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Case Narrative

CASE NARRATIVE
for
MWH LABORATORIES
MWH PROJECT: 99-22289/170033
TRONOX HENDERSON SITE
SDG: 158783

April 27, 2006

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at General Engineering Laboratories, LLC, Charleston, South Carolina on March 23, 2006 for analysis. Shipping container temperatures were checked, documented, and within specifications. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156

Case Narrative

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

Data Package

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

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



Edith Kent

Project Manager

Chain of Custody and Supporting Documentation



MWH Laboratories
 A Division of MWH Americas, Inc.
 750 Royal Oaks Drive Suite 100
 Monrovia, CA 91016-3629
 Ph (626) 386-1100 Fax (626) 386-1095

Ship To **Edie Kent**

General Engineering Laboratories, LLC

**2040 Savage Road
 Charleston, SC 29414**

Date **03/22/06**

Submittal Form & Purchase Order 99-22289

***REPORTING REQUIREMENTS: Do Not Combine Report with any other samples submitted under different MWH project numbers!**
 Report & Invoice must have the MWH Project Number **170033** Sub PO# **99-22289** and Job # **Find Out**

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Reports: Julie Lee Sub-contracting Administrator
 EMAIL TO: Julie.Lee@mwhglobal.com
 MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
 Phone (626) 386-1136 Fax (626) 386-1095
Invoices to: MWH LABORATORIES
 Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report
 the Specified State
 Certification # & Exp Date for
 requested tests + matrix

CA ELAP OK

(843) 556-8171 X4433 Fax (843) 766-1178

MWH Project # Report Due: Sub PO#
170033 04/06/06 99-22289

JDL

Use MWH
 Lab # for ID

158783%

Client Sample ID for reference only

Container

	Analysis Requested	Sample Date & Time	Matrix
1	RADIUM 226	03/20/06 8:00	grnd -6oz glass jars
2	RADIUM 228		
3	LEAD 210		
4	LEAD212		
5	THORIUM (ISOTOPIIC)		
6	URANIUM (ISOTOPIIC)		
7	URANIUM (TOTAL)		
8	RADIUM 226	03/20/06 10:00	grnd -6oz glass jars
9	RADIUM 228		
10	LEAD 210		
11	LEAD212		
12	THORIUM (ISOTOPIIC)		
13	URANIUM (ISOTOPIIC)		
14	URANIUM (TOTAL)		

MILD 3-22-06 5 1L PLASTIC

MILD 3-22-06 5 1L PLASTIC

Relinquished by: *[Signature]* Date **03/22/06** Time **1446** MUST HAVE NOTIFICATION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS
 Page 1

Received by: *[Signature]* Date **3/23/06** Time **845** An Acknowledgement of Receipt is requested to attn: Julie Lee

Row Client Sample ID for reference only Analysis Requested Sample Date & Time Matrix Container

Page 5 of 924

MLD 3-22-C
5 1L PLASTIC

2603210153 M103A RADIUM 226 03/20/06 15:00 grnd 6oz glass jars

RADIUM 228
LEAD 210
LEAD212
THORIUM (ISOTOPIIC)
URANIUM (ISOTOPIIC)
URANIUM (TOTAL)

2603210155 TR - 8 RADIUM 226 03/20/06 14:00 grnd 6oz glass jars- MLD 3-22-C

RADIUM 228
LEAD 210
LEAD212
THORIUM (ISOTOPIIC)
URANIUM (ISOTOPIIC)
URANIUM (TOTAL)

2603210156 TR - 8D RADIUM 226 03/20/06 grnd 6oz glass jars- MLD 3-22-C

RADIUM 228
LEAD 210
LEAD212
THORIUM (ISOTOPIIC)
URANIUM (ISOTOPIIC)
URANIUM (TOTAL)

Relinquished by: Nick Yasa Date 03/22/06 Time 1446 MUST HAVE NOTIFICATION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS Page 2

Received by: [Signature] Date 3/23/06 Time 845 An Acknowledgement of Receipt is requested to attn: Julie Lee



SAMPLE RECEIPT & REVIEW FORM

PM use only

Client: <u>MWH</u>	SDG/ARCOC/Work Order:
Date Received: <u>3/23/06</u>	PM(A) Review (ensure non-conforming items are resolved prior to signing):
Received By: <u>(Signature)</u>	

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

14	Air Bill ,Tracking #'s, & Additional Comments	<u>6912 3665 4449 - 4°C</u> <u>6912 3665 4450 - 6°C</u>		
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#	Suspected Hazard Information	Non-Regulated	Regulated	High Level	Comments
					RSO RAD Receipt # _____ *If > x2 area background is observed on samples identified as "non-regulated/non-radioactive", contact the Radiation Safety group for further investigation.
A	Radiological Classification?	✓			Maximum Counts Observed*: <u>CPM 40</u>
B	PCB Regulated?	✓			Comments:
C	Shipped as DOT Hazardous Material? If yes, contact Waste Manager or ESH Manager.	✓			Hazard Class Shipped: UN#:

PM (or PMA) review of Hazard classification:	Initials _____	Date: _____
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RADIOLOGICAL ANALYSIS

**Radiochemistry Case Narrative
MWH Laboratories (MWHL)
Work Order 158783**

Method/Analysis Information

Product: Alphaspec Th, Liquid
Analytical Method: DOE EML HASL-300, Th-01-RC Modified
Analytical Batch Number: 523917

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201078559	Method Blank (MB)
1201078560	158783005(2603210156) Sample Duplicate (DUP)
1201078561	158783005(2603210156) Matrix Spike (MS)
1201078562	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-038 REV# 9.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 158783005 (2603210156).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

Batch was re-prepped due to low LCS recovery. Sample 1201078562 (LCS) was recounted due to low/high recovery.

Miscellaneous Information:**NCR Documentation**

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

Manual Integration

Manual integration of alpha spectroscopy spectra 1201078562 (LCS) was performed to fully separate counts in Regions of Interest which would have been biased.

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec U, Liquid
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number:	524204

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201079208	Method Blank (MB)
1201079209	158783005(2603210156) Sample Duplicate (DUP)
1201079210	158783005(2603210156) Matrix Spike (MS)
1201079211	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 14.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 158783005 (2603210156).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

Batch was repped due to low LCS recovery.

Miscellaneous Information:

NCR Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

Sample, 158783005, and duplicate, 1201079209, did not meet the relative percent difference requirements for the U-233/234 and U-235 isotopes, however they do meet the relative error ratio requirements with values of 2.36 and 2.10, respectively.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gamma, (Pb-212)**
Analytical Method: EPA 901.1
Analytical Batch Number: 523017

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201076443	Method Blank (MB)
1201076444	158783001(2603210144) Sample Duplicate (DUP)
1201076445	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 10.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

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

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

Designated QC

The following sample was used for QC: 158783001 (2603210144).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Miscellaneous Information:**NCR Documentation**

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Pb210, Liquid

Analytical Method: DOE RP280 Modified

Analytical Batch Number: 522920

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201076207	Method Blank (MB)
1201076208	158783001(2603210144) Sample Duplicate (DUP)
1201076209	158783001(2603210144) Matrix Spike (MS)
1201076210	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-018 REV# 5.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 158783001 (2603210144).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

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

Miscellaneous Information:**NCR Documentation**

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: **GFPC, Ra228, Liquid**

Analytical Method: EPA 904.0 Modified

Analytical Batch Number: 515982

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
1201060412	Method Blank (MB)
1201060413	159251006(060301600-001) Sample Duplicate (DUP)
1201060414	159251006(060301600-001) Matrix Spike (MS)
1201060415	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-009 REV# 12.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

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

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

Designated QC

Because the QC sample is from another client's work order, the quality control table and graphs will only show the blank and LCS data. The following sample was used for QC: 159251006 (060301600-001).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

Samples were re-eluted and recounted due to low recovery.

Chemical Recoveries

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

Miscellaneous Information:**NCR Documentation**

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Ra228, Liquid

Analytical Method: EPA 904.0 Modified

Analytical Batch Number: 515983

Sample ID	Client ID
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201060416	Method Blank (MB)
1201060417	159242003(2603240135 M-121) Sample Duplicate (DUP)
1201060418	159242003(2603240135 M-121) Matrix Spike (MS)
1201060419	Laboratory Control Sample (LCS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-009 REV# 12.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 159242003 (2603240135 M-121).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

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

Miscellaneous Information:

NCR Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: Lucas Cell, Ra226, liquid
Analytical Method: EPA 903.1 Modified
Analytical Batch Number: 517605

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201063978	Method Blank (MB)
1201063981	Laboratory Control Sample (LCS)
1201063982	159242003(2603240135 M-121) Sample Duplicate (DUP)
1201063983	159242003(2603240135 M-121) Matrix Spike (MS)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-008 REV# 9.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 159242003 (2603240135 M-121).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

Sample 1201063978 (MB) was recounted due to a suspected blank false positive.

Miscellaneous Information:

NCR Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: KPA, Total U, Liquid

Analytical Method: ASTM D 5174

Analytical Batch Number: 523026

Sample ID	Client ID
158783001	2603210144
158783002	2603210150
158783003	2603210153
158783004	2603210155
158783005	2603210156
1201076467	Method Blank (MB)
1201076468	158783001(2603210144) Sample Duplicate (DUP)
1201076469	158783001(2603210144) Matrix Spike (MS)
1201076470	Laboratory Control Sample (LCS)
1201076471	Laboratory Control Sample Duplicate (LCSD)

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-023 REV# 11.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The calibration for Total Uranium is performed prior to each analysis and is located in the raw data section.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 158783001 (2603210144).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Preparation Information

All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis

The initial results of samples 158783001 (2603210144), 158783002 (2603210150), 158783003 (2603210153), 158783004 (2603210155) and 158783005 (2603210156) were greater than RDL. Samples were reanalyzed for verification. The initial results are reported.

Miscellaneous Information:

NCR Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.


Certification Statement

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

Review Validation:

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

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

Reviewer/Date:  4/28/06

SAMPLE DATA SUMMARY

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

**Certificate of Analysis Report
for**

MWHL002 MWH Laboratories
Client SDG: 158783 GEL Work Order: 158783

The Qualifiers in this report are defined as follows:

- * Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- < Result is less than amount reported.
- > Result is greater than amount reported.
- B Target analyte was detected in the sample as well as the associated blank.
- BD Results below the MDC or low tracer recovery.
- D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value.
- P The response between the confirmation and the primary columns is >40% Different.
- R Sample results are rejected.
- U Target analyte was analyzed for but not detected above the MDL, MDA, or LOD.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- Y QC Samples were not spiked with this compound.
- Z Paint Filter qualifier: Particulates passed through the filter. No free liquids were observed.
- d The 2:1 depletion requirement was not met for this sample
- h Sample preparation or preservation holding time exceeded.
- ND The analyte concentration is not detected above the reporting limit.

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

** Indicates the analyte is a surrogate compound.

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



Reviewed by _____

GENERAL ENGINEERING LABORATORIES, LLC

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

Certificate of Analysis

Company : MWH Laboratories
 Address : 750 Royal Oaks Drive, Suite 100
 Monrovia, California 91016

Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID:	2603210144	Project:	MWHL00106
Sample ID:	158783001	Client ID:	MWHL002
Matrix:	Ground Water		
Collect Date:	20–MAR–06 08:00		
Receive Date:	23–MAR–06		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid</i>											
Thorium–228		0.502	+/-0.258	0.158	2.00	pCi/L		LCW1 04/26/06	0823	523917	1
Thorium–230		0.299	+/-0.194	0.0898	2.00	pCi/L					
Thorium–232		0.299	+/-0.194	0.0898	2.00	pCi/L					
<i>Alphaspec U, Liquid</i>											
Uranium–233/234		3.09	+/-0.741	0.422	1.00	pCi/L		LCW1 04/28/06	0718	524204	2
Uranium–235/236	U	0.168	+/-0.223	0.418	1.00	pCi/L					
Uranium–238		1.35	+/-0.489	0.311	1.00	pCi/L					
Rad Gamma Spec Analysis											
<i>Gamma, (Pb–212)</i>											
Lead–212	U	5.15	+/-6.22	7.39	10.0	pCi/L		MJH1 04/24/06	2330	523017	3
Rad Gas Flow Proportional Counting											
<i>GFPC, Pb210, Liquid</i>											
Lead–210		4.97	+/-1.52	2.41	3.00	pCi/L		BXF1 04/26/06	1020	522920	4
<i>GFPC, Ra228, Liquid</i>											
Radium–228	U	0.546	+/-0.462	0.909	2.00	pCi/L		PXP1 04/17/06	1415	515982	5
Rad Radium–226											
<i>Lucas Cell, Ra226, liquid</i>											
Radium–226	U	0.244	+/-0.298	0.491	2.00	pCi/L		SG 04/11/06	0800	517605	6
Rad Total Uranium											
<i>KPA, Total U, Liquid</i>											
Total Uranium		7.03	+/-0.151	0.430	1.00	ug/L		DRS1 04/25/06	1437	523026	7

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL–300, Th–01–RC Modified	
2	DOE EML HASL–300, U–02–RC Modified	
3	EPA 901.1	
4	DOE RP280 Modified	
5	EPA 904.0 Modified	
6	EPA 903.1 Modified	
7	ASTM D 5174	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits

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Certificate of Analysis

Company : MWH Laboratories
 Address : 750 Royal Oaks Drive, Suite 100
 Monrovia, California 91016

Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID: 2603210144
 Sample ID: 158783001

Project: MWHL00106
 Client ID: MWHL002

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Surrogate/Tracer recovery	Test					Result	Nominal	Recovery%			Acceptable Limits
Actinium-227	Alphaspec Th, Liquid							92			
Actinium-227	Alphaspec Th, Liquid							92			
Uranium-232	Alphaspec U, Liquid							67			(25%–125%)
Uranium-232	Alphaspec U, Liquid							67			(25%–125%)
Uranium-232	Alphaspec U, Liquid							67			(25%–125%)
Lead-210	GFPC, Pb210, Liquid							50			(25%–125%)
Radium-228	GFPC, Ra228, Liquid							67			(15%–125%)

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Company : MWH Laboratories
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Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID:	2603210150	Project:	MWHL00106
Sample ID:	158783002	Client ID:	MWHL002
Matrix:	Ground Water		
Collect Date:	20–MAR–06 10:00		
Receive Date:	23–MAR–06		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid</i>											
Thorium–228		0.139	+/-0.126	0.0834	2.00	pCi/L		LCW1 04/26/06	0823	523917	1
Thorium–230	U	0.0555	+/-0.0789	0.0832	2.00	pCi/L					
Thorium–232	U	0.0555	+/-0.0789	0.0832	2.00	pCi/L					
<i>Alphaspec U, Liquid</i>											
Uranium–233/234		1.28	+/-0.398	0.220	1.00	pCi/L		LCW1 04/28/06	0718	524204	2
Uranium–235/236	U	0.147	+/-0.154	0.207	1.00	pCi/L					
Uranium–238		0.745	+/-0.305	0.197	1.00	pCi/L					
Rad Gamma Spec Analysis											
<i>Gamma, (Pb–212)</i>											
Lead–212	U	2.26	+/-4.47	6.30	10.0	pCi/L		MJH1 04/24/06	2330	523017	3
Rad Gas Flow Proportional Counting											
<i>GFPC, Pb210, Liquid</i>											
Lead–210	U	1.79	+/-1.18	2.18	3.00	pCi/L		BXF1 04/26/06	1020	522920	4
<i>GFPC, Ra228, Liquid</i>											
Radium–228	U	0.708	+/-0.413	0.764	2.00	pCi/L		PXP1 04/17/06	1415	515982	5
Rad Radium–226											
<i>Lucas Cell, Ra226, liquid</i>											
Radium–226	U	0.392	+/-0.327	0.491	2.00	pCi/L		SG 04/11/06	0800	517605	6
Rad Total Uranium											
<i>KPA, Total U, Liquid</i>											
Total Uranium		2.72	+/-0.061	0.430	1.00	ug/L		DRS1 04/25/06	1439	523026	7

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL–300, Th–01–RC Modified	
2	DOE EML HASL–300, U–02–RC Modified	
3	EPA 901.1	
4	DOE RP280 Modified	
5	EPA 904.0 Modified	
6	EPA 903.1 Modified	
7	ASTM D 5174	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits

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Monrovia, California 91016

Report Date: April 28, 2006

Contact: Ms. Julie Lee
Project: **Tronox Henderson**

Client Sample ID: 2603210150
Sample ID: 158783002

Project: MWHL00106
Client ID: MWHL002

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Surrogate/Tracer recovery	Test					Result	Nominal	Recovery%				Acceptable Limits
Actinium-227	Alphaspec Th, Liquid							88				
Actinium-227	Alphaspec Th, Liquid							88				
Uranium-232	Alphaspec U, Liquid							104				(25%–125%)
Uranium-232	Alphaspec U, Liquid							104				(25%–125%)
Uranium-232	Alphaspec U, Liquid							104				(25%–125%)
Lead-210	GFPC, Pb210, Liquid							49				(25%–125%)
Radium-228	GFPC, Ra228, Liquid							84				(15%–125%)

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Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID:	2603210153	Project:	MWHL00106
Sample ID:	158783003	Client ID:	MWHL002
Matrix:	Ground Water		
Collect Date:	20–MAR–06 15:00		
Receive Date:	23–MAR–06		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid</i>											
Thorium–228		2.39	+/-0.668	0.169	2.00	pCi/L		LCW1 04/26/06	0823	523917	1
Thorium–230		2.30	+/-0.650	0.0958	2.00	pCi/L					
Thorium–232		2.27	+/-0.644	0.0958	2.00	pCi/L					
<i>Alphaspec U, Liquid</i>											
Uranium–233/234		3.36	+/-0.752	0.302	1.00	pCi/L		LCW1 04/28/06	0718	524204	2
Uranium–235/236		0.309	+/-0.259	0.283	1.00	pCi/L					
Uranium–238		2.44	+/-0.643	0.302	1.00	pCi/L					
Rad Gamma Spec Analysis											
<i>Gamma, (Pb–212)</i>											
Lead–212	U	5.96	+/-6.75	7.81	10.0	pCi/L		MJH1 04/24/06	2330	523017	3
Rad Gas Flow Proportional Counting											
<i>GFPC, Pb210, Liquid</i>											
Lead–210	U	1.07	+/-0.977	1.90	3.00	pCi/L		BXF1 04/26/06	1020	522920	4
<i>GFPC, Ra228, Liquid</i>											
Radium–228		1.65	+/-0.611	0.945	2.00	pCi/L		KSD1 04/26/06	1329	515983	5
Rad Radium–226											
<i>Lucas Cell, Ra226, liquid</i>											
Radium–226		0.969	+/-0.473	0.591	2.00	pCi/L		SG 04/11/06	0835	517605	6
Rad Total Uranium											
<i>KPA, Total U, Liquid</i>											
Total Uranium		12.7	+/-0.268	0.430	1.00	ug/L		DRS1 04/25/06	1441	523026	7

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL–300, Th–01–RC Modified	
2	DOE EML HASL–300, U–02–RC Modified	
3	EPA 901.1	
4	DOE RP280 Modified	
5	EPA 904.0 Modified	
6	EPA 903.1 Modified	
7	ASTM D 5174	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits

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Report Date: April 28, 2006

Contact: Ms. Julie Lee
Project: **Tronox Henderson**

Client Sample ID: 2603210153
Sample ID: 158783003

Project: MWHL00106
Client ID: MWHL002

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Surrogate/Tracer recovery	Test					Result	Nominal	Recovery%				Acceptable Limits
Actinium–227	Alphaspec Th, Liquid							75				
Actinium–227	Alphaspec Th, Liquid							75				
Actinium–227	Alphaspec Th, Liquid							75				
Uranium–232	Alphaspec U, Liquid							77				(25%–125%)
Uranium–232	Alphaspec U, Liquid							77				(25%–125%)
Uranium–232	Alphaspec U, Liquid							77				(25%–125%)
Lead–210	GFPC, Pb210, Liquid							63				(25%–125%)
Radium–228	GFPC, Ra228, Liquid							91				(15%–125%)

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Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID:	2603210155	Project:	MWHL00106
Sample ID:	158783004	Client ID:	MWHL002
Matrix:	Ground Water		
Collect Date:	20–MAR–06 14:00		
Receive Date:	23–MAR–06		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid</i>											
Thorium–228		0.181	+/-0.139	0.150	2.00	pCi/L		LCW1 04/26/06	0823	523917	1
Thorium–230		0.192	+/-0.139	0.0722	2.00	pCi/L					
Thorium–232	U	0.0847	+/-0.0983	0.150	2.00	pCi/L					
<i>Alphaspec U, Liquid</i>											
Uranium–233/234		3.06	+/-0.651	0.269	1.00	pCi/L		LCW1 04/28/06	0718	524204	2
Uranium–235/236		0.132	+/-0.149	0.132	1.00	pCi/L					
Uranium–238		1.58	+/-0.474	0.305	1.00	pCi/L					
Rad Gamma Spec Analysis											
<i>Gamma, (Pb–212)</i>											
Lead–212	U	3.69	+/-4.69	5.52	10.0	pCi/L		MJH1 04/24/06	2331	523017	3
Rad Gas Flow Proportional Counting											
<i>GFPC, Pb210, Liquid</i>											
Lead–210	U	1.13	+/-1.32	2.64	3.00	pCi/L		BXF1 04/26/06	1020	522920	4
<i>GFPC, Ra228, Liquid</i>											
Radium–228	U	0.674	+/-0.447	0.826	2.00	pCi/L		KSD1 04/26/06	1329	515983	5
Rad Radium–226											
<i>Lucas Cell, Ra226, liquid</i>											
Radium–226	U	0.356	+/-0.342	0.535	2.00	pCi/L		SG 04/11/06	0835	517605	6
Rad Total Uranium											
<i>KPA, Total U, Liquid</i>											
Total Uranium		5.29	+/-0.111	0.430	1.00	ug/L		DRS1 04/25/06	1443	523026	7

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL–300, Th–01–RC Modified	
2	DOE EML HASL–300, U–02–RC Modified	
3	EPA 901.1	
4	DOE RP280 Modified	
5	EPA 904.0 Modified	
6	EPA 903.1 Modified	
7	ASTM D 5174	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits

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Report Date: April 28, 2006

Contact: Ms. Julie Lee
Project: **Tronox Henderson**

Client Sample ID: 2603210155
Sample ID: 158783004

Project: MWHL00106
Client ID: MWHL002

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Surrogate/Tracer recovery	Test					Result	Nominal	Recovery%				Acceptable Limits
Actinium–227	Alphaspec Th, Liquid							99				
Actinium–227	Alphaspec Th, Liquid							99				
Actinium–227	Alphaspec Th, Liquid							99				
Uranium–232	Alphaspec U, Liquid							87				(25%–125%)
Uranium–232	Alphaspec U, Liquid							87				(25%–125%)
Uranium–232	Alphaspec U, Liquid							87				(25%–125%)
Lead–210	GFPC, Pb210, Liquid							48				(25%–125%)
Radium–228	GFPC, Ra228, Liquid							92				(15%–125%)

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Company : MWH Laboratories
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Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID:	2603210156	Project:	MWHL00106
Sample ID:	158783005	Client ID:	MWHL002
Matrix:	Ground Water		
Collect Date:	20–MAR–06 12:00		
Receive Date:	23–MAR–06		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid</i>											
Thorium–228		0.232	+/-0.167	0.169	2.00	pCi/L		LCW1 04/26/06	0823	523917	1
Thorium–230		0.109	+/-0.110	0.0814	2.00	pCi/L					
Thorium–232		0.0814	+/-0.0947	0.0814	2.00	pCi/L					
<i>Alphaspec U, Liquid</i>											
Uranium–233/234		3.93	+/-0.759	0.322	1.00	pCi/L		LCW1 04/28/06	0718	524204	2
Uranium–235/236		0.524	+/-0.317	0.322	1.00	pCi/L					
Uranium–238		1.83	+/-0.522	0.304	1.00	pCi/L					
Rad Gamma Spec Analysis											
<i>Gamma, (Pb–212)</i>											
Lead–212	U	0.0126	+/-5.27	5.54	10.0	pCi/L		MJH1 04/24/06	2331	523017	3
Rad Gas Flow Proportional Counting											
<i>GFPC, Pb210, Liquid</i>											
Lead–210	U	1.80	+/-1.33	2.52	3.00	pCi/L		BXF1 04/26/06	1020	522920	4
<i>GFPC, Ra228, Liquid</i>											
Radium–228	U	0.606	+/-0.453	0.880	2.00	pCi/L		KSD1 04/26/06	1329	515983	5
Rad Radium–226											
<i>Lucas Cell, Ra226, liquid</i>											
Radium–226	U	0.277	+/-0.318	0.520	2.00	pCi/L		SG 04/11/06	0835	517605	6
Rad Total Uranium											
<i>KPA, Total U, Liquid</i>											
Total Uranium		5.25	+/-0.111	0.430	1.00	ug/L		DRS1 04/25/06	1445	523026	7

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL–300, Th–01–RC Modified	
2	DOE EML HASL–300, U–02–RC Modified	
3	EPA 901.1	
4	DOE RP280 Modified	
5	EPA 904.0 Modified	
6	EPA 903.1 Modified	
7	ASTM D 5174	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits

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Company : MWH Laboratories
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Report Date: April 28, 2006

Contact: Ms. Julie Lee
 Project: **Tronox Henderson**

Client Sample ID: 2603210156
 Sample ID: 158783005

Project: MWHL00106
 Client ID: MWHL002

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Surrogate/Tracer recovery	Test					Result	Nominal	Recovery%			Acceptable Limits
Actinium–227	Alphaspec Th, Liquid							89			
Actinium–227	Alphaspec Th, Liquid							89			
Actinium–227	Alphaspec Th, Liquid							89			
Uranium–232	Alphaspec U, Liquid							76			(25%–125%)
Uranium–232	Alphaspec U, Liquid							76			(25%–125%)
Uranium–232	Alphaspec U, Liquid							76			(25%–125%)
Lead–210	GFPC, Pb210, Liquid							45			(25%–125%)
Radium–228	GFPC, Ra228, Liquid							91			(15%–125%)

QUALITY CONTROL DATA

GENERAL ENGINEERING LABORATORIES, LLC

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QC Summary

Report Date: April 28, 2006

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MWH Laboratories
750 Royal Oaks Drive, Suite 100
Monrovia, California

Contact: Ms. Julie Lee

Workorder: 158783

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	523917										
QC1201078560	158783005	DUP									
Thorium-228		0.232		0.317	pCi/L	31*		(0%-20%)	LCW1	04/26/06	08:24
		+/-0.167		+/-0.181							
Thorium-230		0.109		0.0974	pCi/L	11		(0%-20%)			
		+/-0.110		+/-0.0984							
Thorium-232		0.0814	U	0.0429	pCi/L	62*		(0%-20%)			
		+/-0.0947		+/-0.0701							
QC1201078562	LCS										
Thorium-228			U	0.122	pCi/L			(75%-125%)		04/27/06	14:49
				+/-0.117							
Thorium-230	53.9			47.9	pCi/L		89	(75%-125%)			
				+/-7.21							
Thorium-232				0.301	pCi/L			(75%-125%)			
				+/-0.183							
QC1201078559	MB										
Thorium-228			U	-0.00812	pCi/L					04/26/06	08:23
				+/-0.0163							
Thorium-230			U	0.0676	pCi/L						
				+/-0.0962							
Thorium-232			U	0.0338	pCi/L						
				+/-0.0678							
QC1201078561	158783005	MS									
Thorium-228		0.232		0.238	pCi/L			(75%-125%)		04/26/06	08:24
		+/-0.167		+/-0.191							
Thorium-230	53.9	0.109		42.5	pCi/L		79	(75%-125%)			
		+/-0.110		+/-7.37							
Thorium-232		0.0814		0.202	pCi/L			(75%-125%)			
		+/-0.0947		+/-0.176							
Batch	524204										
QC1201079209	158783005	DUP									
Uranium-233/234		3.93		2.57	pCi/L	42*		(0%-20%)	LCW1	04/28/06	07:18
		+/-0.759		+/-0.550							
Uranium-235/236		0.524	U	0.140	pCi/L	116*		(0%-20%)			
		+/-0.317		+/-0.147							
Uranium-238		1.83		1.61	pCi/L	13		(0%-20%)			
		+/-0.522		+/-0.433							
QC1201079211	LCS										
Uranium-233/234				11.6	pCi/L			(75%-125%)			
				+/-1.15							
Uranium-235/236				0.725	pCi/L			(75%-125%)			
				+/-0.340							
Uranium-238	13.1			11.3	pCi/L		86	(75%-125%)			
				+/-1.13							
QC1201079208	MB										

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QC Summary

Workorder: 158783

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	524204										
Uranium-233/234			U	0.00198 +/-0.108	pCi/L						
Uranium-235/236			U	-0.0589 +/-0.0577	pCi/L				LCW1	04/28/06	07:18
Uranium-238			U	0.00198 +/-0.108	pCi/L						
QC1201079210	158783005 MS										
Uranium-233/234		3.93 +/-0.759		14.8 +/-1.39	pCi/L			(75%-125%)			
Uranium-235/236		0.524 +/-0.317		0.990 +/-0.405	pCi/L			(75%-125%)			
Uranium-238	13.1	1.83 +/-0.522		15.0 +/-1.40	pCi/L		101	(75%-125%)			
Rad Gamma Spec											
Batch	523017										
QC1201076444	158783001 DUP										
Lead-212		5.15 +/-6.22	U	1.80 +/-6.57	pCi/L	96			MJH1	04/25/06	06:13
QC1201076445	LCS										
Americium-241	1220			1440 +/-148	pCi/L		118	(75%-125%)			
Cesium-137	463			494 +/-45.9	pCi/L		107	(75%-125%)			
Cobalt-60	660			654 +/-51.6	pCi/L		99	(75%-125%)			
Lead-212			U	4.24 +/-18.2	pCi/L						
QC1201076443	MB										
Lead-212			U	3.01 +/-4.99	pCi/L					04/24/06	23:31
Rad Gas Flow											
Batch	515982										
QC1201060413	159251006 DUP										
Radium-228		0.568 +/-0.325	U	0.499 +/-0.355	pCi/L	0		(0%-20%)	PXP1	04/17/06	14:14
QC1201060415	LCS										
Radium-228	13.5			16.4 +/-1.63	pCi/L		122	(75%-125%)		04/17/06	15:09
QC1201060412	MB										
Radium-228			U	0.189 +/-0.303	pCi/L					04/17/06	14:14
QC1201060414	159251006 MS										
Radium-228	30.5	0.568 +/-0.325	U	32.0 +/-3.37	pCi/L		105	(75%-125%)		04/17/06	15:08
Batch	515983										
QC1201060417	159242003 DUP										
Radium-228		1.24 +/-0.666	U	0.577 +/-0.503	pCi/L	73*		(0%-20%)	KSD1	04/26/06	13:29

GENERAL ENGINEERING LABORATORIES, LLC

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QC Summary

Workorder: 158783

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	515983										
QC1201060419	LCS										
Radium-228	40.3			46.1 +/-2.84	pCi/L		115	(75%-125%)	KSD1	04/26/06	14:35
QC1201060416	MB										
Radium-228			U	0.323 +/-0.444	pCi/L					04/26/06	13:29
QC1201060418	159242003	MS									
Radium-228	61.0	1.24 +/-0.666		71.6 +/-4.18	pCi/L		115	(75%-125%)		04/26/06	13:44
Batch	522920										
QC1201076208	158783001	DUP									
Lead-210		4.97 +/-1.52		3.08 +/-1.24	pCi/L	47*		(0%-20%)	BXF1	04/26/06	10:20
QC1201076210	LCS										
Lead-210	36.5			29.6 +/-4.43	pCi/L		81	(75%-125%)		04/26/06	10:21
QC1201076207	MB										
Lead-210			U	0.809 +/-0.863	pCi/L					04/26/06	10:19
QC1201076209	158783001	MS									
Lead-210	73.2	4.97 +/-1.52		66.1 +/-9.98	pCi/L		84	(75%-125%)		04/26/06	10:20
Rad Ra-226											
Batch	517605										
QC1201063982	159242003	DUP									
Radium-226		0.471 +/-0.349	U	0.098 +/-0.279	pCi/L	0		(0%-20%)	SG	04/11/06	09:15
QC1201063981	LCS										
Radium-226	25.1			27.0 +/-1.91	pCi/L		108	(75%-125%)			
QC1201063978	MB										
Radium-226			U	0.105 +/-0.315	pCi/L					04/11/06	11:25
QC1201063983	159242003	MS									
Radium-226	25.1	0.471 +/-0.349	U	23.5 +/-1.84	pCi/L		94	(75%-125%)		04/11/06	09:15
Rad Total U											
Batch	523026										
QC1201076468	158783001	DUP									
Total Uranium		7.03 +/-0.151		6.67 +/-0.142	ug/L	5		(0%-20%)	DRS1	04/25/06	14:25
QC1201076470	LCS										
Total Uranium	50.0			51.4 +/-3.24	ug/L		103	(75%-125%)		04/25/06	14:32
QC1201076471	LCSD										
Total Uranium	5.00			5.38 +/-0.114	ug/L	162	108			04/25/06	14:34
QC1201076467	MB										
Total Uranium			U	0.170	ug/L					04/25/06	14:22

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QC Summary

Workorder: 158783

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Total U											
Batch	523026										
				+/-0.0194							
QC1201076469 158783001 MS											
Total Uranium	50.0	7.03		59.5	ug/L		105	(75%-125%)	DRS1	04/25/06	14:29
		+/-0.151		+/-3.76							

Notes:

The Qualifiers in this report are defined as follows:

- B Target analyte was detected in the sample as well as the associated blank.
- BD Results below the MDC or low tracer recovery.
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value.
- U Target analyte was analyzed for but not detected above the MDL, MDA, or LOD.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- d The 2:1 depletion requirement was not met for this sample
- h Sample preparation or preservation holding time exceeded.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

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

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

RAW DATA

Radiochemistry Batch Checklist, Rev 4

Batch# 523917 Product: Th-228 Date: 04/28/00

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.			N/A
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits. Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			N/A
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database. Batch entered into Case Narrative.	✓		
Batch non-conformances completed If applicable.			N/A

General Engineering Laboratories

2/22/2005

Primary Review Performed By: [Signature] 4/28/00

Secondary Review Performed By: [Signature] 4/28/00

04/20/07
04/27/07

Thorium-228 Que Sheet

25-APR-06

Batch #: 523917 Analyst: LCW1
 Tracer Isotope: Ac-227 Tracer Code: 05810
 LCS Isotope: Th-230 LCS Code: 01940
 Spike Isotope: Th-230 Spike Code: 01940
 Prep Date: 4/25/06 Initials: WV Pipet ID: 14160207

Minimum Due Date: 20-APR-06
 Expiration Date: 111100 Vol: 0.1
 Expiration Date: 102100 Vol: 0.1
 Expiration Date: 012100 Vol: 0.1

Ac-227 Separation Date/Time: 1845 4/25/06

Witness: BXF 4-25-06

Sample I	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Label #	Aliquot (g)	Th Det #	Ash Weight (g)
158783001	2603210144	SAMPLE		2 pCi/L	GROUND WATER	MWHL002	20-MAR-06	701	0.100 0.100	114	
158783002	2603210150	SAMPLE		2 pCi/L	GROUND WATER	MWHL002	20-MAR-06	702	0.100	117119	4125/06
158783003	2603210153	SAMPLE		2 pCi/L	GROUND WATER	MWHL002	20-MAR-06	703	0.100	118117	
158783004	2603210155	SAMPLE		2 pCi/L	GROUND WATER	MWHL002	20-MAR-06	704	0.100	119118	
158783005	2603210156	SAMPLE		2 pCi/L	GROUND WATER	MWHL002	20-MAR-06	705	0.100	120	
1201078559	MB for batch 523917	MB		UCF pCi/L to	GROUND WATER	QC ACCOUNT		706	0.200	121	
1201078560	2603210156(158783005DUP)	DUP		2 pCi/L	GROUND WATER	QC ACCOUNT	20-MAR-06	707	0.100	122	
1201078561	2603210156(158783005MS)	MS		2 pCi/L	GROUND WATER	QC ACCOUNT	20-MAR-06	708	0.100	123	
1201078562	LCS for batch 523917	LCS		UCF pCi/L to	GROUND WATER	QC ACCOUNT		709	0.200	124	4125/06

LOW 4/25/06

Handwritten signature

LOW 4/25/06

Solid Sample Dissolution by: LEACH/DIGESTION

Data Reviewed By: Handwritten signature

GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917 SAMPLE DATE : 25-APR-2006 18:45:00		SAMPLE ID : S0158783001_TH SAMPLE QTY: 0.175 L	
DETECTOR NUMBER :45-111B5 AVERAGE %EFFICIENCY :39.0145 % YIELD : 91.844		COUNT DATE:26-APR-2006 08:23:49 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :LCW1	
MS : 0159-O MSD : 0159-O LCS : 0159-O TRACER : 0387-B-102 BKG FILE: B114.CNF;20 BKG DATE: 23-APR-2006	MS PCI/L : 61.63304 MSD PCI/L : 61.63304 LCS PCI/L : 61.63304 TRACER DPM : 4.3512 EFF FILE : W114.CNF;11 CAL DATE: 4-APR-2006	MS ISOTOPE : TH-230 MSD ISOTOPE: TH-230 LCS ISOTOPE: TH-230 TRACER ISOTOPE: AC227 LIB FILE : ENV_ALPHA_TH.N	

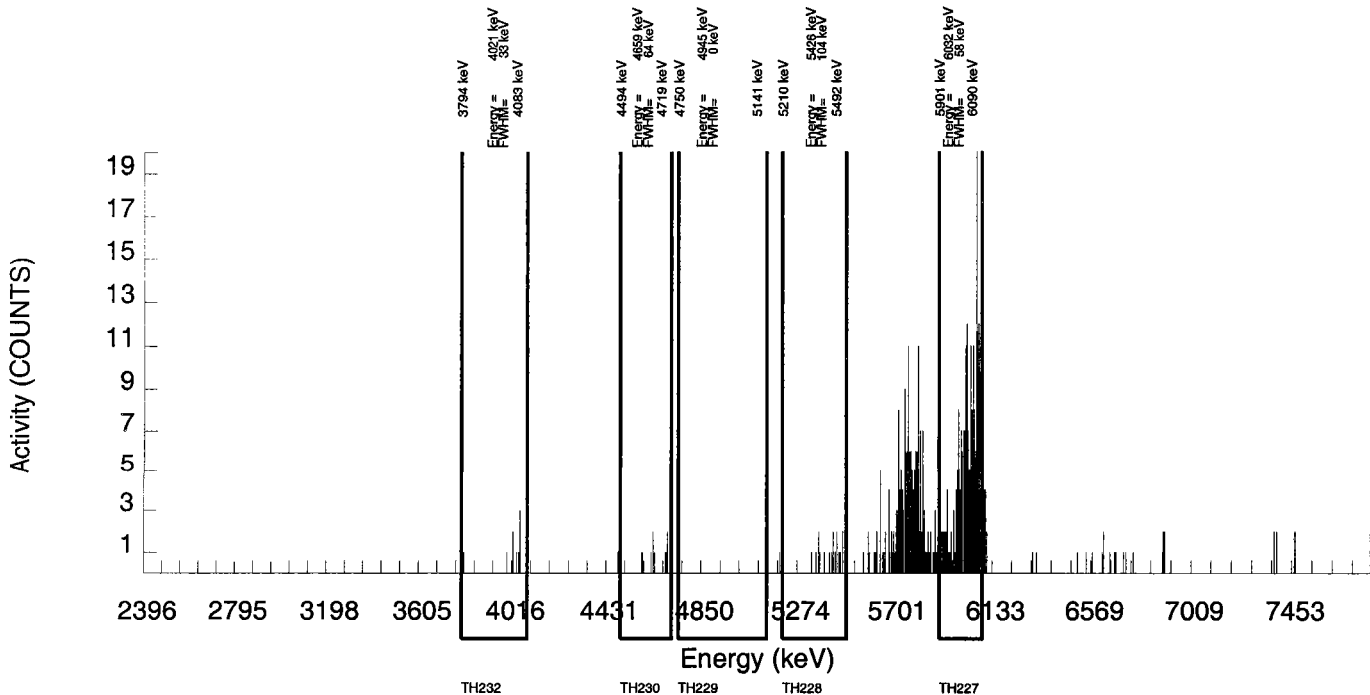
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	200.000	0.000	54.75400	1.12E+01	2.24E+00	1.68E-01
TH-228	5363.000	16.760	0.240	99.94000	5.02E-01	2.58E-01	1.58E-01
TH229	4900.000	0.000	0.000	99.52000	0.00E+00	2.00E+00	9.02E-02
TH-230	4625.000	10.000	0.000	100.0000	2.99E-01	1.94E-01	8.98E-02
TH-232	3972.000	10.000	0.000	100.0000	2.99E-01	1.94E-01	8.98E-02

REVIEWED BY:

DATE :

PH 4/27/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S0158783002_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-132FF3
AVERAGE %EFFICIENCY :38.3846
% YIELD : 88.105

COUNT DATE:26-APR-2006 08:23:51
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B117.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W117.CNF;11
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

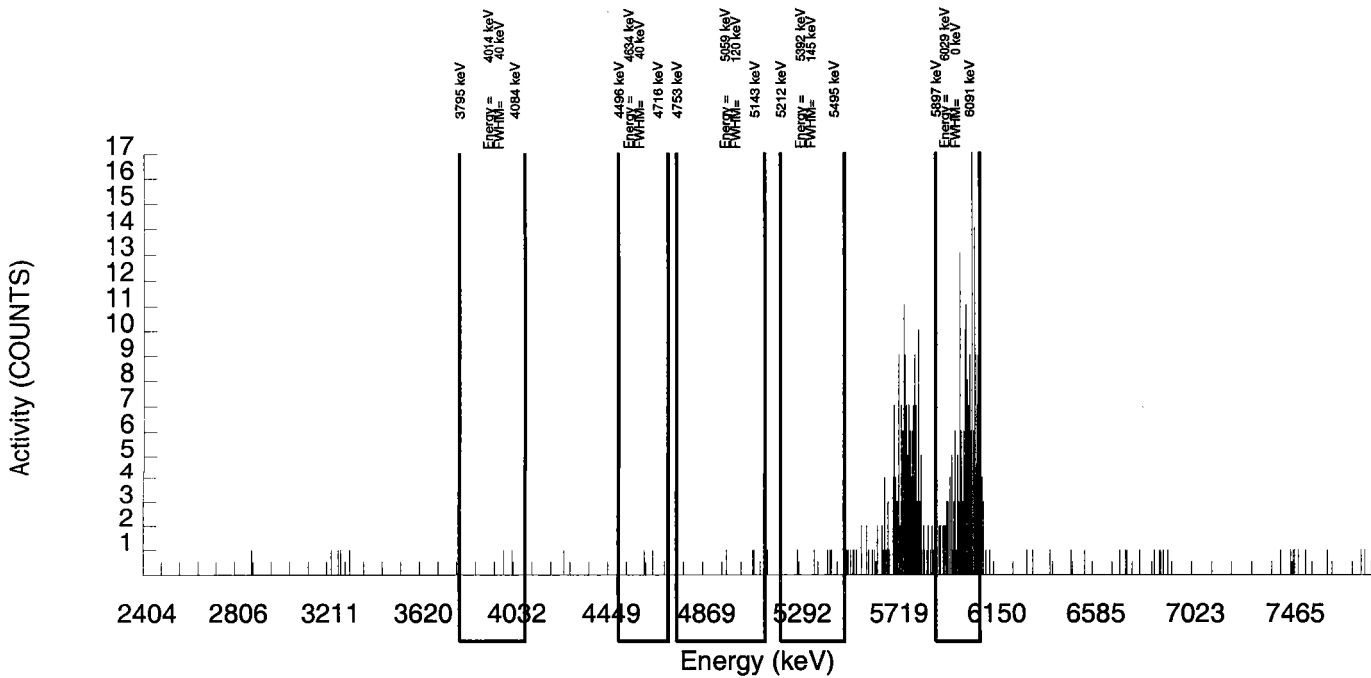
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	188.760	0.240	54.75400	9.80E+00	2.02E+00	2.74E-01
TH-228	5363.000	5.000	0.000	99.94000	1.39E-01	1.26E-01	8.34E-02
TH229	4900.000	3.000	0.000	99.52000	8.36E-02	9.74E-02	8.36E-02
TH-230	4625.000	2.000	0.000	100.0000	5.55E-02	7.89E-02	8.32E-02
TH-232	3972.000	2.000	0.000	100.0000	5.55E-02	7.89E-02	8.32E-02

REVIEWED BY:

DATE :

PH 04/27/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S0158783003_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-132FF4
AVERAGE %EFFICIENCY :39.4655
% YIELD : 74.452

COUNT DATE:26-APR-2006 08:23:54
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B118.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W118.CNF;9
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

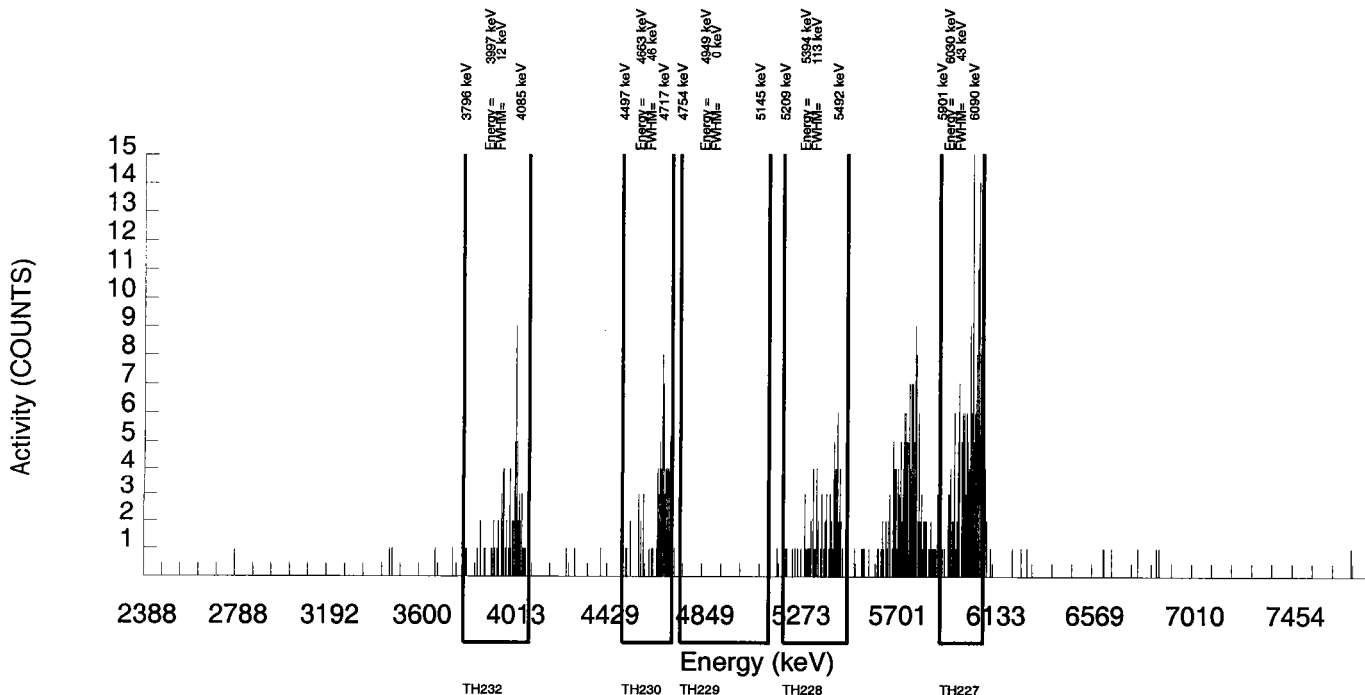
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	164.000	0.000	54.75400	9.80E+00	2.16E+00	1.79E-01
TH-228	5363.000	74.760	0.240	99.94000	2.39E+00	6.68E-01	1.69E-01
TH229	4900.000	-0.240	0.240	99.52000	-7.70E-03	1.55E-02	1.69E-01
TH-230	4625.000	72.000	0.000	100.00000	2.30E+00	6.50E-01	9.58E-02
TH-232	3972.000	71.000	0.000	100.00000	2.27E+00	6.44E-01	9.58E-02

REVIEWED BY:

DATE :

JH 3/27/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S0158783004_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-132FF5
AVERAGE %EFFICIENCY :39.5807
% YIELD : 98.569

COUNT DATE:26-APR-2006 08:23:56
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B119.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W119.CNF;10
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

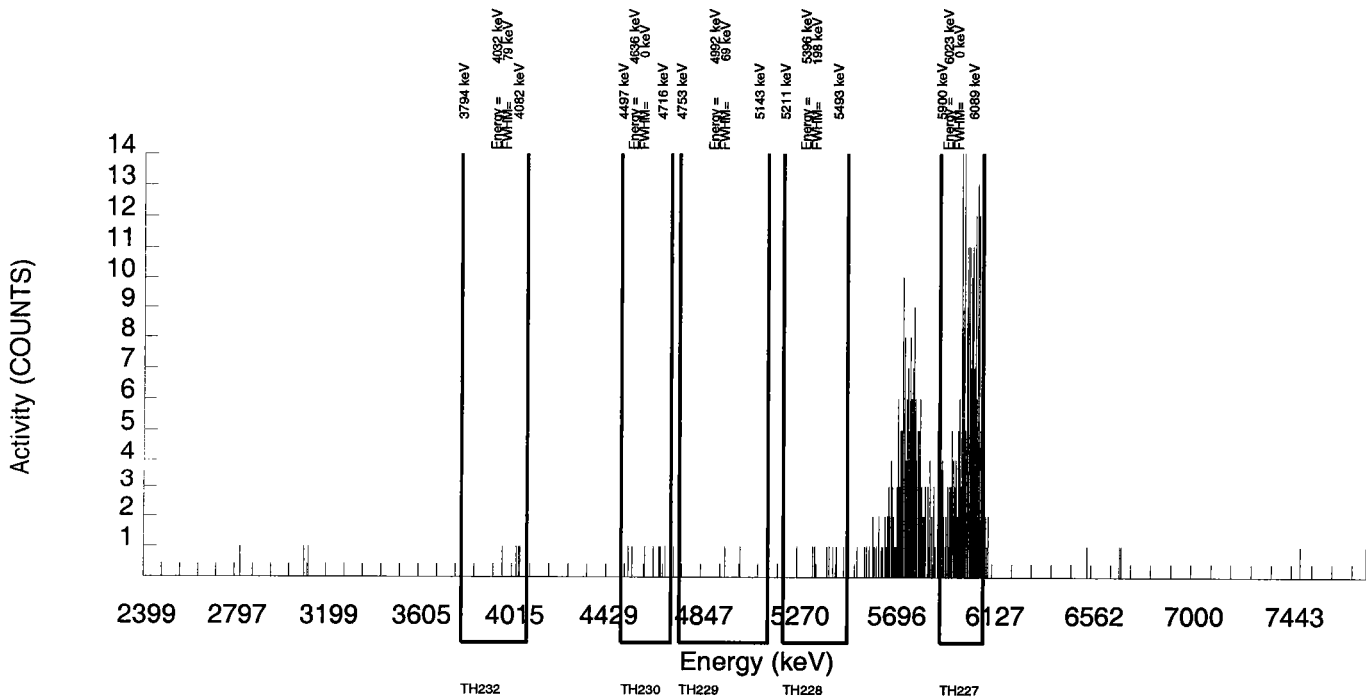
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	217.760	0.240	54.75400	9.80E+00	1.88E+00	2.38E-01
TH-228	5363.000	7.520	0.480	99.94000	1.81E-01	1.39E-01	1.50E-01
TH229	4900.000	2.000	0.000	99.52000	4.83E-02	6.87E-02	7.25E-02
TH-230	4625.000	8.000	0.000	100.0000	1.92E-01	1.39E-01	7.22E-02
TH-232	3972.000	3.520	0.480	100.0000	8.47E-02	9.83E-02	1.50E-01

REVIEWED BY:

DATE :

PH 3/12/10



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S0158783005_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-142F1
AVERAGE %EFFICIENCY :38.9236
% YIELD : 88.837

COUNT DATE:26-APR-2006 08:23:58
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B120.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W120.CNF;11
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

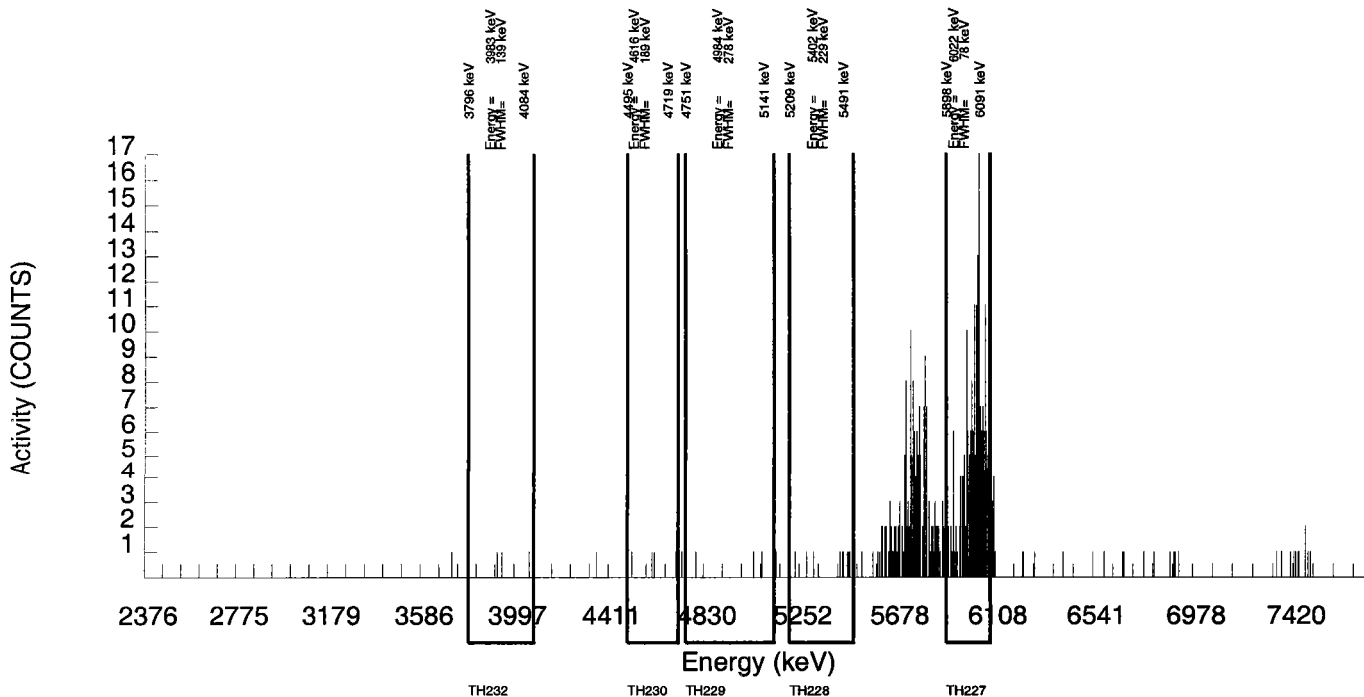
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	193.000	0.000	54.75400	9.80E+00	2.00E+00	1.52E-01
TH-228	5363.000	8.520	0.480	99.94000	2.32E-01	1.67E-01	1.69E-01
TH229	4900.000	3.000	0.000	99.52000	8.18E-02	9.52E-02	8.18E-02
TH-230	4625.000	4.000	0.000	100.0000	1.09E-01	1.10E-01	8.14E-02
TH-232	3972.000	3.000	0.000	100.0000	8.14E-02	9.47E-02	8.14E-02

REVIEWED BY:

DATE :

PJH 04/27/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S1201078559_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-142J4
AVERAGE %EFFICIENCY :38.7952
% YIELD : 71.582

COUNT DATE:26-APR-2006 08:23:59
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B121.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W121.CNF;11
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

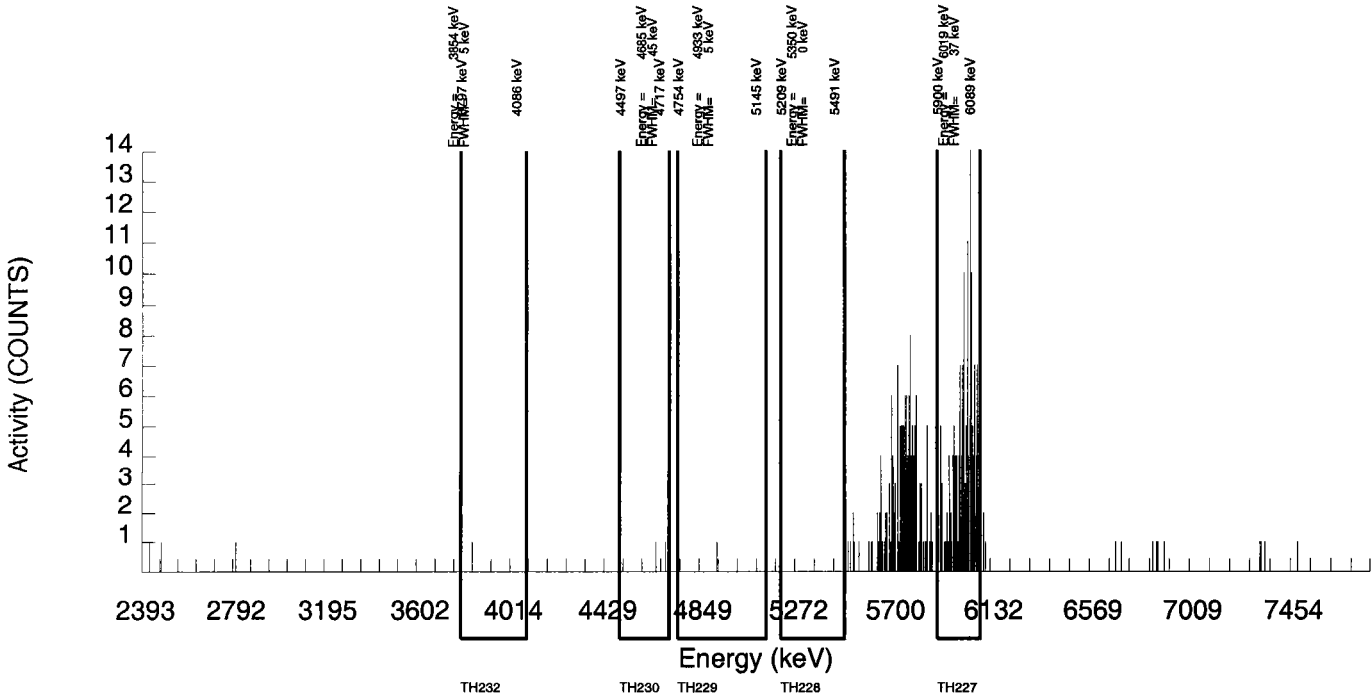
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	155.000	0.000	54.75400	9.80E+00	2.23E+00	1.90E-01
TH-228	5363.000	-0.240	0.240	99.94000	-8.12E-03	1.63E-02	1.79E-01
TH229	4900.000	0.760	0.240	99.52000	2.58E-02	7.00E-02	1.79E-01
TH-230	4625.000	2.000	0.000	100.0000	6.76E-02	9.62E-02	1.01E-01
TH-232	3972.000	1.000	0.000	100.0000	3.38E-02	6.78E-02	1.01E-01

REVIEWED BY:

DATE :

PH 2/12/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S1201078560_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-142J5
AVERAGE %EFFICIENCY :39.6432
% YIELD : 97.167

COUNT DATE:26-APR-2006 08:24:01
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B122.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W122.CNF;11
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

NUCLIDE ACTIVITY SUMMARY

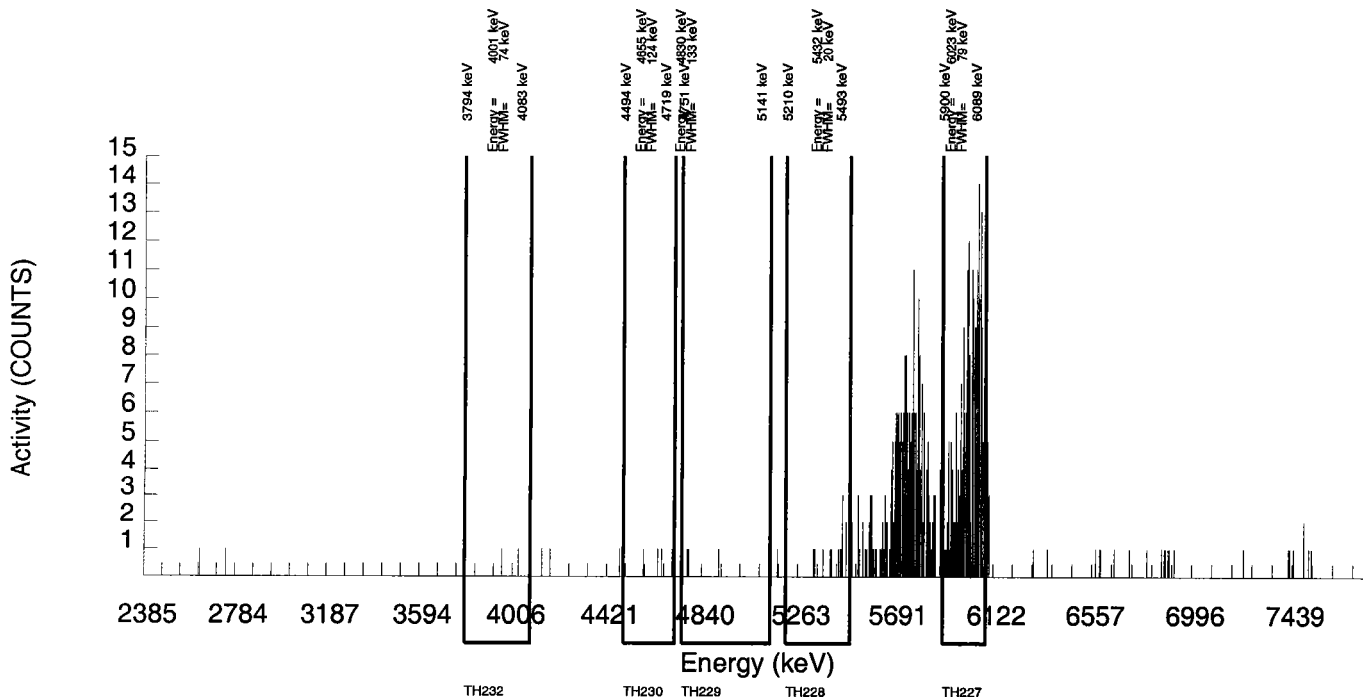
NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	215.000	0.000	54.75400	9.80E+00	1.89E+00	1.37E-01
TH-228	5363.000	13.000	0.000	99.94000	3.17E-01	1.81E-01	7.32E-02
TH229	4900.000	2.760	0.240	99.52000	6.76E-02	8.61E-02	1.29E-01
TH-230	4625.000	4.000	0.000	100.00000	9.74E-02	9.84E-02	7.31E-02
TH-232	3972.000	1.760	0.240	100.00000	4.29E-02	7.01E-02	1.29E-01

REVIEWED BY:

DATE :

JW 4/28/06

*RPO = 31.0% act < 5 uMDF
Th228 = 31.0% act < 5 uMDF
Th230 = 11.2%
Th232 = 61.9%
act < 5 uMDF*



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S1201078561_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-142V1
AVERAGE %EFFICIENCY :38.0530
% YIELD : 70.153

COUNT DATE:26-APR-2006 08:24:03
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B123.CNF;20
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W123.CNF;10
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	149.000	0.000	54.75400	9.80E+00	2.27E+00	1.97E-01
TH-228	5363.000	6.760	0.240	99.94000	2.38E-01	1.91E-01	1.86E-01
TH229	4900.000	12.000	0.000	99.52000	4.24E-01	2.54E-01	1.06E-01
TH-230	4625.000	1208.000	0.000	100.0000	4.25E+01	7.37E+00	1.05E-01
TH-232	3972.000	5.760	0.240	100.0000	2.02E-01	1.76E-01	1.86E-01

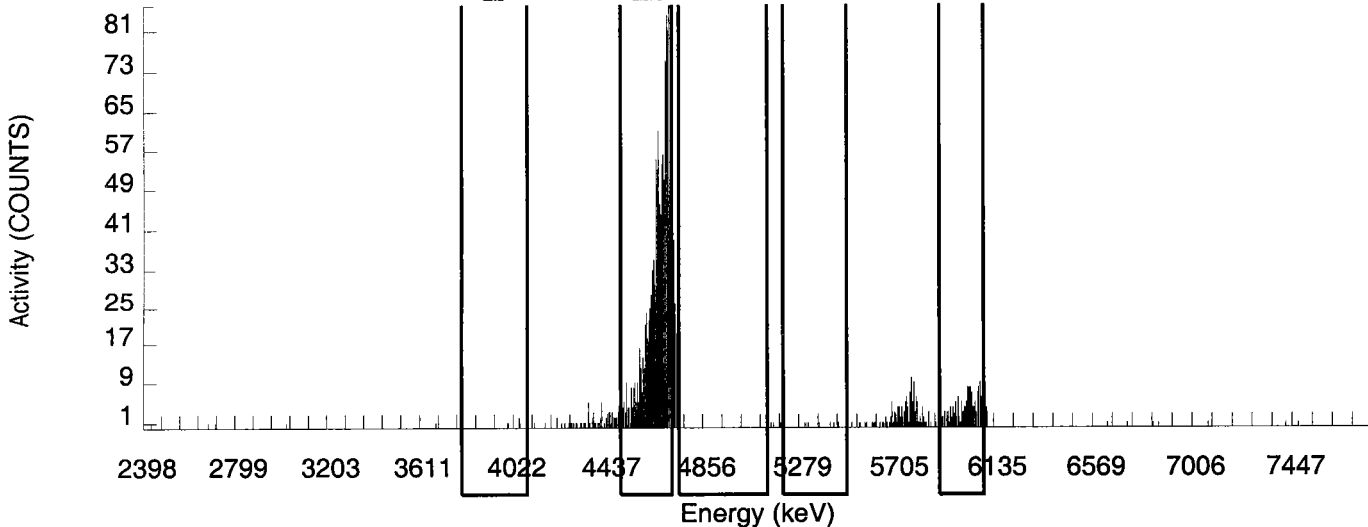
REVIEWED BY:

DATE :

DH101/27100
~~MD = 42.5~~ *78.8%*
53.9

DH101/27100

MS = 42.5 - .109
53.9 = 78.6%



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917
SAMPLE DATE : 25-APR-2006 18:45:00

SAMPLE ID : S1201078562_TH
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :45-145K2
AVERAGE %EFFICIENCY :39.0583
% YIELD : 93.746

COUNT DATE:27-APR-2006 14:49:09
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0159-O
MSD : 0159-O
LCS : 0159-O
TRACER : 0387-B-102
BKG FILE: B132.CNF;16
BKG DATE: 23-APR-2006

MS PCI/L : 53.92891
MSD PCI/L : 53.92891
LCS PCI/L : 53.92891
TRACER DPM : 4.3512
EFF FILE : W132.CNF;11
CAL DATE: 4-APR-2006

MS ISOTOPE : TH-230
MSD ISOTOPE: TH-230
LCS ISOTOPE: TH-230
TRACER ISOTOPE: AC227
LIB FILE : ENV_ALPHA_TH.N

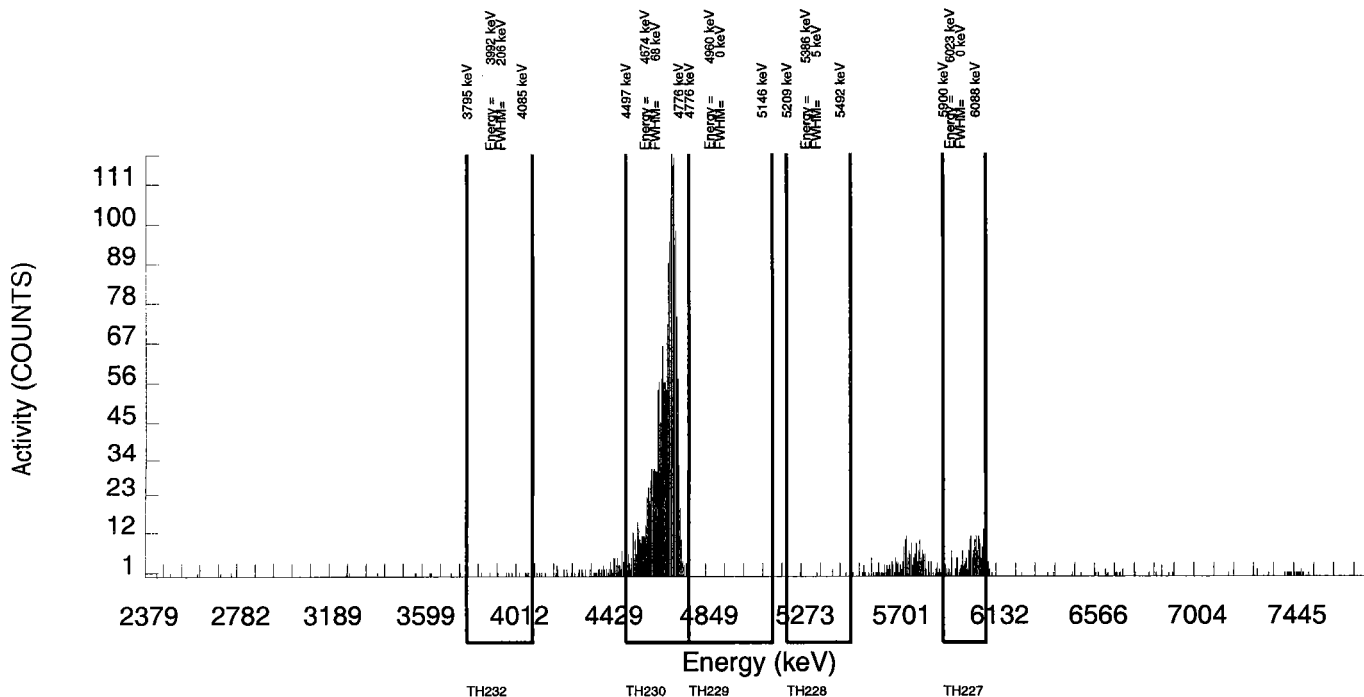
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	195.000	0.000	54.75400	9.80E+00	1.98E+00	1.51E-01
TH-228	5363.000	4.760	0.240	99.94000	1.22E-01	1.17E-01	1.36E-01
TH229	4900.000	-0.240	0.240	99.52000	-6.18E-03	1.24E-02	1.36E-01
TH-230	4625.000	1869.000	0.000	100.0000	4.79E+01	7.21E+00	7.69E-02
TH-232	3972.000	11.760	0.240	100.0000	3.01E-01	1.83E-01	1.35E-01

REVIEWED BY:

DATE: PJH 04/28/06

$$UCS = \frac{47.9}{53.9} = 88.9\%$$



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 523917 SAMPLE DATE : 25-APR-2006 18:45:00		SAMPLE ID : S1201078562_TH SAMPLE QTY: 0.200 L	
DETECTOR NUMBER :45-145K2 AVERAGE %EFFICIENCY :39.0583 % YIELD : 93.746		COUNT DATE:27-APR-2006 14:49:09 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :LCW1	
MS : 0159-O MSD : 0159-O LCS : 0159-O TRACER : 0387-B-102 BKG FILE: B132.CNF;16 BKG DATE: 23-APR-2006		MS PCI/L : 53.92891 MSD PCI/L : 53.92891 LCS PCI/L : 53.92891 TRACER DPM : 4.3512 EFF FILE : W132.CNF;11 CAL DATE: 4-APR-2006	
		MS ISOTOPE : TH-230 MSD ISOTOPE: TH-230 LCS ISOTOPE: TH-230 TRACER ISOTOPE: AC227 LIB FILE : ENV_ALPHA_TH.N	

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	ERROR 2-SIGMA	MDA pCi/L
AC-227	5978.000	195.000	0.000	54.75400	9.80E+00	1.98E+00	1.51E-01
TH-228	5363.000	4.760	0.240	99.94000	1.22E-01	1.17E-01	1.36E-01
TH229	4900.000	6.760	0.240	99.52000	1.74E-01	1.39E-01	1.36E-01
TH-230	4625.000	1572.000	0.000	100.0000	4.03E+01	6.12E+00	7.69E-02
TH-232	3972.000	11.760	0.240	100.0000	3.01E-01	1.83E-01	1.35E-01

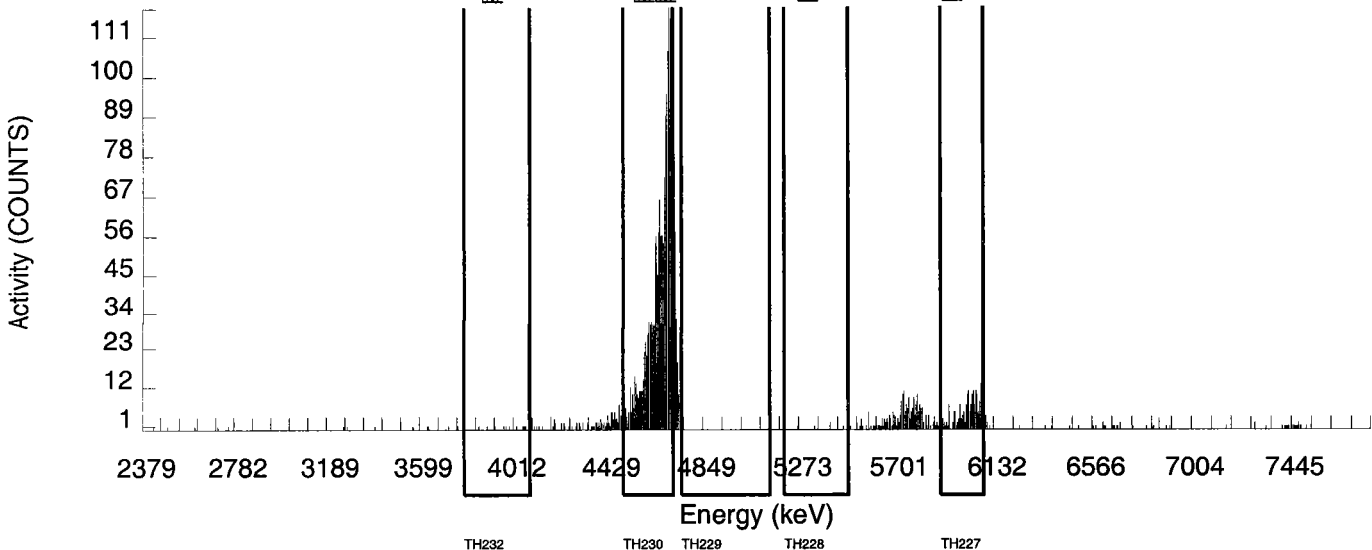
REVIEWED BY:

DATE :

DO NOT REPORT

$$LCS = \frac{40.3}{53.9} = 74.8\%$$

Integrated



Radiochemistry Batch Checklist, Rev 4

Batch# 524204 Product: U Date: 04/28/00

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.			N/A
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%. Or meets the client's required RER acceptance criteria.	✓		CASE NARRATIVE
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			N/A
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database. Batch entered into Case Narrative.	✓		
Batch non-conformances completed If applicable.			N/A

General Engineering Laboratories

2/22/2005
Primary Review Performed By: [Signature] 04/28/00

Secondary Review Performed By: [Signature] 4/28/00

04/20-04/27

Uranium Que Sheet

27-APR-06

Batch #: 524204 Analyst: LCW1 Minimum Due Date: 20-APR-06
 Tracer Isotope: U-232/N-236 Tracer Code: 0000H Expiration Date: 11/2/07 Vol: 0.1
 LCS Isotope: U-238 LCS Code: 0058b Expiration Date: 11/21/00 Vol: 0.1
 Spike Isotope: U-238 Spike Code: 0058b Expiration Date: 11/21/00 Vol: 0.1
 Prep Date: 4/10/06 Initials: LW Pipet ID: 210154b Balance ID: 10150107

Witness: Jly 4-14-06

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Label #	Aliquot (g/μl)	U Det #	Ash Weight (g)
158783001	2603210144	SAMPLE		1 pCi/L	GROUND WATI	MWHL002	20-MAR-06	001	0.100	26	
158783002	2603210150	SAMPLE		1 pCi/L	GROUND WATI	MWHL002	20-MAR-06	002	0.100	27	
158783003	2603210153	SAMPLE		1 pCi/L	GROUND WATI	MWHL002	20-MAR-06	003	0.100	29	
158783004	2603210155	SAMPLE		1 pCi/L	GROUND WATI	MWHL002	20-MAR-06	004	0.100	30	
158783005	2603210156	SAMPLE		1 pCi/L	GROUND WATI	MWHL002	20-MAR-06	005	0.100	37	
1201079208	MB for batch 524204	MB		UCF pCi/L to pC	GROUND WATI	QC ACCOUNT		006	0.100	38	
1201079209	2603210156(158783005DUP)	DUP		1 pCi/L	GROUND WATI	QC ACCOUNT	20-MAR-06	007	0.100	40	
1201079210	2603210156(158783005MS)	MS		1 pCi/L	GROUND WATI	QC ACCOUNT	20-MAR-06	008	0.100	41	
1201079211	LCS for batch 524204	LCS		UCF pCi/L to pC	GROUND WATI	QC ACCOUNT		009	0.100	42	

WV 4/14/06

Handwritten signature

Data Reviewed By: *Handwritten signature*

Solid Sample Dissolution by: LEACH DIGESTION
 Citric One

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

General Engineering Laboratories, Radiochemistry Division

GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S0158783001_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :34427
AVERAGE %EFFICIENCY :31.1163
% YIELD : 67.441

COUNT DATE:28-APR-2006 07:18:29
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B026.CNF;694
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W026.CNF;193
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

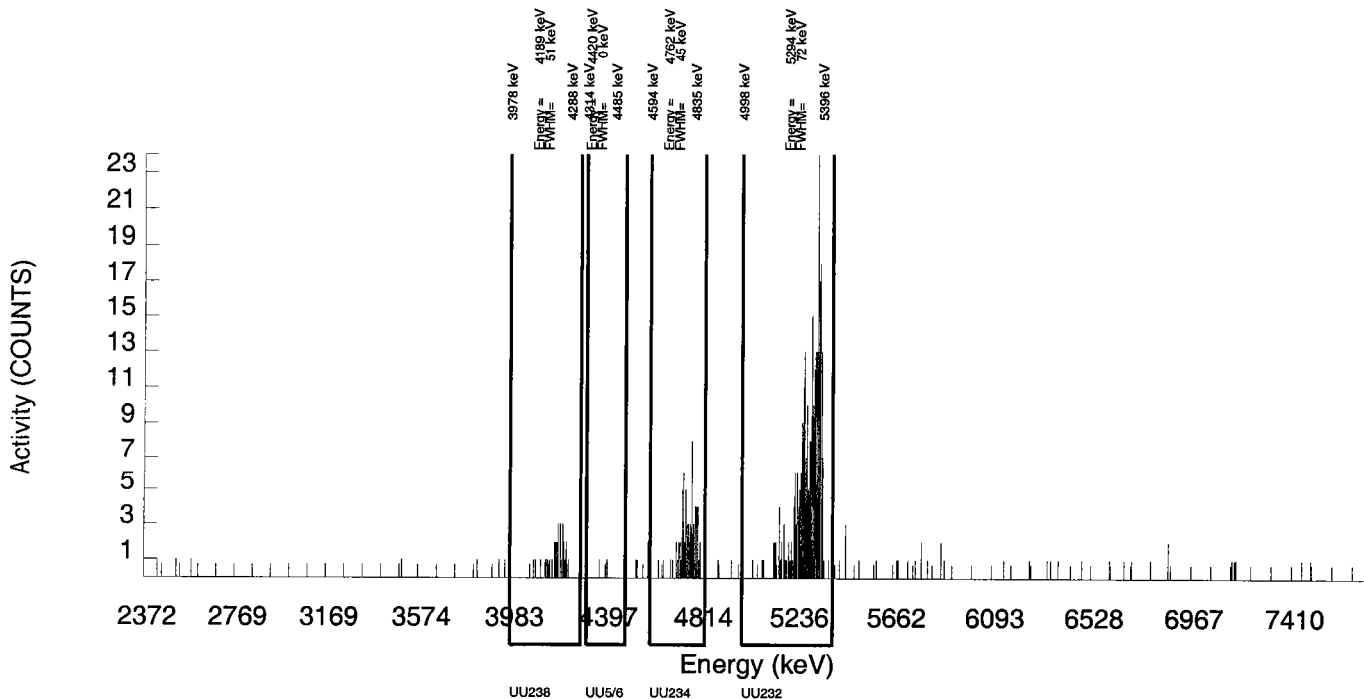
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	69.080	1.920	100.0000	3.09E+00	8.68E-01	4.22E-01	7.41E-01
U232	5302.100	272.240	5.760	100.0000	1.22E+01	2.31E+00	6.34E-01	1.47E+00
U-235	4391.000	3.040	0.960	80.90000	1.68E-01	2.24E-01	4.18E-01	2.23E-01
U-238	4184.730	30.280	0.720	100.0000	1.35E+00	5.28E-01	3.11E-01	4.89E-01

REVIEWED BY:

DATE :

PyH 04/28/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S0158783002_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :31436
AVERAGE %EFFICIENCY :28.5131
% YIELD : 103.975

COUNT DATE:28-APR-2006 07:18:29
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B027.CNF;695
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W027.CNF;220
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

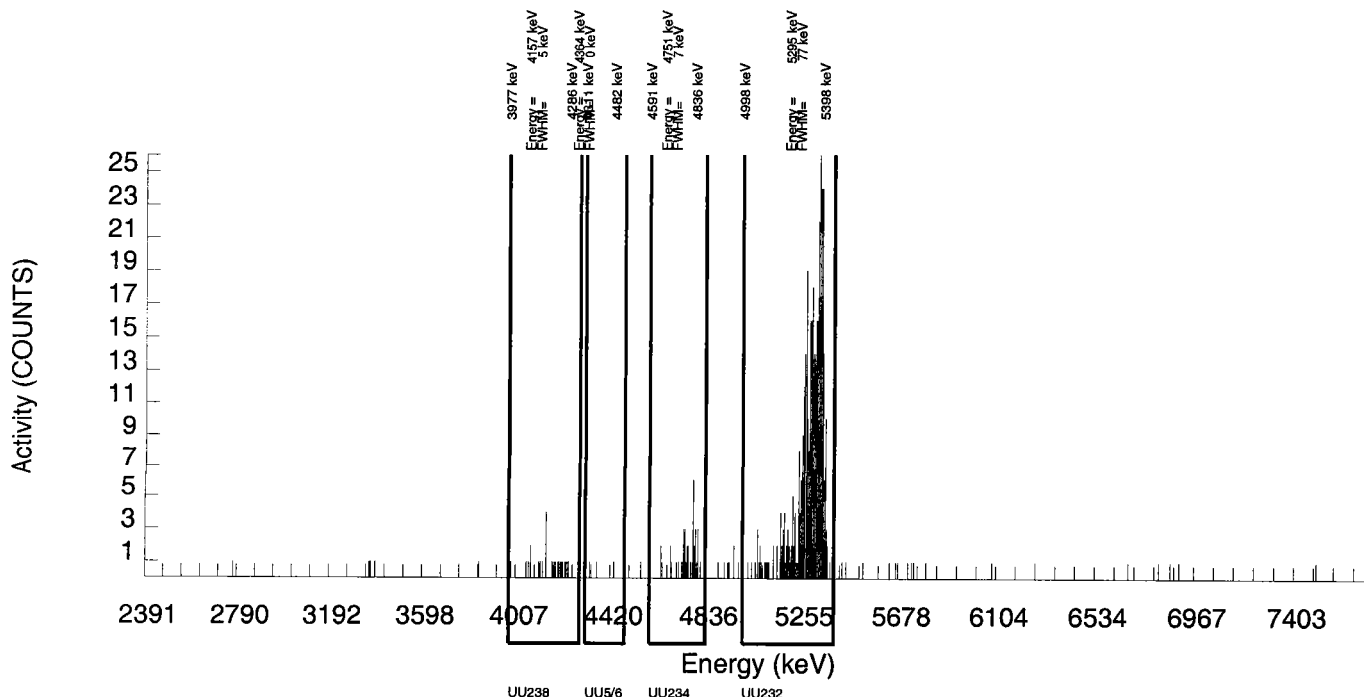
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	40.280	0.720	100.0000	1.28E+00	4.32E-01	2.20E-01	3.98E-01
U232	5302.100	384.600	2.400	100.0000	1.22E+01	2.01E+00	3.23E-01	1.22E+00
U-235	4391.000	3.760	0.240	80.90000	1.47E-01	1.56E-01	2.07E-01	1.54E-01
U-238	4184.730	23.520	0.480	100.0000	7.45E-01	3.20E-01	1.97E-01	3.05E-01

REVIEWED BY:

DATE :

Ph 3/18/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S0158783003_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :30419
AVERAGE %EFFICIENCY :28.0377
% YIELD : 77.090

COUNT DATE:28-APR-2006 07:18:29
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B029.CNF;695
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W029.CNF;211
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

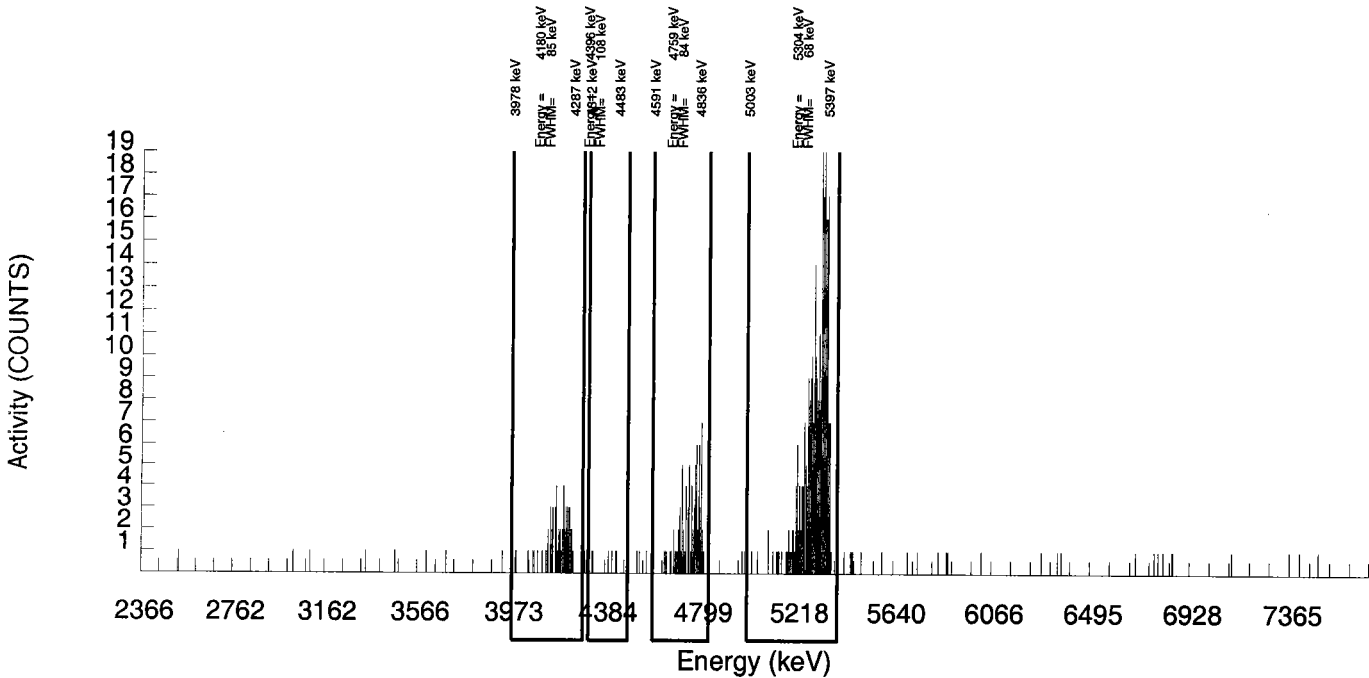
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	77.280	0.720	100.0000	3.36E+00	8.95E-01	3.02E-01	7.52E-01
U232	5302.100	280.400	3.600	100.0000	1.22E+01	2.28E+00	5.14E-01	1.44E+00
U-235	4391.000	5.760	0.240	80.90000	3.09E-01	2.63E-01	2.83E-01	2.59E-01
U-238	4184.730	56.280	0.720	100.0000	2.44E+00	7.34E-01	3.02E-01	6.43E-01

REVIEWED BY:

DATE :

PKH 04/28/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S0158783004_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :30420
AVERAGE %EFFICIENCY :30.3262
% YIELD : 87.072

COUNT DATE:28-APR-2006 07:18:29
ELAPSED LIVE TIME(SEC): 14400.00
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B030.CNF;692
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W030.CNF;200
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

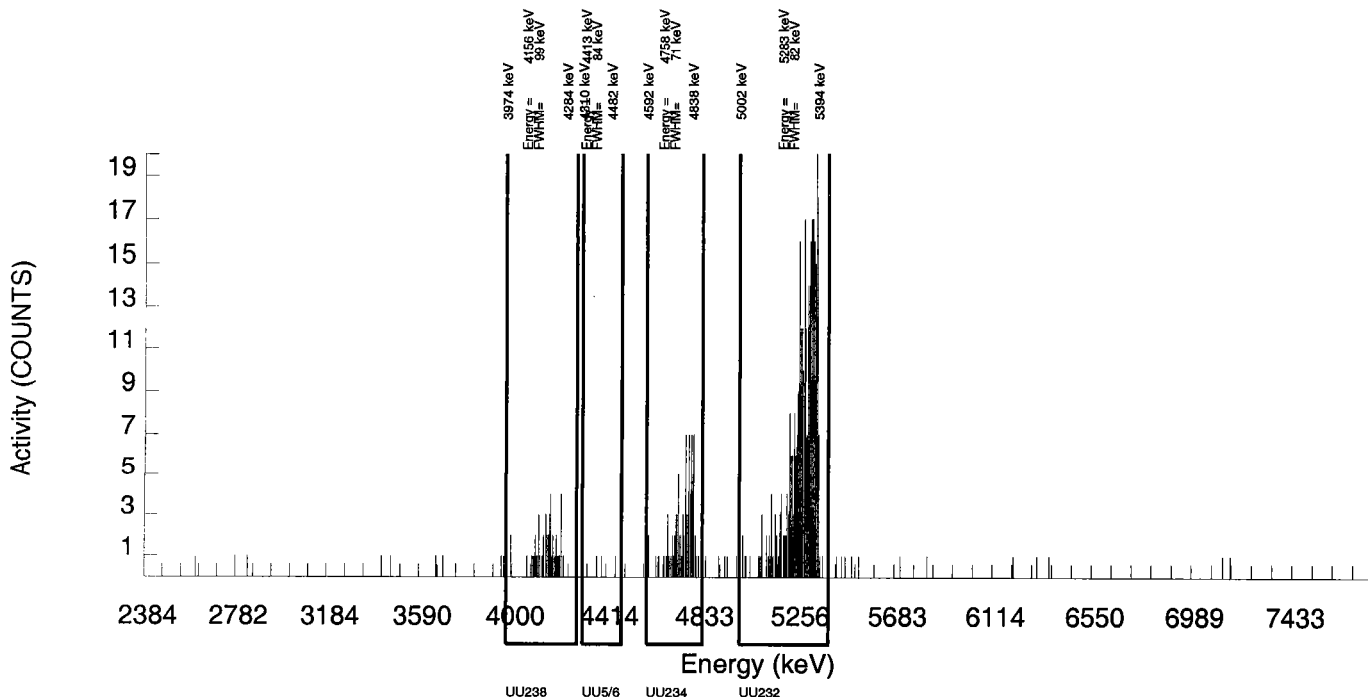
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	86.040	0.960	100.0000	3.06E+00	7.71E-01	2.69E-01	6.51E-01
U232	5302.100	342.560	1.440	100.0000	1.22E+01	2.09E+00	3.05E-01	1.29E+00
U-235	4391.000	3.000	0.000	80.90000	1.32E-01	1.50E-01	1.32E-01	1.49E-01
U-238	4184.730	44.560	1.440	100.0000	1.58E+00	5.20E-01	3.05E-01	4.74E-01

REVIEWED BY:

DATE :

PSH 4/28/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S0158783005_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :32690
AVERAGE %EFFICIENCY :32.9828
% YIELD : 75.750

COUNT DATE:28-APR-2006 07:18:33
ELAPSED LIVE TIME(SEC): 14399.99
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B037.CNF;695
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W037.CNF;206
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

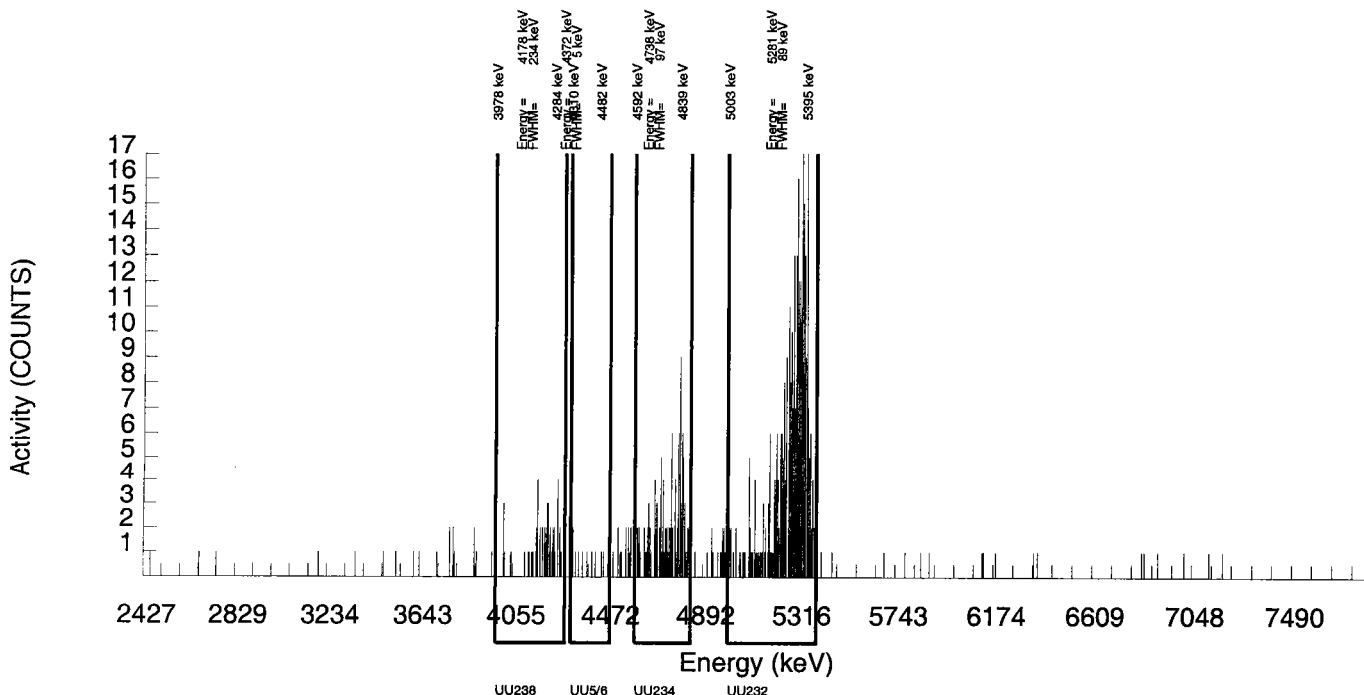
NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	104.560	1.440	100.0000	3.93E+00	9.32E-01	3.22E-01	7.59E-01
U232	5302.100	324.120	2.880	100.0000	1.22E+01	2.14E+00	4.10E-01	1.33E+00
U-235	4391.000	11.280	0.720	80.90000	5.24E-01	3.26E-01	3.22E-01	3.17E-01
U-238	4184.730	48.800	1.200	100.0000	1.83E+00	5.80E-01	3.04E-01	5.22E-01

REVIEWED BY:

DATE :

pgl 4/28/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 26-APR-2006 00:00:00

SAMPLE ID : S1201079208_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :19323
AVERAGE %EFFICIENCY :35.5065
% YIELD : 53.284

COUNT DATE:28-APR-2006 07:18:33
ELAPSED LIVE TIME(SEC): 14399.99
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B038.CNF;695
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4057
EFF FILE : W038.CNF;211
CAL DATE: 4-APR-2006

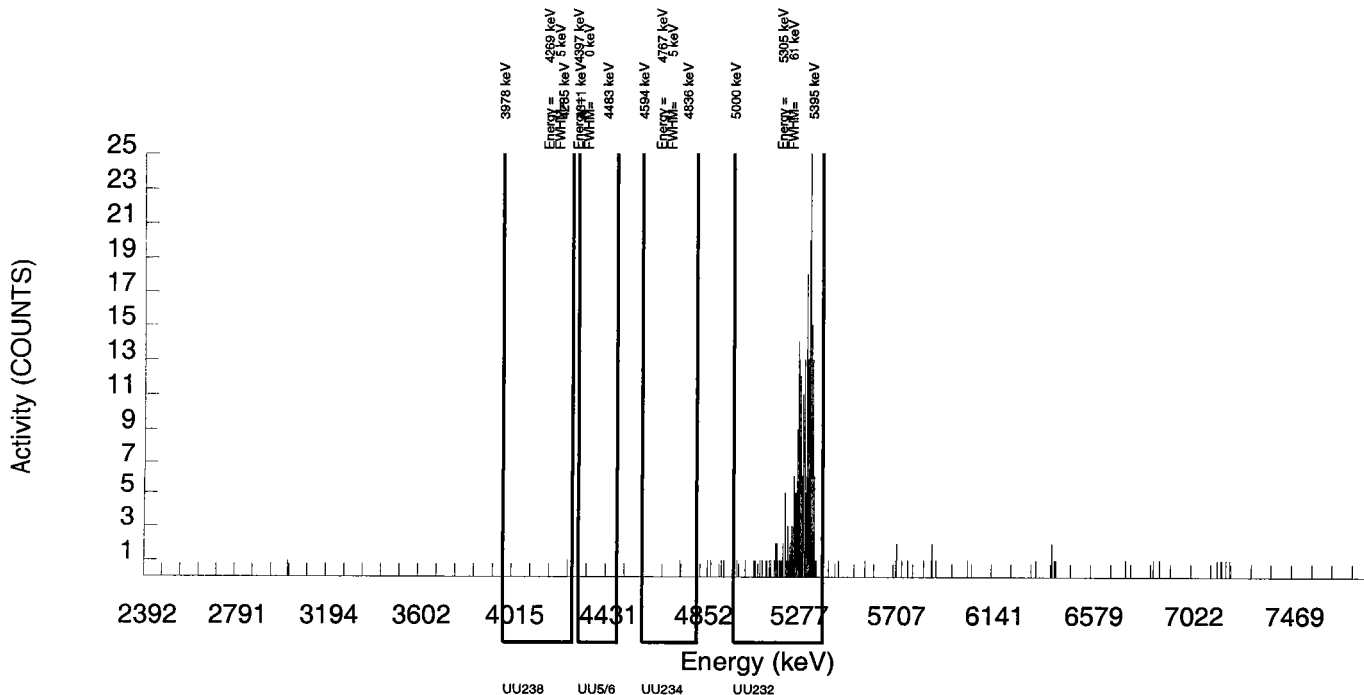
MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	0.040	0.960	100.0000	1.98E-03	1.08E-01	3.75E-01	1.08E-01
U232	5302.100	245.440	4.560	100.0000	1.22E+01	2.40E+00	6.41E-01	1.54E+00
U-235	4391.000	-0.960	0.960	80.90000	-5.89E-02	5.84E-02	4.63E-01	5.77E-02
U-238	4184.730	0.040	0.960	100.0000	1.98E-03	1.08E-01	3.75E-01	1.08E-01

REVIEWED BY:

DATE: *Phy 4/28/06*



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204 SAMPLE DATE : 20-MAR-2006 00:00:00		SAMPLE ID : S1201079209_UU SAMPLE QTY: 0.200 L	
DETECTOR NUMBER :30446 AVERAGE %EFFICIENCY :32.3252 % YIELD : 96.625		COUNT DATE:28-APR-2006 07:18:33 ELAPSED LIVE TIME(SEC): 14399.99 ANALYST :LCW1	
MS : 0858-B MSD : 0858-B LCS : 0858-B TRACER : 0688-H BKG FILE: B040.CNF;695 BKG DATE: 23-APR-2006	MS PCI/L : 13.14673 MSD PCI/L : 13.14673 LCS PCI/L : 13.14673 TRACER DPM : 5.4110 EFF FILE : W040.CNF;203 CAL DATE: 4-APR-2006	MS ISOTOPE : U-238 MSD ISOTOPE: U-238 LCS ISOTOPE: U-238 TRACER ISOTOPE: U232 LIB FILE : ENV_ALPHA_UU.N	

NUCLIDE ACTIVITY SUMMARY

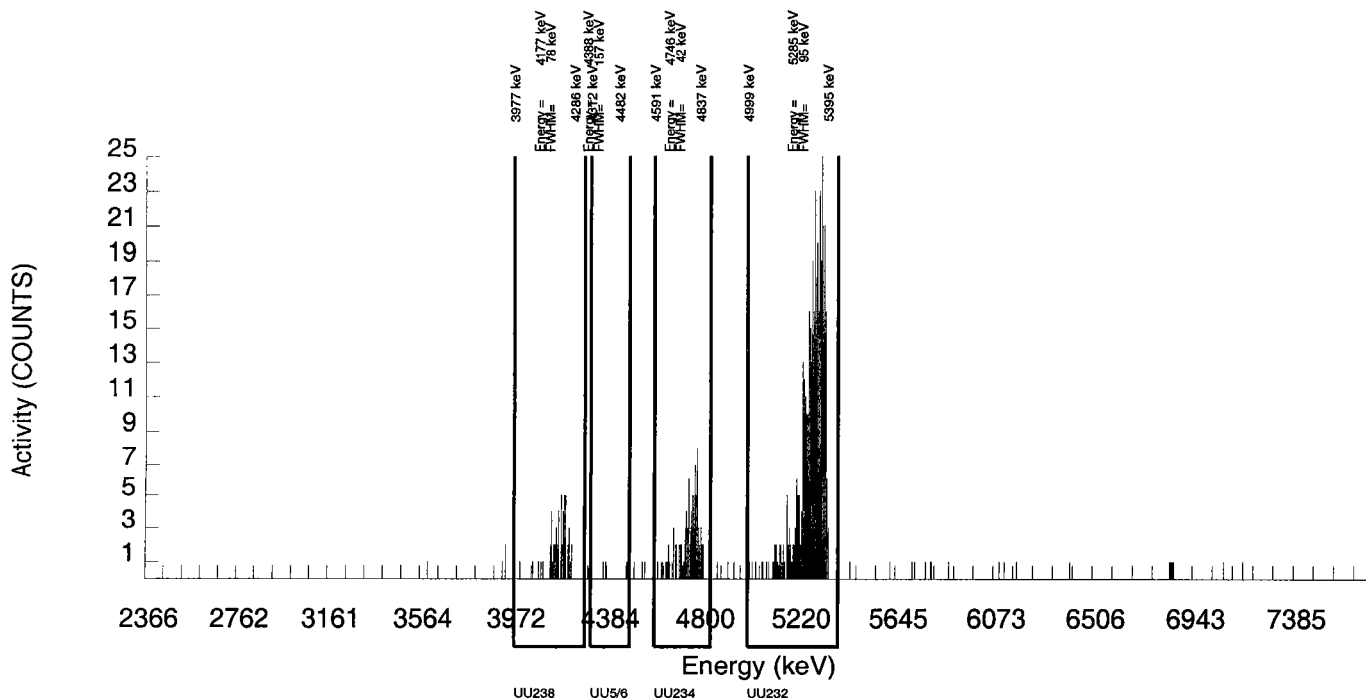
NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	85.560	1.440	100.0000	2.57E+00	6.42E-01	2.58E-01	5.50E-01
U232	5302.100	405.200	4.800	100.0000	1.22E+01	1.97E+00	3.97E-01	1.20E+00
U-235	4391.000	3.760	0.240	80.90000	1.40E-01	1.48E-01	1.96E-01	1.47E-01
U-238	4184.730	53.520	0.480	100.0000	1.61E+00	4.80E-01	1.87E-01	4.33E-01

REVIEWED BY:

DATE: *28/4/2006*

RPO

U314 = 41.8% REC=2.34
U235 = 11.6% REC=2.10
U238 = 12.8%



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204
SAMPLE DATE : 20-MAR-2006 00:00:00

SAMPLE ID : S1201079210_UU
SAMPLE QTY: 0.200 L

DETECTOR NUMBER :22834
AVERAGE %EFFICIENCY :33.2270
% YIELD : 82.904

COUNT DATE:28-APR-2006 07:18:33
ELAPSED LIVE TIME(SEC): 14399.99
ANALYST :LCW1

MS : 0858-B
MSD : 0858-B
LCS : 0858-B
TRACER : 0688-H
BKG FILE: B041.CNF;690
BKG DATE: 23-APR-2006

MS PCI/L : 13.14673
MSD PCI/L : 13.14673
LCS PCI/L : 13.14673
TRACER DPM : 5.4110
EFF FILE : W041.CNF;196
CAL DATE: 4-APR-2006

