U	-0.643	pCi/g						
	Uncert:		+/-1.49							
Cesium-137	TPU:		+/-1.52							
		152	163	pCi/g			107 (75%-125%)			
	Uncert:		+/-2.87							
Chromium-51	TPU:		+/-19.3							
		U	2.98	pCi/g						
	Uncert:		+/-4.28							
Cobalt-56	TPU:		+/-4.49							
		U	0.264	pCi/g						
	Uncert:		+/-0.471							
Cobalt-57	TPU:		+/-0.486							
		U	-0.143	pCi/g						
	Uncert:		+/-0.219							
Cobalt-58	TPU:		+/-0.229							
		U	-0.0845	pCi/g						
	Uncert:		+/-0.456							
	TPU:		+/-0.457							



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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Cobalt-60	63.8		64.7	pCi/g		101	(75%-125%)			
	Uncert:		+/-2.21							
	TPU:		+/-5.48							
Europium-152		U	0.0730	pCi/g						
	Uncert:		+/-1.14							
	TPU:		+/-1.14							
Europium-154		U	0.120	pCi/g						
	Uncert:		+/-0.532							
	TPU:		+/-0.535							
Europium-155		U	0.362	pCi/g						
	Uncert:		+/-0.778							
	TPU:		+/-0.796							
Iridium-192		U	-0.0820	pCi/g						
	Uncert:		+/-0.360							
	TPU:		+/-0.362							
Iron-59		U	0.435	pCi/g						
	Uncert:		+/-1.07							
	TPU:		+/-1.09							
Lead-210			5010	pCi/g						
	Uncert:		+/-44.1							
	TPU:		+/-476							
Lead-212		U	0.000542	pCi/g						
	Uncert:		+/-0.516							
	TPU:		+/-0.516							
Lead-214		U	-0.196	pCi/g						
	Uncert:		+/-0.796							
	TPU:		+/-0.801							
Manganese-54		U	-0.140	pCi/g						
	Uncert:		+/-0.387							
	TPU:		+/-0.393							
Mercury-203		U	0.0368	pCi/g						
	Uncert:		+/-0.398							
	TPU:		+/-0.398							
Neodymium-147		U	-3.20	pCi/g						
	Uncert:		+/-9.05							
	TPU:		+/-9.17							
Neptunium-239		U	0.593	pCi/g						
	Uncert:		+/-2.10							
	TPU:		+/-2.12							
Niobium-94		U	-0.0106	pCi/g						
	Uncert:		+/-0.277							
	TPU:		+/-0.277							
Niobium-95		U	0.0225	pCi/g						
	Uncert:		+/-0.368							
	TPU:		+/-0.368							
Potassium-40		U	-0.165	pCi/g						

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## QC Summary

Workorder: 640278

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Promethium-144										
	Uncert:		+/-1.77							
	TPU:		+/-1.77							
		U	0.279	pCi/g						
Promethium-146										
	Uncert:		+/-0.306							
	TPU:		+/-0.332							
		U	-0.0641	pCi/g						
Radium-226										
	Uncert:		+/-0.667							
	TPU:		+/-0.668							
		U	-0.196	pCi/g						
Radium-228										
	Uncert:		+/-0.796							
	TPU:		+/-0.801							
		U	-0.339	pCi/g						
Ruthenium-106										
	Uncert:		+/-1.73							
	TPU:		+/-1.74							
		U	-1.15	pCi/g						
Silver-110m										
	Uncert:		+/-2.92							
	TPU:		+/-2.97							
		U	-0.119	pCi/g						
Sodium-22										
	Uncert:		+/-0.604							
	TPU:		+/-0.607							
		U	0.0348	pCi/g						
Thallium-208										
	Uncert:		+/-0.187							
	TPU:		+/-0.188							
		U	-0.0530	pCi/g						
Thorium-234										
	Uncert:		+/-0.338							
	TPU:		+/-0.339							
		U	3.79	pCi/g						
Tin-113										
	Uncert:		+/-5.38							
	TPU:		+/-5.71							
		U	-0.211	pCi/g						
Uranium-235										
	Uncert:		+/-0.528							
	TPU:		+/-0.537							
		U	-1.73	pCi/g						
Uranium-238										
	Uncert:		+/-1.62							
	TPU:		+/-1.82							
		U	3.79	pCi/g						
Yttrium-88										
	Uncert:		+/-5.38							
	TPU:		+/-5.71							
		U	0.128	pCi/g						
Zinc-65										
	Uncert:		+/-0.204							
	TPU:		+/-0.213							
		U	-0.416	pCi/g						
Zirconium-95										
	Uncert:		+/-0.912							
	TPU:		+/-0.932							
		U	0.0805	pCi/g						
	Uncert:		+/-0.687							

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>Rad Gamma Spec</b>									
Batch	2505440								
QC1205540615	MB	TPU:	+/-0.688						
Actinium-228		U	0.0110	pCi/g				MXR1	10/30/2309:50
		Uncert:	+/-0.0474						
		TPU:	+/-0.0477						
Americium-241		U	0.00374	pCi/g					
		Uncert:	+/-0.0114						
		TPU:	+/-0.0115						
Antimony-124		U	0.00294	pCi/g					
		Uncert:	+/-0.0641						
		TPU:	+/-0.0641						
Antimony-125		U	-0.0216	pCi/g					
		Uncert:	+/-0.0328						
		TPU:	+/-0.0343						
Barium-133		U	0.0142	pCi/g					
		Uncert:	+/-0.0193						
		TPU:	+/-0.0203						
Barium-140		U	0.123	pCi/g					
		Uncert:	+/-0.175						
		TPU:	+/-0.184						
Beryllium-7		U	-0.113	pCi/g					
		Uncert:	+/-0.136						
		TPU:	+/-0.146						
Bismuth-212		U	-0.135	pCi/g					
		Uncert:	+/-0.247						
		TPU:	+/-0.255						
Bismuth-214		U	-0.00538	pCi/g					
		Uncert:	+/-0.0406						
		TPU:	+/-0.0407						
Cerium-139		U	-0.00170	pCi/g					
		Uncert:	+/-0.0106						
		TPU:	+/-0.0106						
Cerium-141		U	-0.0113	pCi/g					
		Uncert:	+/-0.0187						
		TPU:	+/-0.0194						
Cerium-144		U	0.00129	pCi/g					
		Uncert:	+/-0.0448						
		TPU:	+/-0.0448						
Cesium-134		U	0.00705	pCi/g					
		Uncert:	+/-0.00977						
		TPU:	+/-0.0103						
Cesium-136		U	0.0352	pCi/g					
		Uncert:	+/-0.0723						
		TPU:	+/-0.0742						
Cesium-137		U	0.000974	pCi/g					
		Uncert:	+/-0.0215						

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## QC Summary

Workorder: 640278

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Chromium-51	TPU:		+/-0.0216							
		U	0.0667	pCi/g						
	Uncert:		+/-0.177							
Cobalt-56	TPU:		+/-0.179							
		U	-0.00432	pCi/g						
	Uncert:		+/-0.00847							
Cobalt-57	TPU:		+/-0.00870							
		U	-0.00463	pCi/g						
	Uncert:		+/-0.00582							
Cobalt-58	TPU:		+/-0.00621							
		U	-0.00951	pCi/g						
	Uncert:		+/-0.0222							
Cobalt-60	TPU:		+/-0.0226							
		U	-0.00656	pCi/g						
	Uncert:		+/-0.0264							
Europium-152	TPU:		+/-0.0265							
		U	0.0219	pCi/g						
	Uncert:		+/-0.0383							
Europium-154	TPU:		+/-0.0396							
		U	-0.00709	pCi/g						
	Uncert:		+/-0.0508							
Europium-155	TPU:		+/-0.0509							
		U	-0.0114	pCi/g						
	Uncert:		+/-0.0248							
Iridium-192	TPU:		+/-0.0253							
		U	-0.00356	pCi/g						
	Uncert:		+/-0.0164							
Iron-59	TPU:		+/-0.0165							
		U	0.0221	pCi/g						
	Uncert:		+/-0.0555							
Lead-210	TPU:		+/-0.0564							
		U	0.0167	pCi/g						
	Uncert:		+/-0.0981							
Lead-212	TPU:		+/-0.0984							
		U	-0.0156	pCi/g						
	Uncert:		+/-0.0199							
Lead-214	TPU:		+/-0.0212							
		U	-0.0104	pCi/g						
	Uncert:		+/-0.0384							
Manganese-54	TPU:		+/-0.0387							
		U	0.00852	pCi/g						
	Uncert:		+/-0.0143							
Mercury-203	TPU:		+/-0.0148							
		U	0.00147	pCi/g						
	Uncert:		+/-0.0146							
	TPU:		+/-0.0146							

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## QC Summary

Workorder: 640278

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Neodymium-147		U	-0.110	pCi/g						
	Uncert:		+/-0.297							
	TPU:		+/-0.301							
Neptunium-239		U	-0.0234	pCi/g						
	Uncert:		+/-0.0599							
	TPU:		+/-0.0610							
Niobium-94		U	0.000	pCi/g						
	Uncert:		+/-0.0182							
	TPU:		+/-0.000							
Niobium-95		U	-0.00717	pCi/g						
	Uncert:		+/-0.0239							
	TPU:		+/-0.0241							
Potassium-40		U	-0.0304	pCi/g						
	Uncert:		+/-0.337							
	TPU:		+/-0.337							
Promethium-144		U	0.00332	pCi/g						
	Uncert:		+/-0.0182							
	TPU:		+/-0.0182							
Promethium-146		U	-0.00824	pCi/g						
	Uncert:		+/-0.0169							
	TPU:		+/-0.0173							
Radium-226		U	-0.0104	pCi/g						
	Uncert:		+/-0.0384							
	TPU:		+/-0.0387							
Radium-228		U	0.0110	pCi/g						
	Uncert:		+/-0.0474							
	TPU:		+/-0.0477							
Ruthenium-106		U	-0.0490	pCi/g						
	Uncert:		+/-0.131							
	TPU:		+/-0.133							
Silver-110m		U	0.00441	pCi/g						
	Uncert:		+/-0.0174							
	TPU:		+/-0.0175							
Sodium-22		U	-0.00349	pCi/g						
	Uncert:		+/-0.0175							
	TPU:		+/-0.0176							
Thallium-208		U	-0.00800	pCi/g						
	Uncert:		+/-0.0168							
	TPU:		+/-0.0172							
Thorium-234		U	-0.0247	pCi/g						
	Uncert:		+/-0.149							
	TPU:		+/-0.150							
Tin-113		U	0.0116	pCi/g						
	Uncert:		+/-0.0224							
	TPU:		+/-0.0230							
Uranium-235		U	0.00985	pCi/g						

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	2505440									
Uranium-238		U	-0.0247	pCi/g						
	Uncert:		+/-0.0478							
	TPU:		+/-0.0481							
Yttrium-88		U	0.000414	pCi/g						
	Uncert:		+/-0.149							
	TPU:		+/-0.150							
Zinc-65		U	0.00632	pCi/g						
	Uncert:		+/-0.0364							
	TPU:		+/-0.0365							
Zirconium-95		U	0.0155	pCi/g						
	Uncert:		+/-0.0384							
	TPU:		+/-0.0391							

**Notes:**

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

The Qualifiers in this report are defined as follows:

- U Analyte was analyzed for, but not detected above the Lc.
- J Value is estimated
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- H Analytical holding time was exceeded
- < Result is less than value reported
- > Result is greater than value reported
- UI Gamma Spectroscopy--Uncertain identification
- BD Results are either below the MDC or tracer recovery is low
- h Preparation or preservation holding time was exceeded
- R Sample results are rejected
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- M M if above MDC and less than LLD
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- FA Failed analysis.
- M REMP Result > MDC/CL and < RDL
- UJ Gamma Spectroscopy--Uncertain identification
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- N1 See case narrative
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- \*\* Analyte is a Tracer compound

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## QC Summary

Workorder: 640278

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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

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 2513345 Check-list

This check-list was completed on 02-NOV-23 by Melanie Aycock

This batch was reviewed by Jessica Davis on 02-NOV-23 and Melanie Aycock on 02-NOV-23.

**Batch ID:**  
2513345

**Product:**  
ASP\_\_UUS

**Description:** Alpha Spec Uranium  
GL-RAD-A-011

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
2	Are instrument source checks within limits?	Yes		
3	Have samples been blank corrected?		No	
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were all tracer/carrier recoveries within the required acceptance limits?	Yes		
10	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
11	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
12	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
13	Were manual integrations performed on any sample or QC data files in this batch?		No	
14	Are sample-specific MDA/MDC calculated and reported?	Yes		

# Prep Logbook

## Uranium

Batch ID: 2513345

Analyst: Evan Johnson (EJ1)

Method: DOE EML HASL-300, U-02-RC  
Modified

Lab SOP: GL-RAD-A-011 REV# 28

Instrument: BAL-18550299

Due Dates for Lab: 01-NOV-2023

Package: 02-NOV-2023

SDG: 03-NOV-2023

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205555377	Uranium-238 AS SPIKE	1600-P	.1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)
1	640278001	30-OCT-2023	1	Dry to Dry	0.118	0.118
2	1205555375 MB	30-OCT-2023	1	Dry to Wet		0.118
3	1205555376 DUP (640278001)	30-OCT-2023	1	Dry to Dry	0.113	0.113
4	1205555377 LCS	30-OCT-2023	1	Dry to Wet		0.118

Reagent/Solvent Lot ID	Description	Amount	Comments:
WORK 1564-II	Uranium-232 AS TRACER	.1 ml	Pipet Id: RAD-ASP-184002Z Pu-236 Tracer Used: No Analyzed With: N/A Data Entry Date2: 30-OCT-2023 00:00

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

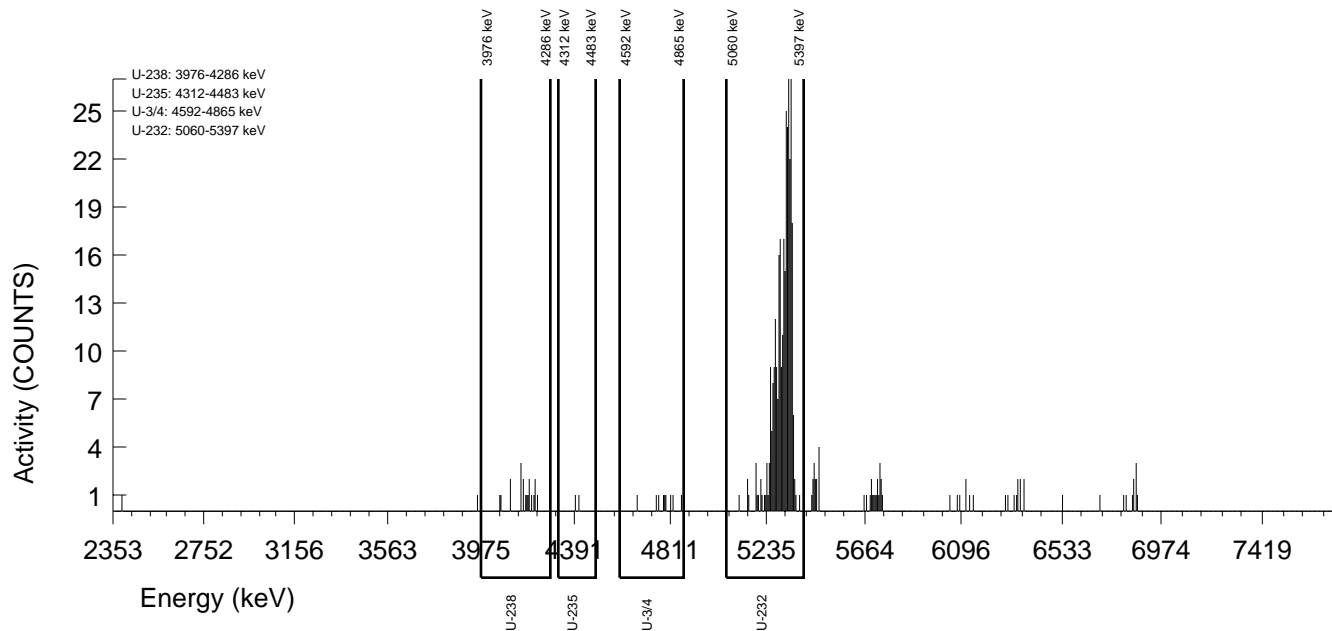
BATCH NUMBER : 2513345 SAMPLE ID : S0640278001_UU SAMPLE QTY : 0.118 G +/-0.847 % SAMPLE DATE : 06-Sep-2023 00:00:00 ANALYST : EJ1 % YIELD : 91.4 +/-6.586 %	CHAMBER : 002 DETECTOR S/N : 149009 AVERAGE %EFFICIENCY : 31.8997 AVERAGE %EFF ERROR : 0.6167 COUNT DATE : 02-Nov-2023 08:18:03 ELAPSED LIVE TIME(SEC) : 14399.99	LIB FILE : UU BKG FILE : B002.CNF;2611 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 59999.99 EFF FILE : W002.CNF;711 CAL DATE : 01-Nov-2023
TRACER ID : 1564-II NUCLIDE : U-232 NOMINAL : 4.4282E+00 dpm RESULTS : 4.0472E+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	5305.22	57.865	318.000	309.360	8.640	2.9394	100.000	1.69E+01	2.99E+00	7.52E-01	2.94E-01	1.92E+00
U-3/4	4763.02	4779.58	188.700	9.000	5.791	2.160	1.4697	100.000	3.16E-01	3.51E-01	5.10E-01	1.73E-01	3.48E-01
U-235	4391.00	4425.97	89.384	3.000	3.000	0.000	1.0000	80.900	2.02E-01	2.68E-01	2.02E-01	1.24E-01	2.66E-01
U-238	4184.73	4161.82	106.765	19.000	17.800	1.200	1.0954	100.000	9.71E-01	5.00E-01	3.83E-01	1.09E-01	4.82E-01

NOTES:

\* Correction made to the following net area due to tracer impurity:  
U-3/4 (1.049 +/-0.031)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

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

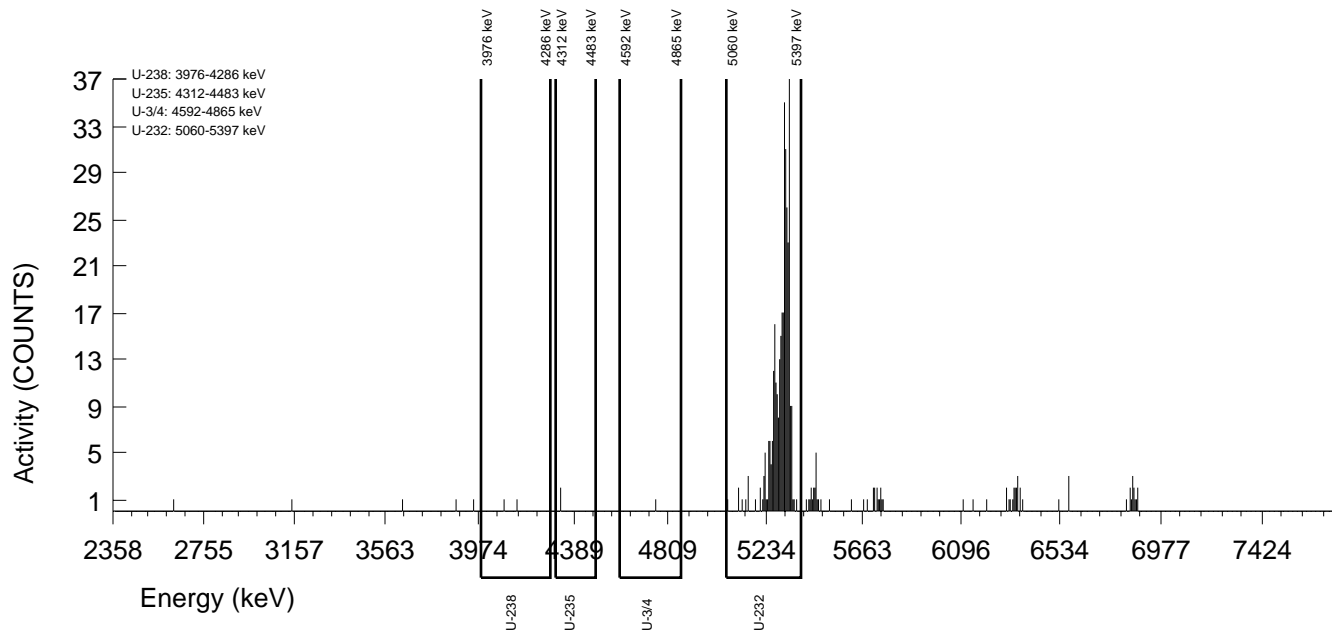
BATCH NUMBER : 2513345 SAMPLE ID : S120555375_UU SAMPLE QTY : 0.118 G +/-0.847 % SAMPLE DATE : 30-Oct-2023 00:00:00 ANALYST : EJ1 % YIELD : 100 +/-6.397 %	CHAMBER : 003 DETECTOR S/N : 149012 AVERAGE %EFFICIENCY : 30.9842 AVERAGE %EFF ERROR : 0.5995 COUNT DATE : 02-Nov-2023 08:18:03 ELAPSED LIVE TIME(SEC) : 14399.99	LIB FILE : UU BKG FILE : B003.CNF;2607 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 59999.99 EFF FILE : W003.CNF;738 CAL DATE : 01-Nov-2023
TRACER ID : 1564-II NUCLIDE : U-232 NOMINAL : 4.4216E+00 dpm RESULTS : 4.4382E+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	5304.63	27.531	336.000	330.000	6.000	2.4495	100.000	1.69E+01	2.89E+00	6.12E-01	2.30E-01	1.84E+00
U-3/4	4763.02	4751.28	4.936	1.000	-2.759	2.640	1.6248	100.000	-1.41E-01	1.65E-01	5.06E-01	1.76E-01	1.64E-01
U-235	4391.00	4332.00	4.936	2.000	1.520	0.480	0.6928	80.900	9.61E-02	2.21E-01	3.50E-01	8.02E-02	2.21E-01
U-238	4184.73	4111.10	59.235	2.000	0.800	1.200	1.0954	100.000	4.09E-02	1.83E-01	3.59E-01	1.03E-01	1.83E-01

NOTES:

\* Correction made to the following net area due to tracer impurity:  
U-3/4 (1.119 +/-0.034)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

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

BATCH NUMBER : 2513345 SAMPLE ID : S120555376_UU SAMPLE QTY : 0.113 G +/-0.885 % SAMPLE DATE : 06-Sep-2023 00:00:00 ANALYST : EJ1 % YIELD : 92.9 +/-6.533 %	CHAMBER : 004 DETECTOR S/N : 79994 AVERAGE %EFFICIENCY : 32.3756 AVERAGE %EFF ERROR : 0.6257 COUNT DATE : 02-Nov-2023 08:18:03 ELAPSED LIVE TIME(SEC) : 14399.99	LIB FILE : UU BKG FILE : B004.CNF;2622 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 59999.99 EFF FILE : W004.CNF;753 CAL DATE : 01-Nov-2023
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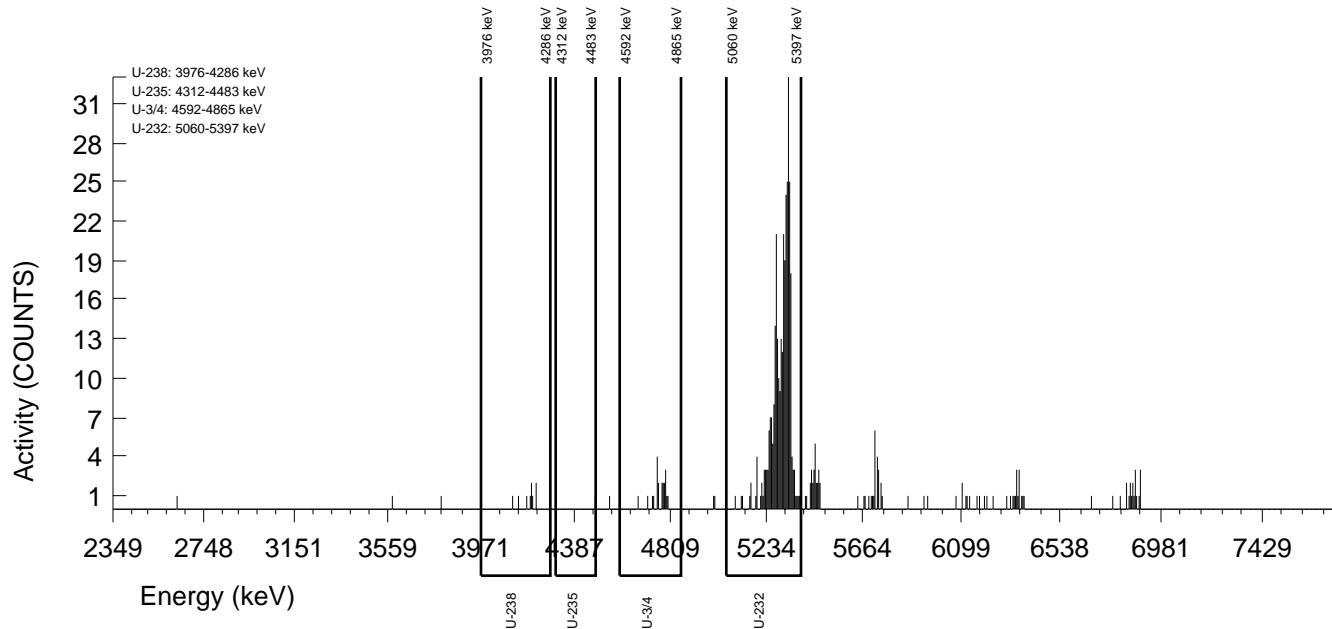
TRACER  
ID : 1564-II  
NUCLIDE : U-232  
NOMINAL : 4.4282E+00 dpm  
RESULTS : 4.1151E+00 dpm

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	5304.07	63.194	331.000	319.240	11.760	3.4293	100.000	1.77E+01	3.10E+00	8.61E-01	3.47E-01	1.98E+00
U-3/4	4763.02	4765.47	39.651	21.000	18.718	1.200	1.0954	100.000	1.03E+00	5.32E-01	4.57E-01	1.46E-01	5.11E-01
U-235	4391.00	4481.79	0.000	1.000	0.520	0.480	0.6928	80.900	3.55E-02	1.97E-01	3.78E-01	8.66E-02	1.97E-01
U-238	4184.73	4186.07	27.260	9.000	7.800	1.200	1.0954	100.000	4.31E-01	3.53E-01	3.87E-01	1.11E-01	3.48E-01

NOTES:

\* Correction made to the following net area due to tracer impurity:  
U-3/4 (1.082 +/-0.032)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 2513345 SAMPLE ID : S120555377_UU SAMPLE QTY : 0.118 G +/-0.847 % SAMPLE DATE : 30-Oct-2023 00:00:00 ANALYST : EJ1 % YIELD : 95.4 +/-6.397 %	CHAMBER : 005 DETECTOR S/N : 101453 AVERAGE %EFFICIENCY : 32.8192 AVERAGE %EFF ERROR : 0.6340 COUNT DATE : 02-Nov-2023 08:18:03 ELAPSED LIVE TIME(SEC) : 14399.99	LIB FILE : UU BKG FILE : B005.CNF;2589 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 59999.99 EFF FILE : W005.CNF;812 CAL DATE : 01-Nov-2023
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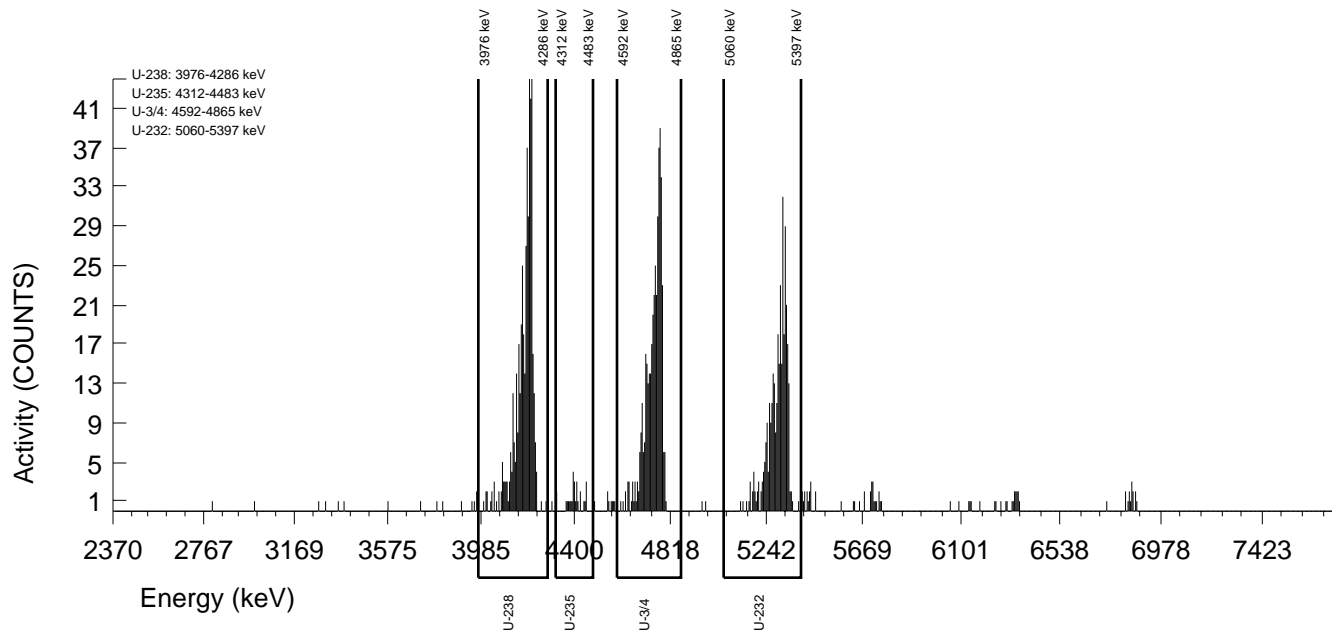
TRACER ID : 1564-II NUCLIDE : U-232 NOMINAL : 4.4216E+00 dpm RESULTS : 4.2164E+00 dpm	LCS ID : 1600-P NUCLIDE : U-238 NOMINAL (pCi/G) : 2.2731E+01 % RECOVERY : 103.305
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NUCLIDE ACTIVITY SUMMARY

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	5293.24	42.157	340.000	332.080	7.920	2.8142	100.000	1.69E+01	2.89E+00	6.77E-01	2.62E-01	1.84E+00
U-3/4	4763.02	4746.68	41.351	416.000	413.434	1.440	1.2000	100.000	2.10E+01	3.45E+00	4.38E-01	1.43E-01	2.04E+00
U-235	4391.00	4400.68	59.267	27.000	26.520	0.480	0.6928	80.900	1.67E+00	6.90E-01	3.48E-01	7.97E-02	6.54E-01
U-238	4184.73	4177.49	45.861	463.000	462.040	0.960	0.9798	100.000	2.35E+01	3.77E+00	3.35E-01	9.12E-02	2.15E+00

NOTES:

\* Correction made to the following net area due to tracer impurity:  
U-3/4 (1.126 +/-0.034)



# Batch 2513346 Check-list

This check-list was completed on 02-NOV-23 by Melanie Aycock

This batch was reviewed by Jessica Davis on 02-NOV-23 and Melanie Aycock on 02-NOV-23.

**Batch ID:**  
2513346

**Product:**  
ASP\_THS

**Description:** Alpha Spec Thorium  
GL-RAD-A-038

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
2	Are instrument source checks within limits?	Yes		
3	Have samples been blank corrected?		No	
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were all tracer/carrier recoveries within the required acceptance limits?	Yes		
10	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
11	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
12	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
13	Were manual integrations performed on any sample or QC data files in this batch?		No	
14	Are sample-specific MDA/MDC calculated and reported?	Yes		

# Prep Logbook

## Thorium

Batch ID: 2513346

Analyst: Evan Johnson (EJ1)

Method: DOE EML HASL-300, Th-01-RC  
Modified

Lab SOP: GL-RAD-A-038 REV# 18

Instrument: BAL-18550299

Due Dates for Lab: 01-NOV-2023

Package: 02-NOV-2023

SDG: 03-NOV-2023

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205555380	Thorium-232 AS SPIKE	1513-J	.1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)
1	640278001	30-OCT-2023	1	Dry to Dry	0.116	0.116
2	1205555378 MB	30-OCT-2023	1	Dry to Wet		0.116
3	1205555379 DUP (640278001)	30-OCT-2023	1	Dry to Dry	0.114	0.114
4	1205555380 LCS	30-OCT-2023	1	Dry to Wet		0.116

Reagent/Solvent Lot ID	Description	Amount	Comments:
WORK 1845-I	Thorium-229 AS TRACER, RASP	.1 mL	Pipet ID: RAD-ASP-184002Z Data Entry Date2: 30-OCT-2023 00:00



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ALPHA SPECTROSCOPY REPORT

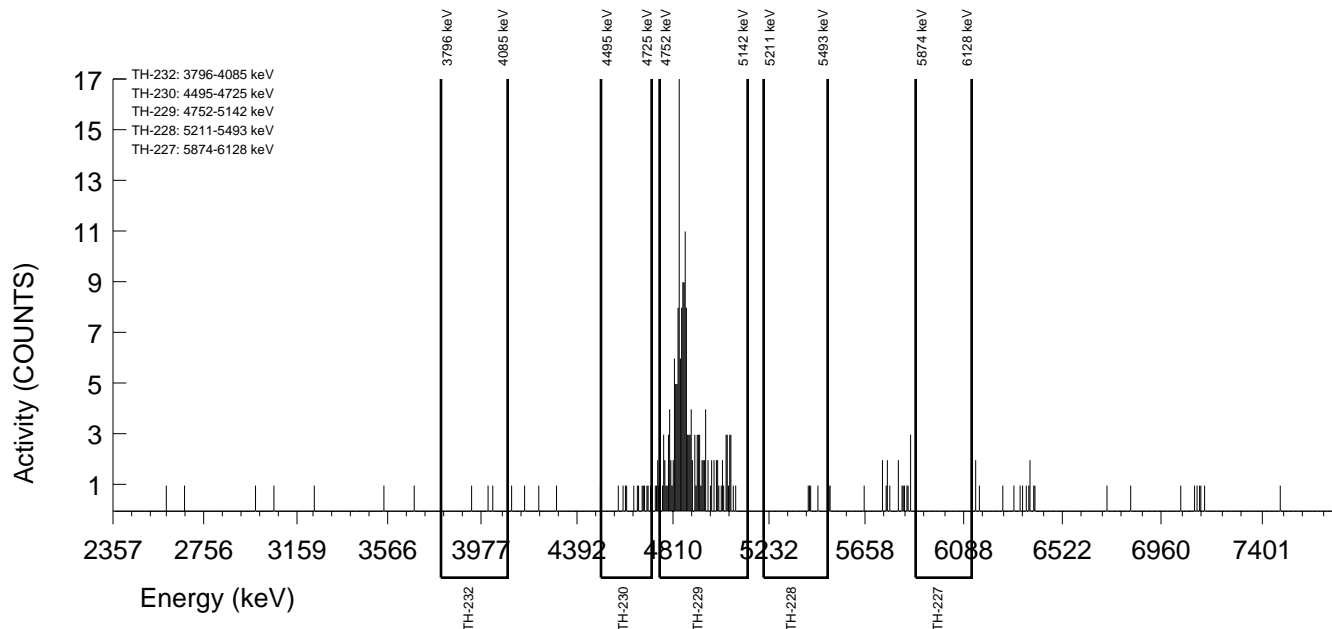
BATCH NUMBER : 2513346 SAMPLE ID : S0640278001_TH SAMPLE QTY : 0.116 G +/-0.862 % SAMPLE DATE : 06-Sep-2023 00:00:00 ANALYST : EJ1 % YIELD : 62.9 +/-7.807 %	CHAMBER : 166 DETECTOR S/N : 155809 AVERAGE %EFFICIENCY : 25.5520 AVERAGE %EFF ERROR : 0.4970 COUNT DATE : 02-Nov-2023 08:29:33 ELAPSED LIVE TIME(SEC) : 14400.00	LIB FILE : TH BKG FILE : B166.CNF;1654 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 60000.00 EFF FILE : W166.CNF;474 CAL DATE : 16-Oct-2023
TRACER ID : 1845-I NUCLIDE : TH-229 NOMINAL : 4.8067E+00 dpm RESULTS : 3.0235E+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
TH-227	5994.04	6000.77	0.000	0.000	-0.720	0.720	0.8485	57.440	-1.06E+00	3.21E+00	9.00E+00	2.29E+00	3.20E+00
TH-228	5363.00	5422.13	44.698	4.000	1.833	2.160	1.4697	99.940	1.95E-01	4.95E-01	8.95E-01	2.87E-01	4.94E-01
TH-229	4900.00	4886.00	33.662	185.000	184.520	0.480	0.6928	99.520	1.87E+01	4.01E+00	5.60E-01	1.28E-01	2.71E+00
TH-230	4671.39	4643.97	0.000	14.000	12.650	0.240	0.4899	99.700	1.28E+00	8.00E-01	6.97E-01	1.97E-01	7.69E-01
TH-232	3972.00	3985.50	94.363	3.000	2.926	0.000	1.0000	100.000	2.95E-01	4.00E-01	3.92E-01	1.90E-01	3.97E-01

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.007 +/-0.000)  
 TH-230 (1.110 +/-0.017)  
 TH-232 (0.074 +/-0.001)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

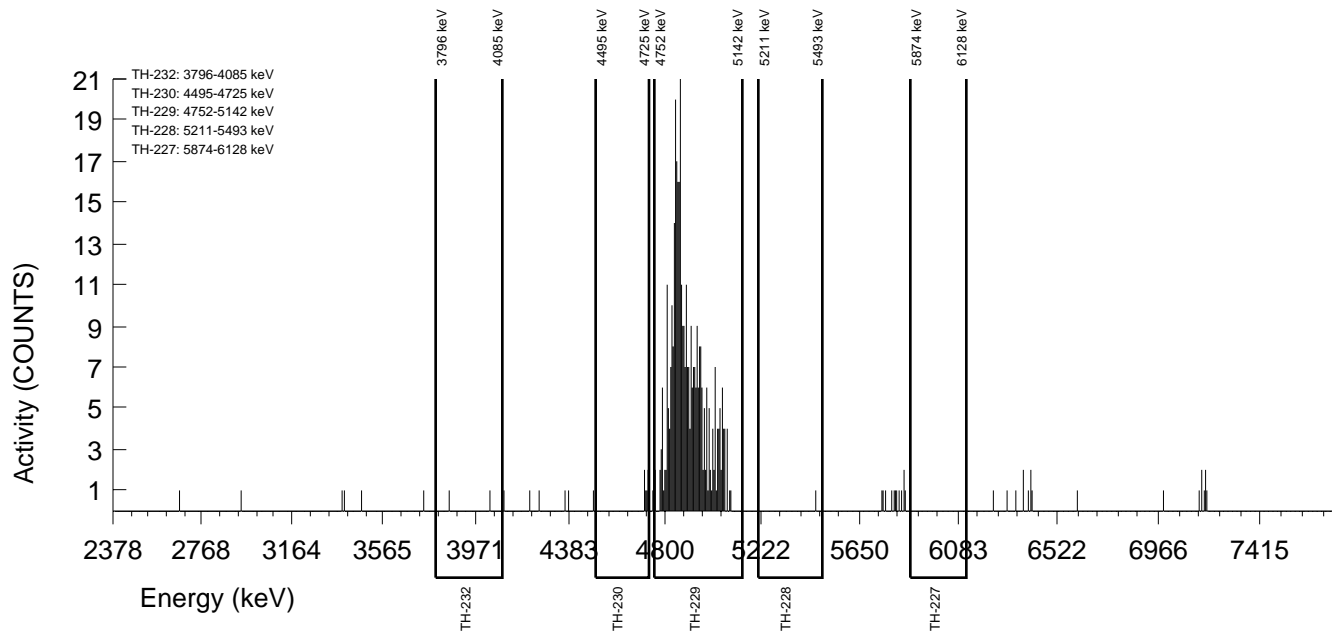
BATCH NUMBER : 2513346 SAMPLE ID : S120555378_TH SAMPLE QTY : 0.116 G +/-0.862 % SAMPLE DATE : 30-Oct-2023 00:00:00 ANALYST : EJ1 % YIELD : 84.0 +/-5.717 %	CHAMBER : 149 DETECTOR S/N : 155293 AVERAGE %EFFICIENCY : 39.2854 AVERAGE %EFF ERROR : 0.7560 COUNT DATE : 02-Nov-2023 08:24:51 ELAPSED LIVE TIME(SEC) : 14400.00	LIB FILE : TH BKG FILE : B149.CNF;1865 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 60000.00 EFF FILE : W149.CNF;117 CAL DATE : 14-Oct-2023
TRACER ID : 1845-I NUCLIDE : TH-229 NOMINAL : 4.8066E+00 dpm RESULTS : 4.0366E+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
TH-227	5994.04	6000.70	0.000	0.000	-0.480	0.480	0.6928	57.440	-4.65E-02	2.06E-01	5.37E-01	1.23E-01	2.06E-01
TH-228	5363.00	5462.10	4.843	1.000	-0.215	1.200	1.0954	99.940	-1.06E-02	1.48E-01	3.46E-01	9.93E-02	1.48E-01
TH-229	4900.00	4901.68	78.361	379.000	378.760	0.240	0.4899	99.520	1.87E+01	2.92E+00	2.36E-01	4.42E-02	1.88E+00
TH-230	4671.39	4718.41	0.000	6.000	3.721	0.000	1.0000	99.700	1.83E-01	2.59E-01	3.92E-01	1.52E-01	2.56E-01
TH-232	3972.00	3942.75	174.345	2.000	1.848	0.000	1.0000	100.000	9.06E-02	1.68E-01	2.10E-01	9.52E-02	1.68E-01

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.015 +/-0.000)  
 TH-230 (2.279 +/-0.035)  
 TH-232 (0.152 +/-0.002)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

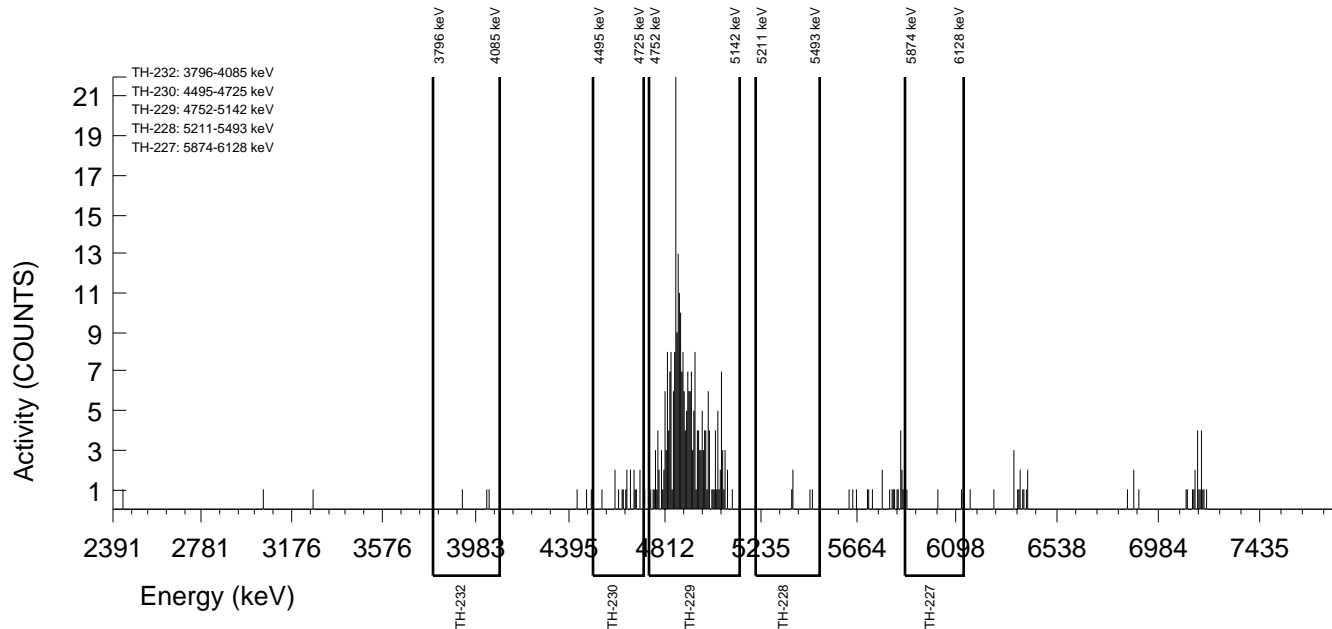
BATCH NUMBER : 2513346 SAMPLE ID : S120555379_TH SAMPLE QTY : 0.114 G +/-0.877 % SAMPLE DATE : 06-Sep-2023 00:00:00 ANALYST : EJ1 % YIELD : 63.0 +/-6.469 %	CHAMBER : 150 DETECTOR S/N : 155294 AVERAGE %EFFICIENCY : 38.9763 AVERAGE %EFF ERROR : 0.7502 COUNT DATE : 02-Nov-2023 08:24:53 ELAPSED LIVE TIME(SEC) : 14400.00	LIB FILE : TH BKG FILE : B150.CNF;1864 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 60000.00 EFF FILE : W150.CNF;97 CAL DATE : 14-Oct-2023
TRACER ID : 1845-I NUCLIDE : TH-229 NOMINAL : 4.8067E+00 dpm RESULTS : 3.0267E+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
TH-227	5994.04	6005.45	217.425	3.000	2.760	0.240	0.4899	57.440	2.71E+00	3.92E+00	4.71E+00	8.81E-01	3.90E+00
TH-228	5363.00	5410.24	7.248	5.000	0.189	4.800	2.1909	99.940	1.34E-02	3.74E-01	7.84E-01	2.85E-01	3.74E-01
TH-229	4900.00	4911.52	18.291	282.000	281.760	0.240	0.4899	99.520	1.90E+01	3.37E+00	3.23E-01	6.05E-02	2.22E+00
TH-230	4671.39	4648.80	0.000	20.000	17.825	0.480	0.6928	99.700	1.20E+00	6.32E-01	5.37E-01	1.68E-01	6.07E-01
TH-232	3972.00	4001.41	115.960	3.000	2.407	0.480	0.6928	100.000	1.61E-01	2.70E-01	3.87E-01	9.29E-02	2.69E-01

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.011 +/-0.000)  
 TH-230 (1.695 +/-0.026)  
 TH-232 (0.113 +/-0.002)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 2513346 SAMPLE ID : S120555380_TH SAMPLE QTY : 0.116 G +/-0.862 % SAMPLE DATE : 30-Oct-2023 00:00:00 ANALYST : EJ1 % YIELD : 99.8 +/-5.333 %	CHAMBER : 151 DETECTOR S/N : 155295 AVERAGE %EFFICIENCY : 39.3529 AVERAGE %EFF ERROR : 0.7573 COUNT DATE : 02-Nov-2023 08:24:55 ELAPSED LIVE TIME(SEC) : 14400.00	LIB FILE : TH BKG FILE : B151.CNF;1862 BKG DATE : 27-Oct-2023 BKG LIVE TIME(SEC) : 60000.00 EFF FILE : W151.CNF;117 CAL DATE : 14-Oct-2023
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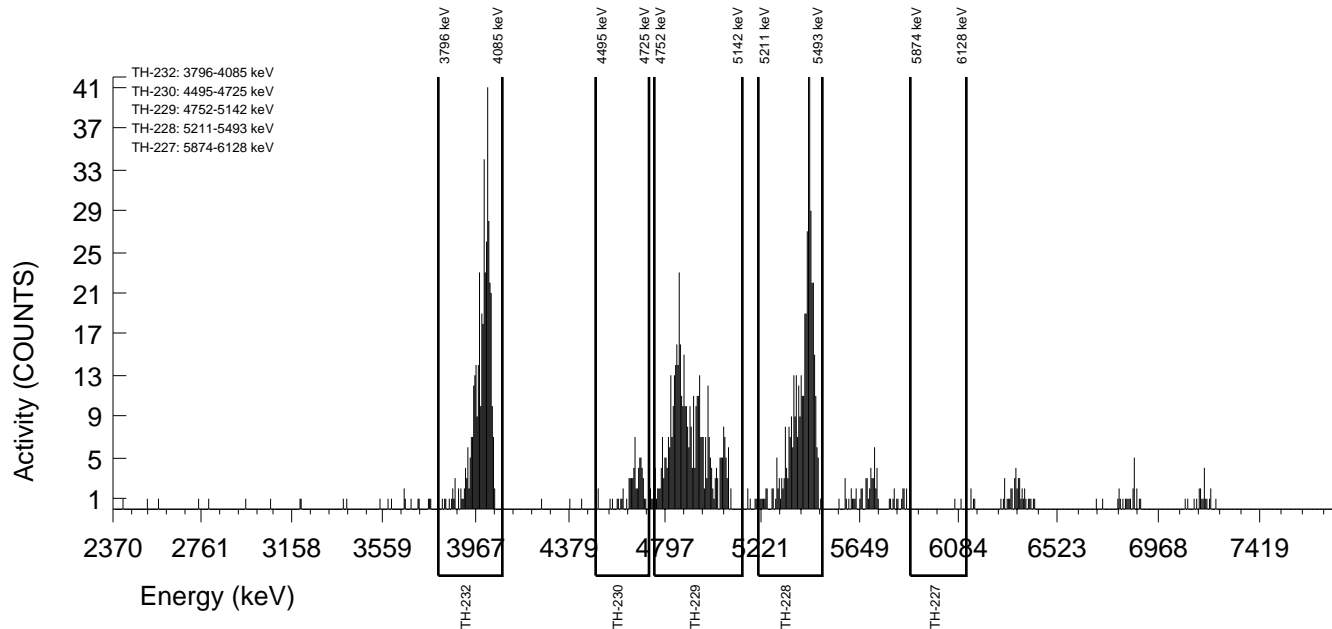
TRACER ID : 1845-I NUCLIDE : TH-229 NOMINAL : 4.8066E+00 dpm RESULTS : 4.7956E+00 dpm	LCS ID : 1513-J NUCLIDE : TH-232 NOMINAL (pCi/G) : 1.7130E+01 % RECOVERY : 96.185
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NUCLIDE ACTIVITY SUMMARY

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
TH-227	5994.04	6098.18	48.528	3.000	3.000	0.000	1.0000	57.440	2.44E-01	3.23E-01	2.44E-01	1.49E-01	3.22E-01
TH-228	5363.00	5403.85	28.597	436.000	435.023	0.960	0.9798	99.940	1.80E+01	2.64E+00	2.74E-01	7.48E-02	1.70E+00
TH-229	4900.00	4907.20	151.960	451.000	450.760	0.240	0.4899	99.520	1.87E+01	2.72E+00	1.99E-01	3.72E-02	1.73E+00
TH-230	4671.39	4654.66	38.822	62.000	58.328	0.960	0.9798	99.700	2.41E+00	7.04E-01	3.93E-01	1.34E-01	6.44E-01
TH-232	3972.00	3991.56	50.096	400.000	399.819	0.000	1.0000	100.000	1.65E+01	2.46E+00	1.81E-01	8.08E-02	1.62E+00

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.017 +/-0.000)  
 TH-230 (2.712 +/-0.042)  
 TH-232 (0.181 +/-0.003)



# **Continuing Calibration Data**

Bank 1 through bank 29 (detectors 1 through 256)

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

	Detector	Parameter	Flag
2-NOV-2023	23	PSFWHM-5000	Above
2-NOV-2023	23	PSCTSS-5000	Below
2-NOV-2023	36	PSFWHM-5000	Below
2-NOV-2023	36	PSENERGY-5000	Below
2-NOV-2023	36	PSCTSS-5000	Below
2-NOV-2023	73	PSENERGY-5000	Below
2-NOV-2023	73	PSCTSS-5000	Below
2-NOV-2023	94	PSFWHM-5000	Below
2-NOV-2023	94	PSCTSS-5000	Below
28-AUG-2023	115	PSCTSS-5000	Below
28-AUG-2023	116	PSCTSS-5000	Below
2-NOV-2023	173	PSCTSS-5000	Below
2-NOV-2023	175	PSFWHM-5000	Below
2-NOV-2023	175	PSCTSS-5000	Below
2-NOV-2023	193	PSCTSS-5000	Below
28-NOV-2020	198	PSFWHM-5000	Below
28-NOV-2020	198	PSCTSS-5000	Below
8-SEP-2023	221	PSFWHM-5000	Above
8-SEP-2023	221	PSCTSS-5000	Below
8-SEP-2023	222	PSENERGY-5000	Above
8-SEP-2023	222	PSCTSS-5000	Below
2-NOV-2023	227	PSFWHM-5000	Below
2-NOV-2023	227	PSCTSS-5000	Below

The following detectors that may not have properly transferred to the QA file

- 115 may not have run since 2-NOV-2023
- 116 may not have run since 2-NOV-2023
- 119 may not have run since 2-NOV-2023
- 120 may not have run since 2-NOV-2023
- 183 may not have run since 2-NOV-2023
- 184 may not have run since 2-NOV-2023
- 187 may not have run since 2-NOV-2023
- 188 may not have run since 2-NOV-2023
- 198 may not have run since 2-NOV-2023


209 may not have run since 2-NOV-2023  
210 may not have run since 2-NOV-2023  
211 may not have run since 2-NOV-2023  
212 may not have run since 2-NOV-2023  
221 may not have run since 2-NOV-2023  
222 may not have run since 2-NOV-2023  
223 may not have run since 2-NOV-2023  
224 may not have run since 2-NOV-2023  
241 may not have run since 2-NOV-2023  
242 may not have run since 2-NOV-2023

APPROVAL DATE: November 2 2023

APPROVAL TIME: 1545

APPROVED BY:

PROCEDURE # GL-RAD-I-009

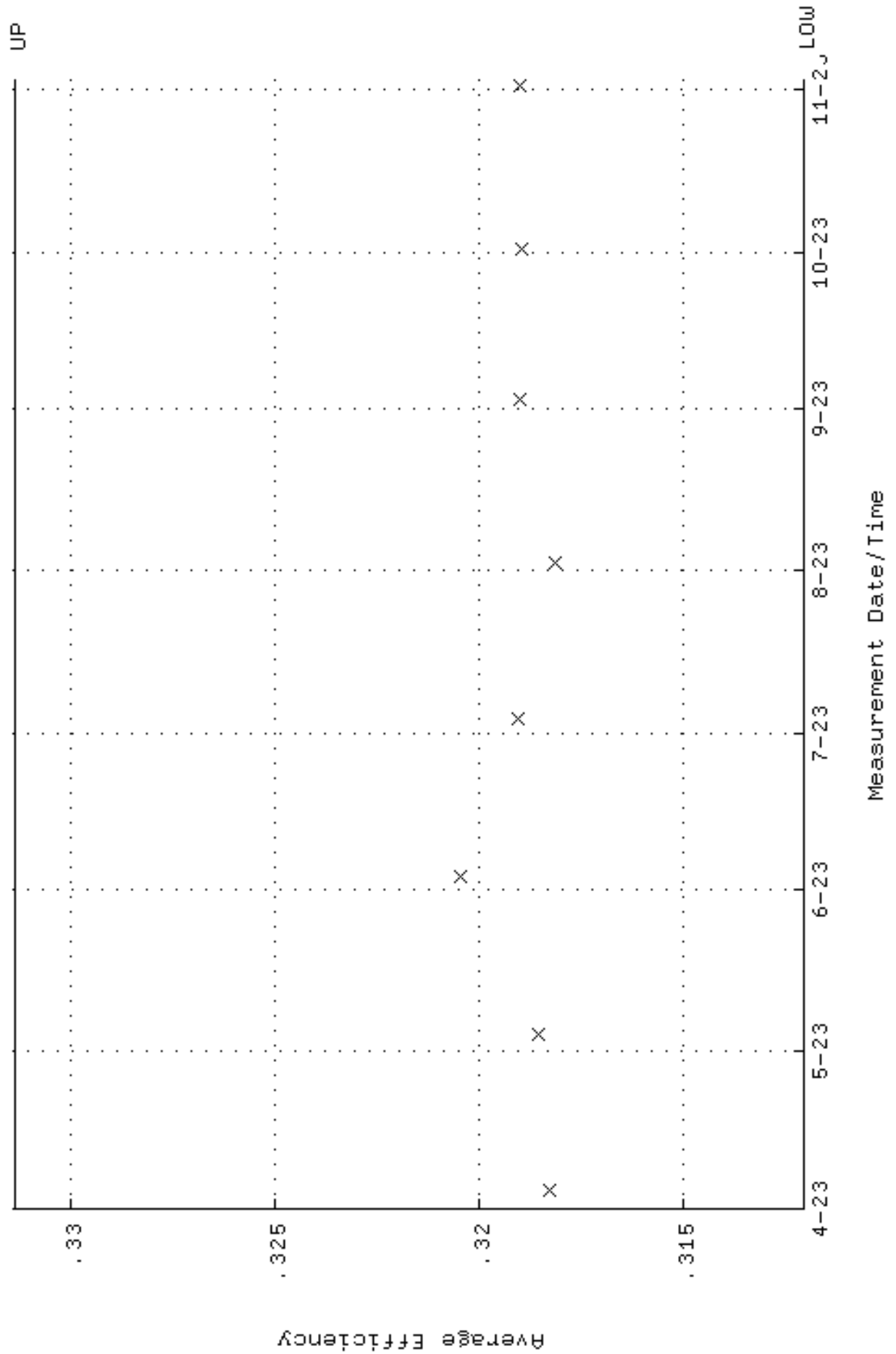


Report completed at 2-NOV-2023 15:31:06.10

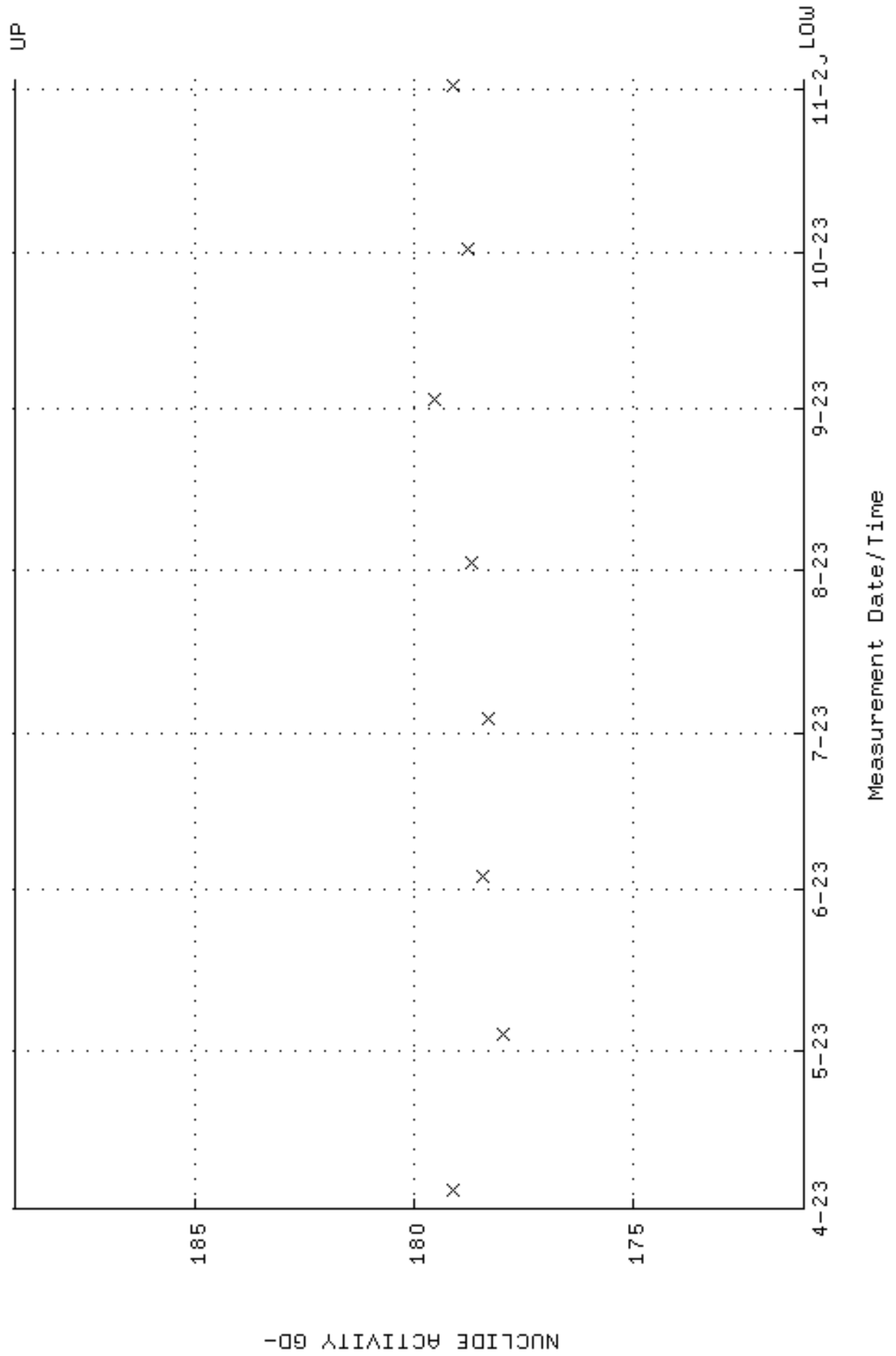
# **Background and Efficiency Data**



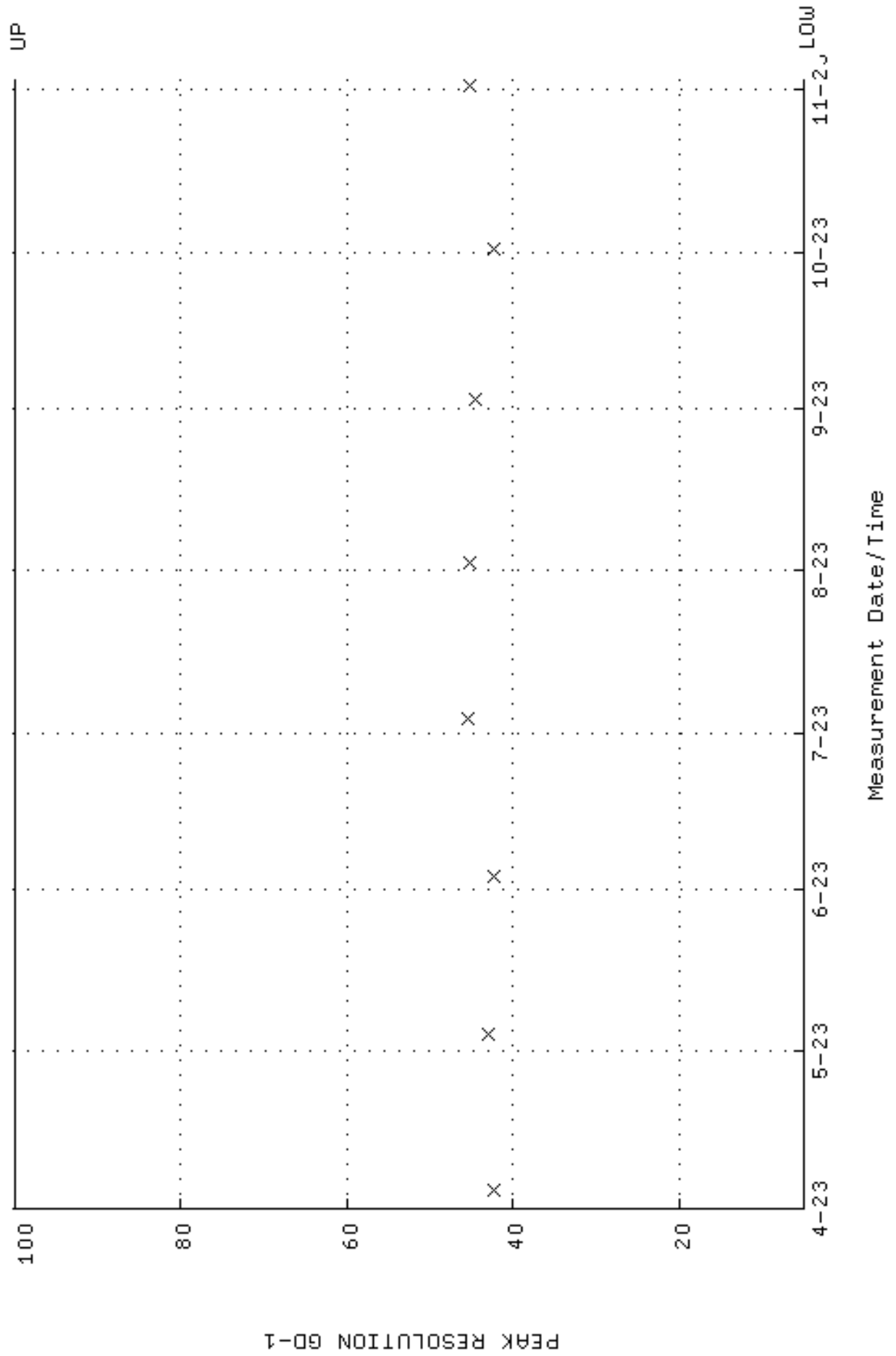
QA filename : DKA100:[ENV\_ALPHA.QA.W]W002.QAF;8  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.312060 through 0.331360



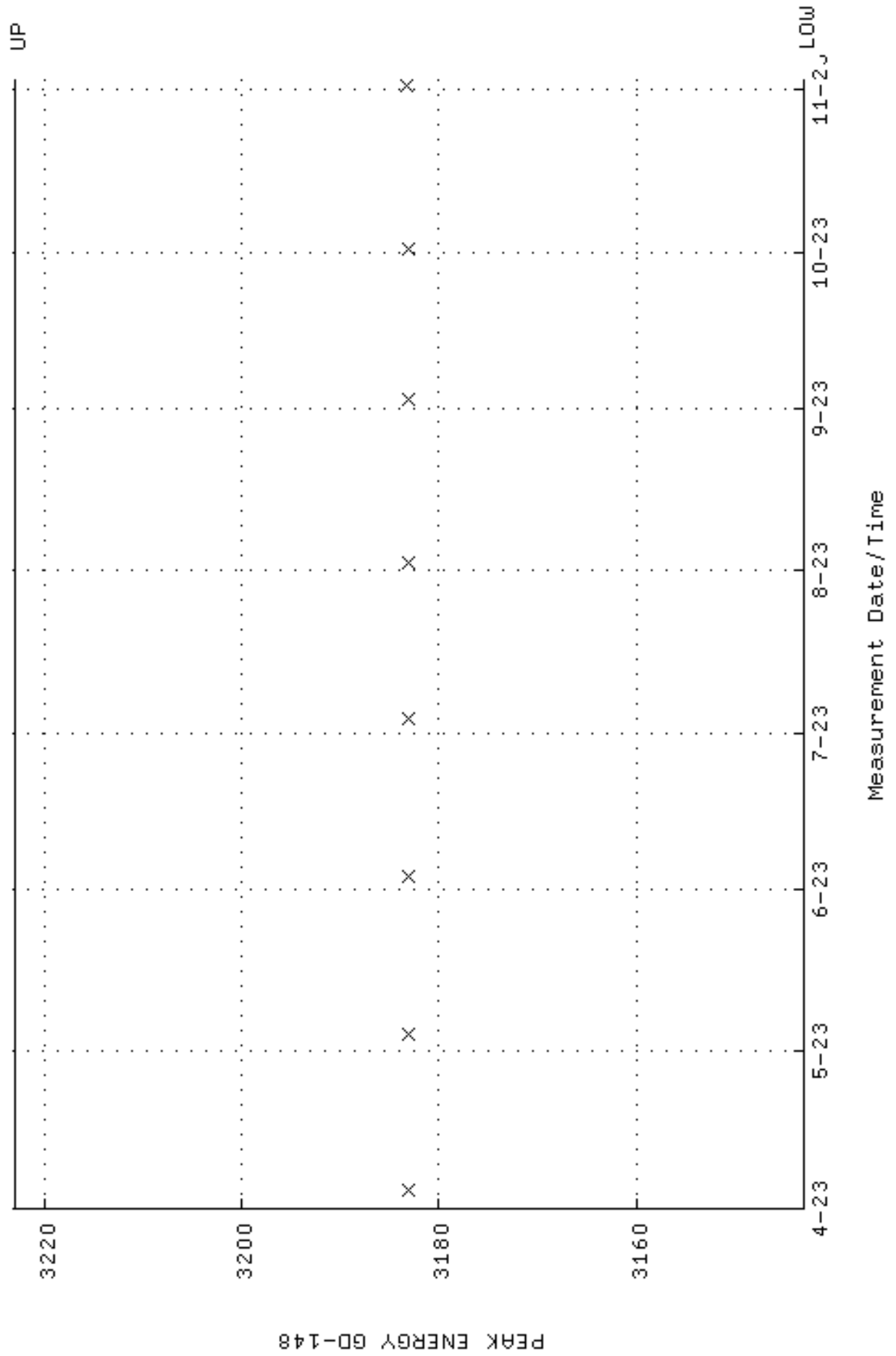
QA filename : DKA100:[ENV\_ALPHA.QA.W]W002.QAF;8  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



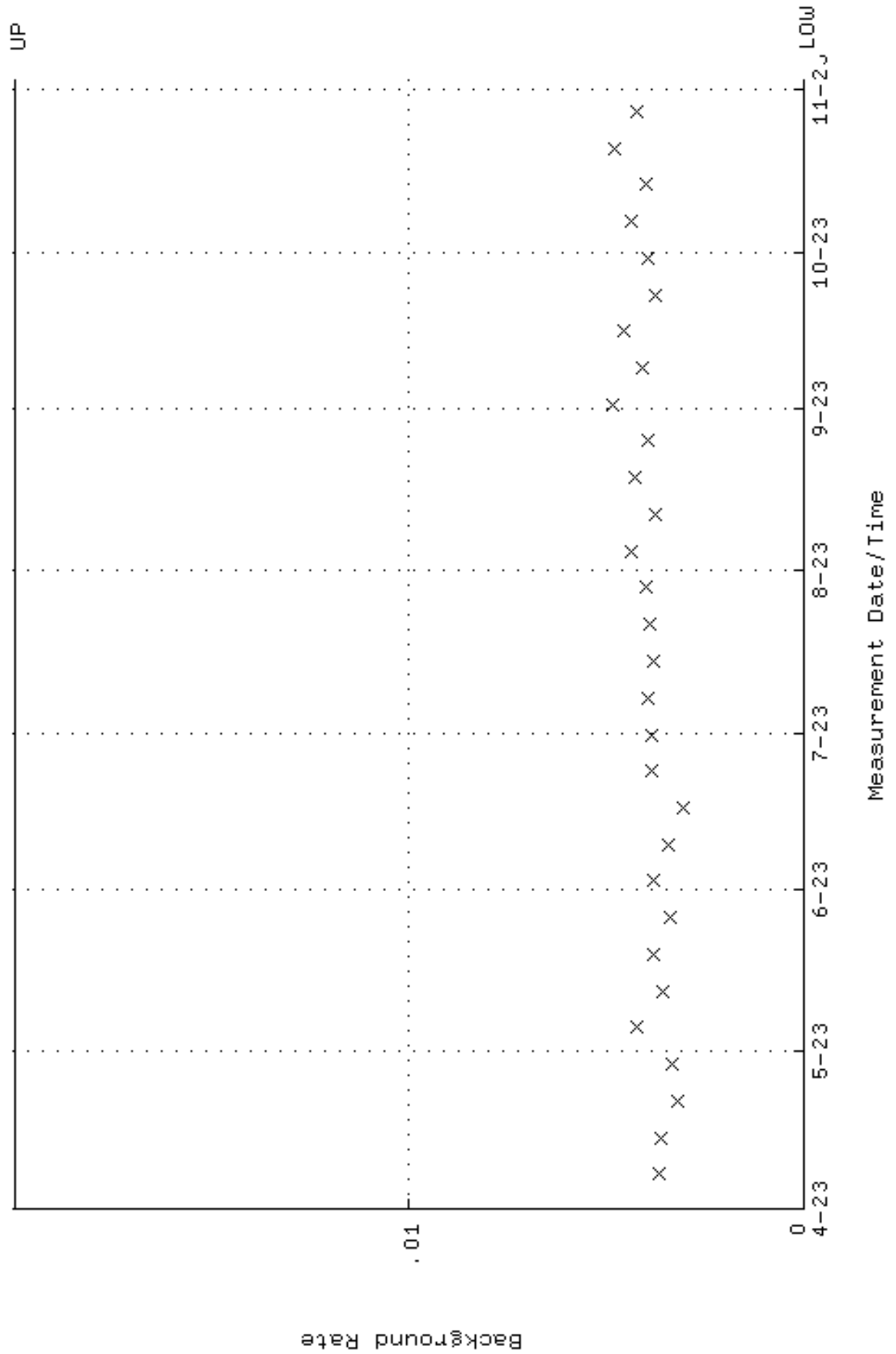
QA filename : DKA100:[ENV\_ALPHA.QA.W]W002.QAF;8  
Parameter Name : PSFVHM-GD148 (PEAK RESOLUTION GD-148)  
Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
Lower/Upper Lmts: 5.00000 through 100.000



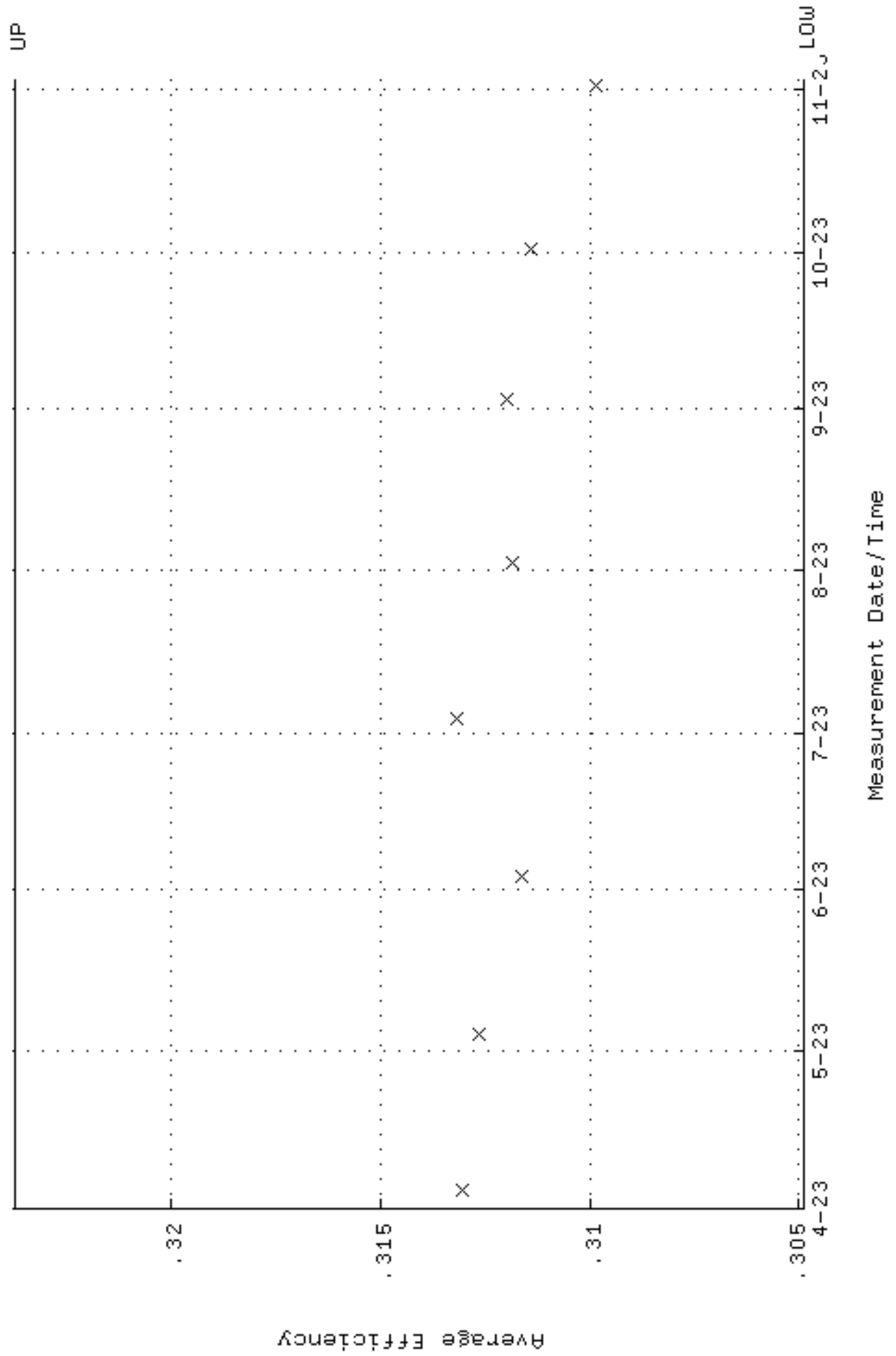
QA filename : DKA100:[ENV\_ALPHA.QA.W]W002.QAF;8  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



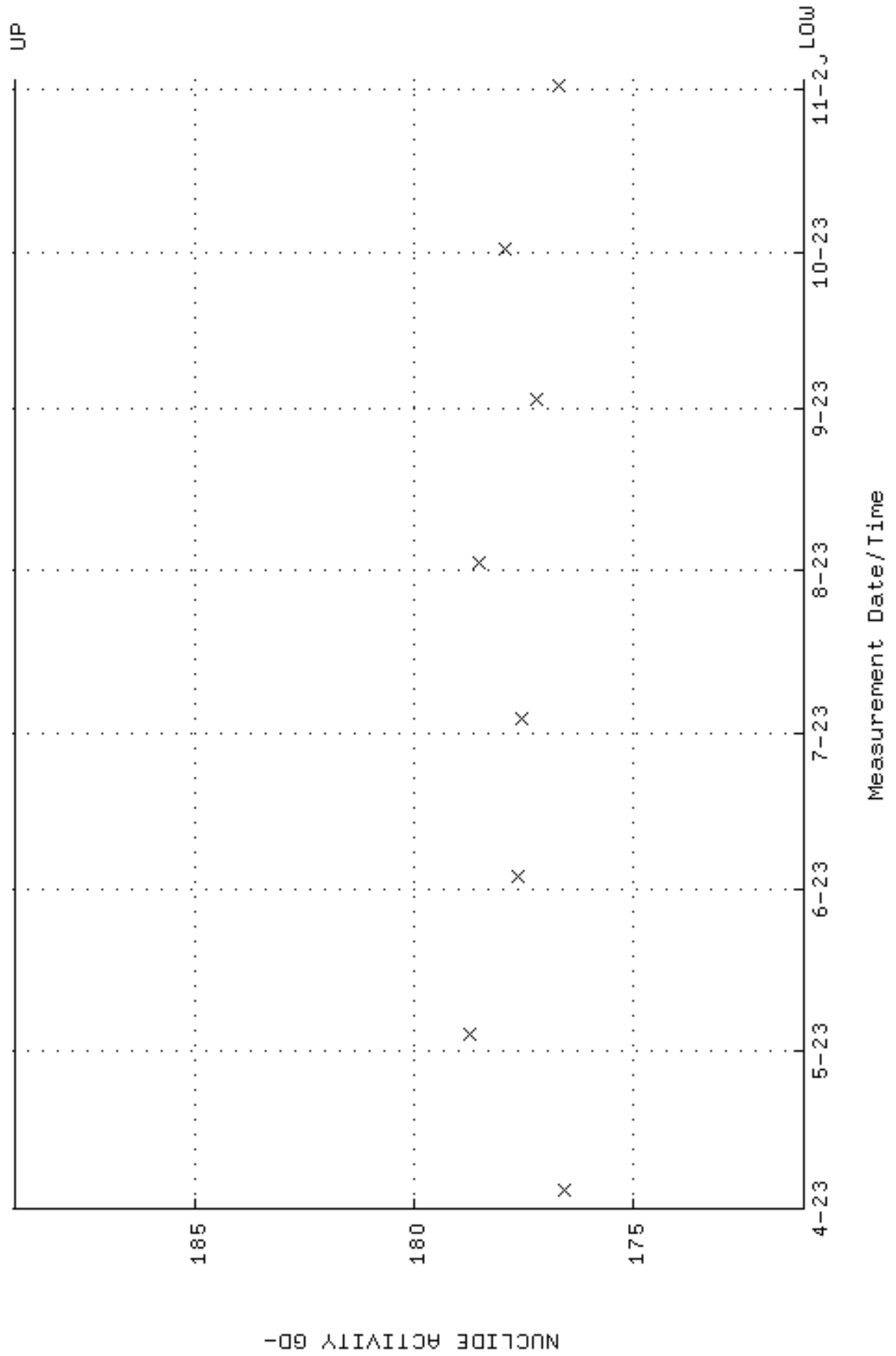
QA filename : DKA100:[ENV\_ALPHA.QA.B]B002.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-APR-2023 13:44:54 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



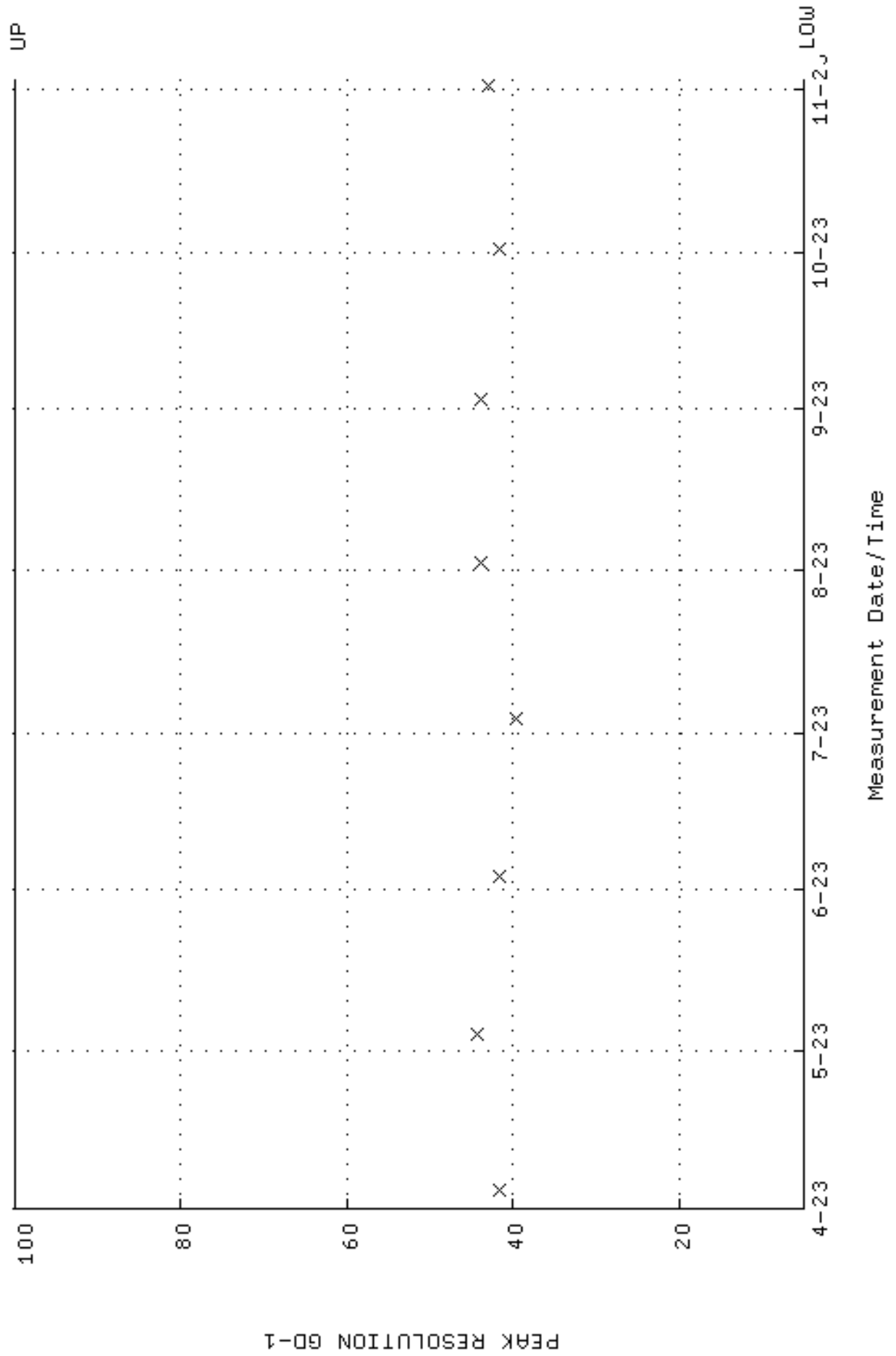
QA filename : DKA100:[ENV\_ALPHA.QA.W]W003.QAF;9  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.304880 through 0.323740



QA filename : DKA100:[ENV\_ALPHA.QA.W]W003.QAF;9  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100

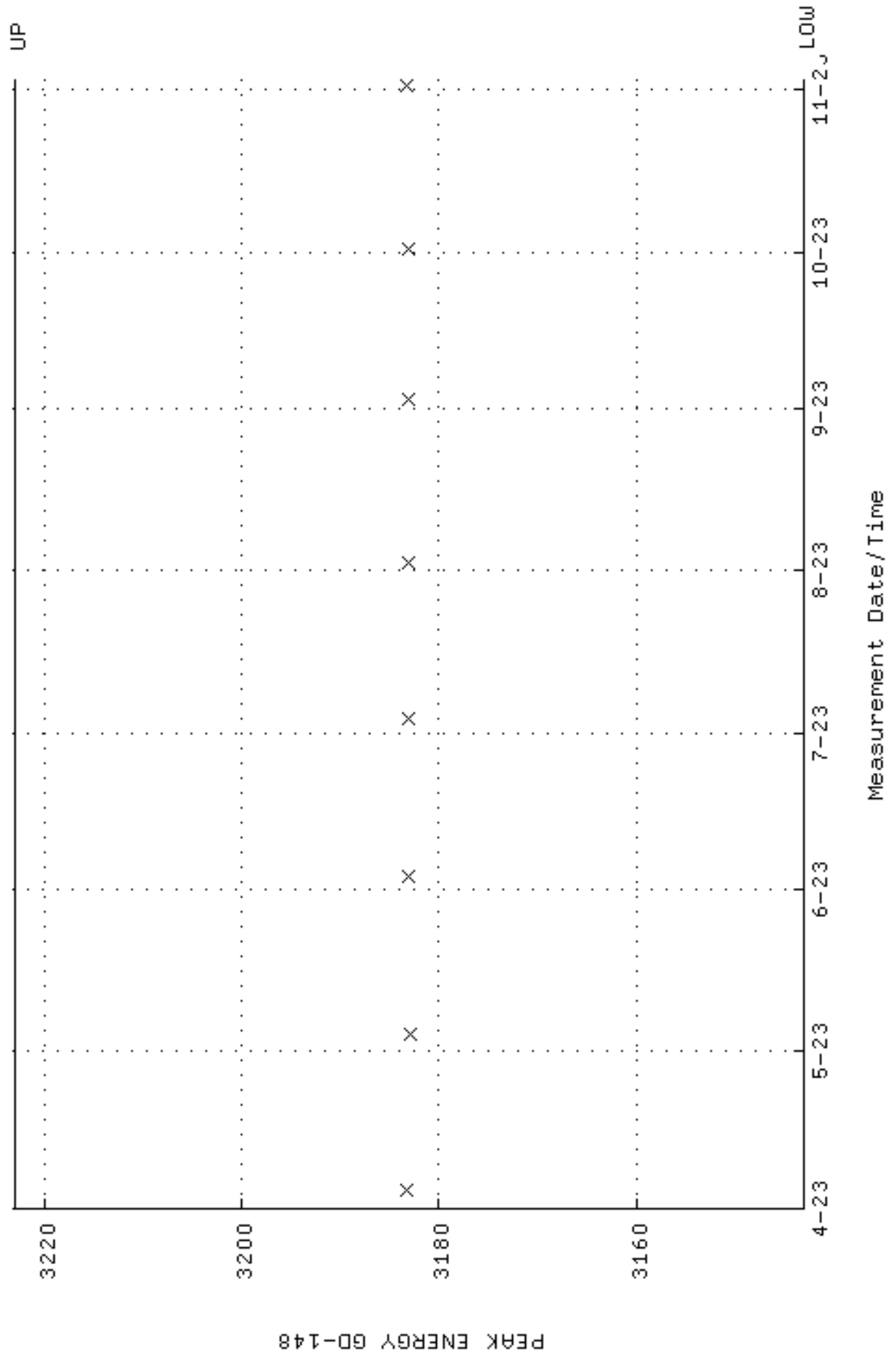


QA filename : DKA100:[ENV\_ALPHA.QA.W]W003.QAF;9  
Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
Lower/Upper Lmts: 5.00000 through 100.000

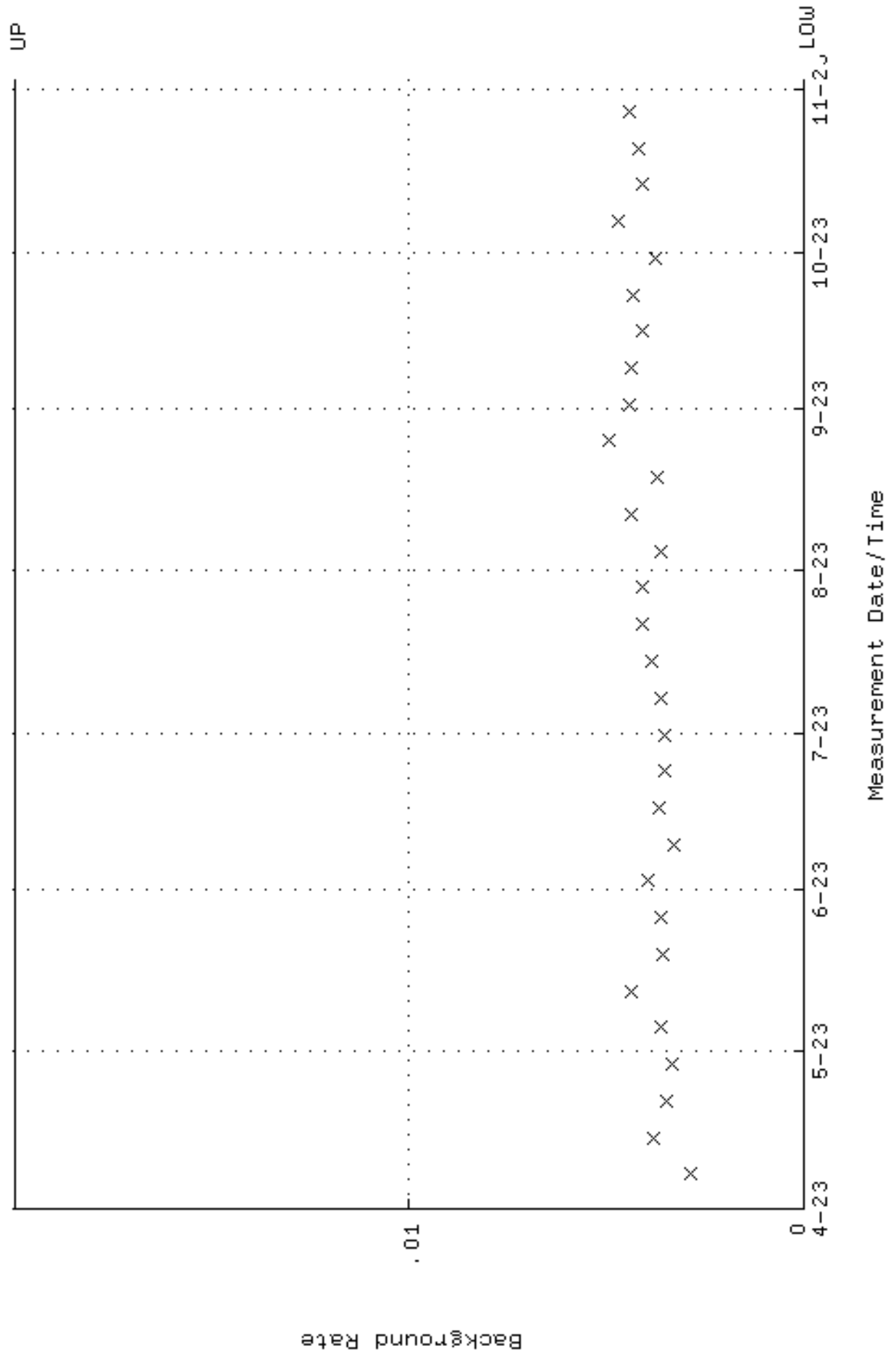




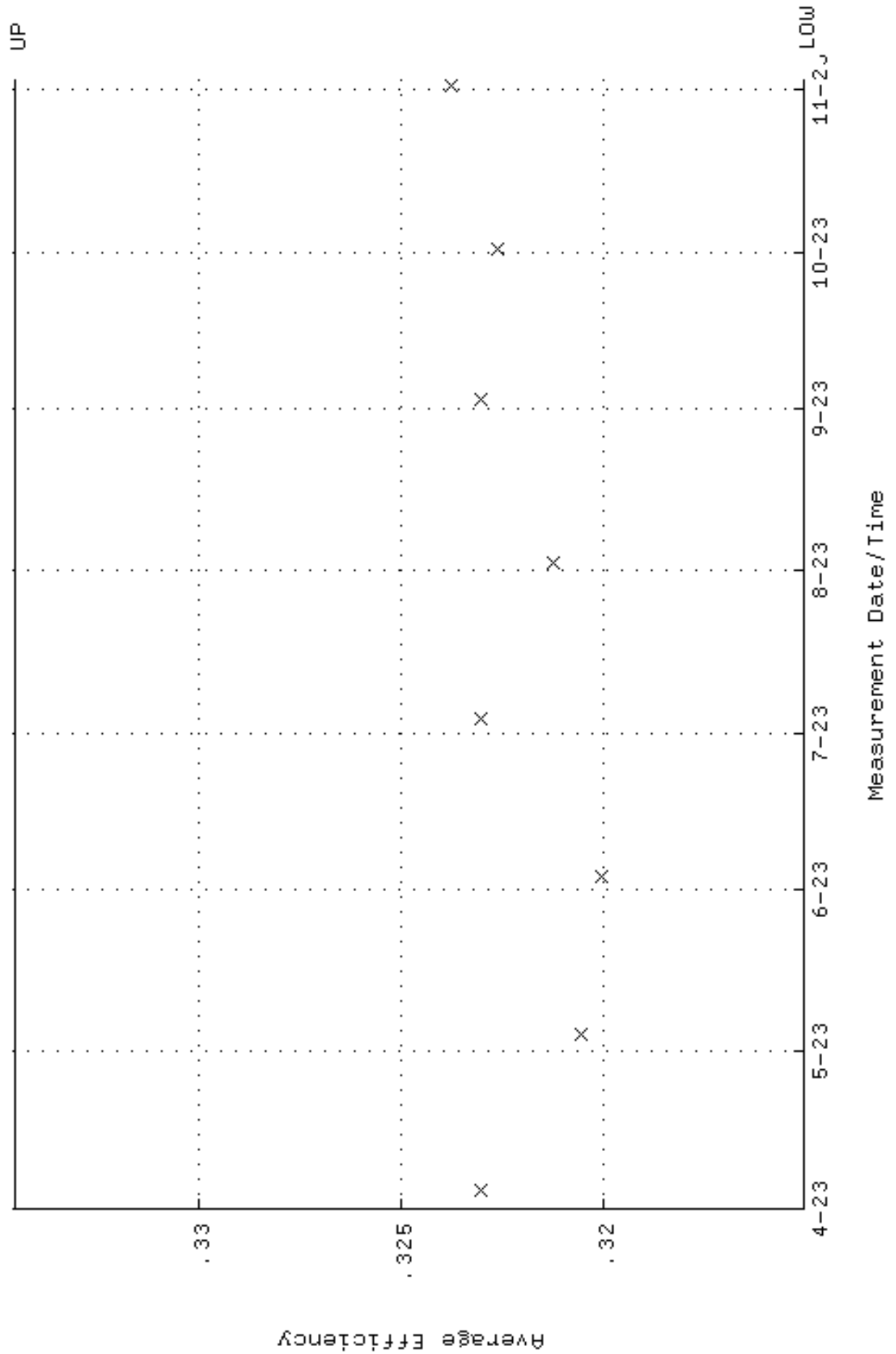
QA filename : DKA100:[ENV\_ALPHA.QA.W]W003.QAF;9  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



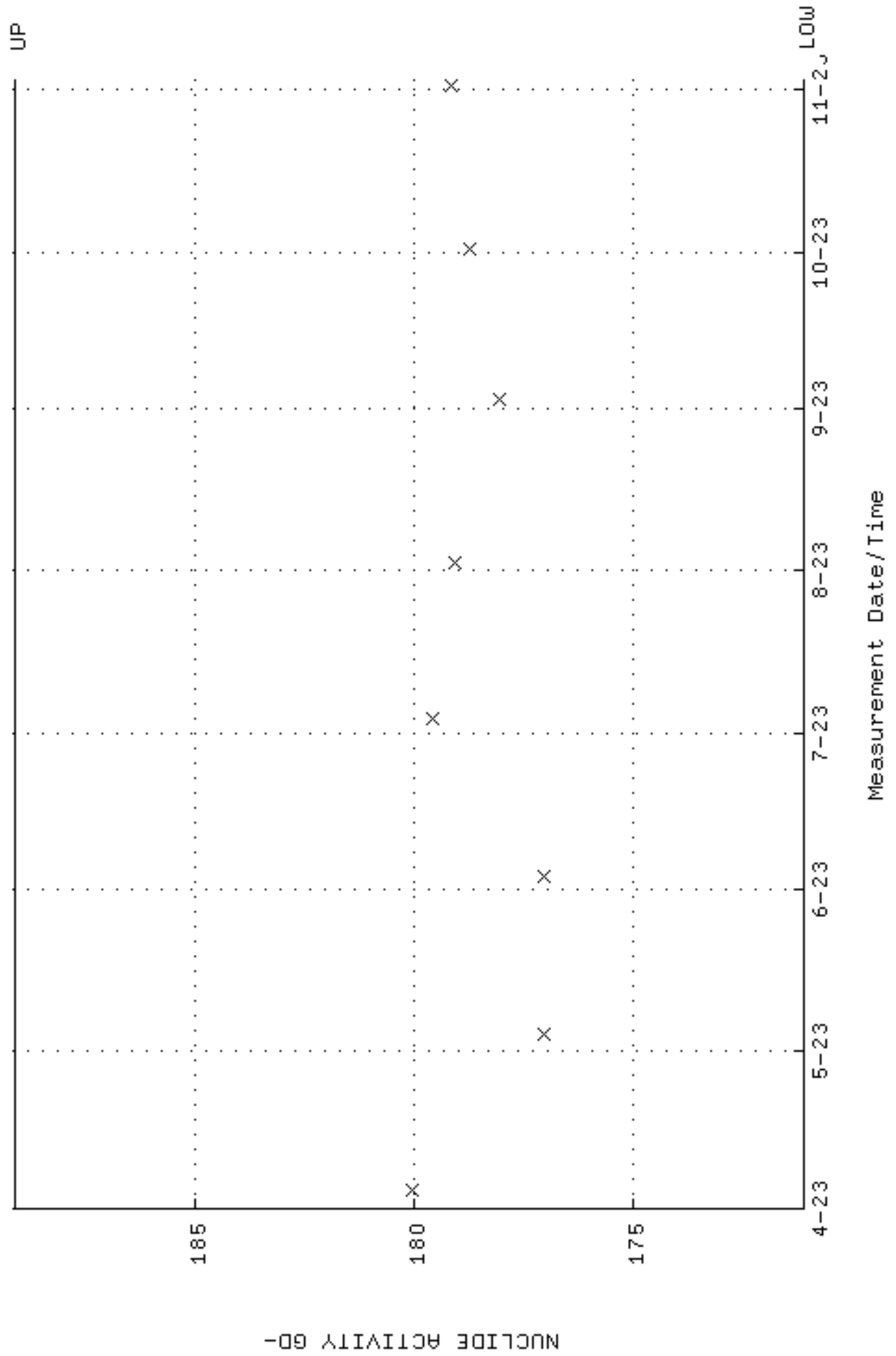
QA filename : DKA100:[ENV\_ALPHA.QA.B]B003.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-APR-2023 13:44:54 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



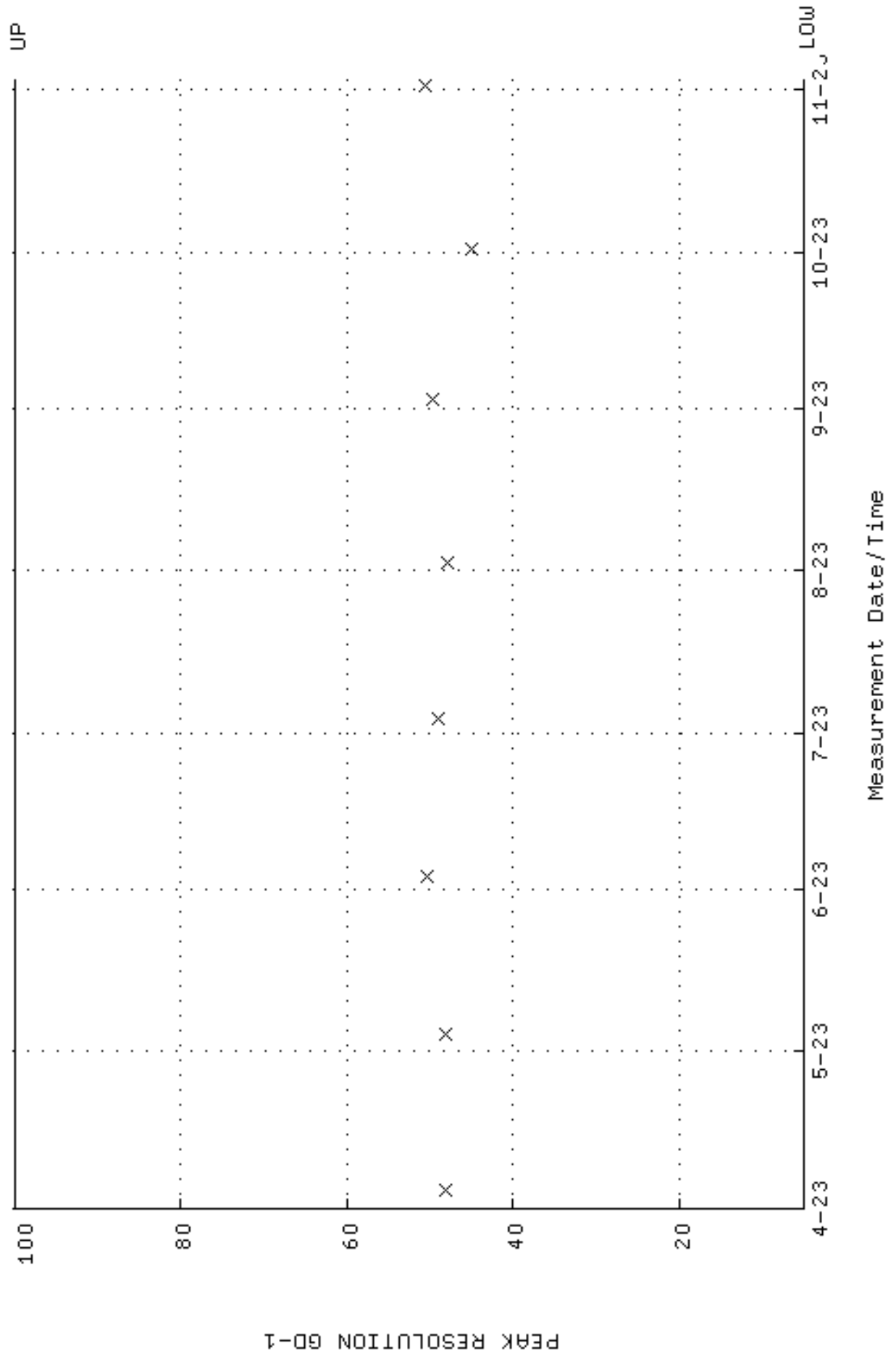
QA filename : DKA100:[ENV\_ALPHA.QA.W]W004.QAF;11  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.315060 through 0.334550



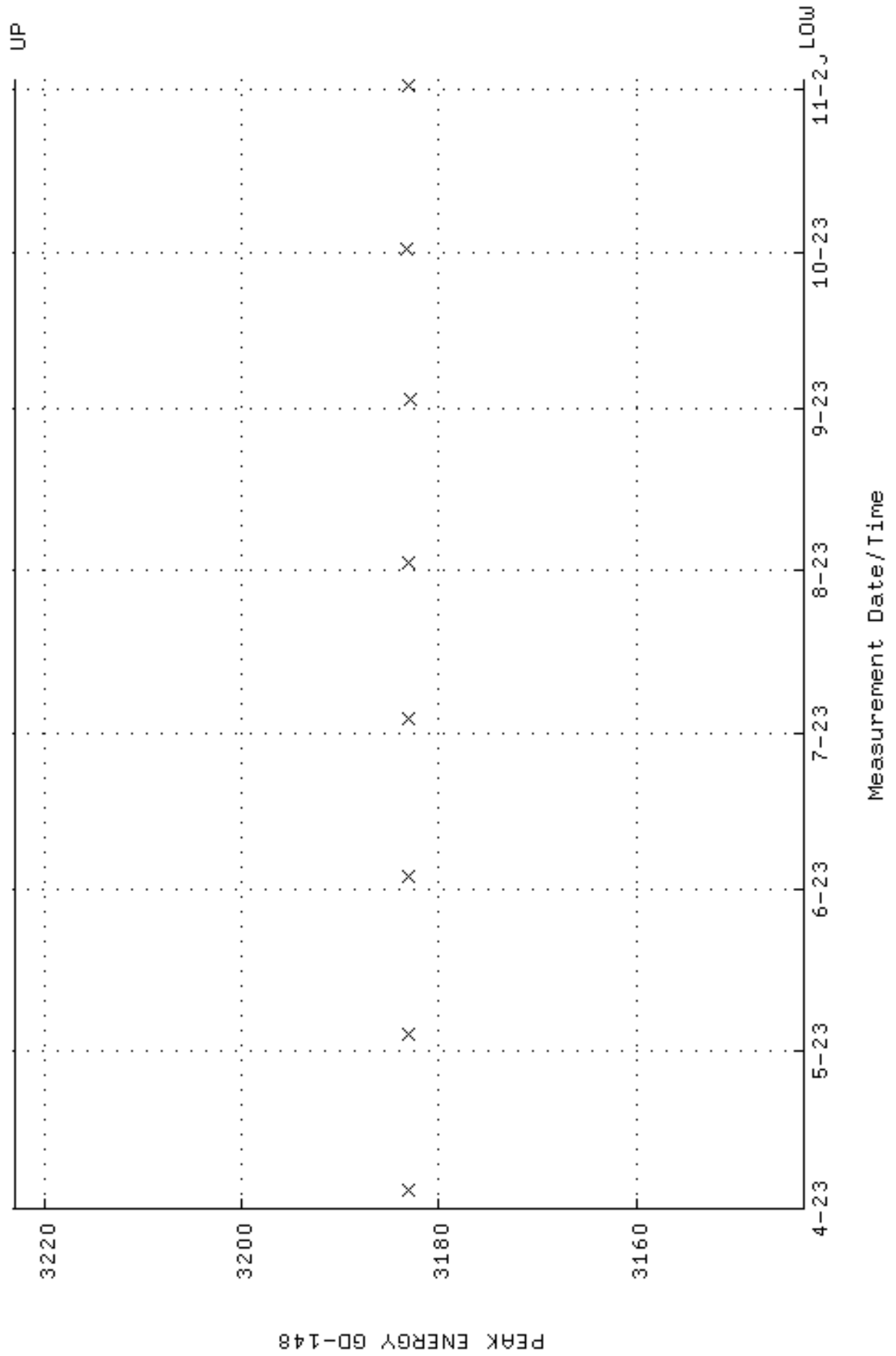
QA filename : DKA100:[ENV\_ALPHA.QA.W]W004.QAF;11  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



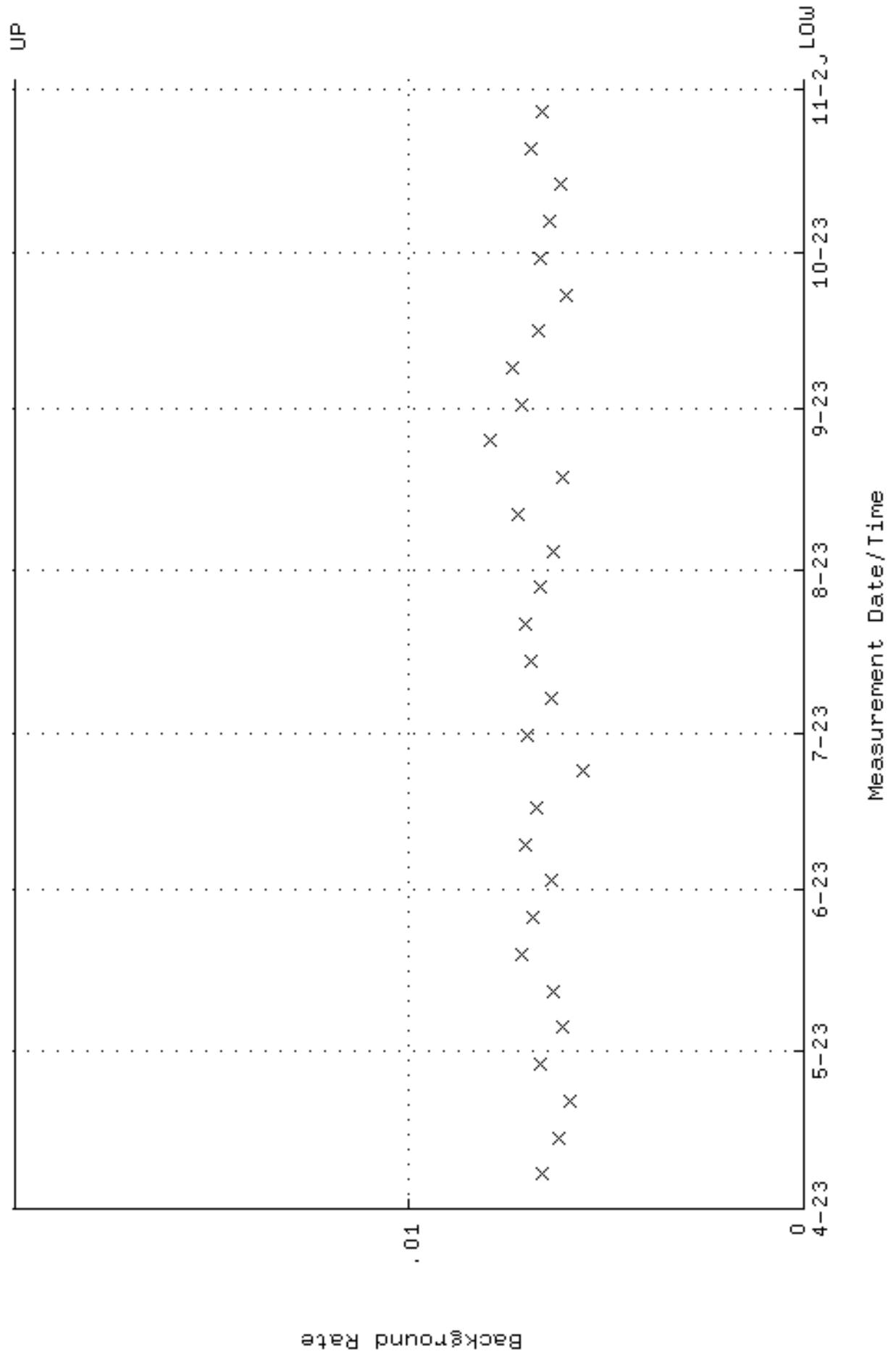
QA filename : DKA100:[ENV\_ALPHA.QA.W]W004.QAF;11  
 Parameter Name : PSFVHM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



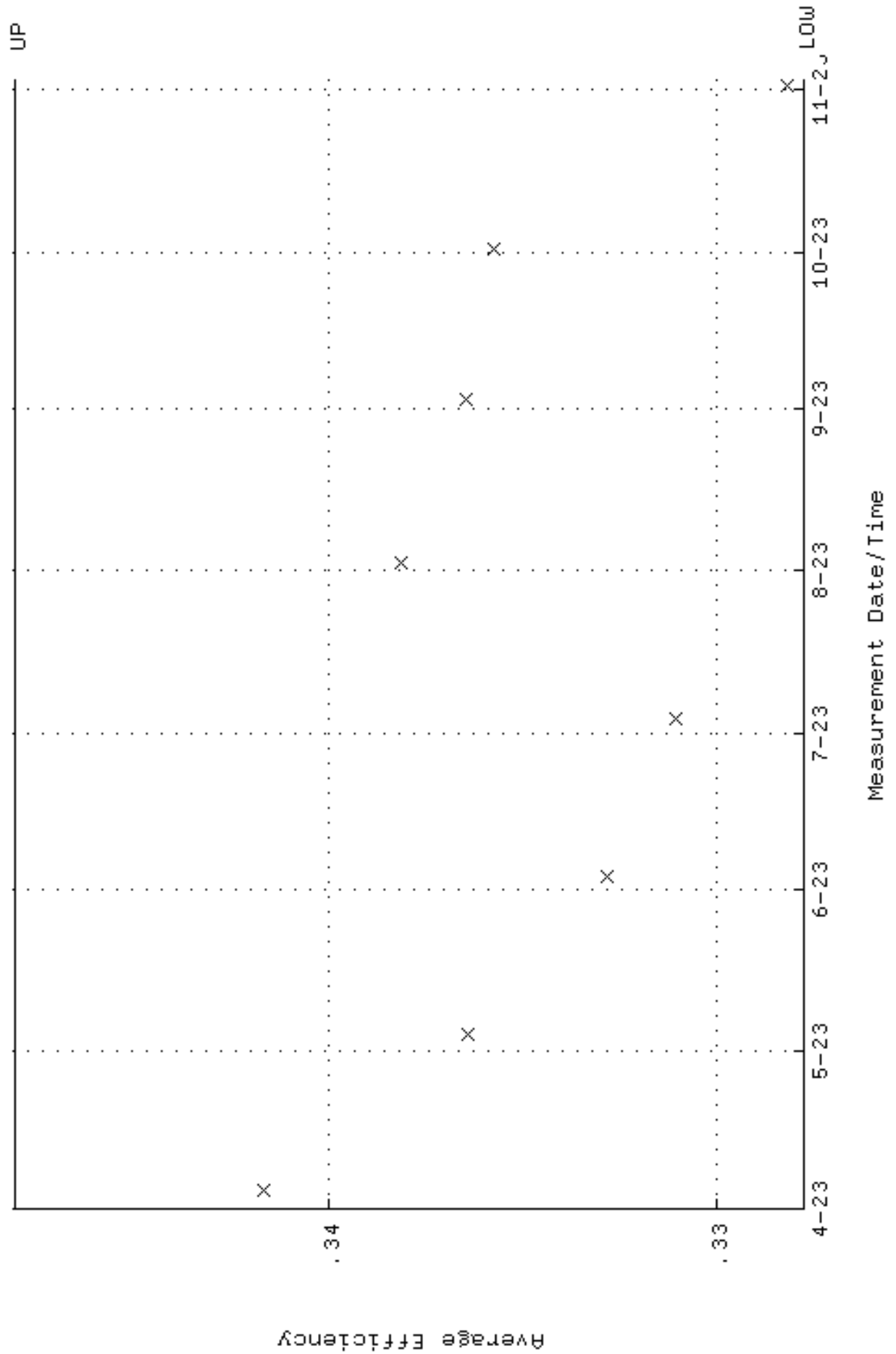
QA filename : DKA100:[ENV\_ALPHA.QA.W]W004.QAF;11  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



QA filename : DKA100:[ENV\_ALPHA.QA.B]B004.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-APR-2023 13:44:54 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

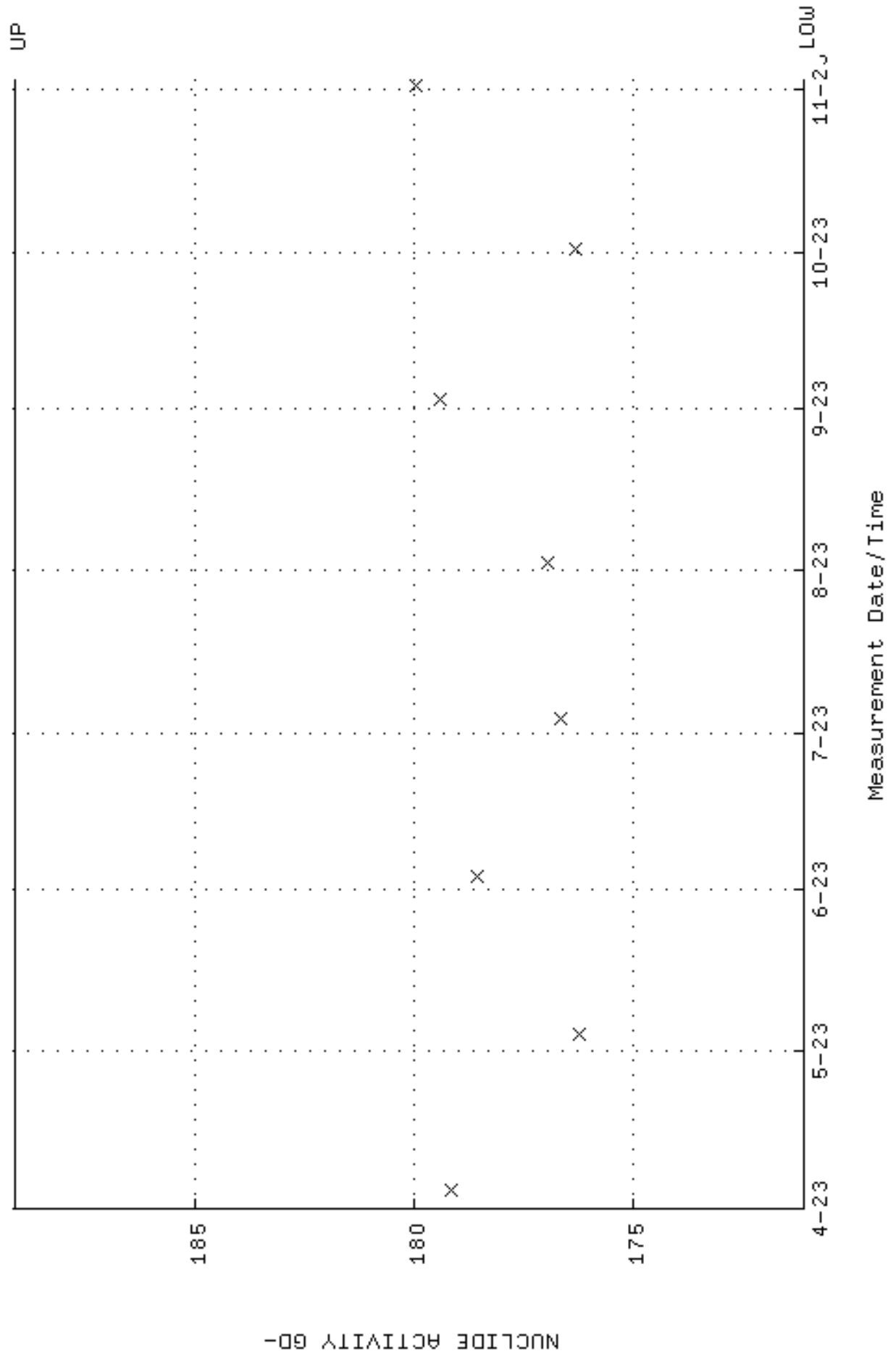


QA filename : DKA100:[ENV\_ALPHA.QA.W]W005.QAF;11  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.327770 through 0.348040

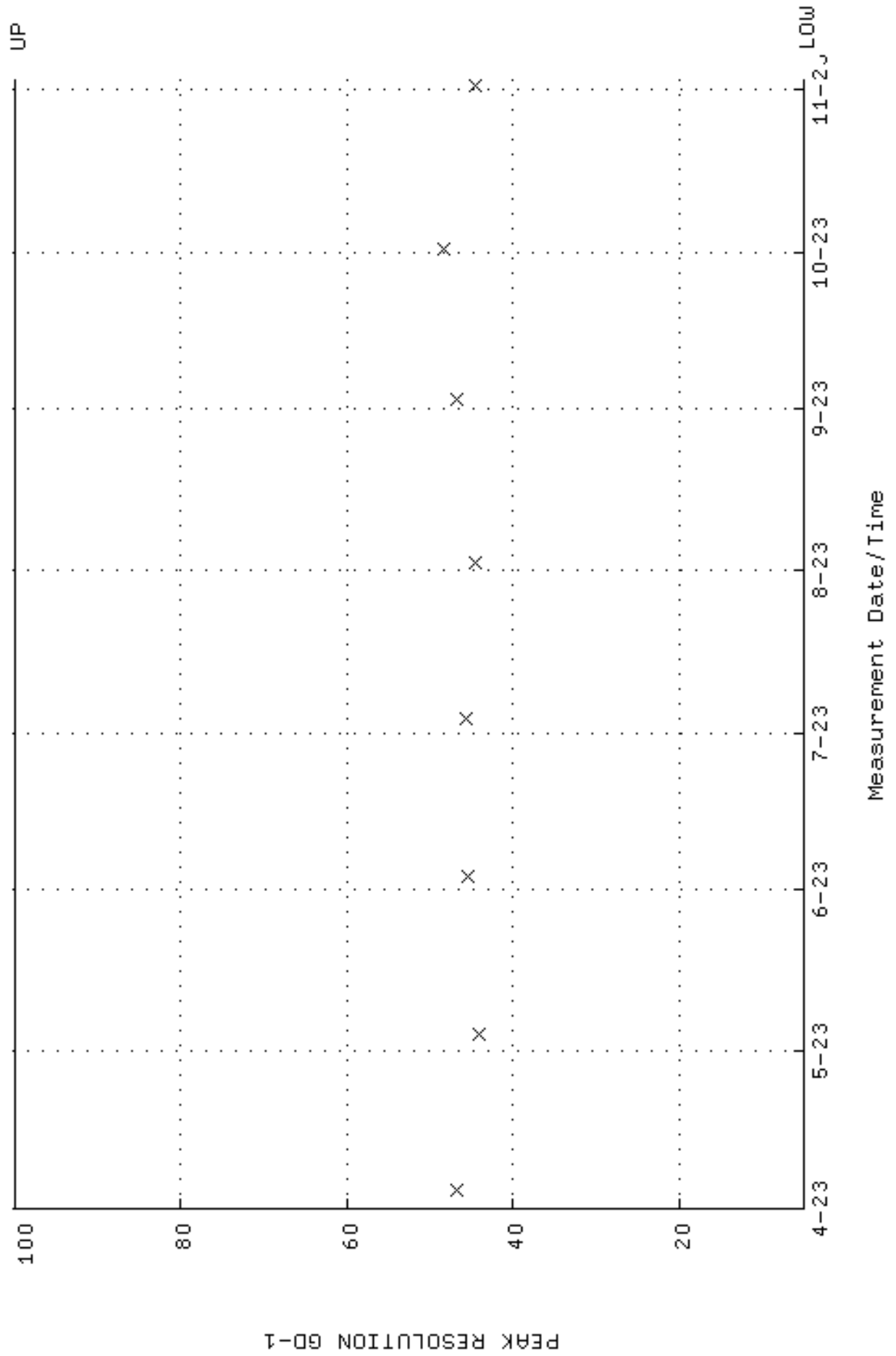




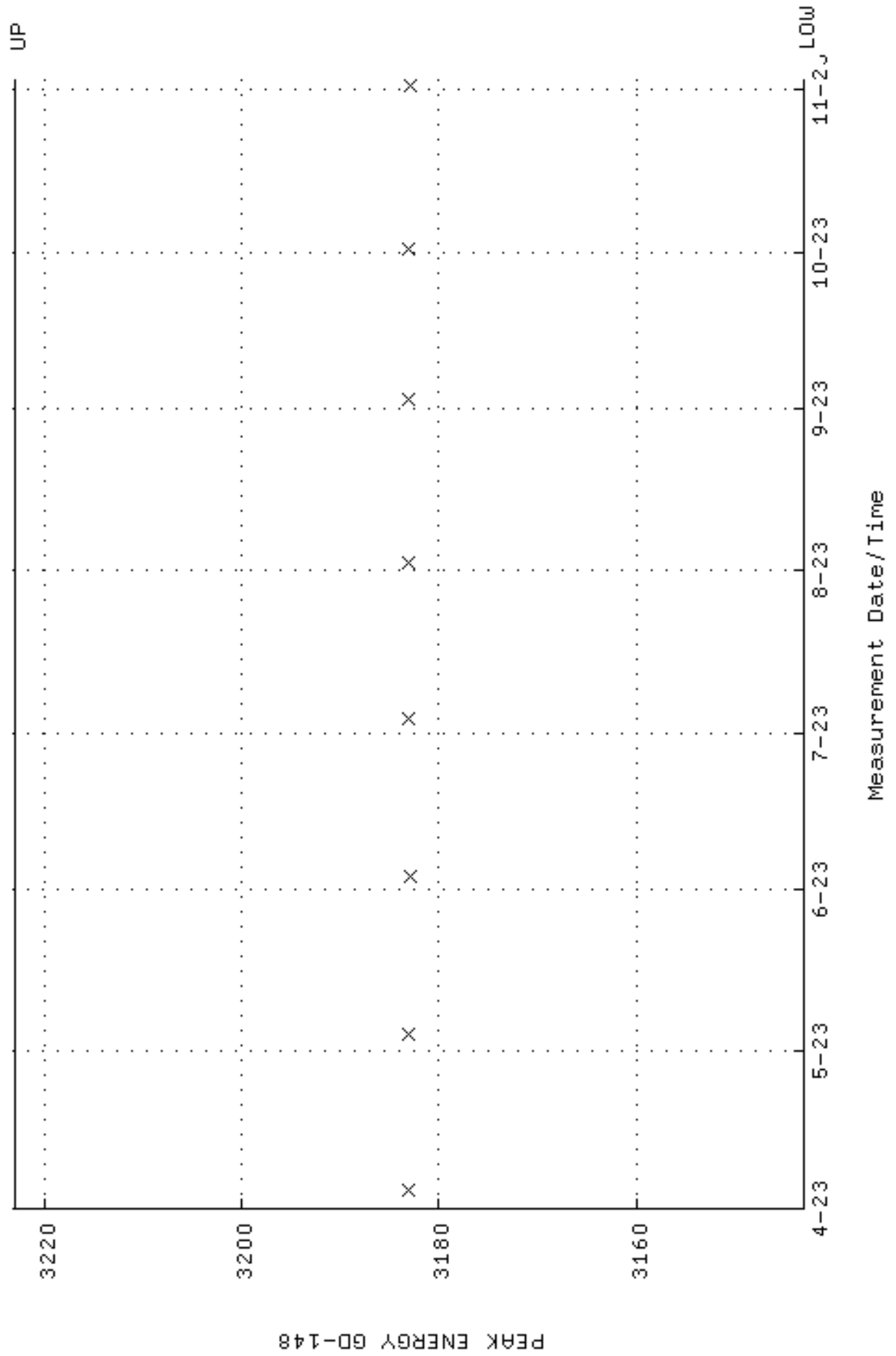
QA filename : DKA100:[ENV\_ALPHA.QA.W]W005.QAF;11  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



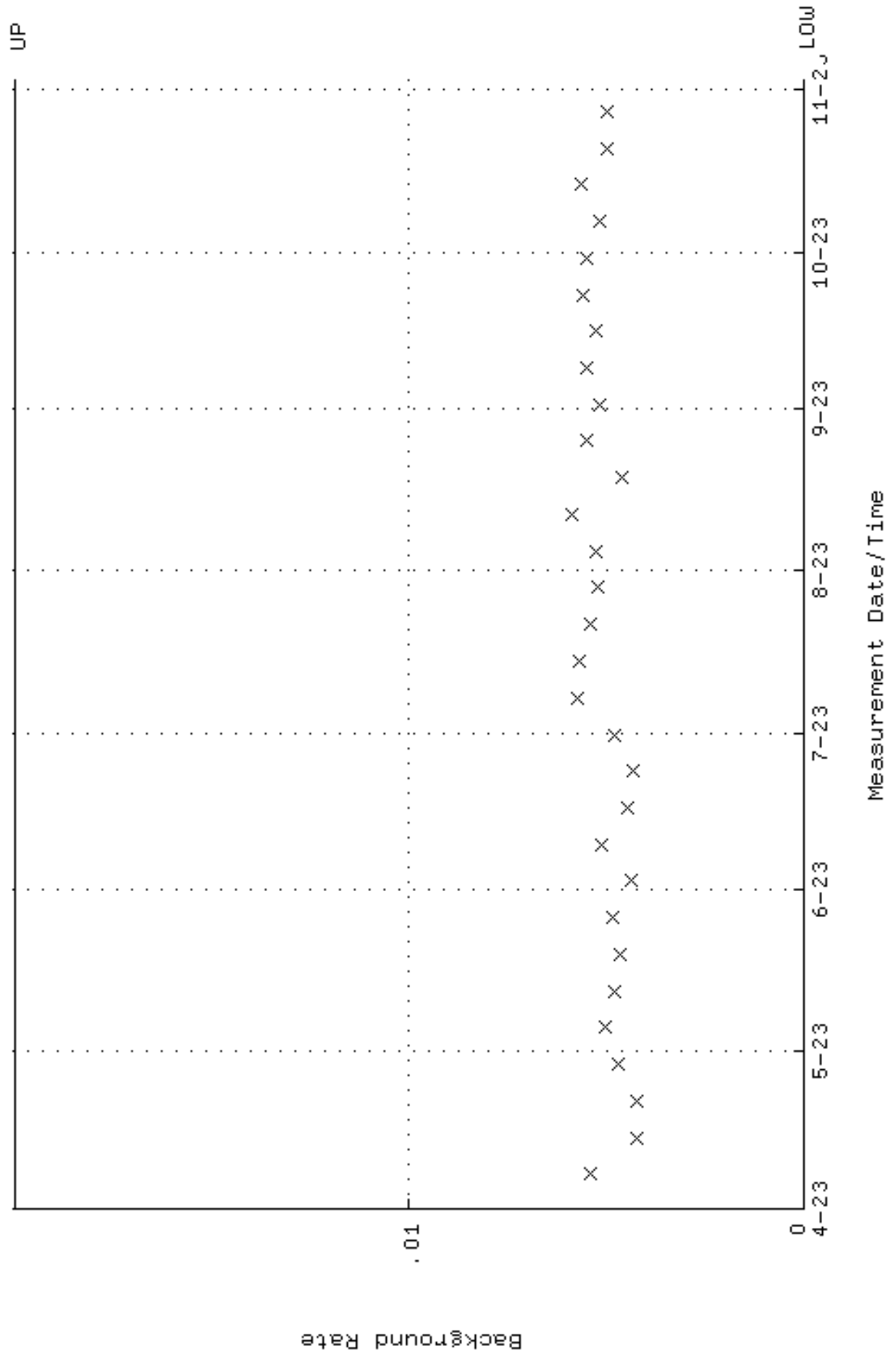
QA filename : DKA100:[ENV\_ALPHA.QA.W]W005.QAF;11  
 Parameter Name : PSFVHM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



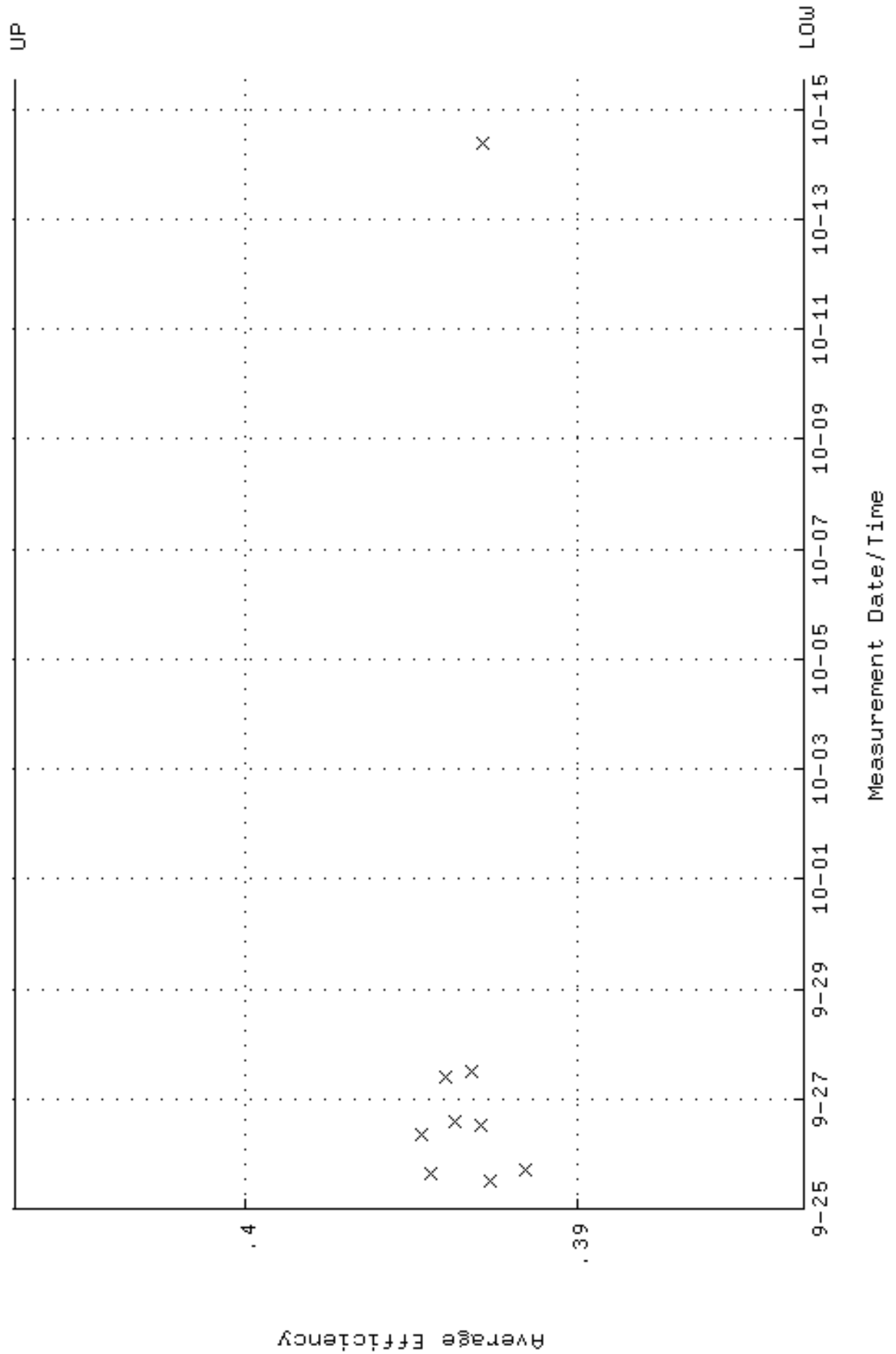
QA filename : DKA100:[ENV\_ALPHA.QA.W]W005.QAF;11  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 4-APR-2023 10:17:22 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



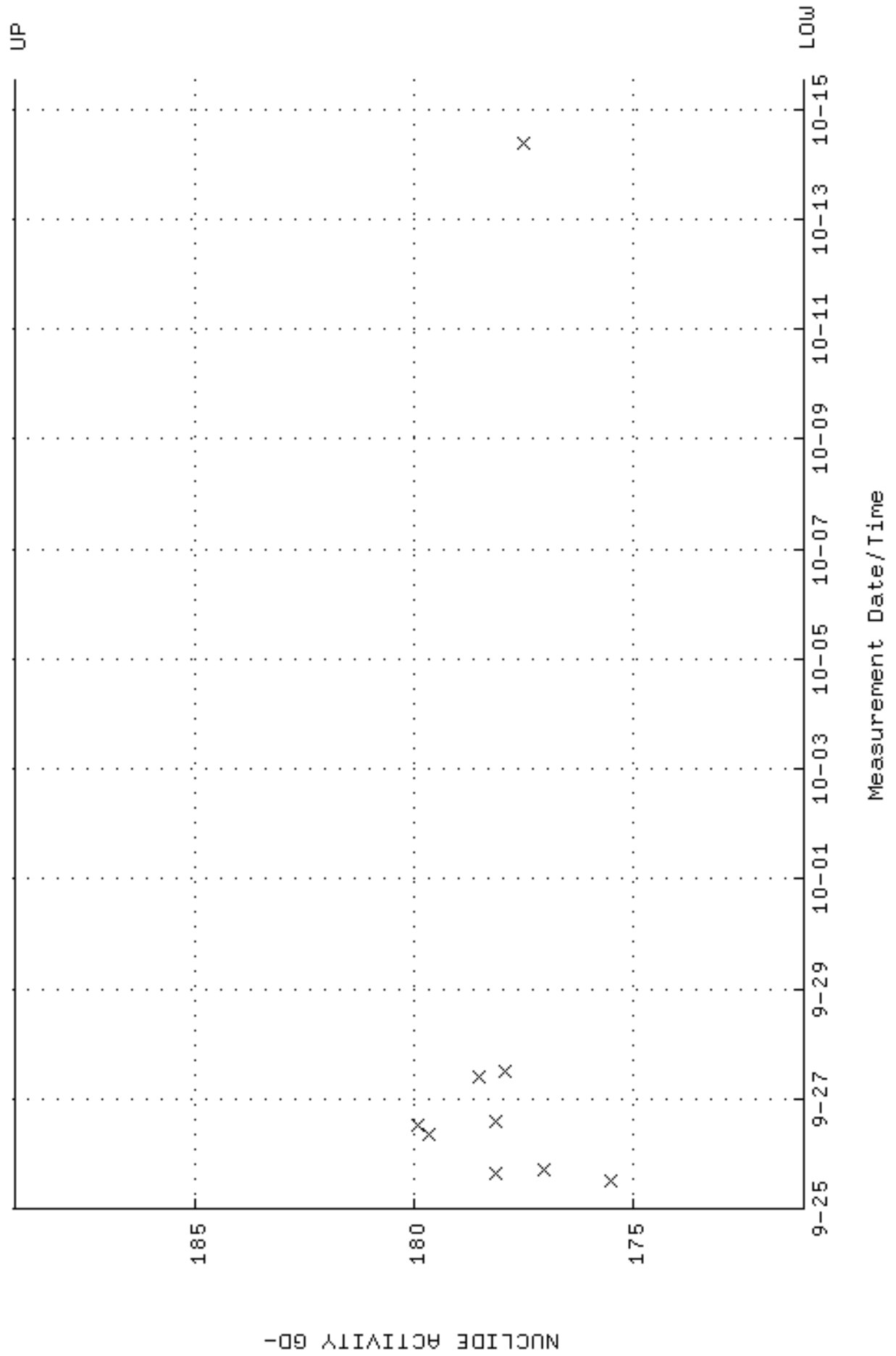
QA filename : DKA100:[ENV\_ALPHA.QA.B]B005.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-APR-2023 13:44:54 through 2-NOV-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



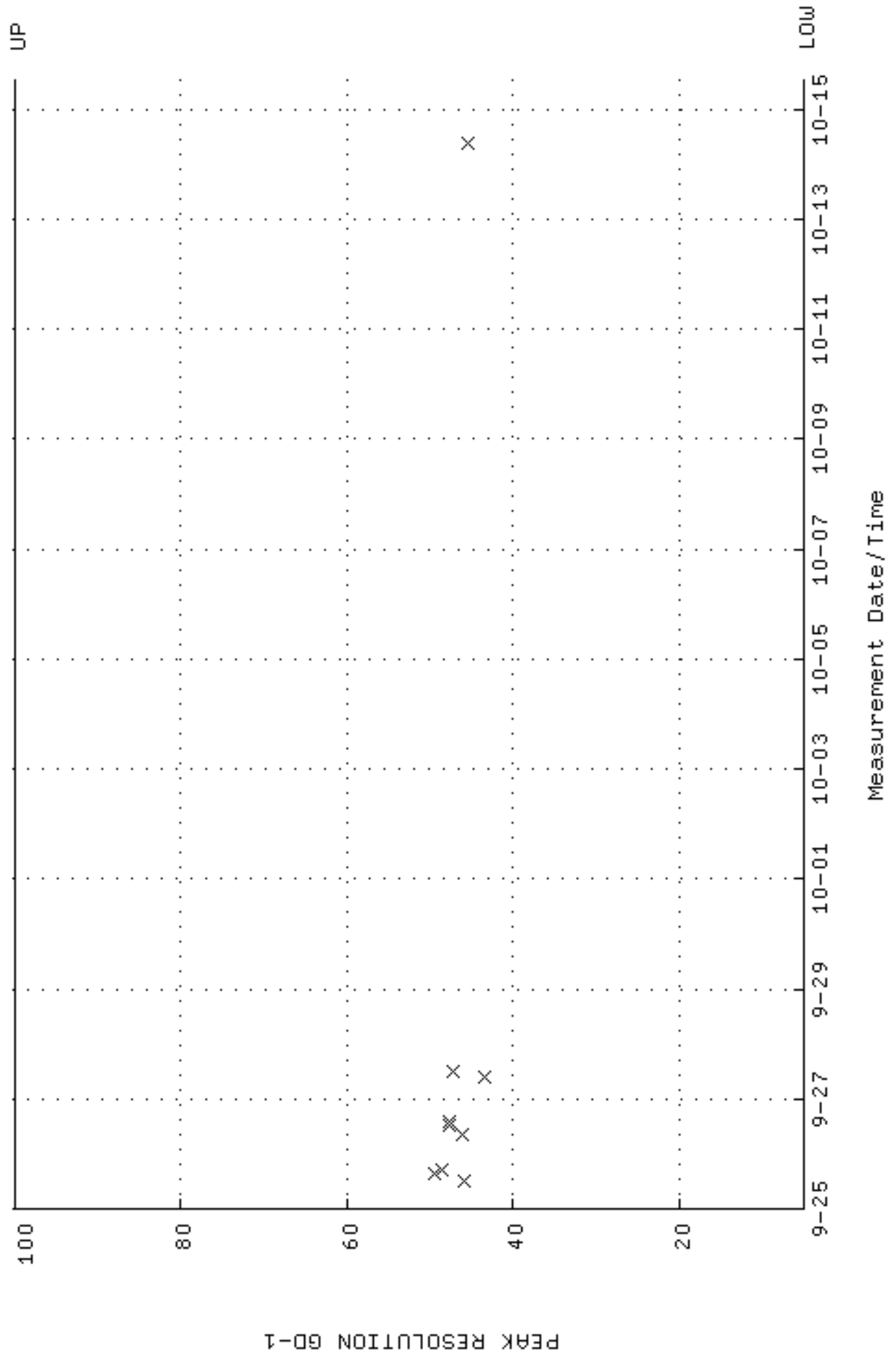
QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 25-SEP-2023 12:20:16 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.383210 through 0.406910



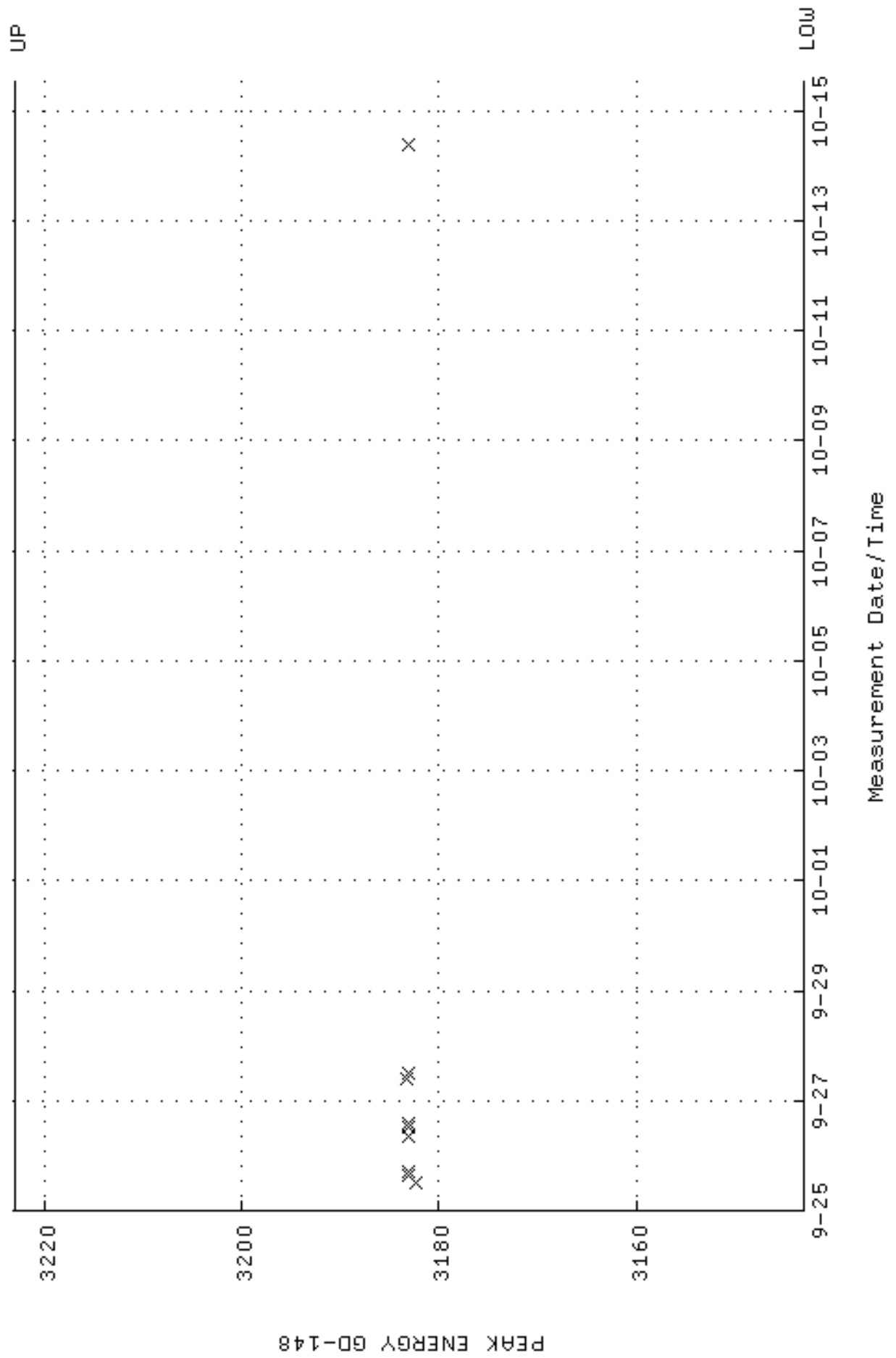
QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 25-SEP-2023 12:20:16 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;4  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 25-SEP-2023 12:20:16 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000

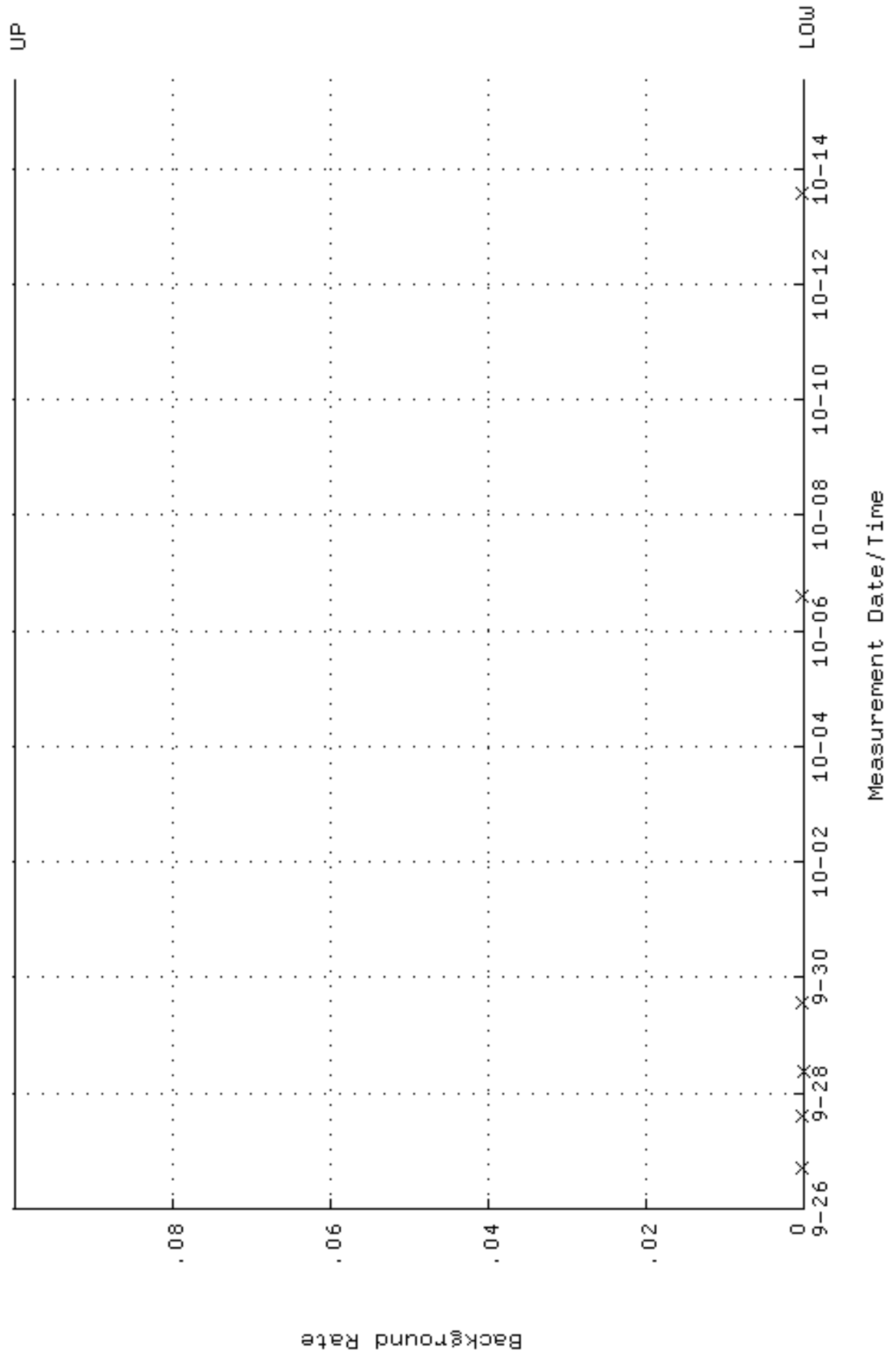


QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;4  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 25-SEP-2023 12:20:16 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00

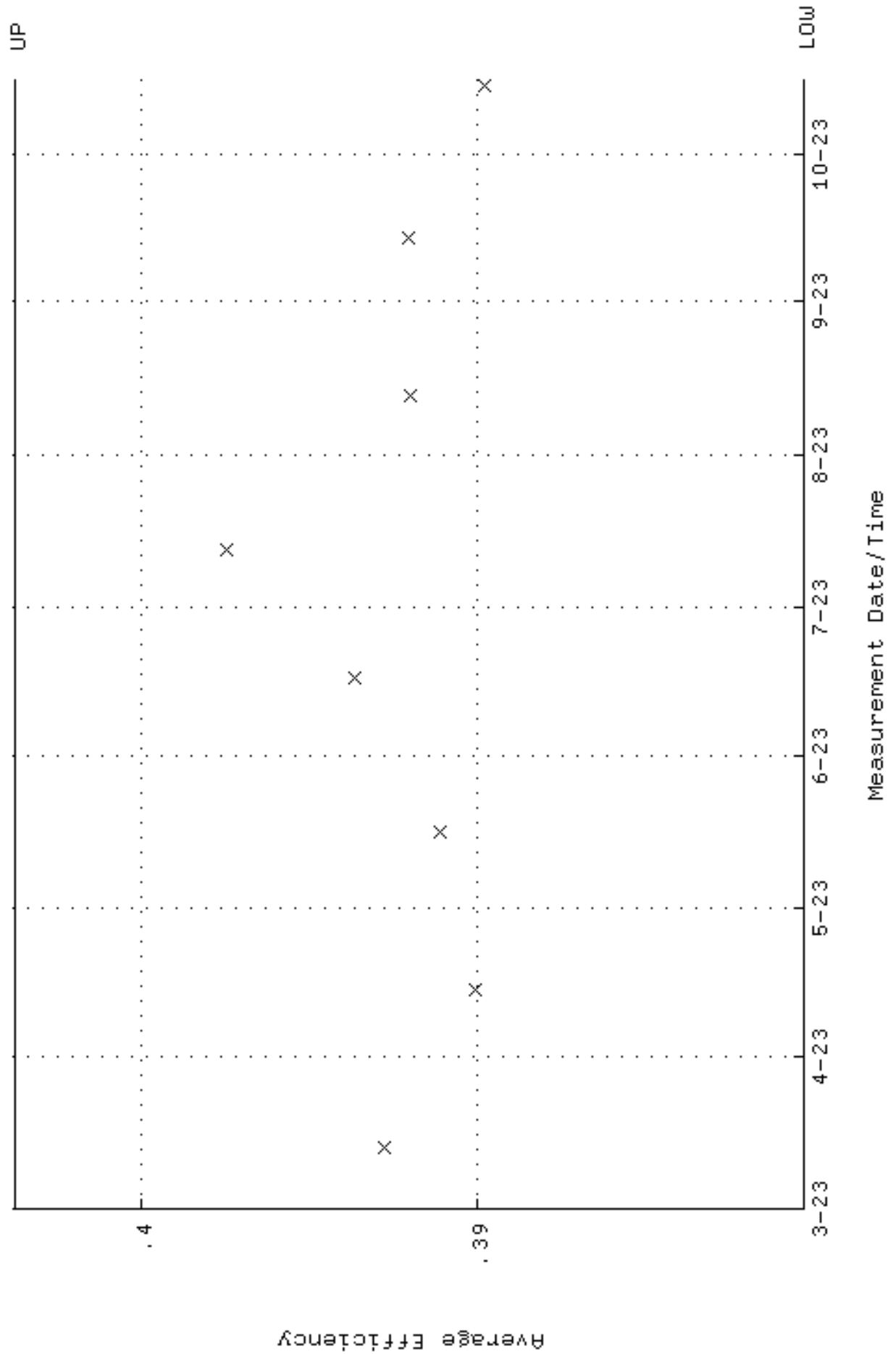




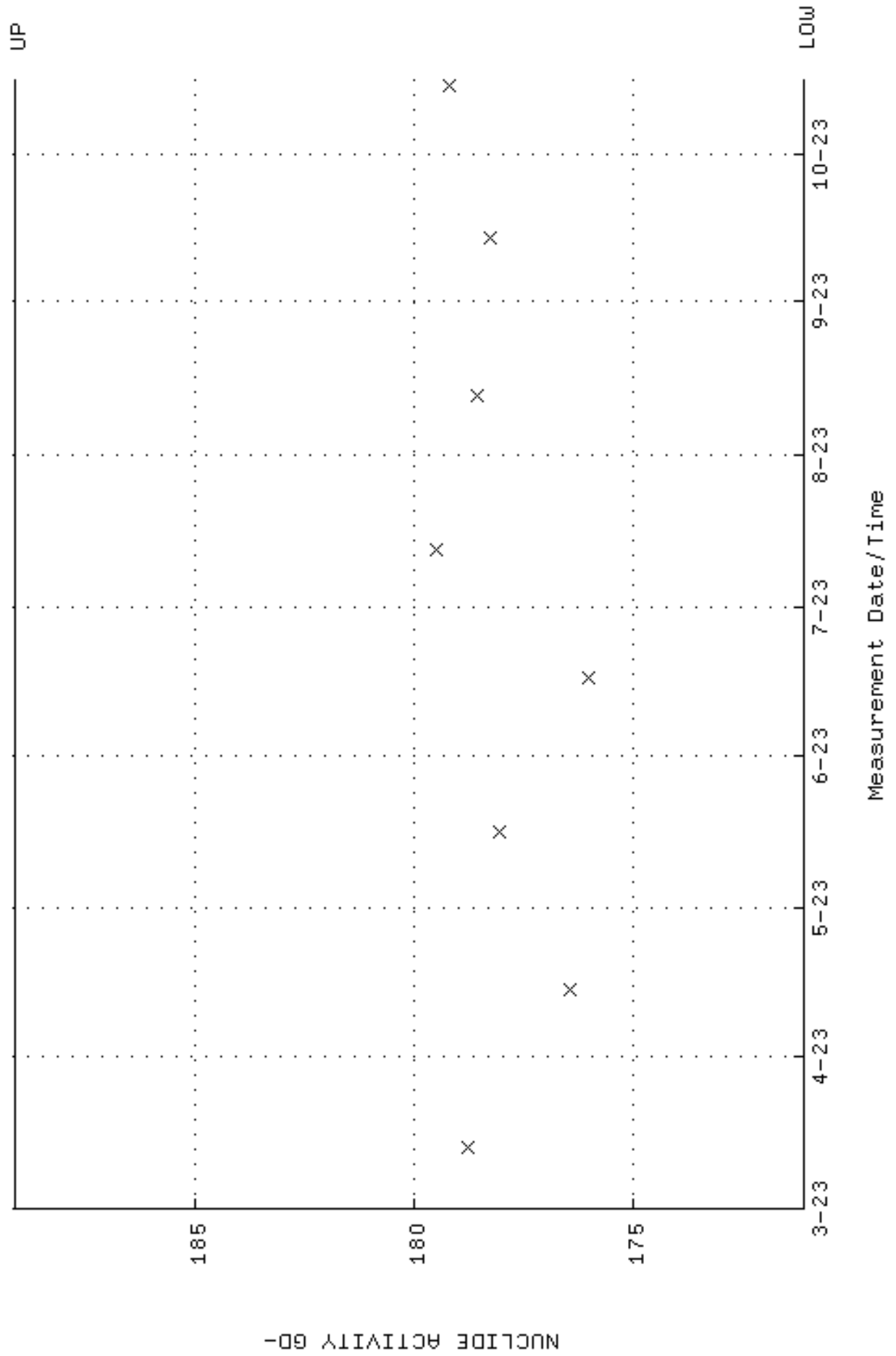
QA filename : DKA100:[ENV\_ALPHA.QA.B]B149.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 26-SEP-2023 16:38:35 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



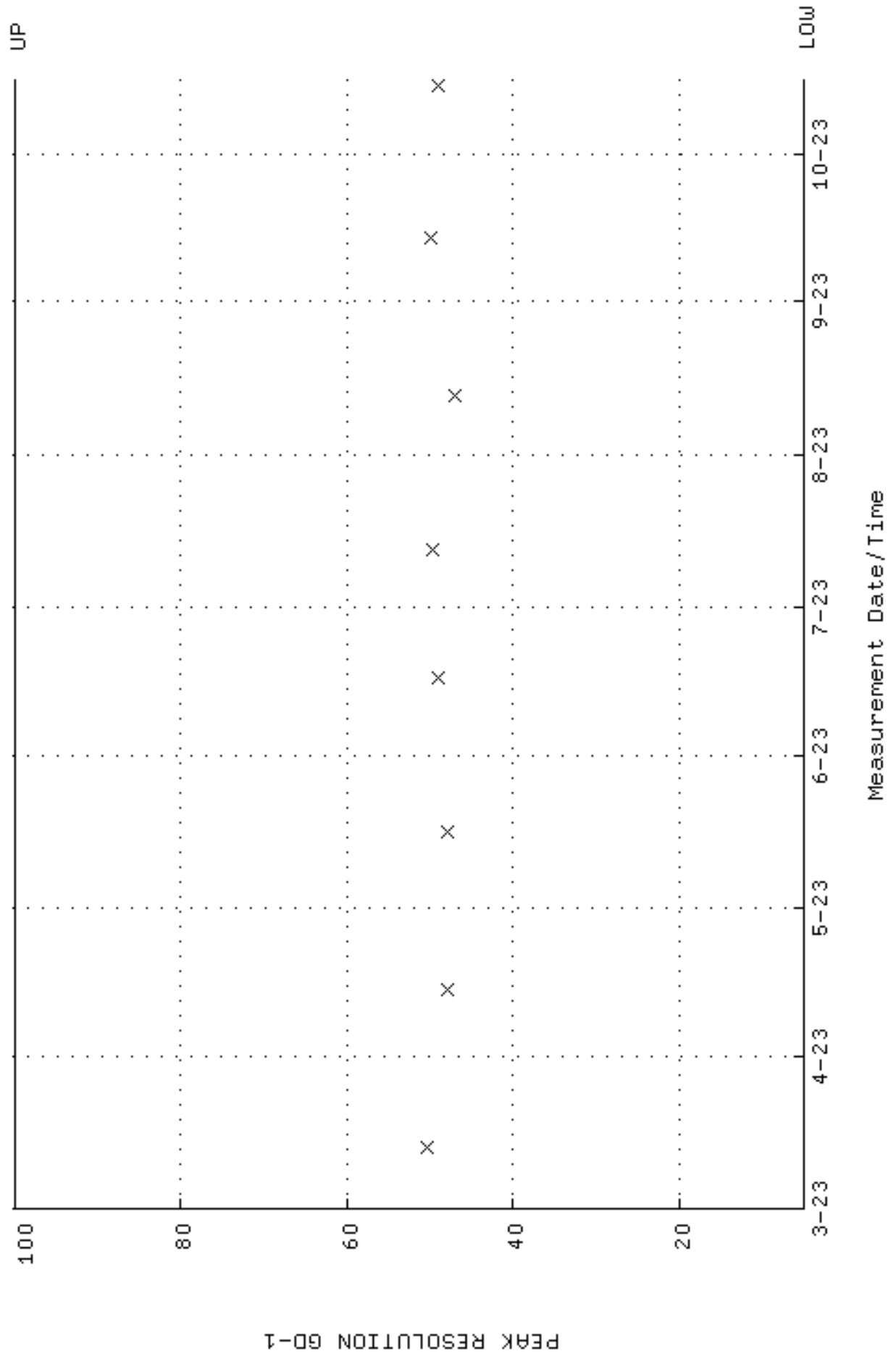
QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 13-MAR-2023 09:48:07 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.380240 through 0.403760



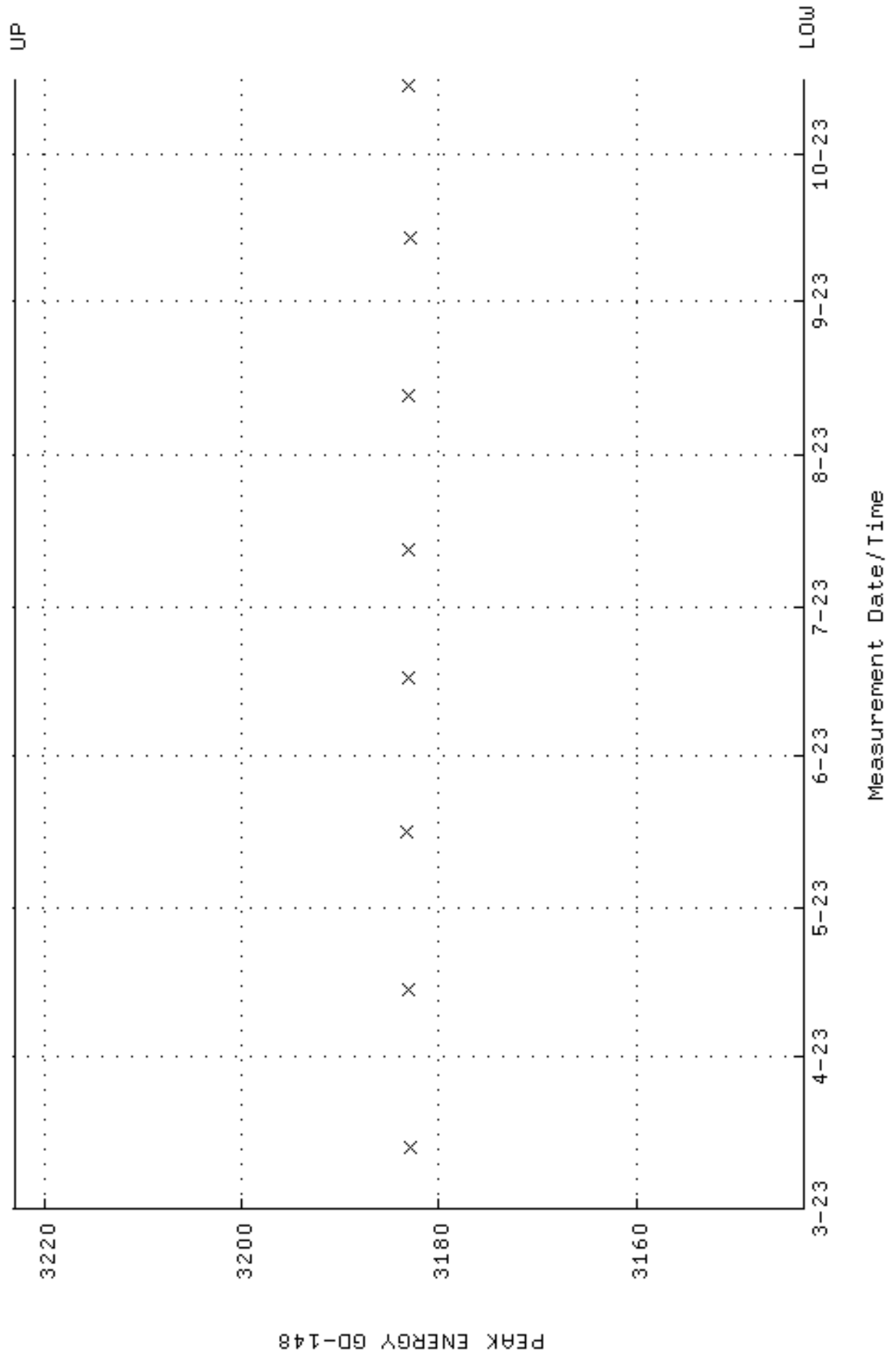
QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;4  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 13-MAR-2023 09:48:07 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



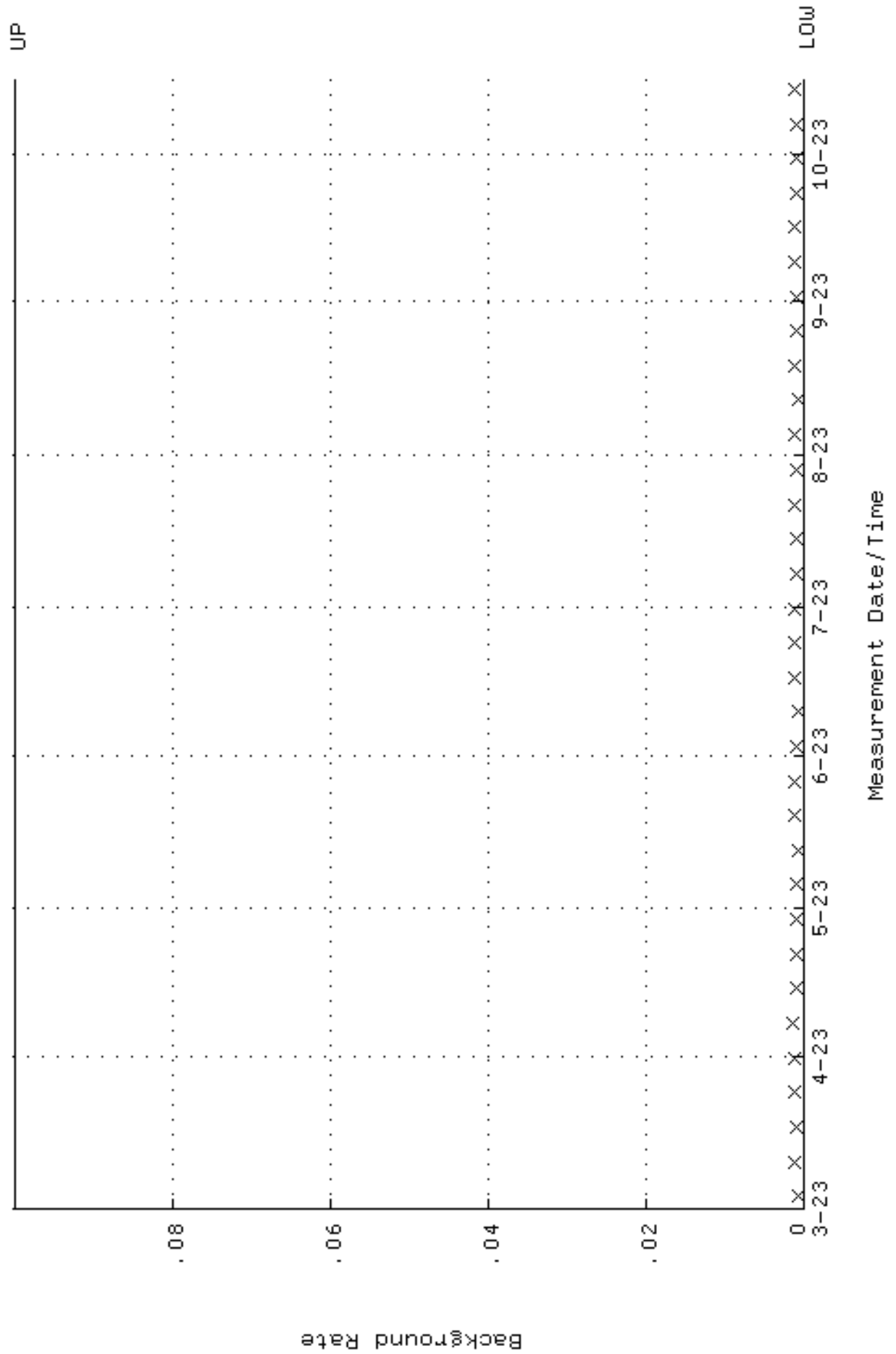
QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;4  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 13-MAR-2023 09:48:07 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



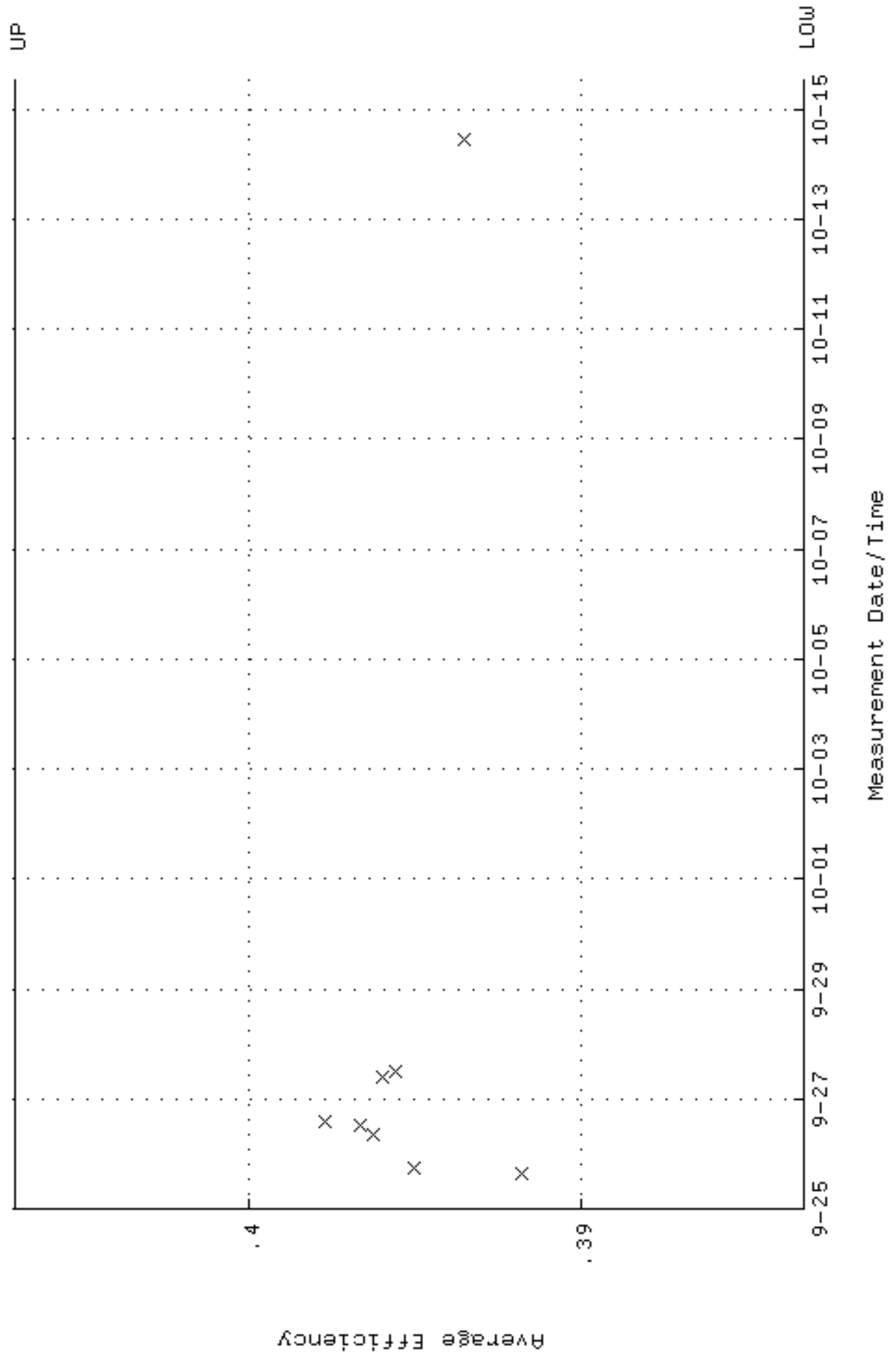
QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;4  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 13-MAR-2023 09:48:07 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



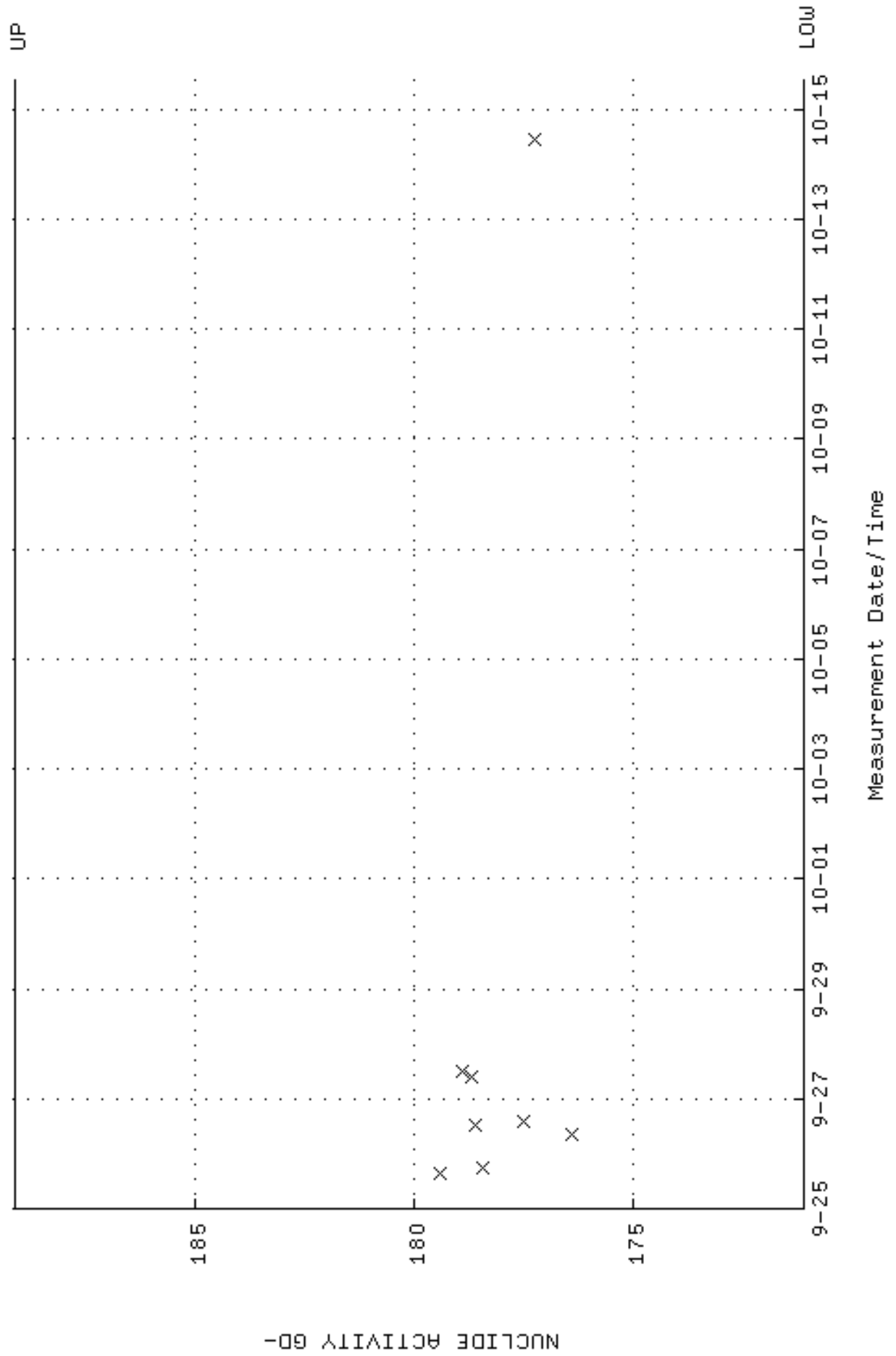
QA filename : DKA100:[ENV\_ALPHA.QA.B]B150.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 3-MAR-2023 13:01:19 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W151.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 25-SEP-2023 14:58:27 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.383320 through 0.407040

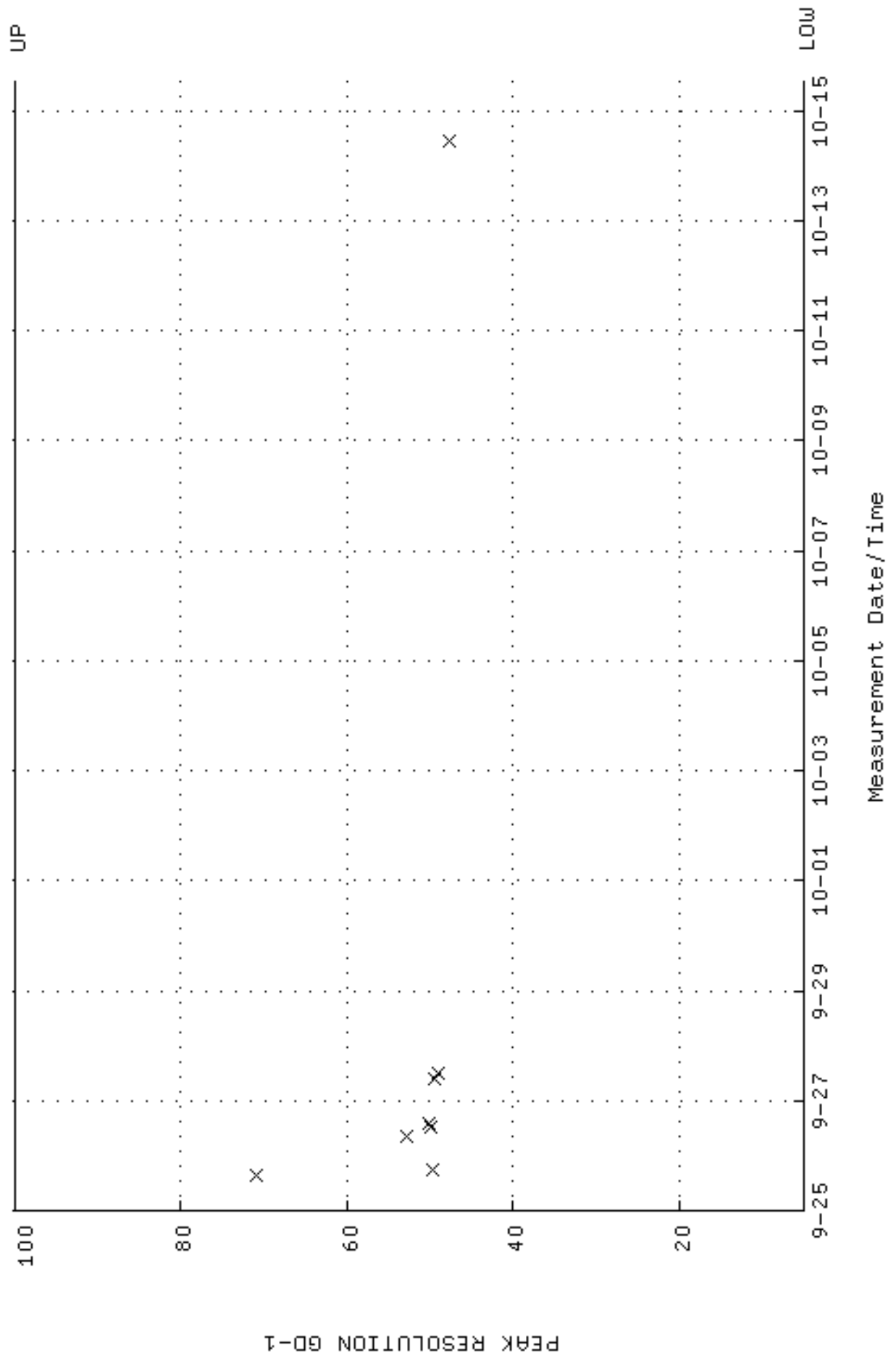


QA filename : DKA100:[ENV\_ALPHA.QA.W]w151.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 25-SEP-2023 14:58:27 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100

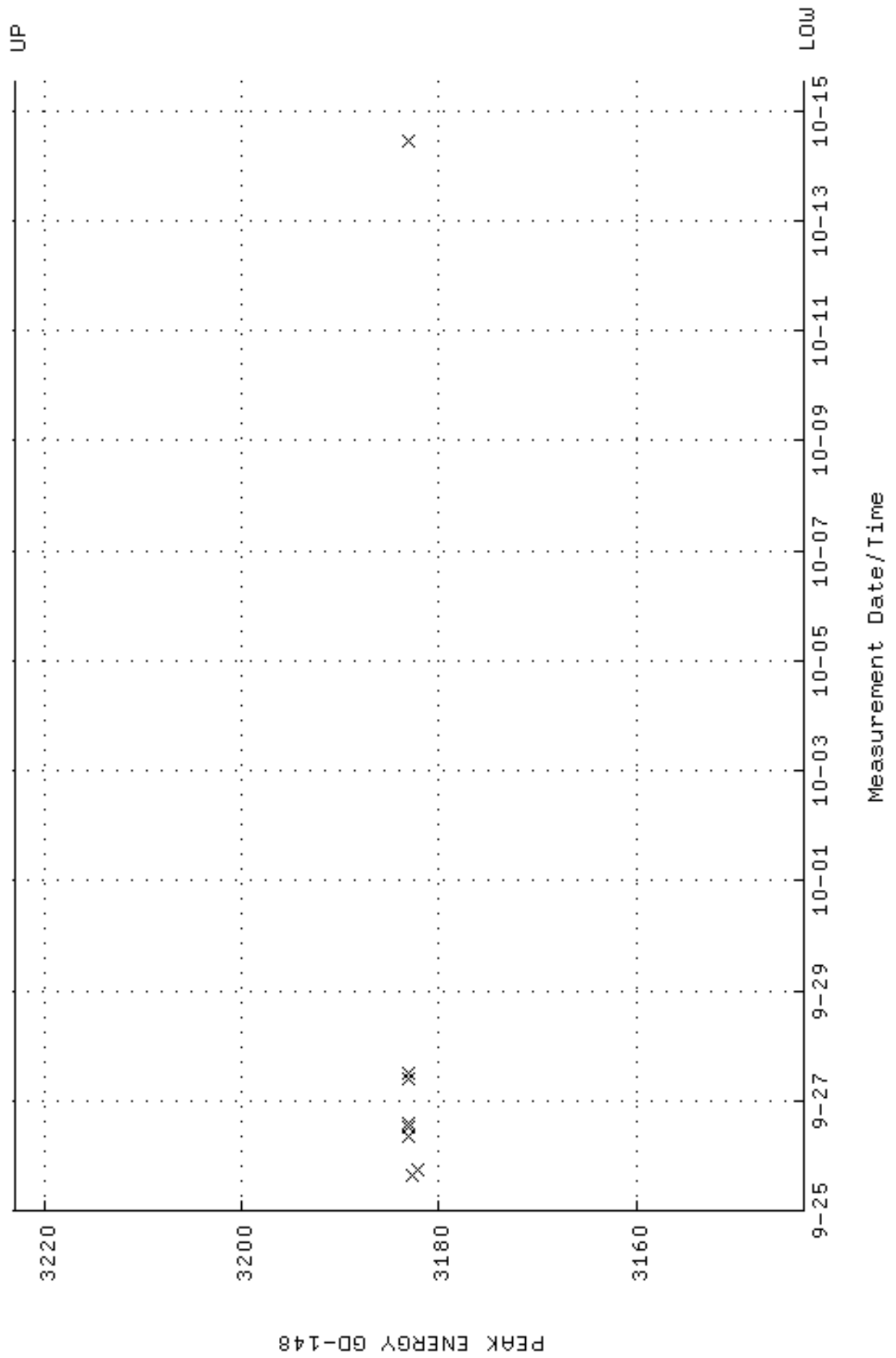




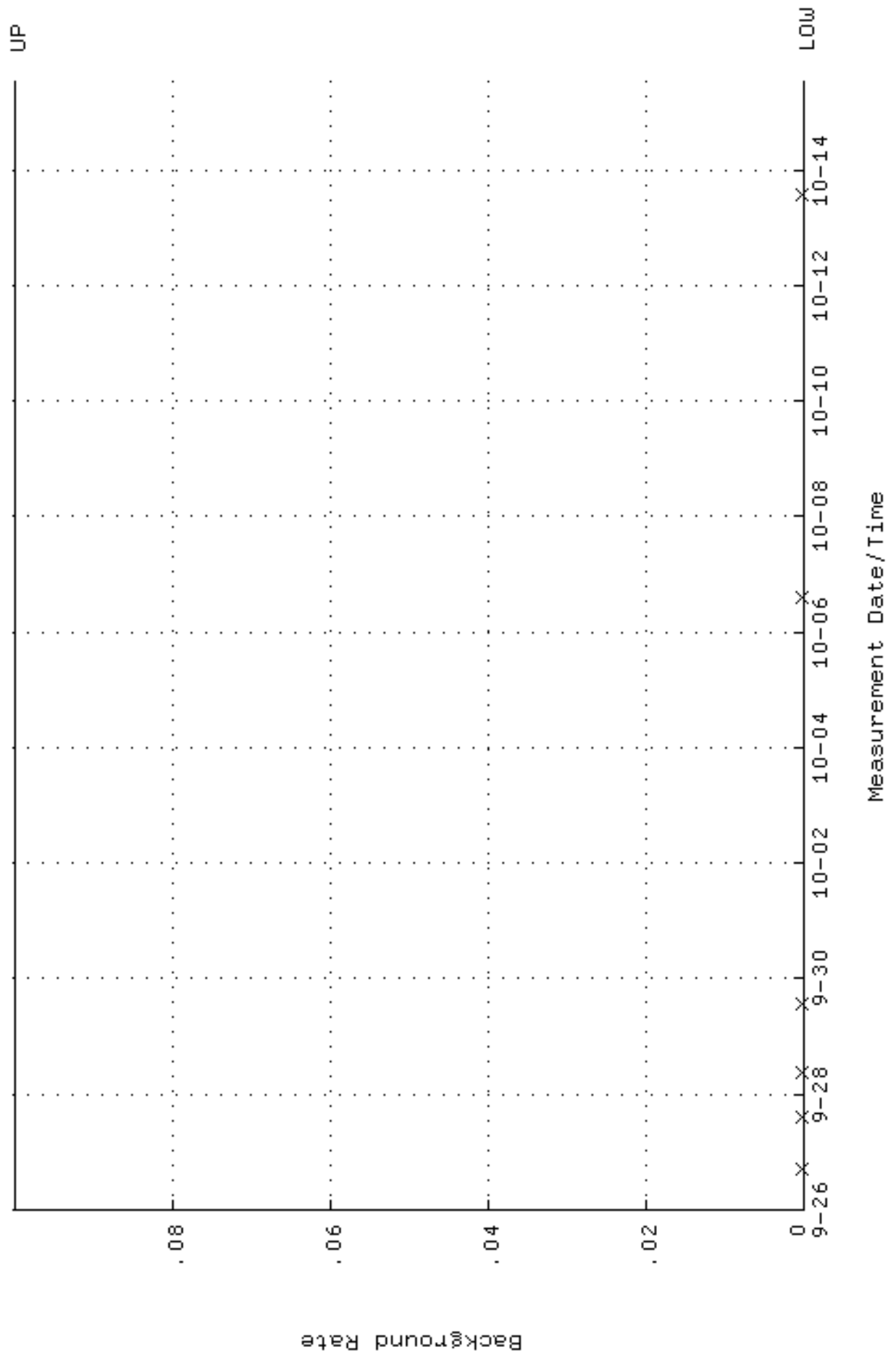
QA filename : DKA100:[ENV\_ALPHA.QA.W]W151.QAF;3  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 25-SEP-2023 14:58:27 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.0000



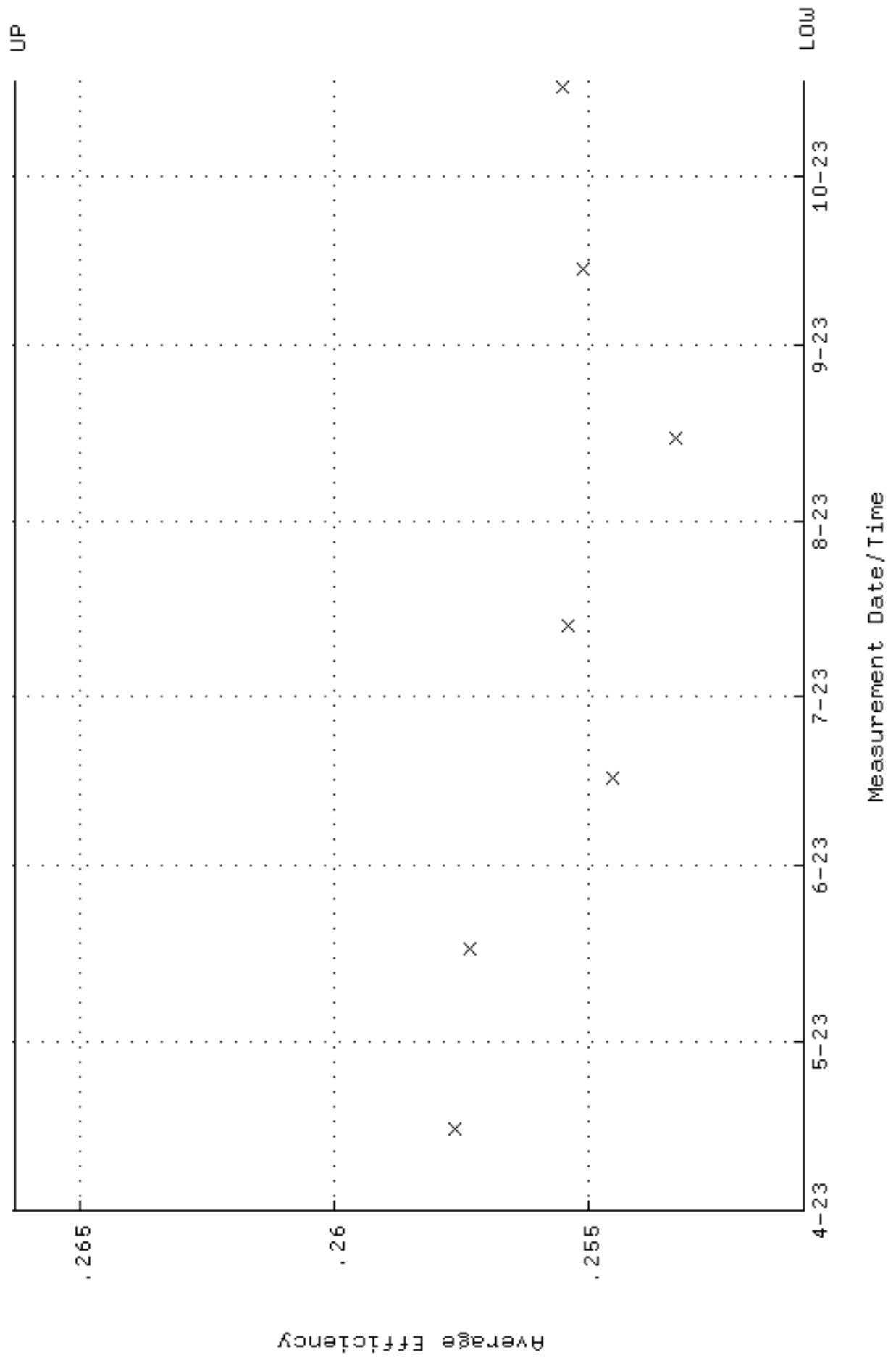
QA filename : DKA100:[ENV\_ALPHA.QA.W]W151.QAF;3  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 25-SEP-2023 14:58:27 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



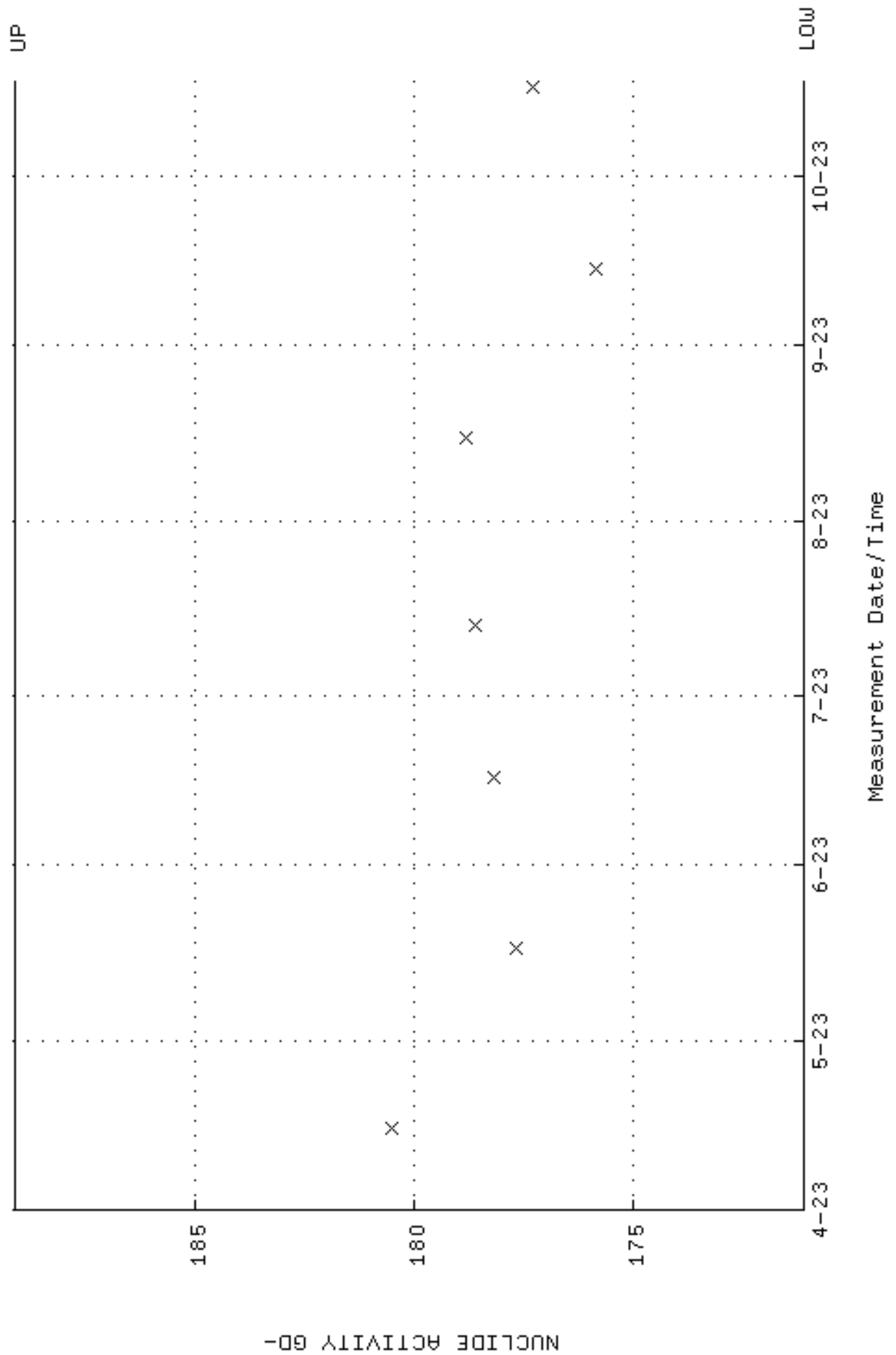
QA filename : DKA100:[ENV\_ALPHA.QA.B]B151.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 26-SEP-2023 16:38:39 through 15-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



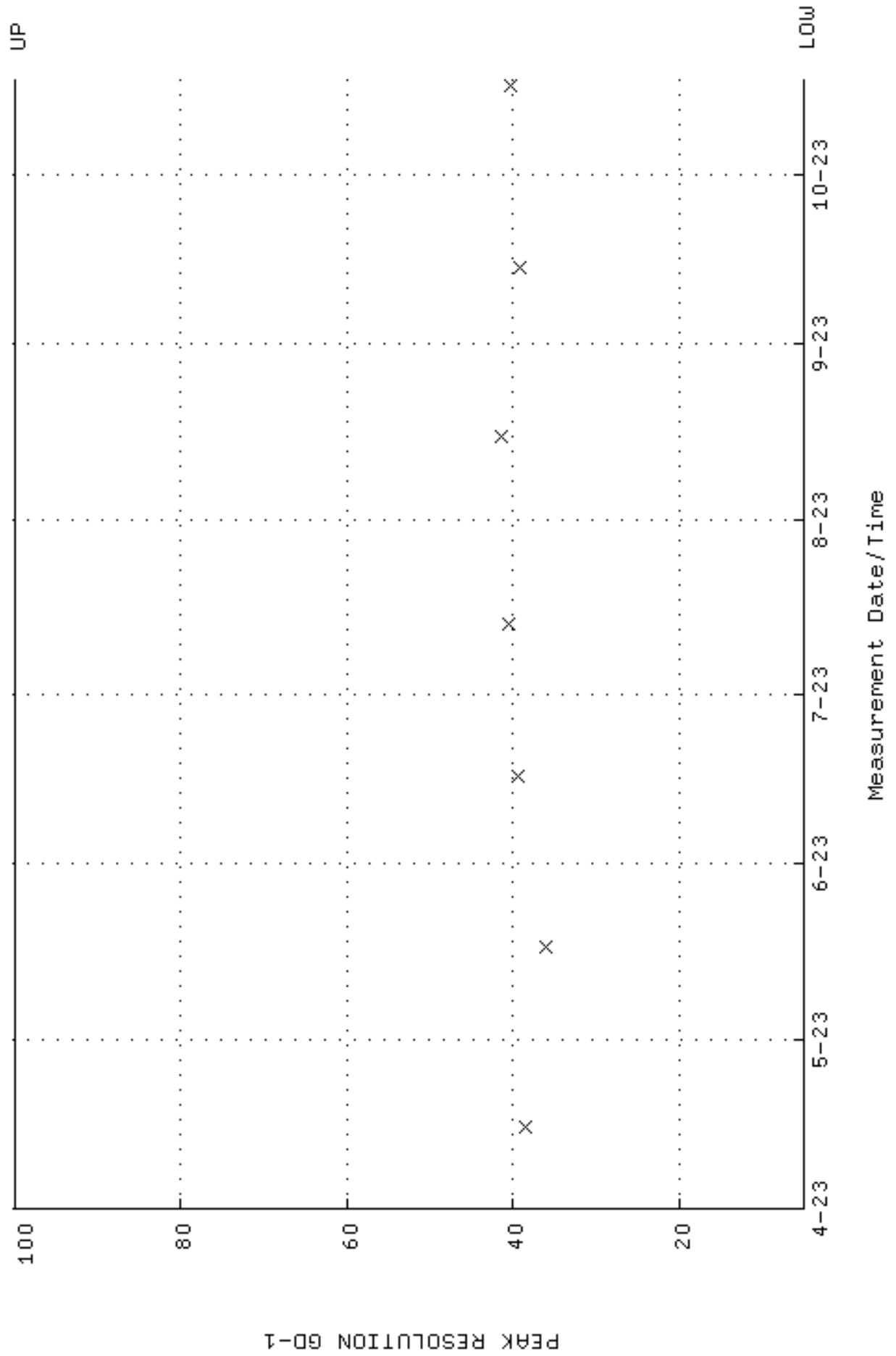
QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;6  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 15-APR-2023 10:50:57 through 17-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.250770 through 0.266280



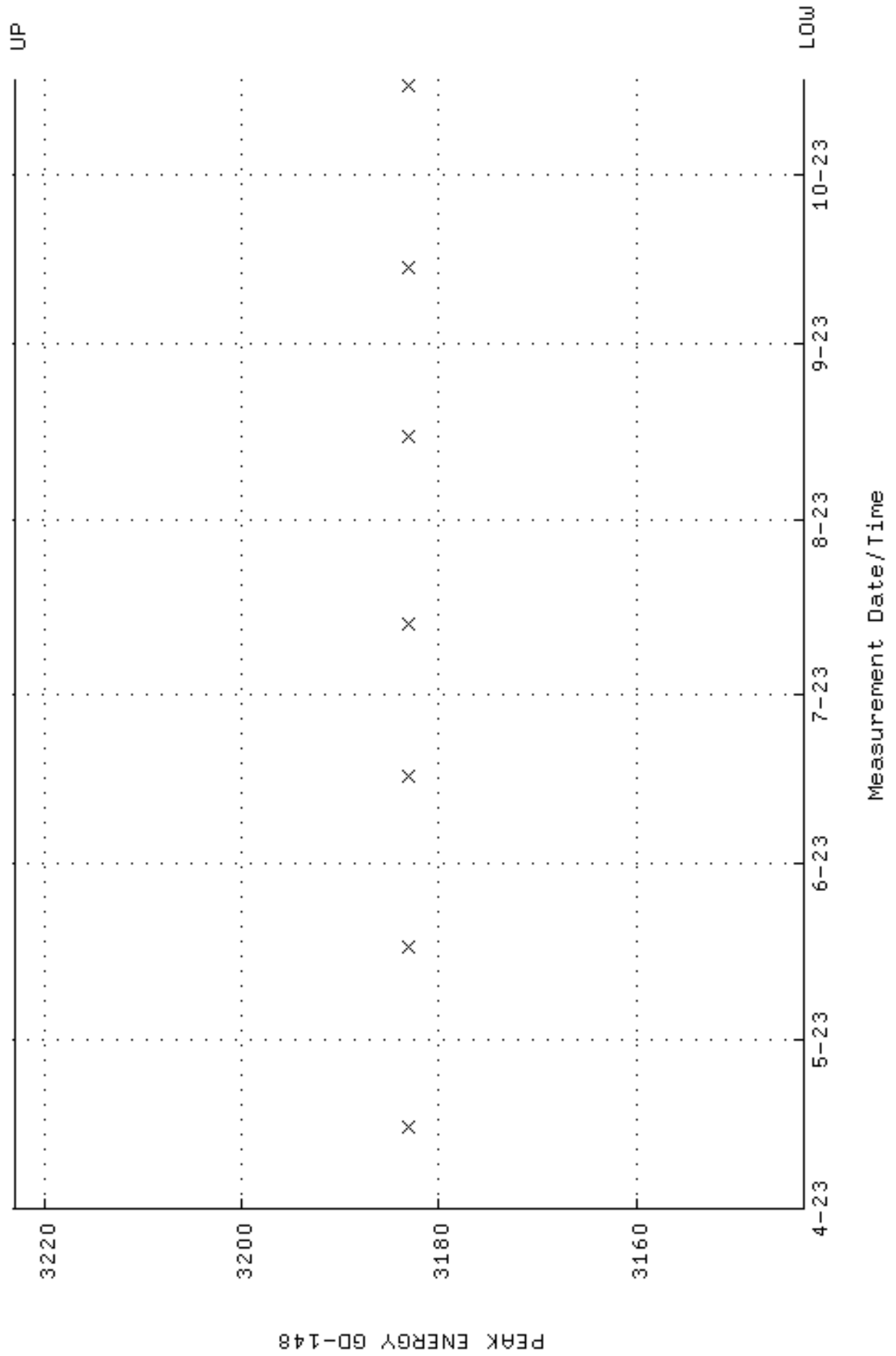
QA filename : DKA100:[ENV\_ALPHA.QA.W]w166.QAF;6  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 15-APR-2023 10:50:57 through 17-OCT-2023 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



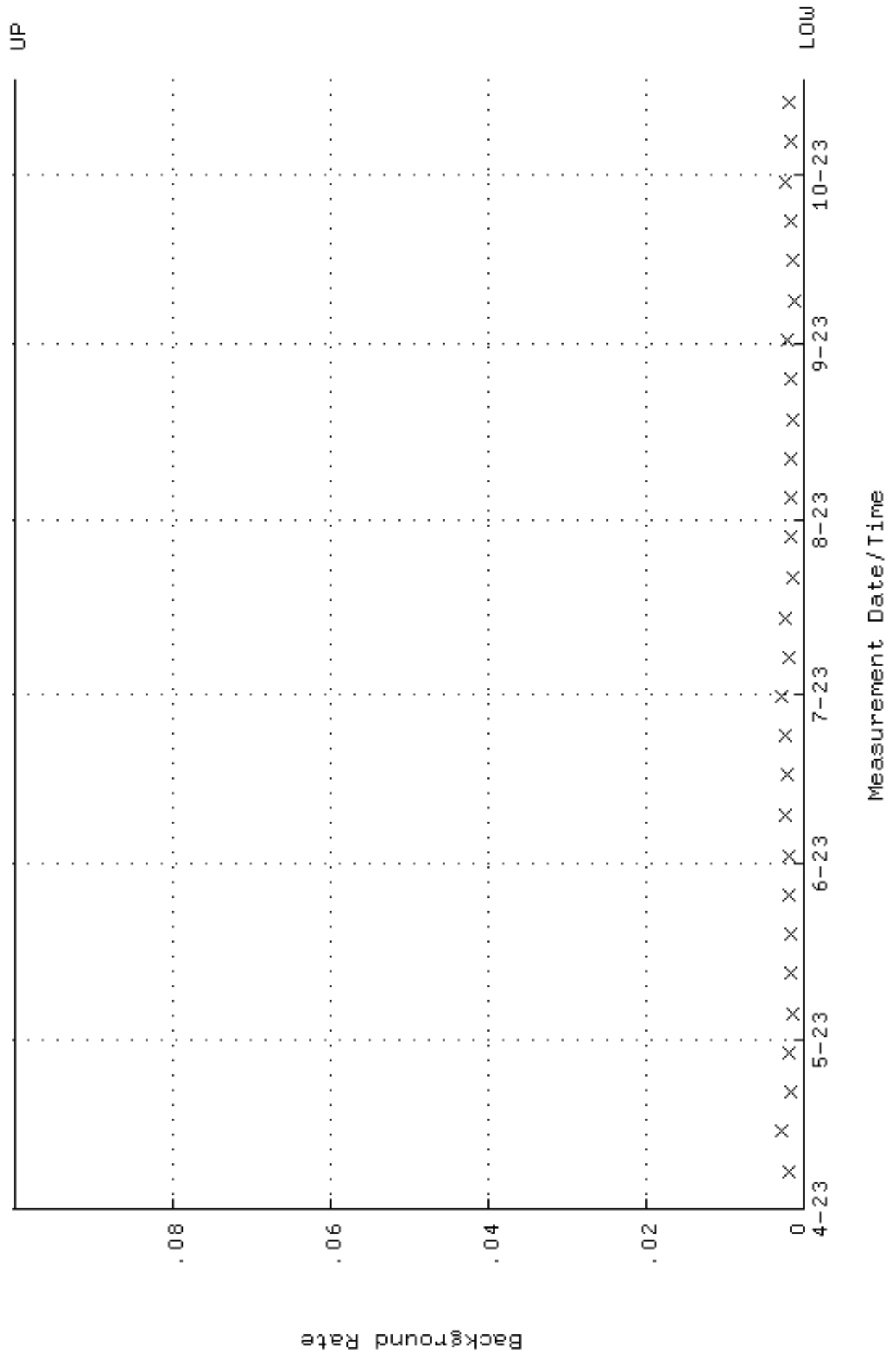
QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;6  
Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
Start/End Dates : 15-APR-2023 10:50:57 through 17-OCT-2023 12:00:00  
Lower/Upper Lmts: 5.00000 through 100.0000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;6  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 15-APR-2023 10:50:57 through 17-OCT-2023 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



QA filename : DKA100:[ENV\_ALPHA.QA.B]B166.QAF;5  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-APR-2023 14:02:46 through 17-OCT-2023 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000





# **RAD Standards Traceability**



Eckert & Ziegler

Analytics

1845

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.ezag.com

CERTIFICATE OF CALIBRATION  
Standard Reference Source

Received: 12-1-17 12:00

SRS Number: 108018

Source Description: 5 mL Liquid in Flame Sealed Ampoule

Product Code: 8229

Customer: GEL Laboratories LLC

P.O. Number: GEL1718798, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by Eckert & Ziegler Analytics (EZA). 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. EZA maintains traceability to the National Institute of Standards and Technology (NIST) 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."