MS ISOTOPE : U-238
MSD ISOTOPE: U-238
LCS ISOTOPE: U-238
TRACER ISOTOPE: U232
LIB FILE : ENV_ALPHA_UU.N

NUCLIDE ACTIVITY SUMMARY

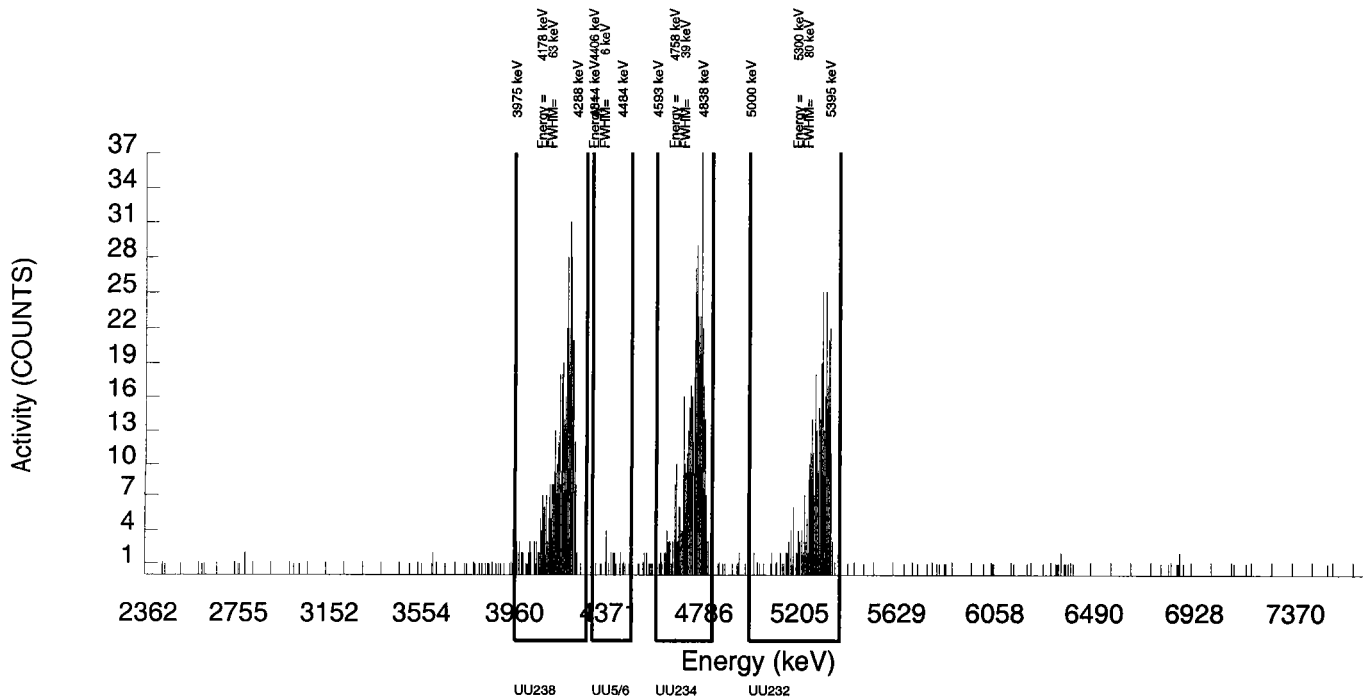
NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	433.800	1.200	100.0000	1.48E+01	2.42E+00	2.76E-01	1.39E+00
U232	5302.100	357.360	2.640	100.0000	1.22E+01	2.06E+00	3.60E-01	1.27E+00
U-235	4391.000	23.520	0.480	80.90000	9.90E-01	4.26E-01	2.62E-01	4.05E-01
U-238	4184.730	440.520	0.480	100.0000	1.50E+01	2.45E+00	2.12E-01	1.40E+00

REVIEWED BY:

DATE :

$$ms = \frac{15.0 - 1.83}{13.1} = 101\%$$

PJH 04/28/06



GENERAL ENGINEERING LABORATORIES, LLC.
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 524204 SAMPLE DATE : 26-APR-2006 00:00:00		SAMPLE ID : S1201079211_UU SAMPLE QTY: 0.200 L	
DETECTOR NUMBER :32695 AVERAGE %EFFICIENCY :33.6124 % YIELD : 94.484		COUNT DATE:28-APR-2006 07:18:33 ELAPSED LIVE TIME(SEC): 14399.99 ANALYST :LCW1	
MS : 0858-B MSD : 0858-B LCS : 0858-B TRACER : 0688-H BKG FILE: B042.CNF;687 BKG DATE: 23-APR-2006	MS PC/I/L : 13.14673 MSD PC/I/L : 13.14673 LCS PC/I/L : 13.14673 TRACER DPM : 5.4057 EFF FILE : W042.CNF;185 CAL DATE: 4-APR-2006	MS ISOTOPE : U-238 MSD ISOTOPE: U-238 LCS ISOTOPE: U-238 TRACER ISOTOPE: U232 LIB FILE : ENV_ALPHA_UU.N	

NUCLIDE ACTIVITY SUMMARY

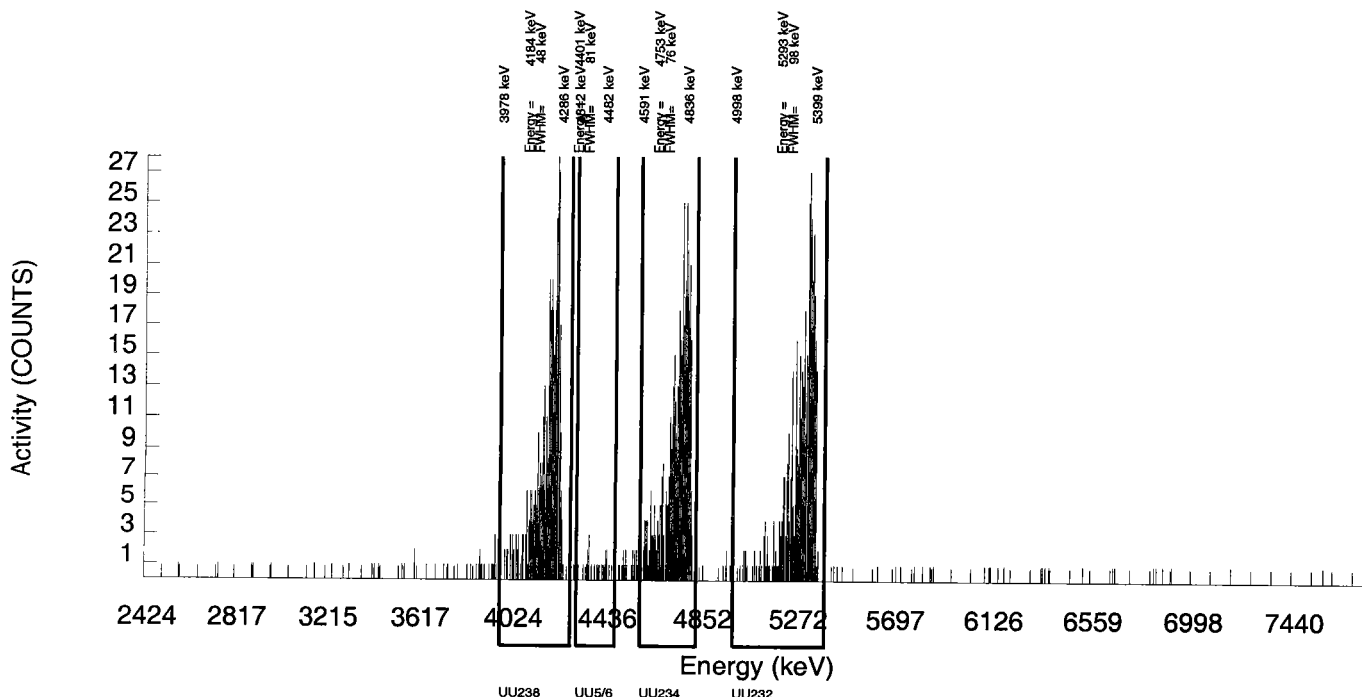
NUCLIDE	ENERGY	NET AREA	BKG AREA	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	UNC pCi/L
U-3/4	4763.020	393.360	2.640	100.0000	1.16E+01	1.89E+00	3.12E-01	1.15E+00
U232	5302.100	412.000	6.000	100.0000	1.22E+01	1.96E+00	4.25E-01	1.19E+00
U-235	4391.000	19.840	2.160	80.90000	7.25E-01	3.52E-01	3.59E-01	3.40E-01
U-238	4184.730	381.560	1.440	100.0000	1.13E+01	1.84E+00	2.54E-01	1.13E+00

REVIEWED BY:

DATE :

$$LCS = \frac{11.3}{13.1} = 86.3\%$$

PJH 04/28/06



Radiochemistry Batch Checklist, Rev 4

Batch# 523017 Product: 8L/mwHL Date: 4/25/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.			NA
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.			NA
Or meets the client's contract acceptance criteria.			
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database.	✓		
Batch entered into Case Narrative.			
Batch non-conformances completed If applicable.			NA

General Engineering Laboratories

2/22/2005
Primary Review Performed By: Jodi Cummings 4/25/06

Secondary Review Performed By: J. Harts 4/25/06

Gamma Spec Que Sheet

04/21/2006

Batch #: 523017 Analyst: MJH1 Minimum Due Date: 04/20/2006
 Gamma Spike Isotope: Mixed Gamma Spike Code: N/A Expiration Date: N/A Vol: N/A Nominal Concentration: N/A
 Gamma LCS Isotope: Mixed Gamma LCS Code: 0781-A Expiration Date: 4/27/06 Vol: 1.0 mL Nominal Concentration: (137=463.3 (0.60)=659.9
 Initials: DRS Prep Date: 4-21-06 Witness: NK

Sample ID	Client Description / Container ID	Type	Hazard Code	RDL	Client	Matrix	Collect Date	Aliquot (g / F)	Detector	Sealing Date/Time (if Applicable)
158783001	2603210144	SAMPLE	10 pCi/L	MWHL002	GROUND WATER	20-MAR-06 08:00:00	2.0	6		
158783002	2603210150	SAMPLE	10 pCi/L	MWHL002	GROUND WATER	20-MAR-06 10:00:00	2.0	9		
158783003	2603210153	SAMPLE	10 pCi/L	MWHL002	GROUND WATER	20-MAR-06 15:00:00	2.0	well		
158783004	2603210155	SAMPLE	10 pCi/L	MWHL002	GROUND WATER	20-MAR-06 14:00:00	2.0	10		
158783005	2603210156	SAMPLE	10 pCi/L	MWHL002	GROUND WATER	20-MAR-06 12:00:00	2.0	11		
1201076443	MB for batch 523017	MB	10 pCi/L	QC ACCOUNT	GROUND WATER	4-21-06	2.0	3		
1201076444	2603210144(158783001DUP)	DUP	10 pCi/L	QC ACCOUNT	GROUND WATER	20-MAR-06 08:00:00	2.0	3		
1201076445	LCS for batch 523017	LCS	10 pCi/L	QC ACCOUNT	GROUND WATER	4-21-06	2.0	WELL		

Handwritten initials/signature

Data Reviewed By: Jodi Cunningham 4/25/06
Ji Hand 4/25/06
 Page 1 of 1

Failed RDL Report

Batch Id	Samp Id	Sample Type	Run Date	Parmname	Result	MDA	RDL
523017	158783001	SAMPLE	24-APR-06				
523017	158783002	SAMPLE	24-APR-06				
523017	158783003	SAMPLE	24-APR-06				
523017	158783004	SAMPLE	24-APR-06				
523017	158783005	SAMPLE	24-APR-06				
523017	1201076443	MB	24-APR-06				
523017	1201076444	DUP	25-APR-06				
523017	1201076445	LCS	25-APR-06	Lead-212	4.235	31.86	10.0

Result Greater Than MDA

Batch Id	Sample Id	Sample Type	Run Date	Parmname	Result	Uncertainty	Units	MDA	RDL
523017	158783001	SAMPLE	24-APR-06	Annihilation Rad.	13.06	2.396	pCi/L	5.026	N
				Iodine-133	2.692E+12	4.244E+12	pCi/L	0	N
				Manganese-56	1.000E+41	2.000E+41	pCi/L	0	N
				Molybdenum-99	18040	18480	pCi/L	0	N
				Niobium-95m	616.4	6120	pCi/L	0	N
				Praseodymium-144	1.000E+41	2.000E+41	pCi/L	0	N
				Technetium-99m	1.000E+41	1.025E+41	pCi/L	0	N
				Tellurium-132	2576	3309	pCi/L	0	N
523017	158783002	SAMPLE	24-APR-06	Annihilation Rad.	17.35	2.466	pCi/L	5.262	N
				Cadmium-115	43870	2.891E+05	pCi/L	0	N
				Iodine-132	1.000E+41	2.000E+41	pCi/L	0	N
				Iodine-135	3.072E+38	5.548E+39	pCi/L	0	N
				Molybdenum-99	24100	20200	pCi/L	0	N
				Niobium-95m	972.3	5827	pCi/L	0	N
				Praseodymium-144	1.000E+41	2.000E+41	pCi/L	0	N
				Promethium-149	1.000E+06	3.025E+06	pCi/L	0	N
				Sodium-24	4.132E+15	3.540E+17	pCi/L	0	N
				Technetium-99m	1.000E+41	8.379E+40	pCi/L	0	N
523017	158783003	SAMPLE	24-APR-06	Annihilation Rad.	19.96	3.1	pCi/L	6.507	N
				Antimony-127	408.3	2746	pCi/L	0	N
				Barium-137m	13.35	3.177	pCi/L	6.682	N
				Cadmium-115	2.022E+05	3.774E+05	pCi/L	0	N
				Cesium-137 <i>UA</i>	14.11	3.358	pCi/L	7.063	N
				Iodine-135	2.795E+39	4.578E+39	pCi/L	0	N
				Molybdenum-99	35060	20460	pCi/L	0	N
				Praseodymium-144	1.000E+41	2.000E+41	pCi/L	0	N
				Sodium-24	8.886E+16	1.663E+17	pCi/L	0	N
				Technetium-99m	1.000E+41	5.835E+40	pCi/L	0	N
523017	158783004	SAMPLE	24-APR-06	Annihilation Rad.	17.18	2.639	pCi/L	5.153	N
				Antimony-127	802.2	2348	pCi/L	0	N
				Iodine-132	1.000E+41	7.620E+42	pCi/L	0	N
				Molybdenum-99	5220	16560	pCi/L	0	N
				Neptunium-237 <i>KE</i>	28.28	21.38	pCi/L	20.84	N
				Praseodymium-144	1.000E+41	4.986E+41	pCi/L	0	N
				Technetium-99m	1.000E+41	3.239E+41	pCi/L	0	N
				Tellurium-132	1121	2541	pCi/L	0	N
523017	158783005	SAMPLE	24-APR-06	Annihilation Rad.	16.69	2.748	pCi/L	5.247	N

Result Greater Than MDA

Batch Id	Sample Id	Sample Type	Run Date	Parmname	Result	Uncertainty	Units	MDA	RDL
523017	158783005	SAMPLE	24-APR-06	Cadmium-115	56300	2.987E+05	pCi/L	0	N
				Iodine-135	2.872E+36	5.070E+39	pCi/L	0	N
				Manganese-56	1.000E+41	3.079E+41	pCi/L	0	N
				Molybdenum-99	21010	19060	pCi/L	0	N
				Niobium-95m	5760	6484	pCi/L	0	N
				Praseodymium-144	1.000E+41	4.987E+42	pCi/L	0	N
				Technetium-99m	1.000E+41	1.119E+41	pCi/L	0	N
				Thorium-234 <i>HE</i>	228.3	204.4	pCi/L	147.3	N
				Thulium-171 <i>HE</i>	3437	2135	pCi/L	3389	N
Uranium-238 <i>HE</i>	228.3	204.4	pCi/L	147.3	N				
523017	1201076443	MB	24-APR-06	Annihilation Rad.	20.54	2.801	pCi/L	5.345	N
				Manganese-56	2.776E+11	4.634E+11	pCi/L	0	N
				Protactinium-234m <i>HE</i>	511.6	361.8	pCi/L	309.1	N
523017	1201076444	DUP	25-APR-06	Annihilation Rad.	15.82	2.941	pCi/L	5.926	N
				Antimony-127	1986	3025	pCi/L	0	N
				Iodine-132	1.000E+41	6.921E+41	pCi/L	0	N
				Iodine-135	1.690E+40	1.772E+40	pCi/L	0	N
				Manganese-56	1.000E+41	3.065E+41	pCi/L	0	N
				Molybdenum-99	4116	21790	pCi/L	0	N
				Potassium-40 <i>HE</i>	47.56	48.22	pCi/L	31.06	N
				Praseodymium-144	1.000E+41	1.741E+41	pCi/L	0	N
				Sodium-24	2.474E+16	4.710E+17	pCi/L	0	N
				Technetium-99m	1.000E+41	5.335E+41	pCi/L	0	N
				Tellurium-132	1990	3289	pCi/L	0	N
523017	1201076445	LCS	25-APR-06	Americium-241	1438	147.5	pCi/L	102.5	N
				Barium-137m	467.4	43.41	pCi/L	20.25	N
				Cadmium-109	8477	631.4	pCi/L	532.7	N
				Cerium-139	82.46	18.77	pCi/L	14.89	N
				Cesium-137	494.1	45.88	pCi/L	21.4	N
				Cobalt-57	166.8	22.19	pCi/L	14.21	N
				Cobalt-60	654	51.55	pCi/L	18.76	N
				Gross Gamma	3195	610.3	pCi/L	1833	N
				Iodine-132	2.069E+14	3.030E+14	pCi/L	0	N
				Neptunium-237	2534	188.7	pCi/L	182.1	N
				Praseodymium-144	1.000E+41	2.000E+41	pCi/L	0	N
				Promethium-147	3.538E+08	4.706E+07	pCi/L	6.038E+07	N
				Technetium-99m	4.820E+05	1.206E+06	pCi/L	0	N

Result Greater Than MDA

Batch Id	Sample Id	Sample Type	Run Date	Parmname	Result	Uncertainty	Units	MDA	RDL
523017	1201076445	LCS	25-APR-06	Tin-113	87.46	32.01	pCi/L	24.2	N
				Tin-126	862.8	64.26	pCi/L	60.8	N
				Yttrium-88	135.5	30.67	pCi/L	10.79	N

VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:30:55.84

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration   : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783001.CNF;1
Sample date     : 20-MAR-2006 08:00:00 Acquisition date : 24-APR-2006 23:30:01
Sample ID      : G158783001 Sample quantity : 2.00000E+00 LITER
Detector name  : GAMMA6 Detector geometry: 2L_MB
Elapsed live time: 0 06:00:00.00 Elapsed real time: 0 06:00:01.75 0.0%
Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 523017 Detector SN# : 1922827
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.13*	30	406	1.38	127.45	125	7	1.37E-03	133.7	
2	0	66.83*	38	362	0.91	134.83	133	6	1.75E-03	94.2	
3	0	92.70*	34	714	1.52	186.46	181	12	1.55E-03	177.0	
4	0	140.66	68	416	1.95	282.19	279	7	3.15E-03	51.2	
5	0	186.11*	15	403	0.98	372.88	369	8	6.75E-04	292.6	
6	0	192.15	56	314	1.38	384.94	382	7	2.59E-03	54.1	
7	0	198.32*	23	405	0.85	397.26	393	9	1.08E-03	191.5	
8	0	238.67*	65	351	1.08	477.79	473	9	3.02E-03	60.3	
9	0	241.59	37	174	0.92	483.61	482	5	1.72E-03	56.2	
10	0	337.96*	30	247	1.78	675.96	669	12	1.38E-03	122.1	
11	0	352.23*	23	152	1.13	704.45	701	8	1.04E-03	134.4	
12	0	559.20	19	75	1.49	1117.61	1113	8	8.71E-04	83.4	
13	0	582.97*	29	132	1.90	1165.05	1157	16	1.32E-03	105.9	
14	0	609.84*	36	94	1.13	1218.70	1212	13	1.64E-03	71.4	
15	0	698.15*	12	46	1.59	1395.02	1392	7	5.56E-04	115.7	
16	0	729.55	25	77	4.00	1457.71	1452	12	1.17E-03	72.2	
17	0	734.42*	11	62	1.39	1467.44	1463	11	5.04E-04	167.1	
18	0	786.21	34	62	2.42	1570.84	1564	13	1.59E-03	50.1	
19	0	800.09	114	85	11.80	1598.56	1584	31	5.26E-03	25.8	
20	0	847.22*	12	39	3.56	1692.68	1687	11	5.60E-04	137.7	
21	0	870.40*	25	52	0.54	1738.96	1733	14	1.14E-03	71.9	
22	0	911.83*	4	56	1.80	1821.69	1816	10	2.07E-04	389.9	
23	0	969.84*	6	43	0.93	1937.54	1932	13	2.59E-04	299.3	
24	0	1051.80	36	26	2.87	2101.23	2095	15	1.64E-03	35.7	
25	0	1121.22*	36	44	8.71	2239.86	2229	20	1.66E-03	56.0	
26	0	1263.51	17	13	1.43	2524.07	2521	8	8.09E-04	42.1	
27	0	1277.20	14	12	2.02	2551.43	2548	8	6.48E-04	50.5	
28	0	1290.83	15	14	1.00	2578.65	2576	7	6.77E-04	51.4	
29	0	1354.04*	5	9	0.85	2704.92	2700	9	2.17E-04	197.1	
30	0	1460.94*	21	13	1.87	2918.47	2912	16	9.89E-04	70.3	
31	0	1512.02	13	24	0.59	3020.52	3011	18	6.21E-04	93.9	
32	0	1665.43*	4	9	1.28	3327.04	3325	6	2.02E-04	174.6	
33	0	1774.84	12	5	1.19	3545.68	3543	8	5.38E-04	46.4	
34	0	1803.18	5	32	10.65	3602.30	3592	22	2.11E-04	323.6	
35	0	1937.67*	44	35	20.31	3871.08	3848	47	2.05E-03	50.6	
36	0	1970.81*	8	18	1.21	3937.31	3930	18	3.74E-04	136.3	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783001
* Acquisition date   : 24-APR-2006 23:30:01 Detector SN#      : 1922827
* Detector ID        : GAMMA6                      Sensitivity    : 3.000
* Geometry           : 2L_MB                       Energy tolerance: 2.000
* Elapsed live time  : 0 06:00:00.00              Abundance limit : 75.000
* Elapsed real time  : 0 06:00:01.75              Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                         *
*
* Sample date        : 20-MAR-2006 08:00:00 Nuclide Library : FERMC
* Sample ID          : G158783001                 Analyst initials: MJH1
* Batch Number       : 523017                     Sample Quantity : 2.0000E+00 LITER
* Recovery           : 1.00000                    Carrier Weight  : 0.00000
*****
*                               QC DATA                                             *
*
* Standard Weight    : 0.00000
* CALIB. DATE/TIME  : 29-DEC-2005 05:08:19 MS Isotope      : TOPLOADER
* MSD DPM            : 5.440                       MSD Isotope     : TOPLOADER
* LCS DPM            : 0.000                       LCS Isotope     : TOPLOADER
* LCSD DPM          : 0.000                       LCSD Isotope    : TOPLOADER
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
K-40	2.557E+01	3.593E+01	2.965E+01	0.000E+00
Y-91	1.789E+00	2.984E+00	4.115E+00	0.000E+00
BI-211	7.552E+00	2.030E+01	1.902E+01	0.000E+00
BI-214	4.836E+00	6.906E+00	5.993E+00	0.000E+00
RA-224	3.326E+01	3.741E+01	6.652E+01	0.000E+00
RA-226	4.836E+00	6.906E+00	5.993E+00	0.000E+00
TH-228	5.151E+00	6.217E+00	6.002E+00	0.000E+00
TH-230	4.836E+00	6.906E+00	5.992E+00	0.000E+00
TH-232	4.971E+00	6.000E+00	5.793E+00	0.000E+00
TH-234	5.413E+01	1.447E+02	1.463E+02	0.000E+00
U-238	5.413E+01	1.447E+02	1.463E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	1.122E-02	2.167E+01	3.893E+01	0.000E+00 NOT IDENT.
NA-22	-2.172E+00	2.184E+00	2.907E+00	0.000E+00 NOT IDENT.
NA-24	0.000E+00	2.647E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	5.832E-01	1.894E+00	3.260E+00	0.000E+00 NOT IDENT.
SC-46	-5.901E-01	2.207E+00	3.791E+00	0.000E+00 FAIL ABUN
V-48	-2.216E+00	8.242E+00	1.405E+01	0.000E+00 NOT IDENT.
CR-51	-7.818E+00	3.708E+01	6.201E+01	0.000E+00 NOT IDENT.
MN-54	4.745E-03	1.712E+00	3.032E+00	0.000E+00 NOT IDENT.
CO-56	1.353E+00	3.727E+00	4.279E+00	0.000E+00 FAIL ABUN
MN-56	0.000E+00	2.000E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	4.828E-01	1.652E+00	2.927E+00	0.000E+00 NOT IDENT.
CO-58	-8.380E-02	2.104E+00	3.731E+00	0.000E+00 NOT IDENT.
FE-59	4.253E+00	5.518E+00	1.049E+01	0.000E+00 FAIL ABUN
CO-60	-1.300E+00	1.893E+00	3.205E+00	0.000E+00 NOT IDENT.
ZN-65	3.528E+00	4.040E+00	7.131E+00	0.000E+00 NOT IDENT.
SE-75	-7.561E-01	2.913E+00	4.902E+00	0.000E+00 FAIL ABUN

KR-85	-1.651E+03	5.070E+02	7.515E+02	0.000E+00	NOT IDENT.
SR-85	-1.052E+01	3.228E+00	4.785E+00	0.000E+00	NOT IDENT.
Y-88	1.461E+00	2.290E+00	4.599E+00	0.000E+00	NOT IDENT.
NB-94	-3.978E-01	1.538E+00	2.674E+00	0.000E+00	FAIL ABUN
NB-95	7.222E-01	2.945E+00	5.374E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	6.120E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	-2.919E-01	3.810E+00	6.752E+00	0.000E+00	NOT IDENT.
MO-99	0.000E+00	1.848E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.025E+41	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-9.719E-01	3.102E+00	5.447E+00	0.000E+00	FAIL ABUN
RH-106	1.462E+01	1.508E+01	2.907E+01	0.000E+00	FAIL ABUN
RU-106	4.972E+00	1.514E+01	2.785E+01	0.000E+00	NOT IDENT.
AG-108M	-2.390E-01	1.890E+00	3.136E+00	0.000E+00	NOT IDENT.
CD-109	-4.502E+00	4.832E+01	7.717E+01	0.000E+00	NOT IDENT.
AG-110M	1.531E-01	1.673E+00	3.013E+00	0.000E+00	NOT IDENT.
SN-113	-3.017E+00	2.927E+00	4.578E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	3.251E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	1.899E+02	2.156E+02	4.139E+02	0.000E+00	FAIL ABUN
SN-117M	-2.571E+00	9.773E+00	1.673E+01	0.000E+00	NOT IDENT.
TE-123M	1.236E+00	1.993E+00	3.532E+00	0.000E+00	NOT IDENT.
SB-124	3.887E-01	5.771E+00	1.069E+01	0.000E+00	NOT IDENT.
SB-125	4.686E+00	5.142E+00	9.186E+00	0.000E+00	NOT IDENT.
TE-125M	3.452E+00	7.359E+02	1.296E+03	0.000E+00	NOT IDENT.
I-126	5.730E+00	2.320E+01	4.247E+01	0.000E+00	NOT IDENT.
SB-126	-2.145E+00	1.921E+01	3.401E+01	0.000E+00	FAIL ABUN
SN-126	1.680E+00	4.671E+00	7.617E+00	0.000E+00	FAIL ABUN
SB-127	0.000E+00	2.481E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	4.314E+00	3.826E+01	6.512E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.309E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	-1.823E+00	2.428E+00	3.903E+00	0.000E+00	NOT IDENT.
I-133	0.000E+00	4.244E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	1.823E+00	1.942E+00	3.716E+00	0.000E+00	FAIL ABUN
CS-135	6.069E+00	9.432E+00	1.652E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	8.903E+39	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-1.266E+00	1.409E+01	2.154E+01	0.000E+00	FAIL ABUN
BA-137M	-4.216E-01	1.521E+00	2.660E+00	0.000E+00	NOT IDENT.
CS-137	-4.440E-01	1.608E+00	2.812E+00	0.000E+00	NOT IDENT.
CE-139	-1.750E-01	2.070E+00	3.571E+00	0.000E+00	NOT IDENT.
BA-140	-2.987E+01	3.936E+01	6.675E+01	0.000E+00	NOT IDENT.
LA-140	8.324E+00	1.436E+01	2.805E+01	0.000E+00	NOT IDENT.
CE-141	-2.663E-01	5.891E+00	1.024E+01	0.000E+00	NOT IDENT.
CE-143	0.000E+00	2.556E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	-6.439E+00	1.317E+01	2.261E+01	0.000E+00	NOT IDENT.
PM-144	9.028E-01	2.088E+00	3.480E+00	0.000E+00	FAIL ABUN
PR-144	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	-3.143E-01	2.450E+00	4.061E+00	0.000E+00	FAIL ABUN
ND-147	5.722E+01	1.050E+02	1.950E+02	0.000E+00	FAIL ABUN
PM-147	-1.318E+06	3.309E+06	5.726E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	3.581E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	3.723E-01	5.764E+00	9.762E+00	0.000E+00	NOT IDENT.
GD-153	-3.499E+00	4.946E+00	8.543E+00	0.000E+00	NOT IDENT.
EU-154	-6.056E+00	6.031E+00	8.008E+00	0.000E+00	NOT IDENT.
EU-155	1.354E+00	6.739E+00	1.196E+01	0.000E+00	NOT IDENT.
TB-160	3.814E+00	7.520E+00	1.405E+01	0.000E+00	NOT IDENT.
TM-171	1.430E+03	2.695E+03	3.473E+03	0.000E+00	FAIL ABUN
HF-181	2.572E-02	2.942E+00	5.301E+00	0.000E+00	FAIL ABUN
TA-182	3.153E-01	8.063E+00	1.496E+01	0.000E+00	FAIL ABUN
IR-192	4.729E-01	2.536E+00	4.335E+00	0.000E+00	NOT IDENT.
HG-203	8.136E-01	3.224E+00	5.553E+00	0.000E+00	NOT IDENT.
BI-207	1.138E+00	2.478E+00	4.537E+00	0.000E+00	NOT IDENT.
TL-208	2.144E+00	4.542E+00	4.274E+00	0.000E+00	FAIL ABUN
BI-210	2.873E+02	3.997E+02	6.330E+02	0.000E+00	NOT IDENT.
PB-210	2.873E+02	3.997E+02	6.330E+02	0.000E+00	NOT IDENT.
PB-211	-3.022E+01	5.079E+01	8.183E+01	0.000E+00	NOT IDENT.
BI-212	1.211E+01	1.611E+01	2.711E+01	0.000E+00	NOT IDENT.
PB-212	5.151E+00	6.217E+00	7.390E+00	0.000E+00	FAIL ABUN
PB-214	2.627E+00	7.060E+00	8.373E+00	0.000E+00	FAIL ABUN
RN-219	-5.171E+00	2.248E+01	3.723E+01	0.000E+00	NOT IDENT.
RA-223	4.824E+00	3.920E+01	6.671E+01	0.000E+00	FAIL ABUN
AC-227	-1.977E+01	2.369E+01	3.877E+01	0.000E+00	NOT IDENT.
TH-227	-1.943E+01	2.328E+01	3.809E+01	0.000E+00	FAIL ABUN
AC-228	1.413E+00	1.102E+01	1.405E+01	0.000E+00	FAIL ABUN
RA-228	1.413E+00	1.102E+01	1.405E+01	0.000E+00	FAIL ABUN
TH-229	3.664E+01	3.964E+01	5.246E+01	0.000E+00	FAIL ABUN
PA-231	6.413E+00	9.026E+01	1.541E+02	0.000E+00	NOT IDENT.
TH-231	1.994E+00	1.139E+01	1.951E+01	0.000E+00	FAIL ABUN
PA-233	-1.441E+00	3.817E+00	6.331E+00	0.000E+00	NOT IDENT.

PA-234	-2.519E+00	1.409E+01	2.433E+01	0.000E+00	FAIL ABUN
PA-234M	9.696E+01	2.188E+02	3.991E+02	0.000E+00	NOT IDENT.
U-234	1.309E+01	8.247E+00	1.500E+01	0.000E+00	FAIL ABUN
U-235	9.054E+00	1.289E+01	2.297E+01	0.000E+00	FAIL ABUN
NP-237	-1.458E+00	1.426E+01	2.277E+01	0.000E+00	NOT IDENT.
NP-239	-3.579E+00	1.204E+01	2.093E+01	0.000E+00	NOT IDENT.
AM-241	1.492E+01	1.195E+01	1.932E+01	0.000E+00	NOT IDENT.
AM-242	1.074E+02	1.357E+02	2.458E+02	0.000E+00	NOT IDENT.
CM-247	-9.263E-02	2.000E+00	3.356E+00	0.000E+00	NOT IDENT.
CF-249	5.979E-01	2.271E+00	3.887E+00	0.000E+00	NOT IDENT.
CF-251	-1.821E-01	8.022E+00	1.383E+01	0.000E+00	NOT IDENT.
ANH-511	0.000E+00	2.396E+00	5.026E+00	0.000E+00	NOT IDENT.

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783001.CNF;1
Sample date        : 20-MAR-2006 08:00:00 Acquisition date : 24-APR-2006 23:30:01
Sample ID          : G158783001 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA6 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:01.75 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 1922827
Matrix Spike DPM : LCS DPM :
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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.13	92	406	1.38	127.45	125	7	4.27E-03	37.5	
2	0	66.83	58	362	0.91	134.83	133	6	2.70E-03	53.4	
3	0	92.70	219	714	1.52	186.46	181	12	1.02E-02	25.3	
4	0	140.66	68	416	1.95	282.19	279	7	3.15E-03	51.2	
5	0	186.11	132	403	0.98	372.88	369	8	6.10E-03	27.8	
6	0	192.15	56	314	1.38	384.94	382	7	2.59E-03	54.1	
7	0	198.32	116	405	0.85	397.26	393	9	5.36E-03	32.6	
8	0	238.67	146	351	1.08	477.79	473	9	6.75E-03	24.6	
9	0	241.59	37	174	0.92	483.61	482	5	1.72E-03	56.2	
10	0	295.30	47	260	1.09	590.82	587	9	2.18E-03	63.4	
11	0	337.96	74	247	1.78	675.96	669	12	3.40E-03	44.4	
12	0	352.23	99	152	1.13	704.45	701	8	4.58E-03	23.8	
13	0	511.17	316	183	2.29	1021.73	1015	15	1.46E-02	10.9	
14	0	559.20	19	75	1.49	1117.61	1113	8	8.71E-04	83.4	
15	0	582.97	79	132	1.90	1165.05	1157	16	3.66E-03	34.4	
16	0	609.84	99	94	1.13	1218.70	1212	13	4.57E-03	22.6	
17	0	694.58	17	47	1.51	1387.90	1386	7	7.78E-04	71.3	
18	0	698.15	22	46	1.59	1395.02	1392	7	1.02E-03	55.0	
19	0	729.55	25	77	4.00	1457.71	1452	12	1.17E-03	72.2	
20	0	734.42	25	62	1.39	1467.44	1463	11	1.16E-03	64.6	
21	0	786.21	34	62	2.42	1570.84	1564	13	1.59E-03	50.1	
22	0	800.09	114	85	11.80	1598.56	1584	31	5.26E-03	25.8	
23	0	847.22	30	39	3.56	1692.68	1687	11	1.37E-03	44.7	
24	0	870.40	35	52	0.54	1738.96	1733	14	1.61E-03	48.4	
25	0	911.83	32	56	1.80	1821.69	1816	10	1.49E-03	47.4	
26	0	969.84	36	43	0.93	1937.54	1932	13	1.69E-03	40.4	
27	0	1051.80	36	26	2.87	2101.23	2095	15	1.64E-03	35.7	
28	0	1121.22	62	44	8.71	2239.86	2229	20	2.89E-03	29.1	
29	0	1263.51	17	13	1.43	2524.07	2521	8	8.09E-04	42.1	
30	0	1277.20	14	12	2.02	2551.43	2548	8	6.48E-04	50.5	
31	0	1290.83	15	14	1.00	2578.65	2576	7	6.77E-04	51.4	
32	0	1354.04	16	9	0.85	2704.92	2700	9	7.51E-04	41.5	
33	0	1460.94	104	13	1.87	2918.47	2912	16	4.83E-03	12.3	
34	0	1512.02	13	24	0.59	3020.52	3011	18	6.21E-04	93.9	
35	0	1665.43	12	9	1.28	3327.04	3325	6	5.56E-04	48.9	
36	0	1765.15	40	35	1.01	3526.32	3515	20	1.85E-03	39.6	
37	0	1774.84	12	5	1.19	3545.68	3543	8	5.38E-04	46.4	
38	0	1803.18	5	32	10.65	3602.30	3592	22	2.11E-04	323.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1937.67	48	35	20.31	3871.08	3848	47	2.23E-03	46.4	
40	0	1970.81	13	18	1.21	3937.31	3930	18	6.02E-04	81.4	

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783001.CNF;1
Sample date        : 20-MAR-2006 08:00:00 Acquisition date : 24-APR-2006 23:30:01
Sample ID         : G158783001 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA6 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:01.75 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 1922827
Matrix Spike DPM : LCS DPM :
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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.81	21	10.67*	4.898E-01	2.557E+01	2.557E+01	140.54
Y-91	557.57	19	95.08*	1.057E+00	1.171E+00	1.789E+00	166.78
	1204.90	-----	0.30	5.698E-01	-----	Line Not Found	-----
BI-211	351.07	23	12.94*	1.442E+00	7.552E+00	7.552E+00	268.73
BI-214	609.31	36	46.30*	9.923E-01	4.836E+00	4.836E+00	142.80
	768.36	-----	5.04	8.308E-01	-----	Line Not Found	-----
	934.06	-----	3.21	7.070E-01	-----	Line Not Found	-----
	1120.29	36	15.10	6.053E-01	2.450E+01	2.450E+01	111.97
	1238.11	-----	5.94	5.571E-01	-----	Line Not Found	-----
	1377.67	-----	4.11	5.117E-01	-----	Line Not Found	-----
RA-226	295.21	-----	19.20	1.614E+00	-----	Line Not Found	-----
	351.92	23	37.20	1.442E+00	2.627E+00	2.627E+00	268.73
	609.31	36	46.30*	9.923E-01	4.836E+00	4.836E+00	142.80
TH-228	84.40	-----	1.21	1.815E+00	-----	Line Not Found	-----
	238.60	65	44.60*	1.842E+00	4.971E+00	5.151E+00	120.69
	300.10	-----	3.41	1.597E+00	-----	Line Not Found	-----
TH-230	295.21	-----	19.20	1.614E+00	-----	Line Not Found	-----
	351.92	23	37.20	1.442E+00	2.627E+00	2.627E+00	268.73
	609.31	36	46.30*	9.923E-01	4.836E+00	4.836E+00	142.80
TH-232	238.59	65	44.60*	1.842E+00	4.971E+00	4.971E+00	120.69
	911.20	4	27.70	7.216E-01	1.397E+00	1.397E+00	779.75
	964.40	-----	5.20	6.882E-01	-----	Line Not Found	-----
	969.11	6	16.60	6.849E-01	3.082E+00	3.082E+00	598.66
TH-234	63.29	30	3.80*	9.033E-01	5.413E+01	5.413E+01	267.40
	92.38	34	5.41	2.042E+00	1.900E+01	1.900E+01	353.94
	112.81	-----	0.24	2.320E+00	-----	Line Not Found	-----
U-238	63.29	30	3.80*	9.033E-01	5.413E+01	5.413E+01	267.40

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
RA-224	240.98	37	3.95*	1.829E+00	3.210E+01	3.326E+01	112.46

Flag: "*" = Keyline

Total number of lines in spectrum 36
 Number of unidentified lines 11
 Number of lines tentatively identified by NID 25 69.44%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	2.557E+01	2.557E+01	3.593E+01	140.54	
Y-91	58.51D	1.53	1.171E+00	1.789E+00	2.984E+00	166.78	
BI-211	7.04E+08Y	1.00	7.552E+00	7.552E+00	20.30E+00	268.73	
BI-214	1600.00Y	1.00	4.836E+00	4.836E+00	6.906E+00	142.80	
RA-226	1600.00Y	1.00	4.836E+00	4.836E+00	6.906E+00	142.80	
TH-228	1.91Y	1.04	4.971E+00	5.151E+00	6.217E+00	120.69	
TH-230	7.70E+04Y	1.00	4.836E+00	4.836E+00	6.906E+00	142.80	
TH-232	1.41E+10Y	1.00	4.971E+00	4.971E+00	6.000E+00	120.69	
TH-234	4.47E+09Y	1.00	5.413E+01	5.413E+01	14.47E+01	267.40	
U-238	4.47E+09Y	1.00	5.413E+01	5.413E+01	14.47E+01	267.40	
Total Activity :			1.670E+02	1.678E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
RA-224	1.91Y	1.04	3.210E+01	3.326E+01	3.741E+01	112.46	
Total Activity :			3.210E+01	3.326E+01			

Grand Total Activity : 1.991E+02 2.011E+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	66.83	38	362	0.91	134.83	133	6	1.75E-03	****	1.09E+00	T
0	140.66	68	416	1.95	282.19	279	7	3.15E-03	****	2.34E+00	T
0	186.11	15	403	0.98	372.88	369	8	6.75E-04	****	2.12E+00	T
0	192.15	56	314	1.38	384.94	382	7	2.59E-03	****	2.08E+00	T
0	198.32	23	405	0.85	397.26	393	9	1.08E-03	****	2.05E+00	T
0	337.96	30	247	1.78	675.96	669	12	1.38E-03	****	1.48E+00	T
0	582.97	29	132	1.90	1165.05	1157	16	1.32E-03	****	1.03E+00	T
0	698.15	12	46	1.59	1395.02	1392	7	5.56E-04	****	8.96E-01	T
0	729.55	25	77	4.00	1457.71	1452	12	1.17E-03	****	8.66E-01	
0	734.42	11	62	1.39	1467.44	1463	11	5.04E-04	****	8.61E-01	T
0	786.21	34	62	2.42	1570.84	1564	13	1.59E-03	****	8.16E-01	
0	800.09	114	85	11.80	1598.56	1584	31	5.26E-03	51.6	8.04E-01	T
0	847.22	12	39	3.56	1692.68	1687	11	5.60E-04	****	7.67E-01	T
0	870.40	25	52	0.54	1738.96	1733	14	1.14E-03	****	7.50E-01	T
0	1051.80	36	26	2.87	2101.23	2095	15	1.64E-03	71.3	6.39E-01	T
0	1263.51	17	13	1.43	2524.07	2521	8	8.09E-04	84.1	5.48E-01	
0	1277.20	14	12	2.02	2551.43	2548	8	6.48E-04	****	5.43E-01	
0	1290.83	15	14	1.00	2578.65	2576	7	6.77E-04	****	5.39E-01	T
0	1354.04	5	9	0.85	2704.92	2700	9	2.17E-04	****	5.19E-01	
0	1512.02	13	24	0.59	3020.52	3011	18	6.21E-04	****	4.78E-01	
0	1665.43	4	9	1.28	3327.04	3325	6	2.02E-04	****	4.50E-01	
0	1774.84	12	5	1.19	3545.68	3543	8	5.38E-04	92.7	4.36E-01	
0	1803.18	5	32	10.65	3602.30	3592	22	2.11E-04	****	4.32E-01	
0	1937.67	44	35	20.31	3871.08	3848	47	2.05E-03	****	4.22E-01	
0	1970.81	8	18	1.21	3937.31	3930	18	3.74E-04	****	4.20E-01	

Flags: "T" = Tentatively associated

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783001.CNF;1
* Acquisition date   : 24-APR-2006 23:30:01  Detector SN#      : 1922827
* Detector ID       : GAMMA6                      Sensitivity       : 3.00000
* Geometry         : 2L_MB                        Energy tolerance  : 2.00000
* Elapsed live time: 0 06:00:00.00                Abundance limit  : 75.00000
* Elapsed real time: 0 06:00:01.75                Half life ratio  : 8.00000
*****
*                                     SAMPLE DATA                                   *
*
* Sample date       : 20-MAR-2006 08:00:00  Nuclide Library  : EPI
* Sample ID        : G158783001             Analyst initials  : MJH1
* Batch Number     : 523017                 Sample Quantity  : 2.00000E+00 LITER
*****
*                                     QC DATA                                       *
*
* CALIB. DATE/TIME : 29-DEC-2005 05:08:19.2MS Isotope       : TOPLOADER
* MSD DPM          :                          MSD Isotope    :
* LCS DPM          :                          LCS Isotope    :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
K-40	2.557E+01	3.593E+01	2.965E+01	0.000E+00	0.862
Y-91	1.789E+00	2.984E+00	4.115E+00	0.000E+00	0.435
BI-211	7.552E+00	2.030E+01	1.902E+01	0.000E+00	0.397
BI-214	4.836E+00	6.906E+00	5.993E+00	0.000E+00	0.807
RA-224	3.326E+01	3.741E+01	6.652E+01	0.000E+00	0.500
RA-226	4.836E+00	6.906E+00	5.993E+00	0.000E+00	0.807
TH-228	5.151E+00	6.217E+00	6.002E+00	0.000E+00	0.858
TH-230	4.836E+00	6.906E+00	5.992E+00	0.000E+00	0.807
TH-232	4.971E+00	6.000E+00	5.793E+00	0.000E+00	0.858
TH-234	5.413E+01	1.447E+02	1.463E+02	0.000E+00	0.370
U-238	5.413E+01	1.447E+02	1.463E+02	0.000E+00	0.370

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

Nuclide	Key-Line Activity K.L. (pCi/LITER)Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	1.122E-02	2.167E+01	3.893E+01	0.000E+00	0.000

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
NA-22	-2.172E+00		2.184E+00	2.907E+00	0.000E+00	-0.747
AL-26	5.832E-01		1.894E+00	3.260E+00	0.000E+00	0.179
SC-46	-5.901E-01		2.207E+00	3.791E+00	0.000E+00	-0.156
V-48	-2.216E+00		8.242E+00	1.405E+01	0.000E+00	-0.158
CR-51	-7.818E+00		3.708E+01	6.201E+01	0.000E+00	-0.126
MN-54	4.745E-03		1.712E+00	3.032E+00	0.000E+00	0.002
CO-56	1.353E+00	+	3.727E+00	4.279E+00	0.000E+00	0.316
CO-57	4.828E-01		1.652E+00	2.927E+00	0.000E+00	0.165
CO-58	-8.380E-02		2.104E+00	3.731E+00	0.000E+00	-0.022
FE-59	4.253E+00		5.518E+00	1.049E+01	0.000E+00	0.405
CO-60	-1.300E+00		1.893E+00	3.205E+00	0.000E+00	-0.406
ZN-65	3.528E+00		4.040E+00	7.131E+00	0.000E+00	0.495
SE-75	-7.561E-01		2.913E+00	4.902E+00	0.000E+00	-0.154
KR-85	-1.651E+03		5.070E+02	7.515E+02	0.000E+00	-2.198
SR-85	-1.052E+01		3.228E+00	4.785E+00	0.000E+00	-2.198
Y-88	1.461E+00		2.290E+00	4.599E+00	0.000E+00	0.318
NB-94	-3.978E-01		1.538E+00	2.674E+00	0.000E+00	-0.149
NB-95	7.222E-01		2.945E+00	5.374E+00	0.000E+00	0.134
ZR-95	-2.919E-01		3.810E+00	6.752E+00	0.000E+00	-0.043
RU-103	-9.719E-01		3.102E+00	5.447E+00	0.000E+00	-0.178
RH-106	1.462E+01		1.508E+01	2.907E+01	0.000E+00	0.503
RU-106	4.972E+00		1.514E+01	2.785E+01	0.000E+00	0.179
AG-108M	-2.390E-01		1.890E+00	3.136E+00	0.000E+00	-0.076
CD-109	-4.502E+00		4.832E+01	7.717E+01	0.000E+00	-0.058
AG-110M	1.531E-01		1.673E+00	3.013E+00	0.000E+00	0.051
SN-113	-3.017E+00		2.927E+00	4.578E+00	0.000E+00	-0.659
SN-115	1.899E+02		2.156E+02	4.139E+02	0.000E+00	0.459
SN-117M	-2.571E+00		9.737E+00	1.673E+01	0.000E+00	-0.154
TE-123M	1.236E+00		1.993E+00	3.532E+00	0.000E+00	0.350
SB-124	3.887E-01		5.771E+00	1.069E+01	0.000E+00	0.036
SB-125	4.686E+00		5.142E+00	9.186E+00	0.000E+00	0.510
TE-125M	3.452E+00		7.359E+02	1.296E+03	0.000E+00	0.003
I-126	5.730E+00		2.320E+01	4.247E+01	0.000E+00	0.135
SB-126	-2.145E+00		1.921E+01	3.401E+01	0.000E+00	-0.063
SN-126	1.680E+00		4.671E+00	7.617E+00	0.000E+00	0.220
I-131	4.314E+00		3.826E+01	6.512E+01	0.000E+00	0.066
BA-133	-1.823E+00		2.428E+00	3.903E+00	0.000E+00	-0.467
CS-134	1.823E+00		1.942E+00	3.716E+00	0.000E+00	0.491
CS-135	6.069E+00		9.432E+00	1.652E+01	0.000E+00	0.367
CS-136	-1.266E+00		1.409E+01	2.154E+01	0.000E+00	-0.059
BA-137M	-4.216E-01		1.521E+00	2.660E+00	0.000E+00	-0.159
CS-137	-4.440E-01		1.608E+00	2.812E+00	0.000E+00	-0.158
CE-139	-1.750E-01		2.070E+00	3.571E+00	0.000E+00	-0.049
BA-140	-2.987E+01		3.936E+01	6.675E+01	0.000E+00	-0.448
LA-140	8.324E+00		1.436E+01	2.805E+01	0.000E+00	0.297
CE-141	-2.663E-01		5.891E+00	1.024E+01	0.000E+00	-0.026
CE-144	-6.439E+00		1.317E+01	2.261E+01	0.000E+00	-0.285
PM-144	9.028E-01	+	2.088E+00	3.480E+00	0.000E+00	0.259

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
PM-146	-3.143E-01		2.450E+00	4.061E+00	0.000E+00	-0.077
ND-147	5.722E+01		1.050E+02	1.950E+02	0.000E+00	0.293
PM-147	-1.318E+06		3.309E+06	5.726E+06	0.000E+00	-0.230
EU-152	3.723E-01		5.764E+00	9.762E+00	0.000E+00	0.038
GD-153	-3.499E+00		4.946E+00	8.543E+00	0.000E+00	-0.410
EU-154	-6.056E+00		6.031E+00	8.008E+00	0.000E+00	-0.756
EU-155	1.354E+00		6.739E+00	1.196E+01	0.000E+00	0.113
TB-160	3.814E+00		7.520E+00	1.405E+01	0.000E+00	0.271
TM-171	1.430E+03	+	2.695E+03	3.473E+03	0.000E+00	0.412
HF-181	2.572E-02		2.942E+00	5.301E+00	0.000E+00	0.005
TA-182	3.153E-01		8.063E+00	1.496E+01	0.000E+00	0.021
IR-192	4.729E-01		2.536E+00	4.335E+00	0.000E+00	0.109
HG-203	8.136E-01		3.224E+00	5.553E+00	0.000E+00	0.147
BI-207	1.138E+00		2.478E+00	4.537E+00	0.000E+00	0.251
TL-208	2.144E+00	+	4.542E+00	4.274E+00	0.000E+00	0.502
BI-210	2.873E+02		3.997E+02	6.330E+02	0.000E+00	0.454
PB-210	2.873E+02		3.997E+02	6.330E+02	0.000E+00	0.454
PB-211	-3.022E+01		5.079E+01	8.183E+01	0.000E+00	-0.369
BI-212	1.211E+01		1.611E+01	2.711E+01	0.000E+00	0.447
PB-212	5.151E+00	+	6.217E+00	7.390E+00	0.000E+00	0.697
PB-214	2.627E+00	+	7.060E+00	8.373E+00	0.000E+00	0.314
RN-219	-5.171E+00		2.248E+01	3.723E+01	0.000E+00	-0.139
RA-223	4.824E+00		3.920E+01	6.671E+01	0.000E+00	0.072
AC-227	-1.977E+01		2.369E+01	3.877E+01	0.000E+00	-0.510
TH-227	-1.943E+01		2.328E+01	3.809E+01	0.000E+00	-0.510
AC-228	1.413E+00	+	1.102E+01	1.405E+01	0.000E+00	0.101
RA-228	1.413E+00	+	1.102E+01	1.405E+01	0.000E+00	0.101
TH-229	3.664E+01	+	3.964E+01	5.246E+01	0.000E+00	0.698
PA-231	6.413E+00		9.026E+01	1.541E+02	0.000E+00	0.042
TH-231	1.994E+00		1.139E+01	1.951E+01	0.000E+00	0.102
PA-233	-1.441E+00		3.817E+00	6.331E+00	0.000E+00	-0.228
PA-234	-2.519E+00		1.409E+01	2.433E+01	0.000E+00	-0.104
PA-234M	9.696E+01		2.188E+02	3.991E+02	0.000E+00	0.243
U-234	1.309E+01		8.247E+00	1.500E+01	0.000E+00	0.873
U-235	9.054E+00		1.289E+01	2.297E+01	0.000E+00	0.394
NP-237	-1.458E+00		1.426E+01	2.277E+01	0.000E+00	-0.064
NP-239	-3.579E+00		1.204E+01	2.093E+01	0.000E+00	-0.171
AM-241	1.492E+01		1.195E+01	1.932E+01	0.000E+00	0.772
AM-242	1.074E+02		1.357E+02	2.458E+02	0.000E+00	0.437
CM-247	-9.263E-02		2.000E+00	3.356E+00	0.000E+00	-0.028
CF-249	5.979E-01		2.271E+00	3.887E+00	0.000E+00	0.154
CF-251	-1.821E-01		8.022E+00	1.383E+01	0.000E+00	-0.013
ANH-511	1.306E+01		2.396E+00	5.026E+00	0.000E+00	2.598

```

*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G158783001
*   ANALYST       : MJH1           DETECTOR    : GAMMA6
*   SAMPLE DATE   : 20-MAR-2006 08:00:00.00  COUNT TIME : 0 06:00:00.00
*   ANALYSIS DATE: 24-APR-2006 23:30:01.39  SAMPLE ALQT: 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 6.785E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 6.900E+01
GROSS GAMMA MDA     (pCi/LITER ) : 2.518E+02
GROSS GAMMA DLC     (pCi/LITER ) : 1.219E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:31:42.32

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration   : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783002.CNF;1
Sample date     : 20-MAR-2006 10:00:00 Acquisition date : 24-APR-2006 23:30:28
Sample ID      : G158783002 Sample quantity : 2.00000E+00 LITER
Detector name  : GAMMA9 Detector geometry: 2L_MB
Elapsed live time: 0 06:00:00.00 Elapsed real time: 0 06:00:03.26 0.0%
Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 523017 Detector SN# : 10017452
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.42*	46	335	1.28	132.78	130	7	2.13E-03	75.8	
2	0	92.74*	53	491	1.15	185.34	180	10	2.46E-03	94.5	
3	0	139.41*	92	366	1.78	278.53	274	9	4.28E-03	41.9	
4	0	163.47*	76	407	1.82	326.58	322	13	3.53E-03	62.8	
5	0	174.36	33	229	1.50	348.33	347	7	1.54E-03	76.7	
6	0	199.01	161	354	2.91	397.57	392	12	7.44E-03	24.8	
7	1	238.72*	29	185	1.52	476.87	473	36	1.34E-03	98.7	1.84E+00
8	1	251.94*	21	185	1.54	503.28	473	36	9.92E-04	136.7	
9	0	352.01*	11	161	2.04	703.15	698	11	4.88E-04	283.3	
10	0	418.62	34	78	1.73	836.21	833	8	1.59E-03	47.7	
11	0	558.32*	60	61	1.85	1115.28	1112	10	2.79E-03	38.4	
12	3	583.11*	18	57	2.21	1164.79	1159	17	8.33E-04	118.7	2.49E+00
13	3	586.65	39	49	2.17	1171.87	1159	17	1.79E-03	35.2	
14	0	594.88	46	93	1.13	1188.32	1182	13	2.11E-03	46.9	
15	0	608.98*	31	58	1.49	1216.49	1212	9	1.42E-03	62.2	
16	0	719.06	24	25	0.94	1436.42	1433	7	1.12E-03	40.4	
17	0	742.70	22	46	1.48	1483.64	1480	10	1.03E-03	60.1	
18	0	844.34	22	39	2.39	1686.74	1681	10	1.01E-03	58.3	
19	0	910.25*	14	44	4.36	1818.45	1811	15	6.35E-04	132.9	
20	0	981.06	24	31	0.98	1959.95	1956	12	1.11E-03	50.0	
21	0	1001.84*	22	41	5.79	2001.49	1993	18	1.03E-03	83.3	
22	0	1014.43	11	18	0.64	2026.64	2024	6	5.09E-04	68.0	
23	0	1221.06	21	27	4.40	2439.62	2432	14	9.92E-04	56.4	
24	0	1365.96	13	21	2.29	2729.28	2722	14	5.96E-04	84.9	
25	0	1376.11*	36	15	3.55	2749.57	2738	20	1.65E-03	36.4	
26	0	1559.98	8	14	1.00	3117.15	3112	10	3.58E-04	99.8	
27	0	1649.78	7	4	0.59	3296.72	3294	6	3.14E-04	62.2	
28	0	1662.80	7	7	1.39	3322.74	3321	6	3.24E-04	71.8	
29	0	1677.93	5	18	3.05	3353.00	3349	12	2.31E-04	175.5	
30	4	1786.26*	14	23	3.29	3569.63	3549	37	6.59E-04	92.2	9.07E-01
31	4	1791.10	21	10	3.29	3579.30	3549	37	9.54E-04	45.3	
32	4	1798.19	21	8	3.29	3593.48	3586	40	9.53E-04	36.0	1.00E+00
33	4	1812.64	16	4	3.00	3622.37	3586	40	7.51E-04	28.3	

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

VAX/VMS Nuclide Identification Report Generated

```

*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****

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DETECTOR DATA

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* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783002
* Acquisition date   : 24-APR-2006 23:30:28 Detector SN#      : 10017452
* Detector ID        : GAMMA9                      Sensitivity       : 3.000
* Geometry           : 2L_MB                       Energy tolerance  : 2.000
* Elapsed live time  : 0 06:00:00.00              Abundance limit  : 75.000
* Elapsed real time  : 0 06:00:03.26              Half life ratio  : 8.000
*****

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SAMPLE DATA

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* Sample date       : 20-MAR-2006 10:00:00 Nuclide Library  : FERMC
* Sample ID        : G158783002                    Analyst initials  : MJH1
* Batch Number     : 523017                        Sample Quantity  : 2.0000E+00 LITER
* Recovery         : 1.00000                       Carrier Weight   : 0.00000
*****

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QC DATA

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* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 8-JUL-2005 12:59:09 MS Isotope      : TOPLOADER
* MSD DPM          : 5.440                          MSD Isotope      : TOPLOADER
* LCS DPM          : 0.000                          LCS Isotope      : TOPLOADER
* LCSD DPM         : 0.000                          LCSD Isotope     : TOPLOADER
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
Y-91	5.347E+00	4.110E+00	3.625E+00	0.000E+00
BI-211	3.420E+00	1.938E+01	1.860E+01	0.000E+00
RA-226	3.863E+00	4.808E+00	4.912E+00	0.000E+00
TH-228	2.263E+00	4.469E+00	5.329E+00	0.000E+00
TH-230	3.863E+00	4.807E+00	4.912E+00	0.000E+00
TH-232	2.184E+00	4.313E+00	5.143E+00	0.000E+00
PA-234M	2.230E+02	3.714E+02	2.989E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	-1.169E+01	2.100E+01	3.523E+01	0.000E+00 NOT IDENT.
NA-22	8.112E-01	1.737E+00	3.285E+00	0.000E+00 NOT IDENT.
NA-24	0.000E+00	3.540E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	1.015E+00	1.670E+00	3.062E+00	0.000E+00 NOT IDENT.
K-40	3.029E+01	2.027E+01	4.067E+01	0.000E+00 NOT IDENT.
SC-46	1.447E+00	1.904E+00	3.708E+00	0.000E+00 NOT IDENT.
V-48	8.347E-03	8.353E+00	1.316E+01	0.000E+00 NOT IDENT.
CR-51	-1.559E+01	3.326E+01	5.715E+01	0.000E+00 NOT IDENT.
MN-54	3.874E-01	1.683E+00	3.104E+00	0.000E+00 NOT IDENT.
CO-56	-2.753E-01	2.218E+00	3.470E+00	0.000E+00 NOT IDENT.
MN-56	0.000E+00	2.000E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	2.193E-01	1.628E+00	2.761E+00	0.000E+00 NOT IDENT.
CO-58	-2.046E-01	1.869E+00	3.395E+00	0.000E+00 NOT IDENT.
FE-59	-2.286E+00	4.774E+00	8.211E+00	0.000E+00 NOT IDENT.
CO-60	-7.590E-01	1.642E+00	2.798E+00	0.000E+00 NOT IDENT.
ZN-65	-3.207E+00	3.427E+00	5.563E+00	0.000E+00 NOT IDENT.
SE-75	-1.291E+00	2.670E+00	4.619E+00	0.000E+00 FAIL ABUN
KR-85	-1.878E+03	5.182E+02	7.218E+02	0.000E+00 NOT IDENT.
SR-85	-1.195E+01	3.297E+00	4.592E+00	0.000E+00 NOT IDENT.
Y-88	-3.995E-01	1.776E+00	3.274E+00	0.000E+00 NOT IDENT.

NB-94	2.643E-02	1.592E+00	2.742E+00	0.000E+00	NOT IDENT.
NB-95	2.310E+00	3.048E+00	5.619E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	5.827E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	-1.161E+00	3.721E+00	6.250E+00	0.000E+00	NOT IDENT.
MO-99	0.000E+00	2.020E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	8.379E+40	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-8.842E-01	3.080E+00	5.252E+00	0.000E+00	FAIL ABUN
RH-106	5.828E+00	1.453E+01	2.620E+01	0.000E+00	NOT IDENT.
RU-106	2.938E+00	1.478E+01	2.617E+01	0.000E+00	NOT IDENT.
AG-108M	7.449E-02	1.615E+00	2.840E+00	0.000E+00	NOT IDENT.
CD-109	-2.337E+01	4.330E+01	7.219E+01	0.000E+00	NOT IDENT.
AG-110M	1.111E+00	1.632E+00	2.998E+00	0.000E+00	NOT IDENT.
SN-113	8.705E-01	2.593E+00	4.636E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	2.891E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	7.427E+00	1.872E+02	3.427E+02	0.000E+00	NOT IDENT.
SN-117M	1.979E+00	9.196E+00	1.553E+01	0.000E+00	NOT IDENT.
TE-123M	-2.595E-01	1.885E+00	3.133E+00	0.000E+00	NOT IDENT.
SB-124	1.039E+00	4.771E+00	9.253E+00	0.000E+00	NOT IDENT.
SB-125	3.316E+00	4.458E+00	8.214E+00	0.000E+00	FAIL ABUN
TE-125M	3.707E+01	7.251E+02	1.229E+03	0.000E+00	NOT IDENT.
I-126	1.407E+01	2.296E+01	4.209E+01	0.000E+00	NOT IDENT.
SB-126	2.162E+01	1.748E+01	3.649E+01	0.000E+00	FAIL ABUN
SN-126	-3.668E+00	4.243E+00	6.981E+00	0.000E+00	NOT IDENT.
SB-127	0.000E+00	2.165E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	2.810E+01	3.509E+01	6.452E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.170E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	1.666E-01	2.378E+00	3.716E+00	0.000E+00	NOT IDENT.
I-133	0.000E+00	3.823E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	8.361E-03	1.769E+00	3.059E+00	0.000E+00	FAIL ABUN
CS-135	-5.863E+00	8.049E+00	1.375E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	5.548E+39	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-1.333E-01	1.266E+01	2.295E+01	0.000E+00	FAIL ABUN
BA-137M	-1.098E+00	1.574E+00	2.557E+00	0.000E+00	NOT IDENT.
CS-137	-1.166E+00	1.663E+00	2.702E+00	0.000E+00	NOT IDENT.
CE-139	2.683E-01	2.080E+00	3.123E+00	0.000E+00	NOT IDENT.
BA-140	1.380E+01	3.621E+01	6.516E+01	0.000E+00	FAIL ABUN
LA-140	5.387E+00	1.270E+01	2.397E+01	0.000E+00	NOT IDENT.
CE-141	3.691E-01	5.723E+00	9.619E+00	0.000E+00	NOT IDENT.
CE-143	0.000E+00	2.108E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	4.604E-01	1.221E+01	2.060E+01	0.000E+00	NOT IDENT.
PM-144	4.412E-01	1.631E+00	2.879E+00	0.000E+00	NOT IDENT.
PR-144	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	2.334E+00	2.047E+00	3.873E+00	0.000E+00	NOT IDENT.
ND-147	-4.612E+01	9.397E+01	1.579E+02	0.000E+00	FAIL ABUN
PM-147	-1.529E+06	3.332E+06	5.511E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	3.025E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	1.375E+00	5.162E+00	9.202E+00	0.000E+00	NOT IDENT.
GD-153	2.857E+00	4.879E+00	8.490E+00	0.000E+00	NOT IDENT.
EU-154	2.207E+00	4.797E+00	9.066E+00	0.000E+00	NOT IDENT.
EU-155	5.826E-01	6.501E+00	1.106E+01	0.000E+00	NOT IDENT.
TB-160	1.202E+00	7.274E+00	1.342E+01	0.000E+00	NOT IDENT.
TM-171	1.697E+03	2.572E+03	3.254E+03	0.000E+00	FAIL ABUN
HF-181	-9.652E-01	2.894E+00	4.940E+00	0.000E+00	FAIL ABUN
TA-182	9.655E+00	1.089E+01	1.362E+01	0.000E+00	FAIL ABUN
IR-192	1.331E+00	2.297E+00	4.160E+00	0.000E+00	NOT IDENT.
HG-203	6.998E-02	2.891E+00	5.116E+00	0.000E+00	NOT IDENT.
BI-207	1.050E+00	2.083E+00	3.960E+00	0.000E+00	NOT IDENT.
TL-208	1.258E+00	2.987E+00	3.544E+00	0.000E+00	FAIL ABUN
BI-210	1.430E+02	3.500E+02	5.600E+02	0.000E+00	NOT IDENT.
PB-210	1.430E+02	3.500E+02	5.600E+02	0.000E+00	NOT IDENT.
PB-211	1.853E+00	4.816E+01	8.448E+01	0.000E+00	NOT IDENT.
BI-212	2.302E+00	1.337E+01	2.340E+01	0.000E+00	NOT IDENT.
PB-212	2.263E+00	4.469E+00	6.296E+00	0.000E+00	FAIL ABUN
BI-214	3.863E+00	4.808E+00	6.933E+00	0.000E+00	FAIL ABUN
PB-214	1.190E+00	6.741E+00	7.039E+00	0.000E+00	FAIL ABUN
RN-219	-4.281E+00	2.051E+01	3.552E+01	0.000E+00	NOT IDENT.
RA-223	-1.708E+01	3.496E+01	5.996E+01	0.000E+00	NOT IDENT.
RA-224	3.234E+01	3.676E+01	6.345E+01	0.000E+00	NOT IDENT.
AC-227	9.634E+00	2.325E+01	3.740E+01	0.000E+00	NOT IDENT.
TH-227	9.467E+00	2.285E+01	3.675E+01	0.000E+00	FAIL ABUN
AC-228	3.925E+00	1.043E+01	1.143E+01	0.000E+00	FAIL ABUN
RA-228	3.925E+00	1.043E+01	1.143E+01	0.000E+00	FAIL ABUN
TH-229	2.083E+01	2.927E+01	5.026E+01	0.000E+00	NOT IDENT.
PA-231	-1.542E+01	8.233E+01	1.441E+02	0.000E+00	NOT IDENT.
TH-231	4.980E+00	9.398E+00	1.706E+01	0.000E+00	FAIL ABUN
PA-233	-3.541E-01	3.384E+00	5.938E+00	0.000E+00	NOT IDENT.
PA-234	1.019E+01	1.247E+01	2.432E+01	0.000E+00	FAIL ABUN

TH-234	1.310E+02	9.841E+01	1.610E+02	0.000E+00	FAIL	ABUN
U-234	6.378E+00	7.295E+00	1.336E+01	0.000E+00	FAIL	ABUN
U-235	1.365E+01	1.255E+01	2.197E+01	0.000E+00	FAIL	ABUN
NP-237	-9.257E+00	1.269E+01	2.100E+01	0.000E+00	NOT	IDENT.
U-238	1.310E+02	9.841E+01	1.610E+02	0.000E+00	NOT	IDENT.
NP-239	-2.179E+00	1.161E+01	1.946E+01	0.000E+00	NOT	IDENT.
AM-241	-6.251E+00	1.139E+01	1.711E+01	0.000E+00	NOT	IDENT.
AM-242	4.070E+01	1.314E+02	2.257E+02	0.000E+00	NOT	IDENT.
CM-247	-1.035E+00	1.874E+00	3.172E+00	0.000E+00	NOT	IDENT.
CF-249	8.484E-01	2.037E+00	3.662E+00	0.000E+00	FAIL	ABUN
CF-251	5.428E+00	8.323E+00	1.276E+01	0.000E+00	FAIL	ABUN
ANH-511	0.000E+00	2.466E+00	5.262E+00	0.000E+00	NOT	IDENT.

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783002.CNF;1
Sample date        : 20-MAR-2006 10:00:00 Acquisition date : 24-APR-2006 23:30:28
Sample ID          : G158783002 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA9 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:03.26 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 10017452
Matrix Spike DPM : LCS DPM :
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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.00	78	403	0.97	125.95	123	8	3.61E-03	45.9	
2	0	66.42	69	335	1.28	132.78	130	7	3.20E-03	45.6	
3	0	92.74	392	491	1.15	185.34	180	10	1.81E-02	11.8	
4	0	139.41	109	366	1.78	278.53	274	9	5.04E-03	33.1	
5	0	163.47	101	407	1.82	326.58	322	13	4.69E-03	42.1	
6	0	174.36	33	229	1.50	348.33	347	7	1.54E-03	76.7	
7	0	185.75	194	287	1.44	371.09	367	8	8.98E-03	16.8	
8	0	199.01	161	354	2.91	397.57	392	12	7.44E-03	24.8	
9	1	238.72	116	185	1.52	476.87	473	36	5.36E-03	20.5	1.84E+00
10	1	251.94	39	185	1.54	503.28	473	36	1.83E-03	68.1	
11	0	294.25	16	195	1.38	587.79	586	8	7.37E-04	153.3	
12	0	352.01	56	161	2.04	703.15	698	11	2.57E-03	46.4	
13	0	418.62	34	78	1.73	836.21	833	8	1.59E-03	47.7	
14	0	510.83	378	212	2.83	1020.40	1012	18	1.75E-02	10.4	
15	0	558.32	97	61	1.85	1115.28	1112	10	4.48E-03	18.1	
16	3	583.11	61	57	2.21	1164.79	1159	17	2.81E-03	27.7	2.49E+00
17	3	586.65	39	49	2.17	1171.87	1159	17	1.79E-03	35.2	
18	0	594.88	46	93	1.13	1188.32	1182	13	2.11E-03	46.9	
19	0	608.98	72	58	1.49	1216.49	1212	9	3.34E-03	22.4	
20	0	719.06	24	25	0.94	1436.42	1433	7	1.12E-03	40.4	
21	0	742.70	22	46	1.48	1483.64	1480	10	1.03E-03	60.1	
22	0	844.34	22	39	2.39	1686.74	1681	10	1.01E-03	58.3	
23	0	910.25	47	44	4.36	1818.45	1811	15	2.15E-03	34.7	
24	0	981.06	24	31	0.98	1959.95	1956	12	1.11E-03	50.0	
25	0	1001.84	43	41	5.79	2001.49	1993	18	2.01E-03	37.6	
26	0	1014.43	11	18	0.64	2026.64	2024	6	5.09E-04	68.0	
27	0	1221.06	21	27	4.40	2439.62	2432	14	9.92E-04	56.4	
28	0	1365.96	13	21	2.29	2729.28	2722	14	5.96E-04	84.9	
29	0	1376.11	44	15	3.55	2749.57	2738	20	2.03E-03	26.4	
30	0	1460.28	40	18	3.05	2917.83	2914	10	1.85E-03	25.2	
31	0	1559.98	8	14	1.00	3117.15	3112	10	3.58E-04	99.8	
32	0	1649.78	7	4	0.59	3296.72	3294	6	3.14E-04	62.2	
33	0	1662.80	7	7	1.39	3322.74	3321	6	3.24E-04	71.8	
34	0	1677.93	5	18	3.05	3353.00	3349	12	2.31E-04	175.5	
35	0	1764.42	35	13	2.41	3525.94	3518	14	1.60E-03	28.5	
36	4	1786.26	18	23	3.29	3569.63	3549	37	8.37E-04	71.1	9.07E-01
37	4	1791.10	21	10	3.29	3579.30	3549	37	9.54E-04	45.3	
38	4	1798.19	21	8	3.29	3593.48	3586	40	9.53E-04	36.0	1.00E+00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	4	1812.64	16	4	3.00	3622.37	3586	40	7.51E-04	28.3	

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783002.CNF;1
Sample date        : 20-MAR-2006 10:00:00 Acquisition date : 24-APR-2006 23:30:28
Sample ID          : G158783002 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA9 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:03.26 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 10017452
Matrix Spike DPM : LCS DPM :
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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
Y-91	557.57	60	95.08*	1.132E+00	3.503E+00	5.347E+00	76.87
	1204.90	-----	0.30	6.417E-01	-----	Line Not Found	-----
BI-211	351.07	11	12.94*	1.490E+00	3.420E+00	3.420E+00	566.66
RA-226	295.21	-----	19.20	1.646E+00	-----	Line Not Found	-----
	351.92	11	37.20	1.490E+00	1.190E+00	1.190E+00	566.66
	609.31	31	46.30*	1.069E+00	3.863E+00	3.863E+00	124.45
TH-228	84.40	-----	1.21	1.850E+00	-----	Line Not Found	-----
	238.60	29	44.60*	1.853E+00	2.184E+00	2.263E+00	197.50
	300.10	-----	3.41	1.631E+00	-----	Line Not Found	-----
TH-230	295.21	-----	19.20	1.646E+00	-----	Line Not Found	-----
	351.92	11	37.20	1.490E+00	1.190E+00	1.190E+00	566.66
	609.31	31	46.30*	1.069E+00	3.863E+00	3.863E+00	124.45
TH-232	238.59	29	44.60*	1.853E+00	2.184E+00	2.184E+00	197.50
	911.20	14	27.70	7.985E-01	3.879E+00	3.879E+00	265.74
	964.40	-----	5.20	7.632E-01	-----	Line Not Found	-----
	969.11	-----	16.60	7.603E-01	-----	Line Not Found	-----
PA-234M	766.40	-----	0.21	9.100E-01	-----	Line Not Found	-----
	1001.03	22	0.85*	7.407E-01	2.230E+02	2.230E+02	166.55

Flag: "*" = Keyline

Total number of lines in spectrum 33
 Number of unidentified lines 9
 Number of lines tentatively identified by NID 24 72.73%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
Y-91	58.51D	1.53	3.503E+00	5.347E+00	4.110E+00	76.87	
BI-211	7.04E+08Y	1.00	3.420E+00	3.420E+00	19.38E+00	566.66	
RA-226	1600.00Y	1.00	3.863E+00	3.863E+00	4.808E+00	124.45	
TH-228	1.91Y	1.04	2.184E+00	2.263E+00	4.469E+00	197.50	
TH-230	7.70E+04Y	1.00	3.863E+00	3.863E+00	4.807E+00	124.45	
TH-232	1.41E+10Y	1.00	2.184E+00	2.184E+00	4.313E+00	197.50	
PA-234M	4.47E+09Y	1.00	2.230E+02	2.230E+02	3.714E+02	166.55	
Total Activity :			2.420E+02	2.439E+02			

Grand Total Activity : 2.420E+02 2.439E+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	66.42	46	335	1.28	132.78	130	7	2.13E-03	****	1.11E+00	T
0	92.74	53	491	1.15	185.34	180	10	2.46E-03	****	2.07E+00	T
0	139.41	92	366	1.78	278.53	274	9	4.28E-03	83.8	2.33E+00	T
0	163.47	76	407	1.82	326.58	322	13	3.53E-03	****	2.23E+00	T
0	174.36	33	229	1.50	348.33	347	7	1.54E-03	****	2.17E+00	T
0	199.01	161	354	2.91	397.57	392	12	7.44E-03	49.6	2.04E+00	T
1	251.94	21	185	1.54	503.28	473	36	9.92E-04	****	1.80E+00	T
0	418.62	34	78	1.73	836.21	833	8	1.59E-03	95.4	1.35E+00	T
3	583.11	18	57	2.21	1164.79	1159	17	8.33E-04	****	1.10E+00	T
3	586.65	39	49	2.17	1171.87	1159	17	1.79E-03	70.5	1.10E+00	
0	594.88	46	93	1.13	1188.32	1182	13	2.11E-03	93.7	1.09E+00	
0	719.06	24	25	0.94	1436.42	1433	7	1.12E-03	80.9	9.53E-01	T
0	742.70	22	46	1.48	1483.64	1480	10	1.03E-03	****	9.31E-01	T
0	844.34	22	39	2.39	1686.74	1681	10	1.01E-03	****	8.46E-01	
0	981.06	24	31	0.98	1959.95	1956	12	1.11E-03	****	7.53E-01	T
0	1014.43	11	18	0.64	2026.64	2024	6	5.09E-04	****	7.33E-01	
0	1221.06	21	27	4.40	2439.62	2432	14	9.92E-04	****	6.35E-01	T
0	1365.96	13	21	2.29	2729.28	2722	14	5.96E-04	****	5.86E-01	T
0	1376.11	36	15	3.55	2749.57	2738	20	1.65E-03	72.8	5.83E-01	T
0	1559.98	8	14	1.00	3117.15	3112	10	3.58E-04	****	5.41E-01	
0	1649.78	7	4	0.59	3296.72	3294	6	3.14E-04	****	5.26E-01	
0	1662.80	7	7	1.39	3322.74	3321	6	3.24E-04	****	5.24E-01	
0	1677.93	5	18	3.05	3353.00	3349	12	2.31E-04	****	5.22E-01	T
4	1786.26	14	23	3.29	3569.63	3549	37	6.59E-04	****	5.11E-01	
4	1791.10	21	10	3.29	3579.30	3549	37	9.54E-04	90.6	5.11E-01	T
4	1798.19	21	8	3.29	3593.48	3586	40	9.53E-04	72.0	5.10E-01	
4	1812.64	16	4	3.00	3622.37	3586	40	7.51E-04	56.5	5.09E-01	T

Flags: "T" = Tentatively associated

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                               *
*                                     Charleston, SC 29414                            *
*****
*                                     DETECTOR DATA                                *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783002.CNF;1
* Acquisition date   : 24-APR-2006 23:30:28  Detector SN#      : 10017452
* Detector ID        : GAMMA9                  Sensitivity       : 3.00000
* Geometry           : 2L_MB                   Energy tolerance: 2.00000
* Elapsed live time  : 0 06:00:00.00          Abundance limit  : 75.00000
* Elapsed real time  : 0 06:00:03.26          Half life ratio  : 8.00000
*****
*                                     SAMPLE DATA                                *
*
* Sample date        : 20-MAR-2006 10:00:00  Nuclide Library  : EPI
* Sample ID          : G158783002            Analyst initials   : MJH1
* Batch Number       : 523017                Sample Quantity   : 2.00000E+00 LITER
*****
*                                     QC DATA                                  *
*
* CALIB. DATE/TIME  : 8-JUL-2005 12:59:09.79MS Isotope        : TOPLOADER
* MSD DPM           :                        MSD Isotope       :
* LCS DPM           :                        LCS Isotope       :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
Y-91	5.347E+00	4.110E+00	3.625E+00	0.000E+00	1.475
BI-211	3.420E+00	1.938E+01	1.860E+01	0.000E+00	0.184
RA-226	3.863E+00	4.808E+00	4.912E+00	0.000E+00	0.786
TH-228	2.263E+00	4.469E+00	5.329E+00	0.000E+00	0.425
TH-230	3.863E+00	4.807E+00	4.912E+00	0.000E+00	0.786
TH-232	2.184E+00	4.313E+00	5.143E+00	0.000E+00	0.425
PA-234M	2.230E+02	3.714E+02	2.989E+02	0.000E+00	0.746

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

Nuclide	Key-Line Activity K.L. (pCi/LITER) Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	-1.169E+01	2.100E+01	3.523E+01	0.000E+00	-0.332
NA-22	8.112E-01	1.737E+00	3.285E+00	0.000E+00	0.247
AL-26	1.015E+00	1.670E+00	3.062E+00	0.000E+00	0.331
K-40	3.029E+01	2.027E+01	4.067E+01	0.000E+00	0.745
SC-46	1.447E+00	1.904E+00	3.708E+00	0.000E+00	0.390

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
V-48	8.347E-03		8.353E+00	1.316E+01	0.000E+00	0.001
CR-51	-1.559E+01		3.326E+01	5.715E+01	0.000E+00	-0.273
MN-54	3.874E-01		1.683E+00	3.104E+00	0.000E+00	0.125
CO-56	-2.753E-01		2.218E+00	3.470E+00	0.000E+00	-0.079
CO-57	2.193E-01		1.628E+00	2.761E+00	0.000E+00	0.079
CO-58	-2.046E-01		1.869E+00	3.395E+00	0.000E+00	-0.060
FE-59	-2.286E+00		4.774E+00	8.211E+00	0.000E+00	-0.278
CO-60	-7.590E-01		1.642E+00	2.798E+00	0.000E+00	-0.271
ZN-65	-3.207E+00		3.427E+00	5.563E+00	0.000E+00	-0.576
SE-75	-1.291E+00		2.670E+00	4.619E+00	0.000E+00	-0.279
KR-85	-1.878E+03		5.182E+02	7.218E+02	0.000E+00	-2.602
SR-85	-1.195E+01		3.297E+00	4.592E+00	0.000E+00	-2.602
Y-88	-3.995E-01		1.776E+00	3.274E+00	0.000E+00	-0.122
NB-94	2.643E-02		1.592E+00	2.742E+00	0.000E+00	0.010
NB-95	2.310E+00		3.048E+00	5.619E+00	0.000E+00	0.411
ZR-95	-1.161E+00		3.721E+00	6.250E+00	0.000E+00	-0.186
RU-103	-8.842E-01		3.080E+00	5.252E+00	0.000E+00	-0.168
RH-106	5.828E+00		1.453E+01	2.620E+01	0.000E+00	0.222
RU-106	2.938E+00		1.478E+01	2.617E+01	0.000E+00	0.112
AG-108M	7.449E-02		1.615E+00	2.840E+00	0.000E+00	0.026
CD-109	-2.337E+01		4.330E+01	7.219E+01	0.000E+00	-0.324
AG-110M	1.111E+00		1.632E+00	2.998E+00	0.000E+00	0.370
SN-113	8.705E-01		2.593E+00	4.636E+00	0.000E+00	0.188
SN-115	7.427E+00		1.872E+02	3.427E+02	0.000E+00	0.022
SN-117M	1.979E+00		9.196E+00	1.553E+01	0.000E+00	0.127
TE-123M	-2.595E-01		1.885E+00	3.133E+00	0.000E+00	-0.083
SB-124	1.039E+00		4.771E+00	9.253E+00	0.000E+00	0.112
SB-125	3.316E+00		4.458E+00	8.214E+00	0.000E+00	0.404
TE-125M	3.707E+01		7.251E+02	1.229E+03	0.000E+00	0.030
I-126	1.407E+01		2.296E+01	4.209E+01	0.000E+00	0.334
SB-126	2.162E+01	+	1.748E+01	3.649E+01	0.000E+00	0.592
SN-126	-3.668E+00		4.243E+00	6.981E+00	0.000E+00	-0.525
I-131	2.810E+01		3.509E+01	6.452E+01	0.000E+00	0.436
BA-133	1.666E-01		2.378E+00	3.716E+00	0.000E+00	0.045
CS-134	8.361E-03		1.769E+00	3.059E+00	0.000E+00	0.003
CS-135	-5.863E+00		8.049E+00	1.375E+01	0.000E+00	-0.426
CS-136	-1.333E-01		1.266E+01	2.295E+01	0.000E+00	-0.006
BA-137M	-1.098E+00		1.574E+00	2.557E+00	0.000E+00	-0.429
CS-137	-1.166E+00		1.663E+00	2.702E+00	0.000E+00	-0.431
CE-139	2.683E-01		2.080E+00	3.123E+00	0.000E+00	0.086
BA-140	1.380E+01		3.621E+01	6.516E+01	0.000E+00	0.212
LA-140	5.387E+00		1.270E+01	2.397E+01	0.000E+00	0.225
CE-141	3.691E-01		5.723E+00	9.619E+00	0.000E+00	0.038
CE-144	4.604E-01		1.221E+01	2.060E+01	0.000E+00	0.022
PM-144	4.412E-01		1.631E+00	2.879E+00	0.000E+00	0.153
PM-146	2.334E+00		2.047E+00	3.873E+00	0.000E+00	0.603
ND-147	-4.612E+01		9.397E+01	1.579E+02	0.000E+00	-0.292
PM-147	-1.529E+06		3.332E+06	5.511E+06	0.000E+00	-0.278

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
EU-152	1.375E+00		5.162E+00	9.202E+00	0.000E+00	0.149
GD-153	2.857E+00		4.879E+00	8.490E+00	0.000E+00	0.337
EU-154	2.207E+00		4.797E+00	9.066E+00	0.000E+00	0.243
EU-155	5.826E-01		6.501E+00	1.106E+01	0.000E+00	0.053
TB-160	1.202E+00		7.274E+00	1.342E+01	0.000E+00	0.090
TM-171	1.697E+03	+	2.572E+03	3.254E+03	0.000E+00	0.521
HF-181	-9.652E-01		2.894E+00	4.940E+00	0.000E+00	-0.195
TA-182	9.655E+00	+	1.089E+01	1.362E+01	0.000E+00	0.709
IR-192	1.331E+00		2.297E+00	4.160E+00	0.000E+00	0.320
HG-203	6.998E-02		2.891E+00	5.116E+00	0.000E+00	0.014
BI-207	1.050E+00		2.083E+00	3.960E+00	0.000E+00	0.265
TL-208	1.258E+00	+	2.987E+00	3.544E+00	0.000E+00	0.355
BI-210	1.430E+02		3.500E+02	5.600E+02	0.000E+00	0.255
PB-210	1.430E+02		3.500E+02	5.600E+02	0.000E+00	0.255
PB-211	1.853E+00		4.816E+01	8.448E+01	0.000E+00	0.022
BI-212	2.302E+00		1.337E+01	2.340E+01	0.000E+00	0.098
PB-212	2.263E+00	+	4.469E+00	6.296E+00	0.000E+00	0.359
BI-214	3.863E+00	+	4.808E+00	6.933E+00	0.000E+00	0.557
PB-214	1.190E+00	+	6.741E+00	7.039E+00	0.000E+00	0.169
RN-219	-4.281E+00		2.051E+01	3.552E+01	0.000E+00	-0.121
RA-223	-1.708E+01		3.496E+01	5.996E+01	0.000E+00	-0.285
RA-224	3.234E+01		3.676E+01	6.345E+01	0.000E+00	0.510
AC-227	9.634E+00		2.325E+01	3.740E+01	0.000E+00	0.258
TH-227	9.467E+00		2.285E+01	3.675E+01	0.000E+00	0.258
AC-228	3.925E+00	+	1.043E+01	1.143E+01	0.000E+00	0.344
RA-228	3.925E+00	+	1.043E+01	1.143E+01	0.000E+00	0.344
TH-229	2.083E+01		2.927E+01	5.026E+01	0.000E+00	0.414
PA-231	-1.542E+01		8.233E+01	1.441E+02	0.000E+00	-0.107
TH-231	4.980E+00		9.398E+00	1.706E+01	0.000E+00	0.292
PA-233	-3.541E-01		3.384E+00	5.938E+00	0.000E+00	-0.060
PA-234	1.019E+01		1.247E+01	2.432E+01	0.000E+00	0.419
TH-234	1.310E+02		9.841E+01	1.610E+02	0.000E+00	0.814
U-234	6.378E+00		7.295E+00	1.336E+01	0.000E+00	0.477
U-235	1.365E+01		1.255E+01	2.197E+01	0.000E+00	0.621
NP-237	-9.257E+00		1.269E+01	2.100E+01	0.000E+00	-0.441
U-238	1.310E+02		9.841E+01	1.610E+02	0.000E+00	0.814
NP-239	-2.179E+00		1.161E+01	1.946E+01	0.000E+00	-0.112
AM-241	-6.251E+00		1.139E+01	1.711E+01	0.000E+00	-0.365
AM-242	4.070E+01		1.314E+02	2.257E+02	0.000E+00	0.180
CM-247	-1.035E+00		1.874E+00	3.172E+00	0.000E+00	-0.326
CF-249	8.484E-01		2.037E+00	3.662E+00	0.000E+00	0.232
CF-251	5.428E+00	+	8.323E+00	1.276E+01	0.000E+00	0.425
ANH-511	1.735E+01		2.466E+00	5.262E+00	0.000E+00	3.297

```

*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G158783002
*   ANALYST       : MJH1           DETECTOR    : GAMMA9
*   SAMPLE DATE   : 20-MAR-2006 10:00:00.00  COUNT TIME : 0 06:00:00.00
*   ANALYSIS DATE: 24-APR-2006 23:30:28.63  SAMPLE ALQT: 2.000 LITER
*
*****

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GROSS GAMMA ACTIVITY (pCi/LITER ) : 5.923E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 4.121E+01
GROSS GAMMA MDA     (pCi/LITER ) : 2.060E+02
GROSS GAMMA DLC     (pCi/LITER ) : 9.973E+01

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:32:27.20

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783003.CNF;1
Sample date   : 20-MAR-2006 15:00:00 Acquisition date : 24-APR-2006 23:30:49
Sample ID    : G158783003 Sample quantity : 2.00000E+00 LITER
Detector name : WELL Detector geometry: 2L_MB
Elapsed live time: 0 06:00:00.00 Elapsed real time: 0 06:00:04.88 0.0%
Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID      : 523017 Detector SN# : 3941466
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	42.97	38	328	1.25	84.77	82	7	1.74E-03	81.8	
2	0	46.74*	15	499	1.63	92.26	88	10	6.80E-04	319.1	
3	0	53.70	54	482	0.81	106.09	103	8	2.50E-03	71.6	
4	0	63.47*	54	427	1.16	125.49	122	8	2.49E-03	82.2	
5	0	67.88	72	607	3.55	134.25	130	10	3.34E-03	64.9	
6	4	139.72	139	402	2.08	276.98	272	23	6.44E-03	29.2	1.02E+00
7	4	143.80*	52	533	2.09	285.11	272	23	2.42E-03	99.4	
8	0	163.75*	54	326	2.35	324.73	321	8	2.49E-03	67.4	
9	0	186.14*	63	305	1.34	369.21	366	8	2.91E-03	68.7	
10	0	224.49	36	260	1.46	445.42	441	8	1.67E-03	79.3	
11	0	238.85*	73	311	1.48	473.96	469	11	3.37E-03	56.7	
12	0	254.54*	25	157	1.74	505.14	503	6	1.16E-03	96.4	
13	0	317.16	12	179	1.51	629.56	627	10	5.40E-04	217.0	
14	0	433.90	28	56	1.84	861.57	858	7	1.28E-03	48.9	
15	0	540.74*	6	49	0.76	1073.91	1071	8	2.94E-04	287.8	
16	0	583.37*	24	93	2.54	1158.65	1151	14	1.10E-03	113.0	
17	0	607.97*	47	144	1.60	1207.55	1199	18	2.19E-03	67.9	
18	0	619.55	45	138	6.87	1230.57	1221	25	2.06E-03	72.5	
19	0	781.05	30	25	3.42	1551.62	1547	10	1.39E-03	36.1	
20	0	844.70*	10	92	3.06	1678.16	1674	24	4.72E-04	265.2	
21	0	910.43*	20	53	1.29	1808.84	1802	14	9.40E-04	92.9	
22	0	937.14	53	34	5.55	1861.97	1854	17	2.44E-03	28.8	
23	0	968.51*	23	43	2.22	1924.34	1918	12	1.07E-03	71.3	
24	0	1149.02	30	43	4.37	2283.30	2273	22	1.39E-03	58.9	
25	0	1164.90	17	19	1.03	2314.89	2309	10	7.77E-04	55.3	
26	5	1191.32	29	28	3.44	2367.43	2346	32	1.32E-03	57.5	1.60E+00
27	5	1194.68	16	7	1.93	2374.11	2346	32	7.60E-04	48.5	
28	0	1239.18*	40	30	8.82	2462.63	2451	24	1.85E-03	40.6	
29	0	1263.63	56	59	8.06	2511.25	2496	39	2.57E-03	47.1	
30	0	1367.33	5	6	0.49	2717.53	2715	5	2.40E-04	93.6	
31	0	1379.99	19	23	3.52	2742.71	2736	14	8.85E-04	59.2	
32	0	1411.82	44	35	11.29	2806.03	2794	28	2.02E-03	41.3	
33	0	1460.37*	4	29	1.02	2902.62	2897	12	1.96E-04	370.2	
34	0	1554.15	19	8	3.77	3089.19	3085	10	8.90E-04	35.2	
35	0	1611.29	19	6	5.01	3202.87	3196	14	8.76E-04	37.2	
36	0	1683.13	14	2	0.55	3345.83	3342	10	6.57E-04	33.2	
37	0	1708.15	17	2	1.97	3395.60	3391	9	7.80E-04	29.1	
38	0	1712.92	20	0	3.18	3405.10	3400	11	9.26E-04	22.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1747.52	21	35	14.93	3473.95	3458	35	9.72E-04	90.6	
40	0	1835.38*	2	10	4.16	3648.79	3643	14	8.18E-05	485.9	
41	0	1868.25	8	5	0.91	3714.21	3711	7	3.72E-04	58.6	
42	0	1897.03	17	3	0.61	3771.48	3768	10	7.84E-04	30.3	
43	0	1914.52	4	8	0.77	3806.30	3803	6	1.66E-04	140.9	
44	0	1957.54	13	13	1.64	3891.92	3885	11	5.83E-04	63.4	
45	0	1997.07	33	6	11.97	3970.60	3957	30	1.51E-03	29.9	
46	0	2011.89*	7	4	1.80	4000.10	3991	13	3.14E-04	77.7	
47	0	2041.20	8	4	0.94	4058.45	4053	9	3.55E-04	61.4	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783003
* Acquisition date   : 24-APR-2006 23:30:49 Detector SN#      : 3941466
* Detector ID       : WELL                               Sensitivity      : 3.000
* Geometry          : 2L_MB                             Energy tolerance: 2.000
* Elapsed live time : 0 06:00:00.00                   Abundance limit : 75.000
* Elapsed real time : 0 06:00:04.88                   Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                         *
*
* Sample date       : 20-MAR-2006 15:00:00 Nuclide Library  : FERMC
* Sample ID        : G158783003                      Analyst initials: MJH1
* Batch Number     : 523017                           Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000                          Carrier Weight  : 0.00000
*****
*                               QC DATA                                             *
*
* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 13-DEC-2005 09:34:01 MS Isotope      :
* MSD DPM           : *****                          MSD Isotope      :
* LCS DPM           : 0.000                            LCS Isotope      :
* LCSD DPM          : 0.000                            LCSD Isotope     :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
K-40	6.171E+00	4.569E+01	3.604E+01	0.000E+00
CE-141	4.527E+00	1.272E+01	1.074E+01	0.000E+00
TM-171	2.165E+03	2.808E+03	2.793E+03	0.000E+00
BI-210	4.400E+01	2.808E+02	2.649E+02	0.000E+00
PB-210	4.400E+01	2.808E+02	2.649E+02	0.000E+00
TH-228	5.955E+00	6.750E+00	6.345E+00	0.000E+00
TH-232	5.748E+00	6.516E+00	6.125E+00	0.000E+00
U-235	1.363E+01	2.709E+01	2.548E+01	0.000E+00
U-238	7.375E+01	1.212E+02	1.253E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	-7.234E-01	2.943E+01	4.999E+01	0.000E+00 NOT IDENT.
NA-22	-3.976E-01	2.369E+00	3.558E+00	0.000E+00 NOT IDENT.
NA-24	0.000E+00	1.663E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	3.618E-01	2.083E+00	4.040E+00	0.000E+00 NOT IDENT.
SC-46	-8.229E-01	2.626E+00	4.569E+00	0.000E+00 NOT IDENT.
V-48	-5.647E+00	9.778E+00	1.642E+01	0.000E+00 NOT IDENT.
CR-51	-3.411E+01	4.797E+01	6.842E+01	0.000E+00 NOT IDENT.
MN-54	1.722E+00	2.177E+00	4.170E+00	0.000E+00 NOT IDENT.
CO-56	-6.454E-01	2.742E+00	4.805E+00	0.000E+00 FAIL ABUN
MN-56	0.000E+00	2.000E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	-8.341E-01	2.006E+00	3.217E+00	0.000E+00 NOT IDENT.
CO-58	-1.760E+00	2.894E+00	4.896E+00	0.000E+00 NOT IDENT.
FE-59	-4.343E+00	6.405E+00	1.054E+01	0.000E+00 NOT IDENT.
CO-60	1.372E+00	2.179E+00	4.210E+00	0.000E+00 NOT IDENT.
ZN-65	5.280E-02	4.707E+00	8.412E+00	0.000E+00 NOT IDENT.
SE-75	-6.540E-01	3.174E+00	5.420E+00	0.000E+00 FAIL ABUN
KR-85	-1.899E+03	6.991E+02	1.004E+03	0.000E+00 NOT IDENT.
SR-85	-1.206E+01	4.438E+00	6.373E+00	0.000E+00 NOT IDENT.

Y-88	4.197E-01	4.078E+00	5.224E+00	0.000E+00	FAIL ABUN
Y-91	1.613E+00	3.229E+00	5.682E+00	0.000E+00	NOT IDENT.
NB-94	-1.103E+00	1.960E+00	3.355E+00	0.000E+00	NOT IDENT.
NB-95	5.064E-01	4.319E+00	7.771E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	6.398E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	4.431E+00	5.323E+00	1.017E+01	0.000E+00	NOT IDENT.
MO-99	0.000E+00	2.046E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	5.835E+40	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-1.172E+00	4.386E+00	7.301E+00	0.000E+00	NOT IDENT.
RH-106	-2.035E+01	2.232E+01	3.738E+01	0.000E+00	NOT IDENT.
RU-106	-2.037E+01	2.234E+01	3.740E+01	0.000E+00	NOT IDENT.
AG-108M	1.974E+00	1.930E+00	3.550E+00	0.000E+00	FAIL ABUN
CD-109	4.127E+01	5.673E+01	9.548E+01	0.000E+00	NOT IDENT.
AG-110M	-1.219E+01	3.030E+00	3.933E+00	0.000E+00	FAIL ABUN
SN-113	2.247E+00	3.336E+00	5.935E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	3.774E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	-1.520E+02	3.363E+02	4.860E+02	0.000E+00	NOT IDENT.
SN-117M	7.361E+00	1.009E+01	1.800E+01	0.000E+00	NOT IDENT.
TE-123M	1.555E+00	2.103E+00	3.752E+00	0.000E+00	NOT IDENT.
SB-124	-5.480E+00	7.079E+00	1.175E+01	0.000E+00	FAIL ABUN
SB-125	5.353E+00	5.785E+00	1.054E+01	0.000E+00	FAIL ABUN
TE-125M	7.699E+02	8.604E+02	1.457E+03	0.000E+00	NOT IDENT.
I-126	-1.232E+02	4.281E+01	6.164E+01	0.000E+00	NOT IDENT.
SB-126	-8.289E-01	2.664E+01	4.763E+01	0.000E+00	NOT IDENT.
SN-126	1.412E+00	5.525E+00	9.157E+00	0.000E+00	FAIL ABUN
SB-127	0.000E+00	2.746E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	1.146E+01	4.122E+01	7.211E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.393E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	-1.793E+00	2.966E+00	4.906E+00	0.000E+00	NOT IDENT.
I-133	0.000E+00	4.226E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	3.587E-01	2.331E+00	4.246E+00	0.000E+00	NOT IDENT.
CS-135	3.801E-01	1.021E+01	1.759E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	4.578E+39	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-2.010E+01	1.708E+01	2.635E+01	0.000E+00	FAIL ABUN
BA-137M	0.000E+00	3.177E+00	6.682E+00	0.000E+00	NOT IDENT.
CS-137	0.000E+00	3.358E+00	7.063E+00	0.000E+00	NOT IDENT.
CE-139	8.501E-02	2.392E+00	3.678E+00	0.000E+00	NOT IDENT.
BA-140	-1.469E+01	5.210E+01	7.530E+01	0.000E+00	FAIL ABUN
LA-140	-4.222E+00	1.734E+01	3.112E+01	0.000E+00	FAIL ABUN
CE-143	0.000E+00	2.160E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	1.255E+01	1.428E+01	2.568E+01	0.000E+00	NOT IDENT.
PM-144	5.393E-01	2.167E+00	3.950E+00	0.000E+00	FAIL ABUN
PR-144	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	1.324E+00	3.041E+00	5.328E+00	0.000E+00	NOT IDENT.
ND-147	-1.188E+02	1.223E+02	1.916E+02	0.000E+00	NOT IDENT.
PM-147	-1.089E+06	4.032E+06	6.507E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	3.546E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	-5.221E+00	6.134E+00	1.001E+01	0.000E+00	NOT IDENT.
GD-153	-2.540E-02	5.904E+00	9.701E+00	0.000E+00	FAIL ABUN
EU-154	-1.111E+00	6.548E+00	9.829E+00	0.000E+00	NOT IDENT.
EU-155	-4.800E+00	7.966E+00	1.275E+01	0.000E+00	NOT IDENT.
TB-160	2.341E+00	9.240E+00	1.708E+01	0.000E+00	NOT IDENT.
HF-181	2.017E+00	4.212E+00	7.389E+00	0.000E+00	FAIL ABUN
TA-182	7.694E+00	9.688E+00	1.896E+01	0.000E+00	FAIL ABUN
IR-192	8.687E-01	3.771E+00	4.752E+00	0.000E+00	FAIL ABUN
HG-203	1.326E+00	3.605E+00	6.299E+00	0.000E+00	NOT IDENT.
BI-207	2.930E+00	2.781E+00	5.525E+00	0.000E+00	NOT IDENT.
TL-208	2.208E+00	4.991E+00	5.024E+00	0.000E+00	FAIL ABUN
BI-211	8.206E+00	1.370E+01	2.416E+01	0.000E+00	NOT IDENT.
PB-211	1.429E+01	6.386E+01	1.104E+02	0.000E+00	NOT IDENT.
BI-212	1.207E+01	1.846E+01	3.455E+01	0.000E+00	NOT IDENT.
PB-212	5.955E+00	6.750E+00	7.812E+00	0.000E+00	FAIL ABUN
BI-214	8.001E+00	1.086E+01	9.097E+00	0.000E+00	FAIL ABUN
PB-214	3.218E+00	4.737E+00	8.395E+00	0.000E+00	NOT IDENT.
RN-219	-1.640E+01	2.830E+01	4.663E+01	0.000E+00	NOT IDENT.
RA-223	5.029E+00	4.444E+01	7.658E+01	0.000E+00	FAIL ABUN
RA-224	6.900E+01	4.655E+01	7.651E+01	0.000E+00	NOT IDENT.
RA-226	8.001E+00	1.086E+01	9.097E+00	0.000E+00	FAIL ABUN
AC-227	1.496E+01	2.884E+01	4.451E+01	0.000E+00	FAIL ABUN
TH-227	1.470E+01	2.834E+01	4.374E+01	0.000E+00	FAIL ABUN
AC-228	8.043E+00	1.495E+01	1.783E+01	0.000E+00	FAIL ABUN
RA-228	8.043E+00	1.495E+01	1.783E+01	0.000E+00	FAIL ABUN
TH-229	-2.269E+01	3.185E+01	5.372E+01	0.000E+00	NOT IDENT.
TH-230	8.000E+00	1.086E+01	9.097E+00	0.000E+00	FAIL ABUN
PA-231	7.407E+01	1.037E+02	1.838E+02	0.000E+00	NOT IDENT.
TH-231	7.091E+00	1.170E+01	2.069E+01	0.000E+00	FAIL ABUN
PA-233	9.048E-01	4.047E+00	7.048E+00	0.000E+00	NOT IDENT.

PA-234	-1.237E+01	1.676E+01	2.769E+01	0.000E+00	FAIL ABUN
PA-234M	4.007E+02	2.566E+02	5.240E+02	0.000E+00	NOT IDENT.
TH-234	7.375E+01	1.212E+02	1.569E+02	0.000E+00	FAIL ABUN
U-234	-1.302E+00	8.484E+00	1.447E+01	0.000E+00	FAIL ABUN
NP-237	-1.258E+01	1.632E+01	2.610E+01	0.000E+00	NOT IDENT.
NP-239	-1.421E+01	1.437E+01	2.256E+01	0.000E+00	NOT IDENT.
AM-241	-6.622E+00	9.470E+00	1.536E+01	0.000E+00	NOT IDENT.
AM-242	1.356E+02	1.589E+02	2.693E+02	0.000E+00	NOT IDENT.
CM-247	-5.769E-01	2.506E+00	4.221E+00	0.000E+00	NOT IDENT.
CF-249	4.741E-01	2.709E+00	4.677E+00	0.000E+00	FAIL ABUN
CF-251	1.101E+01	8.448E+00	1.530E+01	0.000E+00	NOT IDENT.
ANH-511	0.000E+00	3.100E+00	6.507E+00	0.000E+00	NOT IDENT.


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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783003.CNF;1
Sample date        : 20-MAR-2006 15:00:00 Acquisition date : 24-APR-2006 23:30:49
Sample ID          : G158783003 Sample quantity : 2.00000E+00 LITER
Detector name     : WELL Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:04.88 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 3941466
Matrix Spike DPM : LCS DPM :
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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	42.97	38	328	1.25	84.77	82	7	1.74E-03	81.8	
2	0	46.74	92	499	1.63	92.26	88	10	4.28E-03	46.3	
3	0	53.70	54	482	0.81	106.09	103	8	2.50E-03	71.6	
4	0	63.47	228	427	1.16	125.49	122	8	1.05E-02	17.0	
5	0	67.88	72	607	3.55	134.25	130	10	3.34E-03	64.9	
6	0	92.98	462	607	1.44	184.13	180	10	2.14E-02	11.1	
7	4	139.72	139	402	2.08	276.98	272	23	6.44E-03	29.2	1.02E+00
8	4	143.80	92	533	2.09	285.11	272	23	4.24E-03	51.6	
9	0	163.75	75	326	2.35	324.73	321	8	3.48E-03	43.1	
10	0	186.14	307	305	1.34	369.21	366	8	1.42E-02	11.4	
11	0	198.03	22	296	0.91	392.84	390	7	1.02E-03	132.5	
12	0	224.49	36	260	1.46	445.42	441	8	1.67E-03	79.3	
13	0	238.85	184	311	1.48	473.96	469	11	8.52E-03	20.0	
14	0	254.54	34	157	1.74	505.14	503	6	1.57E-03	61.2	
15	0	317.16	12	179	1.51	629.56	627	10	5.40E-04	217.0	
16	0	352.70	47	242	2.91	700.19	692	14	2.20E-03	71.4	
17	0	433.90	28	56	1.84	861.57	858	7	1.28E-03	48.9	
18	0	511.21	318	197	2.10	1015.22	1007	17	1.47E-02	11.6	
19	0	540.74	17	49	0.76	1073.91	1071	8	7.83E-04	75.3	
20	0	583.37	68	93	2.54	1158.65	1151	14	3.15E-03	32.6	
21	0	607.97	65	144	1.60	1207.55	1199	18	3.00E-03	45.2	
22	0	619.55	45	138	6.87	1230.57	1221	25	2.06E-03	72.5	
23	0	627.81	23	78	1.80	1246.99	1245	12	1.05E-03	79.4	
24	0	661.43	137	99	1.71	1313.81	1308	12	6.33E-03	16.9	
25	0	781.05	30	25	3.42	1551.62	1547	10	1.39E-03	36.1	
26	0	844.70	24	92	3.06	1678.16	1674	24	1.11E-03	106.7	
27	0	910.43	45	53	1.29	1808.84	1802	14	2.10E-03	36.9	
28	0	937.14	53	34	5.55	1861.97	1854	17	2.44E-03	28.8	
29	0	968.51	37	43	2.22	1924.34	1918	12	1.73E-03	39.2	
30	0	1000.21	30	28	2.17	1987.37	1983	11	1.37E-03	39.0	
31	0	1149.02	30	43	4.37	2283.30	2273	22	1.39E-03	58.9	
32	0	1164.90	17	19	1.03	2314.89	2309	10	7.77E-04	55.3	
33	5	1191.32	29	28	3.44	2367.43	2346	32	1.32E-03	57.5	1.60E+00
34	5	1194.68	16	7	1.93	2374.11	2346	32	7.60E-04	48.5	
35	0	1239.18	45	30	8.82	2462.63	2451	24	2.10E-03	35.2	
36	0	1263.63	56	59	8.06	2511.25	2496	39	2.57E-03	47.1	
37	0	1367.33	5	6	0.49	2717.53	2715	5	2.40E-04	93.6	
38	0	1379.99	19	23	3.52	2742.71	2736	14	8.85E-04	59.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1411.82	44	35	11.29	2806.03	2794	28	2.02E-03	41.3	
40	0	1460.37	40	29	1.02	2902.62	2897	12	1.84E-03	31.8	
41	0	1554.15	19	8	3.77	3089.19	3085	10	8.90E-04	35.2	
42	0	1611.29	19	6	5.01	3202.87	3196	14	8.76E-04	37.2	
43	0	1683.13	14	2	0.55	3345.83	3342	10	6.57E-04	33.2	
44	0	1708.15	17	2	1.97	3395.60	3391	9	7.80E-04	29.1	
45	0	1712.92	20	0	3.18	3405.10	3400	11	9.26E-04	22.4	
46	0	1747.52	21	35	14.93	3473.95	3458	35	9.72E-04	90.6	
47	0	1835.38	11	10	4.16	3648.79	3643	14	5.16E-04	68.2	
48	0	1868.25	8	5	0.91	3714.21	3711	7	3.72E-04	58.6	
49	0	1897.03	17	3	0.61	3771.48	3768	10	7.84E-04	30.3	
50	0	1914.52	4	8	0.77	3806.30	3803	6	1.66E-04	140.9	
51	0	1957.54	13	13	1.64	3891.92	3885	11	5.83E-04	63.4	
52	0	1960.39	4	10	1.39	3897.61	3896	9	2.02E-04	134.3	
53	0	1997.07	33	6	11.97	3970.60	3957	30	1.51E-03	29.9	
54	0	2011.89	12	4	1.80	4000.10	3991	13	5.58E-04	42.7	
55	0	2041.20	8	4	0.94	4058.45	4053	9	3.55E-04	61.4	

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783003.CNF;1
Sample date        : 20-MAR-2006 15:00:00 Acquisition date : 24-APR-2006 23:30:49
Sample ID          : G158783003 Sample quantity : 2.00000E+00 LITER
Detector name     : WELL Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:04.88 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 3941466
Matrix Spike DPM : LCS DPM :
*****
    
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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.81	4	10.67*	4.023E-01	6.171E+00	6.171E+00	740.38
CE-141	145.44	52	48.40*	2.281E+00	2.957E+00	6.301E+00	198.78
TM-171	51.87	54	0.81	7.989E-01	5.227E+02	5.414E+02	143.25
	59.40	-----	0.21	1.035E+00	-----	Line Not Found	-----
	66.72	72	0.16*	1.365E+00	2.091E+03	2.165E+03	129.71
BI-210	46.50	15	4.05*	5.173E-01	4.386E+01	4.400E+01	638.16
PB-210	46.50	15	4.05*	5.173E-01	4.386E+01	4.400E+01	638.16
TH-228	84.40	-----	1.21	1.862E+00	-----	Line Not Found	-----
	238.60	73	44.60*	1.775E+00	5.748E+00	5.955E+00	113.35
	300.10	-----	3.41	1.481E+00	-----	Line Not Found	-----
TH-232	238.59	73	44.60*	1.775E+00	5.748E+00	5.748E+00	113.35
	911.20	20	27.70	5.771E-01	7.949E+00	7.949E+00	185.87
	964.40	-----	5.20	5.521E-01	-----	Line Not Found	-----
	969.11	23	16.60	5.503E-01	1.586E+01	1.586E+01	142.52
U-235	89.95	-----	2.70	1.980E+00	-----	Line Not Found	-----
	93.35	-----	4.50	2.042E+00	-----	Line Not Found	-----
	105.00	-----	2.10	2.194E+00	-----	Line Not Found	-----
	143.76	52	10.50*	2.281E+00	1.363E+01	1.363E+01	198.78
	163.33	54	4.70	2.202E+00	3.252E+01	3.252E+01	134.88
	185.71	63	54.00	2.080E+00	3.495E+00	3.495E+00	137.33
	205.31	-----	5.00	1.967E+00	-----	Line Not Found	-----
U-238	63.29	54	3.80*	1.198E+00	7.375E+01	7.375E+01	164.41

Flag: "*" = Keyline

Total number of lines in spectrum 47
 Number of unidentified lines 23
 Number of lines tentatively identified by NID 24 51.06%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	6.171E+00	6.171E+00	45.69E+00	740.38	
CE-141	32.50D	2.13	2.957E+00	6.301E+00	12.53E+00	198.78	
TM-171	1.92Y	1.04	2.091E+03	2.165E+03	2.808E+03	129.71	
BI-210	22.26Y	1.00	4.386E+01	4.400E+01	28.08E+01	638.16	
PB-210	22.26Y	1.00	4.386E+01	4.400E+01	28.08E+01	638.16	
TH-228	1.91Y	1.04	5.748E+00	5.955E+00	6.750E+00	113.35	
TH-232	1.41E+10Y	1.00	5.748E+00	5.748E+00	6.516E+00	113.35	
U-235	7.04E+08Y	1.00	1.363E+01	1.363E+01	2.709E+01	198.78	
U-238	4.47E+09Y	1.00	7.375E+01	7.375E+01	12.12E+01	164.41	
Total Activity :			2.286E+03	2.365E+03			

Grand Total Activity : 2.286E+03 2.365E+03

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	42.97	38	328	1.25	84.77	82	7	1.74E-03	****	3.79E-01	
4	139.72	139	402	2.08	276.98	272	23	6.44E-03	58.4	2.29E+00	T
0	224.49	36	260	1.46	445.42	441	8	1.67E-03	****	1.86E+00	T
0	254.54	25	157	1.74	505.14	503	6	1.16E-03	****	1.69E+00	T
0	317.16	12	179	1.51	629.56	627	10	5.40E-04	****	1.41E+00	T
0	433.90	28	56	1.84	861.57	858	7	1.28E-03	97.8	1.07E+00	T
0	540.74	6	49	0.76	1073.91	1071	8	2.94E-04	****	8.84E-01	
0	583.37	24	93	2.54	1158.65	1151	14	1.10E-03	****	8.29E-01	T
0	607.97	47	144	1.60	1207.55	1199	18	2.19E-03	****	8.00E-01	T
0	619.55	45	138	6.87	1230.57	1221	25	2.06E-03	****	7.87E-01	T
0	781.05	30	25	3.42	1551.62	1547	10	1.39E-03	72.3	6.51E-01	
0	844.70	10	92	3.06	1678.16	1674	24	4.72E-04	****	6.12E-01	
0	937.14	53	34	5.55	1861.97	1854	17	2.44E-03	57.6	5.64E-01	T
0	1149.02	30	43	4.37	2283.30	2273	22	1.39E-03	****	4.83E-01	
0	1164.90	17	19	1.03	2314.89	2309	10	7.77E-04	****	4.78E-01	
5	1191.32	29	28	3.44	2367.43	2346	32	1.32E-03	****	4.70E-01	
5	1194.68	16	7	1.93	2374.11	2346	32	7.60E-04	97.1	4.69E-01	
0	1239.18	40	30	8.82	2462.63	2451	24	1.85E-03	81.1	4.56E-01	T
0	1263.63	56	59	8.06	2511.25	2496	39	2.57E-03	94.3	4.50E-01	
0	1367.33	5	6	0.49	2717.53	2715	5	2.40E-04	****	4.23E-01	T
0	1379.99	19	23	3.52	2742.71	2736	14	8.85E-04	****	4.20E-01	
0	1411.82	44	35	11.29	2806.03	2794	28	2.02E-03	82.7	4.13E-01	
0	1554.15	19	8	3.77	3089.19	3085	10	8.90E-04	70.4	3.83E-01	
0	1611.29	19	6	5.01	3202.87	3196	14	8.76E-04	74.4	3.72E-01	
0	1683.13	14	2	0.55	3345.83	3342	10	6.57E-04	66.5	3.59E-01	
0	1708.15	17	2	1.97	3395.60	3391	9	7.80E-04	58.3	3.55E-01	T
0	1712.92	20	0	3.18	3405.10	3400	11	9.26E-04	44.7	3.54E-01	
0	1747.52	21	35	14.93	3473.95	3458	35	9.72E-04	****	3.48E-01	
0	1835.38	2	10	4.16	3648.79	3643	14	8.18E-05	****	3.34E-01	T
0	1868.25	8	5	0.91	3714.21	3711	7	3.72E-04	****	3.29E-01	
0	1897.03	17	3	0.61	3771.48	3768	10	7.84E-04	60.5	3.24E-01	
0	1914.52	4	8	0.77	3806.30	3803	6	1.66E-04	****	3.22E-01	
0	1957.54	13	13	1.64	3891.92	3885	11	5.83E-04	****	3.15E-01	
0	1997.07	33	6	11.97	3970.60	3957	30	1.51E-03	59.8	3.10E-01	
0	2011.89	7	4	1.80	4000.10	3991	13	3.14E-04	****	3.07E-01	
0	2041.20	8	4	0.94	4058.45	4053	9	3.55E-04	****	3.03E-01	

Flags: "T" = Tentatively associated

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783003.CNF;1
* Acquisition date   : 24-APR-2006 23:30:49   Detector SN#      : 3941466
* Detector ID        : WELL                    Sensitivity          : 3.00000
* Geometry           : 2L_MB                   Energy tolerance     : 2.00000
* Elapsed live time  : 0 06:00:00.00          Abundance limit     : 75.00000
* Elapsed real time  : 0 06:00:04.88          Half life ratio     : 8.00000
*****
*                                     SAMPLE DATA                                   *
*
* Sample date        : 20-MAR-2006 15:00:00   Nuclide Library     : EPI
* Sample ID          : G158783003             Analyst initials    : MJH1
* Batch Number       : 523017                 Sample Quantity     : 2.00000E+00 LITER
*****
*                                     QC DATA                                       *
*
* CALIB. DATE/TIME  : 13-DEC-2005 09:34:01.1MS Isotope      :
* MSD DPM           :                          MSD Isotope    :
* LCS DPM           :                          LCS Isotope    :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
K-40	6.171E+00	4.569E+01	3.604E+01	0.000E+00	0.171
CE-141	4.527E+00	1.272E+01	1.074E+01	0.000E+00	0.422
TM-171	2.165E+03	2.808E+03	2.793E+03	0.000E+00	0.775
BI-210	4.400E+01	2.808E+02	2.649E+02	0.000E+00	0.166
PB-210	4.400E+01	2.808E+02	2.649E+02	0.000E+00	0.166
TH-228	5.955E+00	6.750E+00	6.345E+00	0.000E+00	0.939
TH-232	5.748E+00	6.516E+00	6.125E+00	0.000E+00	0.939
U-235	1.363E+01	2.709E+01	2.548E+01	0.000E+00	0.535
U-238	7.375E+01	1.212E+02	1.253E+02	0.000E+00	0.589

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

Nuclide	Key-Line Activity K.L. (pCi/LITER) Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	-7.234E-01	2.943E+01	4.999E+01	0.000E+00	-0.014
NA-22	-3.976E-01	2.369E+00	3.558E+00	0.000E+00	-0.112
AL-26	3.618E-01	2.083E+00	4.040E+00	0.000E+00	0.090

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
SC-46	-8.229E-01		2.626E+00	4.569E+00	0.000E+00	-0.180
V-48	-5.647E+00		9.778E+00	1.642E+01	0.000E+00	-0.344
CR-51	-3.411E+01		4.797E+01	6.842E+01	0.000E+00	-0.499
MN-54	1.722E+00		2.177E+00	4.170E+00	0.000E+00	0.413
CO-56	-6.454E-01		2.742E+00	4.805E+00	0.000E+00	-0.134
CO-57	-8.341E-01		2.006E+00	3.217E+00	0.000E+00	-0.259
CO-58	-1.760E+00		2.894E+00	4.896E+00	0.000E+00	-0.359
FE-59	-4.343E+00		6.405E+00	1.054E+01	0.000E+00	-0.412
CO-60	1.372E+00		2.179E+00	4.210E+00	0.000E+00	0.326
ZN-65	5.280E-02		4.707E+00	8.412E+00	0.000E+00	0.006
SE-75	-6.540E-01		3.174E+00	5.420E+00	0.000E+00	-0.121
KR-85	-1.899E+03		6.991E+02	1.004E+03	0.000E+00	-1.892
SR-85	-1.206E+01		4.438E+00	6.373E+00	0.000E+00	-1.892
Y-88	4.197E-01	+	4.078E+00	5.224E+00	0.000E+00	0.080
Y-91	1.613E+00		3.229E+00	5.682E+00	0.000E+00	0.284
NB-94	-1.103E+00		1.960E+00	3.355E+00	0.000E+00	-0.329
NB-95	5.064E-01		4.319E+00	7.771E+00	0.000E+00	0.065
ZR-95	4.431E+00		5.323E+00	1.017E+01	0.000E+00	0.436
RU-103	-1.172E+00		4.386E+00	7.301E+00	0.000E+00	-0.161
RH-106	-2.035E+01		2.232E+01	3.738E+01	0.000E+00	-0.544
RU-106	-2.037E+01		2.234E+01	3.740E+01	0.000E+00	-0.544
AG-108M	1.974E+00	+	1.930E+00	3.550E+00	0.000E+00	0.556
CD-109	4.127E+01		5.673E+01	9.548E+01	0.000E+00	0.432
AG-110M	-1.219E+01		3.030E+00	3.933E+00	0.000E+00	-3.099
SN-113	2.247E+00		3.336E+00	5.935E+00	0.000E+00	0.379
SN-115	-1.520E+02		3.363E+02	4.860E+02	0.000E+00	-0.313
SN-117M	7.361E+00		1.009E+01	1.800E+01	0.000E+00	0.409
TE-123M	1.555E+00		2.103E+00	3.752E+00	0.000E+00	0.414
SB-124	-5.480E+00		7.079E+00	1.175E+01	0.000E+00	-0.466
SB-125	5.353E+00		5.785E+00	1.054E+01	0.000E+00	0.508
TE-125M	7.699E+02		8.604E+02	1.457E+03	0.000E+00	0.528
I-126	-1.232E+02		4.281E+01	6.164E+01	0.000E+00	-1.999
SB-126	-8.289E-01		2.664E+01	4.763E+01	0.000E+00	-0.017
SN-126	1.412E+00		5.525E+00	9.157E+00	0.000E+00	0.154
I-131	1.146E+01		4.122E+01	7.211E+01	0.000E+00	0.159
BA-133	-1.793E+00		2.966E+00	4.906E+00	0.000E+00	-0.365
CS-134	3.587E-01		2.331E+00	4.246E+00	0.000E+00	0.084
CS-135	3.801E-01		1.021E+01	1.759E+01	0.000E+00	0.022
CS-136	-2.010E+01		1.708E+01	2.635E+01	0.000E+00	-0.763
BA-137M	1.335E+01		3.177E+00	6.682E+00	0.000E+00	1.998
CS-137	1.411E+01		3.358E+00	7.063E+00	0.000E+00	1.998
CE-139	8.501E-02		2.392E+00	3.678E+00	0.000E+00	0.023
BA-140	-1.469E+01		5.210E+01	7.530E+01	0.000E+00	-0.195
LA-140	-4.222E+00		1.734E+01	3.112E+01	0.000E+00	-0.136
CE-144	1.255E+01		1.428E+01	2.568E+01	0.000E+00	0.489
PM-144	5.393E-01		2.167E+00	3.950E+00	0.000E+00	0.137
PM-146	1.324E+00		3.041E+00	5.328E+00	0.000E+00	0.249
ND-147	-1.188E+02		1.223E+02	1.916E+02	0.000E+00	-0.620

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
PM-147	-1.089E+06		4.032E+06	6.507E+06	0.000E+00	-0.167
EU-152	-5.221E+00		6.134E+00	1.001E+01	0.000E+00	-0.521
GD-153	-2.540E-02		5.904E+00	9.701E+00	0.000E+00	-0.003
EU-154	-1.111E+00		6.548E+00	9.829E+00	0.000E+00	-0.113
EU-155	-4.800E+00		7.966E+00	1.275E+01	0.000E+00	-0.377
TB-160	2.341E+00		9.240E+00	1.708E+01	0.000E+00	0.137
HF-181	2.017E+00		4.212E+00	7.389E+00	0.000E+00	0.273
TA-182	7.694E+00		9.688E+00	1.896E+01	0.000E+00	0.406
IR-192	8.687E-01	+	3.771E+00	4.752E+00	0.000E+00	0.183
HG-203	1.326E+00		3.605E+00	6.299E+00	0.000E+00	0.210
BI-207	2.930E+00		2.781E+00	5.525E+00	0.000E+00	0.530
TL-208	2.208E+00	+	4.991E+00	5.024E+00	0.000E+00	0.439
BI-211	8.206E+00		1.370E+01	2.416E+01	0.000E+00	0.340
PB-211	1.429E+01		6.386E+01	1.104E+02	0.000E+00	0.129
BI-212	1.207E+01		1.846E+01	3.455E+01	0.000E+00	0.349
PB-212	5.955E+00	+	6.750E+00	7.812E+00	0.000E+00	0.762
BI-214	8.001E+00	+	1.086E+01	9.097E+00	0.000E+00	0.879
PB-214	3.218E+00		4.737E+00	8.395E+00	0.000E+00	0.383
RN-219	-1.640E+01		2.830E+01	4.663E+01	0.000E+00	-0.352
RA-223	5.029E+00		4.444E+01	7.658E+01	0.000E+00	0.066
RA-224	6.900E+01		4.655E+01	7.651E+01	0.000E+00	0.902
RA-226	8.001E+00	+	1.086E+01	9.097E+00	0.000E+00	0.879
AC-227	1.496E+01	+	2.884E+01	4.451E+01	0.000E+00	0.336
TH-227	1.470E+01	+	2.834E+01	4.374E+01	0.000E+00	0.336
AC-228	8.043E+00	+	1.495E+01	1.783E+01	0.000E+00	0.451
RA-228	8.043E+00	+	1.495E+01	1.783E+01	0.000E+00	0.451
TH-229	-2.269E+01		3.185E+01	5.372E+01	0.000E+00	-0.422
TH-230	8.000E+00	+	1.086E+01	9.097E+00	0.000E+00	0.879
PA-231	7.407E+01		1.037E+02	1.838E+02	0.000E+00	0.403
TH-231	7.091E+00		1.170E+01	2.069E+01	0.000E+00	0.343
PA-233	9.048E-01		4.047E+00	7.048E+00	0.000E+00	0.128
PA-234	-1.237E+01		1.676E+01	2.769E+01	0.000E+00	-0.447
PA-234M	4.007E+02		2.566E+02	5.240E+02	0.000E+00	0.765
TH-234	7.375E+01	+	1.212E+02	1.569E+02	0.000E+00	0.470
U-234	-1.302E+00		8.484E+00	1.447E+01	0.000E+00	-0.090
NP-237	-1.258E+01		1.632E+01	2.610E+01	0.000E+00	-0.482
NP-239	-1.421E+01		1.437E+01	2.256E+01	0.000E+00	-0.630
AM-241	-6.622E+00		9.470E+00	1.536E+01	0.000E+00	-0.431
AM-242	1.356E+02		1.589E+02	2.693E+02	0.000E+00	0.504
CM-247	-5.769E-01		2.506E+00	4.221E+00	0.000E+00	-0.137
CF-249	4.741E-01		2.709E+00	4.677E+00	0.000E+00	0.101
CF-251	1.101E+01		8.448E+00	1.530E+01	0.000E+00	0.720
ANH-511	1.996E+01		3.100E+00	6.507E+00	0.000E+00	3.067


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*****
*
*           General Engineering Labs, LLC
*           2040 SAVAGE ROAD
*           CHARLESTON ,SC 29417
*           GROSS GAMMA REPORT
*
*****
*
* BATCH ID       : 523017           SAMPLE ID      : G158783003
* ANALYST        : MJH1            DETECTOR       : WELL
* SAMPLE DATE    : 20-MAR-2006 15:00:00.00  COUNT TIME    : 0 06:00:00.00
* ANALYSIS DATE : 24-APR-2006 23:30:49.97  SAMPLE ALQT   : 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 1.306E+02
GROSS GAMMA ERROR   (pCi/LITER ) : 1.095E+02
GROSS GAMMA MDA     (pCi/LITER ) : 5.669E+02
GROSS GAMMA DLC     (pCi/LITER ) : 2.760E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:33:11.65

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783004.CNF;1
Sample date        : 20-MAR-2006 14:00:00 Acquisition date : 24-APR-2006 23:31:09
Sample ID          : G158783004 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA10 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:01.50 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 2605
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	53.34*	36	332	1.60	105.72	103	8	1.65E-03	97.7	
2	0	66.49*	52	373	1.01	132.04	129	8	2.41E-03	75.3	
3	3	83.12*	27	95	0.80	165.33	164	15	1.23E-03	79.3	2.90E+00
4	3	84.79*	97	281	1.34	168.68	164	15	4.51E-03	36.2	
5	0	140.14*	22	334	0.95	279.47	276	8	1.03E-03	158.6	
6	0	163.49*	57	243	1.15	326.20	322	8	2.65E-03	56.3	
7	0	198.51*	83	217	1.26	396.29	392	7	3.84E-03	35.2	
8	0	206.06*	42	225	2.44	411.40	407	9	1.97E-03	79.4	
9	0	239.14*	51	190	1.38	477.62	475	8	2.36E-03	63.4	
10	0	351.90*	46	208	2.06	703.30	698	15	2.12E-03	78.5	
11	0	376.22	19	56	1.04	751.98	750	5	8.63E-04	65.0	
12	1	379.77	42	85	1.64	759.07	755	13	1.93E-03	42.2	6.76E-01
13	1	382.63	28	65	1.35	764.81	755	13	1.32E-03	47.8	
14	0	422.29	55	73	2.02	844.18	840	10	2.53E-03	32.1	
15	0	553.78*	7	40	1.42	1107.33	1105	7	3.19E-04	207.0	
16	0	558.57*	57	54	2.00	1116.92	1112	11	2.64E-03	35.3	
17	0	582.83*	19	69	1.17	1165.47	1162	10	8.60E-04	103.9	
18	0	595.24	40	65	1.81	1190.30	1188	8	1.85E-03	38.0	
19	0	608.53*	26	67	1.80	1216.91	1212	10	1.18E-03	76.4	
20	0	723.89	10	27	0.75	1447.76	1446	6	4.71E-04	85.2	
21	0	747.65*	4	61	5.52	1495.32	1484	15	1.89E-04	471.3	
22	0	813.72*	5	29	1.52	1627.52	1624	10	2.38E-04	268.7	
23	0	819.11*	12	35	1.70	1638.32	1635	9	5.37E-04	106.3	
24	0	822.94	17	25	1.80	1645.98	1643	8	8.07E-04	54.4	
25	0	869.26	31	33	3.44	1738.67	1732	12	1.44E-03	42.2	
26	0	895.81*	20	19	1.74	1791.80	1789	8	9.36E-04	59.1	
27	0	999.62*	18	63	5.62	1999.53	1991	18	8.28E-04	114.8	
28	0	1009.41	17	30	1.07	2019.10	2015	11	7.97E-04	66.2	
29	0	1150.88	35	17	4.86	2302.18	2295	14	1.64E-03	30.1	
30	0	1298.32*	1	53	9.16	2597.16	2587	24	4.12E-05	*****	
31	0	1329.38	19	18	3.61	2659.32	2652	15	8.59E-04	55.8	
32	0	1340.24	20	8	2.30	2681.04	2675	10	9.39E-04	33.7	
33	0	1386.61	20	28	1.57	2773.80	2765	16	9.31E-04	62.9	
34	0	1428.69*	0	22	0.58	2858.00	2852	11	2.19E-05	*****	
35	0	1460.24*	8	25	2.22	2921.11	2916	12	3.69E-04	175.2	
36	0	1529.05	8	16	0.62	3058.77	3050	14	3.59E-04	119.1	
37	0	1886.89	42	7	5.29	3774.61	3763	26	1.95E-03	22.6	
38	0	1899.37*	12	2	0.57	3799.58	3794	10	5.62E-04	45.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1935.09*	16	5	6.33	3871.03	3862	19	7.53E-04	46.0	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                         *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783004
* Acquisition date   : 24-APR-2006 23:31:09 Detector SN#      : 2605
* Detector ID       : GAMMA10                      Sensitivity   : 3.000
* Geometry         : 2L_MB                          Energy tolerance: 2.000
* Elapsed live time: 0 06:00:00.00                 Abundance limit : 75.000
* Elapsed real time: 0 06:00:01.50                 Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                           *
*
* Sample date       : 20-MAR-2006 14:00:00 Nuclide Library :
* Sample ID        : G158783004                    Analyst initials: MJH1
* Batch Number     : 523017                          Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000                          Carrier Weight  : 0.00000
*****
*                               QC DATA                                               *
*
* Standard Weight  : 0.00000
* CALIB. DATE/TIME : 1-FEB-2006 14:13:13 MS Isotope      :
* MSD DPM          : 0.000                          MSD Isotope     :
* LCS DPM          : 0.000                          LCS Isotope     :
* LCSD DPM         : 0.000                          LCSD Isotope    :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
K-40	8.592E+00	3.012E+01	3.306E+01	0.000E+00
Y-91	4.978E+00	3.530E+00	2.969E+00	0.000E+00
TM-171	2.375E+03	3.581E+03	3.655E+03	0.000E+00
BI-211	1.413E+01	2.219E+01	1.581E+01	0.000E+00
RA-224	4.167E+01	5.293E+01	5.309E+01	0.000E+00
RA-226	3.202E+00	4.902E+00	5.309E+00	0.000E+00
TH-228	3.690E+00	4.691E+00	4.916E+00	0.000E+00
TH-230	3.202E+00	4.902E+00	5.309E+00	0.000E+00
PA-234M	1.802E+02	4.141E+02	3.313E+02	0.000E+00
NP-237	2.828E+01	2.138E+01	2.084E+01	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	-7.675E+00	1.806E+01	3.072E+01	0.000E+00 NOT IDENT.
NA-22	3.577E-01	1.644E+00	3.033E+00	0.000E+00 NOT IDENT.
NA-24	0.000E+00	2.094E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	6.870E-02	1.573E+00	2.970E+00	0.000E+00 NOT IDENT.
SC-46	7.669E-02	1.765E+00	3.240E+00	0.000E+00 NOT IDENT.
V-48	6.041E-01	6.405E+00	1.179E+01	0.000E+00 NOT IDENT.
CR-51	-9.931E+00	2.853E+01	4.968E+01	0.000E+00 NOT IDENT.
MN-54	2.680E-01	1.592E+00	2.926E+00	0.000E+00 NOT IDENT.
CO-56	-1.535E+00	1.943E+00	3.261E+00	0.000E+00 NOT IDENT.
MN-56	0.000E+00	1.265E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	7.593E-01	1.432E+00	2.511E+00	0.000E+00 NOT IDENT.
CO-58	-1.655E+00	2.276E+00	3.248E+00	0.000E+00 NOT IDENT.
FE-59	3.397E+00	4.889E+00	9.406E+00	0.000E+00 NOT IDENT.
CO-60	4.185E-01	1.589E+00	2.648E+00	0.000E+00 NOT IDENT.
ZN-65	-1.221E+00	3.424E+00	5.919E+00	0.000E+00 NOT IDENT.
SE-75	2.521E+00	2.571E+00	4.494E+00	0.000E+00 FAIL ABUN
KR-85	-1.664E+03	5.462E+02	7.791E+02	0.000E+00 NOT IDENT.

SR-85	-1.057E+01	3.469E+00	4.948E+00	0.000E+00	NOT IDENT.
Y-88	-1.337E+00	2.206E+00	3.739E+00	0.000E+00	NOT IDENT.
NB-94	-1.393E+00	1.438E+00	2.245E+00	0.000E+00	FAIL ABUN
NB-95	-2.040E+00	2.954E+00	5.049E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	5.025E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	8.560E-01	3.713E+00	6.562E+00	0.000E+00	FAIL ABUN
MO-99	0.000E+00	1.656E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	3.239E+41	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-2.706E+00	2.903E+00	4.687E+00	0.000E+00	FAIL ABUN
RH-106	4.167E+00	1.410E+01	2.522E+01	0.000E+00	NOT IDENT.
RU-106	-6.126E+00	1.472E+01	2.460E+01	0.000E+00	NOT IDENT.
AG-108M	-8.794E-01	1.508E+00	2.545E+00	0.000E+00	FAIL ABUN
CD-109	-1.572E+00	4.773E+01	7.425E+01	0.000E+00	NOT IDENT.
AG-110M	-3.694E-01	1.661E+00	2.816E+00	0.000E+00	NOT IDENT.
SN-113	9.224E-01	2.241E+00	4.064E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	2.849E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	6.833E+01	2.023E+02	3.758E+02	0.000E+00	NOT IDENT.
SN-117M	4.396E+00	7.481E+00	1.305E+01	0.000E+00	NOT IDENT.
TE-123M	-1.252E-01	1.563E+00	2.644E+00	0.000E+00	NOT IDENT.
SB-124	7.061E-01	4.778E+00	9.164E+00	0.000E+00	FAIL ABUN
SB-125	-1.741E+00	4.228E+00	7.234E+00	0.000E+00	FAIL ABUN
TE-125M	7.178E+01	6.503E+02	1.125E+03	0.000E+00	NOT IDENT.
I-126	-8.106E+00	2.144E+01	3.594E+01	0.000E+00	NOT IDENT.
SB-126	-1.401E+01	1.929E+01	3.088E+01	0.000E+00	NOT IDENT.
SN-126	1.518E+00	4.072E+00	7.182E+00	0.000E+00	NOT IDENT.
SB-127	0.000E+00	2.348E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	-2.058E+01	3.219E+01	5.463E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	7.620E+42	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	2.541E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	2.407E+00	2.163E+00	3.667E+00	0.000E+00	FAIL ABUN
I-133	0.000E+00	3.230E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	1.177E+00	1.696E+00	3.258E+00	0.000E+00	NOT IDENT.
CS-135	3.598E-02	7.724E+00	1.283E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	3.739E+39	0.000E+00	0.000E+00	SHORT HLIF
CS-136	9.277E+00	1.293E+01	2.486E+01	0.000E+00	FAIL ABUN
BA-137M	1.078E-01	1.509E+00	2.636E+00	0.000E+00	NOT IDENT.
CS-137	1.156E-01	1.596E+00	2.787E+00	0.000E+00	NOT IDENT.
CE-139	6.869E-01	1.858E+00	2.871E+00	0.000E+00	NOT IDENT.
BA-140	3.707E-01	3.574E+01	6.245E+01	0.000E+00	FAIL ABUN
LA-140	-6.746E+00	1.185E+01	2.048E+01	0.000E+00	FAIL ABUN
CE-141	-1.117E+00	5.109E+00	8.597E+00	0.000E+00	NOT IDENT.
CE-143	0.000E+00	1.729E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	1.435E+01	1.110E+01	1.971E+01	0.000E+00	NOT IDENT.
PM-144	3.192E-01	1.592E+00	2.790E+00	0.000E+00	NOT IDENT.
PR-144	0.000E+00	4.986E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	1.399E-01	2.009E+00	3.546E+00	0.000E+00	FAIL ABUN
ND-147	1.108E+01	9.539E+01	1.678E+02	0.000E+00	NOT IDENT.
PM-147	6.351E+05	2.865E+06	4.962E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	2.693E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	-5.490E-01	4.461E+00	7.849E+00	0.000E+00	NOT IDENT.
GD-153	1.751E+00	4.698E+00	8.246E+00	0.000E+00	FAIL ABUN
EU-154	9.651E-01	4.541E+00	8.375E+00	0.000E+00	FAIL ABUN
EU-155	3.679E+00	5.820E+00	1.031E+01	0.000E+00	FAIL ABUN
TB-160	2.411E+00	6.896E+00	1.294E+01	0.000E+00	FAIL ABUN
HF-181	-1.709E+00	2.671E+00	4.456E+00	0.000E+00	FAIL ABUN
TA-182	-2.311E-01	7.638E+00	1.363E+01	0.000E+00	FAIL ABUN
IR-192	1.648E+00	1.985E+00	3.672E+00	0.000E+00	NOT IDENT.
HG-203	7.202E-01	2.828E+00	4.750E+00	0.000E+00	FAIL ABUN
BI-207	-7.060E-01	2.083E+00	3.617E+00	0.000E+00	NOT IDENT.
TL-208	1.285E+00	2.673E+00	3.295E+00	0.000E+00	FAIL ABUN
BI-210	1.621E+02	5.156E+02	8.424E+02	0.000E+00	NOT IDENT.
PB-210	1.621E+02	5.156E+02	8.424E+02	0.000E+00	NOT IDENT.
PB-211	2.204E+01	4.455E+01	7.711E+01	0.000E+00	NOT IDENT.
BI-212	5.538E+00	1.436E+01	2.268E+01	0.000E+00	NOT IDENT.
PB-212	3.690E+00	4.691E+00	5.517E+00	0.000E+00	FAIL ABUN
BI-214	3.202E+00	4.902E+00	6.327E+00	0.000E+00	FAIL ABUN
PB-214	4.914E+00	7.722E+00	7.087E+00	0.000E+00	FAIL ABUN
RN-219	-9.478E+00	1.938E+01	3.299E+01	0.000E+00	NOT IDENT.
RA-223	2.815E+00	3.085E+01	5.495E+01	0.000E+00	NOT IDENT.
AC-227	-3.164E+00	2.029E+01	3.340E+01	0.000E+00	NOT IDENT.
TH-227	-3.109E+00	1.994E+01	3.282E+01	0.000E+00	NOT IDENT.
AC-228	5.648E+00	6.435E+00	1.222E+01	0.000E+00	NOT IDENT.
RA-228	5.648E+00	6.435E+00	1.222E+01	0.000E+00	NOT IDENT.
TH-229	3.312E+00	2.583E+01	4.365E+01	0.000E+00	FAIL ABUN
PA-231	1.715E+01	7.700E+01	1.293E+02	0.000E+00	NOT IDENT.
TH-231	-1.508E+00	9.069E+00	1.490E+01	0.000E+00	FAIL ABUN
TH-232	3.562E+00	4.528E+00	5.315E+00	0.000E+00	FAIL ABUN
PA-233	4.492E-01	3.127E+00	5.587E+00	0.000E+00	FAIL ABUN

PA-234	2.227E+00	1.174E+01	2.173E+01	0.000E+00	FAIL ABUN
TH-234	1.571E+02	1.108E+02	1.971E+02	0.000E+00	NOT IDENT.
U-234	7.774E+00	6.579E+00	1.223E+01	0.000E+00	FAIL ABUN
U-235	1.706E+01	1.145E+01	2.003E+01	0.000E+00	FAIL ABUN
U-238	1.571E+02	1.108E+02	1.971E+02	0.000E+00	NOT IDENT.
NP-239	7.753E+00	1.027E+01	1.818E+01	0.000E+00	NOT IDENT.
AM-241	1.515E+00	1.249E+01	2.215E+01	0.000E+00	NOT IDENT.
AM-242	-3.219E+01	1.185E+02	2.023E+02	0.000E+00	NOT IDENT.
CM-247	-1.358E+00	1.777E+00	2.972E+00	0.000E+00	NOT IDENT.
CF-249	-1.563E+00	1.736E+00	2.882E+00	0.000E+00	NOT IDENT.
CF-251	-3.571E-01	6.474E+00	1.090E+01	0.000E+00	NOT IDENT.
ANH-511	0.000E+00	2.639E+00	5.153E+00	0.000E+00	NOT IDENT.

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783004.CNF;1
Sample date        : 20-MAR-2006 14:00:00 Acquisition date : 24-APR-2006 23:31:09
Sample ID         : G158783004           Sample quantity  : 2.00000E+00 LITER
Detector name     : GAMMA10             Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00       Elapsed real time: 0 06:00:01.50  0.0%
Energy tolerance  : 2.00000 KEV         Analyst Initials  : MJH1
Abundance limit   : 75.00000           Sensitivity       : 3.00000
Batch ID          : 523017              Detector SN#      : 2605
Matrix Spike DPM  :                     LCS DPM          :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	53.34	50	332	1.60	105.72	103	8	2.32E-03	64.3	
2	0	63.32	107	270	0.98	125.70	123	6	4.94E-03	26.1	
3	0	66.49	93	373	1.01	132.04	129	8	4.29E-03	37.7	
4	3	83.12	35	95	0.80	165.33	164	15	1.64E-03	40.0	2.90E+00
5	3	84.79	106	281	1.34	168.68	164	15	4.92E-03	29.8	
6	0	92.66	303	445	1.46	184.43	181	10	1.40E-02	14.2	
7	0	140.14	34	334	0.95	279.47	276	8	1.59E-03	94.0	
8	0	144.25	62	347	1.03	287.69	283	9	2.88E-03	55.6	
9	0	163.49	68	243	1.15	326.20	322	8	3.15E-03	41.5	
10	0	185.75	177	309	1.70	370.75	366	10	8.19E-03	20.1	
11	0	198.51	97	217	1.26	396.29	392	7	4.50E-03	27.2	
12	0	206.06	74	225	2.44	411.40	407	9	3.44E-03	38.7	
13	0	239.14	95	190	1.38	477.62	475	8	4.38E-03	27.3	
14	0	351.90	99	208	2.06	703.30	698	15	4.56E-03	33.4	
15	0	376.22	19	56	1.04	751.98	750	5	8.63E-04	65.0	
16	1	379.77	42	85	1.64	759.07	755	13	1.93E-03	42.2	6.76E-01
17	1	382.63	28	65	1.35	764.81	755	13	1.32E-03	47.8	
18	0	422.29	55	73	2.02	844.18	840	10	2.53E-03	32.1	
19	0	435.79	16	82	0.71	871.20	869	8	7.57E-04	98.3	
20	0	511.36	421	168	2.20	1022.45	1015	19	1.95E-02	8.9	
21	0	553.78	22	40	1.42	1107.33	1105	7	1.02E-03	52.0	
22	0	558.57	96	54	2.00	1116.92	1112	11	4.43E-03	18.1	
23	0	582.83	31	69	1.17	1165.47	1162	10	1.44E-03	52.8	
24	0	595.24	40	65	1.81	1190.30	1188	8	1.85E-03	38.0	
25	0	608.53	59	67	1.80	1216.91	1212	10	2.74E-03	29.0	
26	0	723.89	10	27	0.75	1447.76	1446	6	4.71E-04	85.2	
27	0	747.65	15	61	5.52	1495.32	1484	15	7.08E-04	118.7	
28	0	813.72	23	29	1.52	1627.52	1624	10	1.09E-03	46.8	
29	0	819.11	17	35	1.70	1638.32	1635	9	7.81E-04	68.4	
30	0	822.94	17	25	1.80	1645.98	1643	8	8.07E-04	54.4	
31	0	869.26	31	33	3.44	1738.67	1732	12	1.44E-03	42.2	
32	0	895.81	26	19	1.74	1791.80	1789	8	1.19E-03	35.1	
33	0	942.39	6	23	0.77	1885.01	1885	7	2.92E-04	128.5	
34	0	999.62	37	63	5.62	1999.53	1991	18	1.71E-03	52.9	
35	0	1009.41	17	30	1.07	2019.10	2015	11	7.97E-04	66.2	
36	0	1150.88	35	17	4.86	2302.18	2295	14	1.64E-03	30.1	
37	0	1298.32	14	53	9.16	2597.16	2587	24	6.28E-04	145.7	
38	0	1329.38	19	18	3.61	2659.32	2652	15	8.59E-04	55.8	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1340.24	20	8	2.30	2681.04	2675	10	9.39E-04	33.7	
40	0	1386.61	20	28	1.57	2773.80	2765	16	9.31E-04	62.9	
41	0	1428.69	6	22	0.58	2858.00	2852	11	2.78E-04	156.8	
42	0	1460.24	41	25	2.22	2921.11	2916	12	1.92E-03	28.4	
43	0	1529.05	8	16	0.62	3058.77	3050	14	3.59E-04	119.1	
44	0	1886.89	42	7	5.29	3774.61	3763	26	1.95E-03	22.6	
45	0	1899.37	15	2	0.57	3799.58	3794	10	6.88E-04	32.5	
46	0	1935.09	19	5	6.33	3871.03	3862	19	8.94E-04	35.3	


```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783004.CNF;1
Sample date        : 20-MAR-2006 14:00:00 Acquisition date : 24-APR-2006 23:31:09
Sample ID          : G158783004 Sample quantity : 2.00000E+00 LITER
Detector name      : GAMMA10 Detector geometry: 2L_MB
Elapsed live time  : 0 06:00:00.00 Elapsed real time: 0 06:00:01.50 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 2605
Matrix Spike DPM  : LCS DPM :
*****
    
```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.81	8	10.67*	5.443E-01	8.592E+00	8.592E+00	350.53
Y-91	557.57	57	95.08*	1.147E+00	3.268E+00	4.978E+00	70.92
	1204.90	-----	0.30	6.311E-01	-----	Line Not Found	-----
TM-171	51.87	36	0.81	3.249E-01	8.466E+02	8.768E+02	195.56
	59.40	-----	0.21	5.684E-01	-----	Line Not Found	-----
	66.72	52	0.16*	9.003E-01	2.293E+03	2.375E+03	150.81
BI-211	351.07	46	12.94*	1.571E+00	1.413E+01	1.413E+01	157.07
RA-226	295.21	-----	19.20	1.762E+00	-----	Line Not Found	-----
	351.92	46	37.20	1.571E+00	4.913E+00	4.914E+00	157.04
	609.31	26	46.30*	1.079E+00	3.202E+00	3.202E+00	153.09
TH-228	84.40	97	1.21	1.711E+00	2.945E+02	3.051E+02	73.39
	238.60	51	44.60*	2.010E+00	3.562E+00	3.690E+00	127.11
	300.10	-----	3.41	1.744E+00	-----	Line Not Found	-----
TH-230	295.21	-----	19.20	1.762E+00	-----	Line Not Found	-----
	351.92	46	37.20	1.571E+00	4.913E+00	4.913E+00	157.04
	609.31	26	46.30*	1.079E+00	3.202E+00	3.202E+00	153.09
PA-234M	766.40	-----	0.21	9.080E-01	-----	Line Not Found	-----
	1001.03	18	0.85*	7.347E-01	1.802E+02	1.802E+02	229.81
NP-237	86.48	97	12.60*	1.711E+00	2.828E+01	2.828E+01	75.58
	95.87	-----	2.60	2.056E+00	-----	Line Not Found	-----

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
RA-224	240.98	51	3.95*	2.010E+00	4.022E+01	4.167E+01	127.03

Flag: "*" = Keyline

Total number of lines in spectrum 39
 Number of unidentified lines 16
 Number of lines tentatively identified by NID 23 58.97%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	8.592E+00	8.592E+00	30.12E+00	350.53	
Y-91	58.51D	1.52	3.268E+00	4.978E+00	3.530E+00	70.92	
TM-171	1.92Y	1.04	2.293E+03	2.375E+03	3.581E+03	150.81	
BI-211	7.04E+08Y	1.00	1.413E+01	1.413E+01	2.219E+01	157.07	
RA-226	1600.00Y	1.00	3.202E+00	3.202E+00	4.902E+00	153.09	
TH-228	1.91Y	1.04	3.562E+00	3.690E+00	4.691E+00	127.11	
TH-230	7.70E+04Y	1.00	3.202E+00	3.202E+00	4.902E+00	153.09	
PA-234M	4.47E+09Y	1.00	1.802E+02	1.802E+02	4.141E+02	229.81	
NP-237	2.14E+06Y	1.00	2.828E+01	2.828E+01	2.138E+01	75.58	
Total Activity :			2.537E+03	2.621E+03			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
RA-224	1.91Y	1.04	4.022E+01	4.167E+01	5.293E+01	127.03	
Total Activity :			4.022E+01	4.167E+01			

Grand Total Activity : 2.577E+03 2.662E+03

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	140.14	22	334	0.95	279.47	276	8	1.03E-03	****	2.48E+00	T
0	163.49	57	243	1.15	326.20	322	8	2.65E-03	****	2.41E+00	T
0	198.51	83	217	1.26	396.29	392	7	3.84E-03	70.3	2.23E+00	T
0	206.06	42	225	2.44	411.40	407	9	1.97E-03	****	2.19E+00	T
0	376.22	19	56	1.04	751.98	750	5	8.63E-04	****	1.50E+00	
1	379.77	42	85	1.64	759.07	755	13	1.93E-03	84.3	1.49E+00	
1	382.63	28	65	1.35	764.81	755	13	1.32E-03	95.7	1.49E+00	T
0	422.29	55	73	2.02	844.18	840	10	2.53E-03	64.3	1.39E+00	T
0	553.78	7	40	1.42	1107.33	1105	7	3.19E-04	****	1.15E+00	
0	582.83	19	69	1.17	1165.47	1162	10	8.60E-04	****	1.11E+00	T
0	595.24	40	65	1.81	1190.30	1188	8	1.85E-03	75.9	1.10E+00	
0	723.89	10	27	0.75	1447.76	1446	6	4.71E-04	****	9.49E-01	T
0	747.65	4	61	5.52	1495.32	1484	15	1.89E-04	****	9.26E-01	T
0	813.72	5	29	1.52	1627.52	1624	10	2.38E-04	****	8.67E-01	T
0	819.11	12	35	1.70	1638.32	1635	9	5.37E-04	****	8.62E-01	T
0	822.94	17	25	1.80	1645.98	1643	8	8.07E-04	****	8.59E-01	
0	869.26	31	33	3.44	1738.67	1732	12	1.44E-03	84.4	8.22E-01	T
0	895.81	20	19	1.74	1791.80	1789	8	9.36E-04	****	8.03E-01	
0	1009.41	17	30	1.07	2019.10	2015	11	7.97E-04	****	7.29E-01	
0	1150.88	35	17	4.86	2302.18	2295	14	1.64E-03	60.2	6.55E-01	
0	1298.32	1	53	9.16	2597.16	2587	24	4.12E-05	****	5.95E-01	T
0	1329.38	19	18	3.61	2659.32	2652	15	8.59E-04	****	5.84E-01	
0	1340.24	20	8	2.30	2681.04	2675	10	9.39E-04	67.4	5.80E-01	
0	1386.61	20	28	1.57	2773.80	2765	16	9.31E-04	****	5.65E-01	
0	1428.69	0	22	0.58	2858.00	2852	11	2.19E-05	****	5.53E-01	
0	1529.05	8	16	0.62	3058.77	3050	14	3.59E-04	****	5.27E-01	
0	1886.89	42	7	5.29	3774.61	3763	26	1.95E-03	45.3	4.68E-01	
0	1899.37	12	2	0.57	3799.58	3794	10	5.62E-04	91.3	4.66E-01	
0	1935.09	16	5	6.33	3871.03	3862	19	7.53E-04	92.1	4.63E-01	

Flags: "T" = Tentatively associated

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783004.CNF;1
* Acquisition date   : 24-APR-2006 23:31:09  Detector SN#      : 2605
* Detector ID        : GAMMA10                Sensitivity        : 3.00000
* Geometry           : 2L_MB                  Energy tolerance:    2.00000
* Elapsed live time  : 0 06:00:00.00         Abundance limit    : 75.00000
* Elapsed real time  : 0 06:00:01.50         Half life ratio    : 8.00000
*****
*                                     SAMPLE DATA                                   *
*
* Sample date        : 20-MAR-2006 14:00:00  Nuclide Library   : EPI
* Sample ID          : G158783004            Analyst initials    : MJH1
* Batch Number       : 523017                Sample Quantity    : 2.00000E+00 LITER
*****
*                                     QC DATA                                   *
*
* CALIB. DATE/TIME  : 1-FEB-2006 14:13:13.96MS Isotope       :
* MSD DPM           :                        MSD Isotope      :
* LCS DPM           :                        LCS Isotope      :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
K-40	8.592E+00	3.012E+01	3.306E+01	2.136E+00	0.260
Y-91	4.978E+00	3.530E+00	2.969E+00	1.874E-01	1.677
TM-171	2.375E+03	3.581E+03	3.655E+03	2.786E+02	0.650
BI-211	1.413E+01	2.219E+01	1.581E+01	1.098E+00	0.893
RA-224	4.167E+01	5.293E+01	5.309E+01	3.514E+00	0.785
RA-226	3.202E+00	4.902E+00	5.309E+00	4.321E-01	0.603
TH-228	3.690E+00	4.691E+00	4.916E+00	3.928E-01	0.751
TH-230	3.202E+00	4.902E+00	5.309E+00	4.321E-01	0.603
PA-234M	1.802E+02	4.141E+02	3.313E+02	3.094E+01	0.544
NP-237	2.828E+01	2.138E+01	2.084E+01	4.554E+00	1.357

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

Nuclide	Key-Line Activity K.L. (pCi/LITER) Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	-7.675E+00	1.806E+01	3.072E+01	2.196E+00	-0.250
NA-22	3.577E-01	1.644E+00	3.033E+00	1.879E-01	0.118

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
AL-26	6.870E-02		1.573E+00	2.970E+00	1.696E-01	0.023
SC-46	7.669E-02		1.765E+00	3.240E+00	2.742E-01	0.024
V-48	6.041E-01		6.405E+00	1.179E+01	9.467E-01	0.051
CR-51	-9.931E+00		2.853E+01	4.968E+01	3.539E+00	-0.200
MN-54	2.680E-01		1.592E+00	2.926E+00	2.308E-01	0.092
CO-56	-1.535E+00		1.943E+00	3.261E+00	2.613E-01	-0.471
CO-57	7.593E-01		1.432E+00	2.511E+00	1.730E-01	0.302
CO-58	-1.655E+00		2.276E+00	3.248E+00	2.490E-01	-0.509
FE-59	3.397E+00		4.889E+00	9.406E+00	7.423E-01	0.361
CO-60	4.185E-01		1.589E+00	2.648E+00	1.616E-01	0.158
ZN-65	-1.221E+00		3.424E+00	5.919E+00	4.082E-01	-0.206
SE-75	2.521E+00		2.571E+00	4.494E+00	3.008E-01	0.561
KR-85	-1.664E+03		5.462E+02	7.791E+02	4.909E+01	-2.135
SR-85	-1.057E+01		3.469E+00	4.948E+00	3.118E-01	-2.135
Y-88	-1.337E+00		2.206E+00	3.739E+00	2.118E-01	-0.358
NB-94	-1.393E+00		1.438E+00	2.245E+00	1.474E-01	-0.621
NB-95	-2.040E+00		2.954E+00	5.049E+00	3.633E-01	-0.404
ZR-95	8.560E-01		3.713E+00	6.562E+00	5.338E-01	0.130
RU-103	-2.706E+00		2.903E+00	4.687E+00	6.035E-01	-0.577
RH-106	4.167E+00		1.410E+01	2.522E+01	1.578E+00	0.165
RU-106	-6.126E+00		1.472E+01	2.460E+01	2.944E+00	-0.249
AG-108M	-8.794E-01		1.508E+00	2.545E+00	1.688E-01	-0.346
CD-109	-1.572E+00		4.773E+01	7.425E+01	5.363E+00	-0.021
AG-110M	-3.694E-01		1.661E+00	2.816E+00	1.842E-01	-0.131
SN-113	9.224E-01		2.241E+00	4.064E+00	2.601E-01	0.227
SN-115	6.833E+01		2.023E+02	3.758E+02	3.143E+01	0.182
SN-117M	4.396E+00		7.481E+00	1.305E+01	8.409E-01	0.337
TE-123M	-1.252E-01		1.563E+00	2.644E+00	1.721E-01	-0.047
SB-124	7.061E-01		4.778E+00	9.164E+00	5.876E-01	0.077
SB-125	-1.741E+00		4.228E+00	7.234E+00	4.614E-01	-0.241
TE-125M	7.178E+01		6.503E+02	1.125E+03	9.962E+01	0.064
I-126	-8.106E+00		2.144E+01	3.594E+01	2.237E+00	-0.226
SB-126	-1.401E+01		1.929E+01	3.088E+01	2.082E+00	-0.453
SN-126	1.518E+00		4.072E+00	7.182E+00	5.178E-01	0.211
I-131	-2.058E+01		3.219E+01	5.463E+01	3.932E+00	-0.377
BA-133	2.407E+00		2.163E+00	3.667E+00	4.340E-01	0.656
CS-134	1.177E+00		1.696E+00	3.258E+00	2.459E-01	0.361
CS-135	3.598E-02		7.724E+00	1.283E+01	1.066E+00	0.003
CS-136	9.277E+00		1.293E+01	2.486E+01	1.983E+00	0.373
BA-137M	1.078E-01		1.509E+00	2.636E+00	1.629E-01	0.041
CS-137	1.156E-01		1.596E+00	2.787E+00	1.728E-01	0.041
CE-139	6.869E-01		1.858E+00	2.871E+00	1.848E-01	0.239
BA-140	3.707E-01		3.574E+01	6.245E+01	2.037E+01	0.006
LA-140	-6.746E+00		1.185E+01	2.048E+01	1.238E+00	-0.329
CE-141	-1.117E+00		5.109E+00	8.597E+00	5.767E-01	-0.130
CE-144	1.435E+01		1.110E+01	1.971E+01	2.869E+00	0.728
PM-144	3.192E-01		1.592E+00	2.790E+00	1.822E-01	0.114
PM-146	1.399E-01		2.009E+00	3.546E+00	3.158E-01	0.039

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
ND-147	1.108E+01		9.539E+01	1.678E+02	2.308E+01	0.066
PM-147	6.351E+05		2.865E+06	4.962E+06	3.403E+05	0.128
EU-152	-5.490E-01		4.461E+00	7.849E+00	5.557E-01	-0.070
GD-153	1.751E+00		4.698E+00	8.246E+00	5.580E-01	0.212
EU-154	9.651E-01		4.541E+00	8.375E+00	8.027E-01	0.115
EU-155	3.679E+00		5.820E+00	1.031E+01	7.000E-01	0.357
TB-160	2.411E+00		6.896E+00	1.294E+01	1.082E+00	0.186
HF-181	-1.709E+00		2.671E+00	4.456E+00	2.791E-01	-0.384
TA-182	-2.311E-01		7.638E+00	1.363E+01	8.493E-01	-0.017
IR-192	1.648E+00		1.985E+00	3.672E+00	2.414E-01	0.449
HG-203	7.202E-01		2.828E+00	4.750E+00	3.302E-01	0.152
BI-207	-7.060E-01		2.083E+00	3.617E+00	2.671E-01	-0.195
TL-208	1.285E+00	+	2.673E+00	3.295E+00	2.347E-01	0.390
BI-210	1.621E+02		5.156E+02	8.424E+02	8.587E+01	0.192
PB-210	1.621E+02		5.156E+02	8.424E+02	8.587E+01	0.192
PB-211	2.204E+01		4.455E+01	7.711E+01	4.809E+01	0.286
BI-212	5.538E+00		1.436E+01	2.268E+01	1.927E+00	0.244
PB-212	3.690E+00	+	4.691E+00	5.517E+00	4.408E-01	0.669
BI-214	3.202E+00	+	4.902E+00	6.327E+00	5.149E-01	0.506
PB-214	4.914E+00	+	7.722E+00	7.087E+00	6.152E-01	0.693
RN-219	-9.478E+00		1.938E+01	3.299E+01	4.526E+00	-0.287
RA-223	2.815E+00		3.085E+01	5.495E+01	9.220E+00	0.051
AC-227	-3.164E+00		2.029E+01	3.340E+01	4.841E+00	-0.095
TH-227	-3.109E+00		1.994E+01	3.282E+01	5.647E+00	-0.095
AC-228	5.648E+00		6.435E+00	1.222E+01	1.362E+00	0.462
RA-228	5.648E+00		6.435E+00	1.222E+01	1.362E+00	0.462
TH-229	3.312E+00		2.583E+01	4.365E+01	2.832E+00	0.076
PA-231	1.715E+01		7.700E+01	1.293E+02	1.830E+01	0.133
TH-231	-1.508E+00		9.069E+00	1.490E+01	1.188E+00	-0.101
TH-232	3.562E+00	+	4.528E+00	5.315E+00	4.247E-01	0.670
PA-233	4.492E-01		3.127E+00	5.587E+00	3.844E-01	0.080
PA-234	2.227E+00		1.174E+01	2.173E+01	4.045E+00	0.102
TH-234	1.571E+02		1.108E+02	1.971E+02	3.485E+01	0.797
U-234	7.774E+00		6.579E+00	1.223E+01	1.113E+00	0.635
U-235	1.706E+01		1.145E+01	2.003E+01	3.320E+00	0.852
U-238	1.571E+02		1.108E+02	1.971E+02	3.485E+01	0.797
NP-239	7.753E+00		1.027E+01	1.818E+01	1.229E+00	0.426
AM-241	1.515E+00		1.249E+01	2.215E+01	2.010E+00	0.068
AM-242	-3.219E+01		1.185E+02	2.023E+02	1.348E+01	-0.159
CM-247	-1.358E+00		1.777E+00	2.972E+00	1.803E-01	-0.457
CF-249	-1.563E+00		1.736E+00	2.882E+00	1.747E-01	-0.543
CF-251	-3.571E-01		6.474E+00	1.090E+01	7.022E-01	-0.033
ANH-511	1.718E+01		2.639E+00	5.153E+00	3.245E-01	3.333

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*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G158783004
*   ANALYST       : MJH1           DETECTOR    : GAMMA10
*   SAMPLE DATE   : 20-MAR-2006 14:00:00.00  COUNT TIME : 0 06:00:00.00
*   ANALYSIS DATE: 24-APR-2006 23:31:09.48  SAMPLE ALQT: 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 7.012E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 7.539E+01
GROSS GAMMA MDA     (pCi/LITER ) : 2.197E+02
GROSS GAMMA DLC     (pCi/LITER ) : 1.059E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:33:52.91

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration   : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783005.CNF;1
Sample date     : 20-MAR-2006 12:00:00 Acquisition date : 24-APR-2006 23:31:29
Sample ID      : G158783005 Sample quantity : 2.00000E+00 LITER
Detector name  : GAMMA11 Detector geometry: 2L_MB
Elapsed live time: 0 06:00:00.00 Elapsed real time: 0 06:00:01.93 0.0%
Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 523017 Detector SN# : 11912863
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	64.54*	148	702	5.41	132.69	124	17	6.85E-03	43.7	
2	0	74.71*	204	515	2.95	153.03	146	15	9.44E-03	26.8	
3	0	93.09*	55	430	1.43	189.79	184	12	2.56E-03	86.5	
4	0	138.94	85	371	3.22	281.49	277	11	3.92E-03	45.2	
5	0	163.52	53	279	2.03	330.65	326	10	2.45E-03	60.9	
6	0	197.53*	70	334	2.34	398.68	392	12	3.22E-03	59.4	
7	0	211.40	53	145	2.35	426.42	423	8	2.45E-03	41.9	
8	0	238.35*	0	214	1.20	480.33	477	9	7.59E-06	*****	
9	0	409.35*	14	134	4.81	822.33	817	13	6.61E-04	183.2	
10	0	559.10	98	83	1.52	1121.79	1116	15	4.55E-03	22.8	
11	0	595.56	41	65	2.62	1194.70	1190	10	1.88E-03	40.3	
12	0	608.50*	1	89	2.48	1220.58	1216	14	2.57E-05	*****	
13	0	726.91*	6	47	1.73	1457.38	1455	8	2.96E-04	249.2	
14	0	759.61	7	61	1.36	1522.77	1519	11	3.01E-04	235.0	
15	0	805.69*	63	86	9.78	1614.91	1601	31	2.93E-03	47.4	
16	3	882.90*	10	12	1.87	1769.32	1766	14	4.56E-04	110.6	1.10E+00
17	3	886.44	18	10	1.67	1776.39	1766	14	8.11E-04	41.9	
18	0	1000.16*	5	27	1.86	2003.78	1998	12	2.48E-04	274.4	
19	0	1012.58*	4	26	3.50	2028.62	2020	15	1.78E-04	396.1	
20	0	1153.35	11	6	0.84	2310.10	2308	5	5.08E-04	46.8	
21	0	1172.68	21	17	0.99	2348.75	2344	13	9.84E-04	44.8	
22	0	1197.31	9	15	1.43	2398.00	2396	7	4.04E-04	82.3	
23	0	1215.45	10	4	1.73	2434.27	2432	7	4.56E-04	45.5	
24	0	1360.05	23	27	3.39	2723.39	2713	22	1.06E-03	61.7	
25	0	1376.30	15	36	6.75	2755.87	2739	24	6.94E-04	108.9	
26	0	1394.30*	1	6	1.05	2791.85	2790	7	3.83E-05	701.6	
27	0	1397.08*	4	17	0.61	2797.42	2796	10	1.62E-04	248.7	
28	0	1475.47*	35	11	8.00	2954.15	2945	21	1.61E-03	30.4	
29	0	1532.03	8	12	1.73	3067.23	3059	10	3.70E-04	89.5	
30	0	1579.14	12	17	1.39	3161.42	3155	17	5.56E-04	83.9	
31	0	1652.73*	10	20	0.83	3308.53	3300	20	4.79E-04	115.0	
32	0	1826.16*	31	14	3.97	3655.24	3640	28	1.42E-03	42.7	
33	5	1963.81	19	0	4.21	3930.41	3925	56	8.64E-04	26.6	7.71E-01
34	5	1984.40*	18	8	4.22	3971.58	3925	56	8.30E-04	45.6	
35	0	2019.15	6	17	4.81	4041.04	4029	18	2.72E-04	173.7	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783005
* Acquisition date   : 24-APR-2006 23:31:29 Detector SN#      : 11912863
* Detector ID       : GAMMA11 Sensitivity                    : 3.000
* Geometry          : 2L_MB Energy tolerance:                : 2.000
* Elapsed live time : 0 06:00:00.00 Abundance limit          : 75.000
* Elapsed real time : 0 06:00:01.93 Half life ratio         : 8.000
*****
*                               SAMPLE DATA                                         *
*
* Sample date       : 20-MAR-2006 12:00:00 Nuclide Library   :
* Sample ID        : G158783005 Analyst initials:          : MJH1
* Batch Number     : 523017 Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000 Carrier Weight : 0.00000
*****
*                               QC DATA                                             *
*
* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 14-MAR-2006 14:49:10 MS Isotope       :
* MSD DPM           : 0.000 MSD Isotope                    :
* LCS DPM           : 0.000 LCS Isotope                    :
* LCSD DPM          : 0.000 LCSD Isotope                   :
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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
Y-91	9.096E+00	4.208E+00	3.902E+00	0.000E+00
BI-212	3.955E+00	1.972E+01	2.297E+01	0.000E+00
PB-212	1.261E-02	5.270E+00	5.537E+00	0.000E+00
TH-228	1.261E-02	5.270E+00	5.536E+00	0.000E+00
PA-234M	5.865E+01	3.219E+02	3.588E+02	0.000E+00
TH-234	2.283E+02	2.044E+02	1.473E+02	0.000E+00
U-238	2.283E+02	2.044E+02	1.473E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	-8.311E+00	2.139E+01	3.640E+01	0.000E+00 NOT IDENT.
NA-22	-8.635E-02	1.755E+00	3.194E+00	0.000E+00 NOT IDENT.
NA-24	0.000E+00	4.102E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	-1.057E+00	1.711E+00	2.830E+00	0.000E+00 NOT IDENT.
K-40	4.616E+01	2.331E+01	4.832E+01	0.000E+00 NOT IDENT.
SC-46	4.104E-01	2.432E+00	3.758E+00	0.000E+00 NOT IDENT.
V-48	-5.050E+00	7.573E+00	1.288E+01	0.000E+00 NOT IDENT.
CR-51	-3.840E+01	3.452E+01	5.670E+01	0.000E+00 NOT IDENT.
MN-54	-9.141E-01	1.775E+00	2.929E+00	0.000E+00 NOT IDENT.
CO-56	7.344E-01	2.264E+00	4.060E+00	0.000E+00 NOT IDENT.
MN-56	0.000E+00	3.079E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	-1.654E+00	1.666E+00	2.683E+00	0.000E+00 NOT IDENT.
CO-58	1.696E+00	2.306E+00	4.282E+00	0.000E+00 NOT IDENT.
FE-59	-2.143E+00	5.300E+00	9.238E+00	0.000E+00 NOT IDENT.
CO-60	1.470E+00	1.978E+00	3.858E+00	0.000E+00 FAIL ABUN
ZN-65	1.669E+00	4.169E+00	7.803E+00	0.000E+00 NOT IDENT.
SE-75	1.159E+00	2.729E+00	4.884E+00	0.000E+00 FAIL ABUN
KR-85	-2.187E+03	5.703E+02	7.494E+02	0.000E+00 NOT IDENT.
SR-85	-1.390E+01	3.625E+00	4.764E+00	0.000E+00 NOT IDENT.
Y-88	-5.126E-01	2.450E+00	4.322E+00	0.000E+00 NOT IDENT.

NB-94	1.000E+00	1.636E+00	2.979E+00	0.000E+00	NOT IDENT.
NB-95	-9.121E-01	3.380E+00	5.728E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	6.484E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	-4.046E-01	5.059E+00	7.507E+00	0.000E+00	NOT IDENT.
MO-99	0.000E+00	1.906E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	1.119E+41	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-1.260E+00	3.097E+00	5.248E+00	0.000E+00	FAIL ABUN
RH-106	7.435E+00	1.719E+01	3.086E+01	0.000E+00	NOT IDENT.
RU-106	1.371E+01	1.698E+01	3.122E+01	0.000E+00	NOT IDENT.
AG-108M	-1.249E+00	1.700E+00	2.829E+00	0.000E+00	NOT IDENT.
CD-109	3.500E+01	5.252E+01	8.035E+01	0.000E+00	NOT IDENT.
AG-110M	-2.703E-01	1.886E+00	3.240E+00	0.000E+00	FAIL ABUN
SN-113	1.392E+00	2.604E+00	4.705E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	2.987E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	1.438E+02	2.129E+02	4.103E+02	0.000E+00	NOT IDENT.
SN-117M	-1.922E+00	9.351E+00	1.551E+01	0.000E+00	NOT IDENT.
TE-123M	-1.524E+00	2.261E+00	3.169E+00	0.000E+00	NOT IDENT.
SB-124	7.738E-01	5.773E+00	1.074E+01	0.000E+00	NOT IDENT.
SB-125	-3.448E+00	4.564E+00	7.587E+00	0.000E+00	FAIL ABUN
TE-125M	-7.057E+02	7.406E+02	1.196E+03	0.000E+00	NOT IDENT.
I-126	-9.420E+00	2.452E+01	4.142E+01	0.000E+00	NOT IDENT.
SB-126	1.514E+01	2.127E+01	3.928E+01	0.000E+00	NOT IDENT.
SN-126	1.548E+00	4.594E+00	7.857E+00	0.000E+00	FAIL ABUN
SB-127	0.000E+00	2.670E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	-1.807E+00	3.485E+01	6.101E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	7.000E+41	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.121E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	-7.996E-01	2.331E+00	4.002E+00	0.000E+00	NOT IDENT.
I-133	0.000E+00	3.734E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	-6.371E-01	2.082E+00	3.001E+00	0.000E+00	NOT IDENT.
CS-135	-8.148E+00	8.378E+00	1.397E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	5.070E+39	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-1.400E+01	1.399E+01	2.273E+01	0.000E+00	FAIL ABUN
BA-137M	1.222E-02	1.752E+00	3.052E+00	0.000E+00	NOT IDENT.
CS-137	6.133E-03	1.852E+00	3.224E+00	0.000E+00	NOT IDENT.
CE-139	7.130E-01	2.105E+00	3.147E+00	0.000E+00	NOT IDENT.
BA-140	1.826E+01	4.031E+01	7.196E+01	0.000E+00	FAIL ABUN
LA-140	9.511E+00	1.379E+01	2.727E+01	0.000E+00	NOT IDENT.
CE-141	2.770E+00	5.815E+00	9.926E+00	0.000E+00	NOT IDENT.
CE-143	0.000E+00	2.142E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	-7.701E-01	1.326E+01	2.221E+01	0.000E+00	NOT IDENT.
PM-144	3.261E-02	1.626E+00	2.845E+00	0.000E+00	NOT IDENT.
PR-144	0.000E+00	4.987E+42	0.000E+00	0.000E+00	SHORT HLIF
PM-146	-2.268E+00	2.350E+00	3.826E+00	0.000E+00	NOT IDENT.
ND-147	-6.404E+01	9.563E+01	1.581E+02	0.000E+00	FAIL ABUN
PM-147	-1.260E+06	3.306E+06	5.477E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	2.996E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	1.573E+00	5.096E+00	9.088E+00	0.000E+00	NOT IDENT.
GD-153	2.360E+00	5.524E+00	8.386E+00	0.000E+00	NOT IDENT.
EU-154	-2.257E-01	4.852E+00	8.834E+00	0.000E+00	NOT IDENT.
EU-155	6.613E+00	6.871E+00	1.197E+01	0.000E+00	NOT IDENT.
TB-160	3.001E+00	8.786E+00	1.394E+01	0.000E+00	NOT IDENT.
TM-171	0.000E+00	2.135E+03	3.389E+03	0.000E+00	NOT IDENT.
HF-181	8.787E-01	3.144E+00	5.590E+00	0.000E+00	FAIL ABUN
TA-182	-3.852E+00	7.677E+00	1.321E+01	0.000E+00	NOT IDENT.
IR-192	1.173E+00	2.275E+00	4.092E+00	0.000E+00	NOT IDENT.
HG-203	4.465E+00	2.898E+00	5.420E+00	0.000E+00	FAIL ABUN
BI-207	1.082E+00	2.146E+00	4.129E+00	0.000E+00	NOT IDENT.
TL-208	1.973E+00	1.986E+00	3.674E+00	0.000E+00	FAIL ABUN
BI-210	2.995E+02	3.750E+02	5.868E+02	0.000E+00	NOT IDENT.
PB-210	2.995E+02	3.750E+02	5.868E+02	0.000E+00	NOT IDENT.
BI-211	1.175E+01	1.070E+01	1.976E+01	0.000E+00	NOT IDENT.
PB-211	5.031E+01	6.165E+01	8.746E+01	0.000E+00	NOT IDENT.
BI-214	7.351E-02	6.665E+00	6.824E+00	0.000E+00	FAIL ABUN
PB-214	1.740E+00	3.774E+00	6.763E+00	0.000E+00	FAIL ABUN
RN-219	1.183E+01	2.103E+01	3.799E+01	0.000E+00	NOT IDENT.
RA-223	1.446E+01	3.587E+01	6.397E+01	0.000E+00	NOT IDENT.
RA-224	3.420E+01	4.229E+01	6.457E+01	0.000E+00	NOT IDENT.
RA-226	7.351E-02	6.665E+00	6.824E+00	0.000E+00	FAIL ABUN
AC-227	-7.057E+00	2.204E+01	3.809E+01	0.000E+00	NOT IDENT.
TH-227	-6.935E+00	2.167E+01	3.743E+01	0.000E+00	FAIL ABUN
AC-228	5.509E+00	6.544E+00	1.256E+01	0.000E+00	NOT IDENT.
RA-228	5.509E+00	6.544E+00	1.256E+01	0.000E+00	NOT IDENT.
TH-229	1.077E+01	3.423E+01	5.076E+01	0.000E+00	FAIL ABUN
TH-230	7.351E-02	6.665E+00	6.824E+00	0.000E+00	FAIL ABUN
PA-231	-5.752E+01	8.198E+01	1.382E+02	0.000E+00	NOT IDENT.
TH-231	-6.163E+00	9.806E+00	1.668E+01	0.000E+00	NOT IDENT.
TH-232	1.218E-02	5.086E+00	6.366E+00	0.000E+00	FAIL ABUN

PA-233	-1.984E+00	3.378E+00	5.742E+00	0.000E+00	FAIL	ABUN
PA-234	7.111E+00	1.343E+01	2.555E+01	0.000E+00	FAIL	ABUN
U-234	1.107E-02	7.342E+00	1.286E+01	0.000E+00	NOT	IDENT.
U-235	4.020E+00	1.453E+01	2.159E+01	0.000E+00	FAIL	ABUN
NP-237	7.308E+00	1.360E+01	2.329E+01	0.000E+00	NOT	IDENT.
NP-239	-2.930E+00	1.210E+01	2.017E+01	0.000E+00	FAIL	ABUN
AM-241	-1.164E+01	1.818E+01	1.842E+01	0.000E+00	NOT	IDENT.
AM-242	1.533E+02	1.391E+02	2.434E+02	0.000E+00	NOT	IDENT.
CM-247	-8.459E-01	1.974E+00	3.362E+00	0.000E+00	NOT	IDENT.
CF-249	-1.397E+00	2.047E+00	3.435E+00	0.000E+00	NOT	IDENT.
CF-251	1.298E+00	7.608E+00	1.280E+01	0.000E+00	NOT	IDENT.
ANH-511	0.000E+00	2.748E+00	5.247E+00	0.000E+00	NOT	IDENT.

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783005.CNF;1
Sample date        : 20-MAR-2006 12:00:00 Acquisition date : 24-APR-2006 23:31:29
Sample ID          : G158783005           Sample quantity  : 2.00000E+00 LITER
Detector name     : GAMMA11              Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00        Elapsed real time: 0 06:00:01.93  0.0%
Energy tolerance  : 2.00000 KEV          Analyst Initials  : MJH1
Abundance limit   : 75.00000             Sensitivity       : 3.00000
Batch ID          : 523017               Detector SN#      : 11912863
Matrix Spike DPM  :                      LCS DPM         :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	64.54	193	702	5.41	132.69	124	17	8.95E-03	32.2	
2	0	74.71	241	515	2.95	153.03	146	15	1.11E-02	21.5	
3	0	93.09	222	430	1.43	189.79	184	12	1.03E-02	19.9	
4	0	138.94	85	371	3.22	281.49	277	11	3.92E-03	45.2	
5	0	163.52	53	279	2.03	330.65	326	10	2.45E-03	60.9	
6	0	185.66	84	232	1.50	374.93	372	7	3.87E-03	32.2	
7	0	197.53	120	334	2.34	398.68	392	12	5.54E-03	32.0	
8	0	211.40	53	145	2.35	426.42	423	8	2.45E-03	41.9	
9	0	215.12	28	193	1.54	433.86	432	9	1.32E-03	89.2	
10	0	238.35	102	214	1.20	480.33	477	9	4.71E-03	28.0	
11	0	338.54	19	118	0.93	680.71	678	9	8.82E-04	106.4	
12	0	409.35	29	134	4.81	822.33	817	13	1.34E-03	84.1	
13	0	510.52	355	153	3.06	1024.65	1014	19	1.64E-02	9.9	
14	0	559.10	98	83	1.52	1121.79	1116	15	4.55E-03	22.8	
15	0	595.56	41	65	2.62	1194.70	1190	10	1.88E-03	40.3	
16	0	608.50	44	89	2.48	1220.58	1216	14	2.02E-03	48.2	
17	0	726.91	21	47	1.73	1457.38	1455	8	9.68E-04	60.5	
18	0	759.61	7	61	1.36	1522.77	1519	11	3.01E-04	235.0	
19	0	805.69	78	86	9.78	1614.91	1601	31	3.63E-03	36.6	
20	3	882.90	24	12	1.87	1769.32	1766	14	1.12E-03	29.8	1.10E+00
21	3	886.44	18	10	1.67	1776.39	1766	14	8.11E-04	41.9	
22	0	910.78	15	36	1.20	1825.07	1821	8	6.94E-04	73.9	
23	0	930.54	11	13	0.80	1864.57	1862	5	4.86E-04	59.2	
24	0	1000.16	24	27	1.86	2003.78	1998	12	1.12E-03	47.7	
25	0	1012.58	25	26	3.50	2028.62	2020	15	1.14E-03	49.5	
26	0	1153.35	11	6	0.84	2310.10	2308	5	5.08E-04	46.8	
27	0	1172.68	21	17	0.99	2348.75	2344	13	9.84E-04	44.8	
28	0	1197.31	9	15	1.43	2398.00	2396	7	4.04E-04	82.3	
29	0	1215.45	10	4	1.73	2434.27	2432	7	4.56E-04	45.5	
30	0	1360.05	23	27	3.39	2723.39	2713	22	1.06E-03	61.7	
31	0	1376.30	15	36	6.75	2755.87	2739	24	6.94E-04	108.9	
32	0	1394.30	8	6	1.05	2791.85	2790	7	3.82E-04	58.4	
33	0	1397.08	11	17	0.61	2797.42	2796	10	5.06E-04	74.1	
34	0	1475.47	38	11	8.00	2954.15	2945	21	1.74E-03	27.1	
35	0	1532.03	8	12	1.73	3067.23	3059	10	3.70E-04	89.5	
36	0	1541.67	5	9	0.68	3086.50	3082	8	2.45E-04	110.3	
37	0	1579.14	12	17	1.39	3161.42	3155	17	5.56E-04	83.9	
38	0	1652.73	15	20	0.83	3308.53	3300	20	6.94E-04	77.5	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1762.68	10	17	0.72	3528.35	3523	14	4.70E-04	92.6	
40	0	1826.16	34	14	3.97	3655.24	3640	28	1.57E-03	35.5	
41	5	1963.81	19	0	4.21	3930.41	3925	56	8.64E-04	26.6	7.71E-01
42	5	1984.40	24	8	4.22	3971.58	3925	56	1.12E-03	32.0	
43	0	2019.15	6	17	4.81	4041.04	4029	18	2.72E-04	173.7	

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783005.CNF;1
Sample date        : 20-MAR-2006 12:00:00 Acquisition date : 24-APR-2006 23:31:29
Sample ID          : G158783005 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA11 Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00 Elapsed real time: 0 06:00:01.93 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials : MJH1
Abundance limit   : 75.00000 Sensitivity : 3.00000
Batch ID          : 523017 Detector SN# : 11912863
Matrix Spike DPM : LCS DPM :
*****

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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
Y-91	557.57	98	95.08*	1.085E+00	5.966E+00	9.096E+00	46.26
	1204.90	-----	0.30	5.749E-01	-----	Line Not Found	-----
BI-212	727.18	6	11.80*	8.873E-01	3.818E+00	3.955E+00	498.55
PB-212	74.80	204	10.70	1.552E+00	7.681E+01	7.958E+01	55.32
	87.30	-----	8.00	1.996E+00	-----	Line Not Found	-----
	115.19	-----	0.60	2.401E+00	-----	Line Not Found	-----
	238.63	0	44.60*	1.889E+00	1.218E-02	1.261E-02	41772.27
	300.09	-----	3.41	1.640E+00	-----	Line Not Found	-----
TH-228	84.40	-----	1.21	1.911E+00	-----	Line Not Found	-----
	238.60	0	44.60*	1.889E+00	1.218E-02	1.261E-02	41772.27
	300.10	-----	3.41	1.640E+00	-----	Line Not Found	-----
PA-234M	766.40	-----	0.21	8.498E-01	-----	Line Not Found	-----
	1001.03	5	0.85*	6.766E-01	5.865E+01	5.865E+01	548.80
TH-234	63.29	148	3.80*	1.068E+00	2.283E+02	2.283E+02	89.54
	92.38	55	5.41	2.138E+00	2.994E+01	2.994E+01	173.93
	112.81	-----	0.24	2.389E+00	-----	Line Not Found	-----
U-238	63.29	148	3.80*	1.068E+00	2.283E+02	2.283E+02	89.54

Flag: "*" = Keyline

Total number of lines in spectrum 35
 Number of unidentified lines 17
 Number of lines tentatively identified by NID 18 51.43%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
Y-91	58.51D	1.52	5.966E+00	9.096E+00	4.208E+00	46.26	
BI-212	1.91Y	1.04	3.818E+00	3.955E+00	19.72E+00	498.55	
PB-212	1.91Y	1.04	1.218E-02	1.261E-02	527.0E-02	41772.27	
TH-228	1.91Y	1.04	1.218E-02	1.261E-02	527.0E-02	41772.27	
PA-234M	4.47E+09Y	1.00	5.865E+01	5.865E+01	32.19E+01	548.80	
TH-234	4.47E+09Y	1.00	2.283E+02	2.283E+02	2.044E+02	89.54	
U-238	4.47E+09Y	1.00	2.283E+02	2.283E+02	2.044E+02	89.54	
Total Activity :			5.251E+02	5.283E+02			

Grand Total Activity : 5.251E+02 5.283E+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	138.94	85	371	3.22	281.49	277	11	3.92E-03	90.4	2.40E+00	T
0	163.52	53	279	2.03	330.65	326	10	2.45E-03	****	2.29E+00	T
0	197.53	70	334	2.34	398.68	392	12	3.22E-03	****	2.10E+00	T
0	211.40	53	145	2.35	426.42	423	8	2.45E-03	83.8	2.02E+00	T
0	409.35	14	134	4.81	822.33	817	13	6.61E-04	****	1.34E+00	
0	595.56	41	65	2.62	1194.70	1190	10	1.88E-03	80.6	1.04E+00	
0	608.50	1	89	2.48	1220.58	1216	14	2.57E-05	****	1.02E+00	T
0	759.61	7	61	1.36	1522.77	1519	11	3.01E-04	****	8.56E-01	
0	805.69	63	86	9.78	1614.91	1601	31	2.93E-03	94.8	8.15E-01	T
3	882.90	10	12	1.87	1769.32	1766	14	4.56E-04	****	7.54E-01	T
3	886.44	18	10	1.67	1776.39	1766	14	8.11E-04	83.9	7.52E-01	
0	1012.58	4	26	3.50	2028.62	2020	15	1.78E-04	****	6.69E-01	
0	1153.35	11	6	0.84	2310.10	2308	5	5.08E-04	93.6	5.97E-01	
0	1172.68	21	17	0.99	2348.75	2344	13	9.84E-04	89.6	5.89E-01	T
0	1197.31	9	15	1.43	2398.00	2396	7	4.04E-04	****	5.78E-01	
0	1215.45	10	4	1.73	2434.27	2432	7	4.56E-04	91.0	5.71E-01	
0	1360.05	23	27	3.39	2723.39	2713	22	1.06E-03	****	5.20E-01	
0	1376.30	15	36	6.75	2755.87	2739	24	6.94E-04	****	5.15E-01	T
0	1394.30	1	6	1.05	2791.85	2790	7	3.83E-05	****	5.10E-01	T
0	1397.08	4	17	0.61	2797.42	2796	10	1.62E-04	****	5.09E-01	T
0	1475.47	35	11	8.00	2954.15	2945	21	1.61E-03	60.9	4.88E-01	
0	1532.03	8	12	1.73	3067.23	3059	10	3.70E-04	****	4.75E-01	
0	1579.14	12	17	1.39	3161.42	3155	17	5.56E-04	****	4.66E-01	
0	1652.73	10	20	0.83	3308.53	3300	20	4.79E-04	****	4.52E-01	
0	1826.16	31	14	3.97	3655.24	3640	28	1.42E-03	85.5	4.30E-01	
5	1963.81	19	0	4.21	3930.41	3925	56	8.64E-04	53.1	4.19E-01	
5	1984.40	18	8	4.22	3971.58	3925	56	8.30E-04	91.2	4.18E-01	
0	2019.15	6	17	4.81	4041.04	4029	18	2.72E-04	****	4.17E-01	

Flags: "T" = Tentatively associated


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*****
*                                     GENERAL ENG. LABS, LLC.                                     *
*                                     2040 Savage Road                                       *
*                                     Charleston, SC 29414                                   *
*****
*                                     DETECTOR DATA                                       *
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G158783005.CNF;1             *
* Acquisition date   : 24-APR-2006 23:31:29  Detector SN#      : 11912863                 *
* Detector ID       : GAMMA11                      Sensitivity   : 3.00000                   *
* Geometry         : 2L_MB                          Energy tolerance: 2.00000                   *
* Elapsed live time: 0 06:00:00.00                 Abundance limit : 75.00000                   *
* Elapsed real time: 0 06:00:01.93                 Half life ratio  : 8.00000                   *
*****
*                                     SAMPLE DATA                                       *
* Sample date       : 20-MAR-2006 12:00:00  Nuclide Library  : EPI                       *
* Sample ID        : G158783005                Analyst initials: MJH1                       *
* Batch Number     : 523017                    Sample Quantity : 2.00000E+00 LITER             *
*****
*                                     QC DATA                                           *
* CALIB. DATE/TIME : 14-MAR-2006 14:49:10.4MS Isotope      :                       *
* MSD DPM          :                               MSD Isotope :                       *
* LCS DPM          :                               LCS Isotope :                       *
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
Y-91	9.096E+00	4.208E+00	3.902E+00	2.865E-01	2.331
BI-212	3.955E+00	1.972E+01	2.297E+01	2.019E+00	0.172
PB-212	1.261E-02	5.270E+00	5.537E+00	4.889E-01	0.002
TH-228	1.261E-02	5.270E+00	5.536E+00	4.889E-01	0.002
PA-234M	5.865E+01	3.219E+02	3.588E+02	3.247E+01	0.163
TH-234	2.283E+02	2.044E+02	1.473E+02	2.875E+01	1.550
U-238	2.283E+02	2.044E+02	1.473E+02	2.875E+01	1.550

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

Nuclide	Key-Line Activity K.L. (pCi/LITER) Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	-8.311E+00	2.139E+01	3.640E+01	3.000E+00	-0.228
NA-22	-8.635E-02	1.755E+00	3.194E+00	2.013E-01	-0.027
AL-26	-1.057E+00	1.711E+00	2.830E+00	1.684E-01	-0.374
K-40	4.616E+01	2.331E+01	4.832E+01	3.132E+00	0.955
SC-46	4.104E-01	2.432E+00	3.758E+00	2.941E-01	0.109

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
V-48	-5.050E+00		7.573E+00	1.288E+01	9.822E-01	-0.392
CR-51	-3.840E+01		3.452E+01	5.670E+01	4.668E+00	-0.677
MN-54	-9.141E-01		1.775E+00	2.929E+00	2.234E-01	-0.312
CO-56	7.344E-01		2.264E+00	4.060E+00	3.115E-01	0.181
CO-57	-1.654E+00		1.666E+00	2.683E+00	1.865E-01	-0.616
CO-58	1.696E+00		2.306E+00	4.282E+00	3.236E-01	0.396
FE-59	-2.143E+00		5.300E+00	9.238E+00	7.331E-01	-0.232
CO-60	1.470E+00		1.978E+00	3.858E+00	2.329E-01	0.381
ZN-65	1.669E+00		4.169E+00	7.803E+00	5.474E-01	0.214
SE-75	1.159E+00		2.729E+00	4.884E+00	3.784E-01	0.237
KR-85	-2.187E+03		5.703E+02	7.494E+02	5.579E+01	-2.918
SR-85	-1.390E+01		3.625E+00	4.764E+00	3.546E-01	-2.918
Y-88	-5.126E-01		2.450E+00	4.322E+00	2.559E-01	-0.119
NB-94	1.000E+00		1.636E+00	2.979E+00	2.103E-01	0.336
NB-95	-9.121E-01		3.380E+00	5.728E+00	4.211E-01	-0.159
ZR-95	-4.046E-01		5.059E+00	7.507E+00	6.244E-01	-0.054
RU-103	-1.260E+00		3.097E+00	5.248E+00	7.080E-01	-0.240
RH-106	7.435E+00		1.719E+01	3.086E+01	2.187E+00	0.241
RU-106	1.371E+01		1.698E+01	3.122E+01	3.878E+00	0.439
AG-108M	-1.249E+00		1.700E+00	2.829E+00	2.225E-01	-0.442
CD-109	3.500E+01		5.252E+01	8.035E+01	8.090E+00	0.436
AG-110M	-2.703E-01		1.886E+00	3.240E+00	2.336E-01	-0.083
SN-113	1.392E+00		2.604E+00	4.705E+00	3.627E-01	0.296
SN-115	1.438E+02		2.129E+02	4.103E+02	3.192E+01	0.350
SN-117M	-1.922E+00		9.351E+00	1.551E+01	1.097E+00	-0.124
TE-123M	-1.524E+00		2.261E+00	3.169E+00	2.262E-01	-0.481
SB-124	7.738E-01		5.773E+00	1.074E+01	7.053E-01	0.072
SB-125	-3.448E+00		4.564E+00	7.587E+00	5.810E-01	-0.454
TE-125M	-7.057E+02		7.406E+02	1.196E+03	1.152E+02	-0.590
I-126	-9.420E+00		2.452E+01	4.142E+01	2.854E+00	-0.227
SB-126	1.514E+01		2.127E+01	3.928E+01	2.806E+00	0.385
SN-126	1.548E+00		4.594E+00	7.857E+00	7.897E-01	0.197
I-131	-1.807E+00		3.485E+01	6.101E+01	5.100E+00	-0.030
BA-133	-7.996E-01		2.331E+00	4.002E+00	5.028E-01	-0.200
CS-134	-6.371E-01		2.082E+00	3.001E+00	2.260E-01	-0.212
CS-135	-8.148E+00		8.378E+00	1.397E+01	1.284E+00	-0.583
CS-136	-1.400E+01		1.399E+01	2.273E+01	1.779E+00	-0.616
BA-137M	1.222E-02		1.752E+00	3.052E+00	2.096E-01	0.004
CS-137	6.133E-03		1.852E+00	3.224E+00	2.221E-01	0.002
CE-139	7.130E-01		2.105E+00	3.147E+00	2.253E-01	0.227
BA-140	1.826E+01		4.031E+01	7.196E+01	2.363E+01	0.254
LA-140	9.511E+00		1.379E+01	2.727E+01	1.679E+00	0.349
CE-141	2.770E+00		5.815E+00	9.926E+00	7.091E-01	0.279
CE-144	-7.701E-01		1.326E+01	2.221E+01	3.262E+00	-0.035
PM-144	3.261E-02		1.626E+00	2.845E+00	2.007E-01	0.011
PM-146	-2.268E+00		2.350E+00	3.826E+00	3.763E-01	-0.593
ND-147	-6.404E+01		9.563E+01	1.581E+02	2.260E+01	-0.405
PM-147	-1.260E+06		3.306E+06	5.477E+06	3.819E+05	-0.230

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
EU-152	1.573E+00		5.096E+00	9.088E+00	7.480E-01	0.173
GD-153	2.360E+00		5.524E+00	8.386E+00	7.300E-01	0.281
EU-154	-2.257E-01		4.852E+00	8.834E+00	8.528E-01	-0.026
EU-155	6.613E+00		6.871E+00	1.197E+01	9.657E-01	0.552
TB-160	3.001E+00		8.786E+00	1.394E+01	1.086E+00	0.215
TM-171	3.437E+03		2.135E+03	3.389E+03	3.664E+02	1.014
HF-181	8.787E-01		3.144E+00	5.590E+00	4.182E-01	0.157
TA-182	-3.852E+00		7.677E+00	1.321E+01	8.563E-01	-0.292
IR-192	1.173E+00		2.275E+00	4.092E+00	3.173E-01	0.287
HG-203	4.465E+00		2.898E+00	5.420E+00	4.339E-01	0.824
BI-207	1.082E+00		2.146E+00	4.129E+00	3.009E-01	0.262
TL-208	1.973E+00		1.986E+00	3.674E+00	2.933E-01	0.537
BI-210	2.995E+02		3.750E+02	5.868E+02	6.201E+01	0.510
PB-210	2.995E+02		3.750E+02	5.868E+02	6.201E+01	0.510
BI-211	1.175E+01		1.070E+01	1.976E+01	1.605E+00	0.595
PB-211	5.031E+01		6.165E+01	8.746E+01	5.467E+01	0.575
BI-214	7.351E-02	+	6.665E+00	6.824E+00	6.026E-01	0.011
PB-214	1.740E+00		3.774E+00	6.763E+00	6.527E-01	0.257
RN-219	1.183E+01		2.103E+01	3.799E+01	5.460E+00	0.312
RA-223	1.446E+01		3.587E+01	6.397E+01	1.106E+01	0.226
RA-224	3.420E+01		4.229E+01	6.457E+01	4.919E+00	0.530
RA-226	7.351E-02	+	6.665E+00	6.824E+00	6.026E-01	0.011
AC-227	-7.057E+00		2.204E+01	3.809E+01	5.713E+00	-0.185
TH-227	-6.935E+00		2.167E+01	3.743E+01	6.600E+00	-0.185
AC-228	5.509E+00		6.544E+00	1.256E+01	1.338E+00	0.438
RA-228	5.509E+00		6.544E+00	1.256E+01	1.338E+00	0.438
TH-229	1.077E+01		3.423E+01	5.076E+01	3.724E+00	0.212
TH-230	7.351E-02	+	6.665E+00	6.824E+00	6.025E-01	0.011
PA-231	-5.752E+01		8.198E+01	1.382E+02	2.032E+01	-0.416
TH-231	-6.163E+00		9.806E+00	1.668E+01	1.483E+00	-0.369
TH-232	1.218E-02	+	5.086E+00	6.366E+00	5.621E-01	0.002
PA-233	-1.984E+00		3.378E+00	5.742E+00	4.599E-01	-0.345
PA-234	7.111E+00		1.343E+01	2.555E+01	4.696E+00	0.278
U-234	1.107E-02		7.342E+00	1.286E+01	1.280E+00	0.001
U-235	4.020E+00		1.453E+01	2.159E+01	3.615E+00	0.186
NP-237	7.308E+00		1.360E+01	2.329E+01	5.340E+00	0.314
NP-239	-2.930E+00		1.210E+01	2.017E+01	1.450E+00	-0.145
AM-241	-1.164E+01		1.818E+01	1.842E+01	2.399E+00	-0.632
AM-242	1.533E+02		1.391E+02	2.434E+02	1.969E+01	0.630
CM-247	-8.459E-01		1.974E+00	3.362E+00	2.496E-01	-0.252
CF-249	-1.397E+00		2.047E+00	3.435E+00	2.551E-01	-0.407
CF-251	1.298E+00		7.608E+00	1.280E+01	9.236E-01	0.101
ANH-511	1.669E+01		2.748E+00	5.247E+00	3.908E-01	3.182

```

*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G158783005
*   ANALYST       : MJH1           DETECTOR    : GAMMA11
*   SAMPLE DATE   : 20-MAR-2006 12:00:00.00  COUNT TIME : 0 06:00:00.00
*   ANALYSIS DATE: 24-APR-2006 23:31:29.99  SAMPLE ALQT: 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 7.353E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 2.029E+02
GROSS GAMMA MDA     (pCi/LITER ) : 2.812E+02
GROSS GAMMA DLC     (pCi/LITER ) : 1.365E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 05:34:41.38

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration   : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076443.CNF;1
Sample date     : 21-APR-2006 00:00:00 Acquisition date : 24-APR-2006 23:31:53
Sample ID      : G1201076443 Sample quantity   : 2.00000E+00 LITER
Detector name  : GAMMA3 Detector geometry    : 2L_MB
Elapsed live time: 0 06:00:00.00 Elapsed real time: 0 06:00:02.00 0.0%
Energy tolerance: 2.00000 KEV Analyst Initials  : MJH1
Abundance limit : 75.00000 Sensitivity     : 3.00000
Batch ID       : 523017 Detector SN#      : 12922955
Matrix Spike DPM : LCS DPM                    :
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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	54.07*	56	252	2.30	108.92	105	9	2.60E-03	57.0	
2	0	63.15*	9	361	1.36	127.05	122	11	4.14E-04	521.1	
3	0	73.65*	65	292	2.88	148.01	144	9	3.00E-03	54.3	
4	0	84.60*	55	210	1.28	169.88	167	7	2.53E-03	56.2	
5	0	144.33*	8	350	1.44	289.12	284	11	3.88E-04	508.1	2.46E+00
6	0	186.05*	53	268	1.24	372.42	369	10	2.45E-03	78.4	
7	0	198.47	65	254	1.82	397.23	393	9	3.00E-03	45.9	
8	0	238.73*	44	234	1.14	477.61	473	10	2.02E-03	82.7	
9	0	351.54*	4	160	1.80	702.86	698	11	1.95E-04	655.5	
10	0	374.38	38	105	0.78	748.47	743	10	1.77E-03	52.6	
11	0	583.38*	10	79	3.29	1165.84	1161	11	4.43E-04	243.2	
12	0	609.67*	1	79	0.80	1218.35	1214	11	3.98E-05	*****	
13	0	673.83*	24	67	6.12	1346.49	1340	15	1.11E-03	82.6	
14	0	942.83	5	15	1.21	1883.75	1883	5	2.31E-04	122.0	
15	0	1001.37*	52	32	6.16	2000.68	1989	22	2.41E-03	35.0	
16	0	1008.99	17	11	1.46	2015.91	2012	7	7.64E-04	40.8	
17	0	1043.53	9	13	1.23	2084.90	2080	8	3.99E-04	82.1	
18	0	1120.61*	8	33	4.86	2238.87	2233	13	3.53E-04	174.2	
19	0	1254.39	8	12	0.94	2506.12	2503	5	3.56E-04	77.5	
20	0	1275.62	14	8	0.82	2548.53	2544	9	6.27E-04	48.0	
21	0	1315.43	13	9	1.64	2628.08	2625	9	6.02E-04	50.0	
22	0	1360.00*	1	14	0.71	2717.11	2713	8	2.69E-05	*****	
23	0	1401.63*	13	26	0.47	2800.29	2791	16	6.15E-04	99.0	
24	3	1449.61	17	8	3.28	2896.16	2890	46	7.65E-04	52.1	6.37E-01
25	3	1459.36	23	31	3.29	2915.63	2890	46	1.05E-03	64.6	
26	0	1544.64*	4	13	5.87	3086.03	3078	14	1.84E-04	275.0	
27	0	1550.60	8	15	0.67	3097.94	3091	10	3.70E-04	97.2	
28	0	1587.41	1	19	0.67	3171.49	3168	11	5.44E-05	726.8	
29	0	1595.24	8	25	7.79	3187.13	3182	20	3.48E-04	167.3	
30	0	1624.45	12	20	0.67	3245.50	3239	20	5.56E-04	95.7	
31	0	1635.67	17	11	3.82	3267.91	3260	15	7.83E-04	49.5	
32	0	1768.12	8	4	0.90	3532.58	3531	5	3.67E-04	51.6	
33	1	1776.84	19	10	2.65	3550.00	3539	42	8.69E-04	45.2	1.00E+00
34	1	1781.34	18	12	2.65	3559.00	3539	42	8.38E-04	46.6	
35	0	1845.11	11	3	1.81	3686.43	3684	6	4.96E-04	40.1	
36	0	1891.09	23	13	8.34	3778.32	3769	25	1.06E-03	46.7	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076443
* Acquisition date   : 24-APR-2006 23:31:53 Detector SN#      : 12922955
* Detector ID       : GAMMA3                      Sensitivity    : 3.000
* Geometry          : 2L_MB                       Energy tolerance: 2.000
* Elapsed live time: 0 06:00:00.00                Abundance limit : 75.000
* Elapsed real time: 0 06:00:02.00                Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                         *
*
* Sample date       : 21-APR-2006 00:00:00 Nuclide Library :
* Sample ID        : G1201076443                    Analyst initials: MJH1
* Batch Number     : 523017                          Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000                          Carrier Weight  : 0.00000
*****
*                               QC DATA                                             *
*
* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 25-MAR-2006 12:15:10 MS Isotope      :
* MSD DPM           : 0.000                          MSD Isotope     :
* LCS DPM           : 0.000                          LCS Isotope     :
* LCSD DPM          : 0.000                          LCSD Isotope    :
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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
NA-22	1.381E+00	1.328E+00	2.576E+00	0.000E+00
K-40	2.375E+01	3.074E+01	2.711E+01	0.000E+00
BI-211	1.258E+00	1.649E+01	1.624E+01	0.000E+00
PB-212	3.013E+00	4.989E+00	4.438E+00	0.000E+00
BI-214	1.035E-01	5.078E+00	6.043E+00	0.000E+00
RA-226	1.035E-01	5.078E+00	6.043E+00	0.000E+00
TH-228	3.013E+00	4.989E+00	4.437E+00	0.000E+00
TH-230	1.035E-01	5.078E+00	6.043E+00	0.000E+00
PA-234M	5.116E+02	3.618E+02	3.091E+02	0.000E+00
U-235	1.954E+00	1.986E+01	1.676E+01	0.000E+00
NP-237	1.321E+01	1.521E+01	1.662E+01	0.000E+00
U-238	1.385E+01	1.444E+02	1.010E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	5.990E-01	1.273E+01	2.183E+01	0.000E+00	NOT IDENT.
NA-24	-4.406E+01	1.590E+02	2.788E+02	0.000E+00	NOT IDENT.
AL-26	-1.373E-01	1.418E+00	2.660E+00	0.000E+00	NOT IDENT.
SC-46	6.106E-01	1.559E+00	2.843E+00	0.000E+00	FAIL ABUN
V-48	-1.552E+00	1.909E+00	3.041E+00	0.000E+00	FAIL ABUN
CR-51	4.696E+00	1.272E+01	2.259E+01	0.000E+00	NOT IDENT.
MN-54	1.358E+00	1.591E+00	2.985E+00	0.000E+00	NOT IDENT.
CO-56	9.941E-01	1.659E+00	3.052E+00	0.000E+00	NOT IDENT.
MN-56	0.000E+00	4.634E+11	0.000E+00	0.000E+00	SHORT HLIF
CO-57	7.765E-01	1.243E+00	2.149E+00	0.000E+00	NOT IDENT.
CO-58	-1.338E+00	1.484E+00	2.388E+00	0.000E+00	NOT IDENT.
FE-59	6.866E-01	2.751E+00	5.186E+00	0.000E+00	NOT IDENT.
CO-60	-9.819E-01	1.465E+00	2.450E+00	0.000E+00	NOT IDENT.
ZN-65	-8.911E-01	3.320E+00	5.035E+00	0.000E+00	NOT IDENT.
SE-75	-1.220E+00	1.989E+00	3.359E+00	0.000E+00	FAIL ABUN

KR-85	-2.642E+03	5.957E+02	7.320E+02	0.000E+00	NOT IDENT.
SR-85	-1.206E+01	2.719E+00	3.342E+00	0.000E+00	NOT IDENT.
Y-88	3.725E-01	1.677E+00	3.228E+00	0.000E+00	NOT IDENT.
Y-91	-5.270E-01	1.326E+00	2.314E+00	0.000E+00	NOT IDENT.
NB-94	1.257E+00	1.490E+00	2.792E+00	0.000E+00	NOT IDENT.
NB-95	5.786E-01	1.545E+00	2.820E+00	0.000E+00	NOT IDENT.
NB-95M	-4.289E+00	1.115E+01	1.679E+01	0.000E+00	NOT IDENT.
ZR-95	3.264E-01	2.468E+00	4.450E+00	0.000E+00	NOT IDENT.
MO-99	-1.828E+00	4.118E+00	5.947E+00	0.000E+00	NOT IDENT.
TC-99M	0.000E+00	1.149E+05	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-6.938E-01	1.508E+00	2.474E+00	0.000E+00	FAIL ABUN
RH-106	-2.324E+00	1.295E+01	2.284E+01	0.000E+00	NOT IDENT.
RU-106	-3.052E+00	1.299E+01	2.280E+01	0.000E+00	NOT IDENT.
AG-108M	-4.942E-01	1.527E+00	2.557E+00	0.000E+00	NOT IDENT.
CD-109	1.001E+01	3.305E+01	5.715E+01	0.000E+00	NOT IDENT.
AG-110M	-5.723E-01	1.510E+00	2.602E+00	0.000E+00	NOT IDENT.
SN-113	-1.931E-01	2.044E+00	3.487E+00	0.000E+00	NOT IDENT.
CD-115	-3.495E+00	1.477E+01	2.472E+01	0.000E+00	NOT IDENT.
SN-115	6.655E+01	1.289E+02	2.361E+02	0.000E+00	NOT IDENT.
SN-117M	2.904E-01	1.568E+00	2.626E+00	0.000E+00	NOT IDENT.
TE-123M	3.991E-01	1.347E+00	2.267E+00	0.000E+00	NOT IDENT.
SB-124	-9.515E-01	3.347E+00	5.832E+00	0.000E+00	NOT IDENT.
SB-125	-7.372E-01	4.181E+00	7.086E+00	0.000E+00	NOT IDENT.
TE-125M	1.790E+02	3.953E+02	6.818E+02	0.000E+00	NOT IDENT.
I-126	-1.015E+00	4.363E+00	7.604E+00	0.000E+00	NOT IDENT.
SB-126	3.521E-01	3.415E+00	6.086E+00	0.000E+00	NOT IDENT.
SN-126	2.762E-01	3.707E+00	5.695E+00	0.000E+00	FAIL ABUN
SB-127	2.937E+00	7.915E+00	1.449E+01	0.000E+00	NOT IDENT.
I-131	1.081E+00	2.232E+00	3.949E+00	0.000E+00	NOT IDENT.
I-132	0.000E+00	1.150E+13	0.000E+00	0.000E+00	SHORT HLIF
TE-132	-1.051E+00	3.066E+00	5.291E+00	0.000E+00	NOT IDENT.
BA-133	-2.204E+00	2.473E+00	3.429E+00	0.000E+00	NOT IDENT.
I-133	2.428E+01	3.649E+01	6.595E+01	0.000E+00	NOT IDENT.
CS-134	6.365E-01	1.643E+00	3.011E+00	0.000E+00	NOT IDENT.
CS-135	2.696E+00	7.314E+00	1.299E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	1.797E+05	0.000E+00	0.000E+00	SHORT HLIF
CS-136	1.774E+00	2.449E+00	4.757E+00	0.000E+00	FAIL ABUN
BA-137M	-7.845E-01	1.560E+00	2.661E+00	0.000E+00	NOT IDENT.
CS-137	-8.217E-01	1.650E+00	2.815E+00	0.000E+00	NOT IDENT.
CE-139	-1.287E-01	1.464E+00	2.411E+00	0.000E+00	NOT IDENT.
BA-140	1.725E-01	6.050E+00	1.091E+01	0.000E+00	NOT IDENT.
LA-140	1.161E+00	3.885E+00	4.069E+00	0.000E+00	FAIL ABUN
CE-141	4.627E-01	4.702E+00	4.359E+00	0.000E+00	FAIL ABUN
CE-143	-1.830E+01	2.365E+01	3.885E+01	0.000E+00	FAIL ABUN
CE-144	-3.378E+00	1.016E+01	1.671E+01	0.000E+00	NOT IDENT.
PM-144	-2.641E-01	1.517E+00	2.644E+00	0.000E+00	NOT IDENT.
PR-144	0.000E+00	5.745E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	-1.056E+00	2.042E+00	3.354E+00	0.000E+00	NOT IDENT.
ND-147	4.147E+00	1.161E+01	2.144E+01	0.000E+00	NOT IDENT.
PM-147	4.676E+05	2.646E+06	4.489E+06	0.000E+00	NOT IDENT.
PM-149	-1.311E+01	1.406E+02	2.433E+02	0.000E+00	NOT IDENT.
EU-152	-1.990E+00	4.503E+00	7.574E+00	0.000E+00	NOT IDENT.
GD-153	-1.868E+00	3.662E+00	6.070E+00	0.000E+00	FAIL ABUN
EU-154	3.879E+00	3.741E+00	8.202E+00	0.000E+00	FAIL ABUN
EU-155	4.381E+00	5.112E+00	8.985E+00	0.000E+00	FAIL ABUN
TB-160	1.059E+00	5.264E+00	9.476E+00	0.000E+00	NOT IDENT.
TM-171	-9.783E+02	1.372E+03	2.021E+03	0.000E+00	NOT IDENT.
HF-181	-2.426E-01	1.614E+00	2.725E+00	0.000E+00	NOT IDENT.
TA-182	6.162E+00	5.967E+00	1.203E+01	0.000E+00	FAIL ABUN
IR-192	-6.450E-01	1.379E+00	2.330E+00	0.000E+00	NOT IDENT.
HG-203	8.681E-01	1.646E+00	2.938E+00	0.000E+00	FAIL ABUN
BI-207	1.714E+00	2.281E+00	4.395E+00	0.000E+00	NOT IDENT.
TL-208	6.153E-01	2.993E+00	3.374E+00	0.000E+00	FAIL ABUN
BI-210	1.581E+02	2.743E+02	4.466E+02	0.000E+00	NOT IDENT.
PB-210	1.581E+02	2.743E+02	4.466E+02	0.000E+00	NOT IDENT.
PB-211	-3.733E+01	4.918E+01	6.998E+01	0.000E+00	NOT IDENT.
BI-212	3.861E-01	1.301E+01	2.298E+01	0.000E+00	NOT IDENT.
PB-214	4.375E-01	5.736E+00	6.184E+00	0.000E+00	FAIL ABUN
RN-219	1.301E+00	1.893E+01	3.269E+01	0.000E+00	NOT IDENT.
RA-223	-7.485E+00	3.089E+01	5.273E+01	0.000E+00	FAIL ABUN
RA-224	4.453E+01	3.502E+01	5.787E+01	0.000E+00	NOT IDENT.
AC-227	-1.578E+00	1.851E+01	3.222E+01	0.000E+00	NOT IDENT.
TH-227	-1.555E+00	1.824E+01	3.175E+01	0.000E+00	NOT IDENT.
AC-228	5.433E+00	5.936E+00	1.116E+01	0.000E+00	NOT IDENT.
RA-228	5.433E+00	5.936E+00	1.116E+01	0.000E+00	NOT IDENT.
TH-229	1.407E+01	2.430E+01	4.122E+01	0.000E+00	FAIL ABUN
PA-231	-5.063E+01	7.447E+01	1.243E+02	0.000E+00	NOT IDENT.
TH-231	-2.811E+00	8.913E+00	1.528E+01	0.000E+00	FAIL ABUN

TH-232	3.000E+00	4.968E+00	5.800E+00	0.000E+00	FAIL	ABUN
PA-233	1.075E+00	3.035E+00	5.374E+00	0.000E+00	FAIL	ABUN
PA-234	-7.223E-01	1.494E+01	2.244E+01	0.000E+00	FAIL	ABUN
TH-234	1.385E+01	1.444E+02	1.356E+02	0.000E+00	FAIL	ABUN
U-234	1.657E+00	6.405E+00	1.126E+01	0.000E+00	FAIL	ABUN
NP-239	1.941E+00	9.300E+00	1.584E+01	0.000E+00	NOT	IDENT.
AM-241	1.078E+00	8.553E+00	1.347E+01	0.000E+00	NOT	IDENT.
AM-242	-4.671E+01	1.051E+02	1.745E+02	0.000E+00	NOT	IDENT.
CM-247	1.028E+00	1.651E+00	2.959E+00	0.000E+00	NOT	IDENT.
CF-249	-4.720E-01	1.985E+00	3.355E+00	0.000E+00	NOT	IDENT.
CF-251	-1.105E+00	6.632E+00	1.085E+01	0.000E+00	NOT	IDENT.
ANH-511	0.000E+00	2.801E+00	5.345E+00	0.000E+00	NOT	IDENT.