Reference Date: 29-November-2017 12:00 PM EST

Isotope	Half-Life, d	Activity, Bq	Uncertainty			Calibration Method**
			$u_A$ , %	$u_B$ , %	$U$ , %*	
Th-229	2.897E+06	1.999E+04	0.5	1.5	3.1	4 $\pi$ LS

\*Uncertainty: U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results." \*\*Calibration Methods: 4 $\pi$  LS - 4 $\pi$  Liquid Scintillation Counting, HPG<sub>e</sub> - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber.

(Certificate continued on reverse side)

12/1/17 12:00 PM

**SRS Number:** 108018

**Comments:**

5.21561 g of 0.5 M HNO<sub>3</sub> solution, carrier free.

**Impurities:**

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

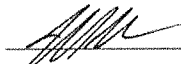
α-impurities: Th-228 6.6E+00 Bq, Th-230 1.2E+02 Bq, Th-232 8.0E+00 Bq

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Prepared by: \_\_\_\_\_

  
K. Eardley, Radiochemist

QC Approved by: \_\_\_\_\_

  
J. Lahr, Spectroscopist

Date: 27-Nov-17

# Standard Logbook

**Serial ID:** 1845                      **Open/Reference Date:** 29-NOV-17      **Aliquot :**                      5.21561 g  
**Name:**      Thorium-229                      **Received:**                      01-DEC-17      **Density :**                      Hand Calculated  
**Type:**      Source Material                      **Expires:**                      01-DEC-18      **Logbook Num :**                      GL-CED-297-138  
**Employee:** Tim Chandler                      **Lot Number :**                      108018  
**Supplier:** Eckert & Ziegler                      **Solvent :**                      0.5M HNO3  
**Uncertainty :**                      1.55 percent

**Description:** 1 ampoule  
**Comments:** None

Analyte	Concentration	Analyte	Concentration
Thorium-229	19990 Bq		

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# Standard Traceability Log Rad

Source Material Info	
Parent Code:	1845
Prepared By:	Tim Chandler
Carrier Conc:	0.5M HNO3
Reference Date:	11/29/2017
Ampoule Mass (g):	5.21561 g
Uncertainty:	+/- 1.55 %
LogBook No:	GL-CED-297-138
Supplier:	Eckert & Ziegler

A Solution Material Info			
Isotope:	Thorium-229		
Prepared By:	Tim Chandler		
Prep Date:	06/08/2018		
Verification Date:	06/27/2023		
Expiration Date:	06/27/2024		
Primary Code:	1845-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.1906 g		
Density(g/mL):	1.0291	Balance ID:	B733529066

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

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(5.1906 \text{ g}) * (19990 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.21561 \text{ g} * 100 \text{ mL}) = 11936.4861 \text{ dpm/mL}$
$(5.1906 \text{ g}) * (19990 \text{ Bq}) * (60 \text{ dpm/Bq}) / (1.0291 \text{ g/mL}) / (5.21561 \text{ g} * 100 \text{ mL}) = 11598.7987 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
06/08/2018	Tim Chandler	2.0385	1000	1845-B	23.6442 dpm/mL	06/01/2020	06/01/2021
07/10/2019	Tim Chandler	4.0198	1000	1845-C	46.62485 dpm/mL	07/07/2020	07/07/2021
10/26/2020	Tim Chandler	4.0184	1000	1845-D	46.6086 dpm/mL	10/27/2020	10/27/2021
04/23/2021	Tim Chandler	4.2911	1000	1845-E	49.7716 dpm/mL	04/26/2021	04/26/2022
11/10/2021	Matelon DeFreese	4.211	1000	1845-F	48.8425 dpm/mL	11/10/2021	11/10/2022
05/11/2022	Matelon DeFreese	4.1951	1000	1845-G	48.6581 dpm/mL	05/12/2022	05/11/2023
01/11/2023	Matelon DeFreese	4.1664	1000	1845-H	48.3252 dpm/mL	01/11/2023	01/11/2024
06/27/2023	Matelon DeFreese	4.1464	1000	1845-I	48.093259 dpm/mL	06/27/2023	06/27/2024

01/11/2023	Tim Chandler	4.1664	1000	2073-A	48.3252 dpm/mL	01/11/2023	01/11/2024
01/11/2023	Tim Chandler	4.1664	1000	2074-A	48.3252 dpm/mL	01/11/2023	01/11/2024

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Th-229 Standard 1845-I

v1.2

Analyst	MXS2
Verification Prep Date	6/27/2023

Tracer Information	
Isotope	Th-232
Serial Number	1513-J
Amount of Std. (mL)	0.2
Expiration Date	4/25/2024

Standard Information	
Isotope	Th-229
Serial Number	1845-I
Isotope Half-life	7.3400E+03 Y
Reference Date	11/29/2017
Ref. Act. (dpm/mL)	48.093259
Amount of Std. (mL)	0.2
Standard Prep Date	6/27/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	6/28/2023	4.260	47.29
2	6/27/2023	4.470	49.62
3	6/27/2023	4.490	49.84

Mean Value = 4.407 48.914  
 Stdev = 0.127410099 1.414252099

Certificate Value\* = 4.3304 pCi  
 Two sigma = 0.2548  
 10 % of Mean = 0.4407  
 Rule A (Pass/Fail) Pass  
 % Recovery 101.76%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 6/27/2024

dpm/mL  
 48.0679  
 2.8285  
 4.8914  
 Pass  
 101.76%  
 Pass

### 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 Th-229 standard 1845-I using 0.2 mL for each source. Each standard was combined with 0.2 mL of Th-232 standard 1513-J and was diluted in a centrifuge tube containing 4 mL 2M HCl, diluted to 40 mL with DI water. 0.1 mL of neodymium carrier and 5 mL of 48% HF was added to precipitate neodymium (and Thorium) 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 Th-229 were calculated by comparison to Th-232 certified values.

6/30/23

1506 1513  
3-11/30/10  
**RECEIVED**  
10/14/10  
21

## CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> Th-232	<b>Customer:</b> GEL LABORATORIES, LLC
<b>Half-life:</b> (1.405 ± 0.006)E+10 years	<b>P.O. No.:</b> 7347RD
<b>Catalog No.:</b> 7232	<b>Reference Date:</b> 1-Nov-10 12:00 PST
<b>Source No.:</b> 1451-62	<b>Contained Radioactivity:</b> 50.26 nCi 1860 Bq (Th-232 only)

### Physical Description:

A. Mass of solution:	5.73256 g in 5 mL flame-sealed ampoule
B. Chemical form:	Th(NO <sub>3</sub> ) <sub>4</sub> in H <sub>2</sub> O
C. Carrier content:	None
D. Density:	1.15 g/mL @ 20°C

### Radioimpurities:

Not determined

**Radionuclide Concentration:** 8.767 nCi/g, 324.4 Bq/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 NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

  
Quality Control

15-OCT-10  
Date

EZIP Ref. No.: 1451-62

RC-S-060-058

ISO 9001 CERTIFIED



# Standard Logbook

**Serial ID:** 1513      **Open/Reference Date:** 01-NOV-10      **Aliquot :** 5.73256 g  
**Name:** Thorium-232      **Received:** 21-OCT-10      **Density :** Hand Calculated g/mL  
**Type:** Source Material      **Expires:** 30-NOV-11      **Logbook Num :** RC-S-060-058  
**Employee:** Gregory Ramsay      **Verified:** 28-APR-11      **Lot Number :** 1451-62  
**Supplier:** Eckert & Ziegler      **Solvent :** DI water  
**Uncertainty :** 1.172 PERCENT

**Description:** in water

**Comments:** None

Analyte	Concentration	Analyte	Concentration
Thorium-232	324.4 Bq/g		

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# Standard Traceability Log Rad

Source Material Info	
Parent Code:	1513
Prepared By:	Gregory Ramsay
Carrier Conc:	DI water
Reference Date:	11/01/2010
Ampoule Mass (g):	5.73256 g
Uncertainty:	+/- 1.172 %
LogBook No:	RC-S-060-058
Supplier:	Eckert & Ziegler

A Solution Material Info			
Isotope:	Thorium-232		
Prepared By:	Christina Kimball		
Prep Date:	04/19/2011		
Verification Date:	04/25/2023		
Expiration Date:	04/25/2024		
Primary Code:	1513-A		
Dilution(mL):	250 mL		
Mass of Parent(g):	5.672 g		
Density(g/mL):	1.0020	Balance ID:	60108592

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

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq/g)}) * (\text{conversion dpm to Bq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)})$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq/g)}) * (\text{conversion dpm to Bq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)})$
$(5.672 \text{ g}) * (324.4 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (250 \text{ mL}) = 441.5992 \text{ dpm/mL}$
$(5.672 \text{ g}) * (324.4 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (1.0020 \text{ g/mL}) / (250 \text{ mL}) = 440.7354 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/19/2011	Christina Kimball	5.0665	100	1513-B	22.3299 dpm/mL	04/11/2013	04/11/2014
02/26/2014	Matelon DeFreese	100.0316	1000	1513-C	44.08747 dpm/mL	12/14/2022	12/14/2023
04/18/2014	Christina Kimball	5.0477	100	1513-D	22.247 dpm/mL	07/14/2023	07/14/2024
01/04/2016	Christina Kimball	.2487	100	1513-E	1.096117 dpm/mL	02/11/2020	02/11/2021
08/01/2016	Christina Kimball	2.053	250	1513-F	3.61932 dpm/mL	07/21/2023	07/21/2024
02/21/2020	Christina Kimball	.248	100	1513-G	1.093 dpm/mL	02/16/2023	02/16/2024
11/11/2022	Christina Kimball	.3	100	1513-H	1.3222 dpm/mL	11/14/2022	11/14/2023
12/13/2022	Christina Kimball	.23	100	1513-I	1.0137 dpm/mL	12/27/2022	12/27/2023

04/25/2023	Matelon DeFreese	25.022	250	1513-J	44.1123247 dpm/mL	04/25/2023	04/25/2024
06/16/2023	Christina Kimball	5.02	100	1513-K	22.1249 dpm/mL	06/21/2023	06/21/2024

GEL Laboratories LLC  
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# Verification for Th-232 Standard 1513-J

v1.2

Analyst	MXS2
Verification Prep Date	4/25/2023

Tracer Information	
Isotope	Th-229
Serial Number	1845-H
Amount of Std. (mL)	0.1
Expiration Date	1/11/2024

Standard Information	
Isotope	Th-232
Serial Number	1513-J
Isotope Halflife	1.4050E+10 Y
Reference Date	1/11/2010
Ref. Act. (dpm/mL)	44.1123247
Amount of Std. (mL)	0.1
Standard Prep Date	4/25/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	4/25/2023	2.010	44.62
2	4/25/2023	1.930	42.85
3	4/25/2023	1.950	43.29

Mean Value = 1.963 43.586  
 Stdev = 0.04163332 0.924259704

Certificate Value\* = 1.9870 pCi  
 Two sigma = 0.0833 1.8485 dpm/mL  
 10 % of Mean = 0.1963 4.3586  
 Rule A (Pass/Fail) Pass  
 % Recovery 98.81%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 4/25/2024

### 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 Th-232 standard 1513-J using 0.1 mL for each source. Each standard was combined with 0.1 mL of Th-229 standard 1845-H and was diluted in a centrifuge tube containing 4 mL 2M HCl, diluted to 40 mL with DI water. 0.1 mL of neodymium carrier and 5 mL of 48% HF was added to precipitate neodymium (and Thorium) 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 Th-232 were calculated by comparison to Th-229 certified values.

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1564

**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*, %			Reference Date (12:00 PM EST)
			$u_A$	$u_B$	U	
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:**

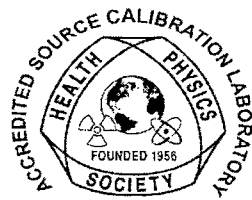
Impurities:  $\gamma$ -impurities (other than decay products) < 0.1 %, U-233 < 1.20E2 Bq, Am-241 < 5.8E1 Bq. 5.06048 grams 2M HNO3 solution.

Source Prepared by: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alternate

Date: 9/12/11

RECEIVED  
9/14/11  
AM



ANA Form005 Rev. --

# Standard Logbook

**Serial ID:** 1564                      **Open/Reference Date:** 12-SEP-11      **Aliquot :**                      5.06048 g  
**Name:** Uranium-232                      **Received:**                      14-SEP-11      **Density :**                      Hand Calculated  
**Type:** Source Material                      **Expires:**                      26-SEP-14      **Logbook Num :**                      RC-S-060-109  
**Employee:** Ashley Drochter                      **Lot Number :**                      85621-278  
**Supplier:** Eckert & Ziegler                      **Solvent :**                      2M HNO3  
**Uncertainty :**                      2.45 percent

**Description:** Ampoule

**Comments:** None

Analyte	Concentration	Analyte	Concentration
Uranium-232	33930 Bq		

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# 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
Supplier:	Eckert & Ziegler

A Solution Material Info			
Isotope:	Uranium-232		
Prepared By:	Ashley Drochter		
Prep Date:	11/15/2012		
Verification Date:	10/10/2023		
Expiration Date:	10/10/2024		
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

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.9067 \text{ g}) * (33930 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.06048 \text{ g} * 100 \text{ mL}) = 19739.3525 \text{ dpm/mL}$
$(4.9067 \text{ g}) * (33930 \text{ Bq}) * (60 \text{ dpm/Bq}) / (1.0615 \text{ g/mL}) / (5.06048 \text{ g} * 100 \text{ mL}) = 18595.7160 \text{ dpm/g}$

### 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
07/26/2021	Christina Kimball	.635	500	1564-BB	23.6166 dpm/mL	07/21/2022	07/21/2023
07/26/2021	Christina Kimball	.635	500	1564-BB Spike	23.6166 dpm/mL	07/21/2022	07/21/2023
01/15/2013	Christina Kimball	.265	250	1564-C	19.7115 dpm/mL	01/13/2014	01/13/2015
12/14/2021	Tim Chandler	2.6412	1000	1564-CC	49.115 dpm/mL	12/15/2021	12/15/2022
02/18/2013	Christina Kimball	.116	500	1564-D	4.31421 dpm/mL	02/16/2015	02/13/2016
04/13/2022	Matelon DeFreese	2.7103	1000	1564-DD	50.4 dpm/mL	04/13/2022	04/13/2023
01/02/2014	Gregory Ramsay	2.6936	1000	1564-E	50.08942 dpm/mL	12/10/2014	12/10/2015

09/21/2022	Tim Chandler	2.6897	1000	1564-EE	50.0169 dpm/mL	09/21/2022	09/21/2023
03/17/2014	Christina Kimball	.266	250	1564-F	19.78584 dpm/mL	03/25/2015	03/25/2016
12/27/2022	Christina Kimball	.61	500	1564-FF	22.6868 dpm/mL	12/28/2022	12/28/2023
12/27/2022	Christina Kimball	.61	500	1564-FF Spike	22.6868 dpm/mL	12/28/2022	12/28/2023
12/10/2014	Tim Chandler	2.6312	1000	1564-G	48.929 dpm/mL	12/10/2014	12/10/2015
01/19/2023	Matelon DeFreese	2.689	1000	1564-GG	50.0039 dpm/mL	01/20/2023	01/20/2024
07/20/2015	Christina Kimball	.266	250	1564-H	19.78584 dpm/mL	07/25/2016	07/25/2017
05/19/2023	Matelon DeFreese	2.685	1000	1564-HH	49.9294975 dpm/mL	05/19/2023	05/19/2024
11/23/2015	Tim Chandler	2.6117	1000	1564-I	48.5664 dpm/mL	11/23/2015	11/23/2016
10/09/2023	Matelon DeFreese	2.6864	1000	1564-II	49.9555315 dpm/mL	10/10/2023	10/10/2024
01/05/2016	Christina Kimball	.119	500	1564-J	4.4258 dpm/mL	12/27/2017	12/27/2018
01/05/2016	Christina Kimball	.119	500	1564-J Spike	4.4258 dpm/mL	12/27/2017	12/27/2018
09/20/2016	Tim Chandler	2.6389	1000	1564-K	49.0722 dpm/mL	09/18/2017	09/18/2018
12/20/2016	Christina Kimball	.276	250	1564-L	20.52974 dpm/mL	12/21/2017	12/21/2018
06/20/2017	Tim Chandler	2.6611	1000	1564-M	49.4851 dpm/mL	06/19/2018	06/19/2019
01/18/2018	Tim Chandler	2.6367	1000	1564-N	49.0313 dpm/mL	04/25/2018	04/25/2019
04/25/2018	Tim Chandler	2.6505	1000	1564-O	49.2879 dpm/mL	04/25/2018	04/25/2019
08/06/2018	Christina Kimball	.106	500	1564-P	3.9423 dpm/mL	12/19/2019	12/19/2020
08/06/2018	Christina Kimball	.106	500	1564-P Spike	3.9423 dpm/mL	12/19/2019	12/19/2020
12/13/2018	Tim Chandler	2.6502	1000	1564-Q	49.2824 dpm/mL	12/13/2018	12/13/2019
01/08/2019	Christina Kimball	.29	250	1564-R	21.571 dpm/mL	01/08/2019	01/08/2020
01/08/2019	Christina Kimball	.29	250	1564-R Spike	21.571 dpm/mL	01/08/2019	01/08/2020



10/01/2019	Tim Chandler	2.6957	1000	1564-S	50.1285 dpm/mL	10/01/2019	10/01/2020
12/18/2019	Christina Kimball	.307	250	1564-T	22.83554 dpm/mL	12/19/2019	12/19/2020
12/18/2019	Christina Kimball	.307	250	1564-T Spike	22.83554 dpm/mL	12/19/2019	12/19/2020
03/31/2020	Tim Chandler	2.6645	1000	1564-U	49.5483 dpm/mL	03/31/2020	03/31/2021
08/14/2020	Christina Kimball	.111	500	1564-V	4.1282 dpm/mL	08/14/2020	08/14/2021
08/14/2020	Christina Kimball	.111	500	1564-V Spike	4.1282 dpm/mL	08/14/2020	08/14/2021
10/13/2020	Tim Chandler	2.6983	1000	1564-W	50.1768 dpm/mL	10/13/2020	10/13/2021
11/04/2020	Christina Kimball	.315	250	1564-X	23.4306 dpm/mL	11/04/2020	11/04/2021
11/04/2020	Christina Kimball	.315	250	1564-X Spike	23.4306 dpm/mL	11/04/2020	11/04/2021
03/19/2021	Matelon DeFreese	2.7599	1000	1564-Y	51.32232 dpm/mL	03/19/2021	03/19/2022
03/19/2021	Matelon DeFreese	2.7599	1000	1564-Z	51.32232 dpm/mL	03/20/2021	03/20/2022

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for U-232 Standard 1564-II

v1.2

Analyst	MXS2
Verification Prep Date	10/10/2023

Tracer Information	
Isotope	U-238
Serial Number	1600-P
Amount of Std. (mL)	0.2
Expiration Date	5/8/2024

Standard Information	
Isotope	U-232
Serial Number	1564-II
Isotope Halflife	68.9000 Y
Reference Date	9/12/2011
Ref. Act. (dpm/mL)	49.9555315
Amount of Std. (mL)	0.2
Standard Prep Date	10/9/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	10/10/2023	3.760	41.74
2	10/10/2023	3.970	44.07
3	10/10/2023	3.790	42.07

Mean Value = 3.840 42.624  
 Stdev = 0.113578167 1.260717653

Certificate Value\* = 3.9856 pCi  
 Two sigma = 0.2272  
 10 % of Mean = 0.3840  
 Rule A (Pass/Fail) Pass  
 % Recovery 96.35%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 10/10/2024

dpm/mL  
 44.2405  
 2.5214  
 4.2624  
 Pass  
 96.35%  
 Pass

### 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-II using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-238 standard 1600-P and was diluted in a centrifuge tube containing 15 mL of 0.1M HCL diluted to 40 mL with DI water. 0.1 mL of neodymium carrier, 0.5 mL of titanium (II) chloride, and 5 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.

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*HS 425 3/20/12  
1600*

## CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> U-238 (Nat)	<b>Customer:</b> GENERAL ENGINEERING LABS.
<b>Half-life:</b> (4.468 ± 0.005)E+09 years	<b>P.O. No.:</b> 936823 RD
<b>Catalog No.:</b> 7338	<b>Reference Date:</b> 15-Apr-12 12:00 PST
<b>Source No.:</b> 1577-71-2	<b>Contained Radioactivity:</b> 1.023 µCi 37.85 kBq (Total Uranium)

**Physical Description:**

- A. Mass of solution: 7.05210 g in 10 mL flame-sealed ampoule
- B. Chemical form: UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> in dilute HNO<sub>3</sub>
- 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.

  
Quality Control

21-MAR-12  
Date

EZIP Ref. No.: 1577-71

*RC-S-065-030a*

ISO 9001 CERTIFIED

## 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:

<u>Nuclide</u>	<u>Atom %</u>	<u>Activity %</u>
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 Logbook

**Serial ID:** 1600                      **Open/Reference Date:** 15-APR-12      **Aliquot :**                      7.0521 g  
**Name:**      Uranium-238                      **Received:**                      24-MAR-12      **Density :**                      Hand Calculated g/mL  
**Type:**      Source Material                      **Expires:**                      26-MAR-15      **Logbook Num :**                      RC-S-065-030  
**Employee:** Ashley Drochter                      **Lot Number :**                      4550102  
**Supplier:** Eckert & Ziegler                      **Solvent :**                      UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> in dilute HNO<sub>3</sub>  
**Uncertainty :**                      1.17 percent

**Description:** Ampoule  
**Comments:** None

Analyte	Concentration	Analyte	Concentration
Uranium-238	18.42 kbq		

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# Standard Traceability Log Rad

Source Material Info	
Parent Code:	1600
Prepared By:	Ashley Drochter
Carrier Conc:	UO <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> in dilute HNO <sub>3</sub>
Reference Date:	04/15/2012
Ampoule Mass (g):	7.0521 g
Uncertainty:	+/- 1.17 %
LogBook No:	RC-S-065-030
Supplier:	Eckert & Ziegler

A Solution Material Info			
Isotope:	Uranium-238		
Prepared By:	Ashley Drochter		
Prep Date:	09/04/2012		
Verification Date:	05/08/2023		
Expiration Date:	05/08/2024		
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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(6.8204 \text{ g}) * (18.42 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (7.0521 \text{ g} * 100 \text{ mL}) = 10688.8814 \text{ dpm/mL}$
$(6.8204 \text{ g}) * (18.42 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (1.0789 \text{ g/mL}) / (7.0521 \text{ g} * 100 \text{ mL}) = 9907.0626 \text{ dpm/g}$

### 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	07/10/2017	07/10/2018
02/16/2017	Tim Chandler	3.0261	500	1600-F	59.9595 dpm/mL	02/06/2018	02/06/2019
10/10/2017	Christina Kimball	.539	250	1600-G	21.3596 dpm/mL	12/28/2022	12/28/2023

04/02/2018	Tim Chandler	3.0544	500	1600-H	60.5203 dpm/mL	03/29/2019	03/29/2020
06/21/2019	Tim Chandler	3.0536	500	1600-I	60.5044 dpm/mL	06/21/2019	06/21/2020
01/30/2020	Tim Chandler	3.0563	500	1600-J	60.5579 dpm/mL	01/26/2021	01/26/2022
03/13/2020	Christina Kimball	.01222	500	1600-K	.24207 dpm/mL	03/15/2022	03/15/2023
04/23/2021	Tim Chandler	3.0507	500	1600-L	60.4469 dpm/mL	04/26/2021	04/26/2022
01/21/2022	Matelon DeFreese	3.1075	500	1600-M	61.5723941 dpm/mL	01/21/2022	01/21/2023
05/19/2022	Christina Kimball	.01275	500	1600-N	.2527 dpm/mL	05/17/2023	05/17/2024
09/06/2022	Matelon DeFreese	3.1499	500	1600-O	62.412513 dpm/mL	09/06/2022	09/06/2023
05/08/2023	Matelon DeFreese	6.0105	1000	1600-P	59.5463998 dpm/mL	05/08/2023	05/08/2024

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for U-238 Standard 1600-P

v1.2

Analyst	MXS2
Verification Prep Date	5/8/2023

Tracer Information	
Isotope	U-232
Serial Number	1564-GG
Amount of Std. (mL)	0.2
Expiration Date	1/20/2024

Standard Information	
Isotope	U-238
Serial Number	1600-P
Isotope Half-life	4.4680E+09 Y
Reference Date	4/15/2012
Ref. Act. (dpm/mL)	59.5463998
Amount of Std. (mL)	0.2
Standard Prep Date	5/8/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	5/10/2023	5.730	63.60
2	5/9/2023	5.280	58.61
3	5/10/2023	5.350	59.39

Mean Value = 5.453 60.532  
 Stdev = 0.242143208 2.687789612

Certificate Value\* = 5.3645 pCi  
 Two sigma = 0.4843  
 10 % of Mean = 0.5453  
 Rule A (Pass/Fail) Pass  
 % Recovery 101.66%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 5/8/2024

dpm/mL  
 59.5464  
 5.3756  
 6.0532  
 Pass  
 101.66%  
 Pass

## 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-P using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-232 standard 1564-GG and was diluted in a centrifuge tube containing 15 mL 0.1M HCl and 25 mL of DI water 0.1 mL of neodymium carrier, 0.5 mL of titanium (III) chloride, and 5 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.



# Runlogs

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 2513345

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
640278001	SAMPLE	EJ1	1002	NOV-02-23 08:18:03	DONE		01-NOV-23 10:55
120555375	MB	EJ1	1003	NOV-02-23 08:18:03	DONE		01-NOV-23 10:55
120555376	DUP	EJ1	1004	NOV-02-23 08:18:03	DONE		01-NOV-23 10:56
120555377	LCS	EJ1	1005	NOV-02-23 08:18:03	DONE		01-NOV-23 10:56

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 2513346

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1205555378	MB	EJ1	1149	NOV-02-23 08:24:51	DONE		14-OCT-23 11:03
1205555379	DUP	EJ1	1150	NOV-02-23 08:24:53	DONE		14-OCT-23 11:27
1205555380	LCS	EJ1	1151	NOV-02-23 08:24:55	DONE		14-OCT-23 12:10
640278001	SAMPLE	EJ1	1166	NOV-02-23 08:29:33	DONE		16-OCT-23 11:36

# **Gamma Spectroscopy Raw Data**

# Batch 2505440 Check-list

This check-list was completed on 30-OCT-23 by Michael Hilton

This batch was reviewed by Michael Hilton on 30-OCT-23 and Tim Winters on 31-OCT-23.

**Batch ID:** 2505440

**Product:** GSCGAMMS

**Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?		No	
11	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

# Prep Logbook

## Gamma Spectroscopy

**Batch ID:** 2505440  
**Analyst:** Maggie Stamps (MXR1)  
**Method:** DOE HASL 300, 4.5.2.3/Ga-01-R  
**Lab SOP:** GL-RAD-A-013 REV# 28  
**Instrument:** No instrument-manual method

<b>Due Dates for Lab: 01-NOV-2023</b>			<b>Hold: 18-SEP-2023</b>	<b>Package: 02-NOV-2023</b>	<b>SDG: 03-NO</b>
Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205540617	84680-278	1556	1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)	Adjusted Aliquot (g)
1	640278001	09-OCT-2023	.1	Dry to Dry	101.9	101.9	101.9
2	640278002	09-OCT-2023	.1	Dry to Dry	121.48	121.48	121.48
3	640278003	09-OCT-2023	.1	Dry to Dry	118.58	118.58	118.58
4	640278004	09-OCT-2023	.1	Dry to Dry	101.97	101.97	101.97
5	640278005	09-OCT-2023	.1	Dry to Dry	147.14	147.14	147.14
6	640278006	09-OCT-2023	.1	Dry to Dry	137.53	137.53	137.53
7	640278007	09-OCT-2023	.1	Dry to Dry	128.73	128.73	128.73
8	640278008	09-OCT-2023	.1	Dry to Dry	126.23	126.23	126.23
9	640278009	09-OCT-2023	.1	Dry to Dry	114.22	114.22	114.22
10	640278010	09-OCT-2023	.1	Dry to Dry	129.64	129.64	129.64
11	1205540615 MB	09-OCT-2023	.1	Dry to Wet	147.14	147.14	147.14
12	1205540616 DUP (640278001)	09-OCT-2023	.1	Dry to Dry	101.9	101.9	101.9
13	1205540617 LCS	09-OCT-2023	.1	Dry to Wet	115	115	115

Reagent/Solvent Lot ID	Description	Amount	Comments:
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VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 09:53:51.83

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278001.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM04.CNF;733
Background date : 29-OCT-2023 11:31:53
Sample date     : 6-SEP-2023 08:00:00. Acquisition date : 30-OCT-2023 08:52:37
Sample ID      : G640278001. Sample quantity   : 1.01900E+02 GRAM
Detector name  : GAM04. Detector geometry: CAN
Elapsed live time: 0 01:00:00.00. Elapsed real time: 0 01:00:00.29 0.0%
Energy tolerance : 1.50000 keV. Analyst Initials : MXR1
Abundance limit : 75.00000. Sensitivity       : 3.00000
Batch ID       : 2505440. Detector SN#      :
Matrix Spike ID : . LCS ID                  :
*****
    
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.78	14	32	0.68	94.13	91	6	3.85E-03	69.7	
2	0	63.87*	35	86	0.91	128.29	124	10	9.65E-03	53.5	
3	3	74.94*	38	49	1.19	150.42	145	17	1.06E-02	36.3	1.96E+00
4	3	77.17	73	42	0.94	154.89	145	17	2.04E-02	18.1	
5	0	87.13	37	71	1.64	174.80	171	8	1.04E-02	42.2	
6	1	92.64*	23	40	1.02	185.81	183	12	6.38E-03	58.6	1.69E+00
7	0	186.31*	59	65	1.35	373.08	367	11	1.63E-02	31.2	
8	1	236.39	18	9	1.25	473.22	472	18	5.02E-03	24.1	3.10E+00
9	1	238.72*	56	33	1.25	477.88	472	18	1.55E-02	24.0	
10	1	242.17	59	30	1.26	484.77	472	18	1.63E-02	21.9	
11	0	295.54*	120	29	1.44	591.47	586	14	3.33E-02	13.4	
12	0	338.74	11	20	0.66	677.86	675	6	3.00E-03	73.2	
13	0	352.21*	146	47	1.12	704.79	700	12	4.07E-02	12.8	
14	0	373.61	10	23	0.61	747.57	743	8	2.83E-03	86.2	
15	0	511.74*	21	6	2.11	1023.77	1018	14	5.79E-03	55.4	
16	0	546.50	15	38	6.55	1093.29	1075	22	4.23E-03	106.8	
17	0	582.87*	25	7	2.89	1166.00	1161	10	6.94E-03	30.1	
18	0	609.38*	101	9	1.38	1219.02	1213	12	2.79E-02	12.0	
19	0	727.80	15	3	1.85	1455.83	1452	7	4.06E-03	33.6	
20	0	760.94	7	14	0.80	1522.11	1515	11	1.90E-03	111.8	
21	0	786.16	15	0	2.00	1572.53	1568	9	4.17E-03	25.8	
22	0	807.44	12	9	1.83	1615.10	1610	10	3.29E-03	61.1	
23	0	820.85	8	2	0.92	1641.92	1639	6	2.11E-03	50.1	
24	0	1001.59*	9	7	3.56	2003.40	1996	13	2.59E-03	70.0	
25	0	1121.09	19	18	1.80	2242.41	2237	13	5.32E-03	52.3	
26	0	1187.48	5	3	0.64	2375.20	2371	6	1.39E-03	70.7	
27	0	1238.74*	10	8	2.03	2477.74	2473	10	2.80E-03	61.9	
28	0	1460.87*	70	10	2.01	2922.08	2915	13	1.95E-02	15.6	
29	0	1764.75*	17	3	2.62	3530.03	3524	12	4.80E-03	34.1	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278001.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 6-SEP-2023 08:00:00 Acquisition date : 30-OCT-2023 08:52:37  
Sample ID : G640278001 Sample quantity : 101.90 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA4 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.29 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

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	66	10.66*	8.622E-01	5.259E+00	5.259E+00	31.22
NB-95M	235.69	18	24.80*	3.730E+00	1.395E-01	2.505E-01	48.25
CD-109	88.03	37	3.70*	3.769E+00	1.947E+00	2.111E+00	84.47
SN-126	64.28	35	9.60	1.485E+00	1.785E+00	1.785E+00	107.08
	86.94	37	8.90	3.769E+00	8.092E-01	8.092E-01	84.47
	87.57	37	37.00*	3.769E+00	1.947E-01	1.947E-01	84.47
TL-208	277.37	-----	6.60	3.332E+00	-----	Line Not Found	-----
	583.19	24	85.00*	1.953E+00	1.056E-01	1.056E-01	60.25
	860.56	-----	12.50	1.399E+00	-----	Line Not Found	-----
BI-210	46.54	14	4.25*	1.868E-01	1.285E+01	1.291E+01	139.47
PB-210	46.54	14	4.25*	1.868E-01	1.285E+01	1.291E+01	139.47
BI-211	72.87	-----	1.23	2.454E+00	-----	Line Not Found	-----
	351.06	141	12.92*	2.816E+00	2.852E+00	2.852E+00	25.56
BI-212	727.33	14	6.67*	1.627E+00	9.408E-01	9.408E-01	67.23
	1620.50	-----	1.47	8.036E-01	-----	Line Not Found	-----
PB-212	74.82	38	10.28	2.671E+00	1.017E+00	1.017E+00	72.52
	77.11	73	17.10	2.897E+00	1.080E+00	1.080E+00	36.18
	238.63	54	43.60*	3.704E+00	2.464E-01	2.464E-01	48.01
	300.09	-----	3.30	3.152E+00	-----	Line Not Found	-----
BI-214	609.32	96	45.49*	1.886E+00	8.220E-01	8.220E-01	24.06
	1120.29	18	14.92	1.088E+00	8.176E-01	8.176E-01	104.57
	1764.49	16	15.30	7.705E-01	1.006E+00	1.006E+00	68.16
PB-214	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
RN-222	609.32	96	45.49*	1.886E+00	8.220E-01	8.220E-01	24.06
	1120.29	18	14.92	1.088E+00	8.176E-01	8.176E-01	104.57
	1764.49	16	15.30	7.705E-01	1.006E+00	1.006E+00	68.16
RA-224	240.99	57	4.10*	3.667E+00	2.781E+00	2.781E+00	43.73
RA-226	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
TH-228	74.82	38	10.28	2.671E+00	1.017E+00	1.017E+00	72.52
	77.11	73	17.10	2.897E+00	1.080E+00	1.080E+00	36.18
	238.63	54	43.60*	3.704E+00	2.464E-01	2.464E-01	48.01
	300.09	-----	3.30	3.152E+00	-----	Line Not Found	-----
TH-230	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
TH-234	63.29	35	3.70*	1.485E+00	4.631E+00	4.631E+00	107.08

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
U-234	92.59	23	4.23	4.141E+00	9.537E-01	9.537E-01	117.18
	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
U-238	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
	63.29	35	3.70*	1.485E+00	4.631E+00	4.631E+00	107.08
AM-243	92.59	23	4.23	4.141E+00	9.537E-01	9.537E-01	117.18
	43.53	-----	5.90	9.197E-02	-----	Line Not Found	-----
ANH-511	74.66	38	67.20*	2.671E+00	1.556E-01	1.556E-01	72.52
	511.00	20	100.00*	2.157E+00	6.799E-02	6.799E-02	110.85

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278001.CNF;1
* Acquisition date   : 30-OCT-2023 08:52:37 Sensitivity      : 3.000
* Detector ID       : GAM04 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.29 Half life ratio : *****
* Sample date       : 6-SEP-2023 08:00:00 Analyst initials: MXR1
* Sample ID         : G640278001 Sample Quantity : 1.0190E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 2-DEC-2022 08:34:33 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM04_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 )	Cnt uncert (1.96-sigma)	MDA (pCi/GRAM )
K-40	5.259E+00	1.609E+00	1.034E+00
NB-95M	2.505E-01	1.184E-01	3.648E-01
CD-109	2.111E+00	1.748E+00	1.860E+00
SN-126	1.947E-01	1.611E-01	1.730E-01
TL-208	1.056E-01	6.233E-02	9.028E-02
BI-210	1.291E+01	1.765E+01	2.259E+01
PB-210	1.291E+01	1.765E+01	2.259E+01
BI-211	2.852E+00	7.143E-01	4.659E-01
BI-212	9.408E-01	6.199E-01	1.242E+00
PB-212	2.464E-01	1.159E-01	1.134E-01
BI-214	8.220E-01	1.938E-01	1.345E-01
PB-214	1.035E+00	2.592E-01	1.694E-01
RN-222	8.220E-01	1.938E-01	1.345E-01
RA-224	2.781E+00	1.192E+00	1.216E+00
RA-226	1.035E+00	2.592E-01	1.694E-01
TH-228	2.464E-01	1.159E-01	1.134E-01
TH-230	1.035E+00	2.592E-01	1.694E-01
TH-234	4.631E+00	4.860E+00	3.976E+00
U-234	1.035E+00	2.592E-01	1.694E-01
U-238	4.631E+00	4.860E+00	3.976E+00
AM-243	1.556E-01	1.106E-01	1.298E-01
ANH-511	6.799E-02	7.386E-02	6.826E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-3.294E-01	6.313E-01	1.144E+00	NOT IDENT.
NA-22	-5.690E-03	4.952E-02	1.023E-01	NOT IDENT.
NA-24	0.000E+00	5.020E+24	0.000E+00	SHORT HLIF
AL-26	3.291E-02	4.477E-02	1.201E-01	NOT IDENT.
SC-46	-1.347E-02	5.439E-02	1.026E-01	FAIL ABUN
V-48	-1.284E-01	3.902E-01	7.189E-01	NOT IDENT.
CR-51	-6.530E-01	1.137E+00	1.842E+00	NOT IDENT.
MN-52	-8.597E-01	3.700E+01	7.993E+01	NOT IDENT.

MN-54	-4.324E-03	3.672E-02	7.319E-02	NOT IDENT.
CO-56	2.677E-02	5.786E-02	1.296E-01	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.090E-03	2.927E-02	5.497E-02	NOT IDENT.
CO-58	-1.854E-03	4.767E-02	9.100E-02	NOT IDENT.
FE-59	-1.115E-03	1.831E-01	3.869E-01	NOT IDENT.
CO-60	-3.317E-02	4.193E-02	6.883E-02	NOT IDENT.
ZN-65	4.436E-02	1.109E-01	2.334E-01	NOT IDENT.
GE-68	3.832E-01	1.438E+00	3.268E+00	NOT IDENT.
AS-73	-1.139E+00	3.164E+00	5.895E+00	NOT IDENT.
AS-74	1.674E-01	5.177E-01	1.067E+00	NOT IDENT.
SE-75	3.896E-02	7.917E-02	1.492E-01	NOT IDENT.
BR-77	0.000E+00	1.538E+06	0.000E+00	SHORT HLIF
SR-82	1.973E-01	1.253E+00	2.507E+00	NOT IDENT.
RB-83	-1.962E-02	1.134E-01	2.181E-01	NOT IDENT.
RB-84	2.679E-02	1.757E-01	3.700E-01	NOT IDENT.
KR-85	4.129E+00	8.874E+00	1.832E+01	NOT IDENT.
SR-85	3.245E-02	7.072E-02	1.459E-01	NOT IDENT.
RB-86	9.279E-01	3.482E+00	7.915E+00	NOT IDENT.
Y-88	2.658E-02	6.831E-02	1.659E-01	NOT IDENT.
Y-91	-3.261E+01	3.499E+01	5.648E+01	NOT IDENT.
NB-94	2.712E-02	3.926E-02	8.621E-02	NOT IDENT.
NB-95	3.362E-02	7.295E-02	1.555E-01	NOT IDENT.
ZR-95	-3.300E-02	1.553E-01	2.549E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.673E+22	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.943E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	9.765E+40	0.000E+00	SHORT HLIF
RH-101	-6.120E-02	3.637E-02	5.373E-02	NOT IDENT.
RH-102	-3.952E-02	6.196E-02	1.072E-01	NOT IDENT.
RU-103	3.672E-02	8.698E-02	1.856E-01	FAIL ABUN
RH-106	1.645E-01	3.821E-01	8.168E-01	NOT IDENT.
RU-106	1.645E-01	3.821E-01	8.168E-01	NOT IDENT.
AG-108M	-3.327E-03	3.115E-02	6.155E-02	NOT IDENT.
AG-110	5.636E-01	7.067E-01	1.716E+00	NOT IDENT.
AG-110M	-1.765E-02	5.232E-02	9.759E-02	NOT IDENT.
SN-113	-1.474E-02	6.070E-02	1.171E-01	NOT IDENT.
CD-115	0.000E+00	2.334E+06	0.000E+00	SHORT HLIF
SN-117M	-1.441E-01	4.656E-01	8.207E-01	NOT IDENT.
SB-122	0.000E+00	4.501E+04	0.000E+00	SHORT HLIF
TE-123M	-1.741E-02	4.062E-02	7.066E-02	NOT IDENT.
SB-124	-7.588E-02	1.052E-01	9.875E-02	NOT IDENT.
SB-125	8.526E-02	1.238E-01	2.614E-01	NOT IDENT.
TE-125M	6.996E+00	1.691E+01	3.302E+01	NOT IDENT.
I-126	-8.601E-02	2.125E+00	4.133E+00	NOT IDENT.
SB-126	4.337E-01	1.226E+00	2.688E+00	NOT IDENT.
SB-127	0.000E+00	1.669E+03	0.000E+00	SHORT HLIF
I-131	1.366E+00	3.686E+00	7.714E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	4.521E+03	0.000E+00	SHORT HLIF
BA-133	-1.766E-02	5.785E-02	9.739E-02	NOT IDENT.
I-133	0.000E+00	2.101E+17	0.000E+00	SHORT HLIF
CS-134	1.770E-03	4.684E-02	9.384E-02	NOT IDENT.
I-135	0.000E+00	1.663E+41	0.000E+00	SHORT HLIF
CS-136	-5.824E-01	1.071E+00	1.791E+00	NOT IDENT.
BA-137M	1.516E-04	3.677E-02	7.389E-02	NOT IDENT.
CS-137	1.601E-04	3.885E-02	7.805E-02	NOT IDENT.
LA-138	6.993E-03	6.339E-02	1.452E-01	NOT IDENT.
CE-139	-2.248E-02	4.012E-02	6.848E-02	NOT IDENT.
BA-140	-6.636E-01	2.869E+00	4.826E+00	NOT IDENT.
LA-140	2.427E-01	9.626E-01	2.220E+00	NOT IDENT.
CE-141	-9.805E-02	1.779E-01	3.043E-01	NOT IDENT.
CE-143	0.000E+00	3.899E+10	0.000E+00	SHORT HLIF
CE-144	-4.412E-02	2.246E-01	4.083E-01	NOT IDENT.
PM-144	2.441E-02	3.734E-02	8.465E-02	NOT IDENT.
PR-144	1.864E+00	2.852E+00	6.466E+00	NOT IDENT.
PM-146	3.128E-02	5.143E-02	1.098E-01	NOT IDENT.
ND-147	2.346E-01	7.204E+00	1.448E+01	NOT IDENT.
PM-147	3.382E+02	8.357E+02	1.624E+03	NOT IDENT.
PM-149	0.000E+00	2.099E+07	0.000E+00	SHORT HLIF
EU-150	-1.905E-03	3.727E-02	6.548E-02	FAIL ABUN
EU-152	-2.843E-02	1.137E-01	2.179E-01	NOT IDENT.
GD-153	-3.714E-02	1.155E-01	1.927E-01	NOT IDENT.
EU-154	-5.261E-02	1.502E-01	2.889E-01	NOT IDENT.
EU-155	3.234E-03	1.114E-01	2.106E-01	FAIL ABUN
TB-160	3.756E-02	2.163E-01	4.570E-01	FAIL ABUN
HO-166M	-1.570E-02	6.616E-02	1.251E-01	NOT IDENT.
TM-171	3.039E+01	5.051E+01	1.039E+02	NOT IDENT.

HF-172	1.097E-01	1.929E-01	3.862E-01	FAIL ABUN
LU-172	-7.620E-02	6.828E-02	1.022E-01	FAIL ABUN
LU-176	-3.566E-03	3.778E-02	6.603E-02	FAIL ABUN
HF-181	-7.040E-02	8.814E-02	1.512E-01	NOT IDENT.
TA-182	2.506E-02	2.669E-01	5.654E-01	FAIL ABUN
RE-183	-6.267E-01	5.330E-01	8.919E-01	NOT IDENT.
RE-184	-9.042E-02	3.082E-01	5.681E-01	NOT IDENT.
W-188	-9.208E-01	1.441E+01	2.350E+01	FAIL ABUN
IR-192	-2.513E-03	5.643E-02	1.019E-01	FAIL ABUN
HG-203	1.300E-03	8.388E-02	1.511E-01	NOT IDENT.
TL-204	4.354E+00	7.637E+00	1.433E+01	NOT IDENT.
BI-207	3.011E-02	4.928E-02	1.222E-01	FAIL ABUN
PB-211	1.214E-01	7.875E-01	1.600E+00	NOT IDENT.
BI-213	6.958E-02	1.145E-01	2.487E-01	NOT IDENT.
RN-219	7.662E-03	4.497E-01	8.969E-01	NOT IDENT.
RA-223	2.299E-01	7.060E-01	1.358E+00	FAIL ABUN
AC-225	2.014E+00	1.008E+01	1.878E+01	NOT IDENT.
AC-227	-1.090E-01	3.130E-01	5.355E-01	FAIL ABUN
TH-227	-1.090E-01	3.130E-01	5.355E-01	FAIL ABUN
AC-228	1.835E-01	2.175E-01	4.752E-01	FAIL ABUN
RA-228	1.835E-01	2.175E-01	4.752E-01	FAIL ABUN
TH-229	-3.973E-02	6.168E-01	1.110E+00	FAIL ABUN
PA-231	5.083E-01	6.293E-01	1.188E+00	NOT IDENT.
TH-231	2.299E-01	7.060E-01	1.358E+00	FAIL ABUN
TH-232	1.835E-01	2.175E-01	4.752E-01	FAIL ABUN
PA-233	-3.625E-02	8.011E-02	1.331E-01	NOT IDENT.
PA-234	1.387E-01	3.627E-01	7.762E-01	NOT IDENT.
PA-234M	6.350E+00	8.710E+00	1.440E+01	FAIL ABUN
U-235	1.710E-01	2.578E-01	4.951E-01	FAIL ABUN
NP-237	-3.625E-02	8.011E-02	1.331E-01	NOT IDENT.
NP-238	0.000E+00	6.892E+06	0.000E+00	SHORT HLIF
NP-239	6.859E-02	2.786E-01	5.361E-01	NOT IDENT.
PU-239	3.684E+02	3.804E+02	7.714E+02	FAIL ABUN
AM-241	7.562E-02	2.541E-01	5.128E-01	NOT IDENT.
CM-243	-2.452E-02	1.136E-01	2.086E-01	NOT IDENT.
BK-247	1.120E-02	1.171E-01	2.100E-01	NOT IDENT.
CM-247	-1.145E-02	4.144E-02	7.913E-02	NOT IDENT.
CF-249	-2.904E-02	5.026E-02	9.120E-02	NOT IDENT.
CF-251	-2.533E-02	1.601E-01	2.847E-01	NOT IDENT.

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	66	10.66*	8.622E-01	5.259E+00	5.259E+00	31.22
NB-95M	235.69	18	24.80*	3.730E+00	1.395E-01	2.505E-01	48.25
CD-109	88.03	37	3.70*	3.769E+00	1.947E+00	2.111E+00	84.47
SN-126	64.28	35	9.60	1.485E+00	1.785E+00	1.785E+00	107.08
	86.94	37	8.90	3.769E+00	8.092E-01	8.092E-01	84.47
	87.57	37	37.00*	3.769E+00	1.947E-01	1.947E-01	84.47
TL-208	277.37	-----	6.60	3.332E+00	-----	Line Not Found	-----
	583.19	24	85.00*	1.953E+00	1.056E-01	1.056E-01	60.25
	860.56	-----	12.50	1.399E+00	-----	Line Not Found	-----
BI-210	46.54	14	4.25*	1.868E-01	1.285E+01	1.291E+01	139.47
PB-210	46.54	14	4.25*	1.868E-01	1.285E+01	1.291E+01	139.47
BI-211	72.87	-----	1.23	2.454E+00	-----	Line Not Found	-----
	351.06	141	12.92*	2.816E+00	2.852E+00	2.852E+00	25.56
BI-212	727.33	14	6.67*	1.627E+00	9.408E-01	9.408E-01	67.23
	1620.50	-----	1.47	8.036E-01	-----	Line Not Found	-----
PB-212	74.82	38	10.28	2.671E+00	1.017E+00	1.017E+00	72.52
	77.11	73	17.10	2.897E+00	1.080E+00	1.080E+00	36.18
	238.63	54	43.60*	3.704E+00	2.464E-01	2.464E-01	48.01
	300.09	-----	3.30	3.152E+00	-----	Line Not Found	-----
BI-214	609.32	96	45.49*	1.886E+00	8.220E-01	8.220E-01	24.06
	1120.29	18	14.92	1.088E+00	8.176E-01	8.176E-01	104.57
	1764.49	16	15.30	7.705E-01	1.006E+00	1.006E+00	68.16
PB-214	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
RN-222	609.32	96	45.49*	1.886E+00	8.220E-01	8.220E-01	24.06
	1120.29	18	14.92	1.088E+00	8.176E-01	8.176E-01	104.57
	1764.49	16	15.30	7.705E-01	1.006E+00	1.006E+00	68.16
RA-224	240.99	57	4.10*	3.667E+00	2.781E+00	2.781E+00	43.73
RA-226	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
TH-228	74.82	38	10.28	2.671E+00	1.017E+00	1.017E+00	72.52
	77.11	73	17.10	2.897E+00	1.080E+00	1.080E+00	36.18
	238.63	54	43.60*	3.704E+00	2.464E-01	2.464E-01	48.01
	300.09	-----	3.30	3.152E+00	-----	Line Not Found	-----
TH-230	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
TH-234	63.29	35	3.70*	1.485E+00	4.631E+00	4.631E+00	107.08
	92.59	23	4.23	4.141E+00	9.537E-01	9.537E-01	117.18
U-234	74.82	38	5.80	2.671E+00	1.803E+00	1.803E+00	72.52
	77.11	73	9.70	2.897E+00	1.905E+00	1.905E+00	36.18
	87.09	37	3.41	3.769E+00	2.112E+00	2.112E+00	84.47
	242.00	57	7.25	3.667E+00	1.573E+00	1.573E+00	43.73
	295.22	116	18.42	3.186E+00	1.452E+00	1.452E+00	26.72
	351.93	141	35.60*	2.816E+00	1.035E+00	1.035E+00	25.56
U-238	63.29	35	3.70*	1.485E+00	4.631E+00	4.631E+00	107.08
	92.59	23	4.23	4.141E+00	9.537E-01	9.537E-01	117.18
AM-243	43.53	-----	5.90	9.197E-02	-----	Line Not Found	-----
	74.66	38	67.20*	2.671E+00	1.556E-01	1.556E-01	72.52
ANH-511	511.00	20	100.00*	2.157E+00	6.799E-02	6.799E-02	110.85

Flag: "\*" = Keyline

Total number of lines in spectrum 29  
 Number of unidentified lines 5  
 Number of lines tentatively identified by NID 24 82.76%

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	5.259E+00	5.259E+00	1.642E+00	31.22	
NB-95M	64.03D	1.80	1.395E-01	2.505E-01	1.209E-01	48.25	
CD-109	461.40D	1.08	1.947E+00	2.111E+00	1.783E+00	84.47	
SN-126	2.30E+05Y	1.00	1.947E-01	1.947E-01	1.644E-01	84.47	
TL-208	1.41E+10Y	1.00	1.056E-01	1.056E-01	0.636E-01	60.25	
BI-210	22.20Y	1.00	1.285E+01	1.291E+01	1.801E+01	139.47	
PB-210	22.20Y	1.00	1.285E+01	1.291E+01	1.801E+01	139.47	
BI-211	7.04E+08Y	1.00	2.852E+00	2.852E+00	0.729E+00	25.56	
BI-212	1.41E+10Y	1.00	9.408E-01	9.408E-01	6.325E-01	67.23	
PB-212	1.41E+10Y	1.00	2.464E-01	2.464E-01	1.183E-01	48.01	
BI-214	1600.00Y	1.00	8.220E-01	8.220E-01	1.978E-01	24.06	
PB-214	1600.00Y	1.00	1.035E+00	1.035E+00	0.265E+00	25.56	
RN-222	1600.00Y	1.00	8.220E-01	8.220E-01	1.978E-01	24.06	
RA-224	1.41E+10Y	1.00	2.781E+00	2.781E+00	1.216E+00	43.73	
RA-226	1600.00Y	1.00	1.035E+00	1.035E+00	0.265E+00	25.56	
TH-228	1.41E+10Y	1.00	2.464E-01	2.464E-01	1.183E-01	48.01	
TH-230	7.54E+04Y	1.00	1.035E+00	1.035E+00	0.265E+00	25.56	
TH-234	4.47E+09Y	1.00	4.631E+00	4.631E+00	4.959E+00	107.08	
U-234	2.45E+05Y	1.00	1.035E+00	1.035E+00	0.265E+00	25.56	
U-238	4.47E+09Y	1.00	4.631E+00	4.631E+00	4.959E+00	107.08	
AM-243	7370.00Y	1.00	1.556E-01	1.556E-01	1.128E-01	72.52	
ANH-511	1.00E+09Y	1.00	6.799E-02	6.799E-02	7.537E-02	110.85	
Total Activity :			5.568E+01	5.608E+01			

Grand Total Activity : 5.568E+01 5.608E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit



It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	186.31	57	63	1.35	373.08	367	11	1.63E-02	62.3	4.37E+00	T
0	338.74	10	19	0.66	677.86	675	6	3.00E-03	****	2.89E+00	T
0	373.61	10	22	0.61	747.57	743	8	2.83E-03	****	2.70E+00	T
0	546.50	15	36	6.55	1093.29	1075	22	4.23E-03	****	2.05E+00	T
0	760.94	6	13	0.80	1522.11	1515	11	1.90E-03	****	1.56E+00	
0	786.16	14	0	2.00	1572.53	1568	9	4.17E-03	51.6	1.52E+00	
0	807.44	11	9	1.83	1615.10	1610	10	3.29E-03	****	1.48E+00	
0	820.85	7	2	0.92	1641.92	1639	6	2.11E-03	****	1.46E+00	
0	1001.59	9	6	3.56	2003.40	1996	13	2.59E-03	****	1.21E+00	T
0	1187.48	5	3	0.64	2375.20	2371	6	1.39E-03	****	1.03E+00	
0	1238.74	9	7	2.03	2477.74	2473	10	2.80E-03	****	9.91E-01	T

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278001.CNF;1
* Acquisition date   : 30-OCT-2023 08:52:37 Sensitivity      : 3.000
* Detector ID       : GAM04 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.29 Half life ratio : *****
* Sample date       : 6-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID         : G640278001 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.0190E+02 GRAM
* Wet wt corr       : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date    : 2-DEC-2022 08:34:33 Eff. Geometry : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM04_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	4.095E-01
NB-95M	1.632E-01
CD-109	8.542E-01
SN-126	7.942E-02
TL-208	3.918E-02
BI-210	9.970E+00
PB-210	9.970E+00
BI-211	2.058E-01
BI-212	5.301E-01
PB-212	5.057E-02
BI-214	5.570E-02
PB-214	7.485E-02
RN-222	5.570E-02
RA-224	5.421E-01
RA-226	7.485E-02
TH-228	5.057E-02
TH-230	7.484E-02
TH-234	1.799E+00
U-234	7.484E-02
U-238	1.799E+00
AM-243	5.931E-02
ANH-511	2.954E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.877E-01	NOT IDENT.
NA-22	4.052E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	4.709E-02	NOT IDENT.
SC-46	3.987E-02	FAIL ABUN
V-48	2.756E-01	NOT IDENT.
CR-51	7.926E-01	NOT IDENT.
MN-52	3.076E+01	NOT IDENT.
MN-54	2.884E-02	NOT IDENT.

CO-56	5.348E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.481E-02	NOT IDENT.
CO-58	3.407E-02	NOT IDENT.
FE-59	1.568E-01	NOT IDENT.
CO-60	2.356E-02	NOT IDENT.
ZN-65	9.586E-02	NOT IDENT.
GE-68	1.322E+00	NOT IDENT.
AS-73	2.662E+00	NOT IDENT.
AS-74	4.615E-01	NOT IDENT.
SE-75	6.793E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.066E+00	NOT IDENT.
RB-83	9.307E-02	NOT IDENT.
RB-84	1.521E-01	NOT IDENT.
KR-85	8.087E+00	NOT IDENT.
SR-85	6.440E-02	NOT IDENT.
RB-86	3.202E+00	NOT IDENT.
Y-88	6.435E-02	NOT IDENT.
Y-91	2.114E+01	NOT IDENT.
NB-94	3.720E-02	NOT IDENT.
NB-95	6.629E-02	NOT IDENT.
ZR-95	1.067E-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	2.386E-02	NOT IDENT.
RH-102	4.370E-02	NOT IDENT.
RU-103	7.996E-02	FAIL ABUN
RH-106	3.490E-01	NOT IDENT.
RU-106	3.490E-01	NOT IDENT.
AG-108M	2.627E-02	NOT IDENT.
AG-110	7.139E-01	NOT IDENT.
AG-110M	3.719E-02	NOT IDENT.
SN-113	5.044E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	3.724E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.192E-02	NOT IDENT.
SB-124	0.000E+00	NOT IDENT.
SB-125	1.167E-01	NOT IDENT.
TE-125M	1.504E+01	NOT IDENT.
I-126	1.755E+00	NOT IDENT.
SB-126	1.111E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	3.387E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.293E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.882E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	7.119E-01	NOT IDENT.
BA-137M	3.068E-02	NOT IDENT.
CS-137	3.241E-02	NOT IDENT.
LA-138	5.530E-02	NOT IDENT.
CE-139	3.074E-02	NOT IDENT.
BA-140	2.044E+00	NOT IDENT.
LA-140	8.689E-01	NOT IDENT.
CE-141	1.389E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.837E-01	NOT IDENT.
PM-144	3.580E-02	NOT IDENT.
PR-144	2.734E+00	NOT IDENT.
PM-146	4.833E-02	NOT IDENT.
ND-147	6.148E+00	NOT IDENT.
PM-147	7.392E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.920E-02	FAIL ABUN
EU-152	9.583E-02	NOT IDENT.
GD-153	8.723E-02	NOT IDENT.
EU-154	1.149E-01	NOT IDENT.
EU-155	9.506E-02	FAIL ABUN
TB-160	1.882E-01	FAIL ABUN
HO-166M	5.152E-02	NOT IDENT.
TM-171	4.721E+01	NOT IDENT.
HF-172	1.746E-01	FAIL ABUN

LU-172	3.622E-02	FAIL ABUN
LU-176	2.961E-02	FAIL ABUN
HF-181	6.235E-02	NOT IDENT.
TA-182	2.322E-01	FAIL ABUN
RE-183	3.911E-01	NOT IDENT.
RE-184	2.281E-01	NOT IDENT.
W-188	1.044E+01	FAIL ABUN
IR-192	4.438E-02	FAIL ABUN
HG-203	6.736E-02	NOT IDENT.
TL-204	6.584E+00	NOT IDENT.
BI-207	4.946E-02	FAIL ABUN
PB-211	6.975E-01	NOT IDENT.
BI-213	1.085E-01	NOT IDENT.
RN-219	3.900E-01	NOT IDENT.
RA-223	5.959E-01	FAIL ABUN
AC-225	8.456E+00	NOT IDENT.
AC-227	2.381E-01	FAIL ABUN
TH-227	2.381E-01	FAIL ABUN
AC-228	2.087E-01	FAIL ABUN
RA-228	2.087E-01	FAIL ABUN
TH-229	5.022E-01	FAIL ABUN
PA-231	5.353E-01	NOT IDENT.
TH-231	5.959E-01	FAIL ABUN
TH-232	2.087E-01	FAIL ABUN
PA-233	5.816E-02	NOT IDENT.
PA-234	3.237E-01	NOT IDENT.
PA-234M	6.229E+00	FAIL ABUN
U-235	2.292E-01	FAIL ABUN
NP-237	5.816E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.428E-01	NOT IDENT.
PU-239	3.543E+02	FAIL ABUN
AM-241	2.300E-01	NOT IDENT.
CM-243	9.405E-02	NOT IDENT.
BK-247	9.539E-02	NOT IDENT.
CM-247	3.420E-02	NOT IDENT.
CF-249	3.989E-02	NOT IDENT.
CF-251	1.296E-01	NOT IDENT.

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*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278001.CNF;1
* Acquisition date   : 30-OCT-2023 08:52:37 Sensitivity      : 3.000
* Detector ID       : GAM04 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.29 Half life ratio  : *****
* Sample date       : 6-SEP-2023 08:00:00 Nuclide Library  : SOLID
* Sample ID         : G640278001 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity  : 1.0190E+02 GRAM
*                   :                               Quantity Err(%) : 1.9627E-03 %
* Wet wt corr       : 1.00000 Wet Weight       : 0.00000
*                   :                               Dry Weight       : 0.00000
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date    : 2-DEC-2022 08:34:33 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM04_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	5.259E+00	1.703E+00	1.703E+00
NB-95M	2.505E-01	1.223E-01	1.223E-01
CD-109	2.111E+00	1.772E+00	1.772E+00
SN-126	1.947E-01	1.631E-01	1.631E-01
TL-208	1.056E-01	6.300E-02	6.300E-02
BI-210	1.291E+01	1.774E+01	1.774E+01
PB-210	1.291E+01	1.774E+01	1.774E+01
BI-211	2.852E+00	7.650E-01	7.650E-01
BI-212	9.408E-01	6.257E-01	6.257E-01
PB-212	2.464E-01	1.189E-01	1.189E-01
BI-214	8.220E-01	2.063E-01	2.063E-01
PB-214	1.035E+00	2.771E-01	2.771E-01
RN-222	8.220E-01	2.063E-01	2.063E-01
RA-224	2.781E+00	1.229E+00	1.229E+00
RA-226	1.035E+00	2.771E-01	2.771E-01
TH-228	2.464E-01	1.189E-01	1.189E-01
TH-230	1.035E+00	2.771E-01	2.771E-01
TH-234	4.631E+00	5.007E+00	5.007E+00
U-234	1.035E+00	2.771E-01	2.771E-01
U-238	4.631E+00	5.007E+00	5.007E+00
AM-243	1.556E-01	1.124E-01	1.124E-01
ANH-511	6.799E-02	7.409E-02	7.409E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-3.294E-01	6.319E-01	6.491E-01	NOT IDENT.
NA-22	-5.690E-03	4.952E-02	4.959E-02	NOT IDENT.
NA-24	-4.152E+24	5.049E+24	0.000E+00	SHORT HLIF
AL-26	3.291E-02	4.485E-02	4.724E-02	NOT IDENT.
SC-46	-1.347E-02	5.441E-02	5.474E-02	FAIL ABUN
V-48	-1.284E-01	3.903E-01	3.946E-01	NOT IDENT.
CR-51	-6.530E-01	1.139E+00	1.176E+00	NOT IDENT.
MN-52	-8.597E-01	3.700E+01	3.700E+01	NOT IDENT.

MN-54	-4.324E-03	3.672E-02	3.677E-02	NOT IDENT.
CO-56	2.677E-02	5.791E-02	5.915E-02	FAIL ABUN
MN-56	1.000E+41	2.163E+41	0.000E+00	SHORT HLIF
CO-57	1.090E-03	2.927E-02	2.928E-02	NOT IDENT.
CO-58	-1.854E-03	4.767E-02	4.768E-02	NOT IDENT.
FE-59	-1.115E-03	1.831E-01	1.831E-01	NOT IDENT.
CO-60	-3.317E-02	4.207E-02	4.465E-02	NOT IDENT.
ZN-65	4.436E-02	1.109E-01	1.127E-01	NOT IDENT.
GE-68	3.832E-01	1.438E+00	1.449E+00	NOT IDENT.
AS-73	-1.139E+00	3.179E+00	3.220E+00	NOT IDENT.
AS-74	1.674E-01	5.180E-01	5.235E-01	NOT IDENT.
SE-75	3.896E-02	7.928E-02	8.120E-02	NOT IDENT.
BR-77	3.269E+06	5.338E+06	5.538E+06	SHORT HLIF
SR-82	1.973E-01	1.253E+00	1.256E+00	NOT IDENT.
RB-83	-1.962E-02	1.134E-01	1.138E-01	NOT IDENT.
RB-84	2.679E-02	1.757E-01	1.761E-01	NOT IDENT.
KR-85	4.129E+00	8.881E+00	9.074E+00	NOT IDENT.
SR-85	3.245E-02	7.078E-02	7.228E-02	NOT IDENT.
RB-86	9.279E-01	3.483E+00	3.508E+00	NOT IDENT.
Y-88	2.658E-02	6.834E-02	6.938E-02	NOT IDENT.
Y-91	-3.261E+01	3.510E+01	3.806E+01	NOT IDENT.
NB-94	2.712E-02	3.933E-02	4.118E-02	NOT IDENT.
NB-95	3.362E-02	7.301E-02	7.456E-02	NOT IDENT.
ZR-95	-3.300E-02	1.553E-01	1.561E-01	NOT IDENT.
NB-97	1.000E+41	2.360E+41	0.000E+00	SHORT HLIF
ZR-97	-1.022E+22	8.673E+22	0.000E+00	SHORT HLIF
MO-99	-2.325E+05	2.951E+05	3.132E+05	SHORT HLIF
TC-99M	1.000E+41	9.846E+40	0.000E+00	SHORT HLIF
RH-101	-6.120E-02	3.827E-02	4.718E-02	NOT IDENT.
RH-102	-3.952E-02	6.211E-02	6.462E-02	NOT IDENT.
RU-103	3.672E-02	8.704E-02	8.860E-02	FAIL ABUN
RH-106	1.645E-01	3.824E-01	3.895E-01	NOT IDENT.
RU-106	1.645E-01	3.824E-01	3.895E-01	NOT IDENT.
AG-108M	-3.327E-03	3.116E-02	3.119E-02	NOT IDENT.
AG-110	5.636E-01	7.083E-01	7.525E-01	NOT IDENT.
AG-110M	-1.765E-02	5.234E-02	5.295E-02	NOT IDENT.
SN-113	-1.474E-02	6.071E-02	6.107E-02	NOT IDENT.
CD-115	8.315E+05	2.335E+06	2.365E+06	SHORT HLIF
SN-117M	-1.441E-01	4.658E-01	4.704E-01	NOT IDENT.
SB-122	1.148E+04	4.502E+04	4.532E+04	SHORT HLIF
TE-123M	-1.741E-02	4.066E-02	4.141E-02	NOT IDENT.
SB-124	-7.588E-02	1.054E-01	1.108E-01	NOT IDENT.
SB-125	8.526E-02	1.240E-01	1.298E-01	NOT IDENT.
TE-125M	6.996E+00	1.693E+01	1.722E+01	NOT IDENT.
I-126	-8.601E-02	2.125E+00	2.126E+00	NOT IDENT.
SB-126	4.337E-01	1.227E+00	1.243E+00	NOT IDENT.
SB-127	-3.701E+02	1.672E+03	1.680E+03	SHORT HLIF
I-131	1.366E+00	3.688E+00	3.739E+00	NOT IDENT.
I-132	1.000E+41	7.542E+41	0.000E+00	SHORT HLIF
TE-132	1.420E+02	4.521E+03	4.521E+03	SHORT HLIF
BA-133	-1.766E-02	5.787E-02	5.841E-02	NOT IDENT.
I-133	3.693E+16	2.105E+17	0.000E+00	SHORT HLIF
CS-134	1.770E-03	4.684E-02	4.684E-02	NOT IDENT.
I-135	1.000E+41	2.066E+41	0.000E+00	SHORT HLIF
CS-136	-5.824E-01	1.073E+00	1.105E+00	NOT IDENT.
BA-137M	1.516E-04	3.677E-02	3.677E-02	NOT IDENT.
CS-137	1.601E-04	3.885E-02	3.885E-02	NOT IDENT.
LA-138	6.993E-03	6.340E-02	6.348E-02	NOT IDENT.
CE-139	-2.248E-02	4.042E-02	4.167E-02	NOT IDENT.
BA-140	-6.636E-01	2.869E+00	2.885E+00	NOT IDENT.
LA-140	2.427E-01	9.629E-01	9.691E-01	NOT IDENT.
CE-141	-9.805E-02	1.781E-01	1.835E-01	NOT IDENT.
CE-143	7.822E+09	3.900E+10	3.916E+10	SHORT HLIF
CE-144	-4.412E-02	2.247E-01	2.255E-01	NOT IDENT.
PM-144	2.441E-02	3.740E-02	3.898E-02	NOT IDENT.
PR-144	1.864E+00	2.856E+00	2.977E+00	NOT IDENT.
PM-146	3.128E-02	5.154E-02	5.343E-02	NOT IDENT.
ND-147	2.346E-01	7.204E+00	7.205E+00	NOT IDENT.
PM-147	3.382E+02	8.362E+02	8.500E+02	NOT IDENT.
PM-149	-4.772E+06	2.100E+07	2.111E+07	SHORT HLIF
EU-150	-1.905E-03	3.727E-02	3.728E-02	FAIL ABUN
EU-152	-2.843E-02	1.137E-01	1.144E-01	NOT IDENT.
GD-153	-3.714E-02	1.156E-01	1.168E-01	NOT IDENT.
EU-154	-5.261E-02	1.503E-01	1.521E-01	NOT IDENT.
EU-155	3.234E-03	1.114E-01	1.114E-01	FAIL ABUN
TB-160	3.756E-02	2.163E-01	2.170E-01	FAIL ABUN
HO-166M	-1.570E-02	6.617E-02	6.655E-02	NOT IDENT.
TM-171	3.039E+01	5.087E+01	5.269E+01	NOT IDENT.

HF-172	1.097E-01	1.939E-01	2.001E-01	FAIL ABUN
LU-172	-7.620E-02	6.896E-02	7.704E-02	FAIL ABUN
LU-176	-3.566E-03	3.778E-02	3.782E-02	FAIL ABUN
HF-181	-7.040E-02	8.835E-02	9.388E-02	NOT IDENT.
TA-182	2.506E-02	2.670E-01	2.672E-01	FAIL ABUN
RE-183	-6.267E-01	5.461E-01	6.149E-01	NOT IDENT.
RE-184	-9.042E-02	3.084E-01	3.111E-01	NOT IDENT.
W-188	-9.208E-01	1.441E+01	1.441E+01	FAIL ABUN
IR-192	-2.513E-03	5.643E-02	5.644E-02	FAIL ABUN
HG-203	1.300E-03	8.388E-02	8.388E-02	NOT IDENT.
TL-204	4.354E+00	7.664E+00	7.912E+00	NOT IDENT.
BI-207	3.011E-02	4.935E-02	5.118E-02	FAIL ABUN
PB-211	1.214E-01	7.876E-01	7.895E-01	NOT IDENT.
BI-213	6.958E-02	1.147E-01	1.189E-01	NOT IDENT.
RN-219	7.662E-03	4.497E-01	4.497E-01	NOT IDENT.
RA-223	2.299E-01	7.065E-01	7.140E-01	FAIL ABUN
AC-225	2.014E+00	1.009E+01	1.013E+01	NOT IDENT.
AC-227	-1.090E-01	3.135E-01	3.173E-01	FAIL ABUN
TH-227	-1.090E-01	3.135E-01	3.173E-01	FAIL ABUN
AC-228	1.835E-01	2.182E-01	2.333E-01	FAIL ABUN
RA-228	1.835E-01	2.182E-01	2.333E-01	FAIL ABUN
TH-229	-3.973E-02	6.168E-01	6.171E-01	FAIL ABUN
PA-231	5.083E-01	6.405E-01	6.802E-01	NOT IDENT.
TH-231	2.299E-01	7.065E-01	7.140E-01	FAIL ABUN
TH-232	1.835E-01	2.182E-01	2.333E-01	FAIL ABUN
PA-233	-3.625E-02	8.020E-02	8.185E-02	NOT IDENT.
PA-234	1.387E-01	3.961E-01	4.010E-01	NOT IDENT.
PA-234M	6.350E+00	8.729E+00	9.187E+00	FAIL ABUN
U-235	1.710E-01	2.583E-01	2.696E-01	FAIL ABUN
NP-237	-3.625E-02	8.020E-02	8.185E-02	NOT IDENT.
NP-238	-5.534E+06	6.910E+06	7.347E+06	SHORT HLIF
NP-239	6.859E-02	2.787E-01	2.804E-01	NOT IDENT.
PU-239	3.684E+02	3.818E+02	4.164E+02	FAIL ABUN
AM-241	7.562E-02	2.544E-01	2.567E-01	NOT IDENT.
CM-243	-2.452E-02	1.136E-01	1.141E-01	NOT IDENT.
BK-247	1.120E-02	1.171E-01	1.172E-01	NOT IDENT.
CM-247	-1.145E-02	4.149E-02	4.181E-02	NOT IDENT.
CF-249	-2.904E-02	5.037E-02	5.204E-02	NOT IDENT.
CF-251	-2.533E-02	1.601E-01	1.605E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	17.5173	85.43	43.9867	131.20	38.8453
45.60	16.5341	86.55	42.2539	133.02	29.9666
46.54	19.0716	86.79	42.2750	133.52	29.9899
49.72	0.0000	86.94	42.2887	136.00	26.0912
51.35	31.9802	87.09	42.3020	136.47	25.1060
51.87	30.3440	87.57	42.3445	140.51	0.0000
52.39	24.4814	88.03	42.3852	143.76	34.5211
52.97	29.5968	88.34	45.4859	144.24	31.4976
53.44	34.7182	88.47	45.4980	145.44	41.7313
54.07	28.8433	89.96	27.7531	152.43	34.9572
57.36	0.0000	1093.63	33.3498	153.25	43.2330
57.53	22.2736	91.11	42.0365	323.87	30.9224
57.98	32.5942	92.59	29.7617	156.02	29.9678
59.27	18.0763	93.35	29.8071	158.56	37.3326
59.32	18.0788	94.56	29.8792	159.00	36.3175
59.54	21.5351	94.65	29.8845	162.33	32.3136
60.96	23.0587	94.67	29.8857	162.66	30.2421
61.17	23.0716	94.87	29.8975	163.33	35.4884
62.93	30.4223	97.43	36.3078	165.86	34.5620
63.29	30.4508	98.43	30.1062	176.31	24.4196
63.58	30.4737	98.44	30.1067	176.60	33.9878
64.28	30.5289	99.53	34.8840	177.52	37.2174
66.73	33.9381	100.11	39.6419	181.07	0.0000
67.24	33.9814	102.03	32.2081	181.52	24.2248
125.81	35.1917	103.18	31.3280	184.41	31.1050
67.75	35.1978	103.37	31.3393	143.76	31.1550
68.89	40.5918	105.21	28.5876	193.51	31.4506
69.67	31.8285	105.31	28.5928	197.03	29.4039
70.82	33.0990	106.12	35.3170	198.01	37.0703
70.83	33.1002	106.47	28.6537	201.83	31.7599
72.81	39.1959	109.28	28.8000	203.43	39.4986
72.87	37.4197	111.00	31.7774	205.31	31.8869
74.66	37.5774	111.76	0.0000	210.85	27.6619
74.82	37.5911	114.06	24.2035	215.65	23.3603
74.97	37.6043	116.30	0.0000	218.12	24.5392
77.11	37.7901	116.74	27.2337	222.11	32.4874
78.74	37.9295	119.76	30.3068	227.09	24.7772
79.69	34.9936	121.12	28.4161	227.38	22.5317
80.03	35.0198	121.22	28.4210	228.16	0.0000
80.12	24.1567	121.78	35.3142	228.18	34.9535
80.19	24.1604	122.06	28.4608	116.74	34.9535
80.57	24.1807	122.92	31.4497	235.69	24.2435
81.00	26.6241	123.07	33.4236	235.96	24.2503
81.07	29.0491	265.00	36.4095	238.63	22.7972
81.75	38.7900	125.81	21.7244	238.98	0.0000
82.47	46.4394	127.23	48.4972	240.99	22.8519
83.79	24.3514	127.91	36.6607	242.00	22.8754
84.00	26.7986	129.30	26.8117	244.70	33.6418



ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	20.8628	563.25	10.5470
252.80	24.2790	345.93	20.8893	564.24	0.0000
254.15	0.0000	351.06	19.2939	569.33	8.6572
256.23	26.6801	351.93	19.3070	946.00	8.6580
260.90	0.0000	355.39	0.0000	569.70	8.6587
264.66	26.8963	356.01	22.7351	583.19	14.5325
264.80	30.4084	364.49	13.5583	584.27	11.6323
265.00	31.5846	366.42	0.0000	595.83	10.7261
269.46	22.3195	372.51	15.3435	427.87	12.7064
270.03	18.8052	375.05	19.2146	602.52	0.0000
271.23	18.8262	377.52	19.5056	604.72	11.7534
273.65	27.1237	356.01	17.1883	607.14	4.4128
276.40	18.9165	388.16	23.2751	609.32	7.8535
277.37	29.5830	388.63	18.1090	610.33	7.8574
277.60	29.5891	391.69	15.5555	614.28	8.8568
278.00	21.3118	264.66	15.6530	618.01	8.8729
279.20	22.5208	401.81	14.7951	620.36	9.8702
279.54	21.3420	402.40	16.5423	621.93	7.9023
279.70	21.3448	404.85	13.9538	630.19	0.0000
280.46	23.7329	410.95	16.6389	631.29	11.9072
283.69	22.6124	413.71	12.2830	633.25	8.9388
284.31	20.2430	414.70	9.6575	634.78	11.9272
285.41	15.4954	423.72	21.1978	635.95	8.9506
285.90	0.0000	427.09	16.8187	636.99	8.9550
287.50	28.6604	427.87	15.0562	657.50	3.0140
290.67	22.3541	433.94	12.4482	657.76	5.0240
293.27	0.0000	439.40	14.2767	657.90	0.0000
351.93	15.6303	440.45	9.8219	661.66	8.0531
295.96	15.6402	453.88	11.7069	664.57	0.0000
879.38	19.2935	463.37	14.4935	666.33	11.0967
299.98	19.3164	468.07	13.6270	666.50	11.0976
300.09	19.3184	473.00	0.0000	667.71	0.0000
300.13	19.3193	475.06	7.2987	677.62	12.1680
301.36	16.1161	476.78	13.6990	685.70	0.0000
302.85	25.4156	477.60	16.4469	692.65	0.0000
256.23	23.0275	482.18	14.6598	695.00	7.1538
304.85	23.0345	487.02	12.8641	696.49	5.1133
306.78	26.7151	492.35	0.0000	696.51	5.1133
308.46	25.5367	497.08	9.2432	697.00	7.1604
311.90	21.9523	505.52	16.7194	697.30	5.1152
316.51	15.9152	507.63	0.0000	697.49	5.1156
319.41	18.4076	511.00	13.9764	702.65	7.1783
320.08	19.6455	514.00	14.0002	706.68	12.3271
321.04	12.2882	514.00	14.0002	711.68	9.2659
323.87	13.5482	520.40	13.1142	720.70	5.1678
325.23	13.5630	520.69	0.0000	721.93	0.0000
328.76	16.0746	522.65	0.0000	722.78	13.6555
333.37	19.8574	527.90	0.0000	722.91	13.6560
333.97	23.5917	528.26	7.5267	723.31	7.7606
334.37	28.5675	529.59	11.2983	724.19	9.3164
338.28	29.9019	529.87	0.0000	727.33	11.4019
338.32	23.6729	531.02	10.3653	733.00	10.3906
311.90	19.9692	537.26	12.7645	735.93	7.2826
340.48	19.9692	546.56	0.0000	333.97	8.3281
340.55	19.9702	552.55	9.5341	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	12.5283	949.00	9.0293	1384.29	0.9617
747.24	10.4533	667.71	0.0000	1408.01	3.8699
748.06	11.5026	962.31	9.0706	1434.09	3.8948
752.31	13.6184	964.08	9.0762	1435.80	2.9224
753.82	6.2893	966.17	6.8120	1457.56	0.0000
756.73	11.0195	911.20	6.8184	1460.82	4.9002
756.80	11.0200	983.53	5.7100	1489.16	2.9599
884.68	17.3688	984.45	0.0000	1505.03	3.9614
765.81	7.3740	1274.44	5.1608	1584.12	3.0255
766.42	9.4834	1001.03	6.8921	1596.21	3.0337
766.84	8.4310	1002.74	6.8960	1620.50	2.0333
772.60	0.0000	1004.73	6.9004	1621.92	3.0509
776.52	9.5226	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.0645
778.90	10.5908	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	2.3250	1764.49	2.0963
788.74	7.9749	1038.76	0.0000	1063.66	2.0989
792.07	6.3884	631.29	10.4919	1771.35	1.0496
795.86	7.4646	1048.07	9.3307	1791.20	0.0000
810.06	3.2172	1049.04	6.1250	1808.65	1.0576
810.29	3.2174	1050.41	2.6261	1810.72	0.0000
344.28	3.2177	1063.66	2.6371	1836.06	2.1267
810.76	3.2180	1077.00	4.4138		
815.77	6.4487	1077.34	4.4141		
1048.07	8.0695	1085.87	9.7365		
832.01	4.3263	1093.63	8.8727		
834.85	5.4138	1099.45	6.2220		
835.71	3.2493	1112.07	8.0305		
836.80	0.0000	1112.84	9.8170		
846.75	0.0000	1115.54	4.2873		
846.77	4.3507	1120.29	8.9447		
856.80	7.6426	1120.55	8.9453		
860.56	4.3734	1221.41	8.9478		
871.09	2.1953	1129.67	3.5879		
873.19	6.5911	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	4.4040	1173.23	4.5428		
880.51	6.6089	1177.95	4.5490		
881.60	4.4077	1189.05	8.7621		
883.24	5.5129	1204.77	9.1681		
884.68	5.5157	1221.41	6.4476		
889.28	4.4201	1231.02	6.4651		
894.76	6.6433	1235.36	5.9180		
898.04	6.6511	1238.28	6.4779		
900.72	9.9862	1260.41	0.0000		
903.28	7.7745	1271.87	6.5377		
911.20	6.6826	1274.44	7.4771		
912.08	12.2555	1274.54	5.6078		
923.98	0.0000	1291.59	7.5112		
926.50	2.2397	1298.22	0.0000		
929.11	6.7251	1312.11	1.8881		
935.54	6.7405	1332.49	5.6946		
937.49	11.2415	1362.66	0.0000		
944.13	6.7605	1365.19	2.8713		
946.00	5.6374	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 09:54:42.10

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                            *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278002.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM06.CNF;911
Background date : 29-OCT-2023 11:32:03
Sample date     : 6-SEP-2023 08:30:00. Acquisition date : 30-OCT-2023 08:53:06
Sample ID      : G640278002           Sample quantity  : 1.21480E+02 GRAM
Detector name  : GAM06                 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00      Elapsed real time: 0 01:00:00.40  0.0%
Energy tolerance : 1.50000 keV        Analyst Initials  : MXR1
Abundance limit : 75.00000            Sensitivity       : 3.00000
Batch ID       : 2505440              Detector SN#      :
Matrix Spike ID :                      LCS ID            :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	52.12	18	10	1.47	103.09	101	5	4.92E-03	36.6	
2	0	76.21*	50	84	3.12	151.27	145	12	1.38E-02	40.1	
3	0	92.92*	3	66	0.97	184.71	181	9	8.24E-04	54.5	
4	0	103.55	30	29	1.58	205.97	201	11	8.32E-03	39.8	
5	0	185.13*	34	53	1.65	369.16	364	11	9.36E-03	47.4	
6	2	238.29*	21	34	1.43	475.50	469	17	5.74E-03	60.5	1.65E+00
7	2	241.74*	17	25	1.44	482.41	469	17	4.83E-03	55.8	
8	0	295.98	21	25	1.58	590.91	584	9	5.87E-03	47.7	
9	0	338.98	8	20	0.69	676.94	670	9	2.12E-03	116.0	
10	0	352.02*	35	24	0.67	703.02	701	8	9.63E-03	34.0	
11	0	458.02	13	4	2.10	915.12	911	8	3.61E-03	38.5	
12	0	462.67	22	3	1.47	924.41	919	11	6.24E-03	25.4	
13	0	490.99	10	10	5.18	981.09	975	11	2.76E-03	71.2	
14	0	608.79*	60	16	1.32	1216.79	1210	15	1.66E-02	19.9	
15	0	625.64	8	4	0.73	1250.52	1246	8	2.25E-03	55.3	
16	0	702.63	6	9	1.23	1404.60	1400	6	1.74E-03	85.2	
17	0	951.29	7	0	1.44	1902.29	1897	9	1.94E-03	37.8	
18	0	1119.22	12	4	1.60	2238.46	2229	13	3.37E-03	42.5	
19	0	1460.16*	7	3	0.49	2921.11	2914	11	2.06E-03	65.7	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278002.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 6-SEP-2023 08:30:00 Acquisition date : 30-OCT-2023 08:53:06  
Sample ID : G640278002 Sample quantity : 121.48 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA6 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.40 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

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	7	10.66*	9.866E-01	4.123E-01	4.123E-01	131.39
AS-73	53.44	20	10.30*	1.157E+00	1.035E+00	1.650E+00	73.22
TM-171	51.35	20	0.27	1.157E+00	3.947E+01	4.164E+01	73.22
	52.39	20	0.47*	1.157E+00	2.268E+01	2.392E+01	73.22
	66.73	-----	0.14	3.111E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.892E+00	-----	Line Not Found	-----
	351.06	35	12.92*	3.293E+00	5.156E-01	5.156E-01	68.04
PB-212	74.82	55	10.28	4.271E+00	7.715E-01	7.715E-01	80.27
	77.11	55	17.10	4.271E+00	4.638E-01	4.638E-01	80.27
	238.63	22	43.60*	4.410E+00	6.939E-02	6.939E-02	120.93
	300.09	-----	3.30	3.714E+00	-----	Line Not Found	-----
BI-214	609.32	59	45.49*	2.151E+00	3.758E-01	3.758E-01	39.77
	1120.29	12	14.92	1.249E+00	3.868E-01	3.868E-01	85.01
	1764.49	-----	15.30	8.634E-01	-----	Line Not Found	-----
PB-214	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.177E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
RN-222	609.32	59	45.49*	2.151E+00	3.758E-01	3.758E-01	39.77
	1120.29	12	14.92	1.249E+00	3.868E-01	3.868E-01	85.01
	1764.49	-----	15.30	8.634E-01	-----	Line Not Found	-----
RA-224	240.99	18	4.10*	4.364E+00	6.264E-01	6.264E-01	111.58
RA-226	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.177E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
TH-228	74.82	55	10.28	4.271E+00	7.715E-01	7.715E-01	80.27
	77.11	55	17.10	4.271E+00	4.638E-01	4.638E-01	80.27
	238.63	22	43.60*	4.410E+00	6.939E-02	6.939E-02	120.93
	300.09	-----	3.30	3.714E+00	-----	Line Not Found	-----
TH-230	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.176E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
U-234	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.176E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278002.CNF;1
* Acquisition date   : 30-OCT-2023 08:53:06 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 01:00:00.40 Half life ratio : *****
* Sample date       : 6-SEP-2023 08:30:00 Analyst initials: MXR1
* Sample ID        : G640278002 Sample Quantity : 1.2148E+02 GRAM
* Batch Number     : 2505440 Wet Weight : 0.00000
* Wet wt corr      : 1.00000 Dry Weight : 0.00000
* Nuclide Library  : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 25-SEP-2023 07:18:20 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;22
*****

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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	4.123E-01	5.308E-01	5.227E-01
AS-73	1.650E+00	1.184E+00	1.711E+00
TM-171	2.392E+01	1.717E+01	2.355E+01
BI-211	5.156E-01	3.438E-01	3.357E-01
PB-212	6.939E-02	8.224E-02	9.026E-02
BI-214	3.758E-01	1.465E-01	9.844E-02
PB-214	1.871E-01	1.248E-01	1.099E-01
RN-222	3.758E-01	1.465E-01	9.844E-02
RA-224	6.264E-01	6.850E-01	9.679E-01
RA-226	1.871E-01	1.248E-01	1.099E-01
TH-228	6.939E-02	8.224E-02	9.026E-02
TH-230	1.871E-01	1.248E-01	1.099E-01
U-234	1.871E-01	1.248E-01	1.099E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-2.623E-01	3.981E-01	6.991E-01	NOT IDENT.
NA-22	1.098E-02	2.836E-02	6.967E-02	NOT IDENT.
NA-24	0.000E+00	3.612E+24	0.000E+00	SHORT HLIF
AL-26	-2.814E-02	2.758E-02	1.962E-02	NOT IDENT.
SC-46	-2.721E-02	5.025E-02	9.247E-02	FAIL ABUN
V-48	6.680E-02	2.681E-01	6.152E-01	NOT IDENT.
CR-51	-8.396E-02	6.820E-01	1.369E+00	NOT IDENT.
MN-52	-1.251E+01	2.078E+01	3.461E+01	NOT IDENT.
MN-54	1.825E-02	3.696E-02	8.156E-02	NOT IDENT.
CO-56	2.787E-02	4.403E-02	1.040E-01	NOT IDENT.
MN-56	0.000E+00	1.580E+41	0.000E+00	SHORT HLIF
CO-57	1.299E-03	1.614E-02	3.208E-02	NOT IDENT.
CO-58	3.496E-03	3.676E-02	8.265E-02	NOT IDENT.
FE-59	1.189E-01	1.460E-01	3.477E-01	NOT IDENT.
CO-60	-3.101E-02	4.101E-02	6.616E-02	NOT IDENT.
ZN-65	1.853E-02	7.034E-02	1.473E-01	NOT IDENT.
GE-68	1.533E-01	1.093E+00	2.380E+00	NOT IDENT.

AS-74	-2.934E-01	2.699E-01	3.755E-01	NOT IDENT.
SE-75	5.987E-02	4.133E-02	9.398E-02	NOT IDENT.
BR-77	0.000E+00	1.085E+06	0.000E+00	SHORT HLIF
SR-82	-7.561E-01	9.106E-01	1.405E+00	NOT IDENT.
RB-83	7.606E-02	7.801E-02	1.811E-01	NOT IDENT.
RB-84	-1.802E-02	1.276E-01	2.608E-01	NOT IDENT.
KR-85	-6.484E+00	7.187E+00	1.190E+01	NOT IDENT.
SR-85	-5.187E-02	5.731E-02	9.483E-02	NOT IDENT.
RB-86	-7.129E-02	2.509E+00	5.312E+00	NOT IDENT.
Y-88	5.594E-04	4.051E-02	9.678E-02	NOT IDENT.
Y-91	-4.222E+00	1.725E+01	3.591E+01	NOT IDENT.
NB-94	2.008E-02	3.353E-02	7.203E-02	FAIL ABUN
NB-95	4.535E-02	5.473E-02	1.232E-01	NOT IDENT.
NB-95M	-2.678E-02	1.604E-01	2.687E-01	NOT IDENT.
ZR-95	-3.009E-02	1.041E-01	1.892E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.455E+22	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.934E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-2.765E-03	1.966E-02	3.753E-02	NOT IDENT.
RH-102	2.587E-02	4.828E-02	1.044E-01	NOT IDENT.
RU-103	2.235E-02	5.654E-02	1.237E-01	NOT IDENT.
RH-106	-2.907E-01	3.184E-01	3.947E-01	NOT IDENT.
RU-106	-2.907E-01	3.184E-01	3.947E-01	NOT IDENT.
AG-108M	-1.275E-02	2.358E-02	4.288E-02	NOT IDENT.
CD-109	-3.267E-01	4.686E-01	8.506E-01	NOT IDENT.
AG-110	-2.471E-01	6.067E-01	1.098E+00	NOT IDENT.
AG-110M	4.484E-02	4.376E-02	1.103E-01	NOT IDENT.
SN-113	2.238E-02	3.735E-02	8.435E-02	NOT IDENT.
CD-115	0.000E+00	1.379E+06	0.000E+00	SHORT HLIF
SN-117M	1.569E-02	2.727E-01	5.217E-01	NOT IDENT.
SB-122	0.000E+00	2.631E+04	0.000E+00	SHORT HLIF
TE-123M	-1.809E-02	2.596E-02	4.456E-02	NOT IDENT.
SB-124	-2.413E-02	8.917E-02	2.003E-01	NOT IDENT.
SB-125	1.123E-02	5.636E-02	1.226E-01	FAIL ABUN
TE-125M	9.313E-01	1.011E+01	1.990E+01	NOT IDENT.
I-126	-1.773E-01	1.201E+00	2.355E+00	NOT IDENT.
SB-126	-8.624E-03	7.774E-01	1.615E+00	NOT IDENT.
SN-126	1.296E-02	4.101E-02	8.474E-02	NOT IDENT.
SB-127	0.000E+00	1.154E+03	0.000E+00	SHORT HLIF
I-131	-1.609E-02	2.313E+00	4.729E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	2.358E+03	0.000E+00	SHORT HLIF
BA-133	-4.054E-03	3.128E-02	5.614E-02	NOT IDENT.
I-133	0.000E+00	1.494E+17	0.000E+00	SHORT HLIF
CS-134	4.070E-03	2.874E-02	6.393E-02	NOT IDENT.
I-135	0.000E+00	1.339E+41	0.000E+00	SHORT HLIF
CS-136	4.386E-02	4.075E-01	9.947E-01	NOT IDENT.
BA-137M	-7.916E-03	2.899E-02	5.383E-02	NOT IDENT.
CS-137	-8.362E-03	3.062E-02	5.686E-02	NOT IDENT.
LA-138	1.887E-02	2.615E-02	8.744E-02	NOT IDENT.
CE-139	-3.936E-03	2.233E-02	4.170E-02	NOT IDENT.
BA-140	-3.641E-01	1.513E+00	2.935E+00	NOT IDENT.
LA-140	2.112E-02	4.998E-01	1.228E+00	NOT IDENT.
CE-141	-4.876E-02	9.533E-02	1.698E-01	NOT IDENT.
CE-143	0.000E+00	3.099E+10	0.000E+00	SHORT HLIF
CE-144	8.534E-02	1.611E-01	3.242E-01	NOT IDENT.
PM-144	-1.336E-02	3.500E-02	6.217E-02	NOT IDENT.
PR-144	-1.021E+00	2.674E+00	4.748E+00	NOT IDENT.
PM-146	-8.818E-03	3.035E-02	5.172E-02	NOT IDENT.
ND-147	5.771E-01	4.096E+00	8.628E+00	NOT IDENT.
PM-147	2.316E+02	4.247E+02	9.008E+02	NOT IDENT.
PM-149	0.000E+00	1.281E+07	0.000E+00	SHORT HLIF
EU-150	-1.306E-02	2.104E-02	3.352E-02	NOT IDENT.
EU-152	8.462E-02	7.955E-02	1.797E-01	NOT IDENT.
GD-153	-5.249E-02	5.522E-02	9.558E-02	FAIL ABUN
EU-154	2.950E-02	7.839E-02	1.923E-01	NOT IDENT.
EU-155	1.021E-02	4.578E-02	9.754E-02	NOT IDENT.
TB-160	-1.087E-02	1.370E-01	2.906E-01	NOT IDENT.
HO-166M	2.381E-02	3.511E-02	8.713E-02	FAIL ABUN
HF-172	9.257E-02	1.150E-01	2.485E-01	FAIL ABUN
LU-172	-6.450E-02	5.005E-02	5.989E-02	FAIL ABUN
LU-176	3.414E-03	1.897E-02	3.958E-02	NOT IDENT.
HF-181	-2.063E-02	6.964E-02	1.312E-01	NOT IDENT.
TA-182	-3.256E-02	1.654E-01	3.311E-01	NOT IDENT.
RE-183	1.219E-01	2.016E-01	4.402E-01	NOT IDENT.
RE-184	5.167E-02	1.783E-01	4.156E-01	NOT IDENT.
W-188	2.888E+00	6.637E+00	1.369E+01	NOT IDENT.

IR-192	-1.967E-02	3.497E-02	6.547E-02	FAIL ABUN
HG-203	9.262E-03	5.041E-02	9.633E-02	NOT IDENT.
TL-204	8.903E-01	2.876E+00	6.002E+00	NOT IDENT.
BI-207	-2.507E-02	5.203E-02	9.472E-02	FAIL ABUN
TL-208	-6.189E-03	3.444E-02	6.907E-02	NOT IDENT.
BI-210	1.484E+00	2.957E+00	6.497E+00	NOT IDENT.
PB-210	1.484E+00	2.957E+00	6.497E+00	NOT IDENT.
PB-211	9.460E-02	4.798E-01	1.016E+00	NOT IDENT.
BI-212	1.491E-01	3.821E-01	8.270E-01	NOT IDENT.
BI-213	-1.247E-02	8.041E-02	1.575E-01	NOT IDENT.
RN-219	1.345E-01	3.126E-01	6.684E-01	NOT IDENT.
RA-223	1.983E-01	4.371E-01	9.506E-01	FAIL ABUN
AC-225	-7.041E-01	6.505E+00	1.145E+01	NOT IDENT.
AC-227	1.673E-01	1.728E-01	3.765E-01	NOT IDENT.
TH-227	1.673E-01	1.728E-01	3.765E-01	NOT IDENT.
AC-228	-5.508E-02	1.392E-01	2.722E-01	FAIL ABUN
RA-228	-5.508E-02	1.392E-01	2.722E-01	FAIL ABUN
TH-229	1.368E-01	3.413E-01	6.844E-01	NOT IDENT.
PA-231	1.489E-01	3.337E-01	7.181E-01	NOT IDENT.
TH-231	1.983E-01	4.371E-01	9.506E-01	FAIL ABUN
TH-232	-5.508E-02	1.392E-01	2.722E-01	FAIL ABUN
PA-233	4.128E-02	5.477E-02	1.186E-01	FAIL ABUN
PA-234	-5.342E-02	2.163E-01	3.810E-01	NOT IDENT.
PA-234M	-3.549E+00	4.201E+00	7.500E+00	NOT IDENT.
TH-234	-3.175E-01	9.701E-01	1.910E+00	FAIL ABUN
U-235	-8.186E-02	1.411E-01	2.428E-01	FAIL ABUN
NP-237	4.128E-02	5.477E-02	1.186E-01	FAIL ABUN
NP-238	0.000E+00	5.166E+06	0.000E+00	SHORT HLIF
U-238	-3.175E-01	9.701E-01	1.910E+00	FAIL ABUN
NP-239	-1.268E-01	1.728E-01	3.043E-01	FAIL ABUN
PU-239	-3.145E+01	2.199E+02	4.164E+02	NOT IDENT.
AM-241	-3.961E-02	1.052E-01	2.052E-01	NOT IDENT.
AM-243	4.277E-02	3.711E-02	8.028E-02	NOT IDENT.
CM-243	0.000E+00	1.258E-01	1.470E-01	FAIL ABUN
BK-247	7.580E-02	5.772E-02	1.302E-01	NOT IDENT.
CM-247	-1.730E-02	3.087E-02	5.616E-02	NOT IDENT.
CF-249	-3.305E-03	2.913E-02	5.799E-02	NOT IDENT.
CF-251	2.750E-02	9.341E-02	1.823E-01	NOT IDENT.
ANH-511	-8.770E-02	4.365E-02	9.019E-02	NOT IDENT.



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	7	10.66*	9.866E-01	4.123E-01	4.123E-01	131.39
AS-73	53.44	20	10.30*	1.157E+00	1.035E+00	1.650E+00	73.22
TM-171	51.35	20	0.27	1.157E+00	3.947E+01	4.164E+01	73.22
	52.39	20	0.47*	1.157E+00	2.268E+01	2.392E+01	73.22
	66.73	-----	0.14	3.111E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.892E+00	-----	Line Not Found	-----
	351.06	35	12.92*	3.293E+00	5.156E-01	5.156E-01	68.04
PB-212	74.82	55	10.28	4.271E+00	7.715E-01	7.715E-01	80.27
	77.11	55	17.10	4.271E+00	4.638E-01	4.638E-01	80.27
	238.63	22	43.60*	4.410E+00	6.939E-02	6.939E-02	120.93
	300.09	-----	3.30	3.714E+00	-----	Line Not Found	-----
BI-214	609.32	59	45.49*	2.151E+00	3.758E-01	3.758E-01	39.77
	1120.29	12	14.92	1.249E+00	3.868E-01	3.868E-01	85.01
	1764.49	-----	15.30	8.634E-01	-----	Line Not Found	-----
PB-214	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.177E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
RN-222	609.32	59	45.49*	2.151E+00	3.758E-01	3.758E-01	39.77
	1120.29	12	14.92	1.249E+00	3.868E-01	3.868E-01	85.01
	1764.49	-----	15.30	8.634E-01	-----	Line Not Found	-----
RA-224	240.99	18	4.10*	4.364E+00	6.264E-01	6.264E-01	111.58
RA-226	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.177E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
TH-228	74.82	55	10.28	4.271E+00	7.715E-01	7.715E-01	80.27
	77.11	55	17.10	4.271E+00	4.638E-01	4.638E-01	80.27
	238.63	22	43.60*	4.410E+00	6.939E-02	6.939E-02	120.93
	300.09	-----	3.30	3.714E+00	-----	Line Not Found	-----
TH-230	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.176E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04
U-234	74.82	55	5.80	4.271E+00	1.367E+00	1.367E+00	80.27
	77.11	55	9.70	4.271E+00	8.176E-01	8.176E-01	80.27
	87.09	-----	3.41	5.244E+00	-----	Line Not Found	-----
	242.00	18	7.25	4.364E+00	3.543E-01	3.543E-01	111.58
	295.22	22	18.42	3.753E+00	1.953E-01	1.953E-01	95.40
	351.93	35	35.60*	3.293E+00	1.871E-01	1.871E-01	68.04

Flag: "\*" = Keyline

Total number of lines in spectrum 19  
 Number of unidentified lines 3  
 Number of lines tentatively identified by NID 16 84.21%

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	4.123E-01	4.123E-01	5.417E-01	131.39	
AS-73	80.30D	1.59	1.035E+00	1.650E+00	1.208E+00	73.22	
TM-171	1.92Y	1.05	2.268E+01	2.392E+01	1.752E+01	73.22	
BI-211	7.04E+08Y	1.00	5.156E-01	5.156E-01	3.508E-01	68.04	
PB-212	1.41E+10Y	1.00	6.939E-02	6.939E-02	8.392E-02	120.93	
BI-214	1600.00Y	1.00	3.758E-01	3.758E-01	1.494E-01	39.77	
PB-214	1600.00Y	1.00	1.871E-01	1.871E-01	1.273E-01	68.04	
RN-222	1600.00Y	1.00	3.758E-01	3.758E-01	1.494E-01	39.77	
RA-224	1.41E+10Y	1.00	6.264E-01	6.264E-01	6.990E-01	111.58	
RA-226	1600.00Y	1.00	1.871E-01	1.871E-01	1.273E-01	68.04	
TH-228	1.41E+10Y	1.00	6.939E-02	6.939E-02	8.392E-02	120.93	
TH-230	7.54E+04Y	1.00	1.871E-01	1.871E-01	1.273E-01	68.04	
U-234	2.45E+05Y	1.00	1.871E-01	1.871E-01	1.273E-01	68.04	
Total Activity :			2.690E+01	2.876E+01			

Grand Total Activity : 2.690E+01 2.876E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.92	3	72	0.97	184.71	181	9	8.24E-04	****	5.60E+00	T
0	103.55	33	32	1.58	205.97	201	11	8.32E-03	79.6	6.01E+00	T
0	185.13	36	56	1.65	369.16	364	11	9.36E-03	94.9	5.25E+00	T
0	338.98	8	21	0.69	676.94	670	9	2.12E-03	****	3.39E+00	T
0	458.02	13	4	2.10	915.12	911	8	3.61E-03	76.9	2.70E+00	
0	462.67	23	3	1.47	924.41	919	11	6.24E-03	50.8	2.67E+00	T
0	490.99	10	10	5.18	981.09	975	11	2.76E-03	****	2.55E+00	T
0	625.64	8	4	0.73	1250.52	1246	8	2.25E-03	****	2.10E+00	
0	702.63	6	9	1.23	1404.60	1400	6	1.74E-03	****	1.91E+00	T
0	951.29	7	0	1.44	1902.29	1897	9	1.94E-03	75.6	1.45E+00	

Flags: "T" = Tentatively associated

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*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278002.CNF;1
* Acquisition date   : 30-OCT-2023 08:53:06 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 01:00:00.40 Half life ratio  : *****
* Sample date        : 6-SEP-2023 08:30:00 Nuclide Library : SOLID
* Sample ID          : G640278002 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity  : 1.2148E+02 GRAM
* Wet wt corr        : 1.00000 Wet Weight      : 0.00000
* Dry Weight         : 0.00000
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date     : 25-SEP-2023 07:18:20 Eff. Geometry   : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;2
*****

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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	1.820E-01
AS-73	7.535E-01
TM-171	1.014E+01
BI-211	1.480E-01
PB-212	4.070E-02
BI-214	4.060E-02
PB-214	4.771E-02
RN-222	4.060E-02
RA-224	4.366E-01
RA-226	4.771E-02
TH-228	4.070E-02
TH-230	4.771E-02
U-234	4.771E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	2.869E-01	NOT IDENT.
NA-22	2.699E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	0.000E+00	NOT IDENT.
SC-46	3.775E-02	FAIL ABUN
V-48	2.455E-01	NOT IDENT.
CR-51	5.909E-01	NOT IDENT.
MN-52	1.052E+01	NOT IDENT.
MN-54	3.500E-02	NOT IDENT.
CO-56	4.357E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.418E-02	NOT IDENT.
CO-58	3.280E-02	NOT IDENT.
FE-59	1.468E-01	NOT IDENT.
CO-60	2.509E-02	NOT IDENT.
ZN-65	5.823E-02	NOT IDENT.
GE-68	9.594E-01	NOT IDENT.
AS-74	1.340E-01	NOT IDENT.

SE-75	4.216E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.627E-01	NOT IDENT.
RB-83	7.871E-02	NOT IDENT.
RB-84	1.059E-01	NOT IDENT.
KR-85	5.152E+00	NOT IDENT.
SR-85	4.106E-02	NOT IDENT.
RB-86	2.098E+00	NOT IDENT.
Y-88	3.429E-02	NOT IDENT.
Y-91	1.272E+01	NOT IDENT.
NB-94	3.160E-02	FAIL ABUN
NB-95	5.307E-02	NOT IDENT.
NB-95M	1.205E-01	NOT IDENT.
ZR-95	7.909E-02	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	1.666E-02	NOT IDENT.
RH-102	4.479E-02	NOT IDENT.
RU-103	5.234E-02	NOT IDENT.
RH-106	1.529E-01	NOT IDENT.
RU-106	1.529E-01	NOT IDENT.
AG-108M	1.811E-02	NOT IDENT.
CD-109	3.777E-01	NOT IDENT.
AG-110	4.414E-01	NOT IDENT.
AG-110M	4.652E-02	NOT IDENT.
SN-113	3.623E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.337E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	1.984E-02	NOT IDENT.
SB-124	6.330E-02	NOT IDENT.
SB-125	5.090E-02	FAIL ABUN
TE-125M	8.952E+00	NOT IDENT.
I-126	9.452E-01	NOT IDENT.
SB-126	6.333E-01	NOT IDENT.
SN-126	3.796E-02	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	2.020E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.384E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.592E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	3.615E-01	NOT IDENT.
BA-137M	2.223E-02	NOT IDENT.
CS-137	2.349E-02	NOT IDENT.
LA-138	3.098E-02	NOT IDENT.
CE-139	1.835E-02	NOT IDENT.
BA-140	1.193E+00	NOT IDENT.
LA-140	4.351E-01	NOT IDENT.
CE-141	7.550E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.477E-01	NOT IDENT.
PM-144	2.621E-02	NOT IDENT.
PR-144	2.002E+00	NOT IDENT.
PM-146	2.098E-02	NOT IDENT.
ND-147	3.501E+00	NOT IDENT.
PM-147	3.999E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.417E-02	NOT IDENT.
EU-152	8.025E-02	NOT IDENT.
GD-153	4.182E-02	FAIL ABUN
EU-154	7.438E-02	NOT IDENT.
EU-155	4.188E-02	NOT IDENT.
TB-160	1.153E-01	NOT IDENT.
HO-166M	3.532E-02	FAIL ABUN
HF-172	1.113E-01	FAIL ABUN
LU-172	1.893E-02	FAIL ABUN
LU-176	1.731E-02	NOT IDENT.
HF-181	5.582E-02	NOT IDENT.
TA-182	1.283E-01	NOT IDENT.
RE-183	1.975E-01	NOT IDENT.
RE-184	1.662E-01	NOT IDENT.
W-188	5.897E+00	NOT IDENT.
IR-192	2.796E-02	FAIL ABUN

HG-203	4.223E-02	NOT IDENT.
TL-204	2.692E+00	NOT IDENT.
BI-207	3.877E-02	FAIL ABUN
TL-208	3.009E-02	NOT IDENT.
BI-210	2.901E+00	NOT IDENT.
PB-210	2.901E+00	NOT IDENT.
PB-211	4.322E-01	NOT IDENT.
BI-212	3.454E-01	NOT IDENT.
BI-213	6.700E-02	NOT IDENT.
RN-219	2.912E-01	NOT IDENT.
RA-223	4.147E-01	FAIL ABUN
AC-225	5.053E+00	NOT IDENT.
AC-227	1.668E-01	NOT IDENT.
TH-227	1.668E-01	NOT IDENT.
AC-228	1.146E-01	FAIL ABUN
RA-228	1.146E-01	FAIL ABUN
TH-229	3.043E-01	NOT IDENT.
PA-231	3.162E-01	NOT IDENT.
TH-231	4.147E-01	FAIL ABUN
TH-232	1.146E-01	FAIL ABUN
PA-233	5.322E-02	FAIL ABUN
PA-234	1.426E-01	NOT IDENT.
PA-234M	3.030E+00	NOT IDENT.
TH-234	8.666E-01	FAIL ABUN
U-235	1.083E-01	FAIL ABUN
NP-237	5.322E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	8.666E-01	FAIL ABUN
NP-239	1.347E-01	FAIL ABUN
PU-239	1.862E+02	NOT IDENT.
AM-241	9.124E-02	NOT IDENT.
AM-243	3.702E-02	NOT IDENT.
CM-243	6.662E-02	FAIL ABUN
BK-247	5.815E-02	NOT IDENT.
CM-247	2.413E-02	NOT IDENT.
CF-249	2.480E-02	NOT IDENT.
CF-251	8.201E-02	NOT IDENT.
ANH-511	4.170E-02	NOT IDENT.

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*****
*                                     GEL Laboratories LLC                       *
*                                     2040 Savage Road                          *
*                                     Charleston, SC 29407                       *
*****
*                                     DETECTOR AND SAMPLE DATA                 *
*                                     *                                         *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278002.CNF;1  *
* Acquisition date   : 30-OCT-2023 08:53:06 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 01:00:00.40 Half life ratio : *****          *
* Sample date       : 6-SEP-2023 08:30:00 Nuclide Library  : SOLID          *
* Sample ID         : G640278002 Analyst initials: MXR1          *
* Batch Number      : 2505440 Sample Quantity : 1.2148E+02 GRAM      *
* Wet wt corr       : 1.00000 Quantity Err(%) : 1.6464E-03 %          *
* Wet Weight        : 0.00000 Wet Weight       : 0.00000          *
* Dry Weight        : 0.00000 Dry Weight       : 0.00000          *
*****
*                                     CALIBRATION INFORMATION                   *
*                                     *                                         *
* Eff. Cal. date    : 25-SEP-2023 07:18:20 Eff. Geometry   : CAN          *
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM06_CAN.CNF;22          *
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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	4.123E-01	5.323E-01	5.323E-01
AS-73	1.650E+00	1.237E+00	1.237E+00
TM-171	2.392E+01	1.738E+01	1.738E+01
BI-211	5.156E-01	3.463E-01	3.463E-01
PB-212	6.939E-02	8.243E-02	8.243E-02
BI-214	3.758E-01	1.501E-01	1.501E-01
PB-214	1.871E-01	1.257E-01	1.257E-01
RN-222	3.758E-01	1.501E-01	1.501E-01
RA-224	6.264E-01	6.869E-01	6.869E-01
RA-226	1.871E-01	1.257E-01	1.257E-01
TH-228	6.939E-02	8.243E-02	8.243E-02
TH-230	1.871E-01	1.256E-01	1.256E-01
U-234	1.871E-01	1.256E-01	1.256E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.623E-01	3.987E-01	4.159E-01	NOT IDENT.
NA-22	1.098E-02	2.838E-02	2.881E-02	NOT IDENT.
NA-24	1.111E+24	3.615E+24	0.000E+00	SHORT HLIF
AL-26	-2.814E-02	2.766E-02	3.043E-02	NOT IDENT.
SC-46	-2.721E-02	5.032E-02	5.179E-02	FAIL ABUN
V-48	6.680E-02	2.682E-01	2.699E-01	NOT IDENT.
CR-51	-8.396E-02	6.821E-01	6.831E-01	NOT IDENT.
MN-52	-1.251E+01	2.081E+01	2.156E+01	NOT IDENT.
MN-54	1.825E-02	3.700E-02	3.790E-02	NOT IDENT.
CO-56	2.787E-02	4.411E-02	4.586E-02	NOT IDENT.
MN-56	1.000E+41	1.582E+41	0.000E+00	SHORT HLIF
CO-57	1.299E-03	1.614E-02	1.615E-02	NOT IDENT.
CO-58	3.496E-03	3.677E-02	3.680E-02	NOT IDENT.
FE-59	1.189E-01	1.466E-01	1.561E-01	NOT IDENT.
CO-60	-3.101E-02	4.111E-02	4.342E-02	NOT IDENT.
ZN-65	1.853E-02	7.035E-02	7.085E-02	NOT IDENT.
GE-68	1.533E-01	1.093E+00	1.095E+00	NOT IDENT.



AS-74	-2.934E-01	2.718E-01	3.023E-01	NOT IDENT.
SE-75	5.987E-02	4.158E-02	4.957E-02	NOT IDENT.
BR-77	9.152E+05	1.794E+06	1.841E+06	SHORT HLIF
SR-82	-7.561E-01	9.132E-01	9.748E-01	NOT IDENT.
RB-83	7.606E-02	7.891E-02	8.604E-02	NOT IDENT.
RB-84	-1.802E-02	1.276E-01	1.278E-01	NOT IDENT.
KR-85	-6.484E+00	7.209E+00	7.779E+00	NOT IDENT.
SR-85	-5.187E-02	5.749E-02	6.206E-02	NOT IDENT.
RB-86	-7.129E-02	2.509E+00	2.509E+00	NOT IDENT.
Y-88	5.594E-04	4.051E-02	4.051E-02	NOT IDENT.
Y-91	-4.222E+00	1.726E+01	1.736E+01	NOT IDENT.
NB-94	2.008E-02	3.357E-02	3.477E-02	FAIL ABUN
NB-95	4.535E-02	5.489E-02	5.857E-02	NOT IDENT.
NB-95M	-2.678E-02	1.604E-01	1.608E-01	NOT IDENT.
ZR-95	-3.009E-02	1.041E-01	1.050E-01	NOT IDENT.
NB-97	-1.000E+41	2.386E+41	0.000E+00	SHORT HLIF
ZR-97	-8.897E+22	8.490E+22	0.000E+00	SHORT HLIF
MO-99	1.326E+05	1.938E+05	2.028E+05	SHORT HLIF
TC-99M	-1.000E+41	2.228E+41	0.000E+00	SHORT HLIF
RH-101	-2.765E-03	1.967E-02	1.971E-02	NOT IDENT.
RH-102	2.587E-02	4.837E-02	4.975E-02	NOT IDENT.
RU-103	2.235E-02	5.658E-02	5.747E-02	NOT IDENT.
RH-106	-2.907E-01	3.197E-01	3.455E-01	NOT IDENT.
RU-106	-2.907E-01	3.197E-01	3.455E-01	NOT IDENT.
AG-108M	-1.275E-02	2.360E-02	2.429E-02	NOT IDENT.
CD-109	-3.267E-01	4.699E-01	4.924E-01	NOT IDENT.
AG-110	-2.471E-01	6.071E-01	6.172E-01	NOT IDENT.
AG-110M	4.484E-02	4.398E-02	4.840E-02	NOT IDENT.
SN-113	2.238E-02	3.739E-02	3.873E-02	NOT IDENT.
CD-115	3.453E+05	1.380E+06	1.388E+06	SHORT HLIF
SN-117M	1.569E-02	2.727E-01	2.728E-01	NOT IDENT.
SB-122	2.755E+03	2.631E+04	2.634E+04	SHORT HLIF
TE-123M	-1.809E-02	2.600E-02	2.724E-02	NOT IDENT.
SB-124	-2.413E-02	8.919E-02	8.985E-02	NOT IDENT.
SB-125	1.123E-02	5.637E-02	5.660E-02	FAIL ABUN
TE-125M	9.313E-01	1.011E+01	1.012E+01	NOT IDENT.
I-126	-1.773E-01	1.201E+00	1.203E+00	NOT IDENT.
SB-126	-8.624E-03	7.774E-01	7.774E-01	NOT IDENT.
SN-126	1.296E-02	4.103E-02	4.144E-02	NOT IDENT.
SB-127	1.028E+03	1.186E+03	1.273E+03	SHORT HLIF
I-131	-1.609E-02	2.313E+00	2.313E+00	NOT IDENT.
I-132	-1.000E+41	3.993E+41	0.000E+00	SHORT HLIF
TE-132	-1.706E+03	2.368E+03	2.490E+03	SHORT HLIF
BA-133	-4.054E-03	3.128E-02	3.134E-02	NOT IDENT.
I-133	-7.626E+16	1.517E+17	0.000E+00	SHORT HLIF
CS-134	4.070E-03	2.875E-02	2.881E-02	NOT IDENT.
I-135	-1.000E+41	1.815E+41	0.000E+00	SHORT HLIF
CS-136	4.386E-02	4.075E-01	4.080E-01	NOT IDENT.
BA-137M	-7.916E-03	2.900E-02	2.922E-02	NOT IDENT.
CS-137	-8.362E-03	3.063E-02	3.086E-02	NOT IDENT.
LA-138	1.887E-02	2.620E-02	2.755E-02	NOT IDENT.
CE-139	-3.936E-03	2.234E-02	2.241E-02	NOT IDENT.
BA-140	-3.641E-01	1.513E+00	1.522E+00	NOT IDENT.
LA-140	2.112E-02	4.998E-01	4.999E-01	NOT IDENT.
CE-141	-4.876E-02	9.540E-02	9.790E-02	NOT IDENT.
CE-143	3.718E+08	3.099E+10	3.099E+10	SHORT HLIF
CE-144	8.534E-02	1.612E-01	1.658E-01	NOT IDENT.
PM-144	-1.336E-02	3.502E-02	3.554E-02	NOT IDENT.
PR-144	-1.021E+00	2.675E+00	2.714E+00	NOT IDENT.
PM-146	-8.818E-03	3.036E-02	3.062E-02	NOT IDENT.
ND-147	5.771E-01	4.096E+00	4.105E+00	NOT IDENT.
PM-147	2.316E+02	4.250E+02	4.377E+02	NOT IDENT.
PM-149	3.510E+06	1.282E+07	1.292E+07	SHORT HLIF
EU-150	-1.306E-02	2.107E-02	2.187E-02	NOT IDENT.
EU-152	8.462E-02	7.989E-02	8.853E-02	NOT IDENT.
GD-153	-5.249E-02	5.539E-02	6.023E-02	FAIL ABUN
EU-154	2.950E-02	7.843E-02	7.955E-02	NOT IDENT.
EU-155	1.021E-02	4.579E-02	4.602E-02	NOT IDENT.
TB-160	-1.087E-02	1.370E-01	1.371E-01	NOT IDENT.
HO-166M	2.381E-02	3.519E-02	3.679E-02	FAIL ABUN
HF-172	9.257E-02	1.161E-01	1.234E-01	FAIL ABUN
LU-172	-6.450E-02	5.071E-02	5.845E-02	FAIL ABUN
LU-176	3.414E-03	1.897E-02	1.903E-02	NOT IDENT.
HF-181	-2.063E-02	6.966E-02	7.028E-02	NOT IDENT.
TA-182	-3.256E-02	1.654E-01	1.660E-01	NOT IDENT.
RE-183	1.219E-01	2.022E-01	2.095E-01	NOT IDENT.
RE-184	5.167E-02	1.784E-01	1.799E-01	NOT IDENT.
W-188	2.888E+00	6.647E+00	6.773E+00	NOT IDENT.

IR-192	-1.967E-02	3.500E-02	3.610E-02	FAIL ABUN
HG-203	9.262E-03	5.041E-02	5.058E-02	NOT IDENT.
TL-204	8.903E-01	2.878E+00	2.906E+00	NOT IDENT.
BI-207	-2.507E-02	5.208E-02	5.329E-02	FAIL ABUN
TL-208	-6.189E-03	3.444E-02	3.456E-02	NOT IDENT.
BI-210	1.484E+00	2.961E+00	3.035E+00	NOT IDENT.
PB-210	1.484E+00	2.961E+00	3.035E+00	NOT IDENT.
PB-211	9.460E-02	4.799E-01	4.818E-01	NOT IDENT.
BI-212	1.491E-01	3.823E-01	3.882E-01	NOT IDENT.
BI-213	-1.247E-02	8.042E-02	8.061E-02	NOT IDENT.
RN-219	1.345E-01	3.132E-01	3.190E-01	NOT IDENT.
RA-223	1.983E-01	4.374E-01	4.465E-01	FAIL ABUN
AC-225	-7.041E-01	6.506E+00	6.514E+00	NOT IDENT.
AC-227	1.673E-01	1.745E-01	1.901E-01	NOT IDENT.
TH-227	1.673E-01	1.745E-01	1.901E-01	NOT IDENT.
AC-228	-5.508E-02	1.393E-01	1.415E-01	FAIL ABUN
RA-228	-5.508E-02	1.393E-01	1.415E-01	FAIL ABUN
TH-229	1.368E-01	3.415E-01	3.470E-01	NOT IDENT.
PA-231	1.489E-01	3.353E-01	3.420E-01	NOT IDENT.
TH-231	1.983E-01	4.374E-01	4.465E-01	FAIL ABUN
TH-232	-5.508E-02	1.393E-01	1.415E-01	FAIL ABUN
PA-233	4.128E-02	5.487E-02	5.794E-02	FAIL ABUN
PA-234	-5.342E-02	2.248E-01	2.261E-01	NOT IDENT.
PA-234M	-3.549E+00	4.214E+00	4.507E+00	NOT IDENT.
TH-234	-3.175E-01	9.728E-01	9.833E-01	FAIL ABUN
U-235	-8.186E-02	1.412E-01	1.460E-01	FAIL ABUN
NP-237	4.128E-02	5.487E-02	5.794E-02	FAIL ABUN
NP-238	2.330E+06	5.170E+06	5.276E+06	SHORT HLIF
U-238	-3.175E-01	9.728E-01	9.833E-01	FAIL ABUN
NP-239	-1.268E-01	1.733E-01	1.825E-01	FAIL ABUN
PU-239	-3.145E+01	2.199E+02	2.203E+02	NOT IDENT.
AM-241	-3.961E-02	1.052E-01	1.067E-01	NOT IDENT.
AM-243	4.277E-02	3.730E-02	4.199E-02	NOT IDENT.
CM-243	1.612E-01	1.270E-01	1.463E-01	FAIL ABUN
BK-247	7.580E-02	5.988E-02	6.894E-02	NOT IDENT.
CM-247	-1.730E-02	3.103E-02	3.199E-02	NOT IDENT.
CF-249	-3.305E-03	2.913E-02	2.917E-02	NOT IDENT.
CF-251	2.750E-02	9.347E-02	9.429E-02	NOT IDENT.
ANH-511	-8.770E-02	4.431E-02	5.938E-02	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	20.2351	85.43	20.6777	131.20	29.9995
45.60	16.4924	86.55	21.6429	133.02	28.1008
46.54	17.3473	86.79	18.9497	133.52	27.1240
49.72	0.0000	86.94	22.5685	136.00	22.2081
51.35	16.0843	87.09	22.5777	136.47	27.2802
51.87	12.8939	87.57	20.7985	140.51	0.0000
52.39	12.9202	88.03	30.7837	143.76	26.6356
52.97	17.2658	88.34	37.1525	144.24	19.4818
53.44	18.3782	88.47	44.4171	145.44	28.7737
54.07	11.9206	89.96	29.1223	152.43	30.1806
57.36	0.0000	1093.63	34.0370	153.25	28.1400
57.53	16.4669	91.11	37.7305	323.87	19.8358
57.98	18.1432	92.59	42.1525	156.02	29.3245
59.27	26.5132	93.35	42.2350	158.56	24.1943
59.32	26.5179	94.56	28.2442	159.00	32.6343
59.54	26.5388	94.65	28.2507	162.33	22.2330
60.96	23.3383	94.67	28.2521	162.66	28.6014
61.17	30.0285	94.87	28.2664	163.33	20.1498
62.93	26.0160	97.43	28.7583	165.86	20.2353
63.29	26.0480	98.43	16.7400	176.31	22.7483
63.58	21.8684	98.44	16.7404	176.60	26.0098
64.28	26.9788	99.53	12.4336	177.52	22.7919
66.73	28.0499	100.11	19.9220	181.07	0.0000
67.24	18.7314	102.03	10.3202	181.52	16.0179
125.81	18.7582	103.18	10.3488	184.41	25.2314
67.75	18.7624	103.37	10.3535	143.76	25.2819
68.89	24.8236	105.21	10.3987	193.51	16.6818
69.67	21.4533	105.31	10.4011	197.03	24.5932
70.82	21.5313	106.12	18.9471	198.01	25.7480
70.83	21.5321	106.47	15.1702	201.83	28.1410
72.81	20.7988	109.28	25.7663	203.43	19.1795
72.87	20.8026	111.00	28.7414	205.31	16.9682
74.66	27.8892	111.76	0.0000	210.85	26.2193
74.82	27.9026	114.06	27.0096	215.65	24.0970
74.97	27.9153	116.30	0.0000	218.12	19.5722
77.11	28.0945	116.74	30.0802	222.11	19.6765
78.74	27.0533	119.76	17.5800	227.09	16.3103
79.69	25.9484	121.12	14.6924	227.38	20.9784
80.03	23.6123	121.22	14.6956	228.16	0.0000
80.12	23.6188	121.78	23.5408	228.18	23.3334
80.19	23.6237	122.06	18.6473	116.74	23.3334
80.57	17.7370	122.92	15.7314	235.69	23.5587
81.00	20.4226	123.07	15.7363	235.96	23.5666
81.07	20.4268	265.00	23.6347	238.63	28.3751
81.75	20.4663	125.81	14.8369	238.98	0.0000
82.47	25.8582	127.23	22.8161	240.99	28.4583
83.79	17.8992	127.91	25.8280	242.00	28.4941
84.00	13.4323	129.30	25.9005	244.70	14.2945

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	11.4758	563.25	6.2422
252.80	15.6380	345.93	15.9141	564.24	0.0000
254.15	0.0000	351.06	18.6540	569.33	7.3096
256.23	9.6627	351.93	14.6685	946.00	7.3105
260.90	0.0000	355.39	0.0000	569.70	7.3113
264.66	8.5383	356.01	12.0460	583.19	9.4772
264.80	8.5396	364.49	11.6882	584.27	10.5371
265.00	8.5417	366.42	0.0000	595.83	9.5486
269.46	20.8500	372.51	8.1491	427.87	11.7032
270.03	26.9998	375.05	15.4267	602.52	0.0000
271.23	25.8072	377.52	10.9126	604.72	11.1977
273.65	22.1808	356.01	16.4579	607.14	7.4757
276.40	23.4850	388.16	12.8473	609.32	7.4851
277.37	14.8484	388.63	18.3606	610.33	7.4896
277.60	13.6147	391.69	7.3631	614.28	9.6511
278.00	13.6208	264.66	10.1997	618.01	5.3733
279.20	14.8788	401.81	11.1375	620.36	7.7479
279.54	19.8457	402.40	18.5714	621.93	12.9243
279.70	19.8491	404.85	9.3042	630.19	0.0000
280.46	18.6241	410.95	14.9603	631.29	7.5791
283.69	19.9360	413.71	15.9306	633.25	10.8390
284.31	13.7151	414.70	14.0674	634.78	5.4242
285.41	16.2282	423.72	8.5007	635.95	7.5987
285.90	0.0000	427.09	5.6821	636.99	8.6895
287.50	10.8431	427.87	6.6331	657.50	8.7874
290.67	8.7878	433.94	15.2327	657.76	9.8873
293.27	0.0000	439.40	15.2962	657.90	0.0000
351.93	15.9787	440.45	12.4380	661.66	9.9082
295.96	12.6245	453.88	8.6981	664.57	0.0000
879.38	17.7226	463.37	4.3793	666.33	6.6221
299.98	17.7487	468.07	8.2026	666.50	7.7263
300.09	13.5244	473.00	0.0000	667.71	0.0000
300.13	13.5247	475.06	5.8884	677.62	6.6619
301.36	13.5423	476.78	10.8087	685.70	0.0000
302.85	16.9539	477.60	12.7813	692.65	0.0000
256.23	16.9824	482.18	13.8089	695.00	6.7224
304.85	16.1391	487.02	11.8765	696.49	13.4551
306.78	14.4690	492.35	0.0000	696.51	13.4551
308.46	20.4619	497.08	6.9762	697.00	8.0751
311.90	16.2555	505.52	18.0421	697.30	8.0763
316.51	17.1899	507.63	0.0000	697.49	10.0964
319.41	11.2057	511.00	18.1084	702.65	8.4360
320.08	14.6633	514.00	25.2014	706.68	6.7627
321.04	18.9940	514.00	25.2014	711.68	2.2599
323.87	11.2549	520.40	6.0740	720.70	4.5404
325.23	18.2050	520.69	0.0000	721.93	0.0000
328.76	17.3975	522.65	0.0000	722.78	7.9539
333.37	20.9697	527.90	0.0000	722.91	9.0908
333.97	17.0474	528.26	4.0701	723.31	10.2290
334.37	15.7423	529.59	7.1290	724.19	6.8225
338.28	12.2893	529.87	0.0000	727.33	5.6942
338.32	12.2899	531.02	4.0775	733.00	5.7102
311.90	14.5140	537.26	8.1878	735.93	9.1494
340.48	14.5140	546.56	0.0000	333.97	6.8672
340.55	14.5147	552.55	8.2676	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	9.1865	949.00	4.5202	1384.29	5.4388
747.24	5.7499	667.71	0.0000	1408.01	2.1901
748.06	4.6019	962.31	4.7331	1434.09	3.3089
752.31	5.7642	964.08	7.5781	1435.80	0.0000
753.82	11.5365	966.17	8.5323	1457.56	0.0000
756.73	10.3975	911.20	4.7453	1460.82	1.7775
756.80	8.0872	983.53	3.8175	1489.16	6.7163
884.68	11.5926	984.45	0.0000	1505.03	2.2482
765.81	5.8014	1274.44	7.6721	1584.12	5.5058
766.42	6.9636	1001.03	9.6072	1596.21	1.8408
766.84	9.2868	1002.74	7.6907	1620.50	0.9259
772.60	0.0000	1004.73	6.7345	1621.92	0.0000
776.52	12.8275	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.8835
778.90	9.6314	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	5.8433	1764.49	2.8737
788.74	9.6754	1038.76	0.0000	1063.66	2.8774
792.07	6.1667	631.29	4.8849	1771.35	0.9594
795.86	5.2949	1048.07	1.9550	1791.20	0.0000
810.06	6.2173	1049.04	1.9557	1808.65	3.8697
810.29	4.4414	1050.41	1.9567	1810.72	0.0000
344.28	4.4418	1063.66	10.8127	1836.06	1.9466
810.76	4.4424	1077.00	4.9380		
815.77	3.5619	1077.34	4.9387		
1048.07	7.1326	1085.87	4.9536		
832.01	11.6602	1093.63	8.9407		
834.85	8.0826	1099.45	3.9817		
835.71	11.6793	1112.07	7.9980		
836.80	0.0000	1112.84	6.4000		
846.75	0.0000	1115.54	3.2029		
846.77	4.5137	1120.29	1.6041		
856.80	6.3467	1120.55	1.6042		
860.56	1.8163	1221.41	3.2092		
871.09	0.0000	1129.67	3.0172		
873.19	4.5651	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	5.4926	1173.23	4.0815		
880.51	6.4110	1177.95	2.0439		
881.60	7.3303	1189.05	3.0769		
883.24	8.2521	1204.77	3.0925		
884.68	2.7523	1221.41	5.1813		
889.28	11.0306	1231.02	9.3549		
894.76	5.5280	1235.36	5.2042		
898.04	1.8452	1238.28	4.1670		
900.72	4.6179	1260.41	0.0000		
903.28	3.6982	1271.87	1.0526		
911.20	9.2755	1274.44	2.1068		
912.08	8.3510	1274.54	2.1069		
923.98	0.0000	1291.59	2.1178		
926.50	9.3332	1298.22	0.0000		
929.11	10.2773	1312.11	1.0654		
935.54	9.3671	1332.49	8.5742		
937.49	11.2493	1362.66	0.0000		
944.13	4.6996	1365.19	4.3276		
946.00	4.5148	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 09:55:31.14

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                             *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278003.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM08.CNF;679
Background date  : 29-OCT-2023 11:32:12
Sample date     : 7-SEP-2023 08:00:00. Acquisition date : 30-OCT-2023 08:53:34
Sample ID      : G640278003 Sample quantity : 1.18580E+02 GRAM
Detector name   : GAM08 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.55 0.0%
Energy tolerance: 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 2505440 Detector SN# :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.18*	27	87	1.85	126.81	123	8	7.42E-03	65.9	
2	3	74.61	92	135	1.49	149.71	143	16	2.56E-02	25.8	2.13E+00
3	3	77.00*	109	129	1.35	154.49	143	16	3.03E-02	21.5	
4	0	86.98	30	192	0.94	174.46	169	11	8.33E-03	91.4	
5	0	92.64*	61	159	1.46	185.81	181	12	1.70E-02	45.8	
6	0	175.55	29	46	1.88	351.81	348	7	7.93E-03	44.0	
7	0	185.75*	68	99	0.79	372.23	369	8	1.90E-02	29.7	
8	0	231.08	31	70	1.45	462.98	457	11	8.68E-03	55.2	
9	1	238.44*	199	48	1.57	477.71	471	22	5.52E-02	9.8	3.10E+00
10	1	241.94	100	58	1.58	484.71	471	22	2.79E-02	16.7	
11	0	270.76	32	63	1.92	542.42	537	10	8.95E-03	49.2	
12	0	295.24*	165	44	1.34	591.43	587	10	4.59E-02	11.0	
13	0	338.79*	20	33	1.15	678.62	674	8	5.49E-03	57.4	
14	0	351.81*	283	38	1.27	704.70	700	12	7.86E-02	7.4	
15	0	363.70	26	26	1.71	728.50	722	11	7.16E-03	43.8	
16	0	421.95	22	39	0.68	845.12	836	15	6.19E-03	65.9	
17	2	514.93	18	29	2.12	1031.26	1018	40	4.87E-03	71.9	1.46E+00
18	0	544.51	29	23	4.37	1090.48	1080	20	8.05E-03	45.9	
19	0	582.96*	38	9	1.24	1167.47	1163	10	1.04E-02	24.0	
20	0	597.13	7	11	1.37	1195.85	1190	7	1.81E-03	91.5	
21	0	609.32*	230	24	1.78	1220.23	1214	14	6.38E-02	8.2	
22	0	651.34	11	6	0.59	1304.36	1295	13	2.92E-03	58.6	
23	5	664.25	20	0	2.29	1330.20	1323	19	5.47E-03	28.7	1.01E+00
24	5	668.61	13	0	2.37	1338.94	1323	19	3.57E-03	25.8	
25	0	673.99	14	5	0.72	1349.71	1345	10	3.89E-03	40.1	
26	0	768.08	23	8	2.02	1538.07	1532	15	6.29E-03	34.0	
27	0	785.29	12	10	0.83	1572.52	1567	10	3.41E-03	55.9	
28	0	911.00*	42	3	1.95	1824.18	1817	14	1.16E-02	19.5	
29	0	934.11	18	5	1.41	1870.46	1865	9	4.86E-03	32.4	
30	0	969.84	41	3	4.29	1941.97	1936	14	1.14E-02	18.2	
31	0	1032.87	8	3	1.63	2068.15	2064	8	2.15E-03	56.4	
32	0	1120.10	53	3	1.26	2242.77	2236	13	1.46E-02	15.5	
33	0	1460.96*	73	8	1.75	2925.09	2917	15	2.04E-02	14.7	
34	0	1539.41	9	0	0.83	3082.11	3078	8	2.50E-03	33.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	2	1762.14	13	0	2.60	3527.95	3525	14	3.70E-03	27.3	4.03E+00
36	2	1764.67*	32	3	2.63	3533.00	3525	14	8.97E-03	21.6	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278003.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 7-SEP-2023 08:00:00 Acquisition date : 30-OCT-2023 08:53:34  
Sample ID : G640278003 Sample quantity : 118.58 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA8 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.55 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

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	69	10.66*	9.549E-01	4.320E+00	4.320E+00	29.35
AS-74	595.83	6	59.00*	2.070E+00	3.333E-02	2.640E-01	183.01
	634.78	-----	15.40	1.970E+00	-----	Line Not Found	-----
KR-85	514.00	17	0.43*	2.326E+00	1.096E+01	1.106E+01	143.80
SR-85	514.00	17	96.00*	2.326E+00	4.954E-02	8.736E-02	143.80
CD-109	88.03	32	3.70*	4.534E+00	1.225E+00	1.327E+00	182.82
SN-126	64.28	29	9.60	2.092E+00	9.251E-01	9.251E-01	131.79
	86.94	32	8.90	4.534E+00	5.094E-01	5.094E-01	182.82
	87.57	32	37.00*	4.534E+00	1.225E-01	1.225E-01	182.82
I-131	80.19	-----	2.62	3.977E+00	-----	Line Not Found	-----
	284.31	-----	6.12	3.652E+00	-----	Line Not Found	-----
	364.49	26	81.50*	3.033E+00	6.686E-02	6.519E+00	87.68
	636.99	-----	7.16	1.964E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	3.720E+00	-----	Line Not Found	-----
	583.19	37	85.00*	2.110E+00	1.314E-01	1.314E-01	48.00
	860.56	-----	12.50	1.522E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.233E+00	-----	Line Not Found	-----
	351.06	287	12.92*	3.110E+00	4.524E+00	4.524E+00	14.90
PB-212	74.82	100	10.28	3.423E+00	1.806E+00	1.806E+00	51.66
	77.11	119	17.10	3.670E+00	1.198E+00	1.198E+00	43.07
	238.63	206	43.60*	4.159E+00	7.176E-01	7.176E-01	19.53
	300.09	-----	3.30	3.507E+00	-----	Line Not Found	-----
BI-214	609.32	227	45.49*	2.036E+00	1.552E+00	1.552E+00	16.34
	1120.29	51	14.92	1.202E+00	1.784E+00	1.784E+00	30.94
	1764.49	30	15.30	8.345E-01	1.499E+00	1.499E+00	43.13
PB-214	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.330E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
RN-222	609.32	227	45.49*	2.036E+00	1.552E+00	1.552E+00	16.34
	1120.29	51	14.92	1.202E+00	1.784E+00	1.784E+00	30.94
	1764.49	30	15.30	8.345E-01	1.499E+00	1.499E+00	43.13
RA-224	240.99	104	4.10*	4.115E+00	3.890E+00	3.890E+00	33.37
RA-226	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.330E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
AC-228	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
RA-228	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
TH-228	74.82	100	10.28	3.423E+00	1.806E+00	1.806E+00	51.66
	77.11	119	17.10	3.670E+00	1.198E+00	1.198E+00	43.07
	238.63	206	43.60*	4.159E+00	7.176E-01	7.176E-01	19.53
	300.09	-----	3.30	3.507E+00	-----	Line Not Found	-----
TH-230	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.329E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
TH-232	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
TH-234	63.29	29	3.70*	2.092E+00	2.400E+00	2.400E+00	131.79
	92.59	66	4.23	4.898E+00	2.017E+00	2.017E+00	91.64
U-234	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.329E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
U-238	63.29	29	3.70*	2.092E+00	2.400E+00	2.400E+00	131.79
	92.59	66	4.23	4.898E+00	2.017E+00	2.017E+00	91.64
AM-243	43.53	-----	5.90	2.506E-01	-----	Line Not Found	-----
	74.66	100	67.20*	3.423E+00	2.763E-01	2.763E-01	51.66

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278003.CNF;1
* Acquisition date   : 30-OCT-2023 08:53:34 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 01:00:00.55 Half life ratio : *****
* Sample date       : 7-SEP-2023 08:00:00 Analyst initials: MXR1
* Sample ID         : G640278003 Sample Quantity : 1.1858E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 8-FEB-2023 07:28:36 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;20
*****

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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	4.320E+00	1.243E+00	8.077E-01
AS-74	2.640E-01	4.735E-01	8.477E-01
KR-85	1.106E+01	1.559E+01	1.477E+01
SR-85	8.736E-02	1.231E-01	1.166E-01
CD-109	1.327E+00	2.377E+00	1.849E+00
SN-126	1.225E-01	2.195E-01	1.719E-01
I-131	6.519E+00	5.602E+00	5.839E+00
TL-208	1.314E-01	6.180E-02	8.203E-02
BI-211	4.524E+00	6.605E-01	4.307E-01
PB-212	7.176E-01	1.373E-01	1.104E-01
BI-214	1.552E+00	2.485E-01	1.662E-01
PB-214	1.642E+00	2.397E-01	1.567E-01
RN-222	1.552E+00	2.485E-01	1.662E-01
RA-224	3.890E+00	1.272E+00	1.183E+00
RA-226	1.642E+00	2.397E-01	1.567E-01
AC-228	6.884E-01	2.624E-01	2.602E-01
RA-228	6.884E-01	2.624E-01	2.602E-01
TH-228	7.176E-01	1.373E-01	1.104E-01
TH-230	1.642E+00	2.397E-01	1.567E-01
TH-232	6.884E-01	2.624E-01	2.602E-01
TH-234	2.400E+00	3.100E+00	3.275E+00
U-234	1.642E+00	2.397E-01	1.567E-01
U-238	2.400E+00	3.100E+00	3.275E+00
AM-243	2.763E-01	1.399E-01	1.268E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-6.179E-02	6.310E-01	1.149E+00	NOT IDENT.
NA-22	3.472E-03	5.464E-02	1.108E-01	NOT IDENT.
NA-24	0.000E+00	1.526E+24	0.000E+00	SHORT HLIF
AL-26	1.400E-02	4.378E-02	1.006E-01	NOT IDENT.
SC-46	-5.583E-02	6.845E-02	1.123E-01	FAIL ABUN
V-48	-2.013E-01	3.648E-01	6.334E-01	NOT IDENT.

CR-51	-3.075E-02	1.075E+00	2.009E+00	NOT IDENT.
MN-52	-1.402E+01	2.993E+01	5.555E+01	FAIL ABUN
MN-54	-4.386E-03	4.712E-02	8.994E-02	NOT IDENT.
CO-56	-5.284E-03	5.141E-02	1.017E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.510E-03	3.184E-02	5.519E-02	NOT IDENT.
CO-58	5.384E-02	5.259E-02	1.265E-01	NOT IDENT.
FE-59	1.246E-01	1.730E-01	3.876E-01	NOT IDENT.
CO-60	-4.028E-02	4.893E-02	8.192E-02	NOT IDENT.
ZN-65	9.128E-03	1.312E-01	2.230E-01	NOT IDENT.
GE-68	-1.447E+00	1.762E+00	2.797E+00	NOT IDENT.
AS-73	1.533E+00	2.058E+00	4.039E+00	NOT IDENT.
SE-75	-3.942E-02	6.168E-02	1.081E-01	NOT IDENT.
BR-77	0.000E+00	1.361E+06	0.000E+00	SHORT HLIF
SR-82	-5.395E-01	9.622E-01	1.708E+00	NOT IDENT.
RB-83	1.787E-02	1.135E-01	2.278E-01	NOT IDENT.
RB-84	-4.105E-02	1.784E-01	3.340E-01	NOT IDENT.
RB-86	-2.056E+00	3.992E+00	6.866E+00	NOT IDENT.
Y-88	-1.179E-02	2.311E-02	2.976E-02	NOT IDENT.
Y-91	1.911E+01	3.906E+01	8.355E+01	NOT IDENT.
NB-94	-8.825E-03	3.086E-02	5.880E-02	NOT IDENT.
NB-95	4.580E-02	6.855E-02	1.383E-01	NOT IDENT.
NB-95M	2.585E-01	2.239E-01	3.795E-01	NOT IDENT.
ZR-95	2.487E-02	1.205E-01	2.447E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.584E+22	0.000E+00	SHORT HLIF
MO-99	0.000E+00	2.121E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-9.989E-03	3.915E-02	6.660E-02	NOT IDENT.
RH-102	2.182E-02	5.795E-02	1.221E-01	FAIL ABUN
RU-103	-2.687E-03	8.876E-02	1.641E-01	FAIL ABUN
RH-106	-1.563E-01	3.860E-01	7.145E-01	NOT IDENT.
RU-106	-1.563E-01	3.860E-01	7.145E-01	NOT IDENT.
AG-108M	-2.432E-02	4.208E-02	7.100E-02	NOT IDENT.
AG-110	2.864E-01	8.989E-01	1.760E+00	NOT IDENT.
AG-110M	2.612E-02	6.067E-02	1.289E-01	NOT IDENT.
SN-113	1.436E-02	6.370E-02	1.224E-01	NOT IDENT.
CD-115	0.000E+00	2.034E+06	0.000E+00	SHORT HLIF
SN-117M	4.320E-02	4.488E-01	8.591E-01	NOT IDENT.
SB-122	0.000E+00	3.488E+04	0.000E+00	SHORT HLIF
TE-123M	3.560E-03	4.098E-02	7.854E-02	NOT IDENT.
SB-124	6.172E-04	1.631E-01	3.474E-01	NOT IDENT.
SB-125	-2.934E-04	1.208E-01	2.218E-01	FAIL ABUN
TE-125M	2.162E+00	1.927E+01	3.421E+01	NOT IDENT.
I-126	1.297E+00	1.877E+00	3.970E+00	NOT IDENT.
SB-126	5.796E-02	1.238E+00	2.476E+00	NOT IDENT.
SB-127	0.000E+00	1.449E+03	0.000E+00	SHORT HLIF
I-132	0.000E+00	5.055E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.201E+03	0.000E+00	SHORT HLIF
BA-133	2.702E-02	4.953E-02	9.111E-02	NOT IDENT.
I-133	0.000E+00	1.212E+17	0.000E+00	SHORT HLIF
CS-134	-7.000E-03	5.942E-02	1.101E-01	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	2.409E-01	9.553E-01	1.927E+00	FAIL ABUN
BA-137M	5.202E-03	4.107E-02	7.396E-02	NOT IDENT.
CS-137	5.496E-03	4.339E-02	7.813E-02	NOT IDENT.
LA-138	2.106E-02	6.715E-02	1.494E-01	NOT IDENT.
CE-139	2.039E-02	4.186E-02	8.236E-02	NOT IDENT.
BA-140	-1.287E+00	2.513E+00	3.954E+00	NOT IDENT.
LA-140	6.533E-01	1.081E+00	2.404E+00	NOT IDENT.
CE-141	-6.647E-02	1.495E-01	2.774E-01	NOT IDENT.
CE-143	0.000E+00	3.987E+10	0.000E+00	SHORT HLIF
CE-144	-2.379E-01	2.266E-01	4.018E-01	NOT IDENT.
PM-144	6.003E-03	4.134E-02	8.265E-02	NOT IDENT.
PR-144	4.464E-01	3.153E+00	6.303E+00	NOT IDENT.
PM-146	-6.738E-03	5.425E-02	9.797E-02	NOT IDENT.
ND-147	-9.922E-01	7.719E+00	1.387E+01	NOT IDENT.
PM-147	2.108E+02	8.469E+02	1.532E+03	NOT IDENT.
PM-149	0.000E+00	1.435E+07	0.000E+00	SHORT HLIF
EU-150	2.872E-02	3.441E-02	6.455E-02	FAIL ABUN
EU-152	-5.139E-02	1.246E-01	2.195E-01	NOT IDENT.
GD-153	4.782E-02	1.147E-01	1.997E-01	NOT IDENT.
EU-154	8.961E-03	1.517E-01	3.075E-01	NOT IDENT.
EU-155	-5.151E-02	1.325E-01	2.252E-01	FAIL ABUN
TB-160	-9.990E-02	2.493E-01	4.469E-01	FAIL ABUN
HO-166M	-4.615E-02	6.681E-02	1.161E-01	FAIL ABUN
TM-171	1.895E+01	3.418E+01	6.598E+01	NOT IDENT.
HF-172	-3.545E-03	2.283E-01	3.994E-01	FAIL ABUN

LU-172	5.619E-02	7.235E-02	1.630E-01	FAIL ABUN
LU-176	1.217E-02	3.012E-02	5.904E-02	FAIL ABUN
HF-181	7.305E-02	9.388E-02	1.945E-01	NOT IDENT.
TA-182	4.878E-02	2.397E-01	5.058E-01	FAIL ABUN
RE-183	-1.318E-02	4.229E-01	7.767E-01	NOT IDENT.
RE-184	-1.162E-01	3.771E-01	6.553E-01	NOT IDENT.
W-188	1.720E+01	1.415E+01	2.725E+01	FAIL ABUN
IR-192	-6.817E-02	5.889E-02	9.431E-02	FAIL ABUN
HG-203	-8.316E-02	8.513E-02	1.426E-01	NOT IDENT.
TL-204	1.391E+00	6.946E+00	1.179E+01	NOT IDENT.
BI-207	1.998E-02	5.054E-02	1.099E-01	FAIL ABUN
BI-210	3.225E+00	7.249E+00	1.402E+01	NOT IDENT.
PB-210	3.225E+00	7.249E+00	1.402E+01	NOT IDENT.
PB-211	-3.121E-01	9.352E-01	1.644E+00	NOT IDENT.
BI-212	-4.543E-02	5.403E-01	1.049E+00	NOT IDENT.
BI-213	-1.938E-02	1.196E-01	2.171E-01	NOT IDENT.
RN-219	2.908E-01	5.413E-01	1.054E+00	FAIL ABUN
RA-223	2.562E-03	7.802E-01	1.450E+00	FAIL ABUN
AC-225	-7.233E+00	9.752E+00	1.714E+01	NOT IDENT.
AC-227	-1.289E-01	2.820E-01	5.058E-01	NOT IDENT.
TH-227	-1.289E-01	2.820E-01	5.058E-01	NOT IDENT.
TH-229	-5.811E-01	5.579E-01	9.653E-01	FAIL ABUN
PA-231	2.038E-01	5.670E-01	1.095E+00	NOT IDENT.
TH-231	2.562E-03	7.802E-01	1.450E+00	FAIL ABUN
PA-233	-8.197E-03	7.936E-02	1.460E-01	NOT IDENT.
PA-234	1.746E-01	3.113E-01	6.849E-01	NOT IDENT.
PA-234M	2.290E-01	5.876E+00	1.157E+01	NOT IDENT.
U-235	-3.271E-03	2.315E-01	4.409E-01	FAIL ABUN
NP-237	-8.197E-03	7.936E-02	1.460E-01	NOT IDENT.
NP-238	0.000E+00	5.328E+06	0.000E+00	SHORT HLIF
NP-239	-7.150E-02	2.897E-01	4.990E-01	NOT IDENT.
PU-239	3.108E+02	4.244E+02	7.864E+02	NOT IDENT.
AM-241	2.285E-02	2.232E-01	3.848E-01	NOT IDENT.
CM-243	2.956E-02	1.256E-01	2.274E-01	NOT IDENT.
BK-247	-2.113E-02	8.998E-02	1.575E-01	NOT IDENT.
CM-247	-8.028E-03	5.067E-02	9.093E-02	NOT IDENT.
CF-249	-1.418E-02	4.380E-02	7.820E-02	NOT IDENT.
CF-251	-1.321E-01	1.526E-01	2.351E-01	NOT IDENT.
ANH-511	-1.745E-02	5.867E-02	1.272E-01	NOT IDENT.

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	69	10.66*	9.549E-01	4.320E+00	4.320E+00	29.35
AS-74	595.83	6	59.00*	2.070E+00	3.333E-02	2.640E-01	183.01
	634.78	-----	15.40	1.970E+00	-----	Line Not Found	-----
KR-85	514.00	17	0.43*	2.326E+00	1.096E+01	1.106E+01	143.80
SR-85	514.00	17	96.00*	2.326E+00	4.954E-02	8.736E-02	143.80
CD-109	88.03	32	3.70*	4.534E+00	1.225E+00	1.327E+00	182.82
SN-126	64.28	29	9.60	2.092E+00	9.251E-01	9.251E-01	131.79
	86.94	32	8.90	4.534E+00	5.094E-01	5.094E-01	182.82
	87.57	32	37.00*	4.534E+00	1.225E-01	1.225E-01	182.82
I-131	80.19	-----	2.62	3.977E+00	-----	Line Not Found	-----
	284.31	-----	6.12	3.652E+00	-----	Line Not Found	-----
	364.49	26	81.50*	3.033E+00	6.686E-02	6.519E+00	87.68
	636.99	-----	7.16	1.964E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	3.720E+00	-----	Line Not Found	-----
	583.19	37	85.00*	2.110E+00	1.314E-01	1.314E-01	48.00
	860.56	-----	12.50	1.522E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.233E+00	-----	Line Not Found	-----
	351.06	287	12.92*	3.110E+00	4.524E+00	4.524E+00	14.90
PB-212	74.82	100	10.28	3.423E+00	1.806E+00	1.806E+00	51.66
	77.11	119	17.10	3.670E+00	1.198E+00	1.198E+00	43.07
	238.63	206	43.60*	4.159E+00	7.176E-01	7.176E-01	19.53
	300.09	-----	3.30	3.507E+00	-----	Line Not Found	-----
BI-214	609.32	227	45.49*	2.036E+00	1.552E+00	1.552E+00	16.34
	1120.29	51	14.92	1.202E+00	1.784E+00	1.784E+00	30.94
	1764.49	30	15.30	8.345E-01	1.499E+00	1.499E+00	43.13
PB-214	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.330E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
RN-222	609.32	227	45.49*	2.036E+00	1.552E+00	1.552E+00	16.34
	1120.29	51	14.92	1.202E+00	1.784E+00	1.784E+00	30.94
	1764.49	30	15.30	8.345E-01	1.499E+00	1.499E+00	43.13
RA-224	240.99	104	4.10*	4.115E+00	3.890E+00	3.890E+00	33.37
RA-226	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.330E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
AC-228	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
RA-228	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
TH-228	74.82	100	10.28	3.423E+00	1.806E+00	1.806E+00	51.66
	77.11	119	17.10	3.670E+00	1.198E+00	1.198E+00	43.07
	238.63	206	43.60*	4.159E+00	7.176E-01	7.176E-01	19.53
	300.09	-----	3.30	3.507E+00	-----	Line Not Found	-----
TH-230	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.329E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
TH-232	105.21	-----	1.10	5.416E+00	-----	Line Not Found	-----
	338.32	20	11.27	3.200E+00	3.529E-01	3.529E-01	114.89
	835.71	-----	1.61	1.562E+00	-----	Line Not Found	-----
	911.20	41	25.80*	1.447E+00	6.884E-01	6.884E-01	38.90
	968.97	40	15.80	1.369E+00	1.162E+00	1.162E+00	36.49
TH-234	63.29	29	3.70*	2.092E+00	2.400E+00	2.400E+00	131.79
	92.59	66	4.23	4.898E+00	2.017E+00	2.017E+00	91.64
U-234	74.82	100	5.80	3.423E+00	3.202E+00	3.202E+00	51.66
	77.11	119	9.70	3.670E+00	2.113E+00	2.113E+00	43.07
	87.09	32	3.41	4.534E+00	1.329E+00	1.329E+00	182.82
	242.00	104	7.25	4.115E+00	2.200E+00	2.200E+00	33.37
	295.22	169	18.42	3.550E+00	1.636E+00	1.636E+00	21.98
	351.93	287	35.60*	3.110E+00	1.642E+00	1.642E+00	14.90
U-238	63.29	29	3.70*	2.092E+00	2.400E+00	2.400E+00	131.79
	92.59	66	4.23	4.898E+00	2.017E+00	2.017E+00	91.64
AM-243	43.53	-----	5.90	2.506E-01	-----	Line Not Found	-----
	74.66	100	67.20*	3.423E+00	2.763E-01	2.763E-01	51.66

Flag: "\*" = Keyline

Total number of lines in spectrum 36  
 Number of unidentified lines 9  
 Number of lines tentatively identified by NID 27 75.00%

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	4.320E+00	4.320E+00	1.268E+00	29.35	
AS-74	17.77D	7.92	3.333E-02	2.640E-01	4.832E-01	183.01	
KR-85	10.56Y	1.01	1.096E+01	1.106E+01	1.591E+01	143.80	
SR-85	64.84D	1.76	4.954E-02	8.736E-02	12.56E-02	143.80	
CD-109	461.40D	1.08	1.225E+00	1.327E+00	2.426E+00	182.82	
SN-126	2.30E+05Y	1.00	1.225E-01	1.225E-01	2.240E-01	182.82	
I-131	8.03D	97.5	6.686E-02	6.519E+00	5.716E+00	87.68	
TL-208	1.41E+10Y	1.00	1.314E-01	1.314E-01	0.631E-01	48.00	
BI-211	7.04E+08Y	1.00	4.524E+00	4.524E+00	0.674E+00	14.90	
PB-212	1.41E+10Y	1.00	7.176E-01	7.176E-01	1.401E-01	19.53	
BI-214	1600.00Y	1.00	1.552E+00	1.552E+00	0.254E+00	16.34	
PB-214	1600.00Y	1.00	1.642E+00	1.642E+00	0.245E+00	14.90	
RN-222	1600.00Y	1.00	1.552E+00	1.552E+00	0.254E+00	16.34	
RA-224	1.41E+10Y	1.00	3.890E+00	3.890E+00	1.298E+00	33.37	
RA-226	1600.00Y	1.00	1.642E+00	1.642E+00	0.245E+00	14.90	
AC-228	1.41E+10Y	1.00	6.884E-01	6.884E-01	2.678E-01	38.90	
RA-228	1.41E+10Y	1.00	6.884E-01	6.884E-01	2.678E-01	38.90	
TH-228	1.41E+10Y	1.00	7.176E-01	7.176E-01	1.401E-01	19.53	
TH-230	7.54E+04Y	1.00	1.642E+00	1.642E+00	0.245E+00	14.90	
TH-232	1.41E+10Y	1.00	6.884E-01	6.884E-01	2.678E-01	38.90	
TH-234	4.47E+09Y	1.00	2.400E+00	2.400E+00	3.163E+00	131.79	
U-234	2.45E+05Y	1.00	1.642E+00	1.642E+00	0.245E+00	14.90	
U-238	4.47E+09Y	1.00	2.400E+00	2.400E+00	3.163E+00	131.79	
AM-243	7370.00Y	1.00	2.763E-01	2.763E-01	1.428E-01	51.66	
Total Activity :			4.357E+01	5.050E+01			

Grand Total Activity : 4.357E+01 5.050E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit



It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	175.55	30	49	1.88	351.81	348	7	7.93E-03	88.0	5.08E+00	T
0	185.75	71	103	0.79	372.23	369	8	1.90E-02	59.3	4.92E+00	T
0	231.08	32	72	1.45	462.98	457	11	8.68E-03	****	4.25E+00	
0	270.76	33	65	1.92	542.42	537	10	8.95E-03	98.4	3.79E+00	T
0	421.95	22	39	0.68	845.12	836	15	6.19E-03	****	2.71E+00	
0	544.51	29	23	4.37	1090.48	1080	20	8.05E-03	91.8	2.23E+00	
0	651.34	10	6	0.59	1304.36	1295	13	2.92E-03	****	1.93E+00	
5	664.25	19	0	2.29	1330.20	1323	19	5.47E-03	57.4	1.90E+00	T
5	668.61	13	0	2.37	1338.94	1323	19	3.57E-03	51.6	1.89E+00	T
0	673.99	14	5	0.72	1349.71	1345	10	3.89E-03	80.2	1.88E+00	
0	768.08	22	8	2.02	1538.07	1532	15	6.29E-03	67.9	1.68E+00	T
0	785.29	12	9	0.83	1572.52	1567	10	3.41E-03	****	1.65E+00	
0	934.11	17	4	1.41	1870.46	1865	9	4.86E-03	64.8	1.42E+00	T
0	1032.87	7	3	1.63	2068.15	2064	8	2.15E-03	****	1.29E+00	
0	1539.41	8	0	0.83	3082.11	3078	8	2.50E-03	66.7	9.17E-01	
2	1762.14	12	0	2.60	3527.95	3525	14	3.70E-03	54.7	8.35E-01	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278003.CNF;1
* Acquisition date   : 30-OCT-2023 08:53:34 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 01:00:00.55 Half life ratio  : *****
* Sample date       : 7-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID         : G640278003 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.1858E+02 GRAM
* Wet wt corr       : 1.00000 Wet Weight      : 0.00000
*                               Dry Weight      : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 8-FEB-2023 07:28:36 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;20
*****

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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	3.200E-01
AS-74	3.681E-01
KR-85	6.522E+00
SR-85	5.150E-02
CD-109	8.690E-01
SN-126	8.077E-02
I-131	2.578E+00
TL-208	3.621E-02
BI-211	1.939E-01
PB-212	5.041E-02
BI-214	7.380E-02
PB-214	7.052E-02
RN-222	7.380E-02
RA-224	5.405E-01
RA-226	7.052E-02
AC-228	1.071E-01
RA-228	1.071E-01
TH-228	5.041E-02
TH-230	7.052E-02
TH-232	1.071E-01
TH-234	1.525E+00
U-234	7.052E-02
U-238	1.525E+00
AM-243	5.960E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	5.075E-01	NOT IDENT.
NA-22	4.711E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.992E-02	NOT IDENT.
SC-46	4.717E-02	FAIL ABUN
V-48	2.532E-01	NOT IDENT.
CR-51	9.057E-01	NOT IDENT.

MN-52	2.143E+01	FAIL ABUN
MN-54	3.880E-02	NOT IDENT.
CO-56	4.190E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.553E-02	NOT IDENT.
CO-58	5.420E-02	NOT IDENT.
FE-59	1.655E-01	NOT IDENT.
CO-60	3.251E-02	NOT IDENT.
ZN-65	9.522E-02	NOT IDENT.
GE-68	1.154E+00	NOT IDENT.
AS-73	1.883E+00	NOT IDENT.
SE-75	4.886E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	7.079E-01	NOT IDENT.
RB-83	1.012E-01	NOT IDENT.
RB-84	1.414E-01	NOT IDENT.
RB-86	2.861E+00	NOT IDENT.
Y-88	0.000E+00	NOT IDENT.
Y-91	3.631E+01	NOT IDENT.
NB-94	2.465E-02	NOT IDENT.
NB-95	6.007E-02	NOT IDENT.
NB-95M	1.749E-01	NOT IDENT.
ZR-95	1.059E-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	3.096E-02	NOT IDENT.
RH-102	5.309E-02	FAIL ABUN
RU-103	7.195E-02	FAIL ABUN
RH-106	3.095E-01	NOT IDENT.
RU-106	3.095E-01	NOT IDENT.
AG-108M	3.190E-02	NOT IDENT.
AG-110	7.644E-01	NOT IDENT.
AG-110M	5.523E-02	NOT IDENT.
SN-113	5.480E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	4.014E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.663E-02	NOT IDENT.
SB-124	1.352E-01	NOT IDENT.
SB-125	9.971E-02	FAIL ABUN
TE-125M	1.599E+01	NOT IDENT.
I-126	1.748E+00	NOT IDENT.
SB-126	1.061E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.099E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.859E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	8.267E-01	FAIL ABUN
BA-137M	3.194E-02	NOT IDENT.
CS-137	3.374E-02	NOT IDENT.
LA-138	6.127E-02	NOT IDENT.
CE-139	3.847E-02	NOT IDENT.
BA-140	1.696E+00	NOT IDENT.
LA-140	1.023E+00	NOT IDENT.
CE-141	1.286E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.850E-01	NOT IDENT.
PM-144	3.609E-02	NOT IDENT.
PR-144	2.752E+00	NOT IDENT.
PM-146	4.371E-02	NOT IDENT.
ND-147	6.111E+00	NOT IDENT.
PM-147	7.096E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.948E-02	FAIL ABUN
EU-152	9.939E-02	NOT IDENT.
GD-153	9.303E-02	NOT IDENT.
EU-154	1.307E-01	NOT IDENT.
EU-155	1.048E-01	FAIL ABUN
TB-160	1.917E-01	FAIL ABUN
HO-166M	4.917E-02	FAIL ABUN
TM-171	3.076E+01	NOT IDENT.
HF-172	1.853E-01	FAIL ABUN
LU-172	6.983E-02	FAIL ABUN

LU-176	2.684E-02	FAIL ABUN
HF-181	8.683E-02	NOT IDENT.
TA-182	2.137E-01	FAIL ABUN
RE-183	3.590E-01	NOT IDENT.
RE-184	2.841E-01	NOT IDENT.
W-188	1.261E+01	FAIL ABUN
IR-192	4.204E-02	FAIL ABUN
HG-203	6.500E-02	NOT IDENT.
TL-204	5.517E+00	NOT IDENT.
BI-207	4.580E-02	FAIL ABUN
BI-210	6.509E+00	NOT IDENT.
PB-210	6.509E+00	NOT IDENT.
PB-211	7.404E-01	NOT IDENT.
BI-212	4.513E-01	NOT IDENT.
BI-213	9.585E-02	NOT IDENT.
RN-219	4.803E-01	FAIL ABUN
RA-223	6.595E-01	FAIL ABUN
AC-225	7.888E+00	NOT IDENT.
AC-227	2.298E-01	NOT IDENT.
TH-227	2.298E-01	NOT IDENT.
TH-229	4.415E-01	FAIL ABUN
PA-231	5.014E-01	NOT IDENT.
TH-231	6.595E-01	FAIL ABUN
PA-233	6.642E-02	NOT IDENT.
PA-234	2.914E-01	NOT IDENT.
PA-234M	5.020E+00	NOT IDENT.
U-235	2.061E-01	FAIL ABUN
NP-237	6.642E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.299E-01	NOT IDENT.
PU-239	3.688E+02	NOT IDENT.
AM-241	1.776E-01	NOT IDENT.
CM-243	1.059E-01	NOT IDENT.
BK-247	7.122E-02	NOT IDENT.
CM-247	4.120E-02	NOT IDENT.
CF-249	3.457E-02	NOT IDENT.
CF-251	1.076E-01	NOT IDENT.
ANH-511	5.994E-02	NOT IDENT.

```

*****
*
*               GEL Laboratories LLC
*               2040 Savage Road
*               Charleston, SC 29407
*****
*
*               DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278003.CNF;1
* Acquisition date   : 30-OCT-2023 08:53:34 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 01:00:00.55 Half life ratio  : *****
* Sample date        : 7-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID          : G640278003 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.1858E+02 GRAM
*                   : Quantity Err(%) : 1.6866E-03 %
* Wet wt corr        : 1.00000 Wet Weight      : 0.00000
*                   : Dry Weight      : 0.00000
*****
*
*               CALIBRATION INFORMATION
*
* Eff. Cal. date     : 8-FEB-2023 07:28:36 Eff. Geometry   : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM08_CAN.CNF;20
*****

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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	4.320E+00	1.308E+00	1.308E+00
AS-74	2.640E-01	4.744E-01	4.744E-01
KR-85	1.106E+01	1.562E+01	1.562E+01
SR-85	8.736E-02	1.233E-01	1.233E-01
CD-109	1.327E+00	2.381E+00	2.381E+00
SN-126	1.225E-01	2.198E-01	2.198E-01
I-131	6.519E+00	5.630E+00	5.630E+00
TL-208	1.314E-01	6.285E-02	6.285E-02
BI-211	4.524E+00	7.705E-01	7.705E-01
PB-212	7.176E-01	1.519E-01	1.519E-01
BI-214	1.552E+00	2.825E-01	2.825E-01
PB-214	1.642E+00	2.784E-01	2.784E-01
RN-222	1.552E+00	2.825E-01	2.825E-01
RA-224	3.890E+00	1.321E+00	1.321E+00
RA-226	1.642E+00	2.784E-01	2.784E-01
AC-228	6.884E-01	2.711E-01	2.711E-01
RA-228	6.884E-01	2.711E-01	2.711E-01
TH-228	7.176E-01	1.519E-01	1.519E-01
TH-230	1.642E+00	2.784E-01	2.784E-01
TH-232	6.884E-01	2.711E-01	2.711E-01
TH-234	2.400E+00	3.149E+00	3.149E+00
U-234	1.642E+00	2.784E-01	2.784E-01
U-238	2.400E+00	3.149E+00	3.149E+00
AM-243	2.763E-01	1.418E-01	1.418E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-6.179E-02	6.310E-01	6.316E-01	NOT IDENT.
NA-22	3.472E-03	5.464E-02	5.466E-02	NOT IDENT.
NA-24	-1.145E+24	1.532E+24	0.000E+00	SHORT HLIF
AL-26	1.400E-02	4.379E-02	4.424E-02	NOT IDENT.
SC-46	-5.583E-02	6.865E-02	7.312E-02	FAIL ABUN
V-48	-2.013E-01	3.653E-01	3.764E-01	NOT IDENT.

CR-51	-3.075E-02	1.075E+00	1.075E+00	NOT IDENT.
MN-52	-1.402E+01	2.996E+01	3.062E+01	FAIL ABUN
MN-54	-4.386E-03	4.712E-02	4.716E-02	NOT IDENT.
CO-56	-5.284E-03	5.141E-02	5.146E-02	NOT IDENT.
MN-56	1.000E+41	5.869E+41	0.000E+00	SHORT HLIF
CO-57	-4.510E-03	3.184E-02	3.191E-02	NOT IDENT.
CO-58	5.384E-02	5.283E-02	5.813E-02	NOT IDENT.
FE-59	1.246E-01	1.735E-01	1.823E-01	NOT IDENT.
CO-60	-4.028E-02	4.906E-02	5.231E-02	NOT IDENT.
ZN-65	9.128E-03	1.312E-01	1.313E-01	NOT IDENT.
GE-68	-1.447E+00	1.766E+00	1.883E+00	NOT IDENT.
AS-73	1.533E+00	2.084E+00	2.196E+00	NOT IDENT.
SE-75	-3.942E-02	6.178E-02	6.429E-02	NOT IDENT.
BR-77	7.114E+06	1.100E+07	1.145E+07	SHORT HLIF
SR-82	-5.395E-01	9.634E-01	9.936E-01	NOT IDENT.
RB-83	1.787E-02	1.135E-01	1.138E-01	NOT IDENT.
RB-84	-4.105E-02	1.784E-01	1.794E-01	NOT IDENT.
RB-86	-2.056E+00	3.996E+00	4.102E+00	NOT IDENT.
Y-88	-1.179E-02	2.313E-02	2.373E-02	NOT IDENT.
Y-91	1.911E+01	3.909E+01	4.003E+01	NOT IDENT.
NB-94	-8.825E-03	3.087E-02	3.113E-02	NOT IDENT.
NB-95	4.580E-02	6.868E-02	7.171E-02	NOT IDENT.
NB-95M	2.585E-01	2.256E-01	2.539E-01	NOT IDENT.
ZR-95	2.487E-02	1.205E-01	1.210E-01	NOT IDENT.
NB-97	-1.000E+41	1.192E+42	0.000E+00	SHORT HLIF
ZR-97	7.543E+21	3.584E+22	0.000E+00	SHORT HLIF
MO-99	-8.541E+04	2.122E+05	2.157E+05	SHORT HLIF
TC-99M	-1.000E+41	4.215E+41	0.000E+00	SHORT HLIF
RH-101	-9.989E-03	3.920E-02	3.946E-02	NOT IDENT.
RH-102	2.182E-02	5.800E-02	5.883E-02	FAIL ABUN
RU-103	-2.687E-03	8.876E-02	8.877E-02	FAIL ABUN
RH-106	-1.563E-01	3.863E-01	3.927E-01	NOT IDENT.
RU-106	-1.563E-01	3.863E-01	3.927E-01	NOT IDENT.
AG-108M	-2.432E-02	4.212E-02	4.353E-02	NOT IDENT.
AG-110	2.864E-01	8.992E-01	9.084E-01	NOT IDENT.
AG-110M	2.612E-02	6.072E-02	6.185E-02	NOT IDENT.
SN-113	1.436E-02	6.371E-02	6.404E-02	NOT IDENT.
CD-115	5.677E+05	2.035E+06	2.051E+06	SHORT HLIF
SN-117M	4.320E-02	4.488E-01	4.492E-01	NOT IDENT.
SB-122	-1.366E+04	3.490E+04	3.544E+04	SHORT HLIF
TE-123M	3.560E-03	4.098E-02	4.101E-02	NOT IDENT.
SB-124	6.172E-04	1.631E-01	1.631E-01	NOT IDENT.
SB-125	-2.934E-04	1.208E-01	1.208E-01	FAIL ABUN
TE-125M	2.162E+00	1.928E+01	1.930E+01	NOT IDENT.
I-126	1.297E+00	1.881E+00	1.970E+00	NOT IDENT.
SB-126	5.796E-02	1.238E+00	1.238E+00	NOT IDENT.
SB-127	1.224E+03	1.483E+03	1.582E+03	SHORT HLIF
I-132	1.000E+41	3.310E+41	0.000E+00	SHORT HLIF
TE-132	1.666E+03	3.208E+03	3.295E+03	SHORT HLIF
BA-133	2.702E-02	4.959E-02	5.106E-02	NOT IDENT.
I-133	-2.659E+16	1.215E+17	0.000E+00	SHORT HLIF
CS-134	-7.000E-03	5.942E-02	5.950E-02	NOT IDENT.
I-135	1.000E+41	5.864E+41	0.000E+00	SHORT HLIF
CS-136	2.409E-01	9.557E-01	9.619E-01	FAIL ABUN
BA-137M	5.202E-03	4.107E-02	4.114E-02	NOT IDENT.
CS-137	5.496E-03	4.339E-02	4.346E-02	NOT IDENT.
LA-138	2.106E-02	6.718E-02	6.785E-02	NOT IDENT.
CE-139	2.039E-02	4.208E-02	4.307E-02	NOT IDENT.
BA-140	-1.287E+00	2.516E+00	2.582E+00	NOT IDENT.
LA-140	6.533E-01	1.083E+00	1.122E+00	NOT IDENT.
CE-141	-6.647E-02	1.496E-01	1.525E-01	NOT IDENT.
CE-143	3.085E+10	3.997E+10	4.232E+10	SHORT HLIF
CE-144	-2.379E-01	2.274E-01	2.514E-01	NOT IDENT.
PM-144	6.003E-03	4.134E-02	4.143E-02	NOT IDENT.
PR-144	4.464E-01	3.154E+00	3.160E+00	NOT IDENT.
PM-146	-6.738E-03	5.425E-02	5.433E-02	NOT IDENT.
ND-147	-9.922E-01	7.720E+00	7.733E+00	NOT IDENT.
PM-147	2.108E+02	8.471E+02	8.524E+02	NOT IDENT.
PM-149	6.996E+06	1.439E+07	1.473E+07	SHORT HLIF
EU-150	2.872E-02	3.450E-02	3.685E-02	FAIL ABUN
EU-152	-5.139E-02	1.247E-01	1.269E-01	NOT IDENT.
GD-153	4.782E-02	1.147E-01	1.167E-01	NOT IDENT.
EU-154	8.961E-03	1.517E-01	1.518E-01	NOT IDENT.
EU-155	-5.151E-02	1.326E-01	1.346E-01	FAIL ABUN
TB-160	-9.990E-02	2.495E-01	2.535E-01	FAIL ABUN
HO-166M	-4.615E-02	6.695E-02	7.011E-02	FAIL ABUN
TM-171	1.895E+01	3.424E+01	3.529E+01	NOT IDENT.
HF-172	-3.545E-03	2.283E-01	2.283E-01	FAIL ABUN

LU-172	5.619E-02	7.269E-02	7.698E-02	FAIL ABUN
LU-176	1.217E-02	3.014E-02	3.064E-02	FAIL ABUN
HF-181	7.305E-02	9.409E-02	9.969E-02	NOT IDENT.
TA-182	4.878E-02	2.397E-01	2.407E-01	FAIL ABUN
RE-183	-1.318E-02	4.229E-01	4.230E-01	NOT IDENT.
RE-184	-1.162E-01	3.774E-01	3.810E-01	NOT IDENT.
W-188	1.720E+01	1.434E+01	1.630E+01	FAIL ABUN
IR-192	-6.817E-02	5.921E-02	6.671E-02	FAIL ABUN
HG-203	-8.316E-02	8.545E-02	9.332E-02	NOT IDENT.
TL-204	1.391E+00	6.948E+00	6.976E+00	NOT IDENT.
BI-207	1.998E-02	5.057E-02	5.137E-02	FAIL ABUN
BI-210	3.225E+00	7.255E+00	7.399E+00	NOT IDENT.
PB-210	3.225E+00	7.255E+00	7.399E+00	NOT IDENT.
PB-211	-3.121E-01	9.356E-01	9.461E-01	NOT IDENT.
BI-212	-4.543E-02	5.403E-01	5.407E-01	NOT IDENT.
BI-213	-1.938E-02	1.196E-01	1.199E-01	NOT IDENT.
RN-219	2.908E-01	5.430E-01	5.586E-01	FAIL ABUN
RA-223	2.562E-03	7.802E-01	7.802E-01	FAIL ABUN
AC-225	-7.233E+00	9.793E+00	1.032E+01	NOT IDENT.
AC-227	-1.289E-01	2.827E-01	2.886E-01	NOT IDENT.
TH-227	-1.289E-01	2.827E-01	2.886E-01	NOT IDENT.
TH-229	-5.811E-01	5.600E-01	6.183E-01	FAIL ABUN
PA-231	2.038E-01	5.689E-01	5.763E-01	NOT IDENT.
TH-231	2.562E-03	7.802E-01	7.802E-01	FAIL ABUN
PA-233	-8.197E-03	7.936E-02	7.945E-02	NOT IDENT.
PA-234	1.746E-01	3.702E-01	3.784E-01	NOT IDENT.
PA-234M	2.290E-01	5.876E+00	5.877E+00	NOT IDENT.
U-235	-3.271E-03	2.315E-01	2.315E-01	FAIL ABUN
NP-237	-8.197E-03	7.936E-02	7.945E-02	NOT IDENT.
NP-238	2.547E+05	5.328E+06	5.330E+06	SHORT HLIF
NP-239	-7.150E-02	2.897E-01	2.915E-01	NOT IDENT.
PU-239	3.108E+02	4.250E+02	4.475E+02	NOT IDENT.
AM-241	2.285E-02	2.232E-01	2.234E-01	NOT IDENT.
CM-243	2.956E-02	1.256E-01	1.263E-01	NOT IDENT.
BK-247	-2.113E-02	9.009E-02	9.059E-02	NOT IDENT.
CM-247	-8.028E-03	5.069E-02	5.082E-02	NOT IDENT.
CF-249	-1.418E-02	4.383E-02	4.429E-02	NOT IDENT.
CF-251	-1.321E-01	1.536E-01	1.647E-01	NOT IDENT.
ANH-511	-1.745E-02	5.869E-02	5.922E-02	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	72.9980	85.43	81.1180	131.20	59.9048
45.60	53.8283	86.55	81.3110	133.02	66.7521
46.54	47.7616	86.79	81.3520	133.52	65.9691
49.72	0.0000	86.94	81.3778	136.00	51.1349
51.35	67.4473	87.09	81.4037	136.47	58.7221
51.87	60.1635	87.57	81.4857	140.51	0.0000
52.39	51.7995	88.03	81.5644	143.76	61.9168
52.97	42.3576	88.34	76.2274	144.24	57.7174
53.44	47.7179	88.47	76.2480	145.44	62.9215
54.07	56.3042	89.96	78.8014	152.43	60.9838
57.36	0.0000	1093.63	78.9114	153.25	58.4755
57.53	55.7876	91.11	78.9876	323.87	61.9988
57.98	50.4860	92.59	63.6909	156.02	66.4734
59.27	41.6820	93.35	63.7885	158.56	65.8429
59.32	41.6878	94.56	63.9428	159.00	62.4148
59.54	46.0278	94.65	63.9545	162.33	67.0546
60.96	41.8729	94.67	63.9570	162.66	67.0852
61.17	37.5623	94.87	54.6191	163.33	67.1455
62.93	60.9609	97.43	45.4842	165.86	56.8750
63.29	61.0182	98.43	49.5014	176.31	47.9009
63.58	61.0645	98.44	49.5023	176.60	59.8988
64.28	71.3712	99.53	61.4175	177.52	57.3036
66.73	64.4903	100.11	57.9385	181.07	0.0000
67.24	70.4434	102.03	58.1505	181.52	61.0767
125.81	76.0304	103.18	60.6551	184.41	45.7041
67.75	76.0436	103.37	55.9176	143.76	54.7544
68.89	61.8917	105.21	60.8847	193.51	52.5566
69.67	70.8696	105.31	69.2542	197.03	44.5877
70.82	65.1451	106.12	71.7494	198.01	57.3930
70.83	65.1469	106.47	70.5986	201.83	68.6310
72.81	81.4500	109.28	66.1492	203.43	56.8403
72.87	81.4617	111.00	61.5275	205.31	51.4507
74.66	81.8059	111.76	0.0000	210.85	56.3982
74.82	81.8365	114.06	47.3051	215.65	52.0534
74.97	81.8649	116.30	0.0000	218.12	59.6510
77.11	82.2704	116.74	51.1811	222.11	40.2526
78.74	79.9362	119.76	35.5216	227.09	36.7037
79.69	72.5498	121.12	45.4246	227.38	39.5395
80.03	78.6543	121.22	47.8880	228.16	0.0000
80.12	78.6713	121.78	54.0782	228.18	36.7462
80.19	54.4731	122.06	54.1034	116.74	36.7462
80.57	51.4904	122.92	56.6437	235.69	22.7917
81.00	86.4045	123.07	56.6577	235.96	30.3975
81.07	86.4179	265.00	61.6467	238.63	37.1489
81.75	74.0206	125.81	55.6763	238.98	0.0000
82.47	76.0391	127.23	64.4852	240.99	37.2385
83.79	62.5310	127.91	60.8320	242.00	37.2770
84.00	62.5594	129.30	58.4789	244.70	43.1296



ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	37.6677	563.25	21.6467
252.80	40.5794	345.93	27.2394	564.24	0.0000
254.15	0.0000	351.06	27.3468	569.33	17.1921
256.23	40.7157	351.93	27.3653	946.00	17.1938
260.90	0.0000	355.39	0.0000	569.70	14.4805
264.66	40.0699	356.01	19.0042	583.19	19.1389
264.80	37.1426	364.49	19.1254	584.27	11.6723
265.00	34.0212	366.42	0.0000	595.83	14.6763
269.46	45.1605	372.51	27.7895	427.87	18.3899
270.03	45.1839	375.05	28.9122	602.52	0.0000
271.23	45.2345	377.52	26.8183	604.72	13.2680
273.65	56.1778	356.01	25.8633	607.14	19.1877
276.40	40.5112	388.16	23.7805	609.32	21.2403
277.37	45.4918	388.63	24.8699	610.33	21.2509
277.60	45.5021	391.69	21.6728	614.28	19.2556
278.00	41.5599	264.66	21.8087	618.01	14.8394
279.20	53.4935	401.81	27.2827	620.36	18.5706
279.54	49.5463	402.40	33.8444	621.93	18.5852
279.70	49.5534	404.85	32.8076	630.19	0.0000
280.46	31.7363	410.95	20.8647	631.29	11.2017
283.69	44.7592	413.71	23.1042	633.25	11.2123
284.31	35.8279	414.70	28.0738	634.78	8.4155
285.41	25.9011	423.72	26.5820	635.95	17.7760
285.90	0.0000	427.09	18.3158	636.99	15.9126
287.50	46.9092	427.87	26.6548	657.50	11.3419
290.67	28.5249	433.94	35.6810	657.76	10.5872
293.27	0.0000	439.40	24.6175	657.90	0.0000
351.93	40.1953	440.45	21.2749	661.66	12.1215
295.96	40.2214	453.88	24.8449	664.57	0.0000
879.38	31.7467	463.37	19.3121	666.33	10.8461
299.98	34.8123	468.07	19.3678	666.50	10.8472
300.09	34.8152	473.00	0.0000	667.71	0.0000
300.13	34.8166	475.06	21.7388	677.62	10.6846
301.36	33.3384	476.78	21.7612	685.70	0.0000
302.85	39.4499	477.60	20.6261	692.65	0.0000
256.23	32.4154	482.18	13.7886	695.00	19.2297
304.85	34.4510	487.02	16.1331	696.49	14.4319
306.78	27.4032	492.35	0.0000	696.51	14.4319
308.46	31.5077	497.08	17.3883	697.00	15.3975
311.90	35.6765	505.52	17.4734	697.30	13.4745
316.51	40.9302	507.63	0.0000	697.49	10.5881
319.41	24.6172	511.00	19.2814	702.65	11.5770
320.08	28.7354	514.00	19.3145	706.68	9.6649
321.04	36.9749	514.00	19.3145	711.68	17.4348
323.87	33.9722	520.40	19.3843	720.70	11.6689
325.23	41.2240	520.69	0.0000	721.93	0.0000
328.76	22.7381	522.65	0.0000	722.78	13.6262
333.37	23.6521	527.90	0.0000	722.91	16.5471
333.97	23.3519	528.26	18.4082	723.31	16.5497
334.37	34.2609	529.59	21.2556	724.19	17.5298
338.28	33.3255	529.87	0.0000	727.33	13.6531
338.32	33.3262	531.02	20.0907	733.00	15.6416
311.90	29.7316	537.26	18.4996	735.93	12.7247
340.48	29.7316	546.56	0.0000	333.97	9.7946
340.55	29.7333	552.55	11.2743	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	9.8227	949.00	10.6207	1384.29	11.5869
747.24	18.6869	667.71	0.0000	1408.01	5.8277
748.06	10.8224	962.31	17.0708	1434.09	6.8431
752.31	18.7263	964.08	11.9571	1435.80	4.8899
753.82	15.7798	966.17	10.2560	1457.56	0.0000
756.73	11.8491	911.20	16.0405	1460.82	4.9197
756.80	12.8369	983.53	9.6718	1489.16	5.9438
884.68	11.0923	984.45	0.0000	1505.03	9.9434
765.81	7.9292	1274.44	14.0299	1584.12	6.0753
766.42	9.5174	1001.03	9.7284	1596.21	6.0917
766.84	10.9073	1002.74	10.8154	1620.50	3.0624
772.60	0.0000	1004.73	15.1514	1621.92	5.1055
776.52	12.9417	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	4.1459
778.90	11.9579	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	7.2933	1764.49	1.0525
788.74	19.2088	1038.76	0.0000	1063.66	16.8594
792.07	17.0306	631.29	5.4852	1771.35	9.4856
795.86	19.0632	1048.07	9.8778	1791.20	0.0000
810.06	6.0540	1049.04	8.7832	1808.65	3.1857
810.29	6.0546	1050.41	10.9839	1810.72	0.0000
344.28	6.0549	1063.66	5.5148	1836.06	1.0678
810.76	4.0371	1077.00	13.2913		
815.77	4.0450	1077.34	15.5082		
1048.07	13.1607	1085.87	5.5533		
832.01	8.1414	1093.63	5.5667		
834.85	14.2628	1099.45	5.5765		
835.71	14.2675	1112.07	11.1963		
836.80	0.0000	1112.84	5.9727		
846.75	0.0000	1115.54	10.7596		
846.77	8.1875	1120.29	4.4895		
856.80	15.4097	1120.55	4.4900		
860.56	12.3453	1221.41	0.0000		
871.09	10.3284	1129.67	5.4026		
873.19	17.5717	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	16.5762	1173.23	8.2085		
880.51	12.4373	1177.95	9.1333		
881.60	12.4420	1189.05	13.7432		
883.24	12.4497	1204.77	10.1240		
884.68	8.3042	1221.41	8.3219		
889.28	17.6760	1231.02	18.5430		
894.76	22.9205	1235.36	13.9241		
898.04	12.5171	1238.28	13.0067		
900.72	14.6174	1260.41	0.0000		
903.28	17.9150	1271.87	7.5008		
911.20	7.3362	1274.44	10.3211		
912.08	5.0322	1274.54	10.3211		
923.98	0.0000	1291.59	4.7131		
926.50	9.4837	1298.22	0.0000		
929.11	5.0626	1312.11	12.3208		
935.54	11.8395	1332.49	11.4340		
937.49	8.4626	1362.66	0.0000		
944.13	11.6630	1365.19	3.8436		
946.00	6.3658	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 09:56:19.71

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*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278004.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM52.CNF;21
Background date : 29-OCT-2023 11:34:09
Sample date     : 7-SEP-2023 08:30:00. Acquisition date : 30-OCT-2023 08:54:00
Sample ID      : G640278004           Sample quantity  : 1.01970E+02 GRAM
Detector name  : GAM52                Detector geometry: CAN
Elapsed live time: 0 01:00:00.00      Elapsed real time: 0 01:00:00.60  0.0%
Energy tolerance : 1.50000 keV        Analyst Initials  : MXR1
Abundance limit : 75.00000            Sensitivity       : 3.00000
Batch ID       : 2505440              Detector SN#      :
Matrix Spike ID :                      LCS ID           :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	47.38*	6	146	1.39	95.02	88	10	1.55E-03	415.9	
2	0	64.07*	13	156	0.71	128.41	123	9	3.63E-03	179.8	
3	3	74.65*	106	123	1.26	149.58	145	16	2.94E-02	21.4	2.53E+00
4	3	77.15	190	80	0.89	154.56	145	16	5.28E-02	10.0	
5	2	87.17	52	141	1.12	174.60	171	13	1.43E-02	39.5	4.36E+00
6	2	90.07	35	138	1.18	180.41	171	13	9.71E-03	56.1	
7	0	93.19*	76	114	1.93	186.66	183	10	2.10E-02	30.3	
8	0	121.15	23	40	1.12	242.58	240	6	6.49E-03	48.5	
9	0	123.98	30	46	1.04	248.22	246	7	8.19E-03	41.7	
10	0	142.98*	6	120	1.18	286.22	281	11	1.78E-03	340.2	
11	0	172.59	24	69	1.11	345.46	339	10	6.54E-03	69.5	
12	0	176.51	34	49	1.59	353.30	349	9	9.46E-03	40.9	
13	0	186.13*	51	97	0.93	372.53	368	10	1.41E-02	40.0	
14	0	209.94	38	52	0.95	420.16	416	9	1.05E-02	38.5	
15	0	213.94	20	63	1.29	428.15	425	9	5.68E-03	72.5	
16	5	238.58*	224	32	0.89	477.43	470	19	6.23E-02	7.8	9.56E-01
17	5	241.54*	119	44	1.88	483.35	470	19	3.30E-02	18.0	
18	0	271.23	19	47	1.27	542.74	538	8	5.25E-03	66.6	
19	6	295.20*	162	34	1.25	590.67	587	11	4.50E-02	9.8	9.81E+00
20	6	297.22	9	25	1.56	594.72	587	11	2.58E-03	139.1	
21	0	301.06	26	52	3.91	602.41	597	12	7.11E-03	59.3	
22	5	324.96	22	36	2.01	650.21	644	16	5.98E-03	60.6	5.90E-01
23	5	328.32	21	11	1.30	656.93	644	16	5.96E-03	36.0	
24	0	332.79	14	36	0.83	665.85	663	8	3.75E-03	80.1	
25	0	338.82	48	44	0.91	677.93	674	9	1.34E-02	28.7	
26	0	351.93*	235	50	1.28	704.15	698	12	6.52E-02	9.0	
27	0	384.93	20	18	1.56	770.15	765	9	5.56E-03	44.3	
28	0	425.01	16	32	4.28	850.30	841	15	4.45E-03	82.4	
29	0	437.88	21	17	1.54	876.05	870	11	5.69E-03	44.3	
30	0	461.82*	31	18	1.61	923.93	918	12	8.51E-03	34.0	
31	0	511.28*	7	55	1.68	1022.86	1016	16	1.85E-03	288.3	
32	0	583.44*	75	21	1.28	1167.18	1160	14	2.07E-02	17.9	
33	0	588.31	12	10	0.78	1176.94	1173	8	3.30E-03	54.6	
34	0	609.35*	164	23	1.33	1219.03	1211	16	4.55E-02	10.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	656.34	16	13	0.99	1313.00	1309	10	4.46E-03	48.4	
36	0	690.96	10	6	1.39	1382.26	1378	8	2.84E-03	51.8	
37	0	717.40	23	0	0.78	1435.13	1431	10	6.39E-03	20.9	
38	0	768.31	23	14	1.42	1536.96	1531	11	6.48E-03	37.1	
39	0	796.32	9	18	1.56	1593.00	1585	12	2.62E-03	100.6	
40	0	831.42	11	5	1.01	1663.20	1659	7	2.99E-03	46.6	
41	0	838.26	12	5	1.46	1676.89	1673	9	3.40E-03	46.4	
42	0	860.96	9	4	1.37	1722.29	1719	6	2.40E-03	51.4	
43	0	911.70*	51	23	1.59	1823.79	1818	15	1.41E-02	25.2	
44	0	948.90	16	3	4.68	1898.19	1892	12	4.49E-03	32.7	
45	0	969.40*	15	22	1.15	1939.21	1933	9	4.30E-03	62.1	
46	0	1039.47	14	5	2.88	2079.36	2073	10	3.89E-03	40.1	
47	0	1050.64	20	0	4.41	2101.70	2096	12	5.56E-03	22.4	
48	0	1107.02	9	22	0.99	2214.49	2204	17	2.63E-03	124.7	
49	0	1120.34	43	13	0.71	2241.13	2232	17	1.20E-02	24.3	
50	0	1126.44	6	4	1.31	2253.33	2249	8	1.67E-03	70.7	
51	0	1186.34	11	4	0.67	2373.14	2369	7	2.92E-03	42.7	
52	0	1190.56	6	3	0.90	2381.58	2378	6	1.67E-03	61.2	
53	0	1243.92	15	3	2.43	2488.33	2485	8	4.20E-03	33.7	
54	0	1460.53*	265	7	1.87	2921.64	2916	13	7.37E-02	6.5	
55	0	1507.91	12	0	3.85	3016.42	3011	10	3.33E-03	28.9	
56	0	1661.08	6	0	1.37	3322.83	3319	7	1.67E-03	40.8	
57	0	1764.21*	19	6	2.00	3529.14	3523	12	5.22E-03	36.3	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278004.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 7-SEP-2023 08:30:00 Acquisition date : 30-OCT-2023 08:54:00  
Sample ID : G640278004 Sample quantity : 101.97 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA52 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.60 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

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	248	10.66*	1.120E+00	1.531E+01	1.531E+01	13.06
CO-57	122.06	23	85.60*	7.601E+00	2.596E-02	2.973E-02	96.97
	136.47	-----	10.68	7.377E+00	-----	Line Not Found	-----
CD-109	88.03	51	3.70*	7.062E+00	1.438E+00	1.557E+00	79.01
AG-110	657.50	15	4.50*	2.341E+00	1.066E+00	1.235E+00	96.71
SN-126	64.28	13	9.60	4.692E+00	2.122E-01	2.122E-01	359.64
	86.94	51	8.90	7.062E+00	5.978E-01	5.978E-01	79.01
	87.57	51	37.00*	7.062E+00	1.438E-01	1.438E-01	79.01
PM-147	121.22	23	0.00*	7.601E+00	7.798E+02	8.103E+02	96.97
TL-208	277.37	-----	6.60	4.751E+00	-----	Line Not Found	-----
	583.19	71	85.00*	2.596E+00	2.370E-01	2.370E-01	35.75
	860.56	8	12.50	1.826E+00	2.638E-01	2.638E-01	102.71
BI-210	46.54	6	4.25*	1.847E+00	5.235E-01	5.259E-01	831.74
PB-210	46.54	6	4.25*	1.847E+00	5.235E-01	5.259E-01	831.74
BI-211	72.87	-----	1.23	5.868E+00	-----	Line Not Found	-----
	351.06	226	12.92*	3.945E+00	3.260E+00	3.260E+00	18.06
PB-212	74.82	105	10.28	6.064E+00	1.240E+00	1.240E+00	42.77
	77.11	189	17.10	6.314E+00	1.285E+00	1.285E+00	19.90
	238.63	217	43.60*	5.318E+00	6.906E-01	6.906E-01	15.54
	300.09	25	3.30	4.460E+00	1.236E+00	1.236E+00	118.70
BI-214	609.32	156	45.49*	2.500E+00	1.010E+00	1.010E+00	21.00
	1120.29	41	14.92	1.424E+00	1.409E+00	1.409E+00	48.55
	1764.49	18	15.30	9.674E-01	8.717E-01	8.717E-01	72.54
PB-214	74.82	105	5.80	6.064E+00	2.197E+00	2.198E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
RN-222	609.32	156	45.49*	2.500E+00	1.010E+00	1.010E+00	21.00
	1120.29	41	14.92	1.424E+00	1.409E+00	1.409E+00	48.55
	1764.49	18	15.30	9.674E-01	8.717E-01	8.717E-01	72.54
RA-224	240.99	115	4.10*	5.270E+00	3.926E+00	3.926E+00	35.90
RA-226	74.82	105	5.80	6.064E+00	2.197E+00	2.198E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
AC-228	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----
	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30
RA-228	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----
	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	105	10.28	6.064E+00	1.240E+00	1.240E+00	42.77
	77.11	189	17.10	6.314E+00	1.285E+00	1.285E+00	19.90
	238.63	217	43.60*	5.318E+00	6.906E-01	6.906E-01	15.54
	300.09	25	3.30	4.460E+00	1.236E+00	1.236E+00	118.70
TH-230	74.82	105	5.80	6.064E+00	2.197E+00	2.197E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
PA-231	283.69	-----	1.70	4.669E+00	-----	Line Not Found	-----
	301.36	25	5.35*	4.460E+00	7.626E-01	7.626E-01	118.70
TH-232	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----
	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
TH-234	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30
	63.29	13	3.70*	4.692E+00	5.505E-01	5.505E-01	359.64
	92.59	75	4.23	7.341E+00	1.774E+00	1.774E+00	60.52
U-234	74.82	105	5.80	6.064E+00	2.197E+00	2.197E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
U-235	89.96	35	3.47	7.210E+00	1.016E+00	1.016E+00	112.30
	93.35	75	5.60	7.341E+00	1.340E+00	1.340E+00	60.52
	143.76	6	10.96*	7.251E+00	5.799E-02	5.799E-02	680.46
	163.33	-----	5.08	6.810E+00	-----	Line Not Found	-----
	185.72	49	57.20	6.308E+00	1.007E-01	1.007E-01	80.01
	205.31	-----	5.01	5.915E+00	-----	Line Not Found	-----
U-238	63.29	13	3.70*	4.692E+00	5.505E-01	5.505E-01	359.64
	92.59	75	4.23	7.341E+00	1.774E+00	1.774E+00	60.52
AM-243	43.53	-----	5.90	1.248E+00	-----	Line Not Found	-----
	74.66	105	67.20*	6.064E+00	1.897E-01	1.897E-01	42.77
ANH-511	511.00	6	100.00*	2.907E+00	1.609E-02	1.609E-02	576.68

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278004.CNF;1
* Acquisition date   : 30-OCT-2023 08:54:00 Sensitivity      : 3.000
* Detector ID       : GAM52 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.60 Half life ratio : *****
* Sample date       : 7-SEP-2023 08:30:00 Analyst initials: MXR1
* Sample ID         : G640278004 Sample Quantity : 1.0197E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 1-SEP-2023 08:30:22 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM52_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	1.531E+01	1.959E+00	8.469E-01
CO-57	2.973E-02	2.825E-02	3.082E-02
CD-109	1.557E+00	1.206E+00	1.472E+00
AG-110	1.235E+00	1.171E+00	1.671E+00
SN-126	1.438E-01	1.114E-01	1.363E-01
PM-147	8.103E+02	7.701E+02	1.129E+03
TL-208	2.370E-01	8.302E-02	7.601E-02
BI-210	5.259E-01	4.286E+00	3.880E+00
PB-210	5.259E-01	4.286E+00	3.880E+00
BI-211	3.260E+00	5.771E-01	3.818E-01
PB-212	6.906E-01	1.052E-01	9.285E-02
BI-214	1.010E+00	2.079E-01	1.064E-01
PB-214	1.183E+00	2.094E-01	1.389E-01
RN-222	1.010E+00	2.079E-01	1.064E-01
RA-224	3.926E+00	1.381E+00	9.954E-01
RA-226	1.183E+00	2.094E-01	1.389E-01
AC-228	7.918E-01	3.908E-01	3.208E-01
RA-228	7.918E-01	3.908E-01	3.208E-01
TH-228	6.906E-01	1.052E-01	9.285E-02
TH-230	1.183E+00	2.094E-01	1.389E-01
PA-231	7.626E-01	8.871E-01	7.936E-01
TH-232	7.918E-01	3.908E-01	3.208E-01
TH-234	5.505E-01	1.940E+00	1.861E+00
U-234	1.183E+00	2.094E-01	1.389E-01
U-235	5.799E-02	3.867E-01	3.478E-01
U-238	5.505E-01	1.940E+00	1.861E+00
AM-243	1.897E-01	7.951E-02	7.238E-02
ANH-511	1.609E-02	9.092E-02	5.995E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	2.783E-01	5.242E-01	1.088E+00	NOT IDENT.
NA-22	2.880E-02	4.898E-02	1.097E-01	NOT IDENT.



NA-24	0.000E+00	1.395E+24	0.000E+00	SHORT HLIF
AL-26	1.935E-02	2.401E-02	7.730E-02	NOT IDENT.
SC-46	5.545E-02	5.318E-02	1.246E-01	FAIL ABUN
V-48	-8.162E-02	3.459E-01	6.433E-01	NOT IDENT.
CR-51	-2.526E-01	1.124E+00	1.738E+00	NOT IDENT.
MN-52	8.353E+00	2.763E+01	6.320E+01	NOT IDENT.
MN-54	9.302E-04	5.516E-02	7.578E-02	NOT IDENT.
CO-56	4.096E-02	6.447E-02	1.357E-01	NOT IDENT.
MN-56	0.000E+00	1.557E+41	0.000E+00	SHORT HLIF
CO-58	2.047E-02	5.427E-02	1.143E-01	NOT IDENT.
FE-59	-3.975E-02	2.262E-01	3.592E-01	NOT IDENT.
CO-60	4.994E-02	3.807E-02	1.023E-01	NOT IDENT.
ZN-65	2.592E-02	1.097E-01	2.097E-01	NOT IDENT.
GE-68	3.802E-01	1.436E+00	2.943E+00	NOT IDENT.
AS-73	-9.612E-02	7.173E-01	1.329E+00	NOT IDENT.
AS-74	-5.587E-02	3.528E-01	6.780E-01	NOT IDENT.
SE-75	3.009E-03	4.935E-02	8.899E-02	FAIL ABUN
BR-77	0.000E+00	1.036E+06	0.000E+00	SHORT HLIF
SR-82	-5.203E-01	8.750E-01	1.500E+00	NOT IDENT.
RB-83	-3.256E-03	7.943E-02	1.573E-01	NOT IDENT.
RB-84	-6.945E-02	1.654E-01	2.917E-01	NOT IDENT.
KR-85	-1.474E+00	7.085E+00	1.325E+01	NOT IDENT.
SR-85	-1.175E-02	5.592E-02	1.045E-01	NOT IDENT.
RB-86	8.334E-02	3.161E+00	6.225E+00	NOT IDENT.
Y-88	-6.813E-04	4.426E-02	1.023E-01	NOT IDENT.
Y-91	-1.442E+01	2.864E+01	5.337E+01	NOT IDENT.
NB-94	-1.516E-02	3.621E-02	6.442E-02	NOT IDENT.
NB-95	-3.801E-03	6.113E-02	1.056E-01	NOT IDENT.
NB-95M	1.291E-02	1.928E-01	3.154E-01	NOT IDENT.
ZR-95	-7.109E-03	9.261E-02	1.814E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.136E+22	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.778E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	4.333E-03	3.188E-02	5.394E-02	FAIL ABUN
RH-102	-6.712E-02	5.494E-02	8.194E-02	FAIL ABUN
RU-103	3.710E-02	8.777E-02	1.788E-01	FAIL ABUN
RH-106	-3.931E-02	3.082E-01	5.928E-01	FAIL ABUN
RU-106	-3.931E-02	3.082E-01	5.928E-01	FAIL ABUN
AG-108M	1.807E-02	2.453E-02	5.107E-02	NOT IDENT.
AG-110M	-1.171E-03	5.483E-02	1.067E-01	FAIL ABUN
SN-113	-4.617E-02	5.113E-02	8.789E-02	NOT IDENT.
CD-115	0.000E+00	1.369E+06	0.000E+00	SHORT HLIF
SN-117M	-3.795E-01	3.303E-01	5.166E-01	NOT IDENT.
SB-122	0.000E+00	3.511E+04	0.000E+00	SHORT HLIF
TE-123M	-3.834E-02	3.033E-02	4.656E-02	NOT IDENT.
SB-124	1.111E-01	1.360E-01	3.682E-01	NOT IDENT.
SB-125	2.053E-03	9.160E-02	1.628E-01	FAIL ABUN
TE-125M	-2.223E-01	1.274E+01	2.317E+01	NOT IDENT.
I-126	2.004E+00	1.461E+00	3.532E+00	NOT IDENT.
SB-126	-1.331E-01	1.428E+00	2.399E+00	NOT IDENT.
SB-127	0.000E+00	1.161E+03	0.000E+00	SHORT HLIF
I-131	-2.105E+00	2.611E+00	4.588E+00	NOT IDENT.
I-132	0.000E+00	7.576E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	2.418E+03	0.000E+00	SHORT HLIF
BA-133	-1.084E-02	4.442E-02	7.495E-02	FAIL ABUN
I-133	0.000E+00	7.197E+16	0.000E+00	SHORT HLIF
CS-134	4.109E-02	8.106E-02	9.932E-02	FAIL ABUN
I-135	0.000E+00	1.752E+41	0.000E+00	SHORT HLIF
CS-136	5.733E-01	6.283E-01	1.521E+00	FAIL ABUN
BA-137M	-3.627E-04	3.374E-02	6.305E-02	NOT IDENT.
CS-137	-3.831E-04	3.564E-02	6.661E-02	NOT IDENT.
LA-138	3.626E-02	6.452E-02	1.513E-01	NOT IDENT.
CE-139	-1.231E-02	3.352E-02	5.762E-02	NOT IDENT.
BA-140	-1.239E+00	1.893E+00	3.310E+00	FAIL ABUN
LA-140	1.085E-01	7.624E-01	1.688E+00	FAIL ABUN
CE-141	-9.102E-02	1.438E-01	2.198E-01	NOT IDENT.
CE-143	0.000E+00	2.936E+10	0.000E+00	SHORT HLIF
CE-144	2.073E-02	1.640E-01	3.043E-01	NOT IDENT.
PM-144	-3.857E-02	3.993E-02	6.352E-02	NOT IDENT.
PR-144	-2.933E+00	3.051E+00	4.857E+00	NOT IDENT.
PM-146	4.956E-03	4.415E-02	8.648E-02	NOT IDENT.
ND-147	-2.110E+00	5.831E+00	1.076E+01	FAIL ABUN
PM-149	0.000E+00	1.276E+07	0.000E+00	SHORT HLIF
EU-150	2.425E-02	3.808E-02	4.841E-02	FAIL ABUN
EU-152	-6.700E-02	7.942E-02	1.394E-01	FAIL ABUN
GD-153	3.274E-02	8.301E-02	1.464E-01	NOT IDENT.
EU-154	8.679E-02	1.377E-01	3.095E-01	FAIL ABUN

EU-155	2.012E-02	9.873E-02	1.817E-01	FAIL ABUN
TB-160	-5.200E-02	2.119E-01	3.875E-01	FAIL ABUN
HO-166M	-1.890E-02	5.984E-02	1.095E-01	NOT IDENT.
TM-171	-4.228E+00	1.055E+01	1.914E+01	NOT IDENT.
HF-172	-1.181E-01	1.793E-01	2.755E-01	FAIL ABUN
LU-172	1.365E-03	5.915E-02	1.182E-01	FAIL ABUN
LU-176	6.520E-03	2.689E-02	4.901E-02	FAIL ABUN
HF-181	1.140E-02	6.669E-02	1.366E-01	NOT IDENT.
TA-182	-2.009E-01	2.559E-01	4.601E-01	FAIL ABUN
RE-183	1.600E-01	1.922E-01	3.813E-01	NOT IDENT.
RE-184	-1.983E-02	2.018E-01	4.021E-01	NOT IDENT.
W-188	1.203E+01	1.081E+01	2.161E+01	FAIL ABUN
IR-192	-1.092E-02	4.852E-02	8.292E-02	FAIL ABUN
HG-203	-3.975E-02	6.516E-02	1.052E-01	NOT IDENT.
TL-204	2.838E+00	3.915E+00	7.126E+00	NOT IDENT.
BI-207	1.946E-02	5.841E-02	1.192E-01	FAIL ABUN
PB-211	-3.010E-01	6.334E-01	1.162E+00	FAIL ABUN
BI-212	1.521E-01	5.747E-01	1.135E+00	NOT IDENT.
BI-213	-7.126E-02	1.058E-01	1.614E-01	NOT IDENT.
RN-219	3.613E-01	4.033E-01	8.583E-01	FAIL ABUN
RA-223	9.109E-01	1.082E+00	1.303E+00	FAIL ABUN
AC-225	-5.052E+00	8.839E+00	1.322E+01	NOT IDENT.
AC-227	7.788E-02	2.516E-01	4.615E-01	FAIL ABUN
TH-227	7.788E-02	2.516E-01	4.615E-01	FAIL ABUN
TH-229	1.194E-01	5.161E-01	9.360E-01	FAIL ABUN
TH-231	9.109E-01	1.082E+00	1.303E+00	FAIL ABUN
PA-233	3.280E-02	6.050E-02	1.162E-01	FAIL ABUN
PA-234	-4.571E-02	3.627E-01	6.005E-01	FAIL ABUN
PA-234M	2.141E+00	4.936E+00	1.026E+01	NOT IDENT.
NP-237	3.280E-02	6.050E-02	1.162E-01	FAIL ABUN
NP-238	0.000E+00	4.802E+06	0.000E+00	SHORT HLIF
NP-239	-1.798E-01	2.519E-01	4.251E-01	NOT IDENT.
PU-239	6.216E+01	3.123E+02	5.722E+02	NOT IDENT.
AM-241	-4.592E-02	1.199E-01	1.981E-01	NOT IDENT.
CM-243	2.561E-02	9.065E-02	1.693E-01	NOT IDENT.
BK-247	-4.928E-02	7.791E-02	1.259E-01	FAIL ABUN
CM-247	2.146E-02	3.522E-02	7.347E-02	NOT IDENT.
CF-249	4.204E-02	4.104E-02	8.341E-02	FAIL ABUN
CF-251	0.000E+00	1.741E-01	2.098E-01	FAIL ABUN

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	248	10.66*	1.120E+00	1.531E+01	1.531E+01	13.06
CO-57	122.06	23	85.60*	7.601E+00	2.596E-02	2.973E-02	96.97
	136.47	-----	10.68	7.377E+00	-----	Line Not Found	-----
CD-109	88.03	51	3.70*	7.062E+00	1.438E+00	1.557E+00	79.01
AG-110	657.50	15	4.50*	2.341E+00	1.066E+00	1.235E+00	96.71
SN-126	64.28	13	9.60	4.692E+00	2.122E-01	2.122E-01	359.64
	86.94	51	8.90	7.062E+00	5.978E-01	5.978E-01	79.01
	87.57	51	37.00*	7.062E+00	1.438E-01	1.438E-01	79.01
PM-147	121.22	23	0.00*	7.601E+00	7.798E+02	8.103E+02	96.97
TL-208	277.37	-----	6.60	4.751E+00	-----	Line Not Found	-----
	583.19	71	85.00*	2.596E+00	2.370E-01	2.370E-01	35.75
	860.56	8	12.50	1.826E+00	2.638E-01	2.638E-01	102.71
BI-210	46.54	6	4.25*	1.847E+00	5.235E-01	5.259E-01	831.74
PB-210	46.54	6	4.25*	1.847E+00	5.235E-01	5.259E-01	831.74
BI-211	72.87	-----	1.23	5.868E+00	-----	Line Not Found	-----
	351.06	226	12.92*	3.945E+00	3.260E+00	3.260E+00	18.06
PB-212	74.82	105	10.28	6.064E+00	1.240E+00	1.240E+00	42.77
	77.11	189	17.10	6.314E+00	1.285E+00	1.285E+00	19.90
	238.63	217	43.60*	5.318E+00	6.906E-01	6.906E-01	15.54
	300.09	25	3.30	4.460E+00	1.236E+00	1.236E+00	118.70
BI-214	609.32	156	45.49*	2.500E+00	1.010E+00	1.010E+00	21.00
	1120.29	41	14.92	1.424E+00	1.409E+00	1.409E+00	48.55
	1764.49	18	15.30	9.674E-01	8.717E-01	8.717E-01	72.54
PB-214	74.82	105	5.80	6.064E+00	2.197E+00	2.198E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
RN-222	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
	609.32	156	45.49*	2.500E+00	1.010E+00	1.010E+00	21.00
	1120.29	41	14.92	1.424E+00	1.409E+00	1.409E+00	48.55
	1764.49	18	15.30	9.674E-01	8.717E-01	8.717E-01	72.54
RA-224	240.99	115	4.10*	5.270E+00	3.926E+00	3.926E+00	35.90
RA-226	74.82	105	5.80	6.064E+00	2.197E+00	2.198E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
AC-228	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----
	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30
RA-228	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30
	74.82	105	10.28	6.064E+00	1.240E+00	1.240E+00	42.77
	77.11	189	17.10	6.314E+00	1.285E+00	1.285E+00	19.90
TH-230	238.63	217	43.60*	5.318E+00	6.906E-01	6.906E-01	15.54
	300.09	25	3.30	4.460E+00	1.236E+00	1.236E+00	118.70
	74.82	105	5.80	6.064E+00	2.197E+00	2.197E+00	42.77
	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
PA-231	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
	283.69	-----	1.70	4.669E+00	-----	Line Not Found	-----
TH-232	301.36	25	5.35*	4.460E+00	7.626E-01	7.626E-01	118.70
	105.21	-----	1.10	7.614E+00	-----	Line Not Found	-----
	338.32	47	11.27	4.066E+00	7.490E-01	7.490E-01	57.43
TH-234	835.71	-----	1.61	1.878E+00	-----	Line Not Found	-----
	911.20	48	25.80*	1.731E+00	7.918E-01	7.918E-01	50.36
	968.97	15	15.80	1.633E+00	4.164E-01	4.164E-01	124.30
	63.29	13	3.70*	4.692E+00	5.505E-01	5.505E-01	359.64
	92.59	75	4.23	7.341E+00	1.774E+00	1.774E+00	60.52
	74.82	105	5.80	6.064E+00	2.197E+00	2.197E+00	42.77
U-234	77.11	189	9.70	6.314E+00	2.266E+00	2.266E+00	19.90
	87.09	51	3.41	7.062E+00	1.560E+00	1.560E+00	79.01
	242.00	115	7.25	5.270E+00	2.220E+00	2.220E+00	35.90
	295.22	156	18.42	4.528E+00	1.381E+00	1.381E+00	19.62
	351.93	226	35.60*	3.945E+00	1.183E+00	1.183E+00	18.06
	89.96	35	3.47	7.210E+00	1.016E+00	1.016E+00	112.30
U-235	93.35	75	5.60	7.341E+00	1.340E+00	1.340E+00	60.52
	143.76	6	10.96*	7.251E+00	5.799E-02	5.799E-02	680.46
	163.33	-----	5.08	6.810E+00	-----	Line Not Found	-----
	185.72	49	57.20	6.308E+00	1.007E-01	1.007E-01	80.01
	205.31	-----	5.01	5.915E+00	-----	Line Not Found	-----
U-238	63.29	13	3.70*	4.692E+00	5.505E-01	5.505E-01	359.64
	92.59	75	4.23	7.341E+00	1.774E+00	1.774E+00	60.52
AM-243	43.53	-----	5.90	1.248E+00	-----	Line Not Found	-----
ANH-511	74.66	105	67.20*	6.064E+00	1.897E-01	1.897E-01	42.77
	511.00	6	100.00*	2.907E+00	1.609E-02	1.609E-02	576.68

Flag: "\*" = Keyline

Total number of lines in spectrum 57  
 Number of unidentified lines 14  
 Number of lines tentatively identified by NID 43 75.44%

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	1.531E+01	1.531E+01	0.200E+01	13.06	
CO-57	271.74D	1.14	2.596E-02	2.973E-02	2.882E-02	96.97	
CD-109	461.40D	1.08	1.438E+00	1.557E+00	1.230E+00	79.01	
AG-110	249.76D	1.16	1.066E+00	1.235E+00	1.195E+00	96.71	
SN-126	2.30E+05Y	1.00	1.438E-01	1.438E-01	1.136E-01	79.01	
PM-147	2.62Y	1.04	7.798E+02	8.103E+02	7.858E+02	96.97	
TL-208	1.41E+10Y	1.00	2.370E-01	2.370E-01	0.847E-01	35.75	
BI-210	22.20Y	1.00	5.235E-01	5.259E-01	43.74E-01	831.74	
PB-210	22.20Y	1.00	5.235E-01	5.259E-01	43.74E-01	831.74	
BI-211	7.04E+08Y	1.00	3.260E+00	3.260E+00	0.589E+00	18.06	
PB-212	1.41E+10Y	1.00	6.906E-01	6.906E-01	1.073E-01	15.54	
BI-214	1600.00Y	1.00	1.010E+00	1.010E+00	0.212E+00	21.00	
PB-214	1600.00Y	1.00	1.183E+00	1.183E+00	0.214E+00	18.06	
RN-222	1600.00Y	1.00	1.010E+00	1.010E+00	0.212E+00	21.00	
RA-224	1.41E+10Y	1.00	3.926E+00	3.926E+00	1.409E+00	35.90	
RA-226	1600.00Y	1.00	1.183E+00	1.183E+00	0.214E+00	18.06	
AC-228	1.41E+10Y	1.00	7.918E-01	7.918E-01	3.988E-01	50.36	
RA-228	1.41E+10Y	1.00	7.918E-01	7.918E-01	3.988E-01	50.36	
TH-228	1.41E+10Y	1.00	6.906E-01	6.906E-01	1.073E-01	15.54	
TH-230	7.54E+04Y	1.00	1.183E+00	1.183E+00	0.214E+00	18.06	
PA-231	7.04E+08Y	1.00	7.626E-01	7.626E-01	9.052E-01	118.70	
TH-232	1.41E+10Y	1.00	7.918E-01	7.918E-01	3.988E-01	50.36	
TH-234	4.47E+09Y	1.00	5.505E-01	5.505E-01	19.80E-01	359.64	
U-234	2.45E+05Y	1.00	1.183E+00	1.183E+00	0.214E+00	18.06	
U-235	7.04E+08Y	1.00	5.799E-02	5.799E-02	39.46E-02	680.46	
U-238	4.47E+09Y	1.00	5.505E-01	5.505E-01	19.80E-01	359.64	
AM-243	7370.00Y	1.00	1.897E-01	1.897E-01	0.811E-01	42.77	
ANH-511	1.00E+09Y	1.00	1.609E-02	1.609E-02	9.277E-02	576.68	
Total Activity :			8.189E+02	8.497E+02			

Grand Total Activity : 8.189E+02 8.497E+02

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	123.98	29	45	1.04	248.22	246	7	8.19E-03	83.5	7.57E+00	T
0	172.59	23	68	1.11	345.46	339	10	6.54E-03	****	6.60E+00	
0	176.51	33	48	1.59	353.30	349	9	9.46E-03	81.8	6.52E+00	T
0	209.94	37	51	0.95	420.16	416	9	1.05E-02	77.0	5.82E+00	T
0	213.94	20	61	1.29	428.15	425	9	5.68E-03	****	5.75E+00	
0	271.23	18	46	1.27	542.74	538	8	5.25E-03	****	4.83E+00	T
6	297.22	9	24	1.56	594.72	587	11	2.58E-03	****	4.50E+00	T
5	324.96	21	35	2.01	650.21	644	16	5.98E-03	****	4.20E+00	T
5	328.32	21	11	1.30	656.93	644	16	5.96E-03	72.0	4.17E+00	T
0	332.79	13	34	0.83	665.85	663	8	3.75E-03	****	4.12E+00	T
0	384.93	19	17	1.56	770.15	765	9	5.56E-03	88.6	3.67E+00	T
0	425.01	15	31	4.28	850.30	841	15	4.45E-03	****	3.39E+00	T
0	437.88	20	16	1.54	876.05	870	11	5.69E-03	88.5	3.31E+00	
0	461.82	29	18	1.61	923.93	918	12	8.51E-03	68.1	3.17E+00	
0	588.31	11	10	0.78	1176.94	1173	8	3.30E-03	****	2.58E+00	
0	690.96	10	5	1.39	1382.26	1378	8	2.84E-03	****	2.24E+00	
0	717.40	22	0	0.78	1435.13	1431	10	6.39E-03	41.7	2.16E+00	
0	768.31	22	13	1.42	1536.96	1531	11	6.48E-03	74.2	2.03E+00	T
0	796.32	9	17	1.56	1593.00	1585	12	2.62E-03	****	1.96E+00	T
0	831.42	10	5	1.01	1663.20	1659	7	2.99E-03	93.1	1.89E+00	T
0	838.26	12	5	1.46	1676.89	1673	9	3.40E-03	92.7	1.87E+00	T
0	948.90	15	3	4.68	1898.19	1892	12	4.49E-03	65.5	1.67E+00	T
0	1039.47	13	5	2.88	2079.36	2073	10	3.89E-03	80.2	1.53E+00	T
0	1050.64	19	0	4.41	2101.70	2096	12	5.56E-03	44.7	1.51E+00	T
0	1107.02	9	20	0.99	2214.49	2204	17	2.63E-03	****	1.44E+00	
0	1126.44	6	4	1.31	2253.33	2249	8	1.67E-03	****	1.42E+00	
0	1186.34	10	3	0.67	2373.14	2369	7	2.92E-03	85.4	1.35E+00	
0	1190.56	6	3	0.90	2381.58	2378	6	1.67E-03	****	1.35E+00	
0	1243.92	14	3	2.43	2488.33	2485	8	4.20E-03	67.5	1.29E+00	
0	1507.91	11	0	3.85	3016.42	3011	10	3.33E-03	57.7	1.09E+00	
0	1661.08	6	0	1.37	3322.83	3319	7	1.67E-03	81.6	1.01E+00	

Flags: "T" = Tentatively associated

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278004.CNF;1
* Acquisition date   : 30-OCT-2023 08:54:00 Sensitivity      : 3.000
* Detector ID       : GAM52 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.60 Half life ratio : *****
* Sample date       : 7-SEP-2023 08:30:00 Nuclide Library : SOLID
* Sample ID         : G640278004 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.0197E+02 GRAM
* Wet wt corr       : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 1-SEP-2023 08:30:22 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM52_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	3.408E-01
CO-57	1.366E-02
CD-109	6.952E-01
AG-110	7.267E-01
SN-126	6.440E-02
PM-147	5.168E+02
TL-208	3.353E-02
BI-210	1.803E+00
PB-210	1.803E+00
BI-211	1.716E-01
PB-212	4.215E-02
BI-214	4.448E-02
PB-214	6.240E-02
RN-222	4.448E-02
RA-224	4.520E-01
RA-226	6.240E-02
AC-228	1.383E-01
RA-228	1.383E-01
TH-228	4.215E-02
TH-230	6.240E-02
PA-231	3.553E-01
TH-232	1.383E-01
TH-234	8.720E-01
U-234	6.240E-02
U-235	1.614E-01
U-238	8.720E-01
AM-243	3.376E-02
ANH-511	2.657E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.826E-01	NOT IDENT.
NA-22	4.673E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF

AL-26	2.825E-02	NOT IDENT.
SC-46	5.365E-02	FAIL ABUN
V-48	2.603E-01	NOT IDENT.
CR-51	7.805E-01	NOT IDENT.
MN-52	2.537E+01	NOT IDENT.
MN-54	3.197E-02	NOT IDENT.
CO-56	5.927E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-58	4.849E-02	NOT IDENT.
FE-59	1.521E-01	NOT IDENT.
CO-60	4.284E-02	NOT IDENT.
ZN-65	8.897E-02	NOT IDENT.
GE-68	1.234E+00	NOT IDENT.
AS-73	6.119E-01	NOT IDENT.
AS-74	2.869E-01	NOT IDENT.
SE-75	3.985E-02	FAIL ABUN
BR-77	0.000E+00	SHORT HLIF
SR-82	6.108E-01	NOT IDENT.
RB-83	6.687E-02	NOT IDENT.
RB-84	1.212E-01	NOT IDENT.
KR-85	5.828E+00	NOT IDENT.
SR-85	4.598E-02	NOT IDENT.
RB-86	2.556E+00	NOT IDENT.
Y-88	3.625E-02	NOT IDENT.
Y-91	2.133E+01	NOT IDENT.
NB-94	2.771E-02	NOT IDENT.
NB-95	4.414E-02	NOT IDENT.
NB-95M	1.445E-01	NOT IDENT.
ZR-95	7.502E-02	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	2.498E-02	FAIL ABUN
RH-102	3.348E-02	FAIL ABUN
RU-103	8.011E-02	FAIL ABUN
RH-106	2.516E-01	FAIL ABUN
RU-106	2.516E-01	FAIL ABUN
AG-108M	2.225E-02	NOT IDENT.
AG-110M	4.450E-02	FAIL ABUN
SN-113	3.815E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.335E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.095E-02	NOT IDENT.
SB-124	1.458E-01	NOT IDENT.
SB-125	7.119E-02	FAIL ABUN
TE-125M	1.067E+01	NOT IDENT.
I-126	1.543E+00	NOT IDENT.
SB-126	1.032E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.985E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.335E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.349E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	6.273E-01	FAIL ABUN
BA-137M	2.678E-02	NOT IDENT.
CS-137	2.829E-02	NOT IDENT.
LA-138	6.237E-02	NOT IDENT.
CE-139	2.641E-02	NOT IDENT.
BA-140	1.395E+00	FAIL ABUN
LA-140	6.662E-01	FAIL ABUN
CE-141	1.011E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.385E-01	NOT IDENT.
PM-144	2.680E-02	NOT IDENT.
PR-144	2.050E+00	NOT IDENT.
PM-146	3.841E-02	NOT IDENT.
ND-147	4.617E+00	FAIL ABUN
PM-149	0.000E+00	SHORT HLIF
EU-150	2.169E-02	FAIL ABUN
EU-152	6.033E-02	FAIL ABUN
GD-153	6.789E-02	NOT IDENT.
EU-154	1.322E-01	FAIL ABUN
EU-155	8.454E-02	FAIL ABUN



TB-160	1.633E-01	FAIL ABUN
HO-166M	4.634E-02	NOT IDENT.
TM-171	8.750E+00	NOT IDENT.
HF-172	1.255E-01	FAIL ABUN
LU-172	4.776E-02	FAIL ABUN
LU-176	2.210E-02	FAIL ABUN
HF-181	5.871E-02	NOT IDENT.
TA-182	1.917E-01	FAIL ABUN
RE-183	1.774E-01	NOT IDENT.
RE-184	1.591E-01	NOT IDENT.
W-188	9.898E+00	FAIL ABUN
IR-192	3.687E-02	FAIL ABUN
HG-203	4.696E-02	NOT IDENT.
TL-204	3.333E+00	NOT IDENT.
BI-207	5.071E-02	FAIL ABUN
PB-211	5.068E-01	FAIL ABUN
BI-212	4.982E-01	NOT IDENT.
BI-213	6.908E-02	NOT IDENT.
RN-219	3.869E-01	FAIL ABUN
RA-223	5.928E-01	FAIL ABUN
AC-225	6.004E+00	NOT IDENT.
AC-227	2.101E-01	FAIL ABUN
TH-227	2.101E-01	FAIL ABUN
TH-229	4.315E-01	FAIL ABUN
TH-231	5.928E-01	FAIL ABUN
PA-233	5.217E-02	FAIL ABUN
PA-234	2.510E-01	FAIL ABUN
PA-234M	4.388E+00	NOT IDENT.
NP-237	5.217E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.962E-01	NOT IDENT.
PU-239	2.651E+02	NOT IDENT.
AM-241	9.209E-02	NOT IDENT.
CM-243	7.838E-02	NOT IDENT.
BK-247	5.622E-02	FAIL ABUN
CM-247	3.286E-02	NOT IDENT.
CF-249	3.760E-02	FAIL ABUN
CF-251	9.610E-02	FAIL ABUN

```

*****
*
*               GEL Laboratories LLC
*               2040 Savage Road
*               Charleston, SC 29407
*****
*
*               DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278004.CNF;1
* Acquisition date   : 30-OCT-2023 08:54:00 Sensitivity      : 3.000
* Detector ID       : GAM52 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.60 Half life ratio  : *****
* Sample date       : 7-SEP-2023 08:30:00 Nuclide Library  : SOLID
* Sample ID         : G640278004 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity  : 1.0197E+02 GRAM
*                   Quantity Err(%) : 1.9614E-03 %
* Wet wt corr       : 1.00000 Wet Weight       : 0.00000
*                   Dry Weight      : 0.00000
*****
*
*               CALIBRATION INFORMATION
*
* Eff. Cal. date    : 1-SEP-2023 08:30:22 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM52_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	1.531E+01	2.379E+00	2.379E+00
CO-57	2.973E-02	2.836E-02	2.836E-02
CD-109	1.557E+00	1.218E+00	1.218E+00
AG-110	1.235E+00	1.177E+00	1.177E+00
SN-126	1.438E-01	1.122E-01	1.122E-01
PM-147	8.103E+02	7.731E+02	7.731E+02
TL-208	2.370E-01	8.612E-02	8.612E-02
BI-210	5.259E-01	4.287E+00	4.287E+00
PB-210	5.259E-01	4.287E+00	4.287E+00
BI-211	3.260E+00	6.363E-01	6.363E-01
PB-212	6.906E-01	1.188E-01	1.188E-01
BI-214	1.010E+00	2.301E-01	2.301E-01
PB-214	1.183E+00	2.301E-01	2.301E-01
RN-222	1.010E+00	2.301E-01	2.301E-01
RA-224	3.926E+00	1.417E+00	1.417E+00
RA-226	1.183E+00	2.301E-01	2.301E-01
AC-228	7.918E-01	3.976E-01	3.976E-01
RA-228	7.918E-01	3.976E-01	3.976E-01
TH-228	6.906E-01	1.188E-01	1.188E-01
TH-230	1.183E+00	2.301E-01	2.301E-01
PA-231	7.626E-01	9.031E-01	9.031E-01
TH-232	7.918E-01	3.976E-01	3.976E-01
TH-234	5.505E-01	1.944E+00	1.944E+00
U-234	1.183E+00	2.301E-01	2.301E-01
U-235	5.799E-02	3.868E-01	3.868E-01
U-238	5.505E-01	1.944E+00	1.944E+00
AM-243	1.897E-01	8.107E-02	8.107E-02
ANH-511	1.609E-02	9.093E-02	9.093E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	2.783E-01	5.248E-01	5.396E-01	NOT IDENT.
NA-22	2.880E-02	4.903E-02	5.072E-02	NOT IDENT.

NA-24	-4.421E+23	1.395E+24	0.000E+00	SHORT HLIF
AL-26	1.935E-02	2.405E-02	2.559E-02	NOT IDENT.
SC-46	5.545E-02	5.341E-02	5.897E-02	FAIL ABUN
V-48	-8.162E-02	3.460E-01	3.479E-01	NOT IDENT.
CR-51	-2.526E-01	1.124E+00	1.130E+00	NOT IDENT.
MN-52	8.353E+00	2.764E+01	2.789E+01	NOT IDENT.
MN-54	9.302E-04	5.516E-02	5.516E-02	NOT IDENT.
CO-56	4.096E-02	6.458E-02	6.717E-02	NOT IDENT.
MN-56	1.000E+41	1.560E+41	0.000E+00	SHORT HLIF
CO-58	2.047E-02	5.430E-02	5.508E-02	NOT IDENT.
FE-59	-3.975E-02	2.262E-01	2.269E-01	NOT IDENT.
CO-60	4.994E-02	3.829E-02	4.442E-02	NOT IDENT.
ZN-65	2.592E-02	1.098E-01	1.104E-01	NOT IDENT.
GE-68	3.802E-01	1.436E+00	1.447E+00	NOT IDENT.
AS-73	-9.612E-02	7.176E-01	7.189E-01	NOT IDENT.
AS-74	-5.587E-02	3.529E-01	3.538E-01	NOT IDENT.
SE-75	3.009E-03	4.935E-02	4.937E-02	FAIL ABUN
BR-77	6.805E+06	1.048E+07	1.092E+07	SHORT HLIF
SR-82	-5.203E-01	8.765E-01	9.073E-01	NOT IDENT.
RB-83	-3.256E-03	7.943E-02	7.945E-02	NOT IDENT.
RB-84	-6.945E-02	1.656E-01	1.685E-01	NOT IDENT.
KR-85	-1.474E+00	7.087E+00	7.118E+00	NOT IDENT.
SR-85	-1.175E-02	5.593E-02	5.618E-02	NOT IDENT.
RB-86	8.334E-02	3.161E+00	3.161E+00	NOT IDENT.
Y-88	-6.813E-04	4.426E-02	4.426E-02	NOT IDENT.
Y-91	-1.442E+01	2.867E+01	2.939E+01	NOT IDENT.
NB-94	-1.516E-02	3.624E-02	3.688E-02	NOT IDENT.
NB-95	-3.801E-03	6.114E-02	6.116E-02	NOT IDENT.
NB-95M	1.291E-02	1.928E-01	1.929E-01	NOT IDENT.
ZR-95	-7.109E-03	9.261E-02	9.266E-02	NOT IDENT.
NB-97	1.000E+41	2.292E+42	0.000E+00	SHORT HLIF
ZR-97	1.767E+21	3.136E+22	0.000E+00	SHORT HLIF
MO-99	8.694E+03	1.778E+05	1.779E+05	SHORT HLIF
TC-99M	1.000E+41	4.026E+42	0.000E+00	SHORT HLIF
RH-101	4.333E-03	3.189E-02	3.195E-02	FAIL ABUN
RH-102	-6.712E-02	5.553E-02	6.324E-02	FAIL ABUN
RU-103	3.710E-02	8.784E-02	8.942E-02	FAIL ABUN
RH-106	-3.931E-02	3.083E-01	3.088E-01	FAIL ABUN
RU-106	-3.931E-02	3.083E-01	3.088E-01	FAIL ABUN
AG-108M	1.807E-02	2.458E-02	2.590E-02	NOT IDENT.
AG-110M	-1.171E-03	5.483E-02	5.483E-02	FAIL ABUN
SN-113	-4.617E-02	5.127E-02	5.534E-02	NOT IDENT.
CD-115	-8.239E+05	1.371E+06	1.421E+06	SHORT HLIF
SN-117M	-3.795E-01	3.317E-01	3.732E-01	NOT IDENT.
SB-122	1.348E+04	3.513E+04	3.565E+04	SHORT HLIF
TE-123M	-3.834E-02	3.048E-02	3.504E-02	NOT IDENT.
SB-124	1.111E-01	1.363E-01	1.452E-01	NOT IDENT.
SB-125	2.053E-03	9.160E-02	9.161E-02	FAIL ABUN
TE-125M	-2.223E-01	1.274E+01	1.274E+01	NOT IDENT.
I-126	2.004E+00	1.478E+00	1.732E+00	NOT IDENT.
SB-126	-1.331E-01	1.428E+00	1.429E+00	NOT IDENT.
SB-127	-1.979E+02	1.163E+03	1.166E+03	SHORT HLIF
I-131	-2.105E+00	2.617E+00	2.784E+00	NOT IDENT.
I-132	-1.000E+41	3.357E+41	0.000E+00	SHORT HLIF
TE-132	-1.603E+03	4.426E+03	2.531E+03	SHORT HLIF
BA-133	-1.084E-02	4.443E-02	4.470E-02	FAIL ABUN
I-133	-4.249E+15	7.199E+16	0.000E+00	SHORT HLIF
CS-134	4.109E-02	8.116E-02	8.325E-02	FAIL ABUN
I-135	1.000E+41	2.125E+41	0.000E+00	SHORT HLIF
CS-136	5.733E-01	6.316E-01	6.824E-01	FAIL ABUN
BA-137M	-3.627E-04	3.374E-02	3.374E-02	NOT IDENT.
CS-137	-3.831E-04	3.564E-02	3.564E-02	NOT IDENT.
LA-138	3.626E-02	6.459E-02	6.662E-02	NOT IDENT.
CE-139	-1.231E-02	3.362E-02	3.407E-02	NOT IDENT.
BA-140	-1.239E+00	1.897E+00	1.977E+00	FAIL ABUN
LA-140	1.085E-01	7.624E-01	7.640E-01	FAIL ABUN
CE-141	-9.102E-02	1.440E-01	1.497E-01	NOT IDENT.
CE-143	-6.483E+09	2.936E+10	2.951E+10	SHORT HLIF
CE-144	2.073E-02	1.640E-01	1.643E-01	NOT IDENT.
PM-144	-3.857E-02	4.011E-02	4.372E-02	NOT IDENT.
PR-144	-2.933E+00	3.064E+00	3.337E+00	NOT IDENT.
PM-146	4.956E-03	4.416E-02	4.421E-02	NOT IDENT.
ND-147	-2.110E+00	5.835E+00	5.912E+00	FAIL ABUN
PM-149	2.223E+06	1.277E+07	1.281E+07	SHORT HLIF
EU-150	2.425E-02	3.813E-02	3.967E-02	FAIL ABUN
EU-152	-6.700E-02	7.963E-02	8.517E-02	FAIL ABUN
GD-153	3.274E-02	8.306E-02	8.436E-02	NOT IDENT.
EU-154	8.679E-02	1.379E-01	1.433E-01	FAIL ABUN

EU-155	2.012E-02	9.875E-02	9.916E-02	FAIL ABUN
TB-160	-5.200E-02	2.120E-01	2.133E-01	FAIL ABUN
HO-166M	-1.890E-02	5.987E-02	6.047E-02	NOT IDENT.
TM-171	-4.228E+00	1.056E+01	1.073E+01	NOT IDENT.
HF-172	-1.181E-01	1.805E-01	1.882E-01	FAIL ABUN
LU-172	1.365E-03	5.915E-02	5.915E-02	FAIL ABUN
LU-176	6.520E-03	2.690E-02	2.706E-02	FAIL ABUN
HF-181	1.140E-02	6.670E-02	6.690E-02	NOT IDENT.
TA-182	-2.009E-01	2.564E-01	2.719E-01	FAIL ABUN
RE-183	1.600E-01	1.930E-01	2.060E-01	NOT IDENT.
RE-184	-1.983E-02	2.018E-01	2.020E-01	NOT IDENT.
W-188	1.203E+01	1.092E+01	1.219E+01	FAIL ABUN
IR-192	-1.092E-02	4.853E-02	4.878E-02	FAIL ABUN
HG-203	-3.975E-02	6.523E-02	6.764E-02	NOT IDENT.
TL-204	2.838E+00	3.926E+00	4.129E+00	NOT IDENT.
BI-207	1.946E-02	5.844E-02	5.909E-02	FAIL ABUN
PB-211	-3.010E-01	6.340E-01	6.483E-01	FAIL ABUN
BI-212	1.521E-01	5.749E-01	5.790E-01	NOT IDENT.
BI-213	-7.126E-02	1.060E-01	1.108E-01	NOT IDENT.
RN-219	3.613E-01	4.067E-01	4.381E-01	FAIL ABUN
RA-223	9.109E-01	1.085E+00	1.160E+00	FAIL ABUN
AC-225	-5.052E+00	8.859E+00	9.147E+00	NOT IDENT.
AC-227	7.788E-02	2.518E-01	2.542E-01	FAIL ABUN
TH-227	7.788E-02	2.518E-01	2.542E-01	FAIL ABUN
TH-229	1.194E-01	5.162E-01	5.190E-01	FAIL ABUN
TH-231	9.109E-01	1.085E+00	1.160E+00	FAIL ABUN
PA-233	3.280E-02	6.055E-02	6.233E-02	FAIL ABUN
PA-234	-4.571E-02	3.665E-01	3.670E-01	FAIL ABUN
PA-234M	2.141E+00	4.939E+00	5.033E+00	NOT IDENT.
NP-237	3.280E-02	6.055E-02	6.233E-02	FAIL ABUN
NP-238	-5.834E+05	4.802E+06	4.809E+06	SHORT HLIF
NP-239	-1.798E-01	2.527E-01	2.654E-01	NOT IDENT.
PU-239	6.216E+01	3.123E+02	3.136E+02	NOT IDENT.
AM-241	-4.592E-02	1.200E-01	1.218E-01	NOT IDENT.
CM-243	2.561E-02	9.070E-02	9.143E-02	NOT IDENT.
BK-247	-4.928E-02	7.859E-02	8.167E-02	FAIL ABUN
CM-247	2.146E-02	3.544E-02	3.674E-02	NOT IDENT.
CF-249	4.204E-02	4.130E-02	4.544E-02	FAIL ABUN
CF-251	2.170E-01	1.763E-01	2.016E-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	52.6524	85.43	74.5420	131.20	41.4447
45.60	57.3692	86.55	96.5881	133.02	33.2383
46.54	57.5160	86.79	96.6293	133.52	32.2218
49.72	0.0000	86.94	96.6560	136.00	40.6728
51.35	45.7007	87.09	96.6827	136.47	32.3500
51.87	45.7610	87.57	96.7667	140.51	0.0000
52.39	44.9224	88.03	96.8468	143.76	55.8410
52.97	41.3887	88.34	96.9002	144.24	55.8758
53.44	47.7427	88.47	96.9231	145.44	57.7221
54.07	38.7949	89.96	97.1802	152.43	50.0666
57.36	0.0000	1093.63	97.2977	153.25	52.2498
57.53	44.5790	91.11	38.9511	323.87	50.1763
57.98	43.7153	92.59	61.1814	156.02	56.7080
59.27	68.2070	93.35	48.2275	158.56	50.4438
59.32	68.2150	94.56	48.3280	159.00	49.3965
59.54	67.0310	94.65	48.3355	162.33	52.8281
60.96	67.2500	94.67	48.3372	162.66	48.5349
61.17	66.0589	94.87	48.3536	163.33	33.4616
62.93	73.6906	97.43	45.9389	165.86	47.6356
63.29	73.7497	98.43	42.4003	176.31	32.1397
63.58	73.7973	98.44	42.4013	176.60	32.1500
64.28	73.9117	99.53	44.4538	177.52	35.1089
66.73	61.9227	100.11	49.4404	181.07	0.0000
67.24	64.4700	102.03	54.5560	181.52	45.5502
125.81	69.8050	103.18	46.7078	184.41	57.4868
67.75	69.8153	103.37	46.7221	143.76	46.4976
68.89	81.1815	105.21	55.8334	193.51	42.4201
69.67	72.9030	105.31	55.8423	197.03	42.5766
70.82	53.7150	106.12	58.9100	198.01	31.4043
70.83	53.7163	106.47	58.9424	201.83	30.4018
72.81	79.0211	109.28	46.1583	203.43	40.6016
72.87	79.0307	111.00	53.3243	205.31	39.5491
74.66	64.2086	111.76	0.0000	210.85	39.3899
74.82	64.2289	114.06	63.6820	215.65	38.0534
74.97	64.2480	116.30	0.0000	218.12	44.2481
77.11	64.5209	116.74	62.9238	222.11	41.3542
78.74	64.7259	119.76	47.5739	227.09	38.0873
79.69	52.1296	121.12	39.4965	227.38	42.7158
80.03	52.1630	121.22	39.5021	228.16	0.0000
80.12	52.1726	121.78	20.4488	228.18	36.9707
80.19	52.1797	122.06	20.4570	116.74	36.9707
80.57	52.2176	122.92	20.4823	235.69	38.7797
81.00	62.4573	123.07	20.4868	235.96	32.5831
81.07	62.4657	265.00	35.5416	238.63	32.6621
81.75	65.0989	125.81	47.9897	238.98	0.0000
82.47	72.8567	127.23	49.4594	240.99	32.7318
83.79	52.5346	127.91	41.2560	242.00	32.7617
84.00	52.5550	129.30	49.6025	244.70	12.5107

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	23.6689	563.25	16.2861
252.80	24.8064	345.93	22.3416	564.24	0.0000
254.15	0.0000	351.06	26.3272	569.33	19.2163
256.23	29.6194	351.93	26.3429	946.00	19.2179
260.90	0.0000	355.39	0.0000	569.70	17.2976
264.66	23.8660	356.01	25.5640	583.19	18.8581
264.80	23.8690	364.49	23.1389	584.27	18.8676
265.00	33.4218	366.42	0.0000	595.83	11.6729
269.46	23.9618	372.51	15.5076	427.87	17.5481
270.03	29.9667	375.05	16.3965	602.52	0.0000
271.23	29.9965	377.52	12.9654	604.72	16.1153
273.65	28.8538	356.01	19.9612	607.14	8.8000
276.40	19.2793	388.16	14.3596	609.32	8.8085
277.37	20.5003	388.63	14.3640	610.33	8.8125
277.60	21.7106	391.69	25.2942	614.28	14.7137
278.00	25.3368	264.66	21.9279	618.01	19.6509
279.20	32.6080	401.81	16.6772	620.36	9.8360
279.54	33.8251	402.40	16.6834	621.93	11.8110
279.70	33.8293	404.85	21.1055	630.19	0.0000
280.46	15.7160	410.95	23.8326	631.29	18.7781
283.69	26.6655	413.71	17.6835	633.25	6.9242
284.31	18.1902	414.70	24.7712	634.78	11.8779
285.41	27.9161	423.72	17.7897	635.95	15.8457
285.90	0.0000	427.09	21.3906	636.99	15.8529
287.50	29.1782	427.87	16.0503	657.50	14.9939
290.67	21.9380	433.94	8.0537	657.76	13.4956
293.27	0.0000	439.40	17.5052	657.90	0.0000
351.93	29.3555	440.45	20.2107	661.66	10.8145
295.96	29.3723	453.88	19.9133	664.57	0.0000
879.38	9.8105	463.37	10.9199	666.33	4.0132
299.98	24.5526	468.07	16.4224	666.50	4.0135
300.09	24.5551	473.00	0.0000	667.71	0.0000
300.13	24.5557	475.06	21.0646	677.62	17.1370
301.36	24.5789	476.78	21.0843	685.70	0.0000
302.85	24.6069	477.60	14.6742	692.65	0.0000
256.23	29.5649	482.18	11.0327	695.00	7.6144
304.85	29.5730	487.02	11.0615	696.49	20.3174
306.78	24.6802	492.35	0.0000	696.51	20.3182
308.46	23.4757	497.08	16.6813	697.00	15.2417
311.90	18.5815	505.52	26.5286	697.30	14.2273
316.51	24.8602	507.63	0.0000	697.49	14.2284
319.41	19.9307	511.00	20.5364	702.65	17.3134
320.08	29.9106	514.00	20.5686	706.68	14.2808
321.04	26.6061	514.00	20.5686	711.68	13.2878
323.87	17.4962	520.40	11.2559	720.70	13.8483
325.23	20.0151	520.69	0.0000	721.93	0.0000
328.76	20.0664	522.65	0.0000	722.78	12.3193
333.37	30.1985	527.90	0.0000	722.91	12.3203
333.97	40.2822	528.26	17.8929	723.31	13.3491
334.37	37.7756	529.59	12.2504	724.19	20.5436
338.28	31.9875	529.87	0.0000	727.33	14.3988
338.32	31.9883	531.02	16.0316	733.00	14.4307
311.90	18.9693	537.26	16.0814	735.93	14.4472
340.48	18.9693	546.56	0.0000	333.97	14.4557
340.55	18.9702	552.55	9.5308	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	8.2819	949.00	4.4479	1384.29	3.7539
747.24	11.4010	667.71	0.0000	1408.01	5.6620
748.06	8.2943	962.31	16.7499	1434.09	3.7971
752.31	8.3076	964.08	8.3798	1435.80	3.7988
753.82	9.3516	966.17	20.1248	1457.56	0.0000
756.73	8.3216	911.20	23.4994	1460.82	5.7301
756.80	8.3219	983.53	7.8684	1489.16	1.9221
884.68	15.6458	984.45	0.0000	1505.03	1.5431
765.81	9.3940	1274.44	9.0280	1584.12	2.9425
766.42	6.2642	1001.03	7.9109	1596.21	3.9333
766.84	10.4419	1002.74	10.1763	1620.50	4.9414
772.60	0.0000	1004.73	9.0511	1621.92	3.9541
776.52	11.5282	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.0024
778.90	7.3424	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	6.8560	1764.49	4.0674
788.74	14.7383	1038.76	0.0000	1063.66	2.0359
792.07	7.9053	631.29	8.5919	1771.35	3.0546
795.86	12.6660	1048.07	1.7192	1791.20	0.0000
810.06	4.2438	1049.04	3.4395	1808.65	0.0000
810.29	6.3662	1050.41	4.5876	1810.72	0.0000
344.28	6.3667	1063.66	8.0596	1836.06	2.0613
810.76	7.4287	1077.00	6.9346		
815.77	8.5052	1077.34	6.9355		
1048.07	7.4492	1085.87	9.2695		
832.01	12.8315	1093.63	5.8065		
834.85	9.6332	1099.45	12.2133		
835.71	8.0301	1112.07	8.7549		
836.80	0.0000	1112.84	9.3405		
846.75	0.0000	1115.54	8.4129		
846.77	9.6735	1120.29	8.4240		
856.80	9.7072	1120.55	8.4246		
860.56	8.6400	1221.41	8.4264		
871.09	10.8386	1129.67	12.6686		
873.19	9.7617	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	11.9561	1173.23	13.3539		
880.51	9.7859	1177.95	14.2617		
881.60	11.9650	1189.05	3.5762		
883.24	7.6184	1204.77	8.9771		
884.68	8.7109	1221.41	12.6226		
889.28	4.3621	1231.02	14.4619		
894.76	7.6477	1235.36	20.8115		
898.04	8.7500	1238.28	10.3495		
900.72	6.5684	1260.41	0.0000		
903.28	5.4781	1271.87	9.1327		
911.20	13.1821	1274.44	6.3972		
912.08	13.1855	1274.54	6.3972		
923.98	0.0000	1291.59	7.3423		
926.50	4.4160	1298.22	0.0000		
929.11	7.7346	1312.11	6.4570		
935.54	8.8577	1332.49	0.9270		
937.49	5.5396	1362.66	0.0000		
944.13	11.6578	1365.19	4.6713		
946.00	9.9983	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:46:14.33

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278005.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM02.CNF;599
Background date : 29-OCT-2023 11:31:43
Sample date     : 11-SEP-2023 08:00:00 Acquisition date : 30-OCT-2023 09:45:37
Sample ID      : G640278005 Sample quantity  : 1.47140E+02 GRAM
Detector name  : GAM02 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.13 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 2505440 Detector SN# :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.30*	40	218	1.36	127.26	123	10	1.11E-02	73.6	
2	2	72.97*	22	113	1.18	146.59	144	19	6.16E-03	75.4	2.05E+00
3	2	74.87*	148	132	0.99	150.39	144	19	4.10E-02	15.4	
4	2	77.26	272	144	1.19	155.17	144	19	7.56E-02	9.7	
5	3	87.37*	103	160	1.35	175.40	164	29	2.87E-02	23.3	2.13E+00
6	3	90.15*	57	153	1.35	180.96	164	29	1.57E-02	41.8	
7	3	92.71*	107	145	1.29	186.09	164	29	2.97E-02	25.5	
8	0	109.97*	37	217	2.83	220.62	214	11	1.04E-02	78.6	
9	0	143.84*	24	135	1.08	288.39	285	8	6.77E-03	87.1	
10	0	157.79	26	115	0.69	316.29	313	7	7.22E-03	71.3	
11	0	186.01*	108	187	1.33	372.75	367	11	2.99E-02	27.8	
12	0	205.45*	9	93	1.35	411.63	409	7	2.44E-03	191.3	
13	0	209.62	56	122	1.35	419.96	416	9	1.54E-02	38.2	
14	0	238.70*	375	152	1.10	478.14	471	12	1.04E-01	8.5	
15	0	242.40	105	104	1.53	485.54	483	9	2.91E-02	20.7	
16	0	295.49*	321	65	1.01	591.74	587	9	8.92E-02	7.3	
17	0	301.90	17	95	1.01	604.57	599	11	4.85E-03	110.1	
18	0	338.75*	81	72	1.07	678.26	672	12	2.24E-02	24.1	
19	0	352.37*	444	69	1.19	705.50	700	13	1.23E-01	6.2	
20	0	370.48	23	41	0.96	741.73	738	9	6.27E-03	56.0	
21	0	463.59	38	49	1.26	927.96	921	14	1.05E-02	42.5	
22	0	511.19*	52	56	2.09	1023.15	1015	15	1.44E-02	39.1	
23	0	558.50*	10	20	1.55	1117.75	1114	8	2.74E-03	91.7	
24	0	583.73*	115	33	1.32	1168.21	1163	11	3.19E-02	13.8	
25	0	609.85*	352	32	1.44	1220.45	1214	14	9.78E-02	6.4	
26	0	669.12	35	38	6.91	1338.97	1329	19	9.72E-03	45.5	
27	0	677.02	18	22	4.79	1354.77	1348	13	4.90E-03	60.5	
28	0	769.68	71	14	3.38	1540.04	1530	22	1.98E-02	18.6	
29	0	796.06	19	21	2.08	1592.78	1585	12	5.28E-03	53.3	
30	0	861.43	24	23	1.12	1723.47	1718	13	6.58E-03	46.5	
31	0	892.51	12	6	1.03	1785.59	1778	12	3.35E-03	49.8	
32	0	896.84	5	8	1.33	1794.25	1790	8	1.26E-03	118.7	
33	0	911.73*	76	26	2.25	1824.02	1817	13	2.10E-02	18.5	
34	0	934.55	28	14	1.47	1869.64	1865	9	7.64E-03	30.7	



Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	969.53*	44	19	1.67	1939.58	1934	11	1.23E-02	24.7	
36	0	1021.10	15	10	4.71	2042.66	2034	14	4.04E-03	54.0	
37	0	1120.69*	78	20	1.85	2241.71	2232	20	2.16E-02	18.5	
38	0	1240.30*	9	16	2.36	2480.77	2472	11	2.56E-03	93.5	
39	0	1342.10	7	8	0.59	2684.21	2676	12	1.89E-03	95.3	
40	0	1378.47	32	7	1.51	2756.88	2748	15	9.02E-03	25.2	
41	0	1461.69*	71	0	2.12	2923.17	2916	17	1.96E-02	12.9	
42	0	1589.29	10	9	1.81	3178.13	3171	12	2.87E-03	65.7	
43	0	1730.43	17	3	0.84	3460.07	3453	12	4.68E-03	32.0	
44	0	1765.27*	56	0	1.86	3529.67	3520	19	1.57E-02	14.3	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278005.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 11-SEP-2023 08:00:00 Acquisition date : 30-OCT-2023 09:45:37  
Sample ID : G640278005 Sample quantity : 147.14 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA2 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.13 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

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	68	10.66*	9.732E-01	3.342E+00	3.342E+00	25.87
CD-109	88.03	129	3.70*	4.705E+00	3.769E+00	4.057E+00	46.66
SN-117M	156.02	-----	2.11	5.317E+00	-----	Line Not Found	-----
	158.56	31	86.40*	5.289E+00	3.437E-02	4.196E-01	142.61
TE-123M	159.00	31	84.00*	5.289E+00	3.535E-02	4.703E-02	142.61
TE-125M	109.28	46	0.27*	5.583E+00	1.545E+01	2.794E+01	157.26
SN-126	64.28	51	9.60	2.229E+00	1.210E+00	1.210E+00	147.17
	86.94	129	8.90	4.705E+00	1.567E+00	1.567E+00	46.66
	87.57	129	37.00*	4.705E+00	3.769E-01	3.769E-01	46.66
TL-208	277.37	-----	6.60	3.664E+00	-----	Line Not Found	-----
	583.19	121	85.00*	2.129E+00	3.414E-01	3.414E-01	27.60
	860.56	24	12.50	1.545E+00	6.349E-01	6.349E-01	92.92
BI-211	72.87	28	1.23	3.399E+00	3.412E+00	3.412E+00	150.79
	351.06	491	12.92*	3.084E+00	6.287E+00	6.287E+00	12.40
PB-212	74.82	186	10.28	3.607E+00	2.559E+00	2.559E+00	30.86
	77.11	342	17.10	3.854E+00	2.647E+00	2.647E+00	19.49
	238.63	429	43.60*	4.081E+00	1.230E+00	1.230E+00	17.06
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
BI-214	609.32	370	45.49*	2.058E+00	2.015E+00	2.015E+00	12.86
	1120.29	77	14.92	1.221E+00	2.159E+00	2.159E+00	36.91
	1764.49	53	15.30	8.594E-01	2.069E+00	2.069E+00	28.55
PB-214	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.667E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
RN-222	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
	609.32	370	45.49*	2.058E+00	2.015E+00	2.015E+00	12.86
	1120.29	77	14.92	1.221E+00	2.159E+00	2.159E+00	36.91
	1764.49	53	15.30	8.594E-01	2.069E+00	2.069E+00	28.55
RA-224	240.99	120	4.10*	4.036E+00	3.693E+00	3.693E+00	41.44
RA-226	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.667E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
AC-228	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31
RA-228	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31
TH-228	74.82	186	10.28	3.607E+00	2.559E+00	2.559E+00	30.86
	77.11	342	17.10	3.854E+00	2.647E+00	2.647E+00	19.49

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	238.63	429	43.60*	4.081E+00	1.230E+00	1.230E+00	17.06
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
TH-230	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.666E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
PA-231	283.69	-----	1.70	3.605E+00	-----	Line Not Found	-----
	301.36	20	5.35*	3.447E+00	5.407E-01	5.407E-01	220.25
TH-232	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31
TH-234	63.29	51	3.70*	2.229E+00	3.140E+00	3.140E+00	147.17
	92.59	132	4.23	5.028E+00	3.175E+00	3.175E+00	50.93
U-234	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.666E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
U-235	89.96	70	3.47	4.883E+00	2.112E+00	2.112E+00	83.58
	93.35	132	5.60	5.028E+00	2.398E+00	2.398E+00	50.93
	143.76	29	10.96*	5.494E+00	2.466E-01	2.466E-01	174.12
	163.33	-----	5.08	5.200E+00	-----	Line Not Found	-----
	185.72	126	57.20	4.829E+00	2.322E-01	2.322E-01	55.65
	205.31	10	5.01	4.528E+00	2.286E-01	2.286E-01	382.57
U-238	63.29	51	3.70*	2.229E+00	3.140E+00	3.140E+00	147.17
	92.59	132	4.23	5.028E+00	3.175E+00	3.175E+00	50.93
AM-243	43.53	-----	5.90	2.631E-01	-----	Line Not Found	-----
	74.66	186	67.20*	3.607E+00	3.915E-01	3.915E-01	30.86
ANH-511	511.00	55	100.00*	2.354E+00	1.199E-01	1.199E-01	78.12

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278005.CNF;1
* Acquisition date   : 30-OCT-2023 09:45:37 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 01:00:01.13 Half life ratio : *****
* Sample date       : 11-SEP-2023 08:00:00 Analyst initials: MXR1
* Sample ID         : G640278005 Sample Quantity : 1.4714E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date    : 13-SEP-2023 09:49:44 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;19
*****

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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	3.342E+00	8.473E-01	6.198E-01
CD-109	4.057E+00	1.855E+00	1.518E+00
SN-117M	4.196E-01	5.864E-01	6.398E-01
TE-123M	4.703E-02	6.572E-02	7.117E-02
TE-125M	2.794E+01	4.306E+01	3.151E+01
SN-126	3.769E-01	1.723E-01	1.419E-01
TL-208	3.414E-01	9.235E-02	7.821E-02
BI-211	6.287E+00	7.640E-01	4.332E-01
PB-212	1.230E+00	2.057E-01	1.229E-01
BI-214	2.015E+00	2.539E-01	1.246E-01
PB-214	2.282E+00	2.773E-01	1.575E-01
RN-222	2.015E+00	2.539E-01	1.246E-01
RA-224	3.693E+00	1.500E+00	1.481E+00
RA-226	2.282E+00	2.773E-01	1.575E-01
AC-228	1.027E+00	3.723E-01	2.687E-01
RA-228	1.027E+00	3.723E-01	2.687E-01
TH-228	1.230E+00	2.057E-01	1.229E-01
TH-230	2.282E+00	2.773E-01	1.575E-01
PA-231	5.407E-01	1.167E+00	9.601E-01
TH-232	1.027E+00	3.723E-01	2.687E-01
TH-234	3.140E+00	4.529E+00	3.140E+00
U-234	2.282E+00	2.773E-01	1.575E-01
U-235	2.466E-01	4.208E-01	4.183E-01
U-238	3.140E+00	4.529E+00	3.140E+00
AM-243	3.915E-01	1.184E-01	1.133E-01
ANH-511	1.199E-01	9.181E-02	7.076E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	1.098E-02		5.408E-01	1.039E+00	NOT IDENT.
NA-22	-7.336E-03		4.063E-02	7.798E-02	NOT IDENT.
NA-24	0.000E+00		1.805E+22	0.000E+00	SHORT HLIF
AL-26	-1.699E-02		3.048E-02	5.603E-02	NOT IDENT.

SC-46	-1.985E-02	5.464E-02	8.891E-02	FAIL ABUN
V-48	1.423E-01	2.985E-01	6.442E-01	NOT IDENT.
CR-51	3.318E-01	9.621E-01	1.927E+00	NOT IDENT.
MN-52	1.378E+01	2.111E+01	4.577E+01	FAIL ABUN
MN-54	-8.088E-03	3.926E-02	7.615E-02	NOT IDENT.
CO-56	2.259E-02	5.981E-02	1.240E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.748E-02	3.010E-02	5.863E-02	NOT IDENT.
CO-58	-3.163E-02	4.820E-02	8.757E-02	NOT IDENT.
FE-59	-3.589E-02	1.501E-01	2.849E-01	NOT IDENT.
CO-60	-3.493E-02	4.077E-02	6.452E-02	NOT IDENT.
ZN-65	-4.431E-03	9.278E-02	1.615E-01	NOT IDENT.
GE-68	-1.206E-01	1.220E+00	2.417E+00	NOT IDENT.
AS-73	3.278E-01	1.833E+00	3.654E+00	NOT IDENT.
AS-74	-8.472E-02	3.970E-01	7.247E-01	NOT IDENT.
SE-75	7.451E-03	6.139E-02	1.213E-01	NOT IDENT.
BR-77	0.000E+00	6.418E+05	0.000E+00	SHORT HLIF
SR-82	-1.257E-01	9.112E-01	1.581E+00	NOT IDENT.
RB-83	4.164E-04	9.575E-02	1.838E-01	NOT IDENT.
RB-84	7.866E-02	1.416E-01	3.068E-01	NOT IDENT.
KR-85	1.098E+01	8.781E+00	1.746E+01	NOT IDENT.
SR-85	8.309E-02	6.650E-02	1.322E-01	NOT IDENT.
RB-86	-8.406E-01	2.485E+00	4.685E+00	NOT IDENT.
Y-88	3.738E-02	4.151E-02	1.137E-01	FAIL ABUN
Y-91	4.257E+00	2.724E+01	5.570E+01	NOT IDENT.
NB-94	8.284E-03	3.676E-02	7.077E-02	NOT IDENT.
NB-95	-1.779E-03	6.922E-02	1.212E-01	NOT IDENT.
NB-95M	9.046E-02	2.008E-01	3.717E-01	NOT IDENT.
ZR-95	8.238E-02	1.109E-01	2.409E-01	NOT IDENT.
NB-97	0.000E+00	1.636E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.945E+20	0.000E+00	SHORT HLIF
MO-99	0.000E+00	8.864E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	3.091E-03	3.797E-02	7.064E-02	NOT IDENT.
RH-102	4.722E-02	5.316E-02	1.157E-01	NOT IDENT.
RU-103	6.280E-02	8.576E-02	1.759E-01	FAIL ABUN
RH-106	4.036E-02	3.301E-01	6.425E-01	NOT IDENT.
RU-106	4.036E-02	3.301E-01	6.425E-01	NOT IDENT.
AG-108M	-3.447E-03	3.335E-02	6.319E-02	NOT IDENT.
AG-110	-2.378E-01	9.024E-01	1.624E+00	NOT IDENT.
AG-110M	1.405E-03	5.631E-02	1.097E-01	FAIL ABUN
SN-113	1.036E-03	6.413E-02	1.232E-01	NOT IDENT.
CD-115	0.000E+00	4.293E+05	0.000E+00	SHORT HLIF
SB-122	0.000E+00	1.224E+04	0.000E+00	SHORT HLIF
SB-124	2.311E-02	9.147E-02	2.303E-01	NOT IDENT.
SB-125	4.593E-02	1.055E-01	2.114E-01	FAIL ABUN
I-126	9.307E-01	1.881E+00	3.351E+00	NOT IDENT.
SB-126	-3.461E-01	9.865E-01	1.890E+00	NOT IDENT.
SB-127	0.000E+00	5.635E+02	0.000E+00	SHORT HLIF
I-131	-1.835E+00	2.370E+00	4.218E+00	NOT IDENT.
I-132	0.000E+00	8.916E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.274E+03	0.000E+00	SHORT HLIF
BA-133	1.182E-02	5.399E-02	9.593E-02	FAIL ABUN
I-133	0.000E+00	4.197E+15	0.000E+00	SHORT HLIF
CS-134	7.348E-02	7.683E-02	1.141E-01	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	-5.070E-02	7.108E-01	1.376E+00	NOT IDENT.
BA-137M	-1.605E-02	4.920E-02	8.435E-02	NOT IDENT.
CS-137	-1.695E-02	5.197E-02	8.911E-02	NOT IDENT.
LA-138	4.261E-02	7.956E-02	1.664E-01	NOT IDENT.
CE-139	-1.900E-02	4.203E-02	7.356E-02	NOT IDENT.
BA-140	-9.033E-02	1.578E+00	3.031E+00	NOT IDENT.
LA-140	6.616E-01	7.830E-01	1.758E+00	NOT IDENT.
CE-141	5.880E-02	1.588E-01	2.779E-01	NOT IDENT.
CE-143	0.000E+00	4.215E+09	0.000E+00	SHORT HLIF
CE-144	1.567E-01	2.639E-01	5.055E-01	NOT IDENT.
PM-144	-2.834E-03	4.475E-02	8.180E-02	NOT IDENT.
PR-144	-1.788E-01	3.414E+00	6.249E+00	NOT IDENT.
PM-146	9.228E-03	4.550E-02	8.955E-02	NOT IDENT.
ND-147	-5.313E-01	5.285E+00	9.925E+00	FAIL ABUN
PM-147	-4.083E+02	8.140E+02	1.460E+03	NOT IDENT.
PM-149	0.000E+00	4.191E+06	0.000E+00	SHORT HLIF
EU-150	4.275E-03	3.238E-02	5.684E-02	FAIL ABUN
EU-152	5.822E-02	1.091E-01	2.213E-01	NOT IDENT.
GD-153	-2.892E-02	1.085E-01	1.865E-01	NOT IDENT.
EU-154	-1.773E-02	1.138E-01	2.194E-01	NOT IDENT.
EU-155	1.079E-02	1.307E-01	2.286E-01	FAIL ABUN
TB-160	-1.100E-01	1.921E-01	3.494E-01	FAIL ABUN

HO-166M	9.395E-03	5.971E-02	1.160E-01	NOT IDENT.
TM-171	-7.058E+00	3.041E+01	5.910E+01	NOT IDENT.
HF-172	1.589E-01	2.359E-01	4.566E-01	FAIL ABUN
LU-172	-2.056E-02	5.544E-02	1.041E-01	FAIL ABUN
LU-176	-1.315E-02	3.142E-02	5.596E-02	FAIL ABUN
HF-181	-1.027E-02	8.648E-02	1.625E-01	NOT IDENT.
TA-182	-4.047E-02	1.954E-01	3.729E-01	FAIL ABUN
RE-183	-4.032E-02	3.837E-01	7.480E-01	NOT IDENT.
RE-184	1.492E-01	2.383E-01	5.221E-01	NOT IDENT.
W-188	4.945E+00	1.290E+01	2.348E+01	FAIL ABUN
IR-192	-2.352E-02	5.177E-02	9.667E-02	FAIL ABUN
HG-203	2.070E-02	7.654E-02	1.515E-01	FAIL ABUN
TL-204	5.010E-01	6.144E+00	1.106E+01	NOT IDENT.
BI-207	-3.089E-02	5.368E-02	9.540E-02	FAIL ABUN
BI-210	-4.629E-01	7.139E+00	1.399E+01	NOT IDENT.
PB-210	-4.629E-01	7.139E+00	1.399E+01	NOT IDENT.
PB-211	-3.002E-01	8.314E-01	1.532E+00	NOT IDENT.
BI-212	3.460E-01	6.810E-01	1.388E+00	NOT IDENT.
BI-213	5.106E-02	1.202E-01	2.400E-01	NOT IDENT.
RN-219	1.302E-02	4.814E-01	9.229E-01	NOT IDENT.
RA-223	2.202E-01	6.973E-01	1.394E+00	FAIL ABUN
AC-225	4.570E+00	7.170E+00	1.360E+01	NOT IDENT.
AC-227	1.382E-01	2.689E-01	5.504E-01	NOT IDENT.
TH-227	1.382E-01	2.689E-01	5.504E-01	NOT IDENT.
TH-229	-4.010E-01	6.554E-01	1.115E+00	FAIL ABUN
TH-231	2.202E-01	6.973E-01	1.394E+00	FAIL ABUN
PA-233	-1.842E-02	7.346E-02	1.397E-01	NOT IDENT.
PA-234	-1.504E-01	3.037E-01	5.566E-01	FAIL ABUN
PA-234M	3.049E+00	6.293E+00	1.330E+01	NOT IDENT.
NP-237	-1.842E-02	7.346E-02	1.397E-01	NOT IDENT.
NP-238	0.000E+00	1.354E+06	0.000E+00	SHORT HLIF
NP-239	1.471E-02	2.908E-01	5.461E-01	NOT IDENT.
PU-239	6.115E+01	3.662E+02	6.886E+02	NOT IDENT.
AM-241	1.284E-01	2.145E-01	4.098E-01	NOT IDENT.
CM-243	1.475E-02	1.192E-01	2.265E-01	NOT IDENT.
BK-247	2.392E-02	9.137E-02	1.823E-01	NOT IDENT.
CM-247	8.518E-04	4.251E-02	8.171E-02	NOT IDENT.
CF-249	2.118E-03	4.672E-02	9.003E-02	NOT IDENT.
CF-251	-3.139E-02	1.636E-01	2.905E-01	NOT IDENT.

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	68	10.66*	9.732E-01	3.342E+00	3.342E+00	25.87
CD-109	88.03	129	3.70*	4.705E+00	3.769E+00	4.057E+00	46.66
SN-117M	156.02	-----	2.11	5.317E+00	-----	Line Not Found	-----
	158.56	31	86.40*	5.289E+00	3.437E-02	4.196E-01	142.61
TE-123M	159.00	31	84.00*	5.289E+00	3.535E-02	4.703E-02	142.61
TE-125M	109.28	46	0.27*	5.583E+00	1.545E+01	2.794E+01	157.26
SN-126	64.28	51	9.60	2.229E+00	1.210E+00	1.210E+00	147.17
	86.94	129	8.90	4.705E+00	1.567E+00	1.567E+00	46.66
	87.57	129	37.00*	4.705E+00	3.769E-01	3.769E-01	46.66
TL-208	277.37	-----	6.60	3.664E+00	-----	Line Not Found	-----
	583.19	121	85.00*	2.129E+00	3.414E-01	3.414E-01	27.60
	860.56	24	12.50	1.545E+00	6.349E-01	6.349E-01	92.92
BI-211	72.87	28	1.23	3.399E+00	3.412E+00	3.412E+00	150.79
	351.06	491	12.92*	3.084E+00	6.287E+00	6.287E+00	12.40
PB-212	74.82	186	10.28	3.607E+00	2.559E+00	2.559E+00	30.86
	77.11	342	17.10	3.854E+00	2.647E+00	2.647E+00	19.49
	238.63	429	43.60*	4.081E+00	1.230E+00	1.230E+00	17.06
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
BI-214	609.32	370	45.49*	2.058E+00	2.015E+00	2.015E+00	12.86
	1120.29	77	14.92	1.221E+00	2.159E+00	2.159E+00	36.91
	1764.49	53	15.30	8.594E-01	2.069E+00	2.069E+00	28.55
PB-214	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.667E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
RN-222	609.32	370	45.49*	2.058E+00	2.015E+00	2.015E+00	12.86
	1120.29	77	14.92	1.221E+00	2.159E+00	2.159E+00	36.91
	1764.49	53	15.30	8.594E-01	2.069E+00	2.069E+00	28.55
RA-224	240.99	120	4.10*	4.036E+00	3.693E+00	3.693E+00	41.44
RA-226	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.667E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
AC-228	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31
RA-228	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31



Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	186	10.28	3.607E+00	2.559E+00	2.559E+00	30.86
	77.11	342	17.10	3.854E+00	2.647E+00	2.647E+00	19.49
	238.63	429	43.60*	4.081E+00	1.230E+00	1.230E+00	17.06
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
TH-230	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.666E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
PA-231	283.69	-----	1.70	3.605E+00	-----	Line Not Found	-----
	301.36	20	5.35*	3.447E+00	5.407E-01	5.407E-01	220.25
TH-232	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	90	11.27	3.172E+00	1.277E+00	1.277E+00	48.25
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
TH-234	911.20	76	25.80*	1.470E+00	1.027E+00	1.027E+00	37.00
	968.97	45	15.80	1.391E+00	1.033E+00	1.033E+00	49.31
	63.29	51	3.70*	2.229E+00	3.140E+00	3.140E+00	147.17
	92.59	132	4.23	5.028E+00	3.175E+00	3.175E+00	50.93
U-234	74.82	186	5.80	3.607E+00	4.536E+00	4.536E+00	30.86
	77.11	342	9.70	3.854E+00	4.666E+00	4.666E+00	19.49
	87.09	129	3.41	4.705E+00	4.090E+00	4.090E+00	46.66
	242.00	120	7.25	4.036E+00	2.088E+00	2.088E+00	41.44
	295.22	360	18.42	3.500E+00	2.851E+00	2.851E+00	14.53
	351.93	491	35.60*	3.084E+00	2.282E+00	2.282E+00	12.40
U-235	89.96	70	3.47	4.883E+00	2.112E+00	2.112E+00	83.58
	93.35	132	5.60	5.028E+00	2.398E+00	2.398E+00	50.93
	143.76	29	10.96*	5.494E+00	2.466E-01	2.466E-01	174.12
	163.33	-----	5.08	5.200E+00	-----	Line Not Found	-----
	185.72	126	57.20	4.829E+00	2.322E-01	2.322E-01	55.65
U-238	205.31	10	5.01	4.528E+00	2.286E-01	2.286E-01	382.57
	63.29	51	3.70*	2.229E+00	3.140E+00	3.140E+00	147.17
AM-243	92.59	132	4.23	5.028E+00	3.175E+00	3.175E+00	50.93
	43.53	-----	5.90	2.631E-01	-----	Line Not Found	-----
ANH-511	74.66	186	67.20*	3.607E+00	3.915E-01	3.915E-01	30.86
	511.00	55	100.00*	2.354E+00	1.199E-01	1.199E-01	78.12

Flag: "\*" = Keyline

Total number of lines in spectrum 44  
 Number of unidentified lines 9  
 Number of lines tentatively identified by NID 35 79.55%

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	3.342E+00	3.342E+00	0.865E+00	25.87	
CD-109	461.40D	1.08	3.769E+00	4.057E+00	1.893E+00	46.66	
SN-117M	13.60D	12.2	3.437E-02	4.196E-01	5.984E-01	142.61	
TE-123M	119.20D	1.33	3.535E-02	4.703E-02	6.707E-02	142.61	
TE-125M	57.40D	1.81	1.545E+01	2.794E+01	4.394E+01	157.26	
SN-126	2.30E+05Y	1.00	3.769E-01	3.769E-01	1.759E-01	46.66	
TL-208	1.41E+10Y	1.00	3.414E-01	3.414E-01	0.942E-01	27.60	
BI-211	7.04E+08Y	1.00	6.287E+00	6.287E+00	0.780E+00	12.40	
PB-212	1.41E+10Y	1.00	1.230E+00	1.230E+00	0.210E+00	17.06	
BI-214	1600.00Y	1.00	2.015E+00	2.015E+00	0.259E+00	12.86	
PB-214	1600.00Y	1.00	2.282E+00	2.282E+00	0.283E+00	12.40	
RN-222	1600.00Y	1.00	2.015E+00	2.015E+00	0.259E+00	12.86	
RA-224	1.41E+10Y	1.00	3.693E+00	3.693E+00	1.530E+00	41.44	
RA-226	1600.00Y	1.00	2.282E+00	2.282E+00	0.283E+00	12.40	
AC-228	1.41E+10Y	1.00	1.027E+00	1.027E+00	0.380E+00	37.00	
RA-228	1.41E+10Y	1.00	1.027E+00	1.027E+00	0.380E+00	37.00	
TH-228	1.41E+10Y	1.00	1.230E+00	1.230E+00	0.210E+00	17.06	
TH-230	7.54E+04Y	1.00	2.282E+00	2.282E+00	0.283E+00	12.40	
PA-231	7.04E+08Y	1.00	5.407E-01	5.407E-01	11.91E-01	220.25	
TH-232	1.41E+10Y	1.00	1.027E+00	1.027E+00	0.380E+00	37.00	
TH-234	4.47E+09Y	1.00	3.140E+00	3.140E+00	4.622E+00	147.17	
U-234	2.45E+05Y	1.00	2.282E+00	2.282E+00	0.283E+00	12.40	
U-235	7.04E+08Y	1.00	2.466E-01	2.466E-01	4.294E-01	174.12	
U-238	4.47E+09Y	1.00	3.140E+00	3.140E+00	4.622E+00	147.17	
AM-243	7370.00Y	1.00	3.915E-01	3.915E-01	1.208E-01	30.86	
ANH-511	1.00E+09Y	1.00	1.199E-01	1.199E-01	0.937E-01	78.12	

Total Activity : 5.960E+01 7.278E+01

Grand Total Activity : 5.960E+01 7.278E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	209.62	64	141	1.35	419.96	416	9	1.54E-02	76.5	4.47E+00	T
0	370.48	25	46	0.96	741.73	738	9	6.27E-03	****	2.97E+00	
0	463.59	41	53	1.26	927.96	921	14	1.05E-02	85.0	2.53E+00	T
0	558.50	10	22	1.55	1117.75	1114	8	2.74E-03	****	2.20E+00	
0	669.12	36	40	6.91	1338.97	1329	19	9.72E-03	91.0	1.91E+00	T
0	677.02	18	23	4.79	1354.77	1348	13	4.90E-03	****	1.89E+00	T
0	769.68	73	14	3.38	1540.04	1530	22	1.98E-02	37.3	1.70E+00	
0	796.06	19	21	2.08	1592.78	1585	12	5.28E-03	****	1.65E+00	T
0	892.51	12	6	1.03	1785.59	1778	12	3.35E-03	99.5	1.50E+00	
0	896.84	5	9	1.33	1794.25	1790	8	1.26E-03	****	1.49E+00	T
0	934.55	28	14	1.47	1869.64	1865	9	7.64E-03	61.4	1.44E+00	T
0	1021.10	15	10	4.71	2042.66	2034	14	4.04E-03	****	1.33E+00	T
0	1240.30	9	16	2.36	2480.77	2472	11	2.56E-03	****	1.12E+00	
0	1342.10	7	8	0.59	2684.21	2676	12	1.89E-03	****	1.04E+00	
0	1378.47	31	6	1.51	2756.88	2748	15	9.02E-03	50.5	1.02E+00	
0	1589.29	10	8	1.81	3178.13	3171	12	2.87E-03	****	9.16E-01	
0	1730.43	16	3	0.84	3460.07	3453	12	4.68E-03	63.9	8.69E-01	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*                               *                                               *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278005.CNF;1   *
* Acquisition date   : 30-OCT-2023 09:45:37 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 01:00:01.13 Half life ratio : ***** *
* Sample date       : 11-SEP-2023 08:00:00 Nuclide Library : SOLID          *
* Sample ID        : G640278005 Analyst initials: MXR1         *
* Batch Number     : 2505440 Sample Quantity : 1.4714E+02 GRAM *
* Wet wt corr      : 1.00000 Wet Weight : 0.00000           *
*                               Dry Weight : 0.00000           *
*****
*                               CALIBRATION INFORMATION                         *
*                               *                                               *
* Eff. Cal. date    : 13-SEP-2023 09:49:44 Eff. Geometry   : CAN           *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;19 *
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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	2.431E-01
CD-109	7.138E-01
SN-117M	3.004E-01
TE-123M	3.340E-02
TE-125M	1.488E+01
SN-126	6.672E-02
TL-208	3.520E-02
BI-211	1.987E-01
PB-212	5.742E-02
BI-214	5.476E-02
PB-214	7.227E-02
RN-222	5.476E-02
RA-224	6.973E-01
RA-226	7.227E-02
AC-228	1.159E-01
RA-228	1.159E-01
TH-228	5.742E-02
TH-230	7.226E-02
PA-231	4.412E-01
TH-232	1.159E-01
TH-234	1.480E+00
U-234	7.226E-02
U-235	1.971E-01
U-238	1.480E+00
AM-243	5.360E-02
ANH-511	3.237E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.672E-01	NOT IDENT.
NA-22	3.237E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.986E-02	NOT IDENT.
SC-46	3.745E-02	FAIL ABUN

V-48	2.792E-01	NOT IDENT.
CR-51	8.890E-01	NOT IDENT.
MN-52	1.979E+01	FAIL ABUN
MN-54	3.314E-02	NOT IDENT.
CO-56	5.506E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.761E-02	NOT IDENT.
CO-58	3.677E-02	NOT IDENT.
FE-59	1.211E-01	NOT IDENT.
CO-60	2.551E-02	NOT IDENT.
ZN-65	6.781E-02	NOT IDENT.
GE-68	1.014E+00	NOT IDENT.
AS-73	1.722E+00	NOT IDENT.
AS-74	3.235E-01	NOT IDENT.
SE-75	5.638E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	6.849E-01	NOT IDENT.
RB-83	8.183E-02	NOT IDENT.
RB-84	1.345E-01	NOT IDENT.
KR-85	8.028E+00	NOT IDENT.
SR-85	6.079E-02	NOT IDENT.
RB-86	1.946E+00	NOT IDENT.
Y-88	4.549E-02	FAIL ABUN
Y-91	2.366E+01	NOT IDENT.
NB-94	3.155E-02	NOT IDENT.
NB-95	5.359E-02	NOT IDENT.
NB-95M	1.739E-01	NOT IDENT.
ZR-95	1.077E-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	3.337E-02	NOT IDENT.
RH-102	5.141E-02	NOT IDENT.
RU-103	8.024E-02	FAIL ABUN
RH-106	2.828E-01	NOT IDENT.
RU-106	2.828E-01	NOT IDENT.
AG-108M	2.863E-02	NOT IDENT.
AG-110	7.193E-01	NOT IDENT.
AG-110M	4.753E-02	FAIL ABUN
SN-113	5.642E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SB-122	0.000E+00	SHORT HLIF
SB-124	8.605E-02	NOT IDENT.
SB-125	9.649E-02	FAIL ABUN
I-126	1.520E+00	NOT IDENT.
SB-126	8.304E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.907E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.417E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	5.184E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	5.985E-01	NOT IDENT.
BA-137M	3.810E-02	NOT IDENT.
CS-137	4.025E-02	NOT IDENT.
LA-138	7.247E-02	NOT IDENT.
CE-139	3.453E-02	NOT IDENT.
BA-140	1.330E+00	NOT IDENT.
LA-140	7.643E-01	NOT IDENT.
CE-141	1.311E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.395E-01	NOT IDENT.
PM-144	3.670E-02	NOT IDENT.
PR-144	2.805E+00	NOT IDENT.
PM-146	4.044E-02	NOT IDENT.
ND-147	4.438E+00	FAIL ABUN
PM-147	6.832E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.609E-02	FAIL ABUN
EU-152	1.020E-01	NOT IDENT.
GD-153	8.770E-02	NOT IDENT.
EU-154	9.124E-02	NOT IDENT.
EU-155	1.079E-01	FAIL ABUN
TB-160	1.501E-01	FAIL ABUN
HO-166M	5.082E-02	NOT IDENT.

TM-171	2.779E+01	NOT IDENT.
HF-172	2.163E-01	FAIL ABUN
LU-172	4.270E-02	FAIL ABUN
LU-176	2.573E-02	FAIL ABUN
HF-181	7.326E-02	NOT IDENT.
TA-182	1.557E-01	FAIL ABUN
RE-183	3.516E-01	NOT IDENT.
RE-184	2.286E-01	NOT IDENT.
W-188	1.092E+01	FAIL ABUN
IR-192	4.421E-02	FAIL ABUN
HG-203	7.074E-02	FAIL ABUN
TL-204	5.226E+00	NOT IDENT.
BI-207	4.036E-02	FAIL ABUN
BI-210	6.595E+00	NOT IDENT.
PB-210	6.595E+00	NOT IDENT.
PB-211	6.986E-01	NOT IDENT.
BI-212	6.351E-01	NOT IDENT.
BI-213	1.095E-01	NOT IDENT.
RN-219	4.230E-01	NOT IDENT.
RA-223	6.422E-01	FAIL ABUN
AC-225	6.361E+00	NOT IDENT.
AC-227	2.557E-01	NOT IDENT.
TH-227	2.557E-01	NOT IDENT.
TH-229	5.226E-01	FAIL ABUN
TH-231	6.422E-01	FAIL ABUN
PA-233	6.430E-02	NOT IDENT.
PA-234	2.372E-01	FAIL ABUN
PA-234M	6.033E+00	NOT IDENT.
NP-237	6.430E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.568E-01	NOT IDENT.
PU-239	3.238E+02	NOT IDENT.
AM-241	1.931E-01	NOT IDENT.
CM-243	1.068E-01	NOT IDENT.
BK-247	8.484E-02	NOT IDENT.
CM-247	3.732E-02	NOT IDENT.
CF-249	4.126E-02	NOT IDENT.
CF-251	1.368E-01	NOT IDENT.

```

*****
*
*               GEL Laboratories LLC
*               2040 Savage Road
*               Charleston, SC 29407
*****
*
*               DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278005.CNF;1
* Acquisition date   : 30-OCT-2023 09:45:37 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 01:00:01.13 Half life ratio  : *****
* Sample date        : 11-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID          : G640278005 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.4714E+02 GRAM
*                   : Quantity Err(%) : 1.3592E-03 %
* Wet wt corr        : 1.00000 Wet Weight      : 0.00000
*                   : Dry Weight      : 0.00000
*****
*
*               CALIBRATION INFORMATION
*
* Eff. Cal. date     : 13-SEP-2023 09:49:44 Eff. Geometry   : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;19
*****

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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	3.342E+00	9.252E-01	9.252E-01
CD-109	4.057E+00	1.918E+00	1.918E+00
SN-117M	4.196E-01	5.874E-01	5.874E-01
TE-123M	4.703E-02	6.584E-02	6.584E-02
TE-125M	2.794E+01	4.313E+01	4.313E+01
SN-126	3.769E-01	1.771E-01	1.771E-01
TL-208	3.414E-01	9.685E-02	9.685E-02
BI-211	6.287E+00	9.219E-01	9.219E-01
PB-212	1.230E+00	2.304E-01	2.304E-01
BI-214	2.015E+00	3.064E-01	3.064E-01
PB-214	2.282E+00	3.325E-01	3.325E-01
RN-222	2.015E+00	3.064E-01	3.064E-01
RA-224	3.693E+00	1.532E+00	1.532E+00
RA-226	2.282E+00	3.325E-01	3.325E-01
AC-228	1.027E+00	3.887E-01	3.887E-01
RA-228	1.027E+00	3.887E-01	3.887E-01
TH-228	1.230E+00	2.304E-01	2.304E-01
TH-230	2.282E+00	3.325E-01	3.325E-01
PA-231	5.407E-01	1.173E+00	1.173E+00
TH-232	1.027E+00	3.887E-01	3.887E-01
TH-234	3.140E+00	4.592E+00	4.592E+00
U-234	2.282E+00	3.325E-01	3.325E-01
U-235	2.466E-01	4.213E-01	4.213E-01
U-238	3.140E+00	4.592E+00	4.592E+00
AM-243	3.915E-01	1.253E-01	1.253E-01
ANH-511	1.199E-01	9.238E-02	9.238E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.098E-02	5.408E-01	5.409E-01	NOT IDENT.
NA-22	-7.336E-03	4.064E-02	4.077E-02	NOT IDENT.
NA-24	-1.600E+21	1.805E+22	0.000E+00	SHORT HLIF
AL-26	-1.699E-02	3.051E-02	3.146E-02	NOT IDENT.

SC-46	-1.985E-02	5.468E-02	5.540E-02	FAIL ABUN
V-48	1.423E-01	2.988E-01	3.056E-01	NOT IDENT.
CR-51	3.318E-01	9.625E-01	9.740E-01	NOT IDENT.
MN-52	1.378E+01	2.116E+01	2.205E+01	FAIL ABUN
MN-54	-8.088E-03	3.926E-02	3.943E-02	NOT IDENT.
CO-56	2.259E-02	5.986E-02	6.072E-02	NOT IDENT.
MN-56	1.000E+41	2.695E+41	0.000E+00	SHORT HLIF
CO-57	1.748E-02	3.013E-02	3.114E-02	NOT IDENT.
CO-58	-3.163E-02	4.830E-02	5.036E-02	NOT IDENT.
FE-59	-3.589E-02	1.502E-01	1.511E-01	NOT IDENT.
CO-60	-3.493E-02	4.096E-02	4.388E-02	NOT IDENT.
ZN-65	-4.431E-03	9.278E-02	9.280E-02	NOT IDENT.
GE-68	-1.206E-01	1.220E+00	1.221E+00	NOT IDENT.
AS-73	3.278E-01	1.835E+00	1.840E+00	NOT IDENT.
AS-74	-8.472E-02	3.971E-01	3.989E-01	NOT IDENT.
SE-75	7.451E-03	6.140E-02	6.149E-02	NOT IDENT.
BR-77	3.839E+06	5.486E+06	5.753E+06	SHORT HLIF
SR-82	-1.257E-01	9.113E-01	9.131E-01	NOT IDENT.
RB-83	4.164E-04	9.575E-02	9.575E-02	NOT IDENT.
RB-84	7.866E-02	1.418E-01	1.462E-01	NOT IDENT.
KR-85	1.098E+01	8.831E+00	1.012E+01	NOT IDENT.
SR-85	8.309E-02	6.688E-02	7.665E-02	NOT IDENT.
RB-86	-8.406E-01	2.486E+00	2.515E+00	NOT IDENT.
Y-88	3.738E-02	4.160E-02	4.489E-02	FAIL ABUN
Y-91	4.257E+00	2.724E+01	2.731E+01	NOT IDENT.
NB-94	8.284E-03	3.677E-02	3.696E-02	NOT IDENT.
NB-95	-1.779E-03	6.923E-02	6.923E-02	NOT IDENT.
NB-95M	9.046E-02	2.011E-01	2.051E-01	NOT IDENT.
ZR-95	8.238E-02	1.112E-01	1.172E-01	NOT IDENT.
NB-97	-1.000E+41	1.638E+41	0.000E+00	SHORT HLIF
ZR-97	3.086E+20	6.950E+20	0.000E+00	SHORT HLIF
MO-99	4.351E+04	6.877E+04	7.151E+04	SHORT HLIF
TC-99M	1.000E+41	2.379E+41	0.000E+00	SHORT HLIF
RH-101	3.091E-03	3.798E-02	3.800E-02	NOT IDENT.
RH-102	4.722E-02	5.341E-02	5.750E-02	NOT IDENT.
RU-103	6.280E-02	8.594E-02	9.048E-02	FAIL ABUN
RH-106	4.036E-02	3.301E-01	3.306E-01	NOT IDENT.
RU-106	4.036E-02	3.301E-01	3.306E-01	NOT IDENT.
AG-108M	-3.447E-03	3.335E-02	3.338E-02	NOT IDENT.
AG-110	-2.378E-01	9.027E-01	9.090E-01	NOT IDENT.
AG-110M	1.405E-03	5.631E-02	5.632E-02	FAIL ABUN
SN-113	1.036E-03	6.413E-02	6.414E-02	NOT IDENT.
CD-115	4.684E+05	4.318E+05	4.807E+05	SHORT HLIF
SB-122	-7.355E+02	1.224E+04	1.225E+04	SHORT HLIF
SB-124	2.311E-02	9.149E-02	9.208E-02	NOT IDENT.
SB-125	4.593E-02	1.055E-01	1.075E-01	FAIL ABUN
I-126	9.307E-01	1.883E+00	1.930E+00	NOT IDENT.
SB-126	-3.461E-01	9.875E-01	9.998E-01	NOT IDENT.
SB-127	-2.682E+02	5.672E+02	5.799E+02	SHORT HLIF
I-131	-1.835E+00	2.375E+00	2.515E+00	NOT IDENT.
I-132	1.000E+41	3.156E+41	0.000E+00	SHORT HLIF
TE-132	4.578E+02	1.275E+03	1.292E+03	SHORT HLIF
BA-133	1.182E-02	5.400E-02	5.426E-02	FAIL ABUN
I-133	-2.386E+15	4.263E+15	4.396E+15	SHORT HLIF
CS-134	7.348E-02	7.715E-02	8.396E-02	FAIL ABUN
I-135	1.000E+41	5.651E+41	0.000E+00	SHORT HLIF
CS-136	-5.070E-02	7.108E-01	7.111E-01	NOT IDENT.
BA-137M	-1.605E-02	4.922E-02	4.975E-02	NOT IDENT.
CS-137	-1.695E-02	5.199E-02	5.255E-02	NOT IDENT.
LA-138	4.261E-02	7.969E-02	8.197E-02	NOT IDENT.
CE-139	-1.900E-02	4.222E-02	4.308E-02	NOT IDENT.
BA-140	-9.033E-02	1.579E+00	1.579E+00	NOT IDENT.
LA-140	6.616E-01	7.857E-01	8.404E-01	NOT IDENT.
CE-141	5.880E-02	1.589E-01	1.611E-01	NOT IDENT.
CE-143	2.030E+09	4.218E+09	4.316E+09	SHORT HLIF
CE-144	1.567E-01	2.642E-01	2.735E-01	NOT IDENT.
PM-144	-2.834E-03	4.475E-02	4.476E-02	NOT IDENT.
PR-144	-1.788E-01	3.414E+00	3.415E+00	NOT IDENT.
PM-146	9.228E-03	4.551E-02	4.570E-02	NOT IDENT.
ND-147	-5.313E-01	5.285E+00	5.290E+00	FAIL ABUN
PM-147	-4.083E+02	8.146E+02	8.351E+02	NOT IDENT.
PM-149	-3.776E+05	4.191E+06	4.195E+06	SHORT HLIF
EU-150	4.275E-03	3.238E-02	3.244E-02	FAIL ABUN
EU-152	5.822E-02	1.092E-01	1.123E-01	NOT IDENT.
GD-153	-2.892E-02	1.085E-01	1.093E-01	NOT IDENT.
EU-154	-1.773E-02	1.138E-01	1.141E-01	NOT IDENT.
EU-155	1.079E-02	1.307E-01	1.308E-01	FAIL ABUN
TB-160	-1.100E-01	1.925E-01	1.987E-01	FAIL ABUN



HO-166M	9.395E-03	5.972E-02	5.987E-02	NOT IDENT.
TM-171	-7.058E+00	3.043E+01	3.059E+01	NOT IDENT.
HF-172	1.589E-01	2.375E-01	2.481E-01	FAIL ABUN
LU-172	-2.056E-02	5.550E-02	5.627E-02	FAIL ABUN
LU-176	-1.315E-02	3.144E-02	3.199E-02	FAIL ABUN
HF-181	-1.027E-02	8.649E-02	8.661E-02	NOT IDENT.
TA-182	-4.047E-02	1.954E-01	1.963E-01	FAIL ABUN
RE-183	-4.032E-02	3.838E-01	3.842E-01	NOT IDENT.
RE-184	1.492E-01	2.391E-01	2.484E-01	NOT IDENT.
W-188	4.945E+00	1.291E+01	1.310E+01	FAIL ABUN
IR-192	-2.352E-02	5.180E-02	5.287E-02	FAIL ABUN
HG-203	2.070E-02	7.656E-02	7.712E-02	FAIL ABUN
TL-204	5.010E-01	6.145E+00	6.149E+00	NOT IDENT.
BI-207	-3.089E-02	5.376E-02	5.553E-02	FAIL ABUN
BI-210	-4.629E-01	7.140E+00	7.143E+00	NOT IDENT.
PB-210	-4.629E-01	7.140E+00	7.143E+00	NOT IDENT.
PB-211	-3.002E-01	8.319E-01	8.428E-01	NOT IDENT.
BI-212	3.460E-01	6.818E-01	6.994E-01	NOT IDENT.
BI-213	5.106E-02	1.202E-01	1.224E-01	NOT IDENT.
RN-219	1.302E-02	4.814E-01	4.815E-01	NOT IDENT.
RA-223	2.202E-01	6.976E-01	7.046E-01	FAIL ABUN
AC-225	4.570E+00	7.190E+00	7.480E+00	NOT IDENT.
AC-227	1.382E-01	2.697E-01	2.768E-01	NOT IDENT.
TH-227	1.382E-01	2.697E-01	2.768E-01	NOT IDENT.
TH-229	-4.010E-01	6.563E-01	6.807E-01	FAIL ABUN
TH-231	2.202E-01	6.976E-01	7.046E-01	FAIL ABUN
PA-233	-1.842E-02	7.348E-02	7.394E-02	NOT IDENT.
PA-234	-1.504E-01	3.494E-01	3.559E-01	FAIL ABUN
PA-234M	3.049E+00	6.301E+00	6.449E+00	NOT IDENT.
NP-237	-1.842E-02	7.348E-02	7.394E-02	NOT IDENT.
NP-238	1.872E+04	1.354E+06	1.354E+06	SHORT HLIF
NP-239	1.471E-02	2.908E-01	2.909E-01	NOT IDENT.
PU-239	6.115E+01	3.662E+02	3.672E+02	NOT IDENT.
AM-241	1.284E-01	2.151E-01	2.227E-01	NOT IDENT.
CM-243	1.475E-02	1.192E-01	1.194E-01	NOT IDENT.
BK-247	2.392E-02	9.151E-02	9.214E-02	NOT IDENT.
CM-247	8.518E-04	4.251E-02	4.252E-02	NOT IDENT.
CF-249	2.118E-03	4.672E-02	4.673E-02	NOT IDENT.
CF-251	-3.139E-02	1.637E-01	1.643E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	70.6782	85.43	83.2047	131.20	93.5005
45.60	72.9987	86.55	83.4159	133.02	86.0623
46.54	82.2775	86.79	83.4601	133.52	92.7594
49.72	0.0000	86.94	83.4891	136.00	93.1388
51.35	77.1696	87.09	83.5168	136.47	88.7720
51.87	76.3779	87.57	83.6064	140.51	0.0000
52.39	88.4868	88.03	83.6925	143.76	88.6906
52.97	100.6536	88.34	83.7502	144.24	88.7569
53.44	85.0806	88.47	83.7742	145.44	82.5459
54.07	84.3214	89.96	84.0498	152.43	93.2935
57.36	0.0000	1093.63	84.1753	153.25	96.8260
57.53	82.4037	91.11	84.2611	323.87	95.8240
57.98	84.3887	92.59	84.5310	156.02	97.6081
59.27	61.4927	93.35	84.6691	158.56	79.6038
59.32	61.5017	94.56	84.8873	159.00	78.1228
59.54	74.1005	94.65	84.9031	162.33	77.3461
60.96	75.6659	94.67	84.9069	162.66	76.2279
61.17	75.7114	94.87	84.9428	163.33	79.7686
62.93	90.3561	97.43	85.3988	165.86	90.4993
63.29	90.4469	98.43	78.6742	176.31	83.5769
63.58	90.5201	98.44	78.6759	176.60	80.0766
64.28	90.6960	99.53	80.9273	177.52	93.1459
66.73	101.2356	100.11	87.2556	181.07	0.0000
67.24	94.9578	102.03	93.8514	181.52	91.6681
125.81	100.2089	103.18	79.4344	184.41	79.7220
67.75	100.2271	103.37	87.8292	143.76	79.8590
68.89	97.6303	105.21	90.9480	193.51	91.4955
69.67	92.9883	105.31	90.9659	197.03	78.5989
70.82	95.8566	106.12	81.2982	198.01	85.9581
70.83	95.8596	106.47	88.3669	201.83	79.4715
72.81	101.5546	109.28	95.1938	203.43	74.7509
72.87	101.5704	111.00	96.2130	205.31	74.9222
74.66	102.0283	111.76	0.0000	210.85	70.5014
74.82	102.0687	114.06	105.6596	215.65	65.5408
74.97	102.1068	116.30	0.0000	218.12	55.8078
77.11	102.6472	116.74	81.5136	222.11	57.3091
78.74	103.0526	119.76	70.0970	227.09	69.3262
79.69	103.2875	121.12	83.2400	227.38	60.1575
80.03	85.4790	121.22	83.2547	228.16	0.0000
80.12	85.4981	121.78	90.9137	228.18	66.0656
80.19	85.5125	122.06	72.5503	116.74	66.0656
80.57	87.5797	122.92	83.5050	235.69	59.4471
81.00	87.6690	123.07	95.4598	235.96	59.4643
81.07	87.6838	265.00	98.8196	238.63	67.2504
81.75	87.8234	125.81	89.3766	238.98	0.0000
82.47	82.6402	127.23	95.0580	240.99	86.5024
83.79	82.8931	127.91	84.2305	242.00	86.5958
84.00	82.9328	129.30	78.9467	244.70	65.1336

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	37.3397	563.25	28.4979
252.80	57.5297	345.93	43.9334	564.24	0.0000
254.15	0.0000	351.06	41.2992	569.33	23.8271
256.23	47.3929	351.93	41.3279	946.00	22.7466
260.90	0.0000	355.39	0.0000	569.70	22.7491
264.66	55.6185	356.01	40.9919	583.19	27.2797
264.80	54.7571	364.49	42.6883	584.27	27.2959
265.00	54.7687	366.42	0.0000	595.83	26.3652
269.46	72.4747	372.51	31.4995	427.87	30.8358
270.03	62.9048	375.05	30.1260	602.52	0.0000
271.23	56.8552	377.52	34.4941	604.72	18.2100
273.65	68.3881	356.01	32.7334	607.14	33.1506
276.40	58.9004	388.16	39.5995	609.32	17.7005
277.37	58.0750	388.63	41.5451	610.33	17.7096
277.60	61.6089	391.69	39.7021	614.28	18.3007
278.00	55.4685	264.66	45.8114	618.01	16.6687
279.20	60.8214	401.81	39.9957	620.36	15.5757
279.54	60.8411	402.40	37.0854	621.93	16.7017
279.70	62.6147	404.85	42.0386	630.19	0.0000
280.46	67.0721	410.95	34.3663	631.29	11.1873
283.69	58.4268	413.71	40.3369	633.25	17.9173
284.31	52.2600	414.70	31.5039	634.78	21.2931
285.41	54.0874	423.72	36.6567	635.95	26.9121
285.90	0.0000	427.09	41.7069	636.99	22.4382
287.50	54.1941	427.87	29.8065	657.50	23.7985
290.67	50.7900	433.94	32.9228	657.76	29.4690
293.27	0.0000	439.40	31.0416	657.90	0.0000
351.93	48.3190	440.45	30.0616	661.66	22.1430
295.96	48.3519	453.88	26.2862	664.57	0.0000
879.38	45.7747	463.37	32.5521	666.33	23.9001
299.98	43.1367	468.07	22.9573	666.50	23.9019
300.09	43.1416	473.00	0.0000	667.71	0.0000
300.13	43.1426	475.06	33.8204	677.62	12.0146
301.36	43.1914	476.78	30.7794	685.70	0.0000
302.85	43.2490	477.60	26.6893	692.65	0.0000
256.23	43.3135	482.18	29.8537	695.00	28.8401
304.85	47.3880	487.02	26.8464	696.49	26.5507
306.78	52.0816	492.35	0.0000	696.51	26.5516
308.46	44.3714	497.08	24.9346	697.00	24.2479
311.90	49.9568	505.52	39.1594	697.30	20.7869
316.51	46.5103	507.63	0.0000	697.49	20.7891
319.41	38.3983	511.00	38.7645	702.65	19.6805
320.08	41.1649	514.00	22.0408	706.68	19.7171
321.04	48.5229	514.00	22.0408	711.68	15.1122
323.87	40.3817	520.40	22.1237	720.70	21.8849
325.23	46.8600	520.69	0.0000	721.93	0.0000
328.76	35.9412	522.65	0.0000	722.78	19.2769
333.37	27.7545	527.90	0.0000	722.91	19.2782
333.97	37.4867	528.26	13.7585	723.31	24.5402
334.37	37.4999	529.59	31.7749	724.19	32.4405
338.28	37.1566	529.87	0.0000	727.33	30.7307
338.32	37.1582	531.02	25.4414	733.00	22.0062
311.90	32.1058	537.26	18.0853	735.93	21.1531
340.48	32.1058	546.56	0.0000	333.97	15.8758
340.55	32.1079	552.55	30.0462	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	19.4615	949.00	9.5914	1384.29	14.0086
747.24	26.5732	667.71	0.0000	1408.01	4.4045
748.06	18.6076	962.31	16.3826	1434.09	7.7592
752.31	22.1931	964.08	9.2572	1435.80	9.9805
753.82	23.0959	966.17	20.0719	1457.56	0.0000
756.73	15.1204	911.20	21.2507	1460.82	4.4636
756.80	15.1209	983.53	9.7089	1489.16	3.3712
884.68	17.1299	984.45	0.0000	1505.03	13.5366
765.81	20.0013	1274.44	17.5529	1584.12	4.5972
766.42	14.2900	1001.03	16.6047	1596.21	7.1713
766.84	14.2930	1002.74	19.5465	1620.50	4.6357
772.60	0.0000	1004.73	27.3839	1621.92	2.7823
776.52	15.7867	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	1.8836
778.90	15.3924	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	10.8785	1764.49	1.9135
788.74	26.4473	1038.76	0.0000	1063.66	4.7896
792.07	11.5566	631.29	18.8446	1771.35	0.0000
795.86	11.7555	1048.07	15.8770	1791.20	0.0000
810.06	14.5532	1049.04	13.8966	1808.65	4.8279
810.29	16.3740	1050.41	9.9304	1810.72	0.0000
344.28	16.3751	1063.66	15.9580	1836.06	0.9710
810.76	15.4669	1077.00	11.0181		
815.77	10.0285	1077.34	10.0177		
1048.07	14.6030	1085.87	9.0406		
832.01	18.3533	1093.63	10.0702		
834.85	17.4553	1099.45	13.1151		
835.71	25.7330	1112.07	10.8040		
836.80	0.0000	1112.84	6.4840		
846.75	0.0000	1115.54	9.7342		
846.77	16.6152	1120.29	14.2170		
856.80	14.8271	1120.55	14.2179		
860.56	10.2084	1221.41	14.2213		
871.09	17.7047	1129.67	16.2949		
873.19	16.7866	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	18.6957	1173.23	17.5437		
880.51	14.9629	1177.95	13.4348		
881.60	11.2269	1189.05	6.2212		
883.24	14.9785	1204.77	9.3752		
884.68	13.9163	1221.41	10.4669		
889.28	13.5114	1231.02	10.4962		
894.76	0.0000	1235.36	13.4516		
898.04	15.0625	1238.28	8.4146		
900.72	15.0776	1260.41	0.0000		
903.28	10.3756	1271.87	7.4328		
911.20	13.2446	1274.44	9.5630		
912.08	13.2489	1274.54	9.5636		
923.98	0.0000	1291.59	7.4734		
926.50	15.2217	1298.22	0.0000		
929.11	10.6654	1312.11	7.5157		
935.54	12.2176	1332.49	11.8755		
937.49	6.1131	1362.66	0.0000		
944.13	15.3193	1365.19	2.1780		
946.00	16.2877	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:46:57.05

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*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278006.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM03.CNF;713
Background date : 29-OCT-2023 11:31:48
Sample date     : 11-SEP-2023 09:00:00 Acquisition date : 30-OCT-2023 09:46:02
Sample ID      : G640278006 Sample quantity   : 1.37530E+02 GRAM
Detector name  : GAM03 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       : 2505440 Detector SN# :
Matrix Spike ID : LCS ID :
*****

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	4	63.55*	42	209	1.76	126.67	120	15	1.18E-02	69.6	4.65E-01
2	4	65.49	31	135	1.35	130.56	120	15	8.64E-03	71.9	
3	3	74.83	136	177	1.20	149.24	142	19	3.76E-02	18.5	1.08E+00
4	3	77.01*	240	210	1.48	153.59	142	19	6.66E-02	13.5	
5	0	82.82	42	244	1.48	165.21	162	10	1.18E-02	70.1	
6	3	87.37	106	119	1.68	174.31	171	19	2.94E-02	18.8	1.46E+00
7	3	92.48*	71	185	1.56	184.53	171	19	1.97E-02	39.0	
8	0	108.46	14	187	3.20	216.50	216	10	3.78E-03	189.5	
9	0	129.30	26	99	0.92	258.18	255	6	7.24E-03	64.0	
10	0	186.07*	94	221	1.45	371.70	366	13	2.60E-02	35.6	
11	0	206.71	46	183	4.96	412.99	406	15	1.26E-02	66.6	
12	1	238.69*	296	139	1.41	476.95	471	21	8.21E-02	9.0	1.86E+00
13	1	241.86	136	137	1.60	483.28	471	21	3.78E-02	20.3	
14	0	295.30	284	77	1.59	590.17	584	11	7.89E-02	8.4	
15	0	300.83	25	67	0.63	601.23	596	9	6.81E-03	63.6	
16	0	328.53	26	61	1.02	656.63	651	9	7.27E-03	57.2	
17	0	338.38*	82	72	1.16	676.33	670	13	2.27E-02	24.4	
18	0	352.00*	490	75	1.35	703.57	698	13	1.36E-01	5.9	
19	0	388.85	40	46	6.12	777.29	769	18	1.12E-02	42.2	
20	0	437.08	17	25	0.69	873.75	870	9	4.70E-03	60.0	
21	0	464.04	21	42	1.03	927.68	921	9	5.88E-03	59.6	
22	0	511.07*	41	53	2.46	1021.76	1013	15	1.13E-02	47.8	
23	0	534.52	6	31	0.87	1068.66	1063	11	1.64E-03	185.2	
24	0	557.97	25	34	0.72	1115.56	1108	15	6.91E-03	54.8	
25	0	574.61	17	22	2.95	1148.86	1141	11	4.59E-03	62.6	
26	0	583.33*	112	40	1.65	1166.31	1158	16	3.10E-02	16.2	
27	0	609.26	379	22	1.54	1218.18	1210	14	1.05E-01	5.8	
28	0	638.51	13	15	2.56	1276.68	1268	12	3.72E-03	63.9	
29	0	665.76	40	20	5.59	1331.19	1322	17	1.10E-02	30.9	
30	0	672.40	13	13	1.82	1344.48	1340	8	3.74E-03	52.5	
31	0	728.12*	36	15	4.12	1455.94	1450	13	9.88E-03	31.1	
32	0	768.76*	31	24	1.56	1537.24	1529	12	8.60E-03	37.1	
33	0	773.38	4	10	0.63	1546.50	1541	10	1.03E-03	168.1	
34	0	794.54	22	6	0.84	1588.82	1584	11	6.12E-03	29.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	809.14	14	24	2.82	1618.04	1607	15	3.92E-03	82.7	
36	0	855.43*	13	7	1.63	1710.64	1704	14	3.68E-03	54.8	
37	0	862.79	14	16	5.33	1725.38	1718	15	4.00E-03	64.5	
38	0	911.32*	74	10	1.36	1822.46	1816	14	2.06E-02	15.5	
39	0	949.37	13	7	0.57	1898.60	1894	10	3.60E-03	48.0	
40	1	964.69	29	8	2.39	1929.25	1922	22	8.10E-03	30.8	7.31E-01
41	1	968.78*	40	10	2.28	1937.44	1922	22	1.10E-02	23.6	
42	0	1015.32*	12	6	0.78	2030.54	2023	13	3.35E-03	53.0	
43	0	1021.17	20	0	0.79	2042.25	2036	12	5.56E-03	22.4	
44	0	1105.78	8	16	0.87	2211.54	2200	15	2.14E-03	126.3	
45	0	1120.41	74	14	1.26	2240.82	2233	14	2.05E-02	15.9	
46	0	1237.51	36	7	1.66	2475.16	2468	13	9.86E-03	22.4	
47	0	1460.83*	53	6	1.48	2922.07	2915	13	1.46E-02	17.7	
48	0	1764.71*	79	0	2.60	3530.28	3522	18	2.20E-02	11.5	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278006.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 11-SEP-2023 09:00:00 Acquisition date : 30-OCT-2023 09:46:02  
Sample ID : G640278006 Sample quantity : 137.53 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA3 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 : Empirical 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	50	10.66*	1.051E+00	2.451E+00	2.451E+00	35.37
CD-109	88.03	126	3.70*	4.893E+00	3.800E+00	4.091E+00	37.67
TE-125M	109.28	16	0.27*	5.925E+00	5.434E+00	9.826E+00	379.02
I-126	388.63	43	35.60	3.176E+00	2.071E-01	2.872E+00	84.44
	666.33	40	32.90*	2.114E+00	3.179E-01	4.408E+00	61.88
	753.82	-----	4.15	1.902E+00	-----	Line Not Found	-----
SN-126	64.28	52	9.60	2.185E+00	1.341E+00	1.341E+00	139.15
	86.94	126	8.90	4.893E+00	1.580E+00	1.580E+00	37.67
	87.57	126	37.00*	4.893E+00	3.800E-01	3.800E-01	37.67
TL-208	277.37	-----	6.60	4.035E+00	-----	Line Not Found	-----
	583.19	115	85.00*	2.351E+00	3.148E-01	3.148E-01	32.34
	860.56	-----	12.50	1.690E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.404E+00	-----	Line Not Found	-----
	351.06	527	12.92*	3.409E+00	6.526E+00	6.526E+00	11.77
BI-212	727.33	36	6.67*	1.960E+00	1.507E+00	1.507E+00	62.10
	1620.50	-----	1.47	9.779E-01	-----	Line Not Found	-----
PB-212	74.82	163	10.28	3.642E+00	2.376E+00	2.376E+00	36.92
	77.11	288	17.10	3.894E+00	2.357E+00	2.357E+00	26.98
	238.63	327	43.60*	4.483E+00	9.133E-01	9.133E-01	18.02
	300.09	27	3.30	3.810E+00	1.157E+00	1.157E+00	127.22
BI-214	609.32	390	45.49*	2.272E+00	2.062E+00	2.062E+00	11.63
	1120.29	72	14.92	1.323E+00	1.996E+00	1.996E+00	31.75
	1764.49	75	15.30	9.339E-01	2.854E+00	2.855E+00	22.92
PB-214	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.156E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.124E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
RN-222	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
	609.32	390	45.49*	2.272E+00	2.062E+00	2.062E+00	11.63
	1120.29	72	14.92	1.323E+00	1.996E+00	1.996E+00	31.75
	1764.49	75	15.30	9.339E-01	2.854E+00	2.855E+00	22.92
RA-224	240.99	150	4.10*	4.443E+00	4.509E+00	4.509E+00	40.69
RA-226	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.156E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.124E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
AC-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18
RA-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18



Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	74.82	163	10.28	3.642E+00	2.376E+00	2.376E+00	36.92
	77.11	288	17.10	3.894E+00	2.357E+00	2.357E+00	26.98
	238.63	327	43.60*	4.483E+00	9.133E-01	9.133E-01	18.02
	300.09	27	3.30	3.810E+00	1.157E+00	1.157E+00	127.22
TH-230	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.155E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.123E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
PA-231	283.69	-----	1.70	3.972E+00	-----	Line Not Found	-----
	301.36	27	5.35*	3.810E+00	7.134E-01	7.134E-01	127.22
TH-232	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
TH-234	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18
	63.29	52	3.70*	2.185E+00	3.479E+00	3.479E+00	139.15
	92.59	84	4.23	5.257E+00	2.064E+00	2.064E+00	78.07
	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
U-234	77.11	288	9.70	3.894E+00	4.155E+00	4.155E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.123E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
	U-235	89.96	-----	3.47	5.088E+00	-----	Line Not Found
93.35		84	5.60	5.257E+00	1.559E+00	1.559E+00	78.07
143.76		-----	10.96*	5.957E+00	-----	Line Not Found	-----
163.33		-----	5.08	5.663E+00	-----	Line Not Found	-----
185.72		105	57.20	5.277E+00	1.907E-01	1.907E-01	71.19
U-238	205.31	51	5.01	4.940E+00	1.123E+00	1.123E+00	133.12
	63.29	52	3.70*	2.185E+00	3.479E+00	3.479E+00	139.15
	92.59	84	4.23	5.257E+00	2.064E+00	2.064E+00	78.07
AM-243	43.53	-----	5.90	2.108E-01	-----	Line Not Found	-----
	74.66	163	67.20*	3.642E+00	3.635E-01	3.635E-01	36.92
CF-249	252.80	-----	2.50	4.308E+00	-----	Line Not Found	-----
	333.37	-----	14.60	3.543E+00	-----	Line Not Found	-----
	388.16	43	66.00*	3.176E+00	1.117E-01	1.117E-01	84.44
ANH-511	511.00	42	100.00*	2.603E+00	8.868E-02	8.868E-02	95.51

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278006.CNF;1
* Acquisition date   : 30-OCT-2023 09:46:02 Sensitivity      : 3.000
* Detector ID        : GAM03 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        : 11-SEP-2023 09:00:00 Analyst initials: MXR1
* Sample ID          : G640278006 Sample Quantity : 1.3753E+02 GRAM
* Batch Number       : 2505440 Wet Weight : 0.00000
* Wet wt corr        : 1.00000 Dry Weight : 0.00000
* Nuclide Library    : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date     : 4-OCT-2023 09:22:59 Eff. Geometry    : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;30
*****

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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	2.451E+00	8.497E-01	9.478E-01
CD-109	4.091E+00	1.510E+00	1.740E+00
TE-125M	9.826E+00	3.650E+01	3.300E+01
I-126	4.408E+00	2.673E+00	2.442E+00
SN-126	3.800E-01	1.403E-01	1.628E-01
TL-208	3.148E-01	9.976E-02	7.537E-02
BI-211	6.526E+00	7.527E-01	4.530E-01
BI-212	1.507E+00	9.174E-01	1.020E+00
PB-212	9.133E-01	1.613E-01	1.330E-01
BI-214	2.062E+00	2.351E-01	1.395E-01
PB-214	2.369E+00	2.732E-01	1.647E-01
RN-222	2.062E+00	2.351E-01	1.395E-01
RA-224	4.509E+00	1.798E+00	1.426E+00
RA-226	2.369E+00	2.732E-01	1.647E-01
AC-228	9.756E-01	2.959E-01	2.393E-01
RA-228	9.756E-01	2.959E-01	2.393E-01
TH-228	9.133E-01	1.613E-01	1.330E-01
TH-230	2.369E+00	2.732E-01	1.647E-01
PA-231	7.134E-01	8.895E-01	9.686E-01
TH-232	9.756E-01	2.959E-01	2.393E-01
TH-234	3.479E+00	4.744E+00	3.488E+00
U-234	2.369E+00	2.732E-01	1.647E-01
U-235	8.283E-02	2.422E-01	4.697E-01
U-238	3.479E+00	4.744E+00	3.488E+00
AM-243	3.635E-01	1.315E-01	1.294E-01
CF-249	1.117E-01	9.246E-02	7.351E-02
ANH-511	8.868E-02	8.301E-02	5.800E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-1.424E-01		4.856E-01	9.260E-01	NOT IDENT.
NA-22	-1.635E-02		4.085E-02	7.666E-02	NOT IDENT.
NA-24	0.000E+00		1.594E+22	0.000E+00	SHORT HLIF

AL-26	-7.083E-03	3.628E-02	7.183E-02	NOT IDENT.
SC-46	6.556E-03	6.732E-02	1.280E-01	FAIL ABUN
V-48	-2.903E-01	2.864E-01	4.340E-01	NOT IDENT.
CR-51	5.593E-01	1.036E+00	1.980E+00	NOT IDENT.
MN-52	1.967E+01	1.893E+01	4.482E+01	NOT IDENT.
MN-54	3.243E-02	4.738E-02	9.712E-02	NOT IDENT.
CO-56	3.370E-02	5.528E-02	1.162E-01	FAIL ABUN
MN-56	0.000E+00	1.663E+41	0.000E+00	SHORT HLIF
CO-57	-9.476E-03	2.943E-02	5.562E-02	NOT IDENT.
CO-58	1.294E-02	5.626E-02	1.020E-01	NOT IDENT.
FE-59	1.690E-01	1.753E-01	3.655E-01	NOT IDENT.
CO-60	2.056E-02	3.550E-02	8.214E-02	NOT IDENT.
ZN-65	1.055E-02	8.967E-02	1.655E-01	NOT IDENT.
GE-68	9.075E-01	1.323E+00	2.873E+00	NOT IDENT.
AS-73	1.616E+00	2.263E+00	4.362E+00	NOT IDENT.
AS-74	2.113E-01	3.554E-01	7.408E-01	NOT IDENT.
SE-75	-6.589E-03	6.169E-02	1.136E-01	NOT IDENT.
BR-77	0.000E+00	4.972E+05	0.000E+00	SHORT HLIF
SR-82	1.426E-02	9.622E-01	1.640E+00	NOT IDENT.
RB-83	-3.485E-02	9.816E-02	1.839E-01	NOT IDENT.
RB-84	-5.801E-02	1.705E-01	3.066E-01	NOT IDENT.
KR-85	2.462E+00	8.976E+00	1.584E+01	NOT IDENT.
SR-85	1.853E-02	6.794E-02	1.199E-01	NOT IDENT.
RB-86	2.042E+00	2.733E+00	5.970E+00	NOT IDENT.
Y-88	1.328E-02	5.746E-02	1.231E-01	NOT IDENT.
Y-91	4.259E+00	2.851E+01	5.865E+01	NOT IDENT.
NB-94	2.420E-02	3.211E-02	6.868E-02	NOT IDENT.
NB-95	3.362E-02	8.182E-02	1.445E-01	NOT IDENT.
NB-95M	1.842E-02	2.525E-01	4.187E-01	NOT IDENT.
ZR-95	4.968E-02	9.991E-02	2.088E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.141E+20	0.000E+00	SHORT HLIF
MO-99	0.000E+00	6.600E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	9.442E-03	3.980E-02	7.003E-02	NOT IDENT.
RH-102	2.360E-02	6.165E-02	1.136E-01	NOT IDENT.
RU-103	2.663E-02	7.667E-02	1.556E-01	FAIL ABUN
RH-106	1.614E-01	3.089E-01	6.517E-01	NOT IDENT.
RU-106	1.614E-01	3.089E-01	6.517E-01	NOT IDENT.
AG-108M	-9.752E-03	3.528E-02	5.473E-02	NOT IDENT.
AG-110	3.212E-01	8.145E-01	1.577E+00	NOT IDENT.
AG-110M	-6.527E-03	6.835E-02	1.271E-01	NOT IDENT.
SN-113	4.321E-03	5.506E-02	1.030E-01	NOT IDENT.
CD-115	0.000E+00	4.592E+05	0.000E+00	SHORT HLIF
SN-117M	1.105E-01	3.538E-01	6.835E-01	NOT IDENT.
SB-122	0.000E+00	1.482E+04	0.000E+00	SHORT HLIF
TE-123M	-8.361E-03	4.065E-02	7.589E-02	NOT IDENT.
SB-124	1.041E-01	1.255E-01	3.177E-01	NOT IDENT.
SB-125	-9.414E-02	1.140E-01	1.863E-01	FAIL ABUN
SB-126	-4.340E-01	1.030E+00	1.864E+00	FAIL ABUN
SB-127	0.000E+00	6.219E+02	0.000E+00	SHORT HLIF
I-131	2.621E-01	2.245E+00	4.221E+00	NOT IDENT.
I-132	0.000E+00	8.909E+40	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.328E+03	0.000E+00	SHORT HLIF
BA-133	-4.664E-02	5.302E-02	7.487E-02	NOT IDENT.
I-133	0.000E+00	3.838E+15	0.000E+00	SHORT HLIF
CS-134	8.166E-02	4.770E-02	9.214E-02	FAIL ABUN
I-135	0.000E+00	1.331E+41	0.000E+00	SHORT HLIF
CS-136	-1.131E-01	5.205E-01	9.822E-01	NOT IDENT.
BA-137M	1.094E-02	3.885E-02	7.015E-02	NOT IDENT.
CS-137	1.156E-02	4.104E-02	7.411E-02	NOT IDENT.
LA-138	1.230E-02	6.362E-02	1.335E-01	NOT IDENT.
CE-139	-1.808E-02	4.349E-02	7.977E-02	NOT IDENT.
BA-140	9.356E-01	1.735E+00	3.321E+00	NOT IDENT.
LA-140	2.735E-01	6.465E-01	1.417E+00	FAIL ABUN
CE-141	-2.463E-02	1.519E-01	2.867E-01	NOT IDENT.
CE-143	0.000E+00	4.721E+09	0.000E+00	SHORT HLIF
CE-144	3.528E-02	2.379E-01	4.599E-01	NOT IDENT.
PM-144	2.491E-03	3.769E-02	7.333E-02	NOT IDENT.
PR-144	1.807E-01	2.870E+00	5.582E+00	NOT IDENT.
PM-146	1.221E-02	4.457E-02	8.990E-02	NOT IDENT.
ND-147	-1.658E-01	5.254E+00	9.075E+00	FAIL ABUN
PM-147	-3.986E+02	8.012E+02	1.497E+03	NOT IDENT.
PM-149	0.000E+00	4.454E+06	0.000E+00	SHORT HLIF
EU-150	-5.036E-03	3.365E-02	5.409E-02	FAIL ABUN
EU-152	-1.163E-01	1.151E-01	1.752E-01	FAIL ABUN
GD-153	2.887E-02	1.133E-01	2.141E-01	NOT IDENT.
EU-154	-4.528E-02	1.138E-01	2.137E-01	NOT IDENT.

EU-155	2.353E-02	1.267E-01	2.378E-01	FAIL ABUN
TB-160	1.720E-01	2.180E-01	4.577E-01	FAIL ABUN
HO-166M	-2.872E-02	6.415E-02	1.159E-01	FAIL ABUN
TM-171	4.225E+01	3.750E+01	7.470E+01	FAIL ABUN
HF-172	1.066E-02	2.323E-01	4.040E-01	FAIL ABUN
LU-172	-1.808E-02	6.577E-02	1.268E-01	FAIL ABUN
LU-176	9.419E-03	2.926E-02	5.596E-02	FAIL ABUN
HF-181	2.294E-02	8.343E-02	1.674E-01	NOT IDENT.
TA-182	7.592E-02	1.750E-01	3.896E-01	FAIL ABUN
RE-183	-2.197E-01	4.696E-01	7.490E-01	NOT IDENT.
RE-184	5.865E-02	2.708E-01	5.330E-01	NOT IDENT.
W-188	-4.788E+00	1.310E+01	2.060E+01	FAIL ABUN
IR-192	2.710E-03	5.040E-02	9.423E-02	FAIL ABUN
HG-203	-5.824E-02	7.571E-02	1.302E-01	NOT IDENT.
TL-204	1.050E-01	8.105E+00	1.335E+01	FAIL ABUN
BI-207	-1.911E-03	5.258E-02	1.002E-01	FAIL ABUN
BI-210	3.272E+00	9.154E+00	1.732E+01	NOT IDENT.
PB-210	3.272E+00	9.154E+00	1.732E+01	NOT IDENT.
PB-211	-6.794E-01	8.007E-01	1.311E+00	NOT IDENT.
BI-213	1.449E-02	1.029E-01	1.862E-01	NOT IDENT.
RN-219	1.692E-01	4.665E-01	8.869E-01	NOT IDENT.
RA-223	-2.411E-01	8.325E-01	1.312E+00	FAIL ABUN
AC-225	-3.165E+00	7.080E+00	1.277E+01	NOT IDENT.
AC-227	-4.014E-02	3.016E-01	5.530E-01	FAIL ABUN
TH-227	-4.014E-02	3.016E-01	5.530E-01	FAIL ABUN
TH-229	-2.334E-01	5.708E-01	1.042E+00	FAIL ABUN
TH-231	-2.411E-01	8.325E-01	1.312E+00	FAIL ABUN
PA-233	5.570E-02	6.662E-02	1.348E-01	FAIL ABUN
PA-234	-5.004E-02	2.971E-01	4.875E-01	FAIL ABUN
PA-234M	-3.177E+00	4.270E+00	8.013E+00	NOT IDENT.
NP-237	5.570E-02	6.662E-02	1.348E-01	FAIL ABUN
NP-238	0.000E+00	1.366E+06	0.000E+00	SHORT HLIF
NP-239	-2.592E-01	2.900E-01	5.280E-01	NOT IDENT.
PU-239	4.290E+02	5.377E+02	7.814E+02	FAIL ABUN
AM-241	2.323E-01	2.555E-01	4.659E-01	NOT IDENT.
CM-243	6.450E-02	1.182E-01	2.372E-01	NOT IDENT.
BK-247	-3.667E-02	9.221E-02	1.652E-01	FAIL ABUN
CM-247	-6.890E-03	4.298E-02	7.705E-02	NOT IDENT.
CF-251	-1.094E-01	1.508E-01	2.699E-01	NOT IDENT.

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	50	10.66*	1.051E+00	2.451E+00	2.451E+00	35.37
CD-109	88.03	126	3.70*	4.893E+00	3.800E+00	4.091E+00	37.67
TE-125M	109.28	16	0.27*	5.925E+00	5.434E+00	9.826E+00	379.02
I-126	388.63	43	35.60	3.176E+00	2.071E-01	2.872E+00	84.44
	666.33	40	32.90*	2.114E+00	3.179E-01	4.408E+00	61.88
	753.82	-----	4.15	1.902E+00	-----	Line Not Found	-----
SN-126	64.28	52	9.60	2.185E+00	1.341E+00	1.341E+00	139.15
	86.94	126	8.90	4.893E+00	1.580E+00	1.580E+00	37.67
	87.57	126	37.00*	4.893E+00	3.800E-01	3.800E-01	37.67
TL-208	277.37	-----	6.60	4.035E+00	-----	Line Not Found	-----
	583.19	115	85.00*	2.351E+00	3.148E-01	3.148E-01	32.34
	860.56	-----	12.50	1.690E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.404E+00	-----	Line Not Found	-----
	351.06	527	12.92*	3.409E+00	6.526E+00	6.526E+00	11.77
BI-212	727.33	36	6.67*	1.960E+00	1.507E+00	1.507E+00	62.10
	1620.50	-----	1.47	9.779E-01	-----	Line Not Found	-----
PB-212	74.82	163	10.28	3.642E+00	2.376E+00	2.376E+00	36.92
	77.11	288	17.10	3.894E+00	2.357E+00	2.357E+00	26.98
	238.63	327	43.60*	4.483E+00	9.133E-01	9.133E-01	18.02
	300.09	27	3.30	3.810E+00	1.157E+00	1.157E+00	127.22
BI-214	609.32	390	45.49*	2.272E+00	2.062E+00	2.062E+00	11.63
	1120.29	72	14.92	1.323E+00	1.996E+00	1.996E+00	31.75
	1764.49	75	15.30	9.339E-01	2.854E+00	2.855E+00	22.92
PB-214	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.156E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.124E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
RN-222	609.32	390	45.49*	2.272E+00	2.062E+00	2.062E+00	11.63
	1120.29	72	14.92	1.323E+00	1.996E+00	1.996E+00	31.75
	1764.49	75	15.30	9.339E-01	2.854E+00	2.855E+00	22.92
RA-224	240.99	150	4.10*	4.443E+00	4.509E+00	4.509E+00	40.69
RA-226	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.156E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.124E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
AC-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18
RA-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18
TH-228	74.82	163	10.28	3.642E+00	2.376E+00	2.376E+00	36.92
	77.11	288	17.10	3.894E+00	2.357E+00	2.357E+00	26.98
	238.63	327	43.60*	4.483E+00	9.133E-01	9.133E-01	18.02
	300.09	27	3.30	3.810E+00	1.157E+00	1.157E+00	127.22
TH-230	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.155E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.123E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
PA-231	283.69	-----	1.70	3.972E+00	-----	Line Not Found	-----
	301.36	27	5.35*	3.810E+00	7.134E-01	7.134E-01	127.22
TH-232	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	88	11.27	3.506E+00	1.215E+00	1.215E+00	48.85
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	74	25.80*	1.604E+00	9.756E-01	9.756E-01	30.95
	968.97	39	15.80	1.515E+00	8.944E-01	8.944E-01	47.18
TH-234	63.29	52	3.70*	2.185E+00	3.479E+00	3.479E+00	139.15
	92.59	84	4.23	5.257E+00	2.064E+00	2.064E+00	78.07
U-234	74.82	163	5.80	3.642E+00	4.211E+00	4.211E+00	36.92
	77.11	288	9.70	3.894E+00	4.155E+00	4.155E+00	26.98
	87.09	126	3.41	4.893E+00	4.123E+00	4.123E+00	37.67
	242.00	150	7.25	4.443E+00	2.550E+00	2.550E+00	40.69
	295.22	309	18.42	3.861E+00	2.374E+00	2.374E+00	16.85
	351.93	527	35.60*	3.409E+00	2.369E+00	2.369E+00	11.77
U-235	89.96	-----	3.47	5.088E+00	-----	Line Not Found	-----
	93.35	84	5.60	5.257E+00	1.559E+00	1.559E+00	78.07
	143.76	-----	10.96*	5.957E+00	-----	Line Not Found	-----
	163.33	-----	5.08	5.663E+00	-----	Line Not Found	-----
	185.72	105	57.20	5.277E+00	1.907E-01	1.907E-01	71.19
	205.31	51	5.01	4.940E+00	1.123E+00	1.123E+00	133.12
U-238	63.29	52	3.70*	2.185E+00	3.479E+00	3.479E+00	139.15
	92.59	84	4.23	5.257E+00	2.064E+00	2.064E+00	78.07
AM-243	43.53	-----	5.90	2.108E-01	-----	Line Not Found	-----
	74.66	163	67.20*	3.642E+00	3.635E-01	3.635E-01	36.92
CF-249	252.80	-----	2.50	4.308E+00	-----	Line Not Found	-----
	333.37	-----	14.60	3.543E+00	-----	Line Not Found	-----
	388.16	43	66.00*	3.176E+00	1.117E-01	1.117E-01	84.44
ANH-511	511.00	42	100.00*	2.603E+00	8.868E-02	8.868E-02	95.51

Flag: "\*" = Keyline

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	2.451E+00	2.451E+00	0.867E+00	35.37	
CD-109	461.40D	1.08	3.800E+00	4.091E+00	1.541E+00	37.67	
TE-125M	57.40D	1.81	5.434E+00	9.826E+00	37.24E+00	379.02	
I-126	12.93D	13.9	3.179E-01	4.408E+00	2.728E+00	61.88	
SN-126	2.30E+05Y	1.00	3.800E-01	3.800E-01	1.431E-01	37.67	
TL-208	1.41E+10Y	1.00	3.148E-01	3.148E-01	1.018E-01	32.34	
BI-211	7.04E+08Y	1.00	6.526E+00	6.526E+00	0.768E+00	11.77	
BI-212	1.41E+10Y	1.00	1.507E+00	1.507E+00	0.936E+00	62.10	
PB-212	1.41E+10Y	1.00	9.133E-01	9.133E-01	1.646E-01	18.02	
BI-214	1600.00Y	1.00	2.062E+00	2.062E+00	0.240E+00	11.63	
PB-214	1600.00Y	1.00	2.369E+00	2.369E+00	0.279E+00	11.77	
RN-222	1600.00Y	1.00	2.062E+00	2.062E+00	0.240E+00	11.63	
RA-224	1.41E+10Y	1.00	4.509E+00	4.509E+00	1.835E+00	40.69	
RA-226	1600.00Y	1.00	2.369E+00	2.369E+00	0.279E+00	11.77	
AC-228	1.41E+10Y	1.00	9.756E-01	9.756E-01	3.019E-01	30.95	
RA-228	1.41E+10Y	1.00	9.756E-01	9.756E-01	3.019E-01	30.95	
TH-228	1.41E+10Y	1.00	9.133E-01	9.133E-01	1.646E-01	18.02	
TH-230	7.54E+04Y	1.00	2.369E+00	2.369E+00	0.279E+00	11.77	
PA-231	7.04E+08Y	1.00	7.134E-01	7.134E-01	9.076E-01	127.22	
TH-232	1.41E+10Y	1.00	9.756E-01	9.756E-01	3.019E-01	30.95	
TH-234	4.47E+09Y	1.00	3.479E+00	3.479E+00	4.841E+00	139.15	
U-234	2.45E+05Y	1.00	2.369E+00	2.369E+00	0.279E+00	11.77	
U-235	7.04E+08Y	1.00	1.907E-01	1.907E-01	1.357E-01	71.19	K
U-238	4.47E+09Y	1.00	3.479E+00	3.479E+00	4.841E+00	139.15	
AM-243	7370.00Y	1.00	3.635E-01	3.635E-01	1.342E-01	36.92	
CF-249	351.00Y	1.00	1.117E-01	1.117E-01	0.943E-01	84.44	
ANH-511	1.00E+09Y	1.00	8.868E-02	8.868E-02	8.470E-02	95.51	
Total Activity :			5.202E+01	6.079E+01			

Grand Total Activity : 5.202E+01 6.079E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	65.49	38	163	1.35	130.56	120	15	8.64E-03	****	2.44E+00	T
0	82.82	51	291	1.48	165.21	162	10	1.18E-02	****	4.50E+00	T
0	129.30	30	114	0.92	258.18	255	6	7.24E-03	****	6.08E+00	T
0	328.53	28	66	1.02	656.63	651	9	7.27E-03	****	3.58E+00	T
0	437.08	18	27	0.69	873.75	870	9	4.70E-03	****	2.92E+00	
0	464.04	22	44	1.03	927.68	921	9	5.88E-03	****	2.80E+00	T
0	534.52	6	32	0.87	1068.66	1063	11	1.64E-03	****	2.52E+00	
0	557.97	26	35	0.72	1115.56	1108	15	6.91E-03	****	2.43E+00	
0	574.61	17	23	2.95	1148.86	1141	11	4.59E-03	****	2.38E+00	
0	638.51	14	15	2.56	1276.68	1268	12	3.72E-03	****	2.19E+00	
0	672.40	14	13	1.82	1344.48	1340	8	3.74E-03	****	2.10E+00	
0	768.76	31	24	1.56	1537.24	1529	12	8.60E-03	74.3	1.87E+00	
0	773.38	4	10	0.63	1546.50	1541	10	1.03E-03	****	1.86E+00	T
0	794.54	22	6	0.84	1588.82	1584	11	6.12E-03	59.6	1.82E+00	T
0	809.14	14	24	2.82	1618.04	1607	15	3.92E-03	****	1.79E+00	T
0	855.43	13	7	1.63	1710.64	1704	14	3.68E-03	****	1.70E+00	T
0	862.79	14	16	5.33	1725.38	1718	15	4.00E-03	****	1.69E+00	
0	949.37	13	7	0.57	1898.60	1894	10	3.60E-03	96.0	1.54E+00	T
1	964.69	29	8	2.39	1929.25	1922	22	8.10E-03	61.7	1.52E+00	T
0	1015.32	12	6	0.78	2030.54	2023	13	3.35E-03	****	1.45E+00	
0	1021.17	20	0	0.79	2042.25	2036	12	5.56E-03	44.7	1.44E+00	T
0	1105.78	8	16	0.87	2211.54	2200	15	2.14E-03	****	1.34E+00	
0	1237.51	34	6	1.66	2475.16	2468	13	9.86E-03	44.8	1.21E+00	T

Flags: "T" = Tentatively associated



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*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*                               *                                               *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278006.CNF;1   *
* Acquisition date   : 30-OCT-2023 09:46:02 Sensitivity      : 3.000           *
* Detector ID       : GAM03 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       : 11-SEP-2023 09:00:00 Nuclide Library : SOLID        *
* Sample ID         : G640278006 Analyst initials: MXR1         *
* Batch Number      : 2505440 Sample Quantity : 1.3753E+02 GRAM      *
* Wet wt corr       : 1.00000 Wet Weight : 0.00000           *
*                               Dry Weight : 0.00000           *
*****
*                               CALIBRATION INFORMATION                         *
*                               *                                               *
* Eff. Cal. date    : 4-OCT-2023 09:22:59 Eff. Geometry   : CAN          *
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;30          *
*****

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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	4.079E-01
CD-109	8.245E-01
TE-125M	1.563E+01
I-126	1.071E+00
SN-126	7.713E-02
TL-208	3.392E-02
BI-211	2.093E-01
BI-212	4.528E-01
PB-212	6.262E-02
BI-214	6.246E-02
PB-214	7.612E-02
RN-222	6.246E-02
RA-224	6.711E-01
RA-226	7.612E-02
AC-228	1.016E-01
RA-228	1.016E-01
TH-228	6.262E-02
TH-230	7.612E-02
PA-231	4.470E-01
TH-232	1.016E-01
TH-234	1.646E+00
U-234	7.612E-02
U-235	2.231E-01
U-238	1.646E+00
AM-243	6.150E-02
CF-249	3.315E-02
ANH-511	2.610E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.130E-01	NOT IDENT.
NA-22	3.179E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.792E-02	NOT IDENT.

SC-46	5.719E-02	FAIL ABUN
V-48	1.750E-01	NOT IDENT.
CR-51	9.182E-01	NOT IDENT.
MN-52	1.937E+01	NOT IDENT.
MN-54	4.377E-02	NOT IDENT.
CO-56	5.135E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	2.613E-02	NOT IDENT.
CO-58	4.421E-02	NOT IDENT.
FE-59	1.618E-01	NOT IDENT.
CO-60	3.441E-02	NOT IDENT.
ZN-65	7.004E-02	NOT IDENT.
GE-68	1.246E+00	NOT IDENT.
AS-73	2.059E+00	NOT IDENT.
AS-74	3.331E-01	NOT IDENT.
SE-75	5.268E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	7.175E-01	NOT IDENT.
RB-83	8.227E-02	NOT IDENT.
RB-84	1.348E-01	NOT IDENT.
KR-85	7.243E+00	NOT IDENT.
SR-85	5.482E-02	NOT IDENT.
RB-86	2.596E+00	NOT IDENT.
Y-88	5.046E-02	NOT IDENT.
Y-91	2.520E+01	NOT IDENT.
NB-94	3.063E-02	NOT IDENT.
NB-95	6.544E-02	NOT IDENT.
NB-95M	1.978E-01	NOT IDENT.
ZR-95	9.205E-02	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	3.310E-02	NOT IDENT.
RH-102	5.056E-02	NOT IDENT.
RU-103	7.037E-02	FAIL ABUN
RH-106	2.888E-01	NOT IDENT.
RU-106	2.888E-01	NOT IDENT.
AG-108M	2.452E-02	NOT IDENT.
AG-110	6.990E-01	NOT IDENT.
AG-110M	5.640E-02	NOT IDENT.
SN-113	4.655E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	3.229E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.583E-02	NOT IDENT.
SB-124	1.302E-01	NOT IDENT.
SB-125	8.432E-02	FAIL ABUN
SB-126	8.217E-01	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	1.917E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.379E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	4.103E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	4.035E-01	NOT IDENT.
BA-137M	3.114E-02	NOT IDENT.
CS-137	3.289E-02	NOT IDENT.
LA-138	5.614E-02	NOT IDENT.
CE-139	3.771E-02	NOT IDENT.
BA-140	1.483E+00	NOT IDENT.
LA-140	5.956E-01	FAIL ABUN
CE-141	1.357E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.171E-01	NOT IDENT.
PM-144	3.260E-02	NOT IDENT.
PR-144	2.481E+00	NOT IDENT.
PM-146	4.079E-02	NOT IDENT.
ND-147	4.034E+00	FAIL ABUN
PM-147	7.025E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.481E-02	FAIL ABUN
EU-152	7.932E-02	FAIL ABUN
GD-153	1.015E-01	NOT IDENT.
EU-154	8.865E-02	NOT IDENT.
EU-155	1.125E-01	FAIL ABUN

TB-160	2.049E-01	FAIL ABUN
HO-166M	5.100E-02	FAIL ABUN
TM-171	3.527E+01	FAIL ABUN
HF-172	1.903E-01	FAIL ABUN
LU-172	5.421E-02	FAIL ABUN
LU-176	2.582E-02	FAIL ABUN
HF-181	7.601E-02	NOT IDENT.
TA-182	1.645E-01	FAIL ABUN
RE-183	3.492E-01	NOT IDENT.
RE-184	2.348E-01	NOT IDENT.
W-188	9.512E+00	FAIL ABUN
IR-192	4.315E-02	FAIL ABUN
HG-203	6.027E-02	NOT IDENT.
TL-204	6.353E+00	FAIL ABUN
BI-207	4.292E-02	FAIL ABUN
BI-210	8.157E+00	NOT IDENT.
PB-210	8.157E+00	NOT IDENT.
PB-211	5.905E-01	NOT IDENT.
BI-213	8.307E-02	NOT IDENT.
RN-219	4.065E-01	NOT IDENT.
RA-223	6.034E-01	FAIL ABUN
AC-225	5.965E+00	NOT IDENT.
AC-227	2.577E-01	FAIL ABUN
TH-227	2.577E-01	FAIL ABUN
TH-229	4.871E-01	FAIL ABUN
TH-231	6.034E-01	FAIL ABUN
PA-233	6.211E-02	FAIL ABUN
PA-234	2.036E-01	FAIL ABUN
PA-234M	3.403E+00	NOT IDENT.
NP-237	6.211E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.479E-01	NOT IDENT.
PU-239	3.707E+02	FAIL ABUN
AM-241	2.199E-01	NOT IDENT.
CM-243	1.122E-01	NOT IDENT.
BK-247	7.650E-02	FAIL ABUN
CM-247	3.513E-02	NOT IDENT.
CF-251	1.268E-01	NOT IDENT.

```

*****
*                                     GEL Laboratories LLC                       *
*                                     2040 Savage Road                          *
*                                     Charleston, SC 29407                       *
*****
*                                     DETECTOR AND SAMPLE DATA                  *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278006.CNF;1
* Acquisition date   : 30-OCT-2023 09:46:02 Sensitivity      : 3.000
* Detector ID        : GAM03 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        : 11-SEP-2023 09:00:00 Nuclide Library : SOLID
* Sample ID          : G640278006 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.3753E+02 GRAM
* Wet wt corr        : 1.00000 Quantity Err(%) : 1.4542E-03 %
* Dry Weight         : 0.00000 Wet Weight      : 0.00000
*                   : 0.00000 Dry Weight      : 0.00000
*****
*                                     CALIBRATION INFORMATION                    *
*
* Eff. Cal. date     : 4-OCT-2023 09:22:59 Eff. Geometry    : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM03_CAN.CNF;30
*****

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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	2.451E+00	8.791E-01	8.791E-01
CD-109	4.091E+00	1.621E+00	1.621E+00
TE-125M	9.826E+00	3.651E+01	3.651E+01
I-126	4.408E+00	2.706E+00	2.706E+00
SN-126	3.800E-01	1.492E-01	1.492E-01
TL-208	3.148E-01	1.035E-01	1.035E-01
BI-211	6.526E+00	9.458E-01	9.458E-01
BI-212	1.507E+00	9.275E-01	9.275E-01
PB-212	9.133E-01	1.809E-01	1.809E-01
BI-214	2.062E+00	2.945E-01	2.945E-01
PB-214	2.369E+00	3.411E-01	3.411E-01
RN-222	2.062E+00	2.945E-01	2.945E-01
RA-224	4.509E+00	1.844E+00	1.844E+00
RA-226	2.369E+00	3.411E-01	3.411E-01
AC-228	9.756E-01	3.110E-01	3.110E-01
RA-228	9.756E-01	3.110E-01	3.110E-01
TH-228	9.133E-01	1.809E-01	1.809E-01
TH-230	2.369E+00	3.411E-01	3.411E-01
PA-231	7.134E-01	9.039E-01	9.039E-01
TH-232	9.756E-01	3.110E-01	3.110E-01
TH-234	3.479E+00	4.825E+00	4.825E+00
U-234	2.369E+00	3.411E-01	3.411E-01
U-235	8.283E-02	2.423E-01	2.423E-01
U-238	3.479E+00	4.825E+00	4.825E+00
AM-243	3.635E-01	1.397E-01	1.397E-01
CF-249	1.117E-01	9.330E-02	9.330E-02
ANH-511	8.868E-02	8.337E-02	8.337E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.424E-01	4.858E-01	4.900E-01	NOT IDENT.
NA-22	-1.635E-02	4.087E-02	4.153E-02	NOT IDENT.
NA-24	-8.119E+21	1.596E+22	0.000E+00	SHORT HLIF

AL-26	-7.083E-03	3.628E-02	3.642E-02	NOT IDENT.
SC-46	6.556E-03	6.732E-02	6.739E-02	FAIL ABUN
V-48	-2.903E-01	2.877E-01	3.161E-01	NOT IDENT.
CR-51	5.593E-01	1.037E+00	1.067E+00	NOT IDENT.
MN-52	1.967E+01	1.901E+01	2.097E+01	NOT IDENT.
MN-54	3.243E-02	4.747E-02	4.967E-02	NOT IDENT.
CO-56	3.370E-02	5.537E-02	5.742E-02	FAIL ABUN
MN-56	1.000E+41	1.666E+41	0.000E+00	SHORT HLIF
CO-57	-9.476E-03	2.944E-02	2.974E-02	NOT IDENT.
CO-58	1.294E-02	5.627E-02	5.657E-02	NOT IDENT.
FE-59	1.690E-01	1.762E-01	1.920E-01	NOT IDENT.
CO-60	2.056E-02	3.555E-02	3.673E-02	NOT IDENT.
ZN-65	1.055E-02	8.968E-02	8.980E-02	NOT IDENT.
GE-68	9.075E-01	1.325E+00	1.387E+00	NOT IDENT.
AS-73	1.616E+00	2.299E+00	2.411E+00	NOT IDENT.
AS-74	2.113E-01	3.561E-01	3.686E-01	NOT IDENT.
SE-75	-6.589E-03	6.170E-02	6.177E-02	NOT IDENT.
BR-77	2.815E+06	4.024E+06	4.220E+06	SHORT HLIF
SR-82	1.426E-02	9.622E-01	9.623E-01	NOT IDENT.
RB-83	-3.485E-02	9.831E-02	9.956E-02	NOT IDENT.
RB-84	-5.801E-02	1.706E-01	1.726E-01	NOT IDENT.
KR-85	2.462E+00	8.979E+00	9.047E+00	NOT IDENT.
SR-85	1.853E-02	6.796E-02	6.847E-02	NOT IDENT.
RB-86	2.042E+00	2.739E+00	2.889E+00	NOT IDENT.
Y-88	1.328E-02	5.747E-02	5.778E-02	NOT IDENT.
Y-91	4.259E+00	2.851E+01	2.858E+01	NOT IDENT.
NB-94	2.420E-02	3.217E-02	3.397E-02	NOT IDENT.
NB-95	3.362E-02	8.187E-02	8.326E-02	NOT IDENT.
NB-95M	1.842E-02	2.526E-01	2.527E-01	NOT IDENT.
ZR-95	4.968E-02	1.000E-01	1.025E-01	NOT IDENT.
NB-97	1.000E+41	3.050E+41	0.000E+00	SHORT HLIF
ZR-97	-7.950E+19	6.142E+20	0.000E+00	SHORT HLIF
MO-99	2.756E+04	6.605E+04	6.721E+04	SHORT HLIF
TC-99M	-1.000E+41	2.224E+41	0.000E+00	SHORT HLIF
RH-101	9.442E-03	3.984E-02	4.006E-02	NOT IDENT.
RH-102	2.360E-02	6.171E-02	6.262E-02	NOT IDENT.
RU-103	2.663E-02	7.670E-02	7.764E-02	FAIL ABUN
RH-106	1.614E-01	3.093E-01	3.177E-01	NOT IDENT.
RU-106	1.614E-01	3.093E-01	3.177E-01	NOT IDENT.
AG-108M	-9.752E-03	3.529E-02	3.557E-02	NOT IDENT.
AG-110	3.212E-01	8.149E-01	8.277E-01	NOT IDENT.
AG-110M	-6.527E-03	6.835E-02	6.842E-02	NOT IDENT.
SN-113	4.321E-03	5.506E-02	5.509E-02	NOT IDENT.
CD-115	4.906E+03	4.592E+05	4.592E+05	SHORT HLIF
SN-117M	1.105E-01	3.540E-01	3.575E-01	NOT IDENT.
SB-122	2.497E+03	1.482E+04	1.487E+04	SHORT HLIF
TE-123M	-8.361E-03	4.066E-02	4.083E-02	NOT IDENT.
SB-124	1.041E-01	1.258E-01	1.343E-01	NOT IDENT.
SB-125	-9.414E-02	1.143E-01	1.219E-01	FAIL ABUN
SB-126	-4.340E-01	1.031E+00	1.050E+00	FAIL ABUN
SB-127	-3.641E+02	6.280E+02	6.491E+02	SHORT HLIF
I-131	2.621E-01	2.245E+00	2.248E+00	NOT IDENT.
I-132	1.000E+41	3.153E+41	0.000E+00	SHORT HLIF
TE-132	9.848E+01	1.328E+03	1.328E+03	SHORT HLIF
BA-133	-4.664E-02	5.317E-02	5.718E-02	NOT IDENT.
I-133	4.290E+14	3.840E+15	3.845E+15	SHORT HLIF
CS-134	8.166E-02	4.826E-02	6.070E-02	FAIL ABUN
I-135	-1.000E+41	1.735E+41	0.000E+00	SHORT HLIF
CS-136	-1.131E-01	5.207E-01	5.232E-01	NOT IDENT.
BA-137M	1.094E-02	3.886E-02	3.917E-02	NOT IDENT.
CS-137	1.156E-02	4.105E-02	4.138E-02	NOT IDENT.
LA-138	1.230E-02	6.363E-02	6.387E-02	NOT IDENT.
CE-139	-1.808E-02	4.366E-02	4.441E-02	NOT IDENT.
BA-140	9.356E-01	1.737E+00	1.788E+00	NOT IDENT.
LA-140	2.735E-01	6.469E-01	6.586E-01	FAIL ABUN
CE-141	-2.463E-02	1.519E-01	1.523E-01	NOT IDENT.
CE-143	1.297E+10	4.854E+09	7.601E+09	SHORT HLIF
CE-144	3.528E-02	2.379E-01	2.385E-01	NOT IDENT.
PM-144	2.491E-03	3.769E-02	3.771E-02	NOT IDENT.
PR-144	1.807E-01	2.870E+00	2.871E+00	NOT IDENT.
PM-146	1.221E-02	4.459E-02	4.493E-02	NOT IDENT.
ND-147	-1.658E-01	5.254E+00	5.255E+00	FAIL ABUN
PM-147	-3.986E+02	8.017E+02	8.216E+02	NOT IDENT.
PM-149	-3.555E+06	4.488E+06	4.765E+06	SHORT HLIF
EU-150	-5.036E-03	3.365E-02	3.373E-02	FAIL ABUN
EU-152	-1.163E-01	1.156E-01	1.269E-01	FAIL ABUN
GD-153	2.887E-02	1.134E-01	1.141E-01	NOT IDENT.
EU-154	-4.528E-02	1.139E-01	1.157E-01	NOT IDENT.

EU-155	2.353E-02	1.267E-01	1.272E-01	FAIL ABUN
TB-160	1.720E-01	2.187E-01	2.320E-01	FAIL ABUN
HO-166M	-2.872E-02	6.420E-02	6.549E-02	FAIL ABUN
TM-171	4.225E+01	3.819E+01	4.267E+01	FAIL ABUN
HF-172	1.066E-02	2.323E-01	2.323E-01	FAIL ABUN
LU-172	-1.808E-02	6.581E-02	6.631E-02	FAIL ABUN
LU-176	9.419E-03	2.927E-02	2.958E-02	FAIL ABUN
HF-181	2.294E-02	8.345E-02	8.409E-02	NOT IDENT.
TA-182	7.592E-02	1.751E-01	1.784E-01	FAIL ABUN
RE-183	-2.197E-01	4.711E-01	4.814E-01	NOT IDENT.
RE-184	5.865E-02	2.709E-01	2.722E-01	NOT IDENT.
W-188	-4.788E+00	1.311E+01	1.329E+01	FAIL ABUN
IR-192	2.710E-03	5.040E-02	5.042E-02	FAIL ABUN
HG-203	-5.824E-02	7.586E-02	8.028E-02	NOT IDENT.
TL-204	1.050E-01	8.105E+00	8.105E+00	FAIL ABUN
BI-207	-1.911E-03	5.259E-02	5.259E-02	FAIL ABUN
BI-210	3.272E+00	9.166E+00	9.284E+00	NOT IDENT.
PB-210	3.272E+00	9.166E+00	9.284E+00	NOT IDENT.
PB-211	-6.794E-01	8.032E-01	8.596E-01	NOT IDENT.
BI-213	1.449E-02	1.029E-01	1.031E-01	NOT IDENT.
RN-219	1.692E-01	4.671E-01	4.733E-01	NOT IDENT.
RA-223	-2.411E-01	8.328E-01	8.399E-01	FAIL ABUN
AC-225	-3.165E+00	7.090E+00	7.232E+00	NOT IDENT.
AC-227	-4.014E-02	3.016E-01	3.022E-01	FAIL ABUN
TH-227	-4.014E-02	3.016E-01	3.022E-01	FAIL ABUN
TH-229	-2.334E-01	5.711E-01	5.807E-01	FAIL ABUN
TH-231	-2.411E-01	8.328E-01	8.399E-01	FAIL ABUN
PA-233	5.570E-02	6.680E-02	7.136E-02	FAIL ABUN
PA-234	-5.004E-02	3.026E-01	3.034E-01	FAIL ABUN
PA-234M	-3.177E+00	4.280E+00	4.513E+00	NOT IDENT.
NP-237	5.570E-02	6.680E-02	7.136E-02	FAIL ABUN
NP-238	-1.601E+06	1.374E+06	1.552E+06	SHORT HLIF
NP-239	-2.592E-01	2.912E-01	3.138E-01	NOT IDENT.
PU-239	4.290E+02	5.386E+02	5.723E+02	FAIL ABUN
AM-241	2.323E-01	2.579E-01	2.783E-01	NOT IDENT.
CM-243	6.450E-02	1.185E-01	1.220E-01	NOT IDENT.
BK-247	-3.667E-02	9.254E-02	9.401E-02	FAIL ABUN
CM-247	-6.890E-03	4.300E-02	4.311E-02	NOT IDENT.
CF-251	-1.094E-01	1.516E-01	1.594E-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	84.8909	85.43	95.6384	131.20	98.6507
45.60	83.0660	86.55	95.8309	133.02	88.8687
46.54	78.6494	86.79	129.9319	133.52	90.3748
49.72	0.0000	86.94	129.9673	136.00	89.7671
51.35	84.3168	87.09	130.0018	136.47	103.4331
51.87	76.2182	87.57	108.6384	140.51	0.0000
52.39	66.9239	88.03	108.7270	143.76	98.0050
52.97	79.9531	88.34	108.7867	144.24	100.8154
53.44	75.3367	88.47	108.8116	145.44	98.2150
54.07	73.0945	89.96	109.0970	152.43	102.7775
57.36	0.0000	1093.63	109.2263	153.25	98.2471
57.53	83.2080	91.11	109.3155	323.87	90.0100
57.98	76.1553	92.59	109.5944	156.02	109.7379
59.27	68.4256	93.35	109.7374	158.56	89.5508
59.32	68.4335	94.56	103.5699	159.00	100.7974
59.54	68.4678	94.65	103.5854	162.33	90.8882
60.96	95.8441	94.67	103.5891	162.66	82.4866
61.17	93.4921	94.87	111.2995	163.33	90.9947
62.93	93.8586	97.43	103.8117	165.86	111.0199
63.29	93.9329	98.43	92.6581	176.31	86.6363
63.58	93.9927	98.44	92.6598	176.60	96.1875
64.28	94.1361	99.53	97.9827	177.52	99.1462
66.73	85.7357	100.11	98.9357	181.07	0.0000
67.24	98.7831	102.03	105.2843	181.52	104.8473
125.81	106.9794	103.18	89.0516	184.41	85.4845
67.75	110.2371	103.37	87.3489	143.76	85.6049
68.89	109.6875	105.21	94.7163	193.51	79.5218
69.67	100.0995	105.31	97.8543	197.03	77.8654
70.82	122.3602	106.12	104.2328	198.01	73.0721
70.83	122.3633	106.47	108.2007	201.83	96.8297
72.81	122.8546	109.28	107.3635	203.43	67.5962
72.87	122.8691	111.00	107.6463	205.31	91.2791
74.66	123.3078	111.76	0.0000	210.85	78.4568
74.82	123.3467	114.06	97.5930	215.65	71.3870
74.97	123.3826	116.30	0.0000	218.12	77.5192
77.11	123.8991	116.74	102.3945	222.11	64.8446
78.74	124.2867	119.76	83.3406	227.09	67.1520
79.69	99.6094	121.12	96.8292	227.38	67.1697
80.03	89.7050	121.22	89.7353	228.16	0.0000
80.12	89.7209	121.78	94.2531	228.18	74.2424
80.19	89.7330	122.06	88.9537	116.74	74.2424
80.57	89.7968	122.92	80.1563	235.69	95.4632
81.00	89.8693	123.07	80.1732	235.96	95.4863
81.07	89.8813	265.00	80.2428	238.63	86.0938
81.75	104.9942	125.81	85.8486	238.98	0.0000
82.47	137.6771	127.23	92.7382	240.99	86.2754
83.79	138.0111	127.91	92.8261	242.00	86.3523
84.00	138.0640	129.30	94.3512	244.70	68.7380

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	50.1580	563.25	31.3770
252.80	56.4043	345.93	48.8940	564.24	0.0000
254.15	0.0000	351.06	49.7278	569.33	29.9688
256.23	65.8268	351.93	49.7571	946.00	29.9707
260.90	0.0000	355.39	0.0000	569.70	29.9736
264.66	56.9728	356.01	46.5673	583.19	27.3353
264.80	56.9795	364.49	31.2203	584.27	27.3486
265.00	61.1330	366.42	0.0000	595.83	18.9612
269.46	42.6391	372.51	36.9887	427.87	18.0520
270.03	57.2257	375.05	39.2945	602.52	0.0000
271.23	64.5732	377.52	44.9797	604.72	24.3680
273.65	62.6135	356.01	25.4036	607.14	24.7757
276.40	50.2021	388.16	28.3030	609.32	24.7995
277.37	54.4280	388.63	28.3112	610.33	22.9028
277.60	61.7668	391.69	28.3656	614.28	12.2363
278.00	69.1166	264.66	42.2144	618.01	21.0654
279.20	69.1837	401.81	34.2523	620.36	19.1705
279.54	74.4451	402.40	38.8331	621.93	14.3875
279.70	74.4538	404.85	42.3228	630.19	0.0000
280.46	78.6957	410.95	29.8504	631.29	16.9506
283.69	61.0149	413.71	39.1001	633.25	26.2188
284.31	62.0969	414.70	35.6709	634.78	18.5197
285.41	61.0975	423.72	38.1764	635.95	17.3710
285.90	0.0000	427.09	44.0473	636.99	17.3787
287.50	58.0324	427.87	45.2271	657.50	15.5835
290.67	57.1190	433.94	29.6763	657.76	15.5850
293.27	0.0000	439.40	23.8158	657.90	0.0000
351.93	49.3589	440.45	21.0264	661.66	17.1719
295.96	54.1657	453.88	28.2490	664.57	0.0000
879.38	51.0820	463.37	25.5582	666.33	17.2052
299.98	47.9407	468.07	26.0986	666.50	17.2063
300.09	47.9443	473.00	0.0000	667.71	0.0000
300.13	47.9462	475.06	21.4347	677.62	25.8164
301.36	47.9910	476.78	30.3938	685.70	0.0000
302.85	52.8495	477.60	26.8300	692.65	0.0000
256.23	40.0871	482.18	28.6890	695.00	25.7175
304.85	44.9095	487.02	27.8643	696.49	20.7840
306.78	41.7620	492.35	0.0000	696.51	20.7840
308.46	52.5360	497.08	25.3011	697.00	20.7885
311.90	31.1718	505.52	30.4946	697.30	20.7911
316.51	38.8279	507.63	0.0000	697.49	19.8022
319.41	44.3141	511.00	27.3038	702.65	13.8902
320.08	42.1722	514.00	33.5440	706.68	19.8755
321.04	35.7090	514.00	33.5443	711.68	23.8975
323.87	50.4204	520.40	29.2637	720.70	23.9824
325.23	42.3293	520.69	0.0000	721.93	0.0000
328.76	50.5964	522.65	0.0000	722.78	17.6016
333.37	44.2120	527.90	0.0000	722.91	14.4022
333.97	44.2310	528.26	25.7065	723.31	14.4044
334.37	50.7979	529.59	23.5188	724.19	12.8082
338.28	41.6259	529.87	0.0000	727.33	21.0391
338.32	41.6267	531.02	22.0642	733.00	12.8523
311.90	41.1407	537.26	16.2304	735.93	21.1096
340.48	41.1407	546.56	0.0000	333.97	23.1334
340.55	41.1423	552.55	19.3248	739.50	0.0000



ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	23.1937	949.00	16.2383	1384.29	8.7631
747.24	18.1725	667.71	0.0000	1408.01	6.8530
748.06	18.1780	962.31	15.6538	1434.09	4.9241
752.31	23.2653	964.08	13.0519	1435.80	7.8816
753.82	19.2302	966.17	13.0605	1457.56	0.0000
756.73	13.1718	911.20	13.0719	1460.82	12.8794
756.80	13.1722	983.53	15.3189	1489.16	7.9754
884.68	24.3831	984.45	0.0000	1505.03	13.0051
765.81	24.3999	1274.44	10.9848	1584.12	9.1560
766.42	19.5246	1001.03	11.0007	1596.21	6.1192
766.84	19.5275	1002.74	11.0062	1620.50	6.1497
772.60	0.0000	1004.73	9.9116	1621.92	9.2272
776.52	16.3315	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.0791
778.90	14.9840	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	11.1218	1764.49	5.2720
788.74	27.3421	1038.76	0.0000	1063.66	0.0000
792.07	11.4977	631.29	8.9204	1771.35	0.0000
795.86	19.7373	1048.07	8.9238	1791.20	0.0000
810.06	11.5726	1049.04	10.0426	1808.65	5.3159
810.29	11.5732	1050.41	8.9302	1810.72	0.0000
344.28	11.5739	1063.66	12.3260	1836.06	5.3430
810.76	11.5753	1077.00	7.8737		
815.77	16.5659	1077.34	7.8746		
1048.07	20.7275	1085.87	7.2172		
832.01	28.1148	1093.63	14.4656		
834.85	18.7619	1099.45	9.0557		
835.71	19.8106	1112.07	15.9038		
836.80	0.0000	1112.84	16.8811		
846.75	0.0000	1115.54	9.0967		
846.77	12.5599	1120.29	10.0192		
856.80	4.2010	1120.55	10.0203		
860.56	4.2064	1221.41	9.1108		
871.09	10.5539	1129.67	10.9582		
873.19	10.5612	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	14.8165	1173.23	12.0117		
880.51	21.1743	1177.95	6.4760		
881.60	22.2414	1189.05	7.4230		
883.24	26.4923	1204.77	11.1803		
884.68	22.2644	1221.41	6.5499		
889.28	22.2984	1231.02	9.3804		
894.76	17.0200	1235.36	9.3906		
898.04	9.5842	1238.28	10.9637		
900.72	17.0537	1260.41	0.0000		
903.28	16.0011	1271.87	4.7385		
911.20	10.6952	1274.44	11.3801		
912.08	10.6982	1274.54	11.3801		
923.98	0.0000	1291.59	3.8094		
926.50	11.8228	1298.22	0.0000		
929.11	20.4386	1312.11	10.5284		
935.54	19.4030	1332.49	4.8093		
937.49	25.8860	1362.66	0.0000		
944.13	10.3764	1365.19	10.6627		
946.00	10.3825	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:47:39.63

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278007.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM05.CNF;872
Background date : 29-OCT-2023 11:31:57
Sample date     : 11-SEP-2023 11:30:00 Acquisition date : 30-OCT-2023 09:46:36
Sample ID      : G640278007 Sample quantity   : 1.28730E+02 GRAM
Detector name  : GAM05 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.63 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID      : 2505440 Detector SN# :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	38.84	28	86	1.81	77.30	73	8	7.79E-03	60.7	
2	0	46.69*	53	105	0.74	92.99	89	8	1.48E-02	38.2	
3	0	53.71*	25	123	1.25	106.99	103	8	6.97E-03	81.8	
4	0	63.21*	88	200	0.79	125.96	121	10	2.44E-02	33.0	
5	1	74.77*	231	136	0.94	149.06	143	18	6.42E-02	10.5	1.57E+00
6	1	77.16*	340	114	0.77	153.83	143	18	9.44E-02	7.2	
7	4	87.21*	135	92	0.86	173.91	163	29	3.76E-02	13.6	2.05E+00
8	4	90.05	76	115	1.19	179.58	163	29	2.11E-02	26.5	
9	4	92.75*	115	101	1.15	184.96	163	29	3.20E-02	19.3	
10	0	154.49	36	89	0.71	308.28	303	9	1.00E-02	50.6	
11	4	182.06	24	71	1.56	363.34	360	16	6.56E-03	60.3	2.14E+00
12	4	186.02*	150	71	1.38	371.23	360	16	4.18E-02	13.1	
13	1	209.82	34	71	1.22	418.78	414	12	9.50E-03	44.9	4.85E+00
14	1	211.55	20	53	1.22	422.22	414	12	5.56E-03	69.9	
15	0	215.78	21	58	1.40	430.67	426	8	5.72E-03	67.8	
16	3	238.69*	318	57	1.01	476.44	472	16	8.82E-02	6.8	2.78E+00
17	3	241.87	143	79	1.54	482.79	472	16	3.98E-02	14.8	
18	0	270.59	34	67	1.95	540.15	535	11	9.32E-03	50.7	
19	0	295.35*	202	77	1.07	589.60	585	10	5.61E-02	10.8	
20	0	300.57	23	57	0.68	600.04	596	7	6.26E-03	60.2	
21	0	318.55*	19	46	0.71	635.94	631	10	5.21E-03	71.6	
22	0	338.38	67	50	1.09	675.56	670	10	1.87E-02	23.1	
23	0	352.13*	348	45	1.07	703.02	698	11	9.66E-02	6.7	
24	0	414.16	67	63	7.95	826.92	811	26	1.86E-02	35.1	
25	0	420.95	7	13	0.89	840.51	837	6	1.92E-03	89.3	
26	0	455.99	6	25	0.55	910.49	906	8	1.59E-03	154.8	
27	0	511.25*	18	26	1.36	1020.89	1015	12	4.98E-03	84.4	
28	0	520.99	17	14	0.93	1040.35	1035	9	4.72E-03	48.0	
29	0	537.96*	27	20	5.39	1074.24	1066	16	7.40E-03	42.8	
30	0	583.42*	90	26	1.51	1165.07	1159	10	2.51E-02	15.1	
31	0	609.29*	246	28	1.39	1216.75	1210	15	6.83E-02	8.0	
32	0	625.56	15	15	1.86	1249.27	1242	10	4.16E-03	54.9	
33	0	727.70	22	13	1.95	1453.35	1448	9	6.02E-03	37.3	
34	0	768.34	41	12	1.28	1534.56	1528	12	1.14E-02	23.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	795.13	21	2	2.79	1588.09	1582	11	5.70E-03	26.9	
36	0	855.01	13	6	1.56	1707.73	1704	10	3.74E-03	41.7	
37	0	860.82	24	8	1.76	1719.35	1713	13	6.62E-03	33.5	
38	0	911.62*	60	31	1.35	1820.87	1815	14	1.67E-02	24.0	
39	0	934.20	14	8	1.78	1865.99	1859	10	3.96E-03	44.7	
40	0	969.23*	25	14	1.17	1936.00	1931	10	6.96E-03	36.0	
41	0	983.04	10	13	0.59	1963.60	1955	14	2.72E-03	86.7	
42	0	1120.47*	53	10	1.50	2238.28	2231	14	1.47E-02	19.4	
43	0	1155.55	17	8	1.46	2308.40	2304	9	4.65E-03	40.2	
44	0	1218.33	10	2	1.04	2433.88	2430	8	2.85E-03	39.0	
45	0	1238.25*	21	10	1.42	2473.70	2466	12	5.97E-03	36.8	
46	0	1377.59*	22	0	2.10	2752.26	2746	12	6.05E-03	22.3	
47	0	1460.97*	105	0	2.36	2918.95	2911	15	2.93E-02	10.0	
48	0	1729.57	15	3	1.02	3456.03	3449	13	4.11E-03	36.1	
49	0	1764.82*	45	0	2.54	3526.54	3520	15	1.24E-02	16.0	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278007.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 11-SEP-2023 11:30:00 Acquisition date : 30-OCT-2023 09:46:36  
Sample ID : G640278007 Sample quantity : 128.73 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA5 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.63 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

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	100	10.66*	1.248E+00	4.393E+00	4.393E+00	20.08
AS-73	53.44	29	10.30*	9.586E+00	1.738E-01	2.651E-01	163.55
CD-109	88.03	154	3.70*	9.318E+00	2.612E+00	2.812E+00	27.22
SN-126	64.28	102	9.60	9.699E+00	6.390E-01	6.390E-01	65.92
	86.94	154	8.90	9.318E+00	1.086E+00	1.086E+00	27.22
	87.57	154	37.00*	9.318E+00	2.612E-01	2.612E-01	27.22
TL-208	277.37	-----	6.60	4.995E+00	-----	Line Not Found	-----
	583.19	92	85.00*	2.729E+00	2.304E-01	2.304E-01	30.19
	860.56	24	12.50	1.955E+00	5.617E-01	5.617E-01	66.94
BI-210	46.54	63	4.25*	9.306E+00	9.312E-01	9.351E-01	76.45
PB-210	46.54	63	4.25*	9.306E+00	9.312E-01	9.351E-01	76.45
BI-211	72.87	-----	1.23	9.622E+00	-----	Line Not Found	-----
	351.06	364	12.92*	4.150E+00	3.959E+00	3.959E+00	13.33
BI-212	727.33	22	6.67*	2.258E+00	8.370E-01	8.370E-01	74.67
	1620.50	-----	1.47	1.146E+00	-----	Line Not Found	-----
PB-212	74.82	266	10.28	9.592E+00	1.573E+00	1.573E+00	21.09
	77.11	390	17.10	9.549E+00	1.393E+00	1.393E+00	14.40
	238.63	341	43.60*	5.575E+00	8.171E-01	8.171E-01	13.64
	300.09	24	3.30	4.699E+00	8.966E-01	8.966E-01	120.35
BI-214	609.32	248	45.49*	2.629E+00	1.210E+00	1.210E+00	15.95
	1120.29	51	14.92	1.560E+00	1.284E+00	1.284E+00	38.90
	1764.49	42	15.30	1.069E+00	1.491E+00	1.491E+00	32.00
PB-214	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
RN-222	609.32	248	45.49*	2.629E+00	1.210E+00	1.210E+00	15.95
	1120.29	51	14.92	1.560E+00	1.284E+00	1.284E+00	38.90
	1764.49	42	15.30	1.069E+00	1.491E+00	1.491E+00	32.00
RA-224	240.99	154	4.10*	5.523E+00	3.957E+00	3.957E+00	29.51
RA-226	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
AC-228	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05
	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
RA-228	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05
	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
TH-228	74.82	266	10.28	9.592E+00	1.573E+00	1.573E+00	21.09

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	390	17.10	9.549E+00	1.393E+00	1.393E+00	14.40
	238.63	341	43.60*	5.575E+00	8.171E-01	8.171E-01	13.64
	300.09	24	3.30	4.699E+00	8.966E-01	8.966E-01	120.35
TH-230	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
PA-231	283.69	-----	1.70	4.911E+00	-----	Line Not Found	-----
	301.36	24	5.35*	4.699E+00	5.530E-01	5.530E-01	120.35
TH-232	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05
	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
TH-234	63.29	102	3.70*	9.699E+00	1.658E+00	1.658E+00	65.92
	92.59	131	4.23	9.169E+00	1.966E+00	1.966E+00	38.51
U-234	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
U-235	89.96	86	3.47	9.243E+00	1.568E+00	1.568E+00	52.92
	93.35	131	5.60	9.169E+00	1.485E+00	1.485E+00	38.51
	143.76	-----	10.96*	7.659E+00	-----	Line Not Found	-----
	163.33	-----	5.08	7.136E+00	-----	Line Not Found	-----
	185.72	164	57.20	6.595E+00	2.534E-01	2.534E-01	26.17
	205.31	-----	5.01	6.186E+00	-----	Line Not Found	-----
U-238	63.29	102	3.70*	9.699E+00	1.658E+00	1.658E+00	65.92
	92.59	131	4.23	9.169E+00	1.966E+00	1.966E+00	38.51
AM-243	43.53	-----	5.90	9.102E+00	-----	Line Not Found	-----
	74.66	266	67.20*	9.592E+00	2.406E-01	2.406E-01	21.09
ANH-511	511.00	18	100.00*	3.052E+00	3.497E-02	3.497E-02	168.89

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278007.CNF;1
* Acquisition date   : 30-OCT-2023 09:46:36 Sensitivity      : 3.000
* Detector ID       : GAM05 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.63 Half life ratio : *****
* Sample date       : 11-SEP-2023 11:30:00 Analyst initials: MXR1
* Sample ID         : G640278007 Sample Quantity : 1.2873E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date    : 16-AUG-2023 10:50:42 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM05_CAN.CNF;28
*****

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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	4.393E+00	8.642E-01	4.176E-01
AS-73	2.651E-01	4.249E-01	3.375E-01
CD-109	2.812E+00	7.500E-01	8.059E-01
SN-126	2.612E-01	6.968E-02	7.474E-02
TL-208	2.304E-01	6.818E-02	5.177E-02
BI-210	9.351E-01	7.006E-01	5.874E-01
PB-210	9.351E-01	7.006E-01	5.874E-01
BI-211	3.959E+00	5.173E-01	2.745E-01
BI-212	8.370E-01	6.125E-01	7.109E-01
PB-212	8.171E-01	1.092E-01	8.833E-02
BI-214	1.210E+00	1.892E-01	1.128E-01
PB-214	1.437E+00	1.878E-01	9.986E-02
RN-222	1.210E+00	1.892E-01	1.128E-01
RA-224	3.957E+00	1.144E+00	9.470E-01
RA-226	1.437E+00	1.878E-01	9.986E-02
AC-228	7.177E-01	3.380E-01	2.277E-01
RA-228	7.177E-01	3.380E-01	2.277E-01
TH-228	8.171E-01	1.092E-01	8.833E-02
TH-230	1.437E+00	1.878E-01	9.985E-02
PA-231	5.530E-01	6.523E-01	7.894E-01
TH-232	7.177E-01	3.380E-01	2.277E-01
TH-234	1.658E+00	1.071E+00	7.278E-01
U-234	1.437E+00	1.878E-01	9.985E-02
U-235	-1.861E-02	1.566E-01	2.900E-01
U-238	1.658E+00	1.071E+00	7.278E-01
AM-243	2.406E-01	4.973E-02	4.613E-02
ANH-511	3.497E-02	5.788E-02	4.416E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	8.689E-02		4.324E-01	8.579E-01	NOT IDENT.
NA-22	-1.155E-02		3.147E-02	5.892E-02	NOT IDENT.
NA-24	0.000E+00		1.380E+22	0.000E+00	SHORT HLIF

AL-26	6.230E-03	2.381E-02	5.978E-02	NOT IDENT.
SC-46	1.078E-02	5.152E-02	1.050E-01	FAIL ABUN
V-48	2.678E-01	4.552E-01	6.118E-01	FAIL ABUN
CR-51	-1.721E-01	7.805E-01	1.351E+00	NOT IDENT.
MN-52	1.026E+00	1.558E+01	3.155E+01	FAIL ABUN
MN-54	-2.614E-02	3.595E-02	5.814E-02	NOT IDENT.
CO-56	2.291E-03	4.316E-02	8.356E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.654E-03	1.788E-02	3.335E-02	NOT IDENT.
CO-58	1.105E-02	4.690E-02	9.306E-02	NOT IDENT.
FE-59	3.118E-02	1.366E-01	2.802E-01	NOT IDENT.
CO-60	-2.382E-02	3.645E-02	6.221E-02	NOT IDENT.
ZN-65	-3.341E-02	6.593E-02	1.001E-01	NOT IDENT.
GE-68	-6.388E-01	1.041E+00	1.858E+00	NOT IDENT.
AS-74	-3.365E-01	2.950E-01	4.610E-01	NOT IDENT.
SE-75	-1.019E-02	4.276E-02	7.527E-02	NOT IDENT.
BR-77	0.000E+00	3.266E+05	0.000E+00	SHORT HLIF
SR-82	-4.011E-01	7.450E-01	1.272E+00	NOT IDENT.
RB-83	1.108E-01	1.043E-01	1.720E-01	FAIL ABUN
RB-84	-5.295E-02	1.317E-01	2.480E-01	NOT IDENT.
KR-85	4.137E+00	5.144E+00	1.056E+01	NOT IDENT.
SR-85	3.104E-02	3.886E-02	7.970E-02	NOT IDENT.
RB-86	-8.007E-01	2.226E+00	4.196E+00	NOT IDENT.
Y-88	3.169E-02	3.713E-02	1.020E-01	NOT IDENT.
Y-91	-8.913E+00	2.432E+01	4.501E+01	NOT IDENT.
NB-94	-1.313E-03	3.622E-02	6.672E-02	NOT IDENT.
NB-95	2.375E-02	5.468E-02	1.015E-01	NOT IDENT.
NB-95M	-1.987E-02	1.529E-01	2.505E-01	NOT IDENT.
ZR-95	-1.815E-02	8.000E-02	1.477E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.657E+20	0.000E+00	SHORT HLIF
MO-99	0.000E+00	5.200E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.716E+41	0.000E+00	SHORT HLIF
RH-101	5.139E-04	2.292E-02	4.343E-02	NOT IDENT.
RH-102	1.374E-02	5.179E-02	1.022E-01	NOT IDENT.
RU-103	-2.773E-02	5.423E-02	9.845E-02	FAIL ABUN
RH-106	-7.471E-02	3.283E-01	5.351E-01	NOT IDENT.
RU-106	-7.471E-02	3.283E-01	5.351E-01	NOT IDENT.
AG-108M	-1.499E-02	2.278E-02	4.087E-02	NOT IDENT.
AG-110	-1.850E-01	7.554E-01	1.377E+00	NOT IDENT.
AG-110M	3.200E-03	5.383E-02	1.077E-01	NOT IDENT.
SN-113	-1.962E-02	4.661E-02	8.670E-02	NOT IDENT.
CD-115	0.000E+00	3.347E+05	0.000E+00	SHORT HLIF
SN-117M	-6.010E-03	2.127E-01	3.979E-01	NOT IDENT.
SB-122	0.000E+00	1.007E+04	0.000E+00	SHORT HLIF
TE-123M	-4.383E-03	2.526E-02	4.642E-02	NOT IDENT.
SB-124	-2.977E-02	7.331E-02	1.517E-01	NOT IDENT.
SB-125	-1.563E-02	7.797E-02	1.484E-01	NOT IDENT.
TE-125M	-2.081E+00	9.249E+00	1.739E+01	NOT IDENT.
I-126	5.639E-01	1.294E+00	2.582E+00	NOT IDENT.
SB-126	-2.705E-01	8.967E-01	1.608E+00	FAIL ABUN
SB-127	0.000E+00	4.849E+02	0.000E+00	SHORT HLIF
I-131	-8.840E-01	1.594E+00	2.955E+00	NOT IDENT.
I-132	0.000E+00	1.647E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	9.057E+02	0.000E+00	SHORT HLIF
BA-133	2.763E-03	2.750E-02	5.131E-02	NOT IDENT.
I-133	0.000E+00	2.531E+15	0.000E+00	SHORT HLIF
CS-134	6.946E-02	3.667E-02	8.032E-02	FAIL ABUN
I-135	0.000E+00	1.648E+41	0.000E+00	SHORT HLIF
CS-136	-1.816E-01	4.719E-01	8.926E-01	FAIL ABUN
BA-137M	2.401E-02	3.466E-02	7.122E-02	NOT IDENT.
CS-137	2.536E-02	3.662E-02	7.524E-02	NOT IDENT.
LA-138	-1.120E-02	5.523E-02	1.053E-01	NOT IDENT.
CE-139	-3.320E-02	2.838E-02	4.691E-02	NOT IDENT.
BA-140	0.000E+00	2.663E+00	2.879E+00	FAIL ABUN
LA-140	-4.985E-02	4.923E-01	9.797E-01	NOT IDENT.
CE-141	-3.994E-02	9.314E-02	1.681E-01	NOT IDENT.
CE-143	0.000E+00	2.637E+09	0.000E+00	SHORT HLIF
CE-144	9.358E-02	1.580E-01	3.118E-01	NOT IDENT.
PM-144	-4.101E-02	3.749E-02	5.838E-02	NOT IDENT.
PR-144	-3.107E+00	2.858E+00	4.457E+00	NOT IDENT.
PM-146	3.392E-03	3.567E-02	6.413E-02	NOT IDENT.
ND-147	1.915E+00	3.655E+00	7.485E+00	FAIL ABUN
PM-147	-5.780E+01	5.005E+02	9.452E+02	NOT IDENT.
PM-149	0.000E+00	2.901E+06	0.000E+00	SHORT HLIF
EU-150	2.428E-02	1.933E-02	4.136E-02	FAIL ABUN
EU-152	1.410E-02	7.041E-02	1.430E-01	NOT IDENT.
GD-153	-5.543E-02	5.302E-02	8.456E-02	NOT IDENT.



EU-154	-2.976E-02	8.827E-02	1.665E-01	NOT IDENT.
EU-155	4.982E-04	6.635E-02	1.274E-01	FAIL ABUN
TB-160	1.709E-01	1.494E-01	3.543E-01	FAIL ABUN
HO-166M	1.361E-02	5.253E-02	1.041E-01	NOT IDENT.
TM-171	3.997E+00	6.406E+00	5.378E+00	FAIL ABUN
HF-172	7.558E-02	1.314E-01	2.620E-01	FAIL ABUN
LU-172	-1.303E-02	5.422E-02	1.042E-01	FAIL ABUN
LU-176	6.068E-03	2.231E-02	4.050E-02	FAIL ABUN
HF-181	1.941E-02	6.192E-02	1.257E-01	NOT IDENT.
TA-182	7.915E-03	1.982E-01	3.503E-01	FAIL ABUN
RE-183	-1.545E-02	5.933E-02	1.161E-01	NOT IDENT.
RE-184	-1.592E-01	1.593E-01	2.617E-01	NOT IDENT.
W-188	8.593E+00	7.957E+00	1.558E+01	FAIL ABUN
IR-192	9.677E-03	4.102E-02	7.554E-02	FAIL ABUN
HG-203	-3.511E-02	5.678E-02	9.414E-02	NOT IDENT.
TL-204	6.970E-01	1.967E+00	3.681E+00	NOT IDENT.
BI-207	6.647E-03	4.584E-02	9.352E-02	FAIL ABUN
PB-211	-3.051E-01	5.773E-01	9.310E-01	NOT IDENT.
BI-213	2.155E-02	7.971E-02	1.621E-01	NOT IDENT.
RN-219	1.048E-01	3.249E-01	6.590E-01	FAIL ABUN
RA-223	3.748E-01	5.169E-01	1.084E+00	FAIL ABUN
AC-225	-1.429E+00	5.353E+00	8.695E+00	NOT IDENT.
AC-227	-1.366E-01	2.128E-01	3.553E-01	FAIL ABUN
TH-227	-1.366E-01	2.128E-01	3.553E-01	FAIL ABUN
TH-229	9.007E-03	4.067E-01	7.495E-01	FAIL ABUN
TH-231	3.748E-01	5.169E-01	1.084E+00	FAIL ABUN
PA-233	-2.776E-03	5.930E-02	1.048E-01	FAIL ABUN
PA-234	3.473E-02	2.061E-01	4.434E-01	NOT IDENT.
PA-234M	8.437E-01	4.271E+00	8.721E+00	NOT IDENT.
NP-237	-2.776E-03	5.930E-02	1.048E-01	FAIL ABUN
NP-238	0.000E+00	1.927E+06	0.000E+00	SHORT HLIF
NP-239	-1.157E-01	1.801E-01	3.246E-01	NOT IDENT.
PU-239	1.552E+02	2.464E+02	4.877E+02	FAIL ABUN
AM-241	1.875E-02	3.942E-02	7.572E-02	NOT IDENT.
CM-243	-5.717E-02	6.186E-02	1.098E-01	NOT IDENT.
BK-247	6.998E-03	6.137E-02	1.133E-01	NOT IDENT.
CM-247	-7.489E-03	2.898E-02	5.518E-02	NOT IDENT.
CF-249	2.890E-03	3.353E-02	6.607E-02	NOT IDENT.
CF-251	-8.917E-03	1.036E-01	1.896E-01	NOT IDENT.

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	100	10.66*	1.248E+00	4.393E+00	4.393E+00	20.08
AS-73	53.44	29	10.30*	9.586E+00	1.738E-01	2.651E-01	163.55
CD-109	88.03	154	3.70*	9.318E+00	2.612E+00	2.812E+00	27.22
SN-126	64.28	102	9.60	9.699E+00	6.390E-01	6.390E-01	65.92
	86.94	154	8.90	9.318E+00	1.086E+00	1.086E+00	27.22
	87.57	154	37.00*	9.318E+00	2.612E-01	2.612E-01	27.22
TL-208	277.37	-----	6.60	4.995E+00	-----	Line Not Found	-----
	583.19	92	85.00*	2.729E+00	2.304E-01	2.304E-01	30.19
	860.56	24	12.50	1.955E+00	5.617E-01	5.617E-01	66.94
BI-210	46.54	63	4.25*	9.306E+00	9.312E-01	9.351E-01	76.45
PB-210	46.54	63	4.25*	9.306E+00	9.312E-01	9.351E-01	76.45
BI-211	72.87	-----	1.23	9.622E+00	-----	Line Not Found	-----
	351.06	364	12.92*	4.150E+00	3.959E+00	3.959E+00	13.33
BI-212	727.33	22	6.67*	2.258E+00	8.370E-01	8.370E-01	74.67
	1620.50	-----	1.47	1.146E+00	-----	Line Not Found	-----
PB-212	74.82	266	10.28	9.592E+00	1.573E+00	1.573E+00	21.09
	77.11	390	17.10	9.549E+00	1.393E+00	1.393E+00	14.40
	238.63	341	43.60*	5.575E+00	8.171E-01	8.171E-01	13.64
	300.09	24	3.30	4.699E+00	8.966E-01	8.966E-01	120.35
BI-214	609.32	248	45.49*	2.629E+00	1.210E+00	1.210E+00	15.95
	1120.29	51	14.92	1.560E+00	1.284E+00	1.284E+00	38.90
	1764.49	42	15.30	1.069E+00	1.491E+00	1.491E+00	32.00
PB-214	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
RN-222	609.32	248	45.49*	2.629E+00	1.210E+00	1.210E+00	15.95
	1120.29	51	14.92	1.560E+00	1.284E+00	1.284E+00	38.90
	1764.49	42	15.30	1.069E+00	1.491E+00	1.491E+00	32.00
RA-224	240.99	154	4.10*	5.523E+00	3.957E+00	3.957E+00	29.51
RA-226	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
AC-228	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05
	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
RA-228	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
	74.82	266	10.28	9.592E+00	1.573E+00	1.573E+00	21.09
	77.11	390	17.10	9.549E+00	1.393E+00	1.393E+00	14.40
TH-230	238.63	341	43.60*	5.575E+00	8.171E-01	8.171E-01	13.64
	300.09	24	3.30	4.699E+00	8.966E-01	8.966E-01	120.35
	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
PA-231	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
	283.69	-----	1.70	4.911E+00	-----	Line Not Found	-----
	301.36	24	5.35*	4.699E+00	5.530E-01	5.530E-01	120.35
	105.21	-----	1.10	8.804E+00	-----	Line Not Found	-----
TH-232	338.32	71	11.27	4.284E+00	8.538E-01	8.538E-01	46.19
	835.71	-----	1.61	2.005E+00	-----	Line Not Found	-----
	911.20	59	25.80*	1.861E+00	7.177E-01	7.177E-01	48.05
	968.97	25	15.80	1.766E+00	5.125E-01	5.125E-01	71.94
TH-234	63.29	102	3.70*	9.699E+00	1.658E+00	1.658E+00	65.92
	92.59	131	4.23	9.169E+00	1.966E+00	1.966E+00	38.51
U-234	74.82	266	5.80	9.592E+00	2.787E+00	2.787E+00	21.09
	77.11	390	9.70	9.549E+00	2.456E+00	2.456E+00	14.40
	87.09	154	3.41	9.318E+00	2.835E+00	2.835E+00	27.22
	242.00	154	7.25	5.523E+00	2.238E+00	2.238E+00	29.51
	295.22	214	18.42	4.763E+00	1.420E+00	1.420E+00	21.69
	351.93	364	35.60*	4.150E+00	1.437E+00	1.437E+00	13.33
U-235	89.96	86	3.47	9.243E+00	1.568E+00	1.568E+00	52.92
	93.35	131	5.60	9.169E+00	1.485E+00	1.485E+00	38.51
	143.76	-----	10.96*	7.659E+00	-----	Line Not Found	-----
	163.33	-----	5.08	7.136E+00	-----	Line Not Found	-----
	185.72	164	57.20	6.595E+00	2.534E-01	2.534E-01	26.17
U-238	205.31	-----	5.01	6.186E+00	-----	Line Not Found	-----
	63.29	102	3.70*	9.699E+00	1.658E+00	1.658E+00	65.92
	92.59	131	4.23	9.169E+00	1.966E+00	1.966E+00	38.51
AM-243	43.53	-----	5.90	9.102E+00	-----	Line Not Found	-----
ANH-511	74.66	266	67.20*	9.592E+00	2.406E-01	2.406E-01	21.09
	511.00	18	100.00*	3.052E+00	3.497E-02	3.497E-02	168.89

Flag: "\*" = Keyline

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	4.393E+00	4.393E+00	0.882E+00	20.08	
AS-73	80.30D	1.53	1.738E-01	2.651E-01	4.336E-01	163.55	
CD-109	461.40D	1.08	2.612E+00	2.812E+00	0.765E+00	27.22	
SN-126	2.30E+05Y	1.00	2.612E-01	2.612E-01	0.711E-01	27.22	
TL-208	1.41E+10Y	1.00	2.304E-01	2.304E-01	0.696E-01	30.19	
BI-210	22.20Y	1.00	9.312E-01	9.351E-01	7.149E-01	76.45	
PB-210	22.20Y	1.00	9.312E-01	9.351E-01	7.149E-01	76.45	
BI-211	7.04E+08Y	1.00	3.959E+00	3.959E+00	0.528E+00	13.33	
BI-212	1.41E+10Y	1.00	8.370E-01	8.370E-01	6.250E-01	74.67	
PB-212	1.41E+10Y	1.00	8.171E-01	8.171E-01	1.114E-01	13.64	
BI-214	1600.00Y	1.00	1.210E+00	1.210E+00	0.193E+00	15.95	
PB-214	1600.00Y	1.00	1.437E+00	1.437E+00	0.192E+00	13.33	
RN-222	1600.00Y	1.00	1.210E+00	1.210E+00	0.193E+00	15.95	
RA-224	1.41E+10Y	1.00	3.957E+00	3.957E+00	1.168E+00	29.51	
RA-226	1600.00Y	1.00	1.437E+00	1.437E+00	0.192E+00	13.33	
AC-228	1.41E+10Y	1.00	7.177E-01	7.177E-01	3.449E-01	48.05	
RA-228	1.41E+10Y	1.00	7.177E-01	7.177E-01	3.449E-01	48.05	
TH-228	1.41E+10Y	1.00	8.171E-01	8.171E-01	1.114E-01	13.64	
TH-230	7.54E+04Y	1.00	1.437E+00	1.437E+00	0.192E+00	13.33	
PA-231	7.04E+08Y	1.00	5.530E-01	5.530E-01	6.656E-01	120.35	
TH-232	1.41E+10Y	1.00	7.177E-01	7.177E-01	3.449E-01	48.05	
TH-234	4.47E+09Y	1.00	1.658E+00	1.658E+00	1.093E+00	65.92	
U-234	2.45E+05Y	1.00	1.437E+00	1.437E+00	0.192E+00	13.33	
U-235	7.04E+08Y	1.00	2.534E-01	2.534E-01	0.663E-01	26.17	K
U-238	4.47E+09Y	1.00	1.658E+00	1.658E+00	1.093E+00	65.92	
AM-243	7370.00Y	1.00	2.406E-01	2.406E-01	0.507E-01	21.09	
ANH-511	1.00E+09Y	1.00	3.497E-02	3.497E-02	5.906E-02	168.89	
Total Activity :			3.464E+01	3.494E+01			

Grand Total Activity : 3.464E+01 3.494E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	38.84	33	103	1.81	77.30	73	8	7.79E-03	****	8.68E+00	
0	154.49	40	98	0.71	308.28	303	9	1.00E-02	****	7.37E+00	T
4	182.06	26	77	1.56	363.34	360	16	6.56E-03	****	6.68E+00	T
1	209.82	37	77	1.22	418.78	414	12	9.50E-03	89.7	6.10E+00	
1	211.55	22	57	1.22	422.22	414	12	5.56E-03	****	6.06E+00	T
0	215.78	22	63	1.40	430.67	426	8	5.72E-03	****	5.98E+00	T
0	270.59	36	72	1.95	540.15	535	11	9.32E-03	****	5.09E+00	T
0	318.55	20	48	0.71	635.94	631	10	5.21E-03	****	4.49E+00	T
0	414.16	69	65	7.95	826.92	811	26	1.86E-02	70.2	3.64E+00	T
0	420.95	7	14	0.89	840.51	837	6	1.92E-03	****	3.59E+00	
0	455.99	6	26	0.55	910.49	906	8	1.59E-03	****	3.36E+00	
0	520.99	17	14	0.93	1040.35	1035	9	4.72E-03	96.0	3.00E+00	T
0	537.96	27	20	5.39	1074.24	1066	16	7.40E-03	85.6	2.92E+00	T
0	625.56	15	15	1.86	1249.27	1242	10	4.16E-03	****	2.57E+00	
0	768.34	41	12	1.28	1534.56	1528	12	1.14E-02	45.9	2.15E+00	
0	795.13	20	2	2.79	1588.09	1582	11	5.70E-03	53.9	2.09E+00	T
0	855.01	13	5	1.56	1707.73	1704	10	3.74E-03	83.3	1.97E+00	
0	934.20	14	8	1.78	1865.99	1859	10	3.96E-03	89.5	1.82E+00	T
0	983.04	10	13	0.59	1963.60	1955	14	2.72E-03	****	1.74E+00	T
0	1155.55	16	8	1.46	2308.40	2304	9	4.65E-03	80.4	1.52E+00	
0	1218.33	10	2	1.04	2433.88	2430	8	2.85E-03	78.0	1.45E+00	
0	1238.25	21	9	1.42	2473.70	2466	12	5.97E-03	73.5	1.43E+00	T
0	1377.59	21	0	2.10	2752.26	2746	12	6.05E-03	44.6	1.31E+00	
0	1729.57	14	3	1.02	3456.03	3449	13	4.11E-03	72.2	1.09E+00	

Flags: "T" = Tentatively associated

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278007.CNF;1
* Acquisition date   : 30-OCT-2023 09:46:36 Sensitivity      : 3.000
* Detector ID       : GAM05 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.63 Half life ratio : *****
* Sample date       : 11-SEP-2023 11:30:00 Nuclide Library : SOLID
* Sample ID        : G640278007 Analyst initials: MXR1
* Batch Number     : 2505440 Sample Quantity : 1.2873E+02 GRAM
* Wet wt corr      : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date    : 16-AUG-2023 10:50:42 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM05_CAN.CNF;28
*****

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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	1.495E-01
AS-73	1.560E-01
CD-109	3.774E-01
SN-126	3.500E-02
TL-208	2.244E-02
BI-210	2.727E-01
PB-210	2.727E-01
BI-211	1.223E-01
BI-212	3.026E-01
PB-212	4.084E-02
BI-214	4.971E-02
PB-214	4.449E-02
RN-222	4.971E-02
RA-224	4.379E-01
RA-226	4.449E-02
AC-228	9.731E-02
RA-228	9.731E-02
TH-228	4.084E-02
TH-230	4.448E-02
PA-231	3.626E-01
TH-232	9.731E-02
TH-234	3.410E-01
U-234	4.448E-02
U-235	1.353E-01
U-238	3.410E-01
AM-243	2.179E-02
ANH-511	1.946E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	3.841E-01	NOT IDENT.
NA-22	2.360E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.237E-02	NOT IDENT.

SC-46	4.625E-02	FAIL ABUN
V-48	2.679E-01	FAIL ABUN
CR-51	6.136E-01	NOT IDENT.
MN-52	1.309E+01	FAIL ABUN
MN-54	2.465E-02	NOT IDENT.
CO-56	3.556E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.538E-02	NOT IDENT.
CO-58	4.026E-02	NOT IDENT.
FE-59	1.212E-01	NOT IDENT.
CO-60	2.514E-02	NOT IDENT.
ZN-65	3.854E-02	NOT IDENT.
GE-68	7.561E-01	NOT IDENT.
AS-74	1.964E-01	NOT IDENT.
SE-75	3.412E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.418E-01	NOT IDENT.
RB-83	7.724E-02	FAIL ABUN
RB-84	1.071E-01	NOT IDENT.
KR-85	4.666E+00	NOT IDENT.
SR-85	3.522E-02	NOT IDENT.
RB-86	1.748E+00	NOT IDENT.
Y-88	4.048E-02	NOT IDENT.
Y-91	1.881E+01	NOT IDENT.
NB-94	2.994E-02	NOT IDENT.
NB-95	4.450E-02	NOT IDENT.
NB-95M	1.154E-01	NOT IDENT.
ZR-95	6.248E-02	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	2.020E-02	NOT IDENT.
RH-102	4.537E-02	NOT IDENT.
RU-103	4.254E-02	FAIL ABUN
RH-106	2.335E-01	NOT IDENT.
RU-106	2.335E-01	NOT IDENT.
AG-108M	1.790E-02	NOT IDENT.
AG-110	6.064E-01	NOT IDENT.
AG-110M	4.730E-02	NOT IDENT.
SN-113	3.899E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.832E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.143E-02	NOT IDENT.
SB-124	4.956E-02	NOT IDENT.
SB-125	6.633E-02	NOT IDENT.
TE-125M	8.066E+00	NOT IDENT.
I-126	1.154E+00	NOT IDENT.
SB-126	7.026E-01	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	1.310E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.247E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.551E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	3.673E-01	FAIL ABUN
BA-137M	3.198E-02	NOT IDENT.
CS-137	3.379E-02	NOT IDENT.
LA-138	4.314E-02	NOT IDENT.
CE-139	2.162E-02	NOT IDENT.
BA-140	1.279E+00	FAIL ABUN
LA-140	3.880E-01	NOT IDENT.
CE-141	7.774E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.455E-01	NOT IDENT.
PM-144	2.544E-02	NOT IDENT.
PR-144	1.943E+00	NOT IDENT.
PM-146	2.835E-02	NOT IDENT.
ND-147	3.289E+00	FAIL ABUN
PM-147	4.370E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.874E-02	FAIL ABUN
EU-152	6.427E-02	NOT IDENT.
GD-153	3.868E-02	NOT IDENT.
EU-154	6.693E-02	NOT IDENT.