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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076443.CNF;1
Sample date        : 21-APR-2006 00:00:00 Acquisition date : 24-APR-2006 23:31:53
Sample ID          : G1201076443              Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA3                    Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00            Elapsed real time: 0 06:00:02.00  0.0%
Energy tolerance  : 2.00000 KEV              Analyst Initials  : MJH1
Abundance limit   : 75.00000                 Sensitivity       : 3.00000
Batch ID          : 523017                    Detector SN#      : 12922955
Matrix Spike DPM  :                           LCS DPM       :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	54.07	73	252	2.30	108.92	105	9	3.38E-03	40.8	
2	0	63.15	149	361	1.36	127.05	122	11	6.90E-03	26.0	
3	0	73.65	83	292	2.88	148.01	144	9	3.82E-03	38.8	
4	0	84.60	87	210	1.28	169.88	167	7	4.02E-03	30.0	
5	1	92.70	335	264	1.33	186.05	179	16	1.55E-02	10.2	2.46E+00
6	1	94.18	53	220	1.21	189.00	179	16	2.44E-03	59.0	
7	0	144.33	85	350	1.44	289.12	284	11	3.92E-03	44.1	
8	0	186.05	278	268	1.24	372.42	369	10	1.29E-02	12.5	
9	0	198.47	65	254	1.82	397.23	393	9	3.00E-03	45.9	
10	0	238.73	142	234	1.14	477.61	473	10	6.56E-03	21.9	
11	0	351.54	29	160	1.80	702.86	698	11	1.32E-03	87.8	
12	0	374.38	38	105	0.78	748.47	743	10	1.77E-03	52.6	
13	0	510.82	457	183	2.26	1020.93	1013	19	2.12E-02	8.4	
14	0	583.38	46	79	3.29	1165.84	1161	11	2.11E-03	40.7	
15	0	609.67	41	79	0.80	1218.35	1214	11	1.88E-03	45.3	
16	0	673.83	36	67	6.12	1346.49	1340	15	1.68E-03	51.9	
17	0	911.18	17	30	1.46	1820.54	1817	7	8.07E-04	57.1	
18	0	942.83	5	15	1.21	1883.75	1883	5	2.31E-04	122.0	
19	0	1001.37	69	32	6.16	2000.68	1989	22	3.20E-03	24.3	
20	0	1008.99	17	11	1.46	2015.91	2012	7	7.64E-04	40.8	
21	0	1043.53	9	13	1.23	2084.90	2080	8	3.99E-04	82.1	
22	0	1120.61	16	33	4.86	2238.87	2233	13	7.18E-04	80.0	
23	0	1254.39	8	12	0.94	2506.12	2503	5	3.56E-04	77.5	
24	0	1275.62	14	8	0.82	2548.53	2544	9	6.27E-04	48.0	
25	0	1315.43	13	9	1.64	2628.08	2625	9	6.02E-04	50.0	
26	0	1360.00	6	14	0.71	2717.11	2713	8	2.74E-04	116.9	
27	0	1401.63	21	26	0.47	2800.29	2791	16	9.93E-04	58.8	
28	0	1407.61	11	9	1.39	2812.24	2810	7	5.02E-04	54.8	
29	3	1449.61	17	8	3.28	2896.16	2890	46	7.65E-04	52.1	6.37E-01
30	3	1459.36	23	31	3.29	2915.63	2890	46	1.05E-03	64.6	
31	0	1544.64	16	13	5.87	3086.03	3078	14	7.18E-04	56.6	
32	0	1550.60	8	15	0.67	3097.94	3091	10	3.70E-04	97.2	
33	0	1587.41	1	19	0.67	3171.49	3168	11	5.44E-05	726.8	
34	0	1595.24	8	25	7.79	3187.13	3182	20	3.48E-04	167.3	
35	0	1624.45	12	20	0.67	3245.50	3239	20	5.56E-04	95.7	
36	0	1635.67	17	11	3.82	3267.91	3260	15	7.83E-04	49.5	
37	0	1768.12	8	4	0.90	3532.58	3531	5	3.67E-04	51.6	
38	1	1776.84	19	10	2.65	3550.00	3539	42	8.69E-04	45.2	1.00E+00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	1	1781.34	18	12	2.65	3559.00	3539	42	8.38E-04	46.6	
40	0	1845.11	11	3	1.81	3686.43	3684	6	4.96E-04	40.1	
41	0	1891.09	23	13	8.34	3778.32	3769	25	1.06E-03	46.7	

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                   *
*                               Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076443.CNF;1
Sample date        : 21-APR-2006 00:00:00 Acquisition date : 24-APR-2006 23:31:53
Sample ID          : G1201076443          Sample quantity  : 2.00000E+00 LITER
Detector name     : GAMMA3                Detector geometry: 2L_MB
Elapsed live time : 0 06:00:00.00         Elapsed real time: 0 06:00:02.00  0.0%
Energy tolerance  : 2.00000 KEV          Analyst Initials  : MJH1
Abundance limit   : 75.00000             Sensitivity       : 3.00000
Batch ID          : 523017                Detector SN#      : 12922955
Matrix Spike DPM  :                       LCS DPM         :
*****
    