EU-155	5.923E-02	FAIL ABUN
TB-160	1.552E-01	FAIL ABUN
HO-166M	4.565E-02	NOT IDENT.
TM-171	2.496E+00	FAIL ABUN
HF-172	1.217E-01	FAIL ABUN
LU-172	4.380E-02	FAIL ABUN
LU-176	1.839E-02	FAIL ABUN
HF-181	5.593E-02	NOT IDENT.
TA-182	1.480E-01	FAIL ABUN
RE-183	5.401E-02	NOT IDENT.
RE-184	1.019E-01	NOT IDENT.
W-188	7.112E+00	FAIL ABUN
IR-192	3.436E-02	FAIL ABUN
HG-203	4.295E-02	NOT IDENT.
TL-204	1.730E+00	NOT IDENT.
BI-207	4.023E-02	FAIL ABUN
PB-211	4.082E-01	NOT IDENT.
BI-213	7.213E-02	NOT IDENT.
RN-219	2.969E-01	FAIL ABUN
RA-223	4.965E-01	FAIL ABUN
AC-225	3.992E+00	NOT IDENT.
AC-227	1.616E-01	FAIL ABUN
TH-227	1.616E-01	FAIL ABUN
TH-229	3.462E-01	FAIL ABUN
TH-231	4.965E-01	FAIL ABUN
PA-233	4.782E-02	FAIL ABUN
PA-234	1.850E-01	NOT IDENT.
PA-234M	3.812E+00	NOT IDENT.
NP-237	4.782E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.501E-01	NOT IDENT.
PU-239	2.279E+02	FAIL ABUN
AM-241	3.549E-02	NOT IDENT.
CM-243	5.046E-02	NOT IDENT.
BK-247	5.142E-02	NOT IDENT.
CM-247	2.460E-02	NOT IDENT.
CF-249	2.986E-02	NOT IDENT.
CF-251	8.790E-02	NOT IDENT.



```

*****
*                                     GEL Laboratories LLC                       *
*                                     2040 Savage Road                          *
*                                     Charleston, SC 29407                       *
*****
*                                     DETECTOR AND SAMPLE DATA                  *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278007.CNF;1
* Acquisition date   : 30-OCT-2023 09:46:36 Sensitivity      : 3.000
* Detector ID       : GAM05 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.63 Half life ratio : *****
* Sample date       : 11-SEP-2023 11:30:00 Nuclide Library : SOLID
* Sample ID         : G640278007 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.2873E+02 GRAM
* Wet wt corr       : 1.00000 Quantity Err(%) : 1.5536E-03 %
*                   : Wet Weight : 0.00000
*                   : Dry Weight : 0.00000
*****
*                                     CALIBRATION INFORMATION                    *
*
* Eff. Cal. date    : 16-AUG-2023 10:50:42 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM05_CAN.CNF;28
*****

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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	4.393E+00	9.426E-01	9.426E-01
AS-73	2.651E-01	4.285E-01	4.285E-01
CD-109	2.812E+00	7.990E-01	7.990E-01
SN-126	2.612E-01	7.293E-02	7.293E-02
TL-208	2.304E-01	7.265E-02	7.265E-02
BI-210	9.351E-01	7.063E-01	7.063E-01
PB-210	9.351E-01	7.063E-01	7.063E-01
BI-211	3.959E+00	6.100E-01	6.100E-01
BI-212	8.370E-01	6.204E-01	6.204E-01
PB-212	8.171E-01	1.371E-01	1.371E-01
BI-214	1.210E+00	2.328E-01	2.328E-01
PB-214	1.437E+00	2.201E-01	2.201E-01
RN-222	1.210E+00	2.328E-01	2.328E-01
RA-224	3.957E+00	1.211E+00	1.211E+00
RA-226	1.437E+00	2.201E-01	2.201E-01
AC-228	7.177E-01	3.457E-01	3.457E-01
RA-228	7.177E-01	3.457E-01	3.457E-01
TH-228	8.171E-01	1.371E-01	1.371E-01
TH-230	1.437E+00	2.201E-01	2.201E-01
PA-231	5.530E-01	6.637E-01	6.637E-01
TH-232	7.177E-01	3.457E-01	3.457E-01
TH-234	1.658E+00	1.135E+00	1.135E+00
U-234	1.437E+00	2.201E-01	2.201E-01
U-235	-1.861E-02	1.567E-01	1.567E-01
U-238	1.658E+00	1.135E+00	1.135E+00
AM-243	2.406E-01	5.346E-02	5.346E-02
ANH-511	3.497E-02	5.798E-02	5.798E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	8.689E-02	4.325E-01	4.342E-01	NOT IDENT.
NA-22	-1.155E-02	3.148E-02	3.191E-02	NOT IDENT.
NA-24	1.092E+21	1.380E+22	0.000E+00	SHORT HLIF

AL-26	6.230E-03	2.381E-02	2.398E-02	NOT IDENT.
SC-46	1.078E-02	5.153E-02	5.176E-02	FAIL ABUN
V-48	2.678E-01	4.559E-01	4.716E-01	FAIL ABUN
CR-51	-1.721E-01	7.807E-01	7.845E-01	NOT IDENT.
MN-52	1.026E+00	1.558E+01	1.558E+01	FAIL ABUN
MN-54	-2.614E-02	3.606E-02	3.793E-02	NOT IDENT.
CO-56	2.291E-03	4.316E-02	4.317E-02	FAIL ABUN
MN-56	1.000E+41	1.884E+42	0.000E+00	SHORT HLIF
CO-57	-4.654E-03	1.789E-02	1.801E-02	NOT IDENT.
CO-58	1.105E-02	4.691E-02	4.718E-02	NOT IDENT.
FE-59	3.118E-02	1.366E-01	1.374E-01	NOT IDENT.
CO-60	-2.382E-02	3.650E-02	3.805E-02	NOT IDENT.
ZN-65	-3.341E-02	6.599E-02	6.769E-02	NOT IDENT.
GE-68	-6.388E-01	1.043E+00	1.082E+00	NOT IDENT.
AS-74	-3.365E-01	2.982E-01	3.346E-01	NOT IDENT.
SE-75	-1.019E-02	4.277E-02	4.302E-02	NOT IDENT.
BR-77	2.444E+06	3.476E+06	3.647E+06	SHORT HLIF
SR-82	-4.011E-01	7.463E-01	7.679E-01	NOT IDENT.
RB-83	1.108E-01	1.058E-01	1.170E-01	FAIL ABUN
RB-84	-5.295E-02	1.318E-01	1.340E-01	NOT IDENT.
KR-85	4.137E+00	5.160E+00	5.487E+00	NOT IDENT.
SR-85	3.104E-02	3.898E-02	4.142E-02	NOT IDENT.
RB-86	-8.007E-01	2.227E+00	2.256E+00	NOT IDENT.
Y-88	3.169E-02	3.720E-02	3.985E-02	NOT IDENT.
Y-91	-8.913E+00	2.433E+01	2.466E+01	NOT IDENT.
NB-94	-1.313E-03	3.622E-02	3.623E-02	NOT IDENT.
NB-95	2.375E-02	5.474E-02	5.578E-02	NOT IDENT.
NB-95M	-1.987E-02	1.529E-01	1.532E-01	NOT IDENT.
ZR-95	-1.815E-02	8.002E-02	8.044E-02	NOT IDENT.
NB-97	-1.000E+41	2.418E+41	0.000E+00	SHORT HLIF
ZR-97	-8.342E+19	4.658E+20	0.000E+00	SHORT HLIF
MO-99	1.295E+04	5.203E+04	5.235E+04	SHORT HLIF
TC-99M	-1.000E+41	1.723E+41	0.000E+00	SHORT HLIF
RH-101	5.139E-04	2.292E-02	2.293E-02	NOT IDENT.
RH-102	1.374E-02	5.183E-02	5.219E-02	NOT IDENT.
RU-103	-2.773E-02	5.431E-02	5.573E-02	FAIL ABUN
RH-106	-7.471E-02	3.284E-01	3.302E-01	NOT IDENT.
RU-106	-7.471E-02	3.284E-01	3.302E-01	NOT IDENT.
AG-108M	-1.499E-02	2.282E-02	2.380E-02	NOT IDENT.
AG-110	-1.850E-01	7.557E-01	7.603E-01	NOT IDENT.
AG-110M	3.200E-03	5.383E-02	5.385E-02	NOT IDENT.
SN-113	-1.962E-02	4.664E-02	4.747E-02	NOT IDENT.
CD-115	-4.753E+04	3.347E+05	3.354E+05	SHORT HLIF
SN-117M	-6.010E-03	2.127E-01	2.127E-01	NOT IDENT.
SB-122	-3.029E+03	1.008E+04	1.017E+04	SHORT HLIF
TE-123M	-4.383E-03	2.526E-02	2.534E-02	NOT IDENT.
SB-124	-2.977E-02	7.334E-02	7.456E-02	NOT IDENT.
SB-125	-1.563E-02	7.798E-02	7.830E-02	NOT IDENT.
TE-125M	-2.081E+00	9.252E+00	9.299E+00	NOT IDENT.
I-126	5.639E-01	1.296E+00	1.321E+00	NOT IDENT.
SB-126	-2.705E-01	8.976E-01	9.058E-01	FAIL ABUN
SB-127	-3.473E+02	4.928E+02	5.171E+02	SHORT HLIF
I-131	-8.840E-01	1.596E+00	1.645E+00	NOT IDENT.
I-132	-1.000E+41	3.439E+41	0.000E+00	SHORT HLIF
TE-132	4.566E+02	9.080E+02	9.310E+02	SHORT HLIF
BA-133	2.763E-03	2.750E-02	2.753E-02	NOT IDENT.
I-133	1.818E+14	2.531E+15	2.533E+15	SHORT HLIF
CS-134	6.946E-02	3.746E-02	4.882E-02	FAIL ABUN
I-135	1.000E+41	1.987E+41	0.000E+00	SHORT HLIF
CS-136	-1.816E-01	4.724E-01	4.794E-01	FAIL ABUN
BA-137M	2.401E-02	3.478E-02	3.642E-02	NOT IDENT.
CS-137	2.536E-02	3.674E-02	3.848E-02	NOT IDENT.
LA-138	-1.120E-02	5.524E-02	5.547E-02	NOT IDENT.
CE-139	-3.320E-02	2.941E-02	3.300E-02	NOT IDENT.
BA-140	3.174E+00	2.683E+00	3.041E+00	FAIL ABUN
LA-140	-4.985E-02	4.923E-01	4.929E-01	NOT IDENT.
CE-141	-3.994E-02	9.328E-02	9.500E-02	NOT IDENT.
CE-143	1.492E+09	2.640E+09	2.724E+09	SHORT HLIF
CE-144	9.358E-02	1.585E-01	1.640E-01	NOT IDENT.
PM-144	-4.101E-02	3.780E-02	4.208E-02	NOT IDENT.
PR-144	-3.107E+00	2.881E+00	3.204E+00	NOT IDENT.
PM-146	3.392E-03	3.568E-02	3.571E-02	NOT IDENT.
ND-147	1.915E+00	3.660E+00	3.760E+00	FAIL ABUN
PM-147	-5.780E+01	5.005E+02	5.012E+02	NOT IDENT.
PM-149	-1.909E+06	2.915E+06	3.039E+06	SHORT HLIF
EU-150	2.428E-02	1.942E-02	2.229E-02	FAIL ABUN
EU-152	1.410E-02	7.042E-02	7.071E-02	NOT IDENT.
GD-153	-5.543E-02	5.328E-02	5.885E-02	NOT IDENT.

EU-154	-2.976E-02	8.831E-02	8.932E-02	NOT IDENT.
EU-155	4.982E-04	6.635E-02	6.635E-02	FAIL ABUN
TB-160	1.709E-01	1.505E-01	1.691E-01	FAIL ABUN
HO-166M	1.361E-02	5.255E-02	5.291E-02	NOT IDENT.
TM-171	3.997E+00	6.417E+00	6.665E+00	FAIL ABUN
HF-172	7.558E-02	1.323E-01	1.366E-01	FAIL ABUN
LU-172	-1.303E-02	5.424E-02	5.456E-02	FAIL ABUN
LU-176	6.068E-03	2.232E-02	2.248E-02	FAIL ABUN
HF-181	1.941E-02	6.195E-02	6.256E-02	NOT IDENT.
TA-182	7.915E-03	1.982E-01	1.982E-01	FAIL ABUN
RE-183	-1.545E-02	5.936E-02	5.977E-02	NOT IDENT.
RE-184	-1.592E-01	1.605E-01	1.758E-01	NOT IDENT.
W-188	8.593E+00	8.031E+00	8.916E+00	FAIL ABUN
IR-192	9.677E-03	4.102E-02	4.125E-02	FAIL ABUN
HG-203	-3.511E-02	5.684E-02	5.900E-02	NOT IDENT.
TL-204	6.970E-01	1.968E+00	1.993E+00	NOT IDENT.
BI-207	6.647E-03	4.585E-02	4.595E-02	FAIL ABUN
PB-211	-3.051E-01	5.780E-01	5.941E-01	NOT IDENT.
BI-213	2.155E-02	7.973E-02	8.032E-02	NOT IDENT.
RN-219	1.048E-01	3.252E-01	3.286E-01	FAIL ABUN
RA-223	3.748E-01	5.179E-01	5.448E-01	FAIL ABUN
AC-225	-1.429E+00	5.357E+00	5.395E+00	NOT IDENT.
AC-227	-1.366E-01	2.138E-01	2.225E-01	FAIL ABUN
TH-227	-1.366E-01	2.138E-01	2.225E-01	FAIL ABUN
TH-229	9.007E-03	4.067E-01	4.067E-01	FAIL ABUN
TH-231	3.748E-01	5.179E-01	5.448E-01	FAIL ABUN
PA-233	-2.776E-03	5.930E-02	5.931E-02	FAIL ABUN
PA-234	3.473E-02	2.099E-01	2.105E-01	NOT IDENT.
PA-234M	8.437E-01	4.272E+00	4.289E+00	NOT IDENT.
NP-237	-2.776E-03	5.930E-02	5.931E-02	FAIL ABUN
NP-238	1.133E+06	1.929E+06	1.996E+06	SHORT HLIF
NP-239	-1.157E-01	1.808E-01	1.881E-01	NOT IDENT.
PU-239	1.552E+02	2.472E+02	2.569E+02	FAIL ABUN
AM-241	1.875E-02	3.945E-02	4.035E-02	NOT IDENT.
CM-243	-5.717E-02	6.229E-02	6.741E-02	NOT IDENT.
BK-247	6.998E-03	6.139E-02	6.147E-02	NOT IDENT.
CM-247	-7.489E-03	2.902E-02	2.921E-02	NOT IDENT.
CF-249	2.890E-03	3.354E-02	3.356E-02	NOT IDENT.
CF-251	-8.917E-03	1.036E-01	1.037E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	36.5143	85.43	71.9070	131.20	67.2101
45.60	56.0296	86.55	72.1247	133.02	57.6748
46.54	56.2515	86.79	72.1704	133.52	52.8382
49.72	0.0000	86.94	72.1998	136.00	59.9743
51.35	52.3783	87.09	72.2292	136.47	60.0283
51.87	53.5341	87.57	72.3212	140.51	0.0000
52.39	49.6975	88.03	72.4100	143.76	63.8457
52.97	49.8080	88.34	72.4695	144.24	58.9100
53.44	49.8972	88.47	72.4945	145.44	60.0403
54.07	50.0160	89.96	72.7785	152.43	55.3907
57.36	0.0000	1093.63	72.9074	153.25	52.7649
57.53	66.7390	91.11	72.9962	323.87	52.8530
57.98	65.2359	92.59	73.2740	156.02	32.6270
59.27	57.1751	93.35	73.4160	158.56	46.0822
59.32	63.6589	94.56	73.6412	159.00	52.2654
59.54	63.7084	94.65	73.6575	162.33	61.8347
60.96	72.7057	94.67	73.6612	162.66	55.6817
61.17	72.7585	94.87	73.6982	163.33	48.5182
62.93	73.7430	97.43	60.2997	165.86	71.5279
63.29	73.8326	98.43	58.0298	176.31	57.9801
63.58	73.9045	98.44	54.4043	176.60	52.7336
64.28	74.0776	99.53	46.3662	177.52	55.9777
66.73	69.6977	100.11	51.8937	181.07	0.0000
67.24	65.3799	102.03	51.2183	181.52	40.3843
125.81	83.2283	103.18	61.4461	184.41	40.5623
67.75	83.2466	103.37	61.4737	143.76	40.6429
68.89	90.2335	105.21	58.0531	193.51	48.6887
69.67	90.4568	105.31	58.0666	197.03	41.3253
70.82	72.8486	106.12	60.9455	198.01	43.5614
70.83	82.9384	106.47	67.4640	201.83	41.6089
72.81	97.2585	109.28	59.5269	203.43	50.4824
72.87	97.2760	111.00	65.3596	205.31	52.8157
74.66	97.8025	111.76	0.0000	210.85	51.7424
74.82	97.8498	114.06	60.1626	215.65	34.2234
74.97	97.8937	116.30	0.0000	218.12	47.7728
77.11	98.5131	116.74	64.2958	222.11	52.9023
78.74	98.9799	119.76	51.3876	227.09	50.9793
79.69	100.1123	121.12	52.4890	227.38	50.9985
80.03	100.2079	121.22	52.4999	228.16	0.0000
80.12	100.2344	121.78	47.7829	228.18	41.9750
80.19	65.6842	122.06	51.6356	116.74	41.9750
80.57	65.7549	122.92	47.8962	235.69	48.8659
81.00	100.4849	123.07	40.2453	235.96	45.8270
81.07	100.5044	265.00	46.0525	238.63	50.5776
81.75	86.8073	125.81	46.2535	238.98	0.0000
82.47	71.3258	127.23	58.9495	240.99	50.7246
83.79	71.5861	127.91	64.8370	242.00	50.7877
84.00	71.6274	129.30	54.3423	244.70	46.3226

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	24.0050	563.25	22.1969
252.80	44.4350	345.93	26.6173	564.24	0.0000
254.15	0.0000	351.06	22.4289	569.33	18.2285
256.23	45.7885	351.93	22.4464	946.00	18.2307
260.90	0.0000	355.39	0.0000	569.70	17.2200
264.66	35.5664	356.01	15.5969	583.19	14.2962
264.80	35.5719	364.49	27.9375	584.27	10.7290
265.00	30.8361	366.42	0.0000	595.83	24.6914
269.46	29.7997	372.51	32.5293	427.87	18.5698
270.03	29.8187	375.05	21.1460	602.52	0.0000
271.23	29.8592	377.52	18.5421	604.72	21.7161
273.65	36.7255	356.01	31.0693	607.14	15.5331
276.40	30.0308	388.16	28.5091	609.32	18.6628
277.37	39.6830	388.63	34.7590	610.33	18.6738
277.60	40.8959	391.69	33.0608	614.28	14.0367
278.00	37.3035	264.66	23.4033	618.01	14.5879
279.20	48.1970	401.81	23.4255	620.36	15.6506
279.54	51.8302	402.40	26.1408	621.93	18.7969
279.70	48.2227	404.85	24.3864	630.19	0.0000
280.46	43.4366	410.95	14.9756	631.29	17.8460
283.69	36.3235	413.71	15.0085	633.25	25.2217
284.31	38.7715	414.70	15.0203	634.78	18.9324
285.41	27.9000	423.72	12.3764	635.95	17.8916
285.90	0.0000	427.09	28.4936	636.99	14.7428
287.50	26.7460	427.87	26.6718	657.50	21.2972
290.67	19.5176	433.94	24.9478	657.76	23.4305
293.27	0.0000	439.40	23.1954	657.90	0.0000
351.93	44.1244	440.45	18.5710	661.66	17.0762
295.96	44.1584	453.88	18.2880	664.57	0.0000
879.38	63.9574	463.37	21.7197	666.33	18.1884
299.98	44.3430	468.07	18.0031	666.50	18.1898
300.09	44.3474	473.00	0.0000	667.71	0.0000
300.13	44.3496	475.06	20.9495	677.62	23.6785
301.36	42.7610	476.78	14.3008	685.70	0.0000
302.85	26.3548	477.60	21.9406	692.65	0.0000
256.23	32.1739	482.18	18.1832	695.00	14.1177
304.85	38.3744	487.02	11.5227	696.49	30.4313
306.78	26.0468	492.35	0.0000	696.51	30.4313
308.46	32.3032	497.08	19.3376	697.00	26.0908
311.90	37.4011	505.52	29.1718	697.30	26.0947
316.51	30.0579	507.63	0.0000	697.49	26.0967
319.41	27.6316	511.00	18.5431	702.65	26.1655
320.08	35.1906	514.00	10.2679	706.68	22.9414
321.04	40.2559	514.00	10.2679	711.68	14.2378
323.87	28.5927	520.40	11.7842	720.70	19.8025
325.23	37.8937	520.69	0.0000	721.93	0.0000
328.76	26.1928	522.65	0.0000	722.78	16.5192
333.37	29.2785	527.90	0.0000	722.91	16.5204
333.97	14.0105	528.26	16.7793	723.31	18.1758
334.37	21.6609	529.59	16.7939	724.19	16.5308
338.28	28.9870	529.87	0.0000	727.33	11.0376
338.32	28.9884	531.02	11.8657	733.00	8.8545
311.90	30.7551	537.26	16.8769	735.93	14.4092
340.48	30.7551	546.56	0.0000	333.97	12.2013
340.55	30.7573	552.55	13.0302	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	13.3545	949.00	10.0329	1384.29	4.8122
747.24	16.7175	667.71	0.0000	1408.01	5.2982
748.06	15.6087	962.31	22.0034	1434.09	7.4708
752.31	15.6406	964.08	16.1471	1435.80	8.5420
753.82	13.4160	966.17	13.2218	1457.56	0.0000
756.73	12.3150	911.20	20.2215	1460.82	2.1499
756.80	12.3155	983.53	7.3943	1489.16	4.3323
884.68	16.8506	984.45	0.0000	1505.03	11.9634
765.81	11.8061	1274.44	12.0736	1584.12	11.0968
766.42	11.8091	1001.03	11.1647	1596.21	5.5649
766.84	12.3741	1002.74	13.9645	1620.50	1.1196
772.60	0.0000	1004.73	10.2484	1621.92	4.4802
776.52	16.9501	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.7328
778.90	13.5752	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	6.6014	1764.49	4.6323
788.74	20.4558	1038.76	0.0000	1063.66	0.0000
792.07	5.1216	631.29	9.4604	1771.35	4.6394
795.86	11.9714	1048.07	10.4119	1791.20	0.0000
810.06	6.8848	1049.04	13.2557	1808.65	1.8713
810.29	8.0331	1050.41	8.5259	1810.72	0.0000
344.28	8.0337	1063.66	11.4214	1836.06	0.9413
810.76	11.4783	1077.00	11.4756		
815.77	14.9551	1077.34	11.4763		
1048.07	13.8213	1085.87	15.3477		
832.01	13.9043	1093.63	11.5415		
834.85	18.5618	1099.45	11.5649		
835.71	16.2479	1112.07	6.7753		
836.80	0.0000	1112.84	7.7451		
846.75	0.0000	1115.54	7.7524		
846.77	10.4952	1120.29	9.7064		
856.80	7.0271	1120.55	9.7070		
860.56	5.6307	1221.41	9.7095		
871.09	10.6047	1129.67	17.5265		
873.19	8.8449	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	6.2075	1173.23	9.8779		
880.51	9.7593	1177.95	11.8718		
881.60	17.7521	1189.05	9.9286		
883.24	20.4289	1204.77	11.9736		
884.68	16.8865	1221.41	9.6293		
889.28	16.0280	1231.02	12.0732		
894.76	17.8491	1235.36	6.4477		
898.04	11.6178	1238.28	6.4535		
900.72	13.4198	1260.41	0.0000		
903.28	11.6424	1271.87	6.1128		
911.20	11.6801	1274.44	8.1567		
912.08	11.6844	1274.54	8.1567		
923.98	0.0000	1291.59	9.2236		
926.50	8.1362	1298.22	0.0000		
929.11	4.3438	1312.11	6.1864		
935.54	10.1613	1332.49	11.4095		
937.49	4.3582	1362.66	0.0000		
944.13	9.1034	1365.19	7.3290		
946.00	7.2881	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:48:23.74

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278008.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;914
Background date : 29-OCT-2023 11:32:18
Sample date     : 11-SEP-2023 13:00:00 Acquisition date : 30-OCT-2023 09:47:14
Sample ID      : G640278008 Sample quantity   : 1.26230E+02 GRAM
Detector name  : GAM11 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       : 2505440 Detector SN# :
Matrix Spike ID : LCS ID :
*****

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.35*	22	72	0.85	92.40	89	6	6.05E-03	67.9	
2	0	58.71	32	107	1.33	117.15	113	8	8.85E-03	59.1	
3	0	62.93*	52	141	1.18	125.59	121	10	1.43E-02	46.4	
4	2	74.63*	125	99	0.91	149.02	143	22	3.47E-02	14.8	1.11E+00
5	2	77.01*	205	83	0.87	153.79	143	22	5.70E-02	9.8	
6	2	80.90	31	92	1.20	161.58	143	22	8.71E-03	59.9	
7	0	83.77	43	87	1.07	167.32	165	6	1.19E-02	37.5	
8	3	87.17*	64	95	1.34	174.14	171	21	1.77E-02	27.6	1.32E+00
9	3	89.85	52	125	1.35	179.49	171	21	1.43E-02	41.1	
10	3	92.60*	90	122	1.36	185.01	171	21	2.51E-02	25.8	
11	0	108.40	26	85	1.07	216.63	213	7	7.29E-03	61.2	
12	0	143.18*	58	113	1.89	286.28	282	10	1.61E-02	37.5	
13	0	163.88*	16	87	1.50	327.73	324	8	4.56E-03	103.0	
14	0	185.82*	119	98	1.29	371.65	366	10	3.30E-02	18.8	
15	0	209.47	32	84	0.80	419.01	415	8	8.97E-03	52.6	
16	1	238.46*	341	62	1.13	477.06	470	25	9.47E-02	6.7	1.41E+00
17	1	241.44	98	69	1.34	483.01	470	25	2.72E-02	18.4	
18	0	271.10*	38	89	3.69	542.41	536	11	1.06E-02	51.5	
19	0	276.66	28	77	0.77	553.53	547	11	7.69E-03	64.3	
20	0	295.21*	185	55	1.27	590.68	584	11	5.15E-02	10.7	
21	0	299.98	20	42	0.69	600.22	597	7	5.56E-03	58.8	
22	0	328.40	17	42	1.06	657.12	653	8	4.67E-03	71.2	
23	0	338.28*	54	77	0.72	676.91	671	11	1.51E-02	34.6	
24	0	351.83*	310	50	1.06	704.03	699	10	8.62E-02	7.2	
25	0	463.50	15	26	0.58	927.59	924	9	4.15E-03	67.5	
26	0	510.89*	30	38	2.05	1022.46	1016	14	8.45E-03	57.3	
27	0	522.46	15	9	1.41	1045.62	1042	7	4.10E-03	44.1	
28	0	583.01*	117	16	1.86	1166.83	1159	13	3.25E-02	12.0	
29	0	609.09*	239	22	1.33	1219.04	1211	15	6.63E-02	8.0	
30	0	663.06	28	24	4.71	1327.07	1320	16	7.78E-03	43.4	
31	0	727.50	34	12	2.25	1456.06	1451	12	9.44E-03	26.6	
32	0	742.91	9	8	0.69	1486.90	1483	7	2.60E-03	60.8	
33	0	795.34	22	4	2.17	1591.84	1587	9	6.04E-03	27.7	
34	0	806.25	15	9	1.54	1613.68	1608	10	4.24E-03	45.9	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	845.24	14	15	1.56	1691.71	1687	15	3.89E-03	66.0	
36	0	861.20	14	11	1.57	1723.68	1716	11	4.01E-03	51.5	
37	0	880.74	8	9	0.96	1762.77	1754	11	2.30E-03	76.2	
38	0	911.56*	93	0	2.47	1824.47	1816	21	2.59E-02	10.9	
39	0	934.31*	14	10	1.16	1870.00	1864	10	3.94E-03	51.0	
40	0	948.67	10	2	1.89	1898.74	1895	7	2.86E-03	37.7	
41	0	969.00*	36	22	0.70	1939.43	1935	12	1.00E-02	30.9	
42	0	1120.45	60	13	1.85	2242.51	2234	17	1.65E-02	18.9	
43	0	1162.40	8	3	3.97	2326.47	2320	12	2.32E-03	53.5	
44	0	1237.99	31	0	1.38	2477.74	2470	14	8.61E-03	18.0	
45	0	1330.65	10	5	0.79	2663.15	2656	11	2.70E-03	56.4	
46	0	1378.35*	22	9	1.91	2758.60	2748	18	6.20E-03	38.6	
47	0	1460.91*	67	0	2.14	2923.81	2917	14	1.86E-02	12.8	
48	0	1509.18	12	2	0.72	3020.37	3016	9	3.24E-03	37.4	
49	0	1582.45	11	2	1.53	3166.98	3160	11	3.02E-03	41.7	
50	0	1630.56	13	4	3.27	3263.23	3255	13	3.47E-03	41.2	
51	0	1729.28*	20	0	1.92	3460.74	3454	13	5.65E-03	24.3	
52	0	1764.48*	50	4	1.82	3531.16	3523	17	1.40E-02	17.6	

Flag: "\*" = Peak area was modified by background subtraction



Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278008.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 11-SEP-2023 13:00:00 Acquisition date : 30-OCT-2023 09:47:14  
Sample ID : G640278008 Sample quantity : 126.23 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA11 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 : Empirical 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	64	10.66*	1.236E+00	2.874E+00	2.874E+00	25.64
RB-84	881.60	8	68.90*	1.913E+00	3.661E-02	1.028E-01	152.45
CD-109	88.03	72	3.70*	6.632E+00	1.738E+00	1.870E+00	55.15
TE-125M	109.28	29	0.27*	7.355E+00	8.748E+00	1.579E+01	122.33
SN-126	64.28	59	9.60	3.886E+00	9.412E-01	9.412E-01	92.85
	86.94	72	8.90	6.632E+00	7.224E-01	7.224E-01	55.15
	87.57	72	37.00*	6.632E+00	1.738E-01	1.738E-01	55.15
BA-137M	661.66	28	89.90*	2.436E+00	7.597E-02	7.621E-02	86.90
CS-137	661.66	28	85.10*	2.436E+00	8.026E-02	8.051E-02	86.90
TL-208	277.37	29	6.60	4.732E+00	5.554E-01	5.554E-01	128.59
	583.19	118	85.00*	2.704E+00	3.049E-01	3.049E-01	24.00
	860.56	14	12.50	1.951E+00	3.463E-01	3.463E-01	102.95
BI-210	46.54	25	4.25*	1.209E+00	2.936E+00	2.949E+00	135.74
PB-210	46.54	25	4.25*	1.209E+00	2.936E+00	2.949E+00	135.74
BI-211	72.87	-----	1.23	5.304E+00	-----	Line Not Found	-----
	351.06	323	12.92*	3.972E+00	3.738E+00	3.738E+00	14.43
BI-212	727.33	34	6.67*	2.255E+00	1.336E+00	1.336E+00	53.27
	1620.50	-----	1.47	1.146E+00	-----	Line Not Found	-----
PB-212	74.82	142	10.28	5.513E+00	1.489E+00	1.489E+00	29.65
	77.11	233	17.10	5.775E+00	1.401E+00	1.401E+00	19.68
	238.63	362	43.60*	5.259E+00	9.397E-01	9.397E-01	13.46
	300.09	21	3.30	4.463E+00	8.480E-01	8.480E-01	117.57
BI-214	609.32	240	45.49*	2.611E+00	1.201E+00	1.201E+00	15.97
	1120.29	58	14.92	1.545E+00	1.483E+00	1.483E+00	37.76
	1764.49	47	15.30	1.087E+00	1.692E+00	1.693E+00	35.23
PB-214	74.82	142	5.80	5.513E+00	2.639E+00	2.640E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.391E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
RN-222	609.32	240	45.49*	2.611E+00	1.201E+00	1.201E+00	15.97
	1120.29	58	14.92	1.545E+00	1.483E+00	1.483E+00	37.76
	1764.49	47	15.30	1.087E+00	1.692E+00	1.693E+00	35.23
RA-224	240.99	104	4.10*	5.214E+00	2.898E+00	2.898E+00	36.82
RA-226	74.82	142	5.80	5.513E+00	2.639E+00	2.640E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.391E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
AC-228	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----
	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----
	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
RA-228	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----
	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
	74.82	142	10.28	5.513E+00	1.489E+00	1.489E+00	29.65
	77.11	233	17.10	5.775E+00	1.401E+00	1.401E+00	19.68
	238.63	362	43.60*	5.259E+00	9.397E-01	9.397E-01	13.46
TH-230	300.09	21	3.30	4.463E+00	8.480E-01	8.480E-01	117.57
	74.82	142	5.80	5.513E+00	2.639E+00	2.639E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
PA-231	295.22	194	18.42	4.515E+00	1.390E+00	1.390E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
	283.69	-----	1.70	4.648E+00	-----	Line Not Found	-----
	301.36	21	5.35*	4.463E+00	5.231E-01	5.231E-01	117.57
	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----
TH-232	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----
	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
	63.29	59	3.70*	3.886E+00	2.442E+00	2.442E+00	92.85
TH-234	92.59	101	4.23	6.933E+00	2.053E+00	2.053E+00	51.52
	74.82	142	5.80	5.513E+00	2.639E+00	2.639E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
U-234	295.22	194	18.42	4.515E+00	1.390E+00	1.390E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
	89.96	58	3.47	6.792E+00	1.465E+00	1.465E+00	82.15
	93.35	101	5.60	6.933E+00	1.550E+00	1.550E+00	51.52
	143.76	63	10.96*	7.073E+00	4.868E-01	4.868E-01	74.99
U-235	163.33	18	5.08	6.657E+00	3.139E-01	3.139E-01	206.06
	185.72	128	57.20	6.201E+00	2.150E-01	2.150E-01	37.68
	205.31	-----	5.01	5.822E+00	-----	Line Not Found	-----
	63.29	59	3.70*	3.886E+00	2.442E+00	2.442E+00	92.85
	92.59	101	4.23	6.933E+00	2.053E+00	2.053E+00	51.52
AM-241	59.54	37	35.90*	3.193E+00	1.902E-01	1.902E-01	118.26
AM-243	43.53	-----	5.90	8.516E-01	-----	Line Not Found	-----
ANH-511	74.66	142	67.20*	5.513E+00	2.278E-01	2.278E-01	29.65
	511.00	31	100.00*	3.000E+00	6.126E-02	6.126E-02	114.59

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278008.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:14 Sensitivity      : 3.000
* Detector ID       : GAM11 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       : 11-SEP-2023 13:00:00 Analyst initials: MXR1
* Sample ID         : G640278008 Sample Quantity : 1.2623E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date    : 21-AUG-2023 09:01:46 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;21
*****

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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	2.874E+00	7.224E-01	5.030E-01
RB-84	1.028E-01	1.536E-01	2.115E-01
CD-109	1.870E+00	1.011E+00	9.573E-01
TE-125M	1.579E+01	1.892E+01	2.130E+01
SN-126	1.738E-01	9.391E-02	8.930E-02
BA-137M	7.621E-02	6.490E-02	5.629E-02
CS-137	8.051E-02	6.856E-02	5.946E-02
TL-208	3.049E-01	7.170E-02	5.098E-02
BI-210	2.949E+00	3.923E+00	3.985E+00
PB-210	2.949E+00	3.923E+00	3.985E+00
BI-211	3.738E+00	5.285E-01	3.499E-01
BI-212	1.336E+00	6.972E-01	7.998E-01
PB-212	9.397E-01	1.239E-01	9.218E-02
BI-214	1.201E+00	1.879E-01	1.124E-01
PB-214	1.357E+00	1.918E-01	1.273E-01
RN-222	1.201E+00	1.879E-01	1.124E-01
RA-224	2.898E+00	1.046E+00	9.880E-01
RA-226	1.357E+00	1.918E-01	1.273E-01
AC-228	1.133E+00	2.412E-01	1.714E-01
RA-228	1.133E+00	2.412E-01	1.714E-01
TH-228	9.397E-01	1.239E-01	9.218E-02
TH-230	1.357E+00	1.918E-01	1.272E-01
PA-231	5.231E-01	6.027E-01	7.145E-01
TH-232	1.133E+00	2.412E-01	1.714E-01
TH-234	2.442E+00	2.222E+00	1.662E+00
U-234	1.357E+00	1.918E-01	1.272E-01
U-235	4.868E-01	3.578E-01	3.138E-01
U-238	2.442E+00	2.222E+00	1.662E+00
AM-241	1.902E-01	2.205E-01	1.802E-01
AM-243	2.278E-01	6.619E-02	7.112E-02
ANH-511	6.126E-02	6.880E-02	4.807E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )
---------	-------------------------------------	------	----------------------------	--------------------

BE-7	-1.267E-01	4.401E-01	8.077E-01	NOT IDENT.
NA-22	3.061E-02	3.189E-02	7.784E-02	NOT IDENT.
NA-24	0.000E+00	1.232E+22	0.000E+00	SHORT HLIF
AL-26	8.360E-04	2.604E-02	5.965E-02	NOT IDENT.
SC-46	1.707E-02	3.023E-02	7.243E-02	FAIL ABUN
V-48	-4.868E-02	2.440E-01	4.757E-01	NOT IDENT.
CR-51	2.601E-01	7.426E-01	1.487E+00	NOT IDENT.
MN-52	-2.389E+00	1.535E+01	2.957E+01	FAIL ABUN
MN-54	-2.716E-02	3.220E-02	5.561E-02	NOT IDENT.
CO-56	-1.073E-02	4.460E-02	8.638E-02	FAIL ABUN
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.244E-02	2.201E-02	4.260E-02	NOT IDENT.
CO-58	1.408E-02	4.166E-02	8.305E-02	NOT IDENT.
FE-59	-2.882E-02	1.047E-01	2.023E-01	NOT IDENT.
CO-60	7.550E-03	4.425E-02	7.983E-02	NOT IDENT.
ZN-65	2.265E-02	7.482E-02	1.455E-01	NOT IDENT.
GE-68	-8.432E-01	1.061E+00	1.776E+00	NOT IDENT.
AS-73	2.824E-01	8.415E-01	1.653E+00	NOT IDENT.
AS-74	7.259E-02	3.473E-01	6.662E-01	NOT IDENT.
SE-75	-7.440E-04	4.811E-02	9.319E-02	NOT IDENT.
BR-77	0.000E+00	3.640E+05	0.000E+00	SHORT HLIF
SR-82	-1.661E-01	7.037E-01	1.369E+00	NOT IDENT.
RB-83	4.963E-03	8.293E-02	1.447E-01	NOT IDENT.
KR-85	1.344E+00	6.712E+00	1.179E+01	NOT IDENT.
SR-85	1.005E-02	5.071E-02	8.904E-02	NOT IDENT.
RB-86	-1.347E+00	2.232E+00	3.938E+00	NOT IDENT.
Y-88	9.944E-03	4.493E-02	1.020E-01	NOT IDENT.
Y-91	6.525E+00	2.530E+01	5.224E+01	NOT IDENT.
NB-94	-1.336E-02	2.934E-02	5.066E-02	NOT IDENT.
NB-95	-1.589E-02	6.027E-02	1.143E-01	NOT IDENT.
NB-95M	-1.111E-02	1.671E-01	2.903E-01	NOT IDENT.
ZR-95	4.822E-02	7.855E-02	1.751E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.942E+20	0.000E+00	SHORT HLIF
MO-99	0.000E+00	5.890E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.831E-02	3.072E-02	5.299E-02	NOT IDENT.
RH-102	-2.192E-02	5.263E-02	9.233E-02	NOT IDENT.
RU-103	-1.546E-02	5.819E-02	1.078E-01	FAIL ABUN
RH-106	-2.522E-01	3.021E-01	4.893E-01	NOT IDENT.
RU-106	-2.522E-01	3.021E-01	4.893E-01	NOT IDENT.
AG-108M	-9.948E-03	2.781E-02	5.064E-02	NOT IDENT.
AG-110	1.703E-01	8.359E-01	1.452E+00	NOT IDENT.
AG-110M	4.004E-02	3.561E-02	8.842E-02	NOT IDENT.
SN-113	-4.656E-03	4.153E-02	7.977E-02	NOT IDENT.
CD-115	0.000E+00	3.231E+05	0.000E+00	SHORT HLIF
SN-117M	1.054E-02	2.588E-01	4.667E-01	NOT IDENT.
SB-122	0.000E+00	1.082E+04	0.000E+00	SHORT HLIF
TE-123M	-8.412E-03	3.001E-02	5.234E-02	NOT IDENT.
SB-124	-3.550E-02	9.556E-02	2.173E-01	NOT IDENT.
SB-125	6.268E-04	8.719E-02	1.662E-01	FAIL ABUN
I-126	8.614E-01	1.272E+00	2.446E+00	NOT IDENT.
SB-126	2.268E-01	8.486E-01	1.664E+00	NOT IDENT.
SB-127	0.000E+00	4.605E+02	0.000E+00	SHORT HLIF
I-131	6.185E-01	2.028E+00	3.998E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	1.028E+03	0.000E+00	SHORT HLIF
BA-133	-4.918E-02	4.507E-02	6.485E-02	FAIL ABUN
I-133	0.000E+00	2.391E+15	0.000E+00	SHORT HLIF
CS-134	7.476E-02	4.053E-02	9.301E-02	FAIL ABUN
I-135	0.000E+00	1.056E+41	0.000E+00	SHORT HLIF
CS-136	-1.570E-01	5.539E-01	1.045E+00	NOT IDENT.
LA-138	1.083E-02	5.537E-02	1.152E-01	NOT IDENT.
CE-139	6.063E-03	3.393E-02	5.728E-02	NOT IDENT.
BA-140	1.181E-01	1.609E+00	3.064E+00	FAIL ABUN
LA-140	-2.723E-01	5.583E-01	1.046E+00	FAIL ABUN
CE-141	1.000E-02	1.121E-01	1.899E-01	NOT IDENT.
CE-143	0.000E+00	2.994E+09	0.000E+00	SHORT HLIF
CE-144	1.058E-01	1.853E-01	3.539E-01	FAIL ABUN
PM-144	1.492E-02	2.999E-02	6.160E-02	NOT IDENT.
PR-144	1.162E+00	2.289E+00	4.707E+00	NOT IDENT.
PM-146	9.496E-03	4.134E-02	8.041E-02	NOT IDENT.
ND-147	1.166E-01	4.063E+00	7.805E+00	FAIL ABUN
PM-147	9.673E+01	5.867E+02	1.100E+03	NOT IDENT.
PM-149	0.000E+00	3.048E+06	0.000E+00	SHORT HLIF
EU-150	-1.845E-02	2.517E-02	3.885E-02	FAIL ABUN
EU-152	-1.900E-02	8.570E-02	1.548E-01	NOT IDENT.

GD-153	2.245E-02	8.710E-02	1.522E-01	NOT IDENT.
EU-154	8.526E-02	8.881E-02	2.168E-01	NOT IDENT.
EU-155	1.892E-02	9.285E-02	1.622E-01	FAIL ABUN
TB-160	1.339E-01	2.001E-01	3.277E-01	FAIL ABUN
HO-166M	-2.838E-02	5.433E-02	9.241E-02	FAIL ABUN
TM-171	2.436E+00	1.301E+01	2.541E+01	NOT IDENT.
HF-172	-4.574E-02	1.671E-01	2.979E-01	FAIL ABUN
LU-172	-3.561E-02	5.236E-02	9.040E-02	FAIL ABUN
LU-176	-7.321E-03	2.094E-02	3.933E-02	FAIL ABUN
HF-181	-2.659E-02	7.442E-02	1.343E-01	FAIL ABUN
TA-182	1.654E-01	1.640E-01	3.916E-01	FAIL ABUN
RE-183	3.230E-01	3.744E-01	3.973E-01	FAIL ABUN
RE-184	5.872E-02	2.115E-01	4.309E-01	NOT IDENT.
W-188	3.975E+00	8.964E+00	1.665E+01	FAIL ABUN
IR-192	1.071E-02	4.055E-02	8.070E-02	FAIL ABUN
HG-203	-7.489E-03	6.571E-02	1.120E-01	NOT IDENT.
TL-204	-2.135E+00	4.247E+00	7.056E+00	FAIL ABUN
BI-207	1.914E-02	4.874E-02	1.019E-01	FAIL ABUN
PB-211	-2.458E-01	6.303E-01	1.150E+00	NOT IDENT.
BI-213	6.201E-02	9.135E-02	1.894E-01	NOT IDENT.
RN-219	3.961E-02	3.632E-01	7.038E-01	FAIL ABUN
RA-223	-3.726E-01	6.432E-01	1.023E+00	FAIL ABUN
AC-225	-4.656E-01	5.568E+00	9.765E+00	NOT IDENT.
AC-227	9.972E-02	2.098E-01	4.265E-01	FAIL ABUN
TH-227	9.972E-02	2.098E-01	4.265E-01	FAIL ABUN
TH-229	6.076E-02	5.115E-01	9.148E-01	FAIL ABUN
TH-231	-3.726E-01	6.432E-01	1.023E+00	FAIL ABUN
PA-233	-1.518E-02	4.962E-02	9.378E-02	FAIL ABUN
PA-234	5.862E-02	2.486E-01	4.771E-01	FAIL ABUN
PA-234M	-1.927E+00	4.210E+00	7.972E+00	NOT IDENT.
NP-237	-1.518E-02	4.962E-02	9.378E-02	FAIL ABUN
NP-238	0.000E+00	9.018E+05	0.000E+00	SHORT HLIF
NP-239	8.832E-02	2.192E-01	4.172E-01	FAIL ABUN
PU-239	2.211E+02	3.306E+02	6.276E+02	NOT IDENT.
CM-243	-8.837E-02	8.795E-02	1.483E-01	FAIL ABUN
BK-247	3.486E-02	7.134E-02	1.394E-01	FAIL ABUN
CM-247	-8.353E-03	3.462E-02	6.420E-02	FAIL ABUN
CF-249	-4.140E-03	3.007E-02	5.763E-02	NOT IDENT.
CF-251	3.313E-02	1.211E-01	2.214E-01	NOT IDENT.

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	64	10.66*	1.236E+00	2.874E+00	2.874E+00	25.64
RB-84	881.60	8	68.90*	1.913E+00	3.661E-02	1.028E-01	152.45
CD-109	88.03	72	3.70*	6.632E+00	1.738E+00	1.870E+00	55.15
TE-125M	109.28	29	0.27*	7.355E+00	8.748E+00	1.579E+01	122.33
SN-126	64.28	59	9.60	3.886E+00	9.412E-01	9.412E-01	92.85
	86.94	72	8.90	6.632E+00	7.224E-01	7.224E-01	55.15
	87.57	72	37.00*	6.632E+00	1.738E-01	1.738E-01	55.15
BA-137M	661.66	28	89.90*	2.436E+00	7.597E-02	7.621E-02	86.90
CS-137	661.66	28	85.10*	2.436E+00	8.026E-02	8.051E-02	86.90
TL-208	277.37	29	6.60	4.732E+00	5.554E-01	5.554E-01	128.59
	583.19	118	85.00*	2.704E+00	3.049E-01	3.049E-01	24.00
	860.56	14	12.50	1.951E+00	3.463E-01	3.463E-01	102.95
BI-210	46.54	25	4.25*	1.209E+00	2.936E+00	2.949E+00	135.74
PB-210	46.54	25	4.25*	1.209E+00	2.936E+00	2.949E+00	135.74
BI-211	72.87	-----	1.23	5.304E+00	-----	Line Not Found	-----
	351.06	323	12.92*	3.972E+00	3.738E+00	3.738E+00	14.43
BI-212	727.33	34	6.67*	2.255E+00	1.336E+00	1.336E+00	53.27
	1620.50	-----	1.47	1.146E+00	-----	Line Not Found	-----
PB-212	74.82	142	10.28	5.513E+00	1.489E+00	1.489E+00	29.65
	77.11	233	17.10	5.775E+00	1.401E+00	1.401E+00	19.68
	238.63	362	43.60*	5.259E+00	9.397E-01	9.397E-01	13.46
	300.09	21	3.30	4.463E+00	8.480E-01	8.480E-01	117.57
BI-214	609.32	240	45.49*	2.611E+00	1.201E+00	1.201E+00	15.97
	1120.29	58	14.92	1.545E+00	1.483E+00	1.483E+00	37.76
	1764.49	47	15.30	1.087E+00	1.692E+00	1.693E+00	35.23
PB-214	74.82	142	5.80	5.513E+00	2.639E+00	2.640E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.391E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
RN-222	609.32	240	45.49*	2.611E+00	1.201E+00	1.201E+00	15.97
	1120.29	58	14.92	1.545E+00	1.483E+00	1.483E+00	37.76
	1764.49	47	15.30	1.087E+00	1.692E+00	1.693E+00	35.23
RA-224	240.99	104	4.10*	5.214E+00	2.898E+00	2.898E+00	36.82
RA-226	74.82	142	5.80	5.513E+00	2.639E+00	2.640E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.391E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
AC-228	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----
	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----
	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
RA-228	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----
	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
TH-228	74.82	142	10.28	5.513E+00	1.489E+00	1.489E+00	29.65
	77.11	233	17.10	5.775E+00	1.401E+00	1.401E+00	19.68
	238.63	362	43.60*	5.259E+00	9.397E-01	9.397E-01	13.46
	300.09	21	3.30	4.463E+00	8.480E-01	8.480E-01	117.57
TH-230	74.82	142	5.80	5.513E+00	2.639E+00	2.639E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.390E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
PA-231	283.69	-----	1.70	4.648E+00	-----	Line Not Found	-----
	301.36	21	5.35*	4.463E+00	5.231E-01	5.231E-01	117.57
TH-232	105.21	-----	1.10	7.313E+00	-----	Line Not Found	-----
	338.32	57	11.27	4.088E+00	7.325E-01	7.325E-01	69.10
	835.71	-----	1.61	2.002E+00	-----	Line Not Found	-----
	911.20	91	25.80*	1.856E+00	1.133E+00	1.133E+00	21.74
	968.97	35	15.80	1.758E+00	7.534E-01	7.534E-01	61.89
TH-234	63.29	59	3.70*	3.886E+00	2.442E+00	2.442E+00	92.85
	92.59	101	4.23	6.933E+00	2.053E+00	2.053E+00	51.52
U-234	74.82	142	5.80	5.513E+00	2.639E+00	2.639E+00	29.65
	77.11	233	9.70	5.775E+00	2.470E+00	2.470E+00	19.68
	87.09	72	3.41	6.632E+00	1.885E+00	1.885E+00	55.15
	242.00	104	7.25	5.214E+00	1.639E+00	1.639E+00	36.82
	295.22	194	18.42	4.515E+00	1.390E+00	1.390E+00	21.39
	351.93	323	35.60*	3.972E+00	1.357E+00	1.357E+00	14.43
U-235	89.96	58	3.47	6.792E+00	1.465E+00	1.465E+00	82.15
	93.35	101	5.60	6.933E+00	1.550E+00	1.550E+00	51.52
	143.76	63	10.96*	7.073E+00	4.868E-01	4.868E-01	74.99
	163.33	18	5.08	6.657E+00	3.139E-01	3.139E-01	206.06
	185.72	128	57.20	6.201E+00	2.150E-01	2.150E-01	37.68
	205.31	-----	5.01	5.822E+00	-----	Line Not Found	-----
U-238	63.29	59	3.70*	3.886E+00	2.442E+00	2.442E+00	92.85
	92.59	101	4.23	6.933E+00	2.053E+00	2.053E+00	51.52
AM-241	59.54	37	35.90*	3.193E+00	1.902E-01	1.902E-01	118.26
AM-243	43.53	-----	5.90	8.516E-01	-----	Line Not Found	-----
	74.66	142	67.20*	5.513E+00	2.278E-01	2.278E-01	29.65
ANH-511	511.00	31	100.00*	3.000E+00	6.126E-02	6.126E-02	114.59

Flag: "\*" = Keyline



Total number of lines in spectrum 52  
 Number of unidentified lines 9  
 Number of lines tentatively identified by NID 43 82.69%

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	2.874E+00	2.874E+00	0.737E+00	25.64	
RB-84	32.82D	2.81	3.661E-02	1.028E-01	1.567E-01	152.45	
CD-109	461.40D	1.08	1.738E+00	1.870E+00	1.031E+00	55.15	
TE-125M	57.40D	1.80	8.748E+00	1.579E+01	1.931E+01	122.33	
SN-126	2.30E+05Y	1.00	1.738E-01	1.738E-01	0.958E-01	55.15	
BA-137M	30.08Y	1.00	7.597E-02	7.621E-02	6.622E-02	86.90	
CS-137	30.08Y	1.00	8.026E-02	8.051E-02	6.996E-02	86.90	
TL-208	1.41E+10Y	1.00	3.049E-01	3.049E-01	0.732E-01	24.00	
BI-210	22.20Y	1.00	2.936E+00	2.949E+00	4.003E+00	135.74	
PB-210	22.20Y	1.00	2.936E+00	2.949E+00	4.003E+00	135.74	
BI-211	7.04E+08Y	1.00	3.738E+00	3.738E+00	0.539E+00	14.43	
BI-212	1.41E+10Y	1.00	1.336E+00	1.336E+00	0.711E+00	53.27	
PB-212	1.41E+10Y	1.00	9.397E-01	9.397E-01	1.265E-01	13.46	
BI-214	1600.00Y	1.00	1.201E+00	1.201E+00	0.192E+00	15.97	
PB-214	1600.00Y	1.00	1.357E+00	1.357E+00	0.196E+00	14.43	
RN-222	1600.00Y	1.00	1.201E+00	1.201E+00	0.192E+00	15.97	
RA-224	1.41E+10Y	1.00	2.898E+00	2.898E+00	1.067E+00	36.82	
RA-226	1600.00Y	1.00	1.357E+00	1.357E+00	0.196E+00	14.43	
AC-228	1.41E+10Y	1.00	1.133E+00	1.133E+00	0.246E+00	21.74	
RA-228	1.41E+10Y	1.00	1.133E+00	1.133E+00	0.246E+00	21.74	
TH-228	1.41E+10Y	1.00	9.397E-01	9.397E-01	1.265E-01	13.46	
TH-230	7.54E+04Y	1.00	1.357E+00	1.357E+00	0.196E+00	14.43	
PA-231	7.04E+08Y	1.00	5.231E-01	5.231E-01	6.150E-01	117.57	
TH-232	1.41E+10Y	1.00	1.133E+00	1.133E+00	0.246E+00	21.74	
TH-234	4.47E+09Y	1.00	2.442E+00	2.442E+00	2.267E+00	92.85	
U-234	2.45E+05Y	1.00	1.357E+00	1.357E+00	0.196E+00	14.43	
U-235	7.04E+08Y	1.00	4.868E-01	4.868E-01	3.651E-01	74.99	
U-238	4.47E+09Y	1.00	2.442E+00	2.442E+00	2.267E+00	92.85	
AM-241	432.60Y	1.00	1.902E-01	1.902E-01	2.250E-01	118.26	
AM-243	7370.00Y	1.00	2.278E-01	2.278E-01	0.675E-01	29.65	
ANH-511	1.00E+09Y	1.00	6.126E-02	6.126E-02	7.020E-02	114.59	
Total Activity :			4.735E+01	5.462E+01			

Grand Total Activity : 4.735E+01 5.462E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	80.90	35	104	1.20	161.58	143	22	8.71E-03	****	6.15E+00	T
0	83.77	48	98	1.07	167.32	165	6	1.19E-02	75.0	6.39E+00	T
0	209.47	35	90	0.80	419.01	415	8	8.97E-03	****	5.75E+00	T
0	271.10	40	94	3.69	542.41	536	11	1.06E-02	****	4.80E+00	T
0	328.40	18	44	1.06	657.12	653	8	4.67E-03	****	4.18E+00	T
0	463.50	15	27	0.58	927.59	924	9	4.15E-03	****	3.23E+00	T
0	522.46	15	9	1.41	1045.62	1042	7	4.10E-03	88.3	2.95E+00	T
0	742.91	9	8	0.69	1486.90	1483	7	2.60E-03	****	2.22E+00	T
0	795.34	21	4	2.17	1591.84	1587	9	6.04E-03	55.3	2.09E+00	T
0	806.25	15	9	1.54	1613.68	1608	10	4.24E-03	91.8	2.07E+00	
0	845.24	14	15	1.56	1691.71	1687	15	3.89E-03	****	1.98E+00	
0	934.31	14	10	1.16	1870.00	1864	10	3.94E-03	****	1.82E+00	T
0	948.67	10	2	1.89	1898.74	1895	7	2.86E-03	75.4	1.79E+00	T
0	1162.40	8	3	3.97	2326.47	2320	12	2.32E-03	****	1.50E+00	
0	1237.99	30	0	1.38	2477.74	2470	14	8.61E-03	35.9	1.42E+00	T
0	1330.65	9	5	0.79	2663.15	2656	11	2.70E-03	****	1.33E+00	
0	1378.35	21	8	1.91	2758.60	2748	18	6.20E-03	77.1	1.29E+00	
0	1509.18	11	2	0.72	3020.37	3016	9	3.24E-03	74.8	1.21E+00	
0	1582.45	10	2	1.53	3166.98	3160	11	3.02E-03	83.3	1.17E+00	
0	1630.56	12	3	3.27	3263.23	3255	13	3.47E-03	82.5	1.14E+00	
0	1729.28	19	0	1.92	3460.74	3454	13	5.65E-03	48.5	1.10E+00	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278008.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:14 Sensitivity      : 3.000
* Detector ID        : GAM11 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        : 11-SEP-2023 13:00:00 Nuclide Library : SOLID
* Sample ID          : G640278008 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.2623E+02 GRAM
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date     : 21-AUG-2023 09:01:46 Eff. Geometry   : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;21
*****

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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	1.905E-01
RB-84	8.847E-02
CD-109	4.424E-01
TE-125M	9.898E+00
SN-126	4.127E-02
BA-137M	2.443E-02
CS-137	2.581E-02
TL-208	2.195E-02
BI-210	1.832E+00
PB-210	1.832E+00
BI-211	1.590E-01
BI-212	3.460E-01
PB-212	4.250E-02
BI-214	4.936E-02
PB-214	5.784E-02
RN-222	4.936E-02
RA-224	4.556E-01
RA-226	5.784E-02
AC-228	6.882E-02
RA-228	6.882E-02
TH-228	4.250E-02
TH-230	5.784E-02
PA-231	3.228E-01
TH-232	6.882E-02
TH-234	7.739E-01
U-234	5.784E-02
U-235	1.462E-01
U-238	7.739E-01
AM-241	8.311E-02
AM-243	3.331E-02
ANH-511	2.132E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )
---------	-------------------

BE-7	3.572E-01	NOT IDENT.
NA-22	3.288E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.233E-02	NOT IDENT.
SC-46	2.982E-02	FAIL ABUN
V-48	1.990E-01	NOT IDENT.
CR-51	6.775E-01	NOT IDENT.
MN-52	1.204E+01	FAIL ABUN
MN-54	2.330E-02	NOT IDENT.
CO-56	3.685E-02	FAIL ABUN
MN-56	0.000E+00	SHORT HLIF
CO-57	1.981E-02	NOT IDENT.
CO-58	3.513E-02	NOT IDENT.
FE-59	8.169E-02	NOT IDENT.
CO-60	3.377E-02	NOT IDENT.
ZN-65	6.096E-02	NOT IDENT.
GE-68	7.105E-01	NOT IDENT.
AS-73	7.728E-01	NOT IDENT.
AS-74	2.982E-01	NOT IDENT.
SE-75	4.281E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.885E-01	NOT IDENT.
RB-83	6.328E-02	NOT IDENT.
KR-85	5.261E+00	NOT IDENT.
SR-85	3.973E-02	NOT IDENT.
RB-86	1.610E+00	NOT IDENT.
Y-88	4.056E-02	NOT IDENT.
Y-91	2.231E+01	NOT IDENT.
NB-94	2.183E-02	NOT IDENT.
NB-95	5.076E-02	NOT IDENT.
NB-95M	1.345E-01	NOT IDENT.
ZR-95	7.598E-02	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	2.479E-02	NOT IDENT.
RH-102	4.030E-02	NOT IDENT.
RU-103	4.695E-02	FAIL ABUN
RH-106	2.097E-01	NOT IDENT.
RU-106	2.097E-01	NOT IDENT.
AG-108M	2.267E-02	NOT IDENT.
AG-110	6.420E-01	NOT IDENT.
AG-110M	3.752E-02	NOT IDENT.
SN-113	3.528E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.163E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.424E-02	NOT IDENT.
SB-124	8.207E-02	NOT IDENT.
SB-125	7.484E-02	FAIL ABUN
I-126	1.083E+00	NOT IDENT.
SB-126	7.290E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.823E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.904E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.177E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	4.418E-01	NOT IDENT.
LA-138	4.780E-02	NOT IDENT.
CE-139	2.665E-02	NOT IDENT.
BA-140	1.367E+00	FAIL ABUN
LA-140	4.192E-01	FAIL ABUN
CE-141	8.804E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.654E-01	FAIL ABUN
PM-144	2.697E-02	NOT IDENT.
PR-144	2.062E+00	NOT IDENT.
PM-146	3.632E-02	NOT IDENT.
ND-147	3.435E+00	FAIL ABUN
PM-147	5.090E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.735E-02	FAIL ABUN
EU-152	6.975E-02	NOT IDENT.
GD-153	7.150E-02	NOT IDENT.

EU-154	9.158E-02	NOT IDENT.
EU-155	7.560E-02	FAIL ABUN
TB-160	1.414E-01	FAIL ABUN
HO-166M	3.968E-02	FAIL ABUN
TM-171	1.183E+01	NOT IDENT.
HF-172	1.385E-01	FAIL ABUN
LU-172	3.667E-02	FAIL ABUN
LU-176	1.767E-02	FAIL ABUN
HF-181	5.997E-02	FAIL ABUN
TA-182	1.678E-01	FAIL ABUN
RE-183	1.857E-01	FAIL ABUN
RE-184	1.859E-01	NOT IDENT.
W-188	7.598E+00	FAIL ABUN
IR-192	3.670E-02	FAIL ABUN
HG-203	5.159E-02	NOT IDENT.
TL-204	3.313E+00	FAIL ABUN
BI-207	4.424E-02	FAIL ABUN
PB-211	5.149E-01	NOT IDENT.
BI-213	8.537E-02	NOT IDENT.
RN-219	3.175E-01	FAIL ABUN
RA-223	4.630E-01	FAIL ABUN
AC-225	4.500E+00	NOT IDENT.
AC-227	1.960E-01	FAIL ABUN
TH-227	1.960E-01	FAIL ABUN
TH-229	4.266E-01	FAIL ABUN
TH-231	4.630E-01	FAIL ABUN
PA-233	4.198E-02	FAIL ABUN
PA-234	2.010E-01	FAIL ABUN
PA-234M	3.423E+00	NOT IDENT.
NP-237	4.198E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	1.945E-01	FAIL ABUN
PU-239	2.958E+02	NOT IDENT.
CM-243	6.869E-02	FAIL ABUN
BK-247	6.409E-02	FAIL ABUN
CM-247	2.895E-02	FAIL ABUN
CF-249	2.546E-02	NOT IDENT.
CF-251	1.032E-01	NOT IDENT.

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*****
*                                     GEL Laboratories LLC                       *
*                                     2040 Savage Road                          *
*                                     Charleston, SC 29407                       *
*****
*                                     DETECTOR AND SAMPLE DATA                 *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278008.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:14 Sensitivity      : 3.000
* Detector ID       : GAM11 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       : 11-SEP-2023 13:00:00 Nuclide Library : SOLID
* Sample ID        : G640278008 Analyst initials: MXR1
* Batch Number     : 2505440 Sample Quantity : 1.2623E+02 GRAM
* Wet wt corr      : 1.00000 Quantity Err(%) : 1.5844E-03 %
* Wet Weight       : 0.00000
* Dry Weight       : 0.00000
*****
*                                     CALIBRATION INFORMATION                   *
*
* Eff. Cal. date    : 21-AUG-2023 09:01:46 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM11_CAN.CNF;21
*****

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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	2.874E+00	7.689E-01	7.689E-01
RB-84	1.028E-01	1.539E-01	1.539E-01
CD-109	1.870E+00	1.039E+00	1.039E+00
TE-125M	1.579E+01	1.897E+01	1.897E+01
SN-126	1.738E-01	9.610E-02	9.610E-02
BA-137M	7.621E-02	6.538E-02	6.538E-02
CS-137	8.051E-02	6.906E-02	6.906E-02
TL-208	3.049E-01	7.793E-02	7.793E-02
BI-210	2.949E+00	3.934E+00	3.934E+00
PB-210	2.949E+00	3.934E+00	3.934E+00
BI-211	3.738E+00	6.110E-01	6.110E-01
BI-212	1.336E+00	7.113E-01	7.113E-01
PB-212	9.397E-01	1.464E-01	1.464E-01
BI-214	1.201E+00	2.239E-01	2.239E-01
PB-214	1.357E+00	2.207E-01	2.207E-01
RN-222	1.201E+00	2.239E-01	2.239E-01
RA-224	2.898E+00	1.073E+00	1.073E+00
RA-226	1.357E+00	2.207E-01	2.207E-01
AC-228	1.133E+00	2.649E-01	2.649E-01
RA-228	1.133E+00	2.649E-01	2.649E-01
TH-228	9.397E-01	1.464E-01	1.464E-01
TH-230	1.357E+00	2.206E-01	2.206E-01
PA-231	5.231E-01	6.137E-01	6.137E-01
TH-232	1.133E+00	2.649E-01	2.649E-01
TH-234	2.442E+00	2.296E+00	2.296E+00
U-234	1.357E+00	2.206E-01	2.206E-01
U-235	4.868E-01	3.599E-01	3.599E-01
U-238	2.442E+00	2.296E+00	2.296E+00
AM-241	1.902E-01	2.214E-01	2.214E-01
AM-243	2.278E-01	7.046E-02	7.046E-02
ANH-511	6.126E-02	6.904E-02	6.904E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)
---------	-------------------------------------	-------------------------------	---------------------

BE-7	-1.267E-01	4.402E-01	4.439E-01	NOT IDENT.
NA-22	3.061E-02	3.199E-02	3.484E-02	NOT IDENT.
NA-24	6.700E+21	1.234E+22	0.000E+00	SHORT HLIF
AL-26	8.360E-04	2.604E-02	2.605E-02	NOT IDENT.
SC-46	1.707E-02	3.027E-02	3.123E-02	FAIL ABUN
V-48	-4.868E-02	2.441E-01	2.450E-01	NOT IDENT.
CR-51	2.601E-01	7.429E-01	7.521E-01	NOT IDENT.
MN-52	-2.389E+00	1.535E+01	1.539E+01	FAIL ABUN
MN-54	-2.716E-02	3.230E-02	3.455E-02	NOT IDENT.
CO-56	-1.073E-02	4.461E-02	4.487E-02	FAIL ABUN
MN-56	-1.000E+41	4.398E+41	0.000E+00	SHORT HLIF
CO-57	1.244E-02	2.203E-02	2.273E-02	NOT IDENT.
CO-58	1.408E-02	4.169E-02	4.217E-02	NOT IDENT.
FE-59	-2.882E-02	1.047E-01	1.055E-01	NOT IDENT.
CO-60	7.550E-03	4.426E-02	4.439E-02	NOT IDENT.
ZN-65	2.265E-02	7.484E-02	7.554E-02	NOT IDENT.
GE-68	-8.432E-01	1.063E+00	1.129E+00	NOT IDENT.
AS-73	2.824E-01	8.437E-01	8.533E-01	NOT IDENT.
AS-74	7.259E-02	3.475E-01	3.490E-01	NOT IDENT.
SE-75	-7.440E-04	4.811E-02	4.811E-02	NOT IDENT.
BR-77	2.760E+06	3.917E+06	4.110E+06	SHORT HLIF
SR-82	-1.661E-01	7.039E-01	7.079E-01	NOT IDENT.
RB-83	4.963E-03	8.294E-02	8.297E-02	NOT IDENT.
KR-85	1.344E+00	6.713E+00	6.740E+00	NOT IDENT.
SR-85	1.005E-02	5.072E-02	5.092E-02	NOT IDENT.
RB-86	-1.347E+00	2.234E+00	2.315E+00	NOT IDENT.
Y-88	9.944E-03	4.493E-02	4.516E-02	NOT IDENT.
Y-91	6.525E+00	2.531E+01	2.548E+01	NOT IDENT.
NB-94	-1.336E-02	2.937E-02	2.998E-02	NOT IDENT.
NB-95	-1.589E-02	6.029E-02	6.072E-02	NOT IDENT.
NB-95M	-1.111E-02	1.671E-01	1.672E-01	NOT IDENT.
ZR-95	4.822E-02	7.870E-02	8.165E-02	NOT IDENT.
NB-97	1.000E+41	3.780E+41	0.000E+00	SHORT HLIF
ZR-97	5.189E+19	4.943E+20	0.000E+00	SHORT HLIF
MO-99	1.264E+04	5.892E+04	5.919E+04	SHORT HLIF
TC-99M	1.000E+41	4.766E+41	0.000E+00	SHORT HLIF
RH-101	-1.831E-02	3.091E-02	3.200E-02	NOT IDENT.
RH-102	-2.192E-02	5.270E-02	5.362E-02	NOT IDENT.
RU-103	-1.546E-02	5.821E-02	5.863E-02	FAIL ABUN
RH-106	-2.522E-01	3.034E-01	3.240E-01	NOT IDENT.
RU-106	-2.522E-01	3.034E-01	3.240E-01	NOT IDENT.
AG-108M	-9.948E-03	2.782E-02	2.818E-02	NOT IDENT.
AG-110	1.703E-01	8.361E-01	8.396E-01	NOT IDENT.
AG-110M	4.004E-02	3.582E-02	4.011E-02	NOT IDENT.
SN-113	-4.656E-03	4.153E-02	4.158E-02	NOT IDENT.
CD-115	-1.162E+05	3.233E+05	3.276E+05	SHORT HLIF
SN-117M	1.054E-02	2.588E-01	2.589E-01	NOT IDENT.
SB-122	-4.003E+03	1.083E+04	1.098E+04	SHORT HLIF
TE-123M	-8.412E-03	3.001E-02	3.025E-02	NOT IDENT.
SB-124	-3.550E-02	9.561E-02	9.694E-02	NOT IDENT.
SB-125	6.268E-04	8.719E-02	8.719E-02	FAIL ABUN
I-126	8.614E-01	1.275E+00	1.333E+00	NOT IDENT.
SB-126	2.268E-01	8.492E-01	8.553E-01	NOT IDENT.
SB-127	-3.193E+02	4.672E+02	4.888E+02	SHORT HLIF
I-131	6.185E-01	2.028E+00	2.048E+00	FAIL ABUN
I-132	-1.000E+41	3.894E+41	0.000E+00	SHORT HLIF
TE-132	7.088E+02	1.032E+03	1.080E+03	SHORT HLIF
BA-133	-4.918E-02	4.524E-02	5.038E-02	FAIL ABUN
I-133	-5.748E+14	2.398E+15	2.412E+15	SHORT HLIF
CS-134	7.476E-02	4.120E-02	5.323E-02	FAIL ABUN
I-135	-1.000E+41	1.531E+41	0.000E+00	SHORT HLIF
CS-136	-1.570E-01	5.542E-01	5.587E-01	NOT IDENT.
LA-138	1.083E-02	5.538E-02	5.559E-02	NOT IDENT.
CE-139	6.063E-03	3.396E-02	3.407E-02	NOT IDENT.
BA-140	1.181E-01	1.609E+00	1.610E+00	FAIL ABUN
LA-140	-2.723E-01	5.587E-01	5.720E-01	FAIL ABUN
CE-141	1.000E-02	1.121E-01	1.122E-01	NOT IDENT.
CE-143	4.362E+09	3.012E+09	3.597E+09	SHORT HLIF
CE-144	1.058E-01	1.855E-01	1.915E-01	FAIL ABUN
PM-144	1.492E-02	3.003E-02	3.077E-02	NOT IDENT.
PR-144	1.162E+00	2.292E+00	2.351E+00	NOT IDENT.
PM-146	9.496E-03	4.135E-02	4.158E-02	NOT IDENT.
ND-147	1.166E-01	4.063E+00	4.064E+00	FAIL ABUN
PM-147	9.673E+01	5.867E+02	5.883E+02	NOT IDENT.
PM-149	-4.049E+05	3.048E+06	3.054E+06	SHORT HLIF
EU-150	-1.845E-02	2.522E-02	2.655E-02	FAIL ABUN
EU-152	-1.900E-02	8.572E-02	8.615E-02	NOT IDENT.

GD-153	2.245E-02	8.713E-02	8.771E-02	NOT IDENT.
EU-154	8.526E-02	8.910E-02	9.704E-02	NOT IDENT.
EU-155	1.892E-02	9.287E-02	9.326E-02	FAIL ABUN
TB-160	1.339E-01	2.005E-01	2.094E-01	FAIL ABUN
HO-166M	-2.838E-02	5.442E-02	5.590E-02	FAIL ABUN
TM-171	2.436E+00	1.301E+01	1.306E+01	NOT IDENT.
HF-172	-4.574E-02	1.673E-01	1.685E-01	FAIL ABUN
LU-172	-3.561E-02	5.255E-02	5.495E-02	FAIL ABUN
LU-176	-7.321E-03	2.095E-02	2.121E-02	FAIL ABUN
HF-181	-2.659E-02	7.447E-02	7.542E-02	FAIL ABUN
TA-182	1.654E-01	1.645E-01	1.806E-01	FAIL ABUN
RE-183	3.230E-01	3.767E-01	4.039E-01	FAIL ABUN
RE-184	5.872E-02	2.116E-01	2.133E-01	NOT IDENT.
W-188	3.975E+00	8.978E+00	9.155E+00	FAIL ABUN
IR-192	1.071E-02	4.056E-02	4.085E-02	FAIL ABUN
HG-203	-7.489E-03	6.571E-02	6.579E-02	NOT IDENT.
TL-204	-2.135E+00	4.255E+00	4.362E+00	FAIL ABUN
BI-207	1.914E-02	4.876E-02	4.952E-02	FAIL ABUN
PB-211	-2.458E-01	6.307E-01	6.404E-01	NOT IDENT.
BI-213	6.201E-02	9.153E-02	9.570E-02	NOT IDENT.
RN-219	3.961E-02	3.633E-01	3.637E-01	FAIL ABUN
RA-223	-3.726E-01	6.441E-01	6.656E-01	FAIL ABUN
AC-225	-4.656E-01	5.569E+00	5.573E+00	NOT IDENT.
AC-227	9.972E-02	2.103E-01	2.151E-01	FAIL ABUN
TH-227	9.972E-02	2.103E-01	2.151E-01	FAIL ABUN
TH-229	6.076E-02	5.115E-01	5.123E-01	FAIL ABUN
TH-231	-3.726E-01	6.441E-01	6.656E-01	FAIL ABUN
PA-233	-1.518E-02	4.964E-02	5.011E-02	FAIL ABUN
PA-234	5.862E-02	2.576E-01	2.589E-01	FAIL ABUN
PA-234M	-1.927E+00	4.214E+00	4.303E+00	NOT IDENT.
NP-237	-1.518E-02	4.964E-02	5.011E-02	FAIL ABUN
NP-238	-2.332E+05	9.021E+05	9.082E+05	SHORT HLIF
NP-239	8.832E-02	2.193E-01	2.229E-01	FAIL ABUN
PU-239	2.211E+02	3.310E+02	3.457E+02	NOT IDENT.
CM-243	-8.837E-02	8.856E-02	9.711E-02	FAIL ABUN
BK-247	3.486E-02	7.171E-02	7.341E-02	FAIL ABUN
CM-247	-8.353E-03	3.466E-02	3.486E-02	FAIL ABUN
CF-249	-4.140E-03	3.007E-02	3.013E-02	NOT IDENT.
CF-251	3.313E-02	1.212E-01	1.221E-01	NOT IDENT.



\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	53.7918	85.43	64.3428	131.20	80.0331
45.60	46.9512	86.55	49.7203	133.02	53.8801
46.54	43.4764	86.79	49.7462	133.52	55.0247
49.72	0.0000	86.94	49.7628	136.00	66.2933
51.35	60.7138	87.09	49.7790	136.47	64.1313
51.87	62.6548	87.57	49.8313	140.51	0.0000
52.39	52.6038	88.03	49.8810	143.76	62.6292
52.97	51.7730	88.34	49.9145	144.24	62.6753
53.44	57.4025	88.47	49.9284	145.44	52.3255
54.07	54.7291	89.96	50.0887	152.43	61.1842
57.36	0.0000	1093.63	50.1614	153.25	52.1824
57.53	49.9813	91.11	50.2111	323.87	64.7521
57.98	50.0460	92.59	50.3680	156.02	67.2005
59.27	50.2307	93.35	50.4478	158.56	50.2990
59.32	50.2378	94.56	50.5746	159.00	56.0499
59.54	47.1273	94.65	50.5841	162.33	47.5034
60.96	47.3156	94.67	50.5859	162.66	55.1909
61.17	47.3433	94.87	62.9168	163.33	59.8465
62.93	60.8936	97.43	72.8707	165.86	55.4377
63.29	60.9530	98.43	53.7297	176.31	53.8838
63.58	61.0011	98.44	53.7309	176.60	51.5605
64.28	61.1162	99.53	82.8430	177.52	57.4892
66.73	74.3302	100.11	81.9021	181.07	0.0000
67.24	83.4122	102.03	44.7486	181.52	67.6188
125.81	75.1572	103.18	69.8810	184.41	58.0058
67.75	75.1709	103.37	75.1234	143.76	58.1030
68.89	80.2251	105.21	50.2603	193.51	61.0676
69.67	91.6845	105.31	58.6485	197.03	61.3321
70.82	93.2461	106.12	50.3478	198.01	46.9570
70.83	93.2490	106.47	58.7782	201.83	54.4311
72.81	72.8859	109.28	57.6829	203.43	65.4425
72.87	72.8967	111.00	64.9243	205.31	66.3981
74.66	73.2163	111.76	0.0000	210.85	53.7902
74.82	73.2448	114.06	62.8045	215.65	50.3998
74.97	73.2716	116.30	0.0000	218.12	48.0758
77.11	73.6487	116.74	54.5501	222.11	58.1978
78.74	73.9324	119.76	49.4650	227.09	58.5191
79.69	74.0964	121.12	48.5043	227.38	58.5377
80.03	74.1540	121.22	48.5129	228.16	0.0000
80.12	74.1699	121.78	42.0853	228.18	43.6298
80.19	74.1819	122.06	47.5036	116.74	43.6298
80.57	74.2474	122.92	58.3864	235.69	55.2954
81.00	74.3209	123.07	58.4013	235.96	46.9310
81.07	74.3328	265.00	60.6275	238.63	47.0637
81.75	49.8539	125.81	64.1072	238.98	0.0000
82.47	49.9359	127.23	84.9534	240.99	47.1811
83.79	64.1079	127.91	66.5142	242.00	47.2306
84.00	64.1382	129.30	73.2250	244.70	47.3639

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	30.5468	563.25	25.6240
252.80	42.6412	345.93	34.2946	564.24	0.0000
254.15	0.0000	351.06	33.5032	569.33	21.4233
256.23	35.0867	351.93	33.5259	946.00	20.3545
260.90	0.0000	355.39	0.0000	569.70	20.3568
264.66	43.1468	356.01	44.8438	583.19	12.9492
264.80	43.1529	364.49	31.0322	584.27	19.4348
265.00	35.2194	366.42	0.0000	595.83	21.7244
269.46	53.3183	372.51	32.1676	427.87	18.5114
270.03	53.3483	375.05	31.2813	602.52	0.0000
271.23	53.4096	377.52	27.5397	604.72	16.3684
273.65	33.9481	356.01	27.6689	607.14	17.4811
276.40	39.2725	388.16	21.0565	609.32	17.5007
277.37	47.1709	388.63	22.0211	610.33	17.5098
277.60	47.1808	391.69	21.1102	614.28	6.5791
278.00	44.5762	264.66	23.1777	618.01	15.3803
279.20	44.6271	401.81	27.0629	620.36	8.7992
279.54	45.9535	402.40	31.9090	621.93	22.0150
279.70	45.9610	404.85	30.0268	630.19	0.0000
280.46	48.6212	410.95	28.2100	631.29	21.0116
283.69	41.2990	413.71	29.2383	633.25	19.9248
284.31	36.9269	414.70	20.4809	634.78	15.5090
285.41	38.7247	423.72	35.3276	635.95	15.5176
285.90	0.0000	427.09	25.5726	636.99	19.9614
287.50	37.9172	427.87	27.5545	657.50	16.8005
290.67	29.1838	433.94	29.6429	657.76	15.1221
293.27	0.0000	439.40	14.8752	657.90	0.0000
351.93	36.2304	440.45	18.8550	661.66	14.5896
295.96	31.9893	453.88	26.0280	664.57	0.0000
879.38	26.7200	463.37	27.1928	666.33	11.8099
299.98	28.8938	468.07	22.7280	666.50	11.8108
300.09	28.8965	473.00	0.0000	667.71	0.0000
300.13	28.8978	475.06	23.3346	677.62	13.5688
301.36	29.4645	476.78	25.3906	685.70	0.0000
302.85	36.2087	477.60	23.3715	692.65	0.0000
256.23	24.1743	482.18	28.5326	695.00	15.9574
304.85	26.8689	487.02	26.5729	696.49	11.4058
306.78	31.3997	492.35	0.0000	696.51	11.4058
308.46	20.6645	497.08	18.5083	697.00	13.6904
311.90	28.8359	505.52	15.5014	697.30	13.6924
316.51	29.8552	507.63	0.0000	697.49	15.9756
319.41	35.3699	511.00	20.7349	702.65	18.3008
320.08	29.9452	514.00	20.2522	706.68	17.1881
321.04	30.8782	514.00	20.2522	711.68	18.3750
323.87	40.9653	520.40	15.6366	720.70	13.8369
325.23	35.5437	520.69	0.0000	721.93	0.0000
328.76	31.5345	522.65	0.0000	722.78	17.3120
333.37	26.1494	527.90	0.0000	722.91	17.3126
333.97	35.8008	528.26	15.7068	723.31	15.5841
334.37	35.8127	529.59	18.8628	724.19	12.1257
338.28	38.6906	529.87	0.0000	727.33	13.8774
338.32	38.6914	531.02	17.8294	733.00	19.1285
311.90	33.2219	537.26	22.1023	735.93	18.5729
340.48	33.2219	546.56	0.0000	333.97	16.2621
340.55	33.2241	552.55	13.7993	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	15.7275	949.00	7.5701	1384.29	6.8988
747.24	9.7986	667.71	0.0000	1408.01	6.5068
748.06	17.5037	962.31	14.2603	1434.09	7.6409
752.31	14.9051	964.08	9.1321	1435.80	6.5522
753.82	12.2829	966.17	15.2314	1457.56	0.0000
756.73	8.7845	911.20	15.2461	1460.82	3.2964
756.80	8.7845	983.53	10.5347	1489.16	6.6383
884.68	15.8604	984.45	0.0000	1505.03	3.5539
765.81	24.6906	1274.44	14.4278	1584.12	12.0671
766.42	17.6410	1001.03	12.5243	1596.21	9.0752
766.84	19.4084	1002.74	10.6035	1620.50	3.6500
772.60	0.0000	1004.73	8.6814	1621.92	5.7050
776.52	15.0581	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.7803
778.90	13.2999	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	5.8517	1764.49	4.7065
788.74	14.2446	1038.76	0.0000	1063.66	1.5707
792.07	12.8377	631.29	15.6484	1771.35	0.0000
795.86	14.2861	1048.07	12.7207	1791.20	0.0000
810.06	7.1843	1049.04	10.7670	1808.65	2.8497
810.29	7.1851	1050.41	3.9170	1810.72	0.0000
344.28	7.1853	1063.66	10.8181	1836.06	3.8209
810.76	7.1863	1077.00	11.8521		
815.77	9.9009	1077.34	11.8528		
1048.07	6.3076	1085.87	8.9138		
832.01	7.2473	1093.63	11.9143		
834.85	17.2315	1099.45	7.9570		
835.71	18.1445	1112.07	9.1295		
836.80	0.0000	1112.84	9.3219		
846.75	0.0000	1115.54	6.3977		
846.77	13.6674	1120.29	7.0077		
856.80	8.7812	1120.55	7.0081		
860.56	12.8242	1221.41	7.0098		
871.09	13.7952	1129.67	15.0595		
873.19	8.5905	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	11.9935	1173.23	5.0858		
880.51	8.8605	1177.95	7.1299		
881.60	8.8641	1189.05	7.1534		
883.24	5.9131	1204.77	9.2390		
884.68	2.4651	1221.41	4.1260		
889.28	3.7040	1231.02	4.9646		
894.76	9.2789	1235.36	9.9416		
898.04	13.9352	1238.28	5.1822		
900.72	11.1592	1260.41	0.0000		
903.28	10.6379	1271.87	7.3234		
911.20	5.6010	1274.44	3.1408		
912.08	5.6028	1274.54	3.1408		
923.98	0.0000	1291.59	7.3632		
926.50	14.0804	1298.22	0.0000		
929.11	13.5299	1312.11	5.2884		
935.54	4.5204	1332.49	8.5078		
937.49	7.5393	1362.66	0.0000		
944.13	7.5571	1365.19	11.7990		
946.00	7.5620	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:49:06.27

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278009.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM16.CNF;848
Background date : 29-OCT-2023 11:32:33
Sample date     : 13-SEP-2023 07:30:00 Acquisition date : 30-OCT-2023 09:47:46
Sample ID      : G640278009 Sample quantity   : 1.14220E+02 GRAM
Detector name  : GAM16 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.42 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MXR1
Abundance limit : 75.00000 Sensitivity    : 3.00000
Batch ID       : 2505440 Detector SN#    :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	74.90	106	80	1.14	149.20	143	22	2.95E-02	17.8	1.92E+00
2	2	77.15	126	75	0.95	153.69	143	22	3.50E-02	14.1	
3	1	87.30	51	81	1.07	173.98	171	23	1.41E-02	30.4	1.31E+00
4	1	89.91	36	76	1.08	179.20	171	23	1.00E-02	41.9	
5	1	92.72*	68	79	1.09	184.82	171	23	1.89E-02	28.4	
6	0	162.79	39	63	1.55	324.88	321	8	1.09E-02	38.5	
7	0	186.14*	44	151	1.23	371.55	366	13	1.22E-02	61.7	
8	3	238.73*	219	53	1.05	476.68	471	18	6.09E-02	8.8	1.15E+00
9	3	241.91	54	86	1.68	483.04	471	18	1.49E-02	37.5	
10	0	270.52*	18	66	1.00	540.23	536	9	5.13E-03	84.5	
11	0	295.64*	125	54	1.04	590.43	584	11	3.47E-02	14.8	
12	0	300.13	28	38	1.98	599.41	596	7	7.80E-03	40.7	
13	0	338.54*	34	81	1.23	676.19	670	11	9.57E-03	54.6	
14	0	352.11*	182	53	1.37	703.33	698	11	5.06E-02	11.1	
15	0	409.17*	31	23	0.68	817.39	812	11	8.61E-03	36.3	
16	0	419.14	26	46	4.57	837.32	827	15	7.27E-03	61.0	
17	0	510.91*	48	38	3.28	1020.79	1012	17	1.33E-02	39.0	
18	0	583.15*	78	32	1.83	1165.20	1159	13	2.18E-02	19.1	
19	0	599.69	7	25	0.77	1198.28	1191	9	2.05E-03	127.0	
20	0	609.53*	98	44	0.97	1217.95	1212	12	2.72E-02	17.7	
21	0	628.14	12	25	1.39	1255.15	1250	10	3.24E-03	85.4	
22	0	685.52	18	22	0.53	1369.87	1365	12	4.93E-03	59.6	
23	0	729.60	8	16	1.26	1458.01	1451	9	2.35E-03	91.1	
24	0	794.66	24	2	3.71	1588.08	1583	10	6.55E-03	24.1	
25	0	801.39	13	11	2.98	1601.54	1595	11	3.61E-03	56.7	
26	0	845.76	15	4	1.23	1690.27	1686	8	4.23E-03	34.2	
27	0	911.14*	58	10	1.19	1820.98	1814	14	1.62E-02	18.7	
28	0	930.80	23	3	0.71	1860.30	1854	12	6.40E-03	25.7	
29	0	954.49	18	4	3.34	1907.66	1901	15	4.99E-03	33.4	
30	0	964.52	22	3	2.16	1927.73	1922	11	6.19E-03	25.6	
31	0	969.26*	18	20	2.07	1937.21	1932	10	4.99E-03	54.0	
32	0	989.09	7	5	1.21	1976.85	1970	9	1.81E-03	70.7	
33	0	1105.05	18	8	3.53	2208.74	2200	15	4.86E-03	41.6	
34	0	1119.96*	37	7	1.78	2238.55	2231	14	1.03E-02	23.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1151.34	13	11	2.22	2301.31	2294	12	3.55E-03	60.6	
36	0	1246.98	19	7	6.18	2492.55	2484	16	5.20E-03	40.7	
37	0	1294.04	6	3	1.05	2586.67	2584	6	1.67E-03	61.2	
38	0	1360.23	11	3	1.87	2719.04	2714	10	3.16E-03	39.5	
39	0	1377.98	15	3	1.80	2754.54	2749	11	4.29E-03	32.7	
40	0	1402.76	8	4	1.66	2804.10	2799	9	2.25E-03	58.2	
41	0	1421.97	6	2	0.77	2842.52	2837	9	1.63E-03	61.5	
42	0	1461.07*	301	0	2.30	2920.71	2914	14	8.35E-02	5.9	
43	0	1496.46	12	0	3.88	2991.50	2986	11	3.33E-03	28.9	
44	0	1764.83*	18	7	1.76	3528.27	3520	13	5.11E-03	41.1	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278009.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 13-SEP-2023 07:30:00 Acquisition date : 30-OCT-2023 09:47:46  
Sample ID : G640278009 Sample quantity : 114.22 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA16 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.42 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

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	283	10.66*	1.187E+00	1.473E+01	1.473E+01	11.80
CD-109	88.03	54	3.70*	5.920E+00	1.607E+00	1.725E+00	60.82
SN-126	64.28	-----	9.60	3.092E+00	-----	Line Not Found	-----
	86.94	54	8.90	5.920E+00	6.680E-01	6.680E-01	60.82
	87.57	54	37.00*	5.920E+00	1.607E-01	1.607E-01	60.82
TL-208	277.37	-----	6.60	4.706E+00	-----	Line Not Found	-----
	583.19	77	85.00*	2.719E+00	2.187E-01	2.187E-01	38.18
	860.56	-----	12.50	1.926E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	4.356E+00	-----	Line Not Found	-----
	351.06	182	12.92*	3.981E+00	2.331E+00	2.331E+00	22.12
PB-212	74.82	113	10.28	4.623E+00	1.562E+00	1.562E+00	35.59
	77.11	134	17.10	4.902E+00	1.049E+00	1.049E+00	28.18
	238.63	223	43.60*	5.213E+00	6.444E-01	6.444E-01	17.66
	300.09	28	3.30	4.455E+00	1.264E+00	1.264E+00	81.32
BI-214	609.32	96	45.49*	2.621E+00	5.290E-01	5.290E-01	35.36
	1120.29	35	14.92	1.498E+00	1.040E+00	1.040E+00	47.04
	1764.49	17	15.30	1.057E+00	6.993E-01	6.994E-01	82.12
PB-214	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.849E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.563E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.460E-01	22.12
RN-222	609.32	96	45.49*	2.621E+00	5.290E-01	5.290E-01	35.36
	1120.29	35	14.92	1.498E+00	1.040E+00	1.040E+00	47.04
	1764.49	17	15.30	1.057E+00	6.993E-01	6.994E-01	82.12
RA-224	240.99	54	4.10*	5.167E+00	1.691E+00	1.691E+00	75.03
RA-226	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.849E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.563E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.460E-01	22.12
AC-228	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
RA-228	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
TH-228	74.82	113	10.28	4.623E+00	1.562E+00	1.562E+00	35.59
	77.11	134	17.10	4.902E+00	1.049E+00	1.049E+00	28.18
	238.63	223	43.60*	5.213E+00	6.444E-01	6.444E-01	17.66
	300.09	28	3.30	4.455E+00	1.264E+00	1.264E+00	81.32
TH-230	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.848E+00	28.18

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.562E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.459E-01	22.12
PA-231	283.69	-----	1.70	4.633E+00	-----	Line Not Found	-----
	301.36	28	5.35*	4.455E+00	7.799E-01	7.799E-01	81.32
TH-232	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
U-234	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.848E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.562E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.459E-01	22.12
U-235	89.96	38	3.47	6.119E+00	1.180E+00	1.180E+00	83.86
	93.35	72	5.60	6.307E+00	1.334E+00	1.334E+00	56.86
	143.76	-----	10.96*	6.870E+00	-----	Line Not Found	-----
	163.33	41	5.08	6.542E+00	8.035E-01	8.035E-01	77.08
	185.72	45	57.20	6.098E+00	8.504E-02	8.504E-02	123.43
	205.31	-----	5.01	5.749E+00	-----	Line Not Found	-----
AM-243	43.53	-----	5.90	3.923E-01	-----	Line Not Found	-----
	74.66	113	67.20*	4.623E+00	2.390E-01	2.390E-01	35.59
ANH-511	511.00	47	100.00*	3.022E+00	1.024E-01	1.024E-01	77.92

Flag: "\*" = Keyline



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*****
*
*               GEL Laboratories LLC
*               2040 Savage Road
*               Charleston, SC 29407
*****
*
*               DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278009.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:46 Sensitivity      : 3.000
* Detector ID       : GAM16 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.42 Half life ratio  : *****
* Sample date       : 13-SEP-2023 07:30:00 Analyst initials: MXR1
* Sample ID         : G640278009 Sample Quantity : 1.1422E+02 GRAM
* Batch Number      : 2505440 Wet Weight      : 0.00000
* Wet wt corr       : 1.00000 Dry Weight       : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*
*               CALIBRATION INFORMATION
*
* Eff. Cal. date    : 9-NOV-2022 03:48:10 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM16_CAN.CNF;22
*****

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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	1.473E+01	1.703E+00	7.505E-01
CD-109	1.725E+00	1.028E+00	1.297E+00
SN-126	1.607E-01	9.578E-02	1.215E-01
TL-208	2.187E-01	8.185E-02	6.526E-02
BI-211	2.331E+00	5.052E-01	3.626E-01
PB-212	6.444E-01	1.115E-01	1.020E-01
BI-214	5.290E-01	1.833E-01	1.305E-01
PB-214	8.460E-01	1.834E-01	1.319E-01
RN-222	5.290E-01	1.833E-01	1.305E-01
RA-224	1.691E+00	1.243E+00	1.093E+00
RA-226	8.460E-01	1.834E-01	1.319E-01
AC-228	7.854E-01	2.873E-01	2.589E-01
RA-228	7.854E-01	2.873E-01	2.589E-01
TH-228	6.444E-01	1.115E-01	1.020E-01
TH-230	8.459E-01	1.833E-01	1.319E-01
PA-231	7.799E-01	6.215E-01	1.040E+00
TH-232	7.854E-01	2.873E-01	2.589E-01
U-234	8.459E-01	1.833E-01	1.319E-01
U-235	-1.686E-02	2.079E-01	3.662E-01
AM-243	2.390E-01	8.338E-02	8.530E-02
ANH-511	1.024E-01	7.818E-02	5.922E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	1.851E-01	5.126E-01	1.001E+00	NOT IDENT.
NA-22	2.772E-03	5.518E-02	1.050E-01	NOT IDENT.
NA-24	0.000E+00	1.923E+21	0.000E+00	SHORT HLIF
AL-26	-1.536E-02	3.388E-02	6.344E-02	NOT IDENT.
SC-46	9.045E-03	5.389E-02	1.082E-01	FAIL ABUN
V-48	6.884E-02	3.483E-01	6.205E-01	NOT IDENT.
CR-51	2.745E-01	7.982E-01	1.573E+00	NOT IDENT.
MN-52	-6.544E+00	9.757E+00	1.740E+01	NOT IDENT.
MN-54	1.610E-02	4.281E-02	8.720E-02	NOT IDENT.

CO-56	7.526E-02	5.039E-02	1.096E-01	FAIL ABUN
MN-56	0.000E+00	6.696E+40	0.000E+00	SHORT HLIF
CO-57	5.933E-03	2.582E-02	4.788E-02	NOT IDENT.
CO-58	4.029E-03	4.556E-02	9.330E-02	NOT IDENT.
FE-59	-2.460E-01	2.113E-01	2.476E-01	NOT IDENT.
CO-60	-1.780E-02	3.345E-02	5.785E-02	NOT IDENT.
ZN-65	1.197E-01	9.757E-02	2.164E-01	NOT IDENT.
GE-68	5.589E-01	1.665E+00	3.331E+00	NOT IDENT.
AS-73	4.770E-01	1.267E+00	2.506E+00	NOT IDENT.
AS-74	1.743E-02	3.275E-01	5.556E-01	NOT IDENT.
SE-75	1.303E-02	5.227E-02	1.023E-01	NOT IDENT.
BR-77	0.000E+00	1.955E+05	0.000E+00	SHORT HLIF
SR-82	1.600E-01	8.467E-01	1.699E+00	NOT IDENT.
RB-83	1.137E-01	9.348E-02	2.019E-01	NOT IDENT.
RB-84	-9.691E-03	1.354E-01	2.640E-01	NOT IDENT.
KR-85	6.786E+00	8.615E+00	1.586E+01	NOT IDENT.
SR-85	5.016E-02	6.389E-02	1.176E-01	NOT IDENT.
RB-86	8.725E-01	3.138E+00	6.239E+00	NOT IDENT.
Y-88	-1.741E-02	3.401E-02	6.324E-02	NOT IDENT.
Y-91	-1.775E+01	3.501E+01	6.044E+01	NOT IDENT.
NB-94	-2.021E-02	3.099E-02	5.572E-02	NOT IDENT.
NB-95	-1.762E-02	6.591E-02	1.231E-01	NOT IDENT.
NB-95M	1.424E-02	1.803E-01	3.143E-01	NOT IDENT.
ZR-95	1.233E-02	1.006E-01	2.018E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	9.195E+19	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.985E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.534E+41	0.000E+00	SHORT HLIF
RH-101	2.085E-02	3.322E-02	6.270E-02	NOT IDENT.
RH-102	2.825E-02	6.048E-02	1.104E-01	NOT IDENT.
RU-103	-2.008E-02	7.108E-02	1.280E-01	FAIL ABUN
RH-106	1.991E-01	3.607E-01	7.176E-01	NOT IDENT.
RU-106	1.991E-01	3.607E-01	7.176E-01	NOT IDENT.
AG-108M	-2.494E-03	3.029E-02	5.636E-02	NOT IDENT.
AG-110	4.045E-01	8.451E-01	1.668E+00	NOT IDENT.
AG-110M	1.000E-02	5.299E-02	1.080E-01	NOT IDENT.
SN-113	1.055E-02	5.544E-02	1.066E-01	NOT IDENT.
CD-115	0.000E+00	2.260E+05	0.000E+00	SHORT HLIF
SN-117M	2.071E-01	2.943E-01	5.213E-01	NOT IDENT.
SB-122	0.000E+00	7.268E+03	0.000E+00	SHORT HLIF
TE-123M	1.920E-02	3.705E-02	6.421E-02	NOT IDENT.
SB-124	-6.358E-02	1.383E-01	2.580E-01	NOT IDENT.
SB-125	-9.204E-02	9.814E-02	1.625E-01	FAIL ABUN
TE-125M	-5.676E+00	1.317E+01	2.318E+01	NOT IDENT.
I-126	-8.290E-01	1.375E+00	2.275E+00	NOT IDENT.
SB-126	3.239E-01	8.295E-01	1.726E+00	NOT IDENT.
SB-127	0.000E+00	7.352E+02	0.000E+00	SHORT HLIF
I-131	2.888E-01	1.656E+00	3.236E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	7.995E+02	0.000E+00	SHORT HLIF
BA-133	1.239E-02	4.414E-02	7.852E-02	NOT IDENT.
I-133	0.000E+00	7.436E+14	0.000E+00	SHORT HLIF
CS-134	0.000E+00	4.168E-02	8.797E-02	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	-3.307E-01	5.565E-01	9.676E-01	NOT IDENT.
BA-137M	3.530E-02	4.112E-02	8.355E-02	NOT IDENT.
CS-137	3.729E-02	4.344E-02	8.827E-02	NOT IDENT.
LA-138	1.327E-02	4.791E-02	1.110E-01	NOT IDENT.
CE-139	9.041E-03	3.453E-02	5.870E-02	NOT IDENT.
BA-140	-8.982E-01	1.672E+00	2.866E+00	FAIL ABUN
LA-140	8.417E-02	5.475E-01	1.178E+00	NOT IDENT.
CE-141	-1.178E-01	1.259E-01	2.047E-01	NOT IDENT.
CE-143	0.000E+00	1.349E+09	0.000E+00	SHORT HLIF
CE-144	2.577E-02	1.974E-01	3.612E-01	NOT IDENT.
PM-144	2.542E-02	3.969E-02	8.287E-02	NOT IDENT.
PR-144	1.906E+00	3.016E+00	6.294E+00	NOT IDENT.
PM-146	4.334E-02	4.427E-02	9.232E-02	NOT IDENT.
ND-147	1.442E+00	4.470E+00	8.683E+00	FAIL ABUN
PM-147	2.321E+02	7.236E+02	1.350E+03	NOT IDENT.
PM-149	0.000E+00	2.032E+06	0.000E+00	SHORT HLIF
EU-150	-6.814E-03	3.334E-02	5.482E-02	FAIL ABUN
EU-152	6.261E-02	9.521E-02	1.928E-01	FAIL ABUN
GD-153	-2.158E-02	8.351E-02	1.391E-01	NOT IDENT.
EU-154	7.727E-03	1.538E-01	2.926E-01	NOT IDENT.
EU-155	-4.619E-02	9.939E-02	1.724E-01	FAIL ABUN
TB-160	1.930E-02	1.791E-01	3.595E-01	FAIL ABUN
HO-166M	-3.153E-02	6.897E-02	1.265E-01	NOT IDENT.
TM-171	1.723E+00	2.208E+01	4.259E+01	NOT IDENT.

HF-172	8.526E-02	1.969E-01	3.677E-01	NOT IDENT.
LU-172	2.731E-02	7.805E-02	1.570E-01	FAIL ABUN
LU-176	1.552E-03	2.413E-02	4.663E-02	FAIL ABUN
HF-181	-7.892E-02	7.505E-02	1.194E-01	NOT IDENT.
TA-182	-5.392E-02	2.564E-01	4.676E-01	FAIL ABUN
RE-183	-9.399E-02	2.775E-01	5.152E-01	FAIL ABUN
RE-184	-7.258E-02	1.604E-01	2.999E-01	NOT IDENT.
W-188	7.794E+00	1.034E+01	1.947E+01	NOT IDENT.
IR-192	-4.936E-02	4.281E-02	7.128E-02	FAIL ABUN
HG-203	-1.787E-03	6.079E-02	1.157E-01	NOT IDENT.
TL-204	1.518E-01	4.517E+00	7.928E+00	NOT IDENT.
BI-207	-3.274E-02	6.360E-02	1.113E-01	FAIL ABUN
BI-210	8.067E-01	4.630E+00	8.872E+00	NOT IDENT.
PB-210	8.067E-01	4.630E+00	8.872E+00	NOT IDENT.
PB-211	3.010E-01	8.009E-01	1.426E+00	NOT IDENT.
BI-212	1.238E-01	5.802E-01	1.062E+00	NOT IDENT.
BI-213	-4.322E-02	1.046E-01	1.864E-01	NOT IDENT.
RN-219	-6.237E-02	4.361E-01	8.038E-01	FAIL ABUN
RA-223	6.259E-01	6.413E-01	1.327E+00	FAIL ABUN
AC-225	-1.502E+00	6.248E+00	1.057E+01	NOT IDENT.
AC-227	6.389E-02	2.475E-01	4.847E-01	FAIL ABUN
TH-227	6.389E-02	2.475E-01	4.847E-01	FAIL ABUN
TH-229	3.284E-01	5.413E-01	1.004E+00	FAIL ABUN
TH-231	6.259E-01	6.413E-01	1.327E+00	FAIL ABUN
PA-233	1.886E-02	5.800E-02	1.153E-01	FAIL ABUN
PA-234	-1.185E-01	3.291E-01	6.025E-01	NOT IDENT.
PA-234M	4.796E+00	5.218E+00	1.131E+01	NOT IDENT.
TH-234	9.755E-02	1.402E+00	2.659E+00	FAIL ABUN
NP-237	1.886E-02	5.800E-02	1.153E-01	FAIL ABUN
NP-238	0.000E+00	6.794E+05	0.000E+00	SHORT HLIF
U-238	9.755E-02	1.402E+00	2.659E+00	FAIL ABUN
NP-239	-5.693E-02	2.557E-01	4.559E-01	NOT IDENT.
PU-239	3.406E+01	3.261E+02	5.938E+02	NOT IDENT.
AM-241	-9.240E-03	1.514E-01	2.871E-01	NOT IDENT.
CM-243	-3.772E-02	9.213E-02	1.609E-01	NOT IDENT.
BK-247	6.206E-03	7.995E-02	1.540E-01	NOT IDENT.
CM-247	-1.997E-02	4.066E-02	7.193E-02	NOT IDENT.
CF-249	4.748E-02	3.927E-02	8.388E-02	NOT IDENT.
CF-251	2.700E-02	1.245E-01	2.255E-01	NOT IDENT.

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*	1.187E+00	1.473E+01	1.473E+01	11.80
CD-109	88.03	54	3.70*	5.920E+00	1.607E+00	1.725E+00	60.82
SN-126	64.28	-----	9.60	3.092E+00	-----	Line Not Found	-----
	86.94	54	8.90	5.920E+00	6.680E-01	6.680E-01	60.82
	87.57	54	37.00*	5.920E+00	1.607E-01	1.607E-01	60.82
TL-208	277.37	-----	6.60	4.706E+00	-----	Line Not Found	-----
	583.19	77	85.00*	2.719E+00	2.187E-01	2.187E-01	38.18
	860.56	-----	12.50	1.926E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	4.356E+00	-----	Line Not Found	-----
	351.06	182	12.92*	3.981E+00	2.331E+00	2.331E+00	22.12
PB-212	74.82	113	10.28	4.623E+00	1.562E+00	1.562E+00	35.59
	77.11	134	17.10	4.902E+00	1.049E+00	1.049E+00	28.18
	238.63	223	43.60*	5.213E+00	6.444E-01	6.444E-01	17.66
	300.09	28	3.30	4.455E+00	1.264E+00	1.264E+00	81.32
BI-214	609.32	96	45.49*	2.621E+00	5.290E-01	5.290E-01	35.36
	1120.29	35	14.92	1.498E+00	1.040E+00	1.040E+00	47.04
	1764.49	17	15.30	1.057E+00	6.993E-01	6.994E-01	82.12
PB-214	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.849E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.563E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.460E-01	22.12
RN-222	609.32	96	45.49*	2.621E+00	5.290E-01	5.290E-01	35.36
	1120.29	35	14.92	1.498E+00	1.040E+00	1.040E+00	47.04
	1764.49	17	15.30	1.057E+00	6.993E-01	6.994E-01	82.12
RA-224	240.99	54	4.10*	5.167E+00	1.691E+00	1.691E+00	75.03
RA-226	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.849E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.563E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.460E-01	22.12
AC-228	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
RA-228	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
TH-228	74.82	113	10.28	4.623E+00	1.562E+00	1.562E+00	35.59
	77.11	134	17.10	4.902E+00	1.049E+00	1.049E+00	28.18
	238.63	223	43.60*	5.213E+00	6.444E-01	6.444E-01	17.66
	300.09	28	3.30	4.455E+00	1.264E+00	1.264E+00	81.32

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-230	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.848E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.562E-01	75.03
	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
PA-231	351.93	182	35.60*	3.981E+00	8.459E-01	8.459E-01	22.12
	283.69	-----	1.70	4.633E+00	-----	Line Not Found	-----
	301.36	28	5.35*	4.455E+00	7.799E-01	7.799E-01	81.32
TH-232	105.21	-----	1.10	6.852E+00	-----	Line Not Found	-----
	338.32	35	11.27	4.094E+00	4.918E-01	4.918E-01	109.15
	835.71	-----	1.61	1.980E+00	-----	Line Not Found	-----
	911.20	56	25.80*	1.825E+00	7.854E-01	7.854E-01	37.32
U-234	968.97	17	15.80	1.720E+00	4.166E-01	4.166E-01	108.02
	74.82	113	5.80	4.623E+00	2.769E+00	2.769E+00	35.59
	77.11	134	9.70	4.902E+00	1.848E+00	1.848E+00	28.18
	87.09	54	3.41	5.920E+00	1.744E+00	1.744E+00	60.82
	242.00	54	7.25	5.167E+00	9.562E-01	9.562E-01	75.03
U-235	295.22	126	18.42	4.503E+00	9.982E-01	9.982E-01	29.67
	351.93	182	35.60*	3.981E+00	8.459E-01	8.459E-01	22.12
	89.96	38	3.47	6.119E+00	1.180E+00	1.180E+00	83.86
	93.35	72	5.60	6.307E+00	1.334E+00	1.334E+00	56.86
	143.76	-----	10.96*	6.870E+00	-----	Line Not Found	-----
AM-243	163.33	41	5.08	6.542E+00	8.035E-01	8.035E-01	77.08
	185.72	45	57.20	6.098E+00	8.504E-02	8.504E-02	123.43
	205.31	-----	5.01	5.749E+00	-----	Line Not Found	-----
	43.53	-----	5.90	3.923E-01	-----	Line Not Found	-----
ANH-511	74.66	113	67.20*	4.623E+00	2.390E-01	2.390E-01	35.59
	511.00	47	100.00*	3.022E+00	1.024E-01	1.024E-01	77.92

Flag: "\*" = Keyline

Total number of lines in spectrum 44  
 Number of unidentified lines 15  
 Number of lines tentatively identified by NID 29 65.91%

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	1.473E+01	1.473E+01	0.174E+01	11.80	
CD-109	461.40D	1.07	1.607E+00	1.725E+00	1.049E+00	60.82	
SN-126	2.30E+05Y	1.00	1.607E-01	1.607E-01	0.977E-01	60.82	
TL-208	1.41E+10Y	1.00	2.187E-01	2.187E-01	0.835E-01	38.18	
BI-211	7.04E+08Y	1.00	2.331E+00	2.331E+00	0.515E+00	22.12	
PB-212	1.41E+10Y	1.00	6.444E-01	6.444E-01	1.138E-01	17.66	
BI-214	1600.00Y	1.00	5.290E-01	5.290E-01	1.870E-01	35.36	
PB-214	1600.00Y	1.00	8.459E-01	8.460E-01	1.871E-01	22.12	
RN-222	1600.00Y	1.00	5.290E-01	5.290E-01	1.870E-01	35.36	
RA-224	1.41E+10Y	1.00	1.691E+00	1.691E+00	1.269E+00	75.03	
RA-226	1600.00Y	1.00	8.459E-01	8.460E-01	1.871E-01	22.12	
AC-228	1.41E+10Y	1.00	7.854E-01	7.854E-01	2.931E-01	37.32	
RA-228	1.41E+10Y	1.00	7.854E-01	7.854E-01	2.931E-01	37.32	
TH-228	1.41E+10Y	1.00	6.444E-01	6.444E-01	1.138E-01	17.66	
TH-230	7.54E+04Y	1.00	8.459E-01	8.459E-01	1.871E-01	22.12	
PA-231	7.04E+08Y	1.00	7.799E-01	7.799E-01	6.342E-01	81.32	
TH-232	1.41E+10Y	1.00	7.854E-01	7.854E-01	2.931E-01	37.32	
U-234	2.45E+05Y	1.00	8.459E-01	8.459E-01	1.871E-01	22.12	
U-235	7.04E+08Y	1.00	8.504E-02	8.504E-02	10.50E-02	123.43	K
AM-243	7370.00Y	1.00	2.390E-01	2.390E-01	0.851E-01	35.59	
ANH-511	1.00E+09Y	1.00	1.024E-01	1.024E-01	0.798E-01	77.92	
Total Activity :			3.003E+01	3.015E+01			

Grand Total Activity : 3.003E+01 3.015E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	270.52	19	67	1.00	540.23	536	9	5.13E-03	****	4.79E+00	T
0	409.17	31	23	0.68	817.39	812	11	8.61E-03	72.5	3.57E+00	
0	419.14	26	46	4.57	837.32	827	15	7.27E-03	****	3.51E+00	
0	599.69	7	24	0.77	1198.28	1191	9	2.05E-03	****	2.66E+00	T
0	628.14	11	25	1.39	1255.15	1250	10	3.24E-03	****	2.56E+00	
0	685.52	17	22	0.53	1369.87	1365	12	4.93E-03	****	2.37E+00	T
0	729.60	8	15	1.26	1458.01	1451	9	2.35E-03	****	2.24E+00	
0	794.66	23	2	3.71	1588.08	1583	10	6.55E-03	48.2	2.07E+00	T
0	801.39	13	11	2.98	1601.54	1595	11	3.61E-03	****	2.06E+00	T
0	845.76	15	4	1.23	1690.27	1686	8	4.23E-03	68.3	1.96E+00	T
0	930.80	22	3	0.71	1860.30	1854	12	6.40E-03	51.3	1.79E+00	
0	954.49	17	4	3.34	1907.66	1901	15	4.99E-03	66.9	1.75E+00	T
0	964.52	21	3	2.16	1927.73	1922	11	6.19E-03	51.2	1.73E+00	T
0	989.09	6	4	1.21	1976.85	1970	9	1.81E-03	****	1.69E+00	
0	1105.05	17	7	3.53	2208.74	2200	15	4.86E-03	83.3	1.52E+00	
0	1151.34	12	11	2.22	2301.31	2294	12	3.55E-03	****	1.46E+00	
0	1246.98	18	7	6.18	2492.55	2484	16	5.20E-03	81.3	1.36E+00	
0	1294.04	6	3	1.05	2586.67	2584	6	1.67E-03	****	1.31E+00	
0	1360.23	11	2	1.87	2719.04	2714	10	3.16E-03	79.0	1.26E+00	
0	1377.98	15	2	1.80	2754.54	2749	11	4.29E-03	65.5	1.24E+00	
0	1402.76	8	4	1.66	2804.10	2799	9	2.25E-03	****	1.23E+00	
0	1421.97	6	2	0.77	2842.52	2837	9	1.63E-03	****	1.21E+00	
0	1496.46	11	0	3.88	2991.50	2986	11	3.33E-03	57.7	1.17E+00	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278009.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:46 Sensitivity      : 3.000
* Detector ID       : GAM16 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.42 Half life ratio : *****
* Sample date       : 13-SEP-2023 07:30:00 Nuclide Library : SOLID
* Sample ID         : G640278009 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.1422E+02 GRAM
* Wet wt corr       : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 9-NOV-2022 03:48:10 Eff. Geometry : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM16_CAN.CNF;2
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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	3.053E-01
CD-109	6.045E-01
SN-126	5.663E-02
TL-208	2.878E-02
BI-211	1.640E-01
PB-212	4.705E-02
BI-214	5.778E-02
PB-214	5.963E-02
RN-222	5.778E-02
RA-224	5.043E-01
RA-226	5.963E-02
AC-228	1.106E-01
RA-228	1.106E-01
TH-228	4.705E-02
TH-230	5.963E-02
PA-231	4.824E-01
TH-232	1.106E-01
U-234	5.963E-02
U-235	1.712E-01
AM-243	3.972E-02
ANH-511	2.666E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.508E-01	NOT IDENT.
NA-22	4.559E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.326E-02	NOT IDENT.
SC-46	4.708E-02	FAIL ABUN
V-48	2.698E-01	NOT IDENT.
CR-51	7.179E-01	NOT IDENT.
MN-52	6.164E+00	NOT IDENT.
MN-54	3.863E-02	NOT IDENT.
CO-56	4.788E-02	FAIL ABUN



MN-56	0.000E+00	SHORT HLIF
CO-57	2.226E-02	NOT IDENT.
CO-58	3.970E-02	NOT IDENT.
FE-59	1.023E-01	NOT IDENT.
CO-60	2.188E-02	NOT IDENT.
ZN-65	9.487E-02	NOT IDENT.
GE-68	1.466E+00	NOT IDENT.
AS-73	1.162E+00	NOT IDENT.
AS-74	2.423E-01	NOT IDENT.
SE-75	4.707E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	7.489E-01	NOT IDENT.
RB-83	9.126E-02	NOT IDENT.
RB-84	1.135E-01	NOT IDENT.
KR-85	7.241E+00	NOT IDENT.
SR-85	5.368E-02	NOT IDENT.
RB-86	2.739E+00	NOT IDENT.
Y-88	1.999E-02	NOT IDENT.
Y-91	2.597E+01	NOT IDENT.
NB-94	2.402E-02	NOT IDENT.
NB-95	5.465E-02	NOT IDENT.
NB-95M	1.457E-01	NOT IDENT.
ZR-95	8.835E-02	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	4.880E-02	NOT IDENT.
RU-103	5.671E-02	FAIL ABUN
RH-106	3.208E-01	NOT IDENT.
RU-106	3.208E-01	NOT IDENT.
AG-108M	2.530E-02	NOT IDENT.
AG-110	7.423E-01	NOT IDENT.
AG-110M	4.658E-02	NOT IDENT.
SN-113	4.834E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.433E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.998E-02	NOT IDENT.
SB-124	9.936E-02	NOT IDENT.
SB-125	7.231E-02	FAIL ABUN
TE-125M	1.074E+01	NOT IDENT.
I-126	9.983E-01	NOT IDENT.
SB-126	7.605E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.453E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	3.558E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.875E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	4.007E-01	NOT IDENT.
BA-137M	3.772E-02	NOT IDENT.
CS-137	3.985E-02	NOT IDENT.
LA-138	4.427E-02	NOT IDENT.
CE-139	2.716E-02	NOT IDENT.
BA-140	1.270E+00	FAIL ABUN
LA-140	4.815E-01	NOT IDENT.
CE-141	9.494E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.676E-01	NOT IDENT.
PM-144	3.725E-02	NOT IDENT.
PR-144	2.829E+00	NOT IDENT.
PM-146	4.195E-02	NOT IDENT.
ND-147	3.887E+00	FAIL ABUN
PM-147	6.289E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.516E-02	FAIL ABUN
EU-152	8.806E-02	FAIL ABUN
GD-153	6.411E-02	NOT IDENT.
EU-154	1.271E-01	NOT IDENT.
EU-155	7.984E-02	FAIL ABUN
TB-160	1.552E-01	FAIL ABUN
HO-166M	5.609E-02	NOT IDENT.
TM-171	1.974E+01	NOT IDENT.
HF-172	1.720E-01	NOT IDENT.

LU-172	6.889E-02	FAIL ABUN
LU-176	2.114E-02	FAIL ABUN
HF-181	5.211E-02	NOT IDENT.
TA-182	2.022E-01	FAIL ABUN
RE-183	2.376E-01	FAIL ABUN
RE-184	1.180E-01	NOT IDENT.
W-188	8.956E+00	NOT IDENT.
IR-192	3.172E-02	FAIL ABUN
HG-203	5.311E-02	NOT IDENT.
TL-204	3.676E+00	NOT IDENT.
BI-207	4.807E-02	FAIL ABUN
BI-210	4.100E+00	NOT IDENT.
PB-210	4.100E+00	NOT IDENT.
PB-211	6.473E-01	NOT IDENT.
BI-212	4.718E-01	NOT IDENT.
BI-213	8.304E-02	NOT IDENT.
RN-219	3.645E-01	FAIL ABUN
RA-223	6.106E-01	FAIL ABUN
AC-225	4.911E+00	NOT IDENT.
AC-227	2.234E-01	FAIL ABUN
TH-227	2.234E-01	FAIL ABUN
TH-229	4.681E-01	FAIL ABUN
TH-231	6.106E-01	FAIL ABUN
PA-233	5.227E-02	FAIL ABUN
PA-234	2.592E-01	NOT IDENT.
PA-234M	5.024E+00	NOT IDENT.
TH-234	1.246E+00	FAIL ABUN
NP-237	5.227E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.246E+00	FAIL ABUN
NP-239	2.118E-01	NOT IDENT.
PU-239	2.766E+02	NOT IDENT.
AM-241	1.328E-01	NOT IDENT.
CM-243	7.409E-02	NOT IDENT.
BK-247	7.084E-02	NOT IDENT.
CM-247	3.254E-02	NOT IDENT.
CF-249	3.830E-02	NOT IDENT.
CF-251	1.045E-01	NOT IDENT.

```

*****
*                               GEL Laboratories LLC                       *
*                               2040 Savage Road                          *
*                               Charleston, SC 29407                     *
*****
*                               DETECTOR AND SAMPLE DATA                 *
*                               *                                         *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278009.CNF;1
* Acquisition date   : 30-OCT-2023 09:47:46 Sensitivity      : 3.000
* Detector ID       : GAM16 Energy tolerance: 1.500
* Elapsed live time: 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time: 0 01:00:00.42 Half life ratio : *****
* Sample date       : 13-SEP-2023 07:30:00 Nuclide Library : SOLID
* Sample ID         : G640278009 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.1422E+02 GRAM
*                               Quantity Err(%) : 1.7510E-03 %
* Wet wt corr       : 1.00000 Wet Weight      : 0.00000
*                               Dry Weight      : 0.00000
*****
*                               CALIBRATION INFORMATION                   *
*                               *                                         *
* Eff. Cal. date    : 9-NOV-2022 03:48:10 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM16_CAN.CNF;22
*****

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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	1.473E+01	2.278E+00	2.278E+00
CD-109	1.725E+00	1.050E+00	1.050E+00
SN-126	1.607E-01	9.742E-02	9.742E-02
TL-208	2.187E-01	8.395E-02	8.395E-02
BI-211	2.331E+00	5.485E-01	5.485E-01
PB-212	6.444E-01	1.273E-01	1.273E-01
BI-214	5.290E-01	1.886E-01	1.886E-01
PB-214	8.460E-01	1.986E-01	1.986E-01
RN-222	5.290E-01	1.886E-01	1.886E-01
RA-224	1.691E+00	1.254E+00	1.254E+00
RA-226	8.460E-01	1.986E-01	1.986E-01
AC-228	7.854E-01	2.975E-01	2.975E-01
RA-228	7.854E-01	2.975E-01	2.975E-01
TH-228	6.444E-01	1.273E-01	1.273E-01
TH-230	8.459E-01	1.986E-01	1.986E-01
PA-231	7.799E-01	6.467E-01	6.467E-01
TH-232	7.854E-01	2.975E-01	2.975E-01
U-234	8.459E-01	1.986E-01	1.986E-01
U-235	-1.686E-02	2.079E-01	2.079E-01
AM-243	2.390E-01	8.733E-02	8.733E-02
ANH-511	1.024E-01	7.868E-02	7.868E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.851E-01	5.129E-01	5.196E-01	NOT IDENT.
NA-22	2.772E-03	5.518E-02	5.519E-02	NOT IDENT.
NA-24	6.212E+20	1.925E+21	0.000E+00	SHORT HLIF
AL-26	-1.536E-02	3.390E-02	3.460E-02	NOT IDENT.
SC-46	9.045E-03	5.389E-02	5.405E-02	FAIL ABUN
V-48	6.884E-02	3.484E-01	3.498E-01	NOT IDENT.
CR-51	2.745E-01	7.987E-01	8.082E-01	NOT IDENT.
MN-52	-6.544E+00	9.779E+00	1.021E+01	NOT IDENT.
MN-54	1.610E-02	4.284E-02	4.345E-02	NOT IDENT.

CO-56	7.526E-02	5.086E-02	6.114E-02	FAIL ABUN
MN-56	1.000E+41	6.758E+40	0.000E+00	SHORT HLIF
CO-57	5.933E-03	2.583E-02	2.597E-02	NOT IDENT.
CO-58	4.029E-03	4.556E-02	4.559E-02	NOT IDENT.
FE-59	-2.460E-01	2.129E-01	2.401E-01	NOT IDENT.
CO-60	-1.780E-02	3.349E-02	3.444E-02	NOT IDENT.
ZN-65	1.197E-01	9.809E-02	1.119E-01	NOT IDENT.
GE-68	5.589E-01	1.666E+00	1.685E+00	NOT IDENT.
AS-73	4.770E-01	1.272E+00	1.290E+00	NOT IDENT.
AS-74	1.743E-02	3.275E-01	3.276E-01	NOT IDENT.
SE-75	1.303E-02	5.228E-02	5.261E-02	NOT IDENT.
BR-77	1.129E+06	1.552E+06	1.633E+06	SHORT HLIF
SR-82	1.600E-01	8.468E-01	8.499E-01	NOT IDENT.
RB-83	1.137E-01	9.517E-02	1.081E-01	NOT IDENT.
RB-84	-9.691E-03	1.354E-01	1.355E-01	NOT IDENT.
KR-85	6.786E+00	8.635E+00	9.161E+00	NOT IDENT.
SR-85	5.016E-02	6.404E-02	6.791E-02	NOT IDENT.
RB-86	8.725E-01	3.139E+00	3.164E+00	NOT IDENT.
Y-88	-1.741E-02	3.403E-02	3.493E-02	NOT IDENT.
Y-91	-1.775E+01	3.504E+01	3.594E+01	NOT IDENT.
NB-94	-2.021E-02	3.104E-02	3.235E-02	NOT IDENT.
NB-95	-1.762E-02	6.593E-02	6.641E-02	NOT IDENT.
NB-95M	1.424E-02	1.803E-01	1.804E-01	NOT IDENT.
ZR-95	1.233E-02	1.006E-01	1.007E-01	NOT IDENT.
NB-97	-1.000E+41	2.745E+41	0.000E+00	SHORT HLIF
ZR-97	1.889E+19	9.196E+19	0.000E+00	SHORT HLIF
MO-99	-4.630E+03	3.985E+04	3.991E+04	SHORT HLIF
TC-99M	1.000E+41	1.539E+41	0.000E+00	SHORT HLIF
RH-101	2.085E-02	3.346E-02	3.475E-02	NOT IDENT.
RH-102	2.825E-02	6.056E-02	6.189E-02	NOT IDENT.
RU-103	-2.008E-02	7.110E-02	7.168E-02	FAIL ABUN
RH-106	1.991E-01	3.612E-01	3.722E-01	NOT IDENT.
RU-106	1.991E-01	3.612E-01	3.722E-01	NOT IDENT.
AG-108M	-2.494E-03	3.029E-02	3.031E-02	NOT IDENT.
AG-110	4.045E-01	8.457E-01	8.652E-01	NOT IDENT.
AG-110M	1.000E-02	5.300E-02	5.319E-02	NOT IDENT.
SN-113	1.055E-02	5.544E-02	5.565E-02	NOT IDENT.
CD-115	-6.356E+03	2.260E+05	2.260E+05	SHORT HLIF
SN-117M	2.071E-01	2.948E-01	3.093E-01	NOT IDENT.
SB-122	1.541E+03	7.269E+03	7.302E+03	SHORT HLIF
TE-123M	1.920E-02	3.709E-02	3.809E-02	NOT IDENT.
SB-124	-6.358E-02	1.385E-01	1.414E-01	NOT IDENT.
SB-125	-9.204E-02	9.846E-02	1.068E-01	FAIL ABUN
TE-125M	-5.676E+00	1.318E+01	1.343E+01	NOT IDENT.
I-126	-8.290E-01	1.378E+00	1.427E+00	NOT IDENT.
SB-126	3.239E-01	8.304E-01	8.432E-01	NOT IDENT.
SB-127	6.291E+02	7.494E+02	8.013E+02	SHORT HLIF
I-131	2.888E-01	1.657E+00	1.662E+00	NOT IDENT.
I-132	-1.000E+41	8.199E+41	0.000E+00	SHORT HLIF
TE-132	-3.879E+02	8.010E+02	8.199E+02	SHORT HLIF
BA-133	1.239E-02	4.416E-02	4.451E-02	NOT IDENT.
I-133	3.665E+13	7.437E+14	7.438E+14	SHORT HLIF
CS-134	8.829E-02	4.242E-02	5.817E-02	FAIL ABUN
I-135	-1.000E+41	5.151E+41	0.000E+00	SHORT HLIF
CS-136	-3.307E-01	5.578E-01	5.774E-01	NOT IDENT.
BA-137M	3.530E-02	4.122E-02	4.418E-02	NOT IDENT.
CS-137	3.729E-02	4.354E-02	4.668E-02	NOT IDENT.
LA-138	1.327E-02	4.792E-02	4.830E-02	NOT IDENT.
CE-139	9.041E-03	3.459E-02	3.483E-02	NOT IDENT.
BA-140	-8.982E-01	1.674E+00	1.722E+00	FAIL ABUN
LA-140	8.417E-02	5.476E-01	5.489E-01	NOT IDENT.
CE-141	-1.178E-01	1.263E-01	1.370E-01	NOT IDENT.
CE-143	1.769E+08	1.349E+09	1.351E+09	SHORT HLIF
CE-144	2.577E-02	1.974E-01	1.978E-01	NOT IDENT.
PM-144	2.542E-02	3.975E-02	4.137E-02	NOT IDENT.
PR-144	1.906E+00	3.021E+00	3.141E+00	NOT IDENT.
PM-146	4.334E-02	4.451E-02	4.861E-02	NOT IDENT.
ND-147	1.442E+00	4.472E+00	4.519E+00	FAIL ABUN
PM-147	2.321E+02	7.239E+02	7.314E+02	NOT IDENT.
PM-149	9.238E+05	2.038E+06	2.080E+06	SHORT HLIF
EU-150	-6.814E-03	3.335E-02	3.349E-02	FAIL ABUN
EU-152	6.261E-02	9.541E-02	9.950E-02	FAIL ABUN
GD-153	-2.158E-02	8.353E-02	8.410E-02	NOT IDENT.
EU-154	7.727E-03	1.538E-01	1.539E-01	NOT IDENT.
EU-155	-4.619E-02	9.950E-02	1.017E-01	FAIL ABUN
TB-160	1.930E-02	1.791E-01	1.793E-01	FAIL ABUN
HO-166M	-3.153E-02	6.903E-02	7.048E-02	NOT IDENT.
TM-171	1.723E+00	2.208E+01	2.209E+01	NOT IDENT.

HF-172	8.526E-02	1.974E-01	2.011E-01	NOT IDENT.
LU-172	2.731E-02	7.813E-02	7.909E-02	FAIL ABUN
LU-176	1.552E-03	2.413E-02	2.414E-02	FAIL ABUN
HF-181	-7.892E-02	7.536E-02	8.334E-02	NOT IDENT.
TA-182	-5.392E-02	2.565E-01	2.576E-01	FAIL ABUN
RE-183	-9.399E-02	2.779E-01	2.811E-01	FAIL ABUN
RE-184	-7.258E-02	1.606E-01	1.639E-01	NOT IDENT.
W-188	7.794E+00	1.040E+01	1.098E+01	NOT IDENT.
IR-192	-4.936E-02	4.306E-02	4.847E-02	FAIL ABUN
HG-203	-1.787E-03	6.079E-02	6.079E-02	NOT IDENT.
TL-204	1.518E-01	4.517E+00	4.517E+00	NOT IDENT.
BI-207	-3.274E-02	6.367E-02	6.536E-02	FAIL ABUN
BI-210	8.067E-01	4.631E+00	4.645E+00	NOT IDENT.
PB-210	8.067E-01	4.631E+00	4.645E+00	NOT IDENT.
PB-211	3.010E-01	8.014E-01	8.128E-01	NOT IDENT.
BI-212	1.238E-01	5.803E-01	5.830E-01	NOT IDENT.
BI-213	-4.322E-02	1.047E-01	1.064E-01	NOT IDENT.
RN-219	-6.237E-02	4.361E-01	4.371E-01	FAIL ABUN
RA-223	6.259E-01	6.445E-01	7.036E-01	FAIL ABUN
AC-225	-1.502E+00	6.250E+00	6.287E+00	NOT IDENT.
AC-227	6.389E-02	2.477E-01	2.493E-01	FAIL ABUN
TH-227	6.389E-02	2.477E-01	2.493E-01	FAIL ABUN
TH-229	3.284E-01	5.420E-01	5.619E-01	FAIL ABUN
TH-231	6.259E-01	6.445E-01	7.036E-01	FAIL ABUN
PA-233	1.886E-02	5.802E-02	5.864E-02	FAIL ABUN
PA-234	-1.185E-01	3.560E-01	3.600E-01	NOT IDENT.
PA-234M	4.796E+00	5.237E+00	5.666E+00	NOT IDENT.
TH-234	9.755E-02	1.402E+00	1.403E+00	FAIL ABUN
NP-237	1.886E-02	5.802E-02	5.864E-02	FAIL ABUN
NP-238	6.607E+05	6.821E+05	7.443E+05	SHORT HLIF
U-238	9.755E-02	1.402E+00	1.403E+00	FAIL ABUN
NP-239	-5.693E-02	2.557E-01	2.570E-01	NOT IDENT.
PU-239	3.406E+01	3.262E+02	3.265E+02	NOT IDENT.
AM-241	-9.240E-03	1.514E-01	1.514E-01	NOT IDENT.
CM-243	-3.772E-02	9.224E-02	9.379E-02	NOT IDENT.
BK-247	6.206E-03	7.996E-02	8.001E-02	NOT IDENT.
CM-247	-1.997E-02	4.083E-02	4.181E-02	NOT IDENT.
CF-249	4.748E-02	3.962E-02	4.503E-02	NOT IDENT.
CF-251	2.700E-02	1.245E-01	1.251E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	46.7950	85.43	66.0919	131.20	60.0999
45.60	54.9067	86.55	63.3561	133.02	51.6877
46.54	38.7490	86.79	63.3942	133.52	52.8132
49.72	0.0000	86.94	63.4180	136.00	64.9631
51.35	42.0881	87.09	63.4423	136.47	67.1853
51.87	41.2891	87.57	63.5187	140.51	0.0000
52.39	52.8085	88.03	63.5916	143.76	62.5708
52.97	57.3280	88.34	63.6407	144.24	58.2292
53.44	46.8226	88.47	63.6615	145.44	68.2581
54.07	45.1561	89.96	63.8961	152.43	60.1592
57.36	0.0000	1093.63	64.0027	153.25	64.7031
57.53	58.2417	91.11	64.0761	323.87	65.9231
57.98	53.8426	92.59	64.3057	156.02	57.1540
59.27	54.9753	93.35	64.4233	158.56	49.5141
59.32	54.9843	94.56	64.6092	159.00	54.0535
59.54	52.3180	94.65	64.6226	162.33	50.9457
60.96	54.3734	94.67	64.6256	162.66	50.9724
61.17	63.4786	94.87	64.6563	163.33	51.0260
62.93	66.5726	97.43	52.0361	165.86	45.5371
63.29	59.3444	98.43	38.7829	176.31	58.9929
63.58	60.3124	98.44	38.7838	176.60	60.1758
64.28	49.4549	99.53	48.2659	177.52	48.6702
66.73	55.3656	100.11	52.3571	181.07	0.0000
67.24	49.9061	102.03	50.5619	181.52	51.2886
125.81	49.9724	103.18	50.6916	184.41	62.0382
67.75	49.9827	103.37	50.7133	143.76	62.1555
68.89	65.0135	105.21	60.0853	193.51	49.7994
69.67	47.1664	105.31	60.0983	197.03	65.5307
70.82	53.5523	106.12	52.0412	198.01	56.0735
70.83	53.5540	106.47	52.0809	201.83	57.5640
72.81	61.0630	109.28	62.6708	203.43	63.6965
72.87	61.0734	111.00	42.2769	205.31	54.2175
74.66	61.3838	111.76	0.0000	210.85	63.1084
74.82	61.4111	114.06	63.3028	215.65	53.7304
74.97	61.4369	116.30	0.0000	218.12	63.6995
77.11	61.8024	116.74	62.6074	222.11	56.6331
78.74	62.0771	119.76	56.6903	227.09	52.0277
79.69	62.2358	121.12	53.6856	227.38	38.4151
80.03	62.2918	121.22	54.7489	228.16	0.0000
80.12	62.3077	121.78	52.7012	228.18	57.0592
80.19	62.3191	122.06	53.7852	116.74	57.0592
80.57	62.3821	122.92	53.8758	235.69	52.5718
81.00	62.4535	123.07	56.0048	235.96	47.5800
81.07	62.4649	265.00	64.5351	238.63	47.7308
81.75	62.8979	125.81	60.5521	238.98	0.0000
82.47	66.8757	127.23	62.8468	240.99	47.8636
83.79	58.0714	127.91	71.4615	242.00	47.9198
84.00	58.1030	129.30	59.8856	244.70	40.4805

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	27.0347	563.25	31.6196
252.80	41.7081	345.93	31.7422	564.24	0.0000
254.15	0.0000	351.06	30.0091	569.33	29.5433
256.23	41.8689	351.93	30.0319	946.00	29.5466
260.90	0.0000	355.39	0.0000	569.70	26.2666
264.66	39.6726	356.01	26.8417	583.19	18.7515
264.80	39.6782	364.49	23.7157	584.27	18.7632
265.00	43.1376	366.42	0.0000	595.83	14.9980
269.46	37.2777	372.51	33.4249	427.87	20.0508
270.03	37.3004	375.05	32.5384	602.52	0.0000
271.23	37.3485	377.52	35.4809	604.72	25.1212
273.65	33.9615	356.01	33.7368	607.14	20.1240
276.40	34.9333	388.16	19.3449	609.32	20.1482
277.37	42.8371	388.63	24.1903	610.33	20.1599
277.60	40.2238	391.69	29.0991	614.28	16.8365
278.00	41.9902	264.66	20.5142	618.01	13.4966
279.20	42.9189	401.81	34.2210	620.36	19.1444
279.54	49.9434	402.40	38.1494	621.93	16.9067
279.70	49.9527	404.85	26.4611	630.19	0.0000
280.46	47.3610	410.95	19.6932	631.29	13.5938
283.69	51.0391	413.71	17.7612	633.25	19.0518
284.31	51.9515	414.70	15.7995	634.78	19.2938
285.41	44.0765	423.72	25.3521	635.95	18.1706
285.90	0.0000	427.09	30.8972	636.99	18.1803
287.50	49.4717	427.87	35.9019	657.50	16.0804
290.67	30.5764	433.94	27.0467	657.76	26.4215
293.27	0.0000	439.40	26.1486	657.90	0.0000
351.93	34.7225	440.45	28.1817	661.66	17.2656
295.96	34.7487	453.88	19.3073	664.57	0.0000
879.38	10.7197	463.37	25.5737	666.33	25.3838
299.98	33.5449	468.07	18.4728	666.50	25.3865
300.09	33.5487	473.00	0.0000	667.71	0.0000
300.13	33.5503	475.06	28.8733	677.62	12.7653
301.36	55.0887	476.78	22.7126	685.70	0.0000
302.85	32.2939	477.60	22.7251	692.65	0.0000
256.23	42.0497	482.18	30.0484	695.00	18.4372
304.85	37.7498	487.02	31.1853	696.49	18.4506
306.78	30.6167	492.35	0.0000	696.51	18.4506
308.46	34.2744	497.08	24.0678	697.00	21.9704
311.90	27.1484	505.52	23.6742	697.30	22.8524
316.51	39.0834	507.63	0.0000	697.49	22.8547
319.41	23.6963	511.00	27.4531	702.65	20.2689
320.08	31.0069	514.00	23.8028	706.68	20.3089
321.04	41.0751	514.00	23.8030	711.68	26.5549
323.87	28.3706	520.40	13.8088	720.70	14.2241
325.23	41.2354	520.69	0.0000	721.93	0.0000
328.76	36.7733	522.65	0.0000	722.78	21.3574
333.37	47.0831	527.90	0.0000	722.91	21.3589
333.97	45.7224	528.26	24.5517	723.31	24.2117
334.37	38.8093	529.59	23.5030	724.19	15.6729
338.28	38.0188	529.87	0.0000	727.33	15.6965
338.32	38.0196	531.02	20.3166	733.00	15.7384
311.90	32.0539	537.26	27.9085	735.93	19.7005
340.48	32.0539	546.56	0.0000	333.97	14.3379
340.55	32.0560	552.55	10.8341	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	13.4843	949.00	10.9724	1384.29	1.1262
747.24	17.1045	667.71	0.0000	1408.01	2.5908
748.06	17.1109	962.31	7.8770	1434.09	5.4788
752.31	18.9492	964.08	6.3057	1435.80	3.6541
753.82	14.4478	966.17	0.0000	1457.56	0.0000
756.73	15.3710	911.20	15.7930	1460.82	6.4371
756.80	15.3715	983.53	12.7027	1489.16	2.3158
884.68	19.0505	984.45	0.0000	1505.03	9.3008
765.81	24.5149	1274.44	11.9645	1584.12	7.5879
766.42	21.7969	1001.03	10.9862	1596.21	5.7076
766.84	21.8013	1002.74	12.9917	1620.50	3.8273
772.60	0.0000	1004.73	20.0018	1621.92	4.7856
776.52	16.4229	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	5.8362
778.90	11.8737	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	19.2273	1764.49	6.5924
788.74	18.3472	1038.76	0.0000	1063.66	14.8521
792.07	14.6997	631.29	17.2563	1771.35	4.9519
795.86	0.0000	1048.07	13.2023	1791.20	0.0000
810.06	9.2599	1049.04	14.2230	1808.65	4.9922
810.29	10.1870	1050.41	11.1806	1810.72	0.0000
344.28	10.1876	1063.66	19.4001	1836.06	3.0130
810.76	10.1890	1077.00	14.3606		
815.77	13.9243	1077.34	14.3623		
1048.07	12.0820	1085.87	17.4897		
832.01	11.2174	1093.63	13.4094		
834.85	15.9105	1099.45	23.1506		
835.71	12.1712	1112.07	10.6756		
836.80	0.0000	1112.84	11.0736		
846.75	0.0000	1115.54	4.9875		
846.77	10.5349	1120.29	15.6107		
856.80	15.1128	1120.55	15.6116		
860.56	18.9203	1221.41	8.3281		
871.09	12.3513	1129.67	12.5266		
873.19	7.6074	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	12.3930	1173.23	21.1719		
880.51	12.3986	1177.95	15.9027		
881.60	13.3583	1189.05	17.0215		
883.24	13.3672	1204.77	18.1746		
884.68	11.4642	1221.41	16.1179		
889.28	13.3997	1231.02	11.8547		
894.76	19.1846	1235.36	24.8193		
898.04	8.6443	1238.28	9.7202		
900.72	8.6537	1260.41	0.0000		
903.28	7.6997	1271.87	16.3632		
911.20	11.5858	1274.44	14.1926		
912.08	11.5898	1274.54	14.1926		
923.98	0.0000	1291.59	8.7778		
926.50	4.6620	1298.22	0.0000		
929.11	12.4449	1312.11	8.8296		
935.54	4.6784	1332.49	6.6606		
937.49	12.6802	1362.66	0.0000		
944.13	10.7566	1365.19	10.7549		
946.00	16.6358	1368.63	0.0000		



VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:49:49.02

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*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                            *
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Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278010.CNF;1
Background file    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM19.CNF;922
Background date    : 29-OCT-2023 11:32:43
Sample date       : 13-SEP-2023 09:00:00 Acquisition date : 30-OCT-2023 09:48:55
Sample ID        : G640278010 Sample quantity   : 1.29640E+02 GRAM
Detector name    : GAM19 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.66 0.0%
Energy tolerance : 1.50000 keV Analyst Initials  : MXR1
Abundance limit  : 75.00000 Sensitivity    : 3.00000
Batch ID        : 2505440 Detector SN#    :
Matrix Spike ID  : LCS ID      :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.46*	20	118	0.98	125.07	123	8	5.53E-03	99.6	
2	0	69.97	28	132	2.17	140.09	136	8	7.68E-03	74.5	
3	2	74.73	100	113	1.14	149.60	144	23	2.79E-02	20.5	1.31E+00
4	2	77.04*	171	105	1.14	154.23	144	23	4.74E-02	13.0	
5	0	86.88	54	134	1.31	173.90	171	8	1.49E-02	39.8	
6	0	93.05*	91	132	1.15	186.25	182	10	2.53E-02	27.6	
7	0	105.52	36	85	0.99	211.19	206	9	1.01E-02	48.6	
8	0	185.67*	80	84	1.08	371.48	366	9	2.23E-02	24.5	
9	6	238.63*	243	68	1.22	477.39	472	20	6.75E-02	8.5	1.32E+00
10	6	241.91	125	73	2.08	483.95	472	20	3.46E-02	21.0	
11	0	270.66	27	76	1.49	541.46	537	9	7.55E-03	61.0	
12	0	295.37*	109	57	1.12	590.87	585	11	3.02E-02	16.9	
13	0	300.31	16	36	0.63	600.73	597	7	4.49E-03	66.7	
14	0	338.54	39	52	1.70	677.21	672	8	1.08E-02	35.8	
15	0	351.78*	246	55	1.29	703.69	698	13	6.83E-02	9.0	
16	0	378.88	17	15	1.44	757.88	755	7	4.84E-03	45.5	
17	0	439.41*	26	14	1.94	878.94	875	9	7.21E-03	34.4	
18	0	473.86	19	33	0.65	947.82	941	14	5.41E-03	67.9	
19	0	501.75	21	17	1.44	1003.61	999	9	5.86E-03	42.0	
20	0	511.34*	11	48	1.25	1022.78	1016	14	3.08E-03	163.9	
21	0	583.04*	93	29	1.25	1166.19	1159	13	2.58E-02	16.2	
22	0	609.23*	177	13	1.42	1218.56	1214	12	4.90E-02	8.7	
23	0	635.87	15	13	2.31	1271.84	1267	12	4.15E-03	53.6	
24	0	713.42	20	2	0.89	1426.95	1423	10	5.59E-03	26.4	
25	0	729.19	18	33	2.19	1458.49	1448	17	5.00E-03	77.7	
26	0	755.69	20	18	5.43	1511.49	1499	18	5.64E-03	53.7	
27	0	782.36	9	7	0.97	1564.82	1559	9	2.58E-03	60.2	
28	0	794.81	32	8	1.70	1589.73	1582	16	8.89E-03	26.5	
29	0	841.59	15	16	0.73	1683.29	1678	10	4.08E-03	61.3	
30	0	859.40	31	12	4.35	1718.91	1713	13	8.63E-03	29.7	
31	0	872.10	15	13	0.62	1744.30	1738	14	4.05E-03	60.2	
32	0	910.92*	48	31	1.70	1821.94	1815	15	1.32E-02	29.6	
33	0	940.63	9	4	0.61	1881.37	1877	7	2.63E-03	46.2	
34	0	969.71*	28	27	1.52	1939.54	1931	12	7.82E-03	42.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	998.86	10	2	1.45	1997.84	1993	9	2.74E-03	41.8	
36	0	1032.01	8	3	0.64	2064.13	2061	6	2.32E-03	47.1	
37	0	1205.07	7	6	0.95	2410.29	2406	6	1.94E-03	67.0	
38	0	1250.99	12	5	0.94	2502.13	2497	10	3.33E-03	45.3	
39	0	1306.35	9	3	3.67	2612.86	2607	10	2.63E-03	45.2	
40	0	1460.62*	317	7	2.00	2921.42	2914	18	8.80E-02	6.1	
41	0	1729.28	9	3	0.64	3458.81	3452	11	2.56E-03	48.0	
42	0	1764.43*	25	2	1.35	3529.11	3523	10	6.88E-03	24.6	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278010.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 13-SEP-2023 09:00:00 Acquisition date : 30-OCT-2023 09:48:55  
Sample ID : G640278010 Sample quantity : 129.64 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA19 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.66 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

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	302	10.66*	1.169E+00	1.402E+01	1.402E+01	12.16
Y-91	1204.77	7	0.26*	1.371E+00	1.098E+01	1.917E+01	134.01
CD-109	88.03	61	3.70*	5.989E+00	1.606E+00	1.724E+00	79.57
SN-126	64.28	-----	9.60	3.439E+00	-----	Line Not Found	-----
	86.94	61	8.90	5.989E+00	6.679E-01	6.679E-01	79.57
	87.57	61	37.00*	5.989E+00	1.606E-01	1.606E-01	79.57
EU-155	86.55	61	30.70	5.989E+00	1.936E-01	1.973E-01	79.57
	105.31	41	21.10*	6.821E+00	1.659E-01	1.690E-01	97.22
TL-204	68.89	32	0.47	4.247E+00	9.322E+00	9.545E+00	149.01
	70.82	32	0.79*	4.247E+00	5.541E+00	5.674E+00	149.01
	80.03	-----	0.28	5.411E+00	-----	Line Not Found	-----
	82.47	-----	0.07	5.637E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	4.574E+00	-----	Line Not Found	-----
	583.19	94	85.00*	2.598E+00	2.475E-01	2.475E-01	32.40
	860.56	31	12.50	1.860E+00	7.654E-01	7.654E-01	59.41
BI-211	72.87	-----	1.23	4.620E+00	-----	Line Not Found	-----
	351.06	258	12.92*	3.843E+00	3.008E+00	3.008E+00	18.09
PB-212	74.82	116	10.28	4.844E+00	1.349E+00	1.349E+00	41.03
	77.11	197	17.10	5.104E+00	1.307E+00	1.307E+00	25.92
	238.63	262	43.60*	5.088E+00	6.828E-01	6.828E-01	16.96
	300.09	17	3.30	4.318E+00	6.969E-01	6.969E-01	133.37
BI-213	440.45	27	25.94*	3.249E+00	1.844E-01	1.844E-01	68.88
BI-214	609.32	179	45.49*	2.505E+00	9.077E-01	9.077E-01	17.33
	1120.29	-----	14.92	1.463E+00	-----	Line Not Found	-----
	1764.49	23	15.30	1.034E+00	8.514E-01	8.515E-01	49.27
PB-214	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
RN-222	609.32	179	45.49*	2.505E+00	9.077E-01	9.077E-01	17.33
	1120.29	-----	14.92	1.463E+00	-----	Line Not Found	-----
	1764.49	23	15.30	1.034E+00	8.514E-01	8.515E-01	49.27
RA-224	240.99	134	4.10*	5.040E+00	3.753E+00	3.753E+00	42.00
RA-226	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
AC-228	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
RA-228	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
TH-228	74.82	116	10.28	4.844E+00	1.349E+00	1.349E+00	41.03
	77.11	197	17.10	5.104E+00	1.307E+00	1.307E+00	25.92
	238.63	262	43.60*	5.088E+00	6.828E-01	6.828E-01	16.96
	300.09	17	3.30	4.318E+00	6.969E-01	6.969E-01	133.37
TH-230	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
PA-231	283.69	-----	1.70	4.501E+00	-----	Line Not Found	-----
	301.36	17	5.35*	4.318E+00	4.299E-01	4.299E-01	133.37
TH-232	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
TH-234	63.29	23	3.70*	3.165E+00	1.150E+00	1.150E+00	199.14
	92.59	104	4.23	6.372E+00	2.228E+00	2.228E+00	55.12
U-234	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
U-238	63.29	23	3.70*	3.165E+00	1.150E+00	1.150E+00	199.14
	92.59	104	4.23	6.372E+00	2.228E+00	2.228E+00	55.12
AM-243	43.53	-----	5.90	5.889E-01	-----	Line Not Found	-----
	74.66	116	67.20*	4.844E+00	2.063E-01	2.063E-01	41.03
ANH-511	511.00	11	100.00*	2.887E+00	2.276E-02	2.276E-02	327.77

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278010.CNF;1
* Acquisition date   : 30-OCT-2023 09:48:55 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 01:00:00.66 Half life ratio : *****
* Sample date      : 13-SEP-2023 09:00:00 Analyst initials: MXR1
* Sample ID       : G640278010 Sample Quantity : 1.2964E+02 GRAM
* Batch Number    : 2505440 Wet Weight      : 0.00000
* Wet wt corr     : 1.00000 Dry Weight     : 0.00000
* Nuclide Library  : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 5-DEC-2022 06:46:55 Eff. Geometry     : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;24
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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	1.402E+01	1.671E+00	5.524E-01
Y-91	1.917E+01	2.518E+01	5.334E+01
CD-109	1.724E+00	1.344E+00	1.299E+00
SN-126	1.606E-01	1.253E-01	1.216E-01
EU-155	1.690E-01	1.610E-01	1.419E-01
TL-204	5.674E+00	8.286E+00	7.196E+00
TL-208	2.475E-01	7.858E-02	4.787E-02
BI-211	3.008E+00	5.331E-01	3.315E-01
PB-212	6.828E-01	1.135E-01	8.855E-02
BI-213	1.844E-01	1.245E-01	1.510E-01
BI-214	9.077E-01	1.541E-01	1.181E-01
PB-214	1.092E+00	1.935E-01	1.205E-01
RN-222	9.077E-01	1.541E-01	1.181E-01
RA-224	3.753E+00	1.545E+00	9.489E-01
RA-226	1.092E+00	1.935E-01	1.205E-01
AC-228	5.960E-01	3.454E-01	2.706E-01
RA-228	5.960E-01	3.454E-01	2.706E-01
TH-228	6.828E-01	1.135E-01	8.855E-02
TH-230	1.092E+00	1.935E-01	1.205E-01
PA-231	4.299E-01	5.618E-01	8.247E-01
TH-232	5.960E-01	3.454E-01	2.706E-01
TH-234	1.150E+00	2.244E+00	1.818E+00
U-234	1.092E+00	1.935E-01	1.205E-01
U-238	1.150E+00	2.244E+00	1.818E+00
AM-243	2.063E-01	8.296E-02	7.727E-02
ANH-511	2.276E-02	7.310E-02	4.877E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-1.985E-02		4.300E-01	7.586E-01	NOT IDENT.
NA-22	-3.597E-03		3.920E-02	7.830E-02	NOT IDENT.
NA-24	0.000E+00		1.426E+21	0.000E+00	SHORT HLIF
AL-26	5.827E-03		2.566E-02	6.187E-02	NOT IDENT.

SC-46	1.634E-02	4.370E-02	9.097E-02	NOT IDENT.
V-48	-2.046E-01	2.620E-01	4.175E-01	NOT IDENT.
CR-51	1.378E-01	6.982E-01	1.407E+00	NOT IDENT.
MN-52	3.634E+00	1.119E+01	2.511E+01	NOT IDENT.
MN-54	3.936E-02	4.351E-02	9.126E-02	NOT IDENT.
CO-56	2.225E-02	4.945E-02	9.873E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.178E-03	2.196E-02	4.142E-02	NOT IDENT.
CO-58	2.029E-02	5.679E-02	1.130E-01	NOT IDENT.
FE-59	-1.007E-01	1.250E-01	2.186E-01	NOT IDENT.
CO-60	-7.790E-03	2.806E-02	5.636E-02	NOT IDENT.
ZN-65	-4.928E-02	8.989E-02	1.649E-01	NOT IDENT.
GE-68	-1.657E-01	1.230E+00	2.451E+00	NOT IDENT.
AS-73	4.047E-01	8.510E-01	1.748E+00	NOT IDENT.
AS-74	-1.410E-01	2.880E-01	5.190E-01	FAIL ABUN
SE-75	6.846E-03	5.140E-02	9.351E-02	NOT IDENT.
BR-77	0.000E+00	1.953E+05	0.000E+00	SHORT HLIF
SR-82	-2.414E-02	7.523E-01	1.375E+00	NOT IDENT.
RB-83	-1.552E-02	8.919E-02	1.688E-01	NOT IDENT.
RB-84	4.073E-02	1.016E-01	2.185E-01	NOT IDENT.
KR-85	3.366E+00	7.423E+00	1.368E+01	NOT IDENT.
SR-85	2.487E-02	5.502E-02	1.014E-01	NOT IDENT.
RB-86	-3.148E-01	2.338E+00	4.658E+00	NOT IDENT.
Y-88	3.906E-02	3.424E-02	1.021E-01	NOT IDENT.
NB-94	2.157E-02	2.769E-02	6.020E-02	FAIL ABUN
NB-95	-1.030E-02	5.589E-02	1.033E-01	NOT IDENT.
NB-95M	9.470E-02	1.601E-01	2.854E-01	NOT IDENT.
ZR-95	1.722E-01	1.813E-01	1.736E-01	FAIL ABUN
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	7.415E+19	0.000E+00	SHORT HLIF
MO-99	0.000E+00	3.770E+04	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.128E+41	0.000E+00	SHORT HLIF
RH-101	1.535E-02	2.599E-02	5.105E-02	NOT IDENT.
RH-102	7.469E-03	5.349E-02	9.598E-02	FAIL ABUN
RU-103	5.906E-02	6.054E-02	1.264E-01	FAIL ABUN
RH-106	7.662E-02	2.721E-01	5.577E-01	NOT IDENT.
RU-106	7.662E-02	2.721E-01	5.577E-01	NOT IDENT.
AG-108M	1.021E-02	2.667E-02	5.499E-02	NOT IDENT.
AG-110	-1.672E-01	6.458E-01	1.212E+00	NOT IDENT.
AG-110M	-1.288E-02	4.946E-02	9.057E-02	NOT IDENT.
SN-113	1.172E-02	4.917E-02	9.855E-02	NOT IDENT.
CD-115	0.000E+00	2.176E+05	0.000E+00	SHORT HLIF
SN-117M	-2.202E-01	2.687E-01	4.566E-01	NOT IDENT.
SB-122	0.000E+00	6.542E+03	0.000E+00	SHORT HLIF
TE-123M	-9.417E-03	3.249E-02	5.793E-02	NOT IDENT.
SB-124	-3.776E-02	9.769E-02	1.889E-01	NOT IDENT.
SB-125	6.560E-02	7.496E-02	1.636E-01	FAIL ABUN
TE-125M	3.929E+00	1.096E+01	2.136E+01	NOT IDENT.
I-126	9.816E-01	1.216E+00	2.556E+00	NOT IDENT.
SB-126	-2.774E-01	8.710E-01	1.498E+00	NOT IDENT.
SB-127	0.000E+00	4.369E+02	0.000E+00	SHORT HLIF
I-131	1.744E+00	1.571E+00	3.440E+00	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	6.080E+02	0.000E+00	SHORT HLIF
BA-133	-1.482E-02	3.623E-02	6.084E-02	NOT IDENT.
I-133	0.000E+00	6.935E+14	0.000E+00	SHORT HLIF
CS-134	0.000E+00	5.864E-02	8.715E-02	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	3.109E-01	4.313E-01	9.839E-01	NOT IDENT.
BA-137M	1.950E-02	3.044E-02	6.471E-02	NOT IDENT.
CS-137	2.059E-02	3.216E-02	6.836E-02	NOT IDENT.
LA-138	-2.542E-02	5.029E-02	9.253E-02	NOT IDENT.
CE-139	8.396E-03	2.934E-02	5.543E-02	NOT IDENT.
BA-140	6.103E-01	1.183E+00	2.518E+00	NOT IDENT.
LA-140	-9.182E-03	3.397E-01	7.561E-01	NOT IDENT.
CE-141	-1.274E-01	1.051E-01	1.713E-01	NOT IDENT.
CE-143	0.000E+00	1.162E+09	0.000E+00	SHORT HLIF
CE-144	6.292E-02	1.674E-01	3.237E-01	NOT IDENT.
PM-144	-3.448E-02	3.713E-02	6.088E-02	NOT IDENT.
PR-144	-2.633E+00	2.824E+00	4.628E+00	NOT IDENT.
PM-146	1.494E-02	3.777E-02	7.732E-02	NOT IDENT.
ND-147	2.254E+00	4.027E+00	8.326E+00	NOT IDENT.
PM-147	-8.510E+02	6.272E+02	1.024E+03	NOT IDENT.
PM-149	0.000E+00	1.774E+06	0.000E+00	SHORT HLIF
EU-150	-5.908E-03	2.396E-02	4.137E-02	FAIL ABUN
EU-152	6.130E-02	8.396E-02	1.770E-01	NOT IDENT.
GD-153	1.061E-02	8.051E-02	1.429E-01	FAIL ABUN
EU-154	-2.203E-02	1.117E-01	2.182E-01	FAIL ABUN

TB-160	-1.430E-01	1.426E-01	2.126E-01	FAIL ABUN
HO-166M	7.047E-03	5.824E-02	1.035E-01	FAIL ABUN
TM-171	1.002E+00	1.524E+01	3.010E+01	NOT IDENT.
HF-172	-2.548E-02	1.540E-01	2.843E-01	FAIL ABUN
LU-172	-3.944E-02	4.718E-02	8.164E-02	FAIL ABUN
LU-176	-8.860E-03	2.372E-02	4.044E-02	FAIL ABUN
HF-181	-2.246E-02	6.542E-02	1.224E-01	NOT IDENT.
TA-182	1.595E-01	1.840E-01	4.248E-01	NOT IDENT.
RE-183	-5.594E-02	2.204E-01	4.209E-01	NOT IDENT.
RE-184	-8.593E-02	2.071E-01	3.668E-01	NOT IDENT.
W-188	-5.613E+00	1.047E+01	1.579E+01	FAIL ABUN
IR-192	2.785E-03	4.298E-02	8.497E-02	FAIL ABUN
HG-203	-4.300E-02	6.221E-02	1.020E-01	FAIL ABUN
BI-207	-1.137E-03	1.130E-01	2.621E-01	FAIL ABUN
BI-210	6.505E-01	3.042E+00	6.040E+00	NOT IDENT.
PB-210	6.505E-01	3.042E+00	6.040E+00	NOT IDENT.
PB-211	9.087E-01	6.671E-01	1.469E+00	NOT IDENT.
BI-212	3.217E-01	5.959E-01	1.182E+00	NOT IDENT.
RN-219	-3.018E-01	3.982E-01	7.128E-01	FAIL ABUN
RA-223	1.650E-01	5.119E-01	1.049E+00	FAIL ABUN
AC-225	-1.389E+00	5.162E+00	9.055E+00	NOT IDENT.
AC-227	-7.302E-02	2.386E-01	4.138E-01	FAIL ABUN
TH-227	-7.302E-02	2.386E-01	4.138E-01	FAIL ABUN
TH-229	-2.389E-01	4.587E-01	7.916E-01	FAIL ABUN
TH-231	1.650E-01	5.119E-01	1.049E+00	FAIL ABUN
PA-233	7.953E-03	6.731E-02	1.209E-01	FAIL ABUN
PA-234	1.105E-01	3.055E-01	6.131E-01	NOT IDENT.
PA-234M	-2.173E+00	4.086E+00	6.633E+00	NOT IDENT.
U-235	-2.506E-02	1.635E-01	2.975E-01	FAIL ABUN
NP-237	7.953E-03	6.731E-02	1.209E-01	FAIL ABUN
NP-238	0.000E+00	5.914E+05	0.000E+00	SHORT HLIF
NP-239	9.425E-02	2.284E-01	4.415E-01	FAIL ABUN
PU-239	6.268E+01	2.851E+02	5.405E+02	NOT IDENT.
AM-241	8.728E-02	1.314E-01	2.523E-01	NOT IDENT.
CM-243	-3.693E-02	8.598E-02	1.437E-01	NOT IDENT.
BK-247	4.956E-04	7.368E-02	1.327E-01	FAIL ABUN
CM-247	-3.727E-03	3.618E-02	6.954E-02	NOT IDENT.
CF-249	5.911E-03	3.415E-02	6.849E-02	NOT IDENT.
CF-251	2.552E-02	1.091E-01	2.046E-01	NOT IDENT.



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	302	10.66*	1.169E+00	1.402E+01	1.402E+01	12.16
Y-91	1204.77	7	0.26*	1.371E+00	1.098E+01	1.917E+01	134.01
CD-109	88.03	61	3.70*	5.989E+00	1.606E+00	1.724E+00	79.57
SN-126	64.28	-----	9.60	3.439E+00	-----	Line Not Found	-----
	86.94	61	8.90	5.989E+00	6.679E-01	6.679E-01	79.57
	87.57	61	37.00*	5.989E+00	1.606E-01	1.606E-01	79.57
EU-155	86.55	61	30.70	5.989E+00	1.936E-01	1.973E-01	79.57
	105.31	41	21.10*	6.821E+00	1.659E-01	1.690E-01	97.22
TL-204	68.89	32	0.47	4.247E+00	9.322E+00	9.545E+00	149.01
	70.82	32	0.79*	4.247E+00	5.541E+00	5.674E+00	149.01
	80.03	-----	0.28	5.411E+00	-----	Line Not Found	-----
	82.47	-----	0.07	5.637E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	4.574E+00	-----	Line Not Found	-----
	583.19	94	85.00*	2.598E+00	2.475E-01	2.475E-01	32.40
	860.56	31	12.50	1.860E+00	7.654E-01	7.654E-01	59.41
BI-211	72.87	-----	1.23	4.620E+00	-----	Line Not Found	-----
	351.06	258	12.92*	3.843E+00	3.008E+00	3.008E+00	18.09
PB-212	74.82	116	10.28	4.844E+00	1.349E+00	1.349E+00	41.03
	77.11	197	17.10	5.104E+00	1.307E+00	1.307E+00	25.92
	238.63	262	43.60*	5.088E+00	6.828E-01	6.828E-01	16.96
	300.09	17	3.30	4.318E+00	6.969E-01	6.969E-01	133.37
BI-213	440.45	27	25.94*	3.249E+00	1.844E-01	1.844E-01	68.88
BI-214	609.32	179	45.49*	2.505E+00	9.077E-01	9.077E-01	17.33
	1120.29	-----	14.92	1.463E+00	-----	Line Not Found	-----
	1764.49	23	15.30	1.034E+00	8.514E-01	8.515E-01	49.27
PB-214	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
RN-222	609.32	179	45.49*	2.505E+00	9.077E-01	9.077E-01	17.33
	1120.29	-----	14.92	1.463E+00	-----	Line Not Found	-----
	1764.49	23	15.30	1.034E+00	8.514E-01	8.515E-01	49.27
RA-224	240.99	134	4.10*	5.040E+00	3.753E+00	3.753E+00	42.00
RA-226	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
AC-228	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
RA-228	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
TH-228	74.82	116	10.28	4.844E+00	1.349E+00	1.349E+00	41.03
	77.11	197	17.10	5.104E+00	1.307E+00	1.307E+00	25.92
	238.63	262	43.60*	5.088E+00	6.828E-01	6.828E-01	16.96
	300.09	17	3.30	4.318E+00	6.969E-01	6.969E-01	133.37
TH-230	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
PA-231	283.69	-----	1.70	4.501E+00	-----	Line Not Found	-----
	301.36	17	5.35*	4.318E+00	4.299E-01	4.299E-01	133.37
TH-232	105.21	41	1.10	6.821E+00	3.182E+00	3.182E+00	97.22
	338.32	41	11.27	3.954E+00	5.337E-01	5.337E-01	71.55
	835.71	-----	1.61	1.907E+00	-----	Line Not Found	-----
	911.20	47	25.80*	1.764E+00	5.960E-01	5.960E-01	59.14
	968.97	28	15.80	1.667E+00	6.065E-01	6.065E-01	83.95
TH-234	63.29	23	3.70*	3.165E+00	1.150E+00	1.150E+00	199.14
	92.59	104	4.23	6.372E+00	2.228E+00	2.228E+00	55.12
U-234	74.82	116	5.80	4.844E+00	2.390E+00	2.390E+00	41.03
	77.11	197	9.70	5.104E+00	2.303E+00	2.303E+00	25.92
	87.09	61	3.41	5.989E+00	1.743E+00	1.743E+00	79.57
	242.00	134	7.25	5.040E+00	2.123E+00	2.123E+00	42.00
	295.22	115	18.42	4.371E+00	8.302E-01	8.302E-01	33.75
	351.93	258	35.60*	3.843E+00	1.092E+00	1.092E+00	18.09
U-238	63.29	23	3.70*	3.165E+00	1.150E+00	1.150E+00	199.14
	92.59	104	4.23	6.372E+00	2.228E+00	2.228E+00	55.12
AM-243	43.53	-----	5.90	5.889E-01	-----	Line Not Found	-----
	74.66	116	67.20*	4.844E+00	2.063E-01	2.063E-01	41.03
ANH-511	511.00	11	100.00*	2.887E+00	2.276E-02	2.276E-02	327.77

Flag: "\*" = Keyline

Total number of lines in spectrum 42  
Number of unidentified lines 10  
Number of lines tentatively identified by NID 32 76.19%

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	1.402E+01	1.402E+01	0.170E+01	12.16	
Y-91	58.51D	1.75	1.098E+01	1.917E+01	2.569E+01	134.01	
CD-109	461.40D	1.07	1.606E+00	1.724E+00	1.372E+00	79.57	
SN-126	2.30E+05Y	1.00	1.606E-01	1.606E-01	1.278E-01	79.57	
EU-155	4.75Y	1.02	1.659E-01	1.690E-01	1.643E-01	97.22	
TL-204	3.78Y	1.02	5.541E+00	5.674E+00	8.455E+00	149.01	
TL-208	1.41E+10Y	1.00	2.475E-01	2.475E-01	0.802E-01	32.40	
BI-211	7.04E+08Y	1.00	3.008E+00	3.008E+00	0.544E+00	18.09	
PB-212	1.41E+10Y	1.00	6.828E-01	6.828E-01	1.158E-01	16.96	
BI-213	7340.00Y	1.00	1.844E-01	1.844E-01	1.270E-01	68.88	
BI-214	1600.00Y	1.00	9.077E-01	9.077E-01	1.573E-01	17.33	
PB-214	1600.00Y	1.00	1.092E+00	1.092E+00	0.197E+00	18.09	
RN-222	1600.00Y	1.00	9.077E-01	9.077E-01	1.573E-01	17.33	
RA-224	1.41E+10Y	1.00	3.753E+00	3.753E+00	1.576E+00	42.00	
RA-226	1600.00Y	1.00	1.092E+00	1.092E+00	0.197E+00	18.09	
AC-228	1.41E+10Y	1.00	5.960E-01	5.960E-01	3.525E-01	59.14	
RA-228	1.41E+10Y	1.00	5.960E-01	5.960E-01	3.525E-01	59.14	
TH-228	1.41E+10Y	1.00	6.828E-01	6.828E-01	1.158E-01	16.96	
TH-230	7.54E+04Y	1.00	1.092E+00	1.092E+00	0.197E+00	18.09	
PA-231	7.04E+08Y	1.00	4.299E-01	4.299E-01	5.733E-01	133.37	
TH-232	1.41E+10Y	1.00	5.960E-01	5.960E-01	3.525E-01	59.14	
TH-234	4.47E+09Y	1.00	1.150E+00	1.150E+00	2.290E+00	199.14	
U-234	2.45E+05Y	1.00	1.092E+00	1.092E+00	0.197E+00	18.09	
U-238	4.47E+09Y	1.00	1.150E+00	1.150E+00	2.290E+00	199.14	
AM-243	7370.00Y	1.00	2.063E-01	2.063E-01	0.847E-01	41.03	
ANH-511	1.00E+09Y	1.00	2.276E-02	2.276E-02	7.459E-02	327.77	

Total Activity : 5.196E+01 6.040E+01

Grand Total Activity : 5.196E+01 6.040E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	185.67	88	91	1.08	371.48	366	9	2.23E-02	49.0	5.98E+00	T
0	270.66	29	81	1.49	541.46	537	9	7.55E-03	****	4.66E+00	T
0	378.88	18	15	1.44	757.88	755	7	4.84E-03	90.9	3.64E+00	T
0	473.86	20	33	0.65	947.82	941	14	5.41E-03	****	3.07E+00	T
0	501.75	22	17	1.44	1003.61	999	9	5.86E-03	84.0	2.93E+00	
0	635.87	15	13	2.31	1271.84	1267	12	4.15E-03	****	2.42E+00	T
0	713.42	20	2	0.89	1426.95	1423	10	5.59E-03	52.9	2.19E+00	
0	729.19	18	33	2.19	1458.49	1448	17	5.00E-03	****	2.15E+00	
0	755.69	20	18	5.43	1511.49	1499	18	5.64E-03	****	2.08E+00	T
0	782.36	9	7	0.97	1564.82	1559	9	2.58E-03	****	2.02E+00	T
0	794.81	32	8	1.70	1589.73	1582	16	8.89E-03	53.0	1.99E+00	T
0	841.59	15	16	0.73	1683.29	1678	10	4.08E-03	****	1.89E+00	
0	872.10	14	13	0.62	1744.30	1738	14	4.05E-03	****	1.84E+00	T
0	940.63	9	3	0.61	1881.37	1877	7	2.63E-03	92.4	1.71E+00	
0	998.86	10	2	1.45	1997.84	1993	9	2.74E-03	83.7	1.62E+00	
0	1032.01	8	3	0.64	2064.13	2061	6	2.32E-03	94.1	1.58E+00	
0	1250.99	12	5	0.94	2502.13	2497	10	3.33E-03	90.5	1.33E+00	
0	1306.35	9	2	3.67	2612.86	2607	10	2.63E-03	90.3	1.28E+00	
0	1729.28	9	3	0.64	3458.81	3452	11	2.56E-03	96.1	1.05E+00	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*                               *                                               *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278010.CNF;1   *
* Acquisition date   : 30-OCT-2023 09:48:55 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 01:00:00.66 Half life ratio  : *****          *
* Sample date       : 13-SEP-2023 09:00:00 Nuclide Library : SOLID          *
* Sample ID         : G640278010 Analyst initials: MXR1          *
* Batch Number      : 2505440 Sample Quantity : 1.2964E+02 GRAM      *
* Wet wt corr       : 1.00000 Wet Weight      : 0.00000          *
*                               Dry Weight     : 0.00000          *
*****
*                               CALIBRATION INFORMATION                         *
*                               *                                               *
* Eff. Cal. date    : 5-DEC-2022 06:46:55 Eff. Geometry   : CAN          *
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;24          *
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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	2.133E-01
Y-91	2.282E+01
CD-109	6.105E-01
SN-126	5.716E-02
EU-155	6.518E-02
TL-204	3.355E+00
TL-208	2.034E-02
BI-211	1.497E-01
PB-212	4.065E-02
BI-213	6.602E-02
BI-214	5.207E-02
PB-214	5.443E-02
RN-222	5.207E-02
RA-224	4.357E-01
RA-226	5.443E-02
AC-228	1.180E-01
RA-228	1.180E-01
TH-228	4.065E-02
TH-230	5.443E-02
PA-231	3.776E-01
TH-232	1.180E-01
TH-234	8.415E-01
U-234	5.443E-02
U-238	8.415E-01
AM-243	3.613E-02
ANH-511	2.163E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	3.331E-01	NOT IDENT.
NA-22	3.293E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.327E-02	NOT IDENT.
SC-46	3.903E-02	NOT IDENT.

V-48	1.718E-01	NOT IDENT.
CR-51	6.399E-01	NOT IDENT.
MN-52	1.029E+01	NOT IDENT.
MN-54	4.104E-02	NOT IDENT.
CO-56	4.298E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.918E-02	NOT IDENT.
CO-58	5.007E-02	NOT IDENT.
FE-59	8.981E-02	NOT IDENT.
CO-60	2.183E-02	NOT IDENT.
ZN-65	7.034E-02	NOT IDENT.
GE-68	1.044E+00	NOT IDENT.
AS-73	8.073E-01	NOT IDENT.
AS-74	2.265E-01	FAIL ABUN
SE-75	4.298E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	5.942E-01	NOT IDENT.
RB-83	7.533E-02	NOT IDENT.
RB-84	9.220E-02	NOT IDENT.
KR-85	6.199E+00	NOT IDENT.
SR-85	4.594E-02	NOT IDENT.
RB-86	1.983E+00	NOT IDENT.
Y-88	4.051E-02	NOT IDENT.
NB-94	2.653E-02	FAIL ABUN
NB-95	4.526E-02	NOT IDENT.
NB-95M	1.322E-01	NOT IDENT.
ZR-95	7.520E-02	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	2.376E-02	NOT IDENT.
RH-102	4.203E-02	FAIL ABUN
RU-103	5.642E-02	FAIL ABUN
RH-106	2.435E-01	NOT IDENT.
RU-106	2.435E-01	NOT IDENT.
AG-108M	2.481E-02	NOT IDENT.
AG-110	5.204E-01	NOT IDENT.
AG-110M	3.846E-02	NOT IDENT.
SN-113	4.468E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	2.125E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.702E-02	NOT IDENT.
SB-124	6.774E-02	NOT IDENT.
SB-125	7.349E-02	FAIL ABUN
TE-125M	9.912E+00	NOT IDENT.
I-126	1.149E+00	NOT IDENT.
SB-126	6.540E-01	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	1.568E+00	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.701E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.873E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	4.165E-01	NOT IDENT.
BA-137M	2.857E-02	NOT IDENT.
CS-137	3.019E-02	NOT IDENT.
LA-138	3.617E-02	NOT IDENT.
CE-139	2.571E-02	NOT IDENT.
BA-140	1.108E+00	NOT IDENT.
LA-140	2.816E-01	NOT IDENT.
CE-141	7.884E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.500E-01	NOT IDENT.
PM-144	2.655E-02	NOT IDENT.
PR-144	2.018E+00	NOT IDENT.
PM-146	3.473E-02	NOT IDENT.
ND-147	3.741E+00	NOT IDENT.
PM-147	4.699E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	1.859E-02	FAIL ABUN
EU-152	8.076E-02	NOT IDENT.
GD-153	6.659E-02	FAIL ABUN
EU-154	9.177E-02	FAIL ABUN
TB-160	8.368E-02	FAIL ABUN

HO-166M	4.509E-02	FAIL ABUN
TM-171	1.393E+01	NOT IDENT.
HF-172	1.313E-01	FAIL ABUN
LU-172	3.205E-02	FAIL ABUN
LU-176	1.821E-02	FAIL ABUN
HF-181	5.414E-02	NOT IDENT.
TA-182	1.839E-01	NOT IDENT.
RE-183	1.951E-01	NOT IDENT.
RE-184	1.541E-01	NOT IDENT.
W-188	7.176E+00	FAIL ABUN
IR-192	3.886E-02	FAIL ABUN
HG-203	4.664E-02	FAIL ABUN
BI-207	1.242E-01	FAIL ABUN
BI-210	2.802E+00	NOT IDENT.
PB-210	2.802E+00	NOT IDENT.
PB-211	6.735E-01	NOT IDENT.
BI-212	5.362E-01	NOT IDENT.
RN-219	3.217E-01	FAIL ABUN
RA-223	4.756E-01	FAIL ABUN
AC-225	4.187E+00	NOT IDENT.
AC-227	1.894E-01	FAIL ABUN
TH-227	1.894E-01	FAIL ABUN
TH-229	3.645E-01	FAIL ABUN
TH-231	4.756E-01	FAIL ABUN
PA-233	5.548E-02	FAIL ABUN
PA-234	2.681E-01	NOT IDENT.
PA-234M	2.737E+00	NOT IDENT.
U-235	1.378E-01	FAIL ABUN
NP-237	5.548E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.061E-01	FAIL ABUN
PU-239	2.517E+02	NOT IDENT.
AM-241	1.178E-01	NOT IDENT.
CM-243	6.610E-02	NOT IDENT.
BK-247	6.068E-02	FAIL ABUN
CM-247	3.158E-02	NOT IDENT.
CF-249	3.086E-02	NOT IDENT.
CF-251	9.471E-02	NOT IDENT.

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G640278010.CNF;1
* Acquisition date   : 30-OCT-2023 09:48:55 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 01:00:00.66 Half life ratio : *****
* Sample date        : 13-SEP-2023 09:00:00 Nuclide Library : SOLID
* Sample ID          : G640278010 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.2964E+02 GRAM
*                               Quantity Err(%) : 1.5427E-03 %
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight  : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date     : 5-DEC-2022 06:46:55 Eff. Geometry    : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM19_CAN.CNF;24
*****

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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	1.402E+01	2.155E+00	2.155E+00
Y-91	1.917E+01	2.523E+01	2.523E+01
CD-109	1.724E+00	1.358E+00	1.358E+00
SN-126	1.606E-01	1.263E-01	1.263E-01
EU-155	1.690E-01	1.618E-01	1.618E-01
TL-204	5.674E+00	8.309E+00	8.309E+00
TL-208	2.475E-01	8.159E-02	8.159E-02
BI-211	3.008E+00	5.896E-01	5.896E-01
PB-212	6.828E-01	1.268E-01	1.268E-01
BI-213	1.844E-01	1.255E-01	1.255E-01
BI-214	9.077E-01	1.739E-01	1.739E-01
PB-214	1.092E+00	2.133E-01	2.133E-01
RN-222	9.077E-01	1.739E-01	1.739E-01
RA-224	3.753E+00	1.576E+00	1.576E+00
RA-226	1.092E+00	2.133E-01	2.133E-01
AC-228	5.960E-01	3.510E-01	3.510E-01
RA-228	5.960E-01	3.510E-01	3.510E-01
TH-228	6.828E-01	1.268E-01	1.268E-01
TH-230	1.092E+00	2.132E-01	2.132E-01
PA-231	4.299E-01	5.700E-01	5.700E-01
TH-232	5.960E-01	3.510E-01	3.510E-01
TH-234	1.150E+00	2.260E+00	2.260E+00
U-234	1.092E+00	2.132E-01	2.132E-01
U-238	1.150E+00	2.260E+00	2.260E+00
AM-243	2.063E-01	8.513E-02	8.513E-02
ANH-511	2.276E-02	7.313E-02	7.313E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.985E-02	4.300E-01	4.301E-01	NOT IDENT.
NA-22	-3.597E-03	3.920E-02	3.923E-02	NOT IDENT.
NA-24	8.265E+20	1.429E+21	0.000E+00	SHORT HLIF
AL-26	5.827E-03	2.566E-02	2.579E-02	NOT IDENT.



SC-46	1.634E-02	4.373E-02	4.434E-02	NOT IDENT.
V-48	-2.046E-01	2.627E-01	2.784E-01	NOT IDENT.
CR-51	1.378E-01	6.983E-01	7.010E-01	NOT IDENT.
MN-52	3.634E+00	1.119E+01	1.131E+01	NOT IDENT.
MN-54	3.936E-02	4.368E-02	4.715E-02	NOT IDENT.
CO-56	2.225E-02	4.950E-02	5.050E-02	NOT IDENT.
MN-56	1.000E+41	2.207E+41	0.000E+00	SHORT HLIF
CO-57	1.178E-03	2.196E-02	2.197E-02	NOT IDENT.
CO-58	2.029E-02	5.683E-02	5.756E-02	NOT IDENT.
FE-59	-1.007E-01	1.254E-01	1.334E-01	NOT IDENT.
CO-60	-7.790E-03	2.807E-02	2.829E-02	NOT IDENT.
ZN-65	-4.928E-02	8.998E-02	9.269E-02	NOT IDENT.
GE-68	-1.657E-01	1.230E+00	1.233E+00	NOT IDENT.
AS-73	4.047E-01	8.555E-01	8.747E-01	NOT IDENT.
AS-74	-1.410E-01	2.884E-01	2.954E-01	FAIL ABUN
SE-75	6.846E-03	5.140E-02	5.149E-02	NOT IDENT.
BR-77	1.175E+06	1.611E+06	1.696E+06	SHORT HLIF
SR-82	-2.414E-02	7.523E-01	7.524E-01	NOT IDENT.
RB-83	-1.552E-02	8.922E-02	8.949E-02	NOT IDENT.
RB-84	4.073E-02	1.017E-01	1.033E-01	NOT IDENT.
KR-85	3.366E+00	7.429E+00	7.582E+00	NOT IDENT.
SR-85	2.487E-02	5.506E-02	5.619E-02	NOT IDENT.
RB-86	-3.148E-01	2.338E+00	2.343E+00	NOT IDENT.
Y-88	3.906E-02	3.436E-02	3.861E-02	NOT IDENT.
NB-94	2.157E-02	2.776E-02	2.941E-02	FAIL ABUN
NB-95	-1.030E-02	5.590E-02	5.609E-02	NOT IDENT.
NB-95M	9.470E-02	1.604E-01	1.659E-01	NOT IDENT.
ZR-95	1.722E-01	1.820E-01	1.979E-01	FAIL ABUN
NB-97	-1.000E+41	4.589E+41	0.000E+00	SHORT HLIF
ZR-97	-4.381E+19	7.425E+19	0.000E+00	SHORT HLIF
MO-99	-9.116E+03	3.771E+04	3.793E+04	SHORT HLIF
TC-99M	1.000E+41	1.134E+41	0.000E+00	SHORT HLIF
RH-101	1.535E-02	2.615E-02	2.705E-02	NOT IDENT.
RH-102	7.469E-03	5.349E-02	5.360E-02	FAIL ABUN
RU-103	5.906E-02	6.077E-02	6.635E-02	FAIL ABUN
RH-106	7.662E-02	2.722E-01	2.744E-01	NOT IDENT.
RU-106	7.662E-02	2.722E-01	2.744E-01	NOT IDENT.
AG-108M	1.021E-02	2.668E-02	2.708E-02	NOT IDENT.
AG-110	-1.672E-01	6.460E-01	6.504E-01	NOT IDENT.
AG-110M	-1.288E-02	4.947E-02	4.981E-02	NOT IDENT.
SN-113	1.172E-02	4.918E-02	4.946E-02	NOT IDENT.
CD-115	2.143E+04	2.176E+05	2.179E+05	SHORT HLIF
SN-117M	-2.202E-01	2.693E-01	2.870E-01	NOT IDENT.
SB-122	-2.127E+03	6.545E+03	6.615E+03	SHORT HLIF
TE-123M	-9.417E-03	3.249E-02	3.277E-02	NOT IDENT.
SB-124	-3.776E-02	9.774E-02	9.921E-02	NOT IDENT.
SB-125	6.560E-02	7.516E-02	8.077E-02	FAIL ABUN
TE-125M	3.929E+00	1.097E+01	1.111E+01	NOT IDENT.
I-126	9.816E-01	1.220E+00	1.297E+00	NOT IDENT.
SB-126	-2.774E-01	8.717E-01	8.806E-01	NOT IDENT.
SB-127	5.388E+01	4.371E+02	4.377E+02	SHORT HLIF
I-131	1.744E+00	1.578E+00	1.763E+00	FAIL ABUN
I-132	1.000E+41	1.063E+42	0.000E+00	SHORT HLIF
TE-132	1.837E+02	6.084E+02	6.140E+02	SHORT HLIF
BA-133	-1.482E-02	3.625E-02	3.686E-02	NOT IDENT.
I-133	3.420E+14	7.011E+14	7.179E+14	SHORT HLIF
CS-134	1.128E-01	5.963E-02	7.838E-02	FAIL ABUN
I-135	1.000E+41	1.345E+42	0.000E+00	SHORT HLIF
CS-136	3.109E-01	4.329E-01	4.550E-01	NOT IDENT.
BA-137M	1.950E-02	3.049E-02	3.173E-02	NOT IDENT.
CS-137	2.059E-02	3.221E-02	3.352E-02	NOT IDENT.
LA-138	-2.542E-02	5.034E-02	5.163E-02	NOT IDENT.
CE-139	8.396E-03	2.940E-02	2.964E-02	NOT IDENT.
BA-140	6.103E-01	1.184E+00	1.216E+00	NOT IDENT.
LA-140	-9.182E-03	3.397E-01	3.398E-01	NOT IDENT.
CE-141	-1.274E-01	1.055E-01	1.201E-01	NOT IDENT.
CE-143	-2.771E+08	1.162E+09	1.169E+09	SHORT HLIF
CE-144	6.292E-02	1.675E-01	1.698E-01	NOT IDENT.
PM-144	-3.448E-02	3.726E-02	4.037E-02	NOT IDENT.
PR-144	-2.633E+00	2.834E+00	3.072E+00	NOT IDENT.
PM-146	1.494E-02	3.780E-02	3.840E-02	NOT IDENT.
ND-147	2.254E+00	4.032E+00	4.158E+00	NOT IDENT.
PM-147	-8.510E+02	6.300E+02	7.376E+02	NOT IDENT.
PM-149	2.495E+05	1.775E+06	1.778E+06	SHORT HLIF
EU-150	-5.908E-03	2.396E-02	2.411E-02	FAIL ABUN
EU-152	6.130E-02	8.414E-02	8.856E-02	NOT IDENT.
GD-153	1.061E-02	8.051E-02	8.066E-02	FAIL ABUN
EU-154	-2.203E-02	1.117E-01	1.122E-01	FAIL ABUN

TB-160	-1.430E-01	1.434E-01	1.572E-01	FAIL ABUN
HO-166M	7.047E-03	5.824E-02	5.833E-02	FAIL ABUN
TM-171	1.002E+00	1.524E+01	1.524E+01	NOT IDENT.
HF-172	-2.548E-02	1.541E-01	1.545E-01	FAIL ABUN
LU-172	-3.944E-02	4.745E-02	5.067E-02	FAIL ABUN
LU-176	-8.860E-03	2.373E-02	2.407E-02	FAIL ABUN
HF-181	-2.246E-02	6.545E-02	6.622E-02	NOT IDENT.
TA-182	1.595E-01	1.845E-01	1.980E-01	NOT IDENT.
RE-183	-5.594E-02	2.205E-01	2.220E-01	NOT IDENT.
RE-184	-8.593E-02	2.074E-01	2.110E-01	NOT IDENT.
W-188	-5.613E+00	1.050E+01	1.080E+01	FAIL ABUN
IR-192	2.785E-03	4.298E-02	4.299E-02	FAIL ABUN
HG-203	-4.300E-02	6.230E-02	6.525E-02	FAIL ABUN
BI-207	-1.137E-03	1.130E-01	1.130E-01	FAIL ABUN
BI-210	6.505E-01	3.043E+00	3.057E+00	NOT IDENT.
PB-210	6.505E-01	3.043E+00	3.057E+00	NOT IDENT.
PB-211	9.087E-01	6.719E-01	7.869E-01	NOT IDENT.
BI-212	3.217E-01	5.967E-01	6.141E-01	NOT IDENT.
RN-219	-3.018E-01	4.006E-01	4.231E-01	FAIL ABUN
RA-223	1.650E-01	5.122E-01	5.175E-01	FAIL ABUN
AC-225	-1.389E+00	5.164E+00	5.202E+00	NOT IDENT.
AC-227	-7.302E-02	2.389E-01	2.411E-01	FAIL ABUN
TH-227	-7.302E-02	2.389E-01	2.411E-01	FAIL ABUN
TH-229	-2.389E-01	4.590E-01	4.715E-01	FAIL ABUN
TH-231	1.650E-01	5.122E-01	5.175E-01	FAIL ABUN
PA-233	7.953E-03	6.732E-02	6.741E-02	FAIL ABUN
PA-234	1.105E-01	3.308E-01	3.345E-01	NOT IDENT.
PA-234M	-2.173E+00	4.091E+00	4.207E+00	NOT IDENT.
U-235	-2.506E-02	1.635E-01	1.639E-01	FAIL ABUN
NP-237	7.953E-03	6.732E-02	6.741E-02	FAIL ABUN
NP-238	4.035E+04	5.914E+05	5.917E+05	SHORT HLIF
NP-239	9.425E-02	2.285E-01	2.325E-01	FAIL ABUN
PU-239	6.268E+01	2.851E+02	2.865E+02	NOT IDENT.
AM-241	8.728E-02	1.317E-01	1.375E-01	NOT IDENT.
CM-243	-3.693E-02	8.608E-02	8.767E-02	NOT IDENT.
BK-247	4.956E-04	7.368E-02	7.368E-02	FAIL ABUN
CM-247	-3.727E-03	3.618E-02	3.622E-02	NOT IDENT.
CF-249	5.911E-03	3.415E-02	3.426E-02	NOT IDENT.
CF-251	2.552E-02	1.091E-01	1.097E-01	NOT IDENT.

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	56.6913	85.43	71.8303	131.20	51.8562
45.60	43.8721	86.55	81.9456	133.02	46.7915
46.54	47.5087	86.79	81.9819	133.52	45.7839
49.72	0.0000	86.94	82.0059	136.00	59.5179
51.35	48.1395	87.09	82.0292	136.47	48.0636
51.87	59.8109	87.57	82.1032	140.51	0.0000
52.39	50.9537	88.03	82.1738	143.76	50.6550
52.97	34.9159	88.34	79.9648	144.24	41.1834
53.44	40.3368	88.47	79.9837	145.44	65.5760
54.07	50.2787	89.96	81.4987	152.43	66.1796
57.36	0.0000	1093.63	62.1724	153.25	71.5923
57.53	57.9651	91.11	81.6711	323.87	67.4008
57.98	58.9360	92.59	65.3183	156.02	69.7012
59.27	50.9359	93.35	65.4082	158.56	79.6062
59.32	50.9420	94.56	65.5503	159.00	71.0394
59.54	50.9692	94.65	65.5605	162.33	57.2830
60.96	62.1023	94.67	65.5631	162.66	57.3064
61.17	68.2249	94.87	56.1234	163.33	55.1898
62.93	52.2986	97.43	59.0002	165.86	48.8473
63.29	52.3424	98.43	59.1028	176.31	46.1605
63.58	52.3778	98.44	59.1042	176.60	51.6738
64.28	58.9053	99.53	66.1244	177.52	47.3259
66.73	70.3408	100.11	61.2507	181.07	0.0000
67.24	55.5954	102.03	51.5402	181.52	53.0728
125.81	51.9403	103.18	52.9643	184.41	41.0441
67.75	51.9480	103.37	52.9814	143.76	41.1050
68.89	63.2395	105.21	42.8478	193.51	56.0272
69.67	63.3479	105.31	42.8550	197.03	59.6161
70.82	63.5056	106.12	42.9124	198.01	65.3084
70.83	63.5072	106.47	37.2789	201.83	53.1382
72.81	68.7791	109.28	48.1505	203.43	63.4204
72.87	68.7880	111.00	61.3611	205.31	57.8715
74.66	69.0477	111.76	0.0000	210.85	53.6395
74.82	69.0706	114.06	58.6275	215.65	52.7551
74.97	69.0924	116.30	0.0000	218.12	56.3347
77.11	69.3979	116.74	56.8430	222.11	47.3249
78.74	69.6278	119.76	44.8698	227.09	46.3959
79.69	69.7604	121.12	64.3780	227.38	39.4479
80.03	69.8074	121.22	69.4978	228.16	0.0000
80.12	69.8203	121.78	51.1444	228.18	37.1563
80.19	69.8304	122.06	51.1662	116.74	37.1563
80.57	69.8830	122.92	45.0843	235.69	40.5430
81.00	69.9428	123.07	45.0944	235.96	48.3517
81.07	69.9523	265.00	40.0063	238.63	42.2188
81.75	70.0463	125.81	52.4813	238.98	0.0000
82.47	77.7976	127.23	48.4653	240.99	42.3122
83.79	59.4570	127.91	65.0291	242.00	42.3517
84.00	59.4812	129.30	56.8858	244.70	42.4578

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	25.5652	563.25	23.2666
252.80	43.9595	345.93	37.8816	564.24	0.0000
254.15	0.0000	351.06	29.1143	569.33	18.4743
256.23	45.2862	351.93	29.1323	946.00	18.4758
260.90	0.0000	355.39	0.0000	569.70	19.4499
264.66	40.8212	356.01	27.0671	583.19	10.7673
264.80	40.8264	364.49	19.8798	584.27	14.6906
265.00	38.4316	366.42	0.0000	595.83	21.6643
269.46	50.6351	372.51	32.1552	427.87	16.7780
270.03	50.6607	375.05	28.7286	602.52	0.0000
271.23	50.7120	377.52	27.4677	604.72	19.2826
273.65	48.3972	356.01	21.0161	607.14	19.3040
276.40	38.8076	388.16	25.4665	609.32	18.8284
277.37	43.6948	388.63	27.2310	610.33	18.8369
277.60	40.0606	391.69	28.1654	614.28	14.8987
278.00	30.3596	264.66	31.8699	618.01	14.9243
279.20	52.2711	401.81	40.7526	620.36	19.9202
279.54	51.0696	402.40	34.5646	621.93	12.9572
279.70	51.0760	404.85	20.4156	630.19	0.0000
280.46	53.5424	410.95	25.8405	631.29	15.0140
283.69	48.8062	413.71	23.2076	633.25	7.5137
284.31	47.6098	414.70	22.3287	634.78	10.0252
285.41	34.2122	423.72	21.5552	635.95	10.0305
285.90	0.0000	427.09	15.2997	636.99	10.0350
287.50	37.9430	427.87	15.3070	657.50	15.1898
290.67	44.1771	433.94	18.0745	657.76	13.1661
293.27	0.0000	439.40	15.4135	657.90	0.0000
351.93	29.5598	440.45	16.3304	661.66	12.1738
295.96	29.5774	453.88	21.0323	664.57	0.0000
879.38	34.5787	463.37	15.6307	666.33	16.2643
299.98	36.2656	468.07	12.4459	666.50	16.2656
300.09	36.2692	473.00	0.0000	667.71	0.0000
300.13	36.2701	475.06	21.2878	677.62	15.3217
301.36	39.6055	476.78	18.0658	685.70	0.0000
302.85	29.7393	477.60	18.0742	692.65	0.0000
256.23	35.9818	482.18	24.1608	695.00	14.4056
304.85	35.9916	487.02	24.2253	696.49	27.7998
306.78	33.5597	492.35	0.0000	696.51	27.7998
308.46	38.5826	497.08	11.2424	697.00	16.4772
311.90	39.9326	505.52	16.9406	697.30	12.3594
316.51	37.5696	507.63	0.0000	697.49	12.3604
319.41	32.6325	511.00	20.7658	702.65	10.3227
320.08	30.9741	514.00	24.1075	706.68	16.5436
321.04	30.1589	514.00	24.1075	711.68	13.9872
323.87	26.8652	520.40	25.6113	720.70	19.9664
325.23	34.4561	520.69	0.0000	721.93	0.0000
328.76	37.0749	522.65	0.0000	722.78	18.7339
333.37	34.4956	527.90	0.0000	722.91	18.7354
333.97	30.4504	528.26	24.7643	723.31	14.0537
334.37	30.4592	529.59	27.6406	724.19	15.6207
338.28	33.9404	529.87	0.0000	727.33	23.9817
338.32	33.9412	531.02	19.0763	733.00	14.1086
311.90	42.0677	537.26	12.4393	735.93	20.9261
340.48	42.0677	546.56	0.0000	333.97	8.3753
340.55	42.0698	552.55	15.4290	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	27.2939	949.00	19.2025	1384.29	6.6911
747.24	18.9177	667.71	0.0000	1408.01	8.6512
748.06	15.7703	962.31	10.8906	1434.09	4.8355
752.31	15.7965	964.08	11.9185	1435.80	7.7402
753.82	15.8057	966.17	27.2607	1457.56	0.0000
756.73	12.6592	911.20	19.3270	1460.82	3.8923
756.80	12.6592	983.53	14.8477	1489.16	3.9175
884.68	9.5208	984.45	0.0000	1505.03	6.8799
765.81	19.0554	1274.44	5.1603	1584.12	3.9998
766.42	20.1187	1001.03	8.6133	1596.21	3.0075
766.84	23.2998	1002.74	17.2357	1620.50	3.0229
772.60	0.0000	1004.73	6.8984	1621.92	3.0238
776.52	14.0320	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	4.0894
778.90	9.5757	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	4.6458	1764.49	6.6391
788.74	12.8154	1038.76	0.0000	1063.66	2.0770
792.07	6.4158	631.29	9.3164	1771.35	5.1938
795.86	6.4248	1048.07	4.6602	1791.20	0.0000
810.06	18.3005	1049.04	9.3236	1808.65	2.0925
810.29	12.9189	1050.41	6.9951	1810.72	0.0000
344.28	15.0732	1063.66	13.1680	1836.06	0.0000
810.76	16.1517	1077.00	12.3389		
815.77	7.5514	1077.34	12.3397		
1048.07	12.9580	1085.87	14.1377		
832.01	26.0439	1093.63	10.6274		
834.85	15.2077	1099.45	14.1943		
835.71	24.7751	1112.07	10.6838		
836.80	0.0000	1112.84	11.5773		
846.75	0.0000	1115.54	16.9335		
846.77	10.4730	1120.29	12.4944		
856.80	9.8533	1120.55	11.6027		
860.56	13.1553	1221.41	13.3905		
871.09	7.7024	1129.67	11.6329		
873.19	7.7078	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	13.2422	1173.23	9.9627		
880.51	11.0392	1177.95	11.7892		
881.60	6.6260	1189.05	12.7345		
883.24	5.5249	1204.77	11.8749		
884.68	13.2661	1221.41	6.4228		
889.28	8.8581	1231.02	17.4774		
894.76	14.4213	1235.36	17.4971		
898.04	13.3271	1238.28	11.9812		
900.72	11.1161	1260.41	0.0000		
903.28	13.3506	1271.87	13.9453		
911.20	15.6173	1274.44	11.1636		
912.08	15.6224	1274.54	10.2333		
923.98	0.0000	1291.59	6.5403		
926.50	7.8488	1298.22	0.0000		
929.11	15.7113	1312.11	8.4523		
935.54	8.4344	1332.49	5.6635		
937.49	15.1919	1362.66	0.0000		
944.13	10.1499	1365.19	7.6118		
946.00	12.4130	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 10:50:32.65

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540615.CNF;1
Background file    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM21.CNF;799
Background date    : 29-OCT-2023 11:32:53
Sample date       : 9-OCT-2023 00:00:00. Acquisition date : 30-OCT-2023 09:50:05
Sample ID        : G1205540615. Sample quantity : 1.47140E+02 GRAM
Detector name    : GAM21. Detector geometry: CAN
Elapsed live time: 0 01:00:00.00. Elapsed real time: 0 01:00:00.17 0.0%
Energy tolerance : 1.50000 keV. Analyst Initials : MXR1
Abundance limit  : 75.00000. Sensitivity : 3.00000
Batch ID        : 2505440. Detector SN# :
Matrix Spike ID  : LCS ID :
*****

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	35.78	15	16	0.97	70.98	69	7	4.22E-03	49.0	
2	0	246.46	10	13	1.47	492.37	489	7	2.78E-03	66.7	
3	0	510.92*	20	5	1.94	1021.36	1014	18	5.64E-03	50.5	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540615.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 9-OCT-2023 00:00:00 Acquisition date : 30-OCT-2023 09:50:05  
Sample ID : G1205540615 Sample quantity : 147.14 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA21 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.17 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

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
ANH-511	511.00	22	100.00*	2.751E+00	4.020E-02	4.020E-02	101.09

Flag: "\*" = Keyline



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*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540615.CNF;1
* Acquisition date   : 30-OCT-2023 09:50:05 Sensitivity      : 3.000
* Detector ID        : GAM21 Energy tolerance: 1.500
* Elapsed live time  : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 01:00:00.17 Half life ratio  : *****
* Sample date        : 9-OCT-2023 00:00:00 Analyst initials: MXR1
* Sample ID          : G1205540615 Sample Quantity : 1.4714E+02 GRAM
* Batch Number       : 2505440 Wet Weight : 0.00000
* Wet wt corr        : 1.00000 Dry Weight : 0.00000
* Nuclide Library    : SOLID.NLB;17
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date     : 3-JUL-2023 09:20:00 Eff. Geometry : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;25
*****

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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 )
ANH-511	4.020E-02	3.983E-02	2.605E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-1.127E-01	1.360E-01	2.398E-01	NOT IDENT.
NA-22	-3.486E-03	1.748E-02	3.950E-02	NOT IDENT.
NA-24	0.000E+00	2.256E+08	0.000E+00	SHORT HLIF
AL-26	-2.240E-02	2.663E-02	3.992E-02	NOT IDENT.
K-40	-3.042E-02	3.368E-01	7.232E-01	NOT IDENT.
SC-46	2.141E-03	2.195E-02	4.845E-02	NOT IDENT.
V-48	3.785E-03	3.588E-02	9.130E-02	NOT IDENT.
CR-51	6.672E-02	1.766E-01	3.813E-01	NOT IDENT.
MN-52	8.342E-02	3.529E-01	8.556E-01	NOT IDENT.
MN-54	8.517E-03	1.428E-02	3.887E-02	NOT IDENT.
CO-56	-4.319E-03	8.465E-03	1.056E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	-4.627E-03	5.815E-03	1.118E-02	NOT IDENT.
CO-58	-9.508E-03	2.215E-02	4.103E-02	NOT IDENT.
FE-59	2.205E-02	5.550E-02	1.356E-01	NOT IDENT.
CO-60	-6.555E-03	2.635E-02	5.367E-02	NOT IDENT.
ZN-65	6.315E-03	3.637E-02	9.134E-02	NOT IDENT.
GE-68	4.064E-01	5.749E-01	1.616E+00	NOT IDENT.
AS-73	1.038E-02	4.297E-02	9.344E-02	NOT IDENT.
AS-74	3.205E-03	6.220E-02	1.330E-01	NOT IDENT.
SE-75	-1.701E-03	1.747E-02	3.481E-02	NOT IDENT.
BR-77	-9.761E+00	2.054E+01	3.867E+01	NOT IDENT.
SR-82	8.584E-02	1.470E-01	4.037E-01	NOT IDENT.
RB-83	2.024E-03	3.254E-02	7.231E-02	NOT IDENT.
RB-84	6.386E-03	2.680E-02	7.096E-02	NOT IDENT.
KR-85	1.739E+00	3.234E+00	7.602E+00	NOT IDENT.
SR-85	9.848E-03	1.831E-02	4.305E-02	NOT IDENT.
RB-86	3.180E-01	4.498E-01	1.264E+00	NOT IDENT.
Y-88	4.137E-04	2.148E-02	5.856E-02	NOT IDENT.

Y-91	-2.496E+00	1.142E+01	2.394E+01	NOT IDENT.
NB-94	0.000E+00	1.822E-02	3.816E-02	NOT IDENT.
NB-95	-7.170E-03	2.386E-02	4.605E-02	NOT IDENT.
NB-95M	6.267E-03	5.205E-02	1.056E-01	NOT IDENT.
ZR-95	1.548E-02	3.841E-02	9.118E-02	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	3.097E+08	0.000E+00	SHORT HLIF
MO-99	4.294E+00	2.692E+01	6.205E+01	NOT IDENT.
TC-99M	0.000E+00	3.192E+23	0.000E+00	SHORT HLIF
RH-101	-2.568E-03	6.926E-03	1.438E-02	NOT IDENT.
RH-102	-5.603E-03	2.113E-02	4.415E-02	NOT IDENT.
RU-103	-6.591E-03	2.065E-02	4.174E-02	NOT IDENT.
RH-106	-4.904E-02	1.312E-01	2.612E-01	NOT IDENT.
RU-106	-4.904E-02	1.312E-01	2.612E-01	NOT IDENT.
AG-108M	-7.656E-03	9.796E-03	1.788E-02	NOT IDENT.
CD-109	1.737E-02	1.188E-01	2.384E-01	NOT IDENT.
AG-110	1.133E-01	3.565E-01	8.271E-01	NOT IDENT.
AG-110M	4.409E-03	1.738E-02	4.608E-02	NOT IDENT.
SN-113	1.160E-02	2.235E-02	4.846E-02	NOT IDENT.
CD-115	-1.414E+01	3.080E+01	6.096E+01	NOT IDENT.
SN-117M	3.082E-03	2.246E-02	4.827E-02	NOT IDENT.
SB-122	-1.572E+00	4.407E+00	8.781E+00	NOT IDENT.
TE-123M	-1.912E-03	8.749E-03	1.786E-02	NOT IDENT.
SB-124	2.936E-03	6.410E-02	1.589E-01	NOT IDENT.
SB-125	-2.159E-02	3.280E-02	6.263E-02	NOT IDENT.
TE-125M	-4.949E-01	2.374E+00	5.059E+00	NOT IDENT.
I-126	-9.096E-02	1.639E-01	2.977E-01	NOT IDENT.
SB-126	4.016E-03	1.269E-01	2.622E-01	NOT IDENT.
SN-126	5.519E-04	1.212E-02	2.354E-02	NOT IDENT.
SB-127	6.066E-01	2.044E+00	4.699E+00	NOT IDENT.
I-131	-3.637E-02	9.032E-02	1.622E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	9.470E-01	9.461E-01	2.257E+00	NOT IDENT.
BA-133	1.419E-02	1.927E-02	4.334E-02	NOT IDENT.
I-133	0.000E+00	2.773E+05	0.000E+00	SHORT HLIF
CS-134	7.051E-03	9.772E-03	3.342E-02	NOT IDENT.
I-135	0.000E+00	2.216E+22	0.000E+00	SHORT HLIF
CS-136	3.517E-02	7.232E-02	1.882E-01	NOT IDENT.
BA-137M	9.220E-04	2.039E-02	4.285E-02	NOT IDENT.
CS-137	9.740E-04	2.154E-02	4.526E-02	NOT IDENT.
LA-138	2.425E-02	3.665E-02	9.978E-02	NOT IDENT.
CE-139	-1.704E-03	1.055E-02	2.136E-02	NOT IDENT.
BA-140	1.225E-01	1.745E-01	4.309E-01	NOT IDENT.
LA-140	-2.885E-02	9.380E-02	1.849E-01	NOT IDENT.
CE-141	-1.131E-02	1.869E-02	3.634E-02	NOT IDENT.
CE-143	0.000E+00	1.108E+03	0.000E+00	SHORT HLIF
CE-144	1.290E-03	4.478E-02	9.921E-02	NOT IDENT.
PM-144	3.323E-03	1.815E-02	3.996E-02	NOT IDENT.
PR-144	6.830E-01	1.236E+00	3.012E+00	NOT IDENT.
PM-146	-8.244E-03	1.689E-02	3.341E-02	NOT IDENT.
ND-147	-1.102E-01	2.969E-01	6.102E-01	NOT IDENT.
PM-147	1.551E+01	1.752E+02	3.887E+02	NOT IDENT.
PM-149	5.247E+01	2.565E+02	5.374E+02	NOT IDENT.
EU-150	1.223E-03	9.846E-03	2.066E-02	NOT IDENT.
EU-152	2.194E-02	3.830E-02	8.672E-02	NOT IDENT.
GD-153	4.471E-03	1.703E-02	3.444E-02	NOT IDENT.
EU-154	-7.087E-03	5.084E-02	1.170E-01	NOT IDENT.
EU-155	-1.135E-02	2.479E-02	5.092E-02	NOT IDENT.
TB-160	1.140E-02	4.776E-02	1.265E-01	NOT IDENT.
HO-166M	-1.293E-02	3.048E-02	5.755E-02	NOT IDENT.
TM-171	-1.168E-01	7.877E-01	1.573E+00	NOT IDENT.
HF-172	3.609E-02	4.648E-02	1.117E-01	NOT IDENT.
LU-172	3.721E-03	9.761E-03	4.176E-02	NOT IDENT.
LU-176	-1.520E-03	1.213E-02	2.340E-02	NOT IDENT.
HF-181	-6.295E-04	2.343E-02	5.007E-02	NOT IDENT.
TA-182	-1.922E-02	3.767E-02	5.311E-02	NOT IDENT.
RE-183	6.348E-03	1.307E-02	2.972E-02	NOT IDENT.
RE-184	-1.997E-02	6.488E-02	1.273E-01	NOT IDENT.
W-188	6.686E-01	3.034E+00	6.356E+00	NOT IDENT.
IR-192	-3.563E-03	1.642E-02	3.116E-02	NOT IDENT.
HG-203	1.467E-03	1.456E-02	3.046E-02	NOT IDENT.
TL-204	5.819E-02	5.601E-01	1.120E+00	NOT IDENT.
BI-207	-4.595E-03	2.243E-02	4.995E-02	NOT IDENT.
TL-208	-8.000E-03	1.684E-02	3.451E-02	NOT IDENT.
BI-210	1.672E-02	9.807E-02	2.086E-01	NOT IDENT.
PB-210	1.672E-02	9.807E-02	2.086E-01	NOT IDENT.
BI-211	4.487E-03	1.023E-01	2.088E-01	NOT IDENT.
PB-211	8.903E-02	3.035E-01	6.917E-01	NOT IDENT.

BI-212	-1.353E-01	2.465E-01	4.437E-01	NOT IDENT.
PB-212	-1.559E-02	1.991E-02	3.524E-02	NOT IDENT.
BI-213	-1.209E-02	4.515E-02	9.336E-02	NOT IDENT.
BI-214	-5.384E-03	4.058E-02	8.454E-02	NOT IDENT.
PB-214	-1.036E-02	3.842E-02	7.369E-02	NOT IDENT.
RN-219	-1.063E-01	2.194E-01	3.771E-01	NOT IDENT.
RN-222	-5.384E-03	4.058E-02	8.454E-02	NOT IDENT.
RA-223	2.044E-01	2.353E-01	5.650E-01	NOT IDENT.
RA-224	-3.891E-02	2.383E-01	4.621E-01	NOT IDENT.
AC-225	-6.206E-02	3.108E-01	6.177E-01	NOT IDENT.
RA-226	-1.036E-02	3.842E-02	7.369E-02	NOT IDENT.
AC-227	-1.127E-02	9.986E-02	1.974E-01	NOT IDENT.
TH-227	-1.127E-02	9.986E-02	1.974E-01	NOT IDENT.
AC-228	1.101E-02	4.737E-02	1.246E-01	NOT IDENT.
RA-228	1.101E-02	4.737E-02	1.246E-01	NOT IDENT.
TH-228	-1.559E-02	1.991E-02	3.524E-02	NOT IDENT.
TH-229	-2.792E-02	1.772E-01	3.564E-01	NOT IDENT.
TH-230	-1.036E-02	3.842E-02	7.369E-02	NOT IDENT.
PA-231	1.631E-01	1.976E-01	4.505E-01	NOT IDENT.
TH-231	2.044E-01	2.353E-01	5.650E-01	NOT IDENT.
TH-232	1.101E-02	4.737E-02	1.246E-01	NOT IDENT.
PA-233	-8.107E-03	2.646E-02	4.968E-02	NOT IDENT.
PA-234	3.610E-02	1.236E-01	3.227E-01	NOT IDENT.
PA-234M	1.079E+00	2.679E+00	6.417E+00	NOT IDENT.
TH-234	-2.465E-02	1.492E-01	2.773E-01	NOT IDENT.
U-234	-1.036E-02	3.842E-02	7.369E-02	NOT IDENT.
U-235	9.850E-03	4.783E-02	1.071E-01	NOT IDENT.
NP-237	-8.107E-03	2.646E-02	4.968E-02	NOT IDENT.
NP-238	0.000E+00	6.037E+01	0.000E+00	SHORT HLIF
U-238	-2.465E-02	1.492E-01	2.773E-01	NOT IDENT.
NP-239	-2.335E-02	5.994E-02	1.244E-01	NOT IDENT.
PU-239	-1.976E+00	6.539E+01	1.465E+02	NOT IDENT.
AM-241	3.740E-03	1.139E-02	2.441E-02	NOT IDENT.
AM-243	-5.937E-05	6.505E-03	1.264E-02	NOT IDENT.
CM-243	-4.419E-03	1.953E-02	4.253E-02	NOT IDENT.
BK-247	1.868E-03	3.131E-02	6.392E-02	NOT IDENT.
CM-247	-1.242E-02	1.756E-02	3.312E-02	NOT IDENT.
CF-249	4.363E-03	1.916E-02	3.937E-02	NOT IDENT.
CF-251	-2.753E-02	4.601E-02	8.664E-02	NOT IDENT.

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
ANH-511	511.00	22	100.00*	2.751E+00	4.020E-02	4.020E-02	101.09

Flag: "\*" = Keyline

Total number of lines in spectrum 3  
Number of unidentified lines 2  
Number of lines tentatively identified by NID 1 33.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
ANH-511	1.00E+09Y	1.00	4.020E-02	4.020E-02	4.064E-02	101.09	
Total Activity :			4.020E-02	4.020E-02			

Grand Total Activity : 4.020E-02 4.020E-02

Flags: "K" = Keyline not found "M" = Manually accepted  
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	35.78	20	21	0.97	70.98	69	7	4.22E-03	98.0	1.01E+01	
0	246.46	11	15	1.47	492.37	489	7	2.78E-03	****	5.66E+00	

Flags: "T" = Tentatively associated

```

*****
*
*               GEL Laboratories LLC
*               2040 Savage Road
*               Charleston, SC 29407
*****
*
*               DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540615.CNF;1
* Acquisition date   : 30-OCT-2023 09:50:05 Sensitivity      : 3.000
* Detector ID       : GAM21 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.17 Half life ratio  : *****
* Sample date       : 9-OCT-2023 00:00:00 Nuclide Library  : SOLID
* Sample ID        : G1205540615 Analyst initials: MXR1
* Batch Number     : 2505440 Sample Quantity  : 1.4714E+02 GRAM
* Wet wt corr      : 1.00000 Wet Weight      : 0.00000
*                               Dry Weight       : 0.00000
*****
*
*               CALIBRATION INFORMATION
*
* Eff. Cal. date    : 3-JUL-2023 09:20:00 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM21_CAN.CNF;25
*****

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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 )
ANH-511	1.044E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	8.932E-02	NOT IDENT.
NA-22	1.308E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.077E-02	NOT IDENT.
K-40	2.914E-01	NOT IDENT.
SC-46	1.877E-02	NOT IDENT.
V-48	3.282E-02	NOT IDENT.
CR-51	1.626E-01	NOT IDENT.
MN-52	3.230E-01	NOT IDENT.
MN-54	1.494E-02	NOT IDENT.
CO-56	0.000E+00	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	4.651E-03	NOT IDENT.
CO-58	1.536E-02	NOT IDENT.
FE-59	5.381E-02	NOT IDENT.
CO-60	1.993E-02	NOT IDENT.
ZN-65	3.360E-02	NOT IDENT.
GE-68	6.260E-01	NOT IDENT.
AS-73	3.933E-02	NOT IDENT.
AS-74	5.469E-02	NOT IDENT.
SE-75	1.479E-02	NOT IDENT.
BR-77	1.655E+01	NOT IDENT.
SR-82	1.545E-01	NOT IDENT.
RB-83	2.920E-02	NOT IDENT.
RB-84	2.514E-02	NOT IDENT.
KR-85	3.200E+00	NOT IDENT.
SR-85	1.812E-02	NOT IDENT.
RB-86	4.899E-01	NOT IDENT.
Y-88	1.851E-02	NOT IDENT.
Y-91	8.895E+00	NOT IDENT.

NB-94	1.549E-02	NOT IDENT.
NB-95	1.807E-02	NOT IDENT.
NB-95M	4.656E-02	NOT IDENT.
ZR-95	3.661E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	2.408E+01	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	6.031E-03	NOT IDENT.
RH-102	1.627E-02	NOT IDENT.
RU-103	1.684E-02	NOT IDENT.
RH-106	9.741E-02	NOT IDENT.
RU-106	9.741E-02	NOT IDENT.
AG-108M	6.517E-03	NOT IDENT.
CD-109	1.008E-01	NOT IDENT.
AG-110	3.345E-01	NOT IDENT.
AG-110M	1.640E-02	NOT IDENT.
SN-113	2.077E-02	NOT IDENT.
CD-115	2.282E+01	NOT IDENT.
SN-117M	2.104E-02	NOT IDENT.
SB-122	3.437E+00	NOT IDENT.
TE-123M	7.720E-03	NOT IDENT.
SB-124	5.629E-02	NOT IDENT.
SB-125	2.395E-02	NOT IDENT.
TE-125M	2.185E+00	NOT IDENT.
I-126	1.163E-01	NOT IDENT.
SB-126	1.083E-01	NOT IDENT.
SN-126	9.990E-03	NOT IDENT.
SB-127	1.899E+00	NOT IDENT.
I-131	6.672E-02	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	9.877E-01	NOT IDENT.
BA-133	1.876E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	1.184E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	7.323E-02	NOT IDENT.
BA-137M	1.767E-02	NOT IDENT.
CS-137	1.867E-02	NOT IDENT.
LA-138	3.866E-02	NOT IDENT.
CE-139	9.393E-03	NOT IDENT.
BA-140	1.797E-01	NOT IDENT.
LA-140	6.509E-02	NOT IDENT.
CE-141	1.540E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	4.198E-02	NOT IDENT.
PM-144	1.626E-02	NOT IDENT.
PR-144	1.227E+00	NOT IDENT.
PM-146	1.315E-02	NOT IDENT.
ND-147	2.256E-01	NOT IDENT.
PM-147	1.673E+02	NOT IDENT.
PM-149	2.298E+02	NOT IDENT.
EU-150	8.566E-03	NOT IDENT.
EU-152	3.680E-02	NOT IDENT.
GD-153	1.471E-02	NOT IDENT.
EU-154	3.969E-02	NOT IDENT.
EU-155	2.208E-02	NOT IDENT.
TB-160	4.483E-02	NOT IDENT.
HO-166M	2.205E-02	NOT IDENT.
TM-171	6.484E-01	NOT IDENT.
HF-172	4.884E-02	NOT IDENT.
LU-172	1.174E-02	NOT IDENT.
LU-176	1.003E-02	NOT IDENT.
HF-181	2.074E-02	NOT IDENT.
TA-182	0.000E+00	NOT IDENT.
RE-183	1.260E-02	NOT IDENT.
RE-184	4.509E-02	NOT IDENT.
W-188	2.722E+00	NOT IDENT.
IR-192	1.320E-02	NOT IDENT.
HG-203	1.282E-02	NOT IDENT.
TL-204	4.793E-01	NOT IDENT.
BI-207	1.762E-02	NOT IDENT.
TL-208	1.377E-02	NOT IDENT.
BI-210	8.889E-02	NOT IDENT.
PB-210	8.889E-02	NOT IDENT.
BI-211	9.066E-02	NOT IDENT.
PB-211	2.918E-01	NOT IDENT.
BI-212	1.661E-01	NOT IDENT.



PB-212	1.477E-02	NOT IDENT.
BI-213	3.811E-02	NOT IDENT.
BI-214	3.547E-02	NOT IDENT.
PB-214	3.185E-02	NOT IDENT.
RN-219	1.578E-01	NOT IDENT.
RN-222	3.547E-02	NOT IDENT.
RA-223	2.413E-01	NOT IDENT.
RA-224	2.006E-01	NOT IDENT.
AC-225	2.643E-01	NOT IDENT.
RA-226	3.185E-02	NOT IDENT.
AC-227	8.478E-02	NOT IDENT.
TH-227	8.478E-02	NOT IDENT.
AC-228	4.416E-02	NOT IDENT.
RA-228	4.416E-02	NOT IDENT.
TH-228	1.477E-02	NOT IDENT.
TH-229	1.546E-01	NOT IDENT.
TH-230	3.185E-02	NOT IDENT.
PA-231	1.966E-01	NOT IDENT.
TH-231	2.413E-01	NOT IDENT.
TH-232	4.416E-02	NOT IDENT.
PA-233	2.072E-02	NOT IDENT.
PA-234	1.208E-01	NOT IDENT.
PA-234M	2.596E+00	NOT IDENT.
TH-234	1.218E-01	NOT IDENT.
U-234	3.185E-02	NOT IDENT.
U-235	4.591E-02	NOT IDENT.
NP-237	2.072E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
U-238	1.218E-01	NOT IDENT.
NP-239	5.284E-02	NOT IDENT.
PU-239	6.078E+01	NOT IDENT.
AM-241	1.046E-02	NOT IDENT.
AM-243	5.378E-03	NOT IDENT.
CM-243	1.791E-02	NOT IDENT.
BK-247	2.742E-02	NOT IDENT.
CM-247	1.374E-02	NOT IDENT.
CF-249	1.672E-02	NOT IDENT.
CF-251	3.769E-02	NOT IDENT.

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \*\*\*\*\*

DETECTOR AND SAMPLE DATA

\* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540615.CNF;1 \*  
 \* Acquisition date : 30-OCT-2023 09:50:05 Sensitivity : 3.000 \*  
 \* Detector ID : GAM21 Energy tolerance: 1.500 \*  
 \* Elapsed live time: 0 01:00:00.00 Abundance limit : 75.000 \*  
 \* Elapsed real time: 0 01:00:00.17 Half life ratio : \*\*\*\*\* \*  
 \* Sample date : 9-OCT-2023 00:00:00 Nuclide Library : SOLID \*  
 \* Sample ID : G1205540615 Analyst initials: MXR1 \*  
 \* Batch Number : 2505440 Sample Quantity : 1.4714E+02 GRAM \*  
 \* Quantity Err(%) : 1.3592E-03 % \*  
 \* Wet wt corr : 1.00000 Wet Weight : 0.00000 \*  
 \* Dry Weight : 0.00000 \*

CALIBRATION INFORMATION

\* Eff. Cal. date : 3-JUL-2023 09:20:00 Eff. Geometry : CAN \*  
 \* Eff. File : DKA100:[CANBERRA.GAMMA]EFF\_GAM21\_CAN.CNF;25 \*  
 \*\*\*\*\*

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)
ANH-511	4.020E-02	4.006E-02	4.006E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-1.127E-01	1.365E-01	1.456E-01	NOT IDENT.
NA-22	-3.486E-03	1.749E-02	1.756E-02	NOT IDENT.
NA-24	1.224E+08	2.259E+08	2.325E+08	SHORT HLIF
AL-26	-2.240E-02	2.668E-02	2.853E-02	NOT IDENT.
K-40	-3.042E-02	3.368E-01	3.371E-01	NOT IDENT.
SC-46	2.141E-03	2.195E-02	2.197E-02	NOT IDENT.
V-48	3.785E-03	3.588E-02	3.592E-02	NOT IDENT.
CR-51	6.672E-02	1.767E-01	1.792E-01	NOT IDENT.
MN-52	8.342E-02	3.530E-01	3.550E-01	NOT IDENT.
MN-54	8.517E-03	1.431E-02	1.482E-02	NOT IDENT.
CO-56	-4.319E-03	8.479E-03	8.699E-03	NOT IDENT.
MN-56	-1.000E+41	1.963E+41	0.000E+00	SHORT HLIF
CO-57	-4.627E-03	5.851E-03	6.212E-03	NOT IDENT.
CO-58	-9.508E-03	2.217E-02	2.259E-02	NOT IDENT.
FE-59	2.205E-02	5.555E-02	5.643E-02	NOT IDENT.
CO-60	-6.555E-03	2.635E-02	2.652E-02	NOT IDENT.
ZN-65	6.315E-03	3.637E-02	3.649E-02	NOT IDENT.
GE-68	4.064E-01	5.760E-01	6.045E-01	NOT IDENT.
AS-73	1.038E-02	4.303E-02	4.328E-02	NOT IDENT.
AS-74	3.205E-03	6.220E-02	6.222E-02	NOT IDENT.
SE-75	-1.701E-03	1.747E-02	1.748E-02	NOT IDENT.
BR-77	-9.761E+00	2.144E+01	2.189E+01	NOT IDENT.
SR-82	8.584E-02	1.473E-01	1.523E-01	NOT IDENT.
RB-83	2.024E-03	3.254E-02	3.256E-02	NOT IDENT.
RB-84	6.386E-03	2.681E-02	2.696E-02	NOT IDENT.
KR-85	1.739E+00	3.239E+00	3.333E+00	NOT IDENT.
SR-85	9.848E-03	1.834E-02	1.887E-02	NOT IDENT.
RB-86	3.180E-01	4.507E-01	4.730E-01	NOT IDENT.
Y-88	4.137E-04	2.148E-02	2.148E-02	NOT IDENT.

Y-91	-2.496E+00	1.142E+01	1.147E+01	NOT IDENT.
NB-94	0.000E+00	1.822E-02	0.000E+00	NOT IDENT.
NB-95	-7.170E-03	2.388E-02	2.410E-02	NOT IDENT.
NB-95M	6.267E-03	5.205E-02	5.213E-02	NOT IDENT.
ZR-95	1.548E-02	3.846E-02	3.909E-02	NOT IDENT.
NB-97	1.000E+41	5.054E+41	0.000E+00	SHORT HLIF
ZR-97	1.674E+08	3.102E+08	3.193E+08	SHORT HLIF
MO-99	4.294E+00	2.693E+01	2.700E+01	NOT IDENT.
TC-99M	-1.495E+22	3.192E+23	0.000E+00	SHORT HLIF
RH-101	-2.568E-03	6.949E-03	7.045E-03	NOT IDENT.
RH-102	-5.603E-03	2.115E-02	2.130E-02	NOT IDENT.
RU-103	-6.591E-03	2.066E-02	2.087E-02	NOT IDENT.
RH-106	-4.904E-02	1.313E-01	1.332E-01	NOT IDENT.
RU-106	-4.904E-02	1.313E-01	1.332E-01	NOT IDENT.
AG-108M	-7.656E-03	9.821E-03	1.041E-02	NOT IDENT.
CD-109	1.737E-02	1.188E-01	1.191E-01	NOT IDENT.
AG-110	1.133E-01	3.568E-01	3.605E-01	NOT IDENT.
AG-110M	4.409E-03	1.739E-02	1.750E-02	NOT IDENT.
SN-113	1.160E-02	2.237E-02	2.297E-02	NOT IDENT.
CD-115	-1.414E+01	3.084E+01	3.149E+01	NOT IDENT.
SN-117M	3.082E-03	2.247E-02	2.251E-02	NOT IDENT.
SB-122	-1.572E+00	4.411E+00	4.467E+00	NOT IDENT.
TE-123M	-1.912E-03	8.752E-03	8.795E-03	NOT IDENT.
SB-124	2.936E-03	6.410E-02	6.412E-02	NOT IDENT.
SB-125	-2.159E-02	3.286E-02	3.427E-02	NOT IDENT.
TE-125M	-4.949E-01	2.374E+00	2.385E+00	NOT IDENT.
I-126	-9.096E-02	1.644E-01	1.694E-01	NOT IDENT.
SB-126	4.016E-03	1.269E-01	1.269E-01	NOT IDENT.
SN-126	5.519E-04	1.212E-02	1.212E-02	NOT IDENT.
SB-127	6.066E-01	2.046E+00	2.065E+00	NOT IDENT.
I-131	-3.637E-02	9.037E-02	9.185E-02	NOT IDENT.
I-132	-1.000E+41	1.238E+42	0.000E+00	SHORT HLIF
TE-132	9.470E-01	9.546E-01	1.046E+00	NOT IDENT.
BA-133	1.419E-02	1.931E-02	2.034E-02	NOT IDENT.
I-133	1.044E+05	2.779E+05	2.819E+05	SHORT HLIF
CS-134	7.051E-03	9.809E-03	1.031E-02	NOT IDENT.
I-135	-1.109E+22	2.282E+22	0.000E+00	SHORT HLIF
CS-136	3.517E-02	7.244E-02	7.415E-02	NOT IDENT.
BA-137M	9.220E-04	2.039E-02	2.040E-02	NOT IDENT.
CS-137	9.740E-04	2.154E-02	2.155E-02	NOT IDENT.
LA-138	2.425E-02	3.670E-02	3.830E-02	NOT IDENT.
CE-139	-1.704E-03	1.056E-02	1.059E-02	NOT IDENT.
BA-140	1.225E-01	1.751E-01	1.836E-01	NOT IDENT.
LA-140	-2.885E-02	9.383E-02	9.472E-02	NOT IDENT.
CE-141	-1.131E-02	1.876E-02	1.944E-02	NOT IDENT.
CE-143	1.381E+02	1.108E+03	1.109E+03	SHORT HLIF
CE-144	1.290E-03	4.478E-02	4.479E-02	NOT IDENT.
PM-144	3.323E-03	1.815E-02	1.821E-02	NOT IDENT.
PR-144	6.830E-01	1.239E+00	1.277E+00	NOT IDENT.
PM-146	-8.244E-03	1.692E-02	1.732E-02	NOT IDENT.
ND-147	-1.102E-01	2.972E-01	3.013E-01	NOT IDENT.
PM-147	1.551E+01	1.752E+02	1.754E+02	NOT IDENT.
PM-149	5.247E+01	2.566E+02	2.577E+02	NOT IDENT.
EU-150	1.223E-03	9.847E-03	9.862E-03	NOT IDENT.
EU-152	2.194E-02	3.835E-02	3.960E-02	NOT IDENT.
GD-153	4.471E-03	1.704E-02	1.716E-02	NOT IDENT.
EU-154	-7.087E-03	5.084E-02	5.094E-02	NOT IDENT.
EU-155	-1.135E-02	2.482E-02	2.534E-02	NOT IDENT.
TB-160	1.140E-02	4.778E-02	4.806E-02	NOT IDENT.
HO-166M	-1.293E-02	3.053E-02	3.108E-02	NOT IDENT.
TM-171	-1.168E-01	7.877E-01	7.895E-01	NOT IDENT.
HF-172	3.609E-02	4.710E-02	4.983E-02	NOT IDENT.
LU-172	3.721E-03	9.773E-03	9.916E-03	NOT IDENT.
LU-176	-1.520E-03	1.213E-02	1.215E-02	NOT IDENT.
HF-181	-6.295E-04	2.343E-02	2.343E-02	NOT IDENT.
TA-182	-1.922E-02	3.770E-02	3.868E-02	NOT IDENT.
RE-183	6.348E-03	1.309E-02	1.340E-02	NOT IDENT.
RE-184	-1.997E-02	6.493E-02	6.555E-02	NOT IDENT.
W-188	6.686E-01	3.035E+00	3.050E+00	NOT IDENT.
IR-192	-3.563E-03	1.642E-02	1.650E-02	NOT IDENT.
HG-203	1.467E-03	1.456E-02	1.458E-02	NOT IDENT.
TL-204	5.819E-02	5.601E-01	5.608E-01	NOT IDENT.
BI-207	-4.595E-03	2.243E-02	2.253E-02	NOT IDENT.
TL-208	-8.000E-03	1.686E-02	1.724E-02	NOT IDENT.
BI-210	1.672E-02	9.808E-02	9.837E-02	NOT IDENT.
PB-210	1.672E-02	9.808E-02	9.837E-02	NOT IDENT.
BI-211	4.487E-03	1.024E-01	1.024E-01	NOT IDENT.
PB-211	8.903E-02	3.036E-01	3.062E-01	NOT IDENT.

BI-212	-1.353E-01	2.471E-01	2.545E-01	NOT IDENT.
PB-212	-1.559E-02	1.999E-02	2.118E-02	NOT IDENT.
BI-213	-1.209E-02	4.516E-02	4.549E-02	NOT IDENT.
BI-214	-5.384E-03	4.059E-02	4.066E-02	NOT IDENT.
PB-214	-1.036E-02	3.843E-02	3.872E-02	NOT IDENT.
RN-219	-1.063E-01	2.200E-01	2.251E-01	NOT IDENT.
RN-222	-5.384E-03	4.059E-02	4.066E-02	NOT IDENT.
RA-223	2.044E-01	2.360E-01	2.534E-01	NOT IDENT.
RA-224	-3.891E-02	2.383E-01	2.389E-01	NOT IDENT.
AC-225	-6.206E-02	3.109E-01	3.122E-01	NOT IDENT.
RA-226	-1.036E-02	3.843E-02	3.872E-02	NOT IDENT.
AC-227	-1.127E-02	9.988E-02	1.000E-01	NOT IDENT.
TH-227	-1.127E-02	9.988E-02	1.000E-01	NOT IDENT.
AC-228	1.101E-02	4.739E-02	4.765E-02	NOT IDENT.
RA-228	1.101E-02	4.739E-02	4.765E-02	NOT IDENT.
TH-228	-1.559E-02	1.999E-02	2.118E-02	NOT IDENT.
TH-229	-2.792E-02	1.772E-01	1.777E-01	NOT IDENT.
TH-230	-1.036E-02	3.843E-02	3.871E-02	NOT IDENT.
PA-231	1.631E-01	2.009E-01	2.139E-01	NOT IDENT.
TH-231	2.044E-01	2.360E-01	2.534E-01	NOT IDENT.
TH-232	1.101E-02	4.739E-02	4.765E-02	NOT IDENT.
PA-233	-8.107E-03	2.647E-02	2.672E-02	NOT IDENT.
PA-234	3.610E-02	1.304E-01	1.314E-01	NOT IDENT.
PA-234M	1.079E+00	2.681E+00	2.725E+00	NOT IDENT.
TH-234	-2.465E-02	1.493E-01	1.498E-01	NOT IDENT.
U-234	-1.036E-02	3.843E-02	3.871E-02	NOT IDENT.
U-235	9.850E-03	4.785E-02	4.805E-02	NOT IDENT.
NP-237	-8.107E-03	2.647E-02	2.672E-02	NOT IDENT.
NP-238	3.131E+00	6.037E+01	6.039E+01	SHORT HLIF
U-238	-2.465E-02	1.493E-01	1.498E-01	NOT IDENT.
NP-239	-2.335E-02	6.003E-02	6.095E-02	NOT IDENT.
PU-239	-1.976E+00	6.539E+01	6.540E+01	NOT IDENT.
AM-241	3.740E-03	1.139E-02	1.152E-02	NOT IDENT.
AM-243	-5.937E-05	6.505E-03	6.505E-03	NOT IDENT.
CM-243	-4.419E-03	1.953E-02	1.964E-02	NOT IDENT.
BK-247	1.868E-03	3.131E-02	3.132E-02	NOT IDENT.
CM-247	-1.242E-02	1.771E-02	1.857E-02	NOT IDENT.
CF-249	4.363E-03	1.917E-02	1.927E-02	NOT IDENT.
CF-251	-2.753E-02	4.624E-02	4.787E-02	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	9.4217	85.43	12.9386	131.20	6.6198
45.60	9.5436	86.55	10.1049	133.02	10.8077
46.54	9.5980	86.79	2.8896	133.52	9.9890
49.72	14.6673	86.94	5.7825	136.00	13.4026
51.35	8.6348	87.09	5.7856	136.47	9.2252
51.87	12.3710	87.57	10.1425	140.51	12.7064
52.39	8.6844	88.03	8.7080	143.76	10.2455
52.97	8.7119	88.34	13.0768	144.24	10.2572
53.44	7.4864	88.47	13.0828	145.44	16.2872
54.07	5.0078	89.96	5.8456	152.43	20.0397
57.36	0.0000	90.64	8.7894	153.25	18.3314
57.53	5.0989	91.11	14.6733	154.21	10.4978
57.98	6.3881	92.59	8.8495	156.02	17.5677
59.27	6.4295	93.35	14.7879	158.56	14.1338
59.32	6.4311	94.56	16.3342	159.00	15.9159
59.54	9.0133	94.65	16.3392	162.33	16.9227
60.96	16.8559	94.67	16.3404	162.66	13.3697
61.17	16.8731	94.87	13.3785	163.33	14.2817
62.93	15.7068	97.43	8.9959	165.86	19.7438
63.29	19.6669	98.43	8.2736	176.31	17.4243
63.58	10.5034	98.44	8.2738	176.60	16.5171
64.28	14.4894	99.53	11.3229	177.52	22.0635
66.73	9.3246	100.11	9.0754	181.07	17.5907
67.24	8.0110	102.03	8.3708	181.52	16.6797
67.68	6.6889	103.18	10.6927	184.41	19.5699
67.75	9.3674	103.37	11.4633	185.72	15.8825
68.89	6.7249	105.21	13.0670	193.51	16.1186
69.67	12.1463	105.31	19.2223	197.03	6.6804
70.82	10.8505	106.12	17.7290	198.01	18.1650
70.83	10.8511	106.47	13.8899	201.83	21.1792
72.81	17.7822	109.28	15.5661	203.43	12.5509
72.87	5.4728	111.00	11.7350	205.31	15.4990
74.66	11.0276	111.76	14.1139	210.85	12.7155
74.82	22.0698	114.06	11.0519	215.65	14.7929
74.97	17.9426	116.30	15.0964	218.12	13.8643
77.11	11.1382	116.74	14.3199	222.11	13.9568
78.74	12.6120	119.76	12.8379	227.09	14.0711
79.69	8.4395	121.12	12.0812	227.38	14.0778
80.03	7.0422	121.22	12.0845	228.16	7.0477
80.12	7.0448	121.78	16.1377	228.18	7.0481
80.19	7.0467	122.06	15.3427	235.69	17.3227
80.57	12.7027	122.92	12.9507	235.96	17.3300
81.00	14.1376	123.07	12.9559	238.63	13.3077
81.07	14.1415	123.68	13.7886	238.98	13.3148
81.75	9.9249	125.81	8.9736	240.99	13.3563
82.47	11.3741	127.23	12.2832	242.00	12.3481
83.79	12.8598	127.91	9.8443	244.70	8.2661
84.00	12.8699	129.30	8.2336	252.40	20.9052

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	17.7798	351.06	9.4819	569.33	4.7900
254.15	0.0000	351.93	11.8640	569.50	5.7488
256.23	13.6650	355.39	0.0000	569.70	5.7495
260.90	10.5829	356.01	7.1503	583.19	4.8372
264.66	11.7039	364.49	10.8243	584.27	5.8091
264.80	11.7063	366.42	4.8207	595.83	6.8319
265.00	11.7097	372.51	9.7036	600.60	7.8333
269.46	9.6408	375.05	10.9457	602.52	0.0000
270.03	8.5764	377.52	15.8513	604.72	6.8735
271.23	6.4431	383.85	6.1365	607.14	8.8517
273.65	11.8520	388.16	8.6287	609.32	5.9099
276.40	15.1412	388.63	8.6329	610.33	10.8420
277.37	12.9954	391.69	7.4224	614.28	5.9297
277.60	11.9161	400.66	8.7370	618.01	2.9722
278.00	9.7550	401.81	13.7450	620.36	1.9845
279.20	8.6853	402.40	14.1698	621.93	4.9666
279.54	7.6031	404.85	7.5196	630.19	0.0000
279.70	7.6048	410.95	8.4045	631.29	3.9977
280.46	9.7874	413.71	10.1123	633.25	5.0035
283.69	7.6456	414.70	8.4349	634.78	2.0034
284.31	13.1177	423.72	7.6562	635.95	4.0099
285.41	5.4736	427.09	9.3871	636.99	5.0157
285.90	9.8589	427.87	7.6859	657.50	4.0654
287.50	13.1733	433.94	6.8703	657.76	4.0661
290.67	9.9212	439.40	6.0414	657.90	0.0000
293.27	0.0000	440.45	8.6387	661.66	7.1330
295.22	9.9800	453.88	7.8686	664.57	0.0000
295.96	12.2092	463.37	8.8153	666.33	8.1758
298.58	12.2505	468.07	7.0809	666.50	9.1985
299.98	13.3879	473.00	5.3330	667.71	0.0000
300.09	13.3898	475.06	3.5615	677.62	4.1164
300.13	13.3905	476.78	5.3500	685.70	4.1367
301.36	7.8233	477.60	8.0305	692.65	6.2310
302.85	17.9155	482.18	8.0614	695.00	4.1598
304.50	11.2204	487.02	7.1945	696.49	5.2045
304.85	7.8577	492.35	9.0326	696.51	3.1227
306.78	13.5029	497.08	8.1606	697.00	4.1649
308.46	5.6380	505.52	1.3694	697.30	4.1655
311.90	11.3239	507.63	0.0000	697.49	4.1660
316.51	12.5267	511.00	5.5013	702.65	6.2683
319.41	7.9995	514.00	5.5144	706.68	6.2832
320.08	8.0060	514.00	5.5144	711.68	6.3015
321.04	9.1602	520.40	5.5420	720.70	7.3905
323.87	4.5956	520.69	5.5432	721.93	0.0000
325.23	12.6583	522.65	0.0000	722.78	6.3423
328.76	9.2444	527.90	5.5742	722.91	4.2285
333.37	5.8089	528.26	6.5050	723.31	3.1721
333.97	6.9754	529.59	2.7906	724.19	5.2895
334.37	10.4680	529.87	0.0000	727.33	6.3589
338.28	7.0100	531.02	4.6562	733.00	3.1898
338.32	7.0104	537.26	3.7427	735.93	4.2601
340.48	7.0276	546.56	0.0000	737.46	3.1979
340.55	7.0281	552.55	1.8928	739.50	3.2015
344.28	5.8817	563.25	2.8615	744.23	4.2801
345.93	10.6065	564.24	6.6816	747.24	3.2155

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	5.3615	954.55	0.0000	1408.01	2.1083
752.31	3.2246	962.31	0.8944	1434.09	2.1252
753.82	9.6819	964.08	0.8951	1435.80	1.0632
756.73	3.2325	966.17	4.4797	1457.56	0.0000
756.80	3.2327	968.97	1.7941	1460.82	4.2852
763.94	7.5725	983.53	1.8055	1489.16	1.0803
765.81	6.4973	984.45	0.0000	1505.03	2.1708
766.42	5.4163	996.26	0.0000	1584.12	2.2202
766.84	3.2505	1001.03	3.6383	1596.21	3.3415
772.60	0.0000	1002.74	3.6410	1620.50	0.0000
776.52	1.0892	1004.73	6.3771	1621.92	1.1217
777.92	3.2700	1021.30	0.0000	1678.03	0.0000
778.90	2.1812	1025.87	0.0000	1690.97	1.8280
783.70	3.2803	1028.54	0.0000	1750.46	0.0000
788.74	3.2891	1037.84	0.0000	1764.49	0.0000
792.07	6.5898	1038.76	0.0000	1770.23	4.6638
795.86	0.0000	1046.59	4.6353	1771.35	1.8660
801.95	3.3121	1048.07	1.8552	1791.20	0.0000
810.06	2.2174	1049.04	2.7839	1808.65	3.7666
810.29	4.4354	1050.41	2.7856	1810.72	0.0000
810.45	4.4357	1063.66	2.8006	1836.06	0.9480
810.76	5.5455	1077.00	0.9385		
815.77	4.4479	1077.34	0.9387		
818.51	2.2271	1085.87	3.7673		
832.01	5.6063	1093.63	0.0000		
834.85	1.1228	1099.45	2.8407		
835.71	3.3700	1112.07	1.9031		
836.80	0.0000	1112.84	1.9037		
846.75	0.0000	1115.54	1.9056		
846.77	1.1296	1120.29	0.9546		
856.80	3.4056	1120.55	0.9547		
860.56	2.2747	1121.30	0.9550		
871.09	2.2864	1129.67	4.7900		
873.19	3.4331	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	1.1478	1173.23	4.8691		
880.51	2.2968	1177.95	2.9264		
881.60	1.1490	1189.05	1.9589		
883.24	2.2998	1204.77	3.9402		
884.68	1.1507	1221.41	0.9909		
889.28	3.4597	1231.02	4.9713		
894.76	8.0938	1235.36	0.9958		
898.04	4.6322	1238.28	2.9905		
900.72	1.1595	1260.41	0.0000		
903.28	3.4827	1271.87	1.0084		
911.20	1.1652	1274.44	2.0187		
912.08	0.0000	1274.54	2.0187		
923.98	0.0000	1291.59	4.0608		
926.50	1.7602	1298.22	0.0000		
929.11	3.5245	1312.11	1.0222		
935.54	2.6512	1332.49	4.1162		
937.49	2.6536	1362.66	0.0000		
944.13	0.0000	1365.19	4.1602		
946.00	1.7758	1368.63	0.0000		
949.00	3.5565	1384.29	2.0927		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 12:37:27.49

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540616.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM23.CNF;870
Background date : 29-OCT-2023 11:32:58
Sample date     : 6-SEP-2023 08:00:00. Acquisition date : 30-OCT-2023 11:35:03
Sample ID      : G1205540616. Sample quantity   : 1.01900E+02 GRAM
Detector name  : GAM23. Detector geometry: CAN
Elapsed live time: 0 01:00:00.00. Elapsed real time: 0 01:00:00.89 0.0%
Energy tolerance : 1.50000 keV. Analyst Initials : MXR1
Abundance limit : 75.00000. Sensitivity : 3.00000
Batch ID       : 2505440. Detector SN# :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.22*	27	43	1.63	92.44	89	8	7.47E-03	47.9	
2	6	60.02	17	35	1.35	120.04	117	16	4.63E-03	61.8	2.43E+00
3	6	63.10*	25	46	1.36	126.18	117	16	6.92E-03	57.3	
4	0	77.39	43	103	1.02	154.76	152	9	1.20E-02	45.8	
5	0	93.07*	42	137	1.73	186.11	179	13	1.18E-02	61.5	
6	0	186.08*	49	86	1.54	372.10	366	12	1.36E-02	42.0	
7	0	209.43	17	35	0.92	418.81	415	8	4.84E-03	62.9	
8	1	238.65*	71	60	1.29	477.23	473	16	1.97E-02	22.2	5.62E+00
9	1	242.03*	59	52	1.30	483.98	473	16	1.65E-02	24.8	
10	0	295.50	107	36	1.49	590.91	586	13	2.98E-02	15.3	
11	0	303.09	18	9	1.95	606.09	603	7	4.97E-03	36.3	
12	0	337.60	25	22	2.11	675.10	671	8	6.99E-03	37.9	
13	0	351.94*	183	30	1.46	703.76	699	10	5.10E-02	9.4	
14	0	464.00	23	14	0.59	927.86	922	11	6.25E-03	40.1	
15	0	511.03*	21	18	2.40	1021.91	1015	15	5.72E-03	68.2	
16	0	525.39	14	6	0.55	1050.62	1047	8	3.92E-03	42.6	
17	0	537.05	11	4	1.53	1073.94	1071	6	3.14E-03	41.3	
18	0	582.29*	20	16	2.37	1164.41	1157	13	5.69E-03	47.6	
19	0	609.28*	133	12	1.62	1218.39	1212	12	3.70E-02	10.4	
20	0	656.51	7	7	0.55	1312.85	1305	9	1.94E-03	77.2	
21	0	787.10	11	5	1.71	1573.99	1570	9	3.09E-03	50.2	
22	0	910.81*	15	5	1.27	1821.39	1816	9	4.16E-03	38.1	
23	0	1119.84	40	6	1.91	2239.45	2233	11	1.11E-02	19.5	
24	0	1377.18	13	0	0.55	2754.15	2747	12	3.61E-03	27.7	
25	0	1460.05*	64	9	1.92	2919.90	2913	13	1.78E-02	16.4	
26	0	1508.90	6	2	0.99	3017.59	3013	8	1.70E-03	56.6	
27	0	1764.08	14	3	1.28	3528.00	3521	13	3.84E-03	38.0	

Flag: "\*" = Peak area was modified by background subtraction



Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540616.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 6-SEP-2023 08:00:00 Acquisition date : 30-OCT-2023 11:35:03  
Sample ID : G1205540616 Sample quantity : 101.90 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA23 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.89 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

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	60	10.66*	9.699E-01	4.268E+00	4.268E+00	32.80
AG-110	657.50	7	4.50*	1.995E+00	5.460E-01	6.345E-01	154.36
TL-208	277.37	-----	6.60	3.918E+00	-----	Line Not Found	-----
	583.19	20	85.00*	2.206E+00	7.671E-02	7.671E-02	95.10
	860.56	-----	12.50	1.568E+00	-----	Line Not Found	-----
BI-210	46.54	27	4.25*	4.357E-01	1.071E+01	1.076E+01	95.84
PB-210	46.54	27	4.25*	4.357E-01	1.071E+01	1.076E+01	95.84
BI-211	72.87	-----	1.23	3.550E+00	-----	Line Not Found	-----
	351.06	176	12.92*	3.272E+00	3.076E+00	3.076E+00	18.83
PB-212	74.82	-----	10.28	3.777E+00	-----	Line Not Found	-----
	77.11	43	17.10	4.061E+00	4.556E-01	4.556E-01	91.56
	238.63	69	43.60*	4.380E+00	2.654E-01	2.654E-01	44.44
	300.09	-----	3.30	3.693E+00	-----	Line Not Found	-----
BI-214	609.32	127	45.49*	2.124E+00	9.674E-01	9.675E-01	20.80
	1120.29	38	14.92	1.226E+00	1.516E+00	1.516E+00	39.07
	1764.49	13	15.30	8.531E-01	7.270E-01	7.270E-01	75.96
PB-214	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.033E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
RN-222	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
	609.32	127	45.49*	2.124E+00	9.674E-01	9.675E-01	20.80
	1120.29	38	14.92	1.226E+00	1.516E+00	1.516E+00	39.07
	1764.49	13	15.30	8.531E-01	7.270E-01	7.270E-01	75.96
RA-224	240.99	58	4.10*	4.336E+00	2.383E+00	2.383E+00	49.61
RA-226	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.033E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
TH-228	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
	74.82	-----	10.28	3.777E+00	-----	Line Not Found	-----
	77.11	43	17.10	4.061E+00	4.556E-01	4.556E-01	91.56
	238.63	69	43.60*	4.380E+00	2.654E-01	2.654E-01	44.44
	300.09	-----	3.30	3.693E+00	-----	Line Not Found	-----
TH-230	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.032E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
TH-234	63.29	25	3.70*	2.296E+00	2.146E+00	2.146E+00	114.61
	92.59	42	4.23	5.340E+00	1.362E+00	1.362E+00	123.09
U-234	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.032E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
U-238	63.29	25	3.70*	2.296E+00	2.146E+00	2.146E+00	114.61
	92.59	42	4.23	5.340E+00	1.362E+00	1.362E+00	123.09
AM-241	59.54	17	35.90*	1.891E+00	1.798E-01	1.798E-01	123.51
ANH-511	511.00	20	100.00*	2.452E+00	5.906E-02	5.906E-02	136.42

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540616.CNF;1
* Acquisition date   : 30-OCT-2023 11:35:03 Sensitivity      : 3.000
* Detector ID       : GAM23 Energy tolerance: 1.500
* Elapsed live time : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time : 0 01:00:00.89 Half life ratio : *****
* Sample date       : 6-SEP-2023 08:00:00 Analyst initials: MXR1
* Sample ID         : G1205540616 Sample Quantity : 1.0190E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 6-SEP-2023 11:17:47 Eff. Geometry    : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;21
*****

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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	4.268E+00	1.372E+00	1.023E+00
AG-110	6.345E-01	9.599E-01	1.553E+00
TL-208	7.671E-02	7.150E-02	7.080E-02
BI-210	1.076E+01	1.010E+01	7.719E+00
PB-210	1.076E+01	1.010E+01	7.719E+00
BI-211	3.076E+00	5.677E-01	3.803E-01
PB-212	2.654E-01	1.156E-01	1.148E-01
BI-214	9.675E-01	1.972E-01	1.494E-01
PB-214	1.116E+00	2.060E-01	1.383E-01
RN-222	9.675E-01	1.972E-01	1.494E-01
RA-224	2.383E+00	1.159E+00	1.232E+00
RA-226	1.116E+00	2.060E-01	1.383E-01
TH-228	2.654E-01	1.156E-01	1.148E-01
TH-230	1.116E+00	2.060E-01	1.383E-01
TH-234	2.146E+00	2.411E+00	2.187E+00
U-234	1.116E+00	2.060E-01	1.383E-01
U-238	2.146E+00	2.411E+00	2.187E+00
AM-241	1.798E-01	2.177E-01	2.842E-01
ANH-511	5.906E-02	7.896E-02	5.292E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	1.379E-01	6.241E-01	1.247E+00	NOT IDENT.
NA-22	9.561E-03	4.358E-02	9.776E-02	NOT IDENT.
NA-24	0.000E+00	4.268E+24	0.000E+00	SHORT HLIF
AL-26	-1.528E-02	4.416E-02	9.354E-02	NOT IDENT.
SC-46	-3.172E-02	6.110E-02	1.098E-01	FAIL ABUN
V-48	-1.728E-01	3.663E-01	6.666E-01	NOT IDENT.
CR-51	-1.216E-01	8.467E-01	1.652E+00	NOT IDENT.
MN-52	-2.735E+01	3.139E+01	4.894E+01	NOT IDENT.
MN-54	1.310E-02	3.971E-02	8.603E-02	NOT IDENT.
CO-56	3.781E-02	6.586E-02	1.440E-01	NOT IDENT.
MN-56	0.000E+00	1.748E+41	0.000E+00	SHORT HLIF

CO-57	1.082E-02	2.346E-02	4.669E-02	NOT IDENT.
CO-58	2.231E-02	5.886E-02	1.287E-01	NOT IDENT.
FE-59	-5.984E-03	1.390E-01	2.900E-01	NOT IDENT.
CO-60	-2.438E-03	3.652E-02	7.987E-02	NOT IDENT.
ZN-65	1.439E-02	1.197E-01	2.160E-01	NOT IDENT.
GE-68	1.728E-01	1.725E+00	3.462E+00	NOT IDENT.
AS-73	-2.609E-01	1.836E+00	3.022E+00	NOT IDENT.
AS-74	-1.997E-01	4.973E-01	8.695E-01	NOT IDENT.
SE-75	-2.834E-02	4.988E-02	8.125E-02	NOT IDENT.
BR-77	0.000E+00	1.585E+06	0.000E+00	SHORT HLIF
SR-82	-1.389E-01	1.232E+00	2.390E+00	NOT IDENT.
RB-83	4.389E-02	1.267E-01	2.409E-01	NOT IDENT.
RB-84	-8.580E-02	1.799E-01	3.266E-01	NOT IDENT.
KR-85	3.049E+00	9.162E+00	1.642E+01	NOT IDENT.
SR-85	2.439E-02	7.320E-02	1.312E-01	NOT IDENT.
RB-86	1.032E+00	4.084E+00	8.479E+00	NOT IDENT.
Y-88	5.051E-02	4.950E-02	1.503E-01	NOT IDENT.
Y-91	7.558E+00	3.630E+01	7.486E+01	NOT IDENT.
NB-94	-6.523E-04	4.077E-02	8.049E-02	NOT IDENT.
NB-95	4.053E-02	7.127E-02	1.543E-01	NOT IDENT.
NB-95M	7.697E-02	1.924E-01	3.384E-01	NOT IDENT.
ZR-95	1.849E-02	1.172E-01	2.437E-01	NOT IDENT.
NB-97	0.000E+00	1.513E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.209E+22	0.000E+00	SHORT HLIF
MO-99	0.000E+00	1.973E+05	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-1.497E-02	2.770E-02	4.890E-02	NOT IDENT.
RH-102	8.725E-03	6.155E-02	1.205E-01	NOT IDENT.
RU-103	-4.127E-04	8.562E-02	1.646E-01	FAIL ABUN
RH-106	5.360E-02	3.676E-01	7.214E-01	NOT IDENT.
RU-106	5.360E-02	3.676E-01	7.214E-01	NOT IDENT.
AG-108M	6.190E-03	3.284E-02	6.484E-02	NOT IDENT.
CD-109	-5.075E-01	8.080E-01	1.334E+00	NOT IDENT.
AG-110M	5.904E-03	6.051E-02	1.247E-01	FAIL ABUN
SN-113	-5.013E-02	5.626E-02	9.420E-02	NOT IDENT.
CD-115	0.000E+00	2.354E+06	0.000E+00	SHORT HLIF
SN-117M	1.626E-01	3.741E-01	7.217E-01	NOT IDENT.
SB-122	0.000E+00	5.074E+04	0.000E+00	SHORT HLIF
TE-123M	-1.635E-02	3.545E-02	6.160E-02	NOT IDENT.
SB-124	-2.210E-02	1.204E-01	2.674E-01	NOT IDENT.
SB-125	2.209E-02	9.315E-02	1.881E-01	FAIL ABUN
TE-125M	-6.268E-01	1.195E+01	2.283E+01	NOT IDENT.
I-126	5.322E-01	1.925E+00	3.853E+00	NOT IDENT.
SB-126	-7.279E-01	1.137E+00	2.051E+00	NOT IDENT.
SN-126	9.323E-02	6.835E-02	1.400E-01	FAIL ABUN
SB-127	0.000E+00	1.451E+03	0.000E+00	SHORT HLIF
I-131	2.503E+00	3.410E+00	7.289E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.119E+03	0.000E+00	SHORT HLIF
BA-133	1.403E-02	3.221E-02	6.571E-02	FAIL ABUN
I-133	0.000E+00	2.361E+17	0.000E+00	SHORT HLIF
CS-134	3.757E-02	3.966E-02	9.583E-02	NOT IDENT.
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	7.037E-02	8.758E-01	1.806E+00	NOT IDENT.
BA-137M	-3.649E-02	3.714E-02	5.411E-02	NOT IDENT.
CS-137	-3.854E-02	3.924E-02	5.716E-02	NOT IDENT.
LA-138	-2.007E-02	6.150E-02	1.222E-01	NOT IDENT.
CE-139	1.113E-02	3.476E-02	6.595E-02	NOT IDENT.
BA-140	2.627E+00	2.125E+00	4.938E+00	FAIL ABUN
LA-140	-3.212E-01	6.318E-01	1.181E+00	NOT IDENT.
CE-141	4.067E-02	1.273E-01	2.447E-01	NOT IDENT.
CE-143	0.000E+00	5.036E+10	0.000E+00	SHORT HLIF
CE-144	-1.771E-01	1.786E-01	2.945E-01	NOT IDENT.
PM-144	-2.049E-02	4.107E-02	7.575E-02	NOT IDENT.
PR-144	-1.578E+00	3.134E+00	5.776E+00	NOT IDENT.
PM-146	-1.343E-02	4.162E-02	7.671E-02	NOT IDENT.
ND-147	2.577E+00	7.698E+00	1.542E+01	NOT IDENT.
PM-147	3.698E+02	6.368E+02	1.284E+03	NOT IDENT.
PM-149	0.000E+00	1.939E+07	0.000E+00	SHORT HLIF
EU-150	8.988E-03	3.039E-02	5.583E-02	NOT IDENT.
EU-152	-1.468E-02	8.267E-02	1.603E-01	NOT IDENT.
GD-153	-4.355E-02	8.593E-02	1.431E-01	NOT IDENT.
EU-154	2.264E-02	1.198E-01	2.678E-01	NOT IDENT.
EU-155	3.174E-02	8.683E-02	1.729E-01	NOT IDENT.
TB-160	-5.578E-02	1.902E-01	3.662E-01	FAIL ABUN
HO-166M	9.742E-03	5.813E-02	1.231E-01	NOT IDENT.
TM-171	-8.037E+00	2.864E+01	4.597E+01	NOT IDENT.
HF-172	5.777E-02	1.651E-01	3.238E-01	FAIL ABUN

LU-172	4.061E-02	8.016E-02	1.739E-01	FAIL ABUN
LU-176	1.667E-02	2.965E-02	5.678E-02	NOT IDENT.
HF-181	5.029E-02	7.978E-02	1.728E-01	NOT IDENT.
TA-182	7.807E-03	2.676E-01	5.273E-01	FAIL ABUN
RE-183	-2.384E-02	3.220E-01	5.974E-01	FAIL ABUN
RE-184	1.591E-01	2.318E-01	5.624E-01	NOT IDENT.
W-188	-4.964E+00	1.093E+01	1.796E+01	FAIL ABUN
IR-192	-7.475E-03	4.275E-02	8.320E-02	FAIL ABUN
HG-203	-3.316E-03	7.341E-02	1.292E-01	NOT IDENT.
TL-204	-1.595E+00	4.421E+00	8.348E+00	NOT IDENT.
BI-207	-1.997E-02	5.759E-02	1.063E-01	NOT IDENT.
PB-211	2.780E-02	7.333E-01	1.429E+00	NOT IDENT.
BI-212	2.772E-01	6.501E-01	1.351E+00	NOT IDENT.
BI-213	8.196E-03	9.914E-02	1.970E-01	NOT IDENT.
RN-219	1.056E-01	4.320E-01	8.619E-01	NOT IDENT.
RA-223	-1.338E-01	6.004E-01	1.146E+00	FAIL ABUN
AC-225	-3.167E+00	8.800E+00	1.509E+01	NOT IDENT.
AC-227	2.019E-01	2.600E-01	5.155E-01	FAIL ABUN
TH-227	2.019E-01	2.600E-01	5.155E-01	FAIL ABUN
AC-228	2.716E-01	2.028E-01	4.583E-01	FAIL ABUN
RA-228	2.716E-01	2.028E-01	4.583E-01	FAIL ABUN
TH-229	-1.768E-01	4.939E-01	8.574E-01	FAIL ABUN
PA-231	1.082E-01	4.894E-01	7.749E-01	NOT IDENT.
TH-231	-1.338E-01	6.004E-01	1.146E+00	FAIL ABUN
TH-232	2.716E-01	2.028E-01	4.583E-01	FAIL ABUN
PA-233	-2.486E-02	6.761E-02	1.259E-01	NOT IDENT.
PA-234	-1.710E-01	2.895E-01	5.090E-01	NOT IDENT.
PA-234M	5.240E-01	5.557E+00	1.114E+01	NOT IDENT.
U-235	-7.462E-02	1.867E-01	3.336E-01	FAIL ABUN
NP-237	-2.486E-02	6.761E-02	1.259E-01	NOT IDENT.
NP-238	0.000E+00	6.469E+06	0.000E+00	SHORT HLIF
NP-239	5.937E-02	1.934E-01	3.869E-01	NOT IDENT.
PU-239	1.786E+02	2.736E+02	5.546E+02	NOT IDENT.
AM-243	6.570E-02	5.986E-02	1.171E-01	NOT IDENT.
CM-243	-1.075E-01	9.385E-02	1.566E-01	NOT IDENT.
BK-247	4.622E-03	7.870E-02	1.428E-01	NOT IDENT.
CM-247	-1.061E-02	4.356E-02	8.052E-02	NOT IDENT.
CF-249	4.365E-02	3.943E-02	8.841E-02	NOT IDENT.
CF-251	-4.384E-03	1.236E-01	2.249E-01	NOT IDENT.

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	60	10.66*	9.699E-01	4.268E+00	4.268E+00	32.80
AG-110	657.50	7	4.50*	1.995E+00	5.460E-01	6.345E-01	154.36
TL-208	277.37	-----	6.60	3.918E+00	-----	Line Not Found	-----
	583.19	20	85.00*	2.206E+00	7.671E-02	7.671E-02	95.10
	860.56	-----	12.50	1.568E+00	-----	Line Not Found	-----
BI-210	46.54	27	4.25*	4.357E-01	1.071E+01	1.076E+01	95.84
PB-210	46.54	27	4.25*	4.357E-01	1.071E+01	1.076E+01	95.84
BI-211	72.87	-----	1.23	3.550E+00	-----	Line Not Found	-----
	351.06	176	12.92*	3.272E+00	3.076E+00	3.076E+00	18.83
PB-212	74.82	-----	10.28	3.777E+00	-----	Line Not Found	-----
	77.11	43	17.10	4.061E+00	4.556E-01	4.556E-01	91.56
	238.63	69	43.60*	4.380E+00	2.654E-01	2.654E-01	44.44
BI-214	300.09	-----	3.30	3.693E+00	-----	Line Not Found	-----
	609.32	127	45.49*	2.124E+00	9.674E-01	9.675E-01	20.80
	1120.29	38	14.92	1.226E+00	1.516E+00	1.516E+00	39.07
PB-214	1764.49	13	15.30	8.531E-01	7.270E-01	7.270E-01	75.96
	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.033E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
RN-222	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
	609.32	127	45.49*	2.124E+00	9.674E-01	9.675E-01	20.80
	1120.29	38	14.92	1.226E+00	1.516E+00	1.516E+00	39.07
RA-224	1764.49	13	15.30	8.531E-01	7.270E-01	7.270E-01	75.96
RA-226	240.99	58	4.10*	4.336E+00	2.383E+00	2.383E+00	49.61
	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.033E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
TH-228	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
	74.82	-----	10.28	3.777E+00	-----	Line Not Found	-----
	77.11	43	17.10	4.061E+00	4.556E-01	4.556E-01	91.56
	238.63	69	43.60*	4.380E+00	2.654E-01	2.654E-01	44.44
TH-230	300.09	-----	3.30	3.693E+00	-----	Line Not Found	-----
	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.032E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
TH-234	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
	63.29	25	3.70*	2.296E+00	2.146E+00	2.146E+00	114.61
U-234	92.59	42	4.23	5.340E+00	1.362E+00	1.362E+00	123.09
	74.82	-----	5.80	3.777E+00	-----	Line Not Found	-----
	77.11	43	9.70	4.061E+00	8.032E-01	8.032E-01	91.56
	87.09	-----	3.41	4.945E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	242.00	58	7.25	4.336E+00	1.348E+00	1.348E+00	49.61
	295.22	104	18.42	3.736E+00	1.110E+00	1.110E+00	30.59
	351.93	176	35.60*	3.272E+00	1.116E+00	1.116E+00	18.83
U-238	63.29	25	3.70*	2.296E+00	2.146E+00	2.146E+00	114.61
	92.59	42	4.23	5.340E+00	1.362E+00	1.362E+00	123.09
AM-241	59.54	17	35.90*	1.891E+00	1.798E-01	1.798E-01	123.51
ANH-511	511.00	20	100.00*	2.452E+00	5.906E-02	5.906E-02	136.42

Flag: "\*" = Keyline



Total number of lines in spectrum 27  
 Number of unidentified lines 4  
 Number of lines tentatively identified by NID 23 85.19%

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	4.268E+00	4.268E+00	1.400E+00	32.80	
AG-110	249.76D	1.16	5.460E-01	6.345E-01	9.795E-01	154.36	
TL-208	1.41E+10Y	1.00	7.671E-02	7.671E-02	7.296E-02	95.10	
BI-210	22.20Y	1.00	1.071E+01	1.076E+01	1.031E+01	95.84	
PB-210	22.20Y	1.00	1.071E+01	1.076E+01	1.031E+01	95.84	
BI-211	7.04E+08Y	1.00	3.076E+00	3.076E+00	0.579E+00	18.83	
PB-212	1.41E+10Y	1.00	2.654E-01	2.654E-01	1.179E-01	44.44	
BI-214	1600.00Y	1.00	9.674E-01	9.675E-01	2.013E-01	20.80	
PB-214	1600.00Y	1.00	1.116E+00	1.116E+00	0.210E+00	18.83	
RN-222	1600.00Y	1.00	9.674E-01	9.675E-01	2.013E-01	20.80	
RA-224	1.41E+10Y	1.00	2.383E+00	2.383E+00	1.182E+00	49.61	
RA-226	1600.00Y	1.00	1.116E+00	1.116E+00	0.210E+00	18.83	
TH-228	1.41E+10Y	1.00	2.654E-01	2.654E-01	1.179E-01	44.44	
TH-230	7.54E+04Y	1.00	1.116E+00	1.116E+00	0.210E+00	18.83	
TH-234	4.47E+09Y	1.00	2.146E+00	2.146E+00	2.460E+00	114.61	
U-234	2.45E+05Y	1.00	1.116E+00	1.116E+00	0.210E+00	18.83	
U-238	4.47E+09Y	1.00	2.146E+00	2.146E+00	2.460E+00	114.61	
AM-241	432.60Y	1.00	1.798E-01	1.798E-01	2.221E-01	123.51	
ANH-511	1.00E+09Y	1.00	5.906E-02	5.906E-02	8.057E-02	136.42	
Total Activity :			4.322E+01	4.341E+01			

Grand Total Activity : 4.322E+01 4.341E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	186.08	48	83	1.54	372.10	366	12	1.36E-02	84.0	5.19E+00	T
0	209.43	17	34	0.92	418.81	415	8	4.84E-03	****	4.81E+00	T
0	303.09	17	9	1.95	606.09	603	7	4.97E-03	72.6	3.66E+00	T
0	337.60	24	21	2.11	675.10	671	8	6.99E-03	75.8	3.38E+00	T
0	464.00	22	13	0.59	927.86	922	11	6.25E-03	80.2	2.65E+00	T
0	525.39	13	6	0.55	1050.62	1047	8	3.92E-03	85.1	2.40E+00	
0	537.05	11	4	1.53	1073.94	1071	6	3.14E-03	82.5	2.36E+00	T
0	787.10	11	5	1.71	1573.99	1570	9	3.09E-03	****	1.70E+00	
0	910.81	14	4	1.27	1821.39	1816	9	4.16E-03	76.2	1.49E+00	T
0	1377.18	12	0	0.55	2754.15	2747	12	3.61E-03	55.5	1.02E+00	
0	1508.90	6	2	0.99	3017.59	3013	8	1.70E-03	****	9.45E-01	

Flags: "T" = Tentatively associated

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*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540616.CNF;1
* Acquisition date   : 30-OCT-2023 11:35:03 Sensitivity      : 3.000
* Detector ID        : GAM23 Energy tolerance: 1.500
* Elapsed live time  : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 01:00:00.89 Half life ratio  : *****
* Sample date        : 6-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID          : G1205540616 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.0190E+02 GRAM
* Wet wt corr        : 1.00000 Wet Weight      : 0.00000
* Dry Weight         : 0.00000
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date     : 6-SEP-2023 11:17:47 Eff. Geometry   : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;21
*****

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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	4.157E-01
AG-110	6.481E-01
TL-208	3.011E-02
BI-210	3.344E+00
PB-210	3.344E+00
BI-211	1.667E-01
PB-212	5.223E-02
BI-214	6.447E-02
PB-214	6.066E-02
RN-222	6.447E-02
RA-224	5.604E-01
RA-226	6.066E-02
TH-228	5.223E-02
TH-230	6.066E-02
TH-234	9.777E-01
U-234	6.066E-02
U-238	9.777E-01
AM-241	1.269E-01
ANH-511	2.242E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	5.495E-01	NOT IDENT.
NA-22	3.943E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	3.502E-02	NOT IDENT.
SC-46	4.472E-02	FAIL ABUN
V-48	2.582E-01	NOT IDENT.
CR-51	7.158E-01	NOT IDENT.
MN-52	1.616E+01	NOT IDENT.
MN-54	3.609E-02	NOT IDENT.
CO-56	6.191E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.115E-02	NOT IDENT.

CO-58	5.412E-02	NOT IDENT.
FE-59	1.123E-01	NOT IDENT.
CO-60	3.030E-02	NOT IDENT.
ZN-65	8.950E-02	NOT IDENT.
GE-68	1.453E+00	NOT IDENT.
AS-73	1.369E+00	NOT IDENT.
AS-74	3.706E-01	NOT IDENT.
SE-75	3.494E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.028E+00	NOT IDENT.
RB-83	1.064E-01	NOT IDENT.
RB-84	1.339E-01	NOT IDENT.
KR-85	7.265E+00	NOT IDENT.
SR-85	5.805E-02	NOT IDENT.
RB-86	3.565E+00	NOT IDENT.
Y-88	5.823E-02	NOT IDENT.
Y-91	3.113E+01	NOT IDENT.
NB-94	3.498E-02	NOT IDENT.
NB-95	6.695E-02	NOT IDENT.
NB-95M	1.529E-01	NOT IDENT.
ZR-95	1.033E-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	2.196E-02	NOT IDENT.
RH-102	5.143E-02	NOT IDENT.
RU-103	7.101E-02	FAIL ABUN
RH-106	3.079E-01	NOT IDENT.
RU-106	3.079E-01	NOT IDENT.
AG-108M	2.849E-02	NOT IDENT.
CD-109	6.087E-01	NOT IDENT.
AG-110M	5.201E-02	FAIL ABUN
SN-113	4.009E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	3.288E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	2.794E-02	NOT IDENT.
SB-124	8.933E-02	NOT IDENT.
SB-125	8.181E-02	FAIL ABUN
TE-125M	1.022E+01	NOT IDENT.
I-126	1.648E+00	NOT IDENT.
SB-126	8.161E-01	NOT IDENT.
SN-126	6.463E-02	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	3.235E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	2.788E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.069E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	7.388E-01	NOT IDENT.
BA-137M	2.147E-02	NOT IDENT.
CS-137	2.269E-02	NOT IDENT.
LA-138	4.573E-02	NOT IDENT.
CE-139	3.004E-02	NOT IDENT.
BA-140	2.141E+00	FAIL ABUN
LA-140	3.732E-01	NOT IDENT.
CE-141	1.113E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.302E-01	NOT IDENT.
PM-144	3.206E-02	NOT IDENT.
PR-144	2.444E+00	NOT IDENT.
PM-146	3.259E-02	NOT IDENT.
ND-147	6.739E+00	NOT IDENT.
PM-147	5.820E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.488E-02	NOT IDENT.
EU-152	6.887E-02	NOT IDENT.
GD-153	6.435E-02	NOT IDENT.
EU-154	1.076E-01	NOT IDENT.
EU-155	7.820E-02	NOT IDENT.
TB-160	1.472E-01	FAIL ABUN
HO-166M	5.170E-02	NOT IDENT.
TM-171	2.070E+01	NOT IDENT.
HF-172	1.466E-01	FAIL ABUN
LU-172	7.371E-02	FAIL ABUN

LU-176	2.547E-02	NOT IDENT.
HF-181	7.476E-02	NOT IDENT.
TA-182	2.187E-01	FAIL ABUN
RE-183	2.682E-01	FAIL ABUN
RE-184	2.312E-01	NOT IDENT.
W-188	7.863E+00	FAIL ABUN
IR-192	3.598E-02	FAIL ABUN
HG-203	5.764E-02	NOT IDENT.
TL-204	3.781E+00	NOT IDENT.
BI-207	4.279E-02	NOT IDENT.
PB-211	6.251E-01	NOT IDENT.
BI-212	5.942E-01	NOT IDENT.
BI-213	8.464E-02	NOT IDENT.
RN-219	3.802E-01	NOT IDENT.
RA-223	5.019E-01	FAIL ABUN
AC-225	6.750E+00	NOT IDENT.
AC-227	2.327E-01	FAIL ABUN
TH-227	2.327E-01	FAIL ABUN
AC-228	2.034E-01	FAIL ABUN
RA-228	2.034E-01	FAIL ABUN
TH-229	3.843E-01	FAIL ABUN
PA-231	3.371E-01	NOT IDENT.
TH-231	5.019E-01	FAIL ABUN
TH-232	2.034E-01	FAIL ABUN
PA-233	5.579E-02	NOT IDENT.
PA-234	1.970E-01	NOT IDENT.
PA-234M	4.706E+00	NOT IDENT.
U-235	1.514E-01	FAIL ABUN
NP-237	5.579E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	1.727E-01	NOT IDENT.
PU-239	2.513E+02	NOT IDENT.
AM-243	5.461E-02	NOT IDENT.
CM-243	7.005E-02	NOT IDENT.
BK-247	6.326E-02	NOT IDENT.
CM-247	3.560E-02	NOT IDENT.
CF-249	3.926E-02	NOT IDENT.
CF-251	1.017E-01	NOT IDENT.

```

*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540616.CNF;1
* Acquisition date   : 30-OCT-2023 11:35:03 Sensitivity      : 3.000
* Detector ID        : GAM23 Energy tolerance: 1.500
* Elapsed live time  : 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 01:00:00.89 Half life ratio  : *****
* Sample date        : 6-SEP-2023 08:00:00 Nuclide Library : SOLID
* Sample ID          : G1205540616 Analyst initials: MXR1
* Batch Number       : 2505440 Sample Quantity : 1.0190E+02 GRAM
* Wet wt corr        : 1.00000 Quantity Err(%) : 1.9627E-03 %
* Dry Weight         : 0.00000
* Wet Weight         : 0.00000
* Dry Weight         : 0.00000
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date     : 6-SEP-2023 11:17:47 Eff. Geometry    : CAN
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM23_CAN.CNF;21
*****

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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	4.268E+00	1.423E+00	1.423E+00
AG-110	6.345E-01	9.615E-01	9.615E-01
TL-208	7.671E-02	7.182E-02	7.182E-02
BI-210	1.076E+01	1.018E+01	1.018E+01
PB-210	1.076E+01	1.018E+01	1.018E+01
BI-211	3.076E+00	6.195E-01	6.195E-01
PB-212	2.654E-01	1.181E-01	1.181E-01
BI-214	9.675E-01	2.152E-01	2.152E-01
PB-214	1.116E+00	2.241E-01	2.241E-01
RN-222	9.675E-01	2.152E-01	2.152E-01
RA-224	2.383E+00	1.179E+00	1.179E+00
RA-226	1.116E+00	2.241E-01	2.241E-01
TH-228	2.654E-01	1.181E-01	1.181E-01
TH-230	1.116E+00	2.241E-01	2.241E-01
TH-234	2.146E+00	2.467E+00	2.467E+00
U-234	1.116E+00	2.241E-01	2.241E-01
U-238	2.146E+00	2.467E+00	2.467E+00
AM-241	1.798E-01	2.188E-01	2.188E-01
ANH-511	5.906E-02	7.913E-02	7.913E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.379E-01	6.242E-01	6.273E-01	NOT IDENT.
NA-22	9.561E-03	4.359E-02	4.380E-02	NOT IDENT.
NA-24	-3.161E+24	4.283E+24	0.000E+00	SHORT HLIF
AL-26	-1.528E-02	4.417E-02	4.471E-02	NOT IDENT.
SC-46	-3.172E-02	6.116E-02	6.281E-02	FAIL ABUN
V-48	-1.728E-01	3.666E-01	3.748E-01	NOT IDENT.
CR-51	-1.216E-01	8.467E-01	8.485E-01	NOT IDENT.
MN-52	-2.735E+01	3.147E+01	3.380E+01	NOT IDENT.
MN-54	1.310E-02	3.973E-02	4.017E-02	NOT IDENT.
CO-56	3.781E-02	6.594E-02	6.811E-02	NOT IDENT.
MN-56	1.000E+41	1.750E+41	0.000E+00	SHORT HLIF

CO-57	1.082E-02	2.347E-02	2.397E-02	NOT IDENT.
CO-58	2.231E-02	5.890E-02	5.975E-02	NOT IDENT.
FE-59	-5.984E-03	1.390E-01	1.390E-01	NOT IDENT.
CO-60	-2.438E-03	3.652E-02	3.654E-02	NOT IDENT.
ZN-65	1.439E-02	1.197E-01	1.198E-01	NOT IDENT.
GE-68	1.728E-01	1.725E+00	1.727E+00	NOT IDENT.
AS-73	-2.609E-01	1.837E+00	1.841E+00	NOT IDENT.
AS-74	-1.997E-01	4.978E-01	5.059E-01	NOT IDENT.
SE-75	-2.834E-02	4.993E-02	5.154E-02	NOT IDENT.
BR-77	3.639E+06	5.914E+06	6.137E+06	SHORT HLIF
SR-82	-1.389E-01	1.232E+00	1.233E+00	NOT IDENT.
RB-83	4.389E-02	1.269E-01	1.285E-01	NOT IDENT.
RB-84	-8.580E-02	1.801E-01	1.842E-01	NOT IDENT.
KR-85	3.049E+00	9.166E+00	9.268E+00	NOT IDENT.
SR-85	2.439E-02	7.323E-02	7.405E-02	NOT IDENT.
RB-86	1.032E+00	4.085E+00	4.111E+00	NOT IDENT.
Y-88	5.051E-02	4.964E-02	5.461E-02	NOT IDENT.
Y-91	7.558E+00	3.630E+01	3.646E+01	NOT IDENT.
NB-94	-6.523E-04	4.077E-02	4.077E-02	NOT IDENT.
NB-95	4.053E-02	7.136E-02	7.366E-02	NOT IDENT.
NB-95M	7.697E-02	1.926E-01	1.957E-01	NOT IDENT.
ZR-95	1.849E-02	1.172E-01	1.175E-01	NOT IDENT.
NB-97	1.000E+41	1.515E+41	0.000E+00	SHORT HLIF
ZR-97	5.569E+22	8.223E+22	0.000E+00	SHORT HLIF
MO-99	1.490E+05	1.978E+05	2.089E+05	SHORT HLIF
TC-99M	-1.000E+41	3.332E+42	0.000E+00	SHORT HLIF
RH-101	-1.497E-02	2.784E-02	2.865E-02	NOT IDENT.
RH-102	8.725E-03	6.156E-02	6.168E-02	NOT IDENT.
RU-103	-4.127E-04	8.562E-02	8.562E-02	FAIL ABUN
RH-106	5.360E-02	3.676E-01	3.684E-01	NOT IDENT.
RU-106	5.360E-02	3.676E-01	3.684E-01	NOT IDENT.
AG-108M	6.190E-03	3.285E-02	3.297E-02	NOT IDENT.
CD-109	-5.075E-01	8.110E-01	8.426E-01	NOT IDENT.
AG-110M	5.904E-03	6.051E-02	6.057E-02	FAIL ABUN
SN-113	-5.013E-02	5.641E-02	6.077E-02	NOT IDENT.
CD-115	-5.247E+05	2.355E+06	2.367E+06	SHORT HLIF
SN-117M	1.626E-01	3.745E-01	3.816E-01	NOT IDENT.
SB-122	-2.649E+04	5.080E+04	5.218E+04	SHORT HLIF
TE-123M	-1.635E-02	3.548E-02	3.624E-02	NOT IDENT.
SB-124	-2.210E-02	1.204E-01	1.209E-01	NOT IDENT.
SB-125	2.209E-02	9.317E-02	9.370E-02	FAIL ABUN
TE-125M	-6.268E-01	1.195E+01	1.196E+01	NOT IDENT.
I-126	5.322E-01	1.926E+00	1.941E+00	NOT IDENT.
SB-126	-7.279E-01	1.141E+00	1.187E+00	NOT IDENT.
SN-126	9.323E-02	6.932E-02	8.107E-02	FAIL ABUN
SB-127	1.248E+03	1.488E+03	1.591E+03	SHORT HLIF
I-131	2.503E+00	3.416E+00	3.597E+00	NOT IDENT.
I-132	1.000E+41	7.975E+41	0.000E+00	SHORT HLIF
TE-132	3.519E+03	3.155E+03	3.531E+03	SHORT HLIF
BA-133	1.403E-02	3.223E-02	3.285E-02	FAIL ABUN
I-133	2.455E+17	2.506E+17	0.000E+00	SHORT HLIF
CS-134	3.757E-02	3.981E-02	4.326E-02	NOT IDENT.
I-135	-1.000E+41	3.549E+41	0.000E+00	SHORT HLIF
CS-136	7.037E-02	8.759E-01	8.764E-01	NOT IDENT.
BA-137M	-3.649E-02	3.728E-02	4.075E-02	NOT IDENT.
CS-137	-3.854E-02	3.938E-02	4.305E-02	NOT IDENT.
LA-138	-2.007E-02	6.152E-02	6.218E-02	NOT IDENT.
CE-139	1.113E-02	3.485E-02	3.521E-02	NOT IDENT.
BA-140	2.627E+00	2.138E+00	2.444E+00	FAIL ABUN
LA-140	-3.212E-01	6.324E-01	6.487E-01	NOT IDENT.
CE-141	4.067E-02	1.274E-01	1.287E-01	NOT IDENT.
CE-143	5.011E+10	5.051E+10	5.534E+10	SHORT HLIF
CE-144	-1.771E-01	1.792E-01	1.962E-01	NOT IDENT.
PM-144	-2.049E-02	4.111E-02	4.213E-02	NOT IDENT.
PR-144	-1.578E+00	3.137E+00	3.217E+00	NOT IDENT.
PM-146	-1.343E-02	4.165E-02	4.208E-02	NOT IDENT.
ND-147	2.577E+00	7.702E+00	7.789E+00	NOT IDENT.
PM-147	3.698E+02	6.374E+02	6.588E+02	NOT IDENT.
PM-149	1.844E+06	1.939E+07	1.941E+07	SHORT HLIF
EU-150	8.988E-03	3.040E-02	3.067E-02	NOT IDENT.
EU-152	-1.468E-02	8.268E-02	8.294E-02	NOT IDENT.
GD-153	-4.355E-02	8.605E-02	8.826E-02	NOT IDENT.
EU-154	2.264E-02	1.198E-01	1.203E-01	NOT IDENT.
EU-155	3.174E-02	8.689E-02	8.806E-02	NOT IDENT.
TB-160	-5.578E-02	1.903E-01	1.919E-01	FAIL ABUN
HO-166M	9.742E-03	5.813E-02	5.830E-02	NOT IDENT.
TM-171	-8.037E+00	2.866E+01	2.889E+01	NOT IDENT.
HF-172	5.777E-02	1.654E-01	1.674E-01	FAIL ABUN

LU-172	4.061E-02	8.032E-02	8.238E-02	FAIL ABUN
LU-176	1.667E-02	2.968E-02	3.061E-02	NOT IDENT.
HF-181	5.029E-02	7.990E-02	8.306E-02	NOT IDENT.
TA-182	7.807E-03	2.676E-01	2.676E-01	FAIL ABUN
RE-183	-2.384E-02	3.220E-01	3.222E-01	FAIL ABUN
RE-184	1.591E-01	2.325E-01	2.433E-01	NOT IDENT.
W-188	-4.964E+00	1.095E+01	1.118E+01	FAIL ABUN
IR-192	-7.475E-03	4.275E-02	4.288E-02	FAIL ABUN
HG-203	-3.316E-03	7.341E-02	7.343E-02	NOT IDENT.
TL-204	-1.595E+00	4.426E+00	4.484E+00	NOT IDENT.
BI-207	-1.997E-02	5.761E-02	5.831E-02	NOT IDENT.
PB-211	2.780E-02	7.333E-01	7.335E-01	NOT IDENT.
BI-212	2.772E-01	6.506E-01	6.625E-01	NOT IDENT.
BI-213	8.196E-03	9.914E-02	9.921E-02	NOT IDENT.
RN-219	1.056E-01	4.323E-01	4.349E-01	NOT IDENT.
RA-223	-1.338E-01	6.005E-01	6.036E-01	FAIL ABUN
AC-225	-3.167E+00	8.810E+00	8.925E+00	NOT IDENT.
AC-227	2.019E-01	2.617E-01	2.771E-01	FAIL ABUN
TH-227	2.019E-01	2.617E-01	2.771E-01	FAIL ABUN
AC-228	2.716E-01	2.043E-01	2.382E-01	FAIL ABUN
RA-228	2.716E-01	2.043E-01	2.382E-01	FAIL ABUN
TH-229	-1.768E-01	4.942E-01	5.006E-01	FAIL ABUN
PA-231	1.082E-01	4.900E-01	4.924E-01	NOT IDENT.
TH-231	-1.338E-01	6.005E-01	6.036E-01	FAIL ABUN
TH-232	2.716E-01	2.043E-01	2.382E-01	FAIL ABUN
PA-233	-2.486E-02	6.764E-02	6.856E-02	NOT IDENT.
PA-234	-1.710E-01	3.496E-01	3.580E-01	NOT IDENT.
PA-234M	5.240E-01	5.557E+00	5.562E+00	NOT IDENT.
U-235	-7.462E-02	1.868E-01	1.898E-01	FAIL ABUN
NP-237	-2.486E-02	6.764E-02	6.856E-02	NOT IDENT.
NP-238	-4.389E+06	6.480E+06	6.776E+06	SHORT HLIF
NP-239	5.937E-02	1.935E-01	1.954E-01	NOT IDENT.
PU-239	1.786E+02	2.739E+02	2.855E+02	NOT IDENT.
AM-243	6.570E-02	6.035E-02	6.722E-02	NOT IDENT.
CM-243	-1.075E-01	9.474E-02	1.064E-01	NOT IDENT.
BK-247	4.622E-03	7.870E-02	7.873E-02	NOT IDENT.
CM-247	-1.061E-02	4.361E-02	4.387E-02	NOT IDENT.
CF-249	4.365E-02	3.971E-02	4.432E-02	NOT IDENT.
CF-251	-4.384E-03	1.236E-01	1.236E-01	NOT IDENT.



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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	20.9220	85.43	55.3985	131.20	28.7421
45.60	14.1145	86.55	29.4915	133.02	36.5678
46.54	14.1888	86.79	26.1423	133.52	33.7220
49.72	0.0000	86.94	26.9995	136.00	29.0762
51.35	20.3810	87.09	27.0134	136.47	32.0196
51.87	24.8144	87.57	24.8028	140.51	0.0000
52.39	32.1979	88.03	48.5535	143.76	32.5652
52.97	23.4852	88.34	62.1682	144.24	31.6128
53.44	27.9545	88.47	50.8873	145.44	28.7265
54.07	26.5662	89.96	23.8660	152.43	33.1964
57.36	0.0000	1093.63	29.8997	153.25	27.2085
57.53	27.0140	91.11	29.9459	323.87	25.2449
57.98	27.0710	92.59	30.0909	156.02	35.4796
59.27	23.4513	93.35	30.1652	158.56	28.5362
59.32	23.4567	94.56	30.2824	159.00	39.7831
59.54	23.4805	94.65	30.2909	162.33	34.9224
60.96	23.6327	94.67	30.2931	162.66	34.9458
61.17	23.6550	94.87	30.3123	163.33	37.0525
62.93	23.8409	97.43	34.9228	165.86	30.0009
63.29	23.8785	98.43	32.4041	176.31	31.6791
63.58	23.9089	98.44	32.4049	176.60	26.4137
64.28	23.9817	99.53	27.2414	177.52	30.6939
66.73	21.8885	100.11	42.2549	181.07	0.0000
67.24	17.7571	102.03	28.3340	181.52	28.4379
125.81	27.2076	103.18	41.7586	184.41	30.0204
67.75	27.2156	103.37	41.7823	143.76	30.0927
68.89	27.6068	105.21	25.0268	193.51	30.5178
69.67	25.3213	105.31	25.0343	197.03	28.5137
70.82	36.5682	106.12	30.4706	198.01	24.1682
70.83	36.5699	106.47	28.7073	201.83	26.5393
72.81	38.4609	109.28	25.3222	203.43	41.0266
72.87	38.4697	111.00	28.1716	205.31	22.2470
74.66	41.9663	111.76	0.0000	210.85	20.9561
74.82	41.9925	114.06	27.4951	215.65	26.0240
74.97	49.5582	116.30	0.0000	218.12	29.5352
77.11	57.0219	116.74	19.3873	222.11	27.4365
78.74	57.3685	119.76	25.1277	227.09	19.5860
79.69	33.9933	121.12	25.2175	227.38	23.0527
80.03	31.8391	121.22	23.3557	228.16	0.0000
80.12	31.8500	121.78	21.5185	228.18	15.0027
80.19	31.8583	122.06	24.3429	116.74	15.0027
80.57	33.0023	122.92	27.2123	235.69	23.3456
81.00	23.1375	123.07	27.2227	235.96	23.3551
81.07	23.1433	265.00	31.0264	238.63	33.9999
81.75	24.3046	125.81	25.5232	238.98	0.0000
82.47	39.8741	127.23	34.1526	240.99	34.1185
83.79	33.3835	127.91	29.4596	242.00	34.1689
84.00	30.0674	129.30	21.9328	244.70	29.9666

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	14.2845	563.25	11.8589
252.80	28.7201	345.93	16.0986	564.24	0.0000
254.15	0.0000	351.06	17.0865	569.33	16.2396
256.23	18.0367	351.93	17.1024	946.00	21.6553
260.90	0.0000	355.39	0.0000	569.70	21.6585
264.66	19.4634	356.01	6.7801	583.19	10.9298
264.80	19.4673	364.49	12.7681	584.27	13.1255
265.00	19.4722	366.42	0.0000	595.83	15.4321
269.46	17.1407	372.51	12.8726	427.87	12.1637
270.03	29.4067	375.05	10.1402	602.52	0.0000
271.23	17.1813	377.52	14.7855	604.72	11.6420
273.65	20.9299	356.01	12.0888	607.14	13.3267
276.40	14.8275	388.16	9.3384	609.32	13.3457
277.37	22.2693	388.63	10.2769	610.33	10.0159
277.60	24.7510	391.69	20.6147	614.28	8.3679
278.00	24.7638	264.66	17.9567	618.01	15.6577
279.20	23.5621	401.81	16.0841	620.36	7.8405
279.54	19.8506	402.40	22.7197	621.93	10.0909
279.70	21.0959	404.85	16.1301	630.19	0.0000
280.46	21.1167	410.95	14.3134	631.29	10.1510
283.69	19.9570	413.71	12.4366	633.25	9.0345
284.31	27.4624	414.70	16.2782	634.78	14.6948
285.41	24.1678	423.72	17.3774	635.95	9.0498
285.90	0.0000	427.09	15.4935	636.99	6.7917
287.50	19.2181	427.87	12.5972	657.50	8.5977
290.67	22.6505	433.94	15.5879	657.76	1.7198
293.27	0.0000	439.40	10.7681	657.90	0.0000
351.93	20.2480	440.45	11.7578	661.66	13.7915
295.96	20.2666	453.88	13.8764	664.57	0.0000
879.38	11.8601	463.37	11.9893	666.33	9.2201
299.98	10.1832	468.07	12.0361	666.50	9.2210
300.09	10.1846	473.00	0.0000	667.71	0.0000
300.13	10.1851	475.06	17.1491	677.62	10.4429
301.36	10.2002	476.78	12.1221	685.70	0.0000
302.85	16.1797	477.60	13.1410	692.65	0.0000
256.23	23.0378	482.18	8.1167	695.00	6.1541
304.85	23.0477	487.02	10.1851	696.49	14.9580
306.78	17.9674	492.35	0.0000	696.51	14.9585
308.46	24.8617	497.08	13.3462	697.00	15.8428
311.90	24.9632	505.52	7.7504	697.30	13.2047
316.51	15.5782	507.63	0.0000	697.49	13.2060
319.41	13.0255	511.00	10.3772	702.65	15.0114
320.08	15.6423	514.00	15.6012	706.68	7.0806
321.04	16.5299	514.00	15.6012	711.68	7.9882
323.87	19.2017	520.40	15.0498	720.70	9.8130
325.23	17.4833	520.69	0.0000	721.93	0.0000
328.76	20.1858	522.65	0.0000	722.78	12.5038
333.37	18.5258	527.90	0.0000	722.91	12.5046
333.97	18.5382	528.26	11.0383	723.31	16.9746
334.37	21.1958	529.59	7.8925	724.19	12.5136
338.28	21.2876	529.87	0.0000	727.33	13.4312
338.32	21.2886	531.02	12.6411	733.00	8.0840
311.90	25.3399	537.26	11.6410	735.93	7.1973
340.48	25.3399	546.56	0.0000	333.97	8.1038
340.55	25.3416	552.55	16.0498	739.50	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	6.3264	949.00	4.9919	1384.29	2.8084
747.24	3.6210	667.71	0.0000	1408.01	5.6575
748.06	6.3395	962.31	9.0374	1434.09	5.7021
752.31	9.9849	964.08	8.0393	1435.80	4.7542
753.82	8.1763	966.17	21.1224	1457.56	0.0000
756.73	9.0988	911.20	9.0632	1460.82	6.3861
756.80	9.0991	983.53	7.0929	1489.16	1.9316
884.68	12.7875	984.45	0.0000	1505.03	1.6170
765.81	9.1431	1274.44	7.1310	1584.12	4.9592
766.42	8.2315	1001.03	9.1865	1596.21	2.9852
766.84	9.1479	1002.74	10.2145	1620.50	2.0031
772.60	0.0000	1004.73	10.2231	1621.92	1.0020
776.52	13.7924	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	2.0403
778.90	14.7300	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	7.2534	1764.49	5.1958
788.74	7.4028	1038.76	0.0000	1063.66	7.2844
792.07	8.8986	631.29	10.3986	1771.35	4.1637
795.86	3.7150	1048.07	6.2428	1791.20	0.0000
810.06	5.6127	1049.04	6.2450	1808.65	3.1512
810.29	6.5490	1050.41	7.2901	1810.72	0.0000
344.28	6.5495	1063.66	8.3750	1836.06	0.0000
810.76	6.5505	1077.00	7.3666		
815.77	4.6907	1077.34	8.4199		
1048.07	8.4548	1085.87	5.2798		
832.01	7.5659	1093.63	6.3549		
834.85	6.6294	1099.45	4.2461		
835.71	9.4745	1112.07	8.5327		
836.80	0.0000	1112.84	12.8027		
846.75	0.0000	1115.54	6.8352		
846.77	7.6206	1120.29	6.8473		
856.80	13.4006	1120.55	6.8480		
860.56	7.6714	1221.41	3.4250		
871.09	7.7097	1129.67	3.2210		
873.19	4.8233	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	7.7397	1173.23	4.3635		
880.51	12.5838	1177.95	5.4636		
881.60	9.6848	1189.05	5.4852		
883.24	3.8768	1204.77	6.6189		
884.68	7.7590	1221.41	7.7669		
889.28	10.6912	1231.02	7.7925		
894.76	13.6415	1235.36	7.8041		
898.04	10.7345	1238.28	5.5801		
900.72	11.7250	1260.41	0.0000		
903.28	2.9346	1271.87	7.2238		
911.20	4.7124	1274.44	4.5188		
912.08	6.2857	1274.54	4.5190		
923.98	0.0000	1291.59	8.1800		
926.50	8.8967	1298.22	0.0000		
929.11	5.9379	1312.11	6.4049		
935.54	7.9399	1332.49	3.6842		
937.49	7.9468	1362.66	0.0000		
944.13	2.9887	1365.19	0.9306		
946.00	7.9766	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 30-OCT-2023 09:28:31.25

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540617.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM46.CNF;131
Background date  : 29-OCT-2023 11:33:53
Sample date     : 9-OCT-2023 00:00:00. Acquisition date : 30-OCT-2023 09:12:55
Sample ID      : G1205540617. Sample quantity : 1.15000E+02 GRAM
Detector name   : GAM46. Detector geometry: CAN
Elapsed live time: 0 00:15:00.00. Elapsed real time: 0 00:15:04.89 0.5%
Energy tolerance: 1.50000 keV. Analyst Initials : MXR1
Abundance limit : 75.00000. Sensitivity : 3.00000
Batch ID       : 2505440. Detector SN# :
Matrix Spike ID : LCS ID :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	5	11.20*	3260	2890	1.44	22.46	19	29	3.62E+00	3.5	4.96E+01
2	5	13.25	12044	3905	1.46	26.56	19	29	1.34E+01	1.4	
3	5	15.78	7606	4183	1.47	31.62	19	29	8.45E+00	2.3	
4	5	17.73	9094	4386	1.49	35.51	19	29	1.01E+01	1.9	
5	5	21.23	4260	4629	1.50	42.52	19	29	4.73E+00	3.2	
6	0	26.22	3338	4047	1.33	52.48	48	9	3.71E+00	3.9	
7	0	32.25	2613	5276	1.23	64.54	60	9	2.90E+00	5.4	
8	0	36.56	1303	6559	1.37	73.15	70	7	1.45E+00	10.6	
9	10	41.05	6094	13069	2.55	82.14	76	22	6.77E+00	4.0	2.30E+02
10	10	46.63*	70607	10295	1.34	93.30	76	22	7.85E+01	0.4	
11	0	50.04	1174	9127	1.24	100.12	98	7	1.30E+00	13.8	
12	0	59.65	65155	8050	1.21	119.32	114	12	7.24E+01	0.5	
13	0	77.22*	133	772	1.76	154.45	152	6	1.47E-01	34.4	
14	0	87.85	173	1196	1.22	175.70	170	12	1.92E-01	40.8	
15	0	231.32	47	347	1.39	462.58	461	6	5.18E-02	64.9	
16	0	249.33	73	262	1.67	498.58	496	6	8.09E-02	37.3	
17	0	341.64	34	271	1.48	683.18	680	6	3.76E-02	78.9	
18	0	457.14*	19	438	1.24	914.13	910	7	2.06E-02	189.0	
19	0	474.40	41	809	3.78	948.64	942	15	4.57E-02	151.6	
20	0	661.75	13490	229	1.63	1323.31	1316	16	1.50E+01	0.9	
21	0	683.00	22	56	1.41	1365.82	1363	6	2.48E-02	57.0	
22	3	690.23	38	123	2.11	1380.27	1370	20	4.20E-02	62.7	1.08E+00
23	3	693.54	27	62	1.15	1386.88	1370	20	3.00E-02	53.0	
24	0	740.74	32	90	2.28	1481.28	1476	9	3.56E-02	56.3	
25	0	844.30	104	216	4.42	1688.40	1680	18	1.16E-01	34.6	
26	0	996.48	101	171	5.48	1992.78	1983	19	1.13E-01	32.8	
27	0	1134.77	17	51	1.00	2269.40	2265	7	1.89E-02	73.6	
28	0	1173.40	3937	99	1.96	2346.67	2336	18	4.37E+00	1.7	
29	0	1233.25	14	20	0.77	2466.39	2461	11	1.59E-02	65.0	
30	0	1241.74*	16	7	0.67	2483.37	2478	10	1.83E-02	39.8	
31	0	1245.62	6	4	0.55	2491.13	2487	6	6.17E-03	73.7	
32	0	1332.70	3496	32	1.97	2665.32	2655	21	3.88E+00	1.7	
33	0	1385.23	9	5	0.68	2770.40	2763	11	9.68E-03	61.9	
34	0	1405.82	7	4	0.88	2811.59	2808	7	7.83E-03	63.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1422.93	9	2	1.31	2845.82	2842	7	1.04E-02	40.2	
36	0	1469.59*	7	2	1.23	2939.17	2936	6	7.91E-03	47.3	
37	0	1504.51	9	4	1.68	3009.03	3003	9	9.49E-03	56.3	
38	0	1731.08	5	7	0.72	3462.33	3451	13	5.00E-03	126.0	
39	0	1738.66	4	5	0.70	3477.50	3472	8	4.81E-03	105.8	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540617.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MXR1  
Sample date : 9-OCT-2023 00:00:00 Acquisition date : 30-OCT-2023 09:12:55  
Sample ID : G1205540617 Sample quantity : 115.00 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA46 Detector geometry: CAN  
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:04.89 0.5%  
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

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	3750	99.85	1.501E+00	6.534E+01	6.584E+01	3.40
	1332.49	3311	99.98*	1.346E+00	6.423E+01	6.472E+01	3.48
CD-109	88.03	183	3.70*	9.385E+00	1.380E+01	1.425E+01	81.60
SN-126	64.28	-----	9.60	9.839E+00	-----	Line Not Found	-----
	86.94	183	8.90	9.385E+00	5.735E+00	5.735E+00	81.60
	87.57	183	37.00*	9.385E+00	1.380E+00	1.380E+00	81.60
BA-137M	661.66	13175	89.90*	2.486E+00	1.540E+02	1.542E+02	1.80
CS-137	661.66	13175	85.10*	2.486E+00	1.626E+02	1.629E+02	1.80
BI-210	46.54	76868	4.25*	9.452E+00	4.997E+03	5.006E+03	0.90
PB-210	46.54	76868	4.25*	9.452E+00	4.997E+03	5.006E+03	0.90
AM-241	59.54	70255	35.90*	9.836E+00	5.196E+02	5.196E+02	0.97

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540617.CNF;1
* Acquisition date   : 30-OCT-2023 09:12:55 Sensitivity      : 3.000
* Detector ID       : GAM46 Energy tolerance: 1.500
* Elapsed live time : 0 00:15:00.00 Abundance limit : 75.000
* Elapsed real time : 0 00:15:04.89 Half life ratio : *****
* Sample date       : 9-OCT-2023 00:00:00 Analyst initials: MXR1
* Sample ID         : G1205540617 Sample Quantity : 1.1500E+02 GRAM
* Batch Number      : 2505440 Wet Weight : 0.00000
* Wet wt corr       : 1.00000 Dry Weight : 0.00000
* Nuclide Library   : SOLID.NLB;17
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 26-SEP-2023 07:28:30 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM46_CAN.CNF;5
*****

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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 )
CO-60	6.472E+01	2.205E+00	3.577E-01
CD-109	1.425E+01	1.139E+01	8.017E+00
SN-126	1.380E+00	1.103E+00	7.751E-01
BA-137M	1.542E+02	2.712E+00	5.550E-01
CS-137	1.629E+02	2.865E+00	5.863E-01
BI-210	5.006E+03	4.410E+01	2.308E+01
PB-210	5.006E+03	4.410E+01	2.308E+01
AM-241	5.196E+02	4.960E+00	1.944E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	1.474E-01		5.466E+00	8.627E+00	NOT IDENT.
NA-22	3.478E-02		1.869E-01	3.800E-01	NOT IDENT.
NA-24	0.000E+00		3.684E+09	0.000E+00	SHORT HLIF
AL-26	-5.639E-02		1.858E-01	3.482E-01	NOT IDENT.
K-40	-1.646E-01		1.771E+00	3.513E+00	NOT IDENT.
SC-46	-2.158E-01		5.139E-01	8.568E-01	NOT IDENT.
V-48	-7.283E-02		1.133E+00	1.924E+00	NOT IDENT.
CR-51	2.976E+00		4.280E+00	7.943E+00	NOT IDENT.
MN-52	6.958E-02		2.383E+00	4.836E+00	NOT IDENT.
MN-54	-1.402E-01		3.873E-01	6.535E-01	NOT IDENT.
CO-56	2.637E-01		4.706E-01	8.429E-01	NOT IDENT.
MN-56	0.000E+00		1.764E+41	0.000E+00	SHORT HLIF
CO-57	-1.433E-01		2.185E-01	3.640E-01	NOT IDENT.
CO-58	-8.450E-02		4.556E-01	7.797E-01	NOT IDENT.
FE-59	4.354E-01		1.073E+00	2.005E+00	NOT IDENT.
ZN-65	-4.158E-01		9.120E-01	1.615E+00	NOT IDENT.
GE-68	2.236E-01		1.380E+01	2.526E+01	NOT IDENT.
AS-73	1.378E+00		6.634E+00	1.066E+01	NOT IDENT.
AS-74	7.768E-01		1.051E+00	1.954E+00	NOT IDENT.
SE-75	-1.278E-01		4.283E-01	7.732E-01	NOT IDENT.
BR-77	-8.570E+01		4.955E+02	9.051E+02	NOT IDENT.
SR-82	1.882E+00		3.864E+00	6.988E+00	NOT IDENT.



RB-83	-3.176E-01	8.252E-01	1.431E+00	NOT IDENT.
RB-84	6.434E-01	9.418E-01	1.691E+00	NOT IDENT.
KR-85	-2.481E+01	7.505E+01	1.305E+02	NOT IDENT.
SR-85	-1.411E-01	4.248E-01	7.384E-01	NOT IDENT.
RB-86	3.631E+00	1.078E+01	2.012E+01	NOT IDENT.
Y-88	1.281E-01	2.043E-01	4.710E-01	NOT IDENT.
Y-91	6.024E+01	1.314E+02	2.604E+02	NOT IDENT.
NB-94	-1.062E-02	2.773E-01	4.886E-01	NOT IDENT.
NB-95	2.246E-02	3.679E-01	6.504E-01	NOT IDENT.
NB-95M	6.709E-01	1.184E+00	2.118E+00	NOT IDENT.
ZR-95	8.054E-02	6.866E-01	1.222E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	8.684E+09	0.000E+00	SHORT HLIF
MO-99	6.561E+02	7.239E+02	1.004E+03	FAIL ABUN
TC-99M	0.000E+00	9.328E+24	0.000E+00	SHORT HLIF
RH-101	-1.685E-01	2.608E-01	4.338E-01	NOT IDENT.
RH-102	-2.184E-01	5.272E-01	9.053E-01	FAIL ABUN
RU-103	2.510E-01	5.220E-01	9.426E-01	NOT IDENT.
RH-106	-1.152E+00	2.916E+00	5.025E+00	NOT IDENT.
RU-106	-1.152E+00	2.916E+00	5.025E+00	NOT IDENT.
AG-108M	-1.789E-02	4.052E-01	7.155E-01	NOT IDENT.
AG-110	3.428E-01	8.330E+00	1.311E+01	NOT IDENT.
AG-110M	-1.193E-01	6.044E-01	1.025E+00	FAIL ABUN
SN-113	-2.105E-01	5.280E-01	9.284E-01	NOT IDENT.
CD-115	1.720E+02	8.366E+02	1.498E+03	NOT IDENT.
SN-117M	-4.193E-01	6.346E-01	1.043E+00	NOT IDENT.
SB-122	4.766E+01	8.862E+01	1.627E+02	FAIL ABUN
TE-123M	5.410E-02	2.470E-01	4.216E-01	NOT IDENT.
SB-124	1.828E-01	4.487E-01	9.962E-01	NOT IDENT.
SB-125	-1.071E+00	1.174E+00	2.010E+00	NOT IDENT.
TE-125M	6.855E+01	8.031E+01	1.422E+02	NOT IDENT.
I-126	-3.761E-02	2.723E+00	4.315E+00	NOT IDENT.
SB-126	1.230E+00	1.772E+00	3.284E+00	FAIL ABUN
SB-127	1.600E+01	4.495E+01	5.963E+01	FAIL ABUN
I-131	1.368E+00	2.224E+00	4.079E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	-2.833E-01	3.066E+01	4.661E+01	FAIL ABUN
BA-133	-7.582E-02	4.494E-01	8.021E-01	NOT IDENT.
I-133	0.000E+00	9.467E+06	0.000E+00	SHORT HLIF
CS-134	9.806E-02	4.260E-01	7.516E-01	NOT IDENT.
I-135	0.000E+00	2.117E+23	0.000E+00	SHORT HLIF
CS-136	-6.433E-01	1.486E+00	2.654E+00	FAIL ABUN
LA-138	-5.966E-02	2.689E-01	5.160E-01	NOT IDENT.
CE-139	-2.062E-01	2.592E-01	4.221E-01	NOT IDENT.
BA-140	-2.748E+00	3.640E+00	6.179E+00	NOT IDENT.
LA-140	-2.155E-03	4.159E-01	8.974E-01	NOT IDENT.
CE-141	5.097E-03	5.837E-01	9.912E-01	NOT IDENT.
CE-143	0.000E+00	2.666E+04	0.000E+00	SHORT HLIF
CE-144	-6.981E-01	1.646E+00	2.757E+00	NOT IDENT.
PM-144	2.787E-01	3.059E-01	5.291E-01	NOT IDENT.
PR-144	2.110E+01	2.298E+01	3.977E+01	NOT IDENT.
PM-146	-6.412E-02	6.670E-01	1.049E+00	NOT IDENT.
ND-147	-3.199E+00	9.051E+00	1.571E+01	NOT IDENT.
PM-147	-2.354E+03	6.310E+03	1.063E+04	NOT IDENT.
PM-149	2.122E+03	6.250E+03	1.149E+04	NOT IDENT.
EU-150	-4.646E-02	2.617E-01	4.692E-01	NOT IDENT.
EU-152	7.296E-02	1.140E+00	1.850E+00	NOT IDENT.
GD-153	-3.377E-01	6.360E-01	1.076E+00	NOT IDENT.
EU-154	1.197E-01	5.319E-01	1.087E+00	FAIL ABUN
EU-155	3.622E-01	7.779E-01	1.362E+00	FAIL ABUN
TB-160	6.605E-01	1.666E+00	2.941E+00	FAIL ABUN
HO-166M	-4.719E-01	5.082E-01	8.306E-01	NOT IDENT.
TM-171	1.459E+02	1.242E+02	2.020E+02	FAIL ABUN
HF-172	8.118E-01	1.651E+00	2.865E+00	NOT IDENT.
LU-172	-5.007E-01	7.086E-01	1.236E+00	FAIL ABUN
LU-176	1.335E-01	2.565E-01	4.740E-01	FAIL ABUN
HF-181	8.675E-02	6.303E-01	1.118E+00	NOT IDENT.
TA-182	-2.480E-01	1.012E+00	1.876E+00	NOT IDENT.
RE-183	0.000E+00	2.371E+00	5.225E+00	FAIL ABUN
RE-184	1.663E-01	1.680E+00	2.901E+00	NOT IDENT.
W-188	-4.642E+01	7.225E+01	1.282E+02	NOT IDENT.
IR-192	-8.195E-02	3.603E-01	6.466E-01	NOT IDENT.
HG-203	3.683E-02	3.977E-01	7.257E-01	NOT IDENT.
TL-204	-1.819E+01	2.311E+01	3.929E+01	NOT IDENT.
BI-207	6.971E-02	5.455E-01	1.008E+00	NOT IDENT.
TL-208	-5.297E-02	3.377E-01	5.949E-01	NOT IDENT.
BI-211	-3.276E-01	2.166E+00	3.872E+00	NOT IDENT.
PB-211	-1.324E+00	8.660E+00	1.532E+01	NOT IDENT.

BI-212	-2.613E+00	4.473E+00	7.533E+00	NOT IDENT.
PB-212	5.421E-04	5.158E-01	9.473E-01	FAIL ABUN
BI-213	-4.793E-02	1.441E+00	2.543E+00	NOT IDENT.
BI-214	4.198E-01	6.433E-01	1.183E+00	NOT IDENT.
PB-214	-1.963E-01	7.959E-01	1.417E+00	FAIL ABUN
RN-219	1.228E+00	4.789E+00	8.614E+00	NOT IDENT.
RN-222	4.198E-01	6.433E-01	1.183E+00	NOT IDENT.
RA-223	-1.328E+00	6.342E+00	1.137E+01	NOT IDENT.
RA-224	-1.620E+00	5.525E+00	1.001E+01	NOT IDENT.
AC-225	3.330E+00	9.360E+00	1.575E+01	NOT IDENT.
RA-226	-1.963E-01	7.959E-01	1.417E+00	FAIL ABUN
AC-227	-1.576E-01	2.338E+00	4.262E+00	NOT IDENT.
TH-227	-1.576E-01	2.338E+00	4.262E+00	NOT IDENT.
AC-228	-3.385E-01	1.732E+00	2.930E+00	NOT IDENT.
RA-228	-3.385E-01	1.732E+00	2.930E+00	NOT IDENT.
TH-228	5.421E-04	5.158E-01	9.473E-01	FAIL ABUN
TH-229	-4.108E+00	5.119E+00	8.263E+00	FAIL ABUN
TH-230	-1.963E-01	7.959E-01	1.417E+00	FAIL ABUN
PA-231	-3.876E+00	4.638E+00	8.147E+00	NOT IDENT.
TH-231	-1.328E+00	6.342E+00	1.137E+01	NOT IDENT.
TH-232	-3.385E-01	1.732E+00	2.930E+00	NOT IDENT.
PA-233	6.229E-01	6.436E-01	1.206E+00	FAIL ABUN
PA-234	1.445E+00	4.034E+00	7.016E+00	NOT IDENT.
PA-234M	-2.557E+00	5.444E+01	8.245E+01	NOT IDENT.
TH-234	3.793E+00	5.381E+00	8.910E+00	NOT IDENT.
U-234	-1.963E-01	7.959E-01	1.417E+00	FAIL ABUN
U-235	-1.729E+00	1.624E+00	2.637E+00	NOT IDENT.
NP-237	6.229E-01	6.436E-01	1.206E+00	FAIL ABUN
NP-238	0.000E+00	1.919E+03	0.000E+00	SHORT HLIF
U-238	3.793E+00	5.381E+00	8.910E+00	NOT IDENT.
NP-239	5.929E-01	2.097E+00	3.632E+00	NOT IDENT.
PU-239	-1.124E+03	2.659E+03	4.461E+03	NOT IDENT.
AM-243	3.490E-02	2.915E-01	4.703E-01	NOT IDENT.
CM-243	6.994E-01	7.802E-01	1.387E+00	NOT IDENT.
BK-247	-2.329E-01	7.433E-01	1.341E+00	NOT IDENT.
CM-247	-6.802E-03	4.404E-01	7.840E-01	NOT IDENT.
CF-249	-1.949E-01	4.614E-01	8.107E-01	NOT IDENT.
CF-251	3.422E-01	1.146E+00	1.951E+00	NOT IDENT.
ANH-511	-8.921E-02	3.301E-01	5.893E-01	NOT IDENT.

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	3750	99.85	1.501E+00	6.534E+01	6.584E+01	3.40
	1332.49	3311	99.98*	1.346E+00	6.423E+01	6.472E+01	3.48
CD-109	88.03	183	3.70*	9.385E+00	1.380E+01	1.425E+01	81.60
SN-126	64.28	-----	9.60	9.839E+00	-----	Line Not Found	-----
	86.94	183	8.90	9.385E+00	5.735E+00	5.735E+00	81.60
	87.57	183	37.00*	9.385E+00	1.380E+00	1.380E+00	81.60
BA-137M	661.66	13175	89.90*	2.486E+00	1.540E+02	1.542E+02	1.80
CS-137	661.66	13175	85.10*	2.486E+00	1.626E+02	1.629E+02	1.80
BI-210	46.54	76868	4.25*	9.452E+00	4.997E+03	5.006E+03	0.90
PB-210	46.54	76868	4.25*	9.452E+00	4.997E+03	5.006E+03	0.90
AM-241	59.54	70255	35.90*	9.836E+00	5.196E+02	5.196E+02	0.97

Flag: "\*" = Keyline

Total number of lines in spectrum 39  
 Number of unidentified lines 24  
 Number of lines tentatively identified by NID 15 38.46%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	5.27Y	1.01	6.423E+01	6.472E+01	0.225E+01	3.48	
CD-109	461.40D	1.03	1.380E+01	1.425E+01	1.163E+01	81.60	
SN-126	2.30E+05Y	1.00	1.380E+00	1.380E+00	1.126E+00	81.60	
BA-137M	30.08Y	1.00	1.540E+02	1.542E+02	0.028E+02	1.80	
CS-137	30.08Y	1.00	1.626E+02	1.629E+02	0.029E+02	1.80	
BI-210	22.20Y	1.00	4.997E+03	5.006E+03	0.045E+03	0.90	
PB-210	22.20Y	1.00	4.997E+03	5.006E+03	0.045E+03	0.90	
AM-241	432.60Y	1.00	5.196E+02	5.196E+02	0.051E+02	0.97	
Total Activity :			1.091E+04	1.093E+04			

Grand Total Activity : 1.091E+04 1.093E+04

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
5	11.20	3745	3320	1.44	22.46	19	29	3.62E+00	7.0	9.77E-01	
5	13.25	13752	4459	1.46	26.56	19	29	1.34E+01	2.8	1.67E+00	
5	15.78	8628	4745	1.47	31.62	19	29	8.45E+00	4.7	2.64E+00	
5	17.73	10271	4954	1.49	35.51	19	29	1.01E+01	3.7	3.42E+00	
5	21.23	4779	5193	1.50	42.52	19	29	4.73E+00	6.4	4.74E+00	
0	26.22	3715	4504	1.33	52.48	48	9	3.71E+00	7.7	6.34E+00	
0	32.25	2886	5826	1.23	64.54	60	9	2.90E+00	10.7	7.76E+00	
0	36.56	1432	7208	1.37	73.15	70	7	1.45E+00	21.2	8.48E+00	
10	41.05	6667	14298	2.55	82.14	76	22	6.77E+00	8.0	9.02E+00	
0	50.04	1274	9909	1.24	100.12	98	7	1.30E+00	27.7	9.62E+00	T
0	77.22	141	824	1.76	154.45	152	6	1.47E-01	68.7	9.65E+00	T
0	231.32	48	355	1.39	462.58	461	6	5.18E-02	****	5.76E+00	
0	249.33	74	267	1.67	498.58	496	6	8.09E-02	74.7	5.47E+00	
0	341.64	34	272	1.48	683.18	680	6	3.76E-02	****	4.32E+00	T
0	457.14	18	435	1.24	914.13	910	7	2.06E-02	****	3.42E+00	
0	474.40	41	801	3.78	948.64	942	15	4.57E-02	****	3.31E+00	T
0	683.00	22	54	1.41	1365.82	1363	6	2.48E-02	****	2.42E+00	
3	690.23	37	120	2.11	1380.27	1370	20	4.20E-02	****	2.40E+00	
3	693.54	26	60	1.15	1386.88	1370	20	3.00E-02	****	2.39E+00	T
0	740.74	31	87	2.28	1481.28	1476	9	3.56E-02	****	2.25E+00	T
0	844.30	101	209	4.42	1688.40	1680	18	1.16E-01	69.1	2.00E+00	
0	996.48	97	164	5.48	1992.78	1983	19	1.13E-01	65.7	1.73E+00	T
0	1134.77	16	49	1.00	2269.40	2265	7	1.89E-02	****	1.55E+00	
0	1233.25	14	19	0.77	2466.39	2461	11	1.59E-02	****	1.44E+00	
0	1241.74	16	7	0.67	2483.37	2478	10	1.83E-02	79.6	1.43E+00	
0	1245.62	5	4	0.55	2491.13	2487	6	6.17E-03	****	1.43E+00	
0	1385.23	8	5	0.68	2770.40	2763	11	9.68E-03	****	1.30E+00	T
0	1405.82	7	4	0.88	2811.59	2808	7	7.83E-03	****	1.29E+00	
0	1422.93	9	2	1.31	2845.82	2842	7	1.04E-02	80.5	1.27E+00	
0	1469.59	7	1	1.23	2939.17	2936	6	7.91E-03	94.5	1.24E+00	
0	1504.51	8	4	1.68	3009.03	3003	9	9.49E-03	****	1.22E+00	T
0	1731.08	4	6	0.72	3462.33	3451	13	5.00E-03	****	1.09E+00	
0	1738.66	4	4	0.70	3477.50	3472	8	4.81E-03	****	1.09E+00	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540617.CNF;1
* Acquisition date   : 30-OCT-2023 09:12:55 Sensitivity      : 3.000
* Detector ID       : GAM46 Energy tolerance: 1.500
* Elapsed live time : 0 00:15:00.00 Abundance limit : 75.000
* Elapsed real time : 0 00:15:04.89 Half life ratio : *****
* Sample date       : 9-OCT-2023 00:00:00 Nuclide Library : SOLID
* Sample ID         : G1205540617 Analyst initials: MXR1
* Batch Number      : 2505440 Sample Quantity : 1.1500E+02 GRAM
* Wet wt corr       : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date    : 26-SEP-2023 07:28:30 Eff. Geometry   : CAN
* Eff. File         : DKA100:[CANBERRA.GAMMA]EFF_GAM46_CAN.CNF;5
*****

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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 )
CO-60	1.526E-01
CD-109	3.903E+00
SN-126	3.773E-01
BA-137M	2.618E-01
CS-137	2.765E-01
BI-210	1.145E+01
PB-210	1.145E+01
AM-241	9.624E-01

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM )	
BE-7	4.179E+00	NOT IDENT.
NA-22	1.645E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.407E-01	NOT IDENT.
K-40	1.493E+00	NOT IDENT.
SC-46	4.065E-01	NOT IDENT.
V-48	9.116E-01	NOT IDENT.
CR-51	3.838E+00	NOT IDENT.
MN-52	2.024E+00	NOT IDENT.
MN-54	3.086E-01	NOT IDENT.
CO-56	4.002E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.767E-01	NOT IDENT.
CO-58	3.689E-01	NOT IDENT.
FE-59	9.480E-01	NOT IDENT.
ZN-65	7.608E-01	NOT IDENT.
GE-68	1.192E+01	NOT IDENT.
AS-73	5.289E+00	NOT IDENT.
AS-74	9.268E-01	NOT IDENT.
SE-75	3.737E-01	NOT IDENT.
BR-77	4.387E+02	NOT IDENT.
SR-82	3.300E+00	NOT IDENT.
RB-83	6.853E-01	NOT IDENT.

RB-84	8.042E-01	NOT IDENT.
KR-85	6.261E+01	NOT IDENT.
SR-85	3.543E-01	NOT IDENT.
RB-86	9.507E+00	NOT IDENT.
Y-88	1.965E-01	NOT IDENT.
Y-91	1.184E+02	NOT IDENT.
NB-94	2.293E-01	NOT IDENT.
NB-95	3.049E-01	NOT IDENT.
NB-95M	1.028E+00	NOT IDENT.
ZR-95	5.739E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	4.735E+02	FAIL ABUN
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.104E-01	NOT IDENT.
RH-102	4.282E-01	FAIL ABUN
RU-103	4.536E-01	NOT IDENT.
RH-106	2.372E+00	NOT IDENT.
RU-106	2.372E+00	NOT IDENT.
AG-108M	3.469E-01	NOT IDENT.
AG-110	6.222E+00	NOT IDENT.
AG-110M	4.858E-01	FAIL ABUN
SN-113	4.484E-01	NOT IDENT.
CD-115	7.163E+02	NOT IDENT.
SN-117M	5.047E-01	NOT IDENT.
SB-122	7.727E+01	FAIL ABUN
TE-123M	2.043E-01	NOT IDENT.
SB-124	4.130E-01	NOT IDENT.
SB-125	9.718E-01	NOT IDENT.
TE-125M	6.915E+01	NOT IDENT.
I-126	2.021E+00	NOT IDENT.
SB-126	1.548E+00	FAIL ABUN
SB-127	2.795E+01	FAIL ABUN
I-131	1.973E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	2.260E+01	FAIL ABUN
BA-133	3.875E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.560E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.245E+00	FAIL ABUN
LA-138	2.156E-01	NOT IDENT.
CE-139	2.042E-01	NOT IDENT.
BA-140	2.935E+00	NOT IDENT.
LA-140	3.472E-01	NOT IDENT.
CE-141	4.805E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.336E+00	NOT IDENT.
PM-144	2.491E-01	NOT IDENT.
PR-144	1.872E+01	NOT IDENT.
PM-146	5.089E-01	NOT IDENT.
ND-147	7.512E+00	NOT IDENT.
PM-147	5.165E+03	NOT IDENT.
PM-149	5.560E+03	NOT IDENT.
EU-150	2.263E-01	NOT IDENT.
EU-152	8.942E-01	NOT IDENT.
GD-153	5.236E-01	NOT IDENT.
EU-154	4.711E-01	FAIL ABUN
EU-155	6.617E-01	FAIL ABUN
TB-160	1.396E+00	FAIL ABUN
HO-166M	3.874E-01	NOT IDENT.
TM-171	1.002E+02	FAIL ABUN
HF-172	1.393E+00	NOT IDENT.
LU-172	5.823E-01	FAIL ABUN
LU-176	2.290E-01	FAIL ABUN
HF-181	5.399E-01	NOT IDENT.
TA-182	8.361E-01	NOT IDENT.
RE-183	2.601E+00	FAIL ABUN
RE-184	1.377E+00	NOT IDENT.
W-188	6.186E+01	NOT IDENT.
IR-192	3.120E-01	NOT IDENT.
HG-203	3.511E-01	NOT IDENT.
TL-204	1.918E+01	NOT IDENT.
BI-207	4.751E-01	NOT IDENT.
TL-208	2.825E-01	NOT IDENT.
BI-211	1.872E+00	NOT IDENT.
PB-211	7.414E+00	NOT IDENT.
BI-212	3.536E+00	NOT IDENT.

PB-212	4.593E-01	FAIL ABUN
BI-213	1.233E+00	NOT IDENT.
BI-214	5.625E-01	NOT IDENT.
PB-214	6.853E-01	FAIL ABUN
RN-219	4.167E+00	NOT IDENT.
RN-222	5.625E-01	NOT IDENT.
RA-223	5.488E+00	NOT IDENT.
RA-224	4.851E+00	NOT IDENT.
AC-225	7.647E+00	NOT IDENT.
RA-226	6.853E-01	FAIL ABUN
AC-227	2.062E+00	NOT IDENT.
TH-227	2.062E+00	NOT IDENT.
AC-228	1.393E+00	NOT IDENT.
RA-228	1.393E+00	NOT IDENT.
TH-228	4.593E-01	FAIL ABUN
TH-229	4.008E+00	FAIL ABUN
TH-230	6.853E-01	FAIL ABUN
PA-231	3.935E+00	NOT IDENT.
TH-231	5.488E+00	NOT IDENT.
TH-232	1.393E+00	NOT IDENT.
PA-233	5.834E-01	FAIL ABUN
PA-234	3.347E+00	NOT IDENT.
PA-234M	3.881E+01	NOT IDENT.
TH-234	4.358E+00	NOT IDENT.
U-234	6.853E-01	FAIL ABUN
U-235	1.277E+00	NOT IDENT.
NP-237	5.834E-01	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	4.358E+00	NOT IDENT.
NP-239	1.764E+00	NOT IDENT.
PU-239	2.161E+03	NOT IDENT.
AM-243	2.297E-01	NOT IDENT.
CM-243	6.745E-01	NOT IDENT.
BK-247	6.482E-01	NOT IDENT.
CM-247	3.791E-01	NOT IDENT.
CF-249	3.917E-01	NOT IDENT.
CF-251	9.457E-01	NOT IDENT.
ANH-511	2.834E-01	NOT IDENT.



\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \*\*\*\*\*

DETECTOR AND SAMPLE DATA

\* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205540617.CNF;1 \*  
 \* Acquisition date : 30-OCT-2023 09:12:55 Sensitivity : 3.000 \*  
 \* Detector ID : GAM46 Energy tolerance: 1.500 \*  
 \* Elapsed live time: 0 00:15:00.00 Abundance limit : 75.000 \*  
 \* Elapsed real time: 0 00:15:04.89 Half life ratio : \*\*\*\*\* \*  
 \* Sample date : 9-OCT-2023 00:00:00 Nuclide Library : SOLID \*  
 \* Sample ID : G1205540617 Analyst initials: MXR1 \*  
 \* Batch Number : 2505440 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 : 26-SEP-2023 07:28:30 Eff. Geometry : CAN \*  
 \* Eff. File : DKA100:[CANBERRA.GAMMA]EFF\_GAM46\_CAN.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)
CO-60	6.472E+01	5.476E+00	5.476E+00
CD-109	1.425E+01	1.148E+01	1.148E+01
SN-126	1.380E+00	1.109E+00	1.109E+00
BA-137M	1.542E+02	1.831E+01	1.831E+01
CS-137	1.629E+02	1.933E+01	1.933E+01
BI-210	5.006E+03	4.763E+02	4.763E+02
PB-210	5.006E+03	4.763E+02	4.763E+02
AM-241	5.196E+02	4.313E+01	4.313E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	1.474E-01	5.466E+00	5.466E+00	NOT IDENT.
NA-22	3.478E-02	1.869E-01	1.875E-01	NOT IDENT.
NA-24	3.720E+09	3.697E+09	4.060E+09	SHORT HLIF
AL-26	-5.639E-02	1.858E-01	1.875E-01	NOT IDENT.
K-40	-1.646E-01	1.771E+00	1.772E+00	NOT IDENT.
SC-46	-2.158E-01	5.144E-01	5.235E-01	NOT IDENT.
V-48	-7.283E-02	1.133E+00	1.134E+00	NOT IDENT.
CR-51	2.976E+00	4.287E+00	4.492E+00	NOT IDENT.
MN-52	6.958E-02	2.383E+00	2.384E+00	NOT IDENT.
MN-54	-1.402E-01	3.876E-01	3.928E-01	NOT IDENT.
CO-56	2.637E-01	4.715E-01	4.862E-01	NOT IDENT.
MN-56	1.000E+41	1.767E+41	0.000E+00	SHORT HLIF
CO-57	-1.433E-01	2.193E-01	2.286E-01	NOT IDENT.
CO-58	-8.450E-02	4.557E-01	4.573E-01	NOT IDENT.
FE-59	4.354E-01	1.074E+00	1.091E+00	NOT IDENT.
ZN-65	-4.158E-01	9.127E-01	9.317E-01	NOT IDENT.
GE-68	2.236E-01	1.380E+01	1.380E+01	NOT IDENT.
AS-73	1.378E+00	6.640E+00	6.669E+00	NOT IDENT.
AS-74	7.768E-01	1.056E+00	1.112E+00	NOT IDENT.
SE-75	-1.278E-01	4.284E-01	4.322E-01	NOT IDENT.
BR-77	-8.570E+01	4.984E+02	4.999E+02	NOT IDENT.
SR-82	1.882E+00	3.870E+00	3.962E+00	NOT IDENT.

RB-83	-3.176E-01	8.269E-01	8.392E-01	NOT IDENT.
RB-84	6.434E-01	9.442E-01	9.877E-01	NOT IDENT.
KR-85	-2.481E+01	7.509E+01	7.592E+01	NOT IDENT.
SR-85	-1.411E-01	4.250E-01	4.297E-01	NOT IDENT.
RB-86	3.631E+00	1.079E+01	1.091E+01	NOT IDENT.
Y-88	1.281E-01	2.045E-01	2.125E-01	NOT IDENT.
Y-91	6.024E+01	1.315E+02	1.343E+02	NOT IDENT.
NB-94	-1.062E-02	2.773E-01	2.773E-01	NOT IDENT.
NB-95	2.246E-02	3.679E-01	3.680E-01	NOT IDENT.
NB-95M	6.709E-01	1.187E+00	1.225E+00	NOT IDENT.
ZR-95	8.054E-02	6.867E-01	6.877E-01	NOT IDENT.
NB-97	1.000E+41	2.075E+41	0.000E+00	SHORT HLIF
ZR-97	6.024E+09	8.704E+09	9.118E+09	SHORT HLIF
MO-99	6.561E+02	7.282E+02	7.859E+02	FAIL ABUN
TC-99M	-2.694E+23	9.328E+24	0.000E+00	SHORT HLIF
RH-101	-1.685E-01	2.633E-01	2.741E-01	NOT IDENT.
RH-102	-2.184E-01	5.280E-01	5.371E-01	FAIL ABUN
RU-103	2.510E-01	5.226E-01	5.347E-01	NOT IDENT.
RH-106	-1.152E+00	2.920E+00	2.965E+00	NOT IDENT.
RU-106	-1.152E+00	2.920E+00	2.965E+00	NOT IDENT.
AG-108M	-1.789E-02	4.052E-01	4.053E-01	NOT IDENT.
AG-110	3.428E-01	8.330E+00	8.332E+00	NOT IDENT.
AG-110M	-1.193E-01	6.045E-01	6.069E-01	FAIL ABUN
SN-113	-2.105E-01	5.283E-01	5.368E-01	NOT IDENT.
CD-115	1.720E+02	8.369E+02	8.404E+02	NOT IDENT.
SN-117M	-4.193E-01	6.368E-01	6.643E-01	NOT IDENT.
SB-122	4.766E+01	8.876E+01	9.132E+01	FAIL ABUN
TE-123M	5.410E-02	2.471E-01	2.483E-01	NOT IDENT.
SB-124	1.828E-01	4.490E-01	4.565E-01	NOT IDENT.
SB-125	-1.071E+00	1.177E+00	1.273E+00	NOT IDENT.
TE-125M	6.855E+01	8.069E+01	8.640E+01	NOT IDENT.
I-126	-3.761E-02	2.723E+00	2.723E+00	NOT IDENT.
SB-126	1.230E+00	1.781E+00	1.866E+00	FAIL ABUN
SB-127	1.600E+01	4.502E+01	4.559E+01	FAIL ABUN
I-131	1.368E+00	2.227E+00	2.311E+00	NOT IDENT.
I-132	-1.000E+41	1.012E+42	0.000E+00	SHORT HLIF
TE-132	-2.833E-01	3.066E+01	3.066E+01	FAIL ABUN
BA-133	-7.582E-02	4.495E-01	4.508E-01	NOT IDENT.
I-133	-2.737E+05	9.467E+06	9.468E+06	SHORT HLIF
CS-134	9.806E-02	4.262E-01	4.284E-01	NOT IDENT.
I-135	-7.046E+21	2.117E+23	0.000E+00	SHORT HLIF
CS-136	-6.433E-01	1.488E+00	1.516E+00	FAIL ABUN
LA-138	-5.966E-02	2.689E-01	2.702E-01	NOT IDENT.
CE-139	-2.062E-01	2.636E-01	2.795E-01	NOT IDENT.
BA-140	-2.748E+00	3.651E+00	3.855E+00	NOT IDENT.
LA-140	-2.155E-03	4.159E-01	4.159E-01	NOT IDENT.
CE-141	5.097E-03	5.837E-01	5.837E-01	NOT IDENT.
CE-143	1.098E+04	2.668E+04	2.713E+04	SHORT HLIF
CE-144	-6.981E-01	1.649E+00	1.679E+00	NOT IDENT.
PM-144	2.787E-01	3.076E-01	3.323E-01	NOT IDENT.
PR-144	2.110E+01	2.311E+01	2.499E+01	NOT IDENT.
PM-146	-6.412E-02	6.670E-01	6.677E-01	NOT IDENT.
ND-147	-3.199E+00	9.057E+00	9.171E+00	NOT IDENT.
PM-147	-2.354E+03	6.317E+03	6.406E+03	NOT IDENT.
PM-149	2.122E+03	6.257E+03	6.330E+03	NOT IDENT.
EU-150	-4.646E-02	2.617E-01	2.625E-01	NOT IDENT.
EU-152	7.296E-02	1.140E+00	1.140E+00	NOT IDENT.
GD-153	-3.377E-01	6.369E-01	6.548E-01	NOT IDENT.
EU-154	1.197E-01	5.320E-01	5.347E-01	FAIL ABUN
EU-155	3.622E-01	7.790E-01	7.959E-01	FAIL ABUN
TB-160	6.605E-01	1.667E+00	1.694E+00	FAIL ABUN
HO-166M	-4.719E-01	5.114E-01	5.538E-01	NOT IDENT.
TM-171	1.459E+02	1.250E+02	1.412E+02	FAIL ABUN
HF-172	8.118E-01	1.659E+00	1.699E+00	NOT IDENT.
LU-172	-5.007E-01	7.115E-01	7.464E-01	FAIL ABUN
LU-176	1.335E-01	2.567E-01	2.636E-01	FAIL ABUN
HF-181	8.675E-02	6.303E-01	6.315E-01	NOT IDENT.
TA-182	-2.480E-01	1.012E+00	1.018E+00	NOT IDENT.
RE-183	9.536E+01	1.076E+01	4.432E+01	FAIL ABUN
RE-184	1.663E-01	1.680E+00	1.681E+00	NOT IDENT.
W-188	-4.642E+01	7.250E+01	7.545E+01	NOT IDENT.
IR-192	-8.195E-02	3.604E-01	3.623E-01	NOT IDENT.
HG-203	3.683E-02	3.977E-01	3.981E-01	NOT IDENT.
TL-204	-1.819E+01	2.318E+01	2.459E+01	NOT IDENT.
BI-207	6.971E-02	5.455E-01	5.464E-01	NOT IDENT.
TL-208	-5.297E-02	3.378E-01	3.386E-01	NOT IDENT.
BI-211	-3.276E-01	2.166E+00	2.171E+00	NOT IDENT.
PB-211	-1.324E+00	8.660E+00	8.681E+00	NOT IDENT.

BI-212	-2.613E+00	4.484E+00	4.636E+00	NOT IDENT.
PB-212	5.421E-04	5.158E-01	5.158E-01	FAIL ABUN
BI-213	-4.793E-02	1.441E+00	1.442E+00	NOT IDENT.
BI-214	4.198E-01	6.450E-01	6.722E-01	NOT IDENT.
PB-214	-1.963E-01	7.960E-01	8.009E-01	FAIL ABUN
RN-219	1.228E+00	4.792E+00	4.824E+00	NOT IDENT.
RN-222	4.198E-01	6.450E-01	6.722E-01	NOT IDENT.
RA-223	-1.328E+00	6.343E+00	6.371E+00	NOT IDENT.
RA-224	-1.620E+00	5.527E+00	5.575E+00	NOT IDENT.
AC-225	3.330E+00	9.369E+00	9.489E+00	NOT IDENT.
RA-226	-1.963E-01	7.960E-01	8.009E-01	FAIL ABUN
AC-227	-1.576E-01	2.338E+00	2.340E+00	NOT IDENT.
TH-227	-1.576E-01	2.338E+00	2.340E+00	NOT IDENT.
AC-228	-3.385E-01	1.732E+00	1.739E+00	NOT IDENT.
RA-228	-3.385E-01	1.732E+00	1.739E+00	NOT IDENT.
TH-228	5.421E-04	5.158E-01	5.158E-01	FAIL ABUN
TH-229	-4.108E+00	5.142E+00	5.465E+00	FAIL ABUN
TH-230	-1.963E-01	7.960E-01	8.009E-01	FAIL ABUN
PA-231	-3.876E+00	4.718E+00	5.031E+00	NOT IDENT.
TH-231	-1.328E+00	6.343E+00	6.371E+00	NOT IDENT.
TH-232	-3.385E-01	1.732E+00	1.739E+00	NOT IDENT.
PA-233	6.229E-01	6.456E-01	7.040E-01	FAIL ABUN
PA-234	1.445E+00	4.362E+00	4.411E+00	NOT IDENT.
PA-234M	-2.557E+00	5.444E+01	5.445E+01	NOT IDENT.
TH-234	3.793E+00	5.449E+00	5.711E+00	NOT IDENT.
U-234	-1.963E-01	7.960E-01	8.009E-01	FAIL ABUN
U-235	-1.729E+00	1.639E+00	1.815E+00	NOT IDENT.
NP-237	6.229E-01	6.456E-01	7.040E-01	FAIL ABUN
NP-238	3.862E+02	1.920E+03	1.928E+03	SHORT HLIF
U-238	3.793E+00	5.449E+00	5.711E+00	NOT IDENT.
NP-239	5.929E-01	2.098E+00	2.115E+00	NOT IDENT.
PU-239	-1.124E+03	2.663E+03	2.711E+03	NOT IDENT.
AM-243	3.490E-02	2.916E-01	2.920E-01	NOT IDENT.
CM-243	6.994E-01	7.853E-01	8.463E-01	NOT IDENT.
BK-247	-2.329E-01	7.450E-01	7.523E-01	NOT IDENT.
CM-247	-6.802E-03	4.404E-01	4.404E-01	NOT IDENT.
CF-249	-1.949E-01	4.619E-01	4.702E-01	NOT IDENT.
CF-251	3.422E-01	1.148E+00	1.158E+00	NOT IDENT.
ANH-511	-8.921E-02	3.303E-01	3.327E-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	5357.7646	85.43	440.3782	131.20	302.8299
45.60	5382.7651	86.55	444.7013	133.02	336.5429
46.54	5393.9175	86.79	444.8592	133.52	352.7125
49.72	5495.3105	86.94	444.9603	136.00	365.1493
51.35	5058.0615	87.09	445.0582	136.47	350.4507
51.87	4969.0840	87.57	445.3772	140.51	340.5156
52.39	4894.7349	88.03	445.6805	143.76	357.8841
52.97	4911.3193	88.34	445.8858	144.24	339.5921
53.44	4947.0908	88.47	445.9710	145.44	330.7748
54.07	4957.4229	89.96	427.5146	152.43	323.9021
57.36	0.0000	90.64	461.0775	153.25	318.3473
57.53	5160.3311	91.11	471.4862	154.21	332.6711
57.98	2959.4417	92.59	447.9271	156.02	293.5317
59.27	2966.7202	93.35	427.4416	158.56	334.1540
59.32	2967.0071	94.56	465.1241	159.00	308.4961
59.54	2968.2312	94.65	465.1829	162.33	304.8198
60.96	2976.1384	94.67	451.0662	162.66	317.8729
61.17	2977.2964	94.87	428.3644	163.33	320.4392
62.93	644.7116	97.43	470.2718	165.86	325.9644
63.29	592.7503	98.43	415.1988	176.31	355.5074
63.58	593.0641	98.44	415.2046	176.60	400.9482
64.28	640.7660	99.53	438.8079	177.52	312.9160
66.73	601.2617	100.11	397.5381	181.07	329.5334
67.24	596.5938	102.03	390.8906	181.52	306.8945
67.68	617.8923	103.18	398.0917	184.41	354.5888
67.75	612.7587	103.37	359.6945	185.72	369.4531
68.89	659.9133	105.21	364.9859	193.51	390.2265
69.67	593.8840	105.31	365.0339	197.03	380.4992
70.82	605.5215	106.12	367.6308	198.01	371.0905
70.83	605.5347	106.47	403.1424	201.83	374.7652
72.81	540.2780	109.28	364.7133	203.43	372.8357
72.87	540.3329	111.00	372.1850	205.31	383.2311
74.66	569.3500	111.76	419.2526	210.85	343.2029
74.82	577.9353	114.06	353.5535	215.65	384.0947
74.97	578.0775	116.30	370.2007	218.12	351.4595
77.11	618.1965	116.74	353.6147	222.11	343.9127
78.74	567.4470	119.76	351.5591	227.09	317.8629
79.69	511.6113	121.12	388.1382	227.38	317.9368
80.03	486.3598	121.22	403.9380	228.16	334.3539
80.12	486.4331	121.78	423.3528	228.18	334.3580
80.19	459.5372	122.06	408.8513	235.69	320.2694
80.57	485.3558	122.92	394.6179	235.96	320.3357
81.00	531.4819	123.07	394.6873	238.63	330.3894
81.07	531.5390	123.68	408.5177	238.98	330.4776
81.75	553.4292	125.81	390.3149	240.99	341.9075
82.47	512.4133	127.23	384.1644	242.00	312.7473
83.79	474.9410	127.91	349.3151	244.70	322.6575
84.00	447.9860	129.30	341.9227	252.40	252.9221

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	265.7115	351.06	283.8853	569.33	117.7284
254.15	0.0000	351.93	292.1733	569.50	124.7770
256.23	294.8480	355.39	0.0000	569.70	124.7871
260.90	300.1152	356.01	274.7355	583.19	121.4355
264.66	288.1078	364.49	261.5068	584.27	124.5265
264.80	288.1353	366.42	291.8945	595.83	91.5454
265.00	288.1764	372.51	288.3334	600.60	101.9084
269.46	299.3823	375.05	259.4109	602.52	0.0000
270.03	290.9212	377.52	272.6186	604.72	110.2412
271.23	297.1819	383.85	272.6582	607.14	89.9121
273.65	293.3868	388.16	290.8521	609.32	105.3302
276.40	298.2589	388.63	275.2220	610.33	102.3031
277.37	298.4630	391.69	280.3083	614.28	92.2156
277.60	275.2115	400.66	290.0371	618.01	103.6384
278.00	263.2077	401.81	279.0527	620.36	103.7330
279.20	287.6082	402.40	286.5818	621.93	105.8541
279.54	284.2203	404.85	305.5915	630.19	0.0000
279.70	289.4377	410.95	291.6240	631.29	113.4554
280.46	291.3166	413.71	317.3228	633.25	108.3795
283.69	292.8274	414.70	281.8936	634.78	87.7877
284.31	289.4911	423.72	312.3848	635.95	107.4616
285.41	289.7018	427.09	322.3506	636.99	86.8301
285.90	275.0532	427.87	326.2545	657.50	115.6295
287.50	269.2696	433.94	336.7195	657.76	115.6431
290.67	284.6414	439.40	312.0386	657.90	0.0000
293.27	0.0000	440.45	340.6673	661.66	91.8135
295.22	296.8567	453.88	345.3343	664.57	0.0000
295.96	314.4727	463.37	370.4428	666.33	73.6813
298.58	280.8946	468.07	376.2769	666.50	73.6871
299.98	268.0177	473.00	311.4145	667.71	0.0000
300.09	273.2920	475.06	311.7168	677.62	89.2057
300.13	285.5617	476.78	311.9665	685.70	63.1543
301.36	304.2039	477.60	314.5070	692.65	82.3037
302.85	273.7871	482.18	261.4417	695.00	82.3735
304.50	250.3607	487.02	229.0379	696.49	61.8135
304.85	255.6907	492.35	212.0923	696.51	61.8135
306.78	246.3330	497.08	197.9283	697.00	77.6780
308.46	280.9487	505.52	210.4377	697.30	85.6143
311.90	245.3766	507.63	0.0000	697.49	87.5202
316.51	258.4941	511.00	197.2214	702.65	79.4220
319.41	249.2080	514.00	200.4307	706.68	85.8977
320.08	242.2186	514.00	200.4307	711.68	87.1117
321.04	274.3230	520.40	183.2678	720.70	72.4686
323.87	267.6923	520.69	183.2905	721.93	0.0000
325.23	279.4901	522.65	0.0000	722.78	79.9866
328.76	278.3193	527.90	150.2621	722.91	79.9896
333.37	264.7933	528.26	150.2868	723.31	81.0685
333.97	249.6764	529.59	148.3948	724.19	81.0933
334.37	248.8437	529.87	0.0000	727.33	92.9296
338.28	258.4043	531.02	170.2713	733.00	68.4948
338.32	258.4102	537.26	142.9395	735.93	91.5987
340.48	292.4414	546.56	0.0000	737.46	72.3532
340.55	292.4480	552.55	137.8821	739.50	81.5200
344.28	272.8430	563.25	111.4065	744.23	75.7439
345.93	274.9170	564.24	104.4232	747.24	87.1139

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	79.6066	954.55	0.0000	1408.01	9.2051
752.31	81.8757	962.31	145.9136	1434.09	8.6765
753.82	89.4607	964.08	122.9960	1435.80	10.6079
756.73	76.6018	966.17	134.5671	1457.56	0.0000
756.80	76.6047	968.97	128.9167	1460.82	10.6623
763.94	74.6237	983.53	109.7896	1489.16	8.7731
765.81	73.5892	984.45	0.0000	1505.03	7.8228
766.42	87.6742	996.26	91.6170	1584.12	7.9434
766.84	95.2653	1001.03	87.0911	1596.21	3.9807
772.60	0.0000	1002.74	85.3911	1620.50	7.9976
776.52	83.6235	1004.73	98.8035	1621.92	5.9996
777.92	101.0490	1021.30	0.0000	1678.03	0.0000
778.90	92.3842	1025.87	0.0000	1690.97	5.0632
783.70	90.3523	1028.54	0.0000	1750.46	0.0000
788.74	87.2298	1037.84	103.7830	1764.49	4.1035
792.07	106.9722	1038.76	0.0000	1770.23	10.2692
795.86	100.5464	1046.59	83.7454	1771.35	6.1626
801.95	86.5091	1048.07	88.1897	1791.20	0.0000
1093.63	102.1047	1049.04	94.3891	1808.65	8.2695
810.29	103.2103	1050.41	88.2446	1810.72	0.0000
810.45	103.2141	1063.66	87.6643	1836.06	4.1538
810.76	108.7163	1077.00	88.8550		
815.77	86.8916	1077.34	93.3041		
818.51	111.1880	1085.87	88.1658		
832.01	103.9217	1093.63	107.9724		
834.85	106.2266	1099.45	90.2552		
835.71	107.3607	1112.07	97.7168		
836.80	0.0000	1112.84	96.8335		
846.75	0.0000	1115.54	99.5911		
846.77	101.0642	1120.29	74.5602		
856.80	95.8087	1120.55	71.8701		
860.56	110.4163	1121.30	76.3724		
871.09	106.2952	1129.67	84.9969		
873.19	96.2846	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	106.5580	1173.23	50.9585		
880.51	115.5732	1177.95	49.5590		
881.60	104.3866	1189.05	32.8821		
883.24	132.5099	1204.77	26.5875		
884.68	116.8392	1221.41	25.7715		
889.28	128.2500	1231.02	20.6623		
894.76	113.8099	1235.36	16.6201		
898.04	101.5137	1238.28	14.7842		
900.72	111.7496	1260.41	0.0000		
903.28	111.8342	1271.87	12.1042		
911.20	127.9480	1274.44	12.1105		
912.08	114.3894	1274.54	12.1113		
923.98	0.0000	1291.59	8.4166		
926.50	130.7882	1298.22	0.0000		
929.11	113.8143	1312.11	11.2734		
935.54	124.2882	1332.49	11.3232		
937.49	136.9043	1362.66	0.0000		
944.13	142.8782	1365.19	15.2041		
946.00	131.5181	1368.63	0.0000		
949.00	146.5104	1384.29	6.6787		

# **Continuing Calibration Data**

Review of Gamma Spectrometer QA results (Daily calibration & background checks)

30-OCT-2023 12:05:59

Run Date	Detector	Parameter	Flag	Status	Comments
30-OCT-23	GAM01	All Parameters Passed			
30-OCT-23	GAM02	All Parameters Passed			
30-OCT-23	GAM03	All Parameters Passed			
30-OCT-23	GAM04	All Parameters Passed			
30-OCT-23	GAM05	All Parameters Passed			
30-OCT-23	GAM06	Cal Check PSFWHM-662	Investigate		
30-OCT-23	GAM07	Cal Check PSFWHM-662	Investigate		
30-OCT-23	GAM08	All Parameters Passed			
30-OCT-23	GAM11	All Parameters Passed			
30-OCT-23	GAM12	All Parameters Passed			
29-OCT-23	GAM14	Cal Check may not have run since 30-OCT-2023			
30-OCT-23	GAM16	All Parameters Passed			
30-OCT-23	GAM18	Cal Check PSFWHM-59	Investigate		
30-OCT-23	GAM18	Cal Check PSFWHM-1332	Investigate		
30-OCT-23	GAM19	All Parameters Passed			
30-OCT-23	GAM20	All Parameters Passed			
30-OCT-23	GAM21	All Parameters Passed			
30-OCT-23	GAM23	All Parameters Passed			
30-OCT-23	GAM24	All Parameters Passed			
30-OCT-23	GAM27	All Parameters Passed			
30-OCT-23	GAM29	All Parameters Passed			
	GAM30	Cal Check may not have run since 30-OCT-2023			
27-OCT-23	GAM30	Bkg Check may not have run since 30-OCT-2023			
30-OCT-23	GAM31	All Parameters Passed			
30-OCT-23	GAM32	All Parameters Passed			
30-OCT-23	GAM33	All Parameters Passed			
30-OCT-23	GAM34	Cal Check PSFWHM-59	Action	Approved	Low FWHM, approved for use.
30-OCT-23	GAM34	Cal Check PSFWHM-662	Investigate		
30-OCT-23	GAM38	All Parameters Passed			
29-OCT-23	GAM40	Cal Check may not have run since 30-OCT-2023			
30-OCT-23	GAM41	All Parameters Passed			
30-OCT-23	GAM43	All Parameters Passed			
18-MAY-23	GAM44	Cal Check may not have run since 30-OCT-2023			
21-MAY-23	GAM44	Bkg Check may not have run since 30-OCT-2023			
30-OCT-23	GAM46	Cal Check PSFWHM-59	Investigate		
30-OCT-23	GAM47	All Parameters Passed			
30-OCT-23	GAM48	Cal Check PSFWHM-59	Investigate		



30-OCT-23	GAM48	Cal Check NLACTVITY-662	Investigate		
30-OCT-23	GAM50	All Parameters Passed			
30-OCT-23	GAM52	All Parameters Passed			
30-OCT-23	GAM53	Cal Check NLACTVITY-1332	Investigate		
30-OCT-23	GAM53	Bkg Check BACKRATE	Investigate		
30-OCT-23	GAM56	All Parameters Passed			
30-OCT-23	XRAY1	Cal Check PSFWHM-40	Investigate		
30-OCT-23	XRAY2	Cal Check PSFWHM-29	Action	Approved	Low FWHM, approved for use.
30-OCT-23	XRAY2	Cal Check PSFWHM-34	Investigate		
30-OCT-23	XRAY3	Cal Check PSFWHM-29	Investigate		
30-OCT-23	XRAY3	Cal Check PSFWHM-34	Action	Lockout	Detector locked out.
30-OCT-23	XRAY3	Cal Check PSFWHM-40	Action	Lockout	Detector locked out.
30-OCT-23	XRAY3	Cal Check NLACTVITY-34	Action	Lockout	Detector locked out.
27-OCT-23	XRAY3	Bkg Check may not have run since 30-OCT-2023			
28-OCT-23	XRAY6	Cal Check may not have run since 30-OCT-2023			
30-OCT-23	XRAY7	All Parameters Passed			

APPROVAL DATE: 30-OCT-2023

APPROVAL TIME: 12:17:10

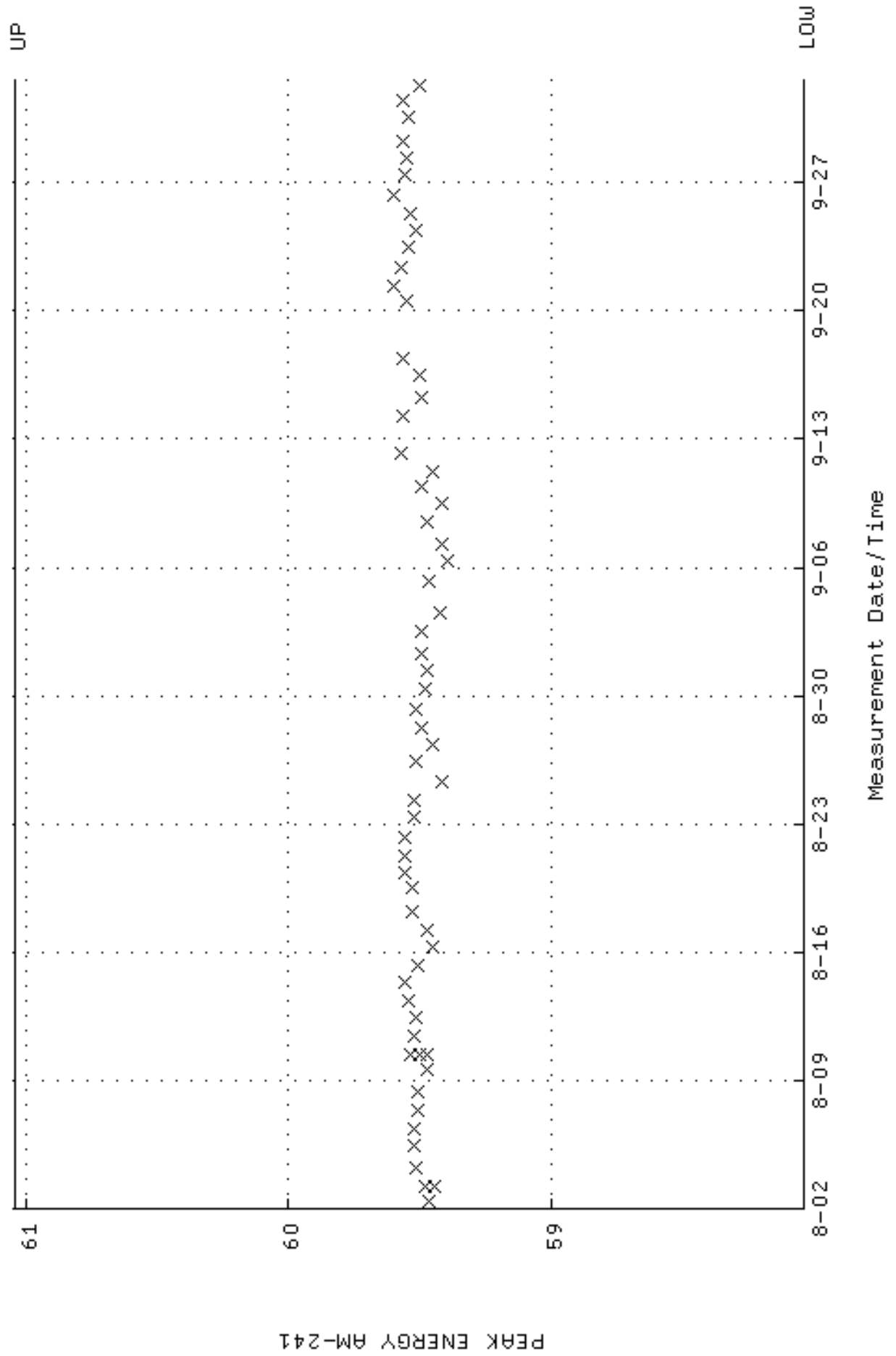
APPROVED BY: Maggie Stamps

PROCEDURE # GL-RAD-I-001

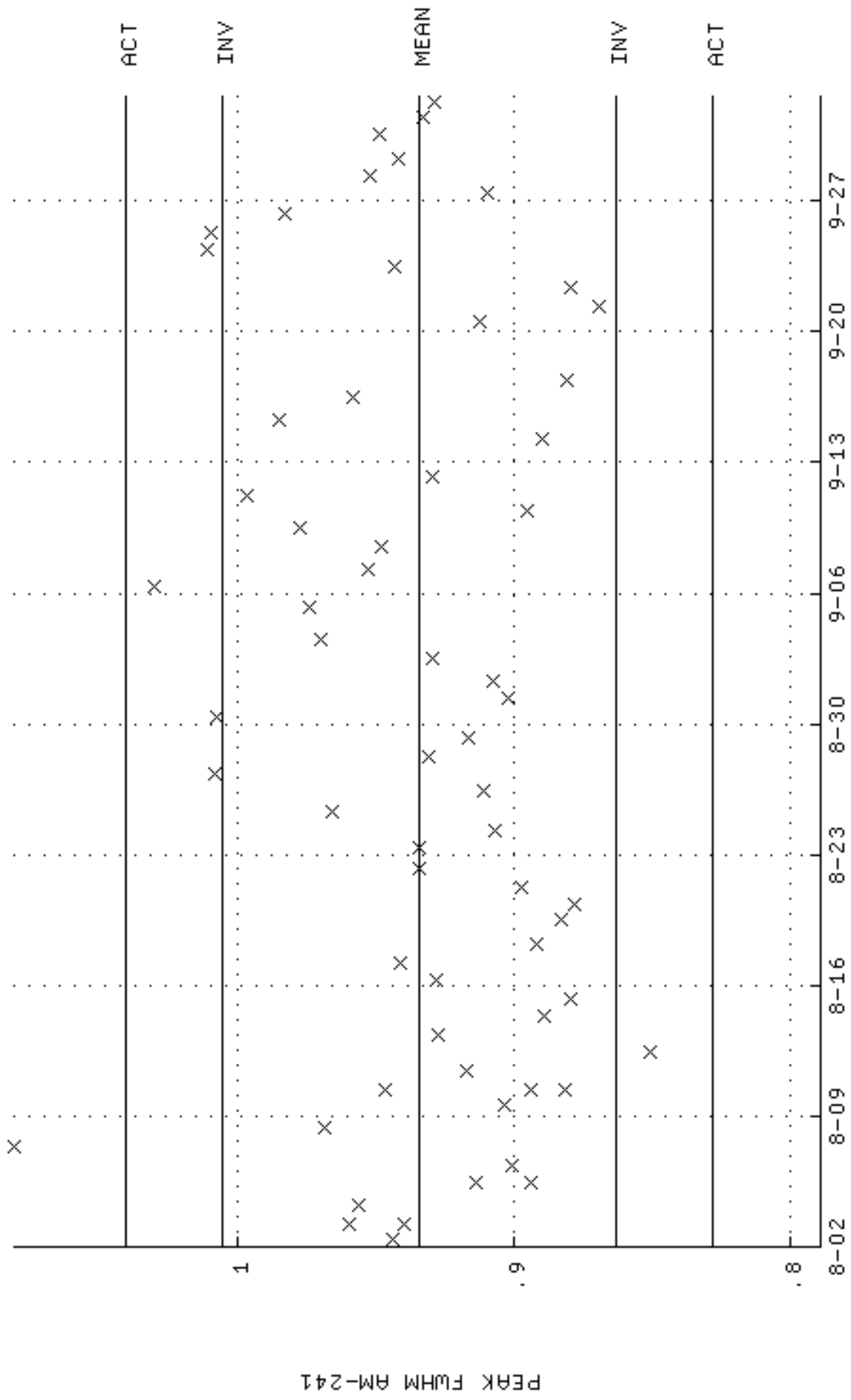
The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

# **Background and Efficiency Data**

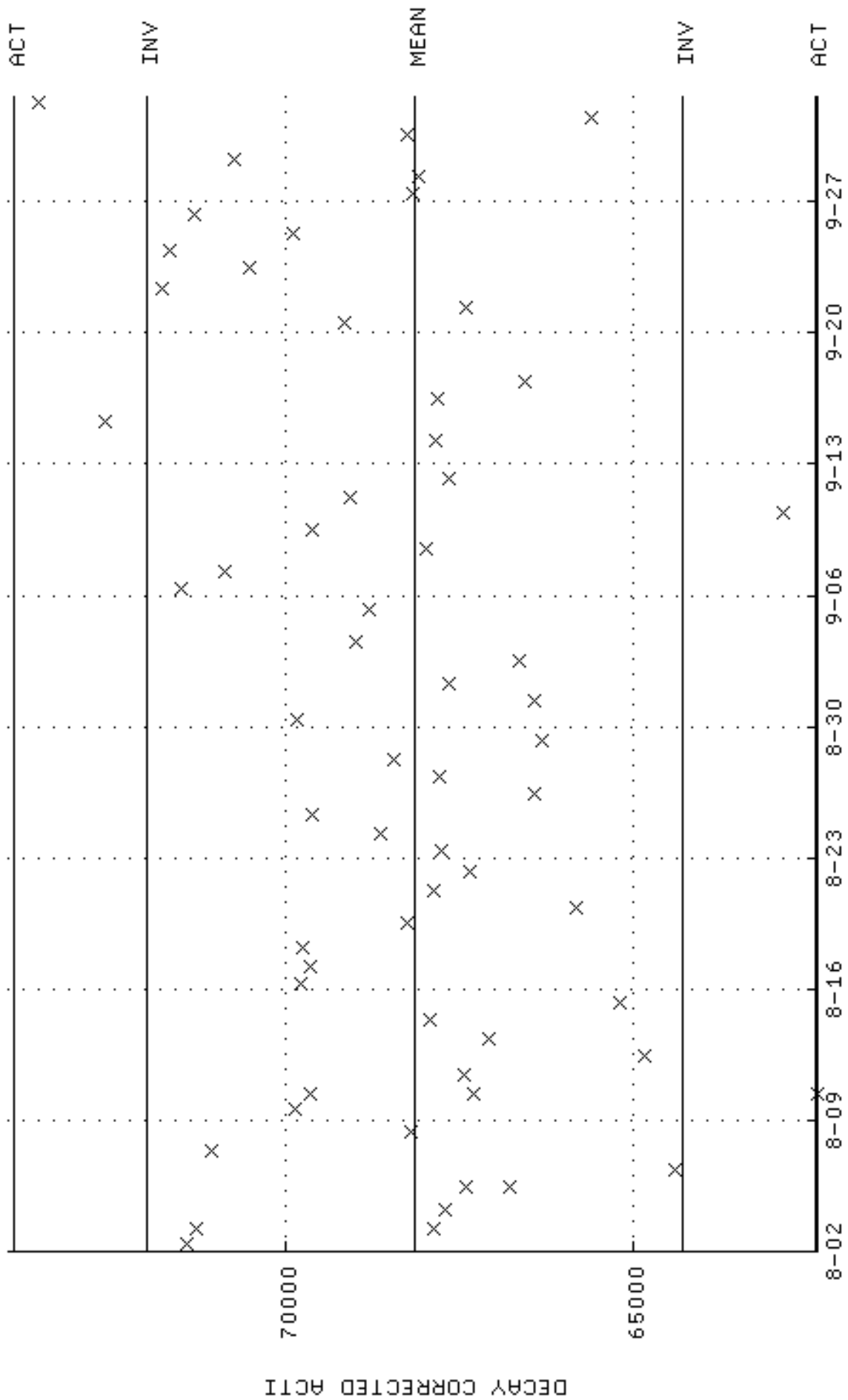
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM02\_JAR.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:34:56 through 2-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



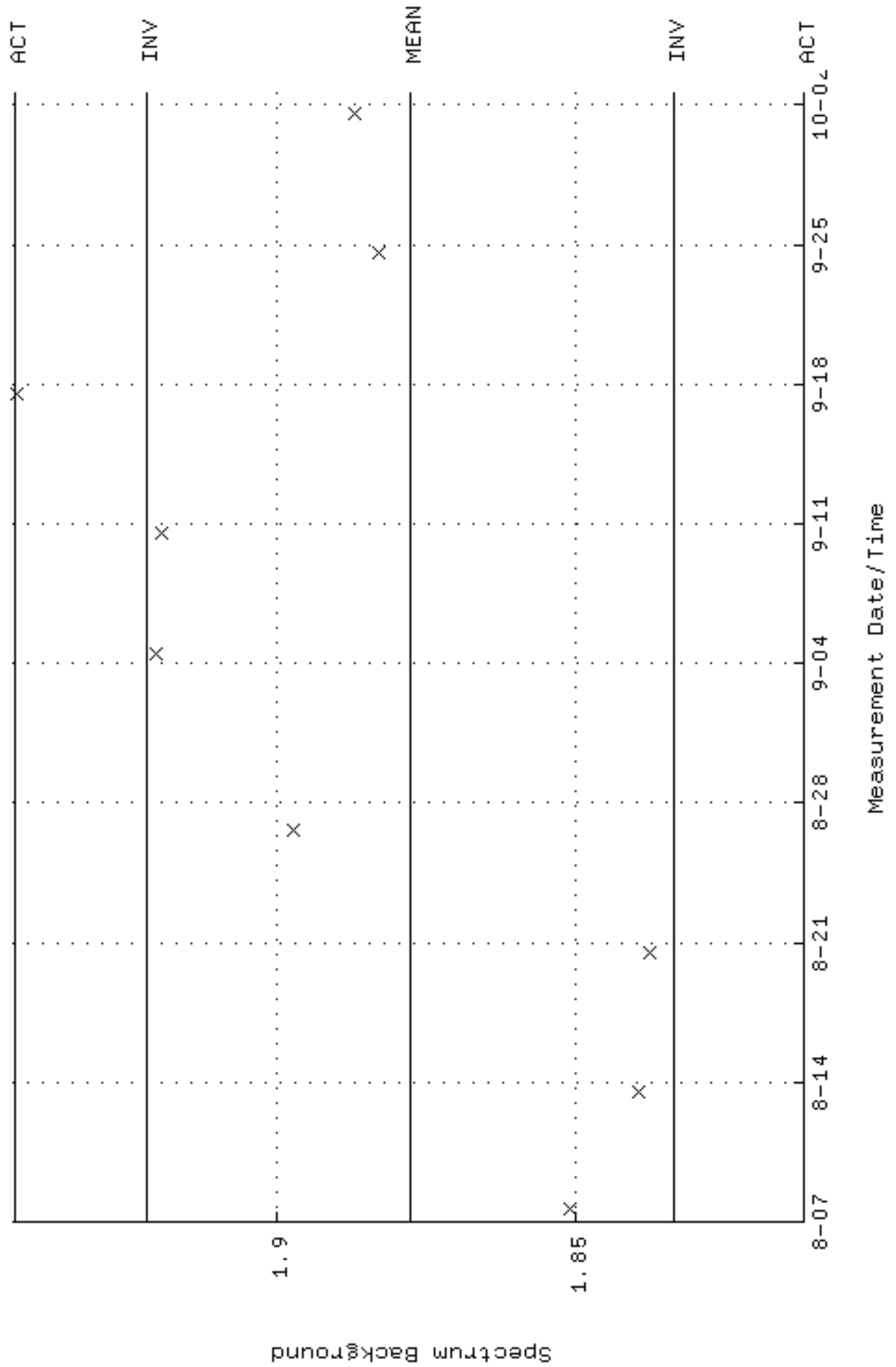
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM02\_JAR.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:34:56 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.934525 +- 3.552412E-02 (3.80 %)



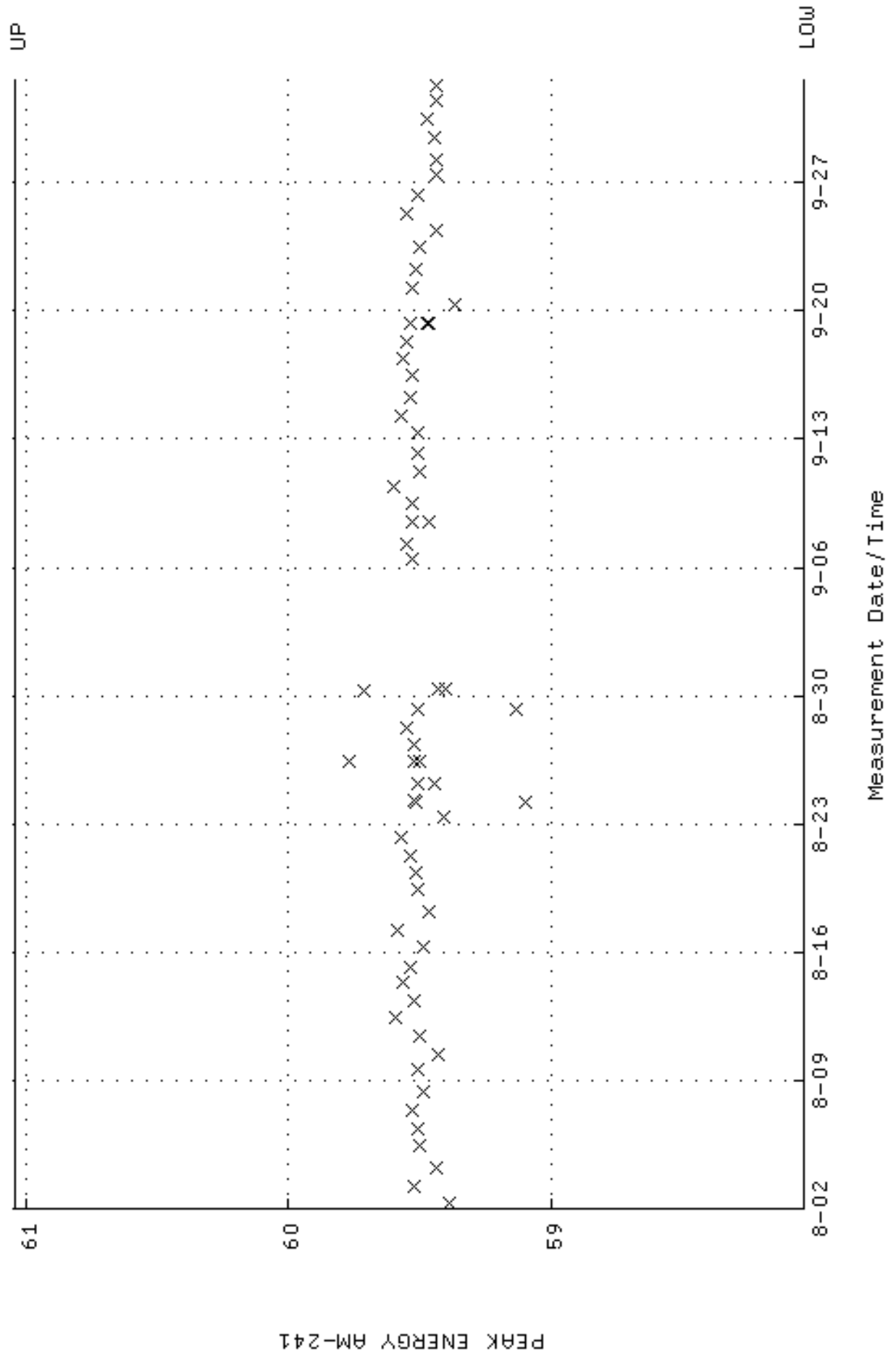
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM02\_JAR.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:34:56 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 68154.9 +- 1924.05 (2.82 %)



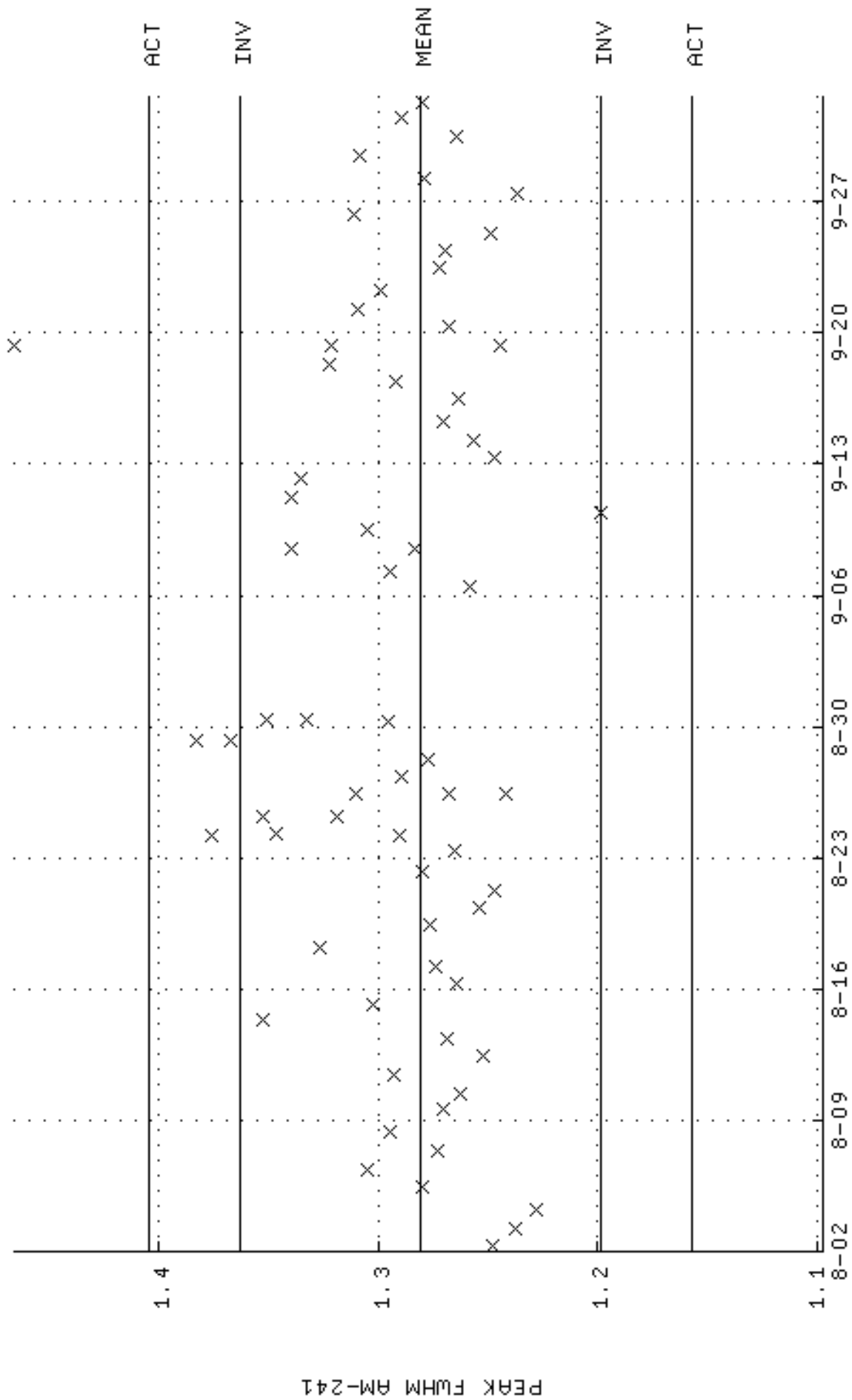
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM02.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:33:52 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.87778 +- 2.208678E-02 (1.18 %)



QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM03\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 07:40:13 through 2-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

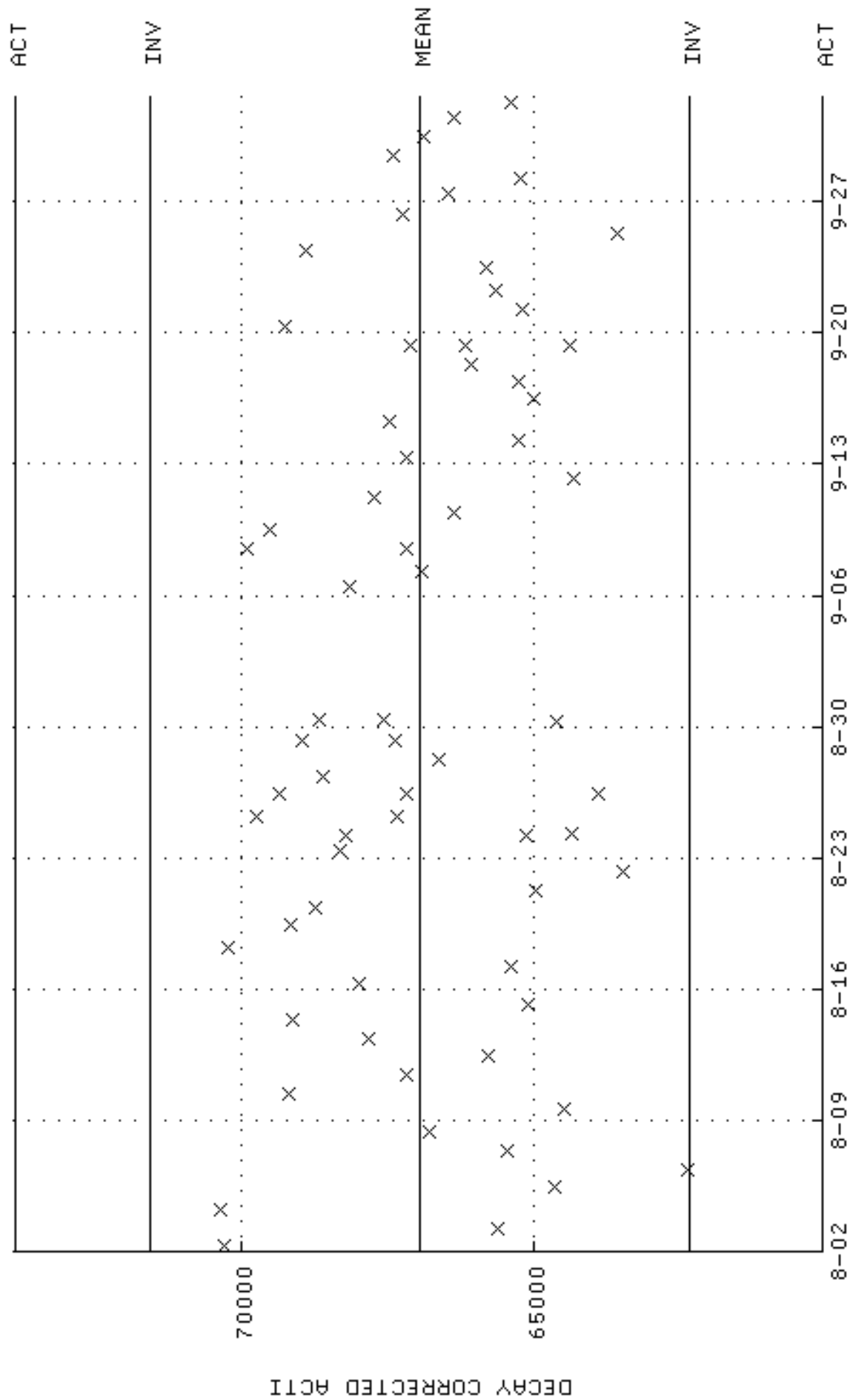


QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM03\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 07:40:13 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.28096 +- 4.129585E-02 (3.22 %)

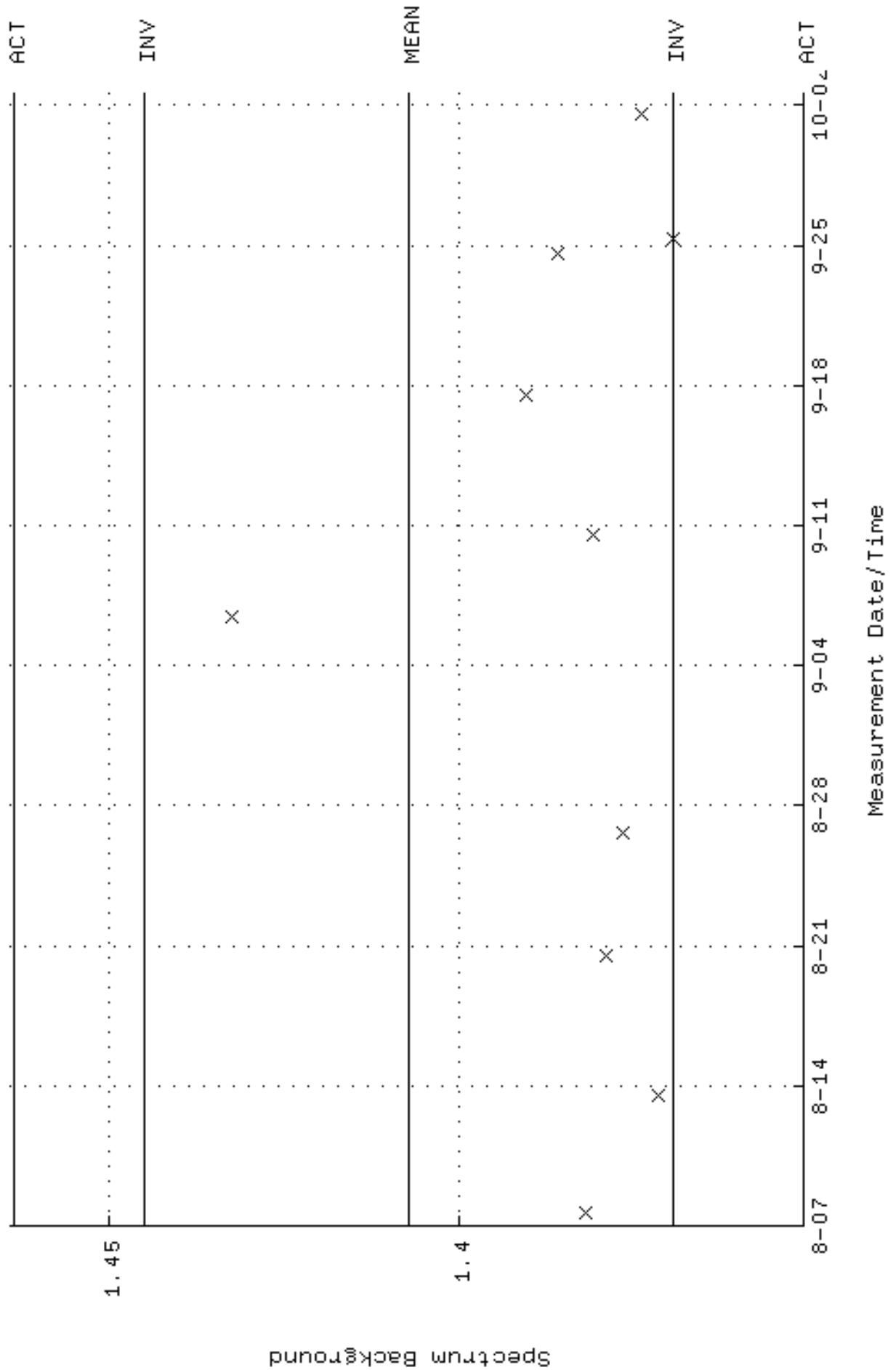




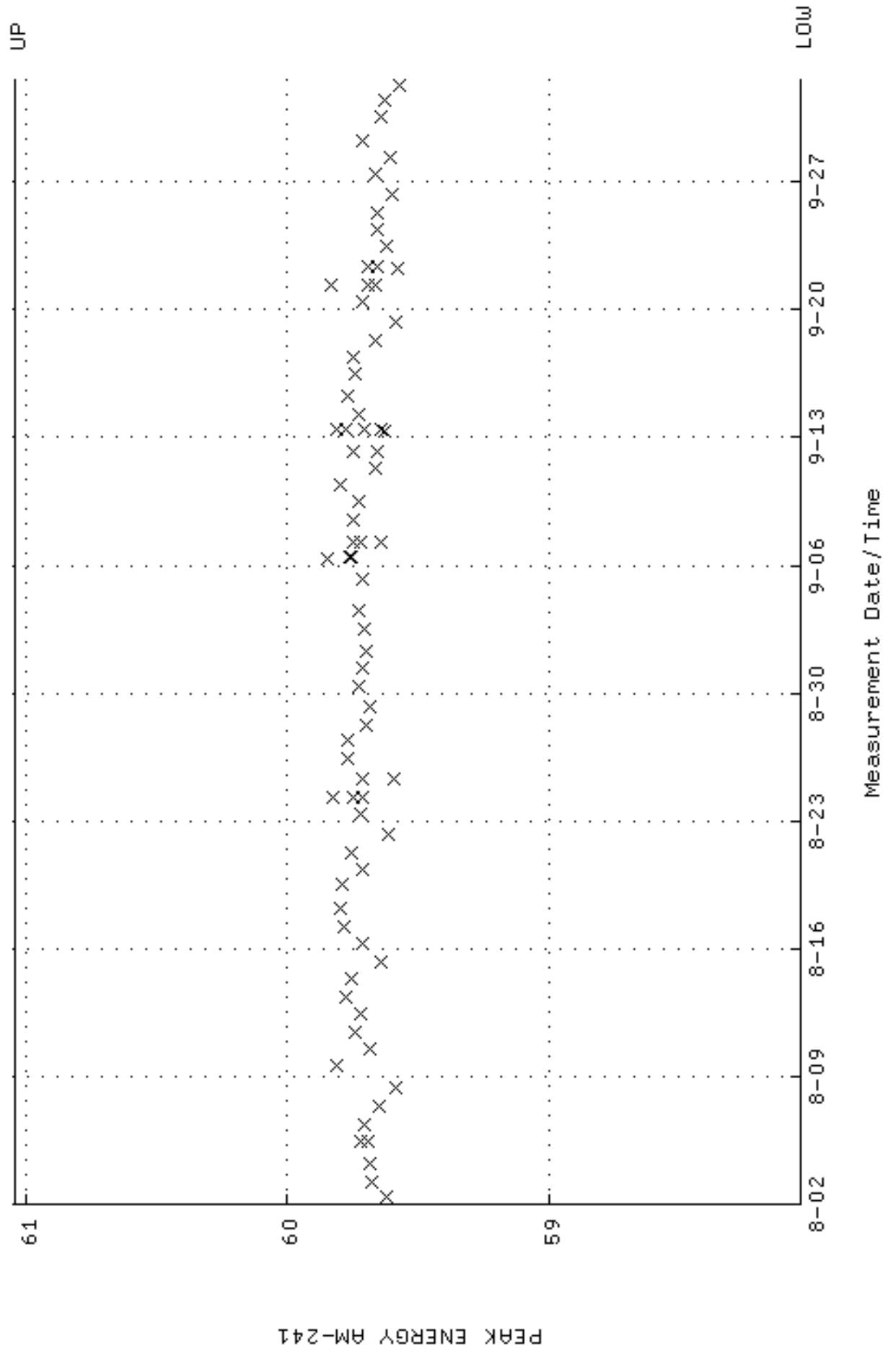
QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM03\_CAN.QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 07:40:13 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 66976.3 +- 2299.47 (3.43 %)



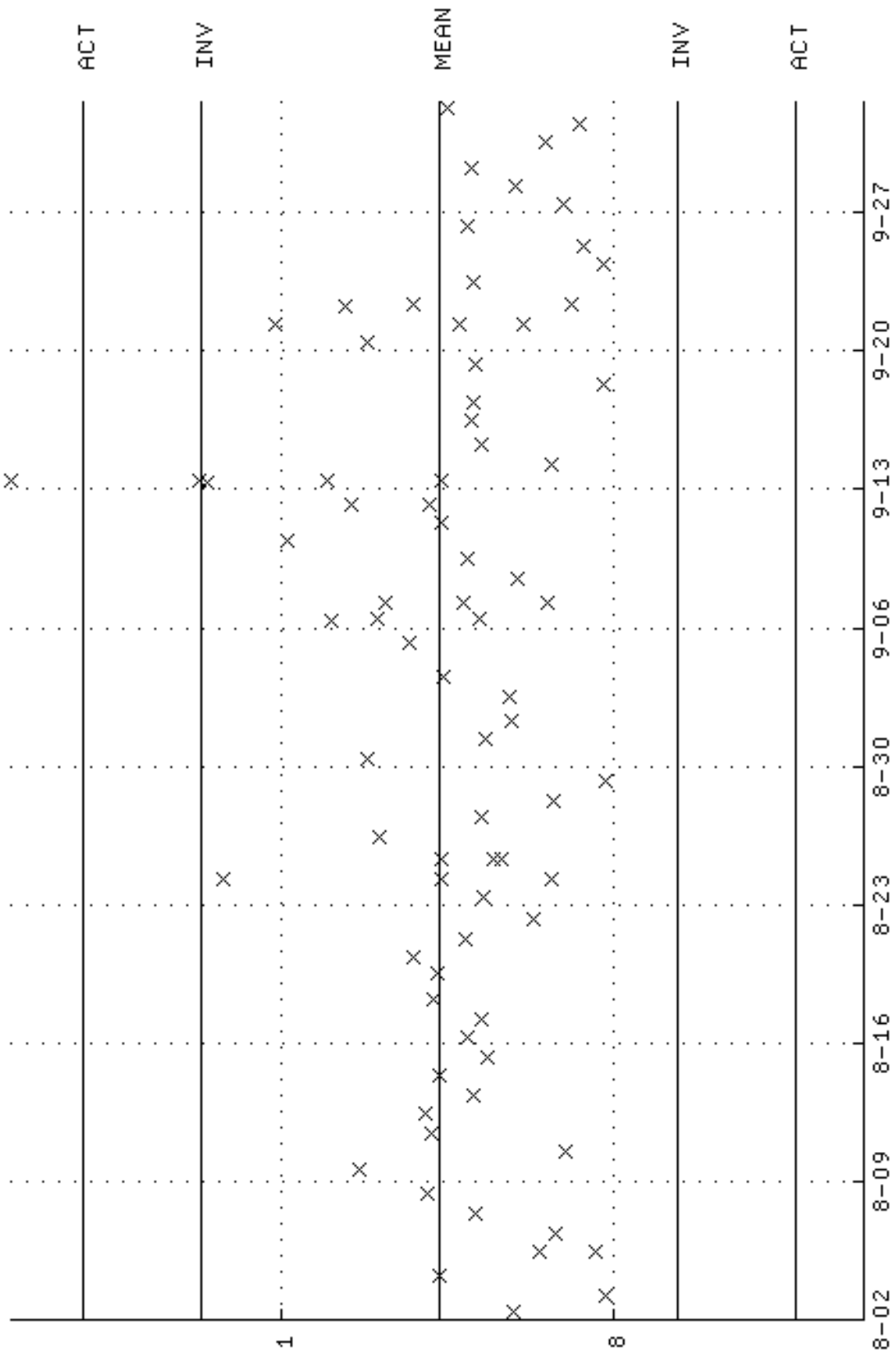
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM03.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:33:57 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.40722 +- 1.889385E-02 (1.34 %)



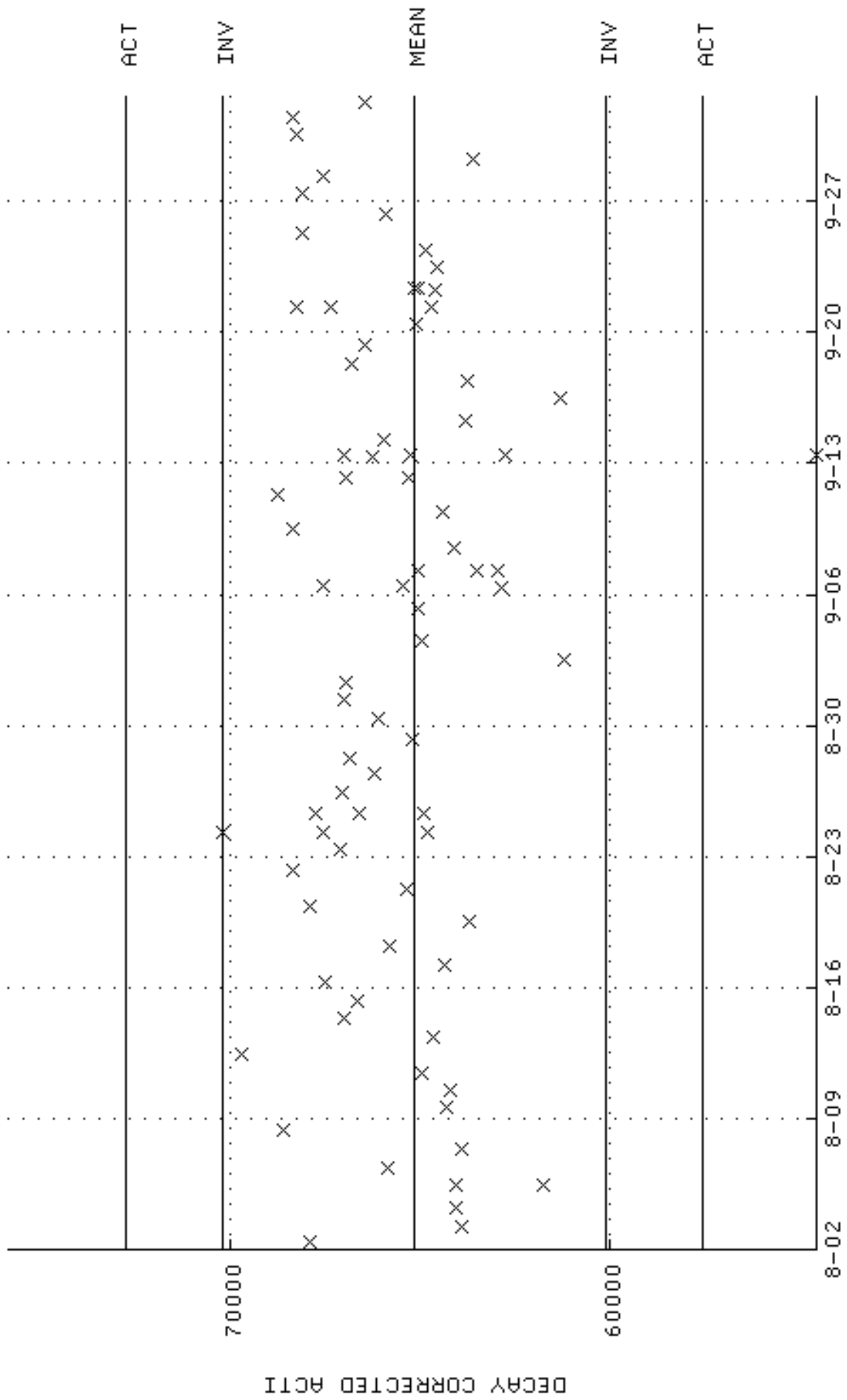
QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:01 through 2-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:01 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.905171 +- 7.152518E-02 (7.90 %)

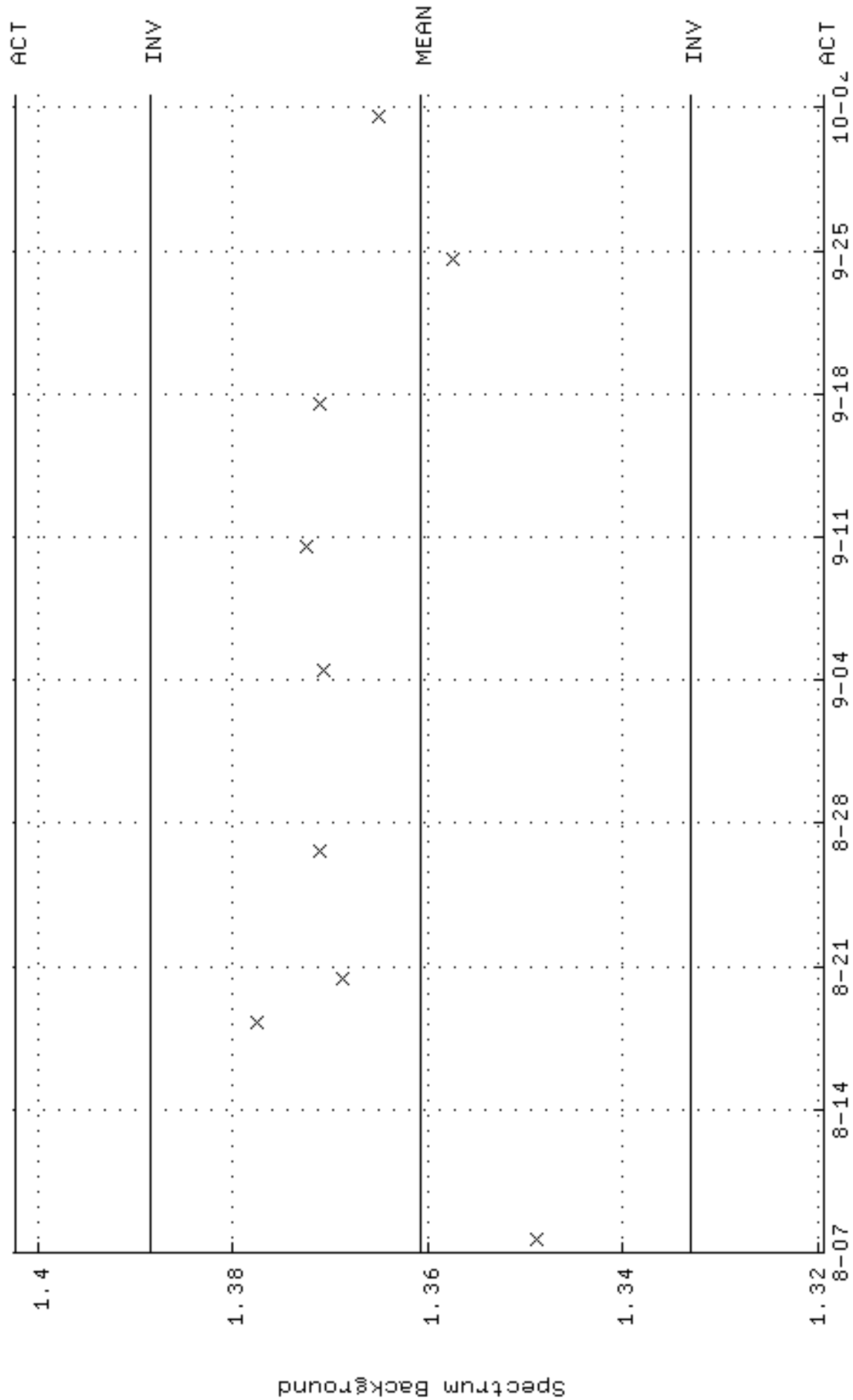


QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:01 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 65161.2 +- 2521.70 (3.87 %)

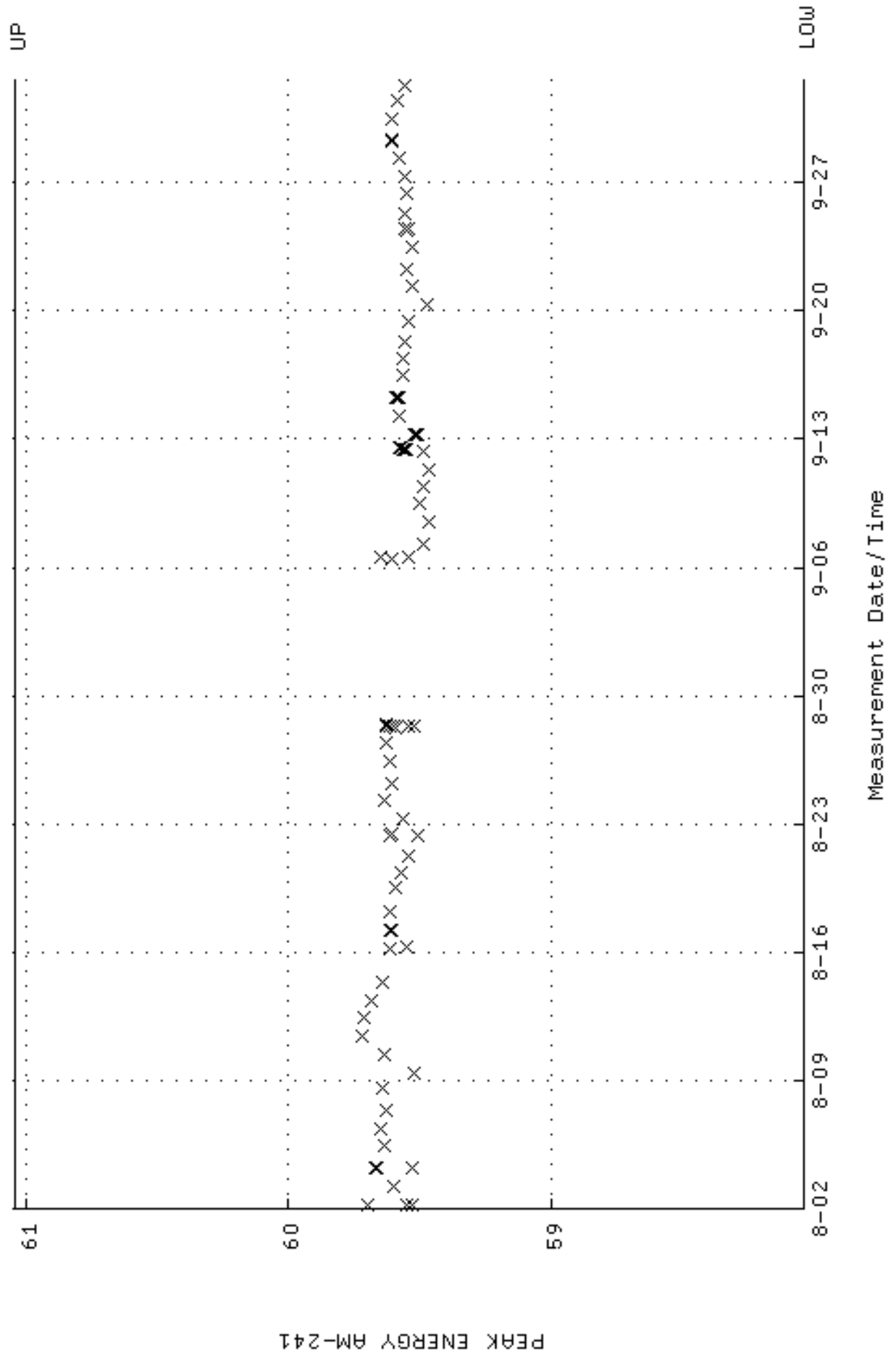


Measurement Date/Time

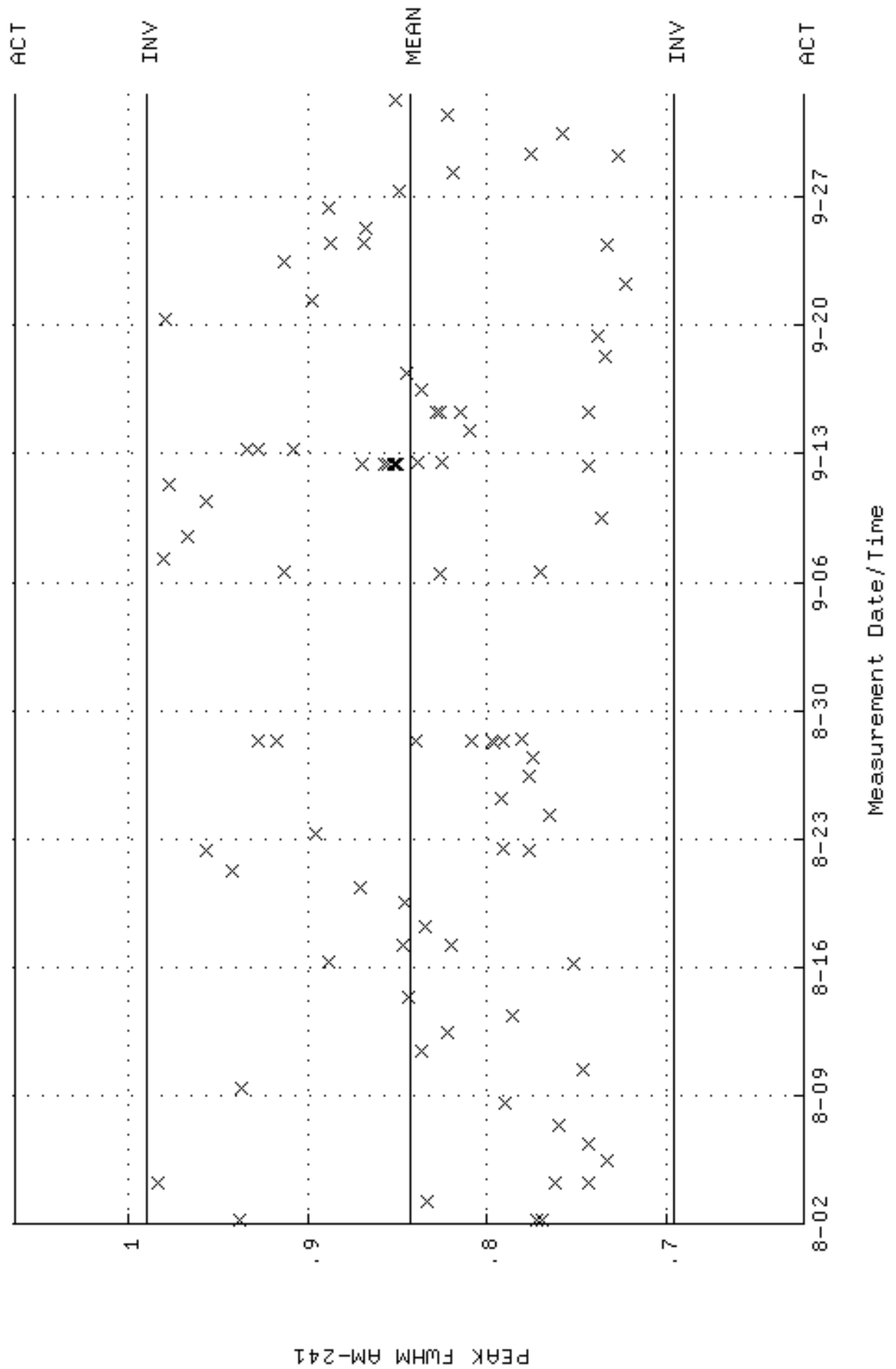
QA filename : DKA100:[CANNBERRA,GAMMA,SCUSR,QA]LBC\_GAM04.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:02 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.36085 +- 1.380287E-02 (1.01 %)



QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM05\_CAN\_QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:47 through 2-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

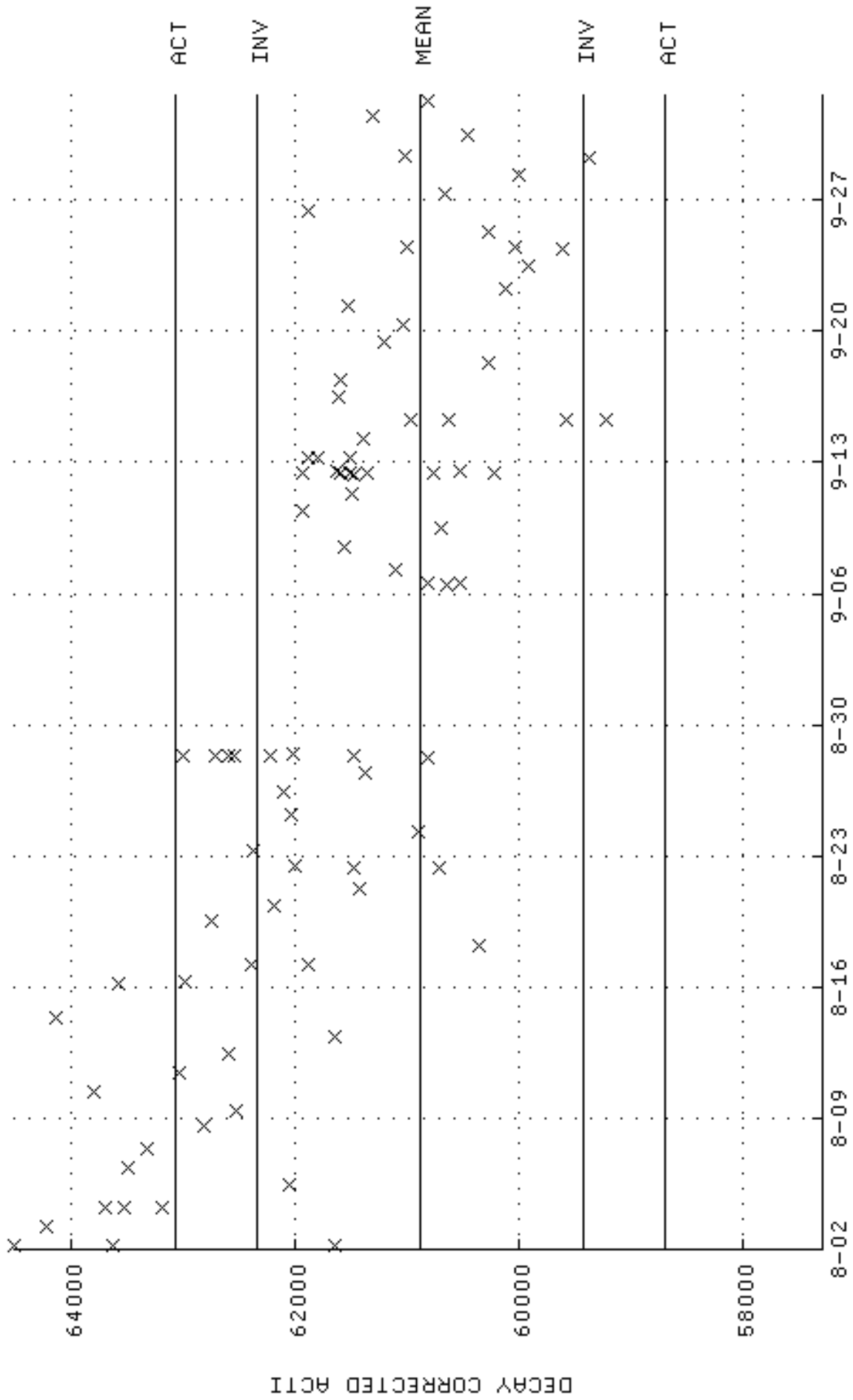


QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM05\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:47 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.843148 +- 7.345330E-02 (8.71 %)

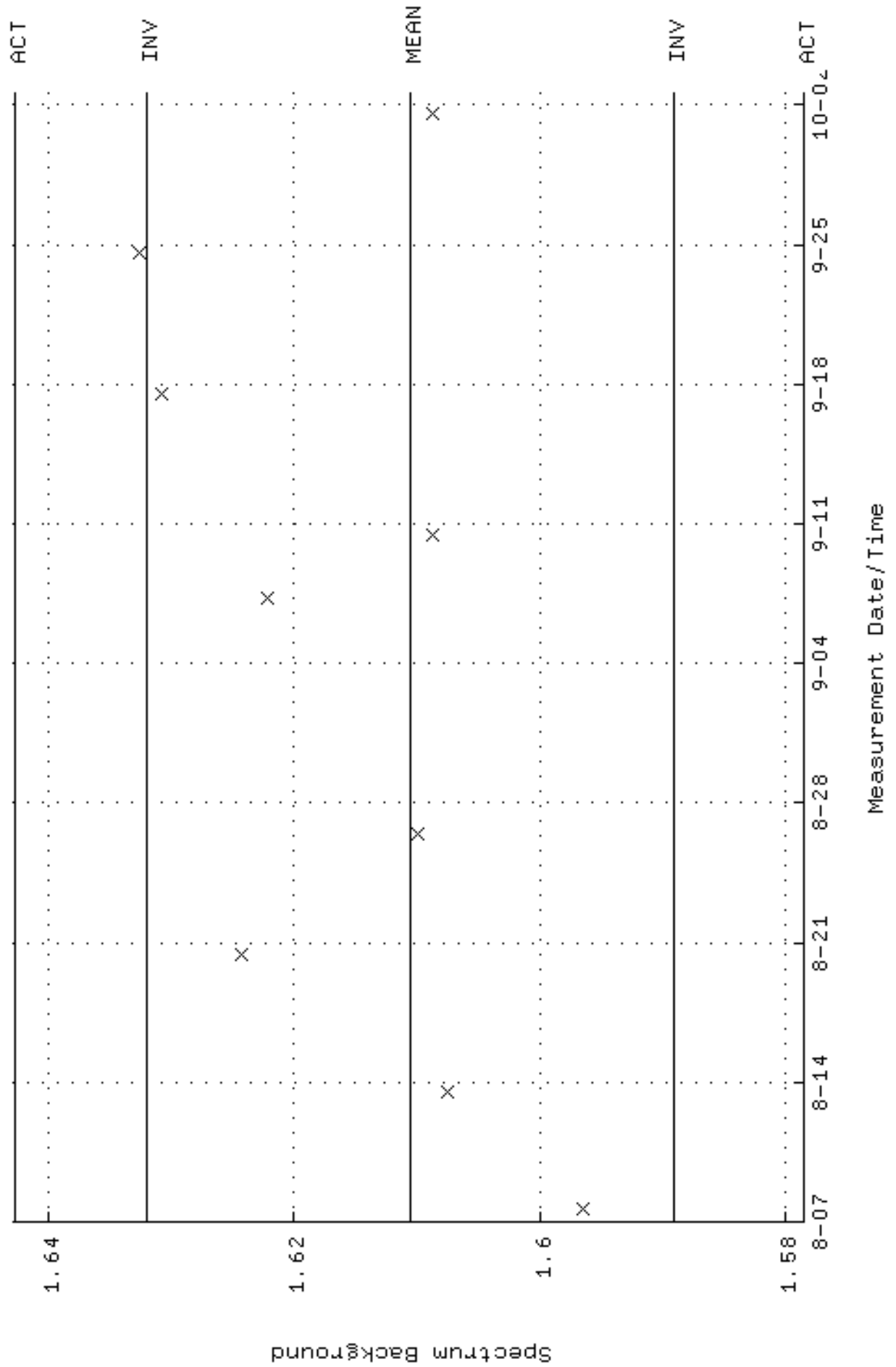




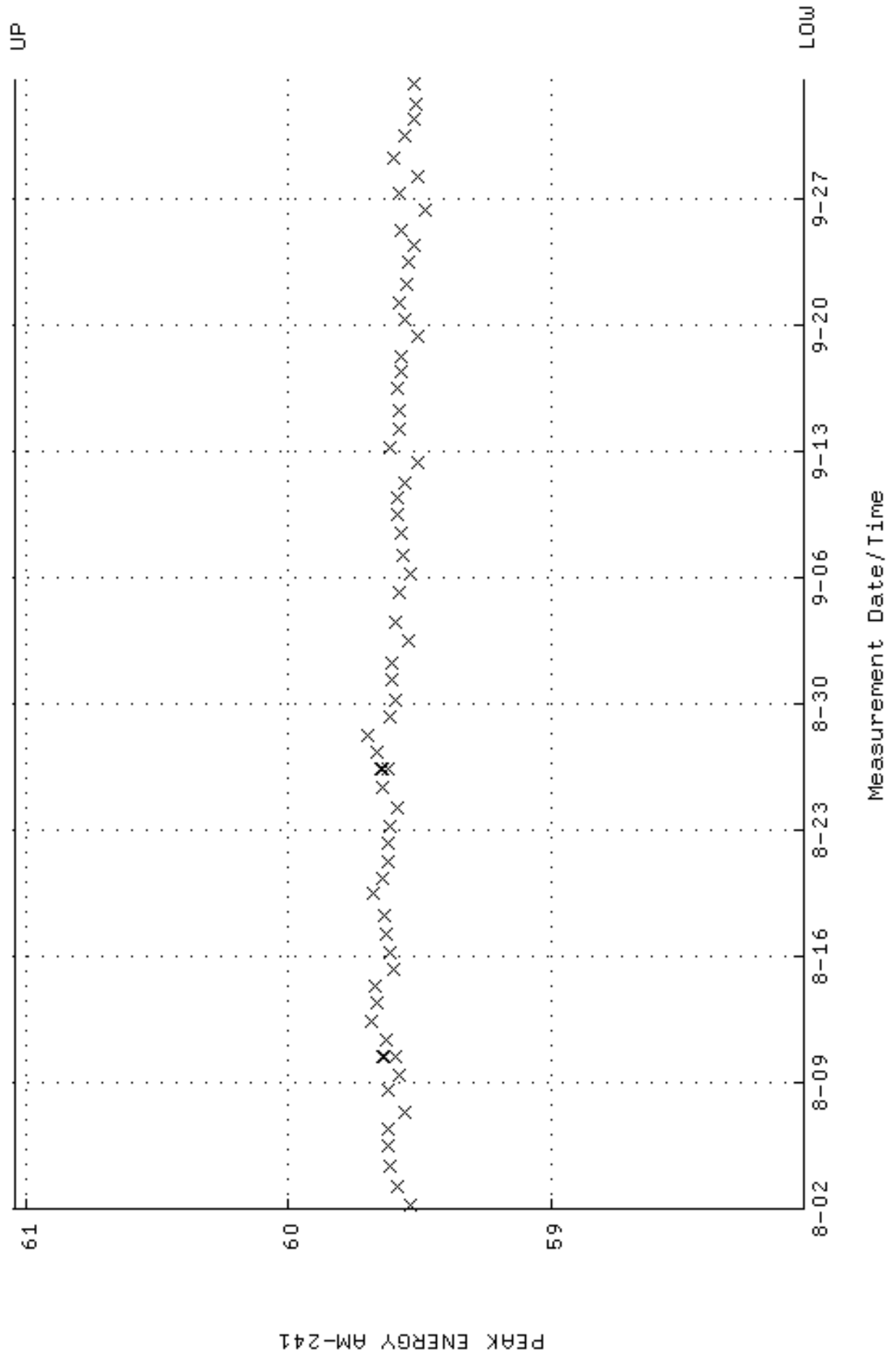
QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM05\_CAN\_QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:47 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 60890.1 +- 730.957 (1.20 %)



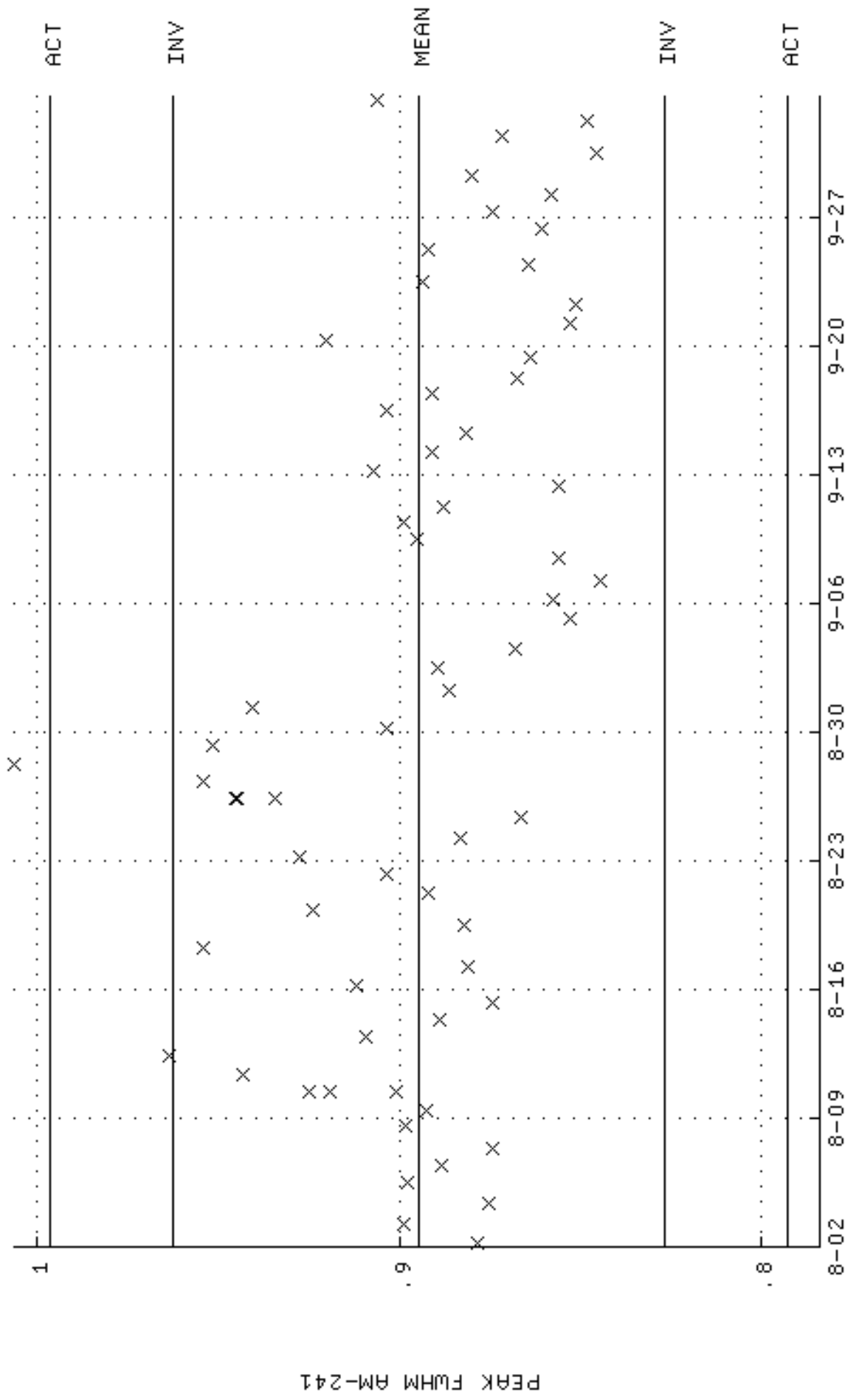
QA filename : DKA100:[CANNBERRA.GAMMA.SCUSR.QA]LBC\_GAM05.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:07 through 2-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.61059 +- 1.070567E-02 (0.66 %)



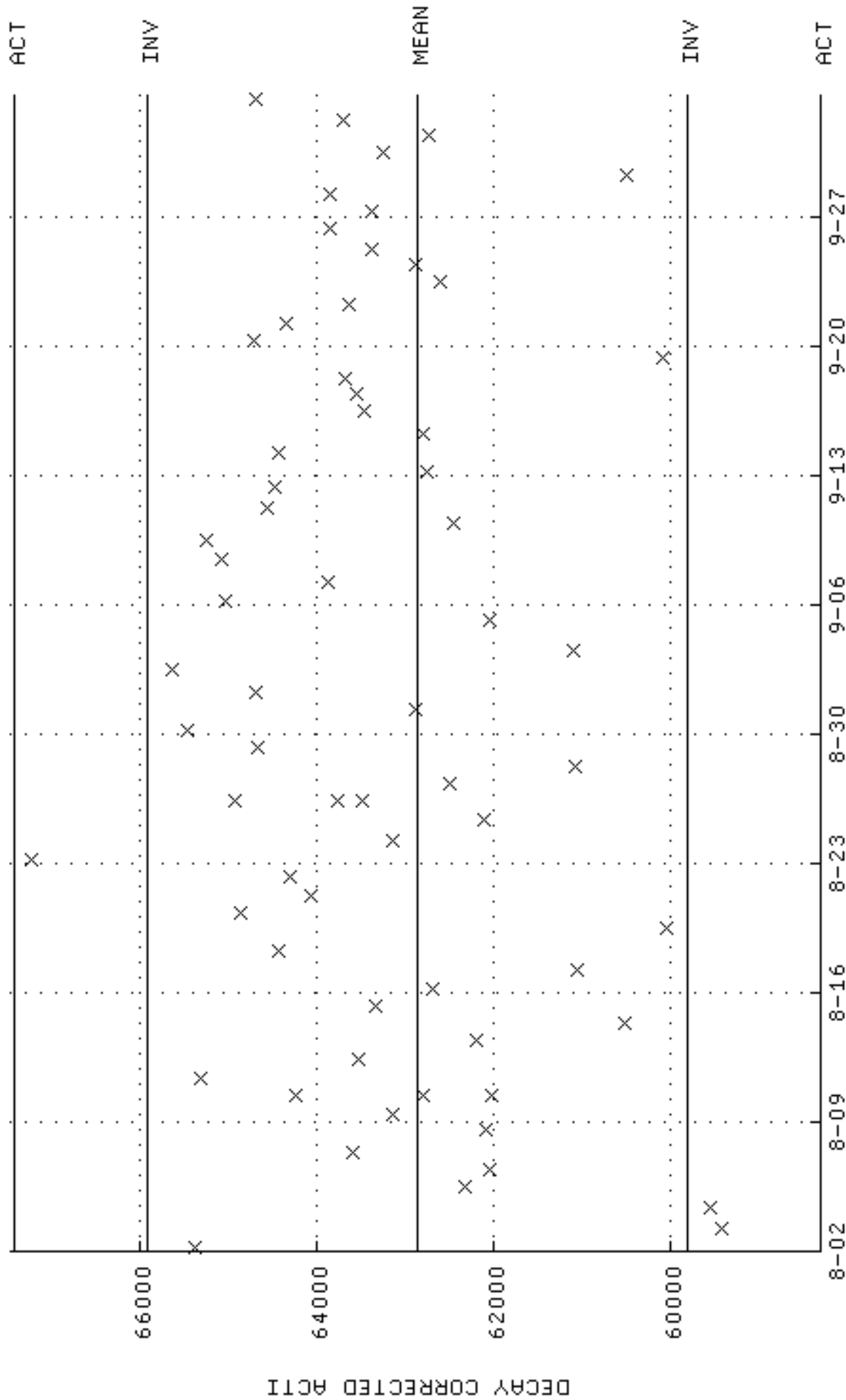
QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM06\_CAN\_QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:06 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