```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
NA-22	1274.53	14	99.94*	6.160E-01	1.376E+00	1.381E+00	96.19
K-40	1460.81	23	10.67*	5.588E-01	2.375E+01	2.375E+01	129.42
CE-141	145.44	8	48.40*	2.558E+00	4.239E-01	4.627E-01	1016.17
BI-211	351.07	4	12.94*	1.621E+00	1.258E+00	1.258E+00	1311.07
PB-212	74.80	65	10.70	1.610E+00	2.354E+01	2.364E+01	110.00
	87.30	-----	8.00	2.136E+00	-----	Line Not Found	-----
	115.19	-----	0.60	2.571E+00	-----	Line Not Found	-----
	238.63	44	44.60*	2.043E+00	3.000E+00	3.013E+00	165.60
	300.09	-----	3.41	1.785E+00	-----	Line Not Found	-----
BI-214	609.31	1	46.30*	1.123E+00	1.035E-01	1.035E-01	4906.54
	768.36	-----	5.04	9.393E-01	-----	Line Not Found	-----
	934.06	-----	3.21	7.985E-01	-----	Line Not Found	-----
	1120.29	8	15.10	6.843E-01	4.614E+00	4.614E+00	348.57
	1238.11	-----	5.94	6.307E-01	-----	Line Not Found	-----
	1377.67	-----	4.11	5.815E-01	-----	Line Not Found	-----
RA-226	295.21	-----	19.20	1.803E+00	-----	Line Not Found	-----
	351.92	4	37.20	1.621E+00	4.375E-01	4.375E-01	1311.06
	609.31	1	46.30*	1.123E+00	1.035E-01	1.035E-01	4906.54
TH-228	84.40	55	1.21	2.051E+00	1.375E+02	1.381E+02	113.74
	238.60	44	44.60*	2.043E+00	3.000E+00	3.013E+00	165.60
	300.10	-----	3.41	1.785E+00	-----	Line Not Found	-----
TH-230	295.21	-----	19.20	1.803E+00	-----	Line Not Found	-----
	351.92	4	37.20	1.621E+00	4.375E-01	4.375E-01	1311.06
	609.31	1	46.30*	1.123E+00	1.035E-01	1.035E-01	4906.54
PA-234M	766.40	-----	0.21	9.412E-01	-----	Line Not Found	-----
	1001.03	52	0.85*	7.526E-01	5.116E+02	5.116E+02	70.71
U-235	89.95	-----	2.70	2.210E+00	-----	Line Not Found	-----
	93.35	-----	4.50	2.294E+00	-----	Line Not Found	-----
	105.00	-----	2.10	2.489E+00	-----	Line Not Found	-----
	143.76	8	10.50*	2.558E+00	1.954E+00	1.954E+00	1016.28
	163.33	-----	4.70	2.464E+00	-----	Line Not Found	-----
	185.71	53	54.00	2.331E+00	2.626E+00	2.626E+00	156.93

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
	205.31	-----	5.00	2.219E+00	-----	Line Not Found	-----
NP-237	86.48	55	12.60*	2.051E+00	1.321E+01	1.321E+01	115.17
	95.87	-----	2.60	2.347E+00	-----	Line Not Found	-----
U-238	63.29	9	3.80*	1.063E+00	1.385E+01	1.385E+01	1042.42

Flag: "*" = Keyline

Total number of lines in spectrum 36
 Number of unidentified lines 20
 Number of lines tentatively identified by NID 16 44.44%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
NA-22	2.60Y	1.00	1.376E+00	1.381E+00	1.328E+00	96.19	
K-40	1.28E+09Y	1.00	2.375E+01	2.375E+01	3.074E+01	129.42	
CE-141	32.50D	1.09	4.239E-01	4.627E-01	47.02E-01	1016.17	
BI-211	7.04E+08Y	1.00	1.258E+00	1.258E+00	16.49E+00	1311.07	
PB-212	1.91Y	1.00	3.000E+00	3.013E+00	4.989E+00	165.60	
BI-214	1600.00Y	1.00	1.035E-01	1.035E-01	50.78E-01	4906.54	
RA-226	1600.00Y	1.00	1.035E-01	1.035E-01	50.78E-01	4906.54	
TH-228	1.91Y	1.00	3.000E+00	3.013E+00	4.989E+00	165.60	
TH-230	7.70E+04Y	1.00	1.035E-01	1.035E-01	50.78E-01	4906.54	
PA-234M	4.47E+09Y	1.00	5.116E+02	5.116E+02	3.618E+02	70.71	
U-235	7.04E+08Y	1.00	1.954E+00	1.954E+00	19.86E+00	1016.28	
NP-237	2.14E+06Y	1.00	1.321E+01	1.321E+01	1.521E+01	115.17	
U-238	4.47E+09Y	1.00	1.385E+01	1.385E+01	14.44E+01	1042.42	
Total Activity :			5.737E+02	5.738E+02			

Grand Total Activity : 5.737E+02 5.738E+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	54.07	56	252	2.30	108.92	105	9	2.60E-03	****	5.72E-01	
0	198.47	65	254	1.82	397.23	393	9	3.00E-03	91.8	2.26E+00	T
0	374.38	38	105	0.78	748.47	743	10	1.77E-03	****	1.56E+00	
0	583.38	10	79	3.29	1165.84	1161	11	4.43E-04	****	1.16E+00	T
0	673.83	24	67	6.12	1346.49	1340	15	1.11E-03	****	1.04E+00	
0	942.83	5	15	1.21	1883.75	1883	5	2.31E-04	****	7.92E-01	T
0	1008.99	17	11	1.46	2015.91	2012	7	7.64E-04	81.6	7.48E-01	
0	1043.53	9	13	1.23	2084.90	2080	8	3.99E-04	****	7.27E-01	
0	1254.39	8	12	0.94	2506.12	2503	5	3.56E-04	****	6.24E-01	
0	1315.43	13	9	1.64	2628.08	2625	9	6.02E-04	****	6.02E-01	
0	1360.00	1	14	0.71	2717.11	2713	8	2.69E-05	****	5.87E-01	
0	1401.63	13	26	0.47	2800.29	2791	16	6.15E-04	****	5.74E-01	
3	1449.61	17	8	3.28	2896.16	2890	46	7.65E-04	****	5.61E-01	
0	1544.64	4	13	5.87	3086.03	3078	14	1.84E-04	****	5.39E-01	
0	1550.60	8	15	0.67	3097.94	3091	10	3.70E-04	****	5.38E-01	
0	1587.41	1	19	0.67	3171.49	3168	11	5.44E-05	****	5.31E-01	
0	1595.24	8	25	7.79	3187.13	3182	20	3.48E-04	****	5.30E-01	T
0	1624.45	12	20	0.67	3245.50	3239	20	5.56E-04	****	5.25E-01	
0	1635.67	17	11	3.82	3267.91	3260	15	7.83E-04	99.1	5.23E-01	
0	1768.12	8	4	0.90	3532.58	3531	5	3.67E-04	****	5.06E-01	
1	1776.84	19	10	2.65	3550.00	3539	42	8.69E-04	90.4	5.05E-01	
1	1781.34	18	12	2.65	3559.00	3539	42	8.38E-04	93.1	5.05E-01	
0	1845.11	11	3	1.81	3686.43	3684	6	4.96E-04	80.3	5.00E-01	
0	1891.09	23	13	8.34	3778.32	3769	25	1.06E-03	93.5	4.97E-01	

Flags: "T" = Tentatively associated

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076443.CNF;1
* Acquisition date   : 24-APR-2006 23:31:53  Detector SN#      : 12922955
* Detector ID        : GAMMA3                 Sensitivity        : 3.00000
* Geometry           : 2L_MB                  Energy tolerance     : 2.00000
* Elapsed live time  : 0 06:00:00.00         Abundance limit     : 75.00000
* Elapsed real time  : 0 06:00:02.00         Half life ratio     : 8.00000
*****
*                                     SAMPLE DATA                                   *
*
* Sample date        : 21-APR-2006 00:00:00  Nuclide Library   : EPI
* Sample ID          : G1201076443          Analyst initials    : MJH1
* Batch Number       : 523017              Sample Quantity    : 2.00000E+00 LITER
*****
*                                     QC DATA                                       *
*
* CALIB. DATE/TIME  : 25-MAR-2006 12:15:10.6MS Isotope       :
* MSD DPM           :                      MSD Isotope        :
* LCS DPM           :                      LCS Isotope         :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
NA-22	1.381E+00	1.328E+00	2.576E+00	1.658E-01	0.536
K-40	2.375E+01	3.074E+01	2.711E+01	1.781E+00	0.876
BI-211	1.258E+00	1.649E+01	1.624E+01	1.205E+00	0.077
PB-212	3.013E+00	4.989E+00	4.438E+00	3.983E-01	0.679
BI-214	1.035E-01	5.078E+00	6.043E+00	4.907E-01	0.017
RA-226	1.035E-01	5.078E+00	6.043E+00	4.907E-01	0.017
TH-228	3.013E+00	4.989E+00	4.437E+00	3.983E-01	0.679
TH-230	1.035E-01	5.078E+00	6.043E+00	4.906E-01	0.017
PA-234M	5.116E+02	3.618E+02	3.091E+02	3.067E+01	1.655
U-235	1.954E+00	1.986E+01	1.676E+01	2.801E+00	0.117
NP-237	1.321E+01	1.521E+01	1.662E+01	4.242E+00	0.795
U-238	1.385E+01	1.444E+02	1.010E+02	2.200E+01	0.137

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

Nuclide	Key-Line Activity K.L. (pCi/LITER)Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	5.990E-01	1.273E+01	2.183E+01	1.584E+00	0.027

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
NA-24	-4.406E+01		1.590E+02	2.788E+02	1.854E+01	-0.158
AL-26	-1.373E-01		1.418E+00	2.660E+00	1.573E-01	-0.052
SC-46	6.106E-01		1.559E+00	2.843E+00	2.602E-01	0.215
V-48	-1.552E+00		1.909E+00	3.041E+00	2.653E-01	-0.510
CR-51	4.696E+00		1.272E+01	2.259E+01	1.762E+00	0.208
MN-54	1.358E+00		1.591E+00	2.985E+00	2.495E-01	0.455
CO-56	9.941E-01		1.659E+00	3.052E+00	2.603E-01	0.326
CO-57	7.765E-01		1.243E+00	2.149E+00	1.352E-01	0.361
CO-58	-1.338E+00		1.484E+00	2.388E+00	1.921E-01	-0.560
FE-59	6.866E-01		2.751E+00	5.186E+00	4.373E-01	0.132
CO-60	-9.819E-01		1.465E+00	2.450E+00	1.509E-01	-0.401
ZN-65	-8.911E-01		3.320E+00	5.035E+00	3.767E-01	-0.177
SE-75	-1.220E+00		1.989E+00	3.359E+00	2.598E-01	-0.363
KR-85	-2.642E+03		5.957E+02	7.320E+02	4.672E+01	-3.610
SR-85	-1.206E+01		2.719E+00	3.342E+00	2.133E-01	-3.610
Y-88	3.725E-01		1.677E+00	3.228E+00	1.895E-01	0.115
Y-91	-5.270E-01		1.326E+00	2.314E+00	1.468E-01	-0.228
NB-94	1.257E+00		1.490E+00	2.792E+00	1.841E-01	0.450
NB-95	5.786E-01		1.545E+00	2.820E+00	2.089E-01	0.205
NB-95M	-4.289E+00		1.115E+01	1.679E+01	1.554E+00	-0.255
ZR-95	3.264E-01		2.468E+00	4.450E+00	3.694E-01	0.073
MO-99	-1.828E+00		4.118E+00	5.947E+00	4.086E-01	-0.307
RU-103	-6.938E-01		1.508E+00	2.474E+00	3.197E-01	-0.280
RH-106	-2.324E+00		1.295E+01	2.284E+01	1.420E+00	-0.102
RU-106	-3.052E+00		1.299E+01	2.280E+01	2.724E+00	-0.134
AG-108M	-4.942E-01		1.527E+00	2.557E+00	1.737E-01	-0.193
CD-109	1.001E+01		3.305E+01	5.715E+01	8.688E+00	0.175
AG-110M	-5.723E-01		1.510E+00	2.602E+00	1.682E-01	-0.220
SN-113	-1.931E-01		2.044E+00	3.487E+00	2.305E-01	-0.055
CD-115	-3.495E+00		1.477E+01	2.472E+01	1.576E+00	-0.141
SN-115	6.655E+01		1.289E+02	2.361E+02	2.144E+01	0.282
SN-117M	2.904E-01		1.568E+00	2.626E+00	1.950E-01	0.111
TE-123M	3.991E-01		1.347E+00	2.267E+00	1.701E-01	0.176
SB-124	-9.515E-01		3.347E+00	5.832E+00	3.837E-01	-0.163
SB-125	-7.372E-01		4.181E+00	7.086E+00	4.642E-01	-0.104
TE-125M	1.790E+02		3.953E+02	6.818E+02	7.178E+01	0.263
I-126	-1.015E+00		4.363E+00	7.604E+00	4.675E-01	-0.134
SB-126	3.521E-01		3.415E+00	6.086E+00	4.149E-01	0.058
SN-126	2.762E-01		3.707E+00	5.695E+00	8.629E-01	0.048
SB-127	2.937E+00		7.915E+00	1.449E+01	1.019E+00	0.203
I-131	1.081E+00		2.232E+00	3.949E+00	2.853E-01	0.274
TE-132	-1.051E+00		3.066E+00	5.291E+00	7.339E-01	-0.199
BA-133	-2.204E+00		2.473E+00	3.429E+00	4.149E-01	-0.643
I-133	2.428E+01		3.649E+01	6.595E+01	4.729E+00	0.368
CS-134	6.365E-01		1.643E+00	3.011E+00	2.369E-01	0.211
CS-135	2.696E+00		7.314E+00	1.299E+01	1.189E+00	0.208
CS-136	1.774E+00		2.449E+00	4.757E+00	4.067E-01	0.373
BA-137M	-7.845E-01		1.560E+00	2.661E+00	1.621E-01	-0.295

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CS-137	-8.217E-01		1.650E+00	2.815E+00	1.721E-01	-0.292
CE-139	-1.287E-01		1.464E+00	2.411E+00	1.864E-01	-0.053
BA-140	1.725E-01		6.050E+00	1.091E+01	3.558E+00	0.016
LA-140	1.161E+00	+	3.885E+00	4.069E+00	2.524E-01	0.285
CE-141	4.627E-01		4.702E+00	4.359E+00	3.105E-01	0.106
CE-143	-1.830E+01		2.365E+01	3.885E+01	8.013E+00	-0.471
CE-144	-3.378E+00		1.016E+01	1.671E+01	2.427E+00	-0.202
PM-144	-2.641E-01		1.517E+00	2.644E+00	1.723E-01	-0.100
PM-146	-1.056E+00		2.042E+00	3.354E+00	3.021E-01	-0.315
ND-147	4.147E+00		1.161E+01	2.144E+01	2.954E+00	0.193
PM-147	4.676E+05		2.646E+06	4.489E+06	2.882E+05	0.104
PM-149	-1.311E+01		1.406E+02	2.433E+02	3.640E+01	-0.054
EU-152	-1.990E+00		4.503E+00	7.574E+00	5.756E-01	-0.263
GD-153	-1.868E+00		3.662E+00	6.070E+00	7.210E-01	-0.308
EU-154	3.879E+00	+	3.741E+00	8.202E+00	7.989E-01	0.473
EU-155	4.381E+00		5.112E+00	8.985E+00	8.881E-01	0.488
TB-160	1.059E+00		5.264E+00	9.476E+00	8.533E-01	0.112
TM-171	-9.783E+02		1.372E+03	2.021E+03	2.953E+02	-0.484
HF-181	-2.426E-01		1.614E+00	2.725E+00	1.739E-01	-0.089
TA-182	6.162E+00		5.967E+00	1.203E+01	7.969E-01	0.512
IR-192	-6.450E-01		1.379E+00	2.330E+00	1.706E-01	-0.277
HG-203	8.681E-01		1.646E+00	2.938E+00	2.317E-01	0.295
BI-207	1.714E+00		2.281E+00	4.395E+00	3.526E-01	0.390
TL-208	6.153E-01	+	2.993E+00	3.374E+00	2.406E-01	0.182
BI-210	1.581E+02		2.743E+02	4.466E+02	4.439E+01	0.354
PB-210	1.581E+02		2.743E+02	4.466E+02	4.439E+01	0.354
PB-211	-3.733E+01		4.918E+01	6.998E+01	4.366E+01	-0.533
BI-212	3.861E-01		1.301E+01	2.298E+01	1.970E+00	0.017
PB-214	4.375E-01	+	5.736E+00	6.184E+00	5.607E-01	0.071
RN-219	1.301E+00		1.893E+01	3.269E+01	4.515E+00	0.040
RA-223	-7.485E+00		3.089E+01	5.273E+01	9.000E+00	-0.142
RA-224	4.453E+01		3.502E+01	5.787E+01	4.496E+00	0.769
AC-227	-1.578E+00		1.851E+01	3.222E+01	4.840E+00	-0.049
TH-227	-1.555E+00		1.824E+01	3.175E+01	5.604E+00	-0.049
AC-228	5.433E+00		5.936E+00	1.116E+01	1.306E+00	0.487
RA-228	5.433E+00		5.936E+00	1.116E+01	1.306E+00	0.487
TH-229	1.407E+01		2.430E+01	4.122E+01	3.204E+00	0.341
PA-231	-5.063E+01		7.447E+01	1.243E+02	1.817E+01	-0.407
TH-231	-2.811E+00		8.913E+00	1.528E+01	1.351E+00	-0.184
TH-232	3.000E+00	+	4.968E+00	5.800E+00	5.206E-01	0.517
PA-233	1.075E+00		3.035E+00	5.374E+00	4.101E-01	0.200
PA-234	-7.223E-01		1.494E+01	2.244E+01	4.250E+00	-0.032
TH-234	1.385E+01	+	1.444E+02	1.356E+02	2.954E+01	0.102
U-234	1.657E+00		6.405E+00	1.126E+01	1.099E+00	0.147
NP-239	1.941E+00		9.300E+00	1.584E+01	1.151E+00	0.122
AM-241	1.078E+00		8.553E+00	1.347E+01	2.160E+00	0.080
AM-242	-4.671E+01		1.051E+02	1.745E+02	1.777E+01	-0.268
CM-247	1.028E+00		1.651E+00	2.959E+00	1.857E-01	0.347

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CF-249	-4.720E-01		1.985E+00	3.355E+00	2.118E-01	-0.141
CF-251	-1.105E+00		6.632E+00	1.085E+01	8.398E-01	-0.102
ANH-511	2.054E+01		2.801E+00	5.345E+00	3.411E-01	3.842

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*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G1201076443
*   ANALYST       : MJH1           DETECTOR    : GAMMA3
*   SAMPLE DATE   : 21-APR-2006 00:00:00.00  COUNT TIME : 0 06:00:00.00
*   ANALYSIS DATE: 24-APR-2006 23:31:53.95  SAMPLE ALQT: 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 5.168E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 7.676E+01
GROSS GAMMA MDA     (pCi/LITER ) : 2.180E+02
GROSS GAMMA DLC     (pCi/LITER ) : 1.048E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 10:13:45.08

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076444.CNF;1
Sample date        : 20-MAR-2006 08:00:00 Acquisition date : 25-APR-2006 06:13:16
Sample ID          : G1201076444 Sample quantity      : 2.00000E+00 LITER
Detector name     : GAMMA3 Detector geometry        : 2L_MB
Elapsed live time : 0 04:00:00.00 Elapsed real time: 0 04:00:01.45 0.0%
Energy tolerance  : 2.00000 KEV Analyst Initials    : MJH1
Abundance limit   : 75.00000 Sensitivity          : 3.00000
Batch ID          : 523017 Detector SN#          : 12922955
Matrix Spike DPM  : LCS DPM                          :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.23*	16	213	1.06	93.27	91	8	1.09E-03	178.7	
2	3	63.24*	28	259	1.51	127.22	122	15	1.92E-03	133.1	2.56E+00
3	3	65.13	51	229	1.14	131.00	122	15	3.53E-03	52.9	
4	0	139.76*	11	239	0.70	280.00	278	7	7.44E-04	264.7	
5	0	185.86*	1	299	1.13	372.05	367	11	8.55E-05	*****	
6	0	198.24	49	195	0.66	396.77	394	8	3.38E-03	51.8	
7	0	238.65*	17	203	1.15	477.44	472	10	1.17E-03	182.2	
8	0	263.14	28	110	1.82	526.35	524	8	1.92E-03	68.4	
9	0	337.26*	12	70	2.81	674.35	670	9	8.11E-04	182.4	
10	0	352.04*	31	69	1.07	703.86	701	8	2.19E-03	56.3	
11	0	374.24	19	26	0.92	748.20	746	5	1.35E-03	45.0	
12	0	465.02	23	34	1.82	929.47	926	7	1.59E-03	47.4	
13	0	503.22	28	25	1.67	1005.76	1003	7	1.94E-03	35.0	
14	0	583.08*	7	59	0.73	1165.23	1161	10	4.66E-04	269.7	
15	0	595.45*	34	41	3.07	1189.94	1184	13	2.36E-03	50.6	
16	0	608.35*	6	66	1.41	1215.70	1212	12	4.50E-04	286.1	
17	0	633.20	13	22	1.42	1265.33	1264	8	8.75E-04	68.7	
18	0	822.80	16	47	5.47	1644.01	1637	17	1.11E-03	101.3	
19	0	843.28*	13	30	4.95	1684.90	1679	12	8.97E-04	97.7	
20	0	888.06	15	24	4.91	1774.35	1769	12	1.02E-03	71.5	
21	0	914.26*	24	49	7.34	1826.69	1816	22	1.68E-03	79.9	
22	0	936.25	24	15	3.70	1870.61	1865	11	1.64E-03	40.5	
23	0	961.51*	4	12	1.13	1921.06	1917	7	2.57E-04	228.5	
24	0	1014.92*	14	12	0.70	2027.74	2024	9	9.93E-04	62.1	
25	0	1021.46	13	19	3.33	2040.81	2036	11	9.11E-04	70.2	
26	0	1080.02	39	0	3.41	2157.79	2150	17	2.71E-03	16.0	
27	0	1120.10*	29	5	6.86	2237.86	2227	22	1.99E-03	31.1	
28	0	1139.69*	15	28	5.36	2276.99	2271	16	1.03E-03	87.5	
29	0	1274.10	14	15	1.04	2545.50	2542	13	9.52E-04	66.0	
30	0	1286.17*	1	5	1.25	2569.62	2568	6	6.98E-05	758.5	
31	0	1318.15	10	7	1.16	2633.50	2630	7	6.94E-04	54.1	
32	0	1362.18*	9	8	1.04	2721.48	2716	11	6.55E-04	93.3	
33	3	1438.16	18	10	3.28	2873.28	2861	46	1.23E-03	50.9	8.86E-01
34	3	1445.35*	21	10	3.28	2887.63	2861	46	1.45E-03	47.9	
35	0	1460.96*	30	28	1.62	2918.83	2911	17	2.10E-03	50.6	
36	0	1498.52	20	10	0.65	2993.87	2986	19	1.35E-03	44.2	
37	0	1555.55*	1	2	1.48	3107.83	3104	7	7.74E-05	467.8	
38	0	1611.62	16	26	3.30	3219.86	3211	26	1.08E-03	93.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1637.58	18	4	6.82	3271.72	3264	16	1.28E-03	33.5	
40	0	1717.98	16	15	10.57	3432.38	3412	31	1.09E-03	78.4	
41	0	1754.51	13	17	4.74	3505.38	3497	17	9.03E-04	77.8	
42	0	1927.66	36	22	17.82	3851.41	3829	43	2.47E-03	47.8	
43	0	1951.08	12	13	5.39	3898.21	3879	26	8.33E-04	87.2	
44	0	2039.92	10	13	3.10	4075.75	4065	26	6.94E-04	103.7	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                         *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076444
* Acquisition date   : 25-APR-2006 06:13:16 Detector SN#      : 12922955
* Detector ID       : GAMMA3                      Sensitivity    : 3.000
* Geometry          : 2L_MB                       Energy tolerance: 2.000
* Elapsed live time : 0 04:00:00.00              Abundance limit : 75.000
* Elapsed real time : 0 04:00:01.45              Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                           *
*
* Sample date       : 20-MAR-2006 08:00:00 Nuclide Library :
* Sample ID        : G1201076444                   Analyst initials: MJH1
* Batch Number     : 523017                        Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000                       Carrier Weight  : 0.00000
*****
*                               QC DATA                                               *
*
* Standard Weight  : 0.00000
* CALIB. DATE/TIME : 25-MAR-2006 12:15:10 MS Isotope      :
* MSD DPM          : 0.000                          MSD Isotope     :
* LCS DPM          : 0.000                          LCS Isotope     :
* LCSD DPM        : 0.000                          LCSD Isotope    :
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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
NA-22	2.143E+00	2.832E+00	4.239E+00	0.000E+00
K-40	4.756E+01	4.822E+01	3.106E+01	0.000E+00
SC-46	2.237E+00	3.203E+00	4.589E+00	0.000E+00
BI-210	1.543E+02	5.519E+02	5.784E+02	0.000E+00
PB-210	1.543E+02	5.519E+02	5.784E+02	0.000E+00
BI-211	1.409E+01	1.591E+01	2.112E+01	0.000E+00
BI-214	1.168E+00	6.685E+00	6.930E+00	0.000E+00
RA-226	1.168E+00	6.685E+00	6.930E+00	0.000E+00
TH-228	1.802E+00	6.567E+00	6.590E+00	0.000E+00
TH-230	1.168E+00	6.685E+00	6.930E+00	0.000E+00
U-238	6.386E+01	1.705E+02	1.570E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	-3.712E+00	2.577E+01	4.378E+01	0.000E+00 NOT IDENT.
NA-24	0.000E+00	4.710E+17	0.000E+00	0.000E+00 SHORT HLIF
AL-26	-1.709E+00	1.774E+00	2.814E+00	0.000E+00 NOT IDENT.
V-48	-4.248E+00	9.115E+00	1.527E+01	0.000E+00 NOT IDENT.
CR-51	2.301E+01	3.664E+01	6.686E+01	0.000E+00 NOT IDENT.
MN-54	-4.903E-01	2.012E+00	3.501E+00	0.000E+00 NOT IDENT.
CO-56	9.733E-01	2.979E+00	4.828E+00	0.000E+00 NOT IDENT.
MN-56	0.000E+00	3.065E+41	0.000E+00	0.000E+00 SHORT HLIF
CO-57	-4.406E-01	1.897E+00	3.162E+00	0.000E+00 NOT IDENT.
CO-58	-1.529E+00	2.612E+00	4.370E+00	0.000E+00 NOT IDENT.
FE-59	-2.313E+00	6.747E+00	1.194E+01	0.000E+00 NOT IDENT.
CO-60	-1.049E-01	2.238E+00	4.089E+00	0.000E+00 NOT IDENT.
ZN-65	-7.514E-01	4.645E+00	7.261E+00	0.000E+00 NOT IDENT.
SE-75	2.768E+00	3.795E+00	5.645E+00	0.000E+00 FAIL ABUN
KR-85	-1.702E+03	6.436E+02	8.806E+02	0.000E+00 NOT IDENT.
SR-85	-1.087E+01	4.109E+00	5.622E+00	0.000E+00 NOT IDENT.

Y-88	-1.416E+00	2.146E+00	3.670E+00	0.000E+00	NOT IDENT.
Y-91	-7.732E-01	2.507E+00	4.434E+00	0.000E+00	NOT IDENT.
NB-94	7.535E-01	1.869E+00	3.460E+00	0.000E+00	NOT IDENT.
NB-95	3.524E+00	3.684E+00	7.200E+00	0.000E+00	NOT IDENT.
NB-95M	0.000E+00	7.111E+03	0.000E+00	0.000E+00	SHORT HLIF
ZR-95	1.433E+00	4.636E+00	8.599E+00	0.000E+00	NOT IDENT.
MO-99	0.000E+00	2.179E+04	0.000E+00	0.000E+00	SHORT HLIF
TC-99M	0.000E+00	5.335E+41	0.000E+00	0.000E+00	SHORT HLIF
RU-103	6.058E-01	3.611E+00	6.292E+00	0.000E+00	FAIL ABUN
RH-106	-7.380E-01	1.781E+01	3.209E+01	0.000E+00	NOT IDENT.
RU-106	4.895E+00	1.735E+01	3.224E+01	0.000E+00	NOT IDENT.
AG-108M	2.364E-01	1.898E+00	3.326E+00	0.000E+00	NOT IDENT.
CD-109	3.538E+01	5.110E+01	8.959E+01	0.000E+00	NOT IDENT.
AG-110M	-5.047E-01	1.889E+00	3.330E+00	0.000E+00	FAIL ABUN
SN-113	-1.806E+00	3.095E+00	5.122E+00	0.000E+00	NOT IDENT.
CD-115	0.000E+00	3.844E+05	0.000E+00	0.000E+00	SHORT HLIF
SN-115	-6.439E+01	3.230E+02	4.770E+02	0.000E+00	NOT IDENT.
SN-117M	1.043E+01	1.076E+01	1.881E+01	0.000E+00	NOT IDENT.
TE-123M	1.696E+00	2.172E+00	3.766E+00	0.000E+00	NOT IDENT.
SB-124	1.225E+00	5.599E+00	1.097E+01	0.000E+00	NOT IDENT.
SB-125	-5.515E-01	5.856E+00	1.003E+01	0.000E+00	FAIL ABUN
TE-125M	4.449E+02	8.549E+02	1.480E+03	0.000E+00	NOT IDENT.
I-126	4.355E+00	2.898E+01	5.299E+01	0.000E+00	NOT IDENT.
SB-126	-6.135E+00	2.233E+01	3.923E+01	0.000E+00	NOT IDENT.
SN-126	1.342E+00	4.998E+00	8.640E+00	0.000E+00	FAIL ABUN
SB-127	0.000E+00	3.025E+03	0.000E+00	0.000E+00	SHORT HLIF
I-131	-1.623E+01	4.115E+01	6.958E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	6.921E+41	0.000E+00	0.000E+00	SHORT HLIF
TE-132	0.000E+00	3.289E+03	0.000E+00	0.000E+00	SHORT HLIF
BA-133	1.805E+00	3.002E+00	4.835E+00	0.000E+00	NOT IDENT.
I-133	0.000E+00	5.891E+12	0.000E+00	0.000E+00	SHORT HLIF
CS-134	1.461E+00	2.100E+00	4.050E+00	0.000E+00	NOT IDENT.
CS-135	7.835E+00	9.498E+00	1.742E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	1.772E+40	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-7.080E+00	1.483E+01	2.613E+01	0.000E+00	FAIL ABUN
BA-137M	-2.847E-01	1.747E+00	3.118E+00	0.000E+00	NOT IDENT.
CS-137	-3.010E-01	1.847E+00	3.296E+00	0.000E+00	NOT IDENT.
CE-139	-1.868E+00	2.334E+00	3.700E+00	0.000E+00	NOT IDENT.
BA-140	-7.418E+00	4.652E+01	8.306E+01	0.000E+00	NOT IDENT.
LA-140	-1.793E+00	1.515E+01	2.754E+01	0.000E+00	NOT IDENT.
CE-141	-9.106E+00	7.062E+00	1.096E+01	0.000E+00	NOT IDENT.
CE-143	0.000E+00	2.870E+08	0.000E+00	0.000E+00	SHORT HLIF
CE-144	-7.634E+00	1.537E+01	2.508E+01	0.000E+00	NOT IDENT.
PM-144	1.083E+00	1.886E+00	3.568E+00	0.000E+00	NOT IDENT.
PR-144	0.000E+00	1.741E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	-3.586E-01	2.473E+00	4.231E+00	0.000E+00	FAIL ABUN
ND-147	1.700E+01	1.181E+02	2.168E+02	0.000E+00	NOT IDENT.
PM-147	2.357E+05	3.820E+06	6.462E+06	0.000E+00	NOT IDENT.
PM-149	0.000E+00	3.907E+06	0.000E+00	0.000E+00	SHORT HLIF
EU-152	1.042E+00	6.057E+00	1.066E+01	0.000E+00	FAIL ABUN
GD-153	2.498E+00	5.694E+00	9.892E+00	0.000E+00	NOT IDENT.
EU-154	5.922E+00	7.837E+00	1.195E+01	0.000E+00	FAIL ABUN
EU-155	-1.327E+00	7.480E+00	1.259E+01	0.000E+00	NOT IDENT.
TB-160	4.569E+00	8.709E+00	1.660E+01	0.000E+00	FAIL ABUN
TM-171	2.669E+03	2.851E+03	3.642E+03	0.000E+00	FAIL ABUN
HF-181	1.694E+00	3.521E+00	6.326E+00	0.000E+00	FAIL ABUN
TA-182	1.045E-01	1.006E+01	1.852E+01	0.000E+00	FAIL ABUN
IR-192	-1.550E-01	2.534E+00	4.417E+00	0.000E+00	NOT IDENT.
HG-203	2.030E+00	3.416E+00	6.188E+00	0.000E+00	NOT IDENT.
BI-207	-4.290E-01	2.510E+00	4.586E+00	0.000E+00	NOT IDENT.
TL-208	6.679E-01	3.604E+00	4.594E+00	0.000E+00	FAIL ABUN
PB-211	3.320E+01	5.795E+01	9.834E+01	0.000E+00	NOT IDENT.
BI-212	1.083E+01	1.573E+01	2.999E+01	0.000E+00	NOT IDENT.
PB-212	1.802E+00	6.567E+00	7.918E+00	0.000E+00	FAIL ABUN
PB-214	4.902E+00	5.539E+00	8.242E+00	0.000E+00	FAIL ABUN
RN-219	1.273E+01	2.356E+01	4.259E+01	0.000E+00	NOT IDENT.
RA-223	-2.095E+01	3.835E+01	6.425E+01	0.000E+00	FAIL ABUN
RA-224	5.060E+01	4.690E+01	7.792E+01	0.000E+00	NOT IDENT.
AC-227	-1.995E-02	2.531E+01	4.443E+01	0.000E+00	NOT IDENT.
TH-227	-1.960E-02	2.487E+01	4.366E+01	0.000E+00	NOT IDENT.
AC-228	6.832E+00	7.769E+00	1.365E+01	0.000E+00	FAIL ABUN
RA-228	6.832E+00	7.769E+00	1.365E+01	0.000E+00	FAIL ABUN
TH-229	1.355E+01	3.433E+01	5.793E+01	0.000E+00	NOT IDENT.
PA-231	2.550E+01	9.363E+01	1.669E+02	0.000E+00	NOT IDENT.
TH-231	7.490E+00	1.117E+01	2.034E+01	0.000E+00	FAIL ABUN
TH-232	1.738E+00	6.336E+00	7.635E+00	0.000E+00	FAIL ABUN
PA-233	1.094E-01	3.978E+00	6.968E+00	0.000E+00	NOT IDENT.
PA-234	1.482E+00	1.404E+01	2.572E+01	0.000E+00	FAIL ABUN

PA-234M	3.693E+02	2.466E+02	5.039E+02	0.000E+00	NOT IDENT.
TH-234	6.386E+01	1.705E+02	1.924E+02	0.000E+00	FAIL ABUN
U-234	5.946E+00	8.039E+00	1.467E+01	0.000E+00	FAIL ABUN
U-235	8.573E+00	1.496E+01	2.557E+01	0.000E+00	FAIL ABUN
NP-237	-1.284E+01	1.539E+01	2.469E+01	0.000E+00	NOT IDENT.
NP-239	-1.073E+01	1.338E+01	2.166E+01	0.000E+00	NOT IDENT.
AM-241	-2.228E+00	1.250E+01	1.933E+01	0.000E+00	NOT IDENT.
AM-242	-2.949E+01	1.516E+02	2.552E+02	0.000E+00	NOT IDENT.
CM-247	-7.538E-01	2.208E+00	3.724E+00	0.000E+00	NOT IDENT.
CF-249	3.957E-01	2.294E+00	4.047E+00	0.000E+00	NOT IDENT.
CF-251	6.381E+00	8.610E+00	1.484E+01	0.000E+00	NOT IDENT.
ANH-511	0.000E+00	2.941E+00	5.926E+00	0.000E+00	NOT IDENT.


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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076444.CNF;1
Sample date        : 20-MAR-2006 08:00:00 Acquisition date : 25-APR-2006 06:13:16
Sample ID         : G1201076444 Sample quantity : 2.00000E+00 LITER
Detector name     : GAMMA3 Detector geometry: 2L_MB
Elapsed live time: 0 04:00:00.00 Elapsed real time: 0 04:00:01.45 0.0%
Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
Abundance limit  : 75.00000 Sensitivity : 3.00000
Batch ID         : 523017 Detector SN# : 12922955
Matrix Spike DPM : LCS DPM :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.23	37	213	1.06	93.27	91	8	2.55E-03	70.7	
2	3	63.24	121	259	1.51	127.22	122	15	8.41E-03	26.8	2.56E+00
3	3	65.13	51	229	1.14	131.00	122	15	3.53E-03	52.9	
4	0	92.66	272	391	1.14	185.96	181	11	1.89E-02	15.4	
5	0	139.76	26	239	0.70	280.00	278	7	1.80E-03	100.3	
6	0	185.86	151	299	1.13	372.05	367	11	1.05E-02	23.7	
7	0	198.24	49	195	0.66	396.77	394	8	3.38E-03	51.8	
8	0	238.65	82	203	1.15	477.44	472	10	5.71E-03	34.2	
9	0	263.14	28	110	1.82	526.35	524	8	1.92E-03	68.4	
10	0	337.26	57	70	2.81	674.35	670	9	3.95E-03	29.6	
11	0	352.04	48	69	1.07	703.86	701	8	3.31E-03	33.4	
12	0	374.24	19	26	0.92	748.20	746	5	1.35E-03	45.0	
13	0	465.02	23	34	1.82	929.47	926	7	1.59E-03	47.4	
14	0	503.22	28	25	1.67	1005.76	1003	7	1.94E-03	35.0	
15	0	511.51	283	68	2.74	1022.30	1015	21	1.97E-02	9.9	
16	0	583.08	31	59	0.73	1165.23	1161	10	2.13E-03	50.5	
17	0	595.45	55	41	3.07	1189.94	1184	13	3.80E-03	27.9	
18	0	608.35	33	66	1.41	1215.70	1212	12	2.29E-03	52.2	
19	0	633.20	13	22	1.42	1265.33	1264	8	8.75E-04	68.7	
20	0	822.80	16	47	5.47	1644.01	1637	17	1.11E-03	101.3	
21	0	843.28	21	30	4.95	1684.90	1679	12	1.46E-03	56.5	
22	0	888.06	15	24	4.91	1774.35	1769	12	1.02E-03	71.5	
23	0	914.26	31	49	7.34	1826.69	1816	22	2.14E-03	60.8	
24	0	936.25	24	15	3.70	1870.61	1865	11	1.64E-03	40.5	
25	0	961.51	12	12	1.13	1921.06	1917	7	8.19E-04	57.2	
26	0	1014.92	16	12	0.70	2027.74	2024	9	1.08E-03	46.7	
27	0	1021.46	13	19	3.33	2040.81	2036	11	9.11E-04	70.2	
28	0	1080.02	39	0	3.41	2157.79	2150	17	2.71E-03	16.0	
29	0	1120.10	34	5	6.86	2237.86	2227	22	2.35E-03	24.6	
30	0	1139.69	23	28	5.36	2276.99	2271	16	1.56E-03	56.7	
31	0	1274.10	14	15	1.04	2545.50	2542	13	9.52E-04	66.0	
32	0	1286.17	6	5	1.25	2569.62	2568	6	4.23E-04	69.2	
33	0	1318.15	10	7	1.16	2633.50	2630	7	6.94E-04	54.1	
34	0	1362.18	13	8	1.04	2721.48	2716	11	9.03E-04	50.8	
35	3	1438.16	18	10	3.28	2873.28	2861	46	1.23E-03	50.9	8.86E-01
36	3	1445.35	28	10	3.28	2887.63	2861	46	1.93E-03	33.7	
37	0	1460.96	51	28	1.62	2918.83	2911	17	3.54E-03	28.1	
38	0	1498.52	20	10	0.65	2993.87	2986	19	1.35E-03	44.2	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1555.55	9	2	1.48	3107.83	3104	7	6.44E-04	40.4	
40	0	1611.62	16	26	3.30	3219.86	3211	26	1.08E-03	93.0	
41	0	1637.58	18	4	6.82	3271.72	3264	16	1.28E-03	33.5	
42	0	1717.98	16	15	10.57	3432.38	3412	31	1.09E-03	78.4	
43	0	1754.51	13	17	4.74	3505.38	3497	17	9.03E-04	77.8	
44	0	1927.66	36	22	17.82	3851.41	3829	43	2.47E-03	47.8	
45	0	1951.08	12	13	5.39	3898.21	3879	26	8.33E-04	87.2	
46	0	2039.92	10	13	3.10	4075.75	4065	26	6.94E-04	103.7	

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                   *
*                               Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076444.CNF;1
Sample date        : 20-MAR-2006 08:00:00 Acquisition date : 25-APR-2006 06:13:16
Sample ID          : G1201076444          Sample quantity  : 2.00000E+00 LITER
Detector name     : GAMMA3                Detector geometry: 2L_MB
Elapsed live time : 0 04:00:00.00        Elapsed real time: 0 04:00:01.45  0.0%
Energy tolerance  : 2.00000 KEV          Analyst Initials  : MJH1
Abundance limit   : 75.00000            Sensitivity       : 3.00000
Batch ID          : 523017                Detector SN#      : 12922955
Matrix Spike DPM :                        LCS DPM         :
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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
NA-22	1274.53	14	99.94*	6.166E-01	2.087E+00	2.143E+00	132.13
K-40	1460.81	30	10.67*	5.584E-01	4.756E+01	4.756E+01	101.40
SC-46	889.25	15	99.98*	8.333E-01	1.661E+00	2.237E+00	143.21
	1120.51	29	99.99	6.846E-01	3.922E+00	5.282E+00	62.71
BI-210	46.50	16	4.05*	2.361E-01	1.538E+02	1.543E+02	357.63
PB-210	46.50	16	4.05*	2.361E-01	1.538E+02	1.543E+02	357.63
BI-211	351.07	31	12.94*	1.620E+00	1.409E+01	1.409E+01	112.88
BI-214	609.31	6	46.30*	1.125E+00	1.168E+00	1.168E+00	572.28
	768.36	-----	5.04	9.393E-01	-----	Line Not Found	-----
	934.06	-----	3.21	7.985E-01	-----	Line Not Found	-----
	1120.29	29	15.10	6.846E-01	2.597E+01	2.597E+01	63.05
	1238.11	-----	5.94	6.307E-01	-----	Line Not Found	-----
	1377.67	-----	4.11	5.815E-01	-----	Line Not Found	-----
RA-226	295.21	-----	19.20	1.803E+00	-----	Line Not Found	-----
	351.92	31	37.20	1.620E+00	4.902E+00	4.902E+00	112.85
	609.31	6	46.30*	1.125E+00	1.168E+00	1.168E+00	572.28
TH-228	84.40	-----	1.21	2.044E+00	-----	Line Not Found	-----
	238.60	17	44.60*	2.043E+00	1.738E+00	1.802E+00	364.48
	300.10	-----	3.41	1.785E+00	-----	Line Not Found	-----
TH-230	295.21	-----	19.20	1.803E+00	-----	Line Not Found	-----
	351.92	31	37.20	1.620E+00	4.902E+00	4.902E+00	112.85
	609.31	6	46.30*	1.125E+00	1.168E+00	1.168E+00	572.28
U-238	63.29	28	3.80*	1.068E+00	6.386E+01	6.386E+01	266.99

Flag: "*" = Keyline

Total number of lines in spectrum 44
 Number of unidentified lines 24
 Number of lines tentatively identified by NID 20 45.45%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
NA-22	2.60Y	1.03	2.087E+00	2.143E+00	2.832E+00	132.13	
K-40	1.28E+09Y	1.00	4.756E+01	4.756E+01	4.822E+01	101.40	
SC-46	83.83D	1.35	1.661E+00	2.237E+00	3.203E+00	143.21	
BI-210	22.26Y	1.00	1.538E+02	1.543E+02	5.519E+02	357.63	
PB-210	22.26Y	1.00	1.538E+02	1.543E+02	5.519E+02	357.63	
BI-211	7.04E+08Y	1.00	1.409E+01	1.409E+01	1.591E+01	112.88	
BI-214	1600.00Y	1.00	1.168E+00	1.168E+00	6.685E+00	572.28	
RA-226	1600.00Y	1.00	1.168E+00	1.168E+00	6.685E+00	572.28	
TH-228	1.91Y	1.04	1.738E+00	1.802E+00	6.567E+00	364.48	
TH-230	7.70E+04Y	1.00	1.168E+00	1.168E+00	6.685E+00	572.28	
U-238	4.47E+09Y	1.00	6.386E+01	6.386E+01	17.05E+01	266.99	
Total Activity :			4.422E+02	4.438E+02			

Grand Total Activity : 4.422E+02 4.438E+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	139.76	11	239	0.70	280.00	278	7	7.44E-04	****	2.57E+00	T
0	185.86	1	299	1.13	372.05	367	11	8.55E-05	****	2.33E+00	T
0	198.24	49	195	0.66	396.77	394	8	3.38E-03	****	2.26E+00	T
0	263.14	28	110	1.82	526.35	524	8	1.92E-03	****	1.93E+00	T
0	337.26	12	70	2.81	674.35	670	9	8.11E-04	****	1.66E+00	T
0	374.24	19	26	0.92	748.20	746	5	1.35E-03	90.0	1.56E+00	
0	465.02	23	34	1.82	929.47	926	7	1.59E-03	94.7	1.36E+00	T
0	503.22	28	25	1.67	1005.76	1003	7	1.94E-03	70.0	1.29E+00	
0	583.08	7	59	0.73	1165.23	1161	10	4.66E-04	****	1.16E+00	T
0	595.45	34	41	3.07	1189.94	1184	13	2.36E-03	****	1.14E+00	
0	633.20	13	22	1.42	1265.33	1264	8	8.75E-04	****	1.09E+00	T
0	822.80	16	47	5.47	1644.01	1637	17	1.11E-03	****	8.88E-01	
0	843.28	13	30	4.95	1684.90	1679	12	8.97E-04	****	8.70E-01	
0	914.26	24	49	7.34	1826.69	1816	22	1.68E-03	****	8.13E-01	
0	936.25	24	15	3.70	1870.61	1865	11	1.64E-03	81.1	7.97E-01	T
0	961.51	4	12	1.13	1921.06	1917	7	2.57E-04	****	7.79E-01	T
0	1014.92	14	12	0.70	2027.74	2024	9	9.93E-04	****	7.44E-01	
0	1021.46	13	19	3.33	2040.81	2036	11	9.11E-04	****	7.40E-01	
0	1080.02	39	0	3.41	2157.79	2150	17	2.71E-03	32.0	7.06E-01	
0	1139.69	15	28	5.36	2276.99	2271	16	1.03E-03	****	6.75E-01	
0	1286.17	1	5	1.25	2569.62	2568	6	6.98E-05	****	6.12E-01	
0	1318.15	10	7	1.16	2633.50	2630	7	6.94E-04	****	6.01E-01	
0	1362.18	9	8	1.04	2721.48	2716	11	6.55E-04	****	5.86E-01	
3	1438.16	18	10	3.28	2873.28	2861	46	1.23E-03	****	5.64E-01	
3	1445.35	21	10	3.28	2887.63	2861	46	1.45E-03	95.8	5.62E-01	
0	1498.52	20	10	0.65	2993.87	2986	19	1.35E-03	88.3	5.49E-01	
0	1555.55	1	2	1.48	3107.83	3104	7	7.74E-05	****	5.37E-01	
0	1611.62	16	26	3.30	3219.86	3211	26	1.08E-03	****	5.27E-01	
0	1637.58	18	4	6.82	3271.72	3264	16	1.28E-03	67.1	5.23E-01	
0	1717.98	16	15	10.57	3432.38	3412	31	1.09E-03	****	5.12E-01	
0	1754.51	13	17	4.74	3505.38	3497	17	9.03E-04	****	5.07E-01	
0	1927.66	36	22	17.82	3851.41	3829	43	2.47E-03	95.6	4.96E-01	
0	1951.08	12	13	5.39	3898.21	3879	26	8.33E-04	****	4.95E-01	
0	2039.92	10	13	3.10	4075.75	4065	26	6.94E-04	****	4.94E-01	

Flags: "T" = Tentatively associated

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076444.CNF;1         *
* Acquisition date   : 25-APR-2006 06:13:16   Detector SN#      : 12922955           *
* Detector ID       : GAMMA3                   Sensitivity       : 3.00000             *
* Geometry         : 2L_MB                     Energy tolerance: 2.00000             *
* Elapsed live time: 0 04:00:00.00             Abundance limit  : 75.00000             *
* Elapsed real time: 0 04:00:01.45             Half life ratio   : 8.00000             *
*****
*                                     SAMPLE DATA                                   *
* Sample date       : 20-MAR-2006 08:00:00   Nuclide Library  : EPI                   *
* Sample ID        : G1201076444             Analyst initials  : MJH1                   *
* Batch Number     : 523017                   Sample Quantity  : 2.00000E+00 LITER         *
*****
*                                     QC DATA                                       *
* CALIB. DATE/TIME : 25-MAR-2006 12:15:10.6MS Isotope      :                   *
* MSD DPM          :                          MSD Isotope    :                   *
* LCS DPM          :                          LCS Isotope    :                   *
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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
NA-22	2.143E+00	2.832E+00	4.239E+00	2.727E-01	0.506
K-40	4.756E+01	4.822E+01	3.106E+01	2.040E+00	1.531
SC-46	2.237E+00	3.203E+00	4.589E+00	4.200E-01	0.487
BI-210	1.543E+02	5.519E+02	5.784E+02	5.749E+01	0.267
PB-210	1.543E+02	5.519E+02	5.784E+02	5.749E+01	0.267
BI-211	1.409E+01	1.591E+01	2.112E+01	1.568E+00	0.667
BI-214	1.168E+00	6.685E+00	6.930E+00	5.627E-01	0.169
RA-226	1.168E+00	6.685E+00	6.930E+00	5.627E-01	0.169
TH-228	1.802E+00	6.567E+00	6.590E+00	5.915E-01	0.273
TH-230	1.168E+00	6.685E+00	6.930E+00	5.627E-01	0.169
U-238	6.386E+01	1.705E+02	1.570E+02	3.420E+01	0.407

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

Nuclide	Key-Line Activity K.L. (pCi/LITER) Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	-3.712E+00	2.577E+01	4.378E+01	3.177E+00	-0.085

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
AL-26	-1.709E+00		1.774E+00	2.814E+00	1.664E-01	-0.607
V-48	-4.248E+00		9.115E+00	1.527E+01	1.332E+00	-0.278
CR-51	2.301E+01		3.664E+01	6.686E+01	5.215E+00	0.344
MN-54	-4.903E-01		2.012E+00	3.501E+00	2.927E-01	-0.140
CO-56	9.733E-01		2.979E+00	4.828E+00	4.118E-01	0.202
CO-57	-4.406E-01		1.897E+00	3.162E+00	1.989E-01	-0.139
CO-58	-1.529E+00		2.612E+00	4.370E+00	3.515E-01	-0.350
FE-59	-2.313E+00		6.747E+00	1.194E+01	1.008E+00	-0.194
CO-60	-1.049E-01		2.238E+00	4.089E+00	2.519E-01	-0.026
ZN-65	-7.514E-01		4.645E+00	7.261E+00	5.433E-01	-0.103
SE-75	2.768E+00	+	3.795E+00	5.645E+00	4.366E-01	0.490
KR-85	-1.702E+03		6.436E+02	8.806E+02	5.620E+01	-1.933
SR-85	-1.087E+01		4.109E+00	5.622E+00	3.588E-01	-1.933
Y-88	-1.416E+00		2.146E+00	3.670E+00	2.155E-01	-0.386
Y-91	-7.732E-01		2.507E+00	4.434E+00	2.814E-01	-0.174
NB-94	7.535E-01		1.869E+00	3.460E+00	2.281E-01	0.218
NB-95	3.524E+00		3.684E+00	7.200E+00	5.340E-01	0.489
ZR-95	1.433E+00		4.636E+00	8.599E+00	7.139E-01	0.167
RU-103	6.058E-01		3.611E+00	6.292E+00	8.132E-01	0.096
RH-106	-7.380E-01		1.781E+01	3.209E+01	1.995E+00	-0.023
RU-106	4.895E+00		1.735E+01	3.224E+01	3.853E+00	0.152
AG-108M	2.364E-01		1.898E+00	3.326E+00	2.259E-01	0.071
CD-109	3.538E+01		5.110E+01	8.959E+01	1.362E+01	0.395
AG-110M	-5.047E-01		1.889E+00	3.330E+00	2.152E-01	-0.152
SN-113	-1.806E+00		3.095E+00	5.122E+00	3.385E-01	-0.353
SN-115	-6.439E+01		3.230E+02	4.770E+02	4.331E+01	-0.135
SN-117M	1.043E+01		1.076E+01	1.881E+01	1.397E+00	0.555
TE-123M	1.696E+00		2.172E+00	3.766E+00	2.826E-01	0.450
SB-124	1.225E+00		5.599E+00	1.097E+01	7.215E-01	0.112
SB-125	-5.515E-01		5.856E+00	1.003E+01	6.572E-01	-0.055
TE-125M	4.449E+02		8.549E+02	1.480E+03	1.573E+02	0.301
I-126	4.355E+00		2.898E+01	5.299E+01	3.258E+00	0.082
SB-126	-6.135E+00		2.233E+01	3.923E+01	2.675E+00	-0.156
SN-126	1.342E+00		4.998E+00	8.640E+00	1.309E+00	0.155
I-131	-1.623E+01		4.115E+01	6.958E+01	5.275E+00	-0.233
BA-133	1.805E+00		3.002E+00	4.835E+00	5.851E-01	0.373
CS-134	1.461E+00		2.100E+00	4.050E+00	3.187E-01	0.361
CS-135	7.835E+00		9.498E+00	1.742E+01	1.595E+00	0.450
CS-136	-7.080E+00		1.483E+01	2.613E+01	2.246E+00	-0.271
BA-137M	-2.847E-01		1.747E+00	3.118E+00	1.899E-01	-0.091
CS-137	-3.010E-01		1.847E+00	3.296E+00	2.016E-01	-0.091
CE-139	-1.868E+00		2.334E+00	3.700E+00	2.860E-01	-0.505
BA-140	-7.418E+00		4.652E+01	8.306E+01	2.710E+01	-0.089
LA-140	-1.793E+00		1.515E+01	2.754E+01	1.708E+00	-0.065
CE-141	-9.106E+00		7.062E+00	1.096E+01	7.812E-01	-0.831
CE-144	-7.634E+00		1.537E+01	2.508E+01	3.642E+00	-0.304
PM-144	1.083E+00		1.886E+00	3.568E+00	2.332E-01	0.304
PM-146	-3.586E-01		2.473E+00	4.231E+00	3.812E-01	-0.085

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
ND-147	1.700E+01		1.181E+02	2.168E+02	2.988E+01	0.078
PM-147	2.357E+05		3.820E+06	6.462E+06	4.149E+05	0.036
EU-152	1.042E+00		6.057E+00	1.066E+01	8.103E-01	0.098
GD-153	2.498E+00		5.694E+00	9.892E+00	1.175E+00	0.253
EU-154	5.922E+00	+	7.837E+00	1.195E+01	1.164E+00	0.496
EU-155	-1.327E+00		7.480E+00	1.259E+01	1.245E+00	-0.105
TB-160	4.569E+00		8.709E+00	1.660E+01	1.494E+00	0.275
TM-171	2.669E+03	+	2.851E+03	3.642E+03	5.321E+02	0.733
HF-181	1.694E+00		3.521E+00	6.326E+00	4.037E-01	0.268
TA-182	1.045E-01		1.006E+01	1.852E+01	1.226E+00	0.006
IR-192	-1.550E-01		2.534E+00	4.417E+00	3.235E-01	-0.035
HG-203	2.030E+00		3.416E+00	6.188E+00	4.879E-01	0.328
BI-207	-4.290E-01		2.510E+00	4.586E+00	3.679E-01	-0.094
TL-208	6.679E-01	+	3.604E+00	4.594E+00	3.275E-01	0.145
PB-211	3.320E+01		5.795E+01	9.834E+01	6.135E+01	0.338
BI-212	1.083E+01		1.573E+01	2.999E+01	2.571E+00	0.361
PB-212	1.802E+00	+	6.567E+00	7.918E+00	7.107E-01	0.228
PB-214	4.902E+00	+	5.539E+00	8.242E+00	7.473E-01	0.595
RN-219	1.273E+01		2.356E+01	4.259E+01	5.883E+00	0.299
RA-223	-2.095E+01		3.835E+01	6.425E+01	1.096E+01	-0.326
RA-224	5.060E+01		4.690E+01	7.792E+01	6.054E+00	0.649
AC-227	-1.995E-02		2.531E+01	4.443E+01	6.674E+00	0.000
TH-227	-1.960E-02		2.487E+01	4.366E+01	7.707E+00	0.000
AC-228	6.832E+00		7.769E+00	1.365E+01	1.597E+00	0.501
RA-228	6.832E+00		7.769E+00	1.365E+01	1.597E+00	0.501
TH-229	1.355E+01		3.433E+01	5.793E+01	4.502E+00	0.234
PA-231	2.550E+01		9.363E+01	1.669E+02	2.440E+01	0.153
TH-231	7.490E+00		1.117E+01	2.034E+01	1.798E+00	0.368
TH-232	1.738E+00	+	6.336E+00	7.635E+00	6.853E-01	0.228
PA-233	1.094E-01		3.978E+00	6.968E+00	5.317E-01	0.016
PA-234	1.482E+00		1.404E+01	2.572E+01	4.872E+00	0.058
PA-234M	3.693E+02		2.466E+02	5.039E+02	5.000E+01	0.733
TH-234	6.386E+01	+	1.705E+02	1.924E+02	4.190E+01	0.332
U-234	5.946E+00		8.039E+00	1.467E+01	1.431E+00	0.405
U-235	8.573E+00		1.496E+01	2.557E+01	4.275E+00	0.335
NP-237	-1.284E+01		1.539E+01	2.469E+01	6.305E+00	-0.520
NP-239	-1.073E+01		1.338E+01	2.166E+01	1.573E+00	-0.496
AM-241	-2.228E+00		1.250E+01	1.933E+01	3.099E+00	-0.115
AM-242	-2.949E+01		1.516E+02	2.552E+02	2.599E+01	-0.116
CM-247	-7.538E-01		2.208E+00	3.724E+00	2.337E-01	-0.202
CF-249	3.957E-01		2.294E+00	4.047E+00	2.555E-01	0.098
CF-251	6.381E+00		8.610E+00	1.484E+01	1.149E+00	0.430
ANH-511	1.582E+01		2.941E+00	5.926E+00	3.783E-01	2.670


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*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
* BATCH ID      : 523017          SAMPLE ID   : G1201076444
* ANALYST      : MJH1            DETECTOR    : GAMMA3
* SAMPLE DATE   : 20-MAR-2006 08:00:00.00  COUNT TIME  : 0 04:00:00.00
* ANALYSIS DATE: 25-APR-2006 06:13:16.73  SAMPLE ALQT: 2.000 LITER
*
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GROSS GAMMA ACTIVITY (pCi/LITER ) : 9.754E+01
GROSS GAMMA ERROR   (pCi/LITER ) : 1.504E+02
GROSS GAMMA MDA     (pCi/LITER ) : 3.866E+02
GROSS GAMMA DLC     (pCi/LITER ) : 1.859E+02

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VAX/VMS Nuclide Identification Report Generated 25-APR-2006 07:14:14.34

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                   *
*                               Charleston, SC 29414                             *
*****
Configuration   : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076445.CNF;1
Sample date     : 21-APR-2006 00:00:00 Acquisition date : 25-APR-2006 06:13:38
Sample ID      : G1201076445 Sample quantity   : 2.00000E+00 LITER
Detector name  : WELL Detector geometry      : 2L_MB
Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:01.98 0.1%
Energy tolerance: 2.00000 KEV Analyst Initials  : MJH1
Abundance limit : 75.00000 Sensitivity     : 3.00000
Batch ID       : 523017 Detector SN#      : 3941466
Matrix Spike DPM : LCS DPM                   :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	59.49	1429	919	1.40	117.59	111	13	3.97E-01	5.1	
2	0	88.24*	1655	598	1.25	174.70	170	10	4.60E-01	3.7	
3	0	122.06	861	484	1.50	241.91	234	16	2.39E-01	6.6	
4	0	136.73	119	311	1.27	271.05	267	10	3.30E-02	29.2	
5	0	166.01	378	346	1.16	329.23	323	13	1.05E-01	11.4	
6	0	186.64*	29	246	3.09	370.22	366	11	7.93E-03	111.1	
7	0	232.80*	52	254	3.44	461.94	456	13	1.45E-02	64.6	
8	0	385.40	24	66	1.08	765.19	762	8	6.76E-03	61.8	
9	0	392.03	173	169	1.77	778.35	773	15	4.81E-02	18.3	
10	0	432.99	16	76	1.40	859.76	857	7	4.46E-03	93.2	
11	0	595.78*	34	68	5.08	1183.32	1176	13	9.32E-03	54.0	
12	0	661.58*	835	119	1.72	1314.12	1307	17	2.32E-01	4.6	
13	0	675.95	26	30	0.82	1342.68	1337	11	7.08E-03	46.1	
14	0	694.05	48	29	4.35	1378.66	1373	12	1.32E-02	27.1	
15	0	714.30	24	43	1.03	1418.92	1414	11	6.58E-03	57.9	
16	0	742.71*	18	48	1.30	1475.39	1471	10	5.08E-03	74.7	
17	0	897.96	240	92	2.23	1784.06	1777	16	6.68E-02	11.0	
18	0	911.20*	17	75	1.02	1810.38	1803	13	4.78E-03	107.4	
19	0	919.05	17	33	1.29	1825.99	1822	7	4.78E-03	60.5	
20	0	934.30*	18	116	3.55	1856.32	1846	16	5.09E-03	133.6	
21	0	1001.43*	13	69	3.16	1989.81	1986	13	3.60E-03	136.4	
22	0	1134.18	24	21	0.90	2253.78	2250	13	6.70E-03	43.2	
23	0	1172.96*	784	59	2.02	2330.92	2322	20	2.18E-01	4.3	
24	3	1230.03	12	0	1.61	2444.43	2442	36	3.40E-03	26.2	1.04E+00
25	3	1234.50	21	3	2.87	2453.32	2442	36	5.93E-03	31.8	
26	3	1244.75	16	4	2.88	2473.70	2442	36	4.35E-03	30.0	
27	0	1298.69	11	9	0.60	2581.00	2575	17	2.92E-03	70.7	
28	0	1332.11*	751	20	2.12	2647.46	2639	20	2.09E-01	3.9	
29	0	1536.84	10	2	1.98	3054.75	3050	10	2.74E-03	43.3	
30	0	1544.47	16	0	4.22	3069.94	3060	17	4.44E-03	25.0	
31	0	1835.32*	116	10	1.72	3648.67	3640	19	3.24E-02	11.3	

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

VAX/VMS Nuclide Identification Report Generated

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*****
*                               General Eng. Labs, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
*                               DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076445
* Acquisition date   : 25-APR-2006 06:13:38 Detector SN#      : 3941466
* Detector ID        : WELL                               Sensitivity      : 3.000
* Geometry           : 2L_MB                             Energy tolerance: 2.000
* Elapsed live time  : 0 01:00:00.00                    Abundance limit : 75.000
* Elapsed real time  : 0 01:00:01.98                    Half life ratio  : 8.000
*****
*                               SAMPLE DATA                                         *
*
* Sample date       : 21-APR-2006 00:00:00 Nuclide Library  : FERMC
* Sample ID        : G1201076445                    Analyst initials: MJH1
* Batch Number     : 523017                          Sample Quantity : 2.0000E+00 LITER
* Recovery         : 1.00000                          Carrier Weight  : 0.00000
*****
*                               QC DATA                                             *
*
* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 13-DEC-2005 09:34:01 MS Isotope      :
* MSD DPM           : *****                          MSD Isotope      :
* LCS DPM           : 0.000                            LCS Isotope      :
* LCSD DPM          : 0.000                            LCSD Isotope     :
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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.668E+02	2.219E+01	1.421E+01	0.000E+00
CO-60	6.540E+02	5.155E+01	1.876E+01	0.000E+00
Y-88	1.355E+02	3.067E+01	1.079E+01	0.000E+00
CD-109	8.477E+03	6.314E+02	5.327E+02	0.000E+00
SN-113	8.746E+01	3.201E+01	2.420E+01	0.000E+00
SN-126	8.628E+02	6.426E+01	6.080E+01	0.000E+00
BA-137M	4.674E+02	4.341E+01	2.025E+01	0.000E+00
CS-137	4.941E+02	4.588E+01	2.140E+01	0.000E+00
CE-139	8.246E+01	1.877E+01	1.489E+01	0.000E+00
PA-234M	1.072E+03	2.924E+03	3.472E+03	0.000E+00
NP-237	2.534E+03	1.887E+02	1.821E+02	0.000E+00
AM-241	1.438E+03	1.475E+02	1.025E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)	
BE-7	2.739E+01	1.042E+02	1.821E+02	0.000E+00 NOT IDENT.
NA-22	-1.158E+00	8.903E+00	1.625E+01	0.000E+00 NOT IDENT.
NA-24	-4.975E+02	8.182E+02	1.443E+03	0.000E+00 NOT IDENT.
AL-26	-7.865E-02	6.964E+00	1.445E+01	0.000E+00 NOT IDENT.
K-40	3.451E+01	6.300E+01	1.431E+02	0.000E+00 NOT IDENT.
SC-46	-1.764E+00	1.468E+01	2.574E+01	0.000E+00 NOT IDENT.
V-48	-1.817E+01	1.764E+01	2.816E+01	0.000E+00 NOT IDENT.
CR-51	-1.044E+01	9.089E+01	1.565E+02	0.000E+00 NOT IDENT.
MN-54	6.108E+00	1.311E+01	2.427E+01	0.000E+00 NOT IDENT.
CO-56	-4.108E+00	1.382E+01	2.397E+01	0.000E+00 NOT IDENT.
MN-56	0.000E+00	1.320E+13	0.000E+00	0.000E+00 SHORT HLIF
CO-58	-1.335E+01	1.283E+01	2.076E+01	0.000E+00 NOT IDENT.
FE-59	-1.640E+01	2.945E+01	4.902E+01	0.000E+00 NOT IDENT.
ZN-65	6.732E-02	2.766E+01	4.909E+01	0.000E+00 NOT IDENT.
SE-75	-5.496E-01	1.310E+01	2.271E+01	0.000E+00 FAIL ABUN

KR-85	-4.921E+02	2.532E+03	4.257E+03	0.000E+00	NOT IDENT.
SR-85	-2.251E+00	1.158E+01	1.947E+01	0.000E+00	NOT IDENT.
Y-91	1.928E+00	1.143E+01	1.988E+01	0.000E+00	NOT IDENT.
NB-94	-7.205E+00	1.081E+01	1.835E+01	0.000E+00	NOT IDENT.
NB-95	-2.323E+00	1.320E+01	2.329E+01	0.000E+00	NOT IDENT.
NB-95M	-8.979E+01	8.273E+01	1.167E+02	0.000E+00	NOT IDENT.
ZR-95	4.598E+00	2.059E+01	3.790E+01	0.000E+00	NOT IDENT.
MO-99	1.093E+01	2.734E+01	4.349E+01	0.000E+00	NOT IDENT.
TC-99M	0.000E+00	1.206E+06	0.000E+00	0.000E+00	SHORT HLIF
RU-103	-8.260E+00	1.225E+01	1.985E+01	0.000E+00	NOT IDENT.
RH-106	-5.570E+01	1.091E+02	1.888E+02	0.000E+00	NOT IDENT.
RU-106	-5.221E+01	1.094E+02	1.900E+02	0.000E+00	NOT IDENT.
AG-108M	6.873E+00	1.281E+01	2.281E+01	0.000E+00	FAIL ABUN
AG-110M	2.244E+01	1.466E+01	2.627E+01	0.000E+00	FAIL ABUN
CD-115	-8.215E+01	1.342E+02	2.178E+02	0.000E+00	FAIL ABUN
SN-115	9.774E+02	2.612E+03	2.541E+03	0.000E+00	FAIL ABUN
SN-117M	7.505E-01	9.866E+00	1.737E+01	0.000E+00	NOT IDENT.
TE-123M	6.607E-01	8.173E+00	1.440E+01	0.000E+00	NOT IDENT.
SB-124	-4.492E+00	1.643E+01	3.124E+01	0.000E+00	FAIL ABUN
SB-125	7.400E+00	3.337E+01	5.821E+01	0.000E+00	NOT IDENT.
TE-125M	-2.352E+02	3.143E+03	5.148E+03	0.000E+00	NOT IDENT.
I-126	-3.151E-01	3.764E+01	5.913E+01	0.000E+00	NOT IDENT.
SB-126	1.081E+01	2.330E+01	4.416E+01	0.000E+00	FAIL ABUN
SB-127	1.188E+01	6.744E+01	1.231E+02	0.000E+00	NOT IDENT.
I-131	-1.441E+00	1.581E+01	2.712E+01	0.000E+00	NOT IDENT.
I-132	0.000E+00	3.030E+14	0.000E+00	0.000E+00	SHORT HLIF
TE-132	-1.648E+01	2.490E+01	3.634E+01	0.000E+00	NOT IDENT.
BA-133	-8.668E+00	1.464E+01	2.429E+01	0.000E+00	FAIL ABUN
I-133	-6.893E+01	3.405E+02	5.756E+02	0.000E+00	FAIL ABUN
CS-134	-2.551E+00	1.325E+01	2.342E+01	0.000E+00	NOT IDENT.
CS-135	3.565E+01	4.959E+01	8.930E+01	0.000E+00	NOT IDENT.
I-135	0.000E+00	1.631E+06	0.000E+00	0.000E+00	SHORT HLIF
CS-136	-2.584E-01	2.279E+01	4.026E+01	0.000E+00	FAIL ABUN
BA-140	3.929E-01	5.319E+01	9.106E+01	0.000E+00	NOT IDENT.
LA-140	-3.388E+00	1.063E+01	1.985E+01	0.000E+00	FAIL ABUN
CE-141	2.734E+00	1.490E+01	2.644E+01	0.000E+00	NOT IDENT.
CE-143	7.931E+01	1.620E+02	2.892E+02	0.000E+00	FAIL ABUN
CE-144	-2.492E+01	7.461E+01	1.139E+02	0.000E+00	NOT IDENT.
PM-144	2.237E+00	1.165E+01	1.884E+01	0.000E+00	NOT IDENT.
PR-144	0.000E+00	2.000E+41	0.000E+00	0.000E+00	SHORT HLIF
PM-146	4.276E+00	1.530E+01	2.686E+01	0.000E+00	NOT IDENT.
ND-147	1.506E+01	9.568E+01	1.671E+02	0.000E+00	NOT IDENT.
PM-147	0.000E+00	4.706E+07	6.038E+07	0.000E+00	FAIL ABUN
PM-149	6.334E+02	9.322E+02	1.686E+03	0.000E+00	NOT IDENT.
EU-152	1.397E+01	3.143E+01	5.598E+01	0.000E+00	FAIL ABUN
GD-153	-1.090E+01	2.803E+01	4.547E+01	0.000E+00	NOT IDENT.
EU-154	-3.422E+00	2.498E+01	4.553E+01	0.000E+00	FAIL ABUN
EU-155	4.794E+01	4.125E+01	7.127E+01	0.000E+00	FAIL ABUN
TB-160	3.783E+00	4.882E+01	8.741E+01	0.000E+00	FAIL ABUN
TM-171	-2.419E+02	1.132E+04	1.873E+04	0.000E+00	FAIL ABUN
HF-181	-1.384E+01	1.297E+01	2.031E+01	0.000E+00	FAIL ABUN
TA-182	-3.069E+01	4.248E+01	6.883E+01	0.000E+00	FAIL ABUN
IR-192	0.000E+00	0.000E+00	1.728E+01	0.000E+00	NOT IDENT.
HG-203	1.233E+01	1.077E+01	1.987E+01	0.000E+00	NOT IDENT.
BI-207	7.227E+00	1.912E+01	3.506E+01	0.000E+00	FAIL ABUN
TL-208	-1.209E+00	1.239E+01	2.103E+01	0.000E+00	NOT IDENT.
BI-210	-1.475E+03	1.313E+03	1.860E+03	0.000E+00	NOT IDENT.
PB-210	-1.475E+03	1.313E+03	1.860E+03	0.000E+00	NOT IDENT.
BI-211	2.465E+01	6.747E+01	1.192E+02	0.000E+00	NOT IDENT.
PB-211	-1.263E+02	3.142E+02	5.258E+02	0.000E+00	NOT IDENT.
BI-212	-3.679E+01	8.571E+01	1.491E+02	0.000E+00	NOT IDENT.
PB-212	4.235E+00	1.816E+01	3.186E+01	0.000E+00	FAIL ABUN
BI-214	-1.526E+00	2.331E+01	4.179E+01	0.000E+00	FAIL ABUN
PB-214	9.837E+00	2.263E+01	4.028E+01	0.000E+00	FAIL ABUN
RN-219	5.483E+01	1.401E+02	2.481E+02	0.000E+00	NOT IDENT.
RA-223	1.298E+01	2.136E+02	3.712E+02	0.000E+00	FAIL ABUN
RA-224	1.843E+02	1.990E+02	3.612E+02	0.000E+00	NOT IDENT.
RA-226	-1.526E+00	2.331E+01	4.179E+01	0.000E+00	NOT IDENT.
AC-227	-1.942E+01	1.311E+02	2.256E+02	0.000E+00	NOT IDENT.
TH-227	-1.913E+01	1.292E+02	2.223E+02	0.000E+00	NOT IDENT.
AC-228	4.047E+01	8.690E+01	1.018E+02	0.000E+00	FAIL ABUN
RA-228	4.047E+01	8.690E+01	1.018E+02	0.000E+00	FAIL ABUN
TH-228	3.951E+00	1.815E+01	3.181E+01	0.000E+00	NOT IDENT.
TH-229	-7.274E+01	1.494E+02	2.552E+02	0.000E+00	FAIL ABUN
TH-230	-1.526E+00	2.331E+01	4.179E+01	0.000E+00	NOT IDENT.
PA-231	-3.259E+02	4.837E+02	8.064E+02	0.000E+00	NOT IDENT.
TH-231	2.145E+01	5.965E+01	1.053E+02	0.000E+00	NOT IDENT.
TH-232	3.840E+00	1.807E+01	3.166E+01	0.000E+00	FAIL ABUN

PA-233	2.165E+01	2.035E+01	3.761E+01	0.000E+00	FAIL	ABUN
PA-234	3.780E+00	1.383E+02	2.428E+02	0.000E+00	FAIL	ABUN
TH-234	-2.708E+02	5.571E+02	8.051E+02	0.000E+00	NOT	IDENT.
U-234	1.907E+01	4.051E+01	7.231E+01	0.000E+00	NOT	IDENT.
U-235	-4.874E+01	6.380E+01	1.086E+02	0.000E+00	FAIL	ABUN
U-238	-2.708E+02	5.571E+02	8.051E+02	0.000E+00	NOT	IDENT.
NP-239	9.957E+00	7.953E+01	1.170E+02	0.000E+00	NOT	IDENT.
AM-242	-9.364E+01	8.684E+02	1.422E+03	0.000E+00	NOT	IDENT.
CM-247	-4.316E+00	1.307E+01	2.197E+01	0.000E+00	NOT	IDENT.
CF-249	-6.085E+00	2.145E+01	2.209E+01	0.000E+00	NOT	IDENT.
CF-251	-1.175E+01	3.655E+01	6.319E+01	0.000E+00	NOT	IDENT.
ANH-511	1.815E+01	1.138E+01	2.152E+01	0.000E+00	NOT	IDENT.

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                   *
*                               Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076445.CNF;1
Sample date        : 21-APR-2006 00:00:00 Acquisition date : 25-APR-2006 06:13:38
Sample ID          : G1201076445           Sample quantity  : 2.00000E+00 LITER
Detector name     : WELL                   Detector geometry: 2L_MB
Elapsed live time : 0 01:00:00.00         Elapsed real time: 0 01:00:01.98  0.1%
Energy tolerance  : 2.00000 KEV           Analyst Initials  : MJH1
Abundance limit   : 75.00000              Sensitivity       : 3.00000
Batch ID          : 523017                 Detector SN#      : 3941466
Matrix Spike DPM  :                       LCS DPM         :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	59.49	1429	919	1.40	117.59	111	13	3.97E-01	5.1	
2	0	88.24	1659	598	1.25	174.70	170	10	4.61E-01	3.7	
3	0	122.06	861	484	1.50	241.91	234	16	2.39E-01	6.6	
4	0	136.73	119	311	1.27	271.05	267	10	3.30E-02	29.2	
5	0	166.01	378	346	1.16	329.23	323	13	1.05E-01	11.4	
6	0	186.64	69	246	3.09	370.22	366	11	1.93E-02	45.3	
7	0	232.80	54	254	3.44	461.94	456	13	1.49E-02	62.9	
8	0	385.40	24	66	1.08	765.19	762	8	6.76E-03	61.8	
9	0	392.03	173	169	1.77	778.35	773	15	4.81E-02	18.3	
10	0	432.99	16	76	1.40	859.76	857	7	4.46E-03	93.2	
11	0	595.78	37	68	5.08	1183.32	1176	13	1.02E-02	49.1	
12	0	661.58	871	119	1.72	1314.12	1307	17	2.42E-01	4.4	
13	0	675.95	26	30	0.82	1342.68	1337	11	7.08E-03	46.1	
14	0	694.05	48	29	4.35	1378.66	1373	12	1.32E-02	27.1	
15	0	714.30	24	43	1.03	1418.92	1414	11	6.58E-03	57.9	
16	0	742.71	19	48	1.30	1475.39	1471	10	5.28E-03	71.7	
17	0	897.96	240	92	2.23	1784.06	1777	16	6.68E-02	11.0	
18	0	911.20	21	75	1.02	1810.38	1803	13	5.94E-03	86.1	
19	0	919.05	17	33	1.29	1825.99	1822	7	4.78E-03	60.5	
20	0	934.30	19	116	3.55	1856.32	1846	16	5.30E-03	128.2	
21	0	1001.43	19	69	3.16	1989.81	1986	13	5.14E-03	95.1	
22	0	1134.18	24	21	0.90	2253.78	2250	13	6.70E-03	43.2	
23	0	1172.96	787	59	2.02	2330.92	2322	20	2.19E-01	4.3	
24	3	1230.03	12	0	1.61	2444.43	2442	36	3.40E-03	26.2	1.04E+00
25	3	1234.50	21	3	2.87	2453.32	2442	36	5.93E-03	31.8	
26	3	1244.75	16	4	2.88	2473.70	2442	36	4.35E-03	30.0	
27	0	1298.69	11	9	0.60	2581.00	2575	17	2.92E-03	70.7	
28	0	1332.11	755	20	2.12	2647.46	2639	20	2.10E-01	3.9	
29	0	1536.84	10	2	1.98	3054.75	3050	10	2.74E-03	43.3	
30	0	1544.47	16	0	4.22	3069.94	3060	17	4.44E-03	25.0	
31	0	1835.32	118	10	1.72	3648.67	3640	19	3.28E-02	11.1	

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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076445.CNF;1
Sample date        : 21-APR-2006 00:00:00 Acquisition date : 25-APR-2006 06:13:38
Sample ID          : G1201076445 Sample quantity      : 2.00000E+00 LITER
Detector name      : WELL Detector geometry          : 2L_MB
Elapsed live time  : 0 01:00:00.00 Elapsed real time: 0 01:00:01.98 0.1%
Energy tolerance  : 2.00000 KEV Analyst Initials    : MJH1
Abundance limit   : 75.00000 Sensitivity         : 3.00000
Batch ID          : 523017 Detector SN#          : 3941466
Matrix Spike DPM  : LCS DPM                          :
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Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	861	85.51*	2.292E+00	1.650E+02	1.668E+02	13.30
	136.47	119	10.47	2.296E+00	1.855E+02	1.876E+02	58.42
CO-60	1173.24	784	99.90	4.758E-01	6.192E+02	6.201E+02	8.64
	1332.50	751	99.98*	4.319E-01	6.529E+02	6.540E+02	7.88
Y-88	898.02	240	93.40	5.833E-01	1.657E+02	1.703E+02	22.01
	1836.01	116	99.38*	3.337E-01	1.318E+02	1.355E+02	22.62
CD-109	88.03	1655	3.79*	1.946E+00	8.423E+03	8.477E+03	7.45
SN-113	391.69	173	64.90*	1.174E+00	8.523E+01	8.746E+01	36.61
SN-126	64.28	-----	9.60	1.230E+00	-----	Line Not Found	-----
	86.94	1655	8.90	1.946E+00	3.587E+03	3.587E+03	7.45
	87.57	1655	37.00*	1.946E+00	8.628E+02	8.628E+02	7.45
BA-137M	661.65	835	89.98*	7.452E-01	4.673E+02	4.674E+02	9.29
CS-137	661.66	835	85.12*	7.452E-01	4.940E+02	4.941E+02	9.29
CE-139	165.85	378	80.35*	2.191E+00	8.070E+01	8.246E+01	22.76
PM-147	121.30	861	0.00*	2.292E+00	3.527E+08	3.538E+08	13.30
PA-234M	766.40	-----	0.21	6.609E-01	-----	Line Not Found	-----
	1001.03	13	0.85*	5.364E-01	1.072E+03	1.072E+03	272.70
NP-237	86.48	1655	12.60*	1.946E+00	2.534E+03	2.534E+03	7.45
AM-241	95.87	-----	2.60	2.082E+00	-----	Line Not Found	-----
	59.54	1429	35.90*	1.039E+00	1.438E+03	1.438E+03	10.26

Flag: "*" = Keyline

Total number of lines in spectrum 31
 Number of unidentified lines 4
 Number of lines tentatively identified by NID 27 87.10%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	270.90D	1.01	1.650E+02	1.668E+02	0.222E+02	13.30	
CO-60	5.27Y	1.00	6.529E+02	6.540E+02	0.515E+02	7.88	
Y-88	106.60D	1.03	1.318E+02	1.355E+02	0.307E+02	22.62	
CD-109	464.00D	1.01	8.423E+03	8.477E+03	0.631E+03	7.45	
SN-113	115.10D	1.03	8.523E+01	8.746E+01	3.201E+01	36.61	
SN-126	1.00E+05Y	1.00	8.628E+02	8.628E+02	0.643E+02	7.45	
BA-137M	30.17Y	1.00	4.673E+02	4.674E+02	0.434E+02	9.29	
CS-137	30.17Y	1.00	4.940E+02	4.941E+02	0.459E+02	9.29	
CE-139	137.66D	1.02	8.070E+01	8.246E+01	1.877E+01	22.76	
PM-147	2.62Y	1.00	3.527E+08	3.538E+08	0.471E+08	13.30	
PA-234M	4.47E+09Y	1.00	1.072E+03	1.072E+03	2.924E+03	272.70	
NP-237	2.14E+06Y	1.00	2.534E+03	2.534E+03	0.189E+03	7.45	
AM-241	432.20Y	1.00	1.438E+03	1.438E+03	0.147E+03	10.26	
Total Activity :			3.527E+08	3.538E+08			

Grand Total Activity : 3.527E+08 3.538E+08

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	186.64	29	246	3.09	370.22	366	11	7.93E-03	****	2.08E+00	T
0	232.80	52	254	3.44	461.94	456	13	1.45E-02	****	1.81E+00	T
0	385.40	24	66	1.08	765.19	762	8	6.76E-03	****	1.19E+00	T
0	432.99	16	76	1.40	859.76	857	7	4.46E-03	****	1.08E+00	T
0	595.78	34	68	5.08	1183.32	1176	13	9.32E-03	****	8.14E-01	
0	675.95	26	30	0.82	1342.68	1337	11	7.08E-03	92.2	7.32E-01	T
0	694.05	48	29	4.35	1378.66	1373	12	1.32E-02	54.2	7.16E-01	T
0	714.30	24	43	1.03	1418.92	1414	11	6.58E-03	****	7.00E-01	T
0	742.71	18	48	1.30	1475.39	1471	10	5.08E-03	****	6.78E-01	T
0	911.20	17	75	1.02	1810.38	1803	13	4.78E-03	****	5.77E-01	T
0	919.05	17	33	1.29	1825.99	1822	7	4.78E-03	****	5.73E-01	T
0	934.30	18	116	3.55	1856.32	1846	16	5.09E-03	****	5.66E-01	T
0	1134.18	24	21	0.90	2253.78	2250	13	6.70E-03	86.4	4.88E-01	T
3	1230.03	12	0	1.61	2444.43	2442	36	3.40E-03	52.4	4.59E-01	T
3	1234.50	21	3	2.87	2453.32	2442	36	5.93E-03	63.6	4.58E-01	T
3	1244.75	16	4	2.88	2473.70	2442	36	4.35E-03	60.0	4.55E-01	
0	1298.69	11	9	0.60	2581.00	2575	17	2.92E-03	****	4.40E-01	T
0	1536.84	10	2	1.98	3054.75	3050	10	2.74E-03	86.5	3.86E-01	
0	1544.47	16	0	4.22	3069.94	3060	17	4.44E-03	50.0	3.85E-01	

Flags: "T" = Tentatively associated

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
*                                     DETECTOR DATA                                   *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1201076445.CNF;1
* Acquisition date   : 25-APR-2006 06:13:38  Detector SN#      : 3941466
* Detector ID        : WELL                    Sensitivity       : 3.00000
* Geometry           : 2L_MB                    Energy tolerance: 2.00000
* Elapsed live time  : 0 01:00:00.00           Abundance limit  : 75.00000
* Elapsed real time  : 0 01:00:01.98           Half life ratio  : 8.00000
*****
*                                     SAMPLE DATA                                   *
*
* Sample date        : 21-APR-2006 00:00:00  Nuclide Library   : EPI
* Sample ID          : G1201076445           Analyst initials   : MJH1
* Batch Number       : 523017                Sample Quantity   : 2.00000E+00 LITER
*****
*                                     QC DATA                                       *
*
* CALIB. DATE/TIME  : 13-DEC-2005 09:34:01.1MS Isotope       :
* MSD DPM           :                        MSD Isotope       :
* LCS DPM           :                        LCS Isotope       :
*****

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Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.668E+02	2.219E+01	1.421E+01	0.000E+00	11.737
CO-60	6.540E+02	5.155E+01	1.876E+01	0.000E+00	34.865
Y-88	1.355E+02	3.067E+01	1.079E+01	0.000E+00	12.564
CD-109	8.477E+03	6.314E+02	5.327E+02	0.000E+00	15.913
SN-113	8.746E+01	3.201E+01	2.420E+01	0.000E+00	3.614
SN-126	8.628E+02	6.426E+01	6.080E+01	0.000E+00	14.189
BA-137M	4.674E+02	4.341E+01	2.025E+01	0.000E+00	23.086
CS-137	4.941E+02	4.588E+01	2.140E+01	0.000E+00	23.085
CE-139	8.246E+01	1.877E+01	1.489E+01	0.000E+00	5.536
PA-234M	1.072E+03	2.924E+03	3.472E+03	0.000E+00	0.309
NP-237	2.534E+03	1.887E+02	1.821E+02	0.000E+00	13.913
AM-241	1.438E+03	1.475E+02	1.025E+02	0.000E+00	14.024

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

Nuclide	Key-Line Activity K.L. (pCi/LITER)Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
BE-7	2.739E+01	1.042E+02	1.821E+02	0.000E+00	0.150

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
NA-22	-1.158E+00		8.903E+00	1.625E+01	0.000E+00	-0.071
NA-24	-4.975E+02		8.182E+02	1.443E+03	0.000E+00	-0.345
AL-26	-7.865E-02		6.964E+00	1.445E+01	0.000E+00	-0.005
K-40	3.451E+01		6.300E+01	1.431E+02	0.000E+00	0.241
SC-46	-1.764E+00		1.468E+01	2.574E+01	0.000E+00	-0.069
V-48	-1.817E+01		1.764E+01	2.816E+01	0.000E+00	-0.645
CR-51	-1.044E+01		9.089E+01	1.565E+02	0.000E+00	-0.067
MN-54	6.108E+00		1.311E+01	2.427E+01	0.000E+00	0.252
CO-56	-4.108E+00		1.382E+01	2.397E+01	0.000E+00	-0.171
CO-58	-1.335E+01		1.283E+01	2.076E+01	0.000E+00	-0.643
FE-59	-1.640E+01		2.945E+01	4.902E+01	0.000E+00	-0.334
ZN-65	6.732E-02		2.766E+01	4.909E+01	0.000E+00	0.001
SE-75	-5.496E-01		1.310E+01	2.271E+01	0.000E+00	-0.024
KR-85	-4.921E+02		2.532E+03	4.257E+03	0.000E+00	-0.116
SR-85	-2.251E+00		1.158E+01	1.947E+01	0.000E+00	-0.116
Y-91	1.928E+00		1.143E+01	1.988E+01	0.000E+00	0.097
NB-94	-7.205E+00		1.081E+01	1.835E+01	0.000E+00	-0.393
NB-95	-2.323E+00		1.320E+01	2.329E+01	0.000E+00	-0.100
NB-95M	-8.979E+01		8.273E+01	1.167E+02	0.000E+00	-0.770
ZR-95	4.598E+00		2.059E+01	3.790E+01	0.000E+00	0.121
MO-99	1.093E+01		2.734E+01	4.349E+01	0.000E+00	0.251
RU-103	-8.260E+00		1.225E+01	1.985E+01	0.000E+00	-0.416
RH-106	-5.570E+01		1.091E+02	1.888E+02	0.000E+00	-0.295
RU-106	-5.221E+01		1.094E+02	1.900E+02	0.000E+00	-0.275
AG-108M	6.873E+00	+	1.281E+01	2.281E+01	0.000E+00	0.301
AG-110M	2.244E+01		1.466E+01	2.627E+01	0.000E+00	0.854
CD-115	-8.215E+01		1.342E+02	2.178E+02	0.000E+00	-0.377
SN-115	9.774E+02	+	2.612E+03	2.541E+03	0.000E+00	0.385
SN-117M	7.505E-01		9.866E+00	1.737E+01	0.000E+00	0.043
TE-123M	6.607E-01		8.173E+00	1.440E+01	0.000E+00	0.046
SB-124	-4.492E+00		1.643E+01	3.124E+01	0.000E+00	-0.144
SB-125	7.400E+00		3.337E+01	5.821E+01	0.000E+00	0.127
TE-125M	-2.352E+02		3.143E+03	5.148E+03	0.000E+00	-0.046
I-126	-3.151E-01		3.764E+01	5.913E+01	0.000E+00	-0.005
SB-126	1.081E+01		2.330E+01	4.416E+01	0.000E+00	0.245
SB-127	1.188E+01		6.744E+01	1.231E+02	0.000E+00	0.097
I-131	-1.441E+00		1.581E+01	2.712E+01	0.000E+00	-0.053
TE-132	-1.648E+01		2.490E+01	3.634E+01	0.000E+00	-0.453
BA-133	-8.668E+00		1.464E+01	2.429E+01	0.000E+00	-0.357
I-133	-6.893E+01		3.405E+02	5.756E+02	0.000E+00	-0.120
CS-134	-2.551E+00		1.325E+01	2.342E+01	0.000E+00	-0.109
CS-135	3.565E+01		4.959E+01	8.930E+01	0.000E+00	0.399
CS-136	-2.584E-01		2.279E+01	4.026E+01	0.000E+00	-0.006
BA-140	3.929E-01		5.319E+01	9.106E+01	0.000E+00	0.004
LA-140	-3.388E+00		1.063E+01	1.985E+01	0.000E+00	-0.171
CE-141	2.734E+00		1.490E+01	2.644E+01	0.000E+00	0.103
CE-143	7.931E+01		1.620E+02	2.892E+02	0.000E+00	0.274
CE-144	-2.492E+01		7.461E+01	1.139E+02	0.000E+00	-0.219

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
PM-144	2.237E+00		1.165E+01	1.884E+01	0.000E+00	0.119
PM-146	4.276E+00		1.530E+01	2.686E+01	0.000E+00	0.159
ND-147	1.506E+01		9.568E+01	1.671E+02	0.000E+00	0.090
PM-147	3.538E+08		4.706E+07	6.038E+07	0.000E+00	5.860
PM-149	6.334E+02		9.322E+02	1.686E+03	0.000E+00	0.376
EU-152	1.397E+01		3.143E+01	5.598E+01	0.000E+00	0.250
GD-153	-1.090E+01		2.803E+01	4.547E+01	0.000E+00	-0.240
EU-154	-3.422E+00		2.498E+01	4.553E+01	0.000E+00	-0.075
EU-155	4.794E+01		4.125E+01	7.127E+01	0.000E+00	0.673
TB-160	3.783E+00		4.882E+01	8.741E+01	0.000E+00	0.043
TM-171	-2.419E+02		1.132E+04	1.873E+04	0.000E+00	-0.013
HF-181	-1.384E+01		1.297E+01	2.031E+01	0.000E+00	-0.681
TA-182	-3.069E+01		4.248E+01	6.883E+01	0.000E+00	-0.446
IR-192	0.000E+00		0.000E+00	1.728E+01	0.000E+00	0.000
HG-203	1.233E+01		1.077E+01	1.987E+01	0.000E+00	0.620
BI-207	7.227E+00		1.912E+01	3.506E+01	0.000E+00	0.206
TL-208	-1.209E+00		1.239E+01	2.103E+01	0.000E+00	-0.057
BI-210	-1.475E+03		1.313E+03	1.860E+03	0.000E+00	-0.793
PB-210	-1.475E+03		1.313E+03	1.860E+03	0.000E+00	-0.793
BI-211	2.465E+01		6.747E+01	1.192E+02	0.000E+00	0.207
PB-211	-1.263E+02		3.142E+02	5.258E+02	0.000E+00	-0.240
BI-212	-3.679E+01		8.571E+01	1.491E+02	0.000E+00	-0.247
PB-212	4.235E+00		1.816E+01	3.186E+01	0.000E+00	0.133
BI-214	-1.526E+00		2.331E+01	4.179E+01	0.000E+00	-0.037
PB-214	9.837E+00		2.263E+01	4.028E+01	0.000E+00	0.244
RN-219	5.483E+01		1.401E+02	2.481E+02	0.000E+00	0.221
RA-223	1.298E+01		2.136E+02	3.712E+02	0.000E+00	0.035
RA-224	1.843E+02		1.990E+02	3.612E+02	0.000E+00	0.510
RA-226	-1.526E+00		2.331E+01	4.179E+01	0.000E+00	-0.037
AC-227	-1.942E+01		1.311E+02	2.256E+02	0.000E+00	-0.086
TH-227	-1.913E+01		1.292E+02	2.223E+02	0.000E+00	-0.086
AC-228	4.047E+01	+	8.690E+01	1.018E+02	0.000E+00	0.397
RA-228	4.047E+01	+	8.690E+01	1.018E+02	0.000E+00	0.397
TH-228	3.951E+00		1.815E+01	3.181E+01	0.000E+00	0.124
TH-229	-7.274E+01		1.494E+02	2.552E+02	0.000E+00	-0.285
TH-230	-1.526E+00		2.331E+01	4.179E+01	0.000E+00	-0.037
PA-231	-3.259E+02		4.837E+02	8.064E+02	0.000E+00	-0.404
TH-231	2.145E+01		5.965E+01	1.053E+02	0.000E+00	0.204
TH-232	3.840E+00		1.807E+01	3.166E+01	0.000E+00	0.121
PA-233	2.165E+01		2.035E+01	3.761E+01	0.000E+00	0.576
PA-234	3.780E+00		1.383E+02	2.428E+02	0.000E+00	0.016
TH-234	-2.708E+02		5.571E+02	8.051E+02	0.000E+00	-0.336
U-234	1.907E+01		4.051E+01	7.231E+01	0.000E+00	0.264
U-235	-4.874E+01		6.380E+01	1.086E+02	0.000E+00	-0.449
U-238	-2.708E+02		5.571E+02	8.051E+02	0.000E+00	-0.336
NP-239	9.957E+00		7.953E+01	1.170E+02	0.000E+00	0.085
AM-242	-9.364E+01		8.684E+02	1.422E+03	0.000E+00	-0.066
CM-247	-4.316E+00		1.307E+01	2.197E+01	0.000E+00	-0.196

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Ided	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CF-249	-6.085E+00		2.145E+01	2.209E+01	0.000E+00	-0.275
CF-251	-1.175E+01		3.655E+01	6.319E+01	0.000E+00	-0.186
ANH-511	1.815E+01		1.138E+01	2.152E+01	0.000E+00	0.843

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*****
*
*                               General Engineering Labs, LLC
*                               2040 SAVAGE ROAD
*                               CHARLESTON ,SC 29417
*                               GROSS GAMMA REPORT
*
*****
*
*   BATCH ID      : 523017          SAMPLE ID   : G1201076445
*   ANALYST       : MJH1           DETECTOR    : WELL
*   SAMPLE DATE   : 21-APR-2006 00:00:00.00  COUNT TIME : 0 01:00:00.00
*   ANALYSIS DATE: 25-APR-2006 06:13:38.31  SAMPLE ALQT: 2.000 LITER
*
*****

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GROSS GAMMA ACTIVITY (pCi/LITER ) : 3.195E+03
GROSS GAMMA ERROR   (pCi/LITER ) : 6.103E+02
GROSS GAMMA MDA     (pCi/LITER ) : 1.833E+03
GROSS GAMMA DLC     (pCi/LITER ) : 8.934E+02

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Radiochemistry Batch Checklist, Rev 4

Batch# 515982 Product: Ra-228 Date: 4/18/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.	NA		
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.			
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.	NA		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.			
All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database.	✓		
Batch entered into Case Narrative.	✓		
Batch non-conformances completed if applicable.	NA		

General Engineering Laboratories

2/22/2005
Primary Review Performed By: J. P. [Signature] 4/18/06

Secondary Review Performed By: no 4/18/06

4/12-4/19

11WHL, MPLA, ALSV

03/29/2006

Radium-228 Que Sheet

Batch #: 515982 Analyst: PXP1 Minimum Due Date: 04/12/2006 Ac-228 Ingrow: 1503 4/11/06
 Spike Isotope: Radium-228 Spike Code: 0503-B Expiration Date: 9/9/06 Vol: 0.1
 LCS Isotope: Radium-228 LCS Code: 0503-B Expiration Date: 9/9/06 Vol: 0.1
 Tracer Isotope: Barium-133 Tracer Code: 0112-H Expiration Date: 1/18/07 Vol: 0.1
 Prep Date: 4/10/06 Initials: KSD Pipet ID: 216653 Balance ID: 51754863 Witness: CMO 4/10/06

Sample ID	Description	Client	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Bkr #	Vol (mL)	Ba Yield (%)	Gamma Det. #
158436001	2603150120 TR-9A		SAMPLE		2 pCi/L	GROUND WAT	MWHL002	14-MAR-06 02:45 PM	1	600	76.86	1A
158783001	2603210144		SAMPLE		2 pCi/L	GROUND WAT	MWHL002	20-MAR-06 08:00 AM	2	600	71.93	1B
158783002	2603210150		SAMPLE		2 pCi/L	GROUND WAT	MWHL002	20-MAR-06 10:00 AM	3	600	86.66	1C
159251003	060100886-002		SAMPLE		1 pCi/L	DRINKING WA	MILA001	22-MAR-06 10:00 AM	4	900	76.66	1D
159251004	060201974-001		SAMPLE		1 pCi/L	DRINKING WA	MILA001	21-MAR-06 09:05 AM	5	900	73.59	2A
159251005	060201974-002		SAMPLE		1 pCi/L	DRINKING WA	MILA001	21-MAR-06 09:10 AM	6	900	78.49	2B
159251006	060301600-001		SAMPLE		1 pCi/L	DRINKING WA	MILA001	23-MAR-06 07:40 AM	7	900	68.10	2C
159252001	9643235-1		SAMPLE		1 pCi/L	DRINKING WA	ALSV001	22-MAR-06 09:15 AM	8	900	78.41	2D
159253001	9643243-1		SAMPLE		1 pCi/L	DRINKING WA	ALSV001	21-MAR-06 11:10 AM	9	900	70.88	3C
159254001	9643245-1		SAMPLE		1 pCi/L	DRINKING WA	ALSV001	21-MAR-06 10:00 AM	10	900	70.00	3D
1201060412	MB for batch 515982		MB		1 pCi/L	DRINKING WA	QC ACCOUNT		11	500	77.80	4A
1201060413	060301600-001(159251006DUP)		DUP		1 pCi/L	DRINKING WA	QC ACCOUNT	23-MAR-06 07:40 AM	12	500	77.68	4B
1201060414	060301600-001(159251006MS)		MS		1 pCi/L	DRINKING WA	QC ACCOUNT	23-MAR-06 07:40 AM	13	400	75.93	4C
1201060415	LCS for batch 515982		LCS		1 pCi/L	DRINKING WA	QC ACCOUNT		14	400	74.26	4D

4/18/06

Data Reviewed By: Karen 4/18/06
 NO 5/19/06

Comments: PKS/N: 10751-4

Radium 228 Re-Elute / Reprecipitate

Batch # 515982
 Ra 228 Spike Code 0503-B
 LCS Code 0503-B
 Ba-133 Tracer Code 0112-14

Prep Date 4/10/06 Initials P.P.
 Spike Vol (mls) 0.1
 LCS Vol (mls) 0.1 Ingrow Start Time: 1236 4/13/06
 Tracer Vol (mls) 0.1 Separation Time: 11:04/17/06

Sample ID	Bkr #	Vol. (mls)	Det #	% Yield	Gamma Det #
158436001	1	600	97-2	69.40	1A
158783001	2	600	97-3	66.79	1B
158783002	3	600	97-4	84.06	1C
159251003	4	900	97-5	62.68	1D
159251004	5	900	89-6	68.91	2A
159251005	6	900	89-7	71.30	2B
159251006	7	900	89-8	66.63	2C
159252001	8	900	89-9	73.00	2D
159253001	9	900	89-10	69.73	4A
159254001	10	900	93-11	63.36	4B
1201060412	11	900	93-12	74.64	4C
1201060413	12	900	93-13	69.68	4D
1201060414	13	900	93-14	75.08	3B 39
1201060415	14	8400 900	93-15	75.67	3C 30

160
4/18/06

200 4/18/06

200 4/18/06

05
4/18/06

Radium-228 Water

Filename : RA228.XLS
 File type : Excel
 Version # : 1

Spike S/N : 0503-B
 Spike Exp Date : 9/9/2006
 Spike Activity (dpm/ml): 269.10
 Spike Volume Added: 0.1

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

LCS S/N : 0503-B
 LCS Exp Date : 9/9/2006
 LCS Activity (dpm/ml): 269.10
 LCS Volume Added: 0.1

Procedure Code : GFC28RAL
 Parname : Radium-228
 Required MDA : 1

Tracer S/N : 0112-H
 Tracer Exp Date : 1/18/2007
 Tracer Volume Added: 0.1

Half-life of Ra-228 : 5.75 years
 Half-life of Ac-228 : 6.13 hours
 Batch counted on : PIC
 BKG Count time : 500 min

Batch : 515982
 Analyst : PXP1
 Prep Date : 4/10/2006
 Ra-228 Abundance : 1
 Calibration Date : 4/22/2005
 Calibration Due Date : 4/22/2006

Sample Characteristics			Tracer Calculations				Tracer Ref.		Tracer Samp.		Tracer	
Sample ID	Sample Aliquot L	Sample Aliquot StDev.	Tracer Concentration (Ba-133 Ref.)	Tracer Count	Tracer Uncertainty	Tracer Concentration (Ba-133 Samp.)	Tracer Count	Tracer Uncertainty	Tracer Aliquot (mL)	Tracer Aliquot	Tracer StDev.	
158436001	0.600	2.0573E-05	364.4	2.50%	2.50%	252.9	3.08%	3.08%	0.1	0.000701	0.000701	
158783001	0.600	2.0573E-05	364.4	2.50%	2.50%	243.4	3.15%	3.15%	0.1	0.000701	0.000701	
158783002	0.600	2.0573E-05	364.4	2.50%	2.50%	306.3	2.76%	2.76%	0.1	0.000701	0.000701	
159251003	0.900	2.0768E-05	364.4	2.50%	2.50%	228.4	3.27%	3.27%	0.1	0.000701	0.000701	
159251004	0.900	2.0768E-05	364.4	2.50%	2.50%	251.1	3.09%	3.09%	0.1	0.000701	0.000701	
159251005	0.900	2.0768E-05	364.4	2.50%	2.50%	259.8	3.03%	3.03%	0.1	0.000701	0.000701	
159251006	0.900	2.0768E-05	364.4	2.50%	2.50%	242.8	3.15%	3.15%	0.1	0.000701	0.000701	
159252001	0.900	2.0768E-05	364.4	2.50%	2.50%	266.0	2.99%	2.99%	0.1	0.000701	0.000701	
159253001	0.900	2.0768E-05	364.4	2.50%	2.50%	254.1	3.07%	3.07%	0.1	0.000701	0.000701	
159254001	0.900	2.0768E-05	364.4	2.50%	2.50%	230.9	3.25%	3.25%	0.1	0.000701	0.000701	
1201060412	0.900	2.0768E-05	364.4	2.50%	2.50%	272.0	2.95%	2.95%	0.1	0.000701	0.000701	
1201060413	0.900	2.0768E-05	364.4	2.50%	2.50%	253.9	3.07%	3.07%	0.1	0.000701	0.000701	
1201060414	0.400	1.9669E-05	364.4	2.50%	2.50%	273.6	2.94%	2.94%	0.1	0.000701	0.000701	
1201060415	0.900	2.0768E-05	364.4	2.50%	2.50%	264.8	3.00%	3.00%	0.1	0.000701	0.000701	

3/18/06
 3/20/06
 3/21/06
 3/22/06
 3/23/06

29 2/1/13
13D

Count raw Data														
Detector ID	Counting Time	Gross Counts Alpha	Beta	Beta cpm	Detector Efficiency	Detector Efficiency Error	Weekly Bkg Count Time cpm	Separation Date/Time	Count Start Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Sample Recovery %	Sample Recovery Error %
1A	120	26	75	0.625	0.5132	0.00600	0.392	4/17/2006 11:10	4/17/2006 14:14	0.989	0.706	1.117	69.40%	2.22%
1B	120	19	55	0.458	0.5082	0.00409	0.304	4/17/2006 11:10	4/17/2006 14:15	0.991	0.705	1.117	66.79%	2.24%
1C	120	18	75	0.625	0.5231	0.00344	0.366	4/17/2006 11:10	4/17/2006 14:15	0.991	0.704	1.117	84.06%	2.11%
1D	120	19	83	0.692	0.5121	0.00511	0.380	4/17/2006 11:10	4/17/2006 14:16	0.991	0.704	1.117	62.68%	2.28%
2A	120	16	78	0.650	0.5097	0.00349	0.374	4/17/2006 11:10	4/17/2006 14:16	0.991	0.704	1.117	68.91%	2.22%
2B	120	15	81	0.675	0.5242	0.00383	0.302	4/17/2006 11:10	4/17/2006 14:16	0.991	0.704	1.117	71.30%	2.20%
2C	120	15	61	0.508	0.5009	0.00575	0.272	4/17/2006 11:10	4/17/2006 14:16	0.992	0.704	1.117	66.63%	2.24%
2D	120	16	71	0.592	0.5067	0.00479	0.330	4/17/2006 11:10	4/17/2006 14:16	0.991	0.703	1.117	73.00%	2.19%
4A	120	16	57	0.475	0.5121	0.00744	0.436	4/17/2006 11:10	4/17/2006 14:16	0.991	0.703	1.117	69.73%	2.21%
4B	120	29	75	0.625	0.5268	0.00196	0.468	4/17/2006 11:10	4/17/2006 14:16	0.991	0.703	1.117	63.36%	2.28%
4C	120	20	65	0.542	0.5052	0.00426	0.452	4/17/2006 11:10	4/17/2006 14:14	0.997	0.707	1.117	74.64%	2.17%
4D	120	16	78	0.650	0.5004	0.00816	0.432	4/17/2006 11:10	4/17/2006 14:14	0.992	0.707	1.117	69.68%	2.21%
3B	60	28	393	6.550	0.4832	0.00655	0.388	4/17/2006 11:10	4/17/2006 15:08	0.992	0.638	1.058	75.08%	2.17%
3C	60	30	443	7.383	0.4861	0.00535	0.424	4/17/2006 11:10	4/17/2006 15:09	0.997	0.637	1.058	72.67%	2.19%

Results Decision Level pCi/L	Critical Level pCi/L	MDA pCi/L	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal	Recovery
							Counting Uncertainty	Total Prop. Uncertainty						
0.6350	0.4483	0.9727	0.7656	0.3330	0.2330	0.0774	0.5116	0.5128		SAMPLE				
0.5871	0.4145	0.9087	0.5463	0.4317	0.1543	0.0665	0.4616	0.4623		SAMPLE				
0.4975	0.3512	0.7641	0.7080	0.2983	0.2590	0.0771	0.4130	0.4140		SAMPLE				
0.4628	0.3267	0.7098	0.7779	0.2602	0.3117	0.0808	0.3951	0.3967		SAMPLE				
0.4197	0.2963	0.6441	0.6297	0.2854	0.2760	0.0785	0.3511	0.3522		SAMPLE				
0.3545	0.2503	0.5490	0.8000	0.2128	0.3730	0.0789	0.3318	0.3336		SAMPLE				
0.3767	0.2660	0.5861	0.5675	0.2985	0.2363	0.0691	0.3254	0.3264		SAMPLE				
0.3747	0.2645	0.5779	0.5673	0.2866	0.2617	0.0748	0.3177	0.3187		SAMPLE				
0.4463	0.3151	0.6809	0.0876	1.7822	0.0390	0.0695	0.3061	0.3061		SAMPLE				
0.4948	0.3493	0.7528	0.3775	0.4998	0.1570	0.0784	0.3694	0.3698		SAMPLE				
0.4253	0.3003	0.6480	0.1886	0.8212	0.0897	0.0796	0.3034	0.3035		MB				
0.4525	0.3195	0.6905	0.4989	0.3643	0.2180	0.0793	0.3555	0.3562	159251006	DUP	0.0%		30.48	105.0%
1.3760	0.9714	2.1771	31.9974	0.0584	6.1620	0.3316	3.3747	3.6618	159251006	MS			13.47	121.8%
0.6532	0.4612	1.0287	16.4108	0.0554	6.9593	0.3520	1.6269	1.7812		LCS				

9/14/11
JPD

SampleID	Instr	Time	Alpha	Beta	Count Start Time	Count End Time
158436001	1A	120	26	75	4/17/2006 14:14	4/17/2006 16:14
158783001	1B	120	19	55	4/17/2006 14:15	4/17/2006 16:15
158783002	1C	120	18	75	4/17/2006 14:15	4/17/2006 16:15
159251003	1D	120	19	83	4/17/2006 14:16	4/17/2006 16:16
159251004	2A	120	16	78	4/17/2006 14:16	4/17/2006 16:16
159251005	2B	120	15	81	4/17/2006 14:16	4/17/2006 16:16
159251006	2C	120	15	61	4/17/2006 14:16	4/17/2006 16:16
159252001	2D	120	16	71	4/17/2006 14:16	4/17/2006 16:16
159253001	4A	120	16	57	4/17/2006 14:16	4/17/2006 16:16
159254001	4B	120	29	75	4/17/2006 14:16	4/17/2006 16:16
1201060412	4C	120	20	65	4/17/2006 14:14	4/17/2006 16:14
1201060413	4D	120	16	78	4/17/2006 14:14	4/17/2006 16:14
1201060414	3B	60	28	393	4/17/2006 15:08	4/17/2006 16:08
1201060415	3C	60	30	443	4/17/2006 15:09	4/17/2006 16:09

A

COUNTING

1480, RiaCalc WIZ, program 3.6, serial #4800440

ASSAY 17-Apr-06 8:40:59

Protocol id 8 228_REC
 Time limit 300
 Count limit 50000
 Isotope Ba-133
 Protocol date 27-Apr-05 14:46:49
 Run id. 88

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	CLOCK
1	97	1	300	1989	364.4	2.5		41:08.0
2	97	2	300	1432	252.9	3.08		69.40
3	97	3	300	1385	243.4	3.15		66.79
4	97	4	300	1699	306.3	2.76		84.06
5	97	5	300	1310	228.4	3.27		62.68
6	89	6	300	1423	251.1	3.09		68.91
7	89	7	300	1466	259.8	3.03		71.30
8	89	8	300	1381	242.8	3.15		66.63
9	89	9	300	1498	266	2.99		73.00
10	89	10	300	1438	254.1	3.07		69.73
11	93	11	300	1322	230.9	3.25		63.36
12	93	12	300	1527	272	2.95		74.64
13	93	13	300	1437	253.9	3.07		69.68
14	93	14	300	1536	273.6	2.94		75.08
15	93	15	300	1492	264.8	3		72.67

END OF ASSAY

END OF COUNTING

J/M
1/18/06

Radiochemistry Batch Checklist, Rev 4

Batch# 515983 Product: Ra-228 Date: 4/26/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.	NA		
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits. Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time. Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.	NA		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All lineouts initialed and dated. No transcription errors are apparent.	✓		
QC data entered into QC database. Batch entered into Case Narrative.	✓		
Batch non-conformances completed If applicable.	NA		

General Engineering Laboratories

2/22/2005
Primary Review Performed By: J. Paron 4/26/06

Secondary Review Performed By: NO 4/26/06

4/20-4/27

MWHL
Page 186 of 924

Radium-228 Que Sheet

Batch #: 515983 Analyst: KSDI Minimum Due Date: 04/20/2006 ^{Jan} _{1st} Ac-228 Ingrow: 2200 4/24/06
 Spike Isotope: Radium-228 Spike Code: ~~0503-B~~ Expiration Date: 4/1/06 Vol: 0.7 0.12
 LCS Isotope: Radium-228 LCS Code: 0503-B Expiration Date: 4/1/06 Vol: 2.1 0.12
 Tracer Isotope: Barium-133 Tracer Code: 0112-H Expiration Date: 1/18/07 Vol: 0.1 0.12
 Prep Date: 4/20/06 Initials: KSDS Pipet ID: 276653 Balance ID: S1204863 Witness: MSP 4/20/06
 Ac-228 Separation Date/Time: 112Y 4/26/06

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Bkr #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
158783003	2603210153	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	20-MAR-06 03:00 PM	1	600	1A	90.67	98-1
158783004	2603210155	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	20-MAR-06 02:00 PM	2	600	1B	91.83	98-2
158783005	2603210156	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	20-MAR-06 12:00 PM	3	600	1C	90.70	98-3
158971001	2603220347 M-103	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	21-MAR-06 02:00 PM	4	600	1D	87.76	98-4
158971002	2603220348 TR-7	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	21-MAR-06 12:00 PM	5	600	2A	101.86	98-5
158971003	2603220357 TR-9	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	21-MAR-06 09:00 AM	6	600	2B	77.34	91-6
158971004	2603230360 TR-10	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	21-MAR-06 10:20 AM	7	600	2C	86.39	91-7
159242001	2603240118 H-11	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	23-MAR-06 03:20 PM	8	600	2D	81.53	91-8
159242002	2603240122 M-117	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	23-MAR-06 02:50 PM	9	600	3A	83.35	91-9
159242003	2603240135 M-121	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	23-MAR-06 08:30 AM	10	600	3B	73.57	91-10
159243001	2603230197 M-118	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	22-MAR-06 02:30 PM	11	600	3C	87.91	94-11
159244001	2603250005 EB-3	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	24-MAR-06 12:00 PM	12	600	4A	84.17	94-12
159247001	2603230069 M-120	SAMPLE		2 pCi/L	GROUND WATI	MWHL002	22-MAR-06 10:20 AM	13	600	4B	83.70	94-13
1201060416	MB for batch 515983	MB		2 pCi/L	GROUND WATI	QC ACCOUNT		14	600	4C	89.32	94-14
1201060417	2603240135 M-121(159242003)DUIDUP			2 pCi/L	GROUND WATI	QC ACCOUNT		15	600	4D	88.86	94-15
1201060418	2603240135 M-121(159242003)MSMS			2 pCi/L	GROUND WATI	QC ACCOUNT	23-MAR-06 08:30 AM	16	400	3D	85.43	93-16
1201060419	LCS for batch 515983	LCS		2 pCi/L	GROUND WATI	QC ACCOUNT	23-MAR-06 08:30 AM	17	600	3E	88.79	93-17

Comments: _____
 Data Reviewed By: SPM 4/26/06

NO 4/26/06

Radium-228 Water

Filename : RA228.XLS
 File type : Excel
 Version # : 1

Spike S/N : 0503-B
 Spike Exp Date : 9/9/2006
 Spike Activity (dpm/ml): 268.22
 Spike Volume Added: 0.2

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

LCS S/N : 0503-B
 LCS Exp Date : 9/9/2006
 LCS Activity (dpm/ml): 268.22
 LCS Volume Added: 0.2

Procedure Code : GFC28FIAL
 Parmname : Radium-228

Required MDA: 2 pCi/L
 Half-life of Ra-228: 5.75 years
 Half-life of Ac-228: 6.13 hours
 Batch counted on : PIC
 BKG Count time : 500 min

Tracer S/N : 0112-H
 Tracer Exp Date : 1/18/2007
 Tracer Volume Added: 0.2

Batch : 515983
 Analyst : KSD1
 Prep Date : 4/20/2006
 Ra-228 Abundance : 1
 Calibration Date : 4/22/2005
 Calibration Due Date : 4/30/2006

Sample Characteristics				Tracer Calculations				
Sample ID	Sample Aliquot L	Sample Aliquot StDev.	Sample Date/Time	Tracer Concentration (Ba-133 Ref.)	Tracer Ref. Count Uncertainty	Tracer Concentration (Ba-133 Samp.)	Tracer Aliquot (mL)	Tracer Aliquot StDev.
158783003	0.600	2.0573E-05	3/20/2006 15:00	391.9	2.40%	710.7	0.2	0.000701
158783004	0.600	2.0573E-05	3/20/2006 14:00	391.9	2.40%	719.8	0.2	0.000701
158783005	0.600	2.0573E-05	3/20/2006 12:00	391.9	2.40%	710.9	0.2	0.000701
158971001	0.600	2.0573E-05	3/21/2006 14:00	391.9	2.40%	734.9	0.2	0.000701
158971002	0.600	2.0573E-05	3/21/2006 12:00	391.9	2.40%	798.4	0.2	0.000701
158971003	0.600	2.0573E-05	3/21/2006 9:00	391.9	2.40%	606.2	0.2	0.000701
158971004	0.600	2.0573E-05	3/21/2006 10:20	391.9	2.40%	677.1	0.2	0.000701
159242001	0.600	2.0573E-05	3/23/2006 15:20	391.9	2.40%	639.0	0.2	0.000701
159242002	0.600	2.0573E-05	3/23/2006 14:50	391.9	2.40%	653.3	0.2	0.000701
159242003	0.600	2.0573E-05	3/23/2006 8:30	391.9	2.40%	576.8	0.2	0.000701
159243001	0.600	2.0573E-05	3/22/2006 14:30	391.9	2.40%	689.0	0.2	0.000701
159244001	0.600	2.0573E-05	3/24/2006 12:00	391.9	2.40%	659.7	0.2	0.000701
159247001	0.600	2.0573E-05	3/22/2006 10:20	391.9	2.40%	657.6	0.2	0.000701
1201060416	0.600	2.0573E-05	4/20/2006 0:00	391.9	2.40%	700.1	0.2	0.000701
1201060417	0.600	2.0573E-05	3/23/2006 8:30	391.9	2.40%	696.5	0.2	0.000701
1201060418	0.400	1.9669E-05	3/23/2006 8:30	391.9	2.40%	669.6	0.2	0.000701
1201060419	0.600	2.0573E-05	4/20/2006 0:00	391.9	2.40%	695.9	0.2	0.000701

no 4/26/06

SK 4/26/06

Count raw Data															
Detector ID	Counting Time	Gross Alpha	Gross Beta	Beta cpm	Detector Efficiency	Detector Efficiency Error	Weekly Bkg cpm	Count Time	Separation Date/Time	Count Start Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Sample Recovery %	Sample Recovery Error %
1A	60	14	70	1.167	0.5132	0.00600	0.414	500	4/26/2006 11:24	4/26/2006 13:29	0.988	0.789	1.058	90.67%	1.56%
1B	60	6	37	0.617	0.5082	0.00409	0.308	500	4/26/2006 11:24	4/26/2006 13:29	0.988	0.789	1.058	91.83%	1.56%
1C	60	8	39	0.650	0.5231	0.00344	0.368	500	4/26/2006 11:24	4/26/2006 13:29	0.988	0.789	1.058	90.70%	1.56%
1D	60	6	32	0.593	0.5121	0.00511	0.450	500	4/26/2006 11:24	4/26/2006 13:30	0.988	0.789	1.058	93.76%	1.55%
2A	60	6	31	0.517	0.5097	0.00349	0.376	500	4/26/2006 11:24	4/26/2006 13:30	0.988	0.789	1.058	101.86%	1.53%
2B	60	6	28	0.467	0.5242	0.00383	0.312	500	4/26/2006 11:24	4/26/2006 13:30	0.988	0.788	1.058	77.34%	1.61%
2C	60	4	44	0.733	0.5009	0.00575	0.294	500	4/26/2006 11:24	4/26/2006 13:30	0.988	0.788	1.058	86.39%	1.57%
2D	60	15	46	0.767	0.5067	0.00479	0.388	500	4/26/2006 11:24	4/26/2006 13:30	0.989	0.788	1.058	81.53%	1.59%
3A	60	15	49	0.817	0.4603	0.00943	0.308	500	4/26/2006 11:24	4/26/2006 13:30	0.989	0.788	1.058	83.35%	1.59%
3B	60	12	48	0.800	0.4832	0.00655	0.368	500	4/26/2006 11:24	4/26/2006 13:30	0.989	0.788	1.058	73.59%	1.62%
3C	60	6	47	0.783	0.4861	0.00535	0.436	500	4/26/2006 11:24	4/26/2006 13:30	0.989	0.788	1.058	87.91%	1.57%
4A	60	12	38	0.633	0.5121	0.00744	0.340	500	4/26/2006 11:24	4/26/2006 13:30	0.989	0.788	1.058	84.17%	1.58%
4B	60	9	40	0.667	0.5268	0.00196	0.502	500	4/26/2006 11:24	4/26/2006 13:32	0.988	0.786	1.058	83.90%	1.58%
4C	60	11	34	0.567	0.5052	0.00426	0.422	500	4/26/2006 11:24	4/26/2006 13:29	0.998	0.789	1.058	89.32%	1.57%
4D	60	15	42	0.700	0.5004	0.00816	0.448	500	4/26/2006 11:24	4/26/2006 13:29	0.989	0.789	1.058	88.86%	1.57%
3D	60	43	1181	19.683	0.4940	0.00464	0.420	500	4/26/2006 11:24	4/26/2006 13:44	0.989	0.768	1.058	85.43%	1.58%
3B	60	72	1063	17.717	0.4832	0.00655	0.368	500	4/26/2006 11:24	4/26/2006 14:35	0.998	0.698	1.058	88.79%	1.57%

Handwritten signature

Results Decision Level pCi/L	Critical Level pCi/L	MDA pCi/L	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty	2 SIGMA Total Prop. Uncertainty	Sample QC	Sample Type	RPD	FIER	Nominal	Recovery
0.5994	0.4232	0.9451	1.6482	0.1889	0.7527	0.1424	0.6111	0.6135		SAMPLE				
0.5155	0.3640	0.8264	0.6740	0.3385	0.3087	0.1044	0.4467	0.4472		SAMPLE				
0.5543	0.3914	0.8796	0.6058	0.3818	0.2820	0.1076	0.4529	0.4533		SAMPLE				
0.6056	0.4275	0.9508	0.1768	1.1874	0.0833	0.0989	0.4115	0.4115		SAMPLE				
0.5120	0.3614	0.8114	0.2761	0.6881	0.1407	0.0968	0.3722	0.3723		SAMPLE				
0.5973	0.4217	0.9568	0.3888	0.5929	0.1547	0.0917	0.4516	0.4518		SAMPLE				
0.5433	0.3836	0.8734	1.0348	0.2582	0.4393	0.1132	0.5225	0.5236		SAMPLE				
0.6533	0.4613	1.0337	0.9337	0.3079	0.3787	0.1164	0.5626	0.5634		SAMPLE				
0.6269	0.4426	1.0049	1.3507	0.2352	0.5087	0.1193	0.6208	0.6227		SAMPLE				
0.7395	0.5221	1.1733	1.2379	0.2751	0.4320	0.1186	0.6662	0.6675		SAMPLE				
0.6700	0.4730	1.0537	0.8285	0.3402	0.3473	0.1180	0.5517	0.5524		SAMPLE				
0.5862	0.4139	0.9344	0.6933	0.3618	0.2933	0.1060	0.4910	0.4916		SAMPLE				
0.6973	0.4923	1.0890	0.3810	0.6886	0.1647	0.1101	0.4991	0.4993		SAMPLE				
0.6177	0.4361	0.9729	0.3233	0.7013	0.1447	0.1014	0.4443	0.4445		MB				
0.6518	0.4602	1.0236	0.5769	0.4451	0.2520	0.1121	0.5029	0.5033	159242003	DUP	72.8%		60.96	115.5%
1.0251	0.7237	1.6151	71.6257	0.0340	19.2633	0.5735	4.1795	4.7742	159242003	MS			40.27	114.5%
0.6861	0.4844	1.0888	46.1275	0.0357	17.3487	0.5441	2.8353	3.2251		LCS				

26
4/26/01

SampleID	Instr	Time	Alpha	Beta	Count Start Time	Count End Time
158783003	1A	60	14	70	4/26/2006 13:29	4/26/2006 14:29
158783004	1B	60	6	37	4/26/2006 13:29	4/26/2006 14:29
158783005	1C	60	8	39	4/26/2006 13:29	4/26/2006 14:29
158971001	1D	60	6	32	4/26/2006 13:30	4/26/2006 14:30
158971002	2A	60	6	31	4/26/2006 13:30	4/26/2006 14:30
158971003	2B	60	6	28	4/26/2006 13:30	4/26/2006 14:30
158971004	2C	60	4	44	4/26/2006 13:30	4/26/2006 14:30
159242001	2D	60	15	46	4/26/2006 13:30	4/26/2006 14:30
159242002	3A	60	15	49	4/26/2006 13:30	4/26/2006 14:30
159242003	3B	60	12	48	4/26/2006 13:30	4/26/2006 14:30
159243001	3C	60	6	47	4/26/2006 13:30	4/26/2006 14:30
159244001	4A	60	12	38	4/26/2006 13:30	4/26/2006 14:30
159247001	4B	60	9	40	4/26/2006 13:32	4/26/2006 14:32
1201060416	4C	60	11	34	4/26/2006 13:29	4/26/2006 14:29
1201060417	4D	60	15	42	4/26/2006 13:29	4/26/2006 14:29
1201060418	3D	60	43	1181	4/26/2006 13:44	4/26/2006 14:44
1201060419	3B	60	72	1063	4/26/2006 14:35	4/26/2006 15:35

1/2/2006

1480, RiaCalc WIZ, program 3.6, serial #4800440

ASSAY 25-Apr-06 17:54:18

Protocol id 8 228_REC
Time limit 300
Count limit 50000
Isotope Ba-133
Protocol date 27-Apr-05 14:46:49
Run id. 94

	POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVI
	1	98	98	1	300	2127	391.9	2.4
*	1	98	98	1	300	3720	710.7	1.74 90.67
*	2	98	98	2	300	3766	719.8	1.72 91.83
*	3	98	98	3	300	3721	710.9	1.74 90.70
*	4	98	98	4	300	3841	734.9	1.71 93.76
*	5	98	98	5	300	4158	798.4	1.63 101.86
*	6	91	91	6	300	3198	606.2	1.89 77.34
*	7	91	91	7	300	3552	677.1	1.78 86.39
*	8	91	91	8	300	3362	639	1.84 81.53
*	9	91	91	9	300	3433	653.3	1.82 83.35
*	10	91	91	10	300	3051	576.8	1.94 73.59
*	11	94	94	11	300	3612	689	1.76 87.91
*	12	94	94	12	300	3465	659.7	1.81 84.17
*	13	94	94	13	300	3455	657.6	1.81 83.90
*	14	94	94	14	300	3667	700.1	1.75 89.32
*	15	94	94	15	300	3649	696.5	1.75 88.86
*	16	93	93	16	300	3515	669.6	1.79 85.43
*	17	93	93	17	300	3646	695.9	1.76 88.79

* Samples were double spiked *traced. & 4/26/06*

END OF ASSAY

END OF COUNTING

2/6 4/25/07

Radiochemistry Batch Checklist, Rev 4

Batch# 522920 Product: PG-210 Date: 4/26/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.	NA		
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL.	✓		
(If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.	NA		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database.	✓		
Batch entered into Case Narrative.	✓		
Batch non-conformances completed if applicable.	NA		

General Engineering Laboratories

2/22/2005

Primary Review Performed By:

J. Rosen 4/29/06 4/26/06

Secondary Review Performed By:

no 4/26/06

4/20 - 4/27

MW HL Page 193 of 924

Pb-210 Que Sheet

04/21/06

Batch #: 522920 Analyst: BXF1 Minimum Due Date 04/20/2006

Spike Isotope: Pb210 Spike Code: ET 491 E Expiration Date: 11-11-06 Vol: 0.1-1 Bi Separation Date/Time: 1800 4/12/06

LCS Isotope: Pb210 LCS Code: ET 491 E Expiration Date: 11-11-06 Vol: 0.1-1 Std Wt: 13.88

Carrier: Pb Carrier Code: 1006564 Expiration Date: 1-19-08 Vol: 1ml Analytical Scale #: 3810047

Prep Date: 4-21-06 Initials: BXF Pipet #: 4497063 Balance #: 36040216 Witness: NXP 4/21/06

Sample ID	Client Description	Hazard Type Code	RDL	Client	Matrix	Collection Date & Time	Bkr#	Aliquot (ml) or g	Det	Initial Pb Weight (g)	Final Pb Weight (g)	Net Pb Weight (mg)
158783001	2603210144	SAMPLE	3 pCi/L	MWHL002	GROUND	WAT20-MAR-06	1	500	1A	.0791	.0871	7.0
158783002	2603210150	SAMPLE	3 pCi/L	MWHL002	GROUND	WAT20-MAR-06	2	500	1B	.0794	.0862	6.8
158783003	2603210153	SAMPLE	3 pCi/L	MWHL002	GROUND	WAT20-MAR-06	3	500	1C	.0796	.0884	8.8
158783004	2603210155	SAMPLE	3 pCi/L	MWHL002	GROUND	WAT20-MAR-06	4	500	1D	.0783	.0849	6.6
158783005	2603210156	SAMPLE	3 pCi/L	MWHL002	GROUND	WAT20-MAR-06	5	500	2A	.0790	.0853	6.3
1201076207	MB for batch 522920	MB	3 pCi/L	QC ACCOUNT	GROUND	WAT1	6	500	2B	.0747	.0838	9.1
1201076208	2603210144(158783001DUP)	DUP	3 pCi/L	QC ACCOUNT	GROUND	WAT20-MAR-06	7	500	2C	.0744	.0815	7.1
1201076209	2603210144(158783001MS)	MS	3 pCi/L	QC ACCOUNT	GROUND	WAT20-MAR-06	8	250	2D	.0758	.0826	6.8
1201076210	LCS for batch 522920	LCS	3 pCi/L	QC ACCOUNT	GROUND	WAT1	9	500	3A	.0791	.0872	8.1

WV

Instrument Used (circle one): LB4100 S/N 8219 PIC S/N: 10751-4

Data Reviewed By:

[Signature]

Page 1 of 1

[Signature]

Lead-210 Water

Filename : PB210.XLS
 File type : Excel
 Version # : 1

Spike S/N : ET491-E
 Spike Exp Date : 11/11/2006
 Spike Activity (dpm/ml): 405.35
 Spike Volume Added: 0.1

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

LCS S/N : ET491-E
 LCS Exp Date : 11/11/2006
 LCS Activity (dpm/ml): 405.35
 LCS Volume Added: 0.1

Procedure Code : GFC_PBL
 Parname : Lead-210

Carrier S/N : 1006864
 Carrier Exp Date : 1/19/2008
 Carrier Volume Added: 1.0
 Carrier Weight (mg/ml): 13.88
 Carrier Weight StDev.: 0.05

Batch : 522920
 Analyst : BXF1
 Prep Date : 4/21/2006
 Pb-210 Abundance : 1

Calibration Date : 7/29/2005
 Calibration Due Date : 7/29/2006

Required MDA: 3 pCi/L
 Half-life of Pb-210 : 22.26 years
 Half-life of Bi-210 : 5.013 days
 Batch counted on : PIC
 BKG Count time : 500 min

Sample Characteristics			Carrier Calculations				
Sample ID	Sample Aliquot L	Sample Aliquot StDev.	Carrier Weight (Standard)	Net Weight (Sample)	Net Weight StDev.	Carrier Aliquot (mL)	Carrier Aliquot StDev.
158783001	0.500	2.0256E-05	13.88	7.0	0.037416	1.0	0.005480
158783002	0.500	2.0256E-05	13.88	6.8	0.036556	1.0	0.005480
158783003	0.500	2.0256E-05	13.88	8.8	0.045152	1.0	0.005480
158783004	0.500	2.0256E-05	13.88	6.6	0.035697	1.0	0.005480
158783005	0.500	2.0256E-05	13.88	6.3	0.034407	1.0	0.005480
1201076207	0.500	2.0256E-05	13.88	9.1	0.046442	1.0	0.005480
1201076208	0.500	2.0256E-05	13.88	7.1	0.037846	1.0	0.005480
1201076209	0.250	1.7439E-05	13.88	6.8	0.036556	1.0	0.005480
1201076210	0.500	2.0256E-05	13.88	8.1	0.042144	1.0	0.005480

Handwritten notes:
 11/11/2006
 11/11/2006

Count Raw Data															
Detector ID	Counting Time	Gross Counts		Gross Beta		Weekly Bkg		Detector Efficiency	Detector Efficiency Error	Count Start Date/Time	Bi-210 Separation Date/Time	Bi-210 Ingrowth	Pb-210 Decay	Sample Recovery %	Sample Recovery Error %
		Alpha	Beta	CPM	CPM	CPM	Time								
1A	180	13	163	0.906	0.414	0.3688	0.00600	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	50.43%	1.00%		
1B	180	12	86	0.478	0.308	0.3647	0.00409	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	48.99%	1.00%		
1C	180	9	89	0.494	0.368	0.3510	0.00344	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	63.40%	0.98%		
1D	180	20	100	0.556	0.450	0.3705	0.00511	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	47.55%	1.01%		
2A	180	20	97	0.539	0.376	0.3743	0.00349	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	45.39%	1.01%		
2B	180	6	74	0.411	0.312	0.3501	0.00383	4/26/2006 10:19	4/21/2006 18:00	0.481	1.000	65.56%	0.98%		
2C	180	21	108	0.600	0.294	0.3648	0.00575	4/26/2006 10:20	4/21/2006 18:00	0.481	0.997	51.15%	1.00%		
2D	60	4	215	3.583	0.388	0.3729	0.00479	4/26/2006 10:20	4/21/2006 18:00	0.478	0.997	48.99%	1.00%		
3A	60	10	209	3.483	0.308	0.3465	0.00943	4/26/2006 10:21	4/21/2006 18:00	0.478	1.000	58.36%	0.99%		

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Results Decision Level pCi/L	Critical Level pCi/L	MDA pCi/L	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty	2 SIGMA Total Prop. Uncertainty	Sample QC	Sample Type	RPD	RER	Nominal	Recovery
1.5964	1.1271	2.4061	4.9658	0.1562	0.4916	0.0765	1.5156	1.5198		SAMPLE				
1.4332	1.0119	2.1818	1.7852	0.3370	0.1698	0.0572	1.1786	1.1792		SAMPLE				
1.2578	0.8880	1.9029	1.0675	0.4669	0.1264	0.0590	0.9765	0.9768		SAMPLE				
1.7572	1.2406	2.6415	1.1258	0.5983	0.1056	0.0631	1.3199	1.3201		SAMPLE				
1.6653	1.1757	2.5177	1.8012	0.3759	0.1629	0.0612	1.3265	1.3270		SAMPLE				
1.1201	0.7908	1.7043	0.8092	0.5442	0.0991	0.0539	0.8630	0.8631		MB				
1.3410	0.9468	2.0449	3.0814	0.2050	0.3060	0.0626	1.2359	1.2379	158783001	DUP	46.8%		73.23	83.5%
5.4844	3.8720	8.6775	66.1355	0.0778	3.1953	0.2460	9.9780	10.0817	158783001	MS			36.52	81.1%
2.2016	1.5543	3.5293	29.6112	0.0775	3.1753	0.2422	4.4273	4.4975		LCS				

SampleID	Instr	Time	Alpha	Beta	Count Start Time	Count End Time
158783001	1A	180	13	163	4/26/2006 10:20	4/26/2006 13:20
158783002	1B	180	12	86	4/26/2006 10:20	4/26/2006 13:20
158783003	1C	180	9	89	4/26/2006 10:20	4/26/2006 13:20
158783004	1D	180	20	100	4/26/2006 10:20	4/26/2006 13:20
158783005	2A	180	20	97	4/26/2006 10:20	4/26/2006 13:20
1201076207	2B	180	6	74	4/26/2006 10:19	4/26/2006 13:19
1201076208	2C	180	21	108	4/26/2006 10:20	4/26/2006 13:20
1201076209	2D	60	4	215	4/26/2006 10:20	4/26/2006 11:20
1201076210	3A	60	10	209	4/26/2006 10:21	4/26/2006 11:21

Radiochemistry Batch Checklist, Rev 4

Batch# 57605 Product: Ra-226 Date: 4/11/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.			NA
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.			NA
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		Case narrative ^{MA} 4/11/06
Sample was run within hold time.			
Special requirements page checked	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.			
All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database.	✓		
Batch entered into Case Narrative.	✓		
Batch non-conformances completed If applicable.			NA

General Engineering Laboratories

2/22/2005
Primary Review Performed By: Ymlanie D. Aycock 4/11/06

Secondary Review Performed By: RO 4/12/06

4/20-4/27
MOTIL

Radium-226 Que Sheet

04/04/2006

General Engineering Laboratories, Radiochemistry Division

Batch #: 517605

Analyst: SG

Minimum Due Date: 04/20/2006

Spike Isotope: Radium-226

Spike Code: 0638-A

Expiration Date: /-17-07

Vol: 0.1

Nom Conc: 25.11

LCS Isotope: Radium-226

LCS Code: 0638-B

Expiration Date: /-17-07

Vol: 0.1

Nom Conc: 25.11

Prep Date: 4-6-06

Pipet ID: 1479303

Initials: SD6

Witness: JCS 4/6/06

Sample Count Time: 30/15 (Min)

Bkg Count Time: 30 (Min)

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Sample I	Client Description	Hazard Type	Matrix	Min CRDL	Client	Vol (mL)	End Init	End LN De-em	Start Count	Cell #	Det #	Bkg cpm	Total Counts
158275001	2603140472 PUMP BLANK	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	105	1	1	95 (15 min)
158276001	2603090347 FB-1	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	202	2	6	20
158277001	2603100260 EB-1	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	302	3	7	17
158436001	2603150120 TR-9A	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	407	4	8	10
158783001	2603210144	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	570	5	6	13
158783002	2603210150	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	610	6	7	19
158783003	2603210153	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	702	1	8	34
158783004	2603210155	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	210	2	7	17
158783005	2603210156	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	302	3	7	15
158971001	2603220347 M-103	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	403	4	8	20
158971002	2603220348 TR-7	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	503	5	8	23
158971003	2603220357 TR-9	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	612	6	7	19
158971004	2603220360 TR-10	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	110	1	8	31
159242003	2603240135 M-121	SAMPLE	GROUND WAI 2	pCi/L	MWHL002	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	203	2	7	21 parallel
1201063978	MB for batch 517605	MB	GROUND WAI 2	pCi/L	QC ACCOUNT	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	304	3	5	204 (15 min)
1201063982	2603240135 M-121(159242003)DUP	DUP	GROUND WAI 2	pCi/L	QC ACCOUNT	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	409	4	8	11
1201063983	2603240135 M-121(159242003)MEMIS	MEMIS	GROUND WAI 2	pCi/L	QC ACCOUNT	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	504	5	8	650
1201063981	LCS for batch 517605	LCS	GROUND WAI 2	pCi/L	QC ACCOUNT	500	4-7-06 0950	4-11-06 0450	4-11-06 0800	611	6	7	788

Indistinct

Data Reviewed By: Maxwell

Comments:

Instrument ID's:

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

Radium-226 Water

Filename : RA226.XLS
 File type : Excel
 Version # : 1

Spike S/N : 0638-B
 Spike Exp Date : 1/17/2007
 Spike Activity (dpm/ml): 278.76
 Spike Volume Added: 0.1

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

Batch : 517605
 Analyst : SG
 Prep Date : 4/6/2006
 Ra-226 Abundance : 1
 Calibration Date : 5/9/2005
 Calibration Due Date : 5/9/2006

Procedure Code : LUC26RAL
 Parmname : Radium-226
 Required MDA: 2 pCi/L
 Half-life of Ra-226 : 1600 years
 Half-life of Rn-222: 3.823 days
 Batch counted on : LUCAS CELL DETECTOR
 BKG Count time : 30 min

Sample Characteristics			Count Raw Data				Weekly Background				Detector Efficiency
Sample ID	Sample Aliquot L	Sample Aliquot StDev.	Sample Date/Time	Cell Number	Counting Time	Gross Counts	Gross CPM	Counts	CPM	Count Time	Detector Efficiency
158275001	0.500	2.0256E-05	3/13/2006 10:45	105	15	5	0.333	1	0.033	30	1.5740
158276001	0.500	2.0256E-05	3/8/2006 15:30	202	30	20	0.667	6	0.200	30	1.7750
158277001	0.500	2.0256E-05	3/9/2006 14:00	301	30	17	0.567	7	0.233	30	1.8210
158436001	0.500	2.0256E-05	3/14/2006 14:45	407	30	10	0.333	8	0.267	30	1.8030
158783001	0.500	2.0256E-05	3/20/2006 8:00	510	30	13	0.433	6	0.200	30	1.7730
158783002	0.500	2.0256E-05	3/20/2006 10:00	610	30	19	0.633	7	0.233	30	1.8880
158783003	0.500	2.0256E-05	3/20/2006 15:00	101	30	34	1.133	8	0.267	30	1.6500
158783004	0.500	2.0256E-05	3/20/2006 14:00	210	30	17	0.567	7	0.233	30	1.7260
158783005	0.500	2.0256E-05	3/20/2006 12:00	302	30	15	0.500	7	0.233	30	1.7770
158971001	0.500	2.0256E-05	3/21/2006 14:00	403	30	20	0.667	8	0.267	30	1.8910
158971002	0.500	2.0256E-05	3/21/2006 12:00	503	30	23	0.767	8	0.267	30	1.7430
158971003	0.500	2.0256E-05	3/21/2006 9:00	612	30	19	0.633	7	0.233	30	1.8340
158971004	0.500	2.0256E-05	3/21/2006 10:20	110	30	31	1.033	8	0.267	30	1.6640
159242003	0.500	2.0256E-05	3/23/2006 8:30	203	30	21	0.700	7	0.233	30	1.8230
1201063978	0.500	2.0256E-05	4/6/2006 0:00	304	15	4	0.267	5	0.167	30	1.7770
1201063982	0.500	2.0256E-05	3/23/2006 8:30	409	30	11	0.367	8	0.267	30	1.8770
1201063983	0.500	2.0256E-05	3/23/2006 8:30	504	30	650	21.667	8	0.267	30	1.6760
1201063981	0.500	2.0256E-05	4/6/2006 0:00	611	30	788	26.267	7	0.233	30	1.7730

Handwritten: MFA 4/11/06
 no y/b/06

Detector Efficiency Error	De-Gas Date/Time	Rn-222 Ingrow End Date/Time	Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
					Ingrowth to Count	During Count	
0.02415	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 11:25	0.497	0.951	1.001	1.000
0.02691	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 8:00	0.497	0.976	1.002	1.000
0.00980	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 8:00	0.497	0.976	1.002	1.000
0.01759	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 8:00	0.497	0.976	1.002	1.000
0.02843	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 8:00	0.497	0.976	1.002	1.000
0.02655	4/7/2006 9:50	4/11/2006 4:50	4/11/2006 8:00	0.497	0.976	1.002	1.000
0.02415	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.02691	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.00980	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.01759	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.02843	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.02655	4/7/2006 9:50	4/11/2006 5:25	4/11/2006 8:35	0.499	0.976	1.002	1.000
0.02415	4/7/2006 9:50	4/11/2006 5:55	4/11/2006 9:15	0.501	0.975	1.002	1.000
0.00980	4/7/2006 9:50	4/11/2006 5:55	4/11/2006 9:15	0.501	0.959	1.001	1.000
0.01759	4/7/2006 9:50	4/11/2006 5:55	4/11/2006 9:15	0.501	0.975	1.002	1.000
0.02843	4/7/2006 9:50	4/11/2006 5:55	4/11/2006 9:15	0.501	0.975	1.002	1.000
0.02655	4/7/2006 9:50	4/11/2006 5:55	4/11/2006 9:15	0.501	0.975	1.002	1.000

March 11, 2007

Results Decision Level pCi/L	Critical Level pCi/L	MDA pCi/L	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA		2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal	Recovery
							Counting Uncertainty	Total Prop. Uncertainty	Counting Uncertainty	Total Prop. Uncertainty						
0.1878	0.1326	0.4832	0.3627	0.5097	0.3000	0.1528	0.3619	0.3623	0.3619		SAMPLE					
0.2808	0.1982	0.4906	0.4871	0.3652	0.4667	0.1700	0.3477	0.3486	0.3477		SAMPLE					
0.2956	0.2087	0.5092	0.3391	0.4900	0.3333	0.1633	0.3256	0.3257	0.3256		SAMPLE					
0.3192	0.2254	0.5434	0.0685	2.1214	0.0667	0.1414	0.2848	0.2848	0.2848		SAMPLE					
0.2811	0.1985	0.4912	0.2438	0.6233	0.2333	0.1453	0.2976	0.2979	0.2976		SAMPLE					
0.2851	0.2013	0.4911	0.3925	0.4257	0.4000	0.1700	0.3269	0.3275	0.3269		SAMPLE					
0.3473	0.2452	0.5912	0.9687	0.2504	0.8667	0.2160	0.4733	0.4755	0.4733		SAMPLE					
0.3105	0.2192	0.5349	0.3562	0.4906	0.3333	0.1633	0.3420	0.3425	0.3420		SAMPLE					
0.3016	0.2129	0.5195	0.2768	0.5864	0.2667	0.1563	0.3181	0.3181	0.3181		SAMPLE					
0.3030	0.2139	0.5158	0.3901	0.4413	0.4000	0.1764	0.3372	0.3374	0.3372		SAMPLE					
0.3287	0.2321	0.5596	0.5291	0.3723	0.5000	0.1856	0.3849	0.3860	0.3849		SAMPLE					
0.2922	0.2063	0.5034	0.4023	0.4257	0.4000	0.1700	0.3350	0.3357	0.3350		SAMPLE					
0.3435	0.2425	0.5847	0.8476	0.2726	0.7667	0.2082	0.4511	0.4529	0.4511		SAMPLE					
0.2933	0.2070	0.5051	0.4709	0.3789	0.4667	0.1764	0.3489	0.3498	0.3489		SAMPLE					
0.3659	0.2583	0.7066	0.1053	1.5276	0.1000	0.1528	0.3154	0.3154	0.3154		MB					
0.3045	0.2150	0.5184	0.0980	1.4531	0.1000	0.1453	0.2791	0.2791	0.2791	159242003	DUP	0.0%		25.11	93.5%	
0.3410	0.2408	0.5805	23.4902	0.0490	21.4000	0.8551	1.8396	2.2578	1.8396	159242003	MS			25.11	107.6%	
0.3015	0.2129	0.5194	27.0123	0.0448	26.0333	0.9399	1.9114	2.3726	1.9114		LCS					

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Radiochemistry Batch Checklist, Rev 4

Batch# 523022 Product: Total U Date: 4/26/06

Criteria:	Yes	No	Comments
Sample Solids are less than 100 mg for GAB.	✓		
If activity less 10* MDA, error is 150% or less of sample activity. If greater 10* MDA, error is 40% or less. If below the MDA, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL has been met.	✓		
If duplicate activities are less 5* MDA, then rpd is 100% or less. If greater 5* MDA, then rpd 20% or less. If below the MDA, the rpd is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Special requirements page checked	✓		
Sample was correctly preserved if required.	NA		
Smears Taken for Radioactive batches.	NA		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All lineouts initialed and dated.	✓		
No transcription errors are apparent.	✓		
QC data entered into QC database.	✓		
Batch entered into Case Narrative.	✓		
Batch non-conformances completed If applicable.	NA		

General Engineering Laboratories

2/22/2005
Primary Review Performed By: [Signature]

Secondary Review Performed By: [Signature] 4/27/06

Total Uranium Que Sheet

04/21/2006

Batch #: 523026 Analyst: DRS1 Minimum Due Date: 04/20/2006 Comments
 Spike Isotope: Natural U Spike Code: 0903 Expiration Date: 3-1-07 Vol: 1.0 Nom Conc: 25.0
 LCS Isotope: Natural U LCS Code: 0903 Expiration Date: 3-1-07 Vol: 1.0 Nom Conc: 25.0
 LCS Code: 0903 Expiration Date: 3-1-07 Vol: 0.1 Witness: JX54 4/21/06
 Prep Date: 4-21-06 Initials: PPS Pipet ID: K609405/1829224
 (1.0) / (0.1)

Sample I	Client Description	Hazard Code	Type	Min CRDL	Matrix	Client	Bkr#	Sample Aliquot (g or mL)	Aliquot for Analysis (mL)
158783001	2603210144		SAMPLE	1 ug/L	GROUND WATER	MWHL002	1	5:10	1.0
158783002	2603210150		SAMPLE	1 ug/L	GROUND WATER	MWHL002	2	5:10	1.0
158783003	2603210153		SAMPLE	1 ug/L	GROUND WATER	MWHL002	3	5:10	1.0
158783004	2603210155		SAMPLE	1 ug/L	GROUND WATER	MWHL002	4	5:10	1.0
158783005	2603210156		SAMPLE	1 ug/L	GROUND WATER	MWHL002	5	5:10	1.0
159970001	9644328-1		SAMPLE	1 ug/L	GROUND WATER	ALSV001	6	5:10	1.0
160885001	9645601-1		SAMPLE	1 ug/L	WATER	ALSV001	7	5:10	1.0
161083001	0604-1132-1		SAMPLE	1 ug/L	WASTE WATER	MILA001	8	5:10	1.0
161083002	0604-1132-2		SAMPLE	1 ug/L	WASTE WATER	MILA001	9	5:10	1.0
1201076467	MB for batch 523026		MB	1 ug/L	GROUND WATER	QC ACCOUNT	10	5:10	1.0
1201076468	2603210144(158783001DUP)		DUP	1 ug/L	GROUND WATER	QC ACCOUNT	11	5:10	1.0
1201076469	2603210144(158783001MS)		MS	1 ug/L	GROUND WATER	QC ACCOUNT	12	5:10	1.0
1201076470	LCS for batch 523026		LCS	1 ug/L	GROUND WATER	QC ACCOUNT	13	5:10	1.0
1201076471	LCS for batch 523026		LCSD	1 ug/L	GROUND WATER	QC ACCOUNT	14	5:10	1.0

Instrument Used (circle one): KPA-10 S/N 89-05050-0035, KPA-10A S/N 89-05040-025, KPA-11 S/N 94-45050-064
 (KPA-10A) S/N 05-45050162
 Data Reviewed By: Jul 4/16/06
SSC 4/27/06
 General Engineering Laboratories, Radiochemistry Division Page 1 of 1

Uranium Water

Filename : TOTU.XLS
 File type : Excel
 Version # : 1

Spike S/N : 0903
 Spike Exp Date : 3/1/2007
 Spike Activity (ug/L): 250.00
 Spike Volume Added(ml): 1.0

LCS S/N : 0903
 LCS Exp Date : 3/1/2007
 LCS Activity (ug/L): 250.00
 LCS Volume Added(ml): 1.0

Batch : 523026

Analyst : DRS1
 Prep Date : 4/21/2006

Nat-U Abundance : 1

Procedure Code : KPATOTUL
 Parmname : Total Uranium

Calibration Date : 4/25/2006 1:46:57

Calibration Due Date : 4/26/2006 1:46:57

Batch counted on : KPA11AUTO2

Sample Characteristics

KPA Raw Data

Sample ID	Initial Aliquot L	Initial Sample StDev.	Final Aliquot L	Final Aliquot StDev.	Sample Counted mL	Sample Counted StDev.	Sample Date/Time	Analysis Range	Intensity	Lifetime (us)	R ²
158783001	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 8:00	Low	24092.910	156.1117	0.9999
158783002	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 10:00	Low	9077.871	268.0822	0.9996
158783003	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 15:00	Low	43776.840	236.8125	0.9999
158783004	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 14:00	Low	18047.940	287.7162	1.0000
158783005	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 12:00	Low	17886.090	292.3452	0.9999
159970001	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/4/2006 8:00	Low	13357.930	309.4055	0.9998
160885001	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/13/2006 10:15	Low	5519.056	301.5107	0.9993
161083001	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/17/2006 12:00	Low	204.690	274.9048	0.9164
161083002	0.005	3.7355E-06	0.100	1.1370E-05	1.000	5.4802E-03	4/17/2006 12:00	Low	1682.751	168.3703	0.9970
1201076467	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/21/2006 0:00	Low	177.740	309.8766	0.9049
1201076468	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 8:00	Low	22854.040	268.7092	0.9999
1201076469	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	3/20/2006 8:00	High	3569.094	259.5782	0.9992
1201076470	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/21/2006 0:00	High	3078.069	309.3802	0.9992
1201076471	0.005	3.7355E-06	0.010	4.2391E-06	1.000	5.4802E-03	4/21/2006 0:00	Low	18346.850	304.6566	0.9999

DRS1

DRS1

Ref Ratio	Results (ug/L)	Error (ug/L)	Count Date/Time	Dilution Corrected Results			Results (pCi)					1 SIGMA Total Prop. Uncertainty
				KPA Result ug/L	KPA Error ug/L	MDA pCi/L	Decision Level pCi/L	Critical Level pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	1 SIGMA Counting Uncertainty	
0.9992	3.5141	0.0386	4/25/2006 14:37	7.0282	0.0772	0.2880	0.2040	0.1440	4.7089	0.0074	0.1013	0.1136
0.9974	1.3612	0.0156	4/25/2006 14:39	2.7223	0.0311	0.2880	0.2040	0.1440	1.8239	0.0077	0.0408	0.0454
0.9985	6.3365	0.0684	4/25/2006 14:41	12.6730	0.1367	0.2880	0.2040	0.1440	8.4909	0.0072	0.1795	0.2020
0.9981	2.6473	0.0284	4/25/2006 14:43	5.2947	0.0567	0.2880	0.2040	0.1440	3.5474	0.0072	0.0745	0.0840
0.9938	2.6241	0.0282	4/25/2006 14:45	5.2483	0.0565	0.2880	0.2040	0.1440	3.5163	0.0072	0.0742	0.0835
0.9907	1.9749	0.0215	4/25/2006 14:47	3.9497	0.0429	0.2880	0.2040	0.1440	2.6463	0.0073	0.0564	0.0633
0.9927	0.8509	0.0099	4/25/2006 14:49	1.7017	0.0198	0.2880	0.2040	0.1440	1.1402	0.0078	0.0260	0.0288
0.9909	0.0889	0.0054	4/25/2006 14:52	0.1777	0.0109	0.2880	0.2040	0.1440	0.1191	0.0410	0.0143	0.0143
0.9680	0.3008	0.0062	4/25/2006 16:22	6.0159	0.1247	2.8804	2.0399	1.4402	4.0307	0.0139	0.1637	0.1695
1.0010	0.0850	0.0050	4/25/2006 14:22	0.1700	0.0099	0.2880	0.2040	0.1440	0.1139	0.0391	0.0130	0.0131
1.0035	3.3365	0.0363	4/25/2006 14:25	6.6729	0.0726	0.2880	0.2040	0.1440	4.4709	0.0073	0.0953	0.1070
1.0046	29.7430	0.9604	4/25/2006 14:29	59.4860	1.9208	0.2880	0.2040	0.1440	39.8556	0.0216	2.5223	2.5595
1.0064	25.7056	0.8263	4/25/2006 14:32	51.4112	1.6526	0.2880	0.2040	0.1440	34.4455	0.0215	2.1702	2.2025
1.0013	2.6902	0.0292	4/25/2006 14:34	5.3804	0.0583	0.2880	0.2040	0.1440	3.6049	0.0073	0.0766	0.0861

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MDA Study Information

Effective Date: 4/1/2006
 Expiration Date: 7/1/2006
 Average: 1.090000000
 StDev.: 0.046200000

Results (ug)	Decision Level ug/L	Critical Level ug/L	MDA ug/L	Sample Act. Conc. ug/L	Sample Act. Error ug/L	2 SIGMA Counting Uncertainty	2 SIGMA Total Prop. Uncertainty	Sample QC	Sample Type	RPD	RER	Nominal	Recovery
0.3045	0.2150	0.4299	7.0282	0.0110	0.1513	0.1696	SAMPLE						
0.3045	0.2150	0.4299	2.7223	0.0114	0.0610	0.0678	SAMPLE						
0.3045	0.2150	0.4299	12.6730	0.0108	0.2680	0.3015	SAMPLE						
0.3045	0.2150	0.4299	5.2947	0.0107	0.1112	0.1253	SAMPLE						
0.3045	0.2150	0.4299	5.2463	0.0108	0.1107	0.1246	SAMPLE						
0.3045	0.2150	0.4299	3.9497	0.0109	0.0842	0.0945	SAMPLE						
0.3045	0.2150	0.4299	1.7017	0.0116	0.0387	0.0430	SAMPLE						
0.3045	0.2150	0.4299	0.1777	0.0611	0.0213	0.0214	SAMPLE						
3.0447	2.1496	4.2992	6.0159	0.0207	0.2444	0.2530	SAMPLE						
0.3045	0.2150	0.4299	0.1700	0.0563	0.0194	0.0195	MB						
0.3045	0.2150	0.4299	6.6729	0.0109	0.1422	0.1598	158783001	DUP	5.2%			50.00	104.9%
0.3045	0.2150	0.4299	59.4860	0.0323	3.7647	3.8201	158783001	MS				50.00	102.8%
0.3045	0.2150	0.4299	51.4112	0.0321	3.2392	3.2873		LCS				5.00	107.6%
0.3045	0.2150	0.4299	5.3804	0.0108	0.1144	0.1285		LCSD	162.1%				

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Sample-ID	Sample-Description	Reference-Ratio	Sample-Lifetime	Sample-R ²	Sample-AnalysisDate	Analysis-Range	Sample-Intercept	Result-AnalyticalResult	Result-AnalyticalUncertainty	Standard	Recovery
2	CChkStd	1.002147	328.8588	0.9998484	4/25/2006 14:04	Low	14159.63	2.08981	2.26E-02	2	104%
5	CChkStd	1.007859	341.3276	0.9993987	4/25/2006 14:07	Low	34689.5	5.035511	0.0539196	5	101%
50	CChkStd	1.008928	325.5164	0.9989748	4/25/2006 14:09	High	6303.663	52.23478	1.681526	50	104%
250	CChkStd	1.009657	336.1268	0.9999209	4/25/2006 14:11	High	30226.55	249.6492	7.931389	250	100%
1201076467	523026	1.001042	309.8766	0.9049183	4/25/2006 14:22	Low	177.7398	8.50E-02	4.95E-03		
1201076468	523026	1.00351	268.7092	0.9998775	4/25/2006 14:25	Low	22854.04	3.336469	3.63E-02		
1201076469	523026	1.004627	259.5782	0.9992069	4/25/2006 14:29	High	3569.094	29.743	0.9603771		
1201076470	523026	1.006399	309.3802	0.9991686	4/25/2006 14:32	High	3078.069	25.70561	0.8263187		
158783001	523026	1.001303	304.6566	0.9998633	4/25/2006 14:34	Low	18346.85	3.514106	3.86E-02		
158783002	523026	0.9992222	156.1117	0.9993939	4/25/2006 14:37	Low	24092.91	3.61106	2.92E-02		
158783003	523026	0.9974084	268.0822	0.9995837	4/25/2006 14:39	Low	9077.871	1.361155	1.56E-02		
158783004	523026	0.9985429	236.8125	0.999994	4/25/2006 14:41	Low	43776.84	6.336511	6.84E-02		
158783005	523026	0.9980622	287.7162	0.999954	4/25/2006 14:43	Low	18047.94	2.647341	2.84E-02		
159970001	523026	0.993826	292.3452	0.9999253	4/25/2006 14:45	Low	17866.09	2.624133	2.82E-02		
160885001	523026	0.9907013	309.4055	0.9998394	4/25/2006 14:47	Low	13357.93	1.974857	2.15E-02		
161083001	523026	0.9926912	301.5107	0.9983415	4/25/2006 14:49	Low	5519.056	1.974857	9.88E-03		
161083002	523026	0.9908771	274.9048	0.9163519	4/25/2006 14:52	Low	204.6897	8.89E-02	5.43E-03		
2	CChkStd	0.9930662	42.74205	0.9292318	4/25/2006 14:54	Low	14924.96	2.199548	0.6855342	2	104%
5	CChkStd	0.9864551	328.7021	0.9998599	4/25/2006 14:56	Low	14081.42	2.078595	2.25E-02	5	102%
50	CChkStd	0.9886503	341.6646	0.9998575	4/25/2006 14:58	Low	35229.25	5.110905	5.52E-02	50	102%
250	CChkStd	0.9865378	332.2707	0.9994636	4/25/2006 15:01	High	6172.308	51.15382	1.635187	250	103%
161083002*	523026	0.9837973	332.1135	0.9998987	4/25/2006 15:03	High	31223	257.8972	8.197084		
2	CChkStd	0.987973	520.63152	0.9861856	4/25/2006 15:22	Low	17169.56	2.521393	0.2709587	2	107%
5	CChkStd	0.9860083	326.2807	0.9997286	4/25/2006 15:24	Low	14508.89	2.139889	2.35E-02	5	103%
50	CChkStd	0.9876515	339.3219	0.9999067	4/25/2006 15:26	Low	35519.62	5.152539	5.54E-02	50	107%
250	CChkStd	0.9842542	325.0912	0.9996101	4/25/2006 15:29	High	6456.16	53.48928	1.7069	250	102%
158783001	523026	0.9871185	329.4987	0.9999344	4/25/2006 15:31	High	30929.48	255.4669	8.115064		
158783002	523026	0.9804002	155.9314	0.9999062	4/25/2006 15:39	Low	24149.23	3.522181	3.93E-02		
158783003	523026	0.9755467	270.5435	0.9996887	4/25/2006 15:41	Low	9236.828	1.383948	1.55E-02		
158783004	523026	0.9824669	233.2981	0.9999502	4/25/2006 15:43	Low	44989.26	6.510355	7.01E-02		
158783005	523026	0.9842609	285.1005	0.9998193	4/25/2006 15:46	Low	18411.26	2.667794	2.96E-02		
159970001	523026	0.9796479	289.8373	0.9999257	4/25/2006 15:48	Low	18190.59	2.667794	0.0287117		
2	CChkStd	0.9720066	299.603	0.9997949	4/25/2006 15:54	Low	13858.58	2.046644	2.24E-02	2	107%
5	CChkStd	0.9683666	324.7628	0.9998298	4/25/2006 15:56	Low	14519.88	2.141464	0.0232637	5	105%
50	CChkStd	0.9665519	336.8769	0.9999155	4/25/2006 15:59	Low	36160.4	5.244419	5.63E-02	50	105%
250	CChkStd	0.9747663	327.127	0.999236	4/25/2006 16:01	High	6320.355	52.37157	1.679718	250	103%
161083002**	523026	0.9775834	329.4738	0.9999347	4/25/2006 16:03	High	31268.23	258.2721	8.204134		
161083002**	523026	0.9679734	168.3703	0.9970203	4/25/2006 16:22	Low	1682.751	0.3007967	6.23E-03		
2	CChkStd	0.9627643	166.5568	0.9971377	4/25/2006 16:33	Low	1647.105	0.2956855	6.09E-03	2	105%
5	CChkStd	0.9637114	319.8451	0.9997178	4/25/2006 16:35	Low	14263.3	2.104674	2.32E-02	5	104%
50	CChkStd	0.958742	342.3464	0.9998702	4/25/2006 16:38	Low	35784.72	5.190551	5.60E-02	50	106%
250	CChkStd	0.9612486	320.1988	0.9990534	4/25/2006 16:51	High	6425.441	53.23682	1.712682	250	104%
2	CChkStd	1.028827	331.8595	0.9998249	4/25/2006 16:53	High	31551.04	260.613	8.29066	2	101%
5	CChkStd	1.028827	306.5463	0.999873	4/26/2006 14:15	Low	13616.03	2.019288	2.27E-02	5	99%
50	CChkStd	1.020057	334.4289	0.9998649	4/26/2006 14:18	Low	34009.2	4.946809	5.55E-02	50	100%
250	CChkStd	1.030576	325.4818	0.9996514	4/26/2006 14:20	High	5853.735	50.02502	1.584227	250	100%
161083001*	523026	1.031196	248.8194	0.9999624	4/26/2006 14:22	High	29307.11	249.3973	7.612912		
2	CChkStd	1.025207	248.1224	0.9999916	4/26/2006 14:27	Low	32771.8	4.769176	5.31E-02	2	101%
5	CChkStd	1.024261	319.494	0.999827	4/26/2006 14:33	Low	13570.46	2.012746	2.27E-02	5	96%
50	CChkStd	1.025862	336.43	0.999994	4/26/2006 14:36	Low	33006.38	4.802851	5.34E-02	50	99%
250	CChkStd	1.03363	327.1279	0.9996791	4/26/2006 14:38	High	5808.087	49.63486	1.521552	250	98%
	CChkStd	1.027956	325.506	0.9999211	4/26/2006 14:40	High	28808.97	245.1754	7.46872		

**Denotes original was diluted 1:10.
 *Denotes original was treated with a post-spike.

Handwritten signatures and initials:
 [Signature]
 [Signature]
 [Signature]

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sal01078

Sample Identification

Sample ID	Proc ID	Sample Type	Description	Date / Time	SpA	SPG	Atomic Mass	Basis Sample	Customer ID
2.0	None	CChkStd	CChkStd	04/25/2006 02:04 PM	2.5E+04	1	238.0289	None	None
9.0	None	CChkStd	CChkStd	04/25/2006 02:07 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/25/2006 02:09 PM	2.5E+04	1	238.0289	None	None
250.0	None	CChkStd	CChkStd	04/25/2006 02:11 PM	2.5E+04	1	238.0289	None	None
1201076467	None	MtdBlk	523026	04/25/2006 02:22 PM	2.5E+04	1	238.0289	None	None
1201076468	None	Sample	523026	04/25/2006 02:25 PM	2.5E+04	1	238.0289	None	None
1201076469	None	Sample	523026	04/25/2006 02:29 PM	2.5E+04	1	238.0289	None	None
1201076470	None	MtdStd	523026	04/25/2006 02:32 PM	2.5E+04	1	238.0289	None	None
1201076471	None	MtdStd	523026	04/25/2006 02:34 PM	2.5E+04	1	238.0289	None	None
158783001	None	Sample	523026	04/25/2006 02:37 PM	2.5E+04	1	238.0289	None	None
158783002	None	Sample	523026	04/25/2006 02:39 PM	2.5E+04	1	238.0289	None	None
158783003	None	Sample	523026	04/25/2006 02:41 PM	2.5E+04	1	238.0289	None	None
158783004	None	Sample	523026	04/25/2006 02:43 PM	2.5E+04	1	238.0289	None	None
158783005	None	Sample	523026	04/25/2006 02:45 PM	2.5E+04	1	238.0289	None	None
159970001	None	Sample	523026	04/25/2006 02:47 PM	2.5E+04	1	238.0289	None	None
160885001	None	Sample	523026	04/25/2006 02:49 PM	2.5E+04	1	238.0289	None	None
161083001	None	Sample	523026	04/25/2006 02:52 PM	2.5E+04	1	238.0289	None	None

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Handwritten signatures and initials:
 [Signature]
 [Signature]
 [Signature]

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sa101078

Sample Identification

Sample ID	Proc ID	Sample Type	Description	Date / Time	SPA	SPG	Atomic Mass	Basis Sample	Customer ID
161083002	None	Sample	523026	04/25/2006 02:54 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/25/2006 02:56 PM	2.5E+04	1	238.0289	None	None
5.0	None	CChkStd	CChkStd	04/25/2006 02:58 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/25/2006 03:01 PM	2.5E+04	1	238.0289	None	None
250.0	None	CChkStd	CChkStd	04/25/2006 03:03 PM	2.5E+04	1	238.0289	None	None
161083002	None	Sample	523026	04/25/2006 03:22 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/25/2006 03:24 PM	2.5E+04	1	238.0289	None	None
5.0	None	CChkStd	CChkStd	04/25/2006 03:26 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/25/2006 03:29 PM	2.5E+04	1	238.0289	None	None
250.0	None	CChkStd	CChkStd	04/25/2006 03:31 PM	2.5E+04	1	238.0289	None	None
158783001	None	Sample	523026	04/25/2006 03:39 PM	2.5E+04	1	238.0289	None	None
158783002	None	Sample	523026	04/25/2006 03:41 PM	2.5E+04	1	238.0289	None	None
158783003	None	Sample	523026	04/25/2006 03:43 PM	2.5E+04	1	238.0289	None	None
158783004	None	Sample	523026	04/25/2006 03:46 PM	2.5E+04	1	238.0289	None	None
158783005	None	Sample	523026	04/25/2006 03:48 PM	2.5E+04	1	238.0289	None	None
159970001	None	Sample	523026	04/25/2006 03:54 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/25/2006 03:56 PM	2.5E+04	1	238.0289	None	None

Handwritten signature and date: 4/27/06

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sal01078

Sample Identification

Sample ID	Proc ID	Sample Type	Description	Date / Time	SpA	SPG	Atomic Mass	Basis Sample	Customer ID
161083002	None	CChkStd	CChkStd	04/25/2006 03:59 PM	2.5E+04	1	238.0289	None	None
161083002	None	CChkStd	CChkStd	04/25/2006 04:01 PM	2.5E+04	1	238.0289	None	None
161083002	None	CChkStd	CChkStd	04/25/2006 04:03 PM	2.5E+04	1	238.0289	None	None
161083002	None	Sample	523026	04/25/2006 04:22 PM	2.5E+04	1	238.0289	None	None
161083002	None	Sample	523026	04/25/2006 04:33 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/25/2006 04:35 PM	2.5E+04	1	238.0289	None	None
5.0	None	CChkStd	CChkStd	04/25/2006 04:38 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/25/2006 04:51 PM	2.5E+04	1	238.0289	None	None
250.0	None	CChkStd	CChkStd	04/25/2006 04:53 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/26/2006 02:15 PM	2.5E+04	1	238.0289	None	None
5.0	None	CChkStd	CChkStd0	04/26/2006 02:18 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/26/2006 02:20 PM	2.5E+04	1	238.0289	None	None
250.0	None	CChkStd	CChkStd	04/26/2006 02:22 PM	2.5E+04	1	238.0289	None	None
161083001	None	Sample	523026	04/26/2006 02:27 PM	2.5E+04	1	238.0289	None	None
2.0	None	CChkStd	CChkStd	04/26/2006 02:33 PM	2.5E+04	1	238.0289	None	None
5.0	None	CChkStd	CChkStd	04/26/2006 02:36 PM	2.5E+04	1	238.0289	None	None
50.0	None	CChkStd	CChkStd	04/26/2006 02:38 PM	2.5E+04	1	238.0289	None	None

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KPAWin© (Version 1.2.8) Multiple Sample Report

Laboratory: Uranium ANALYTE: Uranium ANALYST: sal01078

Sample Identification

Sample ID	Proc ID	Sample Type	Description	Date / Time	SpA	SPG	Atomic Mass	Basis Sample	Customer ID
0250.0	None	CChkStd	CChkStd	04/26/2006 02:40 PM	2.5E+04	1	238.0289	None	None

AG

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sal01078

Analytical Results

Sample ID	Range	Time Gates	Sample Units	Analytical Result	Total Dilution	Sample Type	Final Result	Pulses	Calibration ID	Uncertainty
1201076467	Low	5 -39	µg/l	2.09E+00		CChkStd		1000	4/25/06B	2.26E-02
1201076468	Low	5 -39	µg/l	5.03E+00		CChkStd		1000	4/25/06B	5.39E-02
1201076469	High	5 -39	µg/l	5.22E+01		CChkStd		1000	4/25/06B	1.68E+00
1201076470	High	5 -39	µg/l	2.50E+02		CChkStd		1000	4/25/06B	7.93E+00
1201076471	Low	5 -39	µg/l	8.50E-02	1	MtdBlk	8.50E-02	1000	4/25/06B	4.95E-03
158783001	Low	5 -39	µg/l	3.34E+00	1	Sample	3.34E+00	1000	4/25/06B	3.63E-02
158783002	High	5 -39	µg/l	2.97E+01	1	Sample	2.97E+01	1000	4/25/06B	9.60E-01
158783003	High	5 -39	µg/l	2.57E+01	1	MtdStd	2.57E+01	1000	4/25/06B	8.26E-01
158783004	Low	5 -39	µg/l	2.69E+00	1	MtdStd	2.69E+00	1000	4/25/06B	2.92E-02
158783005	Low	5 -39	µg/l	3.51E+00	1	Sample	3.51E+00	1000	4/25/06B	3.86E-02
159970001	Low	5 -39	µg/l	1.36E+00	1	Sample	1.36E+00	1000	4/25/06B	1.56E-02
160885001	Low	5 -39	µg/l	6.34E+00	1	Sample	6.34E+00	1000	4/25/06B	6.84E-02
161083001	Low	5 -39	µg/l	2.65E+00	1	Sample	2.65E+00	1000	4/25/06B	2.84E-02
	Low	5 -39	µg/l	2.62E+00	1	Sample	2.62E+00	1000	4/25/06B	2.82E-02
	Low	5 -39	µg/l	1.97E+00	1	Sample	1.97E+00	1000	4/25/06B	2.15E-02
	Low	5 -39	µg/l	8.51E-01	1	Sample	8.51E-01	1000	4/25/06B	9.88E-03
	Low	5 -39	µg/l	8.89E-02	1	Sample	8.89E-02	1000	4/25/06B	5.43E-03

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KPAWin© (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sal01078

Analytical Results

Sample ID	Range	Time Gates	Sample Units	Analytical Result	Total Dilution	Sample Type	Final Result	Pulses	Calibration ID	Uncertainty
161083002	Low	5 -26	µg/l	2.20E+00	1	Sample	2.20E+00	1000	4/25/06B	6.86E-01
161083002	Low	5 -39	µg/l	2.08E+00		CChkStd		1000	4/25/06B	2.25E-02
5.0	Low	5 -39	µg/l	5.11E+00		CChkStd		1000	4/25/06B	5.52E-02
50.0	High	5 -39	µg/l	5.12E+01		CChkStd		1000	4/25/06B	1.64E+00
250.0	High	5 -39	µg/l	2.58E+02		CChkStd		1000	4/25/06B	8.20E+00
161083002	Low	5 -39	µg/l	2.52E+00	1	Sample	2.52E+00	1000	4/25/06B	2.71E-01
2.0	Low	5 -39	µg/l	2.14E+00		CChkStd		1000	4/25/06B	2.35E-02
5.0	Low	5 -39	µg/l	5.15E+00		CChkStd		1000	4/25/06B	5.54E-02
50.0	High	5 -39	µg/l	5.35E+01		CChkStd		1000	4/25/06B	1.71E+00
250.0	High	5 -39	µg/l	2.55E+02		CChkStd		1000	4/25/06B	8.12E+00
158783001	Low	5 -39	µg/l	3.52E+00	1	Sample	3.52E+00	1000	4/25/06B	3.93E-02
158783002	Low	5 -39	µg/l	1.38E+00	1	Sample	1.38E+00	1000	4/25/06B	1.55E-02
158783003	Low	5 -39	µg/l	6.51E+00	1	Sample	6.51E+00	1000	4/25/06B	7.01E-02
158783004	Low	5 -39	µg/l	2.70E+00	1	Sample	2.70E+00	1000	4/25/06B	2.96E-02
158783005	Low	5 -39	µg/l	2.67E+00	1	Sample	2.67E+00	1000	4/25/06B	2.87E-02
159970001	Low	5 -39	µg/l	2.05E+00	1	Sample	2.05E+00	1000	4/25/06B	2.24E-02
2.0	Low	5 -39	µg/l	2.14E+00		CChkStd		1000	4/25/06B	2.33E-02

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KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory: ANALYTE: Uranium ANALYST: sal01078

Analytical Results

Sample ID	Range	Time Gates	Sample Units	Analytical Result	Total Dilution	Sample Type	Final Result	Pulses	Calibration ID	Uncertainty
5.0	Low	5 -39	µg/l	5.24E+00		CChkStd		1000	4/25/06B	5.63E-02
50.0	High	5 -39	µg/l	5.24E+01		CChkStd		1000	4/25/06B	1.68E+00
250.0	High	5 -39	µg/l	2.58E+02		CChkStd		1000	4/25/06B	8.20E+00
161083002	Low	5 -39	µg/l	3.01E-01	1	Sample	3.01E-01	1000	4/25/06B	6.23E-03
161083002	Low	5 -39	µg/l	2.96E-01	1	Sample	2.96E-01	1000	4/25/06B	6.09E-03
2.0	Low	5 -39	µg/l	2.10E+00		CChkStd		1000	4/25/06B	2.32E-02
5.0	Low	5 -39	µg/l	5.19E+00		CChkStd		1000	4/25/06B	5.60E-02
50.0	High	5 -39	µg/l	5.32E+01		CChkStd		1000	4/25/06B	1.71E+00
250.0	High	5 -39	µg/l	2.61E+02		CChkStd		1000	4/25/06B	8.29E+00
2.0	Low	5 -39	µg/l	2.02E+00		CChkStd		1000	4/26/06	2.27E-02
5.0	Low	5 -39	µg/l	4.95E+00		CChkStd		1000	4/26/06	5.55E-02
50.0	High	5 -39	µg/l	5.00E+01		CChkStd		1000	4/26/06	1.53E+00
250.0	High	5 -39	µg/l	2.49E+02		CChkStd		1000	4/26/06	7.61E+00
161083001	Low	5 -39	µg/l	4.77E+00	1	Sample	4.77E+00	1000	4/26/06	5.31E-02
2.0	Low	5 -39	µg/l	2.01E+00		CChkStd		1000	4/26/06	2.27E-02
5.0	Low	5 -39	µg/l	4.80E+00		CChkStd		1000	4/26/06	5.34E-02
50.0	High	5 -39	µg/l	4.96E+01		CChkStd		1000	4/26/06	1.52E+00

KPAWin© (Version 1.2.8) Multiple Sample Report

Laboratory: ANALYTE: Uranium ANALYST: sal01078

Analytical Results

Sample ID	Range	Time Gates	Sample Units	Analytical Result	Total Dilution	Sample Type	Final Result	Pulses	Calibration ID	Uncertainty
250.0	High	5 -39	µg/l	2.45E+02		CChkStd		1000	4/26/06	7.49E+00

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4/26/06

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE: Uranium

ANALYST:

sal01078

Quality Control

Sample ID	Basis Sample	Reference Lifetime	R ² Intensity	Reference Ratio	Sample Lifetime	Sample Intercept	IDL / MDL	Recovery (%)	RPD (%)	AW Flags
182.0	None	269	.9998	1.00215	329	14160	0E+00 / 0E+00	104.49		
189.0	None	268	.9999	1.00786	341	34689	0E+00 / 0E+00	100.67		
50.0	None	268	.9990	1.00893	326	6304	0E+00 / 0E+00	104.47		
250.0	None	268	.9999	1.00966	336	30227	0E+00 / 0E+00	99.86		
1201076467	None	267	.9049	1.00104	310	178	0E+00 / 0E+00			A8
1201076468	None	267	.9999	1.00351	269	22854	0E+00 / 0E+00			
1201076469	None	269	.9992	1.00463	260	3569	0E+00 / 0E+00			
1201076470	None	267	.9992	1.00640	309	3078	0E+00 / 0E+00	128.53		
1201076471	None	268	.9999	1.00130	305	18347	0E+00 / 0E+00	134.51		
158783001	None	268	.9999	.99922	156	24093	0E+00 / 0E+00			
158783002	None	267	.9996	.99741	268	9078	0E+00 / 0E+00			
158783003	None	267	.9999	.99854	237	43777	0E+00 / 0E+00			
158783004	None	267	1.0000	.99806	288	18048	0E+00 / 0E+00			
158783005	None	268	.9999	.99383	292	17886	0E+00 / 0E+00			
159970001	None	268	.9998	.99070	309	13358	0E+00 / 0E+00			
160885001	None	267	.9993	.99269	302	5519	0E+00 / 0E+00			
161083001	None	267	.9164	.99088	275	205	0E+00 / 0E+00			A8, A73

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KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory: ANALYTE: Uranium ANALYST: sa101078

Quality Control

Sample ID	Basis Sample	Reference Lifetime	R ² Intensity	Reference Ratio	Sample Lifetime	Sample Intercept	IDL / MDL	Recovery (%)	RPD (%)	AW Flags
161083002	None	267	.9292	.99165	43	14925	0E+00/ 0E+00			A8, A9, A72
2.0	None	266	.9999	.99307	329	14081	0E+00/ 0E+00	103.93		
5.0	None	268	.9999	.98646	342	35229	0E+00/ 0E+00	102.22		
50.0	None	267	.9995	.98865	332	6172	0E+00/ 0E+00	102.31		
250.0	None	267	.9999	.98654	332	31223	0E+00/ 0E+00	103.16		
161083002	None	267	.9862	.98380	61	17170	0E+00/ 0E+00			A9
2.0	None	265	.9997	.98601	326	14509	0E+00/ 0E+00	106.99		
5.0	None	265	.9999	.98765	339	35520	0E+00/ 0E+00	103.05		
50.0	None	266	.9996	.98425	325	6456	0E+00/ 0E+00	106.98		
250.0	None	266	.9999	.98712	329	30929	0E+00/ 0E+00	102.19		
158783001	None	265	.9999	.98040	156	24149	0E+00/ 0E+00			
158783002	None	267	.9997	.97555	271	9237	0E+00/ 0E+00			
158783003	None	265	1.0000	.98247	233	44989	0E+00/ 0E+00			
158783004	None	266	.9998	.98426	285	18411	0E+00/ 0E+00			
158783005	None	267	.9999	.97965	290	18191	0E+00/ 0E+00			
159970001	None	265	.9998	.97201	300	13859	0E+00/ 0E+00			
2.0	None	266	.9998	.96837	325	14520	0E+00/ 0E+00	107.07		

AP
Mark

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory: ANALYTE: Uranium ANALYST: sal01078

Quality Control

Sample ID	Basis Sample	Reference Lifetime	R ² Intensity	Reference Ratio	Sample Lifetime	Sample Intercept	IDL / MDL	Recovery (%)	RPD (%)	AW Flags
250.0	None	267	.9999	.96655	337	36160	0E+00 / 0E+00	104.89		
250.0	None	266	.9992	.97477	327	6320	0E+00 / 0E+00	104.74		
250.0	None	266	.9999	.97758	329	31268	0E+00 / 0E+00	103.31		
161083002	None	266	.9970	.96797	168	1683	0E+00 / 0E+00			
161083002	None	267	.9971	.96276	167	1647	0E+00 / 0E+00			
2.0	None	268	.9997	.96182	320	14263	0E+00 / 0E+00	105.23		
5.0	None	268	.9999	.96371	342	35785	0E+00 / 0E+00	103.81		
50.0	None	268	.9991	.95874	320	6425	0E+00 / 0E+00	106.47		
250.0	None	268	.9998	.96125	332	31551	0E+00 / 0E+00	104.25		
2.0	None	279	.9999	1.02883	307	13616	0E+00 / 0E+00	100.96		
5.0	None	280	.9999	1.02006	334	34009	0E+00 / 0E+00	98.94		
50.0	None	280	.9997	1.03058	325	5854	0E+00 / 0E+00	100.05		
250.0	None	280	1.0000	1.03120	325	29307	0E+00 / 0E+00	99.76		
161083001	None	280	1.0000	1.02521	248	32772	0E+00 / 0E+00			
2.0	None	282	.9998	1.02426	319	13570	0E+00 / 0E+00	100.64		
5.0	None	280	.9999	1.02586	336	33006	0E+00 / 0E+00	96.06		
50.0	None	281	.9997	1.03363	327	5808	0E+00 / 0E+00	99.27		

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KPAWin© (Version 1.2.8) Multiple Sample Report

Laboratory: ANALYTE: Uranium ANALYST: sa101078

Quality Control

Sample ID	Basis Sample	Reference Lifetime	R ² Intensity	Ratio	Reference Lifetime	Sample Intercept	IDL / MDL	Recovery (%)	RPD (%)	AW Flags
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250.0	None	281	.9999	1.02796	326	28809	0E+00 / 0E+00	98.07		
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4/26/06

KPAWin® (Version 1.2.8) Multiple Sample Report

Laboratory:

ANALYTE:

Uranium

ANALYST:

sal01078

Calibration Report Results

Low Calibration ID - 4/25/06B

High Calibration ID - 4/25/06B

Batch ID - 1917

Date - 4/25/2006 1:46:57 PM

Calibration Report Results

Range	Used	Sample ID	Std Conc	Std ID	Intercept	Uncert	Percent Time Reference			R ²	AW Flags
							Discrep	Gates	Lifetime		
Low	+	BckGnd	0.000		538	23	.000	5-39	1.0000	312	.9678
Low	+	1.0 ug/L	1.000	0836	6932	83	5.342	5-39	.9942	321	.9998
Low	+	3.0 ug/L	3.000	0838	20242	142	-1.270	5-39	1.0026	322	.9999
Low	+	5.0 ug/L	5.000	0839	34157	185	-.856	5-39	1.0006	341	.9999
Low	+	10.0 ug/L	10.000	0840	69518	264	.275	5-39	1.0080	316	1.0000

High	+	BckGnd	0.000		6	3	.000	5-25	1.0000	146	.7872
High	+	10.0 ug/L	10.000	0840	1167	34	-.004	5-39	1.0014	320	.9964
High	+	250 ug/L	250.000	0856	30269	174	.000	5-39	1.0099	330	.9999
High	+	500 ug/L	500.000	0842	60362	246	.000	5-39	1.0115	318	1.0000

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KPAWIN Detailed Calibration Report

Laboratory:

Calibration Details

Laboratory ID	KPA11AUTO2	Customer ID	None
Analyst	sa101078	Procedure ID	None
Calibration Config ID	1001 Config	Calibration Date	4/25/2006 1:46:57 PM
Calibration Batch ID	1917		

Low Range Details

User Calibration
 Calibration Id
 Minimum Number of Standards
 Calibration Alarms
 Calibration R²
 Variance
 Calibration Equation

True
 4/25/06B
 3
 0.999846
 3.75E+03
 Y= +6974.168X -415.056

High Range Details

True
 4/25/06B
 3
 1
 1.46E-09
 Y= -0.002X² +121.726X -49.75

KPAWin© (Version 1.2.8) Multiple Sample Report

Laboratory: **Uranium** ANALYTE: **Uranium** ANALYST: **sal01078**

Calibration Report Results

Low Calibration ID - 4/26/06 High Calibration ID - 4/26/06
 Batch ID - 1973
 Date - 4/26/2006 9:32:10 AM

Calibration Report Results

Range	Used	Sample ID	Std Conc	Std ID	Intercept	Uncert	Percent Time Reference			R ²	AW Flags
							Discrep	Gates	Lifetime		
Low	+	BckGnd	0.000		488	22	.000	5-39	1.0000	303	.9613
Low	+	1.0 ug/L	1.000	0836	7000	84	6.950	5-39	1.0010	314	.9996
Low	+	3.0 ug/L	3.000	0838	20203	142	-1.172	5-39	1.0067	324	.9998
Low	+	5.0 ug/L	5.000	0839	33851	184	-1.517	5-39	1.0118	345	.9998
Low	+	10.0 ug/L	10.000	0840	69499	264	.415	5-39	1.0100	318	1.0000

High	+	BckGnd	0.000		5	3	.000	5-20	1.0000	154	.5912
High	+	10.0 ug/L	10.000	0840	1162	34	-.001	5-39	1.0129	320	.9991
High	+	250 ug/L	250.000	0856	29378	171	.000	5-39	1.0110	326	.9999
High	+	500 ug/L	500.000	0842	58986	243	.000	5-39	1.0105	320	.9999

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KPAWIN Detailed Calibration Report

Laboratory:

Calibration Details

Laboratory ID	KPA11AUTO2	Customer ID	None
Analyst	sal01078	Procedure ID	None
Calibration Config ID	1001 Config	Calibration Date	4/26/2006 9:32:10 AM
Calibration Batch ID	1917		

	<u>Low Range Details</u>	<u>High Range Details</u>
User Calibration	True	True
Calibration Id	4/26/06	4/26/06
Minimum Number of Standards	3	3
Calibration Alarms	0.9996973	1
Calibration R ²	7.35E+03	2.13E-09
Variance	Y= +6966.018X -450.366	Y= +0.002X^2 +117.107X -8.91
Calibration Equation		



METHOD CALIBRATION DATA

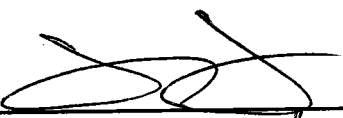
General Engineering Laboratories

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

Gas Flow Proportional Counter Calibration Package

Method: Pb-210

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

Prepared By: 

Date: 7/29/05

Reviewed By: 

Date: 7/30/05

Effective Date: 7/29/05

0356

DEUTSCHER KALIBRIERDIENST **DKD**

Kalibrierlaboratorium für Meßgrößen der Radioaktivität
Calibration laboratory for measurements of radioactivity

AKKREDITIERT DURCH DIE
PHYSIKALISCH-TECHNISCHE BUNDESANSTALT (PTB)



AEA Technology QSA GmbH
Postfach 58 42 Gieselweg 1
D-38049 Braunschweig D-38110 Braunschweig

Tel. +49 (0) 5307 932-0
Fax +49 (0) 5307 932-194

Source no. FX 248

08640
DKD-K-06501
01-01

Kalibrierschein
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand
Object

Reference Solution

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Hersteller
Manufacturer

AEA Technology QSA GmbH

Der Deutsche Kalibrierdienst ist Unterzeichner des multilateralen Übereinkommens der European co-operation for Accreditation (EA) zur gegenseitigen Anerkennung der Kalibrierscheine.

Typ
Type

RBZB44

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Strahler-Nr.
Source number

FX 248

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

Auftraggeber
Customer

**AEA TECHNOLOGY QSA, INC.
USA-BURLINGTON MA 01803**

The Deutscher Kalibrierdienst is signatory to the multilateral agreement of the European co-operation for (EA) for the mutual recognition of calibration certificates.

Auftragsnummer
Order No.

CO 34622

The user is obliged to have the object recalibrated at appropriate intervals.

Anzahl der Seiten des Kalibrierscheines
Number of pages of the certificate

2

Referenzdatum
Reference date

1 January 2001

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Physikalisch-Technischen Bundesanstalt als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the Physikalisch-Technische Bundesanstalt and the issuing laboratory. Calibration certificates without signature and seal are not valid.

Stempel <i>Seal</i>	Datum <i>Date</i>	Leiter des Kalibrierlaboratoriums <i>Head of the calibration laboratory</i>	Stellvertreter <i>Deputy</i>	Bearbeiter <i>Person in charge</i>
	31 January 2001		Schott	
		Dr. Thieme	Schott	Linke / Schott / Schüler

mm 7/29/05

Reference Solution

Solution no.	FX 248
Drawing	VZ-2058/1
Nuclide	Lead-210
Radioactive concentration	34.2 kBq/g
Reference date	1 January 20001 at 12.00 GMT
Mass of solution	(5.182 ± 0.001) g
Volume of solution	approx. 5 ml
Contamination test	Wipe test according to ISO 9978.
Date of wipe test	30 January 2001
Chemical composition	Solution in 1.2 M HNO ₃ ; Carrier: Pb(NO ₃) ₂ , Bi(NO ₃) ₃ ; each 20 mg/l of the corresponding element.
Measuring method	The activity was determined by comparison with a reference solution by measurement with a Ge-detector with MCA.
Traceability	Additional to the direct traceability to the PTB through the DKD this product complies with the requirements for traceability to NIST specified in the American National Standard "Traceability of Radioactive Sources to the NIST and Associated Instrument Quality Control (ANSI N42.22-1995)". As a requirement of the ANSI N42.22-1995 AEA Technology QSA GmbH participates in the NEI/NIST Measurements Assurance Program of the Nuclear Power Industry.
Uncertainty	The relative uncertainty of the activity is 3 %. The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 %. (Ref. NIST Technical Note 1297/"Guide to the Expression of Uncertainty in Measurement" ISO Guide, 1995)
Radioactive impurities	Related to Pb-210 (equal 100 %) the following radioactive impurities were detected: Ra-226: 0.003 %
Quality assurance system	The quality assurance system of AEA Technology QSA GmbH was certified by Lloyd's Register Quality Assurance (LRQA) according to ISO 9001, issue 1994. Isotrak products meet the requirements of 10CFR50 Appendix B in the USA.
Remark	

1297/29/02

Explanations for Certificates (Page 2 of Certificates)

Overall uncertainty

The reported uncertainty is based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %. (ISO Guide, 1995)

Traceability

This certificate documents the traceability of measurement results to national standards, standard measuring equipment and methods for the realisation of physical units of measurement according to the International System of Units (SI). Traceability is defined as 'the property of a result of a measurement whereby it can be related to appropriate standards, generally International or national standards, through an unbroken chain of comparisons'.

AEA Technology QSA GmbH has been accredited as DKD (Deutscher Kalibrierdienst) calibration laboratory by the Physikalisch-Technische Bundesanstalt (PTB) and is authorized to issue reference sources which are traceable to national standards held at the PTB in Germany. Because of the European co-operation for Accreditation (EA) mutual recognition agreement the certificates are also accepted by all EA-members (e. g. NAMAS, UK).

This product complies with the requirements for traceability to NIST specified in the American National Standard 'Traceability of Radioactive Sources to the NIST and Associated Instrument Quality Control (ANSI N42.22-1995)'. As a requirement for the ANSI N42.22-1995 AEA Technology QSA participates in the NEVNIST Measurements Assurance Program of the Nuclear Power Industry.

Leakage and contamination tests

Stringent tests for leakage are an essential feature of radioactive sources production. They are based on ISO 9978. Some standard methods used for testing radiation sources are listed below.

Wipe test I

The source is wiped with a swab or tissue, moistened with ethanol or water, the activity removed is measured. Limit: 185 Bq

Immersion test II

The source is immersed in a suitable liquid at 50 °C for at least 4 hours and the activity removed is measured. Limit: 185 Bq

Bubble test III

The source is immersed in water or a suitable liquid and the pressure in the vessel reduced to 13 kPa (100 mm Hg). No bubbles must be observed. (This test conforms to ISO 9978 except that for some sources, the 100 mm³ free volume requirement is not met.)

Emanation test IV

The source is placed in a gas tight enclosure with activated carbon as absorber and is left there for at least 3 h. The source is considered leak tight when not more than 185 Bq Radon related to a collection time of 12 h can be measured afterwards.

ISO classification

The International Organization for Standardization (ISO) has proposed a system of classification of sealed radioactive sources based on safety requirements for typical uses (see ISO 2919). This system provides a manufacturer of sealed radioactive sources with a set of tests to evaluate the safety of his products. It also assists a user of such sealed sources to select types which suit the application he has in mind. The tests to which specimen sources are subjected are listed in the following table.

Classification of sealed source performance standard according to ISO 2919

	Class 1	2	3	4	5	6
Temperature	No test	- 40 °C (20 min) + 80 °C (1 h)	- 40 °C (20 min) + 180 °C (1 h)	- 40 °C (20 min) + 400 °C (1 h) and thermal shock 400 °C to 20 °C	- 40 °C (20 min) + 600 °C (1 h) and thermal shock 600 °C to 20 °C	- 40 °C (20 min) + 800 °C (1 h) and thermal shock 800 °C to 20 °C