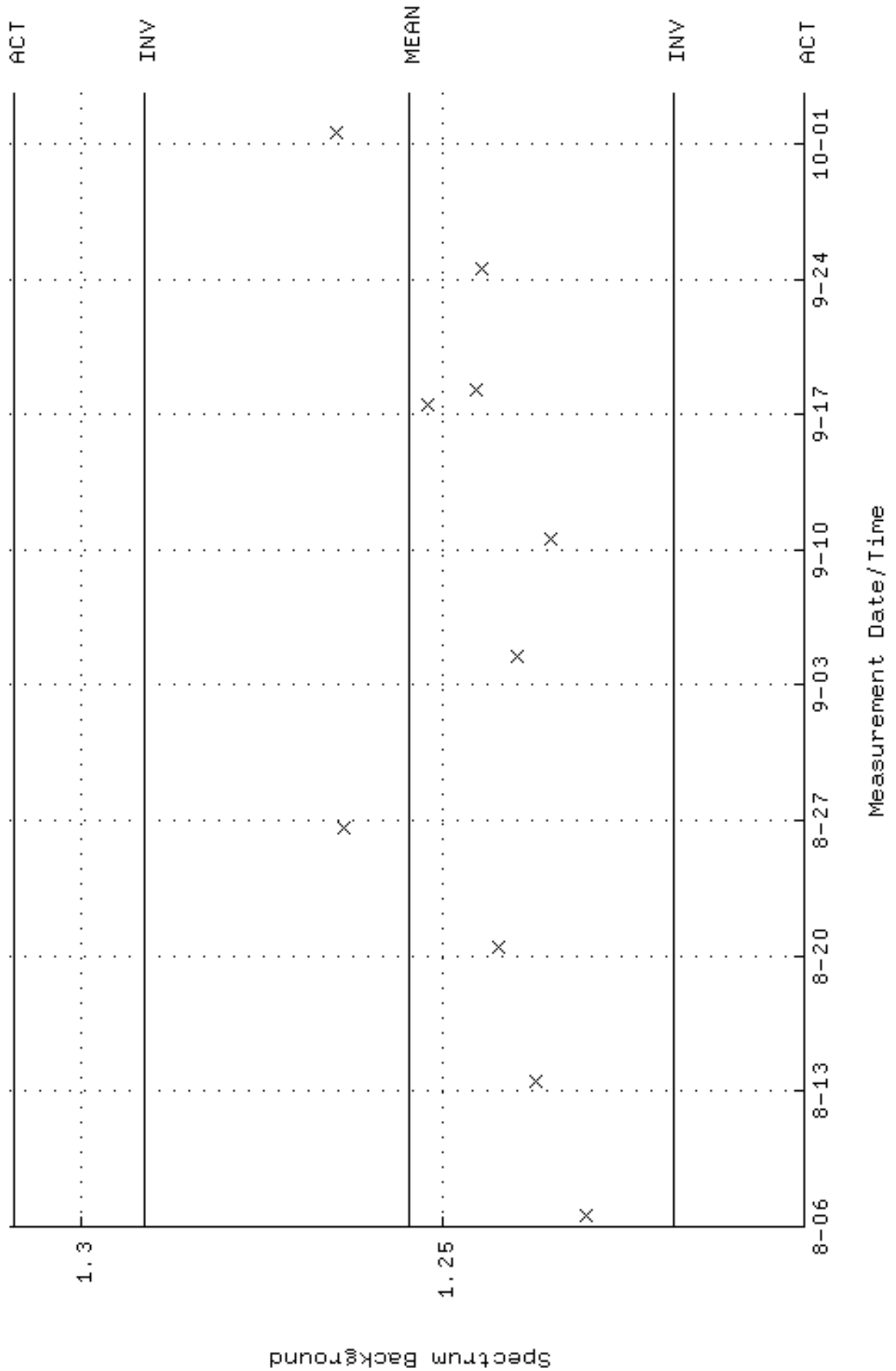
QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM06\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:06 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.894871 +- 3.385826E-02 (3.78 %)



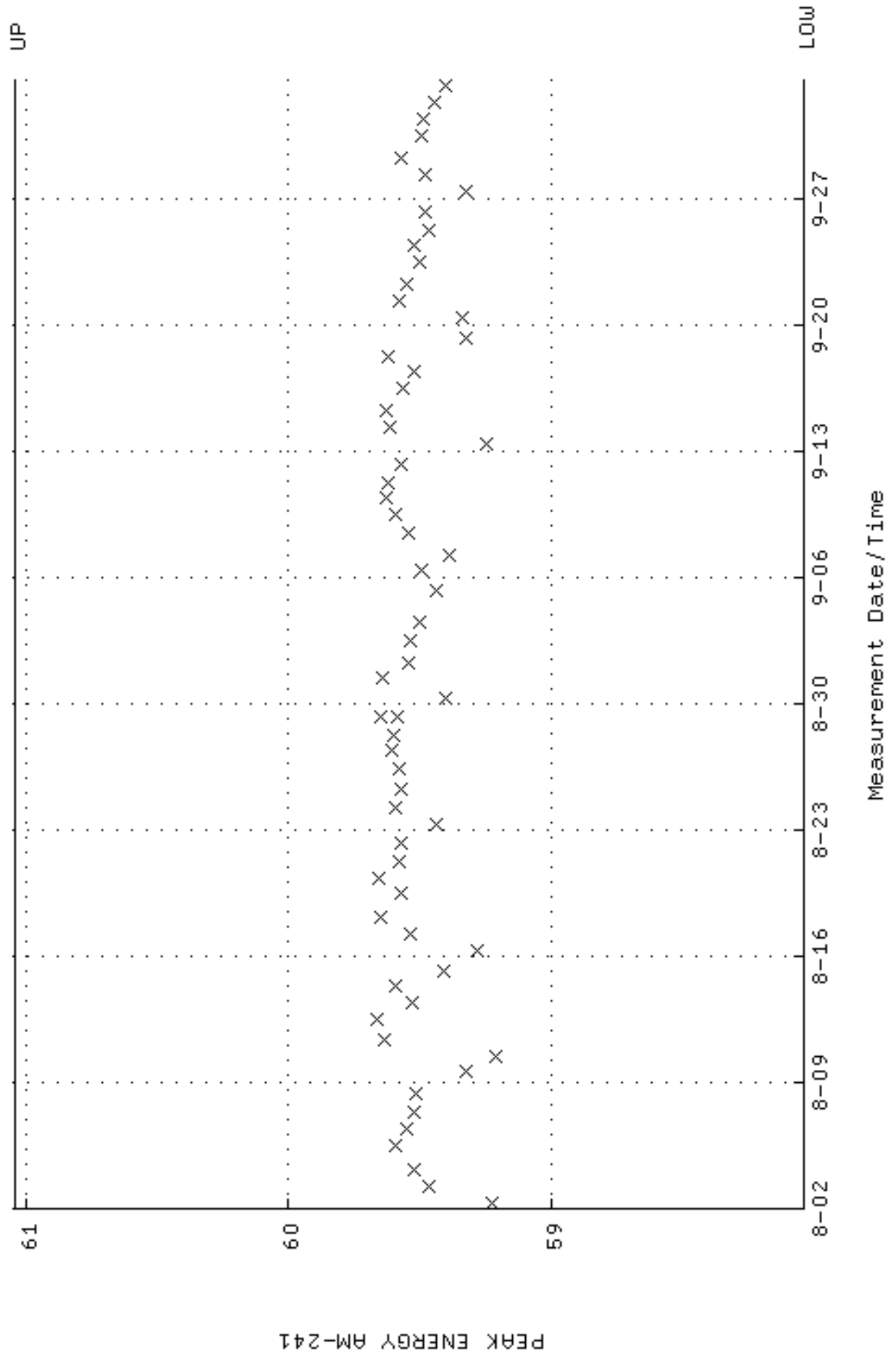
QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM06\_CAN.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:06 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 62870.8 +- 1518.39 (2.42 %)



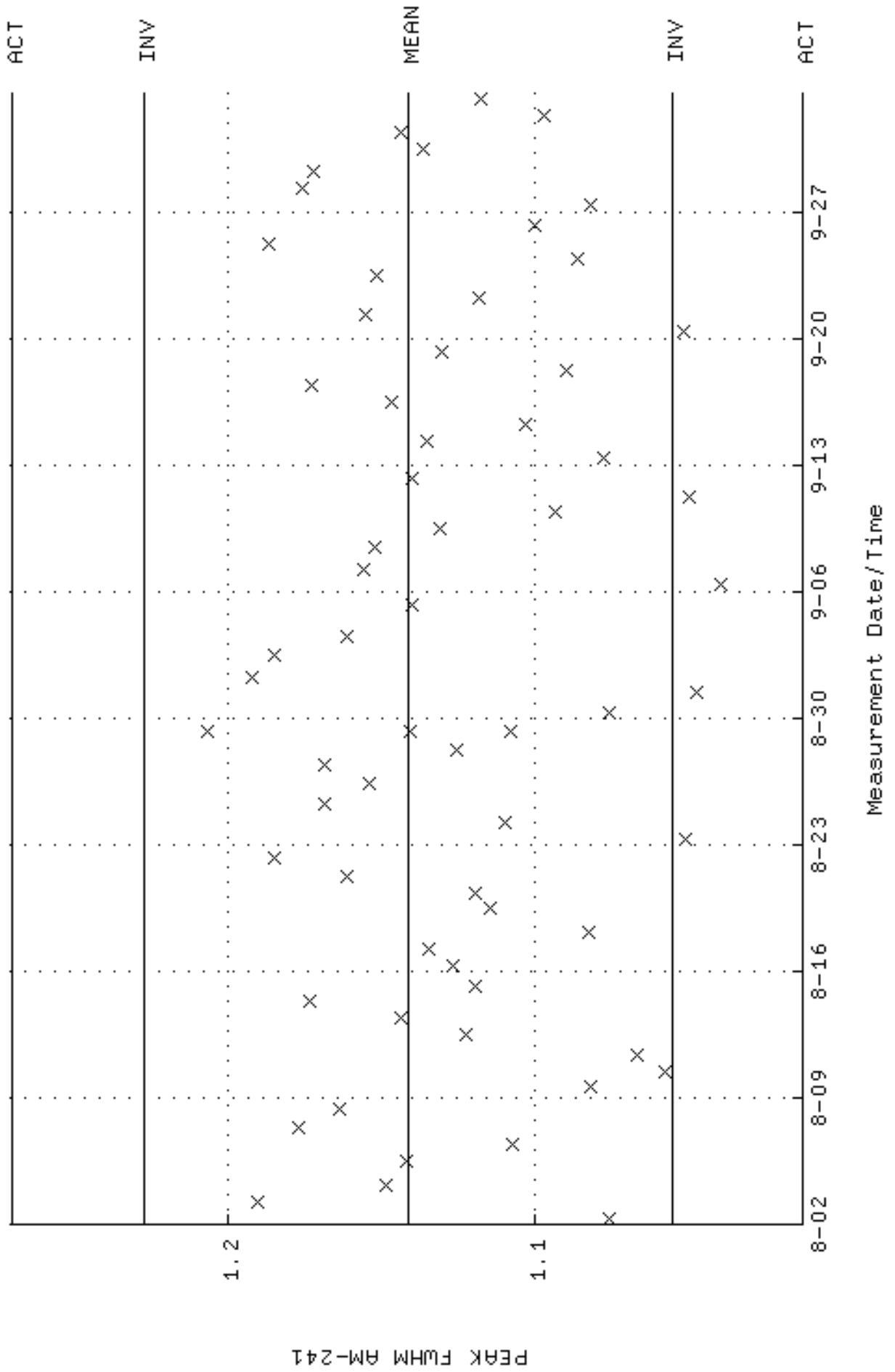
QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]LBC\_GAM06.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 6-AUG-2023 14:51:52 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.25484 +- 1.824749E-02 (1.45 %)



QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM08\_JAR.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:07 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

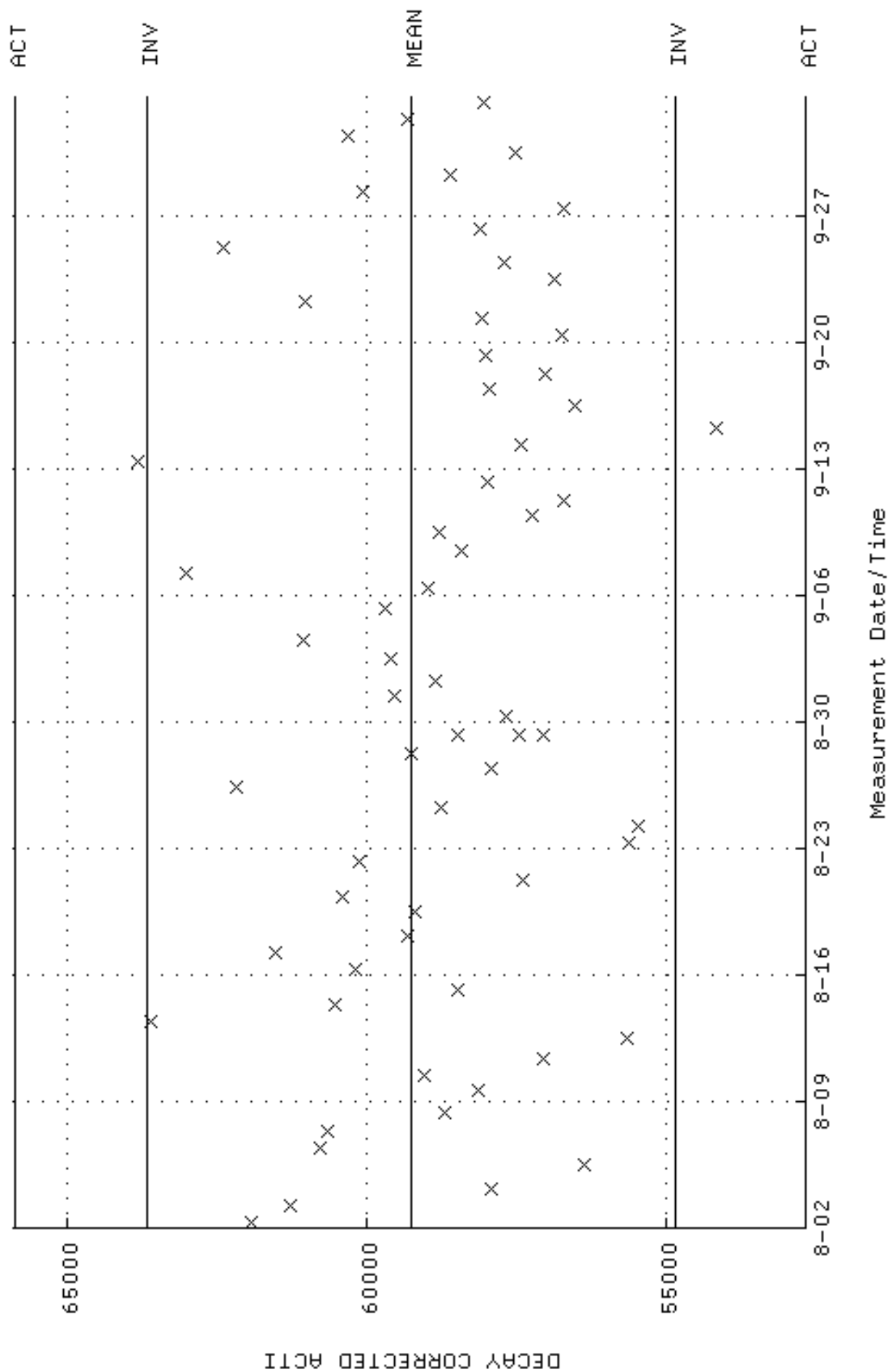


QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM08\_JAR.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:07 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.14163 +- 4.283958E-02 (3.75 %)

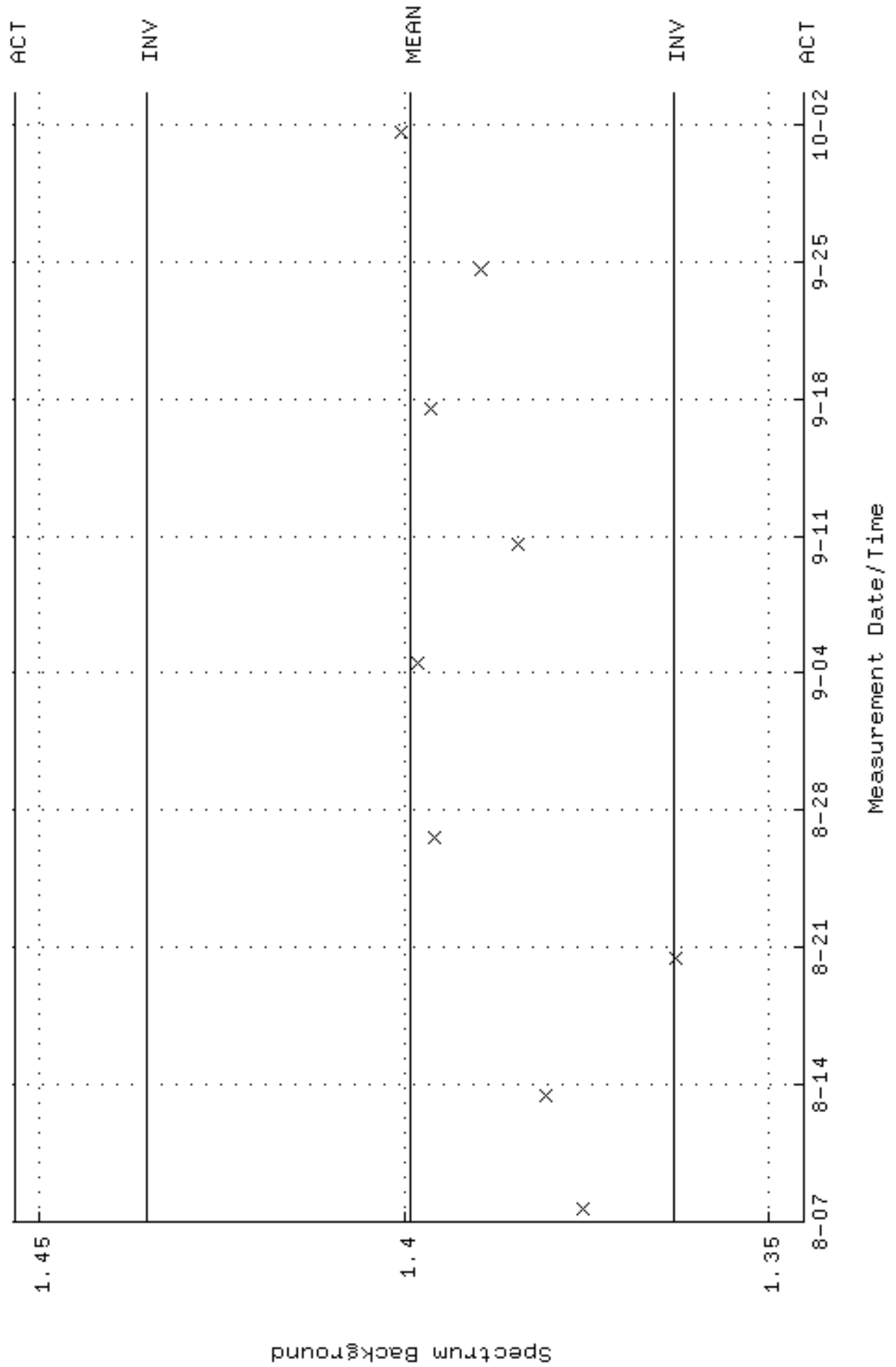




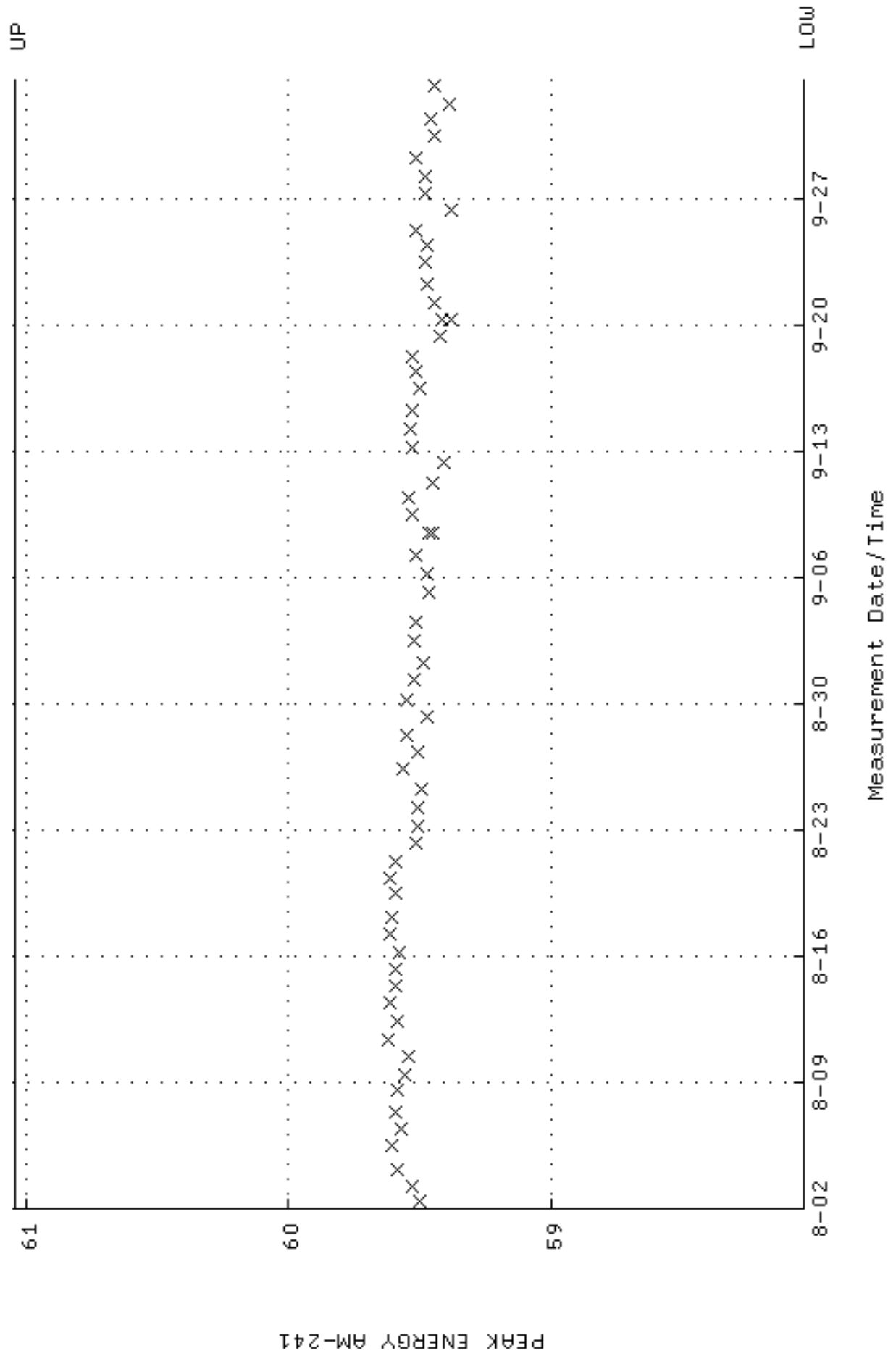
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM08\_JAR.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:35:07 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 59256.3 +- 2199.63 (3.71 %)



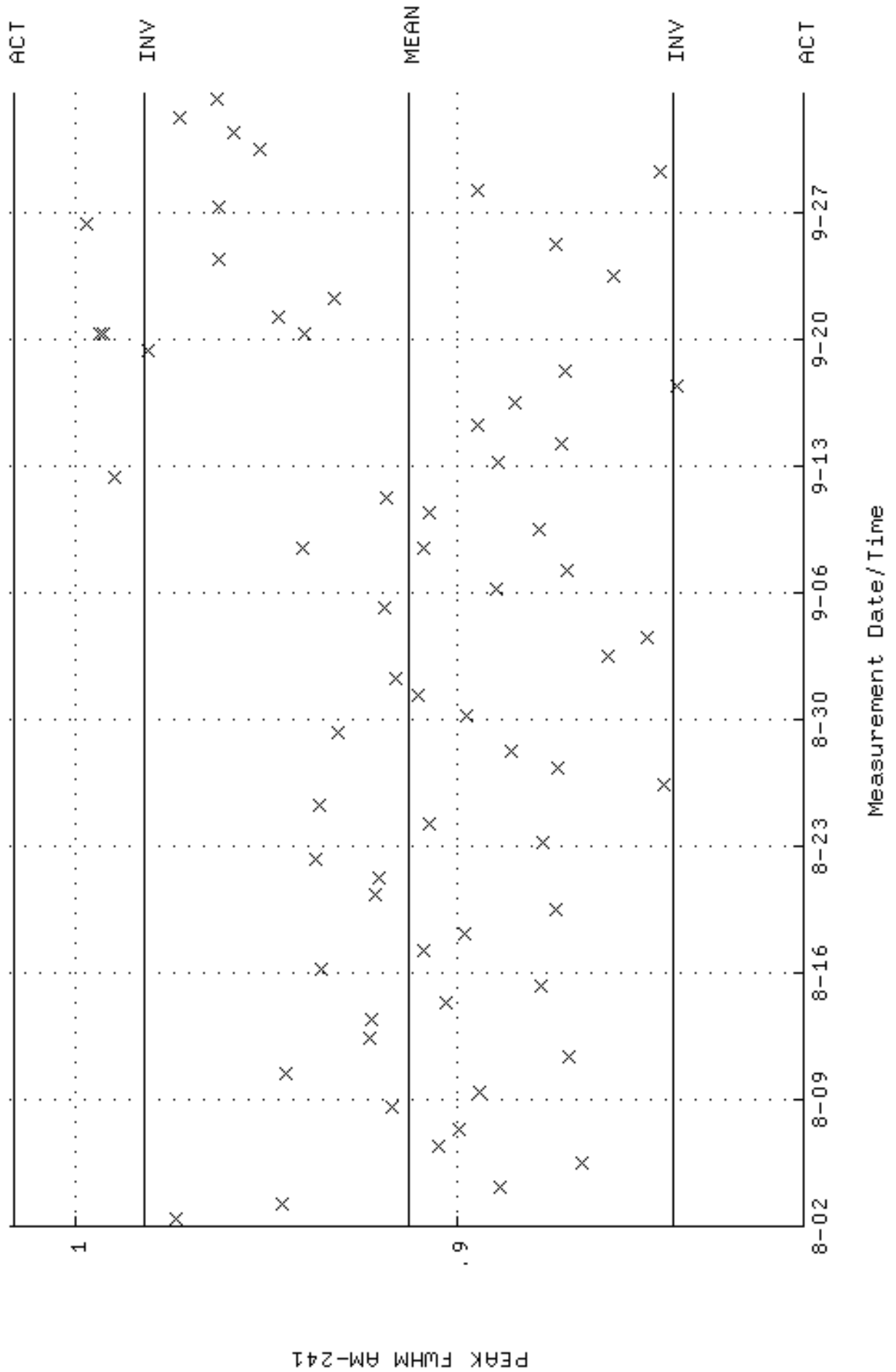
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM08.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:17 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.39925 +- 1.803552E-02 (1.29 %)



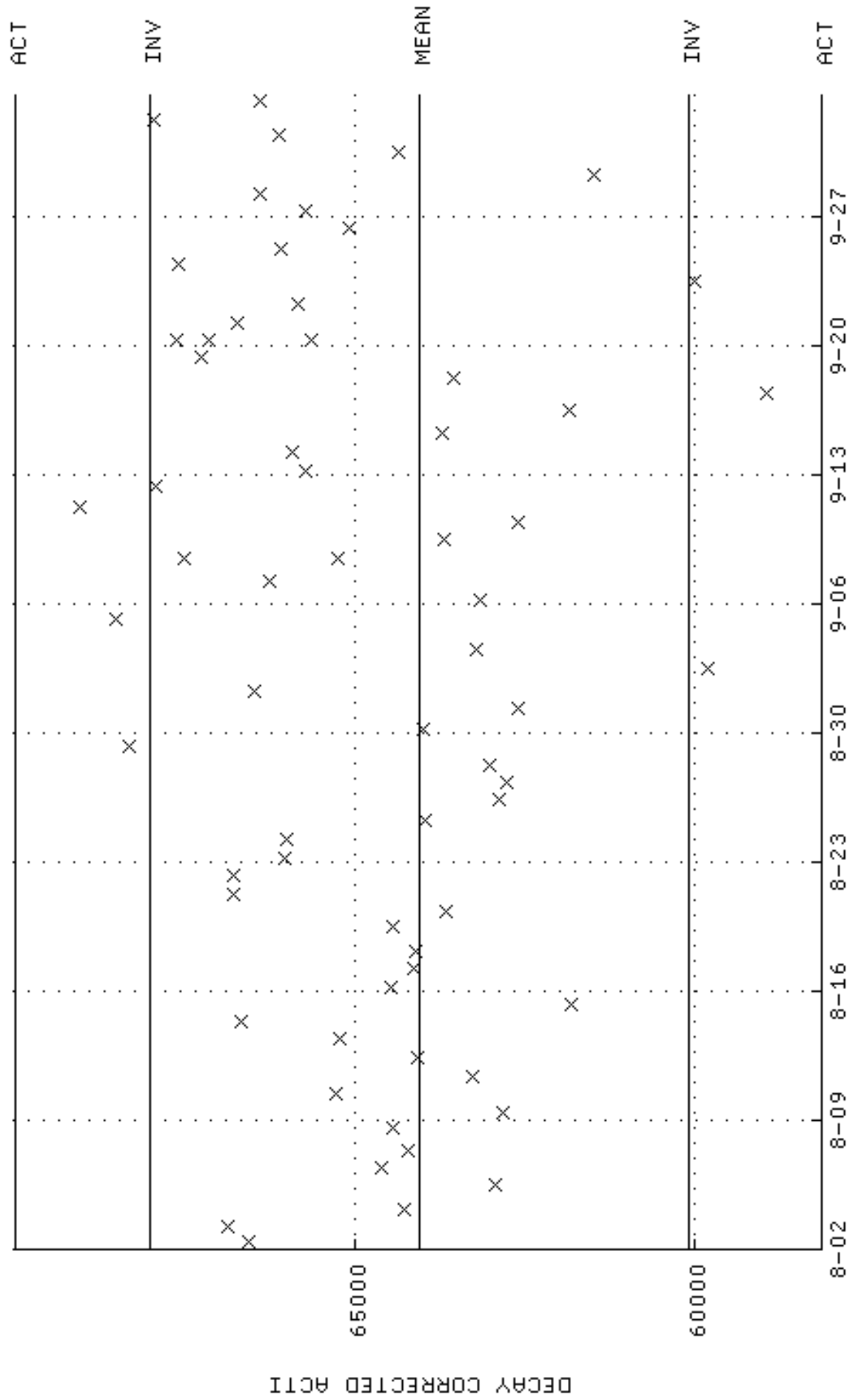
QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM11\_JAR.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:41:51 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



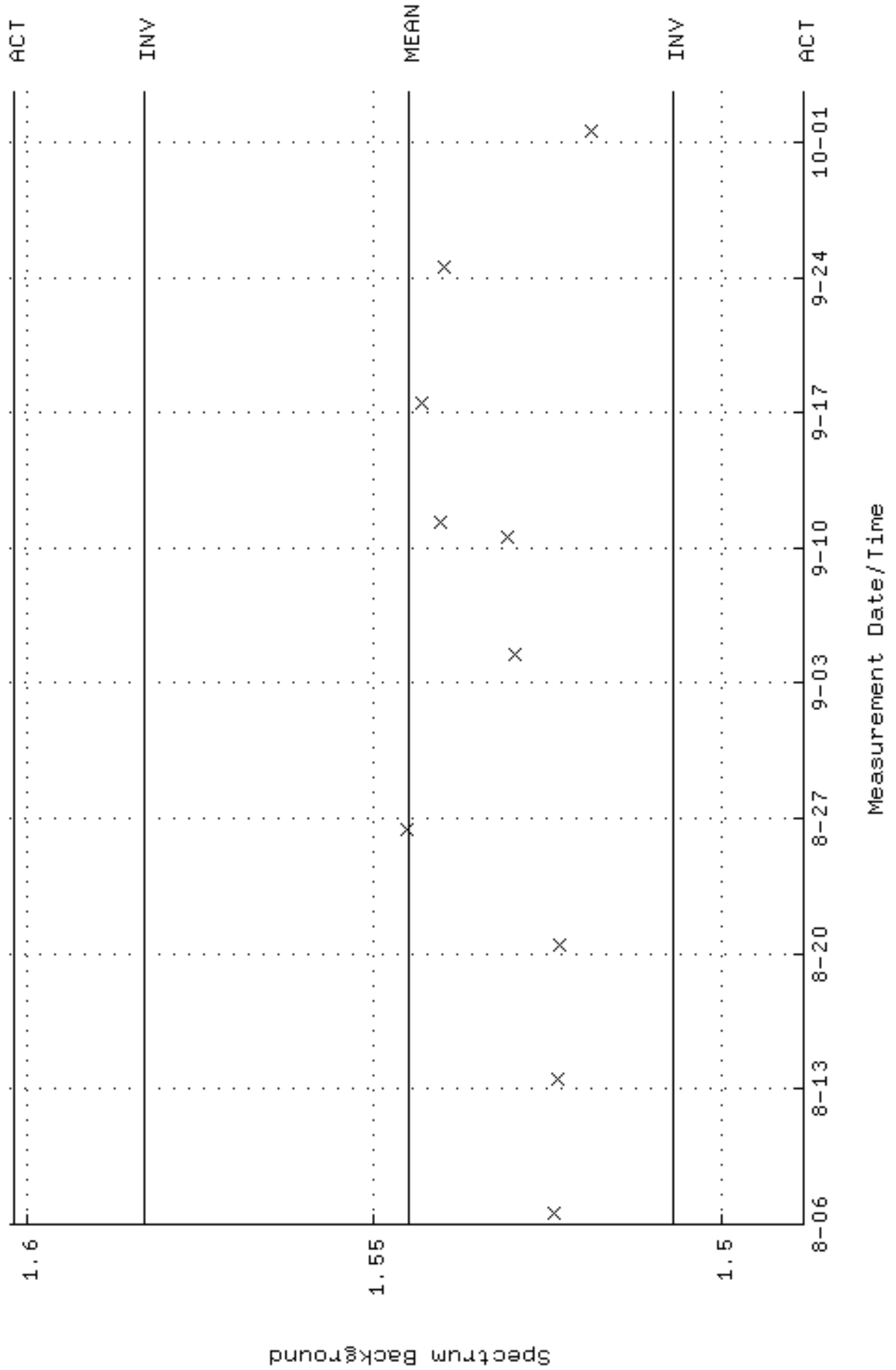
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM11\_JAR.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:41:51 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.912741 +- 3.468141E-02 (3.80 %)



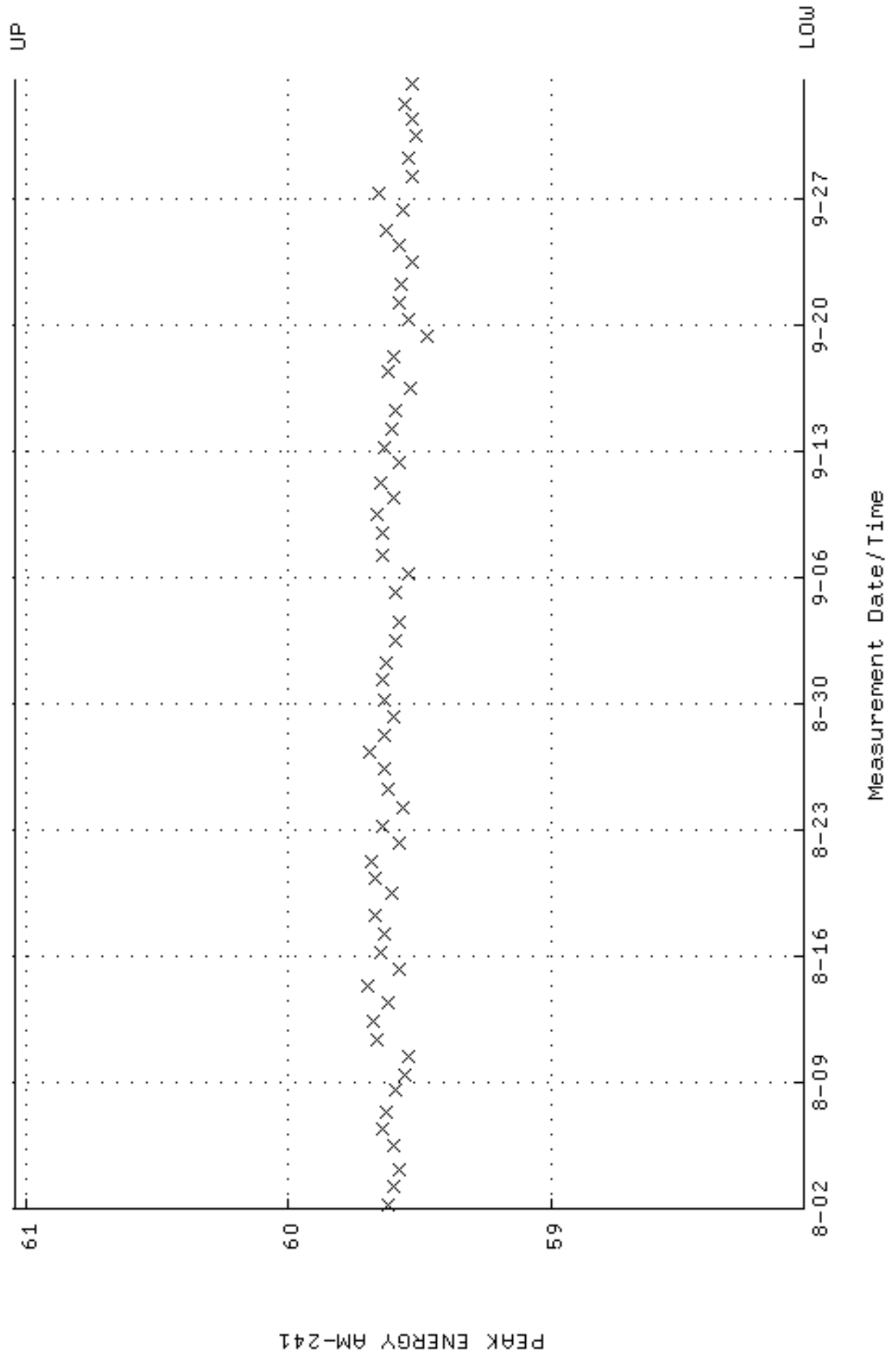
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM11\_JAR.QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:41:51 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 64057.2 +- 1972.72 (3.08 %)



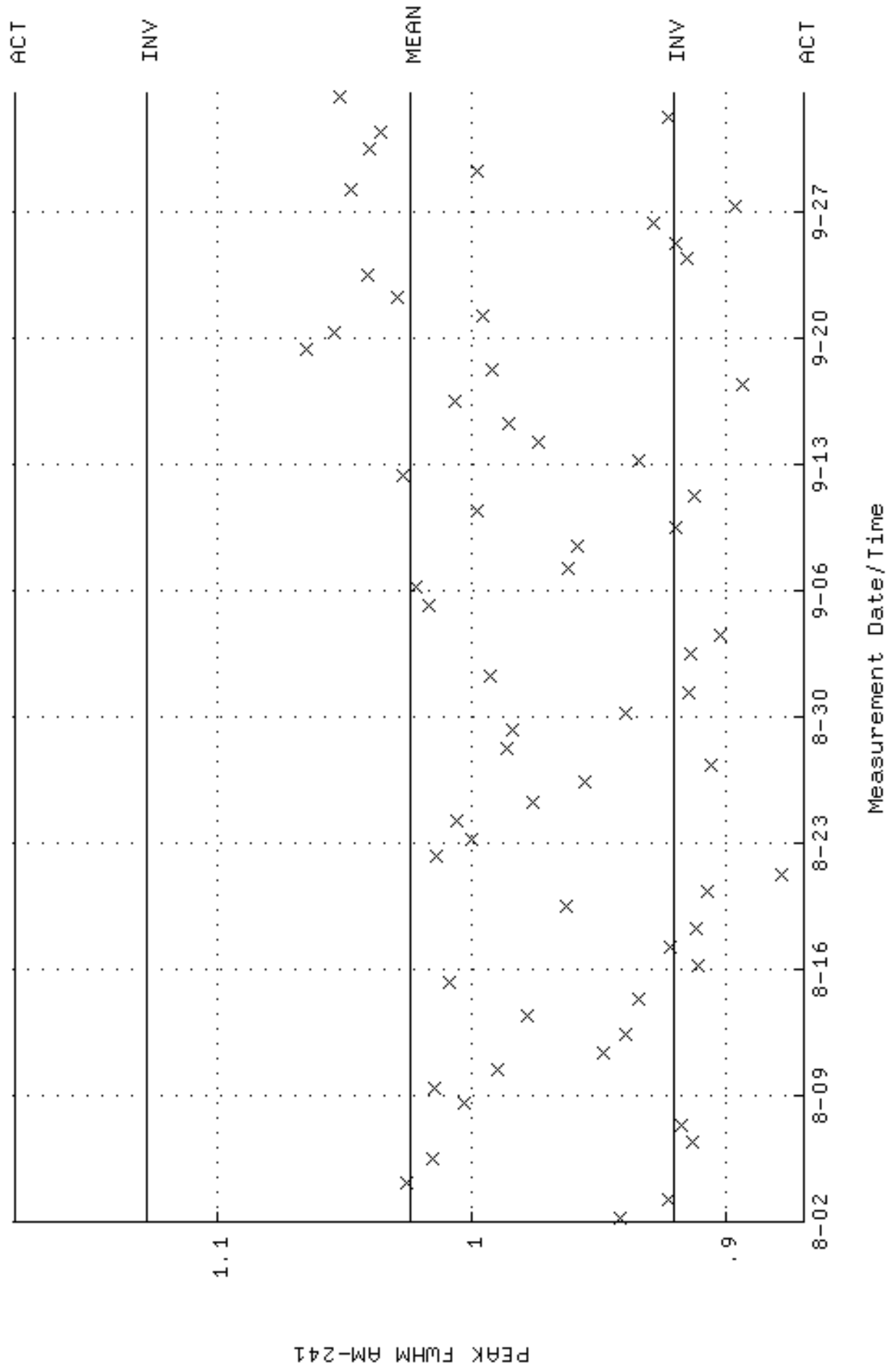
QA filename : DKA100:[CANSBERRA.GAMMA.SCUSR.QA]LBC\_GAM11.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 6-AUG-2023 13:34:35 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.54514 +- 1.902434E-02 (1.23 %)



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]QCC\_GAM16\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:15 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

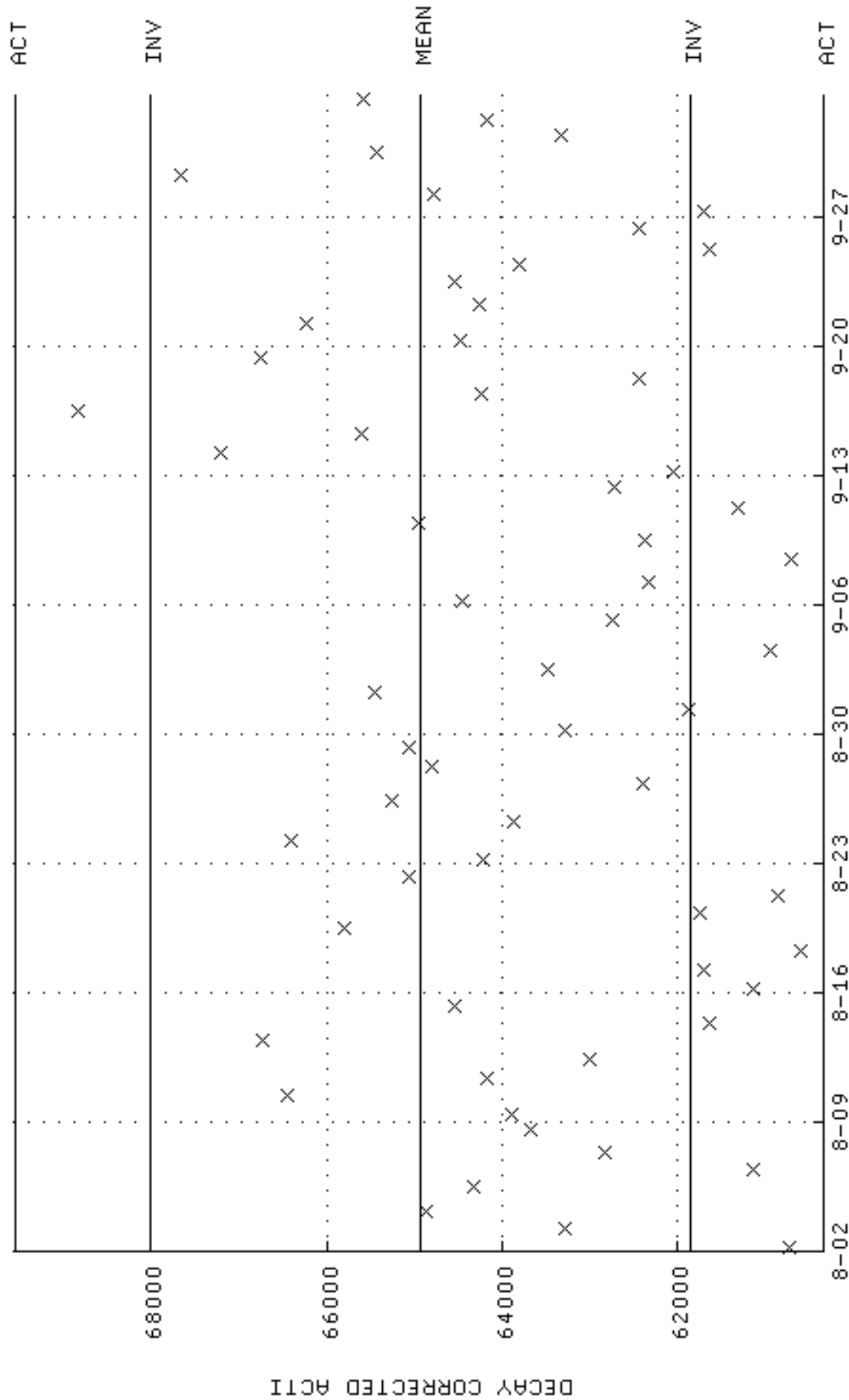


QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM16\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:15 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.02434 +- 5.170491E-02 (5.05 %)

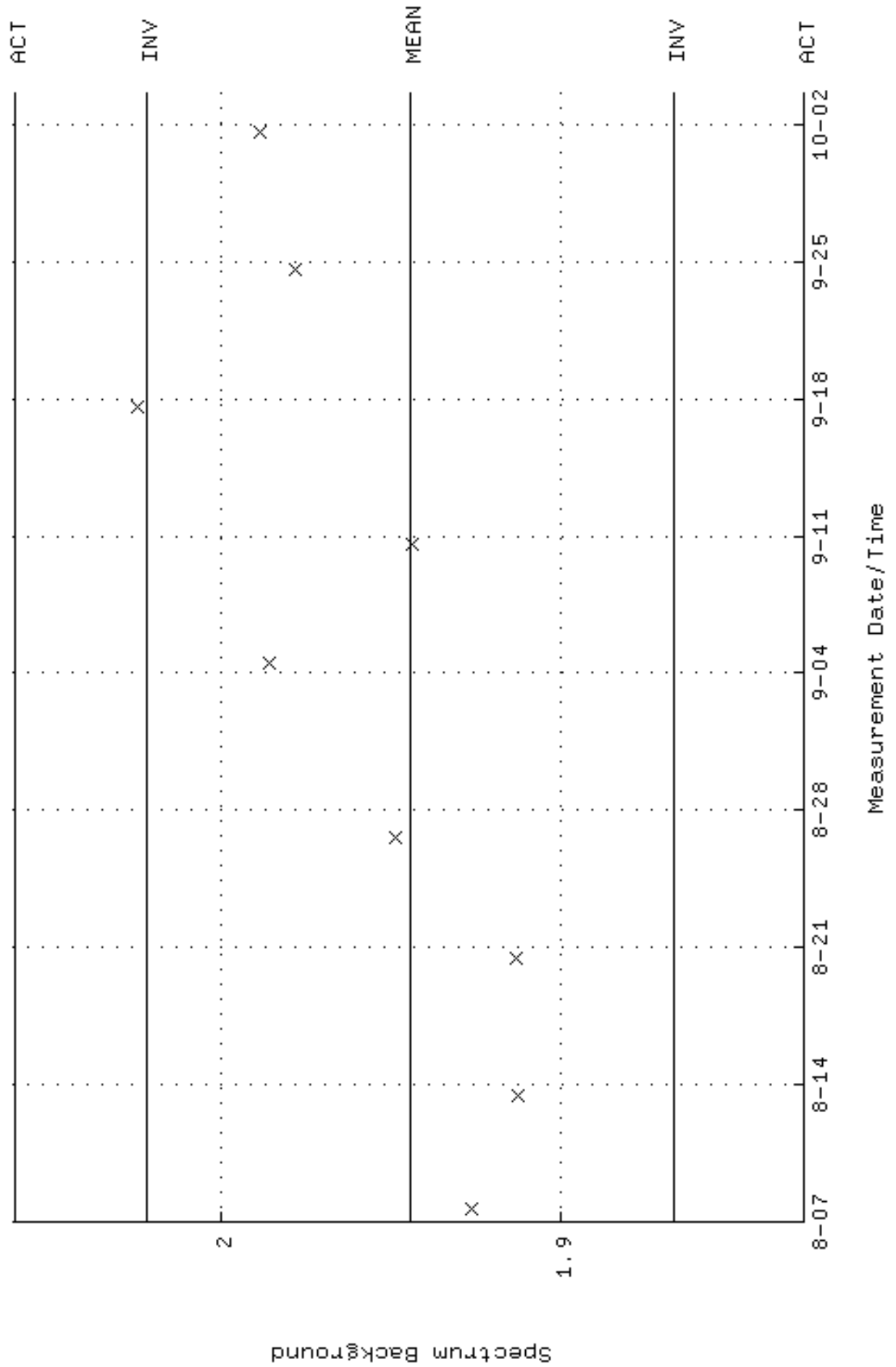




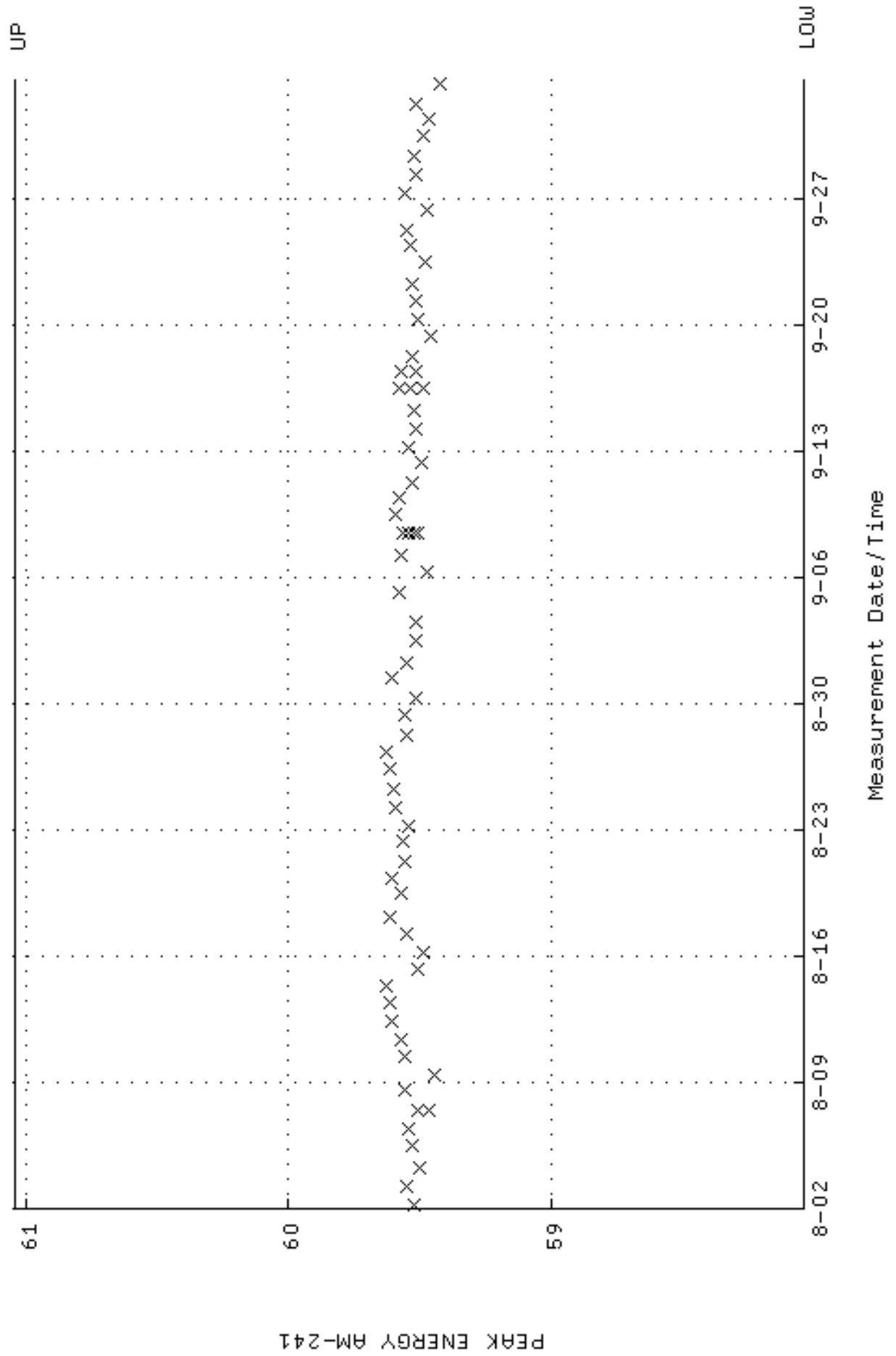
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM16\_CAN\_QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 04:42:15 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 64940.2 +- 1533.70 (2.36 %)



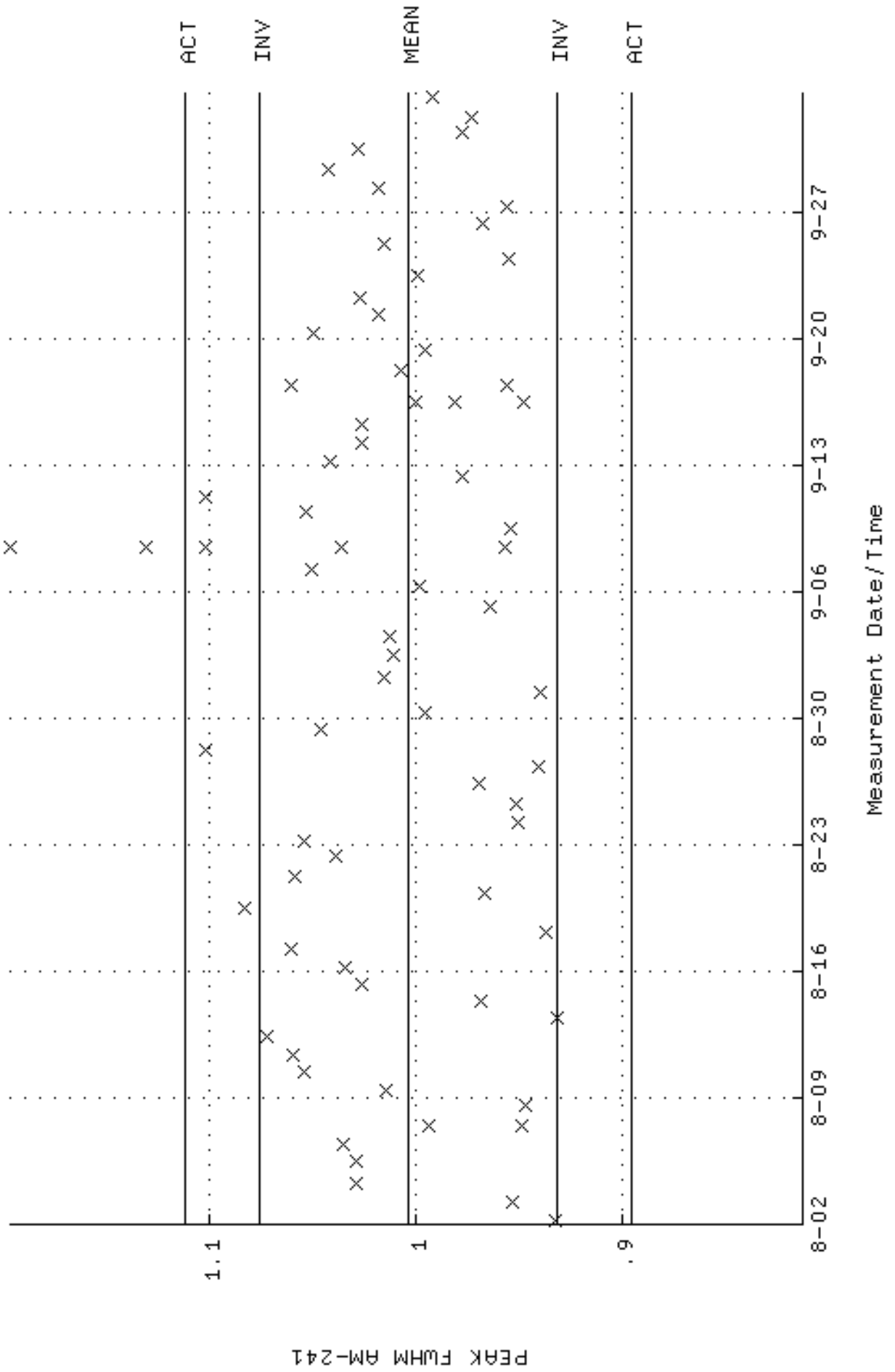
QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC\_GAM16.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:27 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.94453 +- 3.864294E-02 (1.99 %)



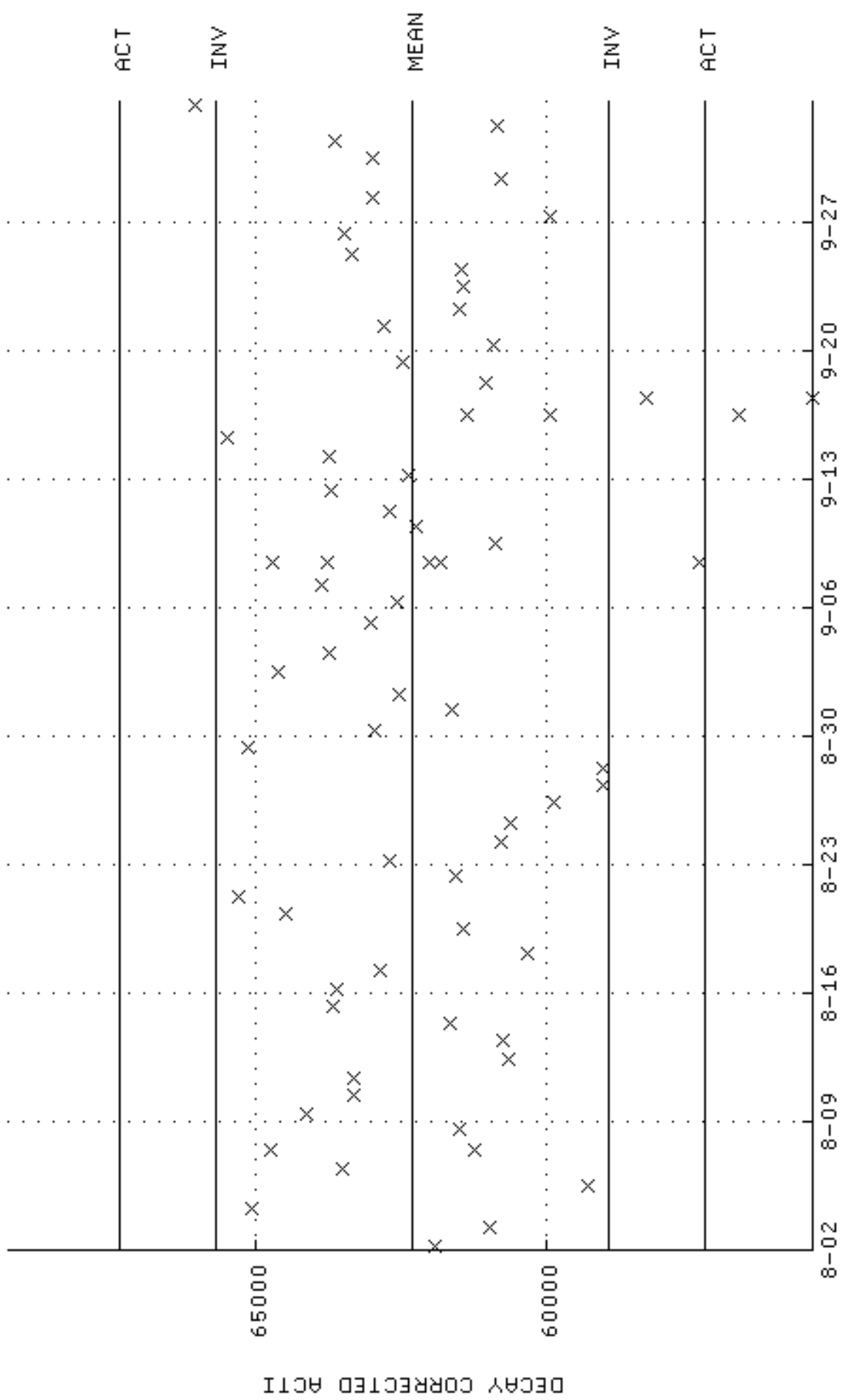
QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM19\_CAN\_QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:52 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM19\_CAN\_QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:52 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.00386 +- 3.604150E-02 (3.59 %)

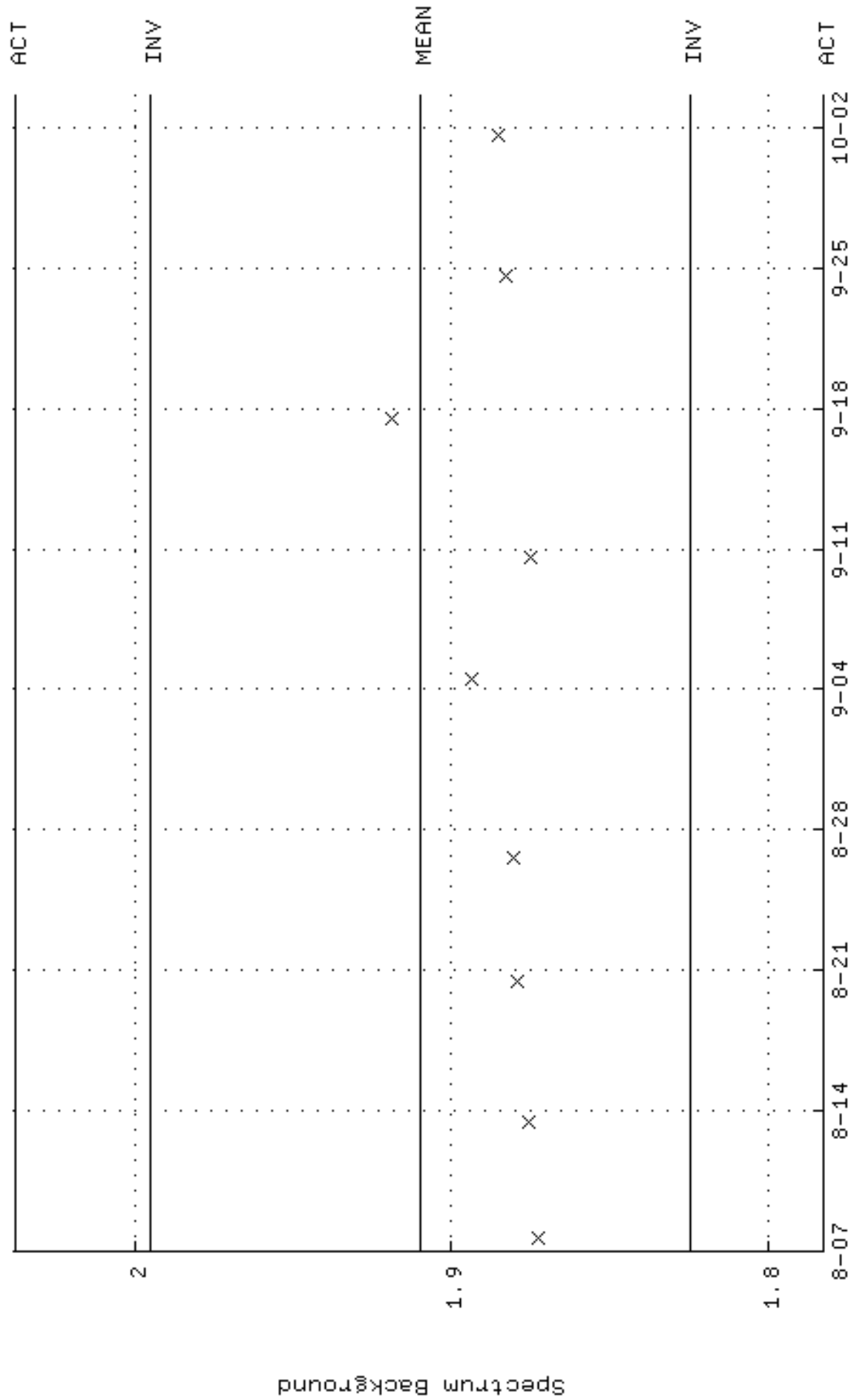


QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM19\_CAN\_QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 05:09:52 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 62330.0 +- 1676.56 (2.69 %)

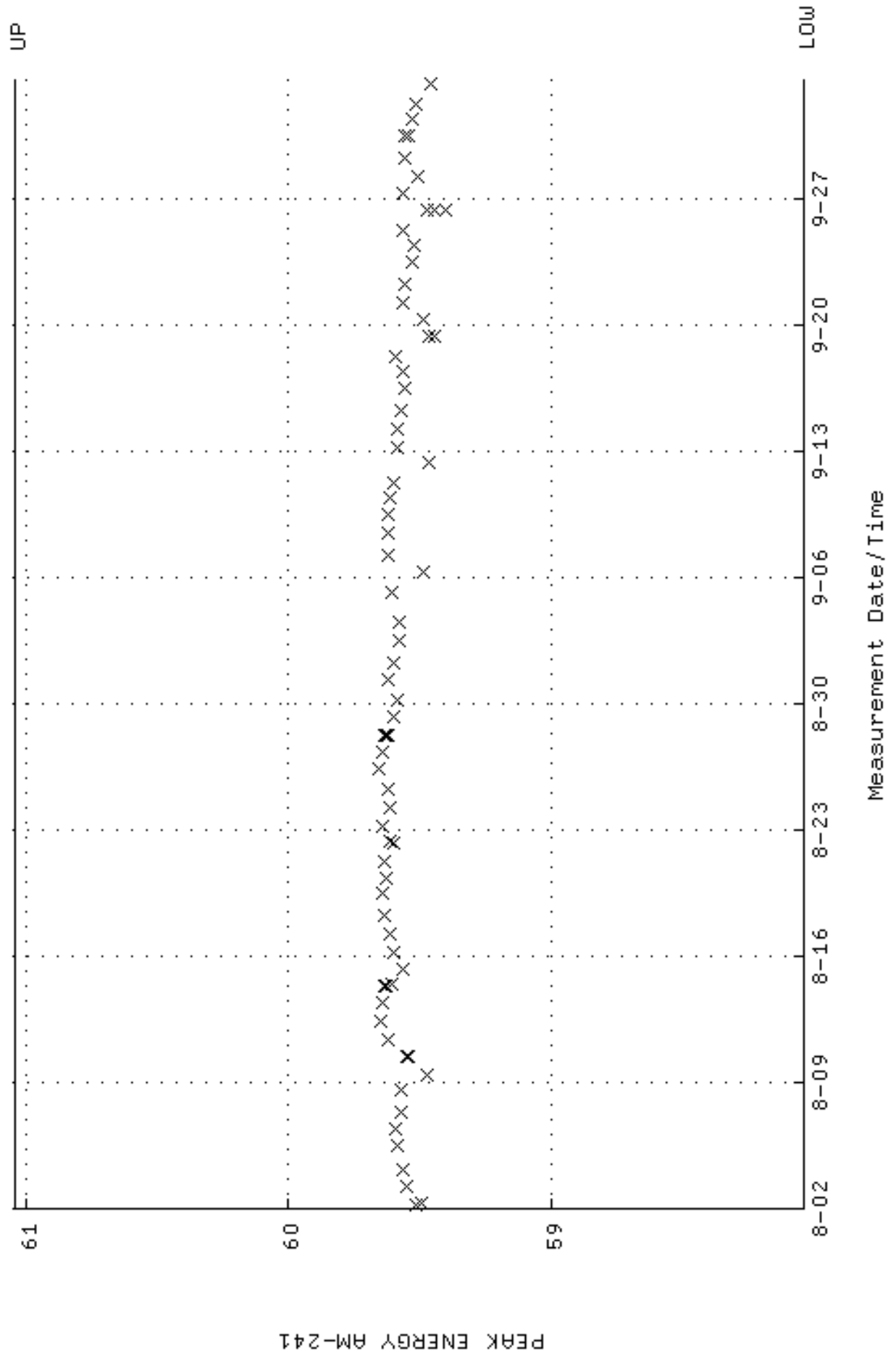


Measurement Date/Time

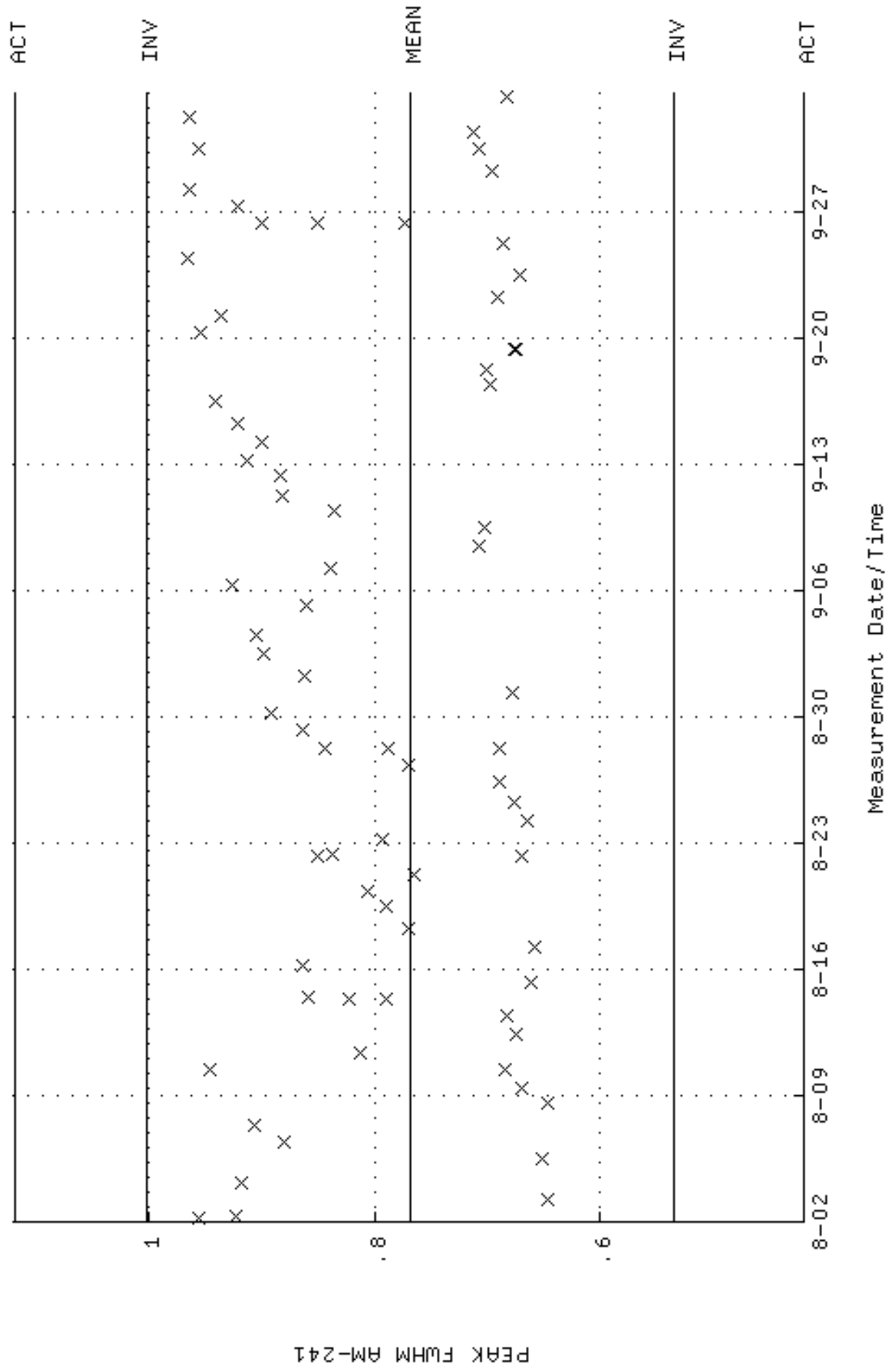
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM19.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:32 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.91013 +- 4.261043E-02 (2.23 %)



QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM21\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 04:55:08 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

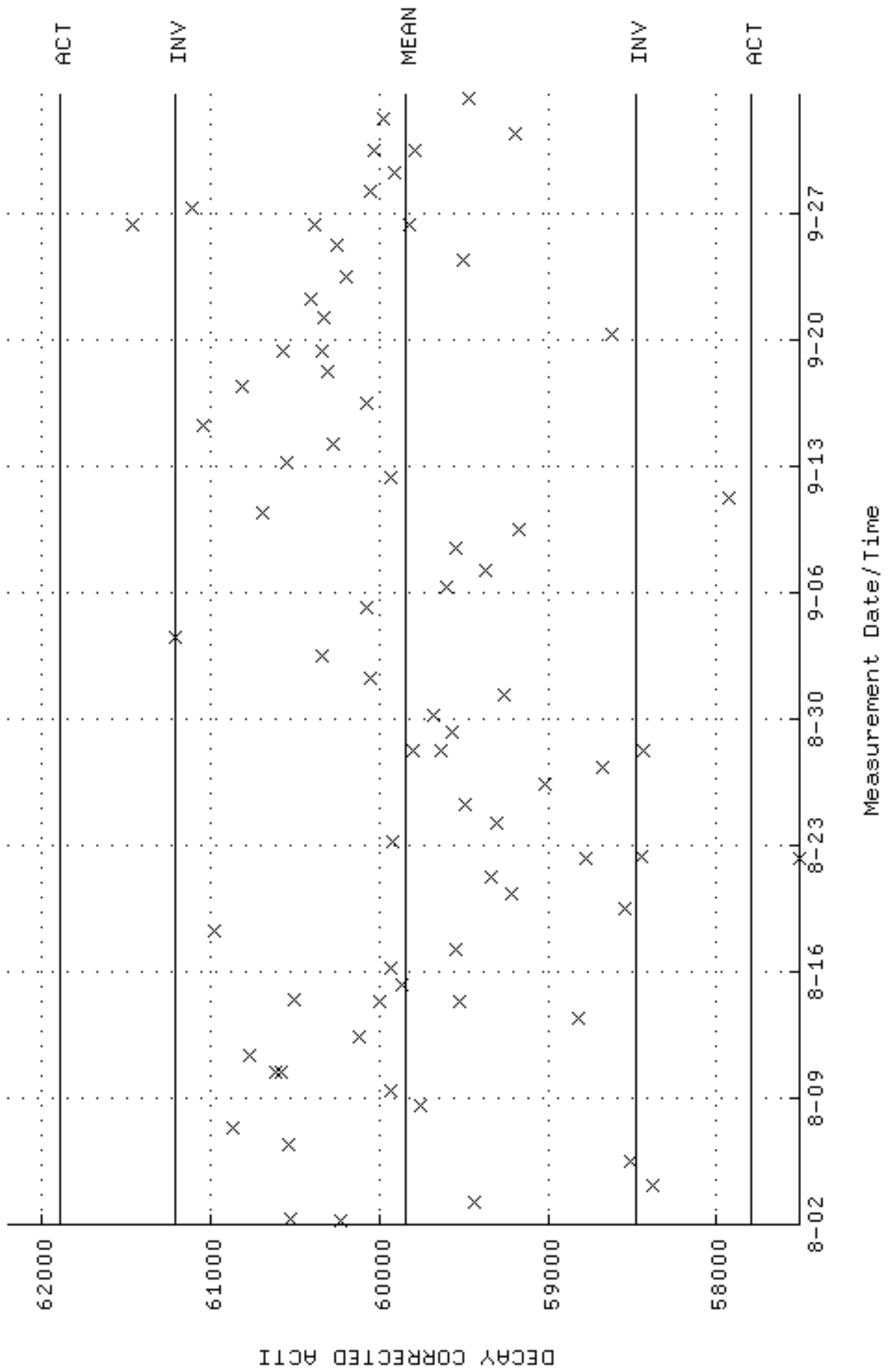


QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM21\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 04:55:08 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.769359 +- 0.116623 (15.16 %)

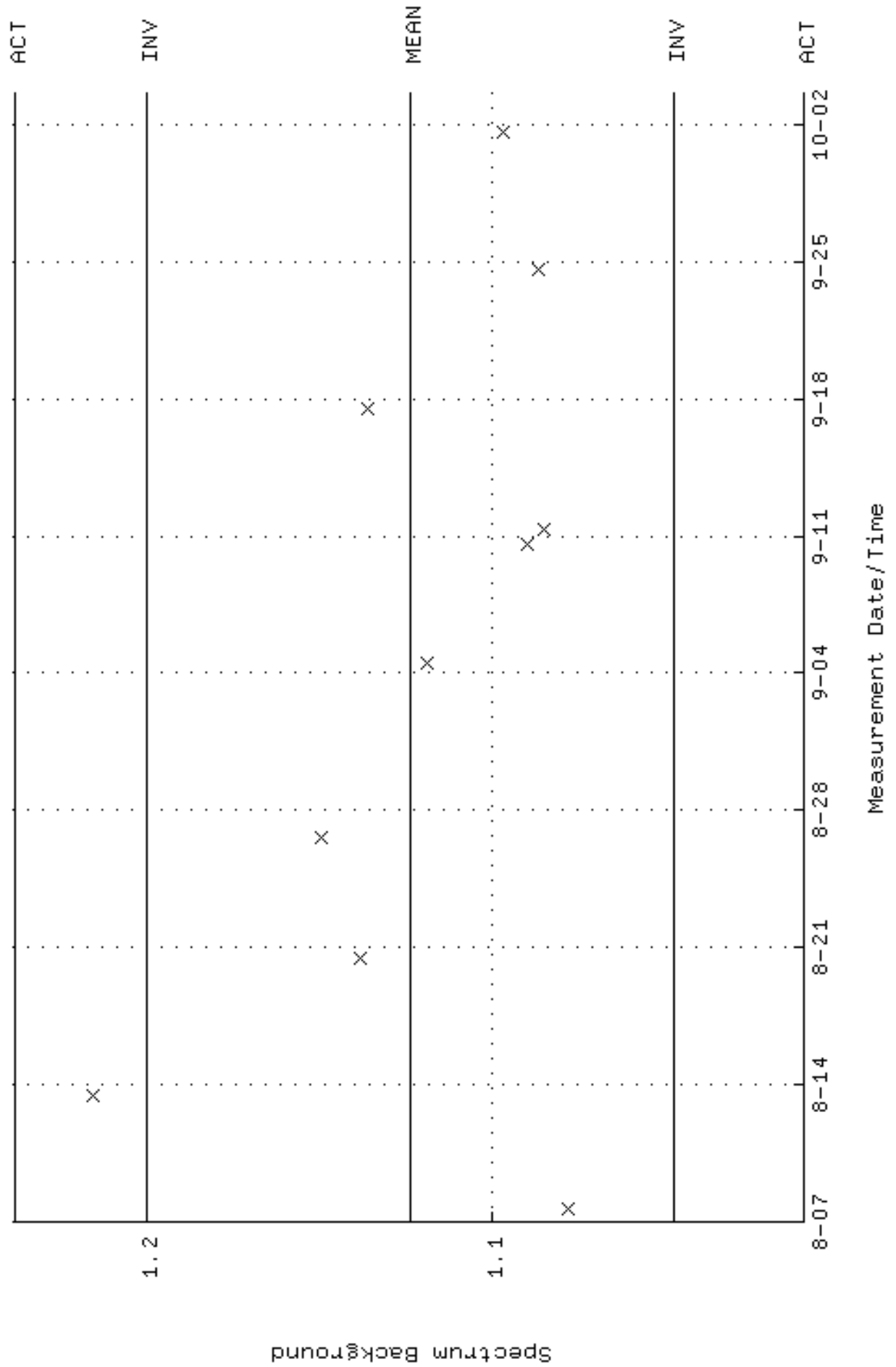




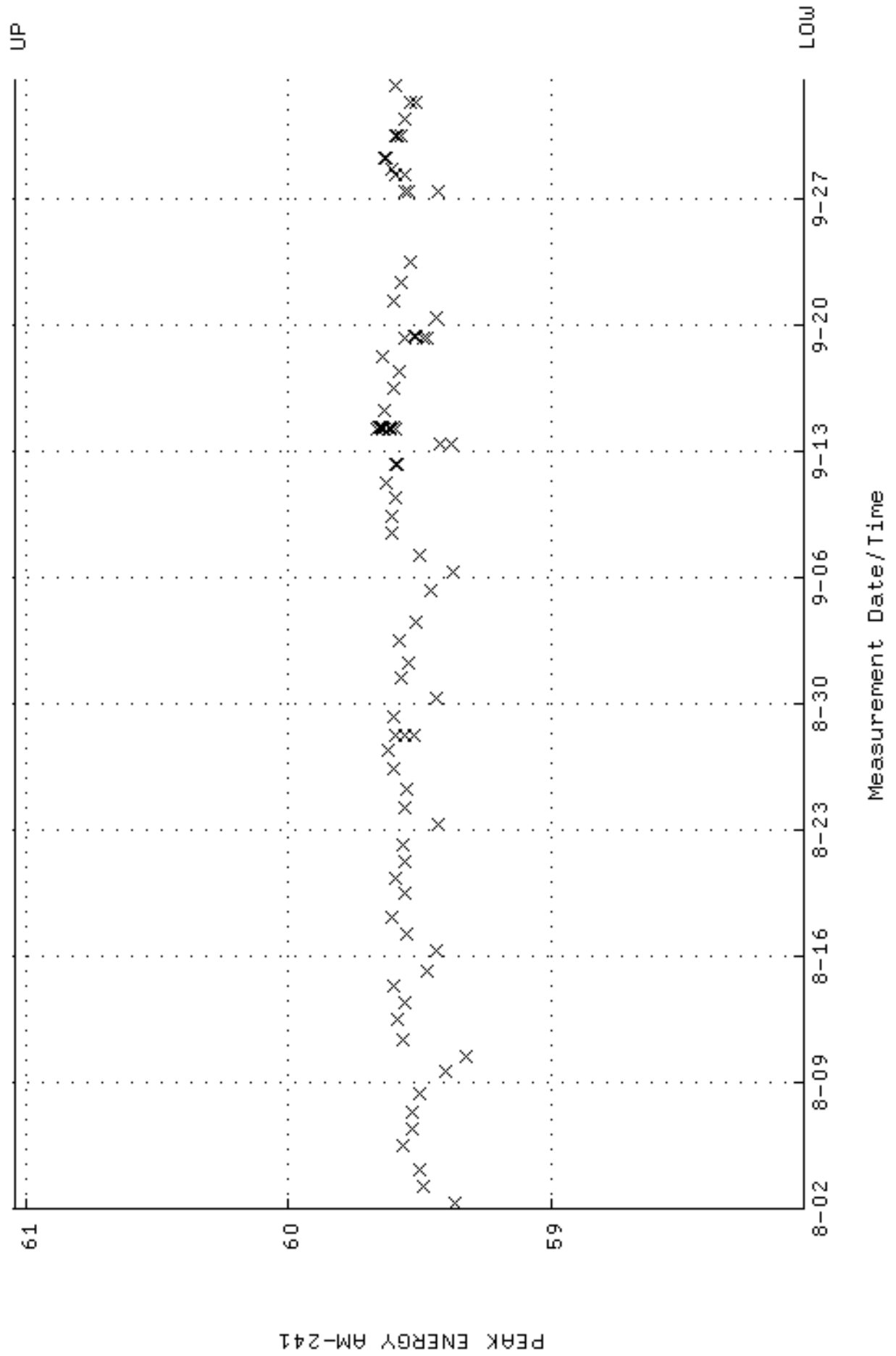
QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM21\_CAN.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 04:55:08 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 59847.2 +- 681.106 (1.14 %)



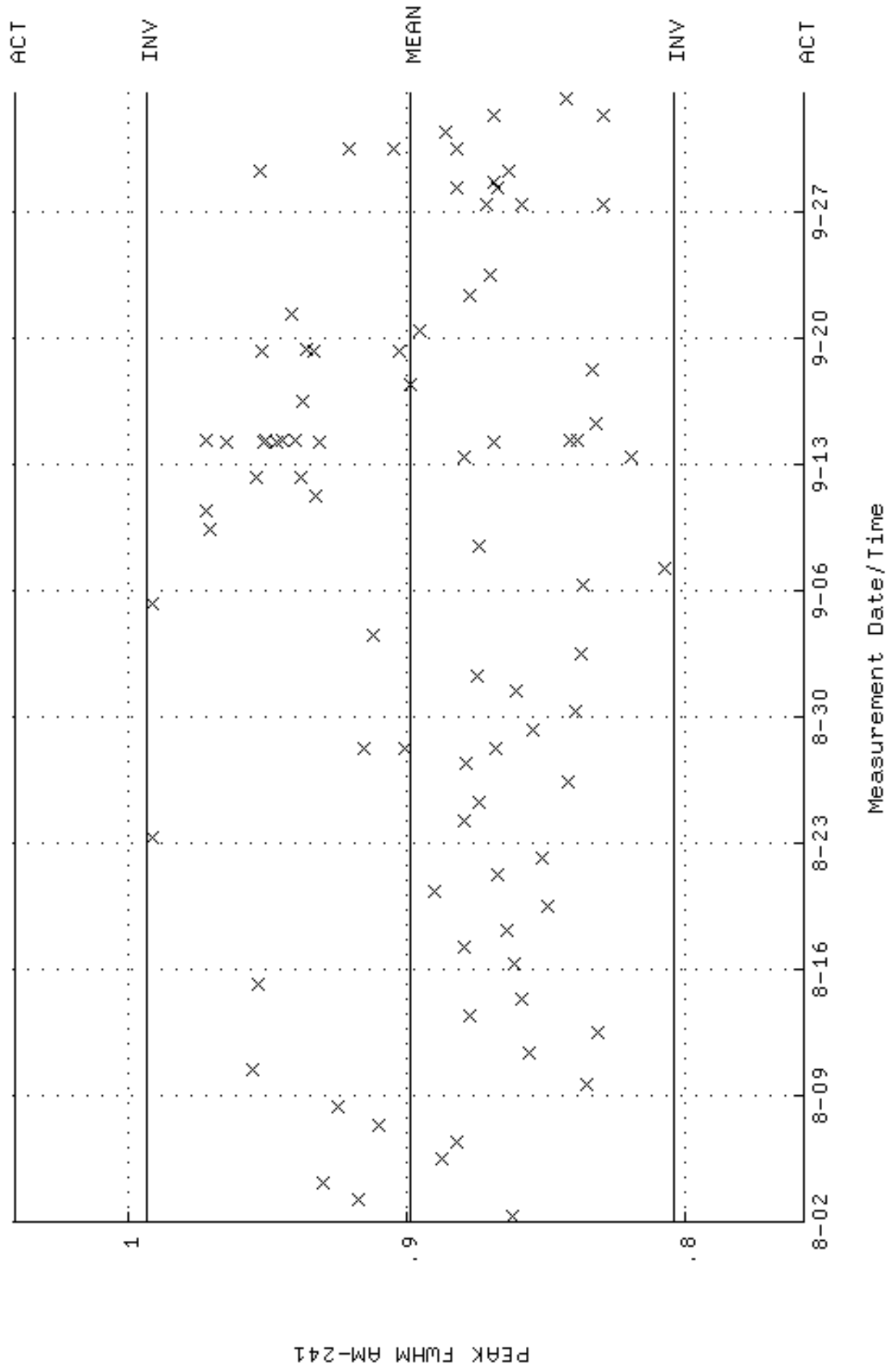
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM21.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:38 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.12399 +- 3.808060E-02 (3.39 %)



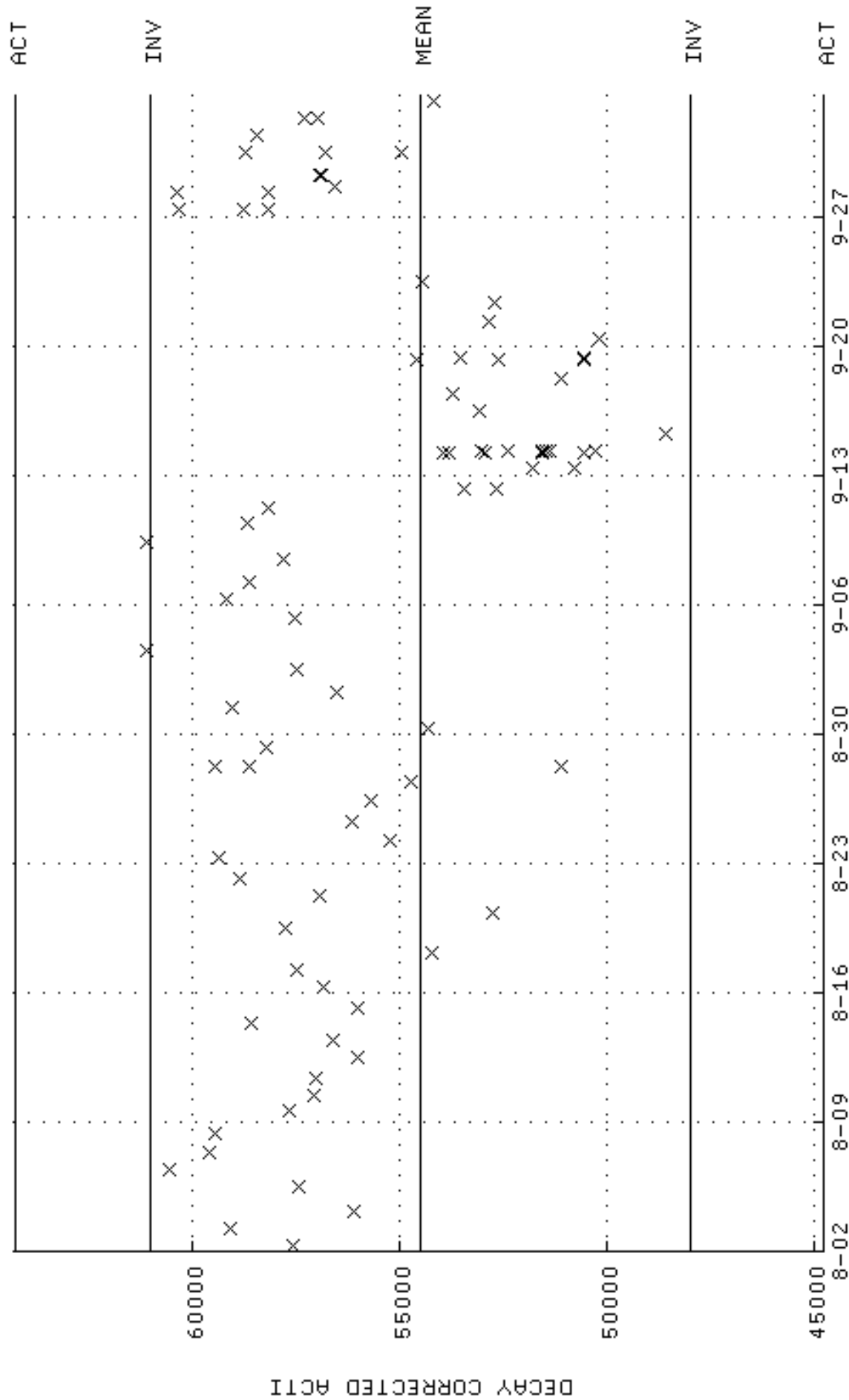
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM23\_CAN\_QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:21:25 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



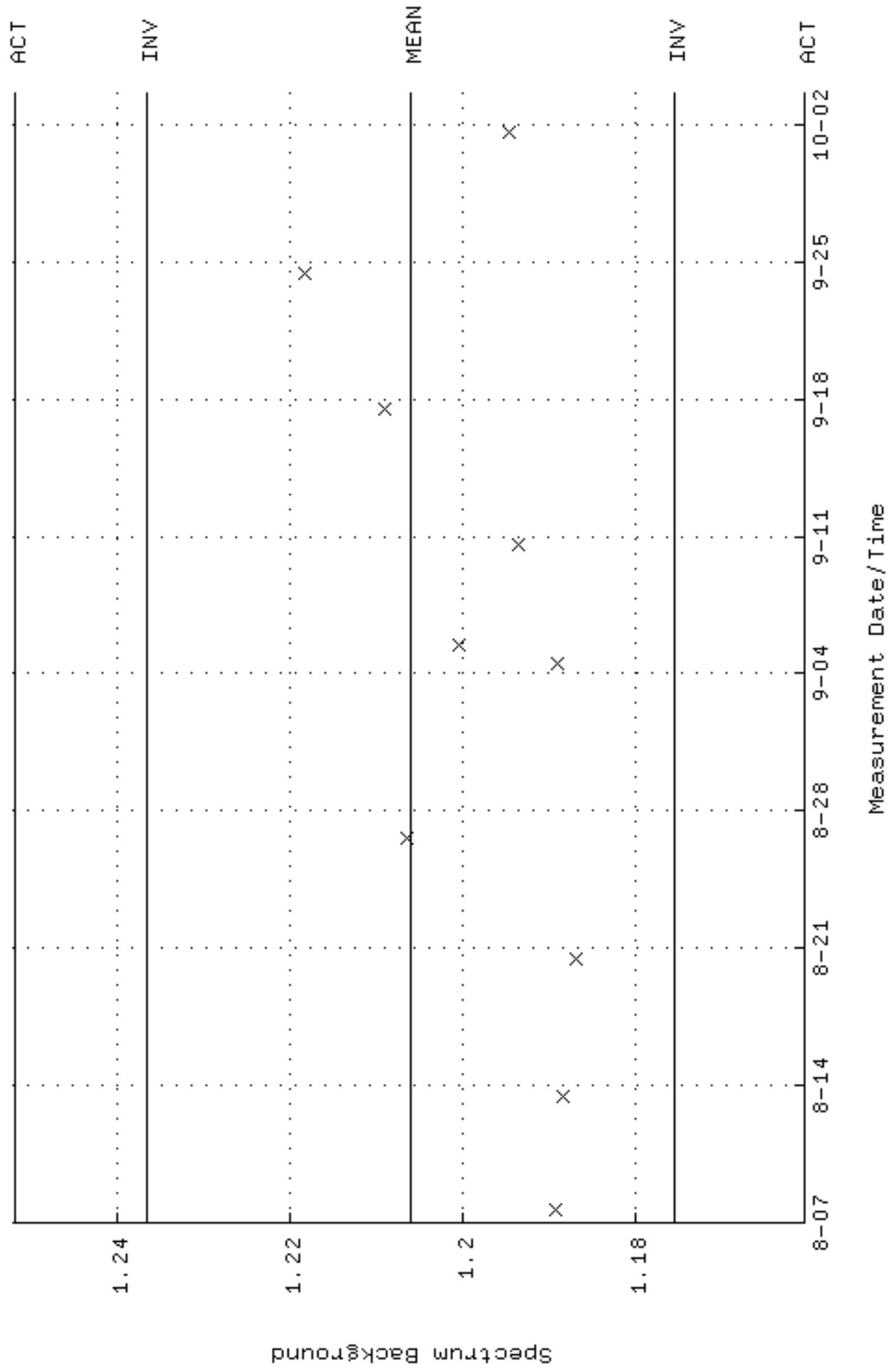
QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM23\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:21:25 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.899069 +- 4.712121E-02 (5.24 %)



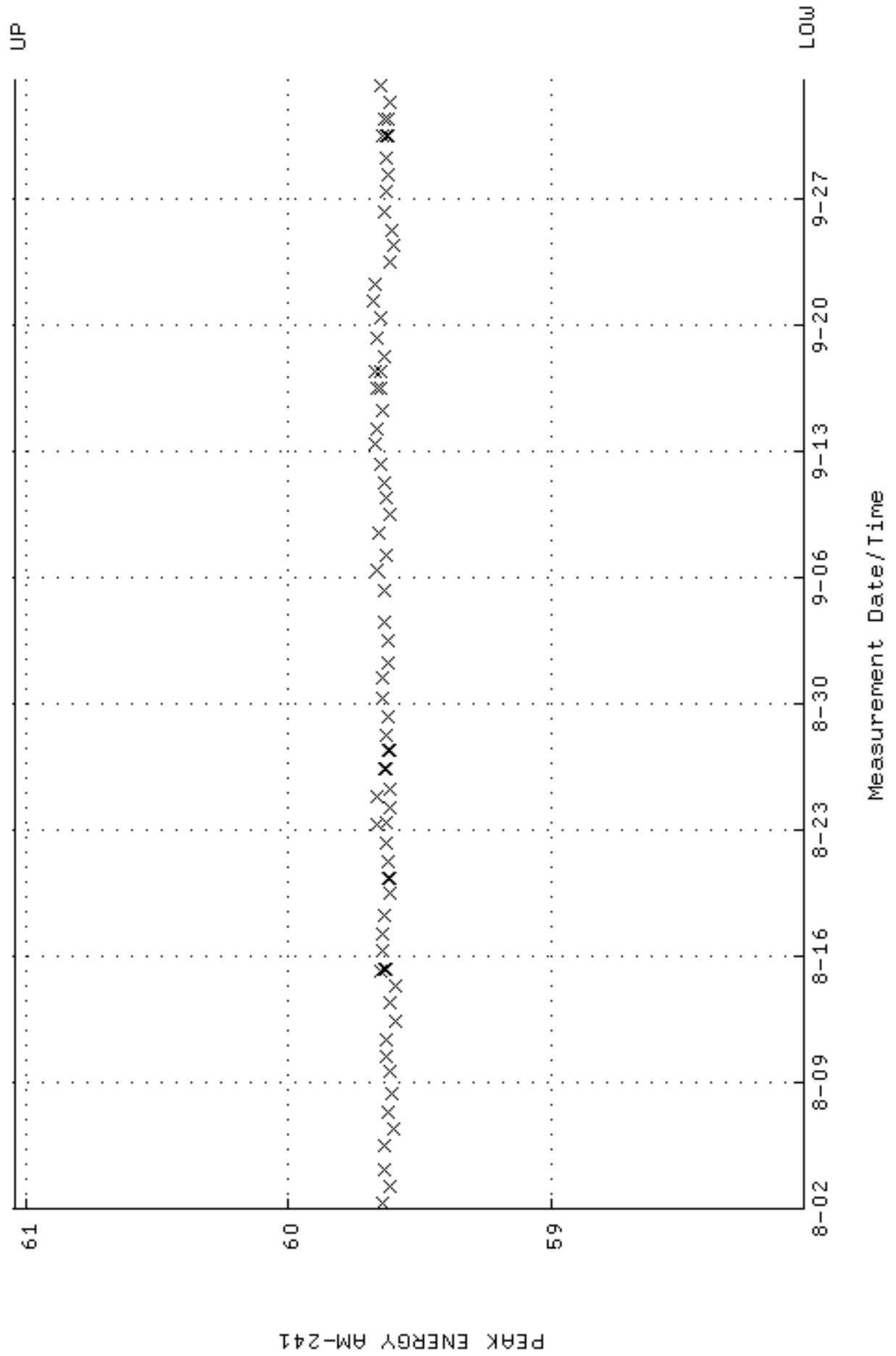
QA filename : DKA100:[CANSBERRA,GAMMA,SCUSR,QA]QCC\_GAM23\_CAN.QAF;1  
 Parameter Name : NLAIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:21:25 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 54516.2 +- 3247.69 (5.96 %)



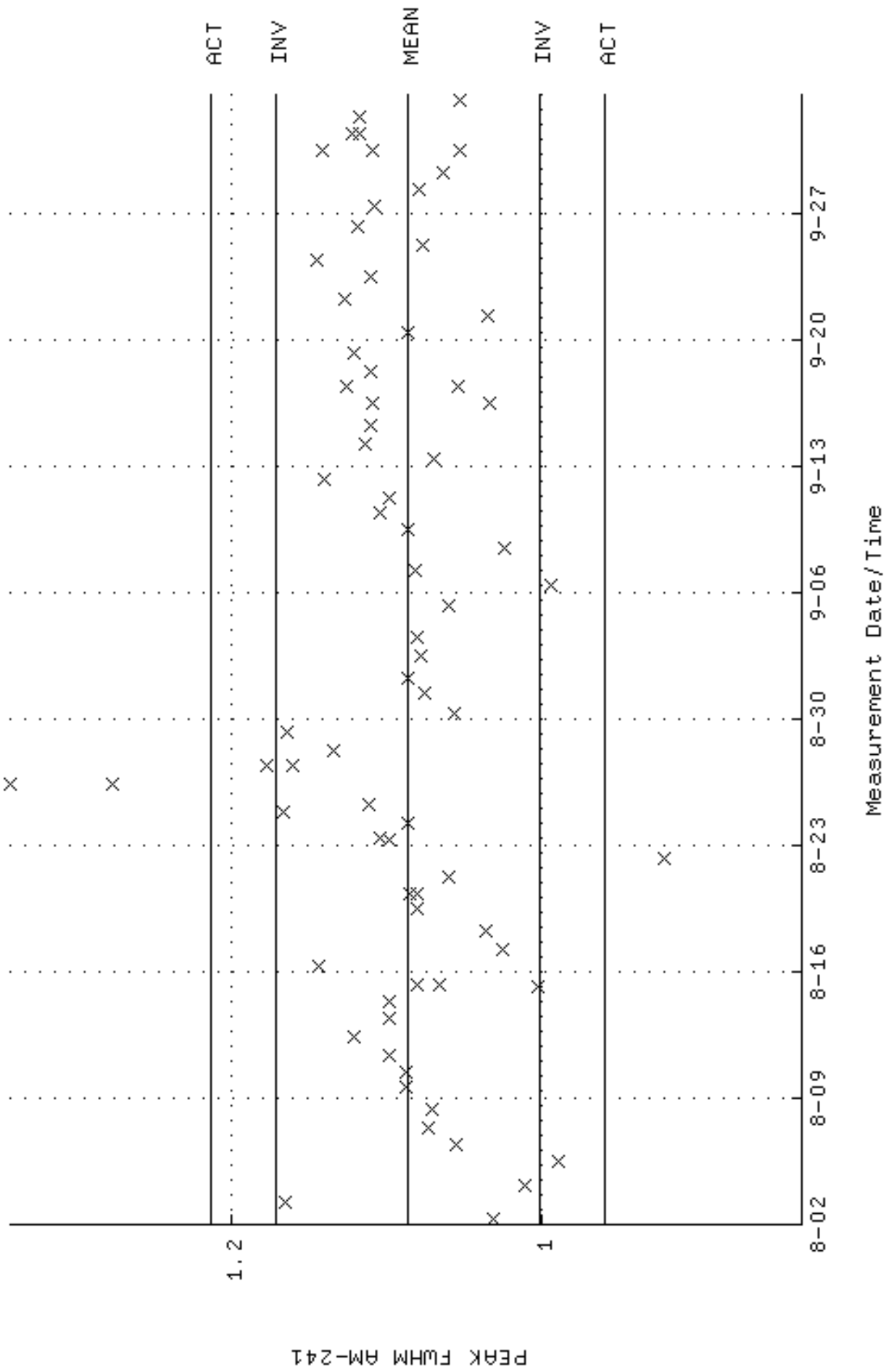
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM23.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:34:43 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.20621 +- 1.524024E-02 (1.26 %)



QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM46\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-AUG-2023 08:10:59 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400

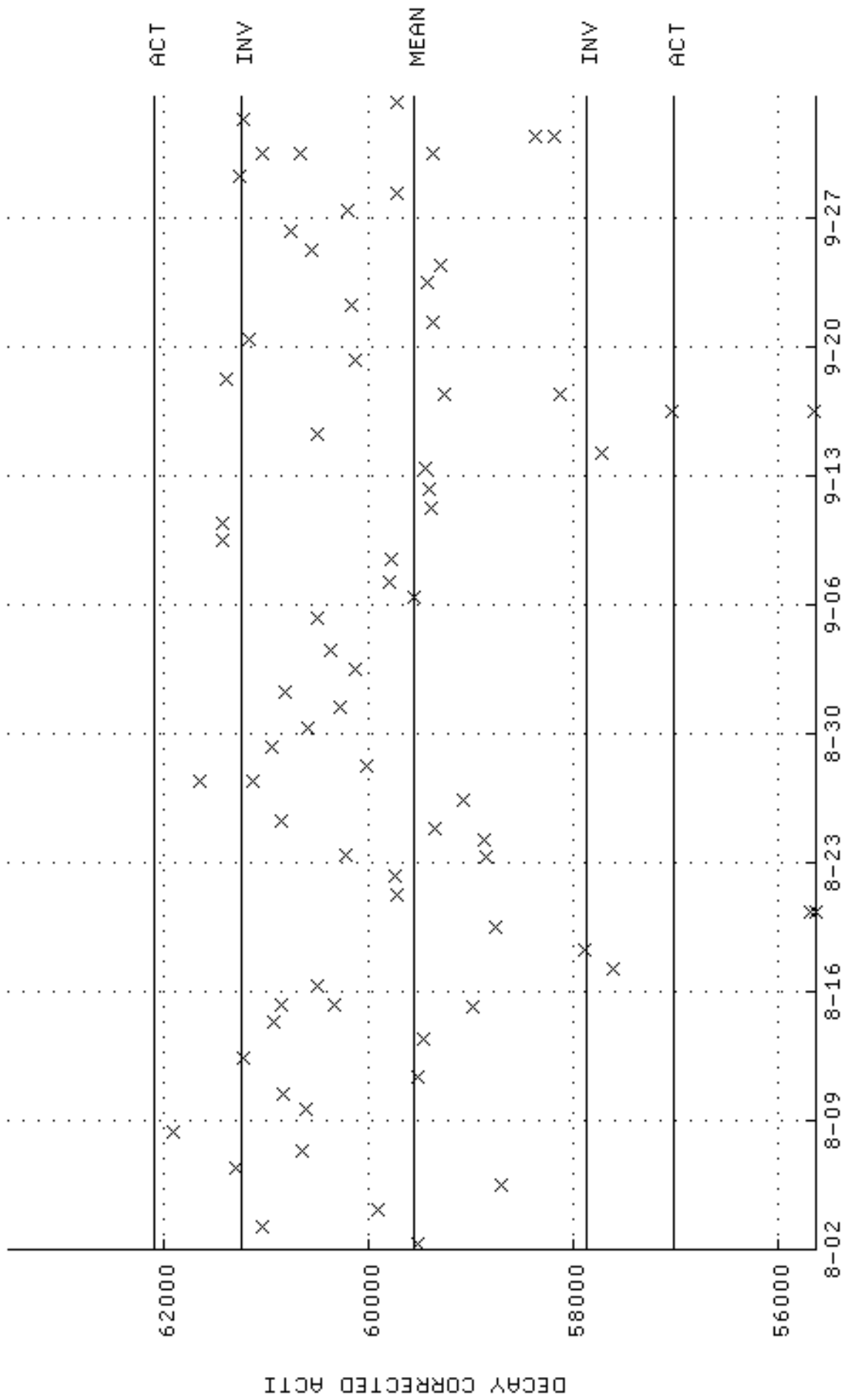


QA filename : DKA100:[CANTERRA,GAMMA,SCUSR,QA]QCC\_GAM46\_CAN.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 2-AUG-2023 08:10:59 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.08649 +- 4.221695E-02 (3.89 %)



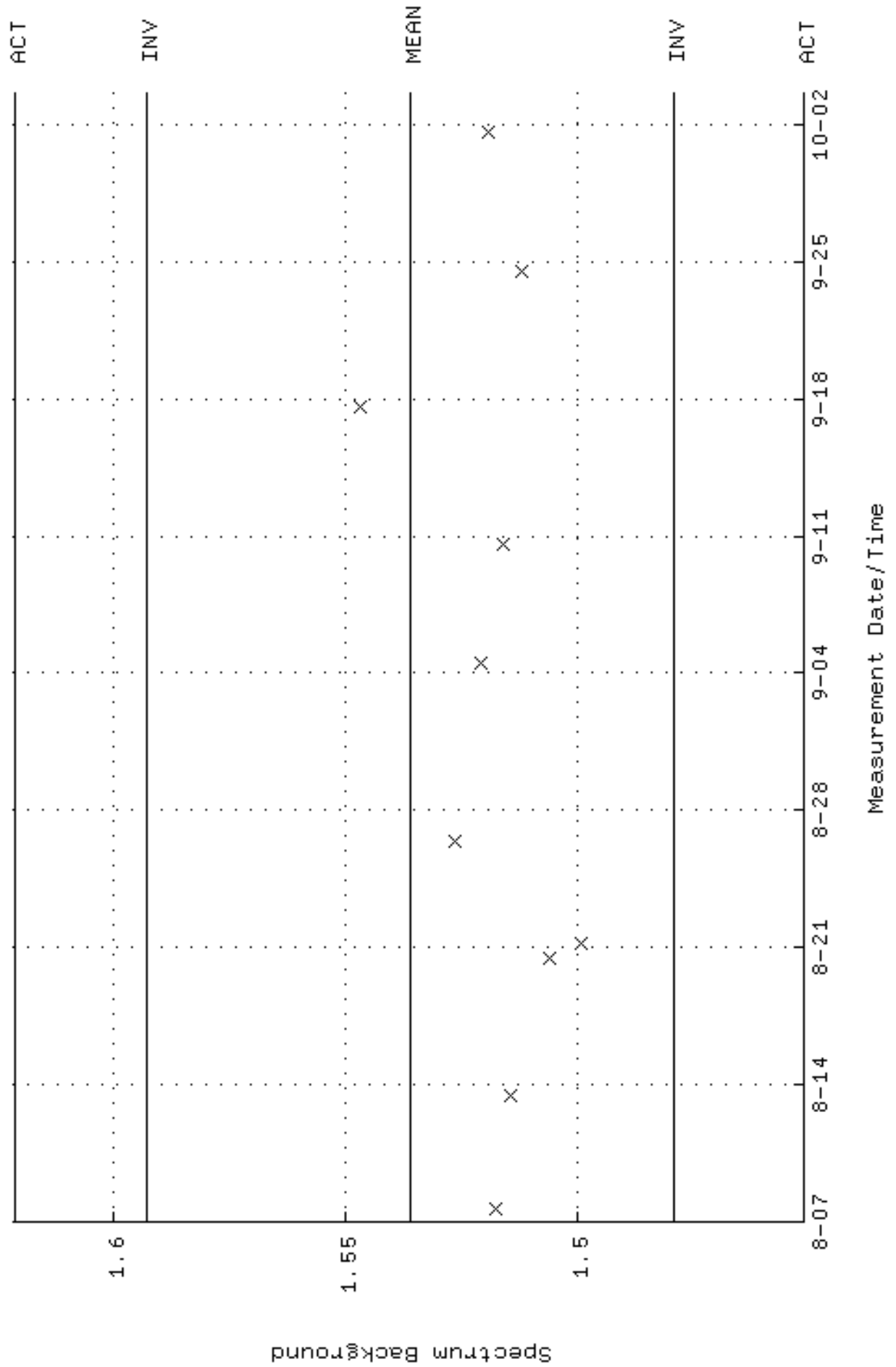


QA filename : DKA100:[CAMBERRA,GAMMA,SCUSR,QA]QCC\_GAM46\_CAN.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-AUG-2023 08:10:59 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 59564.0 +- 843.762 (1.42 %)

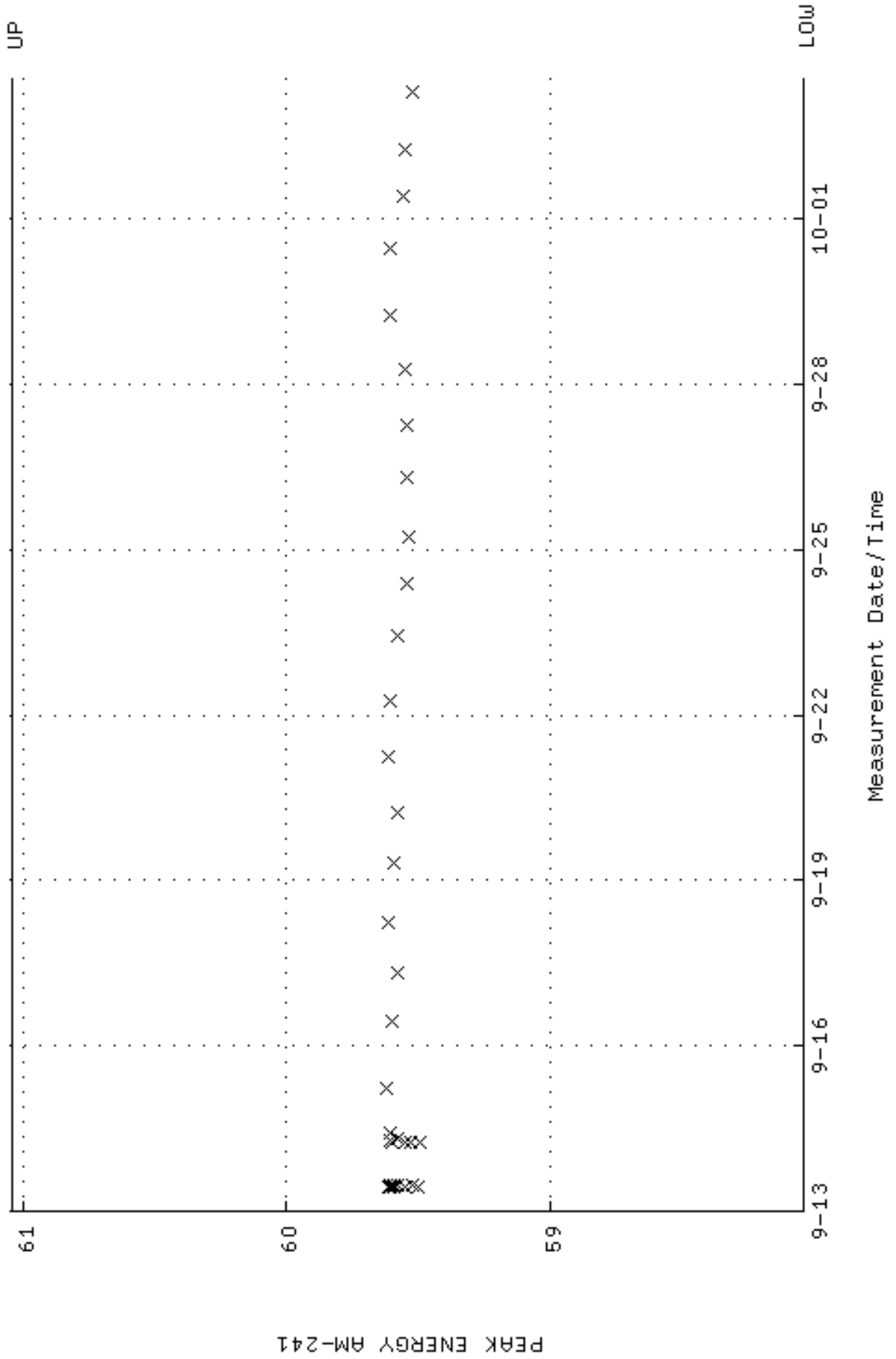


Measurement Date/Time

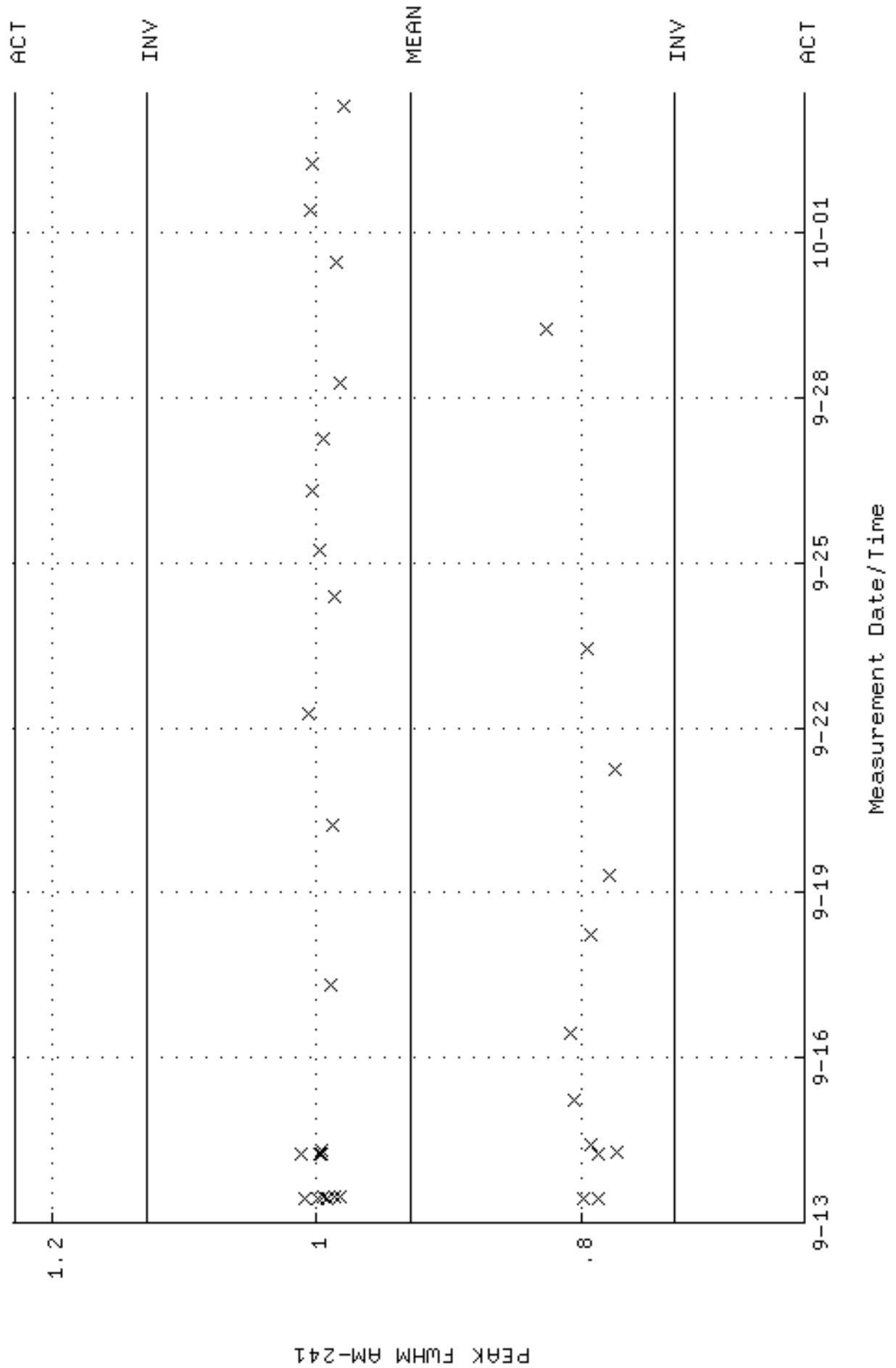
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]LBC\_GAM46.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 7-AUG-2023 15:35:19 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.53619 +- 2.830773E-02 (1.84 %)



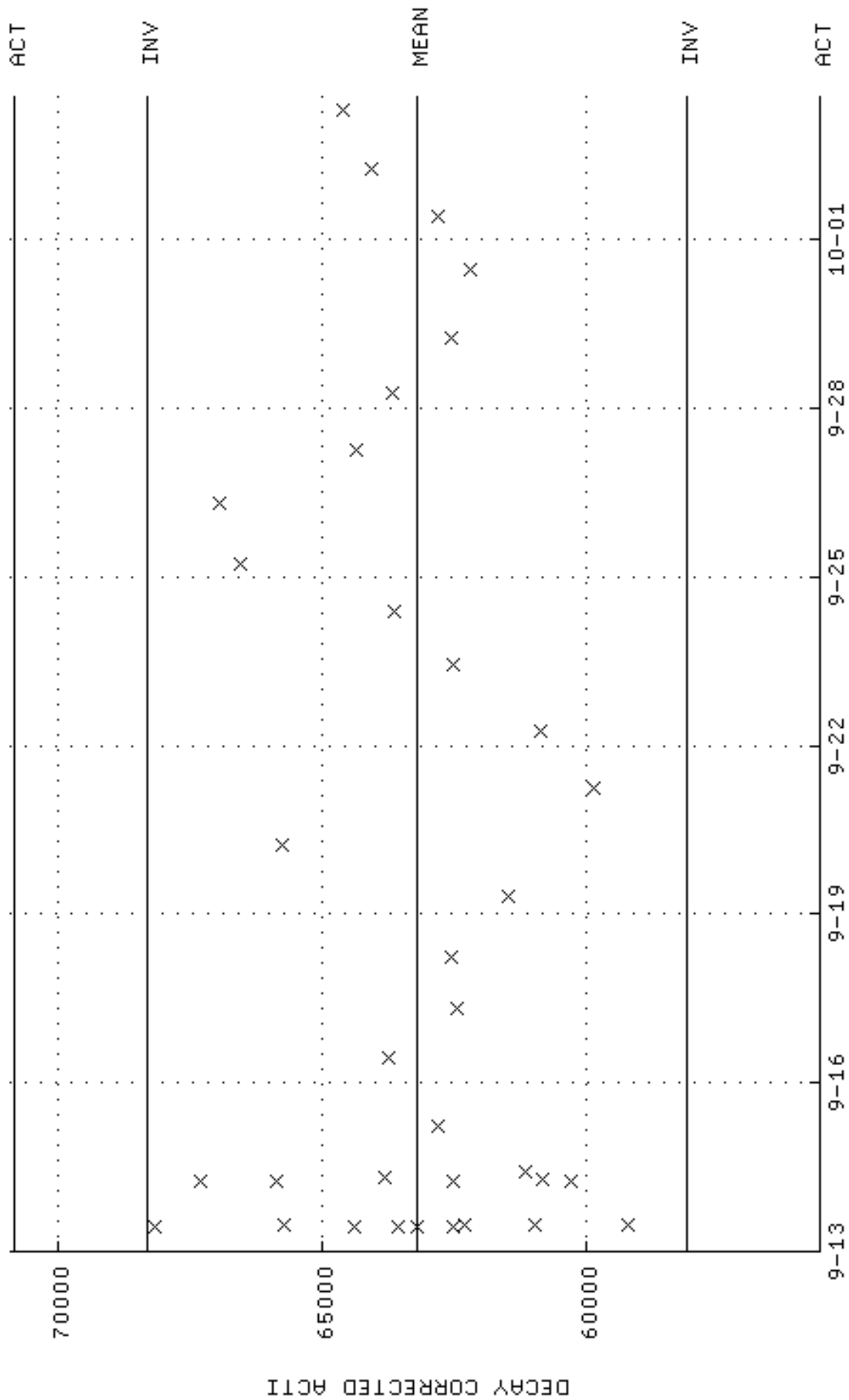
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM52\_400JAR.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 13-SEP-2023 10:13:57 through 3-OCT-2023 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



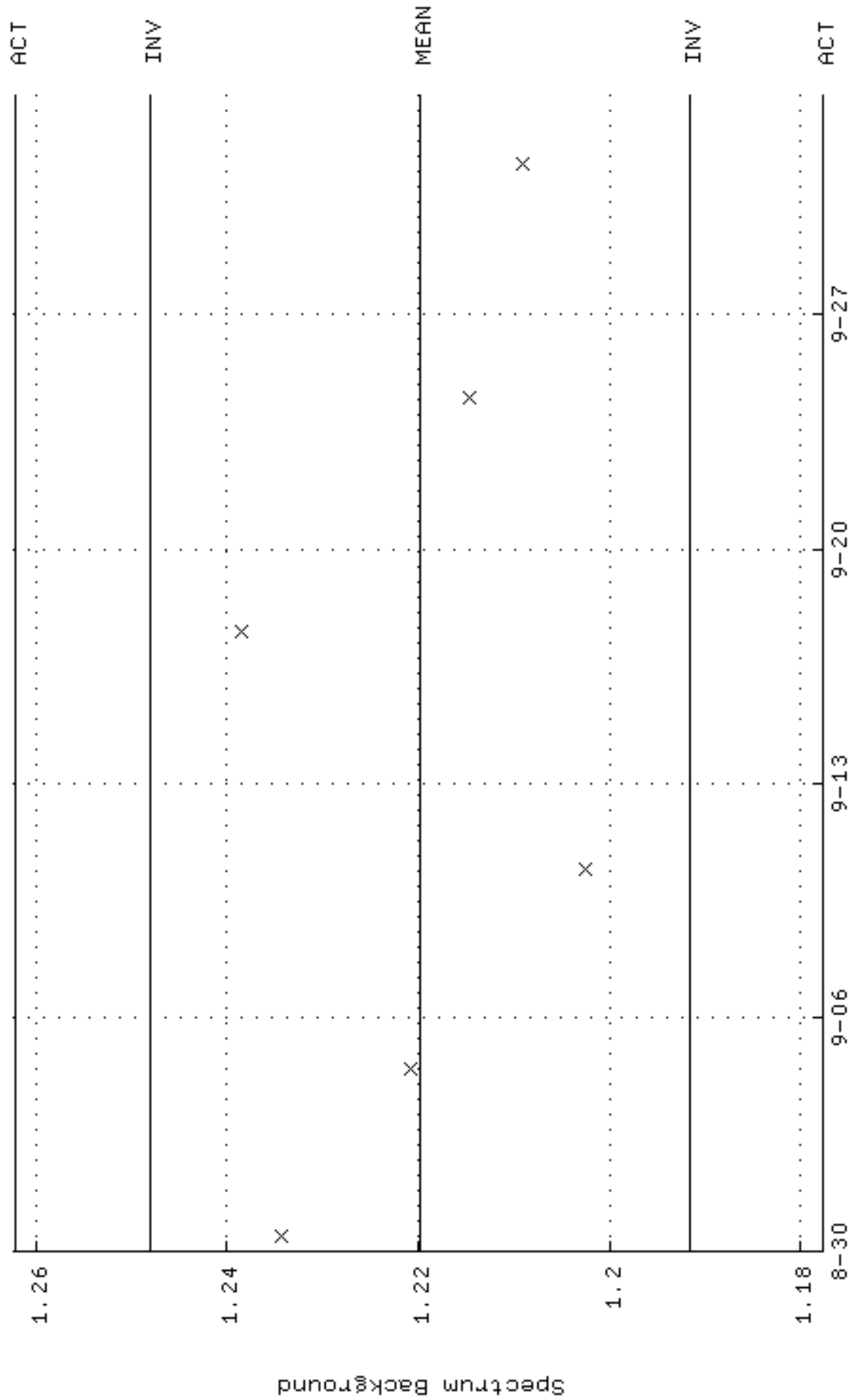
QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM52\_400JAR.QAF;1  
 Parameter Name : PSFWM-59 (PEAK FWHM AM-241)  
 Start/End Dates : 13-SEP-2023 10:13:57 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 0.929940 +- 9.916964E-02 (10.66 %)



QA filename : DKA100:[CANBERRA,GAMMA,SCUSR,QA]QCC\_GAM52\_400JAR.QAF;1  
 Parameter Name : NACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 13-SEP-2023 10:13:57 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 63224.7 +- 2544.67 (4.02 %)



QA filename : DKA100:[CANSBERRA.GAMMA.SCUSR.QA]LBC\_GAM52.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 30-AUG-2023 10:51:25 through 3-OCT-2023 12:00:00  
 Mean +- Std Dev : 1.21991 +- 1.406411E-02 (1.15 %)



# **RAD Standards Traceability**

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

1556

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* $\mu\text{ps}/\text{gram}$	This Source $\mu\text{ps}$	Uncertainty, %			Calibration Method
					$u_A$	$u_B$	U	
Pb-210	46.5	8.120E+03	—	1.129E+03	0.1	2.1	4.1	4 $\pi$ LS
Am-241	59.5	1.580E+05	—	7.538E+02	0.1	1.7	3.5	4 $\pi$ 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:** 4 $\pi$  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)



RC-S-060-101



This standard will expire one year after the reference date.

Source Prepared by: M. Williford  
M. Williford, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alternate

Date: 6/27/11



# 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  
7/14/2011

Isotope	Pb-210	Result	
Mixed Gamma N1		pCi/L	0.0425
Mixed Gamma N2		pCi/L	1129
Mixed Gamma N3		pCi/L	

Isotopic Abundance:  
Certificate Value (dps):

Mean Value (Counting) = 100.622 Pass  
Stdev = 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

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

*Handwritten:*  
11/20/11  
11/20/11  
H. Stamp

**Verification for Mixed Gamma Standard 1556 CAN**

Michael Hilton  
7/14/2011

Isotope	Result	Isotopic Abundance:
Am-241	pCi/L	Certificate Value (dps):
Mixed Gamma N1	58390	0.359
Mixed Gamma N2	60740	753.8
Mixed Gamma N3	57770	

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**

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

*Handwritten notes:*  
 "1201"  
 "1201"  
 "1201"  
 "1201"

CAN

1556

### Verification for Mixed Gamma Standard

Michael Hilton  
7/14/2011

Isotope	Result
Cd-109	pCi/L
Mixed Gamma N1	818400
Mixed Gamma N2	798000
Mixed Gamma N3	764700

Isotopic Abundance:  
Certificate Value (dps):

0.037
1103

Mean Value (Counting) = 98.51091      Pass  
 Sidev = pCi/L      Rule 3 (Pass/Fail)

Certificate Value = 805697.6      pCi/L  
 Lower Limit = 799485.9797      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

*Handwritten:*  
 msh  
 7/20/11  
 M. Hilton  
 7/20/11

#### Verification Rules

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

**Verification for Mixed Gamma Standard      1556      CAN**

Michael Hilton  
7/14/2011

**Isotope**  
Co-57  
Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

**Result**  
pCi/L  
19090  
18820  
18830

Isotopic Abundance:  
Certificate Value (dps):  
0.856  
595.1

Mean Value (Counting) = 18913.33      **100.6592**      **Pass**  
 Stdev = 153.080      **Rule 3 (Pass/Fail)**

Certificate Value = 18789.5  
 Lower Limit = 18607.17433  
 Upper Limit = 19219.49233  
 Rule 1 Pass/Fail **Pass**  
 Two sigma = 306.1590001  
 10 % of Mean = 1891.333333  
 Rule 2 (Pass/Fail) **Pass**

*Handwritten:*  
 7/20/11  
 Mustamp  
 7/20/11

**Verification Rules**

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result
Ce-139	pCi/L
Mixed Gamma N1	28740
Mixed Gamma N2	29410
Mixed Gamma N3	27560

Isotopic Abundance: 0.8  
Certificate Value (dps): 829.2

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

*msgr  
7/20/11*

*Stamp  
7/20/11*

Verification Rules

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Hg-203  
Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L  
66300  
68180  
64480

Isotopic Abundance:  
Certificate Value (dps):  
0.8156  
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

Verification Rules

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

*Handwritten notes:*  
might fail  
V. Stanev  
7/20/11



**Verification for Mixed Gamma Standard 1556 CAN**

Michael Hilton  
7/14/2011

<b>Isotope</b>	<b>Result</b>
Sn-113	pCi/L
Mixed Gamma N1	49560
Mixed Gamma N2	49620
Mixed Gamma N3	48300

Isotopic Abundance: 0.6497  
Certificate Value (dps): 1156

Mean Value (Counting) = 49160.00 pCi/L 102.2277 Pass  
Sidev = 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

*Handwritten:* maha 7/20/11  
Hoffman 7/20/11

**Verification Rules**

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton 7/14/2011	Isotope Cs-137	Result pCi/L	Isotopic Abundance: Certificate Value (dps):
Mixed Gamma N1	23710	0.851	
Mixed Gamma N2	23950	736.1	
Mixed Gamma N3	24040		
Mean Value (Counting) =	23900.00	pCi/L	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		

msc  
7/20/11

Postamp  
7/20/11

Verification Rules

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

**Verification for Mixed Gamma Standard 1556 CAN**

Michael Hilton  
7/14/2011

Isotope  
Y-88 (898)  
Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L  
82690  
81320  
80940

Isotopic Abundance:  
Certificate Value (dps):  
0.937  
2824

Mean Value (Counting) = 81650.00  
Sidev = 920.489  
100.2381  
Pass  
Rule 3 (Pass/Fail)

Certificate Value = 81456.1  
Lower Limit = 79809.022  
Upper Limit = 83490.978  
Rule 1 Pass/Fail Pass  
Two sigma = 1840.978001  
10 % of Mean = 8165  
Rule 2 (Pass/Fail) Pass

*mean  
7/20/11*

*Hoffman  
7/20/11*

**Verification Rules**

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Co-60 (1173)  
Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L  
38910  
39750  
38840

Isotopic Abundance:  
Certificate Value (dps):  
0.9985  
1408

Mean Value (Counting) = 39166.67 pCi/L 102.7694 Pass  
 Stdev = 506.392 pCi/L Rule 3 (Pass/Fall)

Certificate Value = 38111.2 pCi/L  
 Lower Limit = 38153.88173 pCi/L  
 Upper Limit = 40179.45161 pCi/L  
 Rule 1 Pass/Fall Fall  
 Two sigma = 1012.784939  
 10 % of Mean = 3916.666667  
 Rule 2 (Pass/Fall) Pass

\*exception taken due to full recovery of standard

*missed  
-1/20/11*

*Postamp  
7/20/11*

Verification Rules

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result
Co-60 (1332.50)	pCi/L
Mixed Gamma N1	38940
Mixed Gamma N2	40200
Mixed Gamma N3	39150

Isotopic Abundance:  
Certificate Value (dps):  
0.9998  
1408

Mean Value (Counting) = 103.595 Pass  
Stdev = Rule 3 (Pass/Fall)

Certificate Value = 38061.7 pCi/L  
Lower Limit = 38079.88889 pCi/L  
Upper Limit = 40780.11111 pCi/L  
Rule 1 Pass/Fall Fall  
Two sigma = 1350.111107  
10 % of Mean = 3943  
Rule 2 (Pass/Fall) Pass

\*exception taken due to full recovery of standard

*Handwritten:* 7/20/11  
Pass Stamp  
7/20/11

Verification Rules

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- Rule 3 = The determined mean value shall be within 5% of the certificate value.

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Y-88 (1836.1)

Result  
pCi/L

Mixed Gamma N1 82870  
Mixed Gamma N2 83080  
Mixed Gamma N3 84640

Isotopic Abundance:  
Certificate Value (dps):  
0.992  
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 Fall  
Two sigma = 1934.011375  
10 % of Mean = 8353  
Rule 2 (Pass/Fail) Pass

*mgh  
7/20/11*

*Hilton  
7/20/11*

\*exception taken due to full recovery of standard

Verification Rules

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

# 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		

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# Runlogs



# Instrument Run Log

Instrument Type: **GAMMA SPECTROMETER**

Batch ID: **2505440**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
640278001	SAMPLE	MXR1	GAM04	OCT-30-23 08:52:37	DONE CAN		02-DEC-22 00:00
640278002	SAMPLE	MXR1	GAM06	OCT-30-23 08:53:06	DONE CAN		25-SEP-23 00:00
640278003	SAMPLE	MXR1	GAM08	OCT-30-23 08:53:34	DONE CAN		08-FEB-23 00:00
640278004	SAMPLE	MXR1	GAM52	OCT-30-23 08:54:00	DONE CAN		01-SEP-23 00:00
1205540617	LCS	MXR1	GAM46	OCT-30-23 09:12:55	DONE CAN		26-SEP-23 00:00
640278005	SAMPLE	MXR1	GAM02	OCT-30-23 09:45:37	DONE CAN		13-SEP-23 00:00
640278006	SAMPLE	MXR1	GAM03	OCT-30-23 09:46:02	DONE CAN		04-OCT-23 00:00
640278007	SAMPLE	MXR1	GAM05	OCT-30-23 09:46:36	DONE CAN		16-AUG-23 00:00
640278008	SAMPLE	MXR1	GAM11	OCT-30-23 09:47:14	DONE CAN		21-AUG-23 00:00
640278009	SAMPLE	MXR1	GAM16	OCT-30-23 09:47:46	DONE CAN		09-NOV-22 00:00
640278010	SAMPLE	MXR1	GAM19	OCT-30-23 09:48:55	DONE CAN		05-DEC-22 00:00
1205540615	MB	MXR1	GAM21	OCT-30-23 09:50:05	DONE CAN		03-JUL-23 00:00
1205540616	DUP	MXR1	GAM23	OCT-30-23 11:35:03	DONE CAN		06-SEP-23 00:00

# **Kensington Expressway Preliminary Boring Report**

## **Sample Addendum**

Prepared For:

Geotechnical Exploration and Sampling  
PIN 5512.52 – Kensington Expressway, NYS Route 33  
City of Buffalo, Erie County  
LaBella Project No. 2230860



3636 N. Buffalo Road  
Orchard Park, New York 14127

Prepared By:



15 Hazelwood Dr., Suite 112  
Amherst, NY, 14228

MJW Project No. 23.2036

## Addendum

This addendum provides additional data analysis for samples collected for the Kensington Expressway Project. MJW collected an additional sample (FH-X-36, Table 1) from a boring not included in the original work. Further details regarding fieldwork and the project can be found in MJW's Kensington Expressway Preliminary Boring Report (23.2021).

## Sample Data Results

A total of one (1) sample was sent for analysis at GEL Laboratories. Observations and descriptions of the material by MJW staff presented no concerns regarding radiological contamination. The sample was analyzed using DOE HASL-300, 4.5.2.3/Ga-01-R for broad gamma spectroscopy and DOE EML HASL-300, U-02-RC Modified and DOE EML HASL-300, Th-01-RC Modified for alpha spectroscopy of isotopic thorium and uranium.

The laboratory analysis results presented no issues with QA/QC. All samples, duplicates, spikes, and method blanks returned acceptable results.

GEL Laboratories provides qualifiers based on the relationship between the reported result and the minimum detectable concentration (based upon analysis parameters), qualified results indicate a failure to positively identify the radioisotope in the sample. Only non-qualified sample results were utilized in this analysis.

The non-qualified data was reviewed for the isotopes Radium-226 and Radium-228. There were no results that indicated concentrations above typical background soil concentrations for the WNY area. The GEL Labs results for the soil sample analyzed for this site are shown in Table 1 below. Table 2 presents the data from the initial report amended to include the additional sample identified above.

<b>Table 1. Kensington Soil Sample Data for Ra-226</b>		
<b>Sample Number</b>	<b>[Ra-226] pCi/g</b>	<b>UNC ±</b>
FH-X-36	1.18	0.185
FH-X-36(648193001DUP)	0.907	0.229
Method Blank	-0.0157	0.0676
Average Concentration	1.04	.207

<b>Table 2. Complete Kensington Soil Sample Data for Ra-226</b>		
<b>Sample Number</b>	<b>[Ra-226] pCi/g</b>	<b>UNC ±</b>
<b>SDG: 640278</b>		
20230906-FH-X-27-1-3	1.04	0.259
20230906-FH-X-27-3-5	0.187	0.125
20230907-FH-X-23e-1-3	1.64	0.24
20230907-FH-X-23e-3-5	1.18	0.209
20230911-FH-X-34c-1-3	2.28	0.277
20230911-FH-X-34c-3-5	2.37	0.273
20230911-FH-X-32c-1-3	1.44	0.188
20230911-FH-X-32c-3-5	1.36	0.192
20230913-FH-X-07e-1-3	0.846	0.183
20230913-FH-X-07e-3-5	1.09	0.194
20230906-FH-X-27-1-3(640278001DUP)	1.12	0.206
<i>Method Blank</i>	<i>-0.0104</i>	<i>0.0384</i>
<b>SDG: 648193</b>		
FH-X-36	1.18	0.185
FH-X-36(648193001DUP)	0.907	0.229
<i>Method Blank</i>	<i>-0.0157</i>	<i>0.0676</i>
Average Concentration	1.18	0.20



a member of The GEL Group INC



2040 Savage Road | Charleston, SC 29407  
843.556.8171

gel.com

January 03, 2024

Alex Bartels  
MJW Technical Services  
15 Hazelwood Drive  
Suite 112  
Amherst, New York 14228

Re: Kensington  
Work Order: 648193

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 08, 2023. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

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,

Adrian Melendrez for  
Jacob Crook  
Project Manager

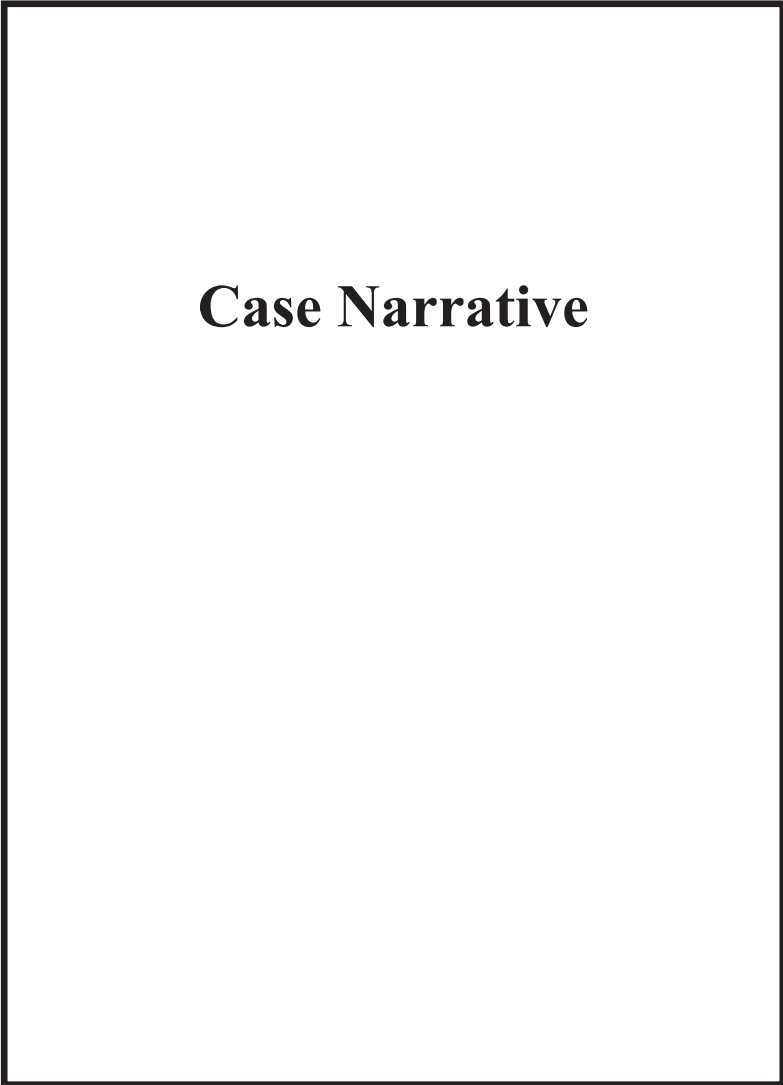
Purchase Order: GELP22-1492  
Enclosures

problem solved

**MJW Technical Services  
Kensington  
SDG: 648193**

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**Case Narrative  
for  
MJW Technical Services  
SDG: 648193**

**January 03, 2024**

**Laboratory Identification:**

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

**Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on December 08, 2023 for analysis. The sample was 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 sample:

<b>Laboratory ID</b>	<b>Client ID</b>
648193001	FH-X-36

**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.



Adrian Melendrez for  
Jacob Crook  
Project Manager

**List of current GEL Certifications as of 03 January 2024**

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
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	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (A133904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122024-05
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-23-21
Utah NELAP	SC000122023-38
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

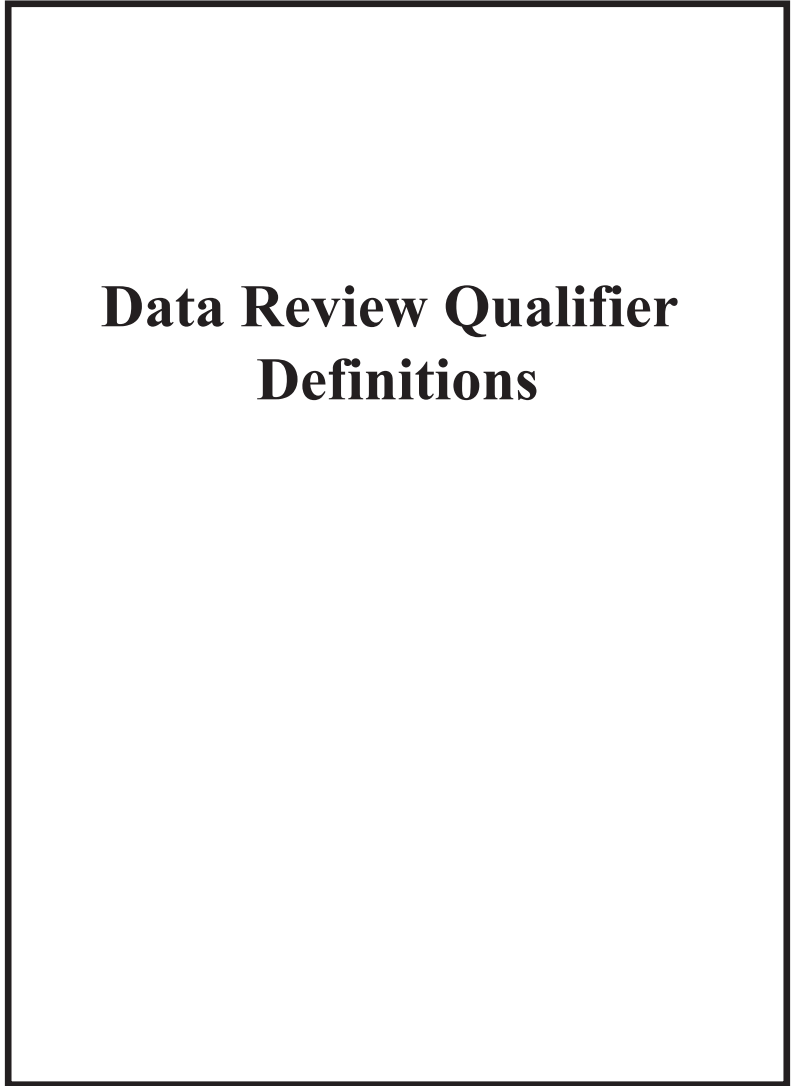




SAMPLE RECEIPT & REVIEW FORM

Client: <u>MSWC</u>		SDG/AR/COC/Work Order: <u>648193</u>	
Received By: <u>GG</u>		Date Received: <u>12/8/23</u>	
Carrier and Tracking Number:		FedEx Express <input checked="" type="checkbox"/> FedEx Ground <input checked="" type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <input type="checkbox"/>	
		<u>7743 4208 6424 18°C</u>	
Suspected Hazard Information	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: <u>UN31</u> If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___	
Did the client designate the samples to be received as radioactive?	<input checked="" type="checkbox"/>	COC contains or radioactive stickers on containers equal client designation	
Did the RSO classify the samples as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> (PM) (AM) (RH) Classified as: Rad 1 Rad 2 Rad 3	
Did the client designate samples as hazardous?	<input checked="" type="checkbox"/>	COC contains or hazard labels on containers equal client designation	
Did the RSO identify possible hazards?	<input checked="" type="checkbox"/>	If D or E is yes, select hazards below. FCBs Flammable Foreign Soil RCRA Asbestos Beryllium Other:	
Sample Receipt Criteria		Comments/Qualifiers (Required for Non-Conforming Items)	
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	Circle Applicable: Clean container and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?	<input checked="" type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry Ice None Other: <u>None</u> *All temperatures are recorded in Celsius TEMP: _____
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>81123</u> Secondary Temperature Device Serial # (if Applicable):
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: If Prescriptions added, List: If Yes, are Encores or Soil Kits present for seals? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer) Are liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (if unknown, select No) Are liquid VOA vials free of headspace? Yes ___ No ___ NA ___ Sample ID's and containers affected:
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	ID's and tests affected:
8	Samples received within holding time?	<input checked="" type="checkbox"/>	ID's and containers affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	Circle Applicable: No date on container No time on container COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	<input checked="" type="checkbox"/>	
13	COC form is properly signed in following/received section?	<input checked="" type="checkbox"/>	Circle Applicable: Not re/imprinted Other (describe)
Comments (Use Conclusion Form if needed): <u>7743 4208 6424 18°C</u> <u>7743 8673 9744 18°C</u>			

PM (or PMA) review: Initials AM Date 12/11/23 Page 1 of 1



# 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  
SDG #: 648193**

**Product:** Alphaspec U, Solid  
**Analytical Method:** DOE EML HASL-300, U-02-RC Modified  
**Analytical Procedure:** GL-RAD-A-011 REV# 28  
**Analytical Batch:** 2542340

**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 25  
**Preparation Batch:** 2537917

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
648193001	FH-X-36
1205604851	Method Blank (MB)
1205604852	Laboratory Control Sample (LCS)
1205604853	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on a "dry weight" 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:** Alphaspec Th, Solid  
**Analytical Method:** DOE EML HASL-300, Th-01-RC Modified  
**Analytical Procedure:** GL-RAD-A-038 REV# 18  
**Analytical Batch:** 2542341

**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 25  
**Preparation Batch:** 2537917

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
648193001	FH-X-36
1205604854	Method Blank (MB)
1205604855	Laboratory Control Sample (LCS)
1205604856	Laboratory Control Sample Duplicate (LCSD)

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**

**Duplication Criteria between LCS and LCSD**

The Laboratory Control Sample and Laboratory Control Sample Duplicate, 1205604855 (LCS) and 1205604856 (LCSD), Thorium-230 relative percent difference (RPD) is not applicable as both were spiked with Thorium-232. The Thorium-232 RPD limit meets acceptance criteria.

**Product:** Dry Weight  
**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 25  
**Preparation Batch:** 2537917

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
648193001	FH-X-36

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:** Gammascpec, Gamma, Solid (Standard List)  
**Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R  
**Analytical Procedure:** GL-RAD-A-013 REV# 28  
**Analytical Batch:** 2538164

**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 25  
**Preparation Batch:** 2537917

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
648193001	FH-X-36
1205597564	Method Blank (MB)
1205597565	648193001(FH-X-36) Sample Duplicate (DUP)
1205597566	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**

**Duplication Criteria between QC Sample and Duplicate Sample**

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1205597565 (FH-X-36DUP)	Lead-214 and Radium-226	RPD 26* (0.00%-20.00%) RER 1.66 (0-3)

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to low abundance.	Promethium-144	648193001	FH-X-36

**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.

**Moisture LogBook**

Batch: 2537917  
 Analyst: GG  
 Date/Time: 11-DEC-2023  
 Procedure Code: \_\_PREPD  
 Procedure Description: Dry Soil Prep GL-RAD-A-021  
 Lab Sop: GL-RAD-A-021

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
648193001	SAMPLE		SP- C234673837	10:29	11.85	561.07	520.89	549.22	509.04	7.315
648201001	SAMPLE		SP- C234673837	10:29	11.93	651.26	597.4	639.33	585.47	8.424
648201002	SAMPLE		SP- C234673837	10:29	11.83	387.56	345.08	375.73	333.25	11.305
648201003	SAMPLE		SP- C234673837	10:29	11.91	430.96	382.66	419.05	370.75	11.526
648201004	SAMPLE		SP- C234673837	10:29	12.02	473.91	410.49	461.89	398.47	13.73
648201005	SAMPLE		SP- C234673837	10:29	11.88	468.58	406.08	456.7	394.2	13.685
648201006	SAMPLE		SP- C234673837	10:29	11.92	466.13	427.5	454.21	415.58	8.504
648201007	SAMPLE		SP- C234673837	10:29	11.96	434.36	366.06	422.4	354.1	16.169
648201008	SAMPLE		SP- C234673837	10:29	12	430.36	394.86	418.36	382.86	8.485
648202001	SAMPLE		SP- C234673837	10:29	11.96	486.25	429.25	474.29	417.29	12.017
648202002	SAMPLE		SP- C234673837	10:29	11.92	377.62	302.68	365.7	290.76	20.492
648202003	SAMPLE		SP- C234673837	10:29	11.95	403.47	336.15	391.52	324.2	17.194
648202004	SAMPLE		SP- C234673837	10:29	12.01	419.35	374.63	407.34	362.62	10.978
648202005	SAMPLE		SP- C234673837	10:29	12.01	373.61	310.88	361.6	298.87	17.347
648202006	SAMPLE		SP- C234673837	10:29	11.84	411.77	345.25	399.93	333.41	16.632
648202007	SAMPLE		SP- C234673837	10:29	12.1	440.87	411.2	428.77	399.1	6.919
648202008	SAMPLE		SP- C234673837	10:29	11.93	386.84	332.69	374.91	320.76	14.443

**Comments:**

A) Result = (Net Initial - Net Final) / Net Initial \* 100

GEL Laboratories LLC

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

**Qualifier Definition Report  
for**

MJWC001 MJW Technical Services  
Client SDG: 648193 GEL Work Order: 648193

**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
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification

**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: 04 JAN 2024

Title: Analyst III - Data Validator

# 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  
 Amherst, New York 14228  
 Contact: Alex Bartels  
 Project: Kensington

Report Date: January 4, 2024

Client Sample ID: FH-X-36  
 Sample ID: 648193001  
 Matrix: Solid  
 Collect Date: 17-OCT-23  
 Receive Date: 08-DEC-23  
 Collector: Client  
 Moisture: 7.32%

Project: MJWC00923  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>														
Thorium-228	U	0.349	+/-0.651	1.13	+/-0.653	1.00	pCi/g			CM4	12/21/23	1250	2542341	1
Thorium-230		0.955	+/-0.713	0.796	+/-0.733	1.00	pCi/g							
Thorium-232		0.851	+/-0.650	0.647	+/-0.665	1.00	pCi/g							
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>														
Uranium-233/234		0.771	+/-0.422	0.377	+/-0.436	1.00	pCi/g			CM4	12/21/23	1245	2542340	2
Uranium-235/236	U	0.172	+/-0.248	0.299	+/-0.249	1.00	pCi/g							
Uranium-238		0.770	+/-0.410	0.308	+/-0.423	1.00	pCi/g							
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Actinium-228		0.689	+/-0.345	0.251	+/-0.351		pCi/g			SF1	01/02/24	1328	2538164	3
Americium-241	U	0.128	+/-0.253	0.446	+/-0.260		pCi/g							
Antimony-124	U	-0.0250	+/-0.189	0.382	+/-0.189		pCi/g							
Antimony-125	U	-0.00241	+/-0.108	0.197	+/-0.108		pCi/g							
Barium-133	U	0.0127	+/-0.0492	0.0926	+/-0.0495		pCi/g							
Barium-140	U	7.52	+/-8.15	16.5	+/-8.85		pCi/g							
Beryllium-7	U	-0.202	+/-0.697	1.33	+/-0.703		pCi/g							
Bismuth-212		0.981	+/-0.675	0.867	+/-0.681		pCi/g							
Bismuth-214		0.968	+/-0.215	0.104	+/-0.231		pCi/g							
Cerium-139	U	-0.0118	+/-0.0428	0.0792	+/-0.0432		pCi/g							
Cerium-141	U	0.0806	+/-0.246	0.478	+/-0.249		pCi/g							
Cerium-144	U	0.00851	+/-0.235	0.451	+/-0.235		pCi/g							
Cesium-134	U	0.101	+/-0.0611	0.113	+/-0.0768		pCi/g							
Cesium-136	U	-3.29	+/-3.24	4.93	+/-3.58		pCi/g							
Cesium-137	U	-0.0499	+/-0.0392	0.0618	+/-0.0454	0.100	pCi/g							
Chromium-51	U	-0.260	+/-2.09	3.39	+/-2.10		pCi/g							
Cobalt-56	U	0.0174	+/-0.0671	0.137	+/-0.0676		pCi/g							
Cobalt-57	U	-0.0169	+/-0.0293	0.0537	+/-0.0303		pCi/g							
Cobalt-58	U	-0.122	+/-0.0747	0.0986	+/-0.0934		pCi/g							
Cobalt-60	U	-0.0301	+/-0.0241	0.0142	+/-0.0278		pCi/g							
Europium-152	U	0.00170	+/-0.116	0.191	+/-0.116		pCi/g							
Europium-154	U	0.144	+/-0.165	0.305	+/-0.178		pCi/g							
Europium-155	U	0.0491	+/-0.111	0.221	+/-0.113		pCi/g							
Iridium-192	U	0.0805	+/-0.102	0.137	+/-0.109		pCi/g							
Iron-59	U	-0.0930	+/-0.222	0.420	+/-0.227		pCi/g							
Lead-210	U	5.50	+/-8.61	16.6	+/-8.99		pCi/g							
Lead-212		0.815	+/-0.134	0.104	+/-0.153		pCi/g							
Lead-214		1.18	+/-0.185	0.150	+/-0.211		pCi/g							
Manganese-54	U	-0.0341	+/-0.0515	0.0729	+/-0.0538		pCi/g							

*Certificate of Analysis*

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

Report Date: January 4, 2024

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: FH-X-36  
Sample ID: 648193001

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspac, Gamma, Solid (Standard List) "Dry Weight Corrected"</i>														
Mercury-203	U	-0.0996	+/-0.106	0.177	+/-0.115		pCi/g							
Neodymium-147	U	-18.2	+/-33.3	51.8	+/-34.4		pCi/g							
Neptunium-239	U	-0.0916	+/-0.281	0.528	+/-0.284		pCi/g							
Niobium-94	U	0.0208	+/-0.0287	0.0677	+/-0.0302		pCi/g							
Niobium-95	U	-0.0594	+/-0.101	0.176	+/-0.105		pCi/g							
Potassium-40		10.9	+/-1.54	0.614	+/-1.84		pCi/g							
Promethium-144	UI	0.000	+/-0.0571	0.0903	+/-0.0750		pCi/g							
Promethium-146	U	0.0354	+/-0.0425	0.0913	+/-0.0455		pCi/g							
Radium-226		1.18	+/-0.185	0.150	+/-0.211		pCi/g							
Radium-228		0.689	+/-0.345	0.251	+/-0.351		pCi/g							
Ruthenium-106	U	0.0376	+/-0.313	0.571	+/-0.313		pCi/g							
Silver-110m	U	-0.00270	+/-0.0639	0.122	+/-0.0639		pCi/g							
Sodium-22	U	0.0523	+/-0.0602	0.0747	+/-0.0604		pCi/g							
Thallium-208		0.186	+/-0.0761	0.0623	+/-0.0778		pCi/g							
Thorium-234	U	2.84	+/-3.07	3.11	+/-3.15		pCi/g							
Tin-113	U	-0.0482	+/-0.0631	0.104	+/-0.0668		pCi/g							
Uranium-235	U	-0.122	+/-0.222	0.409	+/-0.229		pCi/g							
Uranium-238	U	2.84	+/-3.07	3.11	+/-3.15		pCi/g							
Yttrium-88	U	-0.0230	+/-0.0429	0.0763	+/-0.0442		pCi/g							
Zinc-65	U	0.0992	+/-0.111	0.234	+/-0.120		pCi/g							
Zirconium-95	U	0.108	+/-0.144	0.309	+/-0.153		pCi/g							

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	GG	12/11/23	1029	2537917

**The following Analytical Methods were performed**

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"	2542341	45.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"	2542340	82.3	(15%-125%)

*Certificate of Analysis*

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

Report Date: January 4, 2024

Contact: Alex Bartels  
Project: Kensington

Client Sample ID: FH-X-36  
Sample ID: 648193001

Project: MJWC00923  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Surrogate/Tracer Recovery      Test</b>														
												Batch ID	Recovery%	Acceptable Limits

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



# Quality Control Data

## QC Summary

Report Date: January 4, 2024  
 Page 1 of 13

**Client :** MJW Technical Services  
 15 Hazelwood Drive  
 Suite 112  
 Amherst, New York  
**Contact:** Alex Bartels  
**Workorder:** 648193

Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>Rad Alpha Spec</b>									
Batch	2542340								
QC1205604852	LCS								
Uranium-233/234			21.8	pCi/g				CM4	12/21/2312:45
		Uncert:	+/-2.08						
		TPU:	+/-3.69						
Uranium-235/236			0.794	pCi/g					
		Uncert:	+/-0.468						
		TPU:	+/-0.481						
Uranium-238	19.4		19.8	pCi/g		102	(75%-125%)		
		Uncert:	+/-1.98						
		TPU:	+/-3.40						
QC1205604853	LCSD								
Uranium-233/234			18.1	pCi/g	18.7			CM4	12/21/2312:45
		Uncert:	+/-1.93						
		TPU:	+/-3.21						
Uranium-235/236			1.08	pCi/g	30.9				
		Uncert:	+/-0.548						
		TPU:	+/-0.569						
Uranium-238	19.4		17.6	pCi/g	11.6	90.7	(0%-20%)		
		Uncert:	+/-1.91						
		TPU:	+/-3.14						
QC1205604851	MB								
Uranium-233/234			-0.0210	pCi/g				CM4	12/21/2312:45
		Uncert:	+/-0.180						
		TPU:	+/-0.180						
Uranium-235/236			0.0787	pCi/g					
		Uncert:	+/-0.217						
		TPU:	+/-0.217						
Uranium-238			0.0896	pCi/g					
		Uncert:	+/-0.203						
		TPU:	+/-0.204						
Batch	2542341								
QC1205604855	LCS								
Thorium-228			18.2	pCi/g				CM4	12/21/2312:50
		Uncert:	+/-1.96						
		TPU:	+/-2.98						
Thorium-230			1.83	pCi/g			(75%-125%)		
		Uncert:	+/-0.649						
		TPU:	+/-0.692						
Thorium-232	17.6		17.6	pCi/g		100	(75%-125%)		
		Uncert:	+/-1.92						
		TPU:	+/-2.89						
QC1205604856	LCSD								

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec									
Batch	2542341								
Thorium-228			19.1	pCi/g	4.66			CM4	12/21/2312:50
	Uncert:		+/-2.09						
	TPU:		+/-3.20						
Thorium-230			2.82	pCi/g	42.6*		(0%-20%)		
	Uncert:		+/-0.831						
	TPU:		+/-0.911						
Thorium-232	17.6		21.1	pCi/g	18.3	120	(0%-20%)		
	Uncert:		+/-2.18						
	TPU:		+/-3.46						
QC1205604854 MB									
Thorium-228		U	0.0325	pCi/g				CM4	12/21/2312:50
	Uncert:		+/-0.246						
	TPU:		+/-0.246						
Thorium-230		U	0.378	pCi/g					
	Uncert:		+/-0.340						
	TPU:		+/-0.345						
Thorium-232		U	0.00680	pCi/g					
	Uncert:		+/-0.151						
	TPU:		+/-0.151						
Rad Gamma Spec									
Batch	2538164								
QC1205597565 648193001 DUP									
Actinium-228			0.689	pCi/g	40.2		(0% - 100%)	SF1	01/02/2414:34
	Uncert:		+/-0.345						
	TPU:		+/-0.351						
Americium-241		U	0.128	pCi/g	0			N/A	
	Uncert:		+/-0.253						
	TPU:		+/-0.260						
Antimony-124		U	-0.0250	pCi/g	0			N/A	
	Uncert:		+/-0.189						
	TPU:		+/-0.189						
Antimony-125		U	-0.00241	pCi/g	0			N/A	
	Uncert:		+/-0.108						
	TPU:		+/-0.108						
Barium-133		U	0.0127	pCi/g	0			N/A	
	Uncert:		+/-0.0492						
	TPU:		+/-0.0495						
Barium-140		U	7.52	pCi/g	0			N/A	
	Uncert:		+/-8.15						
	TPU:		+/-8.85						
Beryllium-7		U	-0.202	pCi/g	0			N/A	
	Uncert:		+/-0.697						
	TPU:		+/-0.703						
Bismuth-212		U	0.981	pCi/g	29.5		(0% - 100%)		
	Uncert:		+/-0.675						
	TPU:		+/-0.681						

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch	2538164								
Bismuth-214			0.968	pCi/g	5.81		(0%-20%)		
	Uncert:		+/-0.215						
	TPU:		+/-0.231						
Cerium-139		U	-0.0118	pCi/g	0			N/A	
	Uncert:		+/-0.0428						
	TPU:		+/-0.0432						
Cerium-141		U	0.0806	pCi/g	0			N/A	
	Uncert:		+/-0.246						
	TPU:		+/-0.249						
Cerium-144		U	0.00851	pCi/g	0			N/A	
	Uncert:		+/-0.235						
	TPU:		+/-0.235						
Cesium-134		U	0.101	pCi/g	0			N/A	
	Uncert:		+/-0.0611						
	TPU:		+/-0.0768						
Cesium-136		U	-3.29	pCi/g	0			N/A	
	Uncert:		+/-3.24						
	TPU:		+/-3.58						
Cesium-137		U	-0.0499	pCi/g	0			N/A	
	Uncert:		+/-0.0392						
	TPU:		+/-0.0454						
Chromium-51		U	-0.260	pCi/g	0			N/A	
	Uncert:		+/-2.09						
	TPU:		+/-2.10						
Cobalt-56		U	0.0174	pCi/g	0			N/A	
	Uncert:		+/-0.0671						
	TPU:		+/-0.0676						
Cobalt-57		U	-0.0169	pCi/g	0			N/A	
	Uncert:		+/-0.0293						
	TPU:		+/-0.0303						
Cobalt-58		U	-0.122	pCi/g	0			N/A	
	Uncert:		+/-0.0747						
	TPU:		+/-0.0934						
Cobalt-60		U	-0.0301	pCi/g	0			N/A	
	Uncert:		+/-0.0241						
	TPU:		+/-0.0278						
Europium-152		U	0.00170	pCi/g	0			N/A	
	Uncert:		+/-0.116						
	TPU:		+/-0.116						
Europium-154		U	0.144	pCi/g	0			N/A	
	Uncert:		+/-0.165						
	TPU:		+/-0.178						
Europium-155		U	0.0491	pCi/g	0			N/A	
	Uncert:		+/-0.111						
	TPU:		+/-0.113						
Iridium-192		U	0.0805	pCi/g	0			N/A	

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
Iron-59		Uncert: +/-0.102 TPU: +/-0.109 U -0.0930	U +/-0.0697 -0.203	pCi/g	0			N/A	
Lead-210		Uncert: +/-0.222 TPU: +/-0.227 U 5.50	U +/-0.287 +/-0.302 5.15	pCi/g	0			N/A	
Lead-212		Uncert: +/-8.61 TPU: +/-8.99 0.815	U +/-6.43 +/-6.87 0.898	pCi/g	9.66		(0%-20%)		
Lead-214		Uncert: +/-0.134 TPU: +/-0.153 1.18	U +/-0.140 +/-0.159 0.907	pCi/g	26*		(0%-20%)		
Manganese-54		Uncert: +/-0.185 TPU: +/-0.211 U -0.0341	U +/-0.229 +/-0.240 -0.0143	pCi/g	0			N/A	
Mercury-203		Uncert: +/-0.0515 TPU: +/-0.0538 U -0.0996	U +/-0.0476 +/-0.0480 -0.0915	pCi/g	0			N/A	
Neodymium-147		Uncert: +/-0.106 TPU: +/-0.115 U -18.2	U +/-0.112 +/-0.119 -9.45	pCi/g	0			N/A	
Neptunium-239		Uncert: +/-33.3 TPU: +/-34.4 U -0.0916	U +/-31.6 +/-31.9 -0.108	pCi/g	0			N/A	
Niobium-94		Uncert: +/-0.281 TPU: +/-0.284 U 0.0208	U +/-0.265 +/-0.270 0.0336	pCi/g	0			N/A	
Niobium-95		Uncert: +/-0.0287 TPU: +/-0.0302 U -0.0594	U +/-0.0404 +/-0.0432 0.00958	pCi/g	0			N/A	
Potassium-40		Uncert: +/-0.101 TPU: +/-0.105 10.9	U +/-0.0989 +/-0.0990 11.6	pCi/g	6.6		(0%-20%)		
Promethium-144		Uncert: +/-1.54 TPU: +/-1.84 UI 0.000	U +/-1.75 +/-2.17 -0.0152	pCi/g	51			N/A	
Promethium-146		Uncert: +/-0.0571 TPU: +/-0.0750 U 0.0354	U +/-0.0359 +/-0.0366 -0.0114	pCi/g	0			N/A	
Radium-226		Uncert: +/-0.0425 TPU: +/-0.0455 1.18	U +/-0.0545 +/-0.0547 0.907	pCi/g	26*		(0%-20%)		
Radium-228		Uncert: +/-0.185 TPU: +/-0.211 0.689	U +/-0.229 +/-0.240 1.04	pCi/g	40.2		(0% - 100%)		
		Uncert: +/-0.345	+/-0.289						

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
Ruthenium-106		TPU: +/-0.351 U 0.0376	U +/-0.310 -0.111	pCi/g	0			N/A	
Silver-110m		Uncert: +/-0.313 TPU: +/-0.313 U -0.00270	U +/-0.460 +/-0.463 -0.00597	pCi/g	0			N/A	
Sodium-22		Uncert: +/-0.0639 TPU: +/-0.0639 U 0.0523	U +/-0.0629 +/-0.0630 0.0267	pCi/g	0			N/A	
Thallium-208		Uncert: +/-0.0602 TPU: +/-0.0604 0.186	U +/-0.0467 +/-0.0483 0.239	pCi/g	24.8		(0% - 100%)		
Thorium-234		Uncert: +/-0.0761 TPU: +/-0.0778 U 2.84	U +/-0.111 +/-0.113 0.845	pCi/g	0			N/A	
Tin-113		Uncert: +/-3.07 TPU: +/-3.15 U -0.0482	U +/-3.02 +/-3.03 -0.0167	pCi/g	0			N/A	
Uranium-235		Uncert: +/-0.0631 TPU: +/-0.0668 U -0.122	U +/-0.0695 +/-0.0700 0.232	pCi/g	0			N/A	
Uranium-238		Uncert: +/-0.222 TPU: +/-0.229 U 2.84	U +/-0.462 +/-0.462 0.845	pCi/g	0			N/A	
Yttrium-88		Uncert: +/-3.07 TPU: +/-3.15 U -0.0230	U +/-3.02 +/-3.03 0.0230	pCi/g	0			N/A	
Zinc-65		Uncert: +/-0.0429 TPU: +/-0.0442 U 0.0992	U +/-0.0441 +/-0.0454 0.0420	pCi/g	0			N/A	
Zirconium-95		Uncert: +/-0.111 TPU: +/-0.120 U 0.108	U +/-0.122 +/-0.124 0.00409	pCi/g	0			N/A	
QC1205597566 LCS		Uncert: +/-0.144 TPU: +/-0.153	U +/-0.155 +/-0.155						
Actinium-228			U -0.343 +/-2.29	pCi/g				SF1	01/02/2414:35
Americium-241	484		U +/-2.30 540	pCi/g		112	(75%-125%)		
Antimony-124		Uncert: +/-10.9 TPU: +/-54.9 U 0.170	U +/-54.9 0.170	pCi/g					
Antimony-125		Uncert: +/-0.523 TPU: +/-0.529 U -0.662	U +/-0.523 +/-0.529 -0.662	pCi/g					
		Uncert: +/-1.42							

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch	2538164								
Barium-133		TPU:	+/-1.46						
		U	-0.154	pCi/g					
		Uncert:	+/-0.535						
		TPU:	+/-0.540						
Barium-140		U	-0.297	pCi/g					
		Uncert:	+/-4.78						
		TPU:	+/-4.78						
Beryllium-7		U	-0.955	pCi/g					
		Uncert:	+/-5.74						
		TPU:	+/-5.76						
Bismuth-212		U	1.85	pCi/g					
		Uncert:	+/-5.60						
		TPU:	+/-5.66						
Bismuth-214			2.52	pCi/g					
		Uncert:	+/-2.75						
		TPU:	+/-2.99						
Cerium-139		U	-0.276	pCi/g					
		Uncert:	+/-0.267						
		TPU:	+/-0.300						
Cerium-141		U	0.500	pCi/g					
		Uncert:	+/-0.644						
		TPU:	+/-0.683						
Cerium-144		U	-1.22	pCi/g					
		Uncert:	+/-1.80						
		TPU:	+/-1.89						
Cesium-134		U	-0.416	pCi/g					
		Uncert:	+/-0.443						
		TPU:	+/-0.482						
Cesium-136		U	0.647	pCi/g					
		Uncert:	+/-1.94						
		TPU:	+/-1.97						
Cesium-137	152		148	pCi/g		97.4 (75%-125%)			
		Uncert:	+/-3.07						
		TPU:	+/-13.1						
Chromium-51		U	2.05	pCi/g					
		Uncert:	+/-5.63						
		TPU:	+/-5.71						
Cobalt-56		U	0.401	pCi/g					
		Uncert:	+/-0.540						
		TPU:	+/-0.571						
Cobalt-57		U	-0.211	pCi/g					
		Uncert:	+/-0.228						
		TPU:	+/-0.248						
Cobalt-58		U	0.372	pCi/g					
		Uncert:	+/-0.466						
		TPU:	+/-0.497						

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch	2538164								
Cobalt-60	62.3		57.9	pCi/g		92.9 (75%-125%)			
		Uncert:	+/-2.45						
		TPU:	+/-5.72						
Europium-152		U	-0.270	pCi/g					
		Uncert:	+/-1.29						
		TPU:	+/-1.30						
Europium-154		U	0.102	pCi/g					
		Uncert:	+/-0.797						
		TPU:	+/-0.798						
Europium-155		U	-0.328	pCi/g					
		Uncert:	+/-0.926						
		TPU:	+/-0.939						
Iridium-192		U	0.266	pCi/g					
		Uncert:	+/-0.676						
		TPU:	+/-0.687						
Iron-59		U	0.0983	pCi/g					
		Uncert:	+/-1.32						
		TPU:	+/-1.32						
Lead-210			4600	pCi/g					
		Uncert:	+/-304						
		TPU:	+/-569						
Lead-212		U	0.00306	pCi/g					
		Uncert:	+/-0.637						
		TPU:	+/-0.637						
Lead-214		U	0.117	pCi/g					
		Uncert:	+/-0.906						
		TPU:	+/-0.907						
Manganese-54		U	0.200	pCi/g					
		Uncert:	+/-0.411						
		TPU:	+/-0.421						
Mercury-203		U	-0.0792	pCi/g					
		Uncert:	+/-0.508						
		TPU:	+/-0.509						
Neodymium-147		U	-7.00	pCi/g					
		Uncert:	+/-10.6						
		TPU:	+/-11.0						
Neptunium-239		U	-1.56	pCi/g					
		Uncert:	+/-2.38						
		TPU:	+/-2.49						
Niobium-94		U	0.0431	pCi/g					
		Uncert:	+/-0.328						
		TPU:	+/-0.329						
Niobium-95		U	0.111	pCi/g					
		Uncert:	+/-0.480						
		TPU:	+/-0.482						
Potassium-40		U	-0.913	pCi/g					

QC Summary

Workorder: 648193

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
Promethium-144		U	-0.00720	pCi/g					
	Uncert:		+/-1.65						
	TPU:		+/-1.70						
Promethium-146		U	0.0731	pCi/g					
	Uncert:		+/-0.336						
	TPU:		+/-0.336						
Radium-226		U	0.117	pCi/g					
	Uncert:		+/-0.690						
	TPU:		+/-0.691						
Radium-228		U	-0.343	pCi/g					
	Uncert:		+/-0.906						
	TPU:		+/-0.907						
Ruthenium-106		U	-0.141	pCi/g					
	Uncert:		+/-3.65						
	TPU:		+/-3.65						
Silver-110m		U	-0.301	pCi/g					
	Uncert:		+/-0.722						
	TPU:		+/-0.736						
Sodium-22		U	0.0695	pCi/g					
	Uncert:		+/-0.279						
	TPU:		+/-0.281						
Thallium-208		U	-0.184	pCi/g					
	Uncert:		+/-0.400						
	TPU:		+/-0.409						
Thorium-234		U	-4.17	pCi/g					
	Uncert:		+/-12.2						
	TPU:		+/-12.3						
Tin-113		U	-0.266	pCi/g					
	Uncert:		+/-0.621						
	TPU:		+/-0.633						
Uranium-235		U	2.54	pCi/g					
	Uncert:		+/-3.00						
	TPU:		+/-3.21						
Uranium-238		U	-4.17	pCi/g					
	Uncert:		+/-12.2						
	TPU:		+/-12.3						
Yttrium-88		U	0.0507	pCi/g					
	Uncert:		+/-0.161						
	TPU:		+/-0.163						
Zinc-65		U	0.152	pCi/g					
	Uncert:		+/-1.18						
	TPU:		+/-1.18						
Zirconium-95		U	0.204	pCi/g					
	Uncert:		+/-0.823						

QC Summary

Workorder: 648193

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
QC1205597564	MB								
Actinium-228		U	0.0248	pCi/g				SF1	01/02/2413:29
	TPU:		+/-0.828						
Americium-241		U	0.00214	pCi/g					
	Uncert:		+/-0.103						
	TPU:		+/-0.104						
Antimony-124		U	-0.000958	pCi/g					
	Uncert:		+/-0.144						
	TPU:		+/-0.144						
Antimony-125		U	0.0177	pCi/g					
	Uncert:		+/-0.0746						
	TPU:		+/-0.0750						
Barium-133		U	-0.0205	pCi/g					
	Uncert:		+/-0.0299						
	TPU:		+/-0.0314						
Barium-140		U	-0.163	pCi/g					
	Uncert:		+/-0.304						
	TPU:		+/-0.313						
Beryllium-7		U	0.0562	pCi/g					
	Uncert:		+/-0.222						
	TPU:		+/-0.224						
Bismuth-212		U	0.0648	pCi/g					
	Uncert:		+/-0.356						
	TPU:		+/-0.357						
Bismuth-214		U	-0.0499	pCi/g					
	Uncert:		+/-0.0576						
	TPU:		+/-0.0619						
Cerium-139		U	-0.00669	pCi/g					
	Uncert:		+/-0.0219						
	TPU:		+/-0.0222						
Cerium-141		U	0.0104	pCi/g					
	Uncert:		+/-0.0452						
	TPU:		+/-0.0455						
Cerium-144		U	0.0535	pCi/g					
	Uncert:		+/-0.130						
	TPU:		+/-0.133						
Cesium-134		U	0.00162	pCi/g					
	Uncert:		+/-0.0329						
	TPU:		+/-0.0329						
Cesium-136		U	-0.0398	pCi/g					
	Uncert:		+/-0.126						
	TPU:		+/-0.127						
Cesium-137		U	0.0140	pCi/g					
	Uncert:		+/-0.0205						

QC Summary

Workorder: 648193

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
Chromium-51	TPU:		+/-0.0215						
	Uncert:	U	-0.0899	pCi/g					
	TPU:		+/-0.451						
Cobalt-56	TPU:	U	+/-0.453	pCi/g					
	Uncert:		0.0164						
	TPU:		+/-0.0338						
Cobalt-57	TPU:	U	+/-0.0347	pCi/g					
	Uncert:		0.00102						
	TPU:		+/-0.0166						
Cobalt-58	TPU:	U	+/-0.0166	pCi/g					
	Uncert:		0.0334						
	TPU:		+/-0.0285						
Cobalt-60	TPU:	U	+/-0.0324	pCi/g					
	Uncert:		-0.0174						
	TPU:		+/-0.0312						
Europium-152	TPU:	U	+/-0.0322	pCi/g					
	Uncert:		0.00258						
	TPU:		+/-0.0799						
Europium-154	TPU:	U	+/-0.0799	pCi/g					
	Uncert:		-0.0209						
	TPU:		+/-0.0822						
Europium-155	TPU:	U	+/-0.0828	pCi/g					
	Uncert:		0.00248						
	TPU:		+/-0.0516						
Iridium-192	TPU:	U	+/-0.0516	pCi/g					
	Uncert:		-0.0278						
	TPU:		+/-0.0352						
Iron-59	TPU:	U	+/-0.0374	pCi/g					
	Uncert:		0.0256						
	TPU:		+/-0.0580						
Lead-210	TPU:	U	+/-0.0592	pCi/g					
	Uncert:		-1.28						
	TPU:		+/-9.37						
Lead-212	TPU:	U	+/-9.38	pCi/g					
	Uncert:		0.00530						
	TPU:		+/-0.0522						
Lead-214	TPU:	U	+/-0.0523	pCi/g					
	Uncert:		-0.0157						
	TPU:		+/-0.0676						
Manganese-54	TPU:	U	+/-0.0680	pCi/g					
	Uncert:		-0.0197						
	TPU:		+/-0.0300						
Mercury-203	TPU:	U	+/-0.0313	pCi/g					
	Uncert:		-0.0199						
	TPU:		+/-0.0383						
	TPU:		+/-0.0394						

QC Summary

Workorder: 648193

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch		2538164							
Neodymium-147	TPU:	U	0.142	pCi/g					
	Uncert:		+/-0.632						
	TPU:		+/-0.635						
Neptunium-239	TPU:	U	-0.0142	pCi/g					
	Uncert:		+/-0.187						
	TPU:		+/-0.187						
Niobium-94	TPU:	U	0.00808	pCi/g					
	Uncert:		+/-0.0276						
	TPU:		+/-0.0279						
Niobium-95	TPU:	U	0.0164	pCi/g					
	Uncert:		+/-0.0319						
	TPU:		+/-0.0328						
Potassium-40	TPU:	U	0.129	pCi/g					
	Uncert:		+/-0.374						
	TPU:		+/-0.374						
Promethium-144	TPU:	U	0.00690	pCi/g					
	Uncert:		+/-0.0245						
	TPU:		+/-0.0247						
Promethium-146	TPU:	U	0.00382	pCi/g					
	Uncert:		+/-0.0287						
	TPU:		+/-0.0288						
Radium-226	TPU:	U	-0.0157	pCi/g					
	Uncert:		+/-0.0676						
	TPU:		+/-0.0680						
Radium-228	TPU:	U	0.0248	pCi/g					
	Uncert:		+/-0.103						
	TPU:		+/-0.104						
Ruthenium-106	TPU:	U	0.00594	pCi/g					
	Uncert:		+/-0.221						
	TPU:		+/-0.221						
Silver-110m	TPU:	U	0.0132	pCi/g					
	Uncert:		+/-0.0406						
	TPU:		+/-0.0411						
Sodium-22	TPU:	U	-0.000533	pCi/g					
	Uncert:		+/-0.0274						
	TPU:		+/-0.0274						
Thallium-208	TPU:	U	0.0437	pCi/g					
	Uncert:		+/-0.0361						
	TPU:		+/-0.0413						
Thorium-234	TPU:	U	-0.369	pCi/g					
	Uncert:		+/-1.28						
	TPU:		+/-1.29						
Tin-113	TPU:	U	0.00120	pCi/g					
	Uncert:		+/-0.0354						
	TPU:		+/-0.0354						
Uranium-235	TPU:	U	-0.0412	pCi/g					

QC Summary

Workorder: 648193

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Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec									
Batch	2538164								
			Uncert:						
			TPU:						
Uranium-238		U	-0.369	pCi/g					
			Uncert:						
			TPU:						
Yttrium-88		U	0.000536	pCi/g					
			Uncert:						
			TPU:						
Zinc-65		U	0.0222	pCi/g					
			Uncert:						
			TPU:						
Zirconium-95		U	0.0127	pCi/g					
			Uncert:						
			TPU:						

Notes:

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

The Qualifiers in this report are defined as follows:

- U Analyte was analyzed for, but not detected above the Lc.
- J Value is estimated
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- H Analytical holding time was exceeded
- < Result is less than value reported
- > Result is greater than value reported
- UI Gamma Spectroscopy--Uncertain identification
- BD Results are either below the MDC or tracer recovery is low
- h Preparation or preservation holding time was exceeded
- R Sample results are rejected
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- M M if above MDC and less than LLD
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- FA Failed analysis.
- M REMP Result > MDC/CL and < RDLC
- UJ Gamma Spectroscopy--Uncertain identification
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- N1 See case narrative
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- \*\* Analyte is a Tracer compound

QC Summary

Workorder: 648193

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

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

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

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 2542340 Check-list

This check-list was completed on 22-DEC-23 by Melanie Aycock

This batch was reviewed by Melanie Aycock on 22-DEC-23 and Scott Moreland on 28-DEC-23.

**Batch ID:** 2542340      **Product:** ASP\_UUS      **Description:** Alpha Spec Uranium  
GL-RAD-A-011

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
2	Are instrument source checks within limits?	Yes		
3	Have samples been blank corrected?		No	
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were all tracer/carrier recoveries within the required acceptance limits?	Yes		
10	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
11	Were the relative percent differences and/or error (RPD/RER) between the LCS and the LCSD recoveries within the acceptance limits?	Yes		
12	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
13	Were manual integrations performed on any sample or QC data files in this batch?		No	
14	Are sample-specific MDA/MDC calculated and reported?	Yes		



# Prep Logbook Uranium

**Batch ID:** 2542340  
**Analyst:** Chandler Metts (CM4)  
**Method:** DOE EML HASL-300, U-02-RC  
 Modified  
**Lab SOP:** GL-RAD-A-011 REV# 28  
**Instrument:** BAL-C326419771

**Due Dates for Lab:** 01-JAN-2024    **Package:** 02-JAN-2024    **SDG:** 03-JAN-2024

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205604852	Uranium-238 AS SPIKE	1600-P	.1	mL
LCSD	1205604853	Uranium-238 AS SPIKE	1600-P	.1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)
1	647332002	19-DEC-2023	1	Dry to Dry	0.105	0.105
2	648193001	19-DEC-2023	1	Dry to Dry	0.138	0.138
3	1205604851 MB	19-DEC-2023	1	Dry to Wet	0.138	0.138
4	1205604852 LCS	19-DEC-2023	1	Dry to Wet	0.138	0.138
5	1205604853 LCSD	19-DEC-2023	1	Dry to Wet	0.138	0.138

Reagent/Solvent Lot ID	Description	Amount	Comments:
WORK1564-II	Uranium-232 AS TRACER	.1 mL	
REGENT 3976130.3	Acetone	1 mL	Pipet Id: R2-428724
REGENT 3976909.2	Hydrogen Peroxide 30% ACS Reagent	.1 mL	Pu-236 Tracer Used: No
REGENT 4068848	0.1M HCl	15 mL	Analyzed With: N/A
REGENT 4068304	Acetic Anhydronic Acid(0.53M Hydrofluoric Acid)	15 mL	647332002: soft powder material- light gray color.
REGENT 4068306	RASP-6M Hydrochloric Acid	5 mL	Data Entry Date: 19-DEC-2023 00:00
REGENT 3964284.2	Anion Exchange Resin 1x8 100-200 Mesh Resin	3 mL	
REGENT 4070517	Resin Ethyl Alcohol (80%)	5 mL	
REGENT 4072323	Iron Carrier	2 mL	
REGENT 4046868.4	RASP-Hydrofluoric Acid	30 mL	
REGENT 4067119	Neodymium 500 MGL in 4% HNO3	.1 mL	
REGENT 4068852	RASP-Neodymium Substrate	5 mL	
REGENT 4049782.9	Nitric Acid	20 mL	
REGENT 3473590.1	RASP-Titanium Chloride	.5 mL	
REGENT 4068943	5M Stannous Boric Acid	20 mL	
REGENT 4070517	Resin Ethyl Alcohol (80%)	10 mL	
REGENT 4071023.3	RASP-Arsenium Hydroxide	10 mL	
REGENT 4062509	RASP-Hydrochloric Acid	20 mL	

Analytical Logbook version 1.1 1-04-2002

GEL Laboratories LLC

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Alpha Spectroscopy Software Version 3.5.21  
 Release Date: 28-SEP-2023

## GEL Laboratories LLC ALPHA SPECTROSCOPY REPORT

**BATCH NUMBER :** 2542340  
**SAMPLE ID :** 50648193001\_UU  
**SAMPLE QTY :** 0.138 G    **+/-0.725 %**  
**SAMPLE DATE :** 17-Oct-2023 00:00:00  
**ANALYST :** CM4  
**% YIELD :** 82.3    **+/-6.723 %**

**CHAMBER :** 008  
**DETECTOR SN :** 148044  
**AVERAGE %EFFICIENCY :** 32.8027  
**AVERAGE %EFF ERROR :** 0.6388  
**COUNT DATE :** 21-Dec-2023 12:45:09  
**ELAPSED LIVE TIME (SEC) :** 14400.00

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

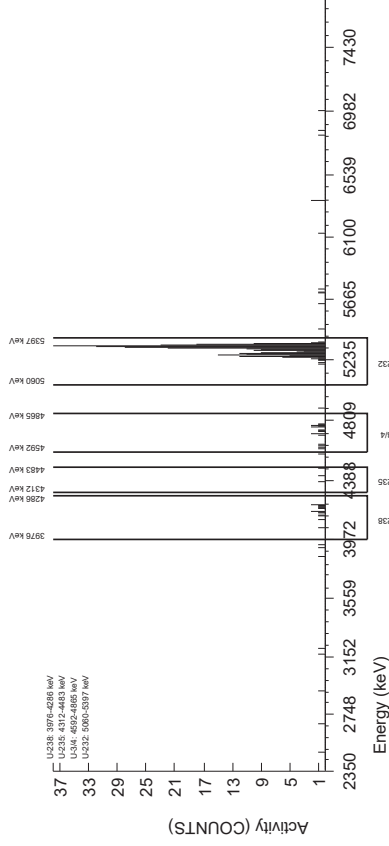
**LIB FILE :** UU  
**BKG FILE :** B008.CNF:2630  
**BKG DATE :** 15-Dec-2023  
**BKG LIVE TIME (SEC) :** 60000.00  
**EFF FILE :** W008.CNF:702  
**CAL DATE :** 01-Dec-2023

**TRACER ID :** 1564-II  
**NUCLIDE :** U-232  
**NOMINAL :** 4.4232E+00 dpm  
**RESULTS :** 3.6404E+00 dpm

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/g	1,96-sigma			
									TPU pCi/g	MDA pCi/g	Lc pCi/g	
U-232	5302.10	5314.10	25.136	288.000	286.080	1.920	1.3856	100.000	1.44E+01	4.08E-01	1.28E-01	1.68E+00
U-3/4	4763.02	4724.71	61.939	17.000	15.309	0.720	0.8485	100.000	7.71E-01	3.77E-01	1.13E-01	4.22E-01
U-235	4391.00	4428.32	94.148	3.000	2.760	0.240	0.4899	80.900	1.72E-01	2.98E-01	5.59E-02	2.48E-01
U-238	4184.73	4162.02	52.029	16.000	15.280	0.720	0.8485	100.000	7.70E-01	3.08E-01	7.83E-02	4.10E-01

**NOTES:**

\* Correction made to the following net area due to tracer impurity:  
 U-3/4 (0.971 +/-0.029)



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORTInstrument SOP: GL-RAD-I-009  
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 2542340  
 SAMPLE ID : S1205604851\_UU  
 SAMPLE QTY : 0.136 G  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 82.1 +/-6.752 %

CHAMBER : 009  
 DETECTOR SN : 149015  
 AVERAGE %EFFICIENCY : 33.2784  
 AVERAGE %EFF ERROR : 0.6429  
 COUNT DATE : 21-Dec-2023 12:45:09  
 ELAPSED LIVE TIME(SEC) : 14400.00

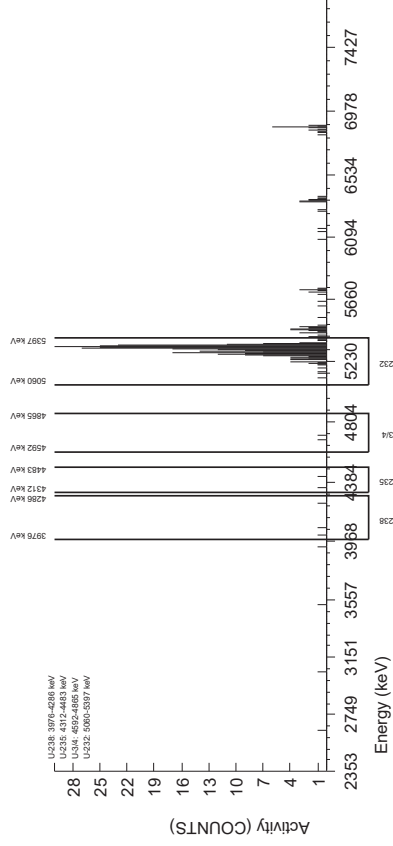
LIB FILE : UU  
 BKG FILE : 6009.CNF:2612  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W009.CNF:699  
 CAL DATE : 01-Dec-2023

TRACER  
 ID : 1564-II  
 NUCLIDE : U-232  
 NOMINAL : 4.4155E+00 dpm  
 RESULTS : 3.6257E+00 dpm

NUCLIDE	LIBRARY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	SIDev	%ABUN	ACTIVITY pCi/G	1,96-sigma	
										TPU pCi/G	Lc pCi/G
U-232	5302.10	5308.56	53.806	297.000	289.560	7.440	2.7276	100.000	1.44E+01	6.47E-01	2.49E-01
U-3/4	4763.02	4693.56	34.501	2.000	-0.423	1.440	1.2000	100.000	-2.10E-02	1.36E-01	1.80E-01
U-235	4391.00	4381.29	78.861	2.000	1.280	0.720	0.8485	80.900	7.87E-02	3.76E-01	9.56E-02
U-238	4184.73	4101.03	216.867	3.000	1.800	1.200	1.0954	100.000	8.96E-02	3.49E-01	9.89E-02

## NOTES:

\* Correction made to the following net area  
 due to tracer impurity:  
 U-3/4 (0.983 +/-0.029)

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORTInstrument SOP: GL-RAD-I-009  
Analytical SOP: GL-RAD-A-011

BATCH NUMBER : 2542340  
 SAMPLE ID : S1205604852\_UU  
 SAMPLE QTY : 0.136 G  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 76.9 +/-6.817 %

CHAMBER : 010  
 DETECTOR SN : 149014  
 AVERAGE %EFFICIENCY : 34.4897  
 AVERAGE %EFF ERROR : 0.6657  
 COUNT DATE : 21-Dec-2023 12:45:09  
 ELAPSED LIVE TIME(SEC) : 14400.00

LIB FILE : UU  
 BKG FILE : 6010.CNF:2661  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W010.CNF:708  
 CAL DATE : 01-Dec-2023

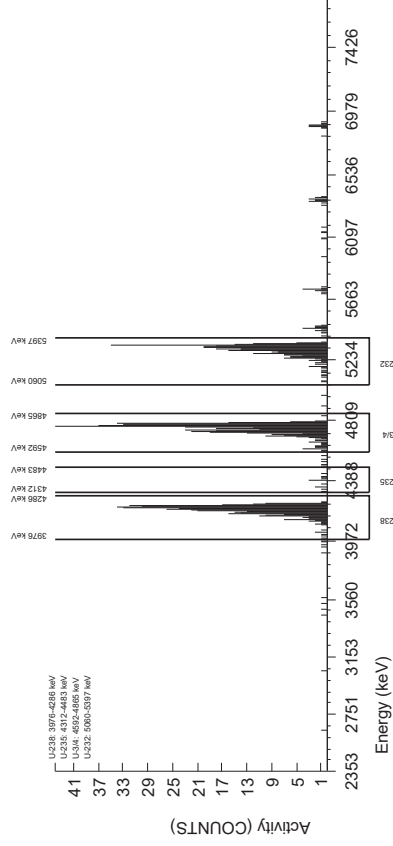
TRACER  
 ID : 1564-II  
 NUCLIDE : U-232  
 NOMINAL : 4.4155E+00 dpm  
 RESULTS : 3.3950E+00 dpm

LCS  
 ID : 1600-P  
 NUCLIDE : U-238  
 NOMINAL (pCi/G) : 1.9437E+01  
 % RECOVERY : 101.864

NUCLIDE	LIBRARY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	SIDev	%ABUN	ACTIVITY pCi/G	1,96-sigma	
										TPU pCi/G	Lc pCi/G
U-232	5302.10	5302.98	29.684	287.000	281.000	6.000	2.4495	100.000	1.44E+01	6.14E-01	2.30E-01
U-3/4	4763.02	4754.61	48.813	427.000	425.086	0.960	0.9798	100.000	2.18E+01	4.01E-01	1.24E-01
U-235	4391.00	4367.98	48.236	13.000	12.520	0.480	0.6928	80.900	7.94E-01	3.51E-01	8.05E-02
U-238	4184.73	4183.34	42.052	387.000	386.040	0.960	0.9798	100.000	1.98E+01	3.40E+00	9.21E-02

## NOTES:

\* Correction made to the following net area  
 due to tracer impurity:  
 U-3/4 (0.954 +/-0.029)



GEL Laboratories LLC  
 ALPHA SPECTROSCOPY REPORT

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

BATCH NUMBER : 2542340  
 SAMPLE ID : S1205604863\_UU  
 SAMPLE QTY : 0.138 G  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 82.5 +/-6.932 %

CHAMBER : 011  
 DETECTOR SN : 72531  
 AVERAGE %EFFICIENCY : 31.0462  
 AVERAGE %EFF ERROR : 0.6007  
 COUNT DATE : 21-Dec-2023 12:45:09  
 ELAPSED LIVE TIME(SEC) : 14400.00

LIB FILE : UU  
 BKG FILE : B011.CNF:2634  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W011.CNF:714  
 CAL DATE : 01-Dec-2023

TRACER ID : 1564-II  
 NUCLIDE : U-232  
 NOMINAL : 4.4155E+00 dpm  
 RESULTS : 3.64448E+00 dpm

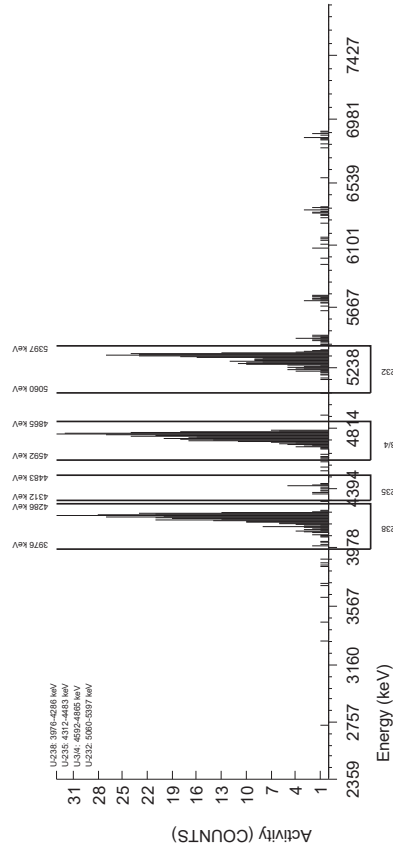
LCS ID : 1600-P  
 NUCLIDE : U-238  
 NOMINAL (pCi/G) : 1.9437E+01  
 % RECOVERY : 90.737

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG	SDDev	%ABUN	ACTIVITY pCi/G	196-sigma TPU pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc
U-232	5302.10	5302.99	31.011	279.000	271.560	7.440	2.7276	100.000	1.44E+01	2.69E+00	6.90E-01	2.65E-01	1.75E+00
U-3/4	4763.02	4756.75	60.409	343.000	340.398	1.680	1.2961	100.000	1.81E+01	3.21E+00	4.62E-01	1.51E-01	1.93E+00
U-235	4391.00	4398.68	6.598	17.000	16.520	0.480	0.6828	80.900	1.08E+00	5.69E-01	3.63E-01	8.33E-02	5.48E-01
U-238	4184.73	4182.65	50.931	334.000	332.320	1.680	1.2961	100.000	1.76E+01	3.14E+00	4.11E-01	1.28E-01	1.91E+00

NOTES:

\* Correction made to the following net area due to tracer impurity:  
 U-3/4 (0.922 +/-0.028)



Batch 2542341 Check-list

This check-list was completed on 22-DEC-23 by Melanie Aycock

This batch was reviewed by Melanie Aycock on 22-DEC-23 and Scott Moreland on 28-DEC-23.