External Pressure	No test	25 kPa absolute	25 kPa absolute to 2 MPa absolute	25 kPa absolute to 7 MPa absolute	25 kPa absolute to 70 MPa absolute	25 kPa absolute to 170 MPa absolute
Impact	No test	50 g from 1 m	200 g from 1 m	2 kg from 1 m	5 kg from 1 m	20 kg from 1 m
Vibration	No test	3 x 10 min 25 - 500 Hz at 5 g peak amplitude	3 x 10 min 25 - 50 Hz at 5 g peak amplitude and 50 - 90 Hz at 0.635 mm amplitude peak to peak and 90 - 500 Hz at 10 g peak amplitude	3 x 30 min 25 - 80 Hz at 1.5 mm amplitude peak to peak and 80 - 2000 Hz at 20 g peak amplitude		
Puncture	No test	1 g from 1 m	10 g from 1 m	50 g from 1 m	300 g from 1 m	1 kg from 1 m

Special applications

No test programme can cover all possible combinations of environments to which a source may be exposed. Users should therefore consult our experts before using sources in potentially adverse environments.

IAEA Special Form

'Special Form' is a test specification for sealed sources given in the IAEA transport regulations (IAEA Safety Series No. 6, 1985, revised edition). It is used in determining the maximum acceptable activities for various types of transport containers.

Quality assurance system

The quality assurance system of AEA Technology QSA GmbH was certified by Lloyd's Register Quality Assurance (LRQA) according to ISO 9001, issue 1994. Isotrak products meet the requirements of 10CFR50 Appendix B.



ms/ector





Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0356	Isotope:	Lead-210
Prepared By:	Angela Albee	Prepared By:	Angela Albee
Carrier Conc:	1.2M HNO3	Prep Date:	04/03/2001
Reference Date:	01/01/2001	Verification Date:	07/12/2005
Ampoule Mass (g):	5.182 g	Expiration Date:	07/12/2006
Uncertainty:	+/- 3 %	Primary Code:	0356-A
LogBook No:	RC S 034 16b	Dilution(mL):	100 mL
		Mass of Parent(g):	4.275 g
		Density(g/mL):	1.0290

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.275 \text{ g}) * (34.2 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 87723.0000 \text{ dpm/mL}$
$(4.275 \text{ g}) * (34.2 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0290 \text{ g/mL}) / (100 \text{ mL}) = 85250.5630 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Angela Albee

Verification for Pb-210 Standard 0356-A

A. Fehr 7/12/2005		Standard	
Isotope	Detector CPM	BKG CPM	NET CPM
0356-A N1	20294.0000	21.7000	20294.0000
0356-A N2	20276.6000	21.7000	20276.6000
0356-A N3	20079.7000	21.7000	20079.7000
			Average =

Detector Eff Mass. Used (mL)	Source DPM/mL
0.1000	76051.19747
0.1000	75985.99146
0.1000	75248.11421
	75761.76771

Mean Value (Counting) =	75761.76771	dpm/g	99.4402909	Pass
Stdev =	446.03015	dpm/g	0.00588727	Rule 3 (Pass/Fail)
Certificate Value =	76188.2	dpm/g		
Lower Limit =	74869.70741	dpm/g		
Upper Limit =	76653.82801	dpm/g		
Rule 1 Pass/Fail	Pass			
Two sigma =	892.0603001			
10 % of Mean =	7576.176771			
Rule 2 (Pass/Fail)	Pass			

Verification Rules

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

The analyst prepared three calibration sources for source 0356-A by transferring portions of the standard to tared glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The calibration vials and background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 31 for Pb-210 standard verification. The efficiency calibration which was used for verification calculations was performed on 7/12/05 using source ET491-A (Pb-210). Each verification source calculation was performed as follows:

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

where:

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

7/12/2005

Angela D. Johnson 7/29/05

PROTOCOL : 31 Pb-210 Verification
DATE : 2005/07/12
TIME : 05:29
ID : P31AS005

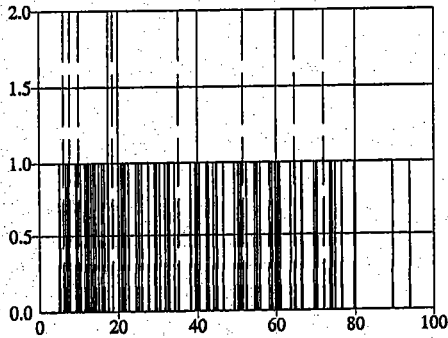
Wallac 1414 WinSpectral v1.40 S/N 4140127
Counting mode : CPM
Isotope(s) : Pb210
Pb210 = 5- 520,21.00 y
Protocol name : Pb-210 Verification
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Advanced modes : Chemilum,PSA
PSA level : 35
Output to Display :
POS,CTIME,DATE,TIME,RACKPOS,CPMw1,CPM,SQPI,CPM1
Additions to Display : Spectrum,Header,Listing
Spectrum : Alpha,Beta
Window 1 : 685- 745 /Alpha
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total count rate:
Pb210 72372.3 CPM

per 1/2/05
Oct 7/12/05

AAQ
7/29/05

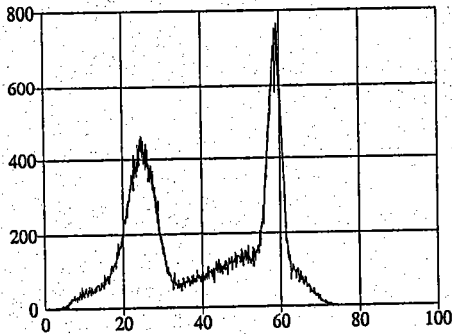
POS	CTIME	DATE	TIME	RACKPOS	CPM
1	300	7/12/2005	5:29 AM	1	20.20



Counts Alpha
Counts Beta

Bkg

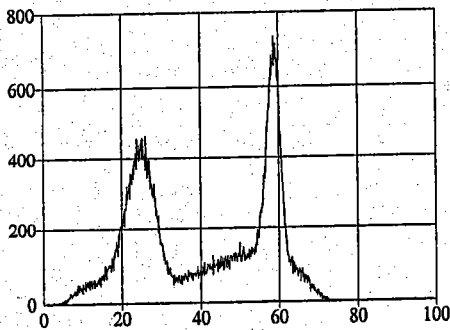
2	300	7/12/2005	5:35 AM	2	22785.60
---	-----	-----------	---------	---	----------



Counts Alpha
Counts Beta

ET491-A

3	300	7/12/2005	5:41 AM	3	22178.60
---	-----	-----------	---------	---	----------



Counts Alpha
Counts Beta

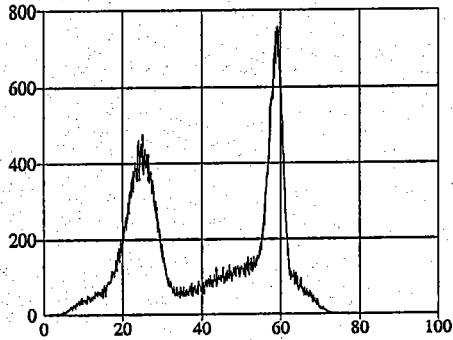
ET491-A

ms 7/29/05

ALF 7/12/05

AdQ
7/29/05

POS	CTIME	DATE	TIME	RACKPOS	CPM
4	300	7/12/2005	5:46 AM	4	22065.70

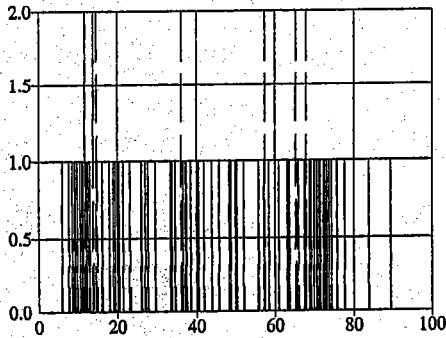


Counts Alpha

Counts Beta

ET491-A

5	300	7/12/2005	5:52 AM	5	21.70
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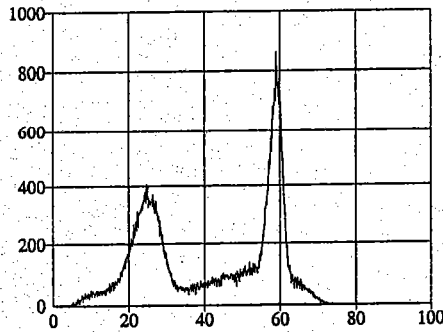


Counts Alpha

Counts Beta

Bkg

6	300	7/12/2005	5:58 AM	6	20294.00
---	-----	-----------	---------	---	----------



Counts Alpha

Counts Beta

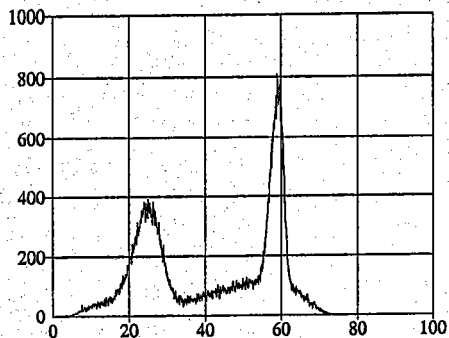
0356-A

ms/rales

ALF7/12/05

200
7/29/05

POS	CTIME	DATE	TIME	RACKPOS	CPM
7	300	7/12/2005	6:04 AM	7	20276.60

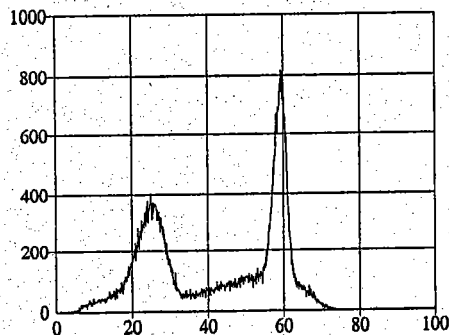


Counts Alpha

Counts Beta

0356-A

8	300	7/12/2005	6:09 AM	8	20079.70
---	-----	-----------	---------	---	----------



Counts Alpha

Counts Beta

0356-A

pm 7/29/05
ALF 7/12/05

ALF
7/29/05

**General Engineering Laboratories
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-018 Isotope Pb-210
 Date Standards Prepared 7/14/05 Cocktail Type Used NA
 Standard ID 0356-A Matrix of Vial/Planchett Lead chromate precipitate on Tuffryn filter
 Amount Used (g or ml) 0.5 Type of Scintillation Vial N/A
 Standard Activity (DPM/g or mL) 87723 Pipette ID Used 2440913
 Reference Date 11/1/05 Balance ID Used R 12/1/04
 Expiration Date 7/12/06 Residue/Carrier Agent Lead Carrier 14.65 μ g/ml Quenching Agent NIA

Separation Date / Time: 7/14/05 0800

Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
C1	0.1	0.0844	0.0850	0.6
C2	0.2	0.0851	0.0865	1.4
C3	0.3	0.0845	0.0880	3.5
C4	0.4	0.0849	0.0913	6.4
C5	0.5	0.0847	0.0926	7.9
C6	0.6	0.0874	0.0975	10.1
C7	0.7	0.0860	0.0950	9.0
C8	0.8	0.0879	0.1000	12.1
C9	0.9	0.0846	0.0966	12.0
C10	1.0	0.0852	0.1000	14.8
C11	1.1	0.0841	0.1010	16.9
C12	1.3	0.0865	0.1033	18.8
		0.0850	0.1053	
		7/13/05		

0.0854 1.0
0.0875 2.4

Prepared By: [Signature] Date 7/22/05
 Reviewed By: [Signature] Date 7/26/05

INSTR_ID	SAMPLE_ID	CNT_TIME	A	B	TIME	USER2	BATCH_ID
Instrument 1 - A	1	2	84	22018	7/28/2005 7:55	1575	PbCal705
Instrument 1 - A	2	2	84	22854	7/28/2005 8:20	1575	PbCal705
Instrument 1 - A	3	2	102	20935	7/28/2005 8:05	1575	PbCal705
Instrument 1 - A	4	2	99	22720	7/28/2005 8:01	1575	PbCal705
Instrument 1 - A	5	2	95	22892	7/28/2005 10:09	1575	PbCal705
Instrument 1 - A	6	2	83	23217	7/28/2005 10:25	1575	PbCal705
Instrument 1 - A	7	2	63	19193	7/28/2005 10:20	1575	PbCal705
Instrument 1 - A	8	2	78	20620	7/28/2005 10:16	1575	PbCal705
Instrument 1 - A	9	2	65	18730	7/28/2005 9:35	1575	PbCal705
Instrument 1 - A	10	2	73	20335	7/28/2005 10:06	1575	PbCal705
Instrument 1 - A	11	2	81	19694	7/28/2005 10:02	1575	PbCal705
Instrument 1 - A	12	2	89	20801	7/28/2005 9:43	1575	PbCal705
Instrument 1 - B	1	2	56	21763	7/28/2005 8:01	1575	PbCal705
Instrument 1 - B	2	2	78	22474	7/28/2005 7:55	1575	PbCal705
Instrument 1 - B	3	2	73	20359	7/28/2005 8:20	1575	PbCal705
Instrument 1 - B	4	2	58	22111	7/28/2005 8:05	1575	PbCal705
Instrument 1 - B	5	2	71	23056	7/28/2005 10:16	1575	PbCal705
Instrument 1 - B	6	2	72	22905	7/28/2005 10:09	1575	PbCal705
Instrument 1 - B	7	2	62	18664	7/28/2005 10:25	1575	PbCal705
Instrument 1 - B	8	2	56	20619	7/28/2005 10:21	1575	PbCal705
Instrument 1 - B	9	2	62	18705	7/28/2005 9:43	1575	PbCal705
Instrument 1 - B	10	2	45	19770	7/28/2005 9:35	1575	PbCal705
Instrument 1 - B	11	2	42	19125	7/28/2005 10:06	1575	PbCal705
Instrument 1 - B	12	2	56	20230	7/28/2005 10:02	1575	PbCal705
Instrument 1 - C	1	2	132	22038	7/28/2005 8:06	1575	PbCal705
Instrument 1 - C	2	2	151	22700	7/28/2005 8:01	1575	PbCal705
Instrument 1 - C	3	2	161	20552	7/28/2005 7:55	1575	PbCal705
Instrument 1 - C	4	2	179	22690	7/28/2005 8:20	1575	PbCal705
Instrument 1 - C	5	2	149	23030	7/28/2005 10:21	1575	PbCal705
Instrument 1 - C	6	2	163	22975	7/28/2005 10:16	1575	PbCal705
Instrument 1 - C	7	2	137	19131	7/28/2005 10:09	1575	PbCal705
Instrument 1 - C	8	2	136	20712	7/28/2005 10:25	1575	PbCal705
Instrument 1 - C	9	2	132	19007	7/28/2005 10:02	1575	PbCal705
Instrument 1 - C	10	2	129	20055	7/28/2005 9:43	1575	PbCal705
Instrument 1 - C	11	2	110	19004	7/28/2005 9:35	1575	PbCal705
Instrument 1 - C	12	2	125	20586	7/28/2005 10:06	1575	PbCal705
Instrument 1 - D	1	2	314	21985	7/28/2005 8:20	1575	PbCal705
Instrument 1 - D	2	2	339	22577	7/28/2005 8:06	1575	PbCal705
Instrument 1 - D	3	2	302	20759	7/28/2005 8:01	1575	PbCal705
Instrument 1 - D	4	2	337	22777	7/28/2005 7:55	1575	PbCal705
Instrument 1 - D	5	2	299	23052	7/28/2005 10:25	1575	PbCal705
Instrument 1 - D	6	2	273	22954	7/28/2005 10:21	1575	PbCal705
Instrument 1 - D	7	2	234	19018	7/28/2005 10:16	1575	PbCal705
Instrument 1 - D	8	2	275	20545	7/28/2005 10:09	1575	PbCal705
Instrument 1 - D	9	2	253	18798	7/28/2005 10:06	1575	PbCal705
Instrument 1 - D	10	2	272	20117	7/28/2005 10:02	1575	PbCal705
Instrument 1 - D	11	2	259	19117	7/28/2005 9:43	1575	PbCal705
Instrument 1 - D	12	2	229	20856	7/28/2005 9:35	1575	PbCal705
Instrument 2 - A	1	2	225	21853	7/28/2005 8:42	1575	PbCal705
Instrument 2 - A	2	2	264	22781	7/28/2005 9:21	1575	PbCal705
Instrument 2 - A	3	2	246	20682	7/28/2005 8:52	1575	PbCal705

Instrument 2 - A	4	2	230	22878	7/28/2005 8:49	1575	PbCal705
Instrument 2 - A	5	2	266	23137	7/28/2005 7:55	1575	PbCal705
Instrument 2 - A	6	2	231	23217	7/28/2005 8:20	1575	PbCal705
Instrument 2 - A	7	2	172	19166	7/28/2005 8:06	1575	PbCal705
Instrument 2 - A	8	2	193	20672	7/28/2005 8:01	1575	PbCal705
Instrument 2 - A	9	2	201	19025	7/28/2005 10:09	1575	PbCal705
Instrument 2 - A	10	2	188	20237	7/28/2005 10:25	1575	PbCal705
Instrument 2 - A	11	2	194	19477	7/28/2005 10:21	1575	PbCal705
Instrument 2 - A	12	2	193	20724	7/28/2005 10:17	1575	PbCal705
Instrument 2 - B	1	2	9	22048	7/28/2005 8:49	1575	PbCal705
Instrument 2 - B	2	2	15	23045	7/28/2005 8:42	1575	PbCal705
Instrument 2 - B	3	2	16	20750	7/28/2005 9:21	1575	PbCal705
Instrument 2 - B	4	2	9	22958	7/28/2005 8:52	1575	PbCal705
Instrument 2 - B	5	2	12	23347	7/28/2005 8:01	1575	PbCal705
Instrument 2 - B	6	2	12	22888	7/28/2005 7:55	1575	PbCal705
Instrument 2 - B	7	2	12	19018	7/28/2005 8:20	1575	PbCal705
Instrument 2 - B	8	2	9	20774	7/28/2005 8:06	1575	PbCal705
Instrument 2 - B	9	2	12	18915	7/28/2005 10:17	1575	PbCal705
Instrument 2 - B	10	2	10	20157	7/28/2005 10:10	1575	PbCal705
Instrument 2 - B	11	2	14	19263	7/28/2005 10:25	1575	PbCal705
Instrument 2 - B	12	2	8	20483	7/28/2005 10:21	1575	PbCal705
Instrument 2 - C	1	2	280	21996	7/28/2005 8:52	1575	PbCal705
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Instrument 2 - C	6	2	268	22568	7/28/2005 8:01	1575	PbCal705
Instrument 2 - C	7	2	240	18943	7/28/2005 7:55	1575	PbCal705
Instrument 2 - C	8	2	239	20584	7/28/2005 8:20	1575	PbCal705
Instrument 2 - C	9	2	222	18740	7/28/2005 10:21	1575	PbCal705
Instrument 2 - C	10	2	222	19943	7/28/2005 10:17	1575	PbCal705
Instrument 2 - C	11	2	221	19199	7/28/2005 10:10	1575	PbCal705
Instrument 2 - C	12	2	234	20523	7/28/2005 10:25	1575	PbCal705
Instrument 2 - D	1	2	280	22194	7/28/2005 9:21	1575	PbCal705
Instrument 2 - D	2	2	338	23021	7/28/2005 8:53	1575	PbCal705
Instrument 2 - D	3	2	288	20861	7/28/2005 8:49	1575	PbCal705
Instrument 2 - D	4	2	282	22714	7/28/2005 8:42	1575	PbCal705
Instrument 2 - D	5	2	254	23276	7/28/2005 8:20	1575	PbCal705
Instrument 2 - D	6	2	282	23097	7/28/2005 8:06	1575	PbCal705
Instrument 2 - D	7	2	232	19264	7/28/2005 8:02	1575	PbCal705
Instrument 2 - D	8	2	274	21105	7/28/2005 7:55	1575	PbCal705
Instrument 2 - D	9	2	221	19341	7/28/2005 10:25	1575	PbCal705
Instrument 2 - D	10	2	250	20334	7/28/2005 10:21	1575	PbCal705
Instrument 2 - D	11	2	210	19513	7/28/2005 10:17	1575	PbCal705
Instrument 2 - D	12	2	241	20672	7/28/2005 10:10	1575	PbCal705
Instrument 3 - A	1	2	151	21669	7/28/2005 9:34	1575	PbCal705
Instrument 3 - A	2	2	140	21967	7/28/2005 10:05	1575	PbCal705
Instrument 3 - A	3	2	151	20088	7/28/2005 10:01	1575	PbCal705
Instrument 3 - A	4	2	162	21796	7/28/2005 9:42	1575	PbCal705
Instrument 3 - A	5	2	165	22294	7/28/2005 8:42	1575	PbCal705
Instrument 3 - A	6	2	180	22353	7/28/2005 9:21	1575	PbCal705
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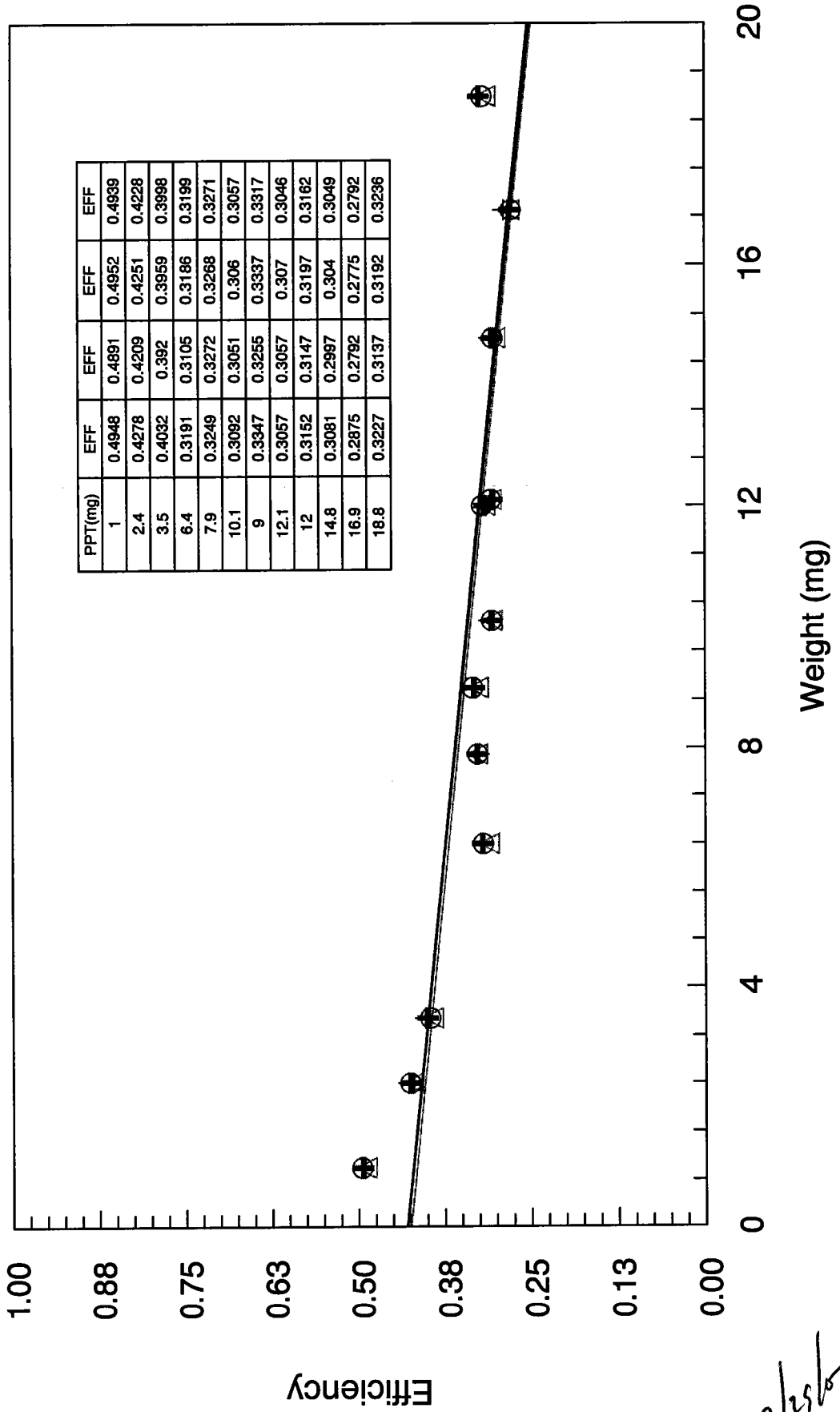
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Instrument 3 - B	9	2	188	18433	7/28/2005 8:02	1575	PbCal705
Instrument 3 - B	10	2	228	19517	7/28/2005 7:56	1575	PbCal705
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Instrument 3 - C	1	2	322	21556	7/28/2005 10:01	1575	PbCal705
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Instrument 3 - C	7	2	283	18866	7/28/2005 8:42	1575	PbCal705
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Instrument 3 - C	12	2	318	20119	7/28/2005 8:20	1575	PbCal705
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Instrument 3 - D	5	2	258	23049	7/28/2005 9:21	1575	PbCal705
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Instrument 3 - D	7	2	196	19014	7/28/2005 8:50	1575	PbCal705
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Instrument 4 - A	3	2	149	20830	7/28/2005 10:20	1575	PbCal705
Instrument 4 - A	4	2	133	22551	7/28/2005 10:16	1575	PbCal705
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Instrument 4 - A	10	2	128	20217	7/28/2005 9:21	1575	PbCal705
Instrument 4 - A	11	2	149	19209	7/28/2005 8:53	1575	PbCal705

Instrument 4 - A	12	2	141	20634	7/28/2005 8:50	1575	PbCal705
Instrument 4 - B	1	2	19	22035	7/28/2005 10:16	1575	PbCal705
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Instrument 4 - B	8	2	16	20883	7/28/2005 10:01	1575	PbCal705
Instrument 4 - B	9	2	12	19153	7/28/2005 8:50	1575	PbCal705
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Instrument 4 - B	11	2	23	19727	7/28/2005 9:21	1575	PbCal705
Instrument 4 - B	12	2	23	20878	7/28/2005 8:53	1575	PbCal705
Instrument 4 - C	1	2	249	22116	7/28/2005 10:20	1575	PbCal705
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Instrument 4 - C	9	2	233	18843	7/28/2005 8:53	1575	PbCal705
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Instrument 4 - D	1	2	522	21545	7/28/2005 10:25	1575	PbCal705
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Instrument 4 - D	3	2	520	20598	7/28/2005 10:16	1575	PbCal705
Instrument 4 - D	4	2	528	22522	7/28/2005 10:09	1575	PbCal705
Instrument 4 - D	5	2	519	23125	7/28/2005 10:05	1575	PbCal705
Instrument 4 - D	6	2	539	23225	7/28/2005 10:02	1575	PbCal705
Instrument 4 - D	7	2	422	18621	7/28/2005 9:43	1575	PbCal705
Instrument 4 - D	8	2	490	20410	7/28/2005 9:35	1575	PbCal705
Instrument 4 - D	9	2	450	18857	7/28/2005 9:21	1575	PbCal705
Instrument 4 - D	10	2	477	20057	7/28/2005 8:53	1575	PbCal705
Instrument 4 - D	11	2	424	19123	7/28/2005 8:50	1575	PbCal705
Instrument 4 - D	12	2	484	20501	7/28/2005 8:43	1575	PbCal705

Pb-210 Efficiency Curve 7/05

Instrument 1

+ 1-A Δ 1-B ○ 1-C + 1-D

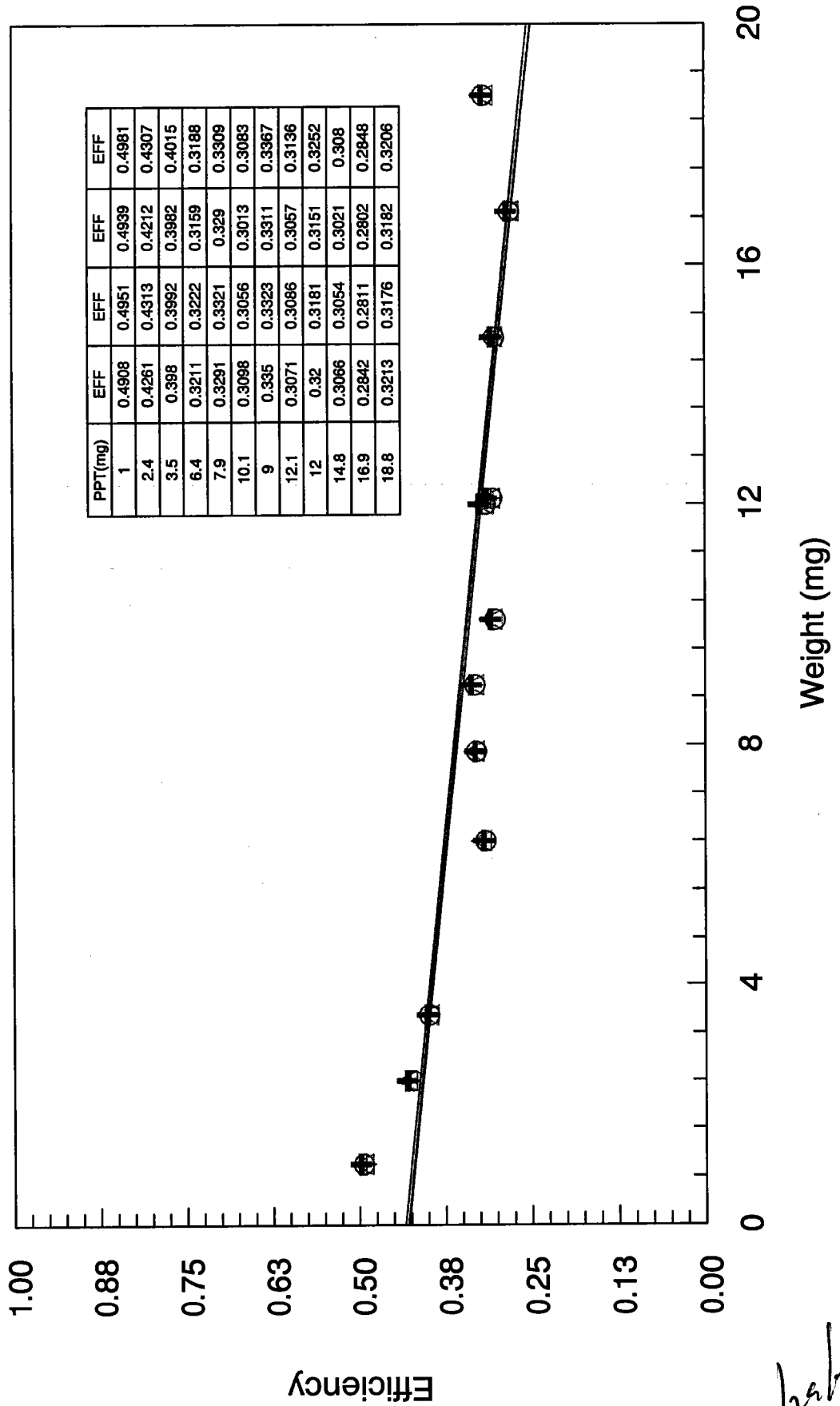


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Pb-210 Efficiency Curve 7/05

Instrument 2

+ 2-A Δ 2-B ○ 2-C + 2-D

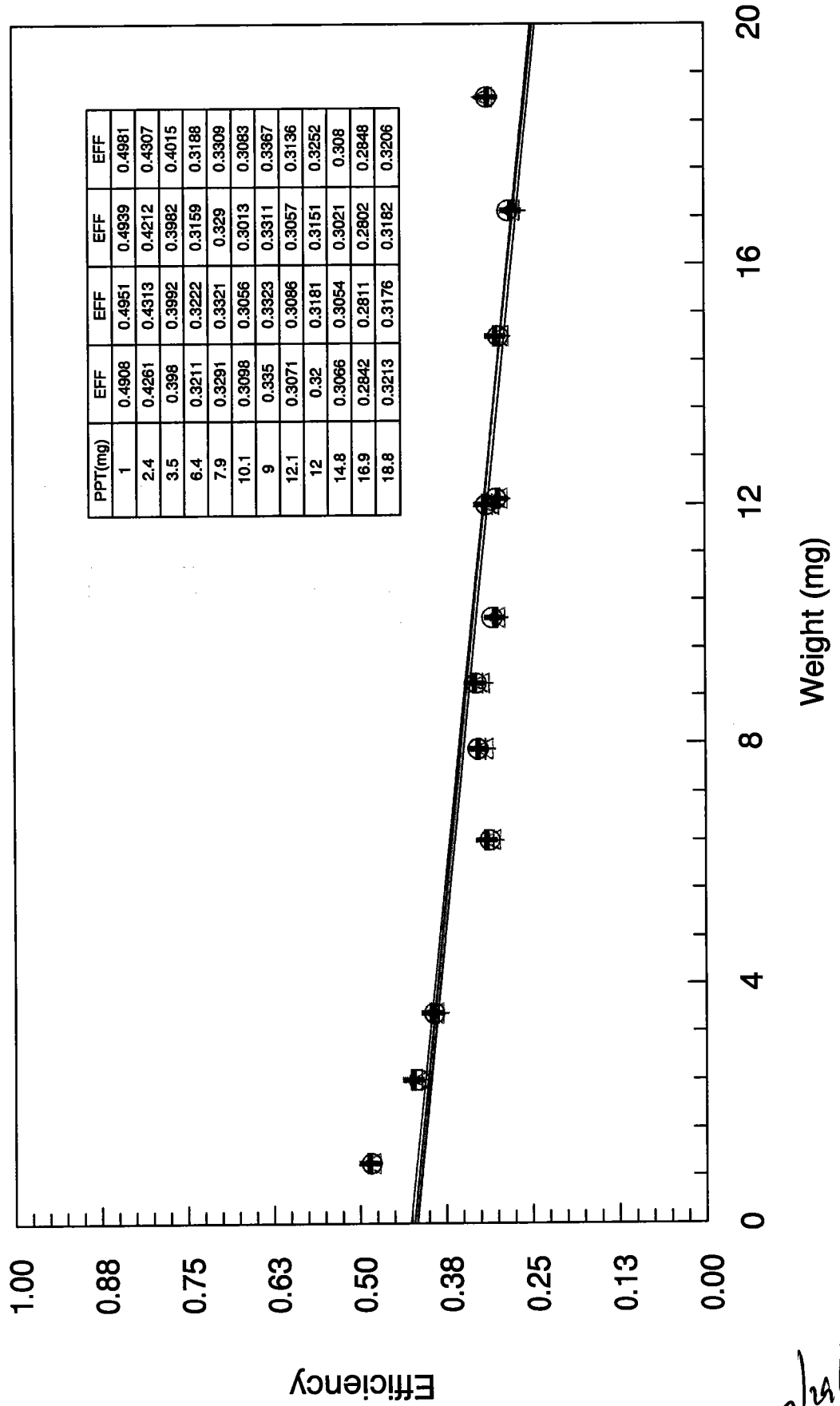


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Pb-210 Efficiency Curve 7/05

Instrument 3

+ 3-A Δ 3-B ○ 3-C + 3-D

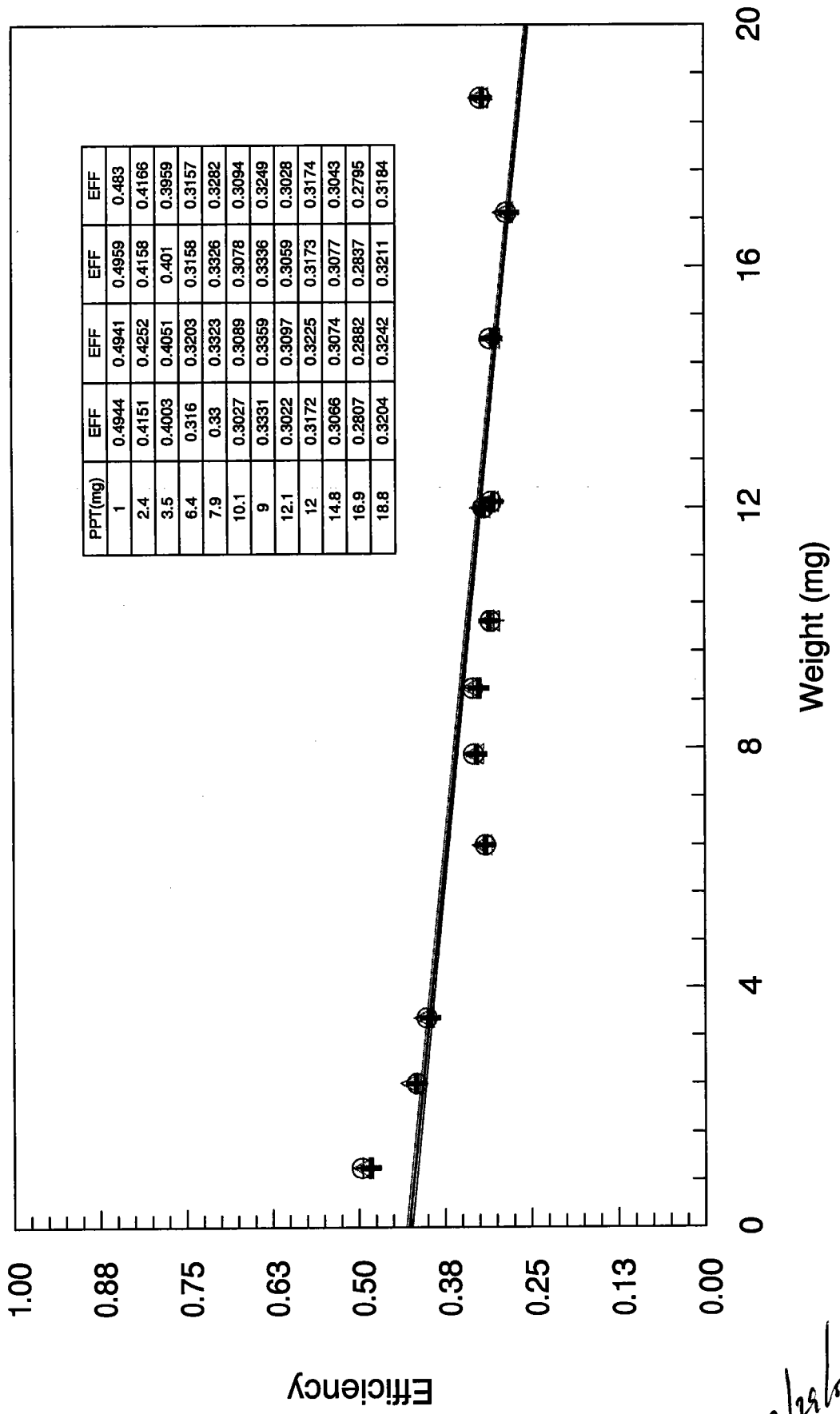


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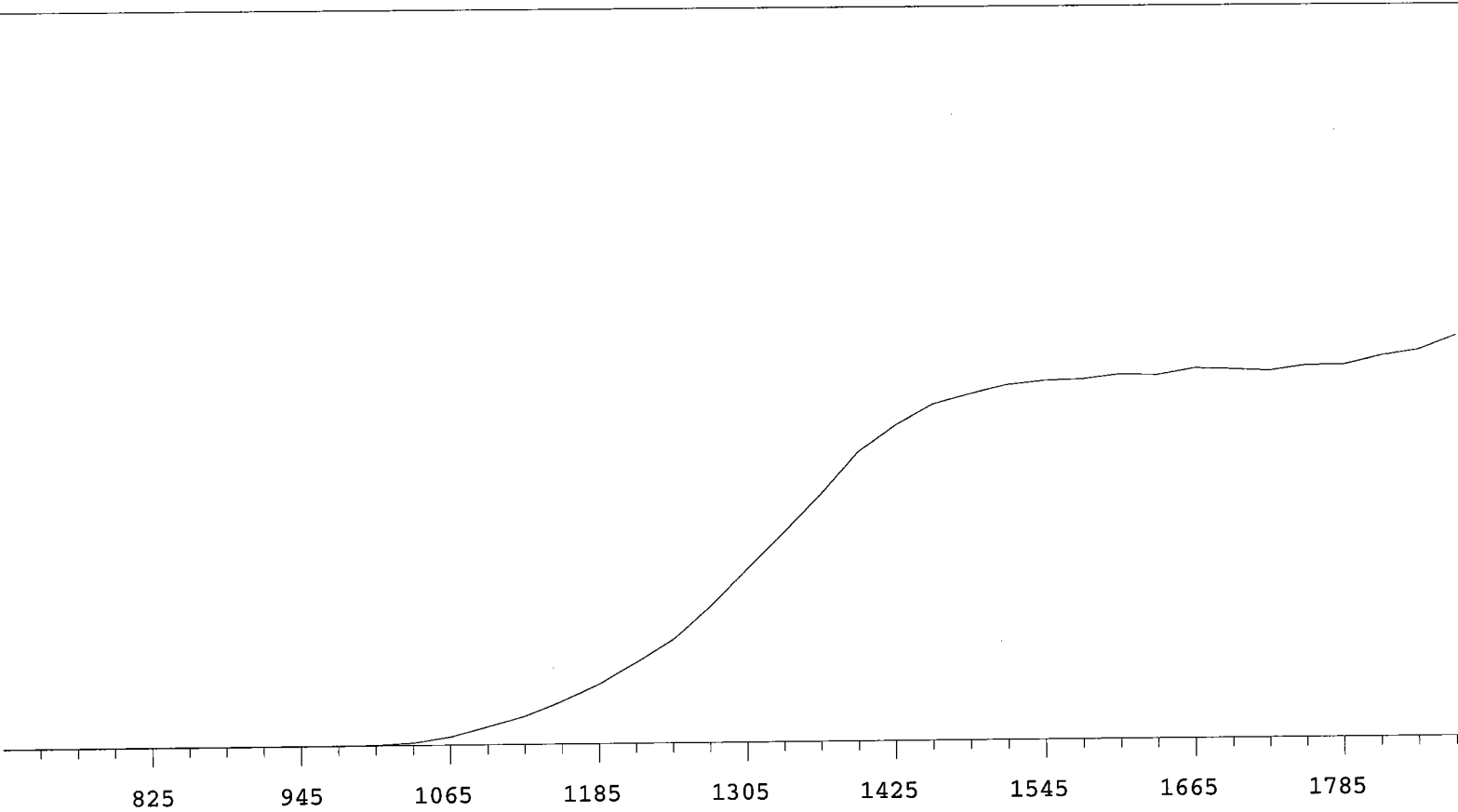
Pb-210 Efficiency Curve 7/05

Instrument 4

+ 4-A Δ 4-B ○ 4-C + 4-D

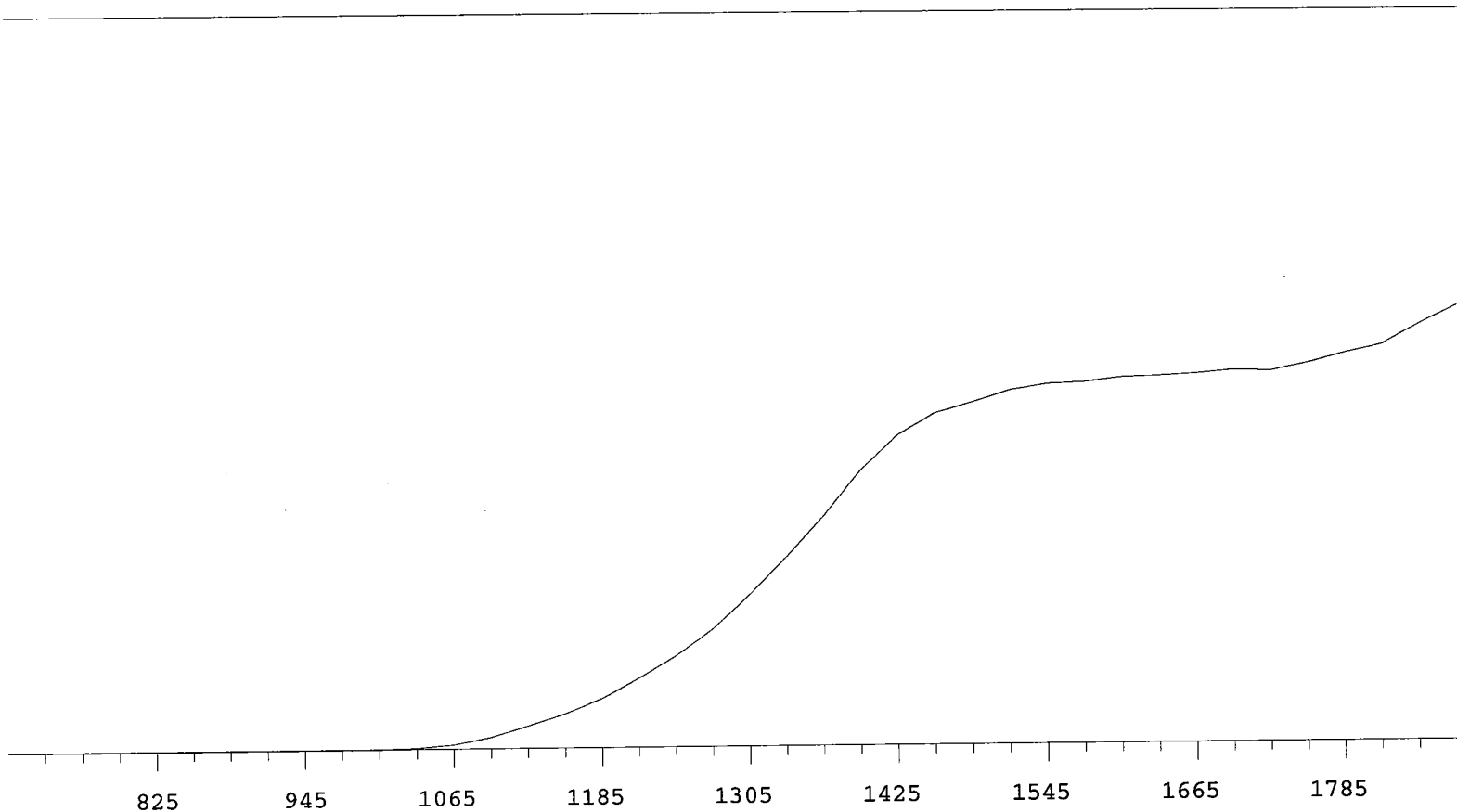


7/2/05



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	3		1305	16206	+70.03
735	1		1335	19739	+60.77
765	1	-18.52	1365	23317	+49.57
795	2	>100	1395	27238	+38.47
825	2	+76.92	1425	29745	+26.87
855	6	+0.00	1455	31733	+16.81
885	2	+0.00	1485	32738	+10.51
915	2	+0.00	1515	33561	+5.83
945	4	>100	1545	33929	+3.90
975	5	>100	1575	34042	+2.13
1005	45	>100	1605	34473	+2.40
1035	260	>100	1635	34376	+2.14
1065	800	>100	1665	34998	+0.99
1095	1706	>100	1695	34891	+1.35
1125	2681	>100	1725	34732	+0.78
1155	4043	>100	1755	35214	+2.68
1185	5606	+98.69	1785	35247	+4.20
1215	7546	+90.11	1815	36051	+6.12
1245	9680	+84.91	1845	36556	
1275	12706	+78.21	1875	37879	

Yurkalo



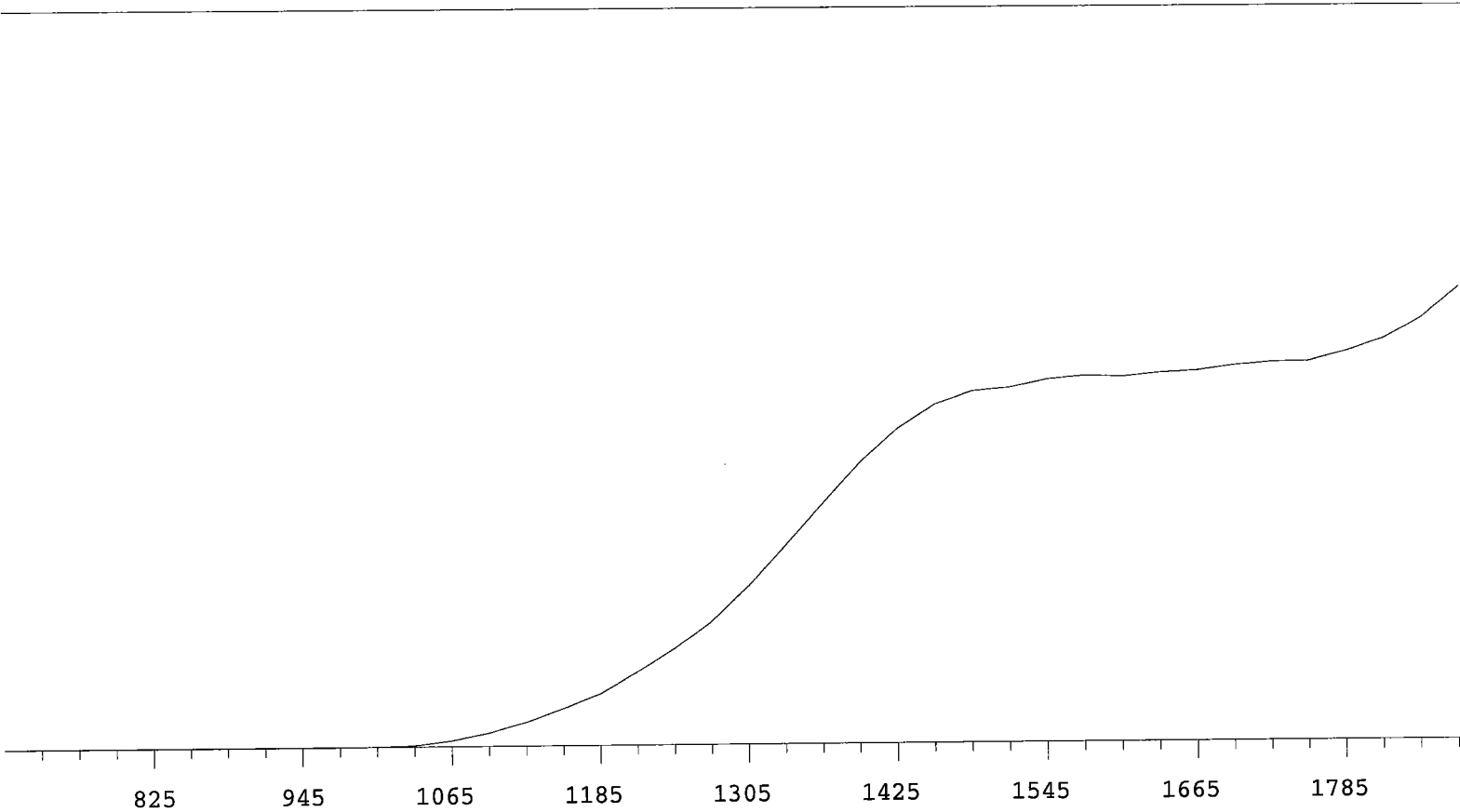
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16022	+74.49
735	2		1335	19934	+67.06
765	3	+33.33	1365	24065	+57.27
795	2	-15.15	1395	28750	+45.17
825	2	-30.30	1425	32437	+31.43
855	2	+0.00	1455	34703	+19.63
885	2	+55.56	1485	35773	+11.94
915	2	+71.43	1515	37013	+7.34
945	4	>100	1545	37643	+5.08
975	4	>100	1575	37795	+2.85
1005	7	>100	1605	38223	+2.11
1035	115	>100	1635	38341	+2.22
1065	458	>100	1665	38578	+1.47
1095	1190	>100	1695	38896	+2.28
1125	2315	>100	1725	38794	+3.94
1155	3550	>100	1755	39562	+5.68
1185	5136	>100	1785	40569	+9.25
1215	7197	+97.45	1815	41402	+11.70
1245	9511	+89.47	1845	43531	
1275	12416	+81.91	1875	45470	

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Plateau 07/18/05
Alpha Volts: 1575

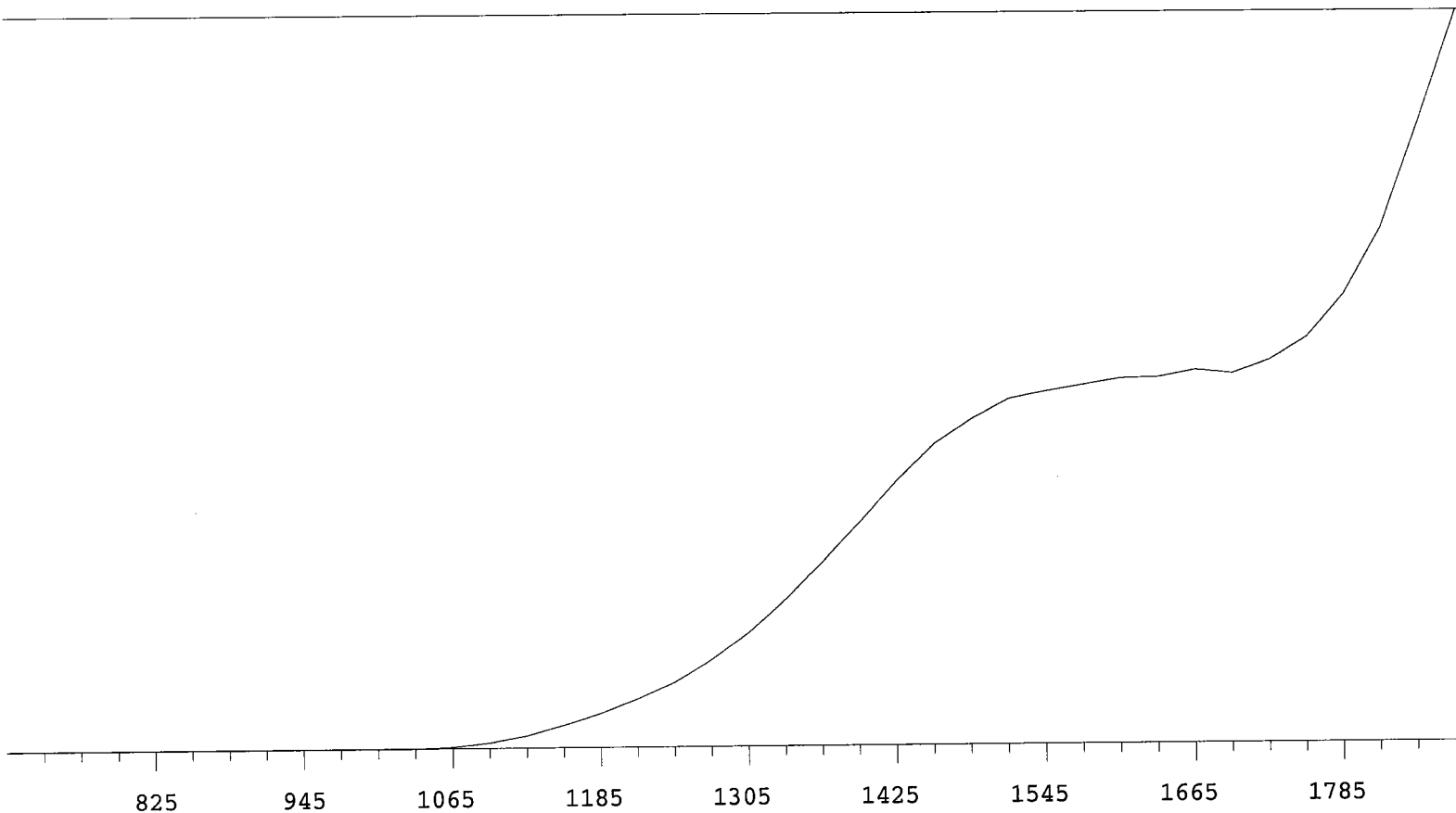
Instrument 1 MPC 9604 Detector C
Beta Volts: 1575

7/18/2005



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16230	+74.23
735	0		1335	20402	+66.21
765	0		1365	24668	+55.06
795	1	>100	1395	28808	+42.90
825	0	>100	1425	32235	+30.71
855	2	+95.24	1455	34745	+19.08
885	2	>100	1485	36123	+11.26
915	2	+64.10	1515	36502	+6.50
945	3	>100	1545	37333	+3.68
975	4	>100	1575	37699	+2.82
1005	17	>100	1605	37570	+1.69
1035	154	>100	1635	37966	+2.25
1065	602	>100	1665	38158	+3.13
1095	1390	>100	1695	38687	+2.67
1125	2520	>100	1725	39009	+3.61
1155	3909	>100	1755	39083	+5.36
1185	5395	>100	1785	40069	+9.12
1215	7579	+92.75	1815	41344	+14.50
1245	9892	+86.09	1845	43429	
1275	12623	+79.89	1875	46557	

perkins

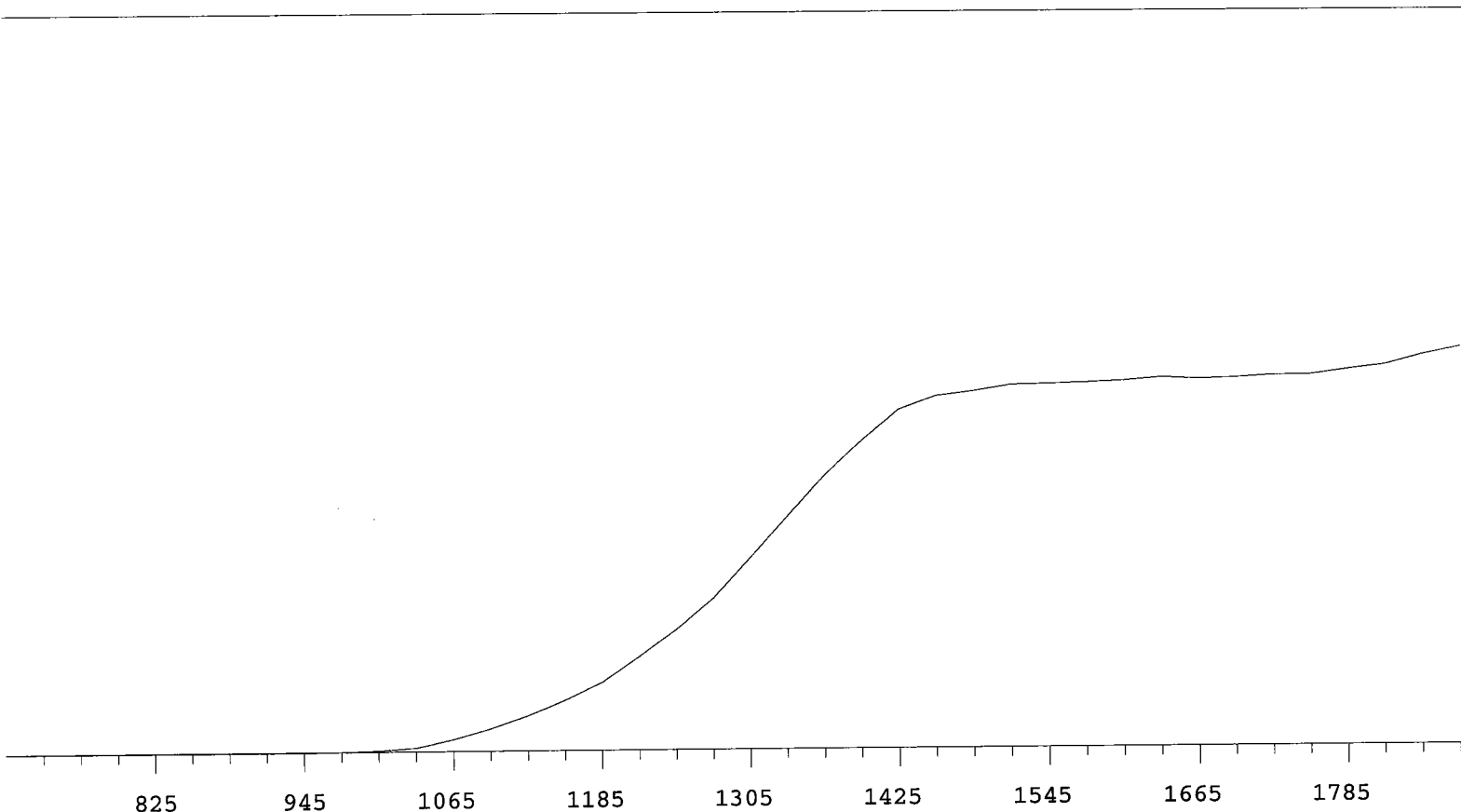


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10971	+84.34
735	1		1335	14097	+75.14
765	2	+0.00	1365	17622	+66.59
795	1	-66.67	1395	21247	+57.12
825	0	>100	1425	25202	+45.74
855	1	+0.00	1455	28604	+34.50
885	0	+0.00	1485	30899	+22.78
915	1	+83.33	1515	32756	+13.99
945	0	>100	1545	33437	+8.81
975	2	>100	1575	34038	+5.07
1005	1	>100	1605	34638	+4.42
1035	13	>100	1635	34735	+2.60
1065	134	>100	1665	35372	+3.37
1095	511	>100	1695	35026	+7.70
1125	1129	>100	1725	36274	+15.84
1155	2134	>100	1755	38436	+28.19
1185	3197	>100	1785	42586	+41.27
1215	4542	>100	1815	48885	+52.29
1245	6086	+97.20	1845	58919	
1275	8291	+90.92	1875	71030	

Y 7/25/05

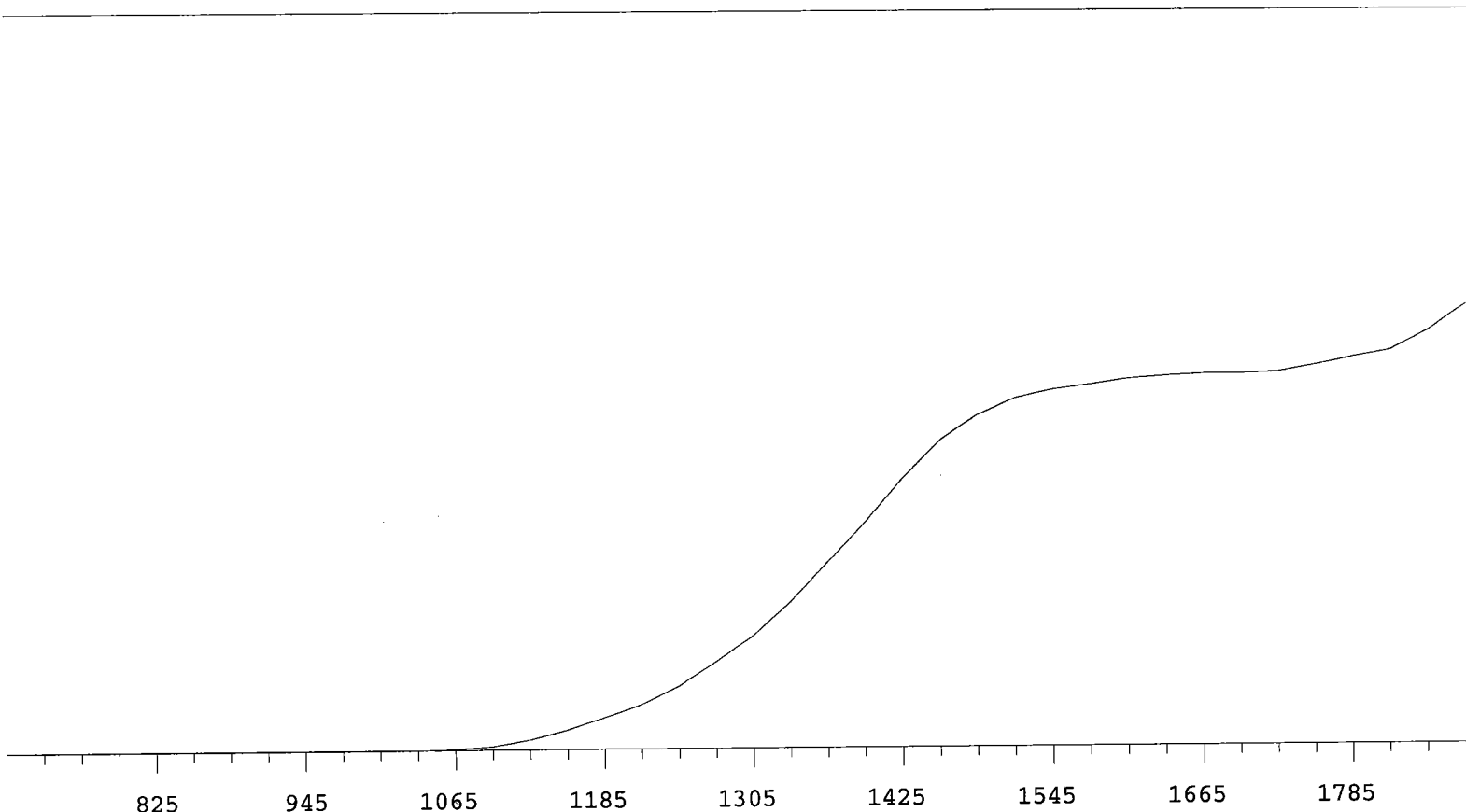
Alpha Volts: 705

Beta Volts: 1575



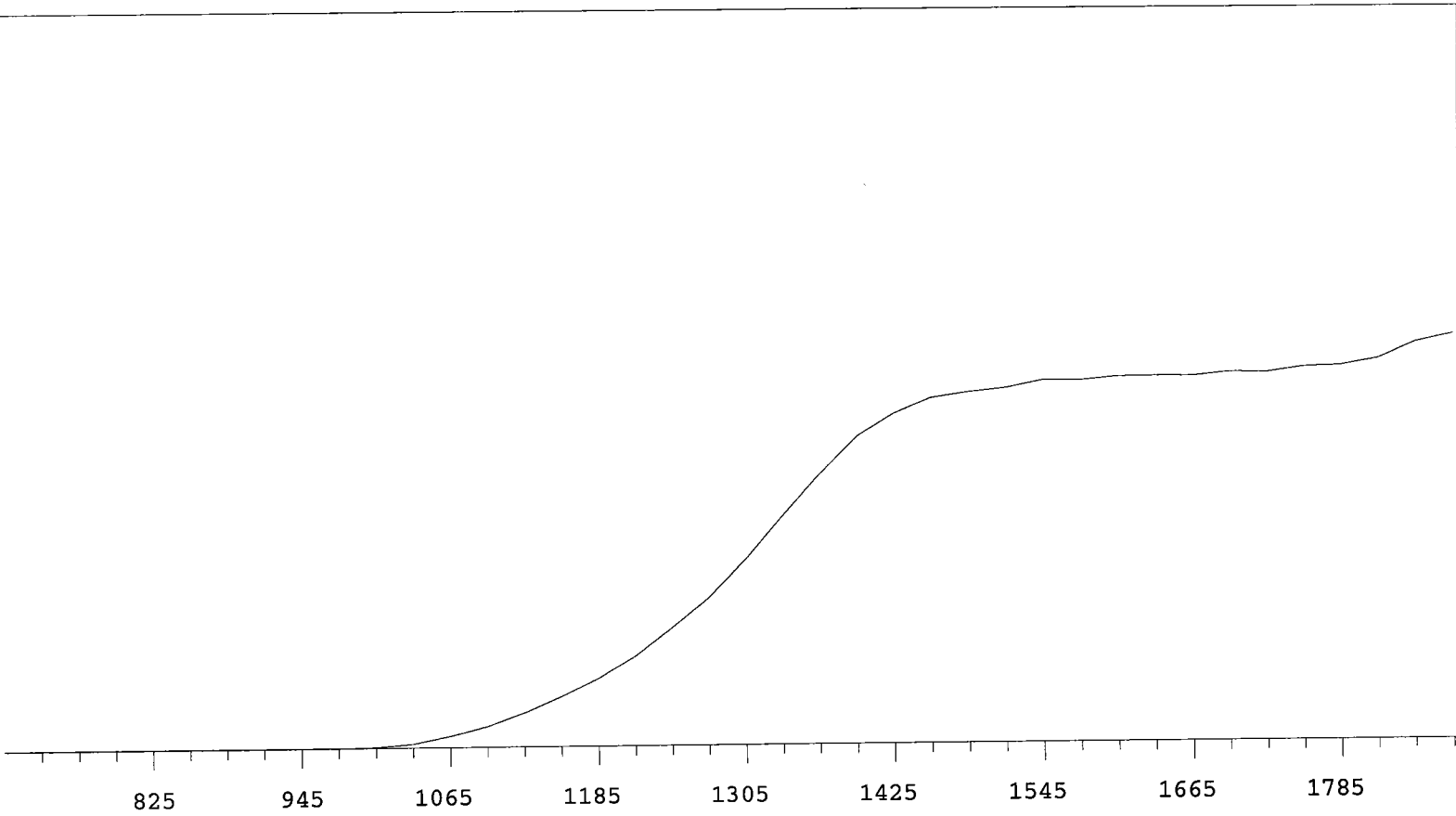
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	22314	+66.02
735	0		1335	27016	+56.65
765	0		1365	31730	+46.09
795	0	>100	1395	35861	+34.20
825	0	>100	1425	39521	+21.96
855	0	>100	1455	41096	+12.55
885	4	+33.33	1485	41618	+5.70
915	1	>100	1515	42360	+2.97
945	0	>100	1545	42428	+1.93
975	25	>100	1575	42562	+1.42
1005	123	>100	1605	42743	+1.15
1035	462	>100	1635	43108	+0.84
1065	1382	>100	1665	42891	+0.79
1095	2620	>100	1695	43031	+0.67
1125	4094	>100	1725	43288	+1.82
1155	5833	>100	1755	43345	+2.62
1185	7915	+97.20	1785	43916	+4.27
1215	10844	+88.32	1815	44430	+5.91
1245	14050	+81.59	1845	45569	
1275	17692	+73.63	1875	46488	

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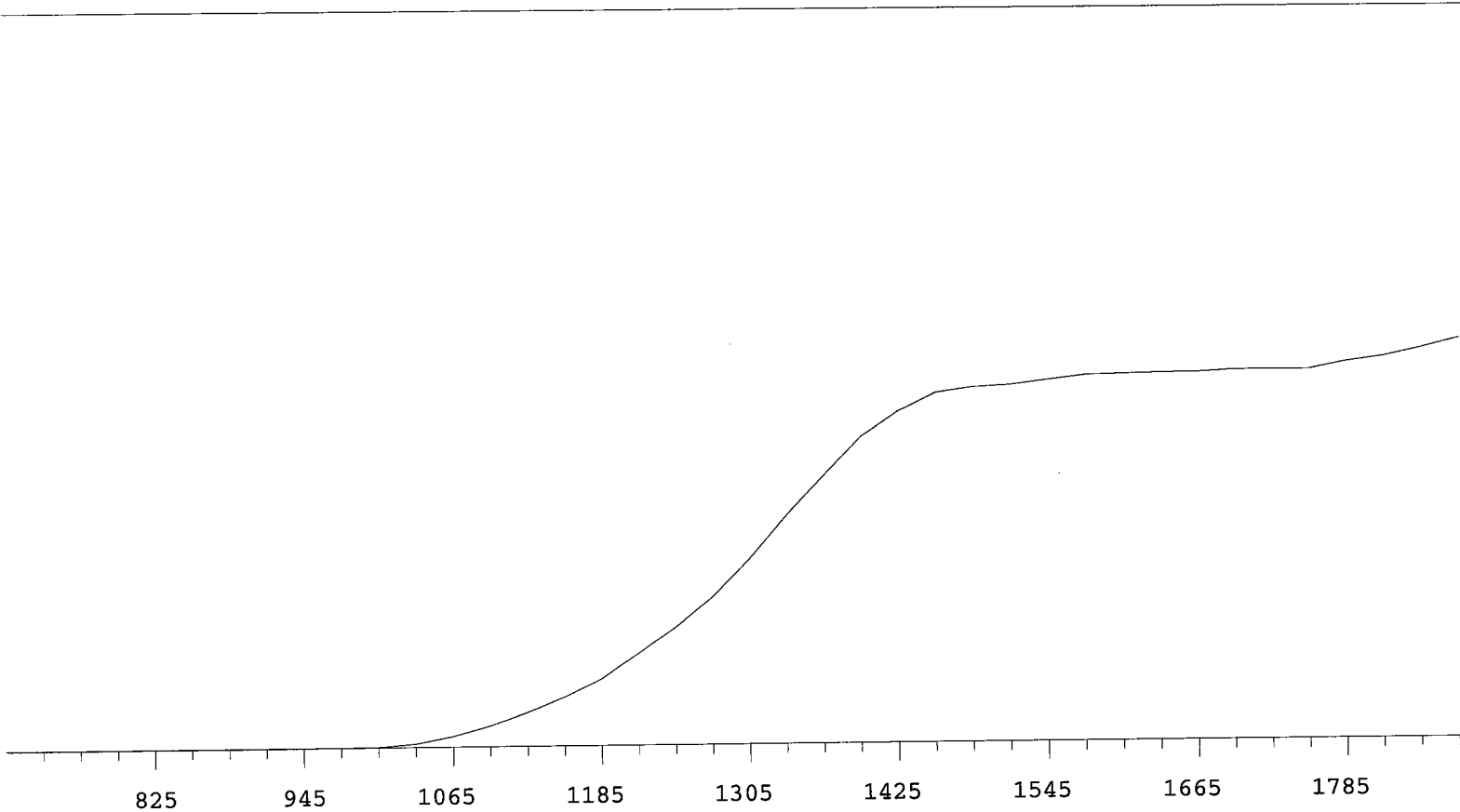
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11504	+85.43
735	1		1335	14849	+76.81
765	2	+66.67	1365	18861	+68.80
795	1	-27.78	1395	22846	+58.63
825	1	+0.00	1425	27157	+46.27
855	1	>100	1455	30851	+34.04
885	2	+74.07	1485	33326	+22.12
915	3	+0.00	1515	34995	+13.15
945	2	+51.28	1545	35846	+7.97
975	1	>100	1575	36351	+4.94
1005	5	>100	1605	36888	+3.44
1035	11	>100	1635	37159	+2.18
1065	76	>100	1665	37334	+1.21
1095	354	>100	1695	37337	+1.96
1125	989	>100	1725	37477	+3.64
1155	1937	>100	1755	38192	+5.29
1185	3197	>100	1785	38972	+8.13
1215	4514	>100	1815	39629	+11.94
1245	6395	>100	1845	41535	
1275	8812	+93.25	1875	44161	

gmk



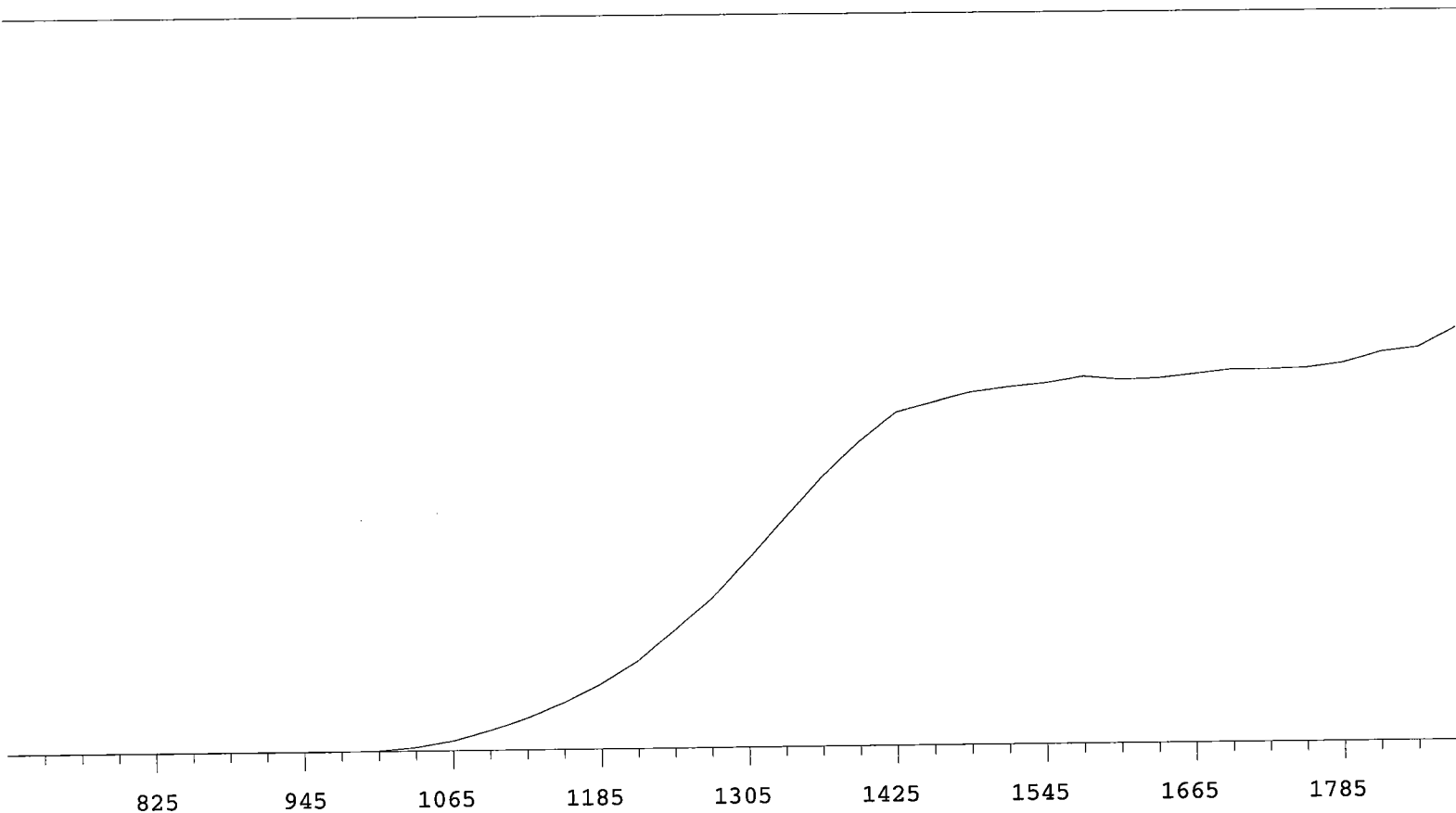
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	16352	+67.34
735	6		1335	20077	+59.09
765	3	-20.83	1365	23789	+46.51
795	2	-58.82	1395	27076	+33.20
825	3	-41.67	1425	29091	+20.71
855	3	-66.67	1455	30421	+11.33
885	1	-30.30	1485	30894	+6.95
915	1	>100	1515	31231	+4.14
945	3	>100	1545	31889	+3.39
975	9	>100	1575	31864	+2.37
1005	87	>100	1605	32186	+0.96
1035	349	>100	1635	32217	+1.30
1065	1009	>100	1665	32174	+0.81
1095	1793	>100	1695	32499	+1.72
1125	2982	>100	1725	32437	+2.17
1155	4367	>100	1755	32922	+2.82
1185	5942	+97.04	1785	33023	+5.92
1215	7886	+87.16	1815	33599	+7.59
1245	10422	+80.66	1845	35066	
1275	13013	+74.57	1875	35778	

pm 7/29/05



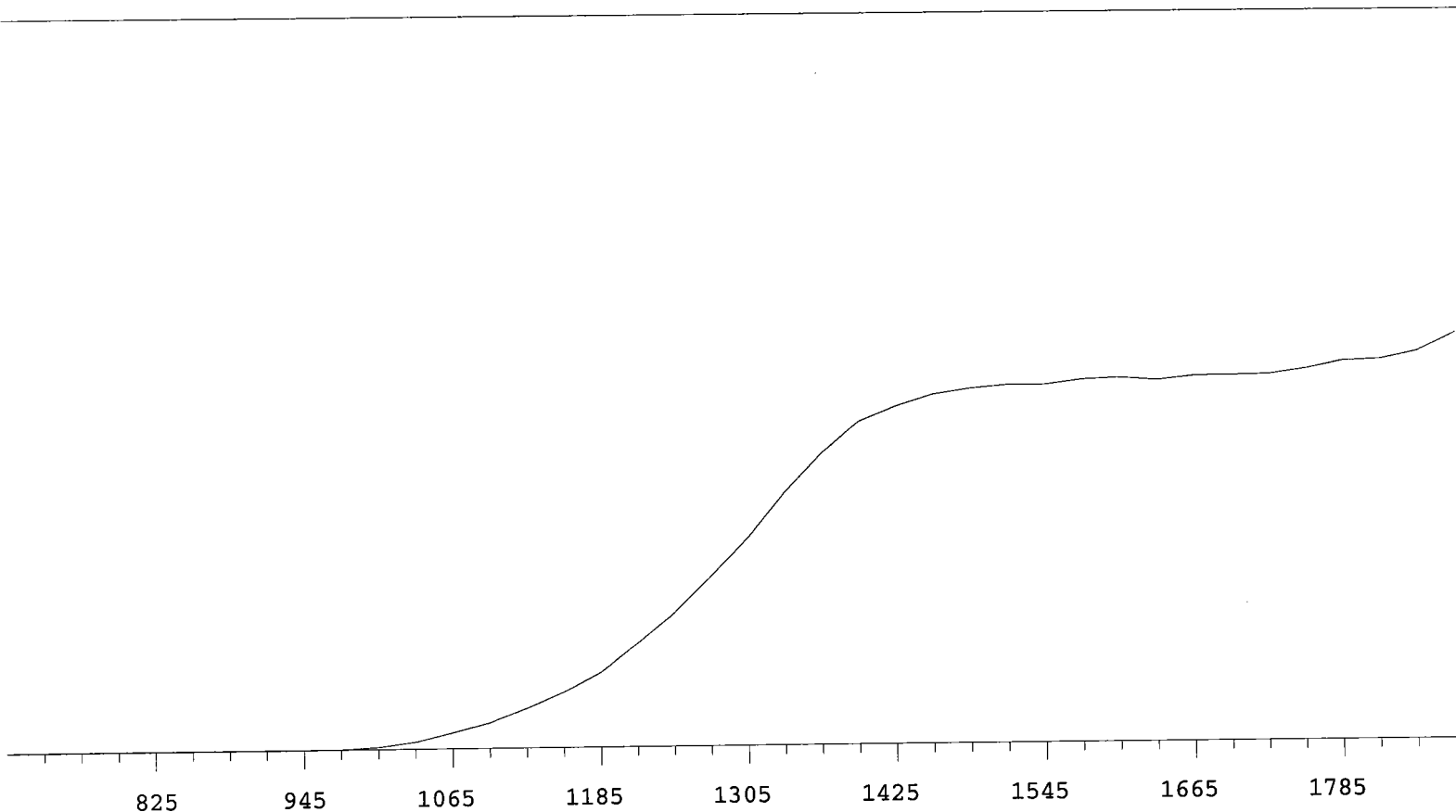
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	3		1305	22754	+66.54
735	1		1335	27979	+58.16
765	3	-55.56	1365	32713	+46.35
795	0	-23.81	1395	37461	+34.14
825	2	>100	1425	40450	+22.38
855	1	>100	1455	42675	+12.11
885	0	+66.67	1485	43308	+6.46
915	5	>100	1515	43568	+3.76
945	2	>100	1545	44157	+3.14
975	19	>100	1575	44714	+2.51
1005	86	>100	1605	44814	+1.32
1035	451	>100	1635	44910	+0.82
1065	1295	>100	1665	44945	+0.82
1095	2525	>100	1695	45204	+0.66
1125	4114	>100	1725	45222	+1.70
1155	5953	>100	1755	45215	+2.80
1185	8113	+98.45	1785	46095	+4.67
1215	11136	+88.70	1815	46688	+6.29
1245	14448	+81.12	1845	47723	
1275	18173	+74.07	1875	48829	

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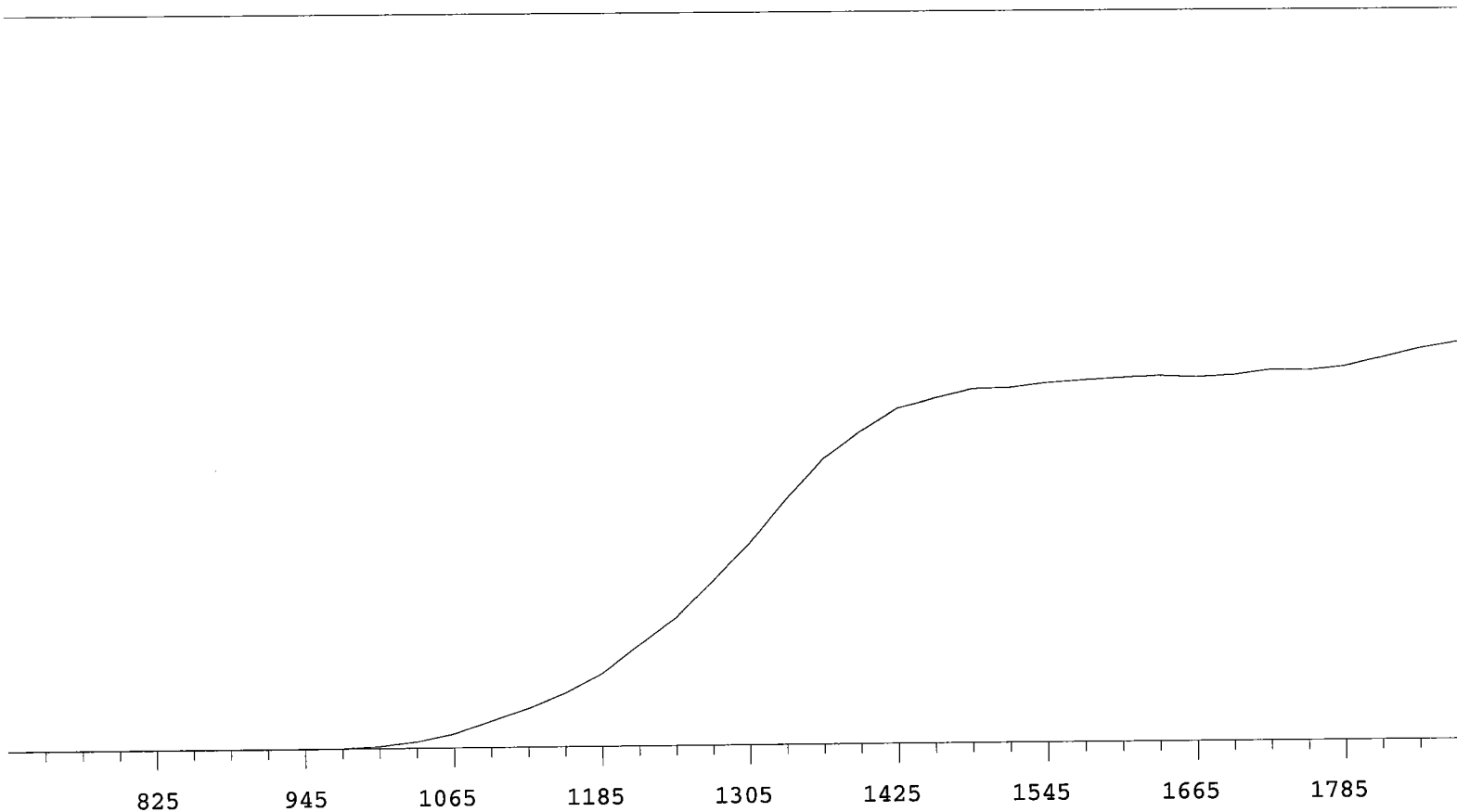
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	4		1305	19958	+67.03
735	4		1335	24246	+57.28
765	0		1365	28539	+46.21
795	0	+18.52	1395	32266	+33.26
825	1	>100	1425	35414	+21.60
855	4	+100.00	1455	36466	+12.52
885	3	-30.30	1485	37462	+6.66
915	2	+20.83	1515	37985	+5.29
945	1	>100	1545	38363	+3.02
975	6	>100	1575	39020	+1.64
1005	71	>100	1605	38677	+1.19
1035	402	>100	1635	38778	+1.48
1065	1048	>100	1665	39179	+2.33
1095	2130	>100	1695	39636	+2.03
1125	3384	>100	1725	39616	+1.90
1155	4976	>100	1755	39758	+3.40
1185	6855	>100	1785	40252	+4.91
1215	9208	+92.12	1815	41367	+7.87
1245	12454	+85.04	1845	41801	
1275	15798	+76.70	1875	43872	

msk



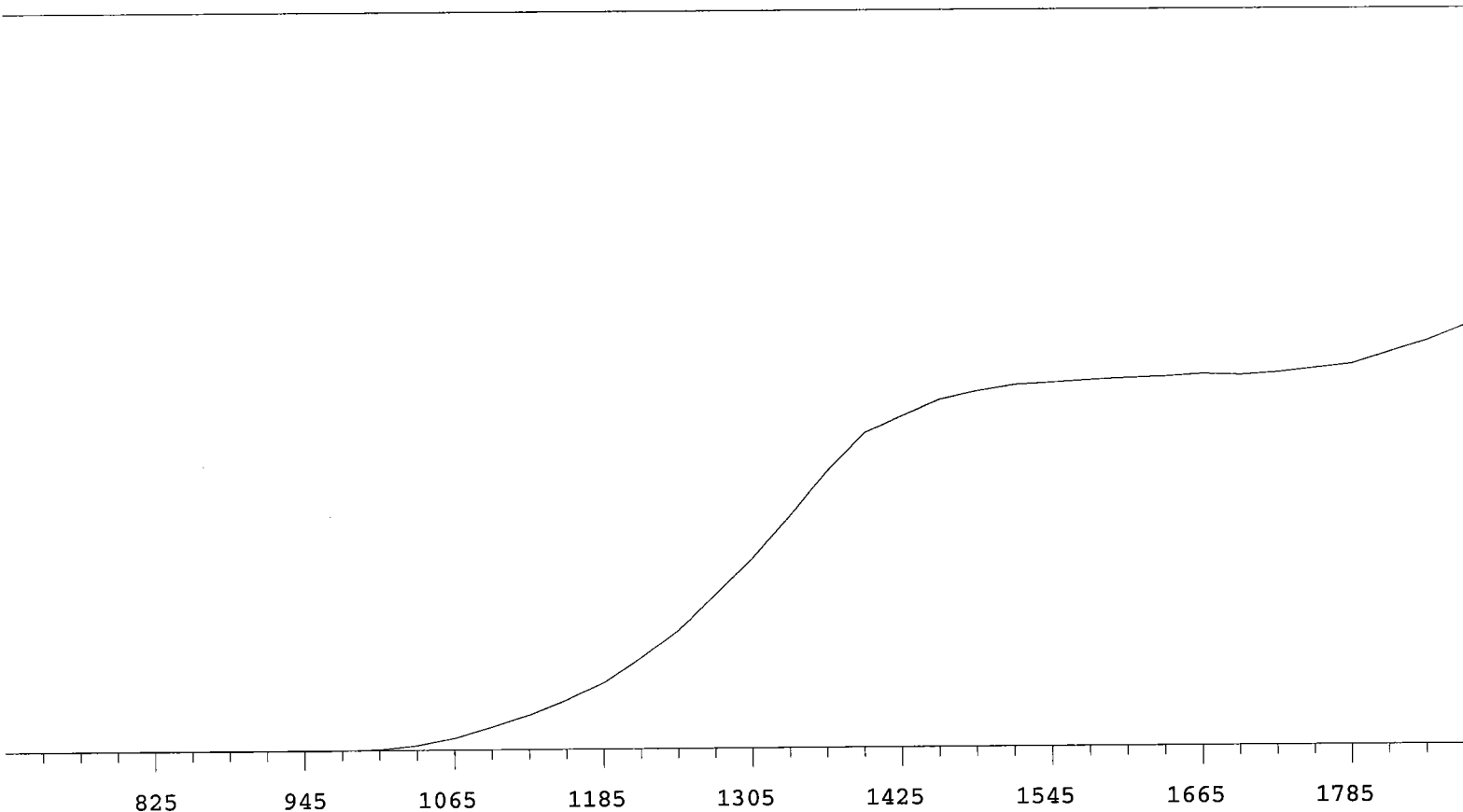
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	17371	+61.82
735	0		1335	21059	+51.03
765	1		1365	24146	+38.17
795	2	>100	1395	26716	+25.34
825	3	+0.00	1425	27972	+15.55
855	2	-33.33	1455	28941	+8.73
885	1	-33.33	1485	29433	+4.91
915	2	>100	1515	29724	+2.97
945	2	>100	1545	29727	+2.22
975	23	>100	1575	30112	+1.21
1005	188	>100	1605	30235	+1.21
1035	628	>100	1635	30012	+0.64
1065	1402	>100	1665	30324	+0.75
1095	2202	>100	1695	30358	+1.95
1125	3405	>100	1725	30404	+3.02
1155	4734	>100	1755	30862	+3.77
1185	6329	+95.04	1785	31464	+4.62
1215	8730	+88.10	1815	31575	+6.76
1245	11220	+79.46	1845	32217	
1275	14252	+70.70	1875	33728	

mshab



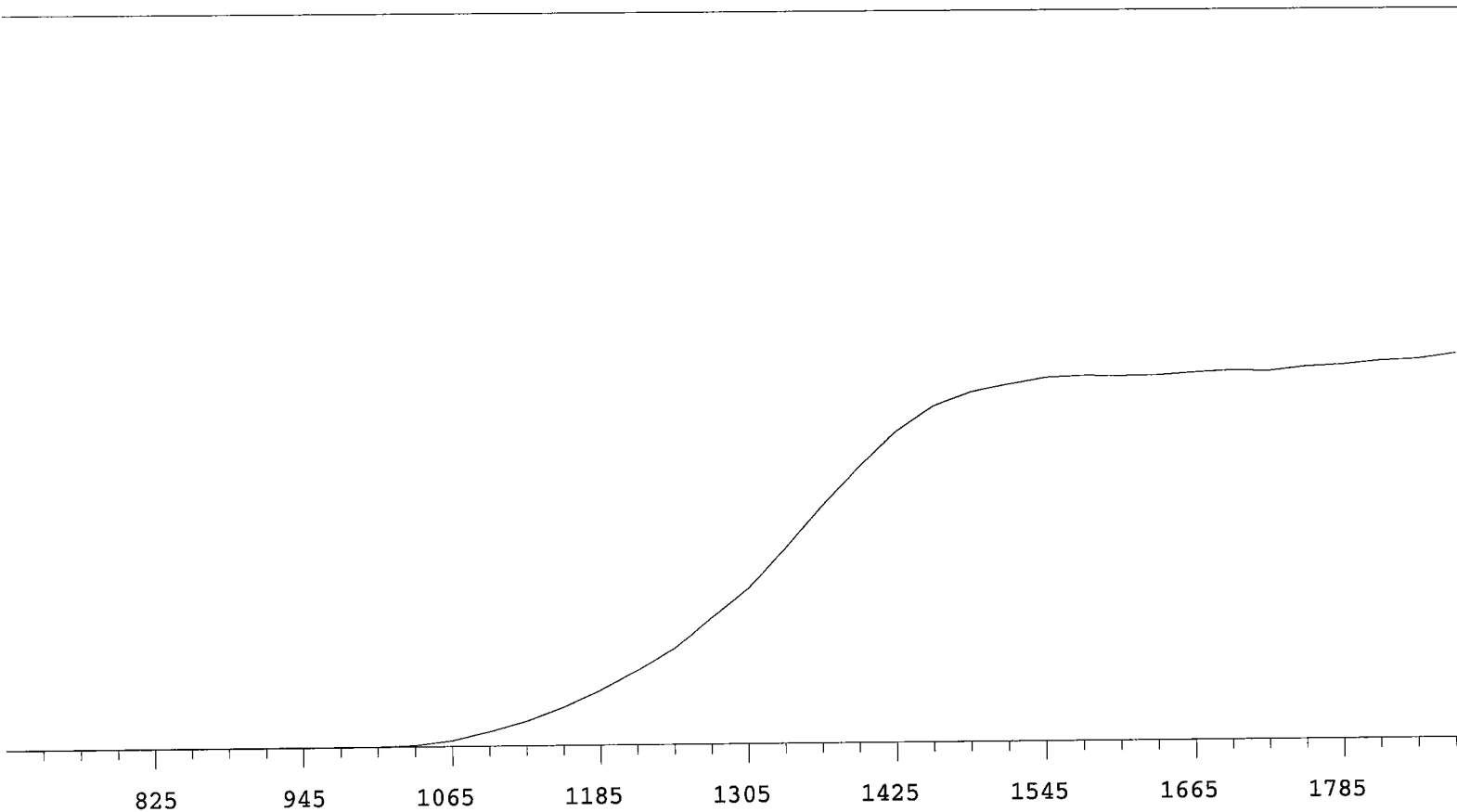
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19992	+64.10
735	1		1335	24434	+52.32
765	2	-55.56	1365	28341	+40.24
795	0	-83.33	1395	31016	+27.00
825	0	>100	1425	33244	+17.26
855	1	>100	1455	34234	+10.11
885	0	>100	1485	35116	+5.57
915	1	>100	1515	35198	+3.72
945	7	>100	1545	35658	+2.57
975	26	>100	1575	35928	+2.43
1005	201	>100	1605	36121	+1.20
1035	622	>100	1635	36271	+0.67
1065	1395	>100	1665	36135	+1.26
1095	2589	>100	1695	36285	+1.47
1125	3807	>100	1725	36799	+2.20
1155	5311	>100	1755	36745	+3.29
1185	7258	+96.60	1785	37112	+4.71
1215	10100	+88.77	1815	37953	+6.34
1245	12793	+79.49	1845	38842	
1275	16338	+71.46	1875	39499	

Jan 12 2006



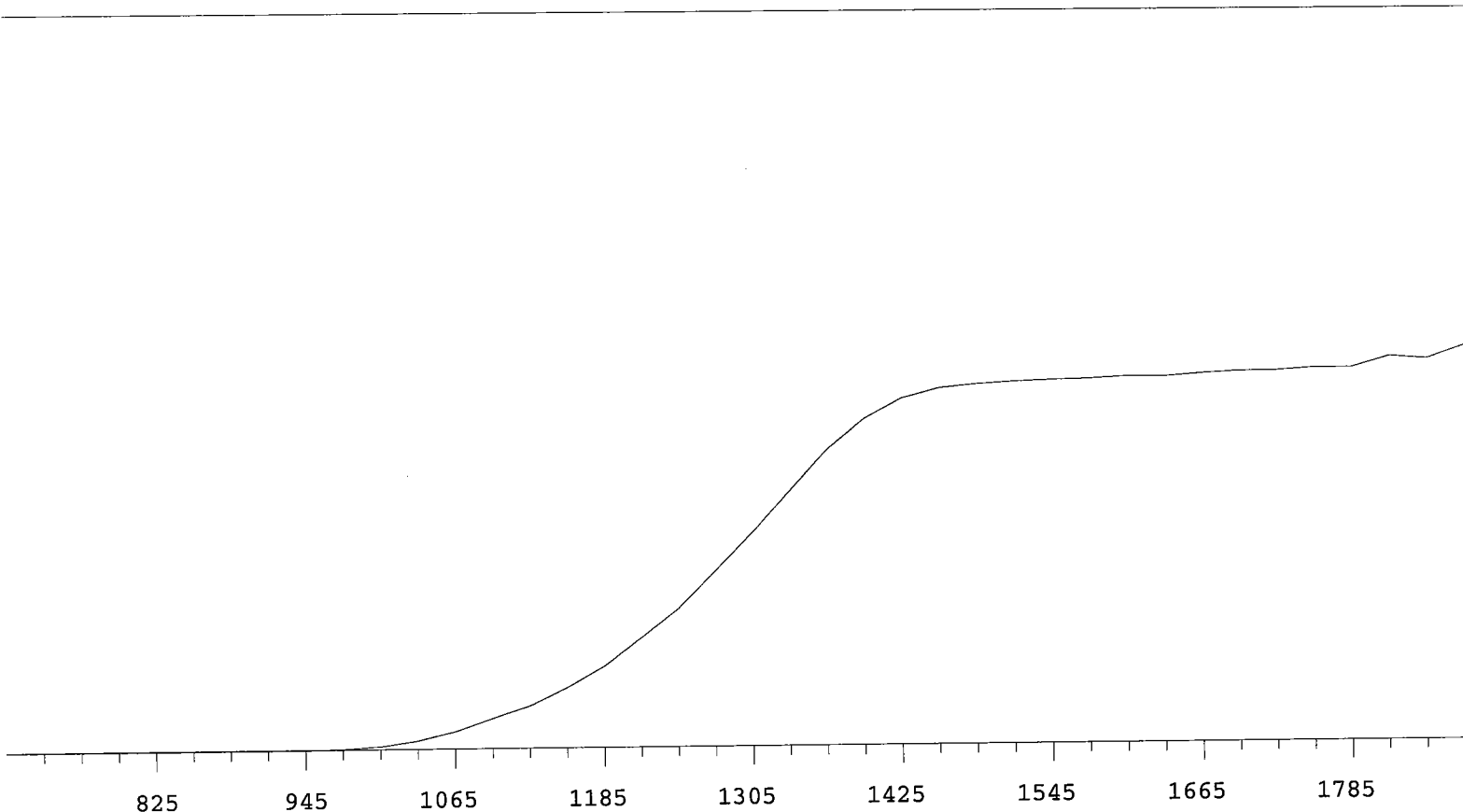
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	3		1305	20823	+66.52
735	0		1335	25209	+57.37
765	0	-27.78	1365	30058	+44.75
795	1	>100	1395	34207	+31.58
825	2	+41.67	1425	35961	+19.48
855	0	+27.78	1455	37712	+11.46
885	1	+0.00	1485	38621	+7.54
915	2	>100	1515	39266	+4.27
945	1	>100	1545	39505	+2.69
975	12	>100	1575	39765	+1.77
1005	101	>100	1605	39960	+1.71
1035	505	>100	1635	40095	+1.10
1065	1271	>100	1665	40363	+0.99
1095	2435	>100	1695	40227	+1.48
1125	3717	>100	1725	40494	+2.25
1155	5349	>100	1755	40925	+4.61
1185	7264	+98.50	1785	41387	+6.78
1215	9948	+91.79	1815	42624	+9.20
1245	13035	+83.57	1845	43902	
1275	16927	+74.29	1875	45583	

m7/25/05



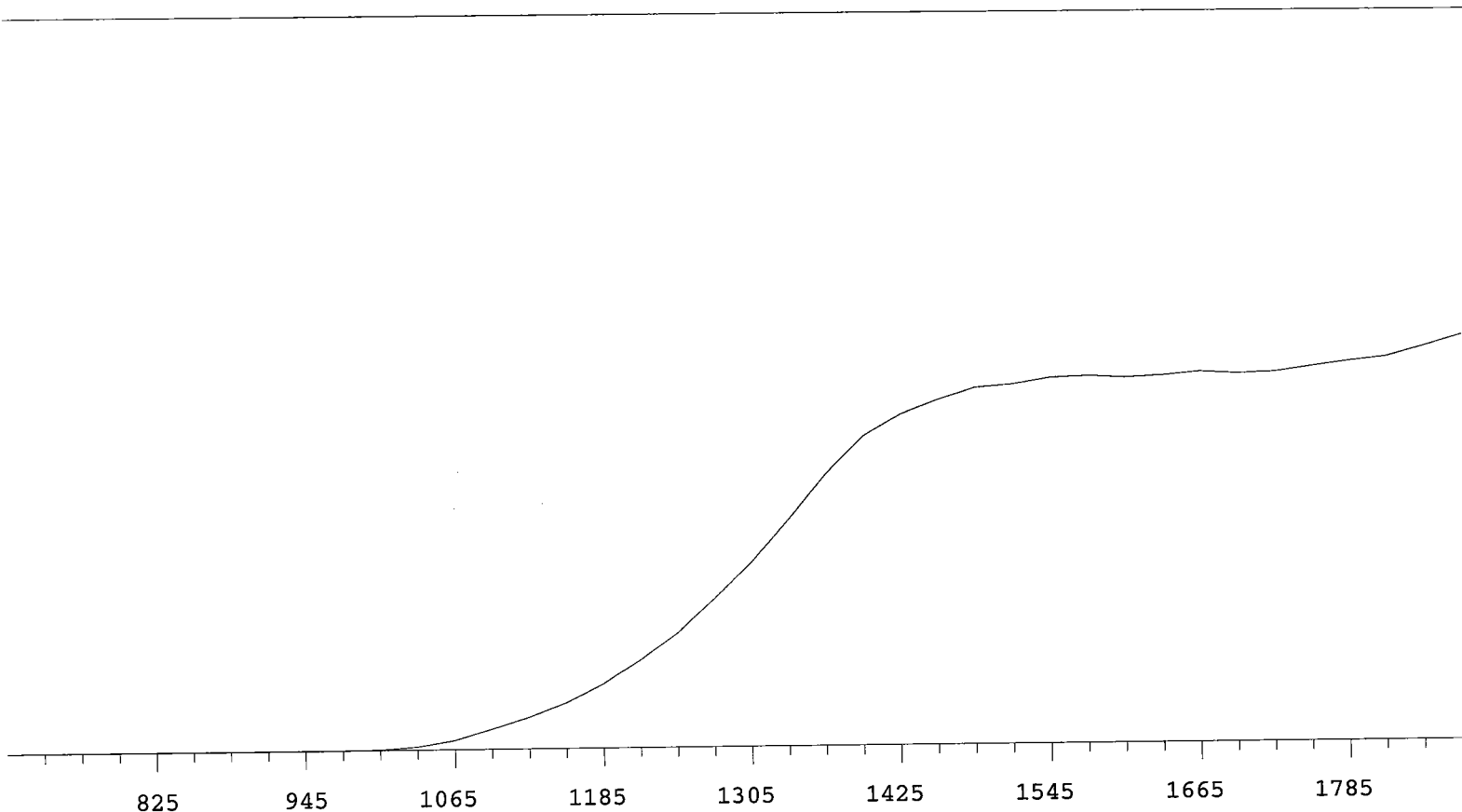
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	18669	+72.76
735	0		1335	23370	+64.55
765	0	+66.67	1365	28550	+55.91
795	0	>100	1395	33260	+43.78
825	3	+83.33	1425	37418	+31.11
855	0	-83.33	1455	40334	+20.16
885	1	>100	1485	41951	+12.02
915	0	>100	1515	42838	+6.74
945	1	>100	1545	43602	+3.50
975	3	>100	1575	43809	+1.61
1005	34	>100	1605	43735	+0.82
1035	190	>100	1635	43823	+1.13
1065	725	>100	1665	44134	+1.17
1095	1724	>100	1695	44358	+1.41
1125	2937	>100	1725	44239	+1.42
1155	4543	>100	1755	44705	+1.95
1185	6429	>100	1785	44909	+2.35
1215	8789	+94.33	1815	45328	+2.52
1245	11443	+85.00	1845	45509	
1275	15155	+78.33	1875	46116	

mm/2005



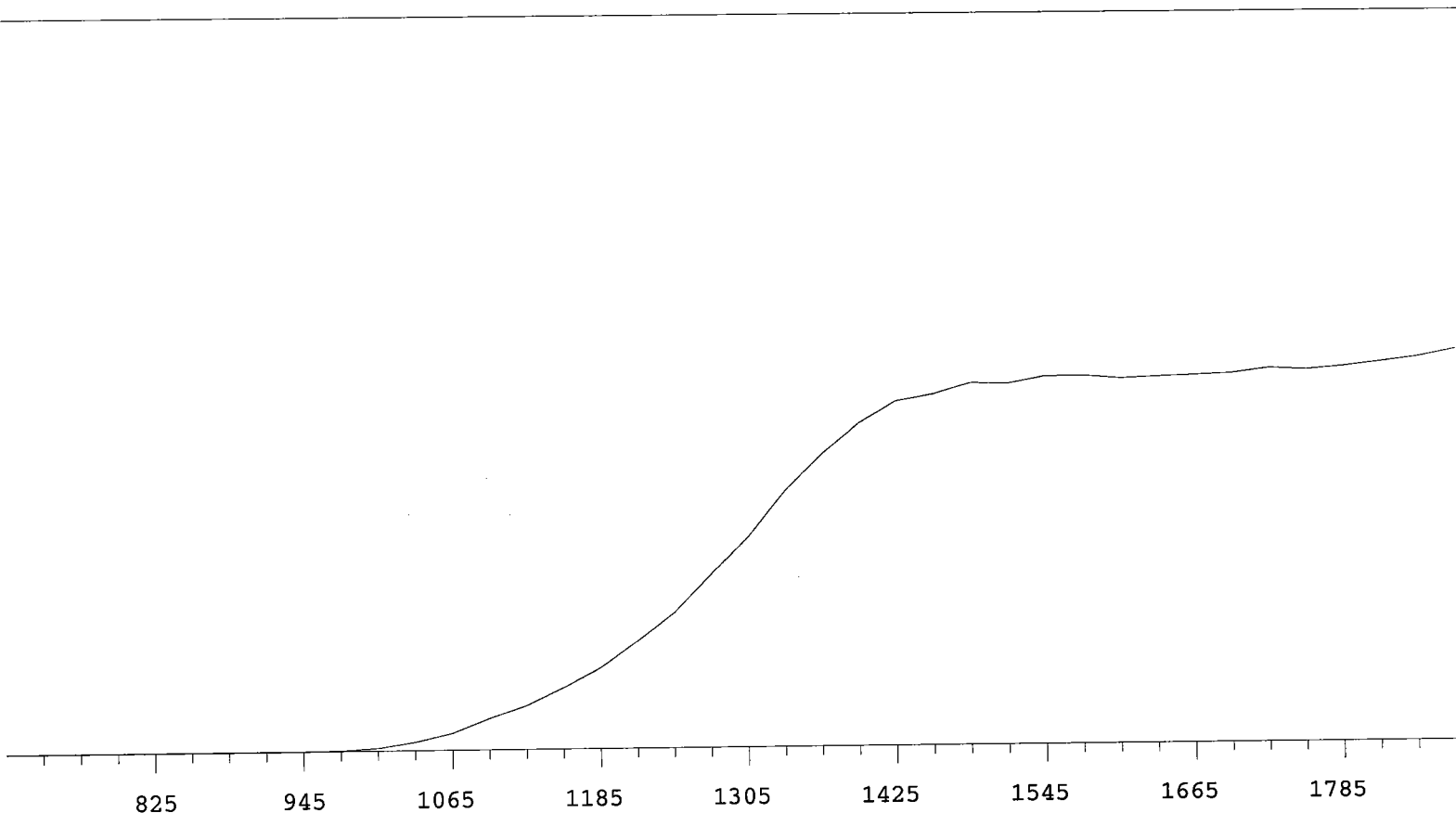
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	3		1305	17564	+61.34
735	2		1335	20983	+50.92
765	1	-66.67	1365	24340	+39.30
795	4	+45.45	1395	26885	+26.88
825	0	+30.30	1425	28563	+15.81
855	4	+0.00	1455	29365	+8.25
885	2	>100	1485	29683	+3.89
915	3	>100	1515	29898	+2.00
945	6	>100	1545	30019	+1.51
975	42	>100	1575	30093	+1.01
1005	244	>100	1605	30263	+1.18
1035	697	>100	1635	30232	+1.46
1065	1429	>100	1665	30485	+1.36
1095	2487	>100	1695	30648	+1.63
1125	3483	>100	1725	30678	+1.10
1155	4980	>100	1755	30883	+2.70
1185	6683	+92.69	1785	30876	+2.89
1215	8988	+84.24	1815	31805	+4.51
1245	11345	+76.74	1845	31569	
1275	14366	+68.74	1875	32673	

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VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	17606	+68.88
735	0		1335	21599	+59.41
765	0		1365	25809	+47.05
795	0	>100	1395	29372	+33.37
825	2	>100	1425	31486	+21.76
855	0	+100.00	1455	32894	+12.91
885	1	>100	1485	34077	+8.33
915	2	>100	1515	34357	+5.14
945	4	>100	1545	34948	+2.35
975	10	>100	1575	35100	+1.39
1005	53	>100	1605	34930	+0.94
1035	327	>100	1635	35093	+0.78
1065	902	>100	1665	35444	+1.03
1095	1970	>100	1695	35257	+1.49
1125	3079	>100	1725	35393	+2.34
1155	4435	>100	1755	35908	+3.77
1185	6202	+99.16	1785	36373	+5.15
1215	8385	+91.20	1815	36800	+6.47
1245	10930	+83.12	1845	37764	
1275	14132	+75.94	1875	38815	

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VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	4		1305	21893	+61.23
735	3		1335	26615	+50.22
765	1		1365	30345	+39.18
795	1	>100	1395	33570	+25.90
825	0	>100	1425	35845	+16.79
855	1	>100	1455	36520	+8.95
885	5	>100	1485	37628	+5.26
915	3	>100	1515	37539	+3.72
945	14	>100	1545	38268	+1.30
975	77	>100	1575	38301	+0.80
1005	298	>100	1605	37985	-0.13
1035	932	>100	1635	38135	+0.48
1065	1829	>100	1665	38276	+1.84
1095	3311	>100	1695	38429	+1.51
1125	4603	>100	1725	38899	+1.48
1155	6424	+96.24	1755	38695	+1.85
1185	8451	+88.86	1785	39003	+2.37
1215	11201	+83.16	1815	39457	+4.14
1245	14170	+76.31	1845	39914	
1275	18128	+69.83	1875	40696	

mu 9/29/05

Pb-210 WATER

Batch : CALVER
 Analyst : JMJ
 Date : 7/28/2005

Procedure Code : GFC_PBL
 Parmname : Lead-210
 Batch Counted On : PIC
 Lead Carrier Weight : 14.65 mg/mL

Required MDA : 5.00 pCi/L
 Bkg Count Time : 500 min

Sample ID	Sample Aliquot L	Sample Date/Time	Prep Date	Carrier Weight mg	Bi-210 Start Time	Bi-210 Ingrowth Factor	Detector Number#	Count Time min
V1	1.000	7/14/2005 0:00	7/14/2005	1.30	7/14/2005 8:00	0.858	1A	10
V2	1.000	7/14/2005 0:00	7/14/2005	2.10	7/14/2005 8:00	0.858	1B	10
V3	1.000	7/14/2005 0:00	7/14/2005	3.60	7/14/2005 8:00	0.858	1C	10
V4	1.000	7/14/2005 0:00	7/14/2005	5.00	7/14/2005 8:00	0.858	1D	10
V5	1.000	7/14/2005 0:00	7/14/2005	7.00	7/14/2005 8:00	0.858	2A	10
V6	1.000	7/14/2005 0:00	7/14/2005	8.80	7/14/2005 8:00	0.858	2B	10
V7	1.000	7/14/2005 0:00	7/14/2005	11.70	7/14/2005 8:00	0.858	2C	10
V8	1.000	7/14/2005 0:00	7/14/2005	13.40	7/14/2005 8:00	0.858	2D	10
V9	1.000	7/14/2005 0:00	7/14/2005	12.90	7/14/2005 8:00	0.858	3A	10
V10	1.000	7/14/2005 0:00	7/14/2005	15.30	7/14/2005 8:00	0.858	3B	10
V11	1.000	7/14/2005 0:00	7/14/2005	15.70	7/14/2005 8:00	0.858	3C	10
V12	1.000	7/14/2005 0:00	7/14/2005	19.80	7/14/2005 8:00	0.858	3D	10
V1	1.000	7/14/2005 0:00	7/14/2005	1.30	7/14/2005 8:00	0.858	4A	10
V2	1.000	7/14/2005 0:00	7/14/2005	2.10	7/14/2005 8:00	0.858	4B	10
V3	1.000	7/14/2005 0:00	7/14/2005	3.60	7/14/2005 8:00	0.858	4C	10
V4	1.000	7/14/2005 0:00	7/14/2005	5.00	7/14/2005 8:00	0.858	4D	10

7/28/05

Pb-210 0.1 ML
 ET491-A 80900.6 DPM
 3644.17 pCi/L

Total Beta Counts	Raw cpm	Detector Efficiency dec	BKG cpm	Counted Time	Sample Decay Factor	Test Rec. dec	Pb-210 MDA pCi/L	Pb-210 RESULT pCi/L	Pb-210 Recovery (%)
22806	2280.60	0.4191	0.362	7/28/2005 10:51	0.999	0.8874	1.636	3223.022	88.44%
23555	2355.50	0.4061	0.296	7/28/2005 10:51	0.999	0.7167	1.937	4252.948	116.71%
25567	2556.70	0.3977	0.36	7/28/2005 10:51	0.999	0.8191	1.864	4124.728	113.19%
23587	2358.70	0.3846	0.338	7/28/2005 10:51	0.999	0.8532	1.806	3777.228	103.65%
26230	2623.00	0.3682	0.348	7/28/2005 10:52	0.999	0.9556	1.703	3917.583	107.50%
25997	2599.70	0.3528	0.386	7/28/2005 10:52	0.999	1.0011	1.766	3868.023	106.14%
26435	2643.50	0.3237	0.42	7/28/2005 10:52	0.999	1.1409	1.745	3762.025	103.23%
26101	2610.10	0.3139	0.414	7/28/2005 10:52	0.999	1.1433	1.786	3822.424	104.89%
22288	2228.80	0.3046	0.32	7/28/2005 10:52	0.999	0.9784	1.948	3930.475	107.86%
24112	2411.20	0.2889	0.366	7/28/2005 10:52	0.999	1.0444	2.025	4199.302	115.23%
22831	2283.10	0.2864	0.402	7/28/2005 10:52	0.999	0.9742	2.271	4300.541	118.01%
21369	2136.90	0.2483	0.384	7/28/2005 10:53	0.999	1.0396	2.411	4349.436	119.35%
22530	2253.00	0.4156	0.334	7/28/2005 11:09	0.999	0.8874	1.600	3210.006	88.09%
24318	2431.80	0.4129	0.32	7/28/2005 11:09	0.999	0.7167	1.961	4317.153	118.47%
25689	2568.90	0.3967	0.35	7/28/2005 11:09	0.999	0.8191	1.848	4153.294	113.97%
23412	2341.20	0.3802	0.394	7/28/2005 11:09	0.999	0.8532	1.937	3791.786	104.05%

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INSTR_ID	SAMPLE_ID	CNT_TIME	A	B	TIME	USER2
Instrument 1 - A	1	10	112	22806	7/28/2005 10:51	1575
Instrument 1 - B	2	10	88	23555	7/28/2005 10:51	1575
Instrument 1 - C	3	10	212	25567	7/28/2005 10:51	1575
Instrument 1 - D	4	10	331	23587	7/28/2005 10:51	1575
Instrument 2 - A	5	10	310	26230	7/28/2005 10:52	1575
Instrument 2 - B	6	10	14	25997	7/28/2005 10:52	1575
Instrument 2 - C	7	10	357	26435	7/28/2005 10:52	1575
Instrument 2 - D	8	10	314	26101	7/28/2005 10:52	1575
Instrument 3 - A	9	10	192	22288	7/28/2005 10:52	1575
Instrument 3 - B	10	10	240	24112	7/28/2005 10:52	1575
Instrument 3 - C	11	10	308	22831	7/28/2005 10:52	1575
Instrument 3 - D	12	10	276	21369	7/28/2005 10:53	1575
Instrument 4 - A	1	10	183	22530	7/28/2005 11:09	1575
Instrument 4 - B	2	10	30	24318	7/28/2005 11:09	1575
Instrument 4 - C	3	10	273	25689	7/28/2005 11:09	1575
Instrument 4 - D	4	10	602	23412	7/28/2005 11:09	1575

for 2/2/06

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-018 Isotope Pb-210
 Date Standards Prepared 7/14/05 Cocktail Type Used N/A
 Standard ID ET491-A Matrix of Vial/Planchett Lead chromate precipitate on Tuffryn filter
 Amount Used (g or ml) 0.1 Type of Scintillation Vial N/A
 Standard Activity (DPM/g or ml) 112301.8 Pipette ID Used 1429303
 Reference Date 1/1/95 Balance ID Used N/A
 Expiration Date 11/1/05 Quenching Agent N/A
 Residue/Carrier Agent Lead Carrier 14.65 ^{ug}/ml

Separation Date/Time: 7/14/05 0800

Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
V1	0.1	0.0839	0.0843	0.49 0.0852
V2	0.2	0.0841	0.0856	1.5 0.0862
V3	0.3	0.0840	0.0876	3.6
V4	0.4	0.0856	0.0906	5.0
V5	0.5	0.0846	0.0916	7.0
V6	0.6	0.0844	0.0932	8.8
V7	0.7	0.0839	0.0956	11.7
V8	0.8	0.0859	0.0993	13.4
V9	0.9	0.0879	0.1008	12.9
V10	1.0	0.0844	0.0997	15.3
V11	1.1	0.0867	0.1024	13.7
V12	1.3	0.0840	0.1038	19.8

1.3
2.1

Prepared By: [Signature]

Date

7/29/05

Reviewed By: [Signature]

Date

2/20/08

Rev 1 RLM 9/10/97

DEUTSCHER KALIBRIERDIENST (DKD)

Kalibrierlaboratorium für Meßgrößen der Radioaktivität
 Calibration laboratory for measurements of radioactivity

AKKREDITIERT DURCH DIE PHYSIKALISCH-TECHNISCHE BUNDESANSTALT (PTB)



Amersham Buchler GmbH & Co KG
 Postfach 11 49 Gieselweg 1
 D-38001 Braunschweig D-38110 Braunschweig

Telefon (05307) 930-0
 Telefax (05307) 930-293
 Telefax-Zentrale 930-237

Kalibrierschein Calibration Certificate

Kalibrierzeichen
 Calibration mark

02628
DKD-K- 06501
95-10

Gegenstand <i>Object</i>	Radioactive Reference Solution
Hersteller <i>Manufacturer</i>	Amersham Buchler GmbH & Co KG Postfach 11 49 Gieselweg 1 D-38001 Braunschweig D-38110 Braunschweig
Typ <i>Type</i>	RBZB44
Strahler-Nr. <i>Source number</i>	ET 491
Auftraggeber <i>Customer</i>	Amersham Corporation 2636 S. Clearbrook Drive Arlington Heights, IL 60005 USA-Arlington Heights, IL
Auftragsnummer <i>Work order number</i>	112116
Anzahl der Seiten des Kalibrierscheines <i>Number of pages of the certificate</i>	2
Referenzdatum <i>Reference date</i>	1 January 1995

Der Deutsche Kalibrierdienst ist Unterzeichner des multilateralen Übereinkommens der Western European Calibration Cooperation (WECC) zur gegenseitigen Anerkennung der Kalibrierscheine. Die Kalibrierung erfolgt auf der Grundlage des zwischen der Physikalisch-Technischen Bundesanstalt und dem Träger abgeschlossenen Vertrages. Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich. *The Deutscher Kalibrierdienst is signatory to the multilateral agreement of the Western European Calibration Cooperation (WECC) for the mutual recognition of calibration certificates. The calibration is performed according to the stipulations of the contract between the Physikalisch-Technische Bundesanstalt and the holder of the calibration laboratory. This calibration certificate documents the traceability to national standards, which realize the physical units of measurement according to the International System of Units (SI). The user is obliged to have the object recalibrated at appropriate intervals.*

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Physikalisch-Technischen Bundesanstalt als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit. *This calibration certificate may not be reproduced other than in full except with the permission of both the Physikalisch-Technische Bundesanstalt and the issuing laboratory. Calibration certificates without signature and seal are not valid.*

Stempel <i>Seal</i>	Datum <i>Date</i>	Leiter des Kalibrierlaboratoriums <i>Head of the calibration laboratory</i>	Stellvertreter <i>Deputy</i>	Bearbeiter <i>Person responsible</i>
	18 October 1995	Dr. Dornhöfer	Dr. Thieme	E. Schuber PC-5-013-4



DEUTSCHER KALIBRIERDIENST (DKD)

PAGE 2 OF CALIBRATION CERTIFICATE FROM 18 October 1995

02628

DKD-K-
06501

95-10

Radioactive Reference Solution

Solution No.: ET 491
Drawing No.: VZ-2058
Nuclide: Lead-210
Radioactive concentration: 38.1 kBq/g
Reference date: 1 January 1995 at 12.00 GMT
Mass of solution: (5.182 ± 0.001) g
Volume of solution: approx. 5 ml
Chemical composition: Solution in 1.2 M HNO₃
Carrier: Pb (NO₃)₂, Bi (NO₃)₃; each 20 mg/l of the corresponding element.
Measuring method: The activity was determined by comparison with a reference solution by measurement with a Ge-detector with MCA.
Traceability: Additional to the direct traceability to the PTB through the DKD this product satisfies the quality assurance requirements of USNRC Regulatory Guide 4.15 Revision 1, February 1979, for achieving NIST traceability through Amersham's participation in the NEI-NIST Measurements Assurance Program of the Nuclear Power Industry.
Uncertainty: The relative uncertainty of the activity is ± 3 %.
The declared uncertainty U is an expanded uncertainty $U = k \cdot u_c$ with a coverage factor of $k = 3$. The combined uncertainty u_c is the sum of all uncertainties which can be evaluated by statistical means (uncertainty type A, u_A) and all other uncertainties (uncertainty type B, u_B) whereby $u_c^2 = u_A^2 + u_B^2$.
(Ref.: NIST Technical Note 1297 / WECC-Doc. 19-1990)
Radioactive impurities: Related to Pb-210 (equal 100 %) the following radioactive impurities were detected:
Ra-226: 0.003 %



Handwritten signature and reference number: 20-5-013-47

TRACEABILITY TO NIST

Amersham Corporation
2636 S. Clearbrook Drive
Arlington Heights, IL 60005
tel (708) 593-6300
fax (708) 593-8091



Traceability is the ability to relate the accuracy of measurement of radionuclides to the National Institute of Standards and Technology (NIST). Traceability is achieved by participation in a Measurements Assurance Program linked to NIST and production of certified materials in accordance with a quality assurance program.

Amersham participates in measurement assurance programs conducted by NIST in cooperation with the Nuclear Energy Institute (NEI, formerly USCEA). Additionally, our production facilities and measurement laboratories operate under routinely audited quality assurance programs.

Therefore, Amersham certified standardized products meet or exceed, the NRC requirements for measurements traceable to NIST.

278004C

mu 7/25/06

RC-S-013-4B



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	ET491	Isotope:	Lead-210
Prepared By:	Garret Ray	Prepared By:	Garret Ray
Carrier Conc:	1.2M HNO3	Prep Date:	03/01/1996
Reference Date:	01/01/1995	Verification Date:	07/12/2005
Ampoule Mass (g):	5.182 g	Expiration Date:	07/12/2006
Uncertainty:	+/- 3 %	Primary Code:	ET491-A
LogBook No:	RC S 014 004	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0547 g
		Density(g/mL):	1.0000

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(5.0547 \text{ g}) * (38.1 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 115550.4420 \text{ dpm/mL}$
$(5.0547 \text{ g}) * (38.1 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0000 \text{ g/mL}) / (100 \text{ mL}) = 115550.4420 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
10/20/1997	Richard Kinney	.467	100	ET491-B	524.45 dpm/ml	03/01/1997	03/01/1998
10/29/1997	Richard Kinney	3.0992	500	ET491-C	696.09 dpm/mL	10/29/1998	10/29/1999
04/03/2001	Angela Albee	.5184	100	ET491-D	582.17 dpm/mL	04/16/2003	04/16/2004
09/15/2003	Angela Albee	.5132	100	ET491-E	576.33 dpm/mL	11/11/2004	11/11/2005

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

m 7/29/05

Verification for Pb-210 Standard ET491-A

A. Fehr
7/12/2005

LAG
7/29/05

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Mass. Used (g)	Standard	Source DPM/ μ rc ⁻² g
ET491-E N1	22785.6000	20.2000	22785.6000	2.63365	0.1038		83349.97114
ET491-E N2	22178.6000	20.2000	22178.6000	2.63365	0.1033		81522.24763
ET491-E N3	22065.7000	20.2000	22065.7000	2.63365	0.1031		81264.5963

Mean Value (Counting) = 82045.60502
Stdev = 1136.936355

Average = 82045.60502

Certificate Value = 80912.1
Lower Limit = 79771.73231
Upper Limit = 84319.47773
Rule 1 Pass/Fail Pass
Two sigma = 2273.872711
10 % of Mean = 8204.560502
Rule 2 (Pass/Fail) Pass

101.400909 Pass
0.01385737 Rule 3 (Pass/Fail)

Verification Rules

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

The analyst prepared three calibration sources for source ET491-A by transferring 0.1 mL portions of the standard to glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The calibration vials and background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 31 for Pb-210 standard verification. The efficiency calibration which was used for verification calculations was performed on 7/12/05 using source 0356-A (Pb-210). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

7/29/05

Angela D. Johnson
7/29/05

PROTOCOL : 31 Pb-210 Verification
DATE : 2005/07/12
TIME : 05:29
ID : P31AS005

Wallac 1414 WinSpectral v1.40 S/N 4140127
Counting mode : CPM
Isotope(s) : Pb210
Pb210 = 5- 520,21.00 y
Protocol name : Pb-210 Verification
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Advanced modes : Chemilum,PSA
PSA level : 35
Output to Display :
POS,CTIME,DATE,TIME,RACKPOS,CPMw1,CPM,SQPI,CPM1
Additions to Display : Spectrum,Header,Listing
Spectrum : Alpha,Beta
Window 1 : 685- 745 /Alpha
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

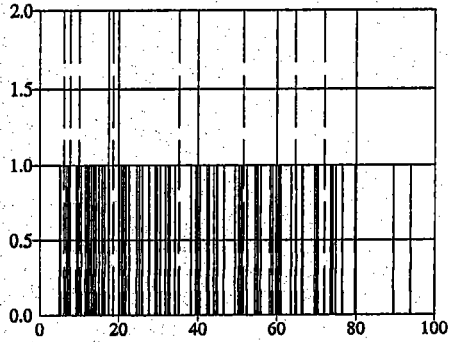
Total count rate:
Pb210 72372.3 CPM

ast 7/12/05

Handwritten signatures and dates:
7/29/05
7/29/05

POS CTIME DATE TIME RACKPOS CPM

1 300 7/12/2005 5:29 AM 1 20.20

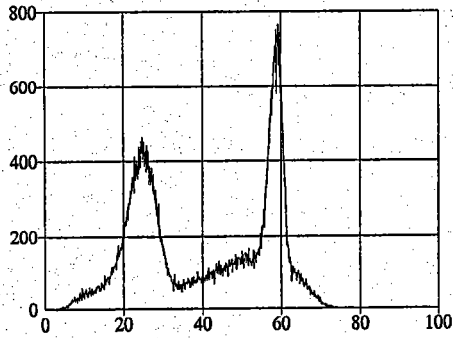


Counts Alpha

Counts Beta

Bkg

2 300 7/12/2005 5:35 AM 2 22785.60

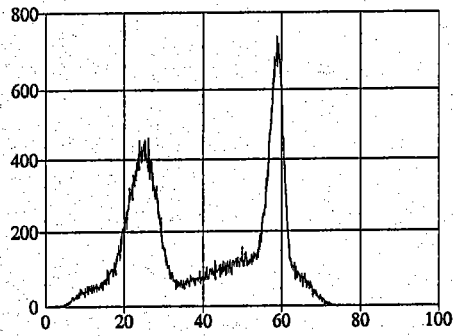


Counts Alpha

Counts Beta

ET491-A

3 300 7/12/2005 5:41 AM 3 22178.60



Counts Alpha

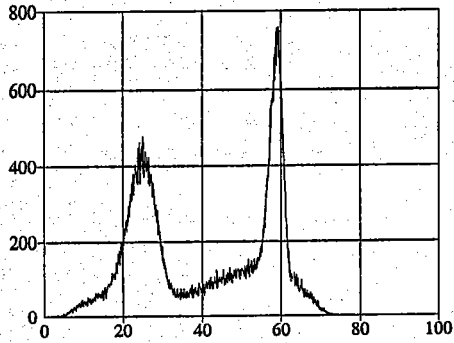
Counts Beta

ET491-A

acf 7/12/05

m 7/24/05
ADQ
7/29/05

POS	CTIME	DATE	TIME	RACKPOS	CPM
4	300	7/12/2005	5:46 AM	4	22065.70

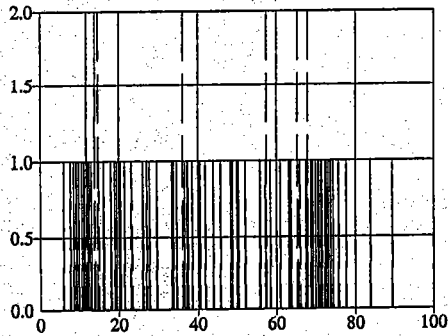


Counts Alpha

Counts Beta

ET491-A

5	300	7/12/2005	5:52 AM	5	21.70
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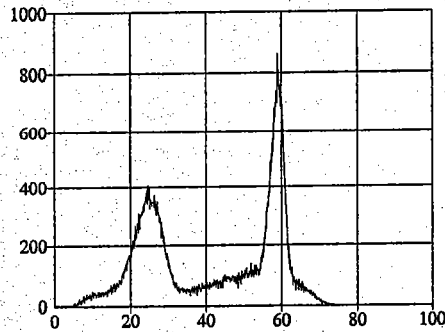


Counts Alpha

Counts Beta

Bkg

6	300	7/12/2005	5:58 AM	6	20294.00
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Counts Alpha

Counts Beta

0356-A

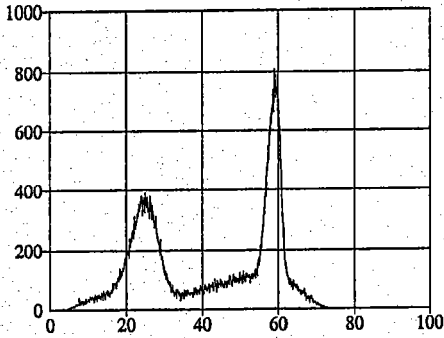
auF7112105

Handwritten signature

Handwritten initials and date
JLQ
7/29/05

POS CTIME DATE TIME RACKPOS CPM

7 300 7/12/2005 6:04 AM 7 20276.60

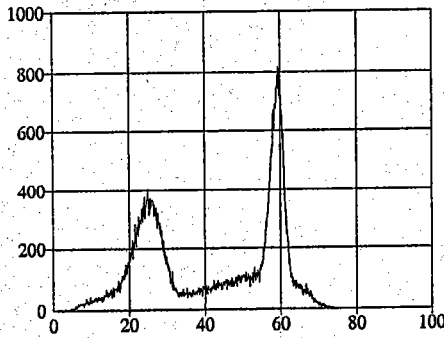


Counts Alpha

Counts Beta

0356-A

8 300 7/12/2005 6:09 AM 8 20079.70



Counts Alpha

Counts Beta

0356-A

AWF 7/12/05

AWF 7/12/05
AWF
7/29/05

General Engineering Laboratories

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

Gas Flow Proportional Counter Calibration Package

Method: RA-228

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

Prepared By: 

Date: 4/22/05

Reviewed By: 

Date: 4/23/05

Effective Date: 4/22/05

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

68229-278

Ra-228 5 mL Liquid in Flame Sealed Vial

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

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

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

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.524 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	April 26, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

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

5.00087 grams 0.1M HCl solution with 25 μ g/g Ba carrier.

P O NUMBER 3240 RD, Item 1

SOURCE PREPARED BY:

M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED:

ACM 4/28/04

RECEIVED
4/29/04
TCW

my 4/28/04



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0683	Isotope:	Radium-228
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl	Prep Date:	02/03/2005
Reference Date:	04/26/2004	Verification Date:	02/04/2005
Ampoule Mass (g):	5.00087 g	Expiration Date:	02/04/2006
Uncertainty:	+/- 3.3 %	Primary Code:	0683-A
LogBook No:	RC-S-037-082	Dilution(mL):	100 mL
		Mass of Parent(g):	4.7315 g
		Density(g/mL):	0.9985

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

$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.7315 \text{ g}) * (25240 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.00087 \text{ g} * 100 \text{ mL}) = 14304.3936 \text{ dpm/mL}$
$(4.7315 \text{ g}) * (25240 \text{ dps}) * (59.9 \text{ dpm/dps}) / (0.9985 \text{ g/mL}) / (5.00087 \text{ g} * 100 \text{ mL}) = 14325.2288 \text{ dpm/g}$

Secondary Standards

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

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

m4k205

Verification for Ra-228 Standard 0683-A

A. Fehr 2/4/2005	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source dPPM/mL
	0683-A N1	46898.2000	33.7000	46864.5000	3.5679424	1.0000 13134.88131
	0683-A N2	46663.7000	33.7000	46630.0000	3.5679424	1.0000 13069.15716
	0683-A N3	46478.8000	33.7000	46445.1000	3.5679424	1.0000 13017.33457
						Average = 13073.79102

Mean Value (Counting) = 13073.79102 dpm/mL 100.210719 % of known
 Stdev = 58.91021579 dpm/mL 0.00450598

Certificate Value = 13046.3 dpm/mL
 Lower Limit = 12955.97058 dpm/mL
 Upper Limit = 13191.61145 dpm/mL
 Rule 1 Pass/Fail Pass
 Two sigma = 117.8204316
 10 % of Mean = 1307.379102
 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.

The analyst prepared three standard verification sources for Ra-228 source 0683-A by transferring portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 4/26/04 using Analytic's source 0503-A (Ra-228). Calibration data is recorded in this logbook under Ra-228 0503. Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda D. Fehr 2/14/05
[Signature] 2/11/05

[Handwritten signature]

PROTOCOL : 23 Radium Std Ver.
DATE : 2005/02/04
TIME : 14:12
ID : P23AS003

Wallac 1414 WinSpectral v1.40 S/N 4140127

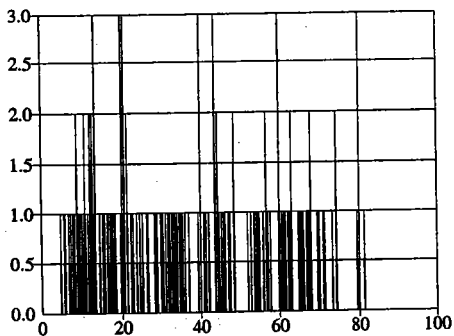
Counting mode : CPM
Isotope(s) : H3
H3 = 5- 350,12.43 y
Protocol name : Radium Std Ver.
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Output to Display :
POS,CTIME,DATE,TIME,RACKPOS,CPMw1,CPM,SQPI,CPM1
Additions to Display : Spectrum,Header,Listing
Spectrum : Beta
Window 1 : 1-1024 /Beta
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total count rate:
H3 30936.7 CPM

ALF 2/4/05

proyector

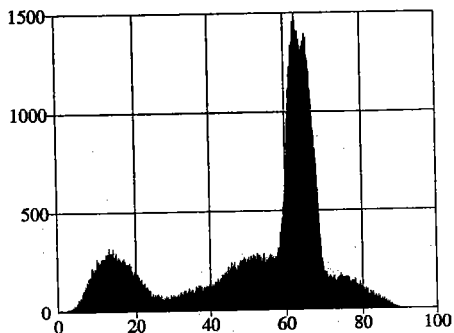
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
1	300	2/4/2005	2:12 PM	1	33.70	33.70
					17.30	



Counts Beta

Bkg

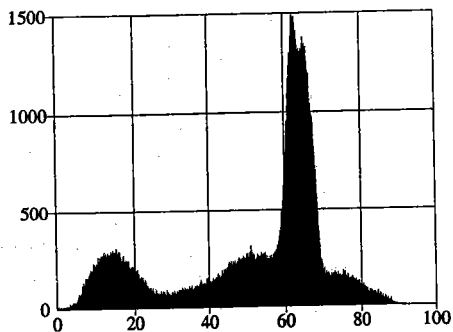
2	300	2/4/2005	2:18 PM	2	46899.00	46898.20
					9470.20	



Counts Beta

0683-A

3	300	2/4/2005	2:23 PM	3	46664.80	46663.70
					9499.90	



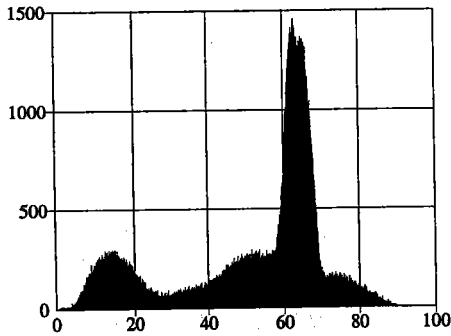
Counts Beta

0683-A

ALF 2/4/05

[Handwritten signature]

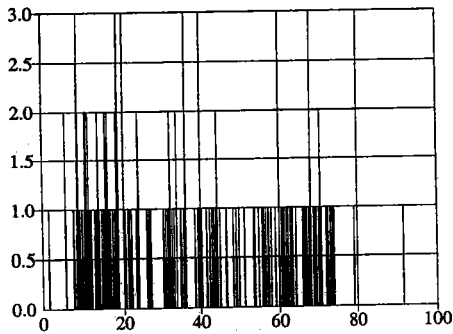
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
4	300	2/4/2005	2:29 PM	4	46479.40	46478.80
					9454.60	



Counts Beta

0683-A

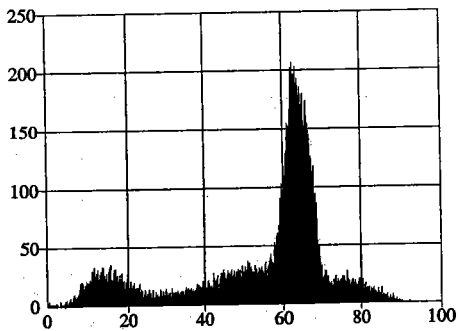
5	300	2/4/2005	2:34 PM	5	34.60	34.60
					19.00	



Counts Beta

BLG

6	300	2/4/2005	2:40 PM	6	5372.10	5371.90
					832.00	



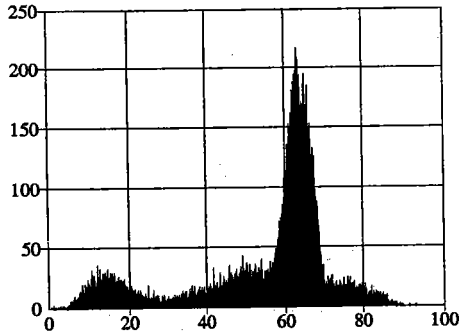
Counts Beta

0553-A

af 2/4/05

Handwritten signature

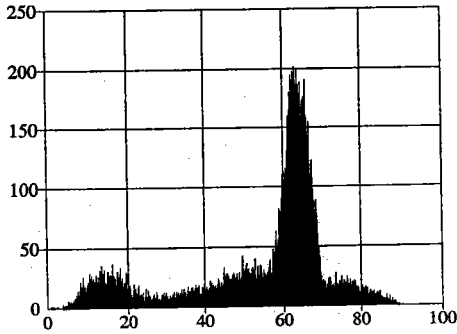
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
7	300	2/4/2005	2:45 PM	7	5421.80	5421.80
					816.10	



Counts Beta

0553-A

8	300	2/4/2005	2:51 PM	8	5340.60	5340.60
					827.60	



Counts Beta

0553-A
2/4/05

ALF 2/4/05

Handwritten signature

General Engineering Laboratories Calibration Source Preparation Sheet

Applicable SOP Number GL-RAD-A-009 Isotope Ra-228
 Date Standards Prepared 4/22/05 Cocktail Type Used NA
 Standard ID 0683-A Matrix of Vial/Planchett 0.1m POLYPROPYLENE
 Amount Used (g or ml) 5.0 FILTER ATTACHED TO
 Standard Activity (DPM/g or ml) 14328.27 SS PLANCHETTE
 Reference Date 2/3/05 Type of Scintillation Vial NA
 Expiration Date 2/4/06 Pipette ID Used _____
 Residue/Carrier Agent _____ Balance ID Used _____
 Quenching Agent _____

Separation Date / Time: 4/22/05 / 0615

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

Prepared By: Angela A. Johnson Date 4/22/05
 Reviewed By: _____ Date 4/22/05

Detector	Pgm time	Sample I.D.	Alpha	Beta	CPM	Alpha Xtk	Beta Bkg.	Ac-228 Decay	Count decay	Corrected CPM	Voltage	Date/Time
Ra-228 00683-A 69824.5 Separation Date/Time: 4/22/2005 6:15												
1-A	1	1	223	19612	19812.00	0.0749	0.49	0.55	1.00	36053.85	1470	4/22/2005 11:33
1-A	1	2	221	19161	19161.00	0.0749	0.49	0.54	1.00	35362.42	1470	4/22/2005 11:40
1-A	1	3	217	19209	19209.00	0.0749	0.49	0.54	1.00	35272.14	1470	4/22/2005 11:38
1-A	1	4	190	19664	19664.00	0.0749	0.49	0.55	1.00	35956.27	1470	4/22/2005 11:35
1-A	1	5	252	18527	18527.00	0.0749	0.49	0.54	1.00	34363.14	1470	4/22/2005 11:43
1-A	1	6	270	20152	20152.00	0.0749	0.49	0.53	1.00	37881.23	1470	4/22/2005 11:50
1-A	1	7	209	17009	17009.00	0.0749	0.49	0.53	1.00	31823.69	1470	4/22/2005 11:48
1-A	1	8	226	21455	21455.00	0.0749	0.49	0.54	1.00	39671.91	1470	4/22/2005 11:45
Average										35835.58		Efficiency 0.5132
1-B	1	1	193	19678	19678.00	0.1066	0.35	0.55	1.00	35978.46	1470	4/22/2005 11:36
1-B	1	2	180	19041	19041.00	0.1066	0.35	0.55	1.00	34656.81	1470	4/22/2005 11:33
1-B	1	3	169	19027	19027.00	0.1066	0.35	0.54	1.00	35117.99	1470	4/22/2005 11:41
1-B	1	4	156	19202	19202.00	0.1066	0.35	0.54	1.00	35264.40	1470	4/22/2005 11:38
1-B	1	5	168	18254	18254.00	0.1066	0.35	0.54	1.00	34006.14	1470	4/22/2005 11:45
1-B	1	6	178	20148	20148.00	0.1066	0.35	0.54	1.00	37377.85	1470	4/22/2005 11:43
1-B	1	7	159	16811	16811.00	0.1066	0.35	0.53	1.00	31602.88	1470	4/22/2005 11:50
1-B	1	8	177	21320	21320.00	0.1066	0.35	0.53	1.00	39898.98	1470	4/22/2005 11:48
Average										35487.91		Efficiency 0.5082
1-C	1	1	190	19929	19929.00	0.0686	0.35	0.54	1.00	36611.91	1470	4/22/2005 11:38
1-C	1	2	222	18736	18736.00	0.0686	0.35	0.55	1.00	36097.79	1470	4/22/2005 11:36
1-C	1	3	215	20230	20230.00	0.0686	0.35	0.55	1.00	36830.57	1470	4/22/2005 11:33
1-C	1	4	198	19844	19844.00	0.0686	0.35	0.54	1.00	36641.31	1470	4/22/2005 11:41
1-C	1	5	216	18760	18760.00	0.0686	0.35	0.53	1.00	35116.87	1470	4/22/2005 11:48
1-C	1	6	247	20456	20456.00	0.0686	0.35	0.54	1.00	38122.61	1470	4/22/2005 11:48
1-C	1	7	191	17262	17262.00	0.0686	0.35	0.54	1.00	32034.46	1470	4/22/2005 11:43
1-C	1	8	228	21665	21665.00	0.0686	0.35	0.53	1.00	40748.67	1470	4/22/2005 11:50
Average										36525.52		Efficiency 0.5231
1-D	1	1	38	19654	19654.00	0.0933	0.4	0.54	1.00	36312.08	1470	4/22/2005 11:41
1-D	1	2	53	19466	19466.00	0.0933	0.4	0.54	1.00	35787.85	1470	4/22/2005 11:38
1-D	1	3	56	19457	19457.00	0.0933	0.4	0.55	1.00	35607.52	1470	4/22/2005 11:36
1-D	1	4	44	19353	19353.00	0.0933	0.4	0.55	1.00	35258.83	1470	4/22/2005 11:33
1-D	1	5	53	18235	18235.00	0.0933	0.4	0.53	1.00	34321.21	1470	4/22/2005 11:51
1-D	1	6	59	20122	20122.00	0.0933	0.4	0.53	1.00	37692.88	1470	4/22/2005 11:48
1-D	1	7	49	17027	17027.00	0.0933	0.4	0.54	1.00	31756.71	1470	4/22/2005 11:48
1-D	1	8	56	21170	21170.00	0.0933	0.4	0.54	1.00	39315.64	1470	4/22/2005 11:43
Average										35786.57		Efficiency 0.5121
2-A	1	1	737	19237	19237.00	0.0440	0.48	0.54	1.00	35679.76	1470	4/22/2005 11:44
2-A	1	2	696	18742	18742.00	0.0440	0.48	0.53	1.00	35240.34	1470	4/22/2005 11:51
2-A	1	3	786	18600	18600.00	0.0440	0.48	0.53	1.00	35170.50	1470	4/22/2005 11:48
2-A	1	4	671	19000	19000.00	0.0440	0.48	0.54	1.00	35393.11	1470	4/22/2005 11:46
2-A	1	5	620	18971	18971.00	0.0440	0.48	0.55	1.00	34534.21	1470	4/22/2005 11:33
2-A	1	6	767	20367	20367.00	0.0440	0.48	0.54	1.00	37583.13	1470	4/22/2005 11:41
2-A	1	7	612	17288	17288.00	0.0440	0.48	0.54	1.00	31752.92	1470	4/22/2005 11:38
2-A	1	8	717	21528	21528.00	0.0440	0.48	0.55	1.00	39354.09	1470	4/22/2005 11:36
Average										35588.51		Efficiency 0.5097
2-B	1	1	158	19990	19990.00	0.1383	0.32	0.54	1.00	37257.13	1470	4/22/2005 11:46
2-B	1	2	125	19577	19577.00	0.1383	0.32	0.54	1.00	36342.14	1470	4/22/2005 11:44
2-B	1	3	114	19354	19354.00	0.1383	0.32	0.53	1.00	36425.99	1470	4/22/2005 11:51
2-B	1	4	136	19264	19264.00	0.1383	0.32	0.53	1.00	36073.97	1470	4/22/2005 11:48
2-B	1	5	144	19228	19228.00	0.1383	0.32	0.55	1.00	35168.92	1470	4/22/2005 11:36
2-B	1	6	137	20676	20676.00	0.1383	0.32	0.55	1.00	38038.06	1470	4/22/2005 11:34
2-B	1	7	114	17842	17842.00	0.1383	0.32	0.54	1.00	32587.93	1470	4/22/2005 11:41
2-B	1	8	157	22249	22249.00	0.1383	0.32	0.54	1.00	40895.55	1470	4/22/2005 11:38
Average										36898.71		Efficiency 0.5242
2-C	1	1	811	19238	19238.00	0.0902	0.33	0.53	1.00	35629.02	1470	4/22/2005 11:48
2-C	1	2	821	18388	18388.00	0.0902	0.33	0.54	1.00	34173.85	1470	4/22/2005 11:46
2-C	1	3	787	18847	18847.00	0.0902	0.33	0.54	1.00	34891.48	1470	4/22/2005 11:44
2-C	1	4	783	18544	18544.00	0.0902	0.33	0.53	1.00	34804.54	1470	4/22/2005 11:51
2-C	1	5	721	18272	18272.00	0.0902	0.33	0.54	1.00	33508.00	1470	4/22/2005 11:38
2-C	1	6	861	20306	20306.00	0.0902	0.33	0.55	1.00	37045.50	1470	4/22/2005 11:36
2-C	1	7	716	17078	17078.00	0.0902	0.33	0.55	1.00	31031.05	1470	4/22/2005 11:34
2-C	1	8	850	20865	20865.00	0.0902	0.33	0.54	1.00	38442.66	1470	4/22/2005 11:41
Average										34978.26		Efficiency 0.5009
2-D	1	1	764	18765	18765.00	0.0382	0.49	0.53	1.00	35307.52	1470	4/22/2005 11:51
2-D	1	2	845	18699	18699.00	0.0382	0.49	0.53	1.00	34999.20	1470	4/22/2005 11:48
2-D	1	3	879	18907	18907.00	0.0382	0.49	0.54	1.00	35223.04	1470	4/22/2005 11:46
2-D	1	4	860	19192	19192.00	0.0382	0.49	0.54	1.00	35606.49	1470	4/22/2005 11:44
2-D	1	5	832	18606	18606.00	0.0382	0.49	0.54	1.00	34352.15	1470	4/22/2005 11:41
2-D	1	6	942	20333	20333.00	0.0382	0.49	0.54	1.00	37358.94	1470	4/22/2005 11:39
2-D	1	7	739	17047	17047.00	0.0382	0.49	0.55	1.00	31173.05	1470	4/22/2005 11:36
2-D	1	8	886	21415	21415.00	0.0382	0.49	0.55	1.00	38996.49	1470	4/22/2005 11:34
Average										35377.36		Efficiency 0.5067
3-A	1	1	2133	17349	17349.00	0.0412	0.58	0.53	1.00	32668.12	1470	4/22/2005 11:53
3-A	1	2	2284	16837	16837.00	0.0412	0.58	0.52	1.00	32119.14	1470	4/22/2005 12:01
3-A	1	3	2165	16897	16897.00	0.0412	0.58	0.52	1.00	32083.42	1470	4/22/2005 11:58
3-A	1	4	2100	17023	17023.00	0.0412	0.58	0.53	1.00	32191.58	1470	4/22/2005 11:56
3-A	1	5	2111	16224	16224.00	0.0412	0.58	0.52	1.00	31118.25	1470	4/22/2005 12:03
3-A	1	6	2324	17122	17122.00	0.0412	0.58	0.51	1.00	33328.52	1470	4/22/2005 12:11
3-A	1	7	1975	14677	14677.00	0.0412	0.58	0.51	1.00	28423.14	1470	4/22/2005 12:08
3-A	1	8	2513	18247	18247.00	0.0412	0.58	0.52	1.00	35176.62	1470	4/22/2005 12:06
Average										32138.60		Efficiency 0.4603
3-B	1	1	1229	18301	18301.00	0.0492	0.28	0.53	1.00	34678.46	1470	4/22/2005 11:56
3-B	1	2	1119	17820	17820.00	0.0492	0.28	0.53	1.00	33625.55	1470	4/22/2005 11:53
3-B	1	3	1193	17468	17468.00	0.0492	0.28	0.52	1.00	33404.60	1470	4/22/2005 12:01

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3-B	1	4	1240	17817	17817.00	0.0482	0.28	0.52	1.00	33897.33	1470		4/22/2005 11:58
3-B	1	5	1178	16876	16876.00	0.0482	0.28	0.52	1.00	32222.98	1470		4/22/2005 12:06
3-B	1	6	1317	18221	18221.00	0.0482	0.28	0.52	1.00	35018.34	1470		4/22/2005 12:03
3-B	1	7	1089	15238	15238.00	0.0482	0.28	0.51	1.00	29723.59	1470	Ra-228	4/22/2005 12:11
3-B	1	8	1428	19248	19248.00	0.0482	0.28	0.51	1.00	37350.47	1470	Efficiency	4/22/2005 12:09
									Average	33739.92		0.4832	
3-C	1	1	739	18087	18087.00	0.0407	0.46	0.52	1.00	34445.09	1470		4/22/2005 11:58
3-C	1	2	681	17872	17872.00	0.0407	0.46	0.53	1.00	33548.15	1470		4/22/2005 11:56
3-C	1	3	702	17887	17887.00	0.0407	0.46	0.53	1.00	33824.18	1470		4/22/2005 11:53
3-C	1	4	747	17811	17811.00	0.0407	0.46	0.52	1.00	34118.75	1470		4/22/2005 12:01
3-C	1	5	731	17040	17040.00	0.0407	0.46	0.51	1.00	33137.20	1470		4/22/2005 12:09
3-C	1	6	855	18315	18315.00	0.0407	0.46	0.52	1.00	35455.36	1470		4/22/2005 12:06
3-C	1	7	687	15413	15413.00	0.0407	0.46	0.52	1.00	29678.59	1470	Ra-228	4/22/2005 12:04
3-C	1	8	838	19109	19109.00	0.0407	0.46	0.51	1.00	37349.86	1470	Efficiency	4/22/2005 12:11
									Average	33944.37		0.4961	
3-D	1	1	589	18431	18431.00	0.0429	0.73	0.52	1.00	35321.89	1470		4/22/2005 12:01
3-D	1	2	533	17875	17875.00	0.0429	0.73	0.52	1.00	34089.55	1470		4/22/2005 11:58
3-D	1	3	530	18135	18135.00	0.0429	0.73	0.53	1.00	34438.15	1470		4/22/2005 11:58
3-D	1	4	484	18298	18298.00	0.0429	0.73	0.53	1.00	34594.85	1470		4/22/2005 11:53
3-D	1	5	549	17038	17038.00	0.0429	0.73	0.51	1.00	33319.81	1470		4/22/2005 12:12
3-D	1	6	640	18362	18362.00	0.0429	0.73	0.51	1.00	35722.19	1470		4/22/2005 12:09
3-D	1	7	502	15895	15895.00	0.0429	0.73	0.52	1.00	30790.80	1470	Ra-228	4/22/2005 12:06
3-D	1	8	806	19562	19562.00	0.0429	0.73	0.52	1.00	37699.31	1470	Efficiency	4/22/2005 12:04
									Average	34495.77		0.4940	
4-A	1	1	436	18783	18783.00	0.0578	0.34	0.52	1.00	36202.39	1470		4/22/2005 12:04
4-A	1	2	442	17978	17978.00	0.0578	0.34	0.51	1.00	35180.82	1470		4/22/2005 12:12
4-A	1	3	410	18198	18198.00	0.0578	0.34	0.51	1.00	35418.59	1470		4/22/2005 12:09
4-A	1	4	379	18683	18683.00	0.0578	0.34	0.52	1.00	36204.68	1470		4/22/2005 12:07
4-A	1	5	398	18198	18198.00	0.0578	0.34	0.53	1.00	34416.71	1470		4/22/2005 11:54
4-A	1	6	437	19420	19420.00	0.0578	0.34	0.52	1.00	37227.02	1470		4/22/2005 12:01
4-A	1	7	377	16781	16781.00	0.0578	0.34	0.52	1.00	32007.32	1470	Ra-228	4/22/2005 11:58
4-A	1	8	451	20737	20737.00	0.0578	0.34	0.53	1.00	39388.88	1470	Efficiency	4/22/2005 11:56
									Average	35755.80		0.5121	
4-B	1	1	73	19059	19059.00	0.0800	0.37	0.52	1.00	36869.81	1470		4/22/2005 12:07
4-B	1	2	62	18836	18836.00	0.0800	0.37	0.52	1.00	35862.06	1470		4/22/2005 12:04
4-B	1	3	63	18870	18870.00	0.0800	0.37	0.51	1.00	36880.44	1470		4/22/2005 12:12
4-B	1	4	53	19050	19050.00	0.0800	0.37	0.51	1.00	37122.57	1470		4/22/2005 12:08
4-B	1	5	53	18563	18563.00	0.0800	0.37	0.53	1.00	35299.88	1470		4/22/2005 11:56
4-B	1	6	50	20222	20222.00	0.0800	0.37	0.53	1.00	38288.88	1470		4/22/2005 11:54
4-B	1	7	66	16906	16906.00	0.0800	0.37	0.52	1.00	32446.75	1470	Ra-228	4/22/2005 12:01
4-B	1	8	55	21570	21570.00	0.0800	0.37	0.52	1.00	41194.45	1470	Efficiency	4/22/2005 11:58
									Average	36763.12		0.5268	
4-C	1	1	749	18454	18454.00	0.0364	0.36	0.51	1.00	35819.42	1470		4/22/2005 12:09
4-C	1	2	710	18119	18119.00	0.0364	0.36	0.52	1.00	35111.47	1470		4/22/2005 12:07
4-C	1	3	706	18128	18128.00	0.0364	0.36	0.52	1.00	34943.12	1470		4/22/2005 12:04
4-C	1	4	731	18045	18045.00	0.0364	0.36	0.51	1.00	35325.39	1470		4/22/2005 12:12
4-C	1	5	688	17757	17757.00	0.0364	0.36	0.52	1.00	33883.05	1470		4/22/2005 11:58
4-C	1	6	755	19232	19232.00	0.0364	0.36	0.53	1.00	36532.89	1470		4/22/2005 11:56
4-C	1	7	583	16571	16571.00	0.0364	0.36	0.53	1.00	31348.77	1470	Ra-228	4/22/2005 11:54
4-C	1	8	819	20415	20415.00	0.0364	0.36	0.52	1.00	39142.72	1470	Efficiency	4/22/2005 12:01
									Average	35275.86		0.5052	
4-D	1	1	1271	18178	18178.00	0.0431	0.58	0.51	1.00	35563.92	1470		4/22/2005 12:12
4-D	1	2	1275	17622	17622.00	0.0431	0.58	0.51	1.00	34248.58	1470		4/22/2005 12:09
4-D	1	3	1334	18020	18020.00	0.0431	0.58	0.52	1.00	34863.03	1470		4/22/2005 12:07
4-D	1	4	1337	18346	18346.00	0.0431	0.58	0.52	1.00	35311.38	1470		4/22/2005 12:04
4-D	1	5	1245	17305	17305.00	0.0431	0.58	0.52	1.00	33129.96	1470		4/22/2005 12:01
4-D	1	6	1357	19186	19186.00	0.0431	0.58	0.52	1.00	36557.46	1470		4/22/2005 11:58
4-D	1	7	1108	16383	16383.00	0.0431	0.58	0.53	1.00	31041.97	1470	Ra-228	4/22/2005 11:56
4-D	1	8	1366	20538	20538.00	0.0431	0.58	0.53	1.00	36795.26	1470	Efficiency	4/22/2005 11:54
									Average	34937.70		0.5004	

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INSTR_ID	SAMPLE_ID	CNT_TIME	A	B	TIME	USER2	BATCH_ID
Instrument 1 - A	1	1	223	19812	4/22/2005 11:33	1575	Ra2280422
Instrument 1 - A	2	1	221	19161	4/22/2005 11:40	1575	Ra2280422
Instrument 1 - A	3	1	217	19209	4/22/2005 11:38	1575	Ra2280422
Instrument 1 - A	4	1	190	19664	4/22/2005 11:35	1575	Ra2280422
Instrument 1 - A	5	1	252	18527	4/22/2005 11:43	1575	Ra2280422
Instrument 1 - A	6	1	270	20152	4/22/2005 11:50	1575	Ra2280422
Instrument 1 - A	7	1	209	17009	4/22/2005 11:48	1575	Ra2280422
Instrument 1 - A	8	1	226	21455	4/22/2005 11:45	1575	Ra2280422
Instrument 1 - B	1	1	193	19678	4/22/2005 11:36	1575	Ra2280422
Instrument 1 - B	2	1	160	19041	4/22/2005 11:33	1575	Ra2280422
Instrument 1 - B	3	1	169	19027	4/22/2005 11:41	1575	Ra2280422
Instrument 1 - B	4	1	156	19202	4/22/2005 11:38	1575	Ra2280422
Instrument 1 - B	5	1	168	18254	4/22/2005 11:45	1575	Ra2280422
Instrument 1 - B	6	1	178	20148	4/22/2005 11:43	1575	Ra2280422
Instrument 1 - B	7	1	159	16811	4/22/2005 11:50	1575	Ra2280422
Instrument 1 - B	8	1	177	21320	4/22/2005 11:48	1575	Ra2280422
Instrument 1 - C	1	1	190	19929	4/22/2005 11:38	1575	Ra2280422
Instrument 1 - C	2	1	222	19736	4/22/2005 11:36	1575	Ra2280422
Instrument 1 - C	3	1	215	20230	4/22/2005 11:33	1575	Ra2280422
Instrument 1 - C	4	1	198	19844	4/22/2005 11:41	1575	Ra2280422
Instrument 1 - C	5	1	216	18760	4/22/2005 11:48	1575	Ra2280422
Instrument 1 - C	6	1	247	20456	4/22/2005 11:46	1575	Ra2280422
Instrument 1 - C	7	1	191	17262	4/22/2005 11:43	1575	Ra2280422
Instrument 1 - C	8	1	228	21665	4/22/2005 11:50	1575	Ra2280422
Instrument 1 - D	1	1	38	19654	4/22/2005 11:41	1575	Ra2280422
Instrument 1 - D	2	1	53	19466	4/22/2005 11:38	1575	Ra2280422
Instrument 1 - D	3	1	56	19457	4/22/2005 11:36	1575	Ra2280422
Instrument 1 - D	4	1	44	19353	4/22/2005 11:33	1575	Ra2280422
Instrument 1 - D	5	1	53	18235	4/22/2005 11:51	1575	Ra2280422
Instrument 1 - D	6	1	59	20122	4/22/2005 11:48	1575	Ra2280422
Instrument 1 - D	7	1	49	17027	4/22/2005 11:46	1575	Ra2280422
Instrument 1 - D	8	1	56	21170	4/22/2005 11:43	1575	Ra2280422
Instrument 2 - A	1	1	737	19237	4/22/2005 11:44	1575	Ra2280422
Instrument 2 - A	2	1	698	18742	4/22/2005 11:51	1575	Ra2280422
Instrument 2 - A	3	1	766	18800	4/22/2005 11:48	1575	Ra2280422
Instrument 2 - A	4	1	671	19000	4/22/2005 11:46	1575	Ra2280422
Instrument 2 - A	5	1	620	18971	4/22/2005 11:33	1575	Ra2280422
Instrument 2 - A	6	1	767	20367	4/22/2005 11:41	1575	Ra2280422
Instrument 2 - A	7	1	612	17288	4/22/2005 11:38	1575	Ra2280422
Instrument 2 - A	8	1	717	21526	4/22/2005 11:36	1575	Ra2280422
Instrument 2 - B	1	1	158	19990	4/22/2005 11:46	1575	Ra2280422
Instrument 2 - B	2	1	125	19577	4/22/2005 11:44	1575	Ra2280422
Instrument 2 - B	3	1	114	19354	4/22/2005 11:51	1575	Ra2280422
Instrument 2 - B	4	1	136	19264	4/22/2005 11:48	1575	Ra2280422
Instrument 2 - B	5	1	144	19226	4/22/2005 11:36	1575	Ra2280422

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Instrument 2 - B	6	1	137	20876	4/22/2005 11:34	1575	Ra2280422
Instrument 2 - B	7	1	114	17642	4/22/2005 11:41	1575	Ra2280422
Instrument 2 - B	8	1	157	22249	4/22/2005 11:38	1575	Ra2280422
Instrument 2 - C	1	1	811	19238	4/22/2005 11:48	1575	Ra2280422
Instrument 2 - C	2	1	821	18388	4/22/2005 11:46	1575	Ra2280422
Instrument 2 - C	3	1	787	18847	4/22/2005 11:44	1575	Ra2280422
Instrument 2 - C	4	1	783	18544	4/22/2005 11:51	1575	Ra2280422
Instrument 2 - C	5	1	721	18272	4/22/2005 11:38	1575	Ra2280422
Instrument 2 - C	6	1	861	20306	4/22/2005 11:36	1575	Ra2280422
Instrument 2 - C	7	1	716	17078	4/22/2005 11:34	1575	Ra2280422
Instrument 2 - C	8	1	850	20865	4/22/2005 11:41	1575	Ra2280422
Instrument 2 - D	1	1	764	18765	4/22/2005 11:51	1575	Ra2280422
Instrument 2 - D	2	1	845	18699	4/22/2005 11:48	1575	Ra2280422
Instrument 2 - D	3	1	879	18907	4/22/2005 11:46	1575	Ra2280422
Instrument 2 - D	4	1	860	19192	4/22/2005 11:44	1575	Ra2280422
Instrument 2 - D	5	1	832	18606	4/22/2005 11:41	1575	Ra2280422
Instrument 2 - D	6	1	942	20333	4/22/2005 11:39	1575	Ra2280422
Instrument 2 - D	7	1	739	17047	4/22/2005 11:36	1575	Ra2280422
Instrument 2 - D	8	1	886	21415	4/22/2005 11:34	1575	Ra2280422
Instrument 3 - A	1	1	2133	17349	4/22/2005 11:53	1575	Ra2280422
Instrument 3 - A	2	1	2284	16837	4/22/2005 12:01	1575	Ra2280422
Instrument 3 - A	3	1	2165	16897	4/22/2005 11:58	1575	Ra2280422
Instrument 3 - A	4	1	2100	17023	4/22/2005 11:56	1575	Ra2280422
Instrument 3 - A	5	1	2111	16224	4/22/2005 12:03	1575	Ra2280422
Instrument 3 - A	6	1	2324	17122	4/22/2005 12:11	1575	Ra2280422
Instrument 3 - A	7	1	1975	14677	4/22/2005 12:09	1575	Ra2280422
Instrument 3 - A	8	1	2513	18247	4/22/2005 12:06	1575	Ra2280422
Instrument 3 - B	1	1	1229	18301	4/22/2005 11:56	1575	Ra2280422
Instrument 3 - B	2	1	1119	17820	4/22/2005 11:53	1575	Ra2280422
Instrument 3 - B	3	1	1193	17468	4/22/2005 12:01	1575	Ra2280422
Instrument 3 - B	4	1	1240	17817	4/22/2005 11:58	1575	Ra2280422
Instrument 3 - B	5	1	1176	16676	4/22/2005 12:06	1575	Ra2280422
Instrument 3 - B	6	1	1317	18221	4/22/2005 12:03	1575	Ra2280422
Instrument 3 - B	7	1	1089	15236	4/22/2005 12:11	1575	Ra2280422
Instrument 3 - B	8	1	1428	19246	4/22/2005 12:09	1575	Ra2280422
Instrument 3 - C	1	1	739	18067	4/22/2005 11:58	1575	Ra2280422
Instrument 3 - C	2	1	661	17672	4/22/2005 11:56	1575	Ra2280422
Instrument 3 - C	3	1	702	17897	4/22/2005 11:53	1575	Ra2280422
Instrument 3 - C	4	1	747	17811	4/22/2005 12:01	1575	Ra2280422
Instrument 3 - C	5	1	731	17040	4/22/2005 12:09	1575	Ra2280422
Instrument 3 - C	6	1	855	18315	4/22/2005 12:06	1575	Ra2280422
Instrument 3 - C	7	1	687	15413	4/22/2005 12:04	1575	Ra2280422
Instrument 3 - C	8	1	838	19109	4/22/2005 12:11	1575	Ra2280422
Instrument 3 - D	1	1	569	18431	4/22/2005 12:01	1575	Ra2280422
Instrument 3 - D	2	1	533	17875	4/22/2005 11:58	1575	Ra2280422
Instrument 3 - D	3	1	530	18135	4/22/2005 11:56	1575	Ra2280422

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Instrument 3 - D	4	1	484	18296	4/22/2005 11:53	1575	Ra2280422
Instrument 3 - D	5	1	549	17038	4/22/2005 12:12	1575	Ra2280422
Instrument 3 - D	6	1	640	18362	4/22/2005 12:09	1575	Ra2280422
Instrument 3 - D	7	1	502	15895	4/22/2005 12:06	1575	Ra2280422
Instrument 3 - D	8	1	606	19562	4/22/2005 12:04	1575	Ra2280422
Instrument 4 - A	1	1	436	18783	4/22/2005 12:04	1575	Ra2280422
Instrument 4 - A	2	1	442	17978	4/22/2005 12:12	1575	Ra2280422
Instrument 4 - A	3	1	410	18198	4/22/2005 12:09	1575	Ra2280422
Instrument 4 - A	4	1	379	18683	4/22/2005 12:07	1575	Ra2280422
Instrument 4 - A	5	1	398	18198	4/22/2005 11:54	1575	Ra2280422
Instrument 4 - A	6	1	437	19420	4/22/2005 12:01	1575	Ra2280422
Instrument 4 - A	7	1	377	16781	4/22/2005 11:58	1575	Ra2280422
Instrument 4 - A	8	1	451	20737	4/22/2005 11:56	1575	Ra2280422
Instrument 4 - B	1	1	73	19059	4/22/2005 12:07	1575	Ra2280422
Instrument 4 - B	2	1	62	18636	4/22/2005 12:04	1575	Ra2280422
Instrument 4 - B	3	1	63	18870	4/22/2005 12:12	1575	Ra2280422
Instrument 4 - B	4	1	53	19050	4/22/2005 12:09	1575	Ra2280422
Instrument 4 - B	5	1	53	18563	4/22/2005 11:56	1575	Ra2280422
Instrument 4 - B	6	1	50	20222	4/22/2005 11:54	1575	Ra2280422
Instrument 4 - B	7	1	66	16906	4/22/2005 12:01	1575	Ra2280422
Instrument 4 - B	8	1	55	21570	4/22/2005 11:58	1575	Ra2280422
Instrument 4 - C	1	1	749	18454	4/22/2005 12:09	1575	Ra2280422
Instrument 4 - C	2	1	710	18119	4/22/2005 12:07	1575	Ra2280422
Instrument 4 - C	3	1	706	18126	4/22/2005 12:04	1575	Ra2280422
Instrument 4 - C	4	1	731	18045	4/22/2005 12:12	1575	Ra2280422
Instrument 4 - C	5	1	688	17757	4/22/2005 11:58	1575	Ra2280422
Instrument 4 - C	6	1	755	19232	4/22/2005 11:56	1575	Ra2280422
Instrument 4 - C	7	1	583	16571	4/22/2005 11:54	1575	Ra2280422
Instrument 4 - C	8	1	819	20415	4/22/2005 12:01	1575	Ra2280422
Instrument 4 - D	1	1	1271	18178	4/22/2005 12:12	1575	Ra2280422
Instrument 4 - D	2	1	1275	17622	4/22/2005 12:09	1575	Ra2280422
Instrument 4 - D	3	1	1334	18020	4/22/2005 12:07	1575	Ra2280422
Instrument 4 - D	4	1	1337	18346	4/22/2005 12:04	1575	Ra2280422
Instrument 4 - D	5	1	1245	17305	4/22/2005 12:01	1575	Ra2280422
Instrument 4 - D	6	1	1357	19186	4/22/2005 11:59	1575	Ra2280422
Instrument 4 - D	7	1	1108	16363	4/22/2005 11:56	1575	Ra2280422
Instrument 4 - D	8	1	1366	20538	4/22/2005 11:54	1575	Ra2280422

Detector	Weight (mg)	Sample I.D.	Act. Time	Alpha	Beta	Voltage	Date/Time	Alpha Xtlk
1-A	0	1	4	123180	7004	1575	7/19/2004 12:45	0.05685988
1-A	2.6	2	4	132201	10981	1575	7/19/2004 13:05	0.083062912
1-A	6.6	3	4	138183	11002	1575	7/19/2004 12:59	0.079619056
1-A	9.7	4	4	118680	9570	1575	7/19/2004 12:51	0.080637007
1-A	13.8	5	4	143739	11066	1575	7/19/2004 14:06	0.076986761
1-A	16.5	6	4	153621	11776	1575	7/19/2004 14:23	0.076656186
1-A	24.4	7	4	128978	9363	1575	7/19/2004 14:17	0.072593776
1-A	34.5	8	4	123306	9830	1575	7/19/2004 14:11	0.07972037
1-A	54.1	9	4	120306	9399	1575	7/19/2004 13:40	0.078125779
1-A	75	10	4	96614	8151	1575	7/19/2004 13:58	0.084366655
1-A	108.1	11	4	101216	8301	1575	7/19/2004 13:51	0.082012725
1-A	128.6	12	4	99107	7975	1575	7/19/2004 13:45	0.080468584
1-B	0	1	4	120045	9546	1575	7/19/2004 12:51	0.07952018
1-B	2.6	2	4	126842	15082	1575	7/19/2004 12:45	0.118903833
1-B	6.6	3	4	131004	15988	1575	7/19/2004 13:05	0.122042075
1-B	9.7	4	4	114350	12711	1575	7/19/2004 12:59	0.111158723
1-B	13.8	5	4	138417	14961	1575	7/19/2004 14:11	0.108086434
1-B	16.5	6	4	150042	15386	1575	7/19/2004 14:06	0.102544621
1-B	24.4	7	4	125522	12682	1575	7/19/2004 14:23	0.101034082
1-B	34.5	8	4	119605	13034	1575	7/19/2004 14:17	0.108975377
1-B	54.1	9	4	116711	12671	1575	7/19/2004 13:45	0.108567316
1-B	75	10	4	92948	10714	1575	7/19/2004 13:40	0.115268752
1-B	108.1	11	4	97976	10862	1575	7/19/2004 13:58	0.110863885
1-B	128.6	12	4	96418	10100	1575	7/19/2004 13:51	0.104752225
1-C	0	1	4	124296	6464	1575	7/19/2004 12:59	0.052004892
1-C	2.6	2	4	133035	10258	1575	7/19/2004 12:51	0.077107528
1-C	6.6	3	4	138090	10531	1575	7/19/2004 12:45	0.076261858
1-C	9.7	4	4	120943	8343	1575	7/19/2004 13:05	0.068982909
1-C	13.8	5	4	144733	10074	1575	7/19/2004 14:18	0.069604029
1-C	16.5	6	4	155042	10804	1575	7/19/2004 14:11	0.069684344
1-C	24.4	7	4	130663	8868	1575	7/19/2004 14:06	0.067869251
1-C	34.5	8	4	125003	8910	1575	7/19/2004 14:23	0.071278289
1-C	54.1	9	4	121804	8748	1575	7/19/2004 13:51	0.071820301
1-C	75	10	4	98322	7255	1575	7/19/2004 13:45	0.073788165
1-C	108.1	11	4	102220	7796	1575	7/19/2004 13:40	0.076266875
1-C	128.6	12	4	101129	7164	1575	7/19/2004 13:58	0.070840214
1-D	0	1	4	123443	8458	1575	7/19/2004 13:05	0.068517453
1-D	2.6	2	4	132199	13898	1575	7/19/2004 12:59	0.105129388
1-D	6.6	3	4	135550	13902	1575	7/19/2004 12:51	0.102559941
1-D	9.7	4	4	120103	11392	1575	7/19/2004 12:45	0.094851919
1-D	13.8	5	4	143729	13676	1575	7/19/2004 14:23	0.095151292
1-D	16.5	6	4	154502	14607	1575	7/19/2004 14:18	0.094542465
								AVERAGE:
								0.077592474
								AVERAGE:
								0.107643125
								AVERAGE:
								0.070459055

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1-D	24.4	7	4	129531	12207	1575	7/19/2004 14:11	0.094239989
1-D	34.5	8	4	123012	12757	1575	7/19/2004 14:06	0.10370533
1-D	54.1	9	4	120150	11613	1575	7/19/2004 13:58	0.096654182
1-D	75	10	4	98215	9779	1575	7/19/2004 13:51	0.099567276
1-D	108.1	11	4	101194	10974	1575	7/19/2004 13:45	0.108445165
1-D	128.6	12	4	99535	9759	1575	7/19/2004 13:40	0.098045913
2-A	0	1	4	124331	4254	1575	7/19/2004 13:12	0.034215119
2-A	2.6	2	4	134232	6233	1575	7/19/2004 13:32	0.046434531
2-A	6.6	2	4	140069	6405	1575	7/19/2004 13:26	0.045727463
2-A	9.7	3	4	122889	5590	1575	7/19/2004 13:20	0.045488205
2-A	13.8	5	4	146863	6837	1575	7/19/2004 12:45	0.046553591
2-A	16.5	6	4	156568	7018	1575	7/19/2004 13:05	0.044823974
2-A	24.4	7	4	131381	6012	1575	7/19/2004 12:59	0.045760041
2-A	34.5	8	4	127176	5984	1575	7/19/2004 12:51	0.047052903
2-A	54.1	9	4	123077	5740	1575	7/19/2004 14:06	0.046637471
2-A	75	10	4	98942	5507	1575	7/19/2004 14:23	0.055658871
2-A	108.1	11	4	104001	4825	1575	7/19/2004 14:18	0.046393785
2-A	128.6	12	4	101917	4956	1575	7/19/2004 14:11	0.048627805
2-B	0	2	4	120721	11567	1575	7/19/2004 13:20	0.095815972
2-B	2.6	3	4	126556	19106	1575	7/19/2004 13:12	0.150968741
2-B	6.6	3	4	132197	19354	1575	7/19/2004 13:32	0.146402717
2-B	9.7	4	4	115049	16847	1575	7/19/2004 13:26	0.146433259
2-B	13.8	5	4	138737	20181	1575	7/19/2004 12:52	0.145462278
2-B	16.5	6	4	148544	21207	1575	7/19/2004 12:46	0.14276578
2-B	24.4	7	4	124653	17331	1575	7/19/2004 13:05	0.139033958