Batch ID: 2542341 Product: ASP\_THS Description: Alpha Spec Thorium GL-RAD-A-038

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
2	Are instrument source checks within limits?	Yes		
3	Have samples been blank corrected?		No	
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were all tracer/carrier recoveries within the required acceptance limits?	Yes		
10	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
11	Were the relative percent differences and/or error (RPD/RER) between the LCS and the LCSD recoveries within the acceptance limits?	Yes		
12	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
13	Were manual integrations performed on any sample or QC data files in this batch?		No	
14	Are sample-specific MDA/MDC calculated and reported?	Yes		

# Prep Logbook Thorium

**Batch ID:** 2542341  
**Analyst:** Chandler Metts (CSM4)  
**Method:** DOE EML HASL-300, TH-01-RC Modified  
**Lab SOP:** GL-RAD-A-038 REV# 18  
**Instrument:** BAL-C326419771

**Due Dates for Lab:** 01-JAN-2024 **Package:** 02-JAN-2024 **SDG:** 03-JAN-2024

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1205604856	Thorium-232 AS SPIKE	1513-J	.1	mL
LCS	1205604855	Thorium-232 AS SPIKE	1513-J	.1	mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Aliquot (g)
1	647332002	19-DEC-2023	1	Dry to Dry	0.102	0.102
2	648193001	19-DEC-2023	1	Dry to Dry	0.113	0.113
3	1216604854 MB	19-DEC-2023	1	Dry to Wet	0.113	0.113
4	1216604855 LCS	19-DEC-2023	1	Dry to Wet	0.113	0.113
5	1216604856 LCS	19-DEC-2023	1	Dry to Wet	0.113	0.113

**Reagent/Solvent Lot ID**

Reagent/Solvent Lot ID	Description	Amount
WORK 18451	Thorium-232 AS TRACER, RASP	.1 mL
REGENT 39761303	Acetone	1 mL
REGENT 39769892	Hydrogen Peroxide 30% ACS Reagent	3 mL
REGENT 4061107	RASP-2M Hydrochloric Acid	4 mL
REGENT 39543842	Resin Exchange Resin 1x8 100-200 Mesh	3 mL
REGENT 4070517	RASP: Ethyl Alcohol (80%)	5 mL
REGENT 4072323	Iron Carrier	2 mL
REGENT 40648684	RASP-Hydrochloric Acid	30 mL
REGENT 4067119	Nesodymium 500 MCL in 4% HNO3	.1 mL
REGENT 4067829	RASP-Nesodymium Substrate	2 mL
REGENT 4069883	5% Saturated Boric Acid	1 mL
REGENT 4071908	8M Nitric Acid	30 mL
REGENT 4075194	9M Hydrochloric Acid	20 mL
REGENT 40627509	RASP-Hydrochloric Acid	20 mL

**Comments:**  
 Pipet ID: RAD-ASP-18400ZZ  
 647332002: soft powder material- light gray color.  
 648193001: soft powder material- brown and slightly darker compared to 647332002.  
 Data Entry Date2: 19-DEC-2023 00:00

Analytical Logbook version 1.1-04-2002

GEL Laboratories LLC

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Alpha Spectroscopy Software Version 3.5.21  
 Release Date: 28-SEP-2023

## GEL Laboratories LLC ALPHA SPECTROSCOPY REPORT

**BATCH NUMBER :** 2542341  
**SAMPLE ID :** 50648193001\_TH  
**SAMPLE QTY :** 0.113 G  
**SAMPLE DATE :** 17-Oct-2023 00:00:00  
**ANALYST :** CM4  
**% YIELD :** 45.3 +/-7.834 %

**AVERAGE %EFFICIENCY :** 35.9376  
**AVERAGE %EFF ERROR :** 0.6821  
**COUNT DATE :** 21-Dec-2023 12:50:42  
**ELAPSED LIVE TIME (SEC) :** 14399.99

**Instrument SOP:** GL-RAD-I-009  
**Analytical SOP:** GL-RAD-A-038

**LIB FILE :** TH  
**BKG FILE :** 5044\_CNF-2620  
**BKG DATE :** 15-Dec-2023  
**BKG LIVE TIME (SEC) :** 59599.99  
**EFF FILE :** W044\_CNF-709  
**CAL DATE :** 02-Dec-2023

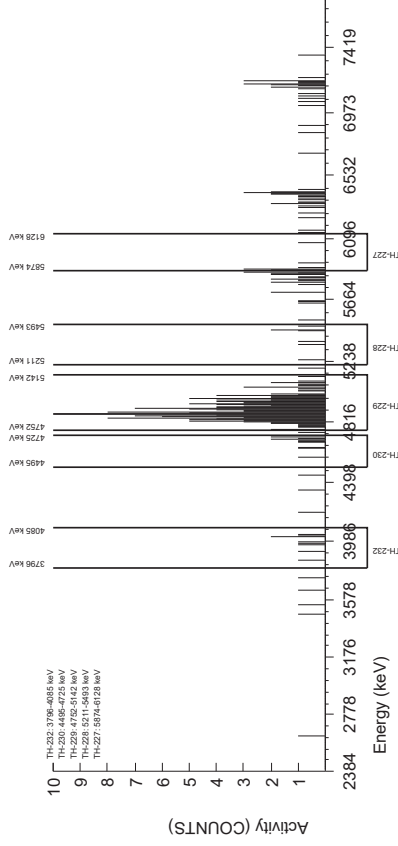
**TRACER**  
**ID :** 1845-I  
**NUCLIDE :** TH-229  
**NOMINAL :** 4.8067E+00 dpm  
**RESULTS :** 2.1758E+00 dpm

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG SDev	%ABUN	ACTIVITY pCi/g	1,96-sigma		
										TPU pCi/g	MDA pCi/g	Lc pCi/g
TH-227	5994.04	5907.84	0.000	8.400	-0.400	2.8983	2.8983	57.440	1.34E+01	2.80E+01	1.09E+01	1.34E+01
TH-228	5363.00	5403.13	7.326	7.000	3.153	3.840	1.9596	99.940	6.53E-01	1.13E+00	3.98E-01	6.51E-01
TH-229	4900.00	4904.16	70.415	185.000	183.800	1.200	1.0954	99.520	4.13E+00	7.31E-01	2.09E-01	2.79E+00
TH-230	4871.39	4671.90	19.537	11.000	9.174	0.720	0.8485	99.700	7.33E-01	7.98E-01	2.42E-01	7.13E-01
TH-232	3972.00	3974.10	7.326	9.000	8.206	0.720	0.8485	100.000	6.68E-01	6.47E-01	1.68E-01	6.50E-01

### NUCLIDE ACTIVITY SUMMARY

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.007 +/-0.000)  
 TH-230 (1.106 +/-0.017)  
 TH-232 (0.074 +/-0.001)



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GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORTInstrument SOP: GL-RAD-I-009  
Analytical SOP: GL-RAD-A-038

BATCH NUMBER : 2542341  
 SAMPLE ID : S1205604854\_TH  
 SAMPLE QTY : 0.113 G  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 97.6 +/-5.786 %

CHAMBER : 045  
 DETECTOR SN : 78783  
 AVERAGE %EFFICIENCY : 32.9493  
 AVERAGE %EFF ERROR : 0.6386  
 COUNT DATE : 21-Dec-2023 12:50:42  
 ELAPSED LIVE TIME(SEC) : 14399.99

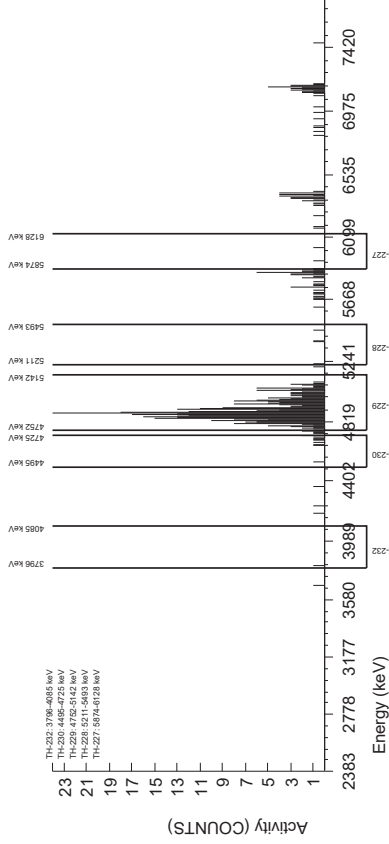
LIB FILE : TH  
 BKG FILE : 6045.CNF:2605  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME(SEC) : 59999.99  
 EFF FILE : W045.CNF:684  
 CAL DATE : 02-Dec-2023

TRACER  
 ID : 1845-J  
 NUCLIDE : TH-229  
 NOMINAL : 4.8066E+00 dpm  
 RESULTS : 4.6893E+00 dpm

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	SIDev	%ABUN	ACTIVITY pCi/G	1,96-sigma		
										TPU pCi/G	MDA pCi/G	Lc pCi/G
TH-227	5994.04	5911.53	0.000	6.000	0.960	2.2450	5.040	57.440	9.52E-02	1.11E+00	4.08E-01	5.59E-01
TH-228	5363.00	5356.62	220.580	4.000	0.626	3.360	1.8330	99.940	3.25E-02	5.04E-01	1.74E-01	2.46E-01
TH-229	4900.00	4894.92	63.373	370.000	369.040	0.960	0.9798	99.520	1.92E+01	3.03E+00	9.32E-02	1.96E+00
TH-230	4871.39	4874.47	4.902	10.000	7.299	0.480	0.6828	99.700	3.78E-01	3.48E-01	4.42E-01	1.43E-01
TH-232	3972.00	3814.60	4.902	1.000	0.132	0.720	0.8885	100.000	6.80E-03	1.51E-01	8.67E-02	1.51E-01

## NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.014 +/-0.000)  
 TH-230 (2.221 +/-0.034)  
 TH-232 (0.148 +/-0.002)

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORTInstrument SOP: GL-RAD-I-009  
Analytical SOP: GL-RAD-A-038

BATCH NUMBER : 2542341  
 SAMPLE ID : S1205604855\_TH  
 SAMPLE QTY : 0.113 G  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 91.2 +/-5.903 %

CHAMBER : 046  
 DETECTOR SN : 148019  
 AVERAGE %EFFICIENCY : 33.5900  
 AVERAGE %EFF ERROR : 0.6488  
 COUNT DATE : 21-Dec-2023 12:50:42  
 ELAPSED LIVE TIME(SEC) : 14399.99

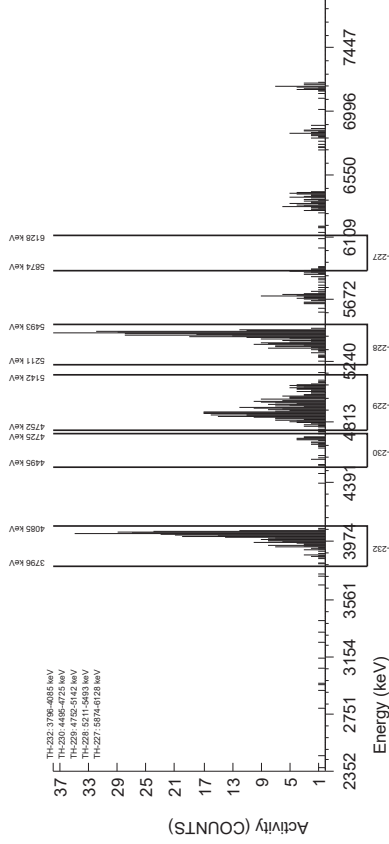
LIB FILE : TH  
 BKG FILE : 6046.CNF:2619  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME(SEC) : 59999.99  
 EFF FILE : W046.CNF:608  
 CAL DATE : 02-Dec-2023

TRACER  
 ID : 1513-J  
 NUCLIDE : TH-232  
 NOMINAL : 1.7584E+01  
 RESULTS : 100.061

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	SIDev	%ABUN	ACTIVITY pCi/G	1,96-sigma		
										TPU pCi/G	MDA pCi/G	Lc pCi/G
TH-227	5994.04	5905.63	0.000	17.000	3.800	13.200	3.6332	57.440	3.95E-01	1.70E+00	6.92E-01	9.39E-01
TH-228	5363.00	5413.29	30.761	336.000	335.507	0.480	0.6928	99.940	1.82E+01	2.98E+00	3.03E-01	6.98E-02
TH-229	4900.00	4913.28	121.800	353.000	351.800	1.200	1.0954	99.520	1.92E+01	3.10E+00	3.82E-01	1.09E-01
TH-230	4871.39	4857.24	24.731	36.000	33.643	0.240	0.4899	99.700	1.83E+00	6.92E-01	4.41E-01	1.39E-01
TH-232	3972.00	4001.59	39.364	325.000	324.618	0.240	0.4899	100.000	1.76E+01	2.89E+00	2.81E-01	5.91E-02

## NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.013 +/-0.000)  
 TH-230 (2.117 +/-0.033)  
 TH-232 (0.142 +/-0.002)



GEL Laboratories LLC  
 ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-I-009  
 Analytical SOP: GL-RAD-A-038

BATCH NUMBER : 2542341  
 SAMPLE ID : S1205604866\_TH  
 SAMPLE QTY : 0.113 G +/-0.885 %  
 SAMPLE DATE : 19-Dec-2023 00:00:00  
 ANALYST : CM4  
 % YIELD : 82.1 +/-6.099 %

CHAMBER : 047  
 DETECTOR SN : 80064  
 AVERAGE %EFFICIENCY : 34.6138  
 AVERAGE %EFF ERROR : 0.6680  
 COUNT DATE : 21-Dec-2023 12:50:42  
 ELAPSED LIVE TIME (SEC) : 14399.99

LIB FILE : TH  
 BKG FILE : 6047.CNF:2611  
 BKG DATE : 15-Dec-2023  
 BKG LIVE TIME (SEC) : 59999.99  
 EFF FILE : W047.CNF:690  
 CAL DATE : 02-Dec-2023

TRACER ID : 1845-J  
 NUCLIDE : TH-229  
 NOMINAL : 4.8069E+00 dpm  
 RESULTS : 3.9442E+00 dpm

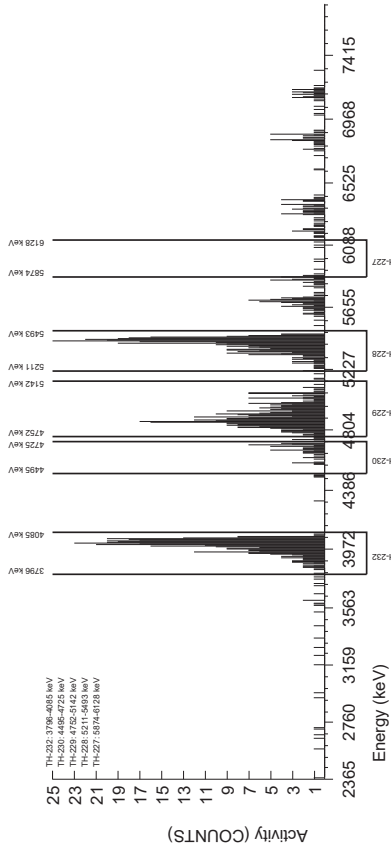
LCSID ID : 1513-J  
 NUCLIDE : TH-232  
 NOMINAL (pCi/G) : 1.7564E+01  
 % RECOVERY : 120.261

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	SIDev	%ABUN	ACTIVITY pCi/G	MDA pCi/G	Lc pCi/G	1.96-sigma cnt Unc
TH-227	5994.04	5971.71	7.353	10.000	0.400	9.600	3.0984	57.440	4.49E-02	1.61E+00	6.37E-01	8.04E-01
TH-228	5363.00	5398.41	44.855	328.000	325.828	2.160	1.4697	99.940	1.91E+01	4.93E-01	1.58E-01	2.09E+00
TH-229	4900.00	4902.15	96.002	328.000	326.090	1.920	1.3856	99.520	1.92E+01	4.76E-01	1.49E-01	2.09E+00
TH-230	4671.39	4662.28	46.571	51.000	48.078	0.960	0.9798	99.700	2.82E+00	5.19E-01	1.71E-01	8.31E-01
TH-232	3972.00	3993.76	95.103	362.000	361.629	0.240	0.4899	100.000	2.11E+01	3.01E-01	6.30E-02	2.18E+00

NOTES:

\* Corrections made to the following net areas due to tracer impurity:  
 TH-228 (0.012 +/-0.000)  
 TH-230 (1.962 +/-0.030)  
 TH-232 (0.131 +/-0.002)



# Continuing Calibration Data

Review of Alpha Spectrometer QA results (Daily checks) 21-DEC-2023 12:00:54.03

Bank 1 through bank 29 (detectors 1 through 256)

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

	Detector	Parameter	Flag
21-DEC-2023	19	PSFWHM-5000	Above
21-DEC-2023	23	PSFWHM-5000	Below
21-DEC-2023	23	PSCTSS-5000	Below
21-DEC-2023	25	PSENERGY-5000	Below
21-DEC-2023	94	PSFWHM-5000	Below
21-DEC-2023	94	PSCTSS-5000	Below
28-AUG-2023	115	PSCTSS-5000	Below
28-AUG-2023	116	PSCTSS-5000	Below
21-DEC-2023	124	PSENERGY-5000	Below
21-DEC-2023	175	PSFWHM-5000	Below
21-DEC-2023	175	PSCTSS-5000	Below
28-NOV-2020	198	PSFWHM-5000	Below
28-NOV-2020	198	PSCTSS-5000	Below
21-DEC-2023	216	PSENERGY-5000	Above
8-SEP-2023	221	PSFWHM-5000	Above
8-SEP-2023	221	PSCTSS-5000	Below
8-SEP-2023	222	PSENERGY-5000	Above
8-SEP-2023	222	PSCTSS-5000	Below
21-DEC-2023	227	PSFWHM-5000	Below
21-DEC-2023	227	PSCTSS-5000	Below
21-DEC-2023	228	PSCTSS-5000	Below

The following detectors that may not have properly transferred to the QA file

115 may not have run since 21-DEC-2023  
116 may not have run since 21-DEC-2023  
119 may not have run since 21-DEC-2023  
120 may not have run since 21-DEC-2023  
121 may not have run since 21-DEC-2023  
122 may not have run since 21-DEC-2023  
183 may not have run since 21-DEC-2023  
184 may not have run since 21-DEC-2023  
198 may not have run since 21-DEC-2023  
209 may not have run since 21-DEC-2023

210 may not have run since 21-DEC-2023  
211 may not have run since 21-DEC-2023  
212 may not have run since 21-DEC-2023  
221 may not have run since 21-DEC-2023  
222 may not have run since 21-DEC-2023  
241 may not have run since 21-DEC-2023  
242 may not have run since 21-DEC-2023

APPROVAL DATE: 2024 12/21/23

APPROVAL TIME: 1205

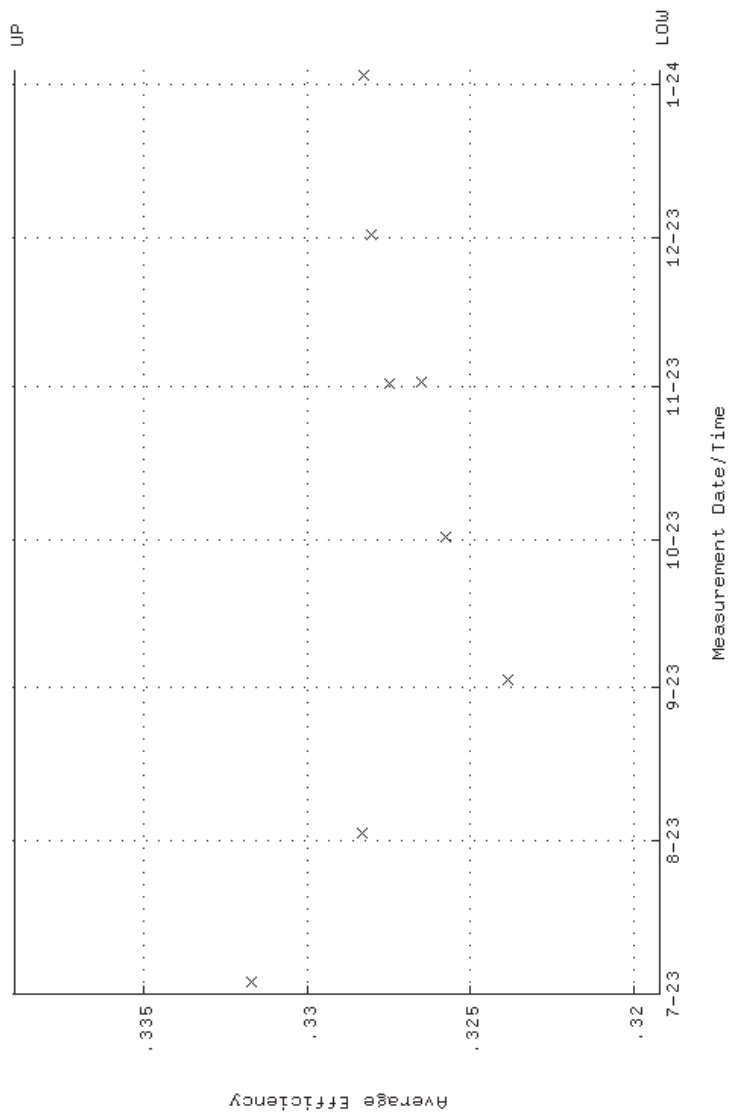
APPROVED BY: 

PROCEDURE # GL-RAD-I-009

Report completed at 21-DEC-2023 12:04:05.72

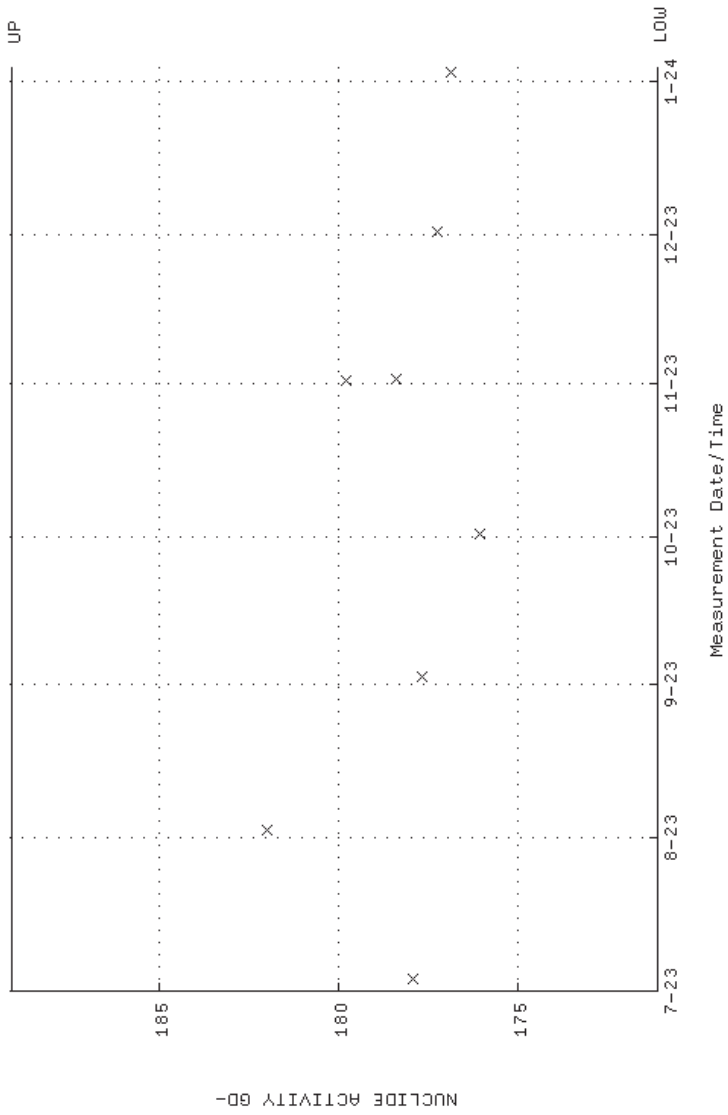
# Background and Efficiency Data

QA filename : DKA100:[ENV\_ALPHA.QA.W]W008.QAF;6  
 Parameter Name : AVREFF (Average Efficiency)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.319210 through 0.338950

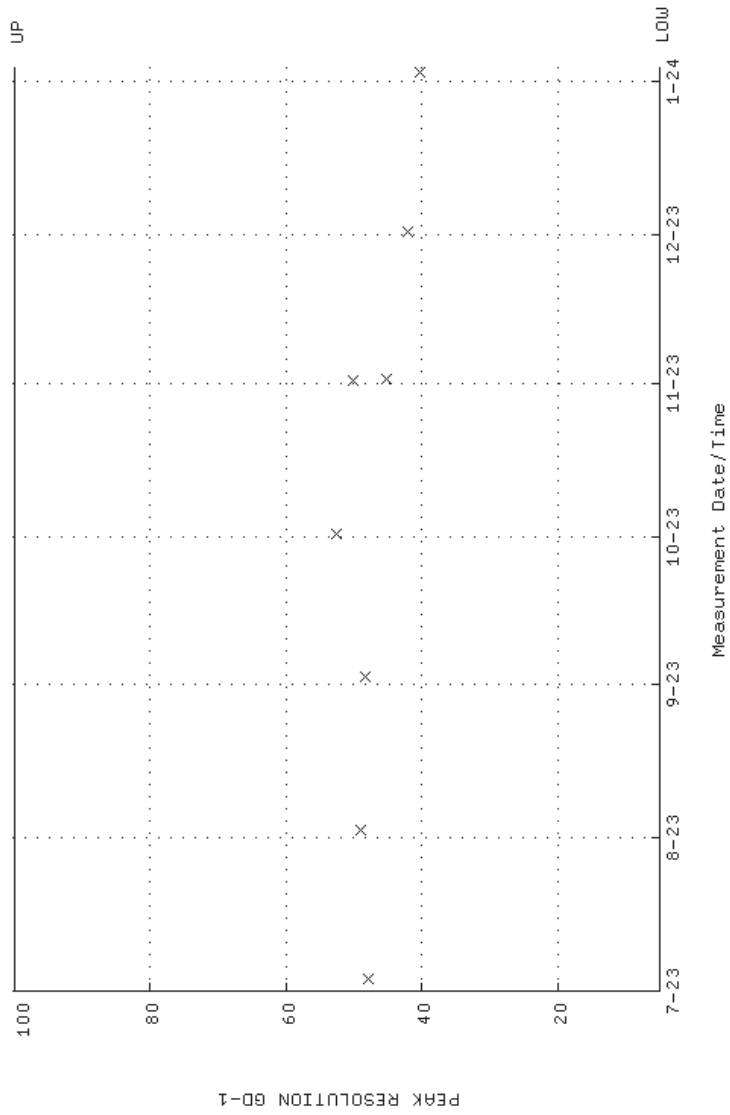




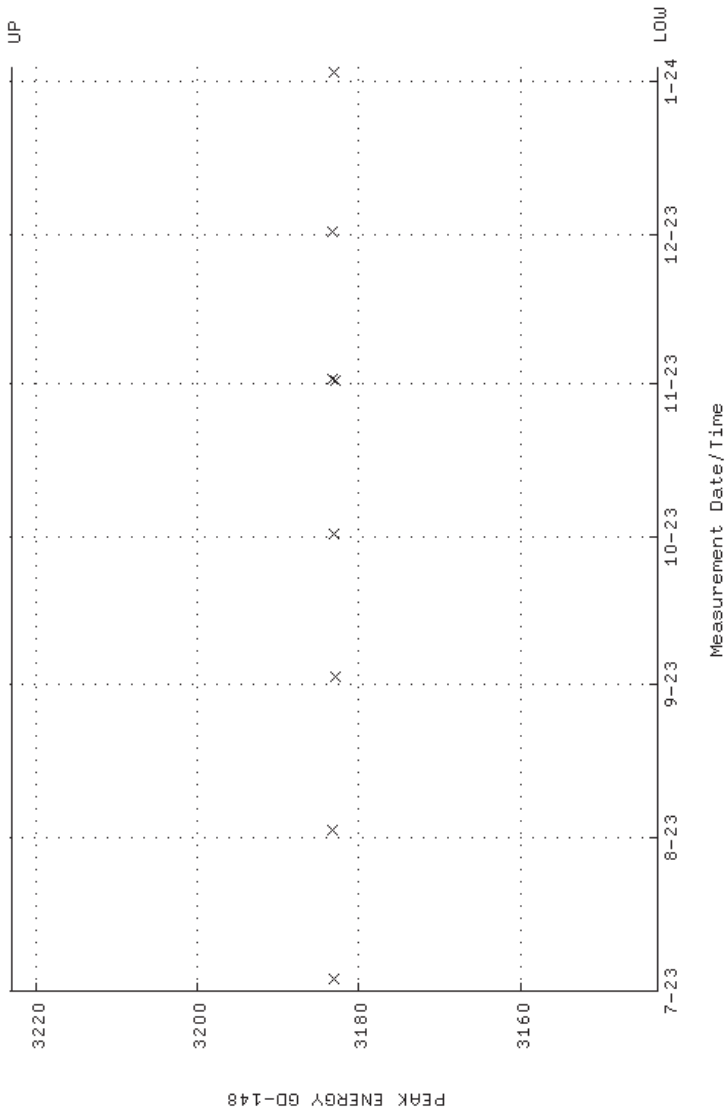
QA filename : DKR100:[ENV\_ALPHA.QR.W]W008.QAF;6  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
Lower/Upper Lmts: 171.090 through 189.100



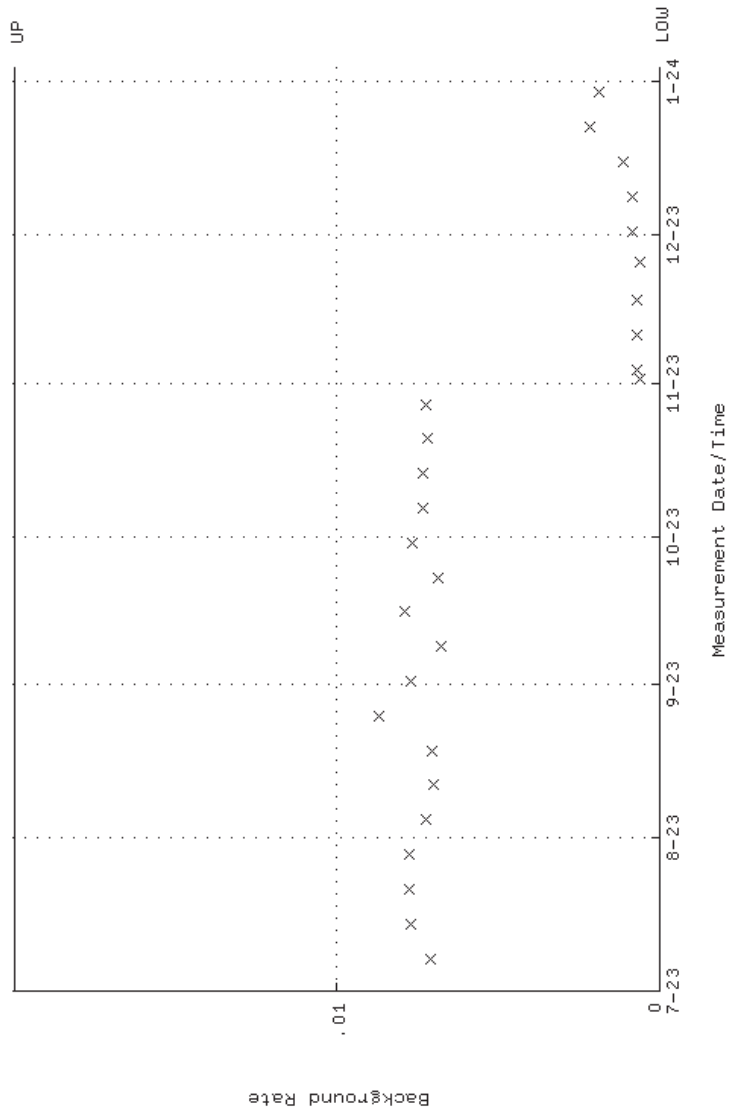
QA filename : DKR100:[ENV\_ALPHA.QR.W]W008.QAF;6  
Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
Lower/Upper Lmts: 5.00000 through 100.000



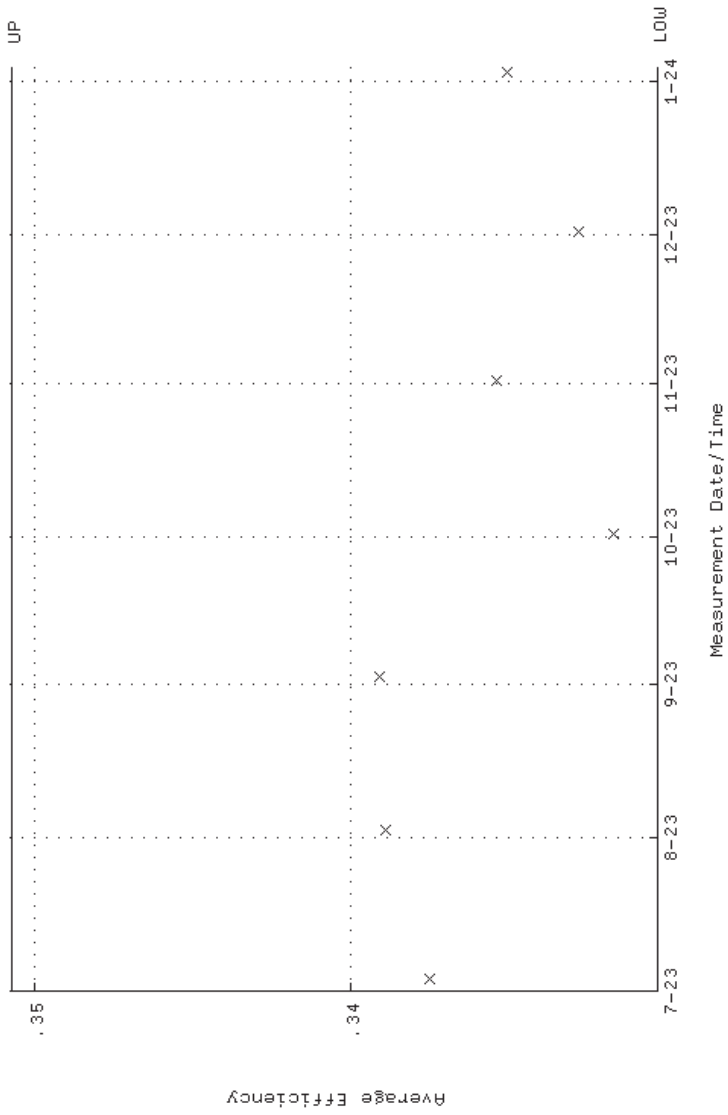
QA filename : DKA100:[ENV\_ALPHA.QA.W]W008.QAF;6  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



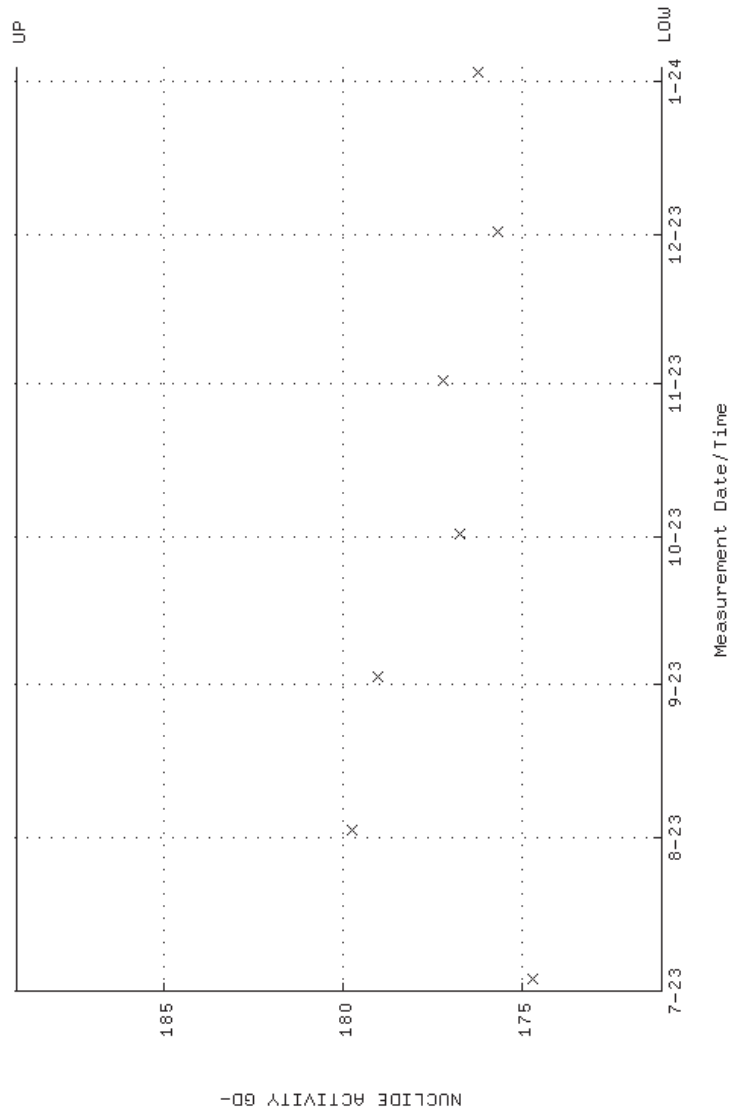
QA filename : DKA100:[ENV\_ALPHA.QA.B]B008.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:14:32 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



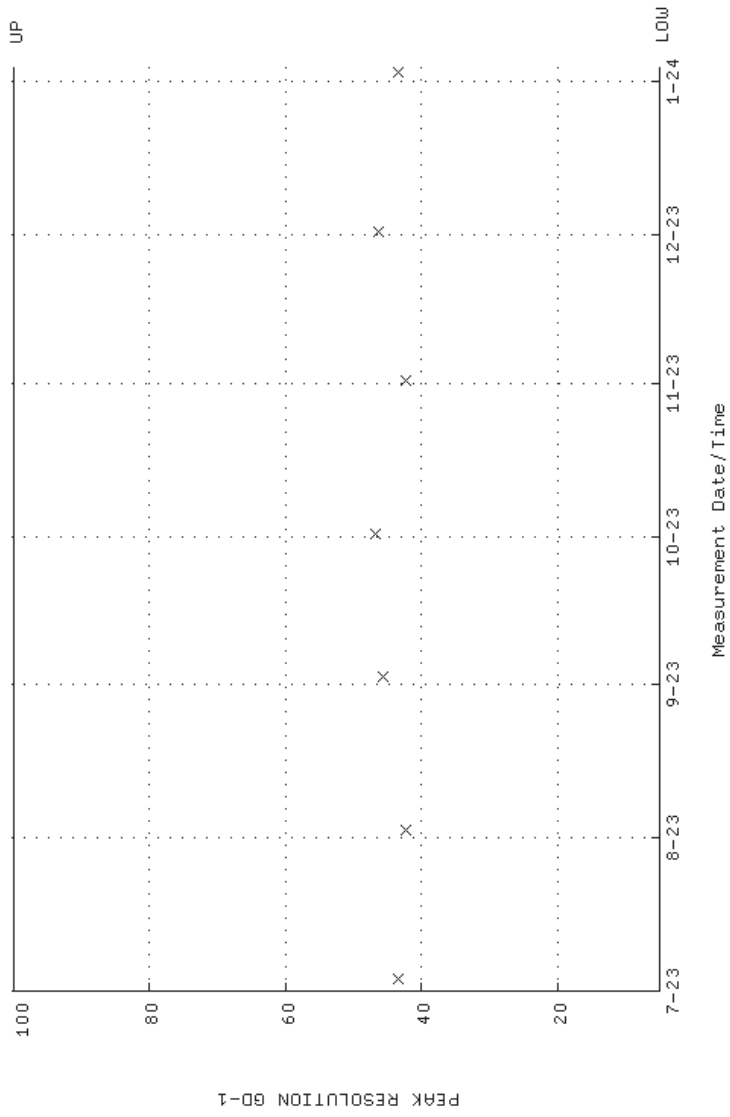
QA filename : DKA100:[ENV\_ALPHA.QA.W]W009.QAF;7  
 Parameter Name : AVREFF (Average Efficiency)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.330290 through 0.350720



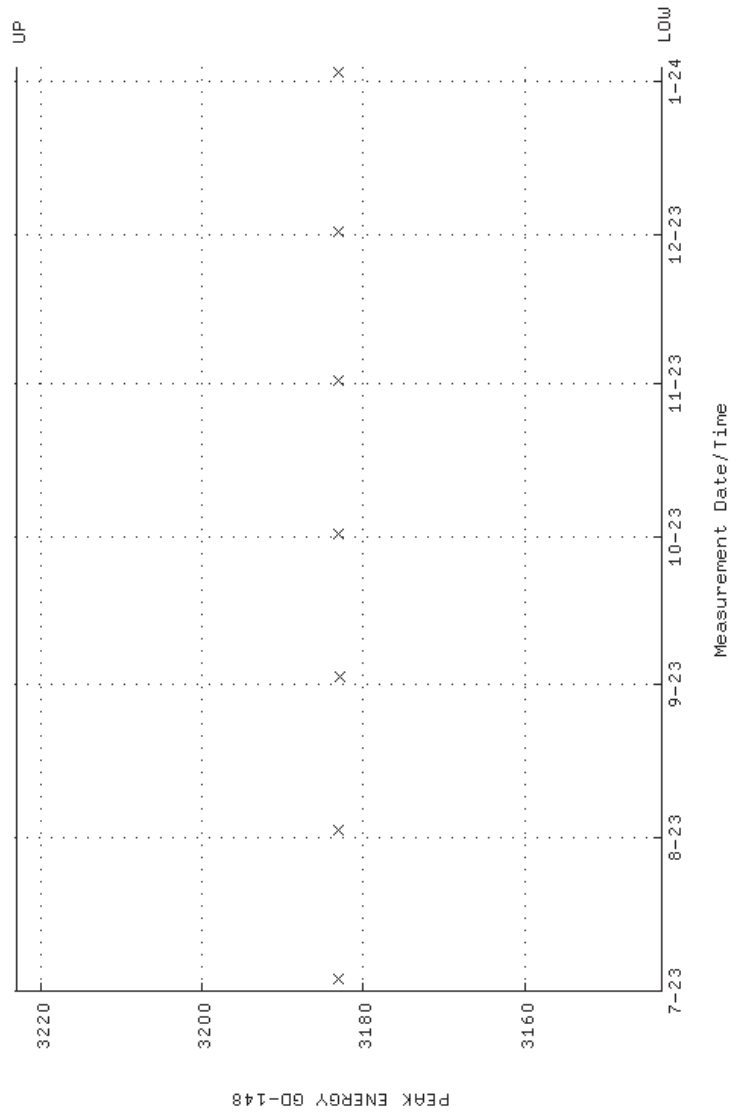
QA filename : DKA100:[ENV\_ALPHA.QA.W]W009.QAF;7  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



QA filename : DKA100:[ENV\_ALPHA.QA.W]W0009.QAF;7  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000

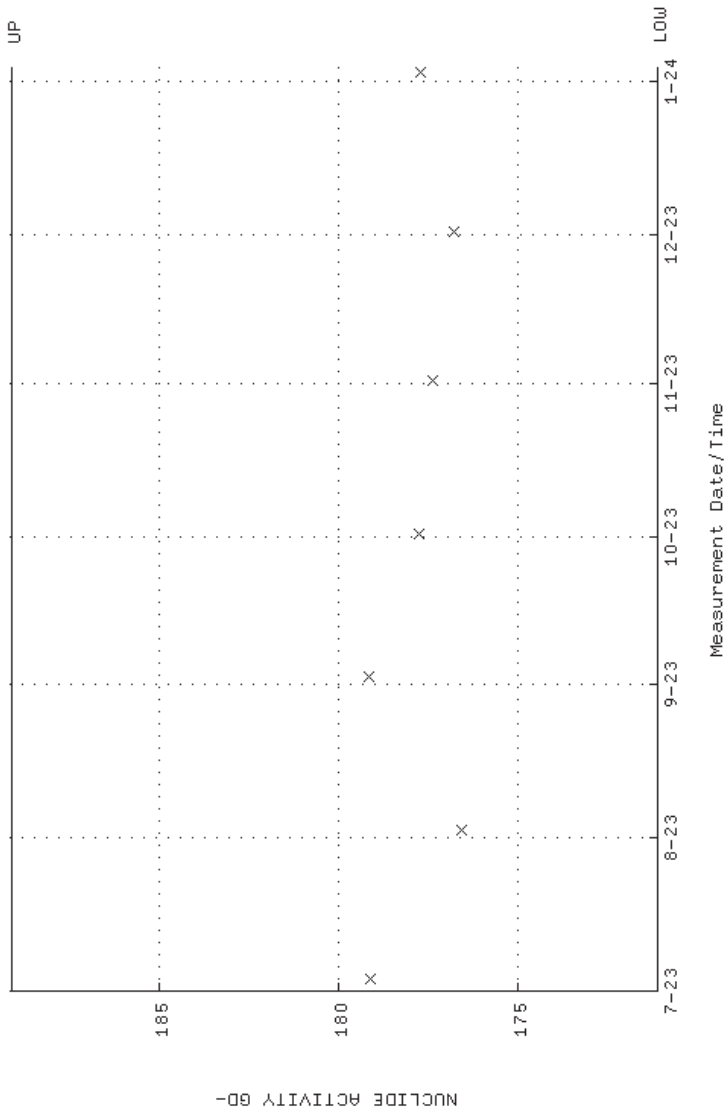


QA filename : DKA100:[ENV\_ALPHA.QA.W]W0009.QAF;7  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00

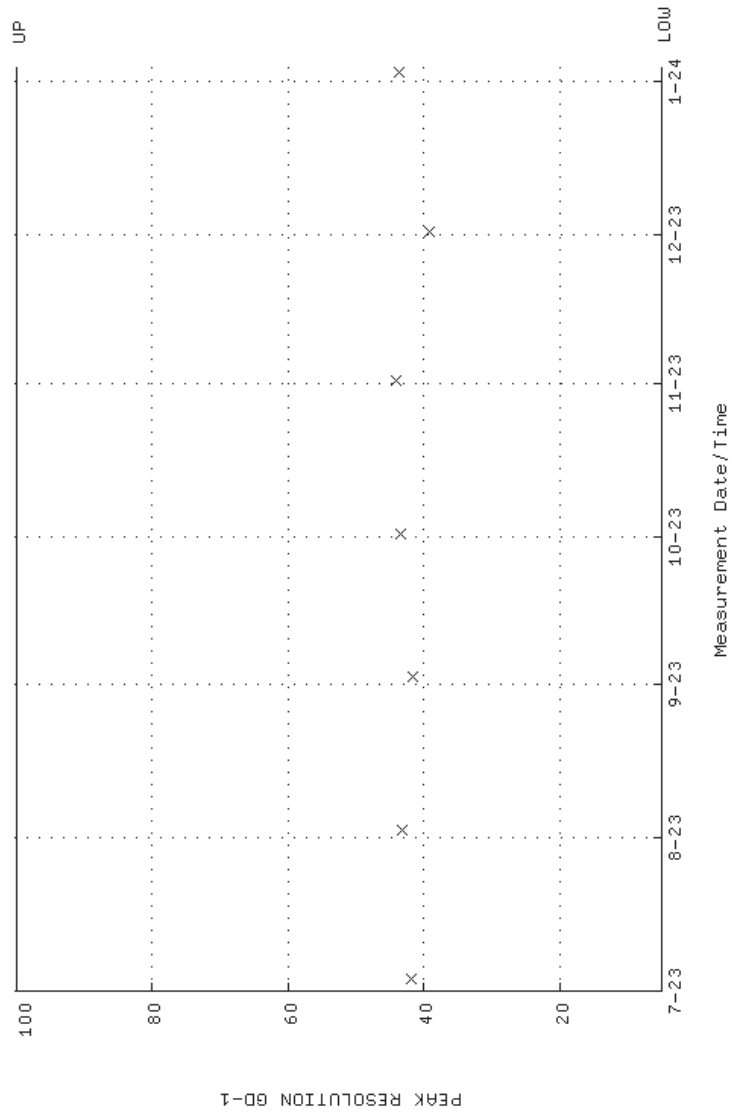




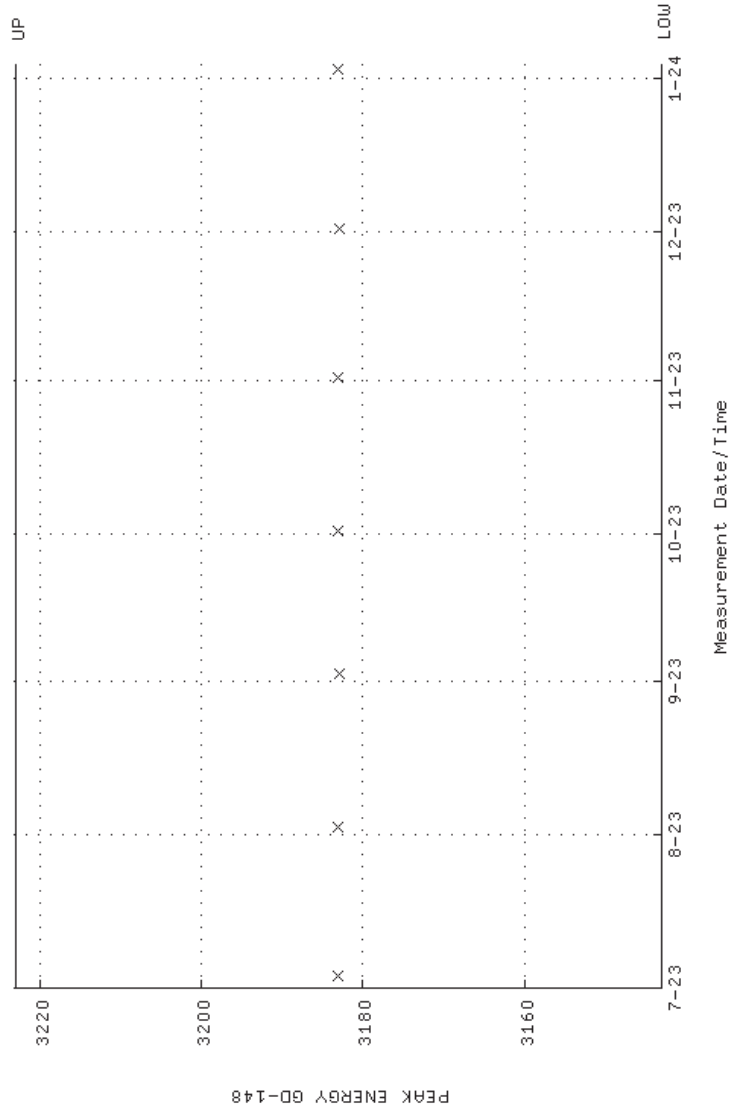
QA filename : DKA100:[ENV\_ALPHA.QA.W]W010.QAF;8  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



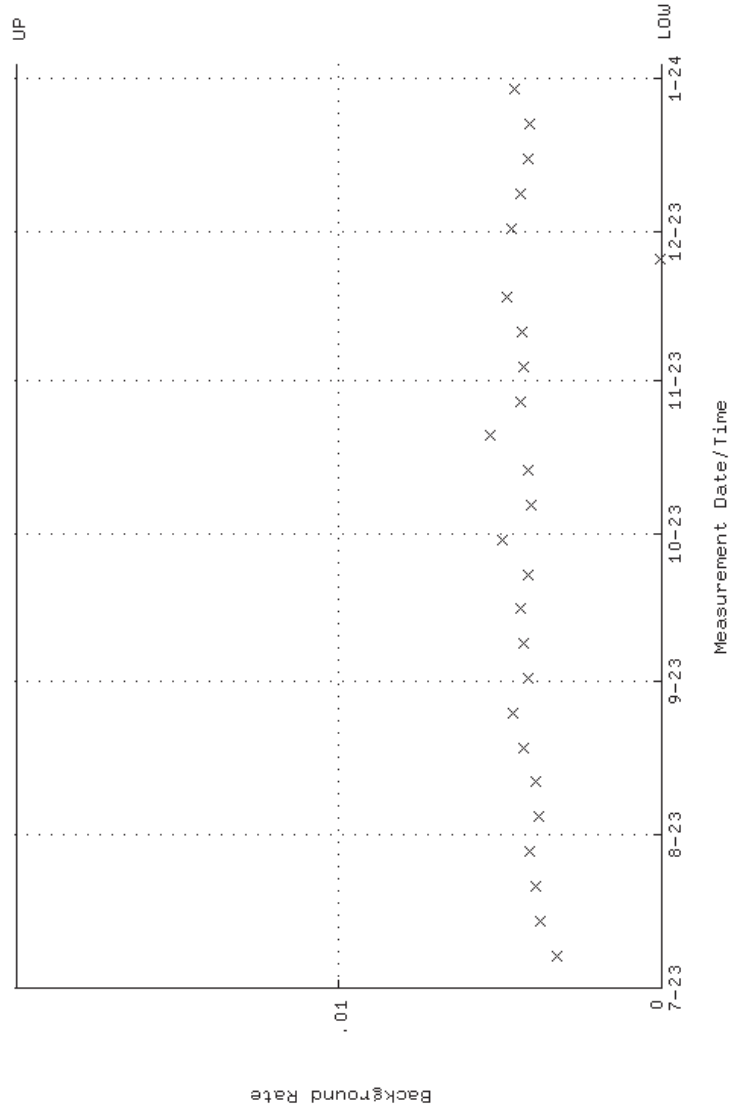
QA filename : DKA100:[ENV\_ALPHA.QA.W]W010.QAF;8  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



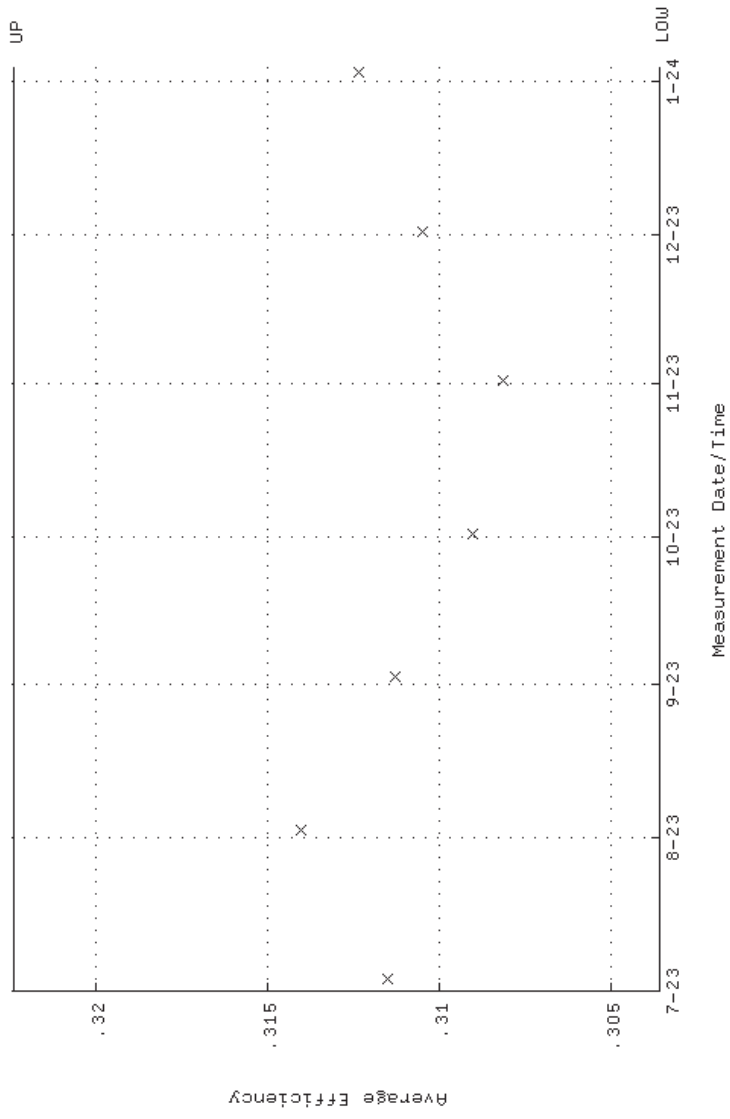
QA filename : DKA100:[ENV\_ALPHA.QA.W]W010.QAF;8  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



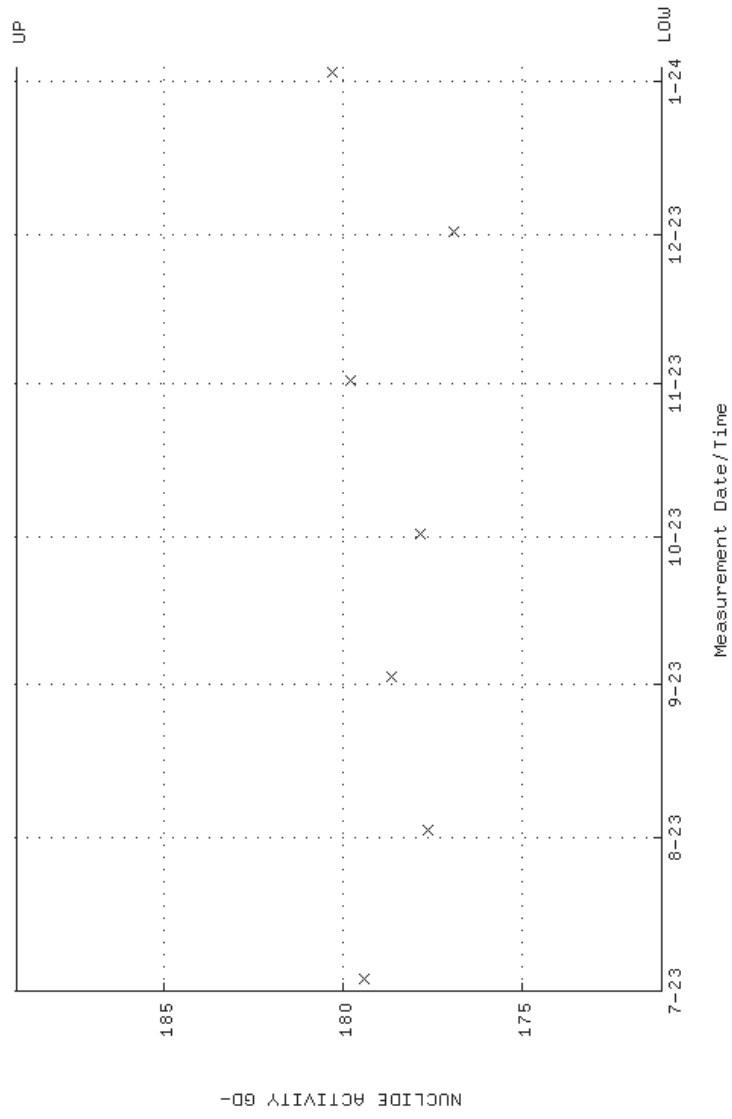
QA filename : DKA100:[ENV\_ALPHA.QA.B]B010.QAF;5  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:14:32 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



QA filename : DKA100:[ENV\_ALPHA.QA.W]W011.QAF;8  
 Parameter Name : AVREFF (Average Efficiency)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.303690 through 0.322370

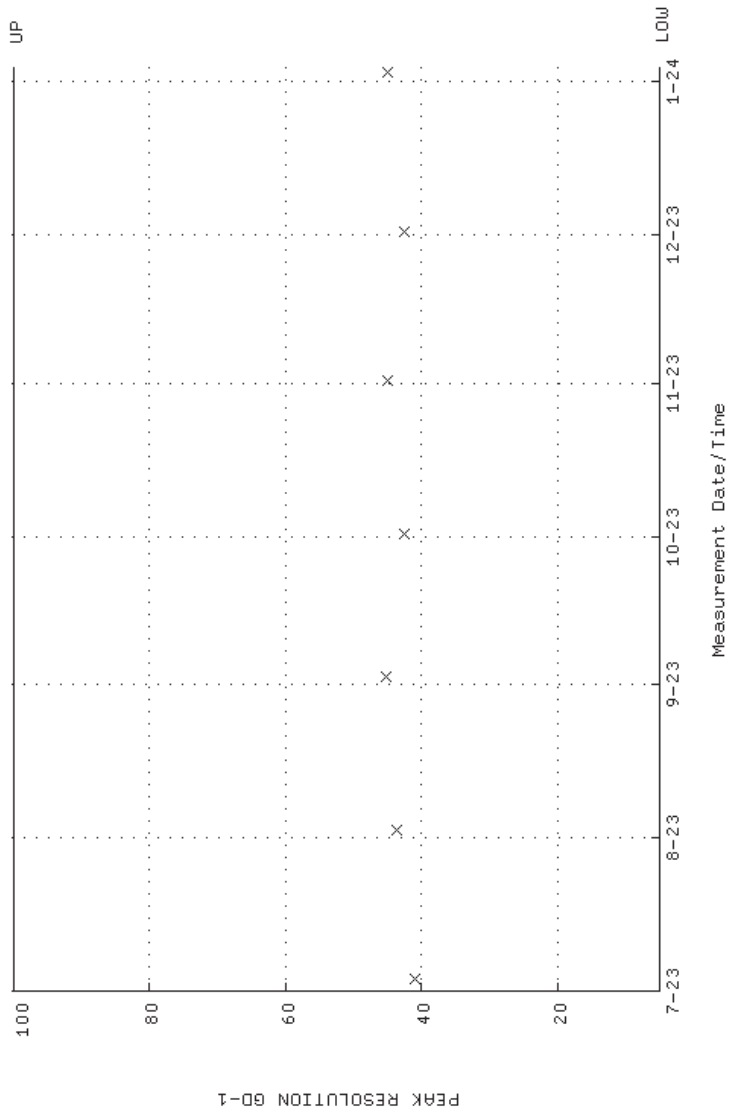


QA filename : DKA100:[ENV\_ALPHA.QA.W]W011.QAF;8  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100

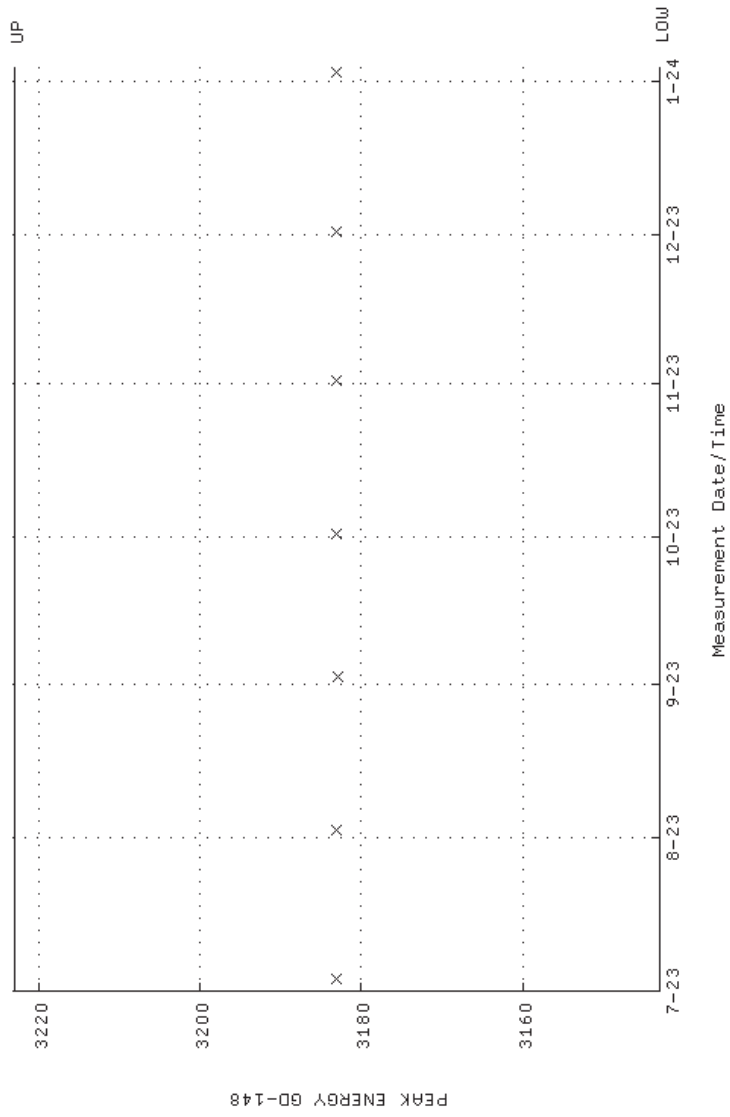




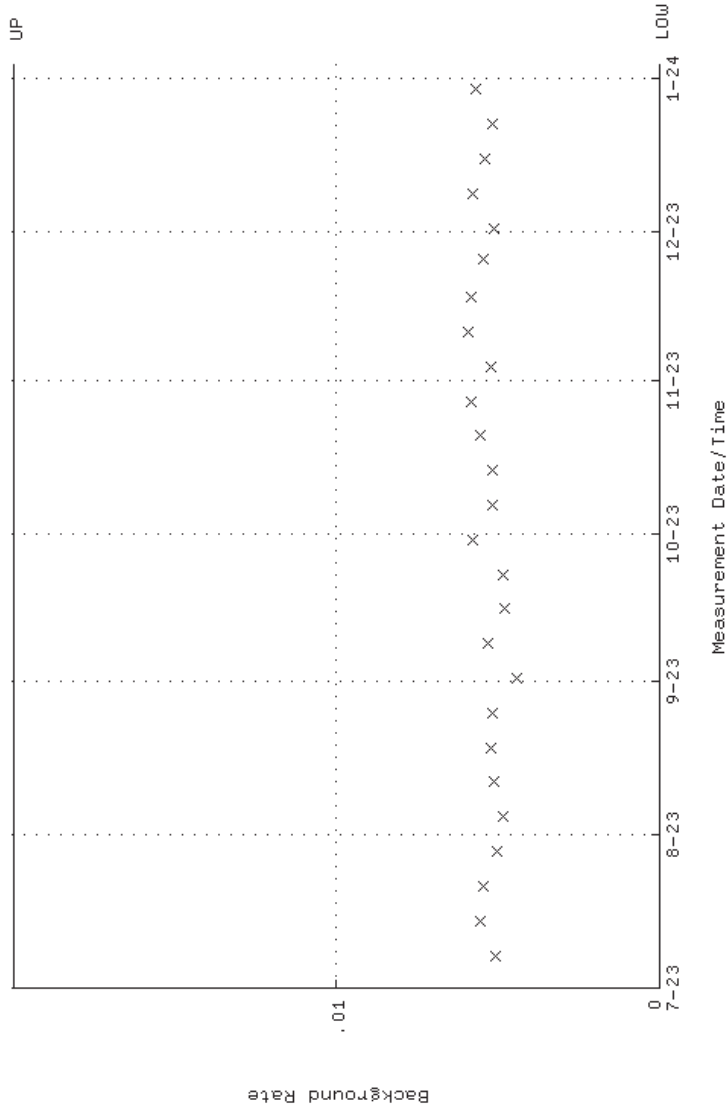
QA filename : DKA100:[ENV\_ALPHA.QA.W]W011.QAF;8  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



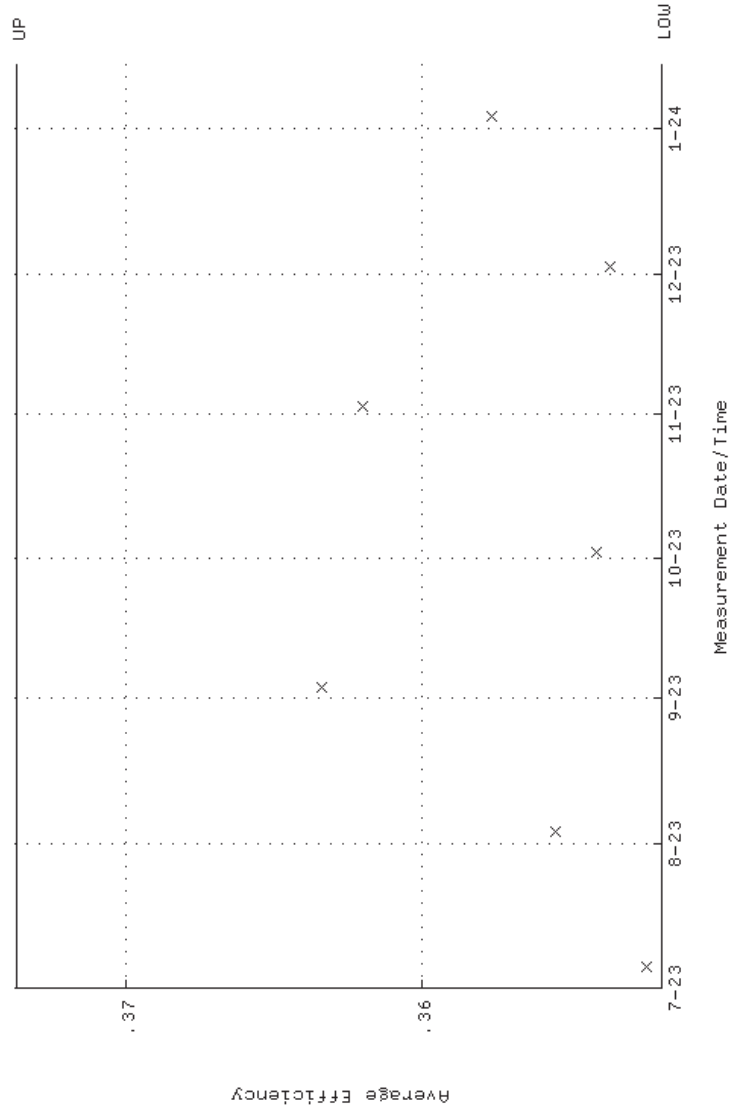
QA filename : DKA100:[ENV\_ALPHA.QA.W]W011.QAF;8  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 3-JUL-2023 10:08:30 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



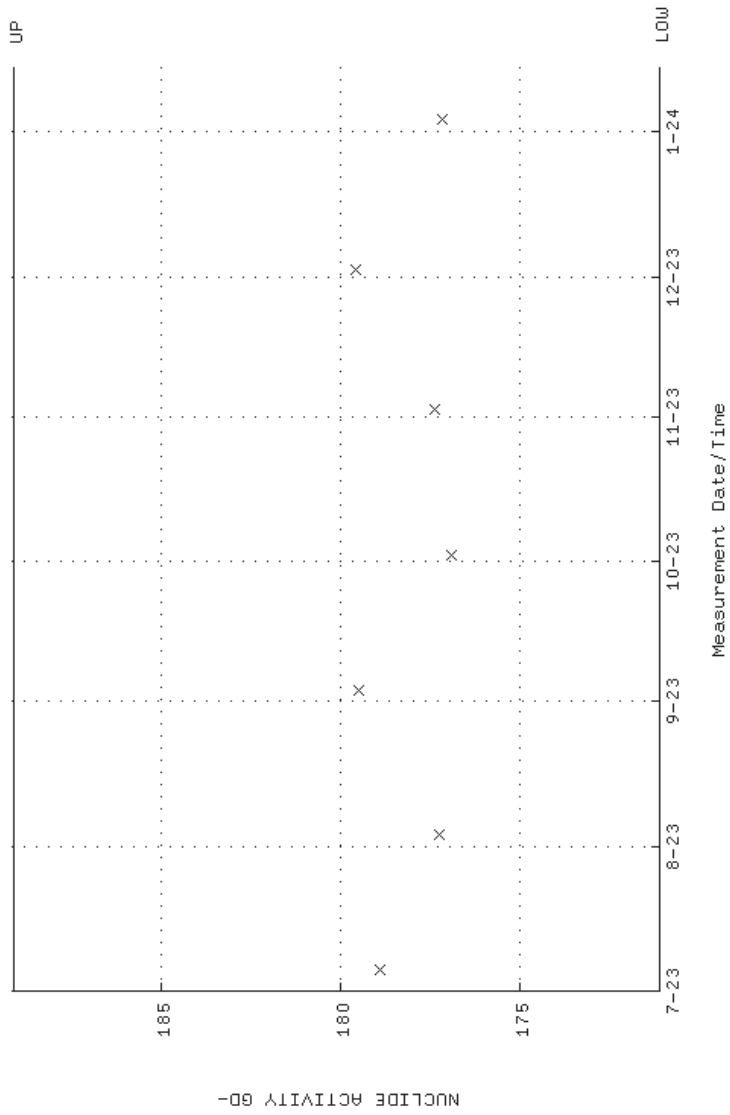
QA filename : DKA100:[ENV\_ALPHA.QA.B]B011.QAF;5  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:14:32 through 3-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



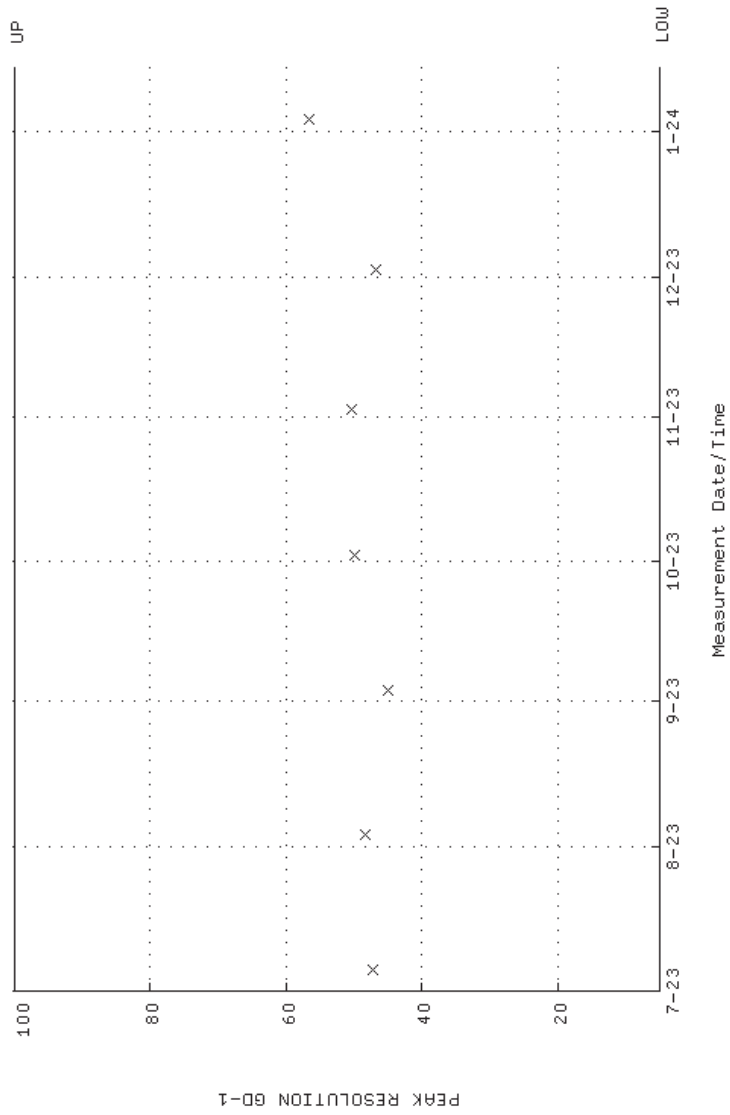
QA filename : DKA100:[ENV\_ALPHA.QA.W]W044.QAF;9  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.351920 through 0.373690



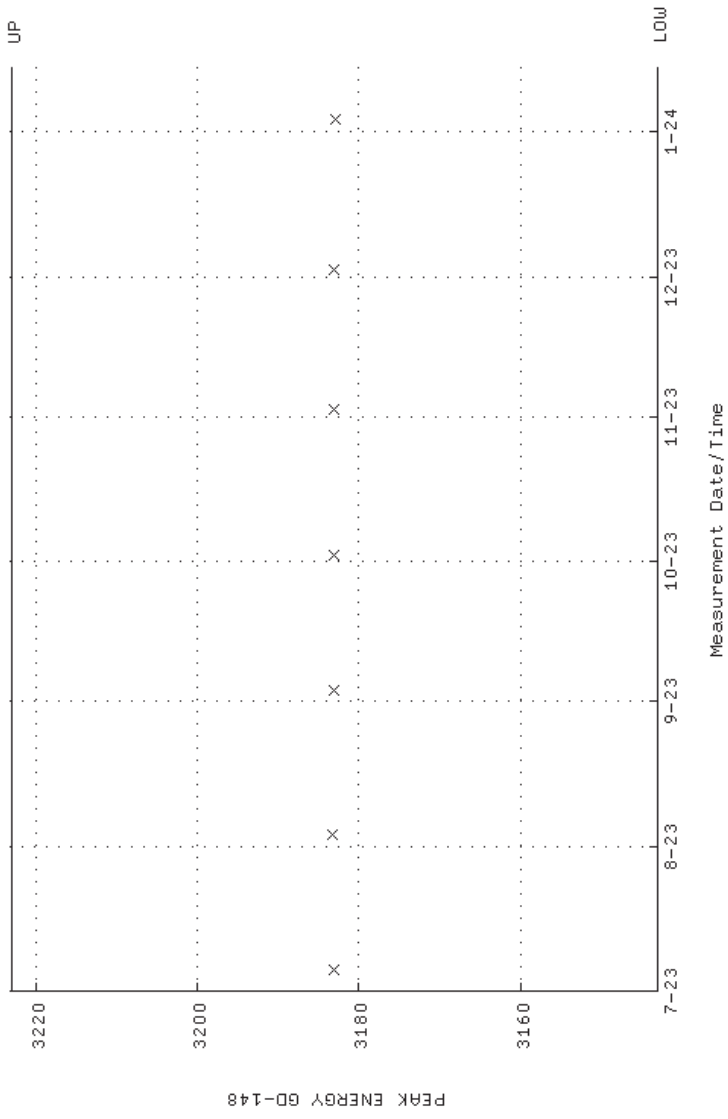
QA filename : DKA100:[ENV\_ALPHA.QA.W]W044.QAF;9  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
Lower/Upper Lmts: 171.090 through 189.100



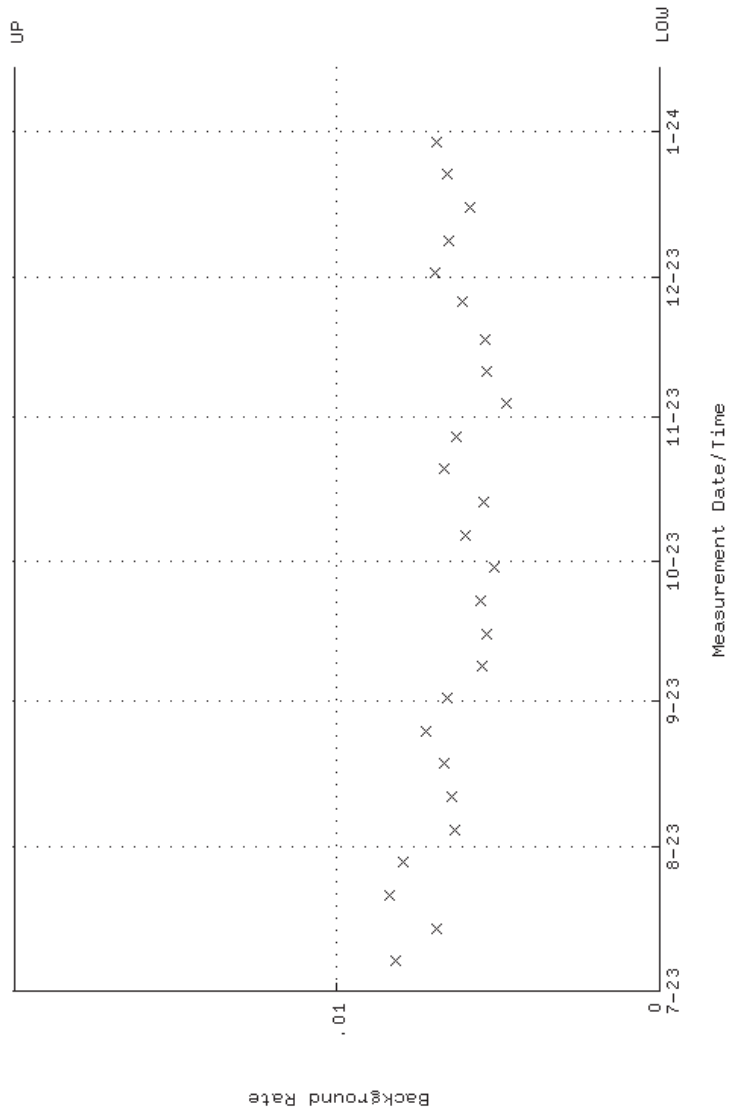
QA filename : DKA100:[ENV\_ALPHA.QA.W]W044.QAF;9  
Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
Lower/Upper Lmts: 5.00000 through 100.000



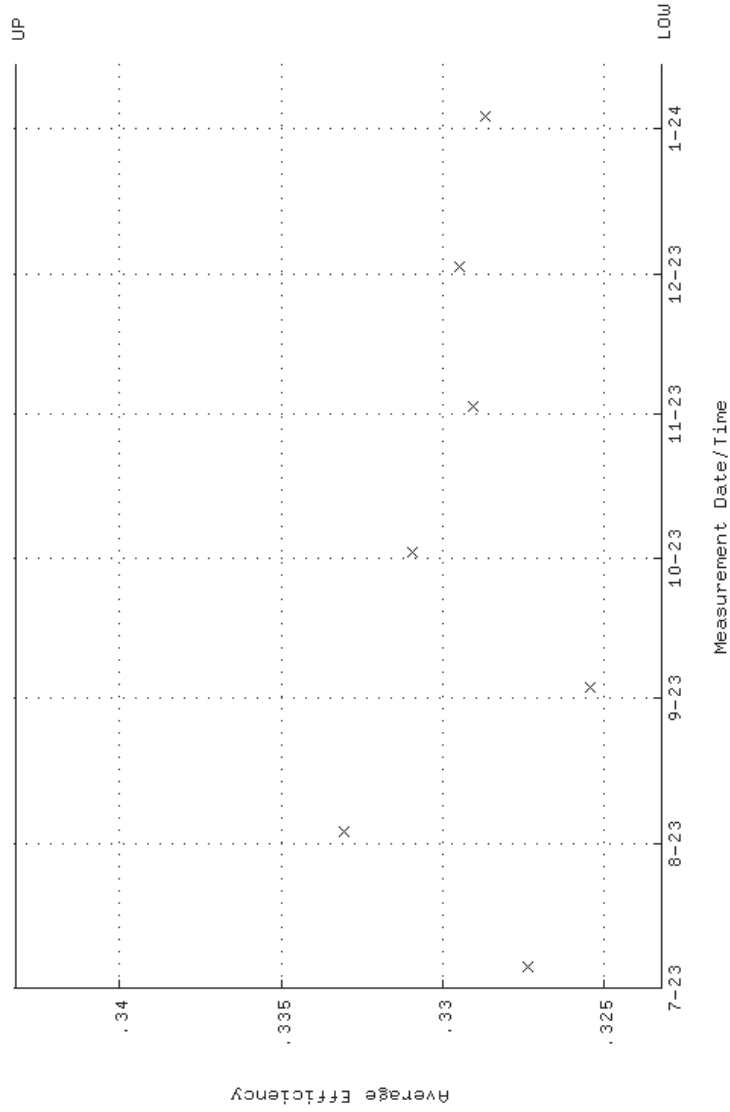
QA filename : DKA100:[ENV\_ALPHA.QA.W]W044.QAF;9  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



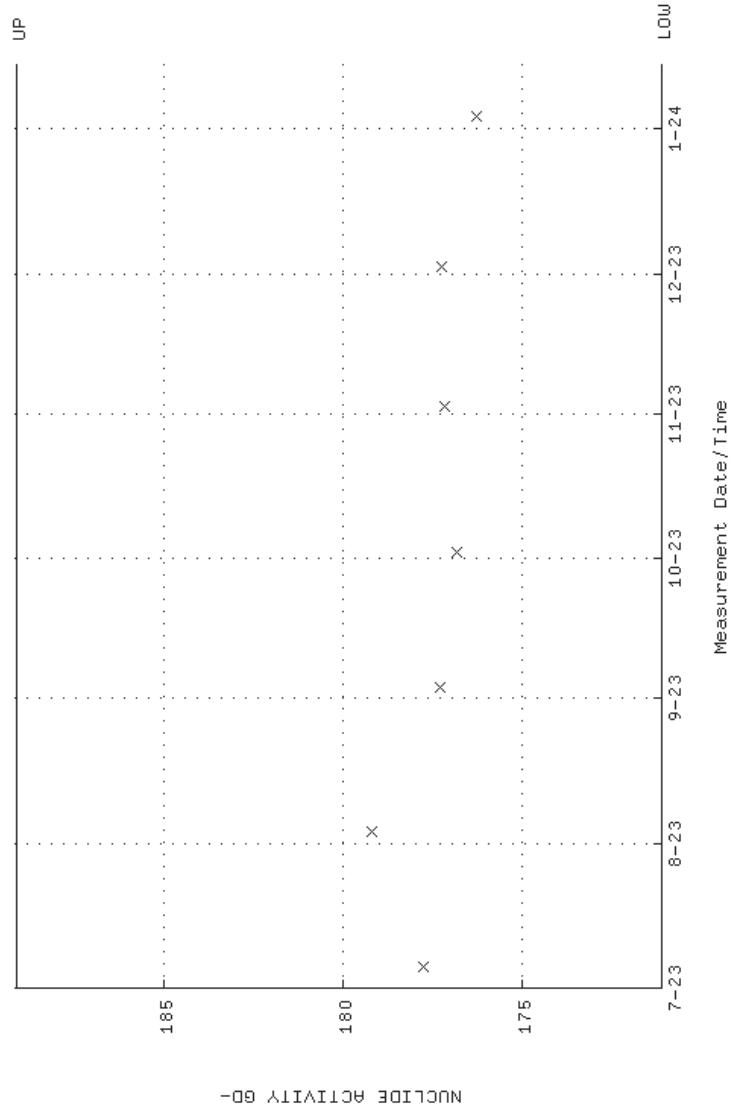
QA filename : DKA100:[ENV\_ALPHA.QA.B]B044.QAF;5  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:20:00 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



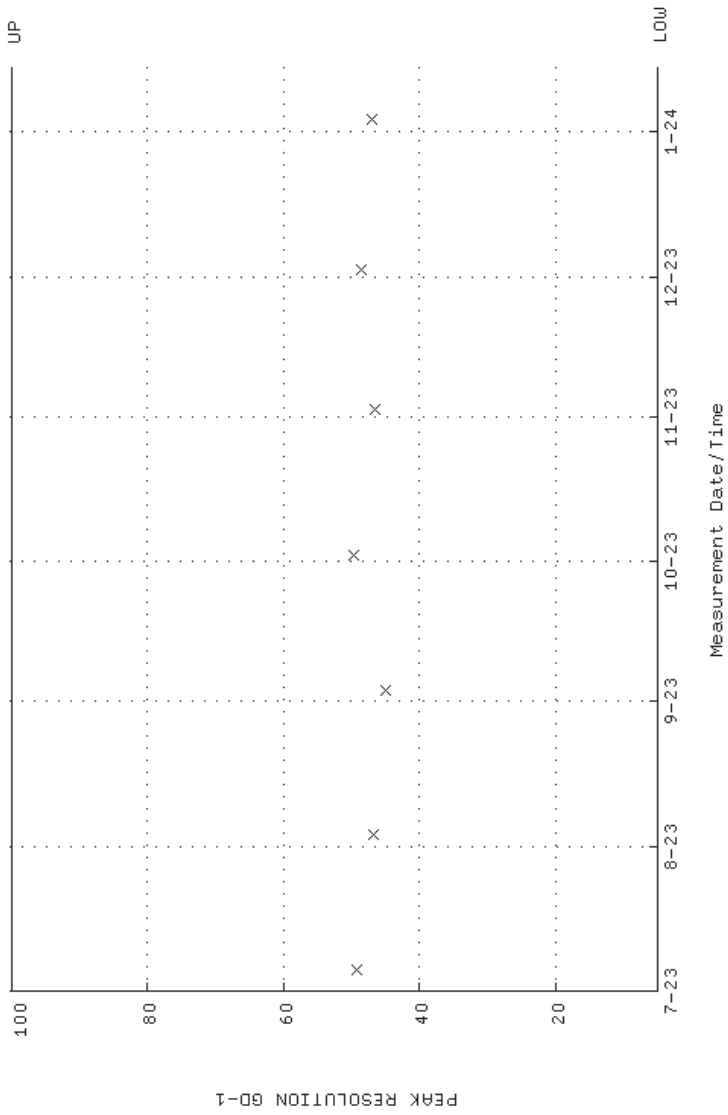
QA filename : DKA100:[ENV\_ALPHA.QA.W]U045.QAF;8  
Parameter Name : AVRGEFF (Average Efficiency)  
Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
Lower/Upper Lmts: 0.323230 through 0.343220



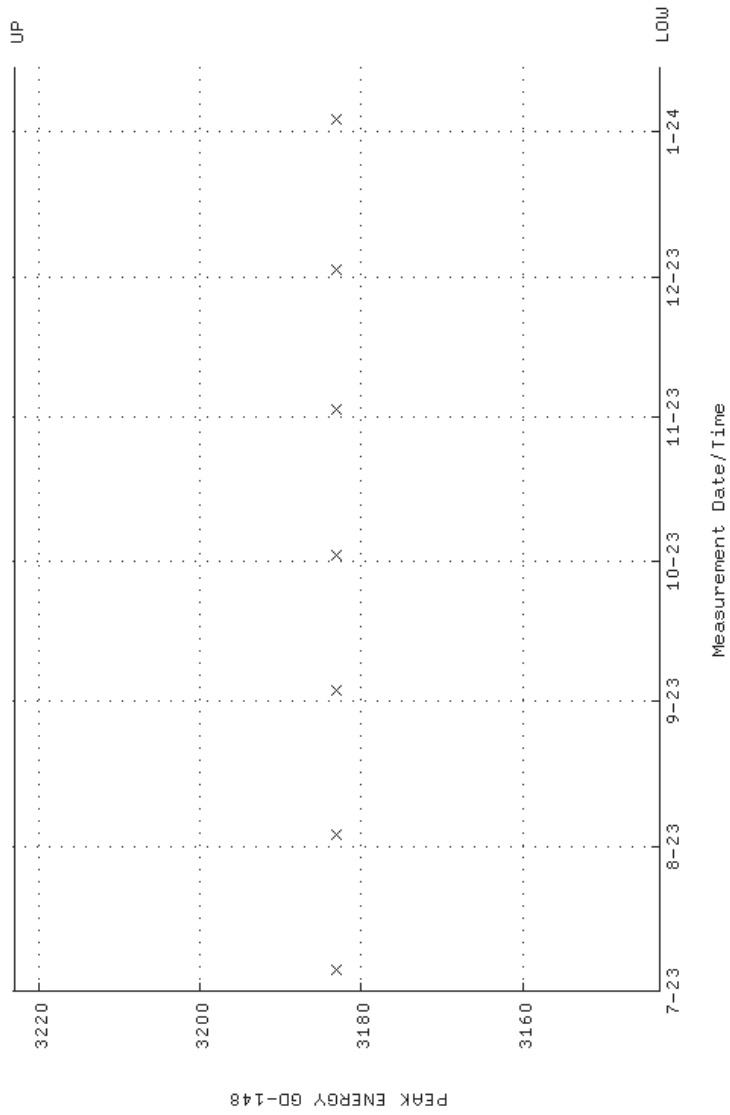
QA filename : DKA100:[ENV\_ALPHA.QA.W]U045.QAF;8  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
Lower/Upper Lmts: 171.090 through 189.100



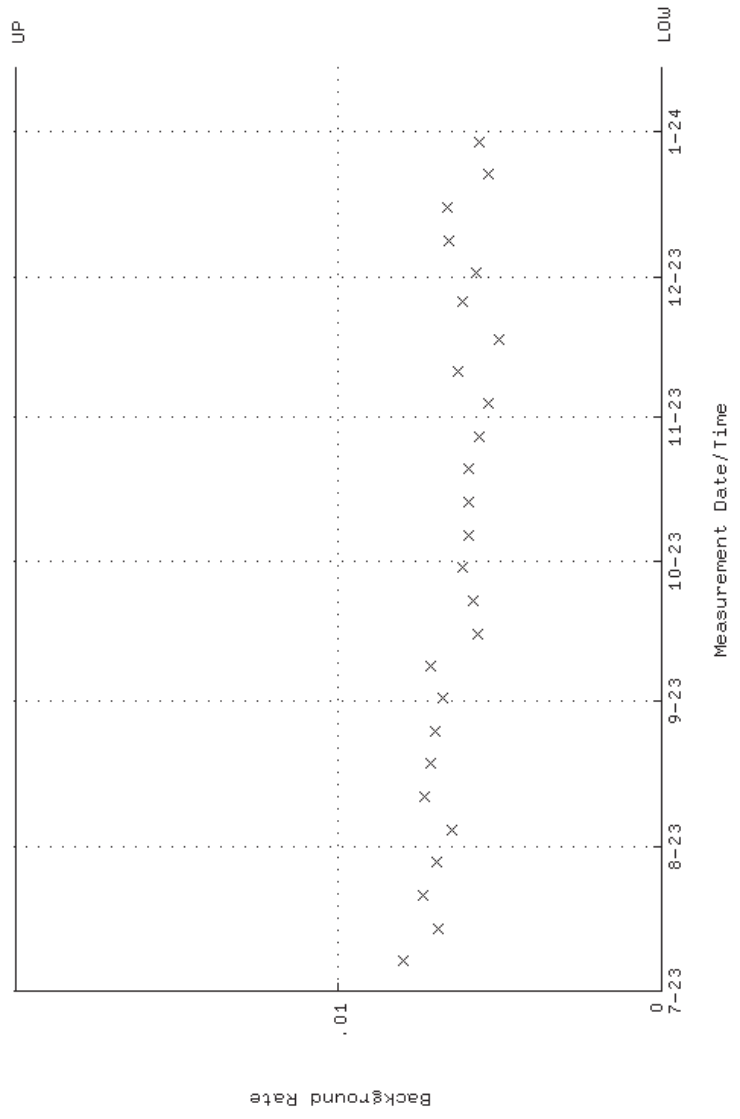
QA filename : DKA100:[ENV\_ALPHA.QA.W]U045.QAF;8  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



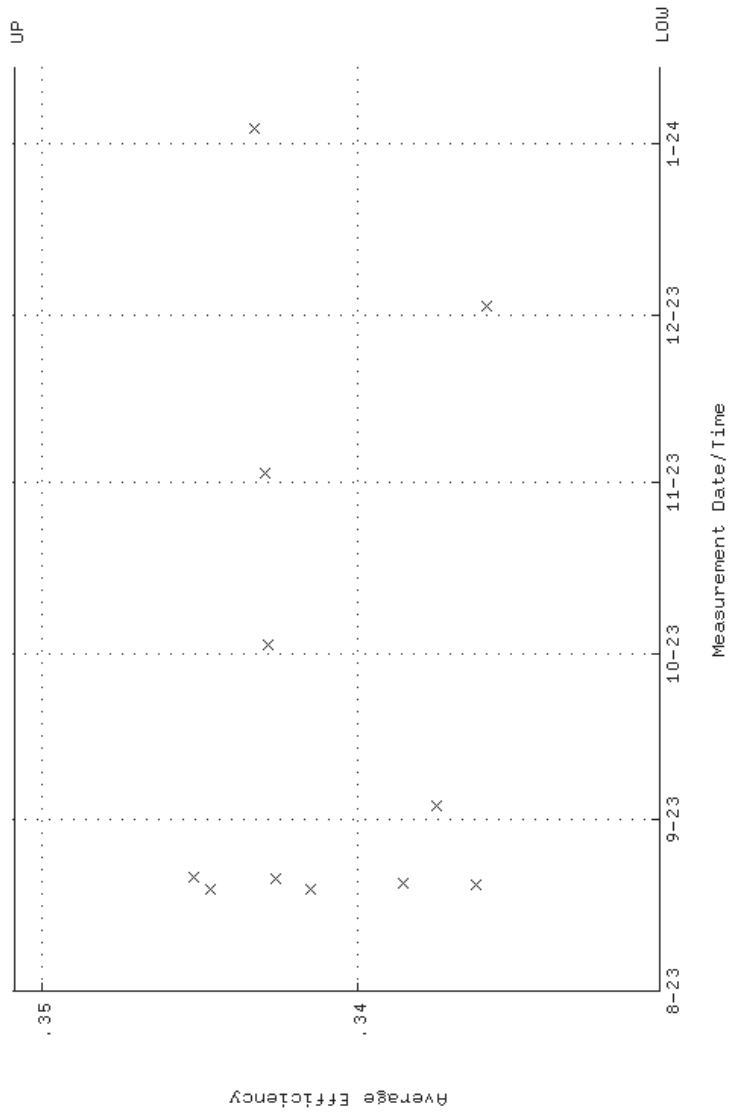
QA filename : DKA100:[ENV\_ALPHA.QA.W]U045.QAF;8  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



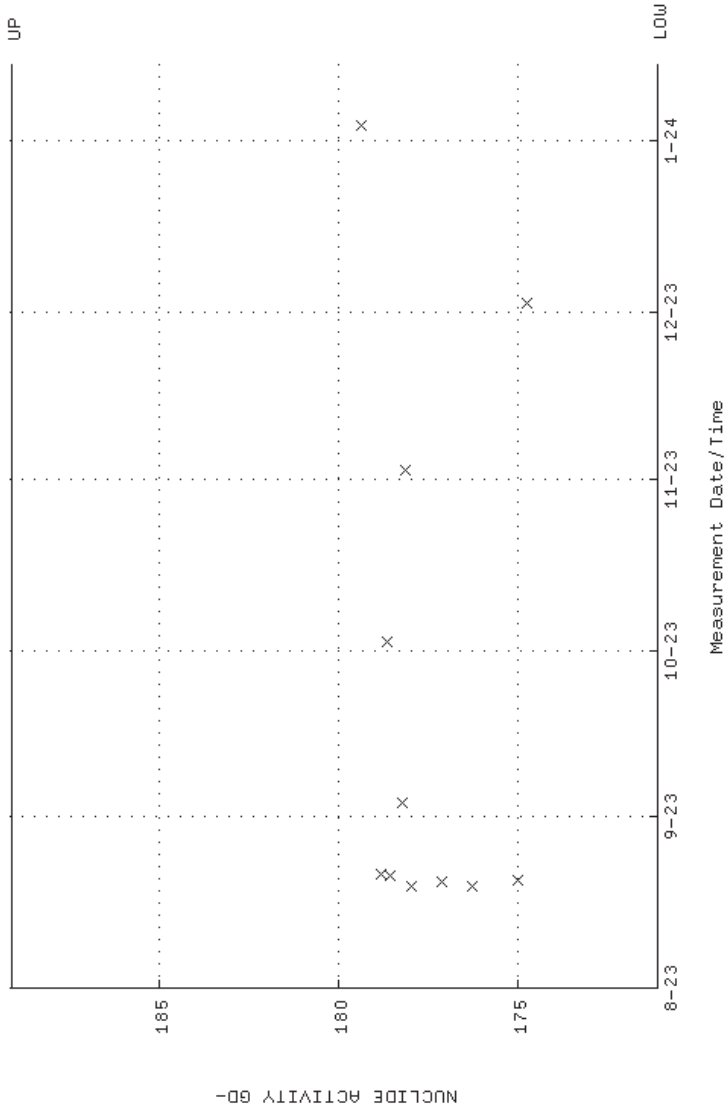
QA filename : DKA100:[ENV\_ALPHA.QA.B]B045.QAF;4  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:20:00 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



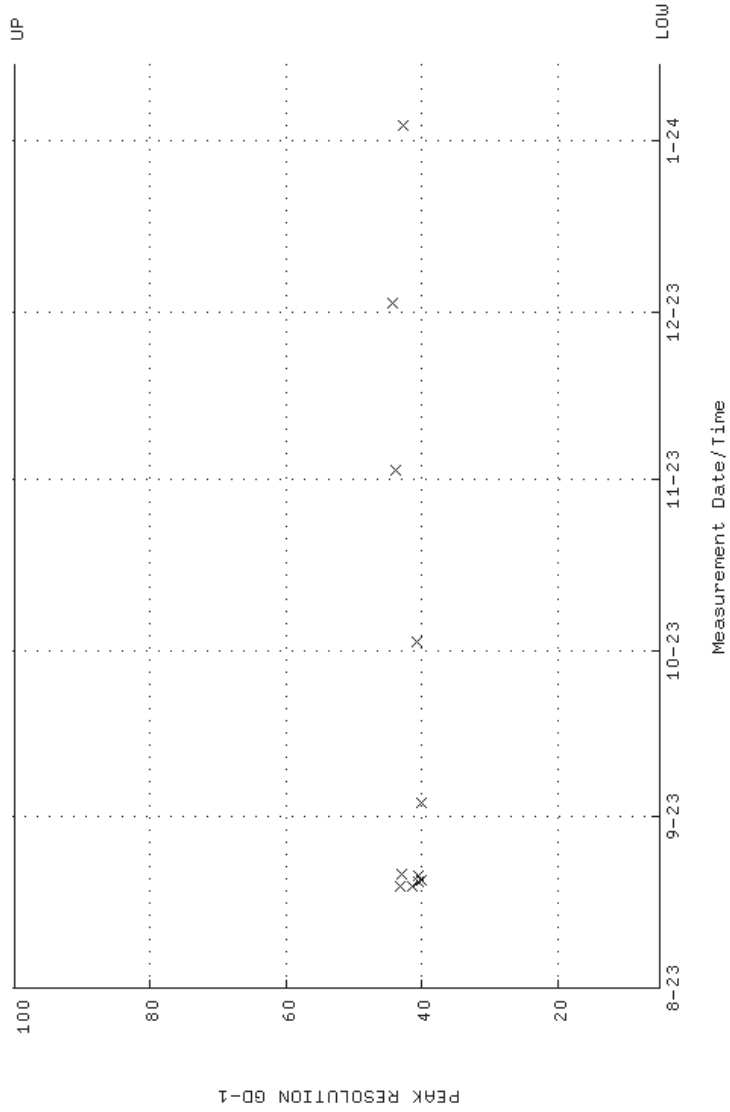
QA filename : DKA100:[ENV\_ALPHA.QA.W]W046.QAF;8  
 Parameter Name : AVREFF (Average Efficiency)  
 Start/End Dates : 19-AUG-2023 08:20:07 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.330425 through 0.350863



QA filename : DKA100:[ENV\_ALPHA.QA.W]U046.QAF;8  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 19-AUG-2023 08:20:07 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



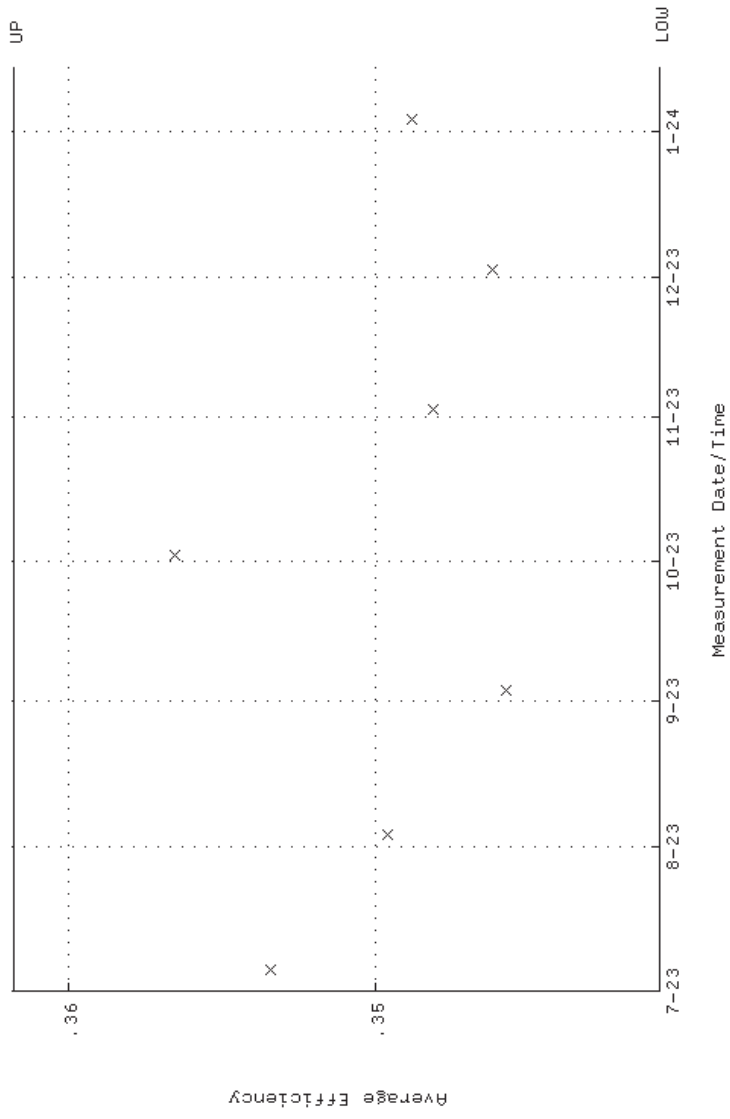
QA filename : DKA100:[ENV\_ALPHA.QA.W]U046.QAF;8  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 19-AUG-2023 08:20:07 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



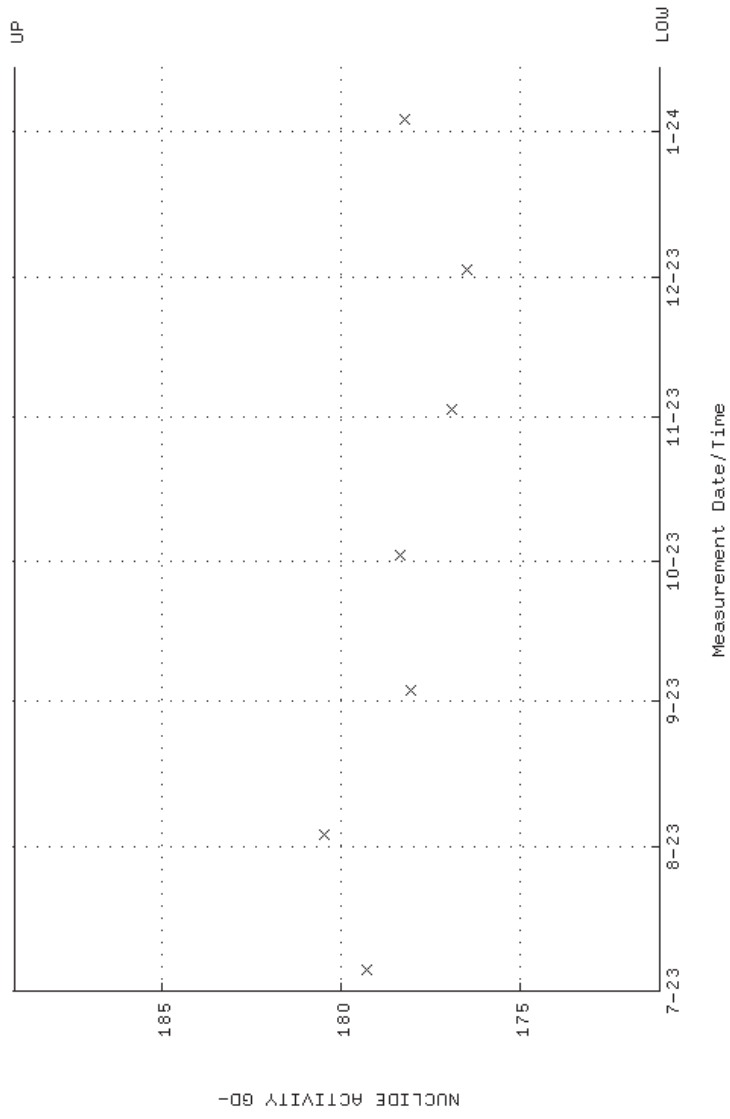




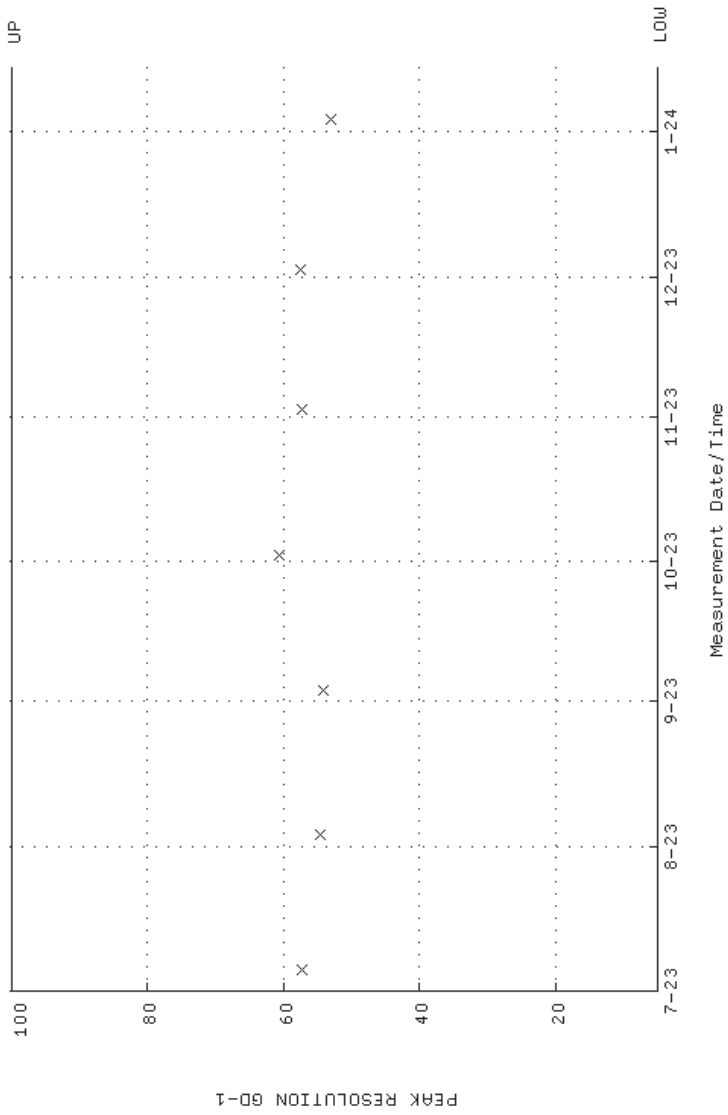
QA filename : DKA100:[ENV\_ALPHA.QA.W]U047.QAF;9  
 Parameter Name : AVREFF (Average Efficiency)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.340710 through 0.361790



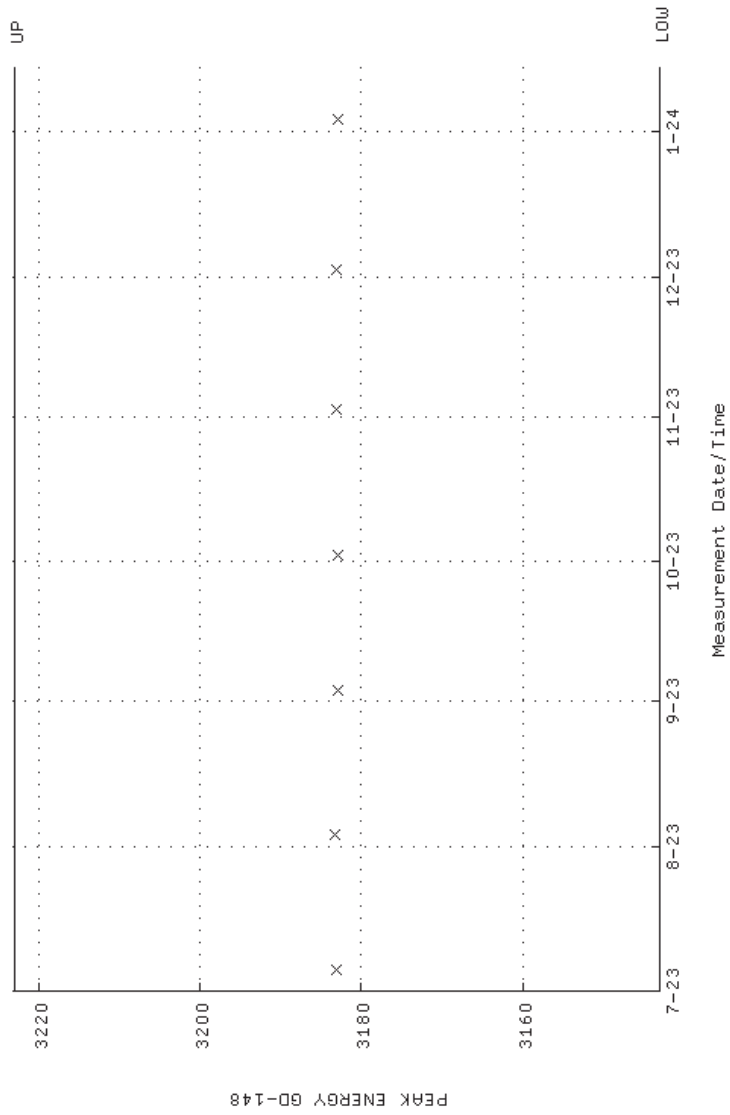
QA filename : DKA100:[ENV\_ALPHA.QA.W]U047.QAF;9  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 171.090 through 189.100



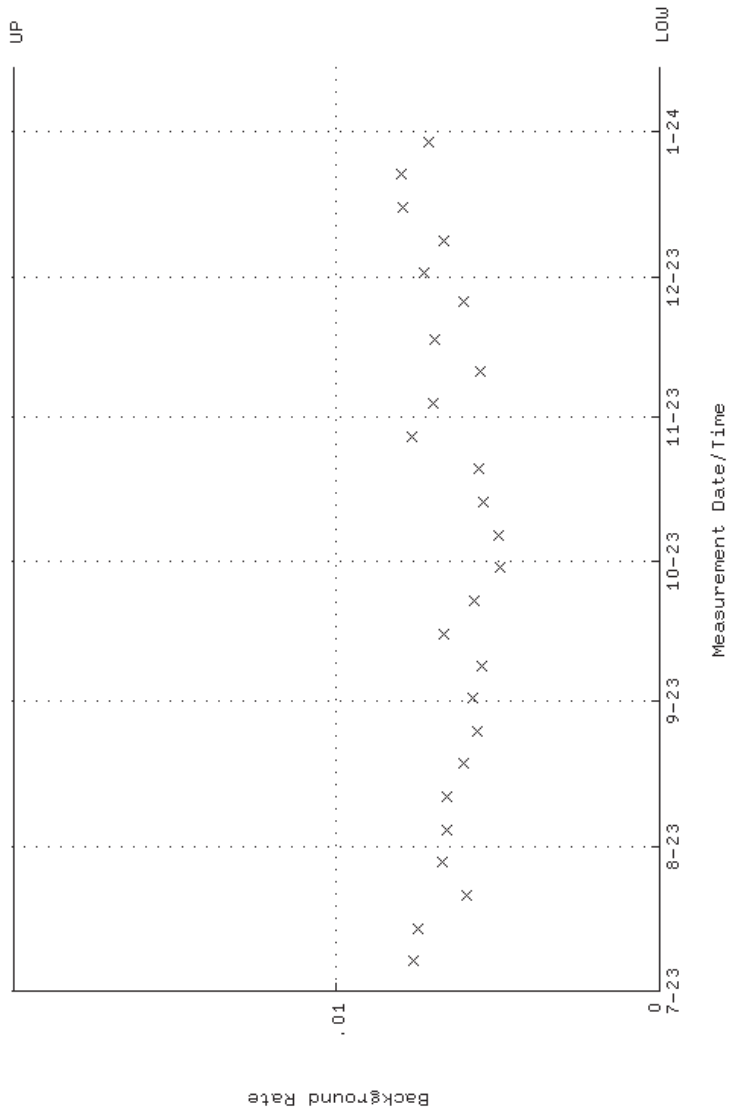
QA filename : DKA100:[ENV\_ALPHA.QA.W]U047.QAF;9  
 Parameter Name : PSFWM-GD148 (PEAK RESOLUTION GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 5.00000 through 100.000



QA filename : DKA100:[ENV\_ALPHA.QA.W]U047.QAF;9  
 Parameter Name : PSENERGY-GD148 (PEAK ENERGY GD-148)  
 Start/End Dates : 5-JUL-2023 09:56:23 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 3143.00 through 3223.00



QA filename : DKA100:[ENV\_ALPHA.QA.B]B047.QAF; 5  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 7-JUL-2023 11:20:00 through 14-JAN-2024 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



# RAD Standards Traceability

1845

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.ezag.com

Received: 12-1-17 12:00

**CERTIFICATE OF CALIBRATION**  
Standard Reference Source

**SRS Number:** 108018

**Source Description:** 5 mL Liquid in Flame Sealed Ampoule

**Product Code:** 8229

**Customer:** GEL Laboratories LLC

**P.O. Number:** GEL1718798, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by Eckert & Ziegler Analytics (EZA). 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. EZA maintains traceability to the National Institute of Standards and Technology (NIST) 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."

**Reference Date:** 29-November-2017 12:00 PM EST

Isotope	Half-Life, d	Activity, Bq	Uncertainty			Calibration Method**
			$u_1$ , %	$u_R$ , %	$U$ , %*	
Th-229	2.897E+06	1.999E+04	0.5	1.5	3.1	4π LS

\***Uncertainty:** U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results." \*\***Calibration Methods:** 4π LS - 4π Liquid Scintillation Counting, HPGc - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber.

(Certificate continued on reverse side)

**SRS Number:** 108018

**Comments:**

5.21561 g of 0.5 M HNO<sub>3</sub> solution, carrier free.

**Impurities:**


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

α-impurities: Th-228 6.6E+00 Bq, Th-230 1.2E+02 Bq, Th-232 8.0E+00 Bq

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Prepared by: 

K. Hardley, Radiochemist

QC Approved by: 

J. Lahr, Spectroscopist

Date: 27-NOV-17



01/11/2023	Tim Chandler	4.1664	1000	2073-A	48.3252 dpm/mL	01/11/2023	01/11/2024
01/11/2023	Tim Chandler	4.1664	1000	2074-A	48.3252 dpm/mL	01/11/2023	01/11/2024

GEL Laboratories LLC  
Version 1.0 9/18/2000

## Verification for Th-229 Standard 1845-I

v1.2

Analyst	MXS2
Verification Prep Date	6/27/2023

Tracer Information	
Isotope	Th-232
Serial Number	1513-J
Amount of Std. (mL)	0.2
Expiration Date	4/25/2024

Standard Information	
Isotope	Th-229
Serial Number	1845-I
Isotope Half-life	7.3400E+03 Y
Reference Date	11/29/2017
Ref. Act. (dpm/mL)	48.093259
Amount of Std. (mL)	0.2
Standard Prep Date	6/27/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	6/28/2023	4.260	47.29
2	6/27/2023	4.470	49.62
3	6/27/2023	4.490	49.84

Mean Value = 4.407      48.914  
Stdev = 0.127410099      1.414252099

pCi  
48.0679  
2.8285  
4.8914  
Pass  
101.76%  
Pass

Certificate Value\* = 4.3304  
Two sigma = 0.2548  
10 % of Mean = 0.4407  
Rule A (Pass/Fail) Pass  
% Recovery 101.76%  
Rule B (Pass/Fail) Pass  
Expiration Date 6/27/2024

**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 Th-229 standard 1845-I using 0.2 mL for each source. Each standard was combined with 0.2 mL of Th-232 standard 1513-J and was diluted in a centrifuge tube containing 4 mL 2M HCl, diluted to 40 mL with DI water. 0.1 mL of neodymium carrier and 5 mL of 48% HF was added to precipitate neodymium (and Thorium) 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 Th-229 were calculated by comparison to Th-232 certified values.

*6/30/23*

1506 1513  
or 11/30/14  
**RECEIVED**  
11/30/14  
21

## CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> Th-232	<b>Customer:</b> GEL LABORATORIES, LLC
<b>Half-life:</b> (1.405 ± 0.006)E+10 years	<b>P.O. No.:</b> 7347RD
<b>Catalog No.:</b> 7232	<b>Reference Date:</b> 1-Nov-10 12:00 PST
<b>Source No.:</b> 1451-62	<b>Contained Radioactivity:</b> 50.26 nCi 1860 Bq (Th-232 only)

**Physical Description:**

A. Mass of solution:	5.73256 g in 5 mL flame-sealed ampoule
B. Chemical form:	Th(NO <sub>3</sub> ) <sub>4</sub> in H <sub>2</sub> O
C. Carrier content:	None
D. Density:	1.15 g/mL @ 20°C

**Radioimpurities:**

Not determined

**Radionuclide Concentration:** 8.767 nCi/g, 324.4 Bq/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 NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

  
Quality Control

15-OCT-10  
Date

EZIP Ref. No.: 1451-62

RC-S-060-058

ISO 9001 CERTIFIED

### Standard Logbook

<b>Serial ID:</b> 1513	<b>Open/Reference Date:</b> 01-NOV-10	<b>Aliquot :</b> 5.73256 g
<b>Name:</b> Thorium-232	<b>Received:</b> 21-OCT-10	<b>Density :</b> Hand Calculated g/mL
<b>Type:</b> Source Material	<b>Expires:</b> 30-NOV-11	<b>Logbook Num :</b> RC-S-060-058
<b>Employee:</b> Gregory Ramsay	<b>Verified:</b> 28-APR-11	<b>Lot Number :</b> 1451-62
<b>Supplier:</b> Eckert & Ziegler		<b>Solvent :</b> DI water
		<b>Uncertainty :</b> 1.172 PERCENT

**Description:** in water  
**Comments:** None

Analyte	Concentration	Analyte	Concentration
Thorium-232	324.4 Bq/g		





## Standard Traceability Log Rad

Source Material Info	
Parent Code:	1513
Prepared By:	Gregory Ramsay
Carrier Conc:	DI water
Reference Date:	11/01/2010
Ampoule Mass (g):	5.73256 g
Uncertainty:	+/- 1.172 %
LogBook No:	RC-S-060-058
Supplier:	Eckert & Ziegler

A Solution Material Info		
Isotope:	Thorium-232	
Prepared By:	Christina Kimball	
Prep Date:	04/19/2011	
Verification Date:	04/25/2023	
Expiration Date:	04/25/2024	
Primary Code:	1513-A	
Dilution(mL):	250 mL	
Mass of Parent(g):	5.672 g	
Density(g/mL):	1.0020	Balance ID: 60108592

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

$(\text{Mass of parent(g)} * (\text{Parent Activity (Bq/g)} * (\text{conversion dpm to Bq}) / (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parent Activity (Bq/g)} * (\text{conversion dpm to Bq}) / \text{Density (g/mL)}) / (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(5.672 \text{ g}) * (324.4 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (250 \text{ mL}) = 441.5992 \text{ dpm/mL}$
$(5.672 \text{ g}) * (324.4 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (1.0020 \text{ g/mL}) / (250 \text{ mL}) = 440.7354 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/19/2011	Christina Kimball	5.0665	100	1513-B	22.3299 dpm/mL	04/11/2013	04/11/2014
02/26/2014	Matelon DeFreese	100.0316	1000	1513-C	44.08747 dpm/mL	12/14/2022	12/14/2023
04/18/2014	Christina Kimball	5.0477	100	1513-D	22.247 dpm/mL	07/14/2023	07/14/2024
01/04/2016	Christina Kimball	.2487	100	1513-E	1.096117 dpm/mL	02/11/2020	02/11/2021
08/01/2016	Christina Kimball	2.053	250	1513-F	3.61932 dpm/mL	07/21/2023	07/21/2024
02/21/2020	Christina Kimball	.248	100	1513-G	1.093 dpm/mL	02/16/2023	02/16/2024
11/11/2022	Christina Kimball	.3	100	1513-H	1.3222 dpm/mL	11/14/2022	11/14/2023
12/13/2022	Christina Kimball	.23	100	1513-I	1.0137 dpm/mL	12/20/2023	12/20/2024

04/25/2023	Matelon DeFreese	25.022	250	1513-J	44.1123247 dpm/mL	04/25/2023	04/25/2024
06/16/2023	Christina Kimball	5.02	100	1513-K	22.1249 dpm/mL	06/21/2023	06/21/2024

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Th-232 Standard 1513-J

v1.2

Analyst	MXS2
Verification Prep Date	4/25/2023

Tracer Information	
Isotope	Th-229
Serial Number	1845-H
Amount of Std. (mL)	0.1
Expiration Date	1/11/2024

Standard Information	
Isotope	Th-232
Serial Number	1513-J
Isotope Half-life	1.4050E+10 Y
Reference Date	11/1/2010
Ref. Act. (dpm/mL)	44,1123247
Amount of Std. (mL)	0.1
Standard Prep Date	4/25/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	4/25/2023	2.010	44.62
2	4/25/2023	1.930	42.85
3	4/25/2023	1.950	43.29

Mean Value = 1.963 43.586  
 Stdev = 0.04163332 0.924259704

dp/mL  
 44.1123  
 1.8485  
 4.3586  
 Pass  
 Pass  
 98.81%  
 Pass

pCi  
 1.9870  
 0.0833  
 0.1963  
 Pass  
 Pass  
 98.81%  
 Pass

Certificate Value\* =  
 Two sigma =  
 10 % of Mean =  
 Rule A (Pass/Fail)  
 % Recovery  
 Rule B (Pass/Fail)  
 Expiration Date

### 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 Th-232 standard 1513-J using 0.1 mL for each source. Each standard was combined with 0.1 mL of Th-229 standard 1845-H and was diluted in a centrifuge tube containing 4 mL 2M HCl, diluted to 40 mL with DI water. 0.1 mL of neodymium carrier and 5 mL of 48% HF was added to precipitate neodymium (and Thorium) 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 Th-232 were calculated by comparison to Th-229 certified values.

*Signature*



15104

1380 Seaboard Industrial Blvd.  
 Atlanta, Georgia 30318  
 Tel 404-352-8677  
 Fax 404-352-2837  
 www.analyticinc.com

## 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*, %			Reference Date (12:00 PM EST)
			u <sub>A</sub>	u <sub>B</sub>	U	
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:  $\gamma$ -impurities (other than decay products) < 0.1 %, U-233 < 1.20E2 Bq, Am-241 < 5.8E1 Bq. 5.06048 grams 2M HNO<sub>3</sub> solution.

Source Prepared by: M. I. Taskaeva  
 M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
 J. D. McCorvey, QA Manager Alternate

Date: 9/12/11

RECEIVED  
 9/12/11  
*ms*





09/21/2022	Tim Chandler	2.6897	1000	1564-EE	50.0169 dpm/mL	09/21/2022	09/21/2023
03/17/2014	Christina Kimball	.266	250	1564-F	19.78584 dpm/mL	03/25/2015	03/25/2016
12/27/2022	Christina Kimball	.61	500	1564-FF	22.6868 dpm/mL	12/01/2023	12/01/2024
12/27/2022	Christina Kimball	.61	500	1564-FF Spike	22.6868 dpm/mL	12/01/2023	12/01/2024
12/10/2014	Tim Chandler	2.6312	1000	1564-G	48.929 dpm/mL	12/10/2014	12/10/2015
01/19/2023	Matelon DeFreese	2.689	1000	1564-GG	50.0039 dpm/mL	01/20/2023	01/20/2024
07/20/2015	Christina Kimball	.266	250	1564-H	19.78584 dpm/mL	07/25/2016	07/25/2017
05/19/2023	Matelon DeFreese	2.685	1000	1564-HH	49.9294975 dpm/mL	05/19/2023	05/19/2024
11/23/2015	Tim Chandler	2.6117	1000	1564-I	48.5664 dpm/mL	11/23/2015	11/23/2016
10/09/2023	Matelon DeFreese	2.6864	1000	1564-II	49.9555315 dpm/mL	10/10/2023	10/10/2024
01/05/2016	Christina Kimball	.119	500	1564-J	4.4258 dpm/mL	12/27/2017	12/27/2018
01/05/2016	Christina Kimball	.119	500	1564-J Spike	4.4258 dpm/mL	12/27/2017	12/27/2018
09/20/2016	Tim Chandler	2.6389	1000	1564-K	49.0722 dpm/mL	09/18/2017	09/18/2018
12/20/2016	Christina Kimball	.276	250	1564-L	20.52974 dpm/mL	12/21/2017	12/21/2018
06/20/2017	Tim Chandler	2.6611	1000	1564-M	49.4851 dpm/mL	06/19/2018	06/19/2019
01/18/2018	Tim Chandler	2.6367	1000	1564-N	49.0313 dpm/mL	04/25/2018	04/25/2019
04/25/2018	Tim Chandler	2.6505	1000	1564-O	49.2879 dpm/mL	04/25/2018	04/25/2019
08/06/2018	Christina Kimball	.106	500	1564-P	3.9423 dpm/mL	12/19/2019	12/19/2020
08/06/2018	Christina Kimball	.106	500	1564-P Spike	3.9423 dpm/mL	12/19/2019	12/19/2020
12/13/2018	Tim Chandler	2.6502	1000	1564-Q	49.2824 dpm/mL	12/13/2018	12/13/2019
01/08/2019	Christina Kimball	.29	250	1564-R	21.571 dpm/mL	01/08/2019	01/08/2020
01/08/2019	Christina Kimball	.29	250	1564-R Spike	21.571 dpm/mL	01/08/2019	01/08/2020

10/01/2019	Tim Chandler	2.6957	1000	1564-S	50.1285 dpm/mL	10/01/2019	10/01/2020
12/18/2019	Christina Kimball	.307	250	1564-T	22.83554 dpm/mL	12/19/2019	12/19/2020
12/18/2019	Christina Kimball	.307	250	1564-T Spike	22.83554 dpm/mL	12/19/2019	12/19/2020
03/31/2020	Tim Chandler	2.6645	1000	1564-U	49.5483 dpm/mL	03/31/2020	03/31/2021
08/14/2020	Christina Kimball	.111	500	1564-V	4.1282 dpm/mL	08/14/2020	08/14/2021
08/14/2020	Christina Kimball	.111	500	1564-V Spike	4.1282 dpm/mL	08/14/2020	08/14/2021
10/13/2020	Tim Chandler	2.6983	1000	1564-W	50.1768 dpm/mL	10/13/2020	10/13/2021
11/04/2020	Christina Kimball	.315	250	1564-X	23.4306 dpm/mL	11/04/2020	11/04/2021
11/04/2020	Christina Kimball	.315	250	1564-X Spike	23.4306 dpm/mL	11/04/2020	11/04/2021
03/19/2021	Matelon DeFreese	2.7599	1000	1564-Y	51.32232 dpm/mL	03/19/2021	03/19/2022
03/19/2021	Matelon DeFreese	2.7599	1000	1564-Z	51.32232 dpm/mL	03/20/2021	03/20/2022

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for U-232 Standard 1564-II

v1.2

Analyst	MXS2
Verification Prep Date	10/10/2023

Tracer Information	
Isotope	U-238
Serial Number	1600-P
Amount of Std. (mL)	0.2
Expiration Date	5/8/2024

Standard Information	
Isotope	U-232
Serial Number	1564-II
Isotope Half-life	68.9000 Y
Reference Date	9/12/2011
Ref. Act. (dpm/mL)	49.9555315
Amount of Std. (mL)	0.2
Standard Prep Date	10/9/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	10/10/2023	3.760	41.74
2	10/10/2023	3.970	44.07
3	10/10/2023	3.790	42.07

Mean Value = 3.840      42.624  
 Stdev = 0.113578167      1.260717653

Certificate Value\* = 3.9856      pCi  
 Two sigma = 0.2272  
 10% of Mean = 0.3840  
 Rule A (Pass/Fail)      Pass  
 % Recovery      96.35%  
 Rule B (Pass/Fail)      Pass  
 Expiration Date      10/10/2024

**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-II using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-238 standard 1600-P and was diluted in a centrifuge tube containing 15 mL of 0.1M HCL diluted to 40 mL with DI water. 0.1 mL of neodymium carrier, 0.5 mL of titanium (III) chloride, and 5 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.

K  
R



24937 Avenue Tibbitts  
 Valencia, California 91355  
 Tel 661-309-1010  
 Fax 661-257-8303

*Handwritten:*  
 15 Apr 2012  
 1600

## CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> U-238 (Nat)	<b>Customer:</b> GENERAL ENGINEERING LABS.
<b>Half-life:</b> (4.468 ± 0.005)E+09 years	<b>P.O. No.:</b> 936823 RD
<b>Catalog No.:</b> 7338	<b>Reference Date:</b> 15-Apr-12 12:00 PST
<b>Source No.:</b> 1577-71-2	<b>Contained Radioactivity:</b> 1.023 μCi 37.85 kBq
	<b>(Total Uranium)</b>

**Physical Description:**

- A. Mass of solution: 7.05210 g in 10 mL flame-sealed ampoule
- B. Chemical form: UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> in dilute HNO<sub>3</sub>
- 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 Dalen*  
 Quality Control

21-MAR-12  
 Date

EZIP Ref. No.: 1577-71

*Handwritten:* RC-S-065-030a

Medical Imaging Laboratory  
 24937 Avenue Tibbitts    Valencia, California 91355

Industrial Gauging Laboratory  
 1800 North Keystone Street    Burbank, California 91504

ISO 9001 CERTIFIED

### 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:

<u>Nuclide</u>	<u>Atom %</u>	<u>Activity %</u>
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 Logbook

**Serial ID:** 1600      **Open/Reference Date:** 15-APR-12      **Aliquot :** 7.0521 g  
**Name:** Uranium-238      **Received:** 24-MAR-12      **Density :** Hand Calculated g/mL  
**Type:** Source Material      **Expires:** 26-MAR-15      **Logbook Num :** RC-S-065-030  
**Employee:** Ashley Drochter      **Lot Number :** 4550102  
**Supplier:** Eckert & Ziegler      **Solvent :** UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> in dilute HNO<sub>3</sub>  
**Description:** Ampoule      **Uncertainty :** 1.17 percent  
**Comments:** None

<u>Analyte</u>	<u>Concentration</u>	<u>Analyte</u>	<u>Concentration</u>
Uranium-238	18.42 kbq		

Page 112 of 239 SDG: 648193



## Standard Traceability Log Rad

Source Material Info	
Parent Code:	1600
Prepared By:	Ashley Drochter
Carrier Conc:	UO <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> in dilute HNO <sub>3</sub>
Reference Date:	04/15/2012
Ampoule Mass (g):	7.0521 g
Uncertainty:	+/- 1.17 %
LogBook No:	RC-S-065-030
Supplier:	Eckert & Ziegler

A Solution Material Info			
Isotope:	Uranium-238		
Prepared By:	Ashley Drochter		
Prep Date:	09/04/2012		
Verification Date:	05/08/2023		
Expiration Date:	05/08/2024		
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

$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(6.8204 \text{ g}) * (18.42 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (7.0521 \text{ g} * 100 \text{ mL}) = 10688.8814 \text{ dpm/mL}$
$(6.8204 \text{ g}) * (18.42 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (1.0789 \text{ g/mL}) / (7.0521 \text{ g} * 100 \text{ mL}) = 9907.0626 \text{ dpm/g}$

### 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	07/10/2017	07/10/2018
02/16/2017	Tim Chandler	3.0261	500	1600-F	59.9595 dpm/mL	02/06/2018	02/06/2019
10/10/2017	Christina Kimball	.539	250	1600-G	21.3596 dpm/mL	12/01/2023	12/01/2024

04/02/2018	Tim Chandler	3.0544	500	1600-H	60.5203 dpm/mL	03/29/2019	03/29/2020
06/21/2019	Tim Chandler	3.0536	500	1600-I	60.5044 dpm/mL	06/21/2019	06/21/2020
01/30/2020	Tim Chandler	3.0563	500	1600-J	60.5579 dpm/mL	01/26/2021	01/26/2022
03/13/2020	Christina Kimball	.01222	500	1600-K	.24207 dpm/mL	03/15/2022	03/15/2023
04/23/2021	Tim Chandler	3.0507	500	1600-L	60.4469 dpm/mL	04/26/2021	04/26/2022
01/21/2022	Matelon DeFreese	3.1075	500	1600-M	61.5723941 dpm/mL	01/21/2022	01/21/2023
05/19/2022	Christina Kimball	.01275	500	1600-N	.2527 dpm/mL	05/17/2023	05/17/2024
09/06/2022	Matelon DeFreese	3.1499	500	1600-O	62.412513 dpm/mL	09/06/2022	09/06/2023
05/08/2023	Matelon DeFreese	6.0105	1000	1600-P	59.5463998 dpm/mL	05/08/2023	05/08/2024

GEL Laboratories LLC  
Version 1.0 9/18/2000

## Verification for U-238 Standard 1600-P

v1.2

Analyst	MXS2
Verification Prep Date	5/8/2023

Tracer Information	
Isotope	U-232
Serial Number	1564-GG
Amount of Std. (mL)	0.2
Expiration Date	1/20/2024

Standard Information	
Isotope	U-238
Serial Number	1600-P
Isotope Half-life	4.4680E+09 Y
Reference Date	4/15/2012
Ref. Act. (dpm/mL)	59.5463998
Amount of Std. (mL)	0.2
Standard Prep Date	5/8/2023

Std #	Count Date	Activity pCi	Standard dpm/mL
1	5/10/2023	5.730	63.80
2	5/9/2023	5.280	58.61
3	5/10/2023	5.350	59.39

Mean Value = 5.453 60.532  
 Stdev = 0.242143208 2.687789612

pCi  
 5.3645  
 0.4843  
 0.5453  
 Pass  
 101.66%  
 Pass

Certificate Value\* =  
 Two sigma =  
 10 % of Mean =  
 Rule A (Pass/Fail)  
 % Recovery  
 Rule B (Pass/Fail)  
 Expiration Date

5/8/2024

### 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-P using 0.2 mL for each source. Each standard was combined with 0.2 mL of U-232 standard 1564-GG and was diluted in a centrifuge tube containing 15 mL 0.1M HCl and 25 mL of DI water. 0.1 mL of neodymium carrier, 0.5 mL of titanium (III) chloride, and 5 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.

*MS*  
5/11/24

# Runlogs



### Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 2542340

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
647332002	SAMPLE	CM4	1007	DEC-21-23 12:45:09	DONE		01-DEC-23 10:40
648193001	SAMPLE	CM4	1008	DEC-21-23 12:45:09	DONE		01-DEC-23 10:40
1205604851	MB	CM4	1009	DEC-21-23 12:45:09	DONE		01-DEC-23 10:40
1205604852	LCS	CM4	1010	DEC-21-23 12:45:09	DONE		01-DEC-23 10:40
1205604853	LCSD	CM4	1011	DEC-21-23 12:45:09	DONE		01-DEC-23 10:40

### Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 2542341

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
647332002	SAMPLE	CM4	1043	DEC-21-23 12:50:42	DONE		02-DEC-23 12:42
648193001	SAMPLE	CM4	1044	DEC-21-23 12:50:42	DONE		02-DEC-23 12:42
1205604854	MB	CM4	1045	DEC-21-23 12:50:42	DONE		02-DEC-23 12:42
1205604855	LCS	CM4	1046	DEC-21-23 12:50:42	DONE		02-DEC-23 12:43
1205604856	LCSD	CM4	1047	DEC-21-23 12:50:42	DONE		02-DEC-23 12:43

# Gamma Spectroscopy Raw Data

## Batch 2538164 Check-list

This check-list was completed on 03-JAN-24 by Tim Winters

This batch was reviewed by Michael Hilton on 03-JAN-24 and Tim Winters on 03-JAN-24.

**Batch ID:** 2538164      **Product:** GSCGAMMS      **Description:** Gamma Spec Solid RAD A-013

#	Criteria	Yes	No	Comments
<b>Preparation Information</b>				
1	Did any sample(s) require dilution?		No	
2	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
3	Was the preservation correct for this analysis?	Yes		
<b>Internal Checklist Information</b>				
4	Are instrument source checks within limits?	Yes		
5	Have sample historical results been reviewed for this batch?	Yes		
<b>Technical Information</b>				
6	Were any additional radionuclides added that were not requested by the client?		No	
7	Were all the samples prepared/analyzed within the required holding time period?	Yes		
<b>Quality Control (QC) Information</b>				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?		No	
11	Has the method required detection limit been met?	Yes		
<b>Miscellaneous Information</b>				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

**Prep Logbook  
Gamma Spectroscopy**

**Batch ID:** 2538164  
**Analyst:** Smith Fenner (SF1)  
**Method:** DOE HASL 300 4.5.2.3(Ga-01-R)  
**Lab SOP:** GL-RAD-A-013 REV# 28  
**Instrument:** No instrument-manual method

**Due Dates for Lab:** 07-JAN-2024    **Hold:** 29-OCT-2023    **Package:** 08-JAN-2024    **SDG:** 09-JAN  
**Type:** LCS    **Sample ID:** 1205597566    **Description:** 84680278    **Serial Number:** 1556    **Spike Amount:** 1    **Spike Units:** mL

#	Sample ID	Prep Date	Min RDL (pCi/g)	Dry or Wet	Unadjusted Aliquot (g)	Adjusted Aliquot (g)
1	648193001	12-DEC-2023	.1	Dry to Dry	130.63	130.63
2	1205597564 MB	12-DEC-2023	.1	Dry to Wet	130.63	130.63
3	1205597565 DUP (648193001)	12-DEC-2023	.1	Dry to Dry	130.63	130.63
4	1205597566 LCS	12-DEC-2023	.1	Dry to Wet	115	115

**Reagent/Solvent Lot ID**    **Description**    **Amount**    **Comments:**

Analytical Logbook version 11/04/2002

GEL Laboratories LLC

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 14:29:06.13

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                             *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G648193001.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG GAM03.CNF;723
Sample date      : 17-OCT-2023 13:00:00 Acquisition date : 2-JAN-2024 13:28:30.
Sample ID        : G648193001 Sample quantity : 1.30630E+02 GRAM
Detector name    : GAM03 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.40 0.0%
Energy tolerance: 1.50000 keV Analyst Initials : SF1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID        : 2538164 Detector SN# :
Matrix Spike ID : LCS ID :
*****
    
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	62.84*	33	86	0.86	125.26	122	8	9.06E-03	55.0	
2	3	74.68	95	112	1.64	148.93	143	16	2.63E-02	25.0	1.04E+00
3	3	77.11*	121	119	1.65	153.79	143	16	3.37E-02	20.2	
4	3	87.85	62	132	2.88	175.28	172	9	1.71E-02	36.0	
5	0	92.75*	39	145	1.30	185.09	181	10	1.09E-02	64.5	
6	0	185.85*	54	135	1.01	371.27	365	12	1.50E-02	47.6	
7	0	199.84	16	117	3.91	399.24	390	12	4.37E-03	140.0	
8	0	238.66*	257	63	1.47	476.88	471	21	7.13E-02	8.4	1.95E+00
9	0	242.26	106	67	2.03	484.08	471	21	2.95E-02	20.9	
10	0	270.14	44	66	2.31	539.85	534	12	1.22E-02	39.9	
11	0	295.24*	96	51	1.45	590.04	586	21	2.65E-02	17.2	4.44E+00
12	0	299.77*	31	68	2.57	599.11	586	21	8.49E-03	69.6	
13	0	308.63	44	68	2.29	616.82	606	21	1.21E-02	49.6	
14	0	317.71	19	40	0.74	634.99	628	10	5.40E-03	64.9	
15	0	338.73*	50	43	1.22	677.03	672	12	1.39E-02	30.1	
16	2	351.89*	236	31	1.66	703.36	695	26	6.57E-02	8.0	2.49E+00
17	2	358.86	26	20	2.02	717.30	695	26	7.20E-03	35.6	
18	0	510.98*	61	43	2.52	1021.57	1009	25	1.70E-02	35.6	
19	0	534.64	14	18	1.91	1068.91	1062	10	3.91E-03	64.4	
20	0	558.48*	17	11	1.65	1116.59	1113	8	4.66E-03	44.3	
21	0	583.56*	64	23	1.40	1166.76	1159	13	1.77E-02	20.9	
22	0	609.21*	172	36	1.55	1218.07	1209	18	4.77E-02	11.3	
23	0	626.24	17	15	0.97	1252.14	1245	14	4.61E-03	58.1	
24	0	695.08*	32	9	3.76	1389.86	1383	16	8.92E-03	27.5	
25	0	701.34	7	8	0.63	1402.37	1399	6	2.02E-03	70.5	
26	0	727.08*	22	9	1.19	1453.87	1449	11	6.19E-03	35.1	
27	0	794.87	26	9	2.15	1589.49	1582	12	7.10E-03	30.8	
28	0	825.24	14	9	3.59	1650.25	1645	11	4.00E-03	47.0	
29	0	840.84	6	15	0.52	1681.45	1672	12	1.60E-03	150.3	
30	0	910.96*	50	22	0.75	1821.74	1814	15	1.40E-02	25.5	
31	0	968.57*	37	4	2.52	1937.00	1929	15	1.03E-02	21.3	
32	0	1120.41	42	11	1.50	2240.83	2233	14	1.18E-02	22.3	
33	0	1146.02	8	6	3.43	2292.07	2285	11	2.08E-03	70.7	
34	0	1174.96	11	17	6.96	2349.99	2337	18	2.98E-03	97.4	

Peak Search Report (continued)  
Sample ID : G648193001

Page : 2  
Acquisition date : 2-JAN-2024 13:28:30

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1202.68	7	6	1.34	2405.45	2397	11	1.81E-03	80.1	
36	0	1275.72	11	7	2.31	2551.62	2543	13	2.92E-03	58.8	
37	0	1279.42	9	4	1.13	2559.01	2555	8	2.46E-03	51.8	
38	0	1460.38*	222	5	2.77	2921.17	2910	21	6.17E-02	7.3	
39	0	1763.95*	14	7	0.93	3528.77	3523	13	3.99E-03	47.4	

Flag: "\*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 2-JAN-2024 14:29:07

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G648193001.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : SF1  
Sample date : 17-OCT-2023 13:00:00 Acquisition date : 2-JAN-2024 13:28:30  
Sample ID : G648193001 Sample quantity : 130.63 GRAM  
Sample type : SOLID Sample geometry :  
Detector name : GAMMA3 Detector geometry: CAN  
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.40 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

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
NA-22	1274.54	10	99.94*	1.176E+00	4.940E-02	5.226E-02	117.61
K-40	1460.82	212	10.66*	1.051E+00	1.085E+01	1.085E+01	14.51
CD-109	88.03	71	3.70*	4.931E+00	2.233E+00	2.507E+00	72.04
SN-126	64.28	38	9.60	2.091E+00	1.096E+00	1.096E+00	109.98
	86.94	71	8.90	4.931E+00	9.281E-01	9.281E-01	72.04
	87.57	71	37.00*	4.931E+00	2.233E-01	2.233E-01	72.04
PR-144	696.51	32	1.34*	2.039E+00	6.786E+00	8.185E+00	55.06
	1489.16	-----	0.28	1.036E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	4.035E+00	-----	Line Not Found	-----
	583.19	65	85.00*	2.351E+00	1.861E-01	1.861E-01	41.73
	860.56	-----	12.50	1.690E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.404E+00	-----	Line Not Found	-----
	351.06	249	12.92*	3.410E+00	3.246E+00	3.246E+00	15.99
BI-212	727.33	22	6.67*	1.962E+00	9.810E-01	9.810E-01	70.23
	1620.50	-----	1.47	9.779E-01	-----	Line Not Found	-----
PB-212	74.82	110	10.28	3.624E+00	1.697E+00	1.697E+00	50.10
	77.11	141	17.10	3.905E+00	1.210E+00	1.210E+00	40.41
	238.63	277	43.60*	4.484E+00	8.151E-01	8.151E-01	16.79
	300.09	33	3.30	3.820E+00	1.483E+00	1.483E+00	139.29
BI-214	609.32	174	45.49*	2.272E+00	9.674E-01	9.675E-01	22.68
	1120.29	41	14.92	1.323E+00	1.200E+00	1.200E+00	44.67
	1764.49	13	15.30	9.341E-01	5.421E-01	5.422E-01	94.83
PB-214	74.82	110	5.80	3.624E+00	3.007E+00	3.008E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.423E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.224E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
RN-222	609.32	174	45.49*	2.272E+00	9.674E-01	9.675E-01	22.68
	1120.29	41	14.92	1.323E+00	1.200E+00	1.200E+00	44.67
	1764.49	13	15.30	9.341E-01	5.421E-01	5.422E-01	94.83
RA-224	240.99	115	4.10*	4.437E+00	3.620E+00	3.620E+00	41.72
RA-226	74.82	110	5.80	3.624E+00	3.007E+00	3.008E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.423E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.224E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
AC-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05
	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
RA-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05
	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
TH-228	74.82	110	10.28	3.624E+00	1.697E+00	1.697E+00	50.10

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	77.11	141	17.10	3.905E+00	1.210E+00	1.210E+00	40.41
	238.63	277	43.60*	4.484E+00	8.151E-01	8.151E-01	16.79
	300.09	33	3.30	3.820E+00	1.483E+00	1.483E+00	139.29
TH-230	74.82	110	5.80	3.624E+00	3.007E+00	3.007E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.422E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.223E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
TH-232	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05
	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
TH-234	63.29	38	3.70*	2.091E+00	2.844E+00	2.844E+00	109.98
	92.59	45	4.23	5.275E+00	1.158E+00	1.158E+00	129.00
U-234	74.82	110	5.80	3.624E+00	3.007E+00	3.007E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.422E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.223E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
U-238	63.29	38	3.70*	2.091E+00	2.844E+00	2.844E+00	109.98
	92.59	45	4.23	5.275E+00	1.158E+00	1.158E+00	129.00
AM-243	43.53	-----	5.90	2.108E-01	-----	Line Not Found	-----
	74.66	110	67.20*	3.624E+00	2.596E-01	2.596E-01	50.10
ANH-511	511.00	63	100.00*	2.603E+00	1.387E-01	1.387E-01	71.24

Flag: "\*" = Keyline

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:29:08.37

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*****
*                               *
*       GEL Laboratories LLC     *
*       2040 Savage Road        *
*       Charleston, SC 29407    *
*                               *
*****
*                               *
*       DETECTOR AND SAMPLE DATA *
*                               *
* Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G648193001.CNF;1 *
* Acquisition date : 2-JAN-2024 13:28:30 Sensitivity   : 3.000           *
* Detector ID     : GAM03 Energy tolerance: 1.500           *
* Elapsed live time: 0 01:00:00.00 Abundance limit : 75.000           *
* Elapsed real time: 0 01:00:00.40 Half life ratio : *****           *
* Sample date    : 17-OCT-2023 13:00:00 Analyst initials: SF1           *
* Sample ID     : G648193001 Sample Quantity : 1.3063E+02 GRAM           *
* Batch Number  : 2538164 Wet Weight : 0.00000           *
* Wet wt corr   : 1.00000 Dry Weight : 0.00000           *
* Nuclide Library : SOLID.NLB;17 *
*****

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CALIBRATION INFORMATION

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* Eff. Cal. date : 4-OCT-2023 09:22:59 Eff. Geometry : CAN *
* Eff. File     : DKA100:[CANBERRA.GAMMA]EFF GAM03 CAN.CNF;30 *
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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 )
NA-22	5.226E-02	6.023E-02	7.467E-02
K-40	1.085E+01	1.542E+00	6.143E-01
CD-109	2.507E+00	1.770E+00	1.681E+00
SN-126	2.233E-01	1.576E-01	1.508E-01
PR-144	8.185E+00	4.417E+00	4.686E+00
TL-208	1.861E-01	7.610E-02	6.231E-02
BI-211	3.246E+00	5.086E-01	4.110E-01
BI-212	9.810E-01	6.752E-01	8.670E-01
PB-212	8.151E-01	1.341E-01	1.044E-01
BI-214	9.675E-01	2.151E-01	1.042E-01
PB-214	1.178E+00	1.846E-01	1.495E-01
RN-222	9.675E-01	2.151E-01	1.042E-01
RA-224	3.620E+00	1.480E+00	1.119E+00
RA-226	1.178E+00	1.846E-01	1.495E-01
AC-228	6.893E-01	3.448E-01	2.511E-01
RA-228	6.893E-01	3.448E-01	2.511E-01
TH-228	8.151E-01	1.341E-01	1.044E-01
TH-230	1.178E+00	1.846E-01	1.494E-01
TH-232	6.893E-01	3.448E-01	2.511E-01
TH-234	2.844E+00	3.065E+00	3.109E+00
U-234	1.178E+00	1.846E-01	1.494E-01
U-238	2.844E+00	3.065E+00	3.109E+00
AM-243	2.596E-01	1.274E-01	1.059E-01
ANH-511	1.387E-01	9.684E-02	5.497E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-2.020E-01	6.972E-01	1.328E+00	NOT IDENT.
NA-24	0.000E+00	3.795E+35	0.000E+00	SHORT HLIF
AL-26	-3.432E-02	4.240E-02	6.691E-02	NOT IDENT.
SC-46	1.239E-02	6.892E-02	1.370E-01	FAIL ABUN
V-48	-8.151E-01	1.108E+00	1.824E+00	NOT IDENT.
CR-51	-2.600E-01	2.093E+00	3.388E+00	NOT IDENT.

MN-52	0.000E+00	5.094E+02	0.000E+00	SHORT HLIF
MN-54	-3.406E-02	5.146E-02	7.287E-02	NOT IDENT.
CO-56	1.741E-02	6.712E-02	1.365E-01	NOT IDENT.
MN-56	0.000E+00	1.960E+11	0.000E+00	SHORT HLIF
CO-57	-1.685E-02	2.928E-02	5.371E-02	NOT IDENT.
CO-58	-1.218E-01	7.470E-02	9.863E-02	NOT IDENT.
FE-59	-9.300E-02	2.223E-01	4.197E-01	NOT IDENT.
CO-60	-3.012E-02	2.410E-02	1.418E-02	NOT IDENT.
ZN-65	9.915E-02	1.111E-01	2.335E-01	NOT IDENT.
GE-68	1.188E-01	1.542E+00	2.999E+00	NOT IDENT.
AS-73	7.633E-01	2.503E+00	4.708E+00	NOT IDENT.
AS-74	1.497E-01	1.012E+00	2.021E+00	NOT IDENT.
SE-75	2.674E-02	7.661E-02	1.330E-01	NOT IDENT.
BR-77	0.000E+00	1.450E+09	0.000E+00	SHORT HLIF
SR-82	3.570E-01	1.844E+00	3.684E+00	NOT IDENT.
RB-83	-2.381E-02	1.019E-01	1.901E-01	NOT IDENT.
RB-84	-1.222E-02	3.221E-01	6.044E-01	NOT IDENT.
KR-85	7.474E+00	7.615E+00	1.621E+01	NOT IDENT.
SR-85	7.552E-02	7.731E-02	1.646E-01	NOT IDENT.
RB-86	-3.184E-01	8.484E+00	1.610E+01	NOT IDENT.
Y-88	2.295E-02	4.290E-02	7.633E-02	NOT IDENT.
Y-91	-2.975E+01	5.005E+01	7.387E+01	NOT IDENT.
NB-94	2.077E-02	2.870E-02	6.770E-02	FAIL ABUN
NB-95	-5.941E-02	1.010E-01	1.757E-01	NOT IDENT.
NB-95M	3.151E-02	2.735E-01	4.610E-01	NOT IDENT.
ZR-95	1.081E-01	1.443E-01	3.093E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	4.892E+32	0.000E+00	SHORT HLIF
MO-99	0.000E+00	6.490E+07	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.499E+41	0.000E+00	SHORT HLIF
RH-101	-1.605E-02	3.262E-02	6.038E-02	NOT IDENT.
RH-102	-1.015E-02	5.454E-02	9.157E-02	NOT IDENT.
RU-103	2.189E-02	1.126E-01	2.283E-01	FAIL ABUN
RH-106	3.760E-02	3.128E-01	5.713E-01	NOT IDENT.
RU-106	3.760E-02	3.128E-01	5.713E-01	NOT IDENT.
AG-108M	1.188E-02	3.240E-02	6.221E-02	NOT IDENT.
AG-110	6.437E-02	8.164E-01	1.621E+00	NOT IDENT.
AG-110M	-2.701E-03	6.390E-02	1.220E-01	NOT IDENT.
SN-113	-4.815E-02	6.306E-02	1.040E-01	NOT IDENT.
CD-115	0.000E+00	2.740E+09	0.000E+00	SHORT HLIF
SN-117M	-5.868E-01	1.172E+00	2.147E+00	NOT IDENT.
SB-122	0.000E+00	1.481E+07	0.000E+00	SHORT HLIF
TE-123M	-2.178E-02	3.794E-02	6.894E-02	NOT IDENT.
SB-124	-2.501E-02	1.885E-01	3.821E-01	NOT IDENT.
SB-125	-2.412E-03	1.081E-01	1.968E-01	NOT IDENT.
TE-125M	5.004E+00	2.078E+01	4.083E+01	NOT IDENT.
I-126	5.945E+00	7.004E+00	1.473E+01	NOT IDENT.
SB-126	1.445E+00	4.753E+00	9.357E+00	FAIL ABUN
SB-127	0.000E+00	8.168E+04	0.000E+00	SHORT HLIF
I-131	8.891E+00	2.577E+01	4.959E+01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.101E+05	0.000E+00	SHORT HLIF
BA-133	1.265E-02	4.920E-02	9.258E-02	NOT IDENT.
I-133	0.000E+00	2.150E+25	0.000E+00	SHORT HLIF
CS-134	1.012E-01	6.108E-02	1.126E-01	FAIL ABUN
I-135	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CS-136	-3.291E+00	3.238E+00	4.933E+00	NOT IDENT.
BA-137M	-4.723E-02	3.711E-02	5.852E-02	NOT IDENT.
CS-137	-4.990E-02	3.921E-02	6.182E-02	NOT IDENT.
LA-138	-1.538E-02	6.403E-02	1.238E-01	NOT IDENT.
CE-139	-1.177E-02	4.280E-02	7.922E-02	NOT IDENT.
CE-140	7.519E+00	8.148E+00	1.649E+01	NOT IDENT.
LA-140	-1.021E+00	2.470E+00	4.625E+00	NOT IDENT.
CE-141	8.055E-02	4.461E-01	4.780E-01	NOT IDENT.
CE-143	0.000E+00	5.428E+15	0.000E+00	SHORT HLIF
CE-144	8.506E-03	2.349E-01	4.507E-01	NOT IDENT.
PM-144	0.000E+00	5.714E-02	9.028E-02	FAIL ABUN
PM-146	3.537E-02	4.246E-02	9.134E-02	NOT IDENT.
ND-147	-1.824E+01	3.333E+01	5.175E+01	NOT IDENT.
PM-147	-2.642E+02	7.939E+02	1.484E+03	NOT IDENT.
PM-149	0.000E+00	2.451E+10	0.000E+00	SHORT HLIF
EU-150	5.664E-03	2.918E-02	4.996E-02	FAIL ABUN
EU-152	1.700E-03	1.158E-01	1.909E-01	NOT IDENT.
GD-153	5.000E-02	1.171E-01	2.119E-01	NOT IDENT.
EU-154	1.435E-01	1.654E-01	3.049E-01	FAIL ABUN
EU-155	4.914E-02	1.108E-01	2.209E-01	FAIL ABUN
TB-160	2.353E-01	2.745E-01	5.896E-01	FAIL ABUN
HO-166M	-2.176E-02	6.393E-02	1.173E-01	FAIL ABUN

TM-171	3.137E-01	3.367E+01	6.175E+01	NOT IDENT.
HF-172	4.955E-02	1.930E-01	3.791E-01	FAIL ABUN
LU-172	7.930E-02	6.580E-02	1.575E-01	FAIL ABUN
LU-176	-1.470E-02	3.787E-02	4.460E-02	FAIL ABUN
HF-181	1.783E-02	1.186E-01	2.381E-01	NOT IDENT.
TA-182	2.035E-01	3.024E-01	6.478E-01	FAIL ABUN
RE-183	-7.960E-03	5.999E-01	1.083E+00	NOT IDENT.
RE-184	-2.414E-01	4.688E-01	7.385E-01	NOT IDENT.
W-188	-1.030E+01	1.493E+01	2.216E+01	FAIL ABUN
IR-192	8.050E-02	1.023E-01	1.366E-01	FAIL ABUN
HG-203	-9.958E-02	1.059E-01	1.771E-01	NOT IDENT.
TL-204	3.832E+00	6.081E+00	1.074E+01	NOT IDENT.
BI-207	1.478E-02	6.326E-02	1.234E-01	FAIL ABUN
BI-210	5.502E+00	8.609E+00	1.664E+01	NOT IDENT.
PB-210	5.502E+00	8.609E+00	1.664E+01	NOT IDENT.
PB-211	4.858E-01	8.005E-01	1.567E+00	NOT IDENT.
BI-213	-6.869E-02	9.386E-02	1.683E-01	NOT IDENT.
RN-219	1.072E-01	4.175E-01	7.957E-01	FAIL ABUN
RA-223	-2.599E-03	7.039E-01	1.297E+00	FAIL ABUN
AC-225	1.739E+01	4.828E+01	9.253E+01	NOT IDENT.
AC-227	2.334E-01	2.659E-01	5.362E-01	FAIL ABUN
TH-227	2.334E-01	2.659E-01	5.362E-01	FAIL ABUN
TH-229	-5.696E-02	6.098E-01	1.016E+00	FAIL ABUN
PA-231	3.266E-01	5.812E-01	1.035E+00	NOT IDENT.
TH-231	-2.599E-03	7.039E-01	1.297E+00	FAIL ABUN
PA-233	2.488E-02	9.401E-02	1.302E-01	FAIL ABUN
PA-234	1.260E-02	3.040E-01	5.929E-01	NOT IDENT.
PA-234M	-9.058E-01	5.155E+00	9.659E+00	NOT IDENT.
U-235	-1.221E-01	2.221E-01	4.092E-01	FAIL ABUN
NP-237	2.488E-02	9.401E-02	1.302E-01	FAIL ABUN
NP-238	0.000E+00	1.222E+10	0.000E+00	SHORT HLIF
NP-239	-9.158E-02	2.806E-01	5.277E-01	NOT IDENT.
PU-239	2.709E+02	3.441E+02	6.946E+02	NOT IDENT.
AM-241	1.280E-01	2.529E-01	4.460E-01	NOT IDENT.
CM-243	-5.006E-02	1.101E-01	2.067E-01	NOT IDENT.
BK-247	6.517E-02	9.427E-02	1.707E-01	NOT IDENT.
CM-247	1.404E-02	3.966E-02	7.611E-02	NOT IDENT.
CF-249	2.829E-02	4.110E-02	8.243E-02	NOT IDENT.
CF-251	-1.735E-02	1.326E-01	2.479E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 14:29:06.92

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
NA-22	1274.54	10	99.94*	1.176E+00	4.940E-02	5.226E-02	117.61
K-40	1460.82	212	10.66*	1.051E+00	1.085E+01	1.085E+01	14.51
CD-109	88.03	71	3.70*	4.931E+00	2.233E+00	2.507E+00	72.04
SN-126	64.28	38	9.60	2.091E+00	1.096E+00	1.096E+00	109.98
	86.94	71	8.90	4.931E+00	9.281E-01	9.281E-01	72.04
	87.57	71	37.00*	4.931E+00	2.233E-01	2.233E-01	72.04
PR-144	696.51	32	1.34*	2.039E+00	6.786E+00	8.185E+00	55.06
	1489.16	-----	0.28	1.036E+00	-----	Line Not Found	-----
TL-208	277.37	-----	6.60	4.035E+00	-----	Line Not Found	-----
	583.19	65	85.00*	2.351E+00	1.861E-01	1.861E-01	41.73
	860.56	-----	12.50	1.690E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.404E+00	-----	Line Not Found	-----
	351.06	249	12.92*	3.410E+00	3.246E+00	3.246E+00	15.99
BI-212	727.33	22	6.67*	1.962E+00	9.810E-01	9.810E-01	70.23
	1620.50	-----	1.47	9.779E-01	-----	Line Not Found	-----
PB-212	74.82	110	10.28	3.624E+00	1.697E+00	1.697E+00	50.10
	77.11	141	17.10	3.905E+00	1.210E+00	1.210E+00	40.41
	238.63	277	43.60*	4.484E+00	8.151E-01	8.151E-01	16.79
	300.09	33	3.30	3.820E+00	1.483E+00	1.483E+00	139.29
BI-214	609.32	174	45.49*	2.272E+00	9.674E-01	9.675E-01	22.68
	1120.29	41	14.92	1.323E+00	1.200E+00	1.200E+00	44.67
	1764.49	13	15.30	9.341E-01	5.421E-01	5.422E-01	94.83
PB-214	74.82	110	5.80	3.624E+00	3.007E+00	3.008E+00	50.10
	87.09	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	77.11	141	3.41	4.931E+00	2.422E+00	2.423E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.224E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
RN-222	609.32	174	45.49*	2.272E+00	9.674E-01	9.675E-01	22.68
	1120.29	41	14.92	1.323E+00	1.200E+00	1.200E+00	44.67
	1764.49	13	15.30	9.341E-01	5.421E-01	5.422E-01	94.83
RA-224	240.99	115	4.10*	4.437E+00	3.620E+00	3.620E+00	41.72
RA-226	74.82	110	5.80	3.624E+00	3.007E+00	3.008E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.423E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.224E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
AC-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05
	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
RA-228	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
TH-228	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
	74.82	110	10.28	3.624E+00	1.697E+00	1.697E+00	50.10
	77.11	141	17.10	3.905E+00	1.210E+00	1.210E+00	40.41
	238.63	277	43.60*	4.484E+00	8.151E-01	8.151E-01	16.79
	300.09	33	3.30	3.820E+00	1.483E+00	1.483E+00	139.29
TH-230	74.82	110	5.80	3.624E+00	3.007E+00	3.007E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.422E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.223E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
TH-232	105.21	-----	1.10	5.839E+00	-----	Line Not Found	-----
	338.32	53	11.27	3.503E+00	7.692E-01	7.692E-01	60.24
	835.71	-----	1.61	1.736E+00	-----	Line Not Found	-----
	911.20	50	25.80*	1.604E+00	6.893E-01	6.893E-01	51.05
	968.97	36	15.80	1.516E+00	8.705E-01	8.705E-01	42.64
TH-234	63.29	38	3.70*	2.091E+00	2.844E+00	2.844E+00	109.98
	92.59	45	4.23	5.275E+00	1.158E+00	1.158E+00	129.00
U-234	74.82	110	5.80	3.624E+00	3.007E+00	3.007E+00	50.10
	77.11	141	9.70	3.905E+00	2.133E+00	2.133E+00	40.41
	87.09	71	3.41	4.931E+00	2.422E+00	2.422E+00	72.04
	242.00	115	7.25	4.437E+00	2.047E+00	2.047E+00	41.72
	295.22	102	18.42	3.861E+00	8.223E-01	8.223E-01	34.45
	351.93	249	35.60*	3.410E+00	1.178E+00	1.178E+00	15.99
U-238	63.29	38	3.70*	2.091E+00	2.844E+00	2.844E+00	109.98
	92.59	45	4.23	5.275E+00	1.158E+00	1.158E+00	129.00
AM-243	43.53	-----	5.90	2.108E-01	-----	Line Not Found	-----
	74.66	110	67.20*	3.624E+00	2.596E-01	2.596E-01	50.10
ANH-511	511.00	63	100.00*	2.603E+00	1.387E-01	1.387E-01	71.24

Flag: "\*" = Keyline

Total number of lines in spectrum 39  
 Number of unidentified lines 11  
 Number of lines tentatively identified by NID 28 71.79%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	%Error	Flags
NA-22	2.60Y	1.06	4.940E-02	5.226E-02	6.146E-02	117.61	
K-40	1.25E+09Y	1.00	1.085E+01	1.085E+01	0.157E+01	14.51	
CD-109	461.40D	1.12	2.233E+00	2.507E+00	1.806E+00	72.04	
SN-126	2.30E+05Y	1.00	2.233E-01	2.233E-01	1.608E-01	72.04	
PR-144	284.91D	1.21	6.786E+00	8.185E+00	4.507E+00	55.06	
TL-208	1.41E+10Y	1.00	1.861E-01	1.861E-01	0.776E-01	41.73	
BI-211	7.04E+08Y	1.00	3.246E+00	3.246E+00	0.519E+00	15.99	
BI-212	1.41E+10Y	1.00	9.810E-01	9.810E-01	6.890E-01	70.23	
PB-212	1.41E+10Y	1.00	8.151E-01	8.151E-01	1.368E-01	16.79	
BI-214	1600.00Y	1.00	9.674E-01	9.675E-01	2.195E-01	22.68	
PB-214	1600.00Y	1.00	1.178E+00	1.178E+00	0.188E+00	15.99	
RN-222	1600.00Y	1.00	9.674E-01	9.675E-01	2.195E-01	22.68	
RA-224	1.41E+10Y	1.00	3.620E+00	3.620E+00	1.510E+00	41.72	
RA-226	1600.00Y	1.00	1.178E+00	1.178E+00	0.188E+00	15.99	
AC-228	1.41E+10Y	1.00	6.893E-01	6.893E-01	3.518E-01	51.05	
RA-228	1.41E+10Y	1.00	6.893E-01	6.893E-01	3.518E-01	51.05	
TH-228	1.41E+10Y	1.00	8.151E-01	8.151E-01	1.368E-01	16.79	
TH-230	7.54E+04Y	1.00	1.178E+00	1.178E+00	0.188E+00	15.99	
TH-232	1.41E+10Y	1.00	6.893E-01	6.893E-01	3.518E-01	51.05	
TH-234	4.47E+09Y	1.00	2.844E+00	2.844E+00	3.127E+00	109.98	
U-238	2.45E+05Y	1.00	1.178E+00	1.178E+00	0.188E+00	15.99	
U-238	4.47E+09Y	1.00	2.844E+00	2.844E+00	3.127E+00	109.98	
AM-243	7370.00Y	1.00	2.596E-01	2.596E-01	1.300E-01	50.10	
ANH-511	1.00E+09Y	1.00	1.387E-01	1.387E-01	0.988E-01	71.24	
Total Activity :			4.460E+01	4.628E+01			

Grand Total Activity : 4.460E+01 4.628E+01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit



Unidentified Energy Lines  
Sample ID : G648193001

Page : 4  
Acquisition date : 2-JAN-2024 13:28:30

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	185.85	59	148	1.01	371.27	365	12	1.50E-02	95.3	5.28E+00	T
0	199.84	17	128	3.91	399.24	390	12	4.37E-03	****	5.05E+00	
0	270.14	47	71	2.31	539.85	534	12	1.22E-02	79.8	4.11E+00	T
0	308.63	46	73	9.29	616.82	606	21	1.21E-02	99.3	3.74E+00	T
0	317.71	21	42	0.74	634.99	628	10	5.40E-03	****	3.67E+00	T
2	358.86	27	21	2.02	717.30	695	26	7.20E-03	71.2	3.36E+00	
0	534.64	14	18	1.91	1068.91	1062	10	3.91E-03	****	2.52E+00	
0	558.48	17	11	1.65	1116.59	1113	8	4.66E-03	88.7	2.43E+00	
0	626.24	17	16	0.97	1252.14	1245	14	4.61E-03	****	2.22E+00	
0	701.34	7	8	0.63	1402.37	1399	6	2.02E-03	****	2.02E+00	T
0	794.87	25	9	2.15	1589.49	1582	12	7.10E-03	61.6	1.82E+00	T
0	825.24	14	9	3.59	1650.25	1645	11	4.00E-03	93.9	1.76E+00	
0	840.84	6	15	0.52	1681.45	1672	12	1.60E-03	****	1.73E+00	
0	1146.02	7	5	3.43	2292.07	2285	11	2.08E-03	****	1.30E+00	
0	1174.96	10	17	6.96	2349.99	2337	18	2.98E-03	****	1.27E+00	
0	1202.68	6	5	1.34	2405.45	2397	11	1.81E-03	****	1.24E+00	
0	1279.42	9	4	1.13	2559.01	2555	8	2.46E-03	****	1.17E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:29:18.15

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*****
*
* GEL Laboratories LLC
* 2040 Savage Road
* Charleston, SC 29407
*****
*
* DETECTOR AND SAMPLE DATA
*
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G648193001.CNF;1
* Acquisition date : 2-JAN-2024 13:28:30 Sensitivity : 3.000
* Detector ID : GAM03 Energy tolerance: 1.500
* Elapsed live time: 0 01:00:00.00 Abundance limit: 75.000
* Elapsed real time: 0 01:00:00.40 Half life ratio: ****
* Sample date : 17-OCT-2023 13:00:00 Nuclide Library: SOLID
* Sample ID : G648193001 Analyst initials: SF1
* Batch Number : 2538164 Sample Quantity : 1.3063E+02 GRAM
* Wet wt corr : 1.00000 Wet Weight : 0.00000
* Dry Weight : 0.00000
*****
*
* CALIBRATION INFORMATION
*
* Eff. Cal. date : 4-OCT-2023 09:22:59 Eff. Geometry : CAN
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF GAM03 CAN.CNF;30
*****
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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)
NA-22	3.033E-02
K-40	2.377E-01
CD-109	7.910E-01
SN-126	7.095E-02
PR-144	1.995E+00
TL-208	2.721E-02
BI-211	1.875E-01
BI-212	3.735E-01
PB-212	4.814E-02
BI-214	4.446E-02
PB-214	6.819E-02
RN-222	4.446E-02
RA-224	5.159E-01
RA-226	6.819E-02
AC-228	1.066E-01
RA-228	1.066E-01
TH-228	4.814E-02
TH-230	6.819E-02
TH-232	1.066E-01
TH-234	1.452E+00
U-234	6.819E-02
U-238	1.452E+00
AM-243	4.963E-02
ANH-511	2.445E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	
BE-7	5.886E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.505E-02	NOT IDENT.
SC-46	5.949E-02	FAIL ABUN
V-48	7.636E-01	NOT IDENT.
CR-51	1.543E+00	NOT IDENT.
MN-52	0.000E+00	SHORT HLIF

MN-54	3.108E-02	NOT IDENT.
CO-56	5.910E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.498E-02	NOT IDENT.
CO-58	3.991E-02	NOT IDENT.
FE-59	1.758E-01	NOT IDENT.
CO-60	0.000E+00	NOT IDENT.
ZN-65	1.023E-01	NOT IDENT.
GE-68	1.284E+00	NOT IDENT.
AS-73	2.191E+00	NOT IDENT.
AS-74	8.938E-01	NOT IDENT.
SE-75	6.142E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.611E+00	NOT IDENT.
RB-83	8.234E-02	NOT IDENT.
RB-84	2.673E-01	NOT IDENT.
KR-85	7.396E+00	NOT IDENT.
SR-85	7.506E-02	NOT IDENT.
RB-86	6.894E+00	NOT IDENT.
Y-88	2.413E-02	NOT IDENT.
Y-91	3.090E+01	NOT IDENT.
NB-94	2.995E-02	FAIL ABUN
NB-95	7.820E-02	NOT IDENT.
NB-95M	2.142E-01	NOT IDENT.
ZR-95	1.371E-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	2.816E-02	NOT IDENT.
RH-102	3.916E-02	NOT IDENT.
RU-103	1.014E-01	FAIL ABUN
RH-106	2.447E-01	NOT IDENT.
RU-106	2.447E-01	NOT IDENT.
AG-108M	2.813E-02	NOT IDENT.
AG-110	7.089E-01	NOT IDENT.
AG-110M	5.291E-02	NOT IDENT.
SN-113	4.583E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	9.912E-01	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.186E-02	NOT IDENT.
SB-124	1.495E-01	NOT IDENT.
SB-125	8.895E-02	NOT IDENT.
TE-125M	1.914E+01	NOT IDENT.
I-126	6.660E+00	NOT IDENT.
SB-126	4.121E+00	FAIL ABUN
SB-127	0.000E+00	SHORT HLIF
I-131	2.253E+01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.246E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	5.087E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	2.065E+00	NOT IDENT.
BA-137M	2.512E-02	NOT IDENT.
CS-137	2.654E-02	NOT IDENT.
LA-138	5.075E-02	NOT IDENT.
CE-139	3.698E-02	NOT IDENT.
BA-140	7.396E+00	NOT IDENT.
LA-140	1.769E+00	NOT IDENT.
CE-141	2.245E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	2.109E-01	NOT IDENT.
PM-144	4.065E-02	FAIL ABUN
PM-146	4.128E-02	NOT IDENT.
ND-147	2.279E+01	NOT IDENT.
PM-147	6.928E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.263E-02	FAIL ABUN
EU-152	8.675E-02	NOT IDENT.
GD-153	9.969E-02	NOT IDENT.
EU-154	1.333E-01	FAIL ABUN
EU-155	1.037E-01	FAIL ABUN
TB-160	2.620E-01	FAIL ABUN
HO-166M	5.138E-02	FAIL ABUN
TM-171	2.865E+01	NOT IDENT.

HF-172	1.769E-01	FAIL ABUN
LU-172	6.887E-02	FAIL ABUN
LU-176	2.004E-02	FAIL ABUN
HF-181	1.063E-01	NOT IDENT.
TA-182	2.863E-01	FAIL ABUN
RE-183	5.067E-01	NOT IDENT.
RE-184	3.118E-01	NOT IDENT.
W-188	9.991E+00	FAIL ABUN
IR-192	6.290E-02	FAIL ABUN
HG-203	8.090E-02	NOT IDENT.
TL-204	5.029E+00	NOT IDENT.
BI-207	5.413E-02	FAIL ABUN
BI-210	7.796E+00	NOT IDENT.
PB-210	7.796E+00	NOT IDENT.
PB-211	7.159E-01	NOT IDENT.
BI-213	7.364E-02	NOT IDENT.
RN-219	3.592E-01	FAIL ABUN
RA-223	5.936E-01	FAIL ABUN
AC-225	4.321E+01	NOT IDENT.
AC-227	2.485E-01	FAIL ABUN
TH-227	2.485E-01	FAIL ABUN
TH-229	4.728E-01	FAIL ABUN
PA-231	4.784E-01	NOT IDENT.
TH-231	5.936E-01	FAIL ABUN
PA-233	5.952E-02	FAIL ABUN
PA-234	2.544E-01	NOT IDENT.
PA-234M	4.197E+00	NOT IDENT.
U-235	1.923E-01	FAIL ABUN
NP-237	5.952E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
NP-239	2.471E-01	NOT IDENT.
PU-239	3.264E+02	NOT IDENT.
AM-241	2.093E-01	NOT IDENT.
CM-243	9.662E-02	NOT IDENT.
BK-247	7.900E-02	NOT IDENT.
CM-247	3.451E-02	NOT IDENT.
CF-249	3.744E-02	NOT IDENT.
CF-251	1.154E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:29:22.58

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \*\*\*\*\*

DETECTOR AND SAMPLE DATA

\* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G648193001.CNF;1 \*  
 \* Acquisition date : 2-JAN-2024 13:28:30 Sensitivity : 3.000 \*  
 \* Detector ID : GAM03 Energy tolerance: 1.500 \*  
 \* Elapsed live time: 0 01:00:00.00 Abundance limit: 75.000 \*  
 \* Elapsed real time: 0 01:00:00.40 Half life ratio : \*\*\*\* \*  
 \* Sample date : 17-OCT-2023 13:00:00 Nuclide Library: SOLID \*  
 \* Sample ID : G648193001 Analyst initials: SF1 \*  
 \* Batch Number : 2538164 Sample Quantity: 1.3063E+02 GRAM \*  
 \* Quantity Err(%): 1.5310E-03 % \*  
 \* Wet wt corr : 1.00000 Wet Weight : 0.00000 \*  
 \* Dry Weight : 0.00000 \*  
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CALIBRATION INFORMATION

\* Eff. Cal. date : 4-OCT-2023 09:22:59 Eff. Geometry : CAN \*  
 \* Eff. File : DKA100:[CANBERRA.GAMMA]EFF\_GAM03\_CAN.CNF;30 \*  
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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)
NA-22	5.226E-02	6.040E-02	6.040E-02
K-40	1.085E+01	1.837E+00	1.837E+00
CD-109	2.507E+00	1.806E+00	1.806E+00
SN-126	2.233E-01	1.604E-01	1.604E-01
PR-144	8.185E+00	4.471E+00	4.471E+00
TL-208	1.861E-01	7.780E-02	7.780E-02
BI-211	3.246E+00	5.829E-01	5.829E-01
BI-212	9.810E-01	6.810E-01	6.810E-01
PB-212	8.151E-01	1.528E-01	1.528E-01
BI-214	9.675E-01	2.306E-01	2.306E-01
PB-214	1.178E+00	2.107E-01	2.107E-01
RN-222	9.675E-01	2.306E-01	2.306E-01
RA-224	3.620E+00	1.516E+00	1.516E+00
RA-226	1.178E+00	2.107E-01	2.107E-01
AC-228	6.893E-01	3.514E-01	3.514E-01
RA-228	6.893E-01	3.514E-01	3.514E-01
TH-228	8.151E-01	1.528E-01	1.528E-01
TH-230	1.178E+00	2.107E-01	2.107E-01
TH-232	6.893E-01	3.514E-01	3.514E-01
TH-234	2.844E+00	3.149E+00	3.149E+00
U-234	1.178E+00	2.107E-01	2.107E-01
U-238	2.844E+00	3.149E+00	3.149E+00
AM-243	2.596E-01	1.318E-01	1.318E-01
ANH-511	1.387E-01	9.761E-02	9.761E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-2.020E-01	6.974E-01	7.033E-01	NOT IDENT.
NA-24	1.851E+35	3.804E+35	0.000E+00	SHORT HLIF
AL-26	-3.432E-02	4.248E-02	4.521E-02	NOT IDENT.
SC-46	1.239E-02	6.893E-02	6.915E-02	FAIL ABUN
V-48	-8.151E-01	1.110E+00	1.170E+00	NOT IDENT.
CR-51	-2.600E-01	2.093E+00	2.097E+00	NOT IDENT.

MN-52	1.481E+02	5.096E+02	5.140E+02	SHORT HLIF
MN-54	-3.406E-02	5.156E-02	5.379E-02	NOT IDENT.
CO-56	1.741E-02	6.713E-02	6.759E-02	NOT IDENT.
MN-56	1.000E+41	3.800E+41	0.000E+00	SHORT HLIF
CO-57	-1.685E-02	2.930E-02	3.027E-02	NOT IDENT.
CO-58	-1.218E-01	7.550E-02	9.336E-02	NOT IDENT.
FE-59	-9.300E-02	2.225E-01	2.265E-01	NOT IDENT.
CO-60	-3.012E-02	2.424E-02	2.778E-02	NOT IDENT.
ZN-65	9.915E-02	1.115E-01	1.201E-01	NOT IDENT.
GE-68	1.188E-01	1.542E+00	1.543E+00	NOT IDENT.
AS-73	7.633E-01	2.510E+00	2.534E+00	NOT IDENT.
AS-74	1.497E-01	1.012E+00	1.014E+00	NOT IDENT.
SE-75	2.674E-02	7.664E-02	7.758E-02	NOT IDENT.
BR-77	8.812E+09	1.966E+10	2.006E+10	SHORT HLIF
SR-82	3.570E-01	1.845E+00	1.852E+00	NOT IDENT.
RB-83	-2.381E-02	1.019E-01	1.025E-01	NOT IDENT.
RB-84	-1.222E-02	3.221E-01	3.221E-01	NOT IDENT.
KR-85	7.474E+00	7.644E+00	8.353E+00	NOT IDENT.
SR-85	7.552E-02	7.760E-02	8.474E-02	NOT IDENT.
RB-86	-3.184E-01	8.484E+00	8.486E+00	NOT IDENT.
Y-88	-2.295E-02	4.293E-02	4.416E-02	NOT IDENT.
Y-91	-2.975E+01	5.012E+01	5.188E+01	NOT IDENT.
NB-94	2.077E-02	2.875E-02	3.024E-02	FAIL ABUN
NB-95	-5.941E-02	1.011E-01	1.046E-01	NOT IDENT.
NB-95M	3.151E-02	2.735E-01	2.739E-01	NOT IDENT.
ZR-95	1.081E-01	1.446E-01	1.526E-01	NOT IDENT.
NB-97	1.000E+41	8.553E+41	0.000E+00	SHORT HLIF
ZR-97	2.629E+32	4.898E+32	0.000E+00	SHORT HLIF
MO-99	-1.792E+06	6.491E+07	6.491E+07	SHORT HLIF
TC-99m	-1.000E+41	1.504E+41	0.000E+00	SHORT HLIF
RH-101	-1.605E-02	3.276E-02	3.355E-02	NOT IDENT.
RH-102	-1.015E-02	5.455E-02	5.475E-02	NOT IDENT.
RU-103	2.189E-02	1.126E-01	1.131E-01	FAIL ABUN
RH-106	3.760E-02	3.128E-01	3.133E-01	NOT IDENT.
RU-106	3.760E-02	3.128E-01	3.133E-01	NOT IDENT.
AG-108M	1.188E-02	3.242E-02	3.286E-02	NOT IDENT.
AG-110	6.437E-02	8.164E-01	8.170E-01	NOT IDENT.
AG-110M	-2.701E-03	6.390E-02	6.392E-02	NOT IDENT.
SN-113	-4.815E-02	6.319E-02	6.682E-02	NOT IDENT.
CD-115	5.462E+08	2.741E+09	2.752E+09	SHORT HLIF
SN-117M	-5.868E-01	1.174E+00	1.203E+00	NOT IDENT.
SB-122	-1.202E+07	1.485E+07	1.581E+07	SHORT HLIF
TE-123M	-2.178E-02	3.798E-02	3.923E-02	NOT IDENT.
SB-124	-2.501E-02	1.885E-01	1.889E-01	NOT IDENT.
SB-125	-2.412E-03	1.081E-01	1.082E-01	NOT IDENT.
TE-125M	5.004E+00	2.078E+01	2.090E+01	NOT IDENT.
I-126	5.945E+00	7.029E+00	7.522E+00	NOT IDENT.
SB-126	1.445E+00	4.756E+00	4.801E+00	FAIL ABUN
SB-127	-3.333E+04	8.257E+04	8.392E+04	SHORT HLIF
I-131	8.891E+00	2.578E+01	2.609E+01	NOT IDENT.
I-132	1.000E+41	6.348E+41	0.000E+00	SHORT HLIF
TE-132	5.475E+04	5.102E+05	5.108E+05	SHORT HLIF
BA-133	1.265E-02	4.921E-02	4.954E-02	NOT IDENT.
I-133	-1.347E+24	2.151E+25	0.000E+00	SHORT HLIF
CS-134	1.012E-01	6.175E-02	7.678E-02	FAIL ABUN
I-135	1.000E+41	2.670E+41	0.000E+00	SHORT HLIF
CS-136	-3.291E+00	3.261E+00	3.583E+00	NOT IDENT.
BA-137M	-4.723E-02	3.732E-02	4.297E-02	NOT IDENT.
CS-137	-4.990E-02	3.942E-02	4.539E-02	NOT IDENT.
LA-138	-1.538E-02	6.405E-02	6.442E-02	NOT IDENT.
CE-138	-1.177E-02	4.287E-02	4.320E-02	NOT IDENT.
BA-140	7.519E+00	8.175E+00	8.350E+00	NOT IDENT.
LA-140	-1.021E+00	2.472E+00	2.514E+00	NOT IDENT.
CE-141	8.055E-02	2.462E-01	2.489E-01	NOT IDENT.
CE-143	2.573E+15	2.432E+15	5.555E+15	SHORT HLIF
CE-144	8.506E-03	2.349E-01	2.349E-01	NOT IDENT.
PM-144	1.059E-01	5.785E-02	7.500E-02	FAIL ABUN
PM-146	3.537E-02	4.263E-02	4.551E-02	NOT IDENT.
ND-147	-1.824E+01	3.337E+01	3.437E+01	NOT IDENT.
PM-147	-2.642E+02	7.941E+02	8.030E+02	NOT IDENT.
PM-149	9.263E+09	2.455E+10	2.490E+10	SHORT HLIF
EU-150	5.664E-03	2.918E-02	2.929E-02	FAIL ABUN
EU-152	1.700E-03	1.158E-01	1.158E-01	NOT IDENT.
GD-153	5.000E-02	1.173E-01	1.194E-01	NOT IDENT.
EU-154	1.435E-01	1.659E-01	1.780E-01	FAIL ABUN
EU-155	4.914E-02	1.109E-01	1.131E-01	FAIL ABUN
TB-160	2.353E-01	2.755E-01	2.952E-01	FAIL ABUN
HO-166M	-2.176E-02	6.396E-02	6.471E-02	FAIL ABUN

TM-171	3.137E-01	3.367E+01	3.367E+01	NOT IDENT.
HF-172	4.955E-02	1.931E-01	1.944E-01	FAIL ABUN
LU-172	7.930E-02	6.659E-02	7.558E-02	FAIL ABUN
LU-176	-1.470E-02	3.789E-02	3.847E-02	FAIL ABUN
HF-181	1.783E-02	1.186E-01	1.189E-01	NOT IDENT.
TA-182	2.035E-01	3.029E-01	3.165E-01	FAIL ABUN
RE-183	-7.960E-03	5.999E-01	5.999E-01	NOT IDENT.
RE-184	-2.414E-01	4.698E-01	4.822E-01	NOT IDENT.
W-188	-1.030E+01	1.499E+01	1.569E+01	FAIL ABUN
IR-192	8.050E-02	1.026E-01	1.088E-01	FAIL ABUN
HG-203	-9.958E-02	1.062E-01	1.153E-01	NOT IDENT.
TL-204	3.832E+00	6.106E+00	6.346E+00	NOT IDENT.
BI-207	1.478E-02	6.327E-02	6.362E-02	FAIL ABUN
BI-210	5.502E+00	8.644E+00	8.993E+00	NOT IDENT.
PB-210	5.502E+00	8.644E+00	8.993E+00	NOT IDENT.
PB-211	4.858E-01	8.017E-01	8.311E-01	NOT IDENT.
BI-213	-6.869E-02	9.405E-02	9.902E-02	NOT IDENT.
RN-219	1.072E-01	4.178E-01	4.206E-01	FAIL ABUN
RA-223	-2.599E-03	7.039E-01	7.039E-01	FAIL ABUN
AC-225	1.739E+01	4.834E+01	4.898E+01	NOT IDENT.
AC-227	2.334E-01	2.682E-01	2.881E-01	FAIL ABUN
TH-227	2.334E-01	2.682E-01	2.881E-01	FAIL ABUN
TH-229	-5.696E-02	6.098E-01	6.103E-01	FAIL ABUN
PA-231	3.266E-01	5.859E-01	6.041E-01	NOT IDENT.
TH-231	-2.599E-03	7.039E-01	7.039E-01	FAIL ABUN
PA-233	2.488E-02	9.404E-02	9.470E-02	FAIL ABUN
PA-234	1.260E-02	3.043E-01	3.044E-01	NOT IDENT.
PA-234M	-9.058E-01	5.155E+00	5.172E+00	NOT IDENT.
U-235	-1.221E-01	2.223E-01	2.290E-01	FAIL ABUN
NP-237	2.488E-02	9.404E-02	9.470E-02	FAIL ABUN
NP-238	-4.260E+09	1.223E+10	1.238E+10	SHORT HLIF
NP-239	-9.158E-02	2.808E-01	2.838E-01	NOT IDENT.
PU-239	2.709E+02	3.447E+02	3.656E+02	NOT IDENT.
AM-241	1.280E-01	2.537E-01	2.601E-01	NOT IDENT.
CM-243	-5.006E-02	1.102E-01	1.125E-01	NOT IDENT.
BK-247	6.517E-02	9.529E-02	9.972E-02	NOT IDENT.
CM-247	1.404E-02	3.974E-02	4.024E-02	NOT IDENT.
CF-249	2.829E-02	4.122E-02	4.315E-02	NOT IDENT.
CF-251	-1.735E-02	1.326E-01	1.329E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	69.9777	82.47	87.6127	125.81	59.9152
45.60	73.8364	323.87	80.2974	127.23	75.2658
46.54	58.9870	84.00	80.3281	127.91	77.1309
49.72	0.0000	85.43	62.9200	129.30	62.9008
51.35	66.7508	86.55	87.0044	131.20	71.1727
51.87	66.8375	879.38	85.7803	482.18	70.4447
52.39	55.1828	87.57	85.8036	133.52	70.4923
52.97	51.7344	87.09	85.8264	264.66	76.1660
53.44	54.1482	87.57	84.6369	122.06	66.2335
125.81	60.1261	88.03	84.7059	140.51	0.0000
57.36	0.0000	88.34	84.7524	143.76	80.6022
57.53	61.8117	193.51	84.7718	144.24	81.5688
57.98	71.3956	89.96	73.5771	145.44	72.5139
1093.63	60.4691	90.64	67.5407	152.43	74.0739
57.98	60.4761	91.11	73.7244	153.25	68.5876
59.54	60.5065	63.29	67.5407	154.21	56.6042
60.96	65.4935	143.76	67.6289	156.02	69.7487
61.17	60.7299	94.56	74.1612	158.56	58.7677
62.93	67.3857	94.65	74.1722	159.00	61.5984
63.29	67.4390	94.67	74.1749	162.33	66.5264
63.58	67.4819	94.87	78.0376	162.66	63.7396
64.28	62.7574	97.43	69.3791	163.33	52.5330
66.73	59.8532	311.90	72.9254	165.86	72.4452
67.24	64.3709	946.00	72.9267	176.31	49.5064
67.68	82.6659	99.53	73.9167	1048.07	60.9505
67.75	79.0303	1221.41	73.9867	177.52	63.8730
68.89	69.4688	265.00	75.9428	739.50	0.0000
69.67	61.8501	103.18	79.5412	181.52	63.1956
70.82	57.1014	103.37	79.5653	711.68	67.2350
70.83	57.1029	116.74	79.5653	185.72	67.3297
72.81	73.7128	105.21	64.1850	193.51	62.5506
279.20	73.7215	105.31	68.5327	197.03	59.3724
72.87	73.7215	106.12	72.9630	127.23	59.4319
74.66	73.9847	106.47	77.3483	306.78	58.6847
74.82	74.0080	109.28	69.8299	203.43	70.5352
1063.66	74.0295	111.00	77.0152	205.31	59.8713
351.93	74.3394	228.16	0.0000	210.85	61.1864
238.63	74.3394	114.06	76.4918	215.65	60.4806
351.93	74.3394	116.30	0.0000	218.12	58.6363
78.74	79.5435	116.74	80.3267	222.11	51.8757
79.69	79.6875	119.76	70.0415	290.67	52.1180
80.03	81.3990	121.12	65.7373	177.52	52.1317
80.12	81.4135	121.22	69.3005	228.16	0.0000
80.19	81.4244	121.78	72.0236	228.18	53.1736
80.57	73.1677	122.06	66.7152	235.69	54.5504
81.00	63.2413	122.92	60.5625	256.23	54.5636
81.07	63.2498	123.07	60.5753	238.63	46.5919
81.75	78.7457	123.68	68.6521	238.98	0.0000

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
240.99	46.6902	340.48	27.9757	546.56	0.0000
242.00	46.7318	340.55	27.9767	552.55	17.6525
344.28	47.3529	344.28	32.9987	563.25	20.9180
252.40	0.0000	345.93	28.0810	564.24	0.0000
252.80	38.9703	351.06	36.4670	795.86	16.8574
254.15	0.0000	351.93	36.4885	569.50	16.8585
256.23	37.0276	507.63	0.0000	569.70	16.8602
260.90	0.0000	356.01	36.5886	583.19	16.0241
264.66	41.9527	364.49	27.8753	584.27	15.0889
264.80	41.9576	366.42	0.0000	595.83	18.0131
265.00	37.3015	372.51	39.2304	600.60	17.3733
269.46	40.5591	129.30	32.5583	602.52	0.0000
270.03	40.5782	377.52	33.7347	604.72	25.8910
271.23	40.6187	383.85	27.0972	607.14	11.4349
273.65	39.1335	388.16	22.6424	609.32	11.4459
356.01	30.3305	388.63	21.5165	497.08	11.4514
277.37	38.7276	391.69	29.5002	433.94	19.8840
277.60	39.7820	400.66	29.6642	696.49	12.4478
278.00	38.7472	401.81	25.1184	620.36	21.4710
279.20	55.5566	402.40	26.2695	621.93	10.7427
279.54	53.4747	404.85	27.4526	667.71	0.0000
279.70	53.4809	410.95	34.4427	631.29	13.8687
280.46	44.0696	413.71	24.1501	453.88	12.1180
283.69	46.2872	414.70	23.0135	595.83	11.5748
364.49	50.5195	423.72	25.4509	635.95	16.4060
285.41	48.4567	404.85	44.0473	636.99	16.4132
285.90	0.0000	427.87	30.1514	657.50	15.5835
402.40	42.2054	433.94	24.4393	884.68	15.5850
290.67	41.2526	333.97	20.1383	657.90	0.0000
293.27	0.0000	440.45	23.6547	661.66	25.3676
295.22	35.0289	453.88	18.5384	664.57	0.0000
295.96	35.0484	463.37	23.0733	666.33	18.5738
298.58	35.1189	468.07	31.1404	720.70	15.6421
299.98	35.1565	685.70	0.0000	667.71	0.0000
300.09	35.1592	475.06	24.1140	677.62	13.7501
300.13	35.1605	476.78	28.6060	685.70	0.0000
301.36	35.1934	477.60	24.1470	564.24	0.0000
302.85	0.0000	482.18	21.5167	695.00	11.0783
304.50	0.0000	1596.21	23.3701	696.49	11.0848
537.26	48.1174	527.90	0.0000	696.51	11.0848
306.78	35.3371	497.08	18.9758	697.00	11.0872
316.51	35.3814	505.52	23.2340	697.30	11.0886
311.90	32.2467	507.63	0.0000	697.49	7.9209
316.51	48.5349	511.00	21.8430	702.65	20.6369
531.02	30.8037	514.00	21.8765	706.68	18.8817
320.08	37.3062	514.00	21.8767	711.68	20.9103
427.87	38.9553	520.40	16.7221	720.70	14.8463
323.87	39.0352	238.98	0.0000	721.93	0.0000
325.23	49.9269	522.65	0.0000	722.78	16.0015
328.76	38.0833	527.90	0.0000	722.91	14.4022
388.16	26.1997	528.26	16.1584	1274.44	14.4044
333.97	27.8491	520.40	14.6992	724.19	12.8082
334.37	27.8569	529.87	0.0000	727.33	13.0242
338.28	29.5763	531.02	26.4771	733.00	10.7103
911.20	29.5768	537.26	13.2794	735.93	8.0417

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
737.46	15.0870	937.49	16.1787	1362.66	0.0000
739.50	0.0000	944.13	9.7278	1365.19	5.8160
744.23	0.0000	946.00	11.8966	1368.63	0.0000
747.24	8.0767	949.00	16.2383	1384.29	4.8684
748.06	14.1384	954.55	0.0000	1408.01	6.8530
752.31	22.2538	962.31	3.4786	1434.09	0.0000
753.82	16.1938	964.08	13.9221	1435.80	8.8668
756.73	12.1586	966.17	15.6727	1457.56	0.0000
756.80	12.1589	968.97	14.1612	1460.82	3.9629
763.94	26.4150	983.53	16.4131	696.51	1.9938
765.81	30.4999	984.45	0.0000	1505.03	5.0020
766.42	20.3381	996.26	8.7878	1584.12	11.1907
766.84	20.3412	1001.03	12.1007	1596.21	6.1192
772.60	0.0000	1002.74	8.8049	727.33	6.1497
776.52	14.2901	1004.73	12.1142	1621.92	6.1515
777.92	0.0000	1021.30	0.0000	1678.03	0.0000
778.90	19.4111	1025.87	0.0000	1690.97	5.1978
783.70	0.0000	1028.54	0.0000	1750.46	0.0000
788.74	22.9674	846.77	13.3462	1764.49	5.2720
792.07	22.9954	1038.76	0.0000	1770.23	6.3334
795.86	9.8687	1046.59	7.8054	1771.35	6.3346
801.95	13.3932	1048.07	20.0786	1791.20	0.0000
810.06	21.6985	1049.04	20.0852	1808.65	8.5055
810.29	21.6998	621.93	11.1627	846.75	0.0000
810.45	23.7679	1063.66	14.5671	1836.06	3.2058
810.76	23.7707	1077.00	12.3730		
815.77	4.1415	1077.34	11.2494		
818.51	14.2132	1085.87	8.1193		
832.01	16.6606	1093.63	5.4246		
834.85	20.0127	1099.45	12.6779		
835.71	16.6826	1112.07	15.9038		
1260.41	0.0000	1112.84	16.8811		
846.75	0.0000	1115.54	7.5806		
846.77	11.5133	609.32	13.6626		
856.80	19.9550	889.28	13.6641		
860.56	12.6193	1121.30	9.1108		
702.65	11.6093	1129.67	8.2187		
873.19	9.5051	1131.51	0.0000		
529.87	0.0000	1147.95	0.0000		
879.38	11.6415	1173.23	14.7836		
880.51	17.9982	1177.95	7.7096		
881.60	20.1231	1189.05	16.7019		
883.24	19.0745	1204.77	15.5282		
884.68	14.8430	1221.41	12.1640		
889.28	12.7419	1231.02	11.2564		
903.28	15.9563	1235.36	16.9031		
898.04	15.9737	1238.28	13.1564		
900.72	9.5927	1260.41	0.0000		
903.28	15.6455	1271.87	9.4771		
911.20	10.6952	1274.44	6.3223		
912.08	10.6982	1274.54	6.3223		
923.98	0.0000	1099.45	7.6188		
926.50	6.4488	1298.22	0.0000		
929.11	13.9843	1312.11	6.6999		
1434.09	0.0000	1332.49	5.7712		

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 14:29:49.77

```

*****
*                               GEL Laboratories LLC                *
*                               2040 Savage Road                  *
*                               Charleston, SC 29407              *
*****
Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597564.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG GAM04.CNF;742
Sample date    : 12-DEC-2023 00:00:00 Acquisition date : 2-JAN-2024 13:29:19.
Sample ID     : G1205597564 Sample quantity : 1.30630E+02 GRAM
Detector name : GAM04 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.21 0.0%
Energy tolerance: 1.50000 keV Analyst Initials : SF1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 2538164 Detector SN# :
Matrix Spike ID : LCS ID :
*****

```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	98.30	8	24	0.61	197.54	195	7	2.32E-03	101.4	
2	0	185.98*	19	31	1.47	372.82	369	9	5.25E-03	63.4	
3	0	197.87*	19	31	1.61	396.59	391	12	5.20E-03	67.5	
4	0	209.53	14	13	1.07	419.90	417	7	4.00E-03	48.3	
5	0	366.10	8	25	1.38	732.90	725	10	2.26E-03	120.3	
6	0	468.18	14	8	3.45	936.99	931	11	3.89E-03	47.7	
7	0	484.62	4	11	1.26	969.86	965	9	1.14E-03	154.9	
8	0	526.05	14	6	1.23	1052.70	1048	11	3.75E-03	43.3	
9	0	551.77	5	4	0.72	1104.11	1099	7	1.25E-03	83.5	
10	0	596.36	8	6	1.51	1193.28	1189	9	2.10E-03	71.4	
11	0	665.91	7	1	1.40	1332.34	1329	6	1.82E-03	48.8	
12	0	1460.30*	2	0	1.75	2921.00	2917	8	6.05E-04	148.0	

Flag: "\*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.1 Generated 2-JAN-2024 14:29:51

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Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597564.CNF;1
Analyses by   : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4
Sample title  : SF1
Sample date   : 12-DEC-2023 00:00:00 Acquisition date : 2-JAN-2024 13:29:19
Sample ID     : G1205597564 Sample quantity : 130.63 GRAM
Sample type   : SOLID Sample geometry :
Detector name : GAMMA4 Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:00.21 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

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected	Decay Corr	2-Sigma
					pCi/GRAM	pCi/GRAM	%Error
K-40	1460.82	2	10.66*	8.678E-01	1.288E-01	1.288E-01	295.98
AS-74	595.83	8	59.00*	1.925E+00	3.890E-02	9.028E-02	142.71
	634.78	-----	15.40	1.835E+00	-----	Line Not Found	-----

Flag: "\*" = Keyline

```

*****
*
* GEL Laboratories LLC
* 2040 Savage Road
* Charleston, SC 29407
*****
*
* DETECTOR AND SAMPLE DATA
*
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597564.CNF;1
* Acquisition date : 2-JAN-2024 13:29:19 Sensitivity : 3.000
* Detector ID : GAM04 Energy tolerance: 1.500
* Elapsed live time: 0 01:00:00.00 Abundance limit: 75.000
* Elapsed real time: 0 01:00:00.21 Half life ratio: *****
* Sample date : 12-DEC-2023 00:00:00 Analyst initials: SF1
* Sample ID : G1205597564 Sample Quantity : 1.3063E+02 GRAM
* Batch Number : 2538164 Wet Weight : 0.00000
* Wet wt corr : 1.00000 Dry Weight : 0.00000
* Nuclide Library : SOLID.NLB;17
*****
*
* CALIBRATION INFORMATION
*
* Eff. Cal. date : 13-DEC-2023 04:08:51 Eff. Geometry : CAN
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF GAM04 CAN.CNF;19
*****
  
```

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	1.288E-01	3.737E-01	5.334E-01
AS-74	9.028E-02	1.263E-01	1.553E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	5.623E-02	2.223E-01	5.016E-01	NOT IDENT.
NA-22	-5.330E-04	2.741E-02	6.265E-02	NOT IDENT.
NA-24	0.000E+00	5.941E+08	0.000E+00	SHORT HLIF
AL-26	1.474E-02	2.067E-02	6.928E-02	NOT IDENT.
SC-46	-1.304E-02	2.570E-02	4.577E-02	NOT IDENT.
V-48	-2.151E-03	7.204E-02	1.481E-01	NOT IDENT.
CR-51	-8.989E-02	4.511E-01	8.020E-01	NOT IDENT.
MN-52	-3.727E-01	5.211E-01	8.818E-01	NOT IDENT.
MN-54	-1.973E-02	2.995E-02	5.028E-02	NOT IDENT.
CO-56	1.636E-02	3.381E-02	7.690E-02	NOT IDENT.
MN-56	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
CO-57	1.016E-03	1.659E-02	3.344E-02	NOT IDENT.
CO-58	3.336E-02	2.847E-02	7.696E-02	NOT IDENT.
FE-59	2.557E-02	5.801E-02	1.505E-01	NOT IDENT.
CO-60	-1.740E-02	3.121E-02	5.754E-02	NOT IDENT.
ZN-65	2.221E-02	6.396E-02	1.511E-01	NOT IDENT.
GE-68	-2.602E-01	7.370E-01	1.541E+00	NOT IDENT.
AS-73	-2.080E-01	1.283E+00	2.676E+00	NOT IDENT.
SE-75	8.370E-03	4.223E-02	8.148E-02	NOT IDENT.
BR-77	1.288E+01	5.201E+01	1.027E+02	NOT IDENT.
SR-82	-9.262E-03	2.202E-01	4.823E-01	NOT IDENT.
RB-83	-7.535E-03	3.989E-02	8.443E-02	FAIL ABUN
RB-84	-5.039E-02	6.861E-02	1.109E-01	NOT IDENT.
KR-85	-1.039E+01	7.483E+00	1.163E+01	NOT IDENT.
SR-85	-5.909E-02	4.242E-02	6.587E-02	NOT IDENT.
RB-86	-8.858E-02	5.333E-01	1.212E+00	NOT IDENT.
Y-88	5.360E-04	2.613E-02	6.716E-02	NOT IDENT.
Y-91	1.491E+01	1.457E+01	4.010E+01	NOT IDENT.

NB-94	8.077E-03	2.764E-02	5.914E-02	NOT IDENT.
NB-95	1.643E-02	3.188E-02	7.356E-02	NOT IDENT.
NB-95M	-1.334E-02	1.017E-01	1.886E-01	NOT IDENT.
ZR-95	1.265E-02	5.276E-02	1.179E-01	NOT IDENT.
NB-97	0.000E+00	1.777E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.193E+09	0.000E+00	SHORT HLIF
MO-99	-4.329E+01	5.183E+01	8.351E+01	FAIL ABUN
TC-99M	0.000E+00	1.502E+24	0.000E+00	SHORT HLIF
RH-101	-1.262E-03	2.330E-02	4.535E-02	FAIL ABUN
RH-102	-5.040E-05	3.493E-02	7.491E-02	NOT IDENT.
RU-103	-3.688E-02	4.007E-02	6.799E-02	NOT IDENT.
RH-106	5.941E-03	2.206E-01	4.678E-01	NOT IDENT.
RU-106	5.941E-03	2.206E-01	4.678E-01	NOT IDENT.
AG-108M	7.286E-04	2.344E-02	4.878E-02	NOT IDENT.
CD-109	-1.916E-01	4.569E-01	8.801E-01	NOT IDENT.
AG-110	-2.351E-01	5.423E-01	1.012E+00	NOT IDENT.
AG-110M	1.322E-02	4.064E-02	9.019E-02	NOT IDENT.
SN-113	1.197E-03	3.538E-02	7.400E-02	NOT IDENT.
CD-115	-1.165E+01	6.384E+01	1.151E+02	NOT IDENT.
SN-117M	-1.846E-02	5.405E-02	1.001E-01	NOT IDENT.
SB-122	-1.951E+00	6.552E+00	1.301E+01	NOT IDENT.
TE-123M	1.187E-02	1.906E-02	4.089E-02	NOT IDENT.
SB-124	-9.577E-04	5.591E-02	1.447E-01	NOT IDENT.
SB-125	1.765E-02	7.460E-02	1.593E-01	NOT IDENT.
TE-125M	2.747E+00	6.577E+00	1.400E+01	NOT IDENT.
I-126	2.080E-01	1.989E-01	5.062E-01	FAIL ABUN
SB-126	-8.766E-02	1.403E-01	2.440E-01	FAIL ABUN
SN-126	2.085E-02	4.287E-02	9.427E-02	NOT IDENT.
SB-127	8.386E-01	2.766E+00	6.309E+00	NOT IDENT.
I-131	1.787E-01	1.879E-01	4.256E-01	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	6.610E-01	2.603E+00	4.986E+00	NOT IDENT.
BA-133	-2.048E-02	2.994E-02	5.572E-02	NOT IDENT.
I-133	0.000E+00	7.187E+05	0.000E+00	SHORT HLIF
CS-134	1.623E-03	3.288E-02	6.786E-02	NOT IDENT.
I-135	0.000E+00	7.107E+22	0.000E+00	SHORT HLIF
CS-136	-3.981E-02	1.255E-01	2.515E-01	NOT IDENT.
BA-137M	1.325E-02	1.938E-02	4.868E-02	NOT IDENT.
CS-137	1.400E-02	2.048E-02	5.143E-02	NOT IDENT.
LA-138	-1.961E-02	3.877E-02	7.350E-02	NOT IDENT.
CE-139	-6.691E-03	2.192E-02	4.070E-02	NOT IDENT.
BA-140	-1.627E-01	3.038E-01	5.596E-01	NOT IDENT.
LA-140	2.328E-02	8.196E-02	2.220E-01	NOT IDENT.
CE-141	1.039E-02	4.519E-02	9.233E-02	NOT IDENT.
CE-143	0.000E+00	2.409E+03	0.000E+00	SHORT HLIF
CE-144	5.354E-02	1.304E-01	2.733E-01	NOT IDENT.
PM-144	6.899E-03	2.445E-02	5.415E-02	NOT IDENT.
PR-144	5.075E-01	1.833E+00	4.057E+00	NOT IDENT.
PM-146	3.821E-03	2.874E-02	6.243E-02	NOT IDENT.
ND-147	1.418E-01	6.317E-01	1.280E+00	NOT IDENT.
PM-147	-3.074E+02	4.754E+02	8.591E+02	NOT IDENT.
PM-149	1.307E+02	5.286E+02	1.055E+03	NOT IDENT.
EU-150	-2.942E-03	2.215E-02	4.064E-02	NOT IDENT.
EU-152	2.576E-03	7.986E-02	1.653E-01	NOT IDENT.
GD-153	4.471E-02	8.883E-02	1.132E-01	FAIL ABUN
EU-154	-2.092E-02	8.220E-02	1.721E-01	NOT IDENT.
EU-155	2.478E-03	5.163E-02	1.089E-01	NOT IDENT.
TB-160	1.093E-01	1.108E-01	2.804E-01	FAIL ABUN
HO-166M	4.395E-02	4.160E-02	1.072E-01	NOT IDENT.
TM-171	-1.962E+01	2.689E+01	5.150E+01	NOT IDENT.
HF-172	4.922E-02	1.287E-01	2.681E-01	NOT IDENT.
IU-172	-2.359E-02	5.044E-02	1.208E-01	NOT IDENT.
IU-176	-5.796E-03	2.147E-02	3.857E-02	NOT IDENT.
HF-181	-1.372E-02	4.290E-02	7.337E-02	NOT IDENT.
TA-182	-7.902E-03	1.057E-01	2.405E-01	NOT IDENT.
RE-183	-1.175E-01	2.263E-01	4.436E-01	NOT IDENT.
RE-184	-5.945E-02	8.201E-02	1.263E-01	NOT IDENT.
W-188	-3.599E+00	6.329E+00	1.067E+01	NOT IDENT.
IR-192	-2.784E-02	3.516E-02	5.579E-02	FAIL ABUN
HG-203	-1.992E-02	3.828E-02	6.530E-02	NOT IDENT.
TL-204	-2.028E-01	3.309E+00	6.871E+00	NOT IDENT.
BI-207	-1.119E-02	3.389E-02	7.007E-02	NOT IDENT.
TL-208	4.371E-02	3.609E-02	8.031E-02	NOT IDENT.
BI-210	-1.284E+00	9.365E+00	1.903E+01	NOT IDENT.
PB-210	-1.284E+00	9.365E+00	1.903E+01	NOT IDENT.
BI-211	-4.296E-02	1.899E-01	3.747E-01	NOT IDENT.
PB-211	3.675E-02	5.102E-01	1.083E+00	NOT IDENT.
BI-212	6.480E-02	3.556E-01	7.725E-01	NOT IDENT.

PB-212	5.300E-03	5.224E-02	1.008E-01	NOT IDENT.
BI-213	-6.489E-02	8.533E-02	1.524E-01	NOT IDENT.
BI-214	-4.990E-02	5.757E-02	1.123E-01	NOT IDENT.
PB-214	-1.566E-02	6.758E-02	1.335E-01	NOT IDENT.
RN-219	-9.243E-04	3.332E-01	6.849E-01	NOT IDENT.
RN-222	-4.990E-02	5.757E-02	1.123E-01	NOT IDENT.
RA-223	-3.299E-01	5.197E-01	8.517E-01	NOT IDENT.
RA-224	-2.938E-01	5.055E-01	8.651E-01	NOT IDENT.
AC-225	2.137E-01	6.458E-01	1.318E+00	NOT IDENT.
RA-226	-1.566E-02	6.758E-02	1.335E-01	NOT IDENT.
AC-227	-1.251E-01	1.898E-01	3.181E-01	NOT IDENT.
TH-227	-1.251E-01	1.898E-01	3.181E-01	NOT IDENT.
AC-228	2.478E-02	1.030E-01	2.361E-01	NOT IDENT.
RA-228	2.478E-02	1.030E-01	2.361E-01	NOT IDENT.
TH-228	5.300E-03	5.224E-02	1.008E-01	NOT IDENT.
TH-229	8.103E-02	4.402E-01	8.024E-01	FAIL ABUN
TH-230	-1.566E-02	6.758E-02	1.335E-01	NOT IDENT.
PA-231	1.776E-01	3.857E-01	7.871E-01	NOT IDENT.
TH-231	-3.299E-01	5.197E-01	8.517E-01	NOT IDENT.
TH-232	2.478E-02	1.030E-01	2.361E-01	NOT IDENT.
PA-233	2.720E-03	5.117E-02	9.834E-02	NOT IDENT.
PA-234	-3.600E-03	1.586E-01	3.571E-01	FAIL ABUN
PA-234M	-3.941E-01	3.431E+00	7.604E+00	NOT IDENT.
TH-234	-3.667E-01	1.277E+00	2.653E+00	NOT IDENT.
U-234	-1.566E-02	6.758E-02	1.335E-01	NOT IDENT.
U-235	-4.120E-02	1.278E-01	2.403E-01	FAIL ABUN
NP-237	4.720E-03	5.117E-02	9.834E-02	FAIL ABUN
NP-238	0.000E+00	1.536E+00	0.000E+00	SHORT HLIF
U-238	-3.687E-01	1.277E+00	2.653E+00	NOT IDENT.
NP-239	-1.421E-02	1.872E-01	3.676E-01	FAIL ABUN
PU-239	-5.382E+01	2.483E+02	4.727E+02	NOT IDENT.
AM-241	2.141E-03	1.435E-01	3.068E-01	NOT IDENT.
AM-243	1.264E-02	3.800E-02	8.105E-02	NOT IDENT.
CM-243	-4.461E-02	6.404E-02	1.163E-01	FAIL ABUN
BK-247	-3.339E-04	7.321E-02	1.370E-01	NOT IDENT.
CM-247	7.373E-04	2.971E-02	6.157E-02	NOT IDENT.
CF-249	3.164E-02	2.992E-02	7.204E-02	NOT IDENT.
CF-251	5.493E-02	7.658E-02	1.698E-01	NOT IDENT.
ANH-511	-5.688E-02	4.983E-02	1.064E-01	NOT IDENT.



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	2	10.66*	8.678E-01	1.288E-01	1.288E-01	295.98
AS-74	595.83	8	59.00*	1.925E+00	3.890E-02	9.028E-02	142.71
	634.78	-----	15.40	1.835E+00	-----	Line Not Found	-----

Flag: "\*" = Keyline

Total number of lines in spectrum 12  
 Number of unidentified lines 2  
 Number of lines tentatively identified by NID 10 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	1.288E-01	1.288E-01	3.814E-01	295.98	
AS-74	17.77D	2.32	3.890E-02	9.028E-02	12.88E-02	142.71	
Total Activity :			1.678E-01	2.191E-01			

Grand Total Activity : 1.678E-01 2.191E-01

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines  
Sample ID : G1205597564

Page : 3  
Acquisition date : 2-JAN-2024 13:29:19

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	98.30	10	27	0.61	197.54	195	7	2.32E-03	****	4.50E+00	T
0	185.98	21	34	1.47	372.82	369	9	5.25E-03	****	4.30E+00	T
0	197.87	20	33	1.61	396.59	391	12	5.20E-03	****	4.13E+00	T
0	209.53	16	14	1.07	419.90	417	7	4.00E-03	96.6	3.98E+00	T
0	366.10	9	26	1.38	732.90	725	10	2.26E-03	****	2.71E+00	T
0	468.18	14	8	3.45	936.99	931	11	3.89E-03	95.5	2.29E+00	T
0	484.62	4	11	1.26	969.86	965	9	1.14E-03	****	2.24E+00	
0	526.05	14	6	1.23	1052.70	1048	11	3.75E-03	86.5	2.11E+00	
0	551.77	5	4	0.72	1104.11	1099	7	1.25E-03	****	2.04E+00	T
0	665.91	7	1	1.40	1332.34	1329	6	1.82E-03	97.6	1.77E+00	T

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:30:01.19

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*****
*
* GEL Laboratories LLC
* 2040 Savage Road
* Charleston, SC 29407
*****
*
* DETECTOR AND SAMPLE DATA
*
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597564.CNF;1
* Acquisition date : 2-JAN-2024 13:29:19 Sensitivity : 3.000
* Detector ID : GAM04 Energy tolerance: 1.500
* Elapsed live time: 0 01:00:00.00 Abundance limit : 75.000
* Elapsed real time: 0 01:00:00.21 Half life ratio : ****
* Sample date : 12-DEC-2023 00:00:00 Nuclide Library : SOLID
* Sample ID : G1205597564 Analyst initials: SF1
* Batch Number : 2538164 Sample Quantity : 1.3063E+02 GRAM
* Wet wt corr : 1.00000 Wet Weight : 0.00000
* Dry Weight : 0.00000
*****
*
* CALIBRATION INFORMATION
*
* Eff. Cal. date : 13-DEC-2023 04:08:51 Eff. Geometry : CAN
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF GAM04 CAN.CNF;19
*****
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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	1.825E-01
AS-74	6.152E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	Identified
BE-7	2.063E-01	NOT IDENT.
NA-22	2.320E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.446E-02	NOT IDENT.
SC-46	1.605E-02	NOT IDENT.
V-48	5.804E-02	NOT IDENT.
CR-51	3.545E-01	NOT IDENT.
MN-52	3.124E-01	NOT IDENT.
MN-54	1.948E-02	NOT IDENT.
CO-56	3.182E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.473E-02	NOT IDENT.
CO-58	3.191E-02	NOT IDENT.
FE-59	5.801E-02	NOT IDENT.
CO-60	2.039E-02	NOT IDENT.
ZN-65	6.073E-02	NOT IDENT.
GE-68	5.458E-01	NOT IDENT.
AS-73	1.163E+00	NOT IDENT.
SE-75	3.620E-02	NOT IDENT.
BR-77	4.617E+01	NOT IDENT.
SR-82	1.805E-01	NOT IDENT.
RB-83	3.238E-02	FAIL ABUN
RB-84	4.246E-02	NOT IDENT.
KR-85	4.965E+00	NOT IDENT.
SR-85	2.811E-02	NOT IDENT.
RB-86	4.294E-01	NOT IDENT.
Y-88	2.174E-02	NOT IDENT.
Y-91	1.628E+01	NOT IDENT.
NB-94	2.491E-02	NOT IDENT.

NB-95	3.045E-02	NOT IDENT.
NB-95M	8.319E-02	NOT IDENT.
ZR-95	4.746E-02	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	3.248E+01	FAIL ABUN
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.028E-02	FAIL ABUN
RH-102	2.973E-02	NOT IDENT.
RU-103	2.820E-02	NOT IDENT.
RH-106	1.896E-01	NOT IDENT.
RU-106	1.896E-01	NOT IDENT.
AG-108M	2.076E-02	NOT IDENT.
CD-109	3.820E-01	NOT IDENT.
AG-110	4.019E-01	NOT IDENT.
AG-110M	3.680E-02	NOT IDENT.
SN-113	3.161E-02	NOT IDENT.
CD-115	4.628E+01	NOT IDENT.
SN-117M	4.409E-02	NOT IDENT.
SB-122	5.143E+00	NOT IDENT.
TE-123M	1.813E-02	NOT IDENT.
SB-124	4.573E-02	NOT IDENT.
SB-125	6.857E-02	NOT IDENT.
TE-125M	6.201E+00	NOT IDENT.
I-126	2.100E-01	FAIL ABUN
SB-126	9.230E-02	FAIL ABUN
SN-126	4.147E-02	NOT IDENT.
SB-127	2.550E+00	NOT IDENT.
I-131	1.897E-01	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	2.233E+00	NOT IDENT.
BA-133	2.319E-02	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	2.776E-02	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	9.980E-02	NOT IDENT.
BA-137M	1.940E-02	NOT IDENT.
CS-137	2.049E-02	NOT IDENT.
LA-138	2.323E-02	NOT IDENT.
CE-139	1.791E-02	NOT IDENT.
BA-140	2.294E-01	NOT IDENT.
LA-140	7.867E-02	NOT IDENT.
CE-141	4.074E-02	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.212E-01	NOT IDENT.
PM-144	2.223E-02	NOT IDENT.
PR-144	1.665E+00	NOT IDENT.
PM-146	2.597E-02	NOT IDENT.
ND-147	5.276E-01	NOT IDENT.
PM-147	3.719E+02	NOT IDENT.
PM-149	4.581E+02	NOT IDENT.
EU-150	1.744E-02	NOT IDENT.
EU-152	7.202E-02	NOT IDENT.
GD-153	4.996E-02	FAIL ABUN
EU-154	6.309E-02	NOT IDENT.
EU-155	4.629E-02	NOT IDENT.
TB-160	1.171E-01	FAIL ABUN
HO-166M	4.491E-02	NOT IDENT.
TM-171	2.199E+01	NOT IDENT.
HF-172	1.195E-01	NOT IDENT.
LU-172	4.914E-02	NOT IDENT.
LU-176	1.650E-02	NOT IDENT.
HF-181	3.045E-02	NOT IDENT.
TA-182	8.778E-02	NOT IDENT.
RE-183	1.898E-01	NOT IDENT.
RE-184	3.992E-02	NOT IDENT.
W-188	4.560E+00	NOT IDENT.
IR-192	2.395E-02	FAIL ABUN
HG-203	2.851E-02	NOT IDENT.
TL-204	2.979E+00	NOT IDENT.
BI-207	2.597E-02	NOT IDENT.
TL-208	3.542E-02	NOT IDENT.
BI-210	8.416E+00	NOT IDENT.
PB-210	8.416E+00	NOT IDENT.
BI-211	1.652E-01	NOT IDENT.
PB-211	4.582E-01	NOT IDENT.
BI-212	3.145E-01	NOT IDENT.
PB-212	4.535E-02	NOT IDENT.

BI-213	6.343E-02	NOT IDENT.
BI-214	4.699E-02	NOT IDENT.
PB-214	5.871E-02	NOT IDENT.
RN-219	2.951E-01	NOT IDENT.
RN-222	4.699E-02	NOT IDENT.
RA-223	3.579E-01	NOT IDENT.
RA-224	3.785E-01	NOT IDENT.
AC-225	5.778E-01	NOT IDENT.
RA-226	5.871E-02	NOT IDENT.
AC-227	1.347E-01	NOT IDENT.
TH-227	1.347E-01	NOT IDENT.
AC-228	9.540E-02	NOT IDENT.
RA-228	9.540E-02	NOT IDENT.
TH-228	4.535E-02	NOT IDENT.
TH-229	3.579E-01	FAIL ABUN
TH-230	5.871E-02	NOT IDENT.
PA-231	3.453E-01	NOT IDENT.
TH-231	3.579E-01	NOT IDENT.
TH-232	9.540E-02	NOT IDENT.
PA-233	4.231E-02	NOT IDENT.
PA-234	1.282E-01	FAIL ABUN
PA-234M	3.043E+00	NOT IDENT.
TH-234	1.175E+00	NOT IDENT.
U-234	5.871E-02	NOT IDENT.
U-235	1.051E-01	FAIL ABUN
NP-237	4.231E-02	FAIL ABUN
NP-238	0.000E+00	SHORT HLIF
U-238	1.175E+00	NOT IDENT.
NP-239	1.633E-01	FAIL ABUN
PU-239	2.108E+02	NOT IDENT.
AM-241	1.321E-01	NOT IDENT.
AM-243	3.605E-02	NOT IDENT.
CM-243	4.990E-02	FAIL ABUN
BK-247	6.063E-02	NOT IDENT.
CM-247	2.644E-02	NOT IDENT.
CF-249	3.140E-02	NOT IDENT.
CF-251	7.439E-02	NOT IDENT.
ANH-511	4.955E-02	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:30:04.95

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \*\*\*\*\*

DETECTOR AND SAMPLE DATA

\* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597564.CNF;1 \*  
 \* Acquisition date : 2-JAN-2024 13:29:19 Sensitivity : 3.000 \*  
 \* Detector ID : GAM04 Energy tolerance: 1.500 \*  
 \* Elapsed live time: 0 01:00:00.00 Abundance limit: 75.000 \*  
 \* Elapsed real time: 0 01:00:00.21 Half life ratio: \*\*\*\*\* \*  
 \* Sample date : 12-DEC-2023 00:00:00 Nuclide Library: SOLID \*  
 \* Sample ID : G1205597564 Analyst initials: SF1 \*  
 \* Batch Number : 2538164 Sample Quantity: 1.3063E+02 GRAM \*  
 \* Wet wt corr : 1.00000 Wet Weight : 0.00000 \*  
 \* Dry Weight : 0.00000 \*  
 \*\*\*\*\*

CALIBRATION INFORMATION

\* Eff. Cal. date : 13-DEC-2023 04:08:51 Eff. Geometry : CAN \*  
 \* Eff. File : DKA100:[CANBERRA.GAMMA]EFF\_GAM04\_CAN.CNF;19 \*  
 \*\*\*\*\*

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	1.288E-01	3.740E-01	3.740E-01
AS-74	9.028E-02	1.266E-01	1.266E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	5.623E-02	2.223E-01	2.237E-01	NOT IDENT.
NA-22	-5.330E-04	2.741E-02	2.741E-02	NOT IDENT.
NA-24	5.889E+08	5.979E+08	6.542E+08	SHORT HLIF
AL-26	1.474E-02	2.070E-02	2.174E-02	NOT IDENT.
SC-46	-1.304E-02	2.573E-02	2.640E-02	NOT IDENT.
V-48	-2.151E-03	7.204E-02	7.205E-02	NOT IDENT.
CR-51	-8.989E-02	4.511E-01	4.529E-01	NOT IDENT.
MN-52	-3.727E-01	5.227E-01	5.491E-01	NOT IDENT.
MN-54	-1.973E-02	3.001E-02	3.130E-02	NOT IDENT.
CO-56	1.636E-02	3.385E-02	3.465E-02	NOT IDENT.
MN-56	1.000E+41	2.113E+41	0.000E+00	SHORT HLIF
CO-57	1.016E-03	1.659E-02	1.659E-02	NOT IDENT.
CO-58	3.336E-02	2.864E-02	3.235E-02	NOT IDENT.
FE-59	2.557E-02	5.808E-02	5.921E-02	NOT IDENT.
CO-60	-1.740E-02	3.127E-02	3.224E-02	NOT IDENT.
ZN-65	2.221E-02	6.399E-02	6.476E-02	NOT IDENT.
GE-68	-2.602E-01	7.374E-01	7.466E-01	NOT IDENT.
AS-73	-2.080E-01	1.284E+00	1.288E+00	NOT IDENT.
SE-75	8.370E-03	4.224E-02	4.241E-02	NOT IDENT.
BR-77	1.288E+01	5.264E+01	5.296E+01	NOT IDENT.
SR-82	-9.262E-03	2.202E-01	2.202E-01	NOT IDENT.
RB-83	-7.535E-03	3.991E-02	4.005E-02	FAIL ABUN
RB-84	-5.039E-02	6.879E-02	7.245E-02	NOT IDENT.
KR-85	-1.039E+01	7.533E+00	8.870E+00	NOT IDENT.
SR-85	-5.909E-02	4.271E-02	5.033E-02	NOT IDENT.
RB-86	-8.858E-02	5.333E-01	5.348E-01	NOT IDENT.
Y-88	5.360E-04	2.613E-02	2.613E-02	NOT IDENT.
Y-91	1.491E+01	1.462E+01	1.609E+01	NOT IDENT.

NB-94	8.077E-03	2.765E-02	2.788E-02	NOT IDENT.
NB-95	1.643E-02	3.191E-02	3.276E-02	NOT IDENT.
NB-95M	-1.334E-02	1.017E-01	1.019E-01	NOT IDENT.
ZR-95	1.265E-02	5.278E-02	5.308E-02	NOT IDENT.
NB-97	-1.000E+41	1.778E+41	0.000E+00	SHORT HLIF
ZR-97	-2.199E+09	1.207E+09	1.562E+09	SHORT HLIF
MO-99	-4.329E+01	5.200E+01	5.554E+01	FAIL ABUN
TC-99M	-7.014E+23	1.505E+24	0.000E+00	SHORT HLIF
RH-101	-1.262E-03	2.330E-02	2.331E-02	FAIL ABUN
RH-102	-5.040E-05	3.493E-02	3.493E-02	NOT IDENT.
RU-103	-3.688E-02	4.020E-02	4.350E-02	NOT IDENT.
RH-106	5.941E-03	2.206E-01	2.207E-01	NOT IDENT.
RU-106	5.941E-03	2.206E-01	2.207E-01	NOT IDENT.
AG-108M	7.286E-04	2.344E-02	2.344E-02	NOT IDENT.
CD-109	-1.916E-01	4.580E-01	4.661E-01	NOT IDENT.
AG-110	-2.351E-01	5.426E-01	5.529E-01	NOT IDENT.
AG-110M	1.322E-02	4.067E-02	4.110E-02	NOT IDENT.
SN-113	1.197E-03	3.538E-02	3.538E-02	NOT IDENT.
CD-115	-1.165E+01	6.385E+01	6.407E+01	NOT IDENT.
SN-117M	-1.846E-02	5.409E-02	5.473E-02	NOT IDENT.
SB-122	-1.951E+00	6.554E+00	6.612E+00	NOT IDENT.
TE-123M	1.187E-02	1.911E-02	1.984E-02	NOT IDENT.
SB-124	-9.577E-04	5.591E-02	5.592E-02	NOT IDENT.
SB-125	1.765E-02	7.461E-02	7.503E-02	NOT IDENT.
TE-125M	2.747E+00	6.584E+00	6.699E+00	NOT IDENT.
I-126	2.080E-01	1.998E-01	2.208E-01	FAIL ABUN
SB-126	-8.766E-02	1.407E-01	1.461E-01	FAIL ABUN
SN-126	2.085E-02	4.299E-02	4.401E-02	NOT IDENT.
SB-127	8.386E-01	2.768E+00	2.794E+00	NOT IDENT.
I-131	1.787E-01	1.885E-01	2.050E-01	NOT IDENT.
I-132	-1.000E+41	3.786E+41	0.000E+00	SHORT HLIF
TE-132	6.610E-01	2.604E+00	2.621E+00	NOT IDENT.
BA-133	-2.048E-02	2.998E-02	3.137E-02	NOT IDENT.
I-133	0.000E+00	7.187E+05	0.000E+00	SHORT HLIF
CS-134	1.623E-03	3.288E-02	3.289E-02	NOT IDENT.
I-135	1.836E+22	7.166E+22	0.000E+00	SHORT HLIF
CS-136	-3.981E-02	1.256E-01	1.268E-01	NOT IDENT.
BA-137M	1.325E-02	1.941E-02	2.031E-02	NOT IDENT.
CS-137	1.400E-02	2.051E-02	2.146E-02	NOT IDENT.
LA-138	-1.961E-02	3.883E-02	3.982E-02	NOT IDENT.
CE-139	-6.691E-03	2.197E-02	2.218E-02	NOT IDENT.
BA-140	-1.627E-01	3.041E-01	3.128E-01	NOT IDENT.
LA-140	2.328E-02	8.200E-02	8.266E-02	NOT IDENT.
CE-141	1.039E-02	4.520E-02	4.545E-02	NOT IDENT.
CE-143	1.403E+03	2.412E+03	2.494E+03	SHORT HLIF
CE-144	5.354E-02	1.305E-01	1.327E-01	NOT IDENT.
PM-144	6.899E-03	2.446E-02	2.466E-02	NOT IDENT.
PR-144	5.075E-01	1.834E+00	1.848E+00	NOT IDENT.
PM-146	3.821E-03	2.874E-02	2.879E-02	NOT IDENT.
ND-147	1.418E-01	6.318E-01	6.350E-01	NOT IDENT.
PM-147	-3.074E+02	4.762E+02	4.960E+02	NOT IDENT.
PM-149	1.307E+02	5.290E+02	5.322E+02	NOT IDENT.
EU-150	-2.942E-03	2.215E-02	2.219E-02	NOT IDENT.
EU-152	2.576E-03	7.986E-02	7.987E-02	NOT IDENT.
GD-153	4.471E-02	8.900E-02	9.126E-02	FAIL ABUN
EU-154	-2.092E-02	8.223E-02	8.277E-02	NOT IDENT.
EU-155	2.478E-03	5.163E-02	5.164E-02	NOT IDENT.
TB-160	1.093E-01	1.115E-01	1.219E-01	FAIL ABUN
HO-166M	4.395E-02	4.179E-02	4.625E-02	NOT IDENT.
TM-171	-1.962E+01	2.722E+01	2.862E+01	NOT IDENT.
HF-172	4.932E-02	1.290E-01	1.310E-01	NOT IDENT.
IU-172	2.359E-02	5.053E-02	5.164E-02	NOT IDENT.
IU-176	-5.796E-03	2.148E-02	2.164E-02	NOT IDENT.
HF-181	-1.372E-02	4.292E-02	4.336E-02	NOT IDENT.
TA-182	-7.902E-03	1.057E-01	1.058E-01	NOT IDENT.
RE-183	-1.175E-01	2.276E-01	2.337E-01	NOT IDENT.
RE-184	-5.945E-02	8.232E-02	8.657E-02	NOT IDENT.
W-188	-3.599E+00	6.347E+00	6.551E+00	NOT IDENT.
IR-192	-2.784E-02	3.523E-02	3.740E-02	FAIL ABUN
HG-203	-2.992E-02	3.935E-02	3.935E-02	NOT IDENT.
TL-204	-2.028E-01	3.309E+00	3.311E+00	NOT IDENT.
BI-207	-1.119E-02	3.391E-02	3.428E-02	NOT IDENT.
TL-208	4.371E-02	3.628E-02	4.128E-02	NOT IDENT.
BI-210	-1.284E+00	9.367E+00	9.384E+00	NOT IDENT.
PB-210	-1.284E+00	9.367E+00	9.384E+00	NOT IDENT.
BI-211	-4.296E-02	1.899E-01	1.909E-01	NOT IDENT.
PB-211	3.675E-02	5.102E-01	5.104E-01	NOT IDENT.
BI-212	6.480E-02	3.557E-01	3.569E-01	NOT IDENT.

PB-212	5.300E-03	5.224E-02	5.229E-02	NOT IDENT.
BI-213	-6.489E-02	8.550E-02	9.037E-02	NOT IDENT.
BI-214	-4.990E-02	5.771E-02	6.194E-02	NOT IDENT.
PB-214	-1.566E-02	6.759E-02	6.796E-02	NOT IDENT.
RN-219	-9.243E-04	3.332E-01	3.332E-01	NOT IDENT.
RN-222	-4.990E-02	5.771E-02	6.194E-02	NOT IDENT.
RA-223	-3.299E-01	5.206E-01	5.414E-01	NOT IDENT.
RA-224	-2.938E-01	5.064E-01	5.234E-01	NOT IDENT.
AC-225	2.137E-01	6.464E-01	6.535E-01	NOT IDENT.
RA-226	-1.566E-02	6.759E-02	6.796E-02	NOT IDENT.
AC-227	-1.251E-01	1.908E-01	1.990E-01	NOT IDENT.
TH-227	-1.251E-01	1.908E-01	1.990E-01	NOT IDENT.
AC-228	2.478E-02	1.030E-01	1.036E-01	NOT IDENT.
RA-228	2.478E-02	1.030E-01	1.036E-01	NOT IDENT.
TH-228	5.300E-03	5.224E-02	5.229E-02	NOT IDENT.
TH-229	8.103E-02	4.403E-01	4.418E-01	FAIL ABUN
TH-230	-1.566E-02	6.759E-02	6.796E-02	NOT IDENT.
PA-231	1.776E-01	3.877E-01	3.959E-01	NOT IDENT.
TH-231	-3.299E-01	5.206E-01	5.414E-01	NOT IDENT.
TH-232	2.478E-02	1.030E-01	1.036E-01	NOT IDENT.
PA-233	2.720E-03	5.117E-02	5.118E-02	NOT IDENT.
PA-234	-3.600E-03	1.586E-01	1.586E-01	FAIL ABUN
PA-234M	3.941E-01	3.431E+00	3.436E+00	NOT IDENT.
TH-234	-3.687E-01	1.281E+00	1.292E+00	NOT IDENT.
U-234	-1.566E-02	6.759E-02	6.796E-02	NOT IDENT.
U-235	-4.120E-02	1.279E-01	1.293E-01	FAIL ABUN
NP-237	2.720E-03	5.117E-02	5.118E-02	FAIL ABUN
NP-238	-8.113E+01	1.538E+02	1.581E+02	SHORT HLIFF
U-238	-3.687E-01	1.281E+00	1.292E+00	NOT IDENT.
NP-239	-1.421E-02	1.872E-01	1.873E-01	FAIL ABUN
PU-239	-5.382E+01	2.483E+02	2.495E+02	NOT IDENT.
AM-241	2.141E-03	1.435E-01	1.435E-01	NOT IDENT.
AM-243	1.264E-02	3.805E-02	3.847E-02	NOT IDENT.
CM-243	-4.461E-02	6.433E-02	6.740E-02	FAIL ABUN
BK-247	-3.339E-04	7.321E-02	7.321E-02	NOT IDENT.
CM-247	7.373E-04	2.971E-02	2.971E-02	NOT IDENT.
CF-249	3.164E-02	3.011E-02	3.332E-02	NOT IDENT.
CF-251	5.493E-02	7.707E-02	8.095E-02	NOT IDENT.
ANH-511	-5.688E-02	5.005E-02	5.624E-02	NOT IDENT.

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	17.9074	85.43	18.2458	131.20	25.8568
45.60	18.0342	86.55	19.2054	133.02	23.9385
46.54	13.1569	86.79	15.5553	133.52	15.9719
49.72	8.3083	86.94	14.6451	136.00	21.0465
51.35	14.1965	87.09	14.6499	136.47	23.0681
51.87	13.3830	87.57	12.8320	140.51	23.2151
52.39	14.2422	88.03	19.2673	143.76	20.2884
52.97	11.7496	88.34	22.9525	144.24	19.2879
53.44	11.7664	88.47	21.1222	145.44	16.2722
54.07	11.7888	89.96	25.7961	152.43	19.5253
57.36	0.0000	1093.63	34.1368	153.25	13.3755
57.53	11.9094	91.11	36.0177	323.87	25.7580
57.98	17.0353	92.59	15.7489	156.02	15.4955
59.27	13.6783	93.35	26.9083	158.56	22.8094
59.32	13.6803	94.56	36.2775	159.00	13.4868
59.54	12.8332	94.65	36.2840	162.33	20.8466
60.96	15.4611	94.67	36.2855	162.66	18.7704
61.17	18.0484	94.87	32.2670	163.33	22.9631
62.93	15.5448	97.43	13.7226	165.86	21.9962
63.29	12.1022	98.43	16.8751	176.31	23.3706
63.58	12.9768	98.44	16.8755	176.60	21.2540
64.28	22.5354	99.53	20.0441	177.52	9.5760
66.73	19.1923	100.11	22.5754	181.07	17.1025
67.24	19.2176	102.03	13.8482	181.52	13.9039
125.81	17.4905	103.18	16.0872	184.41	17.1760
67.75	17.4936	103.37	19.8798	143.76	17.2048
68.89	19.2995	105.21	9.5000	193.51	20.2686
69.67	20.2169	105.31	10.4520	197.03	11.9955
70.82	14.9862	106.12	10.4681	198.01	12.0098
70.83	14.9865	106.47	12.3796	201.83	21.9363
72.81	20.3758	109.28	15.3169	203.43	19.7803
72.87	20.3787	111.00	20.1674	205.31	16.5202
74.66	17.7982	111.76	13.4637	210.85	16.2579
74.82	17.8050	114.06	23.1771	215.65	15.6043
74.97	20.4831	116.30	21.3311	218.12	13.4125
77.11	19.6929	116.74	22.3181	222.11	20.2088
78.74	15.2756	119.76	18.5347	227.09	21.4489
79.69	15.3094	121.12	21.5119	227.38	14.6801
80.03	13.5188	121.22	21.5156	228.16	18.0833
80.12	13.5217	121.78	20.5575	228.18	18.0837
80.19	17.1302	122.06	17.6292	116.74	18.0837
80.57	18.0476	122.92	18.6360	235.69	20.5090
81.00	15.3555	123.07	18.6408	235.96	21.6548
81.07	15.3580	265.00	20.6245	238.63	17.1442
81.75	7.2385	125.81	17.7420	238.98	14.8636
82.47	18.1259	127.23	24.7000	240.99	24.0611
83.79	15.4527	127.91	20.7716	242.00	19.4988
84.00	13.6411	129.30	25.7762	244.70	19.5533

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	17.3891	344.28	15.1014	563.25	4.8364
252.80	15.0767	345.93	12.6010	564.24	6.7747
254.15	0.0000	351.06	16.0258	569.33	4.8523
256.23	17.4560	351.93	15.1926	946.00	5.8232
260.90	15.1987	355.39	0.0000	569.70	6.7944
264.66	18.7754	356.01	14.3942	583.19	4.8881
264.80	19.9514	364.49	11.9316	584.27	12.7159
265.00	19.9551	366.42	8.9619	595.83	4.9202
269.46	15.3256	372.51	8.5744	427.87	10.3577
270.03	10.6161	375.05	11.1679	602.52	0.0000
271.23	8.2664	377.52	5.1638	604.72	8.8971
273.65	10.6526	356.01	12.9700	607.14	9.8975
276.40	11.8671	388.16	6.0717	609.32	7.9268
277.37	22.5683	388.63	6.9414	610.33	9.9137
277.60	19.0088	391.69	11.3049	614.28	9.9333
278.00	9.5081	264.66	8.7518	618.01	7.9616
279.20	22.6071	401.81	13.1384	620.36	8.9674
279.54	22.6141	402.40	12.2677	621.93	5.9829
279.70	19.0464	404.85	9.6554	630.19	0.0000
280.46	5.9563	410.95	11.4596	631.29	5.0090
283.69	16.7275	413.71	9.7152	633.25	7.0194
284.31	9.5640	414.70	12.3733	634.78	6.0210
285.41	14.3606	423.72	12.4497	635.95	5.0203
285.90	11.9724	427.09	11.5866	636.99	5.0230
287.50	17.9851	427.87	10.7009	657.50	8.1165
290.67	18.0368	433.94	10.7444	657.76	8.1178
293.27	0.0000	439.40	8.9862	657.90	0.0000
351.93	13.2814	440.45	15.2869	661.66	1.5249
295.96	12.0822	453.88	7.2568	664.57	0.0000
879.38	14.5323	463.37	13.6890	666.33	6.1130
299.98	10.9127	468.07	8.2375	666.50	6.1135
300.09	15.7644	473.00	3.3052	667.71	0.0000
300.13	15.7652	475.06	9.1927	677.62	2.0485
301.36	12.1402	476.78	10.1227	685.70	4.1123
302.85	17.0185	477.60	5.5243	692.65	3.0940
256.23	8.5216	482.18	11.0798	695.00	7.2273
304.85	8.5242	487.02	9.7235	696.49	5.1658
306.78	14.6375	492.35	8.3611	696.51	5.1658
308.46	9.7727	497.08	16.7699	697.00	5.1670
311.90	12.2522	505.52	9.3632	697.30	5.1676
316.51	22.1407	507.63	0.0000	697.49	4.1344
319.41	18.4959	511.00	15.9686	702.65	7.2524
320.08	22.2078	514.00	28.2288	706.68	4.1517
321.04	18.5211	514.00	28.2300	711.68	2.0805
323.87	16.0897	520.40	4.7223	720.70	7.3110
325.23	16.1080	520.69	3.4006	721.93	0.0000
328.76	11.1844	522.65	0.0000	722.78	8.3630
333.37	12.4744	527.90	7.1140	722.91	8.3636
333.97	13.7285	528.26	5.6924	723.31	9.4105
334.37	9.9875	529.59	5.6965	724.19	2.0920
338.28	13.3590	529.87	0.0000	727.33	5.2374
338.32	13.3594	531.02	5.7012	733.00	6.3005
311.90	9.2005	537.26	11.4424	735.93	0.0000
340.48	9.2005	546.56	0.0000	333.97	10.5212
340.55	9.2011	552.55	2.8850	739.50	10.5306

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	9.4969	949.00	2.2852	1384.29	0.9759
747.24	11.6222	667.71	0.0000	1408.01	2.9453
748.06	4.2277	962.31	5.7395	1434.09	5.9293
752.31	10.5884	964.08	3.4458	1435.80	2.9659
753.82	2.1191	966.17	4.5977	1457.56	0.0000
756.73	4.2433	911.20	1.1506	1460.82	1.5916
756.80	4.2435	983.53	4.6253	1489.16	5.0079
884.68	6.3845	984.45	0.0000	1505.03	5.0269
765.81	4.2598	1274.44	4.6453	1584.12	2.0482
766.42	6.3911	1001.03	2.3264	1596.21	1.0269
766.84	7.4577	1002.74	8.1470	1620.50	1.0325
772.60	0.0000	1004.73	5.8234	1621.92	2.0658
776.52	3.2091	507.63	0.0000	1678.03	0.0000
739.50	6.4219	1025.87	0.0000	1690.97	1.0486
778.90	4.2830	1028.54	0.0000	1750.46	0.0000
783.70	4.2915	1037.84	3.5325	1764.49	3.1952
788.74	3.2253	1038.76	0.0000	1063.66	1.0663
792.07	5.3829	631.29	4.4281	1771.35	2.1332
795.86	6.4695	1048.07	7.0884	1791.20	0.0000
810.06	4.3379	1049.04	9.7499	1808.65	0.0000
810.29	3.2537	1050.41	3.5469	1810.72	0.0000
344.28	2.1693	1063.66	4.4525	1836.06	1.0807
810.76	1.0848	1077.00	2.6829		
815.77	2.1739	1077.34	3.5776		
1048.07	5.4407	1085.87	1.7936		
832.01	6.5637	1093.63	3.5959		
834.85	8.7614	1099.45	1.8013		
835.71	6.5732	1112.07	3.6167		
836.80	0.0000	1112.84	3.6174		
846.75	0.0000	1115.54	3.6206		
846.77	4.4010	1120.29	3.6257		
856.80	7.7317	1120.55	4.5325		
860.56	3.3184	1221.41	3.6270		
871.09	5.5528	1129.67	0.9091		
873.19	3.3344	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	2.2280	1173.23	5.5258		
880.51	3.3435	1177.95	3.6890		
881.60	8.9196	1189.05	1.8505		
883.24	5.5782	1204.77	0.9295		
884.68	4.4650	1221.41	2.8017		
889.28	4.4727	1231.02	6.5552		
894.76	5.6020	1235.36	1.8752		
898.04	4.4871	1238.28	3.7537		
900.72	5.6144	1260.41	0.0000		
903.28	4.4958	1271.87	1.8944		
911.20	2.2544	1274.44	3.7915		
912.08	4.5103	1274.54	2.8436		
923.98	0.0000	1291.59	0.9523		
926.50	3.4004	1298.22	0.0000		
929.11	5.6726	1312.11	1.9152		
935.54	3.4114	1332.49	4.8141		
937.49	5.6895	1362.66	0.0000		
944.13	1.1406	1365.19	0.0000		
946.00	2.2827	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 15:35:21.49

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*****
*                               GEL Laboratories LLC                *
*                               2040 Savage Road                    *
*                               Charleston, SC 29407                *
*****
Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597565.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG GAM02.CNF;609
Sample date    : 17-OCT-2023 13:00:00 Acquisition date : 2-JAN-2024 14:34:57.
Sample ID     : G1205597565      Sample quantity  : 1.30630E+02 GRAM
Detector name : GAM02           Detector geometry: CAN
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.00 0.0%
Energy tolerance: 1.50000 keV   Analyst Initials  : SF1
Abundance limit: 75.00000      Sensitivity     : 3.00000
Batch ID      : 2538164        Detector SN#    :
Matrix Spike ID :                LCS ID             :
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.48*	10	0.87	127.61	124	7	2.90E-03	182.4	
2	1	75.11*	73	0.92	150.87	146	15	2.02E-02	27.3	8.16E-01
3	1	77.27	130	1.09	155.20	146	15	3.60E-02	17.0	
4	0	81.39	43	1.12	163.44	161	6	1.19E-02	34.7	
5	2	86.88*	67	1.22	174.42	167	15	1.85E-02	30.3	4.18E+00
6	2	88.88*	23	1.23	178.43	167	15	6.49E-03	85.3	
7	0	92.76*	95	1.17	186.19	181	12	2.65E-02	34.3	
8	0	144.65*	22	1.27	290.00	283	11	6.04E-03	101.6	
9	0	185.98*	78	1.38	372.67	367	12	2.17E-02	31.1	
10	0	209.92	64	1.45	420.57	417	8	1.12E-02	38.0	
11	3	238.87*	257	1.00	478.48	471	19	7.15E-02	7.9	8.01E-01
12	3	242.01	82	1.69	484.76	471	19	2.27E-02	25.6	
13	0	295.33	143	1.28	591.42	585	12	3.97E-02	13.2	
14	0	328.27	23	1.14	657.31	654	6	6.25E-03	42.8	
15	0	338.88*	48	1.76	678.52	674	9	1.33E-02	30.5	
16	0	352.31*	165	1.29	705.39	699	11	4.57E-02	12.9	
17	0	445.85	24	3.80	892.48	878	17	6.63E-03	74.3	
18	0	511.17*	27	1.94	1023.11	1014	20	7.54E-03	86.3	
19	0	563.37	11	1.36	1127.50	1120	10	3.06E-03	90.2	
20	0	584.06*	74	1.57	1168.87	1162	15	2.05E-02	23.7	
21	3	609.56*	147	1.59	1219.87	1213	36	4.08E-02	10.8	2.69E+00
22	3	617.13	26	1.67	1235.00	1213	36	7.15E-03	36.5	
23	0	747.61	8	0.60	1495.91	1490	8	2.14E-03	96.4	
24	0	758.86	19	1.93	1518.39	1512	11	5.20E-03	37.7	
25	0	768.66	17	2.35	1538.00	1530	14	4.65E-03	75.4	
26	0	807.59	18	4.41	1615.83	1611	12	4.87E-03	45.6	
27	0	844.89	10	1.92	1690.40	1683	12	2.78E-03	90.6	
28	0	911.61*	69	1.70	1823.78	1818	11	1.93E-02	14.2	
29	0	933.97	23	1.27	1868.48	1863	11	6.46E-03	24.9	
30	0	969.60	30	1.31	1939.71	1933	11	8.33E-03	38.2	
31	0	1060.44	8	0.81	2121.29	2117	7	2.15E-03	53.6	
32	0	1121.05*	52	1.64	2242.43	2236	15	1.44E-02	22.1	
33	0	1153.83	15	2.36	2307.95	2303	10	4.27E-03	32.1	
34	0	1181.11	6	1.30	2362.48	2355	15	1.79E-03	136.7	

Pk It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1282.01	12	7	1.70	2564.13	2557	13	3.19E-03	54.4
36	0	1313.39	8	12	0.60	2626.84	2619	13	2.19E-03	99.9
37	0	1377.59	15	5	1.28	2755.12	2749	11	4.17E-03	39.5
38	0	1461.07*	220	12	1.75	2921.94	2914	15	6.10E-02	7.7
39	0	1764.47*	21	0	1.72	3528.08	3521	13	5.87E-03	24.8

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597565.CNF;1  
 Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4  
 Sample title : SF1  
 Sample date : 17-OCT-2023 13:00:00 Acquisition date : 2-JAN-2024 14:34:57  
 Sample ID : G1205597565 Sample quantity : 130.63 GRAM  
 Sample type : SOLID Sample geometry :  
 Detector name : GAMMA2 Detector geometry: CAN  
 Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.00 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
U-235	143.76	CE-141	145.44

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
K-40	1460.82	10.66*	9.735E-01	1.159E+01	1.159E+01	15.41	OK
CD-109	88.03	3.70*	4.805E+00	8.680E-01	9.746E-01	170.56	OK
SN-126	64.28	9.60	2.251E+00	3.257E-01	3.257E-01	364.89	OK
	86.94	8.90	4.671E+00	1.060E+00	1.060E+00	60.57	OK
	87.57	37.00*	4.671E+00	2.549E-01	2.549E-01	60.57	OK
CE-141	145.44	48.29*	5.483E+00	1.204E-02	6.229E-02	912.23	OK
TL-208	277.37	6.60	3.664E+00	-----	Line Not Found	-----	Absent
	583.19	85.00*	2.128E+00	2.388E-01	2.388E-01	47.35	OK
	860.56	12.50	1.547E+00	-----	Line Not Found	-----	Absent
BI-211	72.87	1.23	3.389E+00	-----	Line Not Found	-----	Absent
	351.06	12.92*	3.084E+00	2.499E+00	2.499E+00	25.72	OK
PB-212	74.82	10.28	3.633E+00	1.302E+00	1.302E+00	54.58	OK
	77.11	17.10	3.856E+00	1.310E+00	1.310E+00	34.06	OK
	238.63	43.60*	4.079E+00	8.978E-01	8.978E-01	15.89	OK
	300.09	3.30	3.462E+00	-----	Line Not Found	-----	Absent
BI-214	609.32	45.49*	2.059E+00	9.128E-01	9.129E-01	21.60	OK
	1120.29	14.92	1.220E+00	1.585E+00	1.585E+00	44.29	OK
	1764.49	15.30	8.596E-01	8.678E-01	8.679E-01	49.54	OK
PB-214	74.82	5.80	3.633E+00	2.308E+00	2.309E+00	54.58	OK
	77.11	9.70	3.856E+00	2.310E+00	2.310E+00	34.06	OK
	87.09	3.41	4.671E+00	2.766E+00	2.766E+00	60.57	OK
	242.00	7.25	4.041E+00	1.731E+00	1.731E+00	51.13	OK
	295.22	18.42	3.502E+00	1.357E+00	1.357E+00	26.50	OK
	351.93	35.60*	3.084E+00	9.071E-01	9.072E-01	25.72	OK
RN-222	609.32	45.49*	2.059E+00	9.128E-01	9.129E-01	21.60	OK
	1120.29	14.92	1.220E+00	1.585E+00	1.585E+00	44.29	OK
	1764.49	15.30	8.596E-01	8.678E-01	8.679E-01	49.54	OK
RA-224	240.99	4.10*	4.041E+00	3.060E+00	3.060E+00	51.13	OK
RA-226	74.82	5.80	3.633E+00	2.308E+00	2.309E+00	54.58	OK
	77.11	9.70	3.856E+00	2.310E+00	2.310E+00	34.06	OK
	87.09	3.41	4.671E+00	2.766E+00	2.766E+00	60.57	OK
	242.00	7.25	4.041E+00	1.731E+00	1.731E+00	51.13	OK
	295.22	18.42	3.502E+00	1.357E+00	1.357E+00	26.50	OK
	351.93	35.60*	3.084E+00	9.071E-01	9.072E-01	25.72	OK
AC-228	105.21	1.10	5.492E+00	-----	Line Not Found	-----	Absent
	338.32	11.27	3.171E+00	8.146E-01	8.146E-01	60.98	OK
	835.71	1.61	1.587E+00	-----	Line Not Found	-----	Absent
	911.20	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48	OK
	968.97	15.80	1.391E+00	7.700E-01	7.700E-01	76.49	OK
RA-228	105.21	1.10	5.492E+00	-----	Line Not Found	-----	Absent
	338.32	11.27	3.171E+00	8.146E-01	8.146E-01	60.98	OK
	835.71	1.61	1.587E+00	-----	Line Not Found	-----	Absent
	911.20	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48	OK
	968.97	15.80	1.391E+00	7.700E-01	7.700E-01	76.49	OK
TH-228	74.82	10.28	3.633E+00	1.302E+00	1.302E+00	54.58	OK
	77.11	17.10	3.856E+00	1.310E+00	1.310E+00	34.06	OK
	238.63	43.60*	4.079E+00	8.978E-01	8.978E-01	15.89	OK
	300.09	3.30	3.462E+00	-----	Line Not Found	-----	Absent
TH-229	85.43	14.70	4.671E+00	6.416E-01	6.416E-01	60.57	OK



Nuclide Type:	Energy	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error	Status
	88.47	24.00	4.805E+00	1.338E-01	1.338E-01	170.56	OK
	193.51	4.41*	4.710E+00	-----	Line Not Found	-----	Absent
	210.85	2.80	4.463E+00	2.026E+00	2.026E+00	75.94	OK
TH-230	74.82	5.80	3.633E+00	2.308E+00	2.308E+00	54.58	OK
	77.11	9.70	3.856E+00	2.310E+00	2.310E+00	34.06	OK
	87.09	3.41	4.671E+00	2.766E+00	2.766E+00	60.57	OK
	242.00	7.25	4.041E+00	1.731E+00	1.731E+00	51.13	OK
	295.22	18.42	3.502E+00	1.357E+00	1.357E+00	26.50	OK
TH-232	351.93	35.60*	3.084E+00	9.071E-01	9.071E-01	25.72	OK
	105.21	1.10	5.492E+00	-----	Line Not Found	-----	Absent
	338.32	11.27	3.171E+00	8.146E-01	8.146E-01	60.98	OK
	835.71	1.61	1.587E+00	-----	Line Not Found	-----	Absent
	911.20	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48	OK
	968.97	15.80	1.391E+00	7.700E-01	7.700E-01	76.49	OK
TH-234	63.29	3.70*	2.251E+00	8.451E-01	8.451E-01	364.89	OK
	92.59	4.23	5.030E+00	2.956E+00	2.956E+00	68.55	OK
U-234	74.82	5.80	3.633E+00	2.308E+00	2.308E+00	54.58	OK
	77.11	9.70	3.856E+00	2.310E+00	2.310E+00	34.06	OK
	87.09	3.41	4.671E+00	2.766E+00	2.766E+00	60.57	OK
	242.00	7.25	4.041E+00	1.731E+00	1.731E+00	51.13	OK
	295.22	18.42	3.502E+00	1.357E+00	1.357E+00	26.50	OK
U-235	351.93	35.60*	3.084E+00	9.071E-01	9.071E-01	25.72	OK
	89.96	3.47	4.805E+00	9.255E-01	9.255E-01	170.56	OK
	93.35	5.60	5.030E+00	2.233E+00	2.233E+00	68.55	OK
	143.76	10.96*	5.495E+00	-----	Line Not Found	-----	<<INT Reject
	163.33	5.08	5.200E+00	-----	Line Not Found	-----	Absent
	185.72	57.20	4.830E+00	1.787E-01	1.787E-01	62.18	OK
	205.31	5.01	4.530E+00	-----	Line Not Found	-----	Absent
U-238	63.29	3.70*	2.251E+00	8.451E-01	8.451E-01	364.89	OK
	92.59	4.23	5.030E+00	2.956E+00	2.956E+00	68.55	OK
AM-243	43.53	5.90	2.631E-01	-----	Line Not Found	-----	Absent
	74.66	67.20*	3.633E+00	1.992E-01	1.992E-01	54.58	OK
ANH-511	511.00	100.00*	2.354E+00	6.803E-02	6.803E-02	172.63	OK

Flag: "\*" = Keyline

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*
* GEL Laboratories LLC
* 2040 Savage Road
* Charleston, SC 29407
*
*****
DETECTOR AND SAMPLE DATA
*
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597565.CNF;1
* Acquisition date : 2-JAN-2024 14:34:57 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 01:00:01.00 Half life ratio : ****
* Sample date : 17-OCT-2023 13:00:00 Analyst initials: SF1
* Sample ID : G1205597565 Sample Quantity : 1.3063E+02 GRAM
* Batch Number : 2538164 Wet Weight : 0.00000
* Wet wt corr : 1.00000 Dry Weight : 0.00000
* Nuclide Library : SOLID.NLB;17
*****

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CALIBRATION INFORMATION

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* Eff. Cal. date : 13-SEP-2023 09:49:44 Eff. Geometry : CAN
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;19
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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	1.159E+01	1.750E+00	7.589E-01
CD-109	9.746E-01	1.629E+00	1.610E+00
SN-126	2.549E-01	1.513E-01	1.443E-01
CE-141	6.229E-02	5.569E-01	4.258E-01
TL-208	2.388E-01	1.108E-01	8.548E-02
BI-211	2.499E+00	6.299E-01	3.977E-01
PB-212	8.978E-01	1.398E-01	1.265E-01
BI-214	9.129E-01	1.933E-01	1.630E-01
PB-214	9.072E-01	2.286E-01	1.446E-01
RN-222	9.129E-01	1.933E-01	1.630E-01
RA-224	3.060E+00	1.534E+00	1.356E+00
RA-226	9.072E-01	2.286E-01	1.446E-01
AC-228	1.036E+00	2.892E-01	2.488E-01
RA-228	1.036E+00	2.892E-01	2.488E-01
TH-228	8.978E-01	1.398E-01	1.265E-01
TH-229	1.631E-01	5.808E-01	1.067E+00
TH-230	9.071E-01	2.286E-01	1.446E-01
TH-232	1.036E+00	2.892E-01	2.488E-01
TH-234	8.451E-01	3.022E+00	2.926E+00
U-234	9.071E-01	2.286E-01	1.446E-01
U-235	2.318E-01	4.616E-01	4.398E-01
U-238	8.451E-01	3.022E+00	2.926E+00
AM-243	1.992E-01	1.066E-01	1.091E-01
ANH-511	6.803E-02	1.151E-01	5.831E-02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM)	
BE-7	-5.898E-01		7.923E-01	1.353E+00	NOT IDENT.
NA-22	2.667E-02		4.672E-02	1.010E-01	NOT IDENT.
NA-24	0.000E+00		5.640E+35	0.000E+00	SHORT HLIF
AL-26	7.251E-03		2.933E-02	7.282E-02	NOT IDENT.
SC-46	3.702E-04		7.166E-02	1.432E-01	FAIL ABUN
V-48	7.089E-01		1.121E+00	2.459E+00	FAIL ABUN

CR-51	-1.489E+00	1.853E+00	3.281E+00	NOT IDENT.
MN-52	0.000E+00	7.028E+02	0.000E+00	SHORT HLIF
MN-54	-1.429E-02	4.757E-02	9.005E-02	NOT IDENT.
CO-56	-4.895E-02	8.314E-02	1.264E-01	NOT IDENT.
MN-56	0.000E+00	1.756E+41	0.000E+00	SHORT HLIF
CO-57	1.204E-03	3.014E-02	5.593E-02	NOT IDENT.
CO-58	-3.704E-02	9.110E-02	1.463E-01	NOT IDENT.
FE-59	-2.033E-01	2.872E-01	4.902E-01	NOT IDENT.
CO-60	-1.441E-02	4.006E-02	7.404E-02	NOT IDENT.
ZN-65	4.202E-02	1.221E-01	2.286E-01	NOT IDENT.
GE-68	3.410E-01	1.508E+00	3.135E+00	NOT IDENT.
AS-73	6.492E-01	2.051E+00	4.101E+00	NOT IDENT.
AS-74	3.794E-01	1.110E+00	2.216E+00	NOT IDENT.
SE-75	2.144E-02	7.333E-02	1.457E-01	NOT IDENT.
BR-77	0.000E+00	1.532E+09	0.000E+00	SHORT HLIF
SR-82	4.418E-01	1.862E+00	3.883E+00	NOT IDENT.
RB-83	7.152E-02	1.150E-01	2.426E-01	NOT IDENT.
RB-84	-1.657E-01	2.744E-01	4.933E-01	NOT IDENT.
KR-85	7.387E+00	8.230E+00	1.712E+01	NOT IDENT.
SR-85	7.498E-02	8.364E-02	1.740E-01	NOT IDENT.
RB-86	3.602E+00	7.669E+00	1.680E+01	NOT IDENT.
Y-88	2.300E-02	4.413E-02	1.217E-01	NOT IDENT.
Y-91	1.791E+01	4.511E+01	9.444E+01	NOT IDENT.
NB-94	3.359E-02	4.037E-02	8.356E-02	NOT IDENT.
NB-95	9.580E-03	9.885E-02	1.807E-01	NOT IDENT.
NB-95M	-4.626E-02	3.240E-01	5.557E-01	NOT IDENT.
ZR-95	4.091E-03	1.546E-01	2.787E-01	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	6.095E+32	0.000E+00	SHORT HLIF
MO-99	0.000E+00	7.361E+07	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
RH-101	-8.750E-03	3.606E-02	6.463E-02	NOT IDENT.
RH-102	-5.328E-03	5.471E-02	1.033E-01	NOT IDENT.
RU-103	-5.175E-02	1.261E-01	2.271E-01	FAIL ABUN
RH-106	-1.112E-01	4.603E-01	8.247E-01	NOT IDENT.
RU-106	-1.112E-01	4.603E-01	8.247E-01	NOT IDENT.
AG-108M	1.070E-02	3.519E-02	6.930E-02	NOT IDENT.
AG-110	6.749E-01	8.402E-01	1.826E+00	NOT IDENT.
AG-110M	-5.970E-03	6.290E-02	1.241E-01	NOT IDENT.
SN-113	-1.674E-02	6.954E-02	1.301E-01	NOT IDENT.
CD-115	0.000E+00	3.205E+09	0.000E+00	SHORT HLIF
SN-117M	-7.241E-01	1.508E+00	2.597E+00	NOT IDENT.
SB-122	0.000E+00	2.506E+07	0.000E+00	SHORT HLIF
TE-123M	-8.869E-03	4.817E-02	8.524E-02	NOT IDENT.
SB-124	2.300E-02	1.849E-01	4.170E-01	NOT IDENT.
SB-125	3.002E-02	9.354E-02	1.893E-01	NOT IDENT.
TE-125M	1.985E+01	2.086E+01	4.187E+01	NOT IDENT.
I-126	-7.095E+00	8.382E+00	1.343E+01	NOT IDENT.
SB-126	-1.134E-01	4.199E+00	8.564E+00	NOT IDENT.
SB-127	0.000E+00	1.155E+05	0.000E+00	SHORT HLIF
I-131	-1.915E+01	2.623E+01	4.627E+01	FAIL ABUN
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	0.000E+00	5.215E+05	0.000E+00	SHORT HLIF
BA-133	1.810E-03	5.347E-02	9.263E-02	FAIL ABUN
I-133	0.000E+00	2.145E+25	0.000E+00	SHORT HLIF
CS-134	3.860E-02	4.644E-02	1.030E-01	FAIL ABUN
I-135	0.000E+00	1.181E+41	0.000E+00	SHORT HLIF
CS-136	1.605E+00	3.374E+00	7.058E+00	NOT IDENT.
BA-137M	-2.317E-02	4.377E-02	8.088E-02	NOT IDENT.
CS-137	-2.447E-02	4.624E-02	8.544E-02	NOT IDENT.
LA-138	1.937E-03	6.578E-02	1.326E-01	NOT IDENT.
CE-139	3.393E-02	4.395E-02	8.505E-02	NOT IDENT.
BA-140	-6.820E+00	9.450E+00	1.597E+01	NOT IDENT.
LA-140	-4.580E-01	4.580E-01	5.003E+00	FAIL ABUN
CE-143	0.000E+00	4.696E+15	0.000E+00	SHORT HLIF
CE-144	2.241E-02	2.467E-01	4.550E-01	FAIL ABUN
PM-144	-1.518E-02	3.589E-02	6.288E-02	FAIL ABUN
PR-144	-1.162E+00	2.777E+00	4.870E+00	NOT IDENT.
PM-146	-1.142E-02	5.446E-02	1.003E-01	FAIL ABUN
ND-147	-9.451E+00	3.164E+01	5.750E+01	NOT IDENT.
PM-147	-4.550E+01	7.940E+02	1.460E+03	NOT IDENT.
PM-149	0.000E+00	2.739E+10	0.000E+00	SHORT HLIF
EU-150	2.431E-03	3.111E-02	5.784E-02	FAIL ABUN
EU-152	2.379E-02	1.083E-01	2.136E-01	NOT IDENT.
GD-153	-1.027E-01	1.220E-01	1.916E-01	NOT IDENT.
EU-154	6.400E-02	1.261E-01	2.706E-01	NOT IDENT.
EU-155	-2.811E-03	1.047E-01	1.953E-01	FAIL ABUN
TB-160	8.591E-03	2.521E-01	5.089E-01	FAIL ABUN

HO-166M	-3.412E-02	8.257E-02	1.419E-01	FAIL ABUN
TM-171	-1.851E-01	2.711E+01	5.297E+01	NOT IDENT.
HF-172	9.352E-02	2.195E-01	4.172E-01	FAIL ABUN
LU-172	-7.921E-02	8.254E-02	1.331E-01	FAIL ABUN
LU-176	6.669E-03	2.825E-02	5.619E-02	FAIL ABUN
HF-181	-5.297E-03	1.384E-01	2.620E-01	NOT IDENT.
TA-182	4.589E-02	2.948E-01	5.879E-01	FAIL ABUN
RE-183	-3.177E-01	4.900E-01	8.966E-01	NOT IDENT.
RE-184	-9.605E-02	4.867E-01	9.329E-01	NOT IDENT.
W-188	-1.409E+01	1.585E+01	2.433E+01	FAIL ABUN
IR-192	1.077E-03	6.965E-02	1.349E-01	FAIL ABUN
HG-203	-9.150E-02	1.117E-01	2.001E-01	NOT IDENT.
TL-204	-2.736E-02	5.961E+00	1.049E+01	FAIL ABUN
BI-207	-3.961E-02	6.112E-02	8.703E-02	FAIL ABUN
BI-210	5.146E+00	6.433E+00	1.334E+01	NOT IDENT.
PB-210	5.146E+00	6.433E+00	1.334E+01	NOT IDENT.
PB-211	5.457E-02	7.929E-01	1.531E+00	NOT IDENT.
BI-212	5.976E-01	6.012E-01	1.320E+00	NOT IDENT.
BI-213	-1.515E-02	1.174E-01	2.206E-01	NOT IDENT.
RN-219	-1.132E-01	4.476E-01	8.329E-01	NOT IDENT.
RA-223	-1.341E-01	7.378E-01	1.333E+00	FAIL ABUN
AC-225	2.386E+01	5.464E+01	1.003E+02	NOT IDENT.
AC-227	1.023E-01	2.740E-01	5.512E-01	NOT IDENT.
TH-227	1.023E-01	2.740E-01	5.512E-01	NOT IDENT.
PA-231	2.549E-01	5.685E-01	1.133E+00	NOT IDENT.
TH-231	-1.341E-01	7.378E-01	1.333E+00	FAIL ABUN
PA-233	-2.181E-02	7.517E-02	1.409E-01	NOT IDENT.
PA-234	-1.620E-01	3.057E-01	5.551E-01	NOT IDENT.
PA-234M	-1.418E+00	6.516E+00	1.266E+00	NOT IDENT.
NP-237	-2.181E-02	7.517E-02	1.409E-01	NOT IDENT.
NP-238	0.000E+00	1.397E+10	0.000E+00	SHORT HLIF
NP-239	-1.081E-01	2.652E-01	4.732E-01	NOT IDENT.
PU-239	-4.577E+00	3.925E+02	7.146E+02	NOT IDENT.
AM-241	1.535E-01	2.208E-01	4.182E-01	NOT IDENT.
CM-243	-1.015E-02	1.050E-01	1.946E-01	NOT IDENT.
BK-247	2.890E-02	9.074E-02	1.810E-01	NOT IDENT.
CM-247	-2.787E-02	4.096E-02	7.200E-02	NOT IDENT.
CF-249	2.725E-02	4.229E-02	8.764E-02	NOT IDENT.
CF-251	-1.738E-01	1.528E-01	2.428E-01	NOT IDENT.

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	209	10.66*	9.735E-01	1.159E+01	1.159E+01	15.41
CD-109	88.03	27	3.70*	4.805E+00	8.680E-01	9.746E-01	170.56
SN-126	64.28	12	9.60	2.251E+00	3.257E-01	3.257E-01	364.89
	86.94	77	8.90	4.671E+00	1.060E+00	1.060E+00	60.57
	87.57	77	37.00*	4.671E+00	2.549E-01	2.549E-01	60.57
CE-141	145.44	24	48.29*	5.483E+00	5.261E-02	2.722E-01	203.19
TL-208	277.37	-----	6.60	3.664E+00	-----	Line Not Found	-----
	583.19	75	85.00*	2.128E+00	2.388E-01	2.388E-01	47.35
	860.56	-----	12.50	1.547E+00	-----	Line Not Found	-----
BI-211	72.87	-----	1.23	3.389E+00	-----	Line Not Found	-----
	351.06	173	12.92*	3.084E+00	2.499E+00	2.499E+00	25.72
PB-212	74.82	85	10.28	3.633E+00	1.302E+00	1.302E+00	54.58
	77.11	150	17.10	3.856E+00	1.310E+00	1.310E+00	34.06
	238.63	278	43.60*	4.079E+00	8.978E-01	8.978E-01	15.89
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
BI-214	609.32	149	45.49*	2.059E+00	9.128E-01	9.129E-01	21.60
	1120.29	50	14.92	1.220E+00	1.585E+00	1.585E+00	44.29
	1764.49	20	15.30	8.596E-01	8.678E-01	8.679E-01	49.54
PB-214	74.82	85	5.80	3.633E+00	2.308E+00	2.309E+00	54.58
	77.11	150	9.70	3.856E+00	2.310E+00	2.310E+00	34.06
	87.09	77	3.41	4.671E+00	2.766E+00	2.766E+00	60.57
	242.00	88	7.25	4.041E+00	1.731E+00	1.731E+00	51.13
	295.22	152	18.42	3.502E+00	1.357E+00	1.357E+00	26.50
	351.93	173	35.60*	3.084E+00	9.071E-01	9.072E-01	25.72
RN-222	609.32	149	45.49*	2.059E+00	9.128E-01	9.129E-01	21.60
	1120.29	50	14.92	1.220E+00	1.585E+00	1.585E+00	44.29
	1764.49	20	15.30	8.596E-01	8.678E-01	8.679E-01	49.54
RA-224	240.99	88	4.10*	4.041E+00	3.060E+00	3.060E+00	51.13
RA-226	74.82	85	5.80	3.633E+00	2.308E+00	2.309E+00	54.58
	77.11	150	9.70	3.856E+00	2.310E+00	2.310E+00	34.06
	87.09	77	3.41	4.671E+00	2.766E+00	2.766E+00	60.57
	242.00	88	7.25	4.041E+00	1.731E+00	1.731E+00	51.13
	295.22	152	18.42	3.502E+00	1.357E+00	1.357E+00	26.50
	351.93	173	35.60*	3.084E+00	9.071E-01	9.072E-01	25.72
AC-228	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	51	11.27	3.171E+00	8.146E-01	8.146E-01	60.98
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	68	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48
	968.97	29	15.80	1.391E+00	7.700E-01	7.700E-01	76.49
RA-228	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	51	11.27	3.171E+00	8.146E-01	8.146E-01	60.98
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	68	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48
	968.97	29	15.80	1.391E+00	7.700E-01	7.700E-01	76.49
TH-228	74.82	85	10.28	3.633E+00	1.302E+00	1.302E+00	54.58
	77.11	150	17.10	3.856E+00	1.310E+00	1.310E+00	34.06
	238.63	278	43.60*	4.079E+00	8.978E-01	8.978E-01	15.89

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
	300.09	-----	3.30	3.462E+00	-----	Line Not Found	-----
TH-229	85.43	77	14.70	4.671E+00	6.416E-01	6.416E-01	60.57
	88.47	27	24.00	4.805E+00	1.338E-01	1.338E-01	170.56
	193.51	-----	4.41*	4.710E+00	-----	Line Not Found	-----
TH-230	210.85	44	2.80	4.463E+00	2.026E+00	2.026E+00	75.94
	74.82	85	5.80	3.633E+00	2.308E+00	2.308E+00	54.58
	77.11	150	9.70	3.856E+00	2.310E+00	2.310E+00	34.06
	87.09	77	3.41	4.671E+00	2.766E+00	2.766E+00	60.57
	242.00	88	7.25	4.041E+00	1.731E+00	1.731E+00	51.13
	295.22	152	18.42	3.502E+00	1.357E+00	1.357E+00	26.50
	351.93	173	35.60*	3.084E+00	9.071E-01	9.071E-01	25.72
TH-232	105.21	-----	1.10	5.492E+00	-----	Line Not Found	-----
	338.32	51	11.27	3.171E+00	8.146E-01	8.146E-01	60.98
	835.71	-----	1.61	1.587E+00	-----	Line Not Found	-----
	911.20	68	25.80*	1.470E+00	1.036E+00	1.036E+00	28.48
	968.97	29	15.80	1.391E+00	7.700E-01	7.700E-01	76.49
TH-234	63.29	12	3.70*	2.251E+00	8.451E-01	8.451E-01	364.89
	92.59	109	4.23	5.030E+00	2.956E+00	2.956E+00	68.55
U-234	74.82	85	5.80	3.633E+00	2.308E+00	2.308E+00	54.58
	77.11	150	9.70	3.856E+00	2.310E+00	2.310E+00	34.06
	87.09	77	3.41	4.671E+00	2.766E+00	2.766E+00	60.57
	242.00	88	7.25	4.041E+00	1.731E+00	1.731E+00	51.13
	295.22	152	18.42	3.502E+00	1.357E+00	1.357E+00	26.50
	351.93	173	35.60*	3.084E+00	9.071E-01	9.071E-01	25.72
U-235	89.96	27	3.47	4.805E+00	9.255E-01	9.255E-01	170.56
	93.35	109	5.60	5.030E+00	2.233E+00	2.233E+00	68.55
	143.76	24	10.96*	5.483E+00	2.318E-01	2.318E-01	203.19
	163.33	-----	5.08	5.200E+00	-----	Line Not Found	-----
	185.72	86	57.20	4.830E+00	1.787E-01	1.787E-01	62.18
	205.31	-----	5.01	4.530E+00	-----	Line Not Found	-----
U-238	63.29	12	3.70*	2.251E+00	8.451E-01	8.451E-01	364.89
	92.59	109	4.23	5.030E+00	2.956E+00	2.956E+00	68.55
AM-243	43.53	-----	5.90	2.631E-01	-----	Line Not Found	-----
	74.66	85	67.20*	3.633E+00	1.992E-01	1.992E-01	54.58
ANH-511	511.00	28	100.00*	2.354E+00	6.803E-02	6.803E-02	172.63

Flag: "\*" = Keyline

Total number of lines in spectrum 39  
 Number of unidentified lines 11  
 Number of lines tentatively identified by NID 28 71.79%

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	1.159E+01	1.159E+01	0.179E+01	15.41	
CD-109	461.40D	1.12	8.680E-01	9.746E-01	16.62E-01	170.56	
SN-126	2.30E+05Y	1.00	2.549E-01	2.549E-01	1.544E-01	60.57	
CE-141	32.51D	5.17	5.261E-02	2.722E-01	5.530E-01	203.19	
TL-208	1.41E+10Y	1.00	2.388E-01	2.388E-01	1.131E-01	47.35	
BI-211	7.04E+08Y	1.00	2.499E+00	2.499E+00	0.643E+00	25.72	
PB-212	1.41E+10Y	1.00	8.978E-01	8.978E-01	1.427E-01	15.89	
BI-214	1600.00Y	1.00	9.128E-01	9.129E-01	1.972E-01	21.60	
PB-214	1600.00Y	1.00	9.071E-01	9.072E-01	2.333E-01	25.72	
RN-222	1600.00Y	1.00	9.128E-01	9.129E-01	1.972E-01	21.60	
RA-224	1.41E+10Y	1.00	3.060E+00	3.060E+00	1.565E+00	51.13	
RA-226	1600.00Y	1.00	9.071E-01	9.072E-01	2.333E-01	25.72	
AC-228	1.41E+10Y	1.00	1.036E+00	1.036E+00	0.295E+00	28.48	
RA-228	1.41E+10Y	1.00	1.036E+00	1.036E+00	0.295E+00	28.48	
TH-228	1.41E+10Y	1.00	8.978E-01	8.978E-01	1.427E-01	15.89	
TH-229	7340.00Y	1.00	1.338E-01	1.338E-01	2.282E-01	170.56	K
TH-230	7.54E+04Y	1.00	9.071E-01	9.071E-01	2.333E-01	25.72	
TH-232	1.41E+10Y	1.00	1.036E+00	1.036E+00	0.295E+00	28.48	
TH-234	4.47E+09Y	1.00	8.451E-01	8.451E-01	30.83E-01	364.89	
U-234	2.45E+05Y	1.00	9.071E-01	9.071E-01	2.333E-01	25.72	
U-235	7.04E+08Y	1.00	2.318E-01	2.318E-01	4.710E-01	203.19	
U-238	4.47E+09Y	1.00	8.451E-01	8.451E-01	30.83E-01	364.89	
AM-243	7370.00Y	1.00	1.992E-01	1.992E-01	1.087E-01	54.58	
ANH-511	1.00E+09Y	1.00	6.803E-02	6.803E-02	11.74E-02	172.63	
Total Activity :			3.124E+01	3.157E+01			
Grand Total Activity :			3.124E+01	3.157E+01			

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	81.39	50	83	1.12	163.44	161	6	1.19E-02	69.5	4.24E+00	T
0	328.27	24	29	1.14	657.31	654	6	6.25E-03	85.6	3.24E+00	T
0	445.85	25	57	3.80	892.48	878	17	6.63E-03	****	2.60E+00	
0	563.37	11	25	1.36	1127.50	1120	10	3.06E-03	****	2.19E+00	T
3	617.13	26	18	1.67	1235.00	1213	36	7.15E-03	73.0	2.04E+00	T
0	747.61	8	15	0.60	1495.91	1490	8	2.14E-03	****	1.75E+00	T
0	758.86	19	8	1.93	1518.39	1512	11	5.20E-03	75.3	1.72E+00	
0	768.66	17	32	2.35	1538.00	1530	14	4.65E-03	****	1.70E+00	
0	807.59	17	10	4.41	1615.83	1611	12	4.87E-03	91.2	1.63E+00	
0	844.89	10	18	1.92	1690.40	1683	12	2.78E-03	****	1.57E+00	
0	933.97	23	3	1.27	1868.48	1863	11	6.46E-03	49.8	1.44E+00	
0	1060.44	8	3	0.81	2121.29	2117	7	2.15E-03	****	1.28E+00	
0	1153.83	15	3	2.36	2307.95	2303	10	4.27E-03	64.1	1.19E+00	
0	1181.11	6	14	1.30	2362.48	2355	15	1.79E-03	****	1.16E+00	
0	1282.01	11	6	1.70	2564.13	2557	13	3.19E-03	****	1.08E+00	
0	1313.39	8	12	0.60	2626.84	2619	13	2.19E-03	****	1.06E+00	T
0	1377.59	14	5	1.28	2755.12	2749	11	4.17E-03	79.0	1.02E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 15:35:32.94

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*****
*                               *
* GEL Laboratories LLC          *
* 2040 Savage Road             *
* Charleston, SC 29407         *
*****
*                               *
* DETECTOR AND SAMPLE DATA    *
*                               *
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597565.CNF;1 *
* Acquisition date : 2-JAN-2024 14:34:57 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 01:00:01.00 Half life ratio: **** *
* Sample date : 17-OCT-2023 13:00:00 Nuclide Library: SOLID *
* Sample ID : G1205597565 Analyst initials: SF1 *
* Batch Number : 2538164 Sample Quantity: 1.3063E+02 GRAM *
* Wet wt corr : 1.00000 Wet Weight : 0.00000 *
* Dry Weight : 0.00000 *
*****
*                               *
* CALIBRATION INFORMATION      *
*                               *
* Eff. Cal. date : 13-SEP-2023 09:49:44 Eff. Geometry : CAN *
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF GAM02 CAN.CNF;19 *
*****

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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	3.045E-01
CD-109	7.533E-01
SN-126	6.751E-02
CE-141	1.972E-01
TL-208	3.839E-02
BI-211	1.790E-01
PB-212	5.876E-02
BI-214	7.311E-02
PB-214	6.509E-02
RN-222	7.311E-02
RA-224	6.300E-01
RA-226	6.509E-02
AC-228	1.037E-01
RA-228	1.037E-01
TH-228	5.876E-02
TH-229	4.951E-01
TH-230	6.508E-02
TH-232	1.037E-01
TH-234	1.364E+00
U-234	6.508E-02
U-235	2.061E-01
U-238	1.364E+00
AM-243	5.121E-02
ANH-511	2.580E-02

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	Status
BE-7	5.931E-01	NOT IDENT.
NA-22	4.292E-02	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	2.726E-02	NOT IDENT.
SC-46	6.172E-02	FAIL ABUN
V-48	1.068E+00	FAIL ABUN
CR-51	1.473E+00	NOT IDENT.

MN-52	0.000E+00	SHORT HLIF
MN-54	3.917E-02	NOT IDENT.
CO-56	5.321E-02	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	2.594E-02	NOT IDENT.
CO-58	6.284E-02	NOT IDENT.
FE-59	2.081E-01	NOT IDENT.
CO-60	2.938E-02	NOT IDENT.
ZN-65	9.866E-02	NOT IDENT.
GE-68	1.334E+00	NOT IDENT.
AS-73	1.904E+00	NOT IDENT.
AS-74	9.790E-01	NOT IDENT.
SE-75	6.728E-02	NOT IDENT.
BR-77	0.000E+00	SHORT HLIF
SR-82	1.688E+00	NOT IDENT.
RB-83	1.073E-01	NOT IDENT.
RB-84	2.084E-01	NOT IDENT.
KR-85	7.775E+00	NOT IDENT.
SR-85	7.901E-02	NOT IDENT.
RB-86	7.143E+00	NOT IDENT.
Y-88	4.555E-02	NOT IDENT.
Y-91	4.070E+01	NOT IDENT.
NB-94	3.750E-02	NOT IDENT.
NB-95	7.978E-02	NOT IDENT.
NB-95M	2.599E-01	NOT IDENT.
ZR-95	1.201E-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	3.013E-02	NOT IDENT.
RH-102	4.435E-02	NOT IDENT.
RU-103	9.947E-02	FAIL ABUN
RH-106	3.672E-01	NOT IDENT.
RU-106	3.672E-01	NOT IDENT.
AG-108M	3.135E-02	NOT IDENT.
AG-110	8.016E-01	NOT IDENT.
AG-110M	5.319E-02	NOT IDENT.
SN-113	5.825E-02	NOT IDENT.
CD-115	0.000E+00	SHORT HLIF
SN-117M	1.209E+00	NOT IDENT.
SB-122	0.000E+00	SHORT HLIF
TE-123M	3.979E-02	NOT IDENT.
SB-124	1.635E-01	NOT IDENT.
SB-125	8.423E-02	NOT IDENT.
TE-125M	1.957E+01	NOT IDENT.
I-126	5.937E+00	NOT IDENT.
SB-126	3.668E+00	NOT IDENT.
SB-127	0.000E+00	SHORT HLIF
I-131	2.063E+01	FAIL ABUN
I-132	0.000E+00	SHORT HLIF
TE-132	0.000E+00	SHORT HLIF
BA-133	4.208E-02	FAIL ABUN
I-133	0.000E+00	SHORT HLIF
CS-134	4.553E-02	FAIL ABUN
I-135	0.000E+00	SHORT HLIF
CS-136	3.093E+00	NOT IDENT.
BA-137M	3.588E-02	NOT IDENT.
CS-137	3.791E-02	NOT IDENT.
LA-138	5.428E-02	NOT IDENT.
CE-138	3.966E-02	NOT IDENT.
BA-140	7.044E+00	NOT IDENT.
LA-140	1.912E+00	FAIL ABUN
CE-143	0.000E+00	SHORT HLIF
CE-144	2.119E-01	FAIL ABUN
PM-144	2.649E-02	FAIL ABUN
PR-144	2.052E+00	NOT IDENT.
PM-146	4.527E-02	FAIL ABUN
ND-147	2.533E+01	NOT IDENT.
PM-147	6.771E+02	NOT IDENT.
PM-149	0.000E+00	SHORT HLIF
EU-150	2.633E-02	FAIL ABUN
EU-152	9.718E-02	NOT IDENT.
GD-153	8.918E-02	NOT IDENT.
EU-154	1.145E-01	NOT IDENT.
EU-155	9.044E-02	FAIL ABUN
TB-160	2.186E-01	FAIL ABUN
HO-166M	6.295E-02	FAIL ABUN

TM-171	2.449E+01	NOT IDENT.
HF-172	1.950E-01	FAIL ABUN
LU-172	5.583E-02	FAIL ABUN
LU-176	2.560E-02	FAIL ABUN
HF-181	1.169E-01	NOT IDENT.
TA-182	2.533E-01	FAIL ABUN
RE-183	4.158E-01	NOT IDENT.
RE-184	4.037E-01	NOT IDENT.
W-188	1.096E+01	FAIL ABUN
IR-192	6.148E-02	FAIL ABUN
HG-203	9.163E-02	NOT IDENT.
TL-204	4.907E+00	FAIL ABUN
BI-207	3.529E-02	FAIL ABUN
BI-210	6.232E+00	NOT IDENT.
PB-210	6.232E+00	NOT IDENT.
PB-211	6.903E-01	NOT IDENT.
BI-212	5.941E-01	NOT IDENT.
BI-213	9.871E-02	NOT IDENT.
RN-219	3.737E-01	NOT IDENT.
RA-223	6.056E-01	FAIL ABUN
AC-225	4.677E+01	NOT IDENT.
AC-227	2.540E-01	NOT IDENT.
TH-227	2.540E-01	NOT IDENT.
PA-231	5.239E-01	NOT IDENT.
TH-231	6.056E-01	FAIL ABUN
PA-233	6.431E-02	NOT IDENT.
PA-234	2.317E-01	NOT IDENT.
PA-234M	5.640E+00	NOT IDENT.
NP-237	6.431E-02	NOT IDENT.
NP-238	0.000E+00	SHORT HLIF
NP-239	2.186E-01	NOT IDENT.
PU-239	3.347E+02	NOT IDENT.
AM-241	1.962E-01	NOT IDENT.
CM-243	9.018E-02	NOT IDENT.
BK-247	8.347E-02	NOT IDENT.
CM-247	3.207E-02	NOT IDENT.
CF-249	3.964E-02	NOT IDENT.
CF-251	1.121E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 15:35:36.78

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                             *
*****
*                               DETECTOR AND SAMPLE DATA                       *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597565.CNF;1  *
* Acquisition date   : 2-JAN-2024 14:34:57 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 01:00:01.00 Half life ratio      : *****             *
* Sample date        : 17-OCT-2023 13:00:00 Nuclide Library : SOLID             *
* Sample ID          : G1205597565 Analyst initials      : SF1              *
* Batch Number       : 2538164 Sample Quantity          : 1.3063E+02 GRAM      *
* Wet wt corr        : 1.00000 Wet Weight                : 0.00000             *
*                   : Dry Weight                          : 0.00000             *
*****
*                               CALIBRATION INFORMATION                          *
* Eff. Cal. date     : 13-SEP-2023 09:49:44 Eff. Geometry  : CAN              *
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM02_CAN.CNF;19             *
*****

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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	1.159E+01	2.173E+00	2.173E+00
CD-109	9.746E-01	1.633E+00	1.633E+00
SN-126	2.549E-01	1.538E-01	1.538E-01
CE-141	6.229E-02	5.575E-01	5.575E-01
TL-208	2.388E-01	1.127E-01	1.127E-01
BI-211	2.499E+00	6.624E-01	6.624E-01
PB-212	8.978E-01	1.590E-01	1.590E-01
BI-214	9.129E-01	2.083E-01	2.083E-01
PB-214	9.072E-01	2.400E-01	2.400E-01
RN-222	9.129E-01	2.083E-01	2.083E-01
RA-224	3.060E+00	1.555E+00	1.555E+00
RA-226	9.072E-01	2.400E-01	2.400E-01
AC-228	1.036E+00	3.104E-01	3.104E-01
RA-228	1.036E+00	3.104E-01	3.104E-01
TH-228	8.978E-01	1.590E-01	1.590E-01
TH-229	1.631E-01	5.809E-01	5.809E-01
TH-230	9.071E-01	2.400E-01	2.400E-01
TH-232	1.036E+00	3.104E-01	3.104E-01
TH-234	8.451E-01	3.029E+00	3.029E+00
U-234	9.071E-01	2.400E-01	2.400E-01
U-235	2.318E-01	4.620E-01	4.620E-01
U-238	8.451E-01	3.029E+00	3.029E+00
AM-243	1.992E-01	1.086E-01	1.086E-01
ANH-511	6.803E-02	1.152E-01	1.152E-01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-5.898E-01	7.939E-01	8.372E-01	NOT IDENT.
NA-22	2.667E-02	4.679E-02	4.831E-02	NOT IDENT.
NA-24	-2.740E+35	5.657E+35	0.000E+00	SHORT HLIF
AL-26	7.251E-03	2.933E-02	2.951E-02	NOT IDENT.
SC-46	3.702E-04	7.166E-02	7.166E-02	FAIL ABUN
V-48	7.089E-01	1.124E+00	1.168E+00	FAIL ABUN

CR-51	-1.489E+00	1.856E+00	1.974E+00	NOT IDENT.
MN-52	-1.738E+02	7.030E+02	7.074E+02	SHORT HLIF
MN-54	-1.429E-02	4.759E-02	4.803E-02	NOT IDENT.
CO-56	-4.895E-02	8.328E-02	8.616E-02	NOT IDENT.
MN-56	-1.000E+41	1.759E+41	0.000E+00	SHORT HLIF
CO-57	1.204E-03	3.014E-02	3.015E-02	NOT IDENT.
CO-58	-3.704E-02	9.117E-02	9.269E-02	NOT IDENT.
FE-59	-2.033E-01	2.881E-01	3.023E-01	NOT IDENT.
CO-60	-1.441E-02	4.009E-02	4.062E-02	NOT IDENT.
ZN-65	4.202E-02	1.221E-01	1.236E-01	NOT IDENT.
GE-68	3.410E-01	1.508E+00	1.516E+00	NOT IDENT.
AS-73	6.492E-01	2.056E+00	2.077E+00	NOT IDENT.
AS-74	3.794E-01	1.111E+00	1.124E+00	NOT IDENT.
SE-75	2.144E-02	7.335E-02	7.399E-02	NOT IDENT.
BR-77	9.837E+09	2.196E+10	2.240E+10	SHORT HLIF
SR-82	4.418E-01	1.862E+00	1.873E+00	NOT IDENT.
RB-83	7.152E-02	1.155E-01	1.199E-01	NOT IDENT.
RB-84	-1.657E-01	2.749E-01	2.849E-01	NOT IDENT.
KR-85	7.387E+00	8.254E+00	8.901E+00	NOT IDENT.
SR-85	7.498E-02	8.389E-02	9.044E-02	NOT IDENT.
RB-86	3.602E+00	7.676E+00	7.846E+00	NOT IDENT.
Y-88	2.300E-02	4.416E-02	4.536E-02	NOT IDENT.
Y-91	1.791E+01	4.514E+01	4.586E+01	NOT IDENT.
NB-94	3.359E-02	4.047E-02	4.321E-02	NOT IDENT.
NB-95	9.580E-03	9.886E-02	9.895E-02	NOT IDENT.
NB-95M	-4.626E-02	3.240E-01	3.247E-01	NOT IDENT.
ZR-95	4.091E-03	1.546E-01	1.546E-01	NOT IDENT.
NB-97	1.000E+41	2.597E+41	0.000E+00	SHORT HLIF
ZR-97	1.833E+32	6.097E+32	0.000E+00	SHORT HLIF
MO-99	-6.199E+07	7.386E+07	7.897E+07	SHORT HLIF
TC-99M	-1.000E+41	2.149E+41	0.000E+00	SHORT HLIF
RH-101	-8.750E-03	3.609E-02	3.631E-02	NOT IDENT.
RH-102	-5.328E-03	5.471E-02	5.476E-02	NOT IDENT.
RU-103	-5.175E-02	1.262E-01	1.283E-01	FAIL ABUN
RH-106	-1.112E-01	4.605E-01	4.632E-01	NOT IDENT.
RU-106	-1.112E-01	4.605E-01	4.632E-01	NOT IDENT.
AG-108M	1.070E-02	3.520E-02	3.553E-02	NOT IDENT.
AG-110	6.749E-01	8.420E-01	8.953E-01	NOT IDENT.
AG-110M	-5.970E-03	6.290E-02	6.296E-02	NOT IDENT.
SN-113	-1.674E-02	6.955E-02	6.996E-02	NOT IDENT.
CD-115	-6.747E+08	3.206E+09	3.220E+09	SHORT HLIF
SN-117M	-7.241E-01	1.509E+00	1.544E+00	NOT IDENT.
SB-122	1.417E+07	2.509E+07	2.589E+07	SHORT HLIF
TE-123M	-8.869E-03	4.818E-02	4.835E-02	NOT IDENT.
SB-124	2.300E-02	1.849E-01	1.852E-01	NOT IDENT.
SB-125	3.002E-02	9.357E-02	9.455E-02	NOT IDENT.
TE-125M	1.985E+01	2.093E+01	2.276E+01	NOT IDENT.
I-126	-7.095E+00	8.411E+00	8.999E+00	NOT IDENT.
SB-126	-1.134E-01	4.199E+00	4.199E+00	NOT IDENT.
SB-127	1.907E+04	1.157E+05	1.160E+05	SHORT HLIF
I-131	-1.915E+01	2.627E+01	2.766E+01	FAIL ABUN
I-132	-1.000E+41	2.760E+42	0.000E+00	SHORT HLIF
TE-132	-1.620E+05	5.220E+05	5.271E+05	SHORT HLIF
BA-133	1.810E-03	5.347E-02	5.348E-02	FAIL ABUN
I-133	1.344E+25	2.238E+25	0.000E+00	SHORT HLIF
CS-134	3.860E-02	4.658E-02	4.973E-02	FAIL ABUN
I-135	-1.000E+41	2.107E+41	0.000E+00	SHORT HLIF
CS-136	1.605E+00	3.380E+00	3.456E+00	NOT IDENT.
BA-137M	-2.317E-02	4.381E-02	4.504E-02	NOT IDENT.
CS-137	-2.447E-02	4.628E-02	4.758E-02	NOT IDENT.
LA-138	1.937E-03	6.578E-02	6.579E-02	NOT IDENT.
CE-139	3.393E-02	4.454E-02	4.709E-02	NOT IDENT.
BA-140	-6.820E+00	9.468E+00	9.955E+00	NOT IDENT.
LA-140	-4.580E-01	2.389E+00	2.398E+00	FAIL ABUN
CE-143	2.981E+15	4.702E+15	4.878E+15	SHORT HLIF
CE-144	2.241E-02	2.467E-01	2.469E-01	FAIL ABUN
PM-144	-1.518E-02	3.592E-02	3.656E-02	FAIL ABUN
PR-144	-1.162E+00	2.779E+00	2.828E+00	NOT IDENT.
PM-146	-1.142E-02	5.447E-02	5.471E-02	FAIL ABUN
ND-147	-9.451E+00	3.165E+01	3.194E+01	NOT IDENT.
PM-147	-4.550E+01	7.940E+02	7.943E+02	NOT IDENT.
PM-149	-2.366E+10	2.763E+10	2.962E+10	SHORT HLIF
EU-150	2.431E-03	3.111E-02	3.113E-02	FAIL ABUN
EU-152	2.379E-02	1.084E-01	1.089E-01	NOT IDENT.
GD-153	-1.027E-01	1.224E-01	1.308E-01	NOT IDENT.
EU-154	6.400E-02	1.263E-01	1.295E-01	NOT IDENT.
EU-155	-2.811E-03	1.047E-01	1.047E-01	FAIL ABUN
TB-160	8.591E-03	2.521E-01	2.522E-01	FAIL ABUN

HO-166M	-3.412E-02	8.264E-02	8.405E-02	FAIL ABUN
TM-171	-1.851E-01	2.711E+01	2.711E+01	NOT IDENT.
HF-172	9.352E-02	2.201E-01	2.241E-01	FAIL ABUN
LU-172	-7.921E-02	8.316E-02	9.050E-02	FAIL ABUN
LU-176	6.669E-03	2.825E-02	2.841E-02	FAIL ABUN
HF-181	-5.297E-03	1.384E-01	1.384E-01	NOT IDENT.
TA-182	4.589E-02	2.949E-01	2.956E-01	FAIL ABUN
RE-183	-3.177E-01	4.923E-01	5.127E-01	NOT IDENT.
RE-184	-9.605E-02	4.868E-01	4.888E-01	NOT IDENT.
W-188	-1.409E+01	1.595E+01	1.717E+01	FAIL ABUN
IR-192	1.077E-03	6.965E-02	6.965E-02	FAIL ABUN
HG-203	-9.150E-02	1.119E-01	1.193E-01	NOT IDENT.
TL-204	-2.736E-02	5.961E+00	5.961E+00	FAIL ABUN
BI-207	-3.961E-02	6.122E-02	6.378E-02	FAIL ABUN
BI-210	5.146E+00	6.463E+00	6.867E+00	NOT IDENT.
PB-210	5.146E+00	6.463E+00	6.867E+00	NOT IDENT.
PB-211	5.457E-02	7.929E-01	7.933E-01	NOT IDENT.
BI-212	5.976E-01	6.038E-01	6.612E-01	NOT IDENT.
BI-213	-1.515E-02	1.174E-01	1.176E-01	NOT IDENT.
RN-219	-1.132E-01	4.479E-01	4.508E-01	NOT IDENT.
RA-223	-1.341E-01	7.379E-01	7.404E-01	FAIL ABUN
AC-225	2.386E+01	5.475E+01	5.580E+01	NOT IDENT.
AC-227	1.023E-01	2.744E-01	2.783E-01	NOT IDENT.
TH-227	1.023E-01	2.744E-01	2.783E-01	NOT IDENT.
PA-231	2.549E-01	5.713E-01	5.828E-01	NOT IDENT.
TH-231	-1.341E-01	7.379E-01	7.404E-01	FAIL ABUN
PA-233	-2.181E-02	7.519E-02	7.583E-02	NOT IDENT.
PA-234	-1.620E-01	3.579E-01	3.652E-01	NOT IDENT.
PA-234M	-1.418E+00	6.517E+00	6.549E+00	NOT IDENT.
NP-237	-2.181E-02	7.519E-02	7.583E-02	NOT IDENT.
NP-238	-5.312E+09	1.398E+10	1.418E+10	SHORT HLIF
NP-239	-1.081E-01	2.655E-01	2.699E-01	NOT IDENT.
PU-239	-4.577E+00	3.925E+02	3.925E+02	NOT IDENT.
AM-241	1.535E-01	2.216E-01	2.322E-01	NOT IDENT.
CM-243	-1.015E-02	1.050E-01	1.051E-01	NOT IDENT.
BK-247	2.890E-02	9.095E-02	9.187E-02	NOT IDENT.
CM-247	-2.787E-02	4.127E-02	4.314E-02	NOT IDENT.
CF-249	2.725E-02	4.239E-02	4.414E-02	NOT IDENT.
CF-251	-1.738E-01	1.545E-01	1.733E-01	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	62.6263	85.43	70.4556	131.20	73.7004
45.60	59.4804	86.55	70.6345	133.02	63.9951
46.54	50.6323	86.79	70.6718	133.52	59.6310
49.72	0.0000	86.94	70.6964	136.00	55.4398
51.35	59.7146	87.09	70.7199	136.47	59.9211
51.87	55.2129	87.57	70.7957	140.51	0.0000
52.39	50.6956	88.03	70.8686	143.76	55.0106
52.97	49.8651	88.34	70.9175	144.24	55.0517
53.44	49.9386	88.47	70.9378	145.44	52.5292
54.07	57.4498	89.96	77.2716	152.43	63.7126
57.36	0.0000	1093.63	77.3870	153.25	55.8174
57.53	70.2304	91.11	67.9525	323.87	65.0235
57.98	68.4486	92.59	61.3531	156.02	67.4868
59.27	53.6493	93.35	61.4534	158.56	72.3323
59.32	53.6571	94.56	61.6118	159.00	70.0807
59.54	60.2852	94.65	61.6232	162.33	63.4930
60.96	78.1881	94.67	61.6260	162.66	61.2133
61.17	78.2351	94.87	61.6521	163.33	55.4912
62.93	63.7248	97.43	75.7570	165.86	47.5702
63.29	63.7888	98.43	57.9705	176.31	49.4398
63.58	63.8405	98.44	57.9717	176.60	57.7023
64.28	68.7380	99.53	61.2142	177.52	74.2809
66.73	61.5103	100.11	73.7518	181.07	0.0000
67.24	58.7070	102.03	54.2253	181.52	61.6389
125.81	70.3389	103.18	55.3950	184.41	49.9750
67.75	70.3517	103.37	55.4160	143.76	50.0609
68.89	67.6646	105.21	53.5194	193.51	49.3594
69.67	77.4902	105.31	53.5299	197.03	76.1804
70.82	69.9494	106.12	71.4863	198.01	49.6378
70.83	69.9516	106.47	66.2752	201.83	55.9544
72.81	76.8169	109.28	48.6546	203.43	56.0632
72.87	76.8289	111.00	68.9762	205.31	58.6348
74.66	77.1752	111.76	0.0000	210.85	47.5474
74.82	77.2058	114.06	55.4980	215.65	48.2281
74.97	77.2346	116.30	0.0000	218.12	54.5676
77.11	77.6434	116.74	57.9176	222.11	48.5881
78.74	77.9501	119.76	59.3128	227.09	44.2686
79.69	47.6711	121.12	56.2141	227.38	46.7891
80.03	47.7092	121.22	56.2240	228.16	0.0000
80.12	47.7198	121.78	50.8684	228.18	53.5215
80.19	47.7279	122.06	54.1420	116.74	53.5215
80.57	47.7708	122.92	59.6464	235.69	73.3602
81.00	43.8345	123.07	62.9167	235.96	73.3815
81.07	43.8419	265.00	61.8980	238.63	57.5223
81.75	43.9117	125.81	58.8577	238.98	0.0000
82.47	47.9846	127.23	68.8351	240.99	57.6683
83.79	48.1315	127.91	71.1037	242.00	57.7305
84.00	70.2254	129.30	73.4642	244.70	31.9283

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.40	0.0000	344.28	30.8052	563.25	25.9072
252.80	37.7807	345.93	30.8469	564.24	0.0000
254.15	0.0000	351.06	27.2200	569.33	22.7440
256.23	39.6377	351.93	27.2388	946.00	18.4139
260.90	0.0000	355.39	0.0000	569.70	18.4160
264.66	43.4519	356.01	32.5108	583.19	26.1885
264.80	41.7197	364.49	33.2020	584.27	26.2041
265.00	41.7285	366.42	0.0000	595.83	15.3797
269.46	41.9131	372.51	28.6359	427.87	19.8230
270.03	37.5681	375.05	28.6914	602.52	0.0000
271.23	43.7347	377.52	37.3687	604.72	21.5209
273.65	63.1274	356.01	25.9942	607.14	36.4657
276.40	39.5599	388.16	21.2485	609.32	25.4445
277.37	41.3564	388.63	24.1542	610.33	25.4576
277.60	39.6057	391.69	28.0820	614.28	25.5100
278.00	40.5008	264.66	28.2666	618.01	25.5587
279.20	54.6511	401.81	29.2651	620.36	25.5886
279.54	54.6688	402.40	32.2057	621.93	25.6092
279.70	47.6224	404.85	27.3739	630.19	0.0000
280.46	43.2439	410.95	26.5111	631.29	13.4248
283.69	45.1479	413.71	28.5309	633.25	12.3182
284.31	33.6590	414.70	22.6434	634.78	21.2931
285.41	37.2405	423.72	28.7310	635.95	16.8201
285.90	0.0000	427.09	18.8674	636.99	11.2191
287.50	31.0950	427.87	17.8839	657.50	9.0661
290.67	44.1071	433.94	25.9392	657.76	11.3342
293.27	0.0000	439.40	24.0322	657.90	0.0000
351.93	34.8970	440.45	26.0534	661.66	18.1686
295.96	34.9208	453.88	32.3522	664.57	0.0000
879.38	44.4283	463.37	25.4313	666.33	29.5907
299.98	36.3966	468.07	18.3658	666.50	29.5928
300.09	26.9635	473.00	0.0000	667.71	0.0000
300.13	26.9641	475.06	24.5967	677.62	22.8849
301.36	41.3918	476.78	17.4417	685.70	0.0000
302.85	36.9419	477.60	26.6893	692.65	0.0000
256.23	38.8017	482.18	23.6771	695.00	13.8433
304.85	34.2999	487.02	23.7487	696.49	13.8525
306.78	31.6468	492.35	0.0000	696.51	13.8530
308.46	40.7492	497.08	21.8177	697.00	8.0826
311.90	41.7820	505.52	14.0974	697.30	6.9290
316.51	35.5667	507.63	0.0000	697.49	6.9297
319.41	34.7413	511.00	19.9061	702.65	15.0498
320.08	38.4205	514.00	19.9417	706.68	18.5573
321.04	32.0435	514.00	19.9417	711.68	26.7369
323.87	36.3435	520.40	12.6421	720.70	12.2556
325.23	31.6994	520.69	0.0000	721.93	0.0000
328.76	37.3236	522.65	0.0000	722.78	17.5244
333.37	37.0060	527.90	0.0000	722.91	17.5256
333.97	33.3215	528.26	25.4004	723.31	20.1580
334.37	31.9444	529.59	15.8875	724.19	21.9193
338.28	35.2987	529.87	0.0000	727.33	14.9264
338.32	35.3003	531.02	22.2612	733.00	14.0840
311.90	27.9181	537.26	28.7238	735.93	15.8648
340.48	27.9181	546.56	0.0000	333.97	10.5839
340.55	27.9199	552.55	18.2423	739.50	0.0000



ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
744.23	0.0000	949.00	14.3871	1384.29	13.1331
747.24	21.2585	667.71	0.0000	1408.01	3.3034
748.06	18.4304	962.31	16.5203	1434.09	0.0000
752.31	15.3872	964.08	16.9716	1435.80	6.6537
753.82	18.4768	966.17	16.9839	1457.56	0.0000
756.73	12.8079	911.20	25.1145	1460.82	5.5795
756.80	12.8083	983.53	8.7380	1489.16	3.3712
884.68	7.1375	984.45	0.0000	1505.03	6.3171
765.81	14.2866	1274.44	15.6025	1584.12	5.5166
766.42	13.3969	1001.03	17.5814	1596.21	4.6101
766.84	13.3997	1002.74	16.6145	1620.50	4.6357
772.60	0.0000	1004.73	26.4059	1621.92	4.6372
776.52	12.5576	507.63	0.0000	1678.03	0.0000
739.50	0.0000	1025.87	0.0000	1690.97	3.7672
778.90	19.7535	1028.54	0.0000	1750.46	0.0000
783.70	0.0000	1037.84	16.8122	1764.49	0.9567
788.74	18.0322	1038.76	0.0000	1063.66	7.6633
792.07	15.3487	631.29	15.8691	1771.35	1.9162
795.86	10.8512	1048.07	11.9077	1791.20	0.0000
810.06	11.6426	1049.04	6.9483	1808.65	1.9312
810.29	16.0102	1050.41	9.9304	1810.72	0.0000
344.28	16.0112	1063.66	12.7664	1836.06	0.9710
810.76	17.4686	1077.00	7.0115		
815.77	10.0285	1077.34	9.0159		
1048.07	12.7776	1085.87	12.0542		
832.01	13.7650	1093.63	19.1334		
834.85	18.3740	1099.45	18.1593		
835.71	20.2188	1112.07	16.2061		
836.80	0.0000	1112.84	15.1968		
846.75	0.0000	1115.54	9.7342		
846.77	16.2459	1120.29	14.2170		
856.80	18.5339	1120.55	14.2179		
860.56	11.1365	1221.41	14.2213		
871.09	14.9092	1129.67	11.2028		
873.19	9.3259	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	12.1522	1173.23	7.0765		
880.51	10.2870	1177.95	6.6141		
881.60	15.9048	1189.05	20.7373		
883.24	10.2977	1204.77	9.3752		
884.68	13.1135	1221.41	11.5136		
889.28	13.1361	1231.02	10.4962		
894.76	13.1635	1235.36	21.0181		
898.04	11.2969	1238.28	16.8291		
900.72	13.1929	1260.41	0.0000		
903.28	16.0350	1271.87	5.3091		
911.20	8.5144	1274.44	6.0718		
912.08	7.5708	1274.54	6.0721		
923.98	0.0000	1291.59	12.8115		
926.50	16.1730	1298.22	0.0000		
929.11	12.1891	1312.11	11.8104		
935.54	0.0000	1332.49	7.5571		
937.49	12.2262	1362.66	0.0000		
944.13	10.5320	1365.19	3.2670		
946.00	13.4134	1368.63	0.0000		

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 14:51:56.45

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*                               GEL Laboratories LLC                       *
*                               2040 Savage Road                          *
*                               Charleston, SC 29407                       *
*****
Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597566.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG GAM06.CNF;920
Background date : 31-DEC-2023 20:17:15
Sample date : 12-DEC-2023 00:00:00 Acquisition date : 2-JAN-2024 14:35:43.
Sample ID : G1205597566 Sample quantity : 1.15000E+02 GRAM
Detector name : GAM06 Detector geometry: CAN
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:02.80 0.3%
Energy tolerance : 1.50000 keV Analyst Initials : SFl
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID : 2538164 Detector SN# :
Matrix Spike ID : LCS ID :
*****

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.48*	4012	4040	0.85	91.82	87	10	4.46E+00	3.4	
2	0	59.63	14693	2596	0.90	118.11	113	9	1.63E+01	1.0	
3	0	87.23	25	554	1.30	173.33	172	7	2.73E-02	160.4	
4	0	142.27	61	439	0.94	283.42	281	8	6.82E-02	60.2	
5	0	316.10	24	326	0.50	631.17	629	8	2.71E-02	129.7	
6	0	323.97	40	276	1.08	646.90	645	7	4.41E-02	71.0	
7	0	346.56	55	290	1.40	692.10	688	8	6.15E-02	55.3	
8	0	404.07	47	313	3.71	807.16	803	8	5.23E-02	67.2	
9	0	419.94	78	258	1.33	838.93	835	7	8.65E-02	36.4	
10	0	610.59*	96	359	6.76	1220.40	1209	27	1.07E-01	55.7	
11	0	661.76	9887	223	1.53	1322.81	1315	15	1.10E+01	1.1	
12	0	685.62*	25	89	1.26	1370.56	1364	10	2.82E-02	72.8	
13	0	913.60	18	159	2.26	1826.83	1819	11	2.05E-02	135.1	
14	0	1002.57*	12	232	6.31	2004.93	1998	19	1.37E-02	298.9	
15	0	1054.86	33	93	0.53	2109.61	2104	10	3.71E-02	56.6	
16	0	1060.15	25	169	3.22	2120.20	2114	16	2.79E-02	117.3	
17	0	1173.25*	2857	65	2.08	2346.63	2339	19	3.17E+00	2.0	
18	0	1332.53	2475	57	2.23	2665.54	2654	23	2.75E+00	2.2	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597566.CNF;1  
 Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
 Sample title : SF1  
 Sample date : 12-DEC-2023 00:00:00 Acquisition date : 2-JAN-2024 14:35:43  
 Sample ID : G1205597566 Sample quantity : 115.00 GRAM  
 Sample type : SOLID Sample geometry :  
 Detector name : GAMMA6 Detector geometry: CAN  
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:02.80 0.3%  
 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

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2721	99.85	1.195E+00	5.954E+01	6.001E+01	3.98
	1332.49	2344	99.98*	1.066E+00	5.744E+01	5.789E+01	4.32
CD-109	88.03	26	3.70*	5.254E+00	3.501E+00	3.617E+00	320.88
SN-126	64.28	-----	9.60	2.778E+00	-----	Line Not Found	-----
	86.94	26	8.90	5.254E+00	1.456E+00	1.456E+00	320.88
	87.57	26	37.00*	5.254E+00	3.501E-01	3.501E-01	320.88
BA-137M	661.66	9656	89.90*	2.006E+00	1.398E+02	1.400E+02	2.12
CS-137	661.66	9656	85.10*	2.006E+00	1.477E+02	1.479E+02	2.12
BI-210	46.54	4369	4.25*	5.841E-01	4.596E+03	4.604E+03	6.74
PB-210	46.54	4369	4.25*	5.841E-01	4.596E+03	4.604E+03	6.74
AM-241	59.54	15844	35.90*	2.133E+00	5.403E+02	5.404E+02	2.06

Flag: "\*" = Keyline

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:51:58.41

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*****
*                               *
*       GEL Laboratories LLC     *
*       2040 Savage Road        *
*       Charleston, SC 29407    *
*                               *
*****
*                               *
*       DETECTOR AND SAMPLE DATA *
*                               *
* Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597566.CNF;1 *
* Acquisition date : 2-JAN-2024 14:35:43 Sensitivity   : 3.000             *
* Detector ID     : GAM06 Energy tolerance: 1.500             *
* Elapsed live time: 0 00:15:00.00 Abundance limit: 75.000        *
* Elapsed real time: 0 00:15:02.80 Half life ratio: ****          *
* Sample date    : 12-DEC-2023 00:00:00 Analyst initials: SF1      *
* Sample ID      : G1205597566 Sample Quantity: 1.1500E+02 GRAM   *
* Batch Number   : 2538164 Wet Weight : 0.00000             *
* Wet wt corr    : 1.00000 Dry Weight : 0.00000             *
* Nuclide Library : SOLID.NLB;17 *
*****
*                               *
*       CALIBRATION INFORMATION   *
*                               *
* Eff. Cal. date  : 25-SEP-2023 07:18:20 Eff. Geometry : CAN          *
* Eff. File       : DKA100:[CANBERRA.GAMMA]EFF GAM06 CAN.CNF;22      *
*****

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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 )
CO-60	5.789E+01	2.453E+00	5.696E-01
CD-109	3.617E+00	1.137E+01	1.167E+01
SN-126	3.501E-01	1.101E+00	1.136E+00
BA-137M	1.400E+02	2.903E+00	7.668E-01
CS-137	1.479E+02	3.066E+00	8.100E-01
BI-210	4.604E+03	3.040E+02	1.850E+02
PB-210	4.604E+03	3.040E+02	1.850E+02
AM-241	5.404E+02	1.091E+01	4.998E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/GRAM )	
BE-7	-9.546E-01		5.744E+00	1.002E+01	NOT IDENT.
NA-22	6.946E-02		2.790E-01	5.450E-01	NOT IDENT.
NA-24	0.000E+00		4.955E+09	0.000E+00	SHORT HLIF
AL-26	-4.778E-02		1.892E-01	3.756E-01	NOT IDENT.
K-40	-9.130E-01		1.651E+00	2.371E+00	NOT IDENT.
SC-46	4.283E-01		5.713E-01	1.079E+00	NOT IDENT.
V-48	-1.267E-01		1.207E+00	2.161E+00	NOT IDENT.
CR-51	2.051E+00		5.634E+00	8.754E+00	NOT IDENT.
MN-52	-3.804E-01		3.124E+00	5.956E+00	NOT IDENT.
MN-54	1.997E-01		4.108E-01	7.776E-01	NOT IDENT.
CO-56	4.008E-01		5.403E-01	1.026E+00	NOT IDENT.
MN-56	0.000E+00		1.351E+41	0.000E+00	SHORT HLIF
CO-57	-2.112E-01		2.280E-01	3.904E-01	NOT IDENT.
CO-58	3.724E-01		4.660E-01	9.026E-01	NOT IDENT.
FE-59	9.828E-02		1.321E+00	2.366E+00	NOT IDENT.
ZN-65	1.522E-01		1.177E+00	2.107E+00	NOT IDENT.
GE-68	-7.631E+00		1.698E+01	2.938E+01	NOT IDENT.
AS-73	-1.652E+01		2.180E+01	3.965E+01	NOT IDENT.
AS-74	-1.438E-01		1.392E+00	2.423E+00	NOT IDENT.
SE-75	-2.521E-02		5.301E-01	8.862E-01	NOT IDENT.
BR-77	-1.556E+02		6.617E+02	1.106E+03	NOT IDENT.
SR-82	-1.370E-01		4.379E+00	7.540E+00	NOT IDENT.

RB-83	8.106E-02	9.544E-01	1.691E+00	NOT IDENT.
RB-84	-2.692E-01	1.101E+00	1.965E+00	NOT IDENT.
KR-85	-5.908E+01	8.914E+01	1.514E+02	NOT IDENT.
SR-85	-3.348E-01	5.058E-01	8.593E-01	NOT IDENT.
RB-86	4.244E-01	1.316E+01	2.359E+01	NOT IDENT.
Y-88	5.070E-02	1.611E-01	4.002E-01	NOT IDENT.
Y-91	1.934E+01	1.723E+02	3.203E+02	NOT IDENT.
NB-94	4.313E-02	3.282E-01	5.795E-01	NOT IDENT.
NB-95	1.107E-01	4.796E-01	8.420E-01	NOT IDENT.
NB-95M	-1.1010E+00	1.421E+00	2.318E+00	NOT IDENT.
ZR-95	2.043E-01	8.228E-01	1.455E+00	NOT IDENT.
NB-97	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	1.258E+10	0.000E+00	SHORT HLIF
MO-99	-1.038E+02	6.120E+02	1.051E+03	NOT IDENT.
TC-99M	0.000E+00	1.984E+25	0.000E+00	SHORT HLIF
RH-101	-2.871E-01	2.836E-01	4.820E-01	FAIL ABUN
RH-102	5.183E-02	6.582E-01	1.154E+00	NOT IDENT.
RU-103	-1.271E-02	6.241E-01	1.099E+00	FAIL ABUN
RH-106	-1.413E-01	3.653E+00	6.375E+00	NOT IDENT.
RU-106	-1.413E-01	3.653E+00	6.375E+00	NOT IDENT.
AG-108M	7.573E-02	4.648E-01	8.287E-01	NOT IDENT.
AG-110	-7.452E+00	1.142E+01	1.659E+01	NOT IDENT.
AG-110M	-3.007E-01	7.223E-01	1.274E+00	NOT IDENT.
SN-113	-2.660E-01	6.212E-01	1.094E+00	NOT IDENT.
CD-115	-6.845E+02	1.112E+03	1.890E+03	NOT IDENT.
SN-117M	-3.802E-01	6.997E-01	1.193E+00	NOT IDENT.
SB-122	4.365E+01	1.156E+02	2.087E+02	NOT IDENT.
TE-123M	-1.319E-02	2.678E-01	4.670E-01	NOT IDENT.
SB-124	1.695E-01	5.230E-01	1.175E+00	NOT IDENT.
SB-125	-6.621E-01	1.424E+00	2.479E+00	NOT IDENT.
TE-125M	3.551E+00	9.409E+01	1.689E+02	NOT IDENT.
I-126	9.284E-05	3.792E+00	5.886E+00	NOT IDENT.
SB-126	1.058E+00	2.297E+00	4.119E+00	NOT IDENT.
SB-127	4.410E+01	6.291E+01	7.950E+01	FAIL ABUN
I-131	-1.759E+00	2.587E+00	4.538E+00	NOT IDENT.
I-132	0.000E+00	1.960E+41	0.000E+00	SHORT HLIF
TE-132	-3.187E+00	3.385E+01	5.700E+01	NOT IDENT.
BA-133	-1.538E-01	5.354E-01	9.565E-01	NOT IDENT.
I-133	0.000E+00	1.262E+07	0.000E+00	SHORT HLIF
CS-134	-4.156E-01	4.425E-01	7.640E-01	NOT IDENT.
I-135	0.000E+00	4.477E+23	0.000E+00	SHORT HLIF
CS-136	6.469E-01	1.944E+00	3.463E+00	NOT IDENT.
LA-138	-2.075E-01	3.315E-01	5.533E-01	NOT IDENT.
CE-139	-2.761E-01	2.668E-01	4.421E-01	NOT IDENT.
BA-140	-2.965E-01	4.775E+00	8.376E+00	NOT IDENT.
LA-140	2.072E-01	6.735E-01	1.493E+00	NOT IDENT.
CE-141	4.997E-01	6.436E-01	1.096E+00	NOT IDENT.
CE-143	0.000E+00	3.462E+04	0.000E+00	SHORT HLIF
CE-144	-1.223E+00	1.802E+00	3.097E+00	NOT IDENT.
PM-144	-7.197E-03	3.356E-01	5.860E-01	NOT IDENT.
PR-144	-1.551E-01	2.523E+01	4.411E+01	NOT IDENT.
PM-146	7.314E-02	6.902E-01	1.222E+00	NOT IDENT.
ND-147	-6.999E+00	1.055E+01	1.789E+01	NOT IDENT.
PM-147	9.286E+02	6.367E+03	1.143E+04	NOT IDENT.
PM-149	3.163E+03	8.261E+03	1.403E+04	NOT IDENT.
EU-150	-6.505E-02	3.082E-01	5.564E-01	NOT IDENT.
EU-152	-2.699E-01	1.291E+00	2.084E+00	NOT IDENT.
GD-153	4.870E-01	7.489E-01	1.387E+00	NOT IDENT.
EU-154	1.021E-01	7.965E-01	1.527E+00	NOT IDENT.
EU-155	-3.281E-01	9.264E-01	1.643E+00	FAIL ABUN
TE-160	-5.685E-02	1.939E+00	3.506E+00	FAIL ABUN
HO-166M	-2.236E-01	6.530E-01	1.103E+00	NOT IDENT.
TM-171	4.181E+01	4.439E+02	8.197E+02	NOT IDENT.
HF-172	1.029E+00	7.173E+00	3.117E+00	NOT IDENT.
LU-172	5.535E-02	8.397E-01	1.505E+00	FAIL ABUN
LU-176	-3.605E-01	3.042E-01	5.304E-01	FAIL ABUN
HF-181	-9.236E-02	7.588E-01	1.334E+00	FAIL ABUN
TA-182	-5.130E-01	1.375E+00	2.418E+00	NOT IDENT.
RE-183	0.000E+00	4.908E+00	1.023E+01	FAIL ABUN
RE-184	6.654E-01	1.987E+00	3.655E+00	NOT IDENT.
W-188	5.778E+01	8.664E+01	1.632E+02	NOT IDENT.
IR-192	6.659E-01	6.758E-01	8.206E-01	FAIL ABUN
HG-203	-7.919E-02	5.077E-01	8.386E-01	NOT IDENT.
TL-204	-6.202E+00	4.083E+01	7.491E+01	NOT IDENT.
BI-207	1.113E+00	7.409E-01	1.334E+00	NOT IDENT.
TL-208	-1.840E-01	4.000E-01	6.824E-01	NOT IDENT.
BI-211	3.326E-01	2.578E+00	4.500E+00	NOT IDENT.
PB-211	1.092E+01	1.440E+01	1.776E+01	FAIL ABUN

BI-212	1.852E+00	5.595E+00	9.925E+00	NOT IDENT.
PB-212	3.060E-03	6.369E-01	1.077E+00	NOT IDENT.
BI-213	8.436E-01	1.625E+00	2.933E+00	NOT IDENT.
BI-214	0.000E+00	2.754E+00	1.317E+00	FAIL ABUN
PB-214	1.165E-01	9.057E-01	1.651E+00	FAIL ABUN
RN-219	9.040E-01	6.320E+00	1.022E+01	NOT IDENT.
RN-222	0.000E+00	2.754E+00	1.317E+00	FAIL ABUN
RA-223	7.453E+00	1.038E+01	1.421E+01	FAIL ABUN
RA-224	3.169E+00	6.601E+00	1.139E+01	NOT IDENT.
AC-225	8.170E-02	1.068E+01	1.812E+01	NOT IDENT.
RA-226	1.165E-01	9.057E-01	1.651E+00	FAIL ABUN
AC-227	1.178E+00	2.967E+00	5.075E+00	NOT IDENT.
TH-227	1.178E+00	2.967E+00	5.075E+00	NOT IDENT.
AC-228	-3.429E-01	2.294E+00	3.599E+00	NOT IDENT.
RA-228	-3.429E-01	2.294E+00	3.599E+00	NOT IDENT.
TH-228	3.060E-03	6.369E-01	1.077E+00	NOT IDENT.
TH-229	-1.668E+00	5.608E+00	9.492E+00	FAIL ABUN
TH-230	1.165E-01	9.057E-01	1.651E+00	FAIL ABUN
PA-231	-5.630E-01	5.532E+00	1.009E+01	NOT IDENT.
TH-231	7.453E+00	1.038E+01	1.421E+01	FAIL ABUN
TH-232	-3.429E-01	2.294E+00	3.599E+00	NOT IDENT.
PA-233	-4.910E-02	7.434E-01	1.357E+00	NOT IDENT.
PA-234	-5.784E-01	4.831E+00	8.578E+00	NOT IDENT.
PA-234M	2.664E+01	6.125E+01	1.131E+02	NOT IDENT.
TH-234	-4.168E+00	1.215E+01	2.233E+01	NOT IDENT.
U-234	1.165E-01	9.057E-01	1.651E+00	FAIL ABUN
U-235	2.538E+00	2.996E+00	3.030E+00	FAIL ABUN
NP-237	-4.910E-02	7.434E-01	1.357E+00	NOT IDENT.
NP-238	0.000E+00	2.175E+03	0.000E+00	SHORT HLIF
U-238	-4.168E+00	1.215E+01	2.233E+01	NOT IDENT.
NP-239	-1.562E+00	2.381E+00	4.140E+00	NOT IDENT.
PU-239	4.034E+03	3.019E+03	5.640E+03	NOT IDENT.
AM-243	-1.655E-01	4.396E-01	7.966E-01	NOT IDENT.
CM-243	6.091E-01	9.287E-01	1.715E+00	NOT IDENT.
BK-247	-7.284E-02	9.183E-01	1.533E+00	NOT IDENT.
CM-247	-1.851E-01	5.792E-01	9.129E-01	NOT IDENT.
CF-249	-7.579E-02	5.585E-01	9.952E-01	NOT IDENT.
CF-251	-3.776E-01	1.200E+00	2.049E+00	NOT IDENT.
ANH-511	3.236E-03	3.801E-01	6.858E-01	NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 2-JAN-2024 14:51:57.15

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	2-Sigma %Error
CO-60	1173.23	2721	99.85	1.195E+00	5.954E+01	6.001E+01	3.98
	1332.49	2344	99.98*	1.066E+00	5.744E+01	5.789E+01	4.32
CD-109	88.03	26	3.70*	5.254E+00	3.501E+00	3.617E+00	320.88
SN-126	64.28	-----	9.60	2.778E+00	-----	Line Not Found	-----
	86.94	26	8.90	5.254E+00	1.456E+00	1.456E+00	320.88
	87.57	26	37.00*	5.254E+00	3.501E-01	3.501E-01	320.88
BA-137M	661.66	9656	89.90*	2.006E+00	1.398E+02	1.400E+02	2.12
CS-137	661.66	9656	85.10*	2.006E+00	1.477E+02	1.479E+02	2.12
BI-210	46.54	4369	4.25*	5.841E-01	4.596E+03	4.604E+03	6.74
PB-210	46.54	4369	4.25*	5.841E-01	4.596E+03	4.604E+03	6.74
AM-241	59.54	15844	35.90*	2.133E+00	5.403E+02	5.404E+02	2.06

Flag: "\*" = Keyline

Total number of lines in spectrum 18  
 Number of unidentified lines 4  
 Number of lines tentatively identified by NID 14 77.78%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/GRAM	Decay Corr pCi/GRAM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	5.27Y	1.01	5.744E+01	5.789E+01	0.250E+01	4.32	
CD-109	461.40D	1.03	3.501E+00	3.617E+00	11.61E+00	320.88	
SN-126	2.30E+05Y	1.00	3.501E-01	3.501E-01	11.23E-01	320.88	
BA-137M	30.08Y	1.00	1.398E+02	1.400E+02	0.030E+02	2.12	
CS-137	30.08Y	1.00	1.477E+02	1.479E+02	0.031E+02	2.12	
BI-210	22.20Y	1.00	4.596E+03	4.604E+03	0.310E+03	6.74	
PB-210	22.20Y	1.00	4.596E+03	4.604E+03	0.310E+03	6.74	
AM-241	432.60Y	1.00	5.403E+02	5.404E+02	0.111E+02	2.06	
Total Activity :			1.008E+04	1.010E+04			

Grand Total Activity : 1.008E+04 1.010E+04

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	142.27	64	457	0.94	283.42	281	8	6.82E-02	****	6.00E+00	T
0	316.10	25	328	0.50	631.17	629	8	2.71E-02	****	3.57E+00	T
0	323.97	40	278	1.08	646.90	645	7	4.41E-02	****	3.51E+00	T
0	346.56	56	291	1.40	692.10	688	8	6.15E-02	****	3.33E+00	T
0	404.07	47	312	3.71	807.16	803	8	5.23E-02	****	2.97E+00	T
0	419.94	77	257	1.33	838.93	835	7	8.65E-02	72.8	2.88E+00	
0	610.59	94	352	6.76	1220.40	1209	27	1.07E-01	****	2.15E+00	T
0	685.62	25	87	1.26	1370.56	1364	10	2.82E-02	****	1.95E+00	T
0	913.60	18	153	2.26	1826.83	1819	11	2.05E-02	****	1.51E+00	
0	1002.57	12	222	6.31	2004.93	1998	19	1.37E-02	****	1.38E+00	T
0	1054.86	32	89	0.53	2109.61	2104	10	3.71E-02	****	1.32E+00	
0	1060.15	24	162	3.22	2120.20	2114	16	2.79E-02	****	1.31E+00	

Flags: "T" = Tentatively associated

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:52:09.51

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
*                               DETECTOR AND SAMPLE DATA                       *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597566.CNF;1 *
* Acquisition date   : 2-JAN-2024 14:35:43 Sensitivity      : 3.000             *
* Detector ID        : GAM06 Energy tolerance: 1.500       *
* Elapsed live time  : 0 00:15:00.00 Abundance limit: 75.000  *
* Elapsed real time  : 0 00:15:02.80 Half life ratio: **** *
* Sample date        : 12-DEC-2023 00:00:00 Nuclide Library: SOLID *
* Sample ID          : G1205597566 Analyst initials: SF1    *
* Batch Number       : 2538164 Sample Quantity: 1.1500E+02 GRAM *
* Wet wt corr        : 1.00000 Wet Weight : 0.00000        *
*                               Dry Weight : 0.00000        *
*****
*                               CALIBRATION INFORMATION                         *
* Eff. Cal. date     : 25-SEP-2023 07:18:20 Eff. Geometry  : CAN             *
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF GAM06 CAN.CNF;22 *
*****

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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)
CO-60	2.516E-01
CD-109	5.649E+00
SN-126	5.498E-01
BA-137M	3.639E-01
CS-137	3.844E-01
BI-210	9.108E+01
PB-210	9.108E+01
AM-241	2.453E+00

---- Non-Identified Nuclides ----

Nuclide	Lc (pCi/GRAM)	Status
BE-7	4.840E+00	NOT IDENT.
NA-22	2.403E-01	NOT IDENT.
NA-24	0.000E+00	SHORT HLIF
AL-26	1.465E-01	NOT IDENT.
K-40	1.151E+00	NOT IDENT.
SC-46	5.123E-01	NOT IDENT.
V-48	1.017E+00	NOT IDENT.
CR-51	4.204E+00	NOT IDENT.
MN-52	2.466E+00	NOT IDENT.
MN-54	3.663E-01	NOT IDENT.
CO-56	4.868E-01	NOT IDENT.
MN-56	0.000E+00	SHORT HLIF
CO-57	1.881E-01	NOT IDENT.
CO-58	4.254E-01	NOT IDENT.
FE-59	1.115E+00	NOT IDENT.
ZN-65	9.950E-01	NOT IDENT.
GE-68	1.380E+01	NOT IDENT.
AS-73	1.951E+01	NOT IDENT.
AS-74	1.148E+00	NOT IDENT.
SE-75	4.265E-01	NOT IDENT.
BR-77	5.342E+02	NOT IDENT.
SR-82	3.529E+00	NOT IDENT.
RB-83	8.072E-01	NOT IDENT.

RB-84	9.309E-01	NOT IDENT.
KR-85	7.242E+01	NOT IDENT.
SR-85	4.109E-01	NOT IDENT.
RB-86	1.110E+01	NOT IDENT.
Y-88	1.519E-01	NOT IDENT.
Y-91	1.452E+02	NOT IDENT.
NB-94	2.713E-01	NOT IDENT.
NB-95	3.958E-01	NOT IDENT.
NB-95M	1.119E+00	NOT IDENT.
ZR-95	6.818E-01	NOT IDENT.
NB-97	0.000E+00	SHORT HLIF
ZR-97	0.000E+00	SHORT HLIF
MO-99	4.883E+02	NOT IDENT.
TC-99M	0.000E+00	SHORT HLIF
RH-101	2.325E-01	FAIL ABUN
RH-102	5.466E-01	NOT IDENT.
RU-103	5.270E-01	FAIL ABUN
RH-106	3.013E+00	NOT IDENT.
RU-106	3.013E+00	NOT IDENT.
AG-108M	4.006E-01	NOT IDENT.
AG-110	7.885E+00	NOT IDENT.
AG-110M	6.040E-01	NOT IDENT.
SN-113	5.268E-01	NOT IDENT.
CD-115	9.010E+02	NOT IDENT.
SN-117M	5.750E-01	NOT IDENT.
SB-122	9.899E+01	NOT IDENT.
TE-123M	2.251E-01	NOT IDENT.
SB-124	4.809E-01	NOT IDENT.
SB-125	1.197E+00	NOT IDENT.
TE-125M	8.167E+01	NOT IDENT.
I-126	2.772E+00	NOT IDENT.
SB-126	1.942E+00	NOT IDENT.
SB-127	3.734E+01	FAIL ABUN
I-131	2.182E+00	NOT IDENT.
I-132	0.000E+00	SHORT HLIF
TE-132	2.755E+01	NOT IDENT.
BA-133	4.608E-01	NOT IDENT.
I-133	0.000E+00	SHORT HLIF
CS-134	3.575E-01	NOT IDENT.
I-135	0.000E+00	SHORT HLIF
CS-136	1.628E+00	NOT IDENT.
LA-138	2.230E-01	NOT IDENT.
CE-139	2.122E-01	NOT IDENT.
BA-140	3.992E+00	NOT IDENT.
LA-140	6.170E-01	NOT IDENT.
CE-141	5.287E-01	NOT IDENT.
CE-143	0.000E+00	SHORT HLIF
CE-144	1.493E+00	NOT IDENT.
PM-144	2.738E-01	NOT IDENT.
PR-144	2.062E+01	NOT IDENT.
PM-146	5.910E-01	NOT IDENT.
ND-147	8.505E+00	NOT IDENT.
PM-147	5.513E+03	NOT IDENT.
PM-149	6.754E+03	NOT IDENT.
EU-150	2.675E-01	NOT IDENT.
EU-152	1.003E+00	NOT IDENT.
GD-153	6.711E-01	NOT IDENT.
EU-154	6.723E-01	NOT IDENT.
EU-155	7.934E-01	FAIL ABUN
TB-160	1.661E+00	FAIL ABUN
HO-166M	5.169E-01	NOT IDENT.
TM-171	4.034E+02	NOT IDENT.
HF-172	1.506E+00	NOT IDENT.
LU-172	7.078E-01	FAIL ABUN
LU-176	2.549E-01	FAIL ABUN
HF-181	6.429E-01	FAIL ABUN
TA-182	1.080E+00	NOT IDENT.
RE-183	5.052E+00	FAIL ABUN
RE-184	1.735E+00	NOT IDENT.
W-188	7.874E+01	NOT IDENT.
IR-192	3.957E-01	FAIL ABUN
HG-203	4.041E-01	NOT IDENT.
TL-204	3.620E+01	NOT IDENT.
BI-207	6.312E-01	NOT IDENT.
TL-208	3.226E-01	NOT IDENT.
BI-211	2.167E+00	NOT IDENT.
PB-211	8.564E+00	FAIL ABUN
BI-212	4.678E+00	NOT IDENT.

PB-212 5.203E-01 NOT IDENT.  
 BI-213 1.418E+00 NOT IDENT.  
 BI-214 6.226E-01 FAIL ABUN  
 PB-214 7.954E-01 FAIL ABUN  
 RN-219 4.930E+00 NOT IDENT.  
 RN-222 6.226E-01 FAIL ABUN  
 RA-223 6.855E+00 FAIL ABUN  
 RA-224 5.498E+00 NOT IDENT.  
 AC-225 8.767E+00 NOT IDENT.  
 RA-226 7.954E-01 FAIL ABUN  
 AC-227 2.449E+00 NOT IDENT.  
 TH-227 2.449E+00 NOT IDENT.  
 AC-228 1.710E+00 NOT IDENT.  
 RA-228 1.710E+00 NOT IDENT.  
 TH-228 5.203E-01 NOT IDENT.  
 TH-229 4.589E+00 FAIL ABUN  
 TH-230 7.954E-01 FAIL ABUN  
 PA-231 4.867E+00 NOT IDENT.  
 TH-231 6.855E+00 FAIL ABUN  
 TH-232 1.710E+00 NOT IDENT.  
 PA-233 6.530E-01 NOT IDENT.  
 PA-234 4.089E+00 NOT IDENT.  
 PA-234M 5.353E+01 NOT IDENT.  
 TH-234 1.080E+01 NOT IDENT.  
 U-234 7.954E-01 FAIL ABUN  
 U-235 1.461E+00 FAIL ABUN  
 NP-237 6.530E-01 NOT IDENT.  
 NP-238 0.000E+00 SHORT HLIF  
 U-238 1.080E+01 NOT IDENT.  
 NP-239 1.998E+00 NOT IDENT.  
 PU-239 2.729E+03 NOT IDENT.  
 AM-243 3.854E-01 NOT IDENT.  
 CM-243 8.293E-01 NOT IDENT.  
 BK-247 7.374E-01 NOT IDENT.  
 CM-247 4.400E-01 NOT IDENT.  
 CF-249 4.802E-01 NOT IDENT.  
 CF-251 9.867E-01 NOT IDENT.  
 ANH-511 3.287E-01 NOT IDENT.

VAX/VMS Nuclide Identification Report Generated 02-JAN-2024 14:52:13.17

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*****
*
* GEL Laboratories LLC
* 2040 Savage Road
* Charleston, SC 29407
*****
*
* DETECTOR AND SAMPLE DATA
*
* Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1205597566.CNF;1
* Acquisition date : 2-JAN-2024 14:35:43 Sensitivity : 3.000
* Detector ID : GAM06 Energy tolerance: 1.500
* Elapsed live time: 0 00:15:00.00 Abundance limit : 75.000
* Elapsed real time: 0 00:15:02.80 Half life ratio : ****
* Sample date : 12-DEC-2023 00:00:00 Nuclide Library : SOLID
* Sample ID : G1205597566 Analyst initials: SF1
* Batch Number : 2538164 Sample Quantity : 1.1500E+02 GRAM
* Wet wt corr : 1.00000 Wet Weight : 0.00000
* Dry Weight : 0.00000
*****
*
* CALIBRATION INFORMATION
*
* Eff. Cal. date : 25-SEP-2023 07:18:20 Eff. Geometry : CAN
* Eff. File : DKA100:[CANBERRA.GAMMA]EFF.GAM06.CAN.CNF;22
*****
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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)
CO-60	5.789E+01	5.716E+00	5.716E+00
CD-109	3.617E+00	1.138E+01	1.138E+01
SN-126	3.501E-01	1.101E+00	1.101E+00
BA-137M	1.400E+02	1.244E+01	1.244E+01
CS-137	1.479E+02	1.313E+01	1.313E+01
BI-210	4.604E+03	5.688E+02	5.688E+02
PB-210	4.604E+03	5.688E+02	5.688E+02
AM-241	5.404E+02	5.491E+01	5.491E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/GRAM)	K.L Act error (1.96-sigma)	TPU (1.96-sigma)	
BE-7	-9.546E-01	5.745E+00	5.761E+00	NOT IDENT.
NA-22	6.946E-02	2.791E-01	2.809E-01	NOT IDENT.
NA-24	-1.717E+09	4.958E+09	5.018E+09	SHORT HLIF
AL-26	-4.778E-02	1.892E-01	1.904E-01	NOT IDENT.
K-40	-9.130E-01	1.653E+00	1.703E+00	NOT IDENT.
SC-46	4.283E-01	5.727E-01	6.044E-01	NOT IDENT.
V-48	-1.267E-01	1.207E+00	1.208E+00	NOT IDENT.
CR-51	2.051E+00	5.636E+00	5.711E+00	NOT IDENT.
MN-52	-3.804E-01	3.124E+00	3.129E+00	NOT IDENT.
MN-54	1.997E-01	4.112E-01	4.209E-01	NOT IDENT.
CO-56	4.008E-01	5.416E-01	5.709E-01	NOT IDENT.
MN-56	1.000E+41	1.354E+41	0.000E+00	SHORT HLIF
CO-57	-2.112E-01	2.286E-01	2.476E-01	NOT IDENT.
CO-58	3.724E-01	4.673E-01	4.965E-01	NOT IDENT.
FE-59	9.828E-02	1.321E+00	1.322E+00	NOT IDENT.
ZN-65	1.522E-01	1.177E+00	1.179E+00	NOT IDENT.
GE-68	-7.631E+00	1.700E+01	1.734E+01	NOT IDENT.
AS-73	-1.652E+01	2.210E+01	2.332E+01	NOT IDENT.
AS-74	-1.438E-01	1.393E+00	1.394E+00	NOT IDENT.
SE-75	-2.521E-02	5.301E-01	5.302E-01	NOT IDENT.
BR-77	-1.556E+02	6.689E+02	6.726E+02	NOT IDENT.
SR-82	-1.370E-01	4.379E+00	4.380E+00	NOT IDENT.

RB-83	8.106E-02	9.545E-01	9.552E-01	NOT IDENT.
RB-84	-2.692E-01	1.102E+00	1.108E+00	NOT IDENT.
KR-85	-5.908E+01	8.929E+00	9.318E+01	NOT IDENT.
SR-85	-3.348E-01	5.066E-01	5.286E-01	NOT IDENT.
RB-86	4.244E-01	1.316E+01	1.316E+01	NOT IDENT.
Y-88	5.070E-02	1.611E-01	1.627E-01	NOT IDENT.
Y-91	1.934E+01	1.723E+02	1.725E+02	NOT IDENT.
NB-94	4.313E-02	3.283E-01	3.288E-01	NOT IDENT.
NB-95	1.107E-01	4.797E-01	4.823E-01	NOT IDENT.
NB-95M	-1.010E+00	1.425E+00	1.496E+00	NOT IDENT.
ZR-95	2.043E-01	8.230E-01	8.282E-01	NOT IDENT.
NB-97	-1.000E+41	3.312E+41	0.000E+00	SHORT HLIF
ZR-97	4.336E+09	1.258E+10	1.274E+10	SHORT HLIF
MO-99	-1.038E+02	6.121E+02	6.139E+02	NOT IDENT.
TC-99M	-3.872E+24	1.984E+25	0.000E+00	SHORT HLIF
RH-101	-2.871E-01	2.886E-01	3.163E-01	FAIL ABUN
RH-102	5.183E-02	6.582E-01	6.586E-01	NOT IDENT.
RU-103	-1.271E-02	6.241E-01	6.241E-01	FAIL ABUN
RH-106	-1.413E-01	3.653E+00	3.654E+00	NOT IDENT.
RU-106	-1.413E-01	3.653E+00	3.654E+00	NOT IDENT.
AG-108M	7.573E-02	4.649E-01	4.661E-01	NOT IDENT.
AG-110	-7.452E+00	1.144E+01	1.192E+01	NOT IDENT.
AG-110M	-3.007E-01	7.229E-01	7.355E-01	NOT IDENT.
SN-113	-2.660E-01	6.216E-01	6.331E-01	NOT IDENT.
CD-115	-6.845E+02	1.114E+03	1.156E+03	NOT IDENT.
SN-117M	-3.802E-01	7.004E-01	7.210E-01	NOT IDENT.
SB-122	4.365E+01	1.156E+02	1.173E+02	NOT IDENT.
TE-123M	-1.319E-02	2.678E-01	2.678E-01	NOT IDENT.
SB-124	1.695E-01	5.232E-01	5.287E-01	NOT IDENT.
SB-125	-6.621E-01	1.425E+00	1.456E+00	NOT IDENT.
TE-125M	3.551E+00	9.409E+01	9.410E+01	NOT IDENT.
I-126	9.284E-05	3.792E+00	3.792E+00	NOT IDENT.
SB-126	1.058E+00	2.301E+00	2.350E+00	NOT IDENT.
SB-127	4.410E+01	6.318E+01	6.624E+01	FAIL ABUN
I-131	-1.759E+00	2.591E+00	2.710E+00	NOT IDENT.
I-132	1.000E+41	4.102E+41	0.000E+00	SHORT HLIF
TE-132	-3.187E+00	3.385E+01	3.388E+01	NOT IDENT.
BA-133	-1.538E-01	5.355E-01	5.400E-01	NOT IDENT.
I-133	2.717E+06	1.263E+07	1.269E+07	SHORT HLIF
CS-134	-4.156E-01	4.441E-01	4.820E-01	NOT IDENT.
I-135	-2.978E+22	4.479E+23	0.000E+00	SHORT HLIF
CS-136	6.469E-01	1.945E+00	1.967E+00	NOT IDENT.
LA-138	-2.075E-01	3.320E-01	3.449E-01	NOT IDENT.
CE-139	-2.761E-01	2.731E-01	3.001E-01	NOT IDENT.
BA-140	-2.965E-01	4.775E+00	4.777E+00	NOT IDENT.
LA-140	2.072E-01	6.737E-01	6.801E-01	NOT IDENT.
CE-141	4.997E-01	6.447E-01	6.829E-01	NOT IDENT.
CE-143	7.579E+03	3.463E+04	3.479E+04	SHORT HLIF
CE-144	-1.223E+00	1.805E+00	1.887E+00	NOT IDENT.
PM-144	-7.197E-03	3.356E-01	3.356E-01	NOT IDENT.
PR-144	-1.551E-01	2.523E+01	2.523E+01	NOT IDENT.
PM-146	7.314E-02	6.903E-01	6.911E-01	NOT IDENT.
ND-147	-6.999E+00	1.057E+01	1.103E+01	NOT IDENT.
PM-147	9.286E+02	6.367E+03	6.381E+03	NOT IDENT.
PM-149	3.163E+03	8.275E+03	8.396E+03	NOT IDENT.
EU-150	-6.505E-02	3.083E-01	3.097E-01	NOT IDENT.
EU-152	-2.699E-01	1.291E+00	1.297E+00	NOT IDENT.
GD-153	4.870E-01	7.500E-01	7.815E-01	NOT IDENT.
EU-154	1.021E-01	7.966E-01	7.979E-01	NOT IDENT.
EU-155	-3.281E-01	9.269E-01	9.386E-01	FAIL ABUN
TB-160	-5.685E-02	1.939E+00	1.939E+00	FAIL ABUN
HO-166M	-2.236E-01	6.533E-01	6.610E-01	NOT IDENT.
TM-171	4.181E+01	4.440E+02	4.444E+02	NOT IDENT.
HF-172	1.029E+00	1.722E+00	1.783E+00	NOT IDENT.
LU-172	5.535E-02	8.388E-01	8.391E-01	FAIL ABUN
IU-176	-3.605E-01	3.054E-01	3.459E-01	FAIL ABUN
HF-181	-1.236E-02	7.588E-01	7.588E-01	FAIL ABUN
TA-182	-5.130E-01	1.375E+00	1.395E+00	NOT IDENT.
RE-183	4.636E+01	7.561E+00	2.223E+01	FAIL ABUN
RE-184	6.654E-01	1.988E+00	2.011E+00	NOT IDENT.
W-188	5.778E+01	8.695E+01	9.077E+01	NOT IDENT.
IR-192	2.659E-01	6.761E-01	6.866E-01	FAIL ABUN
HG-203	-7.919E-02	5.078E-01	5.090E-01	NOT IDENT.
TL-204	-6.202E+00	4.084E+01	4.093E+01	NOT IDENT.
BI-207	1.113E+00	7.473E-01	9.002E-01	NOT IDENT.
TL-208	-1.840E-01	4.004E-01	4.089E-01	NOT IDENT.
BI-211	3.326E-01	2.578E+00	2.583E+00	NOT IDENT.
PB-211	1.092E+01	1.443E+01	1.524E+01	FAIL ABUN

BI-212	1.852E+00	5.598E+00	5.660E+00	NOT IDENT.
PB-212	3.060E-03	6.369E-01	6.369E-01	NOT IDENT.
BI-213	8.436E-01	1.626E+00	1.670E+00	NOT IDENT.
BI-214	2.522E+00	2.763E+00	2.987E+00	FAIL ABUN
PB-214	1.165E-01	9.058E-01	9.073E-01	FAIL ABUN
RN-219	9.040E-01	6.321E+00	6.334E+00	NOT IDENT.
RN-222	2.522E+00	2.763E+00	2.987E+00	FAIL ABUN
RA-223	7.453E+00	1.040E+01	1.093E+01	FAIL ABUN
RA-224	3.169E+00	6.606E+00	6.759E+00	NOT IDENT.
AC-225	8.170E-02	1.068E+01	1.068E+01	NOT IDENT.
RA-226	1.165E-01	9.058E-01	9.073E-01	FAIL ABUN
AC-227	1.178E+00	2.972E+00	3.019E+00	NOT IDENT.
TH-227	1.178E+00	2.972E+00	3.019E+00	NOT IDENT.
AC-228	-3.429E-01	2.294E+00	2.299E+00	NOT IDENT.
RA-228	-3.429E-01	2.294E+00	2.299E+00	NOT IDENT.
TH-228	3.060E-03	6.369E-01	6.369E-01	NOT IDENT.
TH-229	-1.668E+00	5.610E+00	5.660E+00	FAIL ABUN
TH-230	1.165E-01	9.058E-01	9.073E-01	FAIL ABUN
PA-231	-5.630E-01	5.533E+00	5.539E+00	NOT IDENT.
TH-231	7.453E+00	1.040E+01	1.093E+01	FAIL ABUN
TH-232	-3.429E-01	2.294E+00	2.299E+00	NOT IDENT.
PA-233	-4.910E-02	7.434E-01	7.437E-01	NOT IDENT.
PA-234	-5.784E-01	4.876E+00	4.883E+00	NOT IDENT.
PA-234M	2.664E+01	6.130E+01	6.247E+01	NOT IDENT.
TH-234	-4.168E+00	1.219E+01	1.233E+01	NOT IDENT.
U-234	1.165E-01	9.058E-01	9.073E-01	FAIL ABUN
U-235	2.538E+00	3.002E+00	3.213E+00	FAIL ABUN
NP-237	-4.910E-02	7.434E-01	7.437E-01	NOT IDENT.
NP-238	3.985E+02	2.175E+03	2.182E+03	SHORT HLIF
U-238	-4.168E+00	1.219E+01	1.233E+01	NOT IDENT.
NP-239	-1.562E+00	2.386E+00	2.488E+00	NOT IDENT.
PU-239	4.034E+03	3.034E+03	3.537E+03	NOT IDENT.
AM-243	-1.655E-01	4.398E-01	4.461E-01	NOT IDENT.
CM-243	6.091E-01	9.311E-01	9.707E-01	NOT IDENT.
BK-247	-7.284E-02	9.185E-01	9.191E-01	NOT IDENT.
CM-247	-1.851E-01	5.802E-01	5.862E-01	NOT IDENT.
CF-249	-7.579E-02	5.585E-01	5.596E-01	NOT IDENT.
CF-251	-3.776E-01	1.201E+00	1.213E+00	NOT IDENT.
ANH-511	3.236E-03	3.801E-01	3.801E-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	1363.5370	85.43	291.2866	131.20	269.9959
45.60	1320.9664	86.55	318.6313	133.02	260.9363
46.54	1326.2792	86.79	285.1479	133.52	271.2401
49.72	1181.4261	86.94	285.2660	136.00	261.4503
51.35	1176.5658	87.09	285.3817	136.47	247.5421
51.87	1198.3231	87.57	298.4129	140.51	247.0878
52.39	1241.1434	88.03	298.7831	143.76	254.0623
52.97	1271.4634	88.34	299.0323	144.24	244.7193
53.44	1307.0135	88.47	299.1355	145.44	204.1566
54.07	1337.8146	89.96	303.3575	152.43	246.6484
57.36	0.0000	90.64	316.0577	153.25	239.7108
57.53	1456.7721	91.11	279.9358	154.21	251.6019
57.98	891.4918	92.59	271.2422	156.02	229.3592
59.27	895.6485	93.35	280.9545	158.56	258.7737
59.32	895.8093	94.56	292.8797	159.00	241.0727
59.54	896.5145	94.65	292.9476	162.33	239.2698
60.96	296.7300	94.67	292.9622	162.66	225.6332
61.17	266.9202	94.87	300.4840	163.32	197.2560
62.93	307.7161	97.43	262.5359	165.86	233.2389
63.29	299.1324	98.43	258.5401	176.31	240.4819
63.58	281.7655	98.44	258.5464	176.60	241.6741
64.28	249.5541	99.53	304.0009	177.52	235.5160
66.73	287.2995	100.11	276.4183	181.07	272.8443
67.24	273.3075	102.03	280.5224	181.52	276.3095
67.68	265.1729	103.18	254.0149	184.41	303.8733
67.75	265.2322	103.37	251.3066	185.72	259.4142
68.89	272.2040	105.21	268.4753	193.51	294.7122
69.67	286.6159	105.31	277.9937	197.03	279.4685
70.82	279.9069	106.12	281.3651	198.01	275.3912
70.83	279.9168	106.47	246.5152	201.83	269.0282
72.81	296.3824	109.28	279.6121	203.43	289.9485
72.87	296.4372	111.00	273.0431	205.31	279.4090
74.66	308.5238	111.76	267.7546	210.85	270.1726
74.82	297.3369	114.06	245.9807	215.65	251.2973
74.97	319.2811	116.30	278.2174	218.12	290.1292
77.11	286.2126	116.74	280.4252	222.11	285.8877
78.74	320.2283	119.76	245.1440	227.09	288.9259
79.69	302.5351	121.12	233.1191	227.38	293.6975
80.03	305.4837	121.22	233.1700	228.16	279.9939
80.12	305.5679	121.78	256.9868	228.18	280.0012
80.19	305.6311	122.06	272.8397	235.69	285.0597
80.57	301.5285	122.92	234.0052	235.96	285.1557
81.00	308.1150	123.07	234.0779	238.63	260.1053
81.07	308.1785	123.68	254.0731	238.98	268.4957
81.75	278.5197	125.81	249.2603	240.99	234.7806
82.47	293.3570	127.23	287.6813	242.00	245.7620
83.79	280.1220	127.91	282.1214	244.70	243.0064
84.00	275.8094	129.30	233.1047	252.40	234.4576

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
252.80	242.9912	351.06	219.5841	569.33	110.6884
254.15	0.0000	351.93	224.0273	569.50	110.7013
256.23	231.9053	355.39	0.0000	569.70	114.8922
260.90	236.8172	356.01	241.8115	583.19	112.6731
264.66	218.3365	364.49	234.6621	584.27	106.4248
264.80	218.3693	366.42	206.2454	595.83	112.4611
265.00	218.4239	372.51	217.3096	600.60	126.6070
269.46	271.0501	375.05	213.2508	602.52	0.0000
270.03	224.5894	377.52	231.8927	604.72	94.3806
271.23	200.3127	383.85	245.0396	607.14	103.5914
273.65	218.1117	388.16	256.0281	609.32	103.7216
276.40	215.0733	388.63	222.1632	610.33	103.7848
277.37	237.5742	391.69	239.3013	614.28	104.0177
277.60	217.8354	400.66	232.2751	618.01	128.9600
278.00	217.9321	401.81	243.6317	620.36	100.0764
279.20	239.3004	402.40	252.1064	621.93	100.1635
279.54	226.9852	404.85	241.4440	630.19	0.0000
279.70	227.0243	410.95	262.7400	631.29	105.0241
280.46	225.9726	413.71	230.5249	633.25	93.2157
283.69	236.7404	414.70	240.0833	634.78	116.0778
284.31	239.3906	423.72	245.9528	635.95	116.1518
285.41	225.9462	427.09	273.6892	636.99	94.4978
285.90	208.5818	427.87	287.1201	657.50	146.6403
287.50	241.8850	433.94	269.4292	657.76	146.6620
290.67	222.6245	439.40	276.2881	657.90	0.0000
293.27	0.0000	440.45	255.4567	661.66	115.5957
295.22	229.5884	453.88	281.2372	664.57	0.0000
295.96	231.4494	463.37	316.2852	666.33	87.7424
298.58	253.1799	468.07	314.4335	666.50	77.8151
299.98	218.0549	473.00	286.1484	667.71	0.0000
300.09	221.4623	475.06	285.5887	677.62	65.5083
300.13	221.4676	476.78	286.9207	685.70	56.8645
301.36	250.5329	477.60	272.3394	692.65	77.2123
302.85	267.8723	482.18	237.7100	695.00	78.4281
304.50	196.1470	487.02	199.9205	696.49	68.3967
304.85	194.5186	492.35	201.6536	696.51	68.3967
306.78	248.5256	497.08	184.3714	697.00	66.1709
308.46	231.0491	505.52	180.4211	697.30	63.9371
311.90	220.7319	507.63	0.0000	697.49	66.1877
316.51	215.7338	511.00	158.9515	702.65	68.6126
319.41	199.1172	514.00	183.4663	706.68	96.9320
320.08	179.4102	514.00	183.4663	711.68	83.6173
321.04	220.1575	520.40	145.7754	720.70	78.3213
323.87	183.1089	520.69	139.7295	721.93	0.0000
325.23	241.8658	522.65	0.0000	722.78	92.0380
328.76	225.4711	527.90	158.7041	722.91	82.9537
333.37	206.2023	528.26	168.9112	723.31	81.8320
333.97	213.3114	529.59	131.3778	724.19	96.6522
334.37	211.6466	529.87	0.0000	727.33	80.8573
338.28	231.7412	531.02	146.7891	733.00	76.5173
338.32	231.7520	537.26	139.1930	735.93	75.4827
340.48	190.8816	546.56	0.0000	737.46	77.8281
340.55	190.8904	552.55	138.4819	739.50	60.7205
344.28	219.8051	563.25	111.3190	744.23	81.5304
345.93	206.8828	564.24	102.0155	747.24	67.8490

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
748.06	75.9312	954.55	0.0000	1408.01	9.8553
752.31	66.8643	962.31	115.4882	1434.09	8.8237
753.82	70.3724	964.08	115.5664	1435.80	11.0345
756.73	68.1611	966.17	125.1398	1457.56	0.0000
756.80	72.7848	968.97	94.9066	1460.82	6.6658
763.94	88.1038	983.53	87.8026	1489.16	5.5969
765.81	76.5784	984.45	0.0000	1505.03	2.2482
766.42	76.5999	996.26	112.0129	1584.12	7.3410
766.84	65.0075	1001.03	92.2295	1596.21	5.5225
772.60	0.0000	1002.74	92.2881	1620.50	7.4074
776.52	72.3005	1004.73	92.3584	1621.92	3.7049
777.92	77.8913	1021.30	0.0000	1678.03	0.0000
778.90	76.1754	1025.87	0.0000	1690.97	4.7087
783.70	72.8352	1028.54	0.0000	1750.46	0.0000
788.74	81.8007	1037.84	84.7273	1764.49	5.7473
792.07	74.8808	1038.76	0.0000	1770.23	1.9183
795.86	93.5425	1046.59	86.9521	1771.35	1.9188
801.95	90.2648	1048.07	74.8469	1791.20	0.0000
1093.63	80.8247	1049.04	76.6630	1808.65	5.8046
810.29	71.0620	1050.41	84.5279	1810.72	0.0000
810.45	71.0693	1063.66	61.3374	1836.06	1.9466
810.76	70.1906	1077.00	82.9592		
815.77	82.8139	1077.34	91.8591		
818.51	91.8318	1085.87	81.2393		
832.01	94.1789	1093.63	82.4529		
834.85	76.3361	1099.45	86.6017		
835.71	67.3805	1112.07	100.9753		
836.80	0.0000	1112.84	84.0000		
846.75	0.0000	1115.54	92.0842		
846.77	92.9823	1120.29	67.1718		
856.80	97.9211	1120.55	67.1758		
860.56	81.7328	1121.30	68.1951		
871.09	88.4865	1129.67	61.3500		
873.19	103.1718	1131.51	0.0000		
875.33	0.0000	1147.95	0.0000		
879.38	109.8523	1173.23	43.8766		
880.51	108.0718	1177.95	29.4328		
881.60	115.4526	1189.05	33.8459		
883.24	107.2774	1204.77	29.8939		
884.68	123.8557	1221.41	29.0151		
889.28	97.4373	1231.02	11.4337		
894.76	95.8179	1235.36	14.5717		
898.04	110.7092	1238.28	15.6262		
900.72	90.5112	1260.41	0.0000		
903.28	108.1736	1271.87	23.1575		
911.20	124.6629	1274.44	16.8545		
912.08	121.5532	1274.54	15.8020		
923.98	0.0000	1291.59	11.6479		
926.50	139.0645	1298.22	0.0000		
929.11	118.6555	1312.11	12.7844		
935.54	125.5187	1332.49	19.2920		
937.49	115.3050	1362.66	0.0000		
944.13	116.5490	1365.19	5.4095		
946.00	142.9685	1368.63	0.0000		
949.00	141.2567	1384.29	4.3511		

## Continuing Calibration Data

Review of Gamma Spectrometer QA results (Daily calibration & background checks)  
02-JAN-2024 12:50:34

Run Date	Detector	Parameter	Flag	Status	Comments
02-JAN-24	GAM01	Cal Check NLACTION-662	Investigate		
02-JAN-24	GAM02	All Parameters Passed			
02-JAN-24	GAM03	All Parameters Passed			
02-JAN-24	GAM04	All Parameters Passed			
02-JAN-24	GAM05	All Parameters Passed			
02-JAN-24	GAM06	All Parameters Passed			
02-JAN-24	GAM07	All Parameters Passed			
26-DEC-23	GAM08	Cal Check may not have run since 2-JAN-2024			Detector locked out.
24-DEC-23	GAM08	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	GAM11	Cal Check PSENERGY-1332	Below		Detector locked out.
02-JAN-24	GAM12	Cal Check NLACTION-59	Investigate		
02-JAN-24	GAM12	Cal Check NLACTION-1332	Investigate		
02-JAN-24	GAM14	Cal Check NLACTION-59	Investigate		
02-JAN-24	GAM16	All Parameters Passed			
02-JAN-24	GAM18	All Parameters Passed			
02-JAN-24	GAM19	Cal Check PSFWM-1332	Investigate		
02-JAN-24	GAM19	Cal Check NLACTION-662	Investigate		
02-JAN-24	GAM20	All Parameters Passed			
02-JAN-24	GAM21	All Parameters Passed			
	GAM22	Cal Check may not have run since 2-JAN-2024			Detector locked out.
24-DEC-23	GAM22	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	GAM23	All Parameters Passed			
02-JAN-24	GAM24	All Parameters Passed			
02-JAN-24	GAM27	All Parameters Passed			
02-JAN-24	GAM29	Cal Check PSENERGY-1332	Above		Detector locked out.
18-DEC-23	GAM30	Cal Check may not have run since 2-JAN-2024			Detector locked out.
16-DEC-23	GAM30	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	GAM31	All Parameters Passed			
02-JAN-24	GAM32	Cal Check NLACTION-662	Investigate		
02-JAN-24	GAM38	All Parameters Passed			
02-JAN-24	GAM40	All Parameters Passed			
31-DEC-23	GAM41	Cal Check may not have run since 2-JAN-2024			Detector locked out.
31-DEC-23	GAM41	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	GAM43	All Parameters Passed			
18-MAY-23	GAM44	Cal Check may not have run since 2-JAN-2024			Detector locked out.
21-MAY-23	GAM44	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	GAM46	All Parameters Passed			
02-JAN-24	GAM47	All Parameters Passed			
02-JAN-24	GAM48	All Parameters Passed			

02-JAN-24	GAM50	All Parameters Passed			
02-JAN-24	GAM52	All Parameters Passed			
02-JAN-24	GAM53	All Parameters Passed			
02-JAN-24	GAM56	Cal Check PSFWM-59	Investigate		
02-JAN-24	GAM61	All Parameters Passed			
31-DEC-23	XRAY1	Cal Check may not have run since 2-JAN-2024			Detector locked out.
31-DEC-23	XRAY1	Bkg Check may not have run since 2-JAN-2024			Detector locked out.
02-JAN-24	XRAY2	All Parameters Passed			
02-JAN-24	XRAY3	All Parameters Passed			
02-JAN-24	XRAY6	Cal Check PSFWM-29	Investigate		
02-JAN-24	XRAY7	All Parameters Passed			

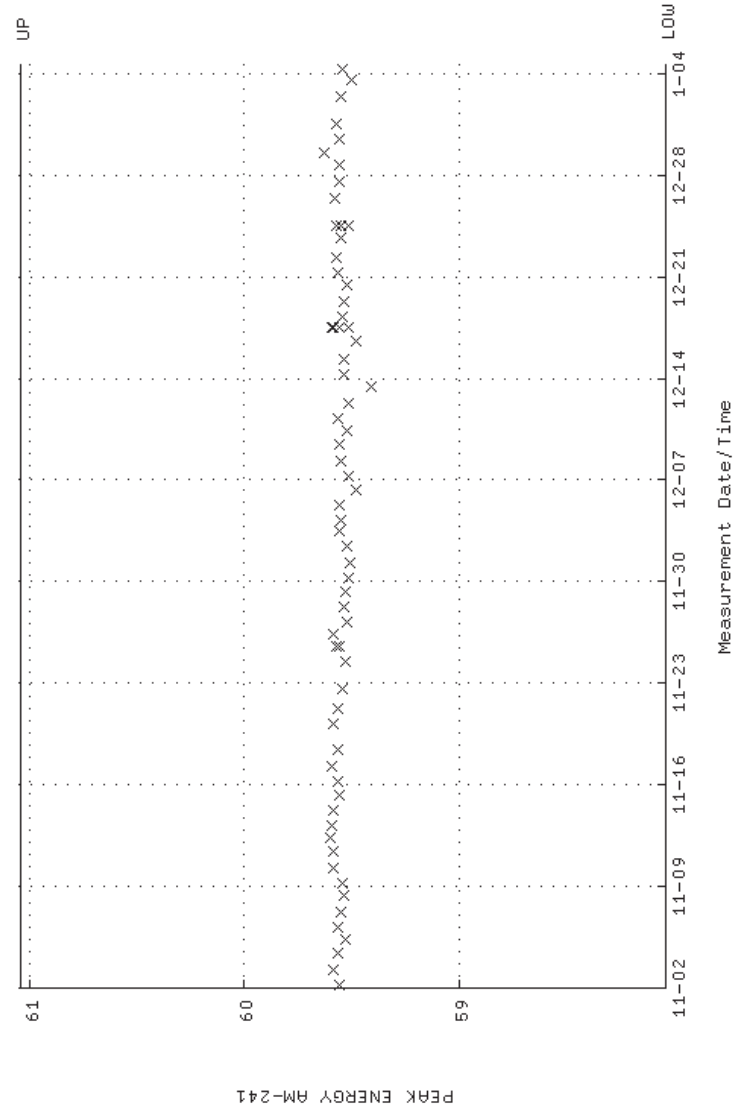
APPROVAL DATE: 02-JAN-2024 APPROVAL TIME: 14:27:15

APPROVED BY: Smith Fenner PROCEDURE # GL-RAD-I-001

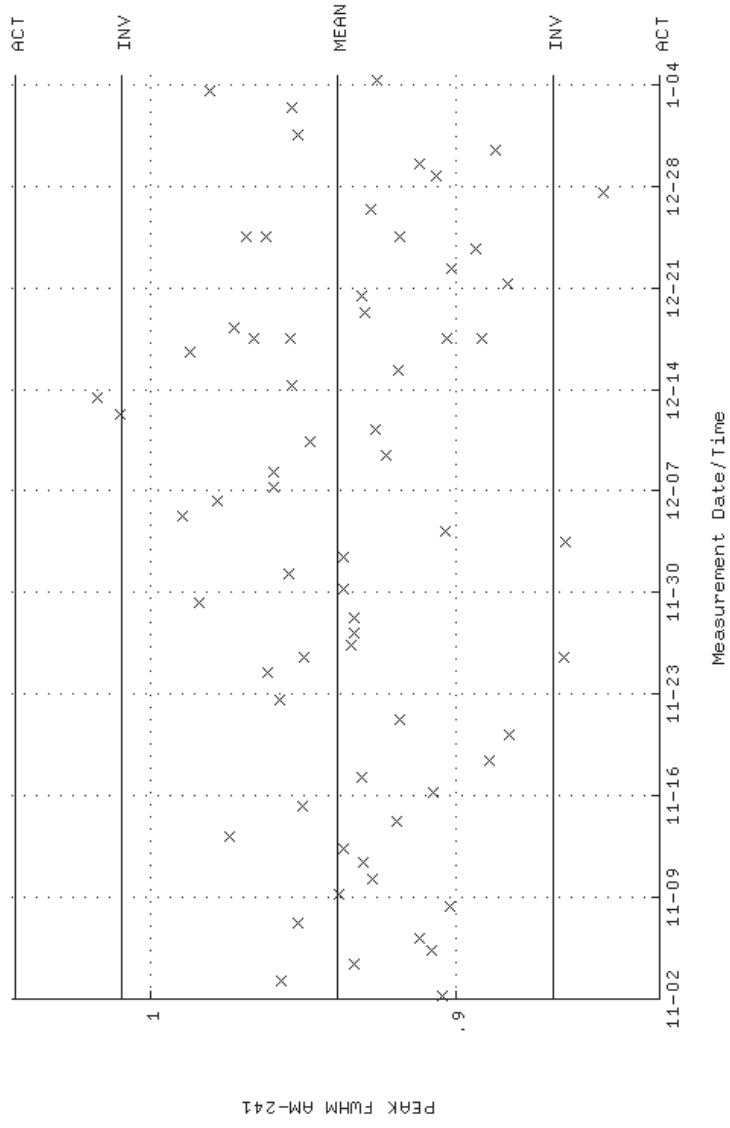
The Investigate flag does not indicate a lockout and is approved for use. Action flags that have not been approved are locked out of service.

# Background and Efficiency Data

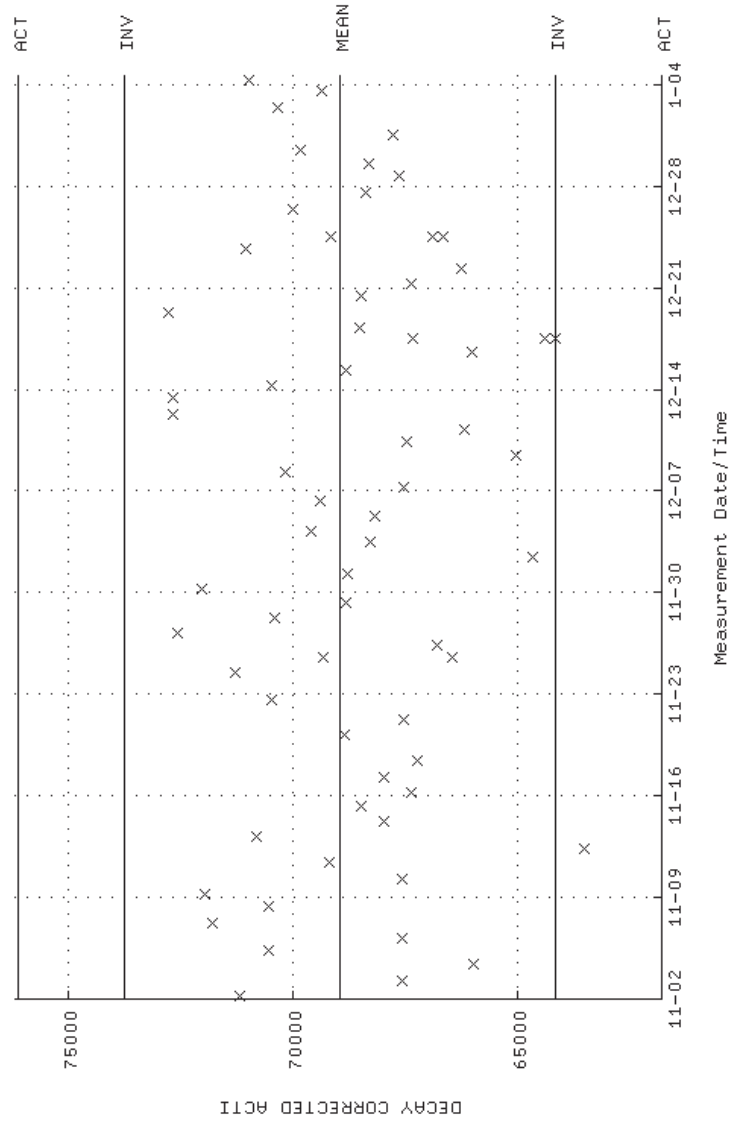
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM02\_JAR.QAF;1  
Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
Start/End Dates : 2-NOV-2023 05:17:39 through 4-JAN-2024 12:00:00  
Lower/Upper Lmts: 58.0400 through 61.0400



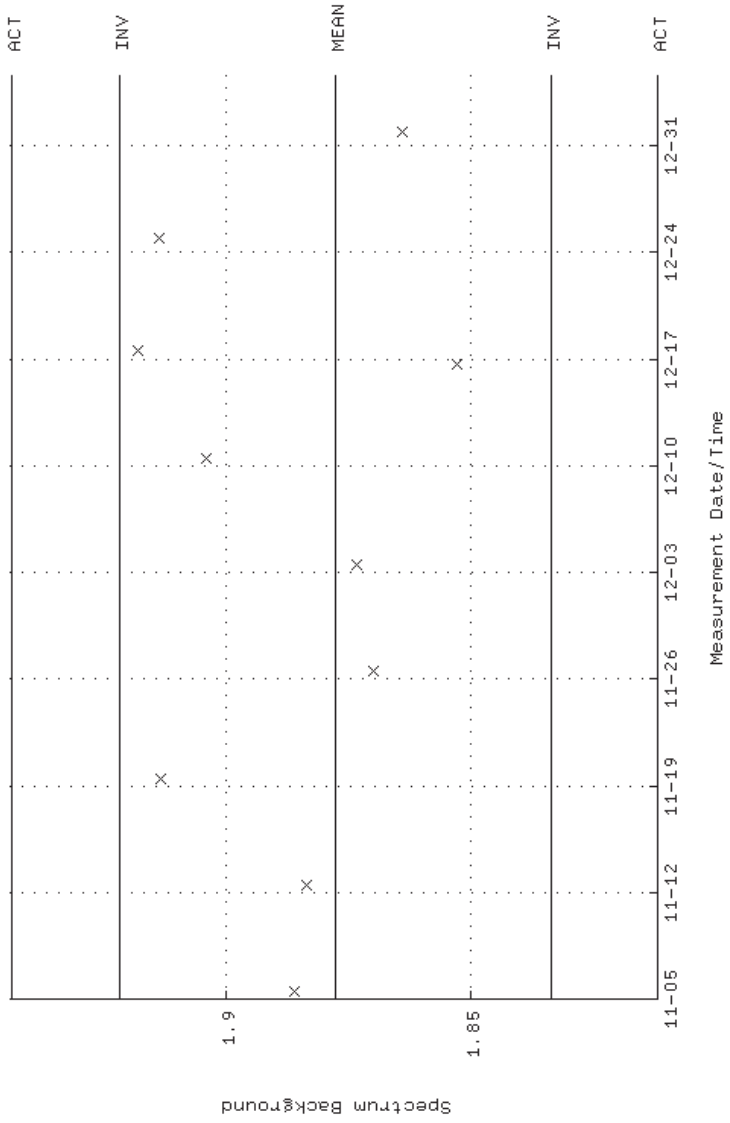
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM02\_JAR.QAF;1  
 Parameter Name : PSFUHM-59 (PEAK FUHM AM-241)  
 Start/End Dates : 2-NOV-2023 05:17:39 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 0.939124 +- 3.526196E-02 (3.75 %)



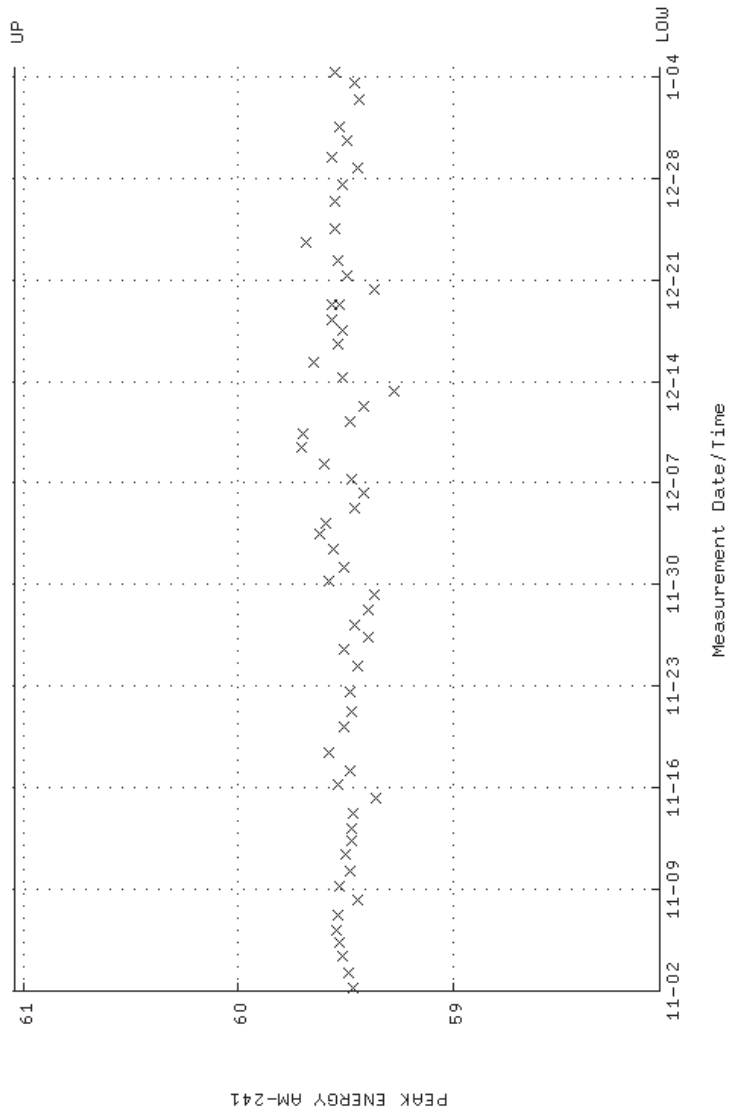
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM02\_JAR.QAF;1  
 Parameter Name : NLACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-NOV-2023 05:17:39 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 68960.1 +- 2392.16 (3.47 %)



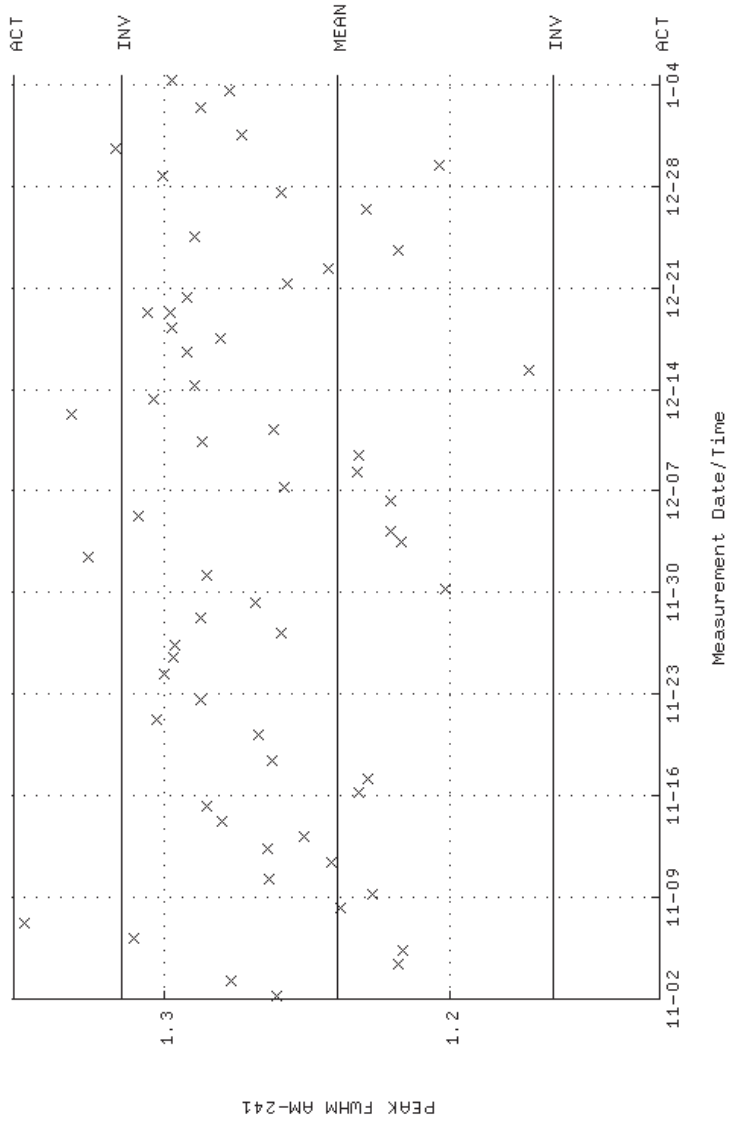
QA filename : DKA100:[CANSBERRA.GAMMA.SCUSR.QA]LBC\_GAM02.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 5-NOV-2023 12:40:58 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 1.87778 +- 2.208678E-02 (1.18 %)



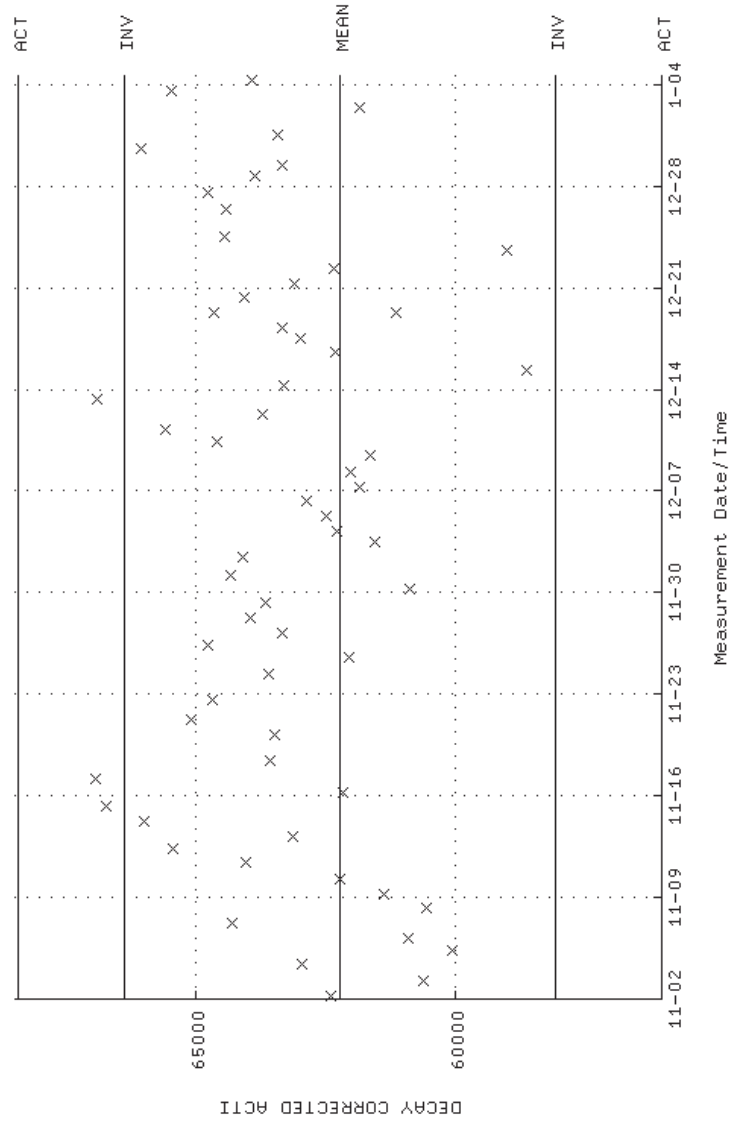
QA filename : DKA100:[CANSBERRA.GAMMA.SCUSR.QA]QCC\_GAM03.CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:48 through 4-JAN-2024 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



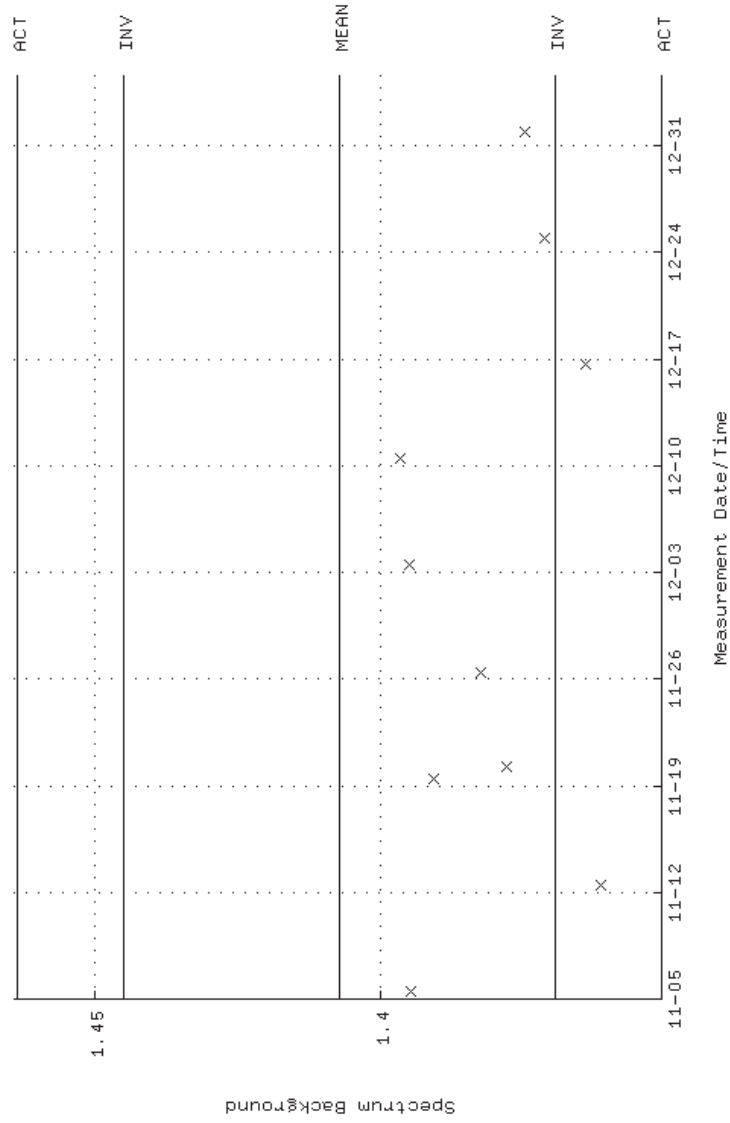
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM03\_CAN.QAF;1  
 Parameter Name : PSFUHM-59 (PEAK FUHM AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:48 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 1.23979 +- 3.762075E-02 (3.03 %)



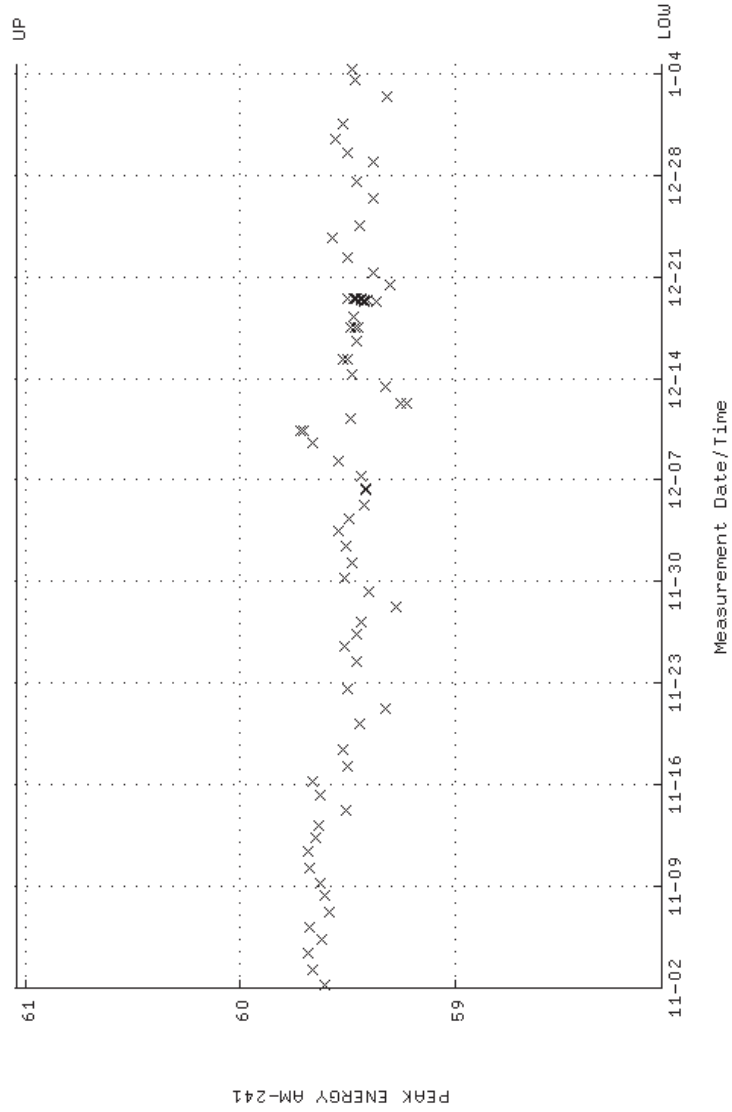
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 Parameter Name : NLACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:48 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 62244.7 +- 2074.11 (3.33 %)



QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]LBC\_GAM03.QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 5-NOV-2023 12:48:16 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 1.40722 +- 1.889385E-02 (1.34 %)

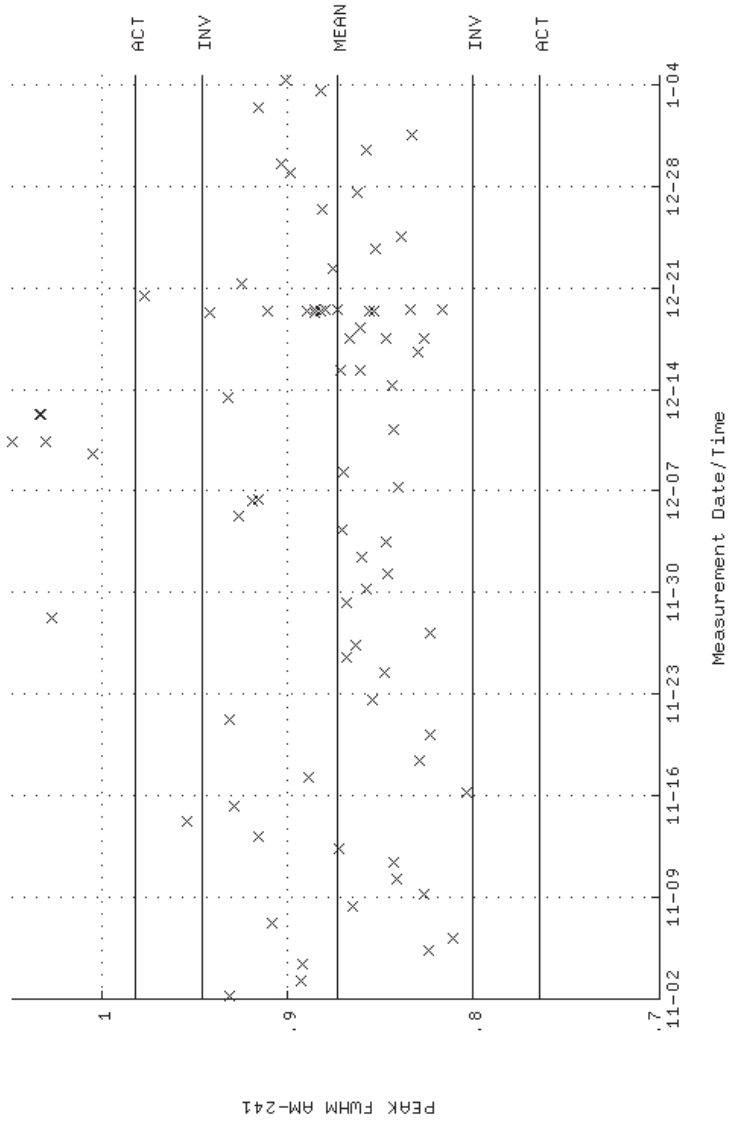


QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-NOV-2023 05:17:44 through 4-JAN-2024 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



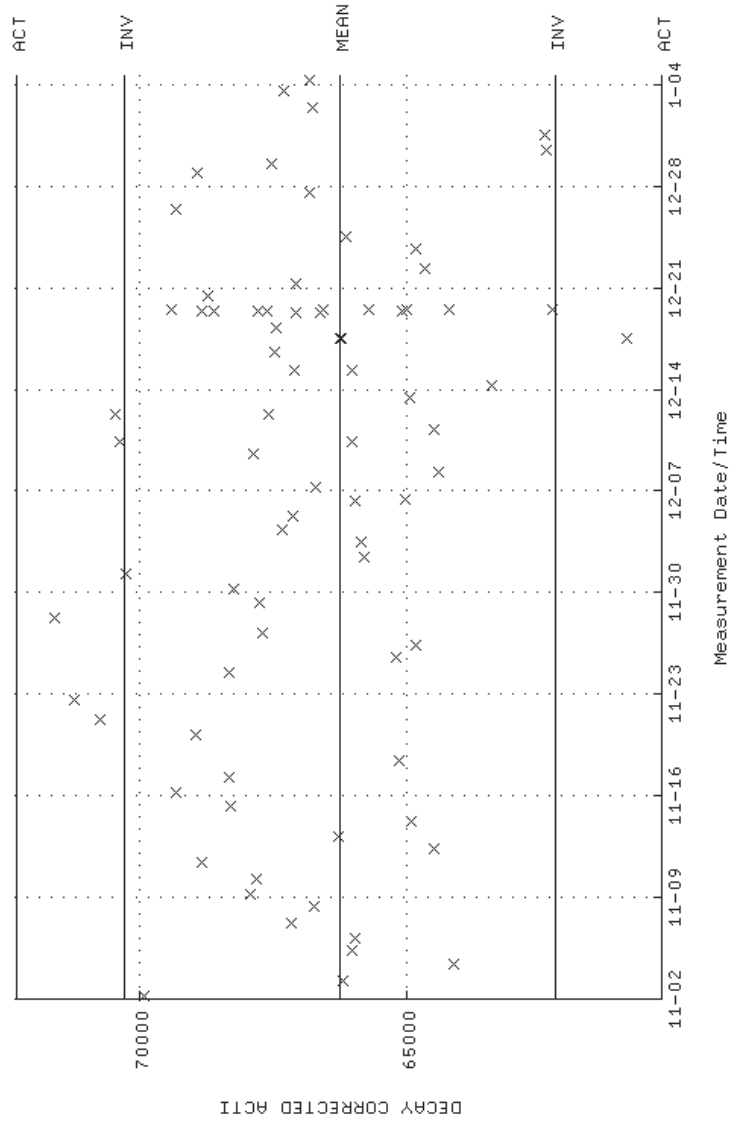


QA filename : DKA100:[CANTBERRA.GAMMA.SCUSR.QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : PSFUHM-59 (PEAK FUHM AM-241)  
 Start/End Dates : 2-NOV-2023 05:17:44 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 0.873483 +- 3.630246E-02 (4.16 %)



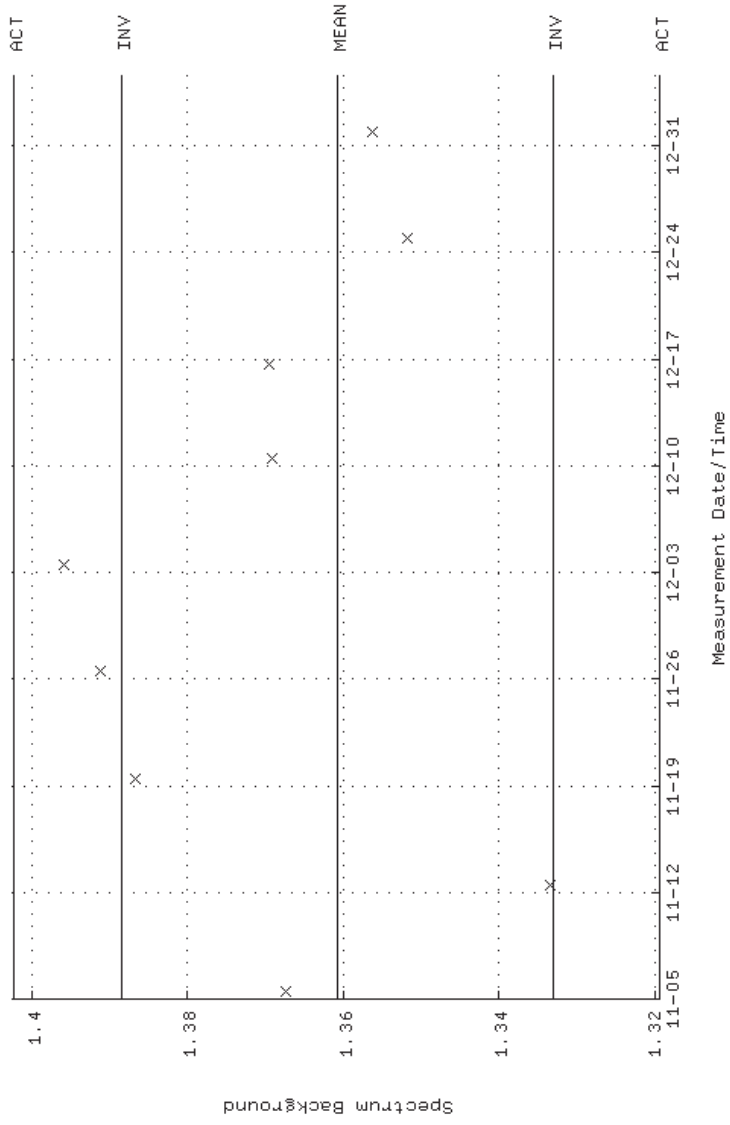
PEAK FUHM AM-241

QA filename : DKA100:[CANTBERRA.GAMMA.SCUSR.QA]QCC\_GAM04\_CAN.QAF;1  
 Parameter Name : NLACTIVITY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-NOV-2023 05:17:44 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 66267.7 +- 2015.50 (3.04 %)

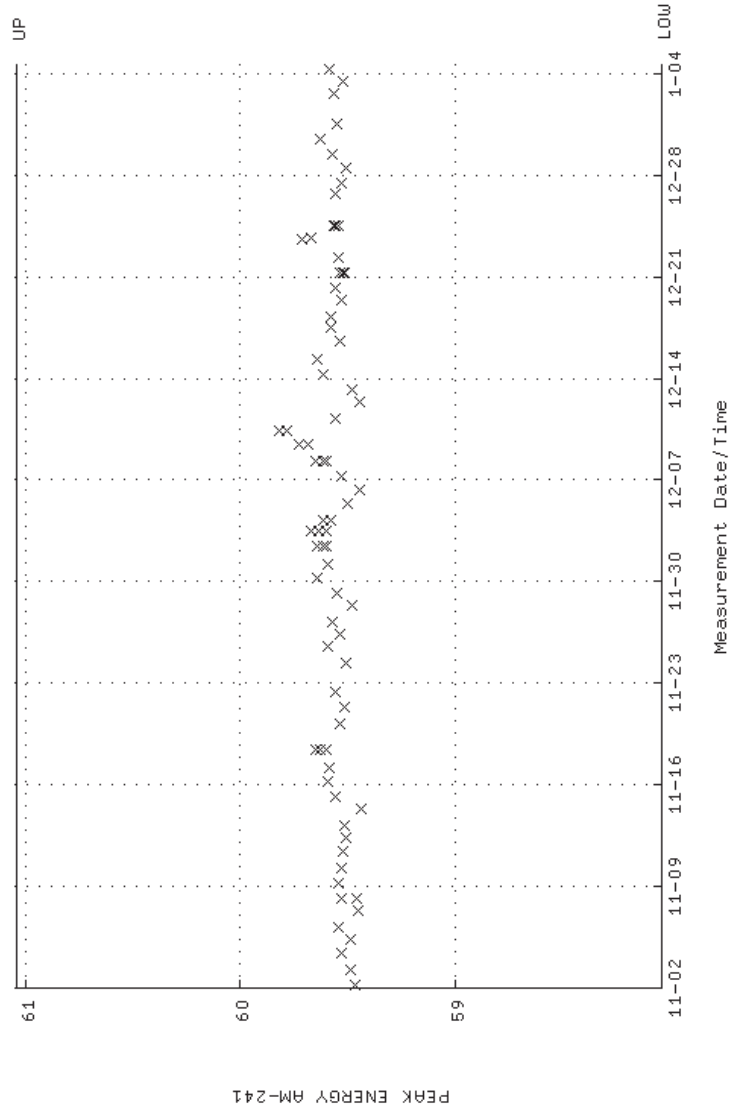


DECAY CORRECTED ACTI

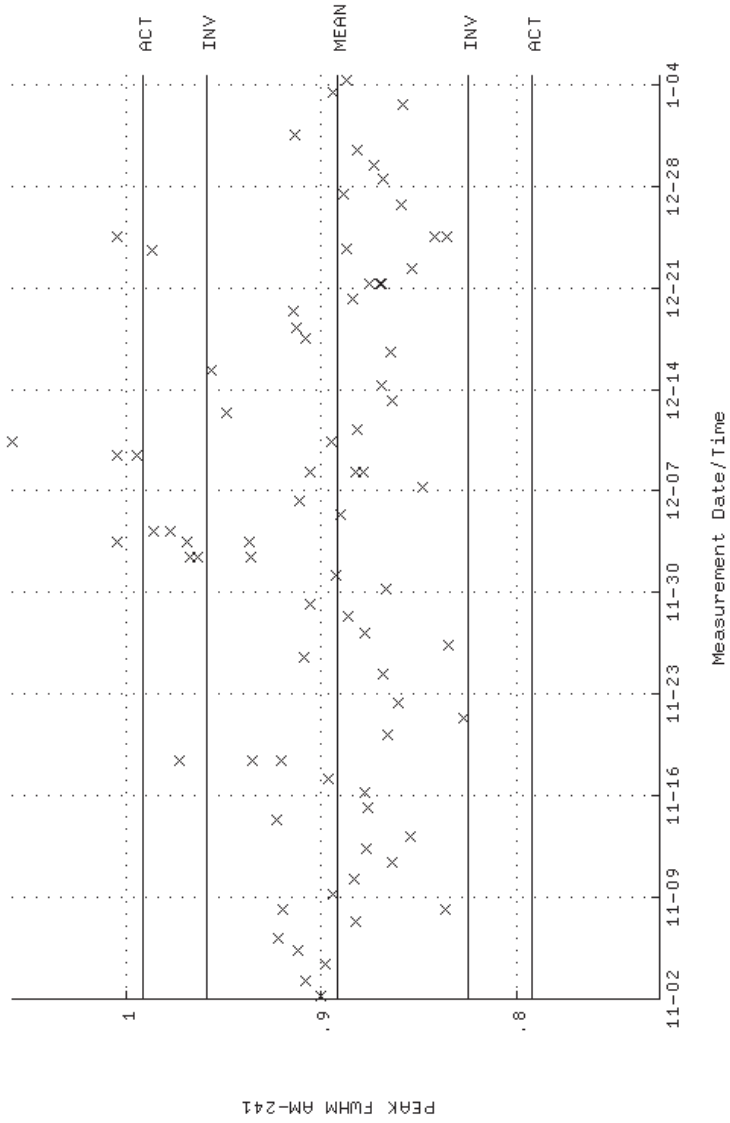
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]LBC\_GAM04\_QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 5-NOV-2023 12:41:42 through 4-JAN-2024 12:00:00  
 Mean +/- Std Dev : 1.36085 +/- 1.380287E-02 (1.01 %)



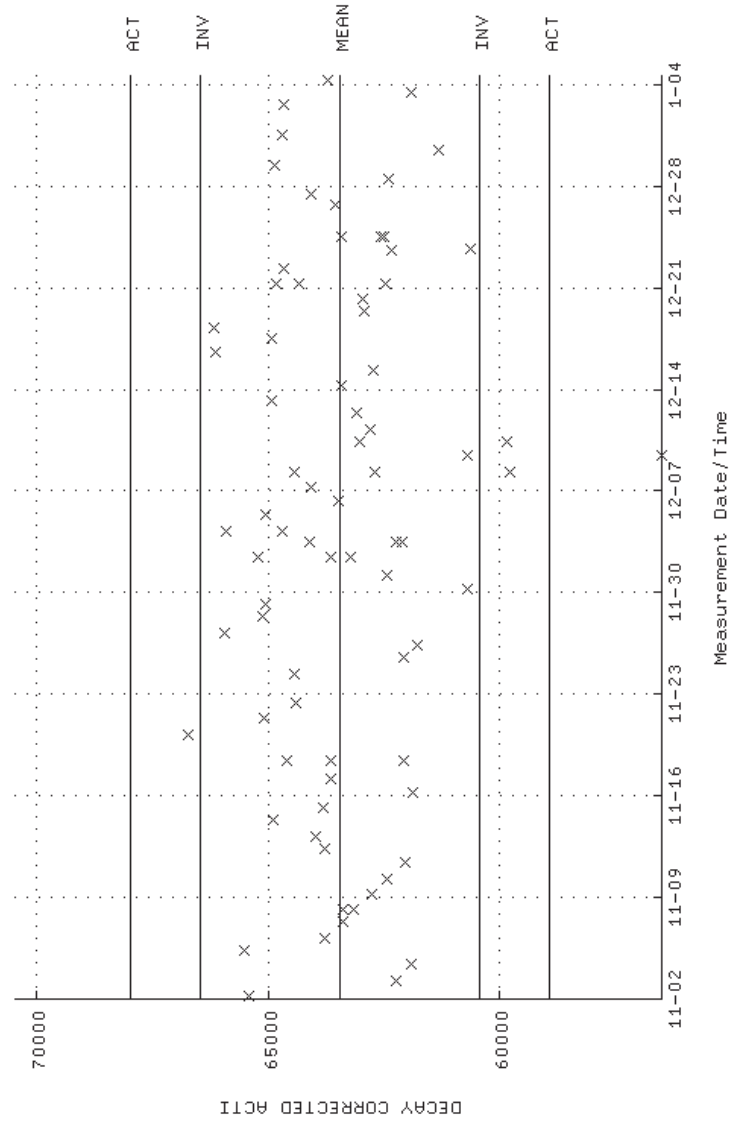
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM06\_CAN\_QAF;1  
 Parameter Name : PSENERGY-59 (PEAK ENERGY AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:54 through 4-JAN-2024 12:00:00  
 Lower/Upper Lmts: 58.0400 through 61.0400



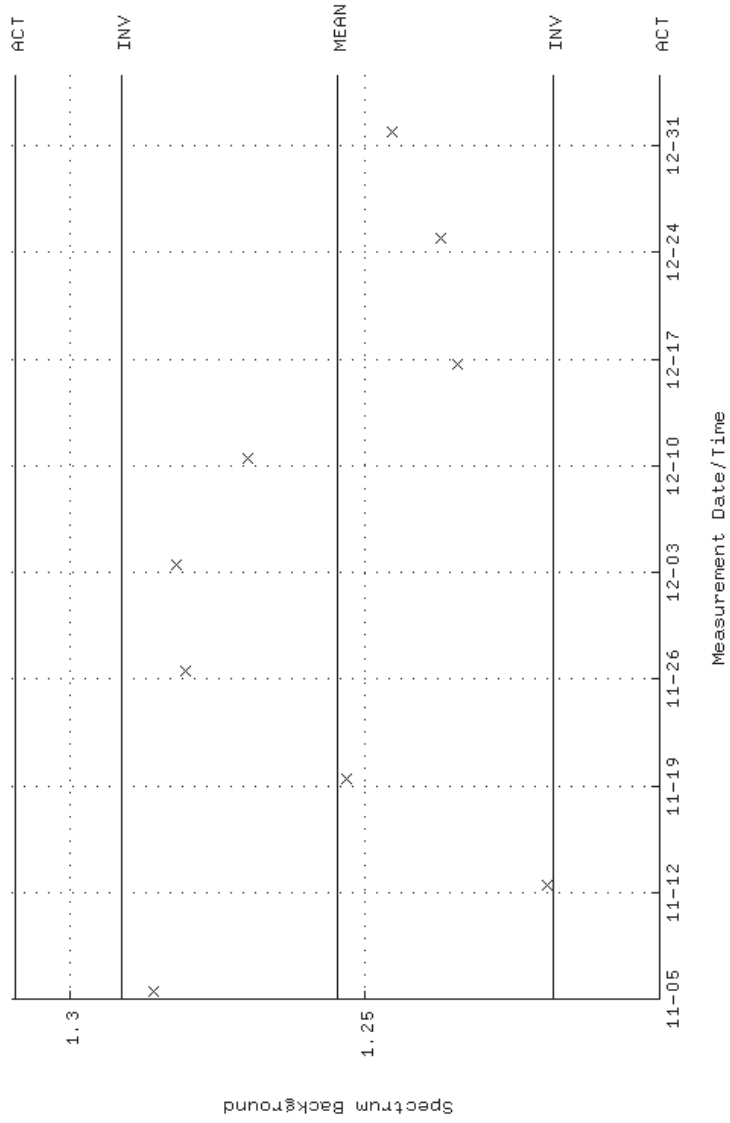
QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM06\_CAN.QAF;1  
 Parameter Name : PSFUHM-59 (PEAK FUHM AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:54 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 0.891957 +- 3.327383E-02 (3.73 %)



QA filename : DKA100:[CANTERRA.GAMMA.SCUSR.QA]QCC\_GAM06\_CAN.QAF;1  
 Parameter Name : NLACTY-59 (DECAY CORRECTED ACTIVITY AM-241)  
 Start/End Dates : 2-NOV-2023 04:45:54 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 63473.8 +- 1503.81 (2.37 %)



QA filename : DKA100:[CANTERRA\_GAMMA\_SCUSR\_QA]LBC\_GAM06\_QAF;1  
 Parameter Name : BACKRATE (Spectrum Background Rate)  
 Start/End Dates : 5-NOV-2023 12:41:48 through 4-JAN-2024 12:00:00  
 Mean +- Std Dev : 1.25484 +- 1.824749E-02 (1.45 %)



# RAD Standards Traceability

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

1556

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 Analytix (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* yps/gram	This Source yps	Uncertainty, %			Calibration Method
					U <sub>A</sub>	U <sub>B</sub>	U	
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 Analytix' 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)



PC-S-060-101

Page 1 of 2

MGS Certificate, Rev 2 09-28-2009

Corporate Office

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  
J. D. McCorvey, QA Manager Alternate

Date: 6/27/11



MGS Certificate, Rev 2 09-28-2009

## 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  
 7/7/4/2011  
 Isotope: Pb-210  
 Result: pCi/L 722900  
 Mixed Gamma N1: 722900  
 Mixed Gamma N2: 752300  
 Mixed Gamma N3: 692100  
 Isotopic Abundance: 0.0425  
 Certificate Value (dps): 1129

Mean Value (Counting) = 722433.33      pCi/L 100.622      Pass  
 Stdev = 30102.713      pCi/L      Rule 3 (Pass/Fail)  
 Certificate Value = 717955.0      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**

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

*11/20/11*  
*Maggie Stamps*

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result	
Am-241	pCi/L	
Mixed Gamma N1	58590	0.359
Mixed Gamma N2	60740	753.8
Mixed Gamma N3	57770	

Mean Value (Counting) = 58966.67 pCi/L 103.9074 Pass  
 Stdev = 1586.727 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

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

Handwritten notes: "Handwritten", "7/14/11", "U.S. Stamp", "7/14/11"

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result	
Cs-137	pCi/L	
Mixed Gamma N1	818400	0.037
Mixed Gamma N2	798000	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 = 739465.9797 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

Verification Rules

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

Handwritten notes: "Handwritten", "7/14/11", "U.S. Stamp", "7/14/11"

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Co-57

Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L  
19090  
18820  
18830

Isotopic Abundance:  
Certificate Value (dps):  
0.856  
595.1

Mean Value (Counting) =  
Stdev =

18913.33  
153.080

100.6592  
Pass  
Rule 3 (Pass/Fail)

Certificate Value =  
Lower Limit =  
Upper Limit =  
Rule 1 Pass/Fail  
Two sigma =  
10 % of Mean =  
Rule 2 (Pass/Fail)

18789.5  
18607.17433  
19219.49233  
Pass  
306.1590001  
1891.333333  
Pass

*Handwritten:*  
11/20/11  
H. Stamp  
7/20/11

Verification Rules

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Ce-139

Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L  
28740  
29410  
27950

Isotopic Abundance:  
Certificate Value (dps):  
0.8  
829.2

Mean Value (Counting) =  
Stdev =

28570.00  
936.643

101.9865  
Pass  
Rule 3 (Pass/Fail)

Certificate Value =  
Lower Limit =  
Upper Limit =  
Rule 1 Pass/Fail  
Two sigma =  
10 % of Mean =  
Rule 2 (Pass/Fail)

28013.5  
26686.71412  
30443.28588  
Pass  
1873.295983  
2857  
Pass

*Handwritten:*  
11/20/11  
H. Stamp  
7/20/11

Verification Rules

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



Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Hg-203

Result  
pCi/L 66300

Mixed Gamma N1 66300

Mixed Gamma N2 68180

Mixed Gamma N3 64480

Isotopic Abundance:  
Certificate Value (dps): 0.8156  
1928

Mean Value (Counting) = 66320.00 pCi/L 103.8046 Pass

Stdev = 1850.081 pCi/L Rule 3 (Pass/Fail)

Certificate Value = 63880.3 pCi/L

Lower Limit = 62519.83784 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

Verification Rules

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

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

Rule 3 = The determined mean value shall be within 5% of the certificate value.

*might  
fail*

*Must stamp  
1/20/11*

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Sr-113

Result  
pCi/L 49560

Mixed Gamma N1 49560

Mixed Gamma N2 49620

Mixed Gamma N3 48300

Isotopic Abundance:  
Certificate Value (dps): 0.6497  
1156

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 = 47689.22839 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

Verification Rules

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

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

Rule 3 = The determined mean value shall be within 5% of the certificate value.

*might  
fail*

*Must stamp  
1/20/11*

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result	
CS-137	pCi/L	
Mixed Gamma N1	23710	Isotopic Abundance:
Mixed Gamma N2	23950	Certificate Value (dps):
Mixed Gamma N3	24040	

Mean Value (Counting) = 23900.00 pCi/L 102.2333 Pass  
 Stdev = 170.567 pCi/L Rule 3 (Pass/Fail)

Certificate Value = 23377.9 pCi/L  
 Lower Limit = 23558.62556 pCi/L  
 Upper Limit = 24241.17444 pCi/L  
 Rule 1 Pass/Fail Fall  
 Two sigma = 341.1744422  
 10% of Mean = 2390  
 Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard

Verification Rules

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

*Handwritten:* 1/20/11  
 1/20/11  
 1/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result	
Y-88 (898)	pCi/L	
Mixed Gamma N1	82690	Isotopic Abundance:
Mixed Gamma N2	81320	Certificate Value (dps):
Mixed Gamma N3	80940	

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 = 1640.978001  
 10% of Mean = 8165  
 Rule 2 (Pass/Fail) Pass

Verification Rules

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

*Handwritten:* 1/20/11  
 1/20/11  
 1/20/11

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result
Co-60 (1173)	pCi/L
Mixed Gamma N1	38910
Mixed Gamma N2	39750
Mixed Gamma N3	38840

Isotopic Abundance:  
Certificate Value (dps):  
0.9985  
1408

Mean Value (Counting) = 39166.67  
Stdev = 506.392

Certificate Value = 102.7694  
Lower Limit =  
Upper Limit =  
Rule 1 Pass/Fail  
Two sigma =  
10 % of Mean =  
Rule 2 (Pass/Fail)

Pass  
Rule 3 (Pass/Fail)

\*exception taken due to full recovery of standard

*moh*  
7/20/11

*WJZ mpj*  
7/20/11

Verification Rules

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope	Result
Co-60 (1332.50)	pCi/L
Mixed Gamma N1	38940
Mixed Gamma N2	40200
Mixed Gamma N3	39150

Isotopic Abundance:  
Certificate Value (dps):  
0.9988  
1408

Mean Value (Counting) = 39430.00  
Stdev = 675.056

Certificate Value = 103.595  
Lower Limit =  
Upper Limit =  
Rule 1 Pass/Fail  
Two sigma =  
10 % of Mean =  
Rule 2 (Pass/Fail)

Pass  
Rule 3 (Pass/Fail)

\*exception taken due to full recovery of standard

*moh*  
7/20/11

*WJZ mpj*  
7/20/11

Verification Rules

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

Verification for Mixed Gamma Standard 1556 CAN

Michael Hilton  
7/14/2011

Isotope  
Y-88 (1836.1)  
Mixed Gamma N1  
Mixed Gamma N2  
Mixed Gamma N3

Result  
pCi/L 82870  
pCi/L 83060  
pCi/L 84640

Isotopic Abundance:  
Certificate Value (dps): 0.992  
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 = 81595.96862 pCi/L  
Upper Limit = 85464.01138 pCi/L  
Rule 1 Pass/Fail Fail  
Two sigma = 1834.011375  
10% of Mean = 8353  
Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard

Verification Rules

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

*mgh  
7/20/11*

*Maggie Stamps  
11/20/11*

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		

# Runlogs

## Instrument Run Log

Instrument Type: GAMMA SPECTROMETER

Batch ID: 2538164

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
648193001	SAMPLE	SF1	GAM03	JAN-02-24 13:28:30	DONE CAN		04-OCT-23 00:00
1205597564	MB	SF1	GAM04	JAN-02-24 13:29:19	DONE CAN		13-DEC-23 00:00
1205597565	DUP	SF1	GAM02	JAN-02-24 14:34:57	DONE CAN		13-SEP-23 00:00
1205597566	LCS	SF1	GAM06	JAN-02-24 14:35:43	DONE CAN		25-SEP-23 00:00