2-B	34.5	8	4	120407	18554	1575	7/19/2004 12:59	0.154094031
2-B	54.1	9	4	116092	17170	1575	7/19/2004 14:11	0.147899941
2-B	75	10	4	93838	14131	1575	7/19/2004 14:06	0.150589313
2-B	108.1	11	4	96549	14386	1575	7/19/2004 14:23	0.149002061
2-B	128.6	12	4	95608	14028	1575	7/19/2004 14:18	0.146724124
2-C	0	1	4	123437	7996	1575	7/19/2004 13:26	0.064777984
2-C	2.6	3	4	130582	12877	1575	7/19/2004 13:21	0.098612366
2-C	6.6	4	4	135962	13321	1575	7/19/2004 13:12	0.097975905
2-C	9.7	4	4	117914	10926	1575	7/19/2004 13:32	0.092660753
2-C	13.8	5	4	142788	13288	1575	7/19/2004 12:59	0.093061042
2-C	16.5	6	4	152660	14110	1575	7/19/2004 12:52	0.092427617
2-C	24.4	7	4	128133	11613	1575	7/19/2004 12:46	0.09063239
2-C	34.5	8	4	123135	12371	1575	7/19/2004 13:05	0.100466967
2-C	54.1	9	4	119749	11112	1575	7/19/2004 14:18	0.092794094
2-C	75	10	4	96802	9106	1575	7/19/2004 14:11	0.094068304
2-C	108.1	11	4	99510	9531	1575	7/19/2004 14:06	0.095779319
2-C	128.6	12	4	99332	9346	1575	7/19/2004 14:23	0.094088511
2-D	0	1	4	124985	3697	1575	7/19/2004 13:32	0.02957955
								AVERAGE:
								0.096784193
								AVERAGE:
								0.142932681
								AVERAGE:
								0.092278771

2-D	2.6	1	4	134295	5262	1575	7/19/2004 13:27	0.039182397
2-D	6.6	2	4	139294	5598	1575	7/19/2004 13:21	0.040188379
2-D	9.7	4	4	120900	4856	1575	7/19/2004 13:12	0.040165426
2-D	13.8	5	4	146331	5790	1575	7/19/2004 13:05	0.039567829
2-D	16.5	6	4	156656	6547	1575	7/19/2004 12:59	0.041792207
2-D	24.4	7	4	131437	5001	1575	7/19/2004 12:52	0.038048647
2-D	34.5	8	4	127414	5150	1575	7/19/2004 12:46	0.04041942
2-D	54.1	9	4	122996	5076	1575	7/19/2004 14:24	0.041269635
2-D	75	10	4	98974	5113	1575	7/19/2004 14:18	0.051660032
2-D	108.1	11	4	103311	4367	1575	7/19/2004 14:11	0.042270426
2-D	128.6	12	4	101622	4274	1575	7/19/2004 14:06	0.042057822
3-A	0	1	4	122186	4445	1575	7/19/2004 13:40	0.036378963
3-A	2.6	2	4	130339	5572	1575	7/19/2004 13:58	0.042750059
3-A	6.6	3	4	140222	5810	1575	7/19/2004 13:51	0.041434297
3-A	9.7	4	4	119964	4894	1575	7/19/2004 13:45	0.040795572
3-A	13.8	5	4	143053	6082	1575	7/19/2004 13:12	0.042515711
3-A	16.5	6	4	153829	6793	1575	7/19/2004 13:33	0.044159424
3-A	24.4	7	4	126901	5289	1575	7/19/2004 13:27	0.041678159
3-A	34.5	8	4	123020	5105	1575	7/19/2004 13:21	0.041497318
3-A	54.1	9	4	120698	4933	1575	7/19/2004 12:46	0.040870603
3-A	75	10	4	97187	4395	1575	7/19/2004 13:05	0.045222098
3-A	108.1	11	4	101168	4293	1575	7/19/2004 13:00	0.042434367
3-A	128.6	12	4	99836	4174	1575	7/19/2004 12:52	0.041808566
3-B	0	1	4	121402	5014	1575	7/19/2004 13:45	0.041300802
3-B	2.6	2	4	129690	6779	1575	7/19/2004 13:40	0.0522708
3-B	6.6	3	4	138571	6967	1575	7/19/2004 13:58	0.050277475
3-B	9.7	4	4	120351	6116	1575	7/19/2004 13:51	0.050818024
3-B	13.8	5	4	143658	7295	1575	7/19/2004 13:21	0.050780325
3-B	16.5	6	4	153281	7805	1575	7/19/2004 13:12	0.050919553
3-B	24.4	7	4	127795	6233	1575	7/19/2004 13:33	0.048773426
3-B	34.5	8	4	123289	6301	1575	7/19/2004 13:27	0.05110756
3-B	54.1	9	4	120929	6014	1575	7/19/2004 12:52	0.049731661
3-B	75	10	4	96420	5434	1575	7/19/2004 12:46	0.056357602
3-B	108.1	11	4	101324	5330	1575	7/19/2004 13:05	0.052603529
3-B	128.6	12	4	99597	5094	1575	7/19/2004 13:00	0.051146119
3-C	0	1	4	117686	3645	1575	7/19/2004 13:51	0.030972248
3-C	2.6	2	4	126503	5098	1575	7/19/2004 13:45	0.04029944
3-C	6.6	3	4	137132	5930	1575	7/19/2004 13:40	0.043243007
3-C	9.7	4	4	117244	5109	1575	7/19/2004 13:59	0.043575791
3-C	13.8	5	4	140315	6224	1575	7/19/2004 13:27	0.044357339
3-C	16.5	6	4	149844	6728	1575	7/19/2004 13:21	0.044900029
3-C	24.4	7	4	124407	5022	1575	7/19/2004 13:12	0.040367503
3-C	34.5	8	4	120984	5272	1575	7/19/2004 13:33	0.04357601
AVERAGE:								0.040516814
AVERAGE:								0.041795428
AVERAGE:								0.05050724

3-C	54.1	9	4	118600	5424	1575	7/19/2004 13:00	0.045733558
3-C	75	10	4	94679	5251	1575	7/19/2004 12:52	0.055461084
3-C	108.1	11	4	98791	4743	1575	7/19/2004 12:46	0.048010446
3-C	128.6	12	4	98385	4632	1575	7/19/2004 13:05	0.047080348
3-D	0	1	4	116626	3829	1575	7/19/2004 13:59	0.032831444
3-D	2.6	2	4	120065	5035	1575	7/19/2004 13:51	0.041935618
3-D	6.6	3	4	133070	6019	1575	7/19/2004 13:45	0.045231833
3-D	9.7	4	4	112803	5203	1575	7/19/2004 13:40	0.04612466
3-D	13.8	5	4	135629	6272	1575	7/19/2004 13:33	0.046243797
3-D	16.5	6	4	145863	6984	1575	7/19/2004 13:27	0.047880545
3-D	24.4	7	4	121303	5235	1575	7/19/2004 13:21	0.043156393
3-D	34.5	8	4	118060	5449	1575	7/19/2004 13:12	0.046154498
3-D	54.1	9	4	114887	5495	1575	7/19/2004 13:05	0.047829606
3-D	75	10	4	91763	5562	1575	7/19/2004 13:00	0.060612665
3-D	108.1	11	4	96450	4792	1575	7/19/2004 12:52	0.049683774
3-D	128.6	12	4	93522	4729	1575	7/19/2004 12:46	0.050565642
4-A	0	1	4	120076	5726	1575	7/19/2004 14:05	0.047686465
4-A	2.6	2	4	129124	8209	1575	7/19/2004 14:24	0.063574548
4-A	6.6	3	4	135773	8094	1575	7/19/2004 14:18	0.059614209
4-A	9.7	4	4	117817	6776	1575	7/19/2004 14:12	0.057512923
4-A	13.8	5	4	140420	8331	1575	7/19/2004 13:40	0.059329155
4-A	16.5	6	4	150631	8981	1575	7/19/2004 13:59	0.059622521
4-A	24.4	7	4	126148	7123	1575	7/19/2004 13:51	0.056465422
4-A	34.5	8	4	121316	7207	1575	7/19/2004 13:46	0.059406838
4-A	54.1	9	4	118329	7059	1575	7/19/2004 13:13	0.059655706
4-A	75	10	4	94634	6413	1575	7/19/2004 13:33	0.067766342
4-A	108.1	11	4	99741	6120	1575	7/19/2004 13:27	0.06135892
4-A	128.6	12	4	98809	5913	1575	7/19/2004 13:21	0.059842727
4-B	0	1	4	114878	6464	1575	7/19/2004 14:12	0.056268389
4-B	2.6	2	4	120144	9787	1575	7/19/2004 14:05	0.081460581
4-B	6.6	3	4	130808	11221	1575	7/19/2004 14:24	0.085782215
4-B	9.7	4	4	112163	9518	1575	7/19/2004 14:18	0.084858643
4-B	13.8	5	4	134597	11874	1575	7/19/2004 13:46	0.088218905
4-B	16.5	6	4	140671	12325	1575	7/19/2004 13:40	0.087615784
4-B	24.4	7	4	119419	9576	1575	7/19/2004 13:59	0.080189245
4-B	34.5	8	4	115264	10105	1575	7/19/2004 13:52	0.087668309
4-B	54.1	9	4	114888	10477	1575	7/19/2004 13:21	0.091193162
4-B	75	10	4	88706	9932	1575	7/19/2004 13:13	0.111965369
4-B	108.1	11	4	94176	8845	1575	7/19/2004 13:33	0.093919895
4-B	128.6	12	4	93601	8766	1575	7/19/2004 13:27	0.093652846
4-C	0	1	4	118134	3354	1575	7/19/2004 14:18	0.028391488
4-C	2.6	2	4	125302	4459	1575	7/19/2004 14:12	0.035586024
4-C	6.6	3	4	135611	5208	1575	7/19/2004 14:05	0.038403964
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								AVERAGE:
								0.059319648
								AVERAGE:
								0.086899362

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4-C	9.7	4	4	116746	4631	1575	7/19/2004 14:24	0.039667312
4-C	13.8	5	4	138550	5404	1575	7/19/2004 13:52	0.03900397
4-C	16.5	6	4	150017	6076	1575	7/19/2004 13:46	0.040502076
4-C	24.4	7	4	121173	4552	1575	7/19/2004 13:40	0.037566124
4-C	34.5	8	4	120766	4681	1575	7/19/2004 13:59	0.03876091
4-C	54.1	9	4	118850	4749	1575	7/19/2004 13:27	0.03995793
4-C	75	10	4	93892	4984	1575	7/19/2004 13:21	0.053082265
4-C	108.1	11	4	98070	4263	1575	7/19/2004 13:13	0.043468951
4-C	128.6	12	4	97189	4294	1575	7/19/2004 13:33	0.044181955
4-D	0	1	4	124733	4617	1575	7/19/2004 14:24	0.037015064
4-D	2.6	2	4	132301	5960	1575	7/19/2004 14:18	0.04504879
4-D	6.6	3	4	142954	6245	1575	7/19/2004 14:12	0.043685381
4-D	9.7	4	4	121909	5303	1575	7/19/2004 14:05	0.04349966
4-D	13.8	5	4	145491	6551	1575	7/19/2004 13:59	0.04502684
4-D	16.5	6	4	157710	7062	1575	7/19/2004 13:52	0.044778391
4-D	24.4	7	4	130628	5760	1575	7/19/2004 13:46	0.044094681
4-D	34.5	8	4	125691	5573	1575	7/19/2004 13:40	0.044338895
4-D	54.1	9	4	124488	5406	1575	7/19/2004 13:33	0.043425872
4-D	75	10	4	98537	4867	1575	7/19/2004 13:27	0.049392614
4-D	108.1	11	4	103586	4711	1575	7/19/2004 13:21	0.045479119
4-D	128.6	12	4	101025	4587	1575	7/19/2004 13:13	0.045404603
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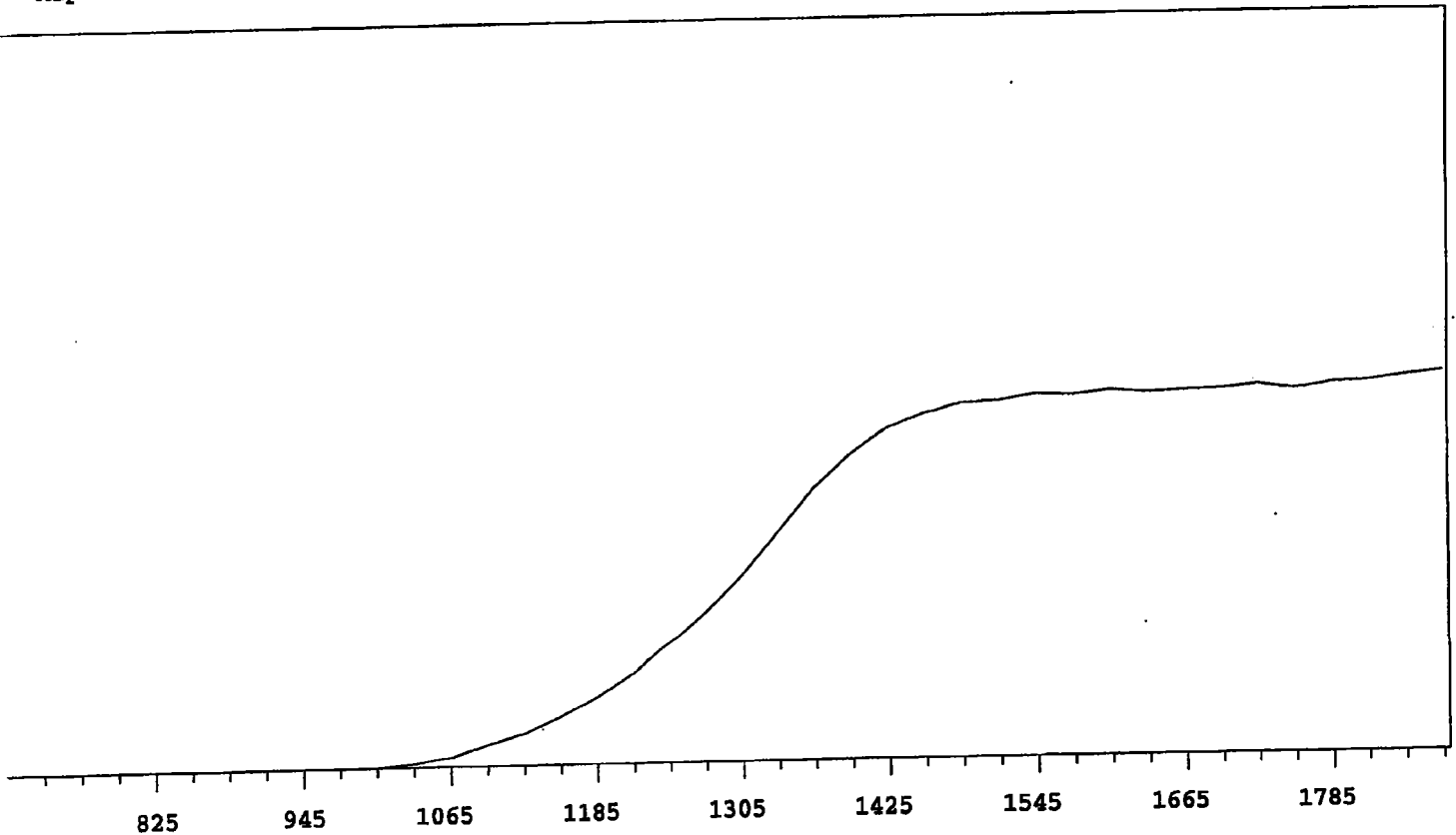
Plateau 07/04

Instrument 1 MPC 9604 Detector A

7/19/2004

Alpha Volts: 1575

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19647	+66.40
735	1		1335	24085	+56.97
765	0		1365	28472	+45.24
795	0	>100	1395	31886	+32.36
825	0	>100	1425	34566	+21.39
855	0	>100	1455	36094	+12.77
885	0	>100	1485	37160	+7.52
915	0	>100	1515	37374	+4.09
945	2	>100	1545	38060	+2.67
975	9	>100	1575	37933	+1.53
1005	93	>100	1605	38395	+0.47
1035	472	>100	1635	38079	+0.70
1065	1107	>100	1665	38254	+0.98
1095	2321	>100	1695	38405	+0.88
1125	3514	>100	1725	38794	+0.97
1155	5227	>100	1755	38316	+1.20
1185	7099	+98.30	1785	38858	+2.01
1215	9425	+88.55	1815	39067	+3.46
1245	12574	+81.27	1845	39590	
1275	15807	+74.39	1875	39984	

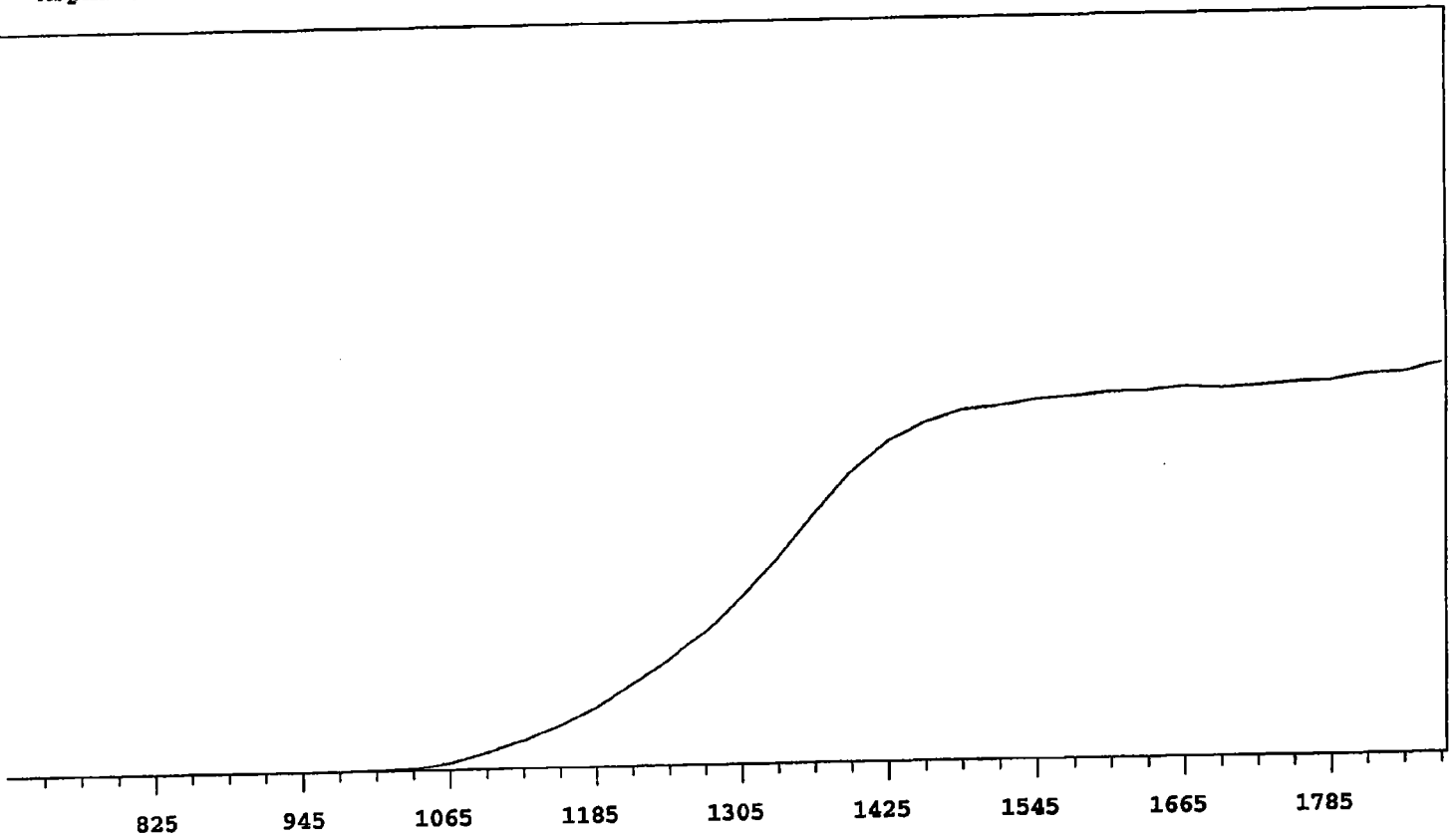
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Plateau 07/04

Instrument 1 MPC 9604 Detector B

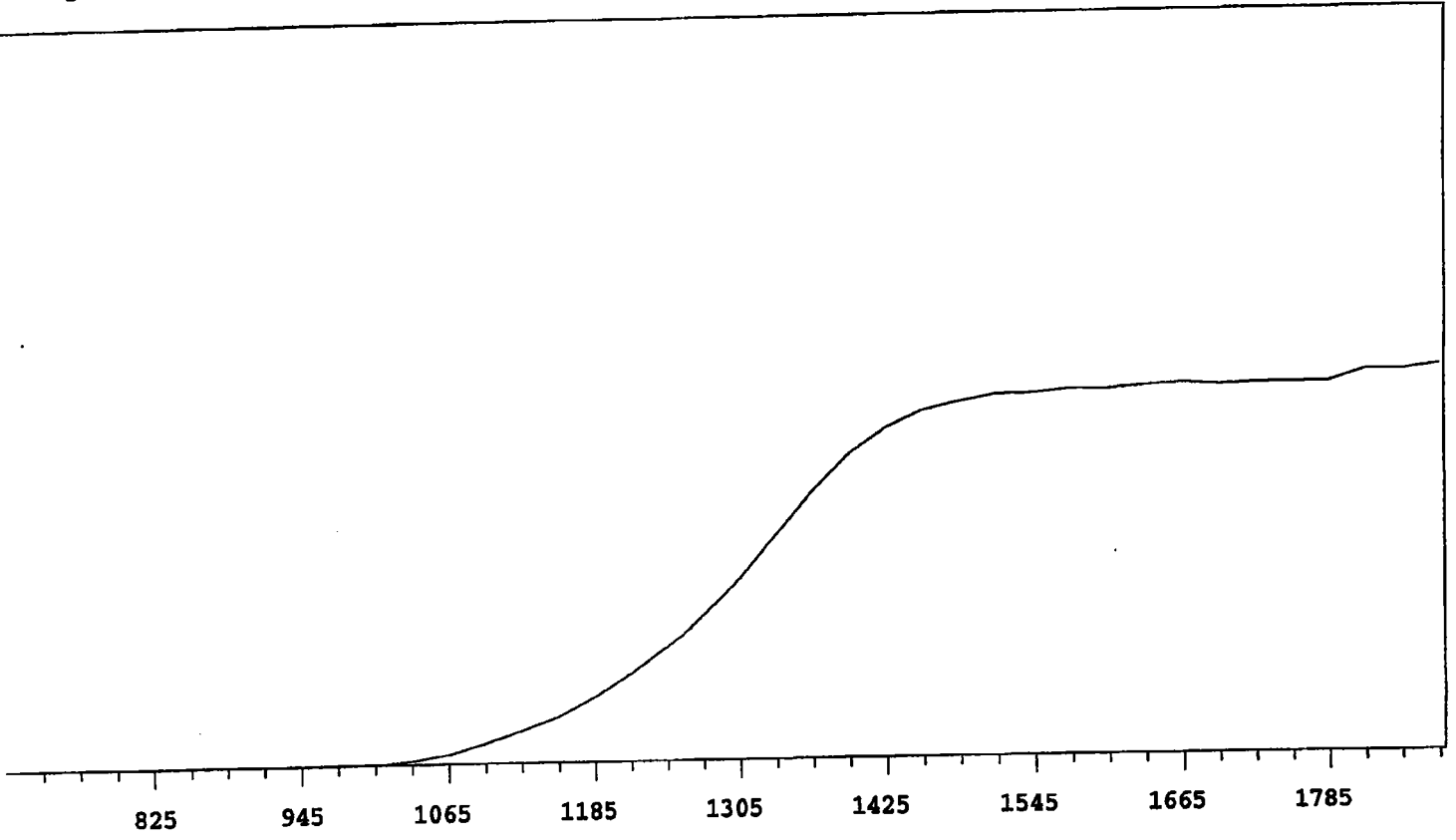
7/19/2004

Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	18233	+71.56
735	0		1335	22329	+63.09
765	0		1365	26957	+52.29
795	0	>100	1395	31333	+40.07
825	0	>100	1425	34676	+27.41
855	0	>100	1455	36745	+16.34
885	0	>100	1485	38047	+9.30
915	0	>100	1515	38436	+5.37
945	1	>100	1545	39049	+3.58
975	1	>100	1575	39332	+2.73
1005	28	>100	1605	39689	+2.17
1035	189	>100	1635	39721	+1.41
1065	694	>100	1665	40142	+0.97
1095	1704	>100	1695	39944	+1.22
1125	2895	>100	1725	40159	+1.15
1155	4335	>100	1755	40445	+2.43
1185	6174	>100	1785	40586	+2.67
1215	8490	+93.12	1815	41204	+3.66
1245	11048	+85.61	1845	41412	
1275	14282	+78.12	1875	42292	

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VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19843	+68.09
735	0		1335	24383	+58.12
765	0		1365	28965	+46.47
795	0	>100	1395	32739	+33.67
825	0	>100	1425	35363	+22.02
855	0	>100	1455	37211	+13.59
885	0	>100	1485	38118	+7.60
915	0	>100	1515	38793	+4.20
945	0	>100	1545	38869	+2.24
975	6	>100	1575	39257	+1.56
1005	67	>100	1605	39192	+1.77
1035	384	>100	1635	39548	+0.99
1065	1049	>100	1665	39770	+0.83
1095	2181	>100	1695	39557	+0.19
1125	3529	>100	1725	39678	+0.06
1155	4985	>100	1755	39708	+2.33
1185	7117	+98.92	1785	39728	+3.00
1215	9603	+91.00	1815	40929	+3.79
1245	12383	+81.78	1845	40873	
1275	16035	+75.02	1875	41442	

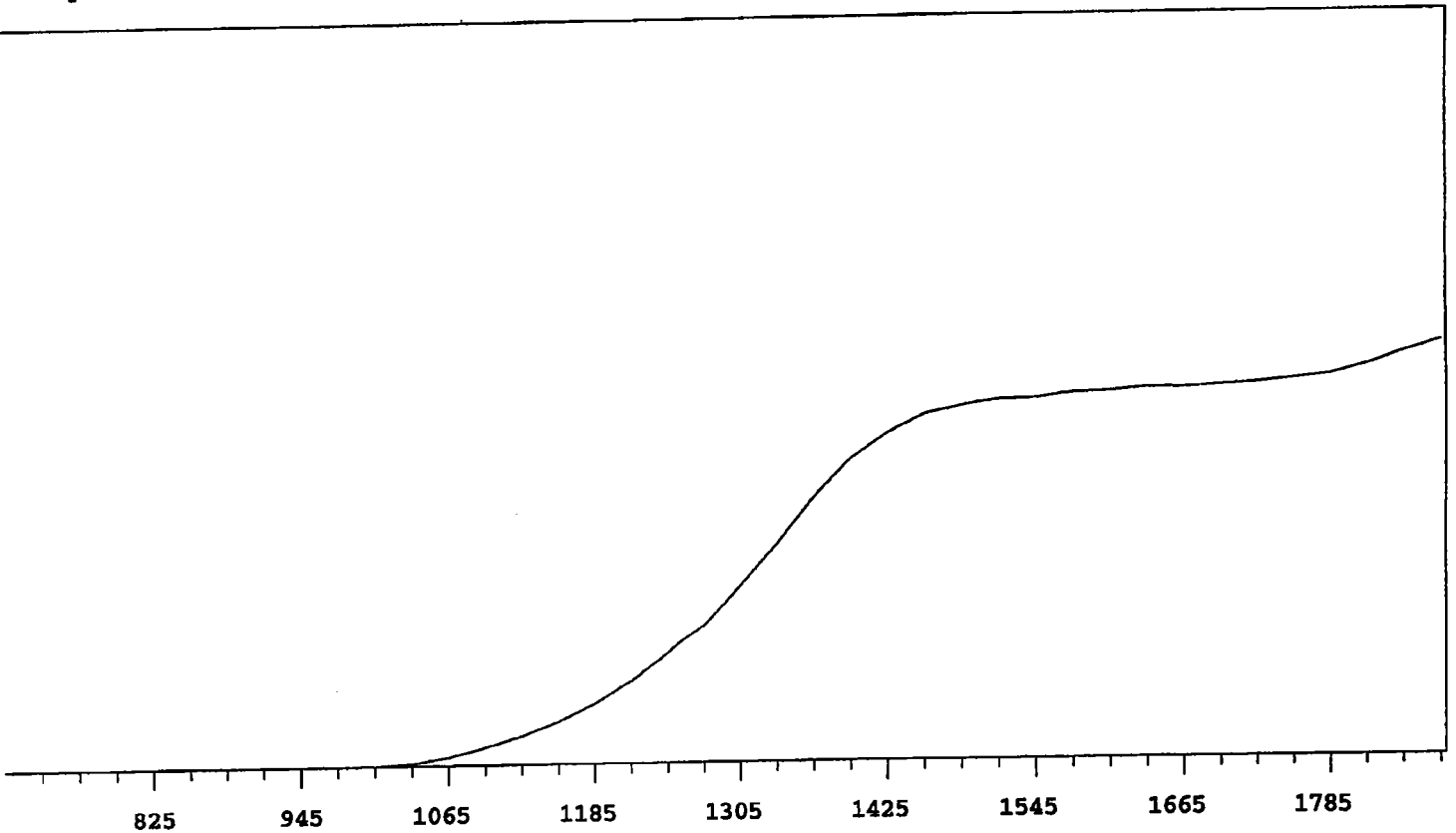
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Plateau 07/04

Instrument 1 MPC 9604 Detector D

7/19/2004

Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	18119	+70.98
735	0		1335	22262	+62.06
765	0		1365	26838	+49.29
795	0	>100	1395	30731	+36.23
825	0	>100	1425	33292	+23.33
855	0	>100	1455	35153	+13.90
885	1	>100	1485	35963	+7.60
915	0	>100	1515	36553	+4.34
945	1	>100	1545	36642	+2.93
975	3	>100	1575	37178	+2.39
1005	38	>100	1605	37266	+1.96
1035	235	>100	1635	37570	+1.40
1065	812	>100	1665	37540	+1.51
1095	1784	>100	1695	37829	+1.86
1125	2940	>100	1725	37991	+2.68
1155	4370	>100	1755	38402	+4.04
1185	6148	>100	1785	38788	+6.23
1215	8306	+93.10	1815	39767	+7.92
1245	11151	+85.86	1845	40972	
1275	14209	+78.51	1875	42061	

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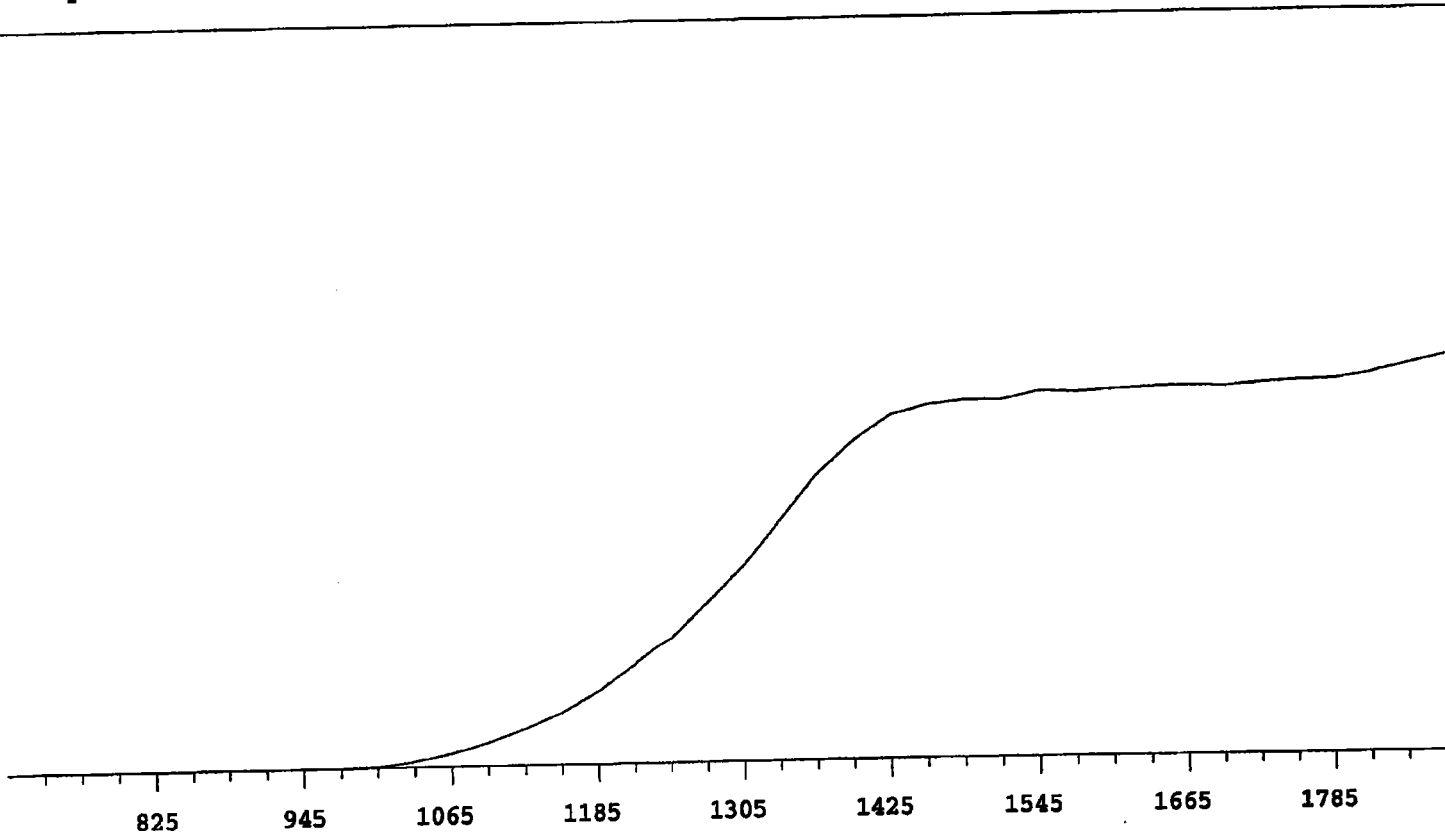
Plateau 07/04

Instrument 2 MPC 9604 Detector A

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	23851	+64.66
735	0		1335	29020	+54.28
765	0		1365	34107	+43.53
795	0	>100	1395	37915	+30.25
825	0	>100	1425	41080	+18.36
855	0	>100	1455	42265	+9.28
885	0	>100	1485	42852	+4.65
915	0	>100	1515	42788	+2.83
945	1	>100	1545	43789	+2.26
975	31	>100	1575	43625	+2.13
1005	186	>100	1605	43907	+1.05
1035	709	>100	1635	44123	+0.93
1065	1655	>100	1665	44235	+0.77
1095	2913	>100	1695	44074	+1.03
1125	4590	>100	1725	44441	+1.31
1155	6428	>100	1755	44707	+2.55
1185	8824	+94.92	1785	44790	+3.80
1215	11872	+87.83	1815	45612	+5.33
1245	15239	+79.24	1845	46564	
1275	19527	+71.87	1875	47485	

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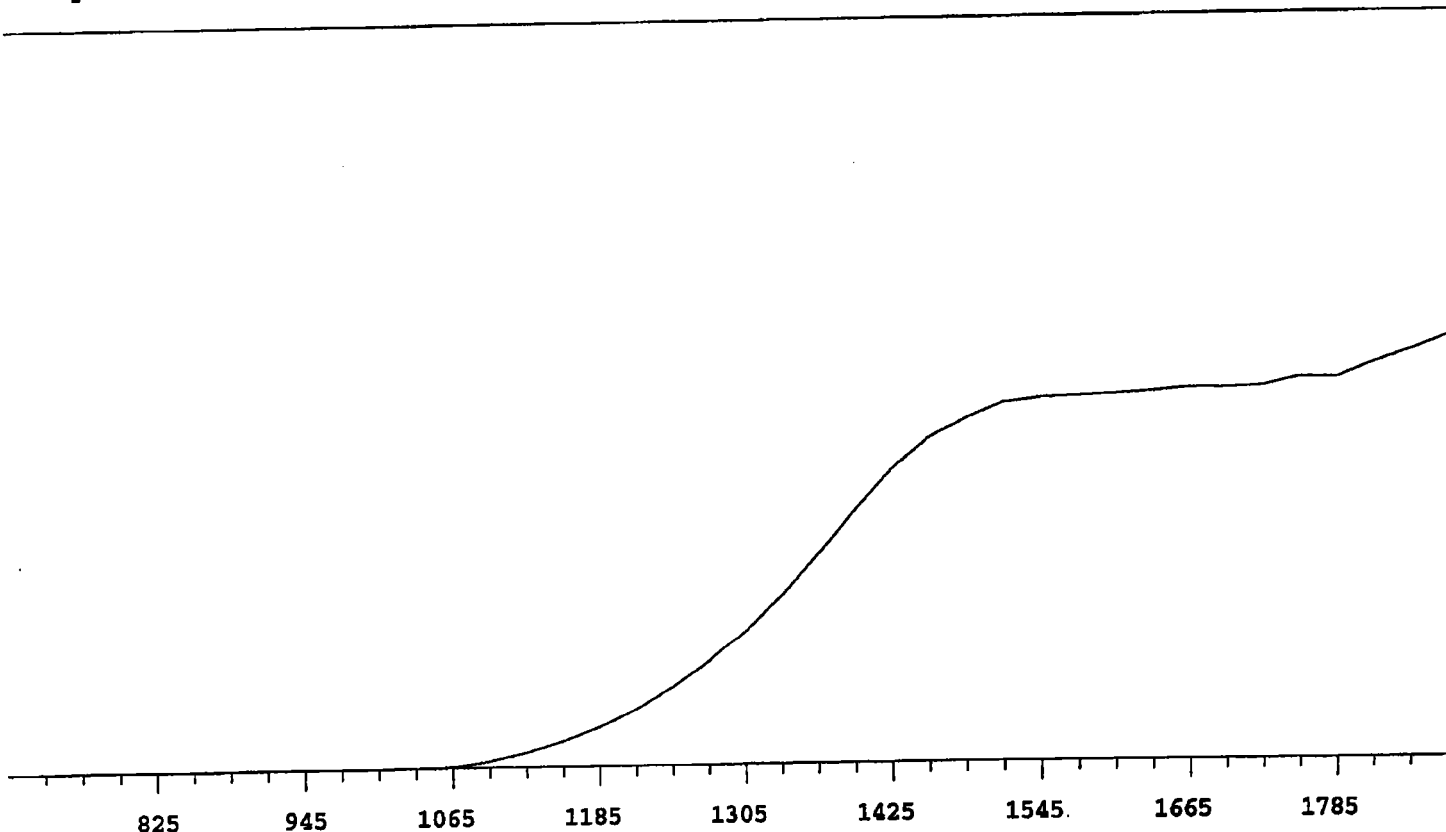
Plateau 07/04

Instrument 2 MPC 9604 Detector B

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	1	>100
1035	25	>100
1065	181	>100
1095	642	>100
1125	1508	>100
1155	2634	>100
1185	4092	>100
1215	5839	>100
1245	8055	+95.00
1275	10574	+86.26
1305	13796	+79.13
1335	17365	+72.79
1365	21609	+64.02
1395	26226	+52.97
1425	30369	+39.49
1455	33493	+27.22
1485	35403	+16.91
1515	36977	+9.40
1545	37438	+4.79
1575	37579	+2.09
1605	37762	+1.97
1635	37995	+1.78
1665	38346	+1.51
1695	38303	+2.41
1725	38472	+2.43
1755	39326	+4.86
1785	39246	+7.18
1815	40775	+8.99
1845	42052	
1875	43445	

VOLTS	COUNTS	%/100 Volts
1305	13796	+79.13
1335	17365	+72.79
1365	21609	+64.02
1395	26226	+52.97
1425	30369	+39.49
1455	33493	+27.22
1485	35403	+16.91
1515	36977	+9.40
1545	37438	+4.79
1575	37579	+2.09
1605	37762	+1.97
1635	37995	+1.78
1665	38346	+1.51
1695	38303	+2.41
1725	38472	+2.43
1755	39326	+4.86
1785	39246	+7.18
1815	40775	+8.99
1845	42052	
1875	43445	

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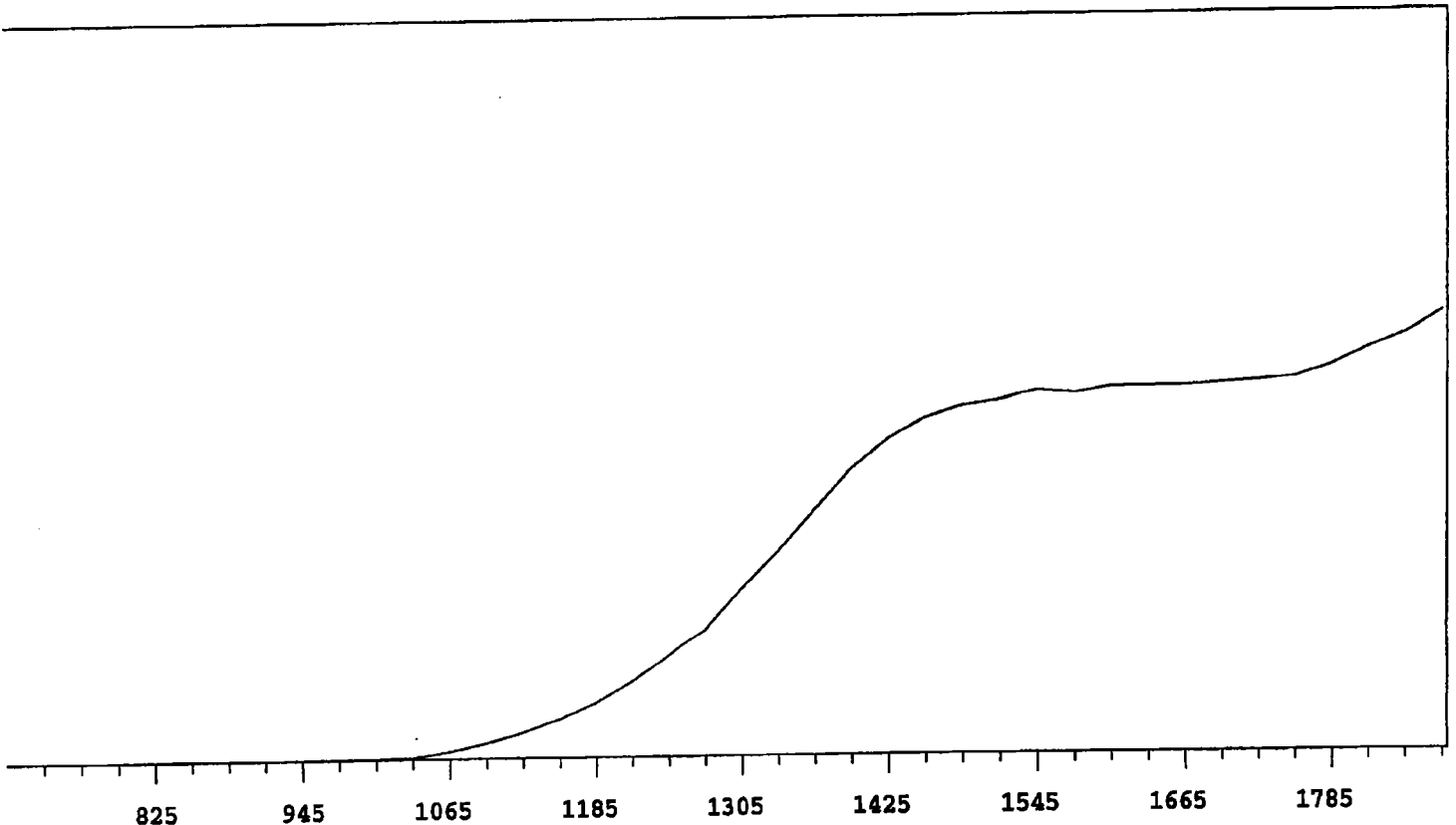
Plateau 07/04

Instrument 2 MPC 9604 Detector C

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15462	+71.07
735	0		1335	18841	+62.11
765	0		1365	22516	+50.11
795	0	>100	1395	26055	+38.36
825	0	>100	1425	28616	+26.36
855	0	>100	1455	30333	+16.13
885	0	>100	1485	31358	+10.48
915	0	>100	1515	31858	+5.90
945	0	>100	1545	32724	+4.01
975	2	>100	1575	32459	+2.65
1005	34	>100	1605	33001	+1.27
1035	198	>100	1635	33015	+1.78
1065	678	>100	1665	33071	+1.30
1095	1441	>100	1695	33306	+2.08
1125	2391	>100	1725	33504	+4.14
1155	3604	>100	1755	33840	+7.46
1185	5105	>100	1785	34896	+10.40
1215	7080	+93.85	1815	36461	+13.37
1245	9331	+87.10	1845	37695	
1275	11919	+78.91	1875	39769	

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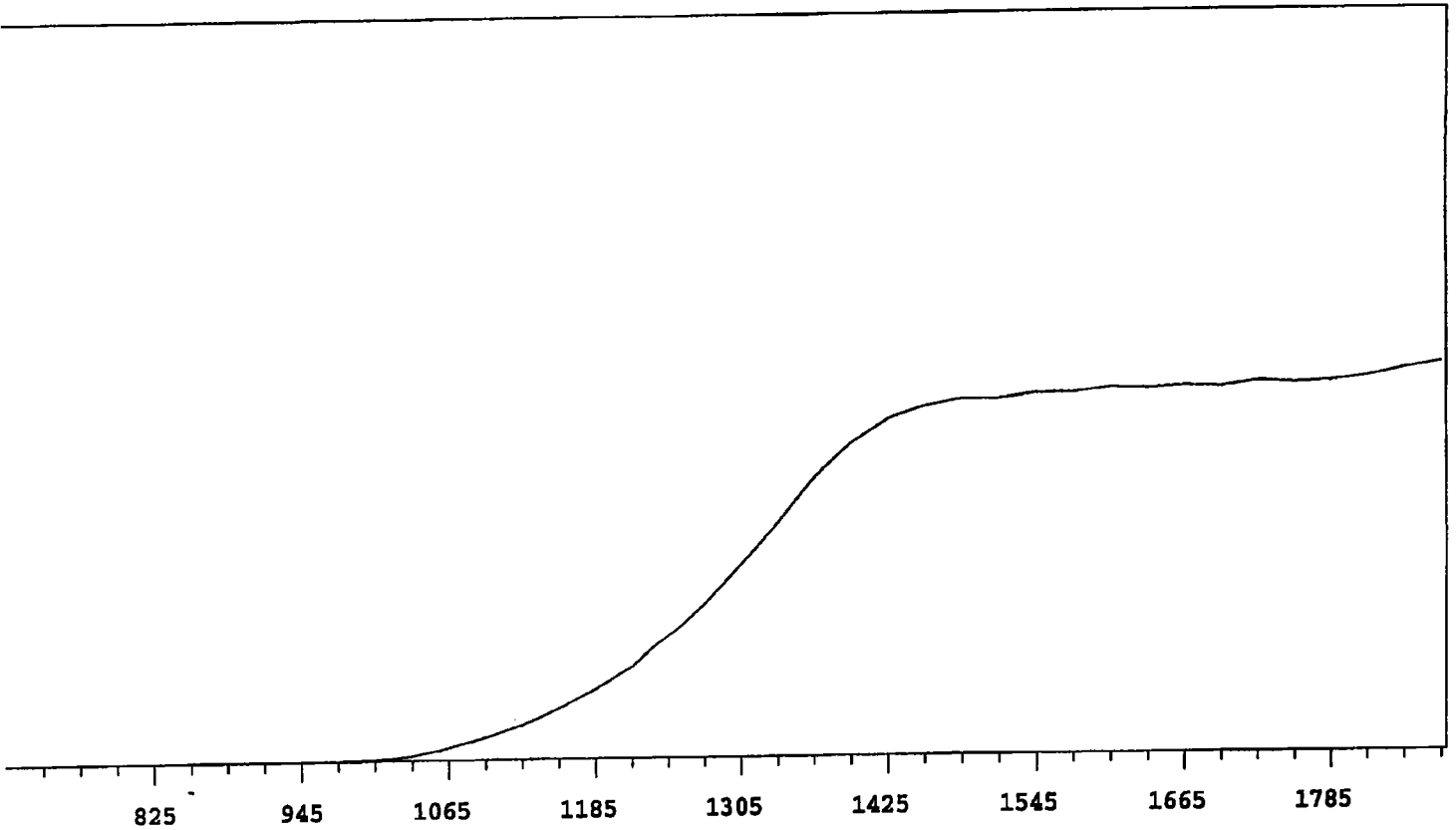
Plateau 07/04

Instrument 2 MPC 9604 Detector D

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	24635	+66.12
735	0		1335	29835	+56.19
765	0		1365	35285	+43.75
795	0	>100	1395	39469	+30.76
825	0	>100	1425	42337	+19.13
855	0	>100	1455	43919	+10.31
885	0	>100	1485	44875	+5.61
915	0	>100	1515	44862	+3.06
945	2	>100	1545	45596	+2.54
975	19	>100	1575	45621	+2.21
1005	153	>100	1605	46227	+1.45
1035	638	>100	1635	46064	+0.97
1065	1652	>100	1665	46372	+1.14
1095	2965	>100	1695	46217	+1.30
1125	4560	>100	1725	46942	+1.05
1155	6605	>100	1755	46688	+1.70
1185	9052	+95.03	1785	46874	+2.68
1215	11639	+87.08	1815	47445	+4.76
1245	15562	+81.12	1845	48467	
1275	19691	+74.76	1875	49304	

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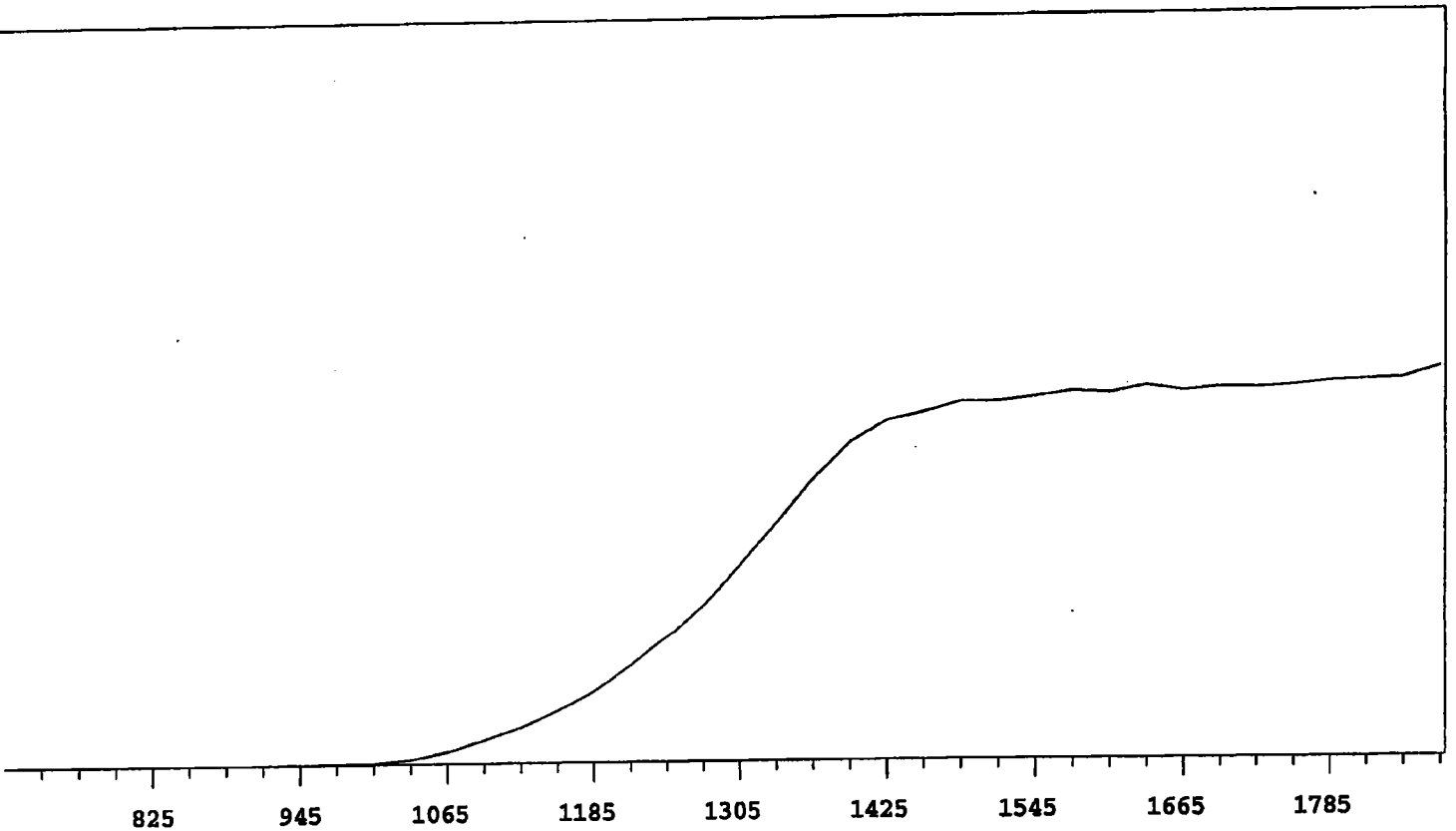
Plateau 07/04

Instrument 3 MPC 9604 Detector A

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	21575	+65.87
735	0		1335	26174	+56.59
765	0		1365	30896	+44.00
795	0	>100	1395	34809	+29.89
825	1	+0.00	1425	37134	+18.34
855	0	>100	1455	38035	+9.55
885	0	>100	1485	39191	+5.33
915	0	>100	1515	39178	+4.07
945	0	>100	1545	39651	+2.17
975	18	>100	1575	40203	+2.85
1005	109	>100	1605	39970	+1.23
1035	454	>100	1635	40729	+0.64
1065	1261	>100	1665	40127	+0.51
1095	2472	>100	1695	40509	+0.10
1125	3802	>100	1725	40387	+1.66
1155	5583	>100	1755	40662	+1.77
1185	7639	+99.85	1785	41060	+2.16
1215	10514	+89.69	1815	41255	+3.34
1245	13685	+81.66	1845	41417	
1275	17277	+73.24	1875	42557	

g 7/22/04

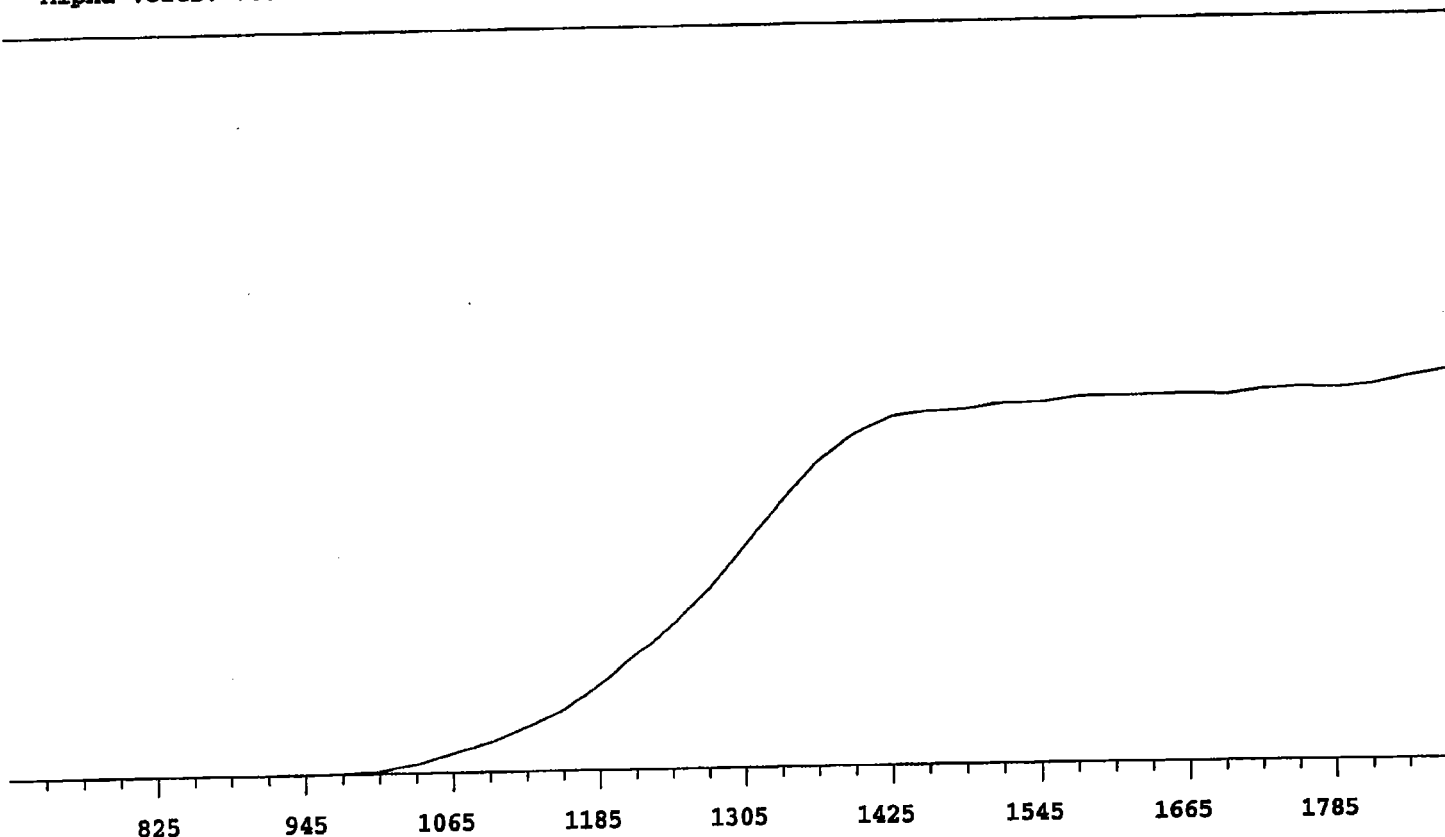
Plateau 07/04

Instrument 3 MPC 9604 Detector B

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19165	+59.15
735	0		1335	22642	+47.93
765	0		1365	25877	+34.84
795	0	>100	1395	28084	+22.41
825	0	>100	1425	29543	+12.08
855	0	>100	1455	29959	+6.28
885	0	>100	1485	30142	+3.11
915	0	>100	1515	30579	+2.97
945	4	>100	1545	30642	+2.65
975	46	>100	1575	31069	+1.73
1005	241	>100	1605	31120	+1.39
1035	763	>100	1635	31142	+0.31
1065	1642	>100	1665	31255	+0.92
1095	2578	>100	1695	31148	+1.60
1125	3908	>100	1725	31549	+1.43
1155	5339	>100	1755	31750	+1.73
1185	7437	+92.71	1785	31631	+2.34
1215	9881	+83.26	1815	31928	+3.75
1245	12503	+75.07	1845	32580	
1275	15447	+67.35	1875	33087	

Jan 7/2004

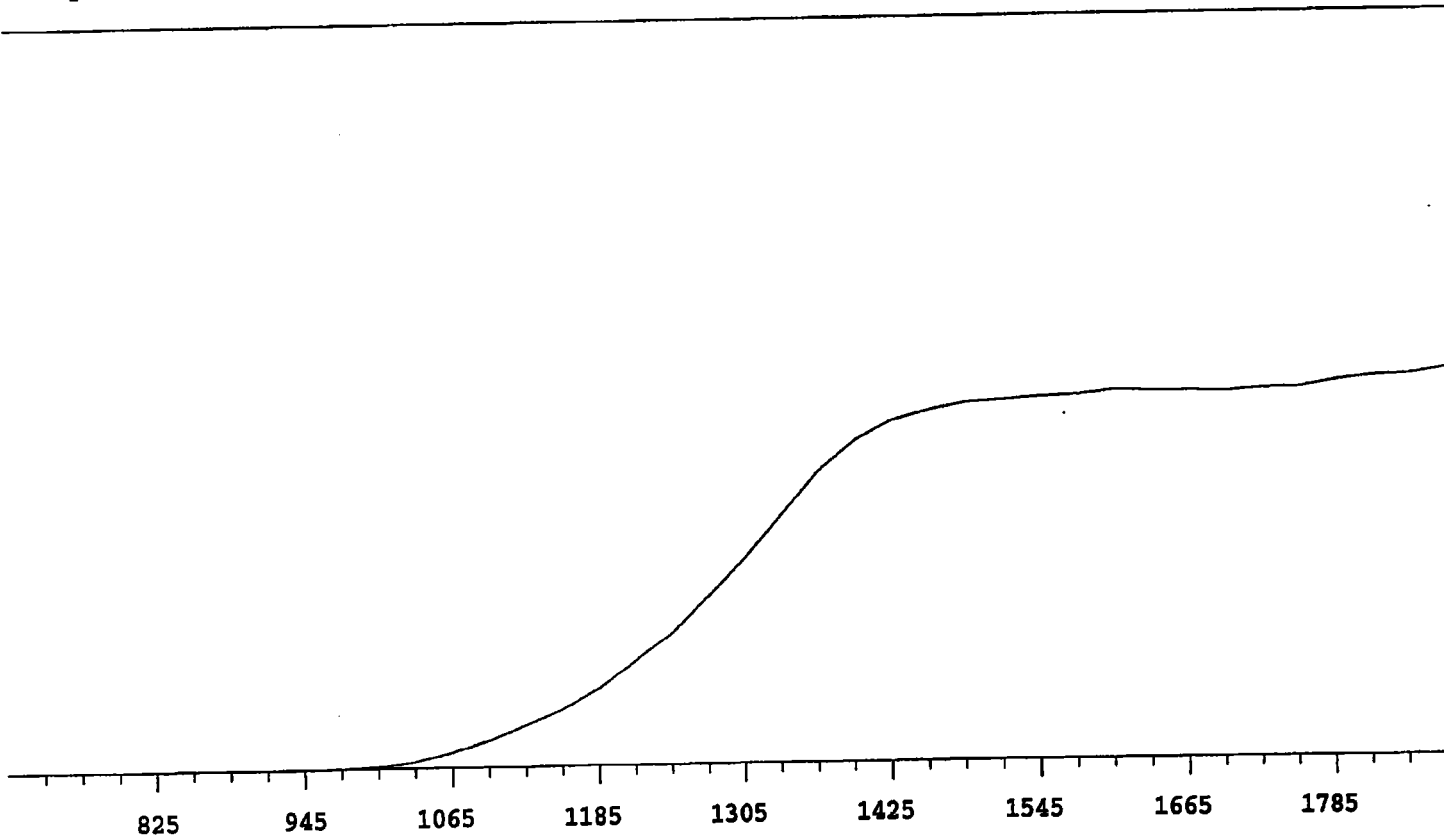
Plateau 07/04

Instrument 3 MPC 9604 Detector C

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21337	+62.41
735	0		1335	25676	+51.87
765	0		1365	30007	+39.96
795	0	>100	1395	33079	+26.87
825	0	>100	1425	35034	+16.03
855	0	>100	1455	36048	+8.88
885	0	>100	1485	36739	+4.80
915	1	>100	1515	36965	+2.78
945	2	>100	1545	37198	+2.19
975	33	>100	1575	37358	+1.72
1005	226	>100	1605	37766	+1.06
1035	678	>100	1635	37648	+0.24
1065	1589	>100	1665	37650	+0.01
1095	2696	>100	1695	37553	+0.60
1125	4193	>100	1725	37820	+1.80
1155	5866	>100	1755	37904	+3.02
1185	7961	+94.24	1785	38499	+3.09
1215	10746	+87.02	1815	38941	+3.56
1245	13783	+78.35	1845	39086	
1275	17549	+69.99	1875	39684	

Handwritten signature

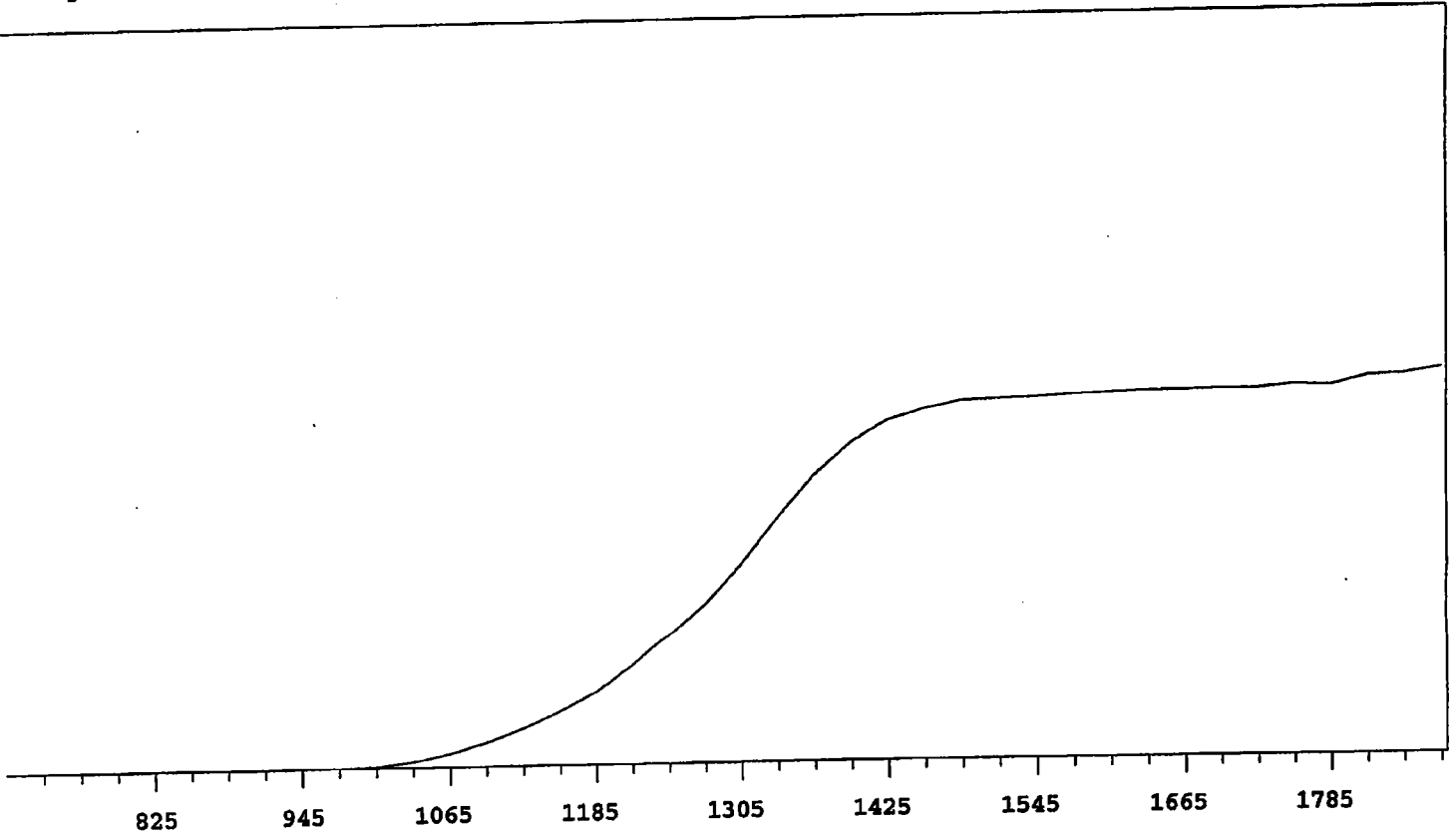
Plateau 07/04

Instrument 3 MPC 9604 Detector D

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	22384	+64.91
735	0		1335	27338	+55.29
765	0		1365	31944	+42.57
795	0	>100	1395	35658	+29.20
825	1	>100	1425	38071	+18.44
855	0	+0.00	1455	39378	+10.29
885	1	+0.00	1485	40341	+5.25
915	0	>100	1515	40508	+2.75
945	1	>100	1545	40640	+1.56
975	24	>100	1575	40893	+1.60
1005	140	>100	1605	41098	+1.34
1035	643	>100	1635	41263	+0.92
1065	1519	>100	1665	41279	+0.44
1095	2739	>100	1695	41369	+0.81
1125	4191	>100	1725	41320	+0.79
1155	6042	>100	1755	41747	+2.17
1185	8080	+96.76	1785	41579	+2.94
1215	10986	+87.61	1815	42600	+3.47
1245	14405	+80.38	1845	42748	
1275	17994	+72.82	1875	43368	

Jan 7/2004

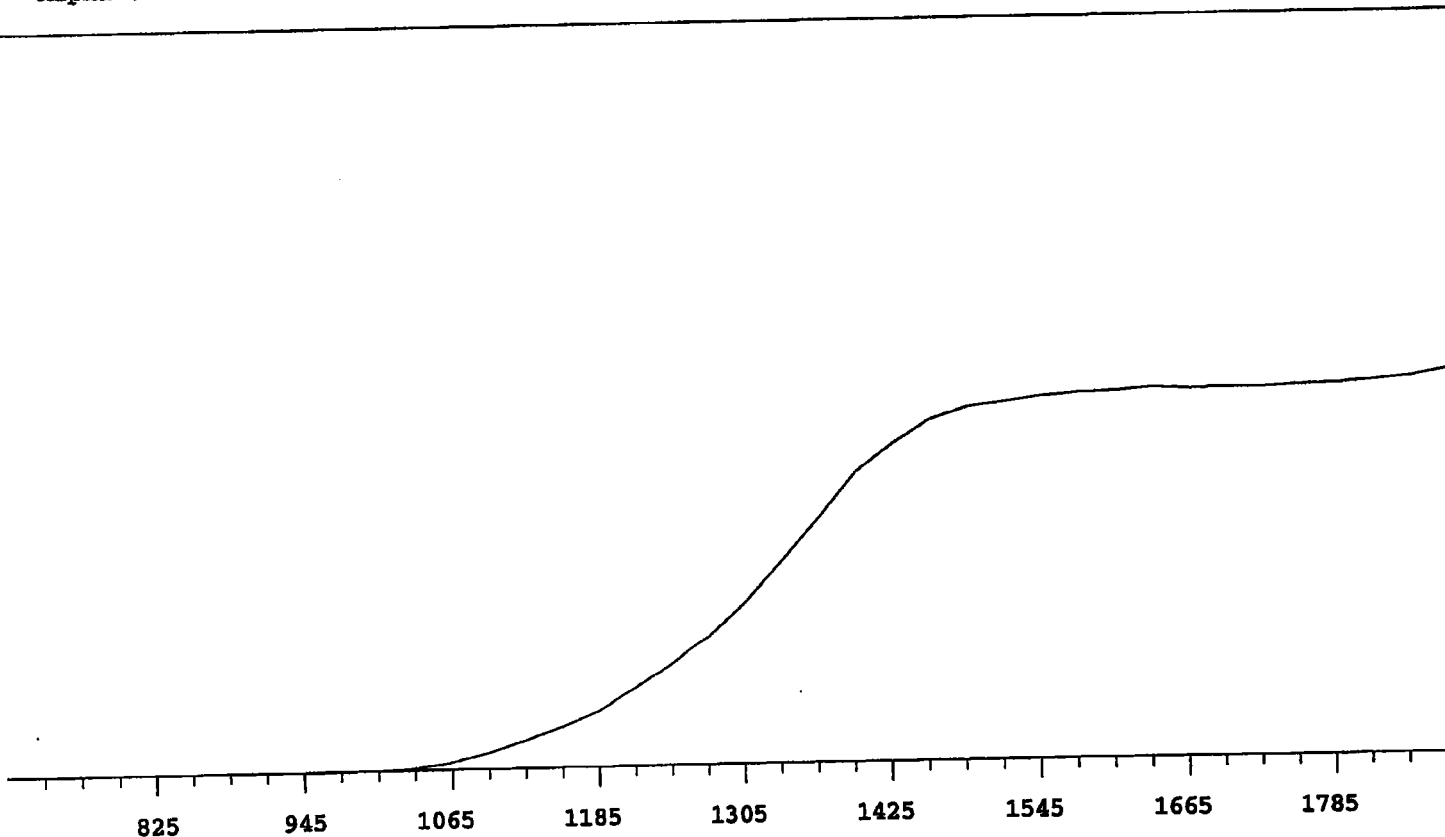
Plateau 07/04

Instrument 4 MPC 9604 Detector A

7/19/2004

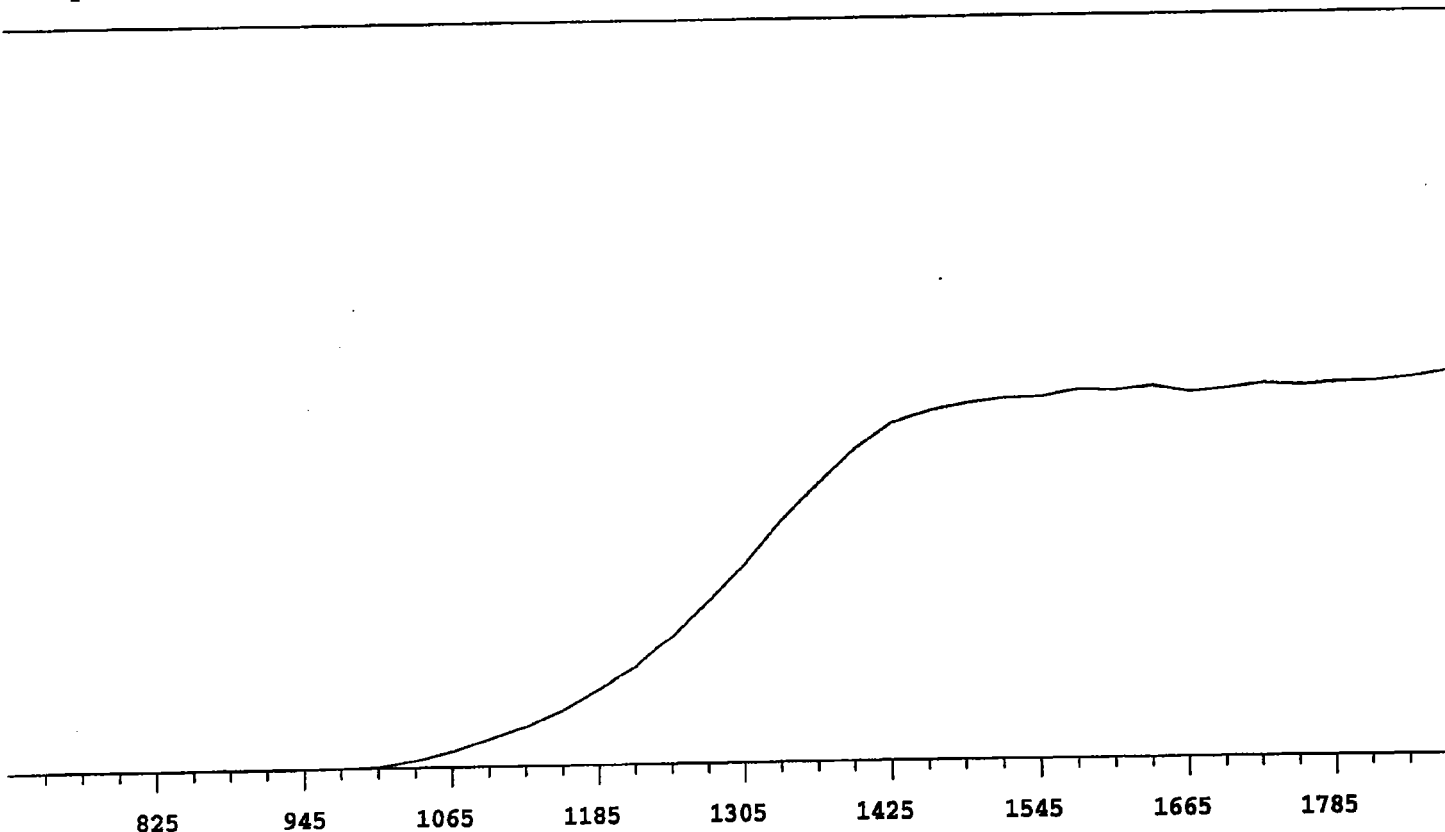
Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20196	+70.92
735	0		1335	25093	+64.47
765	0		1365	30252	+53.89
795	0	>100	1395	35803	+41.42
825	0	>100	1425	39177	+28.43
855	0	>100	1455	42048	+16.73
885	0	>100	1485	43395	+9.95
915	0	>100	1515	43954	+5.33
945	1	>100	1545	44588	+3.24
975	3	>100	1575	44953	+2.66
1005	38	>100	1605	45053	+1.37
1035	245	>100	1635	45510	+0.69
1065	830	>100	1665	45235	+0.28
1095	1955	>100	1695	45331	+0.23
1125	3389	>100	1725	45336	+0.89
1155	4997	>100	1755	45617	+1.20
1185	6863	>100	1785	45696	+1.76
1215	9674	+92.94	1815	45975	+2.73
1245	12535	+84.46	1845	46363	
1275	16168	+76.69	1875	47175	

7/19/04



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16703	+61.95
735	0		1335	20386	+52.74
765	0		1365	23431	+42.22
795	0	>100	1395	26285	+29.61
825	0	>100	1425	28336	+19.32
855	0	>100	1455	29277	+11.04
885	0	>100	1485	29890	+5.68
915	0	>100	1515	30279	+4.18
945	2	>100	1545	30360	+2.81
975	36	>100	1575	30933	+2.50
1005	158	>100	1605	30845	+0.95
1035	577	>100	1635	31188	-0.15
1065	1316	>100	1665	30673	+0.82
1095	2298	>100	1695	30948	+0.70
1125	3318	>100	1725	31344	+1.72
1155	4684	>100	1755	31181	+1.01
1185	6422	+93.30	1785	31359	+1.04
1215	8326	+85.47	1815	31414	+2.60
1245	10922	+77.15	1845	31716	
1275	13740	+71.11	1875	32233	

7/19/04

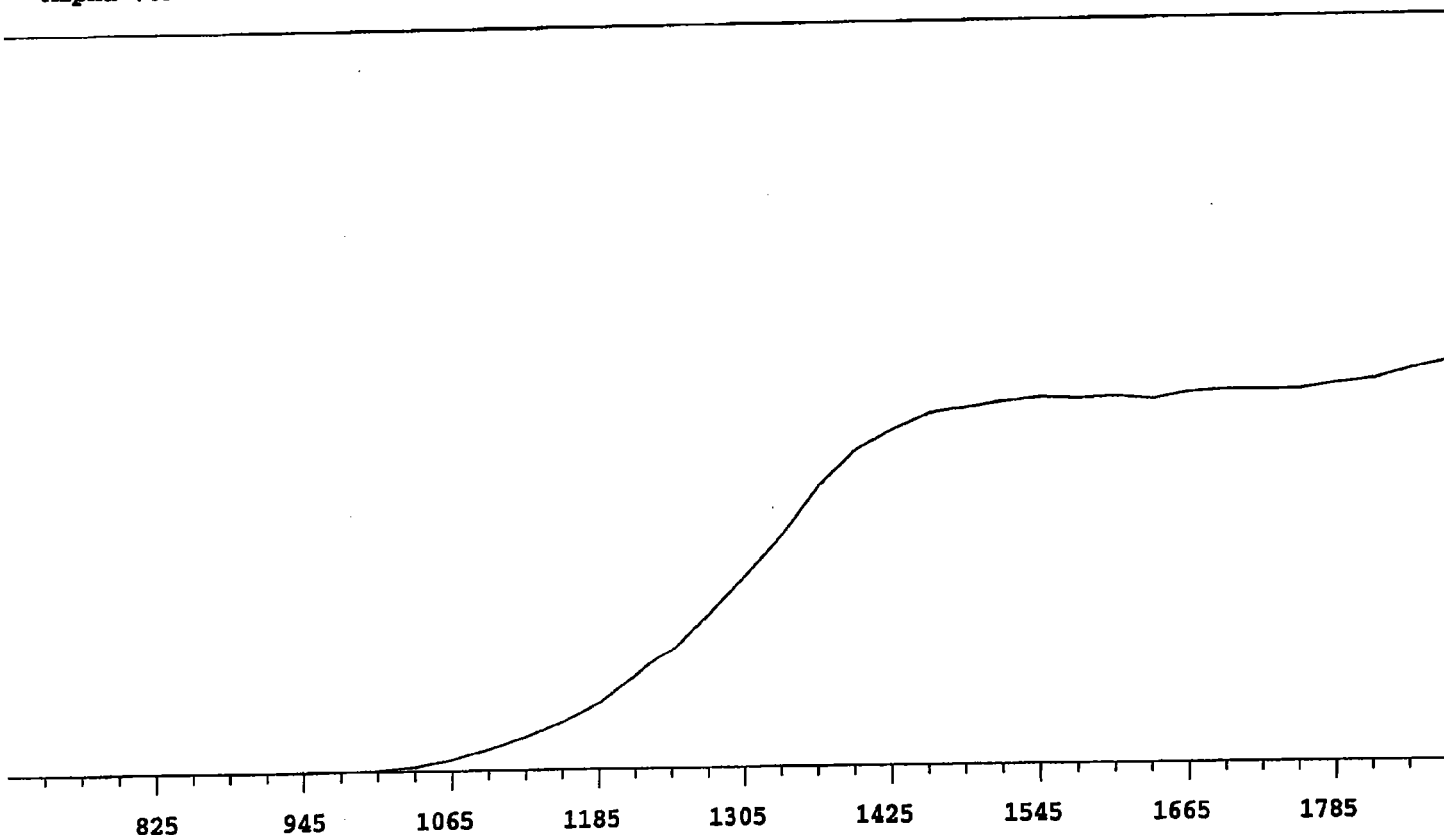
Plateau 07/04

Instrument 4 MPC 9604 Detector C

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	18839	+67.96
735	0		1335	22872	+57.68
765	0		1365	27407	+44.46
795	1	+0.00	1395	30682	+31.38
825	0	>100	1425	32591	+18.94
855	0	>100	1455	34190	+11.24
885	0	>100	1485	34722	+6.93
915	0	>100	1515	35262	+3.37
945	1	>100	1545	35641	+2.03
975	11	>100	1575	35504	+0.26
1005	103	>100	1605	35679	+0.69
1035	441	>100	1635	35382	+1.78
1065	1179	>100	1665	36072	+1.78
1095	2167	>100	1695	36265	+1.74
1125	3422	>100	1725	36194	+1.34
1155	4853	>100	1755	36262	+2.25
1185	6672	+97.47	1785	36803	+4.27
1215	9215	+89.47	1815	37192	+5.77
1245	11739	+81.79	1845	38095	
1275	15086	+73.77	1875	38856	

per 7/19/04

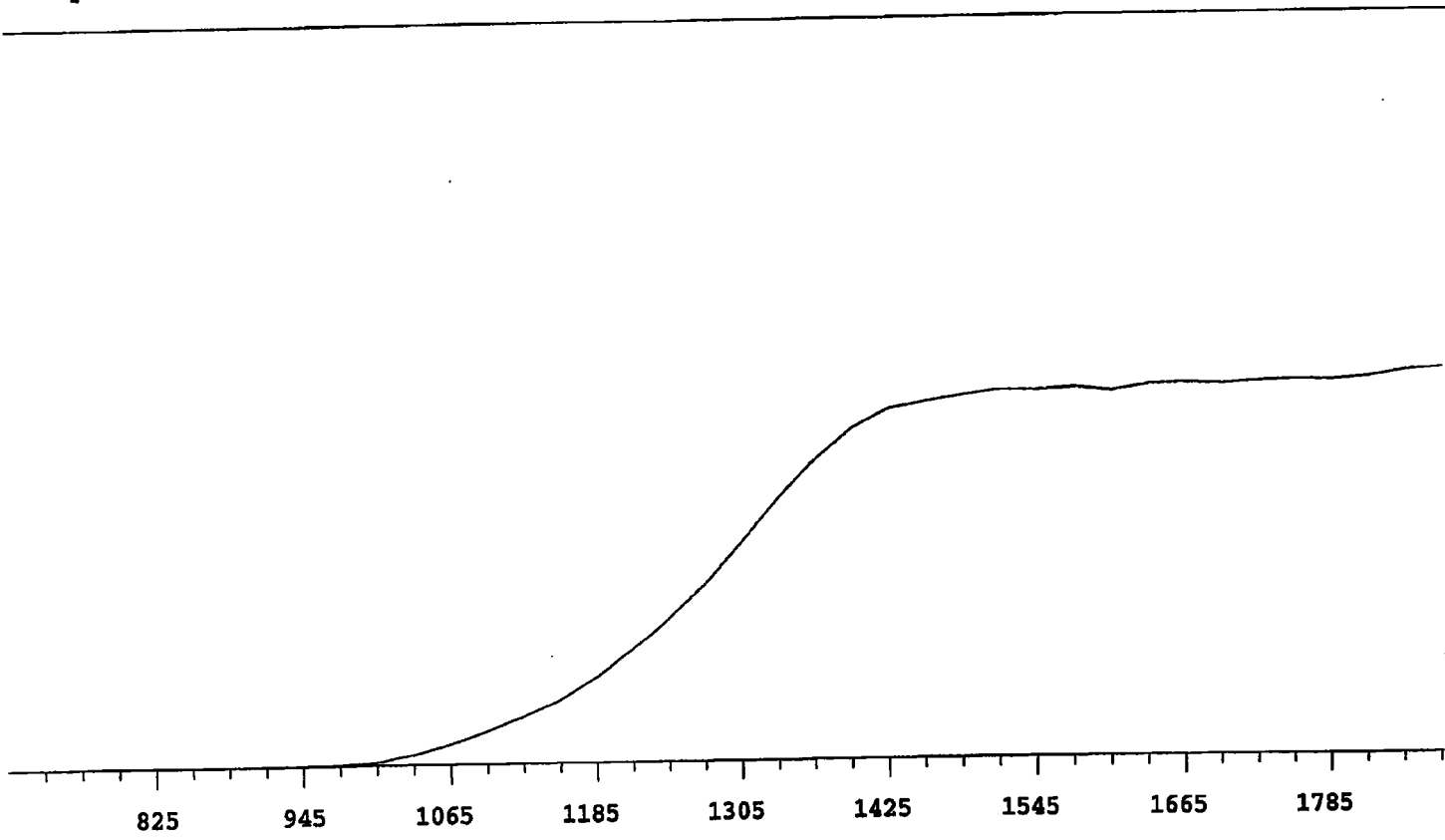
Plateau 07/04

Instrument 4 MPC 9604 Detector D

7/19/2004

Alpha Volts: 705

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	9	>100
975	84	>100
1005	395	>100
1035	1117	>100
1065	2179	>100
1095	3536	>100
1125	5088	>100
1155	6883	+96.73
1185	9282	+89.24
1215	12161	+81.81
1245	15561	+74.40
1275	19236	+67.51
1305	23556	+58.78
1335	28144	+48.66
1365	32003	+36.52
1395	35174	+24.06
1425	37136	+14.44
1455	37870	+8.04
1485	38481	+4.14
1515	39029	+2.66
1545	38936	+0.63
1575	39184	+0.49
1605	38768	+1.21
1635	39399	+0.95
1665	39540	+1.39
1695	39360	+0.69
1725	39609	+0.58
1755	39771	+1.08
1785	39681	+1.80
1815	39966	+2.60
1845	40592	
1875	40881	

VOLTS	COUNTS	%/100 Volts
1305	23556	+58.78
1335	28144	+48.66
1365	32003	+36.52
1395	35174	+24.06
1425	37136	+14.44
1455	37870	+8.04
1485	38481	+4.14
1515	39029	+2.66
1545	38936	+0.63
1575	39184	+0.49
1605	38768	+1.21
1635	39399	+0.95
1665	39540	+1.39
1695	39360	+0.69
1725	39609	+0.58
1755	39771	+1.08
1785	39681	+1.80
1815	39966	+2.60
1845	40592	
1875	40881	

7/19/04

VER4_05
RADIUM-228 WATER

Analyst : JMJ
Batch : verification
Date : 4/22/2005

Procedure Code : GFC28RAL

Parname : Radium-228

MDA : 1 pCi/L

Batch Counted on : PIC

Bkg Count Time: 1000 min

Sample I.D.	Sample Vol. L	Beta cpm	Ac 228 eff	Ba yield %	Ac-228		Ra-228		BKG cpm	Alpha cts	Beta cts
					Decay	Con	Decay	Con			
1A	1.000	7289.93	0.5132	100	0.58	1.00	1.000	0.49	505	36457	
1B	1.000	7542.79	0.5082	100	0.58	1.00	1.000	0.35	430	37720	
1C	1.000	7409.93	0.5231	100	0.58	1.00	1.000	0.35	500	37055	
1D	1.000	5865.16	0.5121	100	0.58	1.00	1.000	0.40	84	29327	
2A	1.000	5744.69	0.5097	100	0.58	1.00	1.000	0.48	1171	28748	
2B	1.000	7309.60	0.5242	100	0.58	1.00	1.000	0.32	302	36554	
2C	1.000	7315.97	0.5009	100	0.58	1.00	1.000	0.33	1759	36608	
2D	1.000	6912.80	0.5067	100	0.58	1.00	1.000	0.49	1600	34594	
3A	1.000	6638.33	0.4603	100	0.58	1.00	1.000	0.58	4839	33327	
3B	1.000	6177.63	0.4832	100	0.58	1.00	1.000	0.28	2355	30949	
3C	1.000	6140.98	0.4861	100	0.58	1.00	1.000	0.46	1449	30744	
3D	1.000	6727.78	0.4940	100	0.58	1.00	1.000	0.73	1195	33670	
4A	1.000	6135.16	0.5121	100	0.58	1.00	1.000	0.34	849	30684	
4B	1.000	7244.80	0.5268	100	0.58	1.00	1.000	0.37	154	36226	
4C	1.000	7153.96	0.5052	100	0.58	1.00	1.000	0.36	1434	35786	
4D	1.000	7365.57	0.5004	100	0.58	1.00	1.000	0.58	2976	36867	

Mulatos

Ac-228 0696-A 1mL NC 9369.54955

Count time	min	Sampling Date/Time	Ac-228 Elution Date/time	Starting count Date/Time	Ra-228 MDA pCi/L	Ra-228 result pCi/L	Ra-228 error pCi/L	Ra-228 % RECOVERY
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	3.050	11112.583	114.092	118.60%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	2.734	11617.226	117.254	123.99%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	2.657	11089.935	112.931	118.36%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	2.844	8968.322	102.653	95.72%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	3.052	8827.546	102.097	94.22%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:26	2.572	10924.735	112.009	116.60%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	2.721	11445.723	117.300	122.16%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	3.095	10693.248	112.742	114.13%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	3.627	11306.800	121.652	120.68%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	2.670	10027.006	111.828	107.02%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	3.156	9909.619	110.852	105.76%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	3.689	10685.237	114.200	114.04%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	2.693	9401.891	105.220	100.35%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	2.697	10794.986	111.174	115.21%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:27	2.786	11117.128	115.216	118.65%
5		4/22/2005 0:00	4/22/2005 7:35	4/22/2005 12:28	3.341	11558.337	118.059	123.36%

yan u/2005

VERRAW

INSTR_ID	SAMPLE_ID	CNT_TIME	A	B	TIME	USER2	BATCH_ID
Instrument 1 - A	1	5	505	36457	4/22/2005 12:26	1575	Ra2280422v
Instrument 1 - B	2	5	430	37720	4/22/2005 12:26	1575	Ra2280422v
Instrument 1 - C	3	5	500	37055	4/22/2005 12:26	1575	Ra2280422v
Instrument 1 - D	4	5	84	29327	4/22/2005 12:26	1575	Ra2280422v
Instrument 2 - A	5	5	1171	28748	4/22/2005 12:26	1575	Ra2280422v
Instrument 2 - B	6	5	302	36554	4/22/2005 12:26	1575	Ra2280422v
Instrument 2 - C	7	5	1759	36608	4/22/2005 12:27	1575	Ra2280422v
Instrument 2 - D	8	5	1600	34594	4/22/2005 12:27	1575	Ra2280422v
Instrument 3 - A	9	5	4839	33327	4/22/2005 12:27	1575	Ra2280422v
Instrument 3 - B	10	5	2355	30949	4/22/2005 12:27	1575	Ra2280422v
Instrument 3 - C	11	5	1449	30744	4/22/2005 12:27	1575	Ra2280422v
Instrument 3 - D	12	5	1195	33670	4/22/2005 12:27	1575	Ra2280422v
Instrument 4 - A	13	5	849	30684	4/22/2005 12:27	1575	Ra2280422v
Instrument 4 - B	14	5	154	36226	4/22/2005 12:27	1575	Ra2280422v
Instrument 4 - C	15	5	1434	35786	4/22/2005 12:27	1575	Ra2280422v
Instrument 4 - D	16	5	2976	36867	4/22/2005 12:28	1575	Ra2280422v

4/22/05

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-009 Isotope Ra-228
 Date Standards Prepared 4/22/05 Cocktail Type Used NA
 Standard ID 0696-A Matrix of Vial/Planchett 0.1M POLYPROPYLENE
FILTEL ATTACHED TO
SS PLANCHETTE
 Amount Used (g or ml) 1.0 Type of Scintillation Vial NA
 Standard Activity (DPM/g or ml) 22558.26 Pipette ID Used 3001383
 Reference Date 8/19/04 Balance ID Used NA
 Expiration Date 4/21/06 Quenching Agent —
 Residue/Carrier Agent —

Separation Date / Time: 4/22/05 / 0735

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				

my 4/22/05

my 4/22/05

Prepared By:  Date 4/22/05
 Reviewed By:  Date 4/22/05

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

69008-278

Ra-228 5 mL Liquid in Flame Sealed Vial

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

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

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

ISOTOPE:	Ra-228
ACTIVITY (dps):	3.882 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	August 19, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

Impurities: γ -impurities <0.1%

5.02035 grams 0.1M HCl solution with 50 μ g/g Ba carrier.

P O NUMBER 3244 RD, Item 1

SOURCE PREPARED BY:

M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

DM MJ 8-24-04

RECEIVED
8/24/04

my/zelos

Verification for Ra-228 Standard 0696-A

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
0696-A N1	8043.6000	28.3000	8015.3000	0.1078	20839.30285
0696-A N2	8032.8000	28.3000	8004.5000	0.1072	20927.70422
0696-A N3	8038.8000	28.3000	8010.5000	0.1068	21021.83084
				Average =	20929.61264

Mean Value (Counting) = 20929.61264 dpm/mL
 Stdev = 91.27896032 dpm/mL

Certificate Value = 20767.0 dpm/mL
 Lower Limit = 20747.05472 dpm/mL
 Upper Limit = 21112.17056 dpm/mL
 Rule 1 Pass/Fail = Pass
 Two sigma = 182.5579206
 10 % of Mean = 2092.961264
 Rule 2 (Pass/Fail) = Pass

100.783034 Pass
 0.00436124 Rule 3 (Pass/Fail)

Verification Rules

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

The analyst prepared three standard verification sources for Ra-228 source 0696-A by transferring portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 4/27/04 using Analytic's source 0503-A (Ra-228). Calibration data is recorded in this logbook under Ra-228 0503. Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 4/27/05

PROTOCOL : 23 Radium Std Ver.
DATE : 2005/04/27
TIME : 04:53
ID : P23AS011

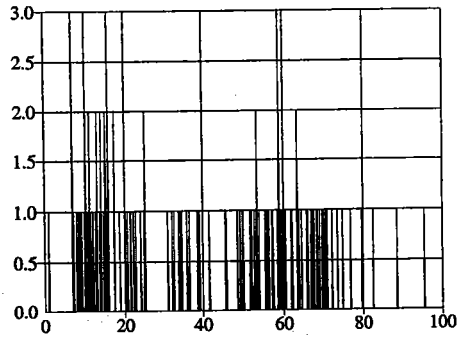
Wallac 1414 WinSpectral v1.40 S/N 4140127

Counting mode : CPM
Isotope(s) : H3
H3 = 5- 350,12.43 y
Protocol name : Radium Std Ver.
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Output to Display :
POS,CTIME,DATE,TIME,RACKPOS,CPMw1,CPM,SQPI,CPM1
Additions to Display : Spectrum,Header,Listing
Spectrum : Beta
Window 1 : 20- 80 /Beta
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total count rate:
H3 5643.4 CPM

04/27/05

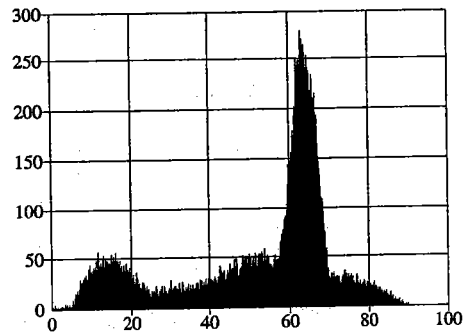
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
1	300	4/27/2005	4:53 AM	1	1.20	28.30
					13.50	



■ Counts
Beta

Bkg

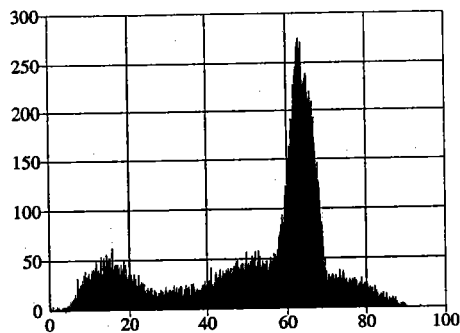
2	300	4/27/2005	4:59 AM	2	95.70	8043.60
					1590.80	



■ Counts
Beta

0696-A

3	300	4/27/2005	5:04 AM	3	88.40	8032.80
					1601.40	

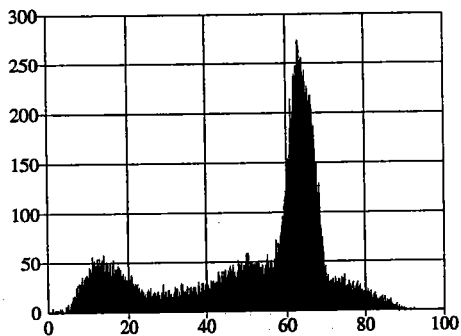


■ Counts
Beta

0696-A

auF4127105

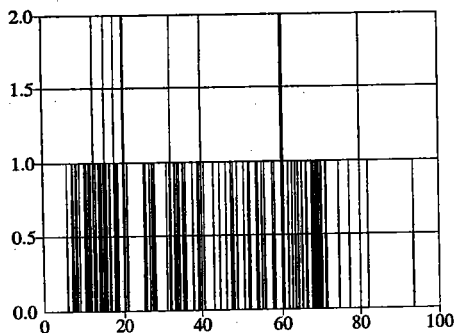
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
4	300	4/27/2005	5:10 AM	4	90.10	8038.80
					1615.60	



Counts Beta

0696-A

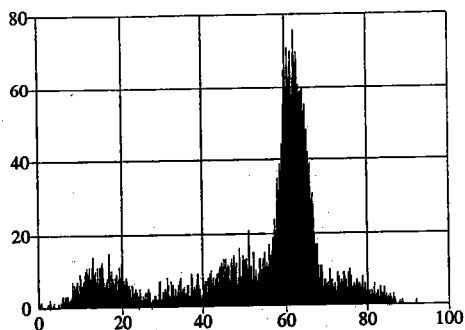
5	300	4/27/2005	5:15 AM	5	0.60	22.90
					11.90	



Counts Beta

Blkg

6	300	4/27/2005	5:21 AM	6	10.40	1711.00
					266.60	

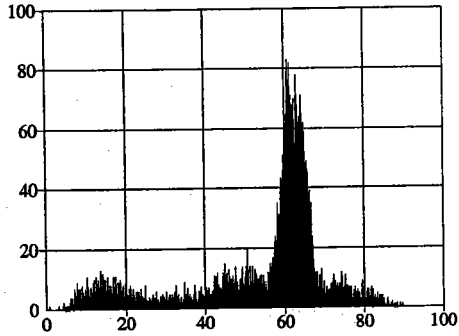


Counts Beta

0553-B

OLF 4/27/05

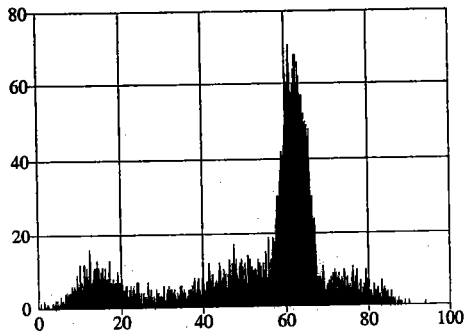
POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
7	300	4/27/2005	5:26 AM	7	18.10	1764.00
					275.10	



■ Counts
Beta

0553-B

8	300	4/27/2005	5:32 AM	8	15.40	1715.80
					268.60	



■ Counts
Beta

0553-B

QWF 4/27/05

Alpha Spectroscopy Calibration Sources

The following is a summary of the procedure performed for preparing mixed alpha calibration standards:

A calibration stock solution was prepared by combining the following in a volumetric flask and diluting to 50 ml (51.4561 grams). These individual standards were first verified by direct precipitation of small aliquots of each standard (as described in Attachment I).

Isotope	Serial #	amount used (g)	dpm (note 1)
Gd-148	64445-278	0.2471	212.159287
Np-237	4341	1.8075	204.438594
Cm-244	4320A	7.2704	240.144737

Note 1: Dpm values are decay corrected to 2/7/2003.

Forty one weighted aliquots were then directly precipitated using Neodymium Flouride /HF system. The sources were then mounted on 0.1Poly-propylene filters and taped securely to 1 inch stainless steel planchettes for counting in an Alpha Spectroscopy system. The liquid fraction that passes through the filter is collected, traced with Am-241 and prepared for counting using the identical procedure. These samples are counted to ensure there is no more than 1% loss in the filtering processes. All sources pass this requirement. The DPM information for each source is listed in attachment II.

Certificate files were then created on the Alpha system used for acquisition and processing of data. Each source is assigned a name (AESS-001 through AESS-041). The information for the source activities is entered into the certificate files appropriate for the detector being used.

For example: If source AESS-001 is used for calibrating detector 25, the source data is entered into the certificate file name [env_alpha.cer]U025.cer.

The computer software uses these certificate files to calculate an energy calibration and determine the efficiency of the detector after counting the source.

Ante Hill
4/1/03

2002 Alpha Eff Source Stock Verification

Curium-244

Isotope	Value pCi/g
SSTOCK2002A2_AM	106.000
SSTOCK2002B2_AM	106.000
SSTOCK2002C2_AM	106.000

Mean Value (Counting) = 106.000 98.04%
 Stdev = 0 pCi/g

Target = 108.1230 pCi/g
 Lower Limit = 106
 Upper Limit = 106
 Rule 1 Pass/Fail Pass
 Two sigma = 0
 10 % of Mean = 10.6
 Rule 2 (Pass/Fail) Pass

PASS
 Fair 3/2/0

Neptunium-237

Isotope	Value pCi/g
SSTOCK2002A2_AM	90.100
SSTOCK2002B2_AM	87.200
SSTOCK2002C2_AM	93.500

Mean Value (Counting) = 90.267 98.02%
 Stdev = 3.153305144 pCi/g

Target = 92.0900 pCi/g
 Lower Limit = 83.96005638
 Upper Limit = 96.57327696
 Rule 1 Pass/Fail Pass
 Two sigma = 6.306610289
 10 % of Mean = 9.026666667
 Rule 2 (Pass/Fail) Pass

Gadolinium-148

Isotope	Value pCi/g
SSTOCK2002A2_AM	95.080
SSTOCK2002B2_AM	93.750
SSTOCK2002C2_AM	96.560

Mean Value (Counting) = 95.463 99.81%
 Stdev = 1.503074627 pCi/g

Target = 95.6460 pCi/g
 Lower Limit = 92.45718408
 Upper Limit = 98.46948259
 Rule 1 Pass/Fail Pass
 Two sigma = 3.006148253
 10 % of Mean = 9.546333333
 Rule 2 (Pass/Fail) Pass

The analyst prepared three standard verification sources for the mixed alpha stock standard using 0.1030 g for source #1, 0.1035 g for source #2 and 0.1028 g for source #3. Each standard was combined with 1.0 mL of Am-243 standard 0454-A and 0.1 mL of Nd carrier in a disposable centrifuge tube. Four mL of 2 M HCl was added to each standard and then diluted with 4 mL of DI water. 5 mL of ascorbic acid was added to each sample then one mL of 48% HF was added to precipitate Nd (and Curium) fluoride. After 30 minutes, each sample was filtered following routine procedures for alpha spectroscopy source preparation. Each source was counted using routine alpha spec procedures. pCi/L values for the Mixed Alpha Stock were calculated and compared to Am-243 certified values.

① The rule failed because the 3 results from 3 sources were the same. Therefore, the stdev was zero. The intent of this rule is to ensure an appropriate amount of counts are achieved for proper determinations. ~~Since~~ For each standard the # of counts achieved was

Just under 10000 which has a counting error of nearly 1%. Because the standard's bias is < 2% from the known value the standard is acceptable.

Robertson 02/20/03

Attachment II

Mixed alpha isotope	Reference date = Source	Stock Dpm/g	Reference date	Half-life (years)	amount used for mixed	Dpm/g mixed	Decay corr dpm/g
Gd-148	64445-278 (0502)	44354.59289	9/5/2002	74.60	0.2471	212.9974853	212.159287
Np-237	Srm 4341 (0493)	5820	3/1/1992	2.14E+06	1.8075	204.4393182	204.438594
Cm-244	SRM 4320a (0490)	2223.6	2/1/1996	18.1	7.2704	314.1796879	240.144737
Source	Amount of standard used	dpm Gd-148	dpm Np-237	dpm Cm-244	dps Gd-148	dps Np-237	dps Cm-244
AESS-001	1.0362	219.839	211.839	248.838	3.664	3.531	4.147
AESS-002	1.0344	219.458	211.471	248.406	3.658	3.525	4.140
AESS-003	1.034	219.373	211.390	248.310	3.656	3.523	4.138
AESS-004	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-005	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-006	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-007	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-008	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-009	1.0352	219.627	211.635	248.598	3.660	3.527	4.143
AESS-010	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-011	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-012	1.0367	219.946	211.941	248.958	3.666	3.532	4.149
AESS-013	1.0396	220.561	212.534	249.654	3.676	3.542	4.161
AESS-014	1.0368	219.967	211.962	248.982	3.666	3.533	4.150
AESS-015	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-016	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-017	1.0356	219.712	211.717	248.694	3.662	3.529	4.145
AESS-018	1.0359	219.776	211.778	248.766	3.663	3.530	4.146
AESS-019	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-020	1.0361	219.818	211.819	248.814	3.664	3.530	4.147
AESS-021	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-022	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-023	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-024	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-025	1.0364	219.882	211.880	248.886	3.665	3.531	4.148
AESS-026	1.0336	219.288	211.308	248.214	3.655	3.522	4.137
AESS-027	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-028	1.0366	219.924	211.921	248.934	3.665	3.532	4.149

Attachment II

AESS-029	1.0355	219.691	211.696	248.670	3.662	3.528	4.144
AESS-030	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-031	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-032	1.0326	219.076	211.103	247.973	3.651	3.518	4.133
AESS-033	1.0308	218.694	210.735	247.541	3.645	3.512	4.126
AESS-034	1.0314	218.821	210.858	247.685	3.647	3.514	4.128
AESS-035	1.0303	218.588	210.633	247.421	3.643	3.511	4.124
AESS-036	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-037	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-038	1.0373	220.073	212.064	249.102	3.668	3.534	4.152
AESS-039	1.0334	219.245	211.267	248.166	3.654	3.521	4.136
AESS-040	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-041	1.0352	219.627	211.635	248.598	3.660	3.527	4.143



0490
0491

National Institute of Standards & Technology

Certificate

Standard Reference Material 4320A Curium-244 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive curium-244 nitrate and nitric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of alpha-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains curium-244 with a total activity of approximately 200 Bq. Curium-244 decays by alpha-particle emission to plutonium-240, which also decays by alpha-particle emission. None of the alpha particles escape from the SRM ampoule. During the decay process X-rays and gamma rays with energies from 40 keV to 1100 keV are also emitted. Most of these photons escape from the SRM ampoule but their intensities are so small that they do not represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains nitric acid (HNO_3) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least February 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
February 1996 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

Recommended Procedure for Opening the SRM Ampoule

- 1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.
- 2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.
- 3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.
- 4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.
- 5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.
- 6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.
- 7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.
- 8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle.
NEVER PIPETTE BY MOUTH
- 9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

PROPERTIES OF SRM 4320A
(Certified values are shown in bold type)

Source identification number	NIST SRM 4320A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution density	(1.030 ± 0.002) g·mL ⁻¹ at 22.8 °C [b]*		
Solution mass	Approximately 5.15 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L ⁻¹)	Mass Fraction (g·g ⁻¹)
	H ₂ O	54	0.94
	HNO ₃	1.0	0.06
	HCl	<0.001	<4 × 10 ⁻⁵
	²⁴⁴ Cm +3	5 × 10 ⁻¹¹	1 × 10 ⁻¹¹
Radiological Properties:			
Radionuclide	Curium-244		
Reference time	1230 EST, 1 February 1996 [c]		
Massic activity of the solution [d]	37.06 Bq·g ⁻¹ 24.12 Bq·g ⁻¹		
Relative expanded uncertainty (k=2)	0.68% [e] [f]		
Alpha-particle-emitting daughters	Plutonium-240: (0.22 ± 0.11) Bq·g ⁻¹ [b] [c]		
Alpha-particle-emitting impurities	Curium-243: (0.005 ± 0.004) Bq·g ⁻¹ [b] [g]		
Photon-emitting impurities	None detected [h]		
Half lives used in the decay corrections	Curium-244: (18.10 ± 0.02) a [i] Plutonium-240: (6563 ± 7) a [i]		
Calibration method	Two 4π liquid-scintillation counting systems		

- [i] The stated uncertainty is the standard uncertainty. See reference [5].
- [j] Relative standard uncertainty of the input quantity x_i .
- [k] The relative change in the output quantity y divided by the relative change in the input quantity x_i . If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y . If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y .
- [m] Relative component of combined standard uncertainty of output quantity y , rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.
- [n] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.
- [p] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$
- [q] The live time is determined by counting the pulses from a gated oscillator.
- [r] The standard uncertainty given is for the detected Cm-243 impurity. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Cm-244})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Cm-244})\}$.
- [s] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Cm-244})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Cm-244})\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

- [1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.
- [2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)
- [3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.
- [4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.
- [5] Evaluated Nuclear Structure Data File (ENSDF), February 1996.



CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

64445-278

Gd-148 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

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

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

ISOTOPE:	Gd-148
ACTIVITY (dps):	<u>3.759 E3</u>
HALF-LIFE:	<u>74.6 years</u>
CALIBRATION DATE:	September 5, 2002 12:00 EST
TOTAL UNCERTAINTY*:	2.7%
SYSTEMATIC:	1.9%
RANDOM:	0.8%

99% confidence level.

5.08493 grams 0.1M HCl solution.

P O NUMBER 3207RD, Item 1

SOURCE PREPARED BY:

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

Q A APPROVED:

100. [Signature] 9-6-02

25
31
30
31
31
7:

0493



National Institute of Standards & Technology

Certificate

Standard Reference Material 4341 Radioactivity Standard

Radionuclide	Neptunium-237
Source identification	SRM 4341
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule ^{(1)*}
Solution mass	Approximately 5 grams
Solution composition	Neptunium-237 in 2 mol·L ⁻¹ nitric acid
Reference time	March 1992
Radioactivity concentration	97.0 Bq·g ⁻¹
Overall uncertainty	1.28 percent ⁽²⁾
Photon-emitting impurities	None detected ⁽³⁾
Alpha-particle-emitting impurities	None detected ⁽⁴⁾
Half life	(2.14 ± 0.11) × 10 ⁶ years ⁽⁵⁾
Measuring instrument	NIST "0.8π" α defined-solid-angle counter with scintillation detector

This standard reference material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M. Robin Hutchinson, Acting Group Leader.

Gaithersburg, MD
January 1993

William P. Reed, Chief
Standard Reference Materials Program

*Notes on back

PC 5 075 000

NOTES

(1) Approximately five milliliters of solution. Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

(2) The overall uncertainty was formed by taking three times the quadratic combination of the standard deviations of the mean, or approximations thereof, for the following:

a) alpha-particle-emission-rate measurements	0.34 percent
b) background	0.01 percent
c) livetime	0.10 percent
d) detection efficiency	0.16 percent
e) count-rate-vs-energy extrapolation to zero energy	0.10 percent
f) half life	0.00 percent
g) gravimetric measurements	0.10 percent
h) alpha-emitting impurities	0.10 percent

(3) The protactinium-233 daughter of neptunium-237 is approximately in equilibrium.
The limit of detection for photon-emitting impurities is

$0.19 \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 30 and 307 keV and
 $0.01 \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 317 and 1750 keV,

provided that the impurity photons are separated in energy by 5 keV or more from photons emitted in the decay of neptunium-237 and progeny.

(4) The limit of detection for alpha-particle-emitting impurities is

$0.10 \text{ } \alpha \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 1.0 and 4.3 MeV and
 $0.05 \text{ } \alpha \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 4.9 and 10 MeV.

(5) Evaluated Nuclear Structure Data File (ENSDF), February 1990.

For further information please contact Dr. J.M. Robin Hutchinson at NIST.

Telephone: (301) 975-5532

FAX: (301) 926-7416

Subsection 1: Energy Calibration

The Energy Calibration energy=Cal_Zero+(e1*C)+(e2*C^2)

where : Cal_Zero = Energy Calibration Zero
 e1 = Energy Calibration Slope
 e2 = Energy Calibration Quadratic
 C = Channel

Instrument : CHAMBER 001
 Detector : 33088
 Calibration Date/Time : 3-APR-2006 16:30:52
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.589
NP-237	4341	2/28/06	4768.800	4768.498
CM-244	4320A	2/28/06	5795.020	5794.859

Energy/Channel Equation : see above
 Energy Calibration Zero : 2394.447
 Energy Calibration Slope : 4.976289
 Energy Calibration Quadratic : 2.7050270E-04
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 003
 Detector : 20659
 Calibration Date/Time : 3-APR-2006 16:32:34
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.813
NP-237	4341	2/28/06	4768.800	4768.688
CM-244	4320A	2/28/06	5795.020	5795.021

Energy/Channel Equation : see above
 Energy Calibration Zero : 2371.253
 Energy Calibration Slope : 5.028544
 Energy Calibration Quadratic : 2.5955989E-04
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 004
 Detector : 33077
 Calibration Date/Time : 3-APR-2006 16:32:51
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.835
NP-237	4341	2/28/06	4768.800	4768.419
CM-244	4320A	2/28/06	5795.020	5794.571

Energy/Channel Equation : see above
 Energy Calibration Zero : 2409.653
 Energy Calibration Slope : 4.949907
 Energy Calibration Quadratic : 2.7518670E-04
 Energy Calibration Range : 7767.000

Instrument : CHAMBER 005
 Detector : 28642
 Calibration Date/Time : 3-APR-2006 16:33:05
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5794.893

Energy/Channel Equation : see above
 Energy Calibration Zero : 2356.725
 Energy Calibration Slope : 4.952652
 Energy Calibration Quadratic : 3.0983411E-04
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 007
 Detector : 30416
 Calibration Date/Time : 3-APR-2006 16:35:21
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.624
CM-244	4320A	2/28/06	5795.020	5795.021

Energy/Channel Equation : see above
 Energy Calibration Zero : 2382.813
 Energy Calibration Slope : 4.944474
 Energy Calibration Quadratic : 3.1966669E-04
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 009
 Detector : 13285
 Calibration Date/Time : 3-APR-2006 16:39:51
 Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.700
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5794.917

Energy/Channel Equation : see above
 Energy Calibration Zero : 2406.029
 Energy Calibration Slope : 4.889740
 Energy Calibration Quadratic : 3.3907106E-04
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 010
 Detector : 33083
 Calibration Date/Time : 3-APR-2006 16:40:04
 Calibration Source Id : AESS-010
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.328
 NP-237 4341 2/28/06 4768.800 4768.118
 CM-244 4320A 2/28/06 5795.020 5795.011

Energy/Channel Equation : see above
 Energy Calibration Zero : 2382.230
 Energy Calibration Slope : 4.964393
 Energy Calibration Quadratic : 2.9206229E-04
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 011
 Detector : 9537
 Calibration Date/Time : 3-APR-2006 16:40:58
 Calibration Source Id : AESS-011
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.722
 NP-237 4341 2/28/06 4768.800 4768.758
 CM-244 4320A 2/28/06 5795.020 5794.941

Energy/Channel Equation : see above
 Energy Calibration Zero : 2401.574
 Energy Calibration Slope : 4.894418
 Energy Calibration Quadratic : 3.3610439E-04
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 012
 Detector : 33085
 Calibration Date/Time : 3-APR-2006 16:41:13
 Calibration Source Id : AESS-012
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4768.403
 CM-244 4320A 2/28/06 5795.020 5794.958

Energy/Channel Equation : see above
 Energy Calibration Zero : 2403.072
 Energy Calibration Slope : 4.959775
 Energy Calibration Quadratic : 2.8419620E-04
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 013
 Detector : 21084
 Calibration Date/Time : 3-APR-2006 16:41:26
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.603
NP-237	4341	2/28/06	4768.800	4769.678
CM-244	4320A	2/28/06	5795.020	5795.297

Energy/Channel Equation : see above
 Energy Calibration Zero : 2372.215
 Energy Calibration Slope : 4.879492
 Energy Calibration Quadratic : 3.3235765E-04
 Energy Calibration Range : 7717.000

Instrument : CHAMBER 016
 Detector : 21086
 Calibration Date/Time : 3-APR-2006 16:45:33
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.993
NP-237	4341	2/28/06	4768.800	4768.792
CM-244	4320A	2/28/06	5795.020	5794.887

Energy/Channel Equation : see above
 Energy Calibration Zero : 2373.788
 Energy Calibration Slope : 4.866085
 Energy Calibration Quadratic : 3.4461656E-04
 Energy Calibration Range : 7718.000

Instrument : CHAMBER 017
 Detector : 33203
 Calibration Date/Time : 3-APR-2006 16:45:52
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.753
NP-237	4341	2/28/06	4768.800	4768.686
CM-244	4320A	2/28/06	5795.020	5795.002

Energy/Channel Equation : see above
 Energy Calibration Zero : 2381.283
 Energy Calibration Slope : 4.983909
 Energy Calibration Quadratic : 2.9758285E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 018
 Detector : 21063
 Calibration Date/Time : 3-APR-2006 16:46:43
 Calibration Source Id : AESS-018
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.678
 NP-237 4341 2/28/06 4768.800 4768.731
 CM-244 4320A 2/28/06 5795.020 5795.019
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2340.789
 Energy Calibration Slope : 4.900531
 Energy Calibration Quadratic : 3.0987556E-04
 Energy Calibration Range : 7684.000

Instrument : CHAMBER 019
 Detector : 23882
 Calibration Date/Time : 3-APR-2006 16:46:59
 Calibration Source Id : AESS-019
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.344
 NP-237 4341 2/28/06 4768.800 4769.286
 CM-244 4320A 2/28/06 5795.020 5795.346
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2328.678
 Energy Calibration Slope : 5.011906
 Energy Calibration Quadratic : 2.4903595E-04
 Energy Calibration Range : 7722.000

Instrument : CHAMBER 020
 Detector : 33093
 Calibration Date/Time : 3-APR-2006 16:47:46
 Calibration Source Id : AESS-020
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4768.523
 CM-244 4320A 2/28/06 5795.020 5795.020
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2351.189
 Energy Calibration Slope : 4.985672
 Energy Calibration Quadratic : 2.7204608E-04
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 021
 Detector : 33893
 Calibration Date/Time : 3-APR-2006 16:48:06
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.276
NP-237	4341	2/28/06	4768.800	4768.355
CM-244	4320A	2/28/06	5795.020	5794.907

Energy/Channel Equation : see above
 Energy Calibration Zero : 2374.427
 Energy Calibration Slope : 4.951159
 Energy Calibration Quadratic : 3.0070700E-04
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 023
 Detector : 22873
 Calibration Date/Time : 3-APR-2006 16:49:38
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3180.453
NP-237	4341	2/28/06	4768.800	4764.511
CM-244	4320A	2/28/06	5795.020	5793.157

Energy/Channel Equation : see above
 Energy Calibration Zero : 2403.611
 Energy Calibration Slope : 4.972397
 Energy Calibration Quadratic : 2.1793865E-04
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 026
 Detector : 34427
 Calibration Date/Time : 4-APR-2006 12:02:00
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.743
NP-237	4341	2/28/06	4768.800	4768.458
CM-244	4320A	2/28/06	5795.020	5794.860

Energy/Channel Equation : see above
 Energy Calibration Zero : 2367.357
 Energy Calibration Slope : 4.926605
 Energy Calibration Quadratic : 3.3364003E-04
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 027
 Detector : 31436
 Calibration Date/Time : 4-APR-2006 12:02:17
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.368
NP-237	4341	2/28/06	4768.800	4769.435
CM-244	4320A	2/28/06	5795.020	5795.142

Energy/Channel Equation : see above
 Energy Calibration Zero : 2385.802
 Energy Calibration Slope : 4.966618
 Energy Calibration Quadratic : 2.6491811E-04
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 028
 Detector : 21056
 Calibration Date/Time : 4-APR-2006 12:02:41
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.801
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2320.544
 Energy Calibration Slope : 4.935237
 Energy Calibration Quadratic : 2.7769944E-04
 Energy Calibration Range : 7665.000

Instrument : CHAMBER 029
 Detector : 30419
 Calibration Date/Time : 4-APR-2006 12:02:56
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.690
NP-237	4341	2/28/06	4768.800	4770.051
CM-244	4320A	2/28/06	5795.020	5795.380

Energy/Channel Equation : see above
 Energy Calibration Zero : 2360.631
 Energy Calibration Slope : 4.932264
 Energy Calibration Quadratic : 2.8612607E-04
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 030
 Detector : 30420
 Calibration Date/Time : 4-APR-2006 12:03:11
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.638
CM-244	4320A	2/28/06	5795.020	5794.905

Energy/Channel Equation : see above
 Energy Calibration Zero : 2379.492
 Energy Calibration Slope : 4.942307
 Energy Calibration Quadratic : 3.2948688E-04
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 032
 Detector : 33207
 Calibration Date/Time : 4-APR-2006 12:04:09
 Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.162
NP-237	4341	2/28/06	4768.800	4769.075
CM-244	4320A	2/28/06	5795.020	5795.066

Energy/Channel Equation : see above
 Energy Calibration Zero : 2332.264
 Energy Calibration Slope : 4.962142
 Energy Calibration Quadratic : 2.9673061E-04
 Energy Calibration Range : 7725.000

Instrument : CHAMBER 033
 Detector : 28647
 Calibration Date/Time : 4-APR-2006 12:04:20
 Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.737
CM-244	4320A	2/28/06	5795.020	5794.927

Energy/Channel Equation : see above
 Energy Calibration Zero : 2371.926
 Energy Calibration Slope : 4.915609
 Energy Calibration Quadratic : 3.0408576E-04
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 034
 Detector : 32697
 Calibration Date/Time : 4-APR-2006 12:04:32
 Calibration Source Id : AESS-010
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.670
 NP-237 4341 2/28/06 4768.800 4768.840
 CM-244 4320A 2/28/06 5795.020 5795.021
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2340.410
 Energy Calibration Slope : 4.974835
 Energy Calibration Quadratic : 3.3510773E-04
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 035
 Detector : 29271
 Calibration Date/Time : 4-APR-2006 12:04:44
 Calibration Source Id : AESS-011
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4768.800
 CM-244 4320A 2/28/06 5795.020 5795.020
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2347.646
 Energy Calibration Slope : 4.986292
 Energy Calibration Quadratic : 2.8726328E-04
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 036
 Detector : 29275
 Calibration Date/Time : 4-APR-2006 12:04:58
 Calibration Source Id : AESS-012
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.797
 NP-237 4341 2/28/06 4768.800 4767.041
 CM-244 4320A 2/28/06 5795.020 5793.387
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2388.490
 Energy Calibration Slope : 5.017391
 Energy Calibration Quadratic : 3.2070087E-04
 Energy Calibration Range : 7863.000

Instrument : CHAMBER 037
 Detector : 32690
 Calibration Date/Time : 4-APR-2006 12:05:37
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.312
CM-244	4320A	2/28/06	5795.020	5794.990

Energy/Channel Equation : see above
 Energy Calibration Zero : 2422.263
 Energy Calibration Slope : 4.994318
 Energy Calibration Quadratic : 2.9049869E-04
 Energy Calibration Range : 7841.000

Instrument : CHAMBER 038
 Detector : 19323
 Calibration Date/Time : 4-APR-2006 12:05:48
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.338
NP-237	4341	2/28/06	4768.800	4769.033
CM-244	4320A	2/28/06	5795.020	5795.267

Energy/Channel Equation : see above
 Energy Calibration Zero : 2386.917
 Energy Calibration Slope : 4.961154
 Energy Calibration Quadratic : 3.4057652E-04
 Energy Calibration Range : 7824.000

Instrument : CHAMBER 040
 Detector : 30446
 Calibration Date/Time : 4-APR-2006 12:06:33
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.744
NP-237	4341	2/28/06	4768.800	4768.729
CM-244	4320A	2/28/06	5795.020	5794.990

Energy/Channel Equation : see above
 Energy Calibration Zero : 2361.522
 Energy Calibration Slope : 4.912026
 Energy Calibration Quadratic : 3.2777814E-04
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 041
 Detector : 22834
 Calibration Date/Time : 4-APR-2006 12:06:46
 Calibration Source Id : AESS-017
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4769.004
 CM-244 4320A 2/28/06 5795.020 5795.141
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2357.184
 Energy Calibration Slope : 4.881192
 Energy Calibration Quadratic : 3.4815943E-04
 Energy Calibration Range : 7721.000

Instrument : CHAMBER 042
 Detector : 32695
 Calibration Date/Time : 4-APR-2006 12:07:02
 Calibration Source Id : AESS-018
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4769.104
 CM-244 4320A 2/28/06 5795.020 5795.107
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2418.706
 Energy Calibration Slope : 4.890110
 Energy Calibration Quadratic : 3.4867792E-04
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 043
 Detector : 42470
 Calibration Date/Time : 4-APR-2006 12:07:20
 Calibration Source Id : AESS-019
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4769.388
 CM-244 4320A 2/28/06 5795.020 5795.759
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2363.161
 Energy Calibration Slope : 5.010756
 Energy Calibration Quadratic : 2.3886505E-04
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 044
 Detector : 34433
 Calibration Date/Time : 4-APR-2006 12:07:31
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2381.287
 Energy Calibration Slope : 4.986757
 Energy Calibration Quadratic : 2.9497029E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 045
 Detector : 34430
 Calibration Date/Time : 4-APR-2006 12:07:49
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.799
CM-244	4320A	2/28/06	5795.020	5795.021

Energy/Channel Equation : see above
 Energy Calibration Zero : 2396.370
 Energy Calibration Slope : 4.975925
 Energy Calibration Quadratic : 2.7766536E-04
 Energy Calibration Range : 7783.000

Instrument : CHAMBER 046
 Detector : 42471
 Calibration Date/Time : 4-APR-2006 12:08:03
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.981
NP-237	4341	2/28/06	4768.800	4768.475
CM-244	4320A	2/28/06	5795.020	5794.831

Energy/Channel Equation : see above
 Energy Calibration Zero : 2370.690
 Energy Calibration Slope : 4.938850
 Energy Calibration Quadratic : 3.0132200E-04
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 047
 Detector : 30449
 Calibration Date/Time : 4-APR-2006 12:08:14
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.801
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2367.885
 Energy Calibration Slope : 4.977801
 Energy Calibration Quadratic : 2.7243813E-04
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 048
 Detector : 42483
 Calibration Date/Time : 4-APR-2006 12:08:24
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2379.919
 Energy Calibration Slope : 5.011742
 Energy Calibration Quadratic : 2.4467456E-04
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 065
 Detector : 21087
 Calibration Date/Time : 3-APR-2006 12:05:24
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.701
NP-237	4341	2/28/06	4768.800	4768.799
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2381.709
 Energy Calibration Slope : 4.966328
 Energy Calibration Quadratic : 3.2913609E-04
 Energy Calibration Range : 7812.000

Instrument : CHAMBER 066
 Detector : 38159
 Calibration Date/Time : 3-APR-2006 12:05:41
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.194
NP-237	4341	2/28/06	4768.800	4769.460
CM-244	4320A	2/28/06	5795.020	5795.202

Energy/Channel Equation : see above
 Energy Calibration Zero : 2361.937
 Energy Calibration Slope : 4.956664
 Energy Calibration Quadratic : 3.0704346E-04
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 068
 Detector : 33204
 Calibration Date/Time : 3-APR-2006 12:06:11
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.734
NP-237	4341	2/28/06	4768.800	4768.288
CM-244	4320A	2/28/06	5795.020	5794.885

Energy/Channel Equation : see above
 Energy Calibration Zero : 2340.602
 Energy Calibration Slope : 4.952214
 Energy Calibration Quadratic : 2.9989655E-04
 Energy Calibration Range : 7726.000

Instrument : CHAMBER 069
 Detector : 39172
 Calibration Date/Time : 3-APR-2006 12:06:22
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.678
NP-237	4341	2/28/06	4768.800	4768.439
CM-244	4320A	2/28/06	5795.020	5794.953

Energy/Channel Equation : see above
 Energy Calibration Zero : 2383.433
 Energy Calibration Slope : 4.992626
 Energy Calibration Quadratic : 3.0025930E-04
 Energy Calibration Range : 7811.000

Instrument : CHAMBER 070
 Detector : 33207
 Calibration Date/Time : 3-APR-2006 12:06:32
 Calibration Source Id : AESS-006
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.583
 NP-237 4341 2/28/06 4768.800 4768.687
 CM-244 4320A 2/28/06 5795.020 5794.788
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2397.668
 Energy Calibration Slope : 4.915377
 Energy Calibration Quadratic : 3.6479929E-04
 Energy Calibration Range : 7814.000

Instrument : CHAMBER 072
 Detector : 33210
 Calibration Date/Time : 3-APR-2006 12:07:20
 Calibration Source Id : AESS-008
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3185.797
 NP-237 4341 2/28/06 4768.800 4771.520
 CM-244 4320A 2/28/06 5795.020 5795.709
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2429.633
 Energy Calibration Slope : 4.970463
 Energy Calibration Quadratic : 2.6446831E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 073
 Detector : 33211
 Calibration Date/Time : 3-APR-2006 12:07:31
 Calibration Source Id : AESS-009
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.651
 NP-237 4341 2/28/06 4768.800 4768.479
 CM-244 4320A 2/28/06 5795.020 5794.623
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2374.705
 Energy Calibration Slope : 4.961344
 Energy Calibration Quadratic : 3.4754534E-04
 Energy Calibration Range : 7820.000

Instrument : CHAMBER 075
 Detector : 29976
 Calibration Date/Time : 3-APR-2006 12:07:53
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.693
NP-237	4341	2/28/06	4768.800	4768.668
CM-244	4320A	2/28/06	5795.020	5794.923

Energy/Channel Equation : see above
 Energy Calibration Zero : 2362.553
 Energy Calibration Slope : 4.960943
 Energy Calibration Quadratic : 3.2853242E-04
 Energy Calibration Range : 7787.000

Instrument : CHAMBER 076
 Detector : 33213
 Calibration Date/Time : 3-APR-2006 12:08:02
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.644
NP-237	4341	2/28/06	4768.800	4768.760
CM-244	4320A	2/28/06	5795.020	5794.972

Energy/Channel Equation : see above
 Energy Calibration Zero : 2372.898
 Energy Calibration Slope : 4.983890
 Energy Calibration Quadratic : 3.3487112E-04
 Energy Calibration Range : 7828.000

Instrument : CHAMBER 077
 Detector : 28239
 Calibration Date/Time : 3-APR-2006 12:08:16
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.346
NP-237	4341	2/28/06	4768.800	4769.262
CM-244	4320A	2/28/06	5795.020	5795.317

Energy/Channel Equation : see above
 Energy Calibration Zero : 2368.874
 Energy Calibration Slope : 4.931313
 Energy Calibration Quadratic : 3.2203639E-04
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 078
 Detector : 34425
 Calibration Date/Time : 3-APR-2006 12:08:26
 Calibration Source Id : AESS-014
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.993
 NP-237 4341 2/28/06 4768.800 4768.645
 CM-244 4320A 2/28/06 5795.020 5794.911
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2393.754
 Energy Calibration Slope : 4.904502
 Energy Calibration Quadratic : 3.5731806E-04
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 079
 Detector : 28408
 Calibration Date/Time : 3-APR-2006 12:08:37
 Calibration Source Id : AESS-015
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.266
 NP-237 4341 2/28/06 4768.800 4768.567
 CM-244 4320A 2/28/06 5795.020 5794.887
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2383.558
 Energy Calibration Slope : 4.929332
 Energy Calibration Quadratic : 3.0991141E-04
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 080
 Detector : 29269
 Calibration Date/Time : 3-APR-2006 12:08:46
 Calibration Source Id : AESS-016
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.363
 NP-237 4341 2/28/06 4768.800 4768.345
 CM-244 4320A 2/28/06 5795.020 5794.711
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2360.141
 Energy Calibration Slope : 5.008783
 Energy Calibration Quadratic : 2.6339359E-04
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 081
 Detector : 28243
 Calibration Date/Time : 5-APR-2006 14:20:00
 Calibration Source Id : AESS-017
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4769.124
 CM-244 4320A 2/28/06 5795.020 5795.316
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2423.205
 Energy Calibration Slope : 4.974538
 Energy Calibration Quadratic : 2.3569762E-04
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 083
 Detector : 34436
 Calibration Date/Time : 3-APR-2006 12:09:35
 Calibration Source Id : AESS-019
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4768.144
 CM-244 4320A 2/28/06 5795.020 5794.581
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2370.701
 Energy Calibration Slope : 5.018431
 Energy Calibration Quadratic : 2.5893620E-04
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 084
 Detector : 29953
 Calibration Date/Time : 3-APR-2006 12:09:48
 Calibration Source Id : AESS-020
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.067
 NP-237 4341 2/28/06 4768.800 4768.425
 CM-244 4320A 2/28/06 5795.020 5794.511
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2368.562
 Energy Calibration Slope : 5.005028
 Energy Calibration Quadratic : 3.0593007E-04
 Energy Calibration Range : 7815.000

Instrument : CHAMBER 085
 Detector : 30451
 Calibration Date/Time : 3-APR-2006 12:10:02
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.503
NP-237	4341	2/28/06	4768.800	4768.802
CM-244	4320A	2/28/06	5795.020	5795.019

Energy/Channel Equation : see above
 Energy Calibration Zero : 2385.228
 Energy Calibration Slope : 4.990182
 Energy Calibration Quadratic : 3.0125739E-04
 Energy Calibration Range : 7811.000

Instrument : CHAMBER 086
 Detector : 29278
 Calibration Date/Time : 3-APR-2006 12:10:24
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.313
CM-244	4320A	2/28/06	5795.020	5794.889

Energy/Channel Equation : see above
 Energy Calibration Zero : 2367.011
 Energy Calibration Slope : 5.001186
 Energy Calibration Quadratic : 2.4593988E-04
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 087
 Detector : 34430
 Calibration Date/Time : 3-APR-2006 12:10:36
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.326
NP-237	4341	2/28/06	4768.800	4768.556
CM-244	4320A	2/28/06	5795.020	5794.574

Energy/Channel Equation : see above
 Energy Calibration Zero : 2363.815
 Energy Calibration Slope : 5.009631
 Energy Calibration Quadratic : 2.4977388E-04
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 088
 Detector : 30434
 Calibration Date/Time : 3-APR-2006 12:10:54
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.313
NP-237	4341	2/28/06	4768.800	4767.746
CM-244	4320A	2/28/06	5795.020	5794.659

Energy/Channel Equation : see above
 Energy Calibration Zero : 2334.709
 Energy Calibration Slope : 4.874549
 Energy Calibration Quadratic : 2.1355411E-04
 Energy Calibration Range : 7550.000

Instrument : CHAMBER 089
 Detector : 21087
 Calibration Date/Time : 3-APR-2006 23:05:32
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.451
NP-237	4341	2/28/06	4768.800	4768.626
CM-244	4320A	2/28/06	5795.020	5794.917

Energy/Channel Equation : see above
 Energy Calibration Zero : 2349.260
 Energy Calibration Slope : 4.948930
 Energy Calibration Quadratic : 3.2322409E-04
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 090
 Detector : 38159
 Calibration Date/Time : 3-APR-2006 23:06:16
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5794.866

Energy/Channel Equation : see above
 Energy Calibration Zero : 2386.311
 Energy Calibration Slope : 4.986774
 Energy Calibration Quadratic : 3.3244080E-04
 Energy Calibration Range : 7841.000

Instrument : CHAMBER 091
 Detector : 33205
 Calibration Date/Time : 4-APR-2006 21:06:36
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.391
NP-237	4341	2/28/06	4768.800	4769.357
CM-244	4320A	2/28/06	5795.020	5795.305

Energy/Channel Equation : see above
 Energy Calibration Zero : 2363.386
 Energy Calibration Slope : 4.961743
 Energy Calibration Quadratic : 3.2066394E-04
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 092
 Detector : 33204
 Calibration Date/Time : 3-APR-2006 23:08:02
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.867
CM-244	4320A	2/28/06	5795.020	5795.175

Energy/Channel Equation : see above
 Energy Calibration Zero : 2358.222
 Energy Calibration Slope : 4.950097
 Energy Calibration Quadratic : 3.0710385E-04
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 093
 Detector : 33206
 Calibration Date/Time : 3-APR-2006 23:08:14
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4769.063
CM-244	4320A	2/28/06	5795.020	5795.298

Energy/Channel Equation : see above
 Energy Calibration Zero : 2375.739
 Energy Calibration Slope : 4.926612
 Energy Calibration Quadratic : 3.1170124E-04
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 094
 Detector : 33207
 Calibration Date/Time : 3-APR-2006 23:08:34
 Calibration Source Id : AESS-006
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.993
 NP-237 4341 2/28/06 4768.800 4768.799
 CM-244 4320A 2/28/06 5795.020 5795.021
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2369.583
 Energy Calibration Slope : 4.936423
 Energy Calibration Quadratic : 3.2235958E-04
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 096
 Detector : 30429
 Calibration Date/Time : 3-APR-2006 23:09:48
 Calibration Source Id : AESS-008
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.677
 NP-237 4341 2/28/06 4768.800 4768.561
 CM-244 4320A 2/28/06 5795.020 5794.869
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2346.092
 Energy Calibration Slope : 4.863141
 Energy Calibration Quadratic : 3.1486651E-04
 Energy Calibration Range : 7656.000

Instrument : CHAMBER 098
 Detector : 30431
 Calibration Date/Time : 3-APR-2006 23:10:26
 Calibration Source Id : AESS-010
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3182.647
 NP-237 4341 2/28/06 4768.800 4768.514
 CM-244 4320A 2/28/06 5795.020 5794.903
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2380.759
 Energy Calibration Slope : 4.922705
 Energy Calibration Quadratic : 3.2662629E-04
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 099
 Detector : 30432
 Calibration Date/Time : 4-APR-2006 21:07:16
 Calibration Source Id : AESS-011
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4769.171
 CM-244 4320A 2/28/06 5795.020 5795.241
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2411.170
 Energy Calibration Slope : 4.859684
 Energy Calibration Quadratic : 3.3678240E-04
 Energy Calibration Range : 7741.000

Instrument : CHAMBER 101
 Detector : 31696
 Calibration Date/Time : 3-APR-2006 23:11:17
 Calibration Source Id : AESS-013
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.759
 NP-237 4341 2/28/06 4768.800 4767.478
 CM-244 4320A 2/28/06 5795.020 5793.923
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2397.165
 Energy Calibration Slope : 4.939373
 Energy Calibration Quadratic : 2.7448736E-04
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 102
 Detector : 30438
 Calibration Date/Time : 3-APR-2006 23:11:38
 Calibration Source Id : AESS-014
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3183.000
 NP-237 4341 2/28/06 4768.800 4768.799
 CM-244 4320A 2/28/06 5795.020 5795.021
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2390.065
 Energy Calibration Slope : 4.967123
 Energy Calibration Quadratic : 3.3759646E-04
 Energy Calibration Range : 7830.000

Instrument : CHAMBER 103
 Detector : 30437
 Calibration Date/Time : 3-APR-2006 23:11:50
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.632
NP-237	4341	2/28/06	4768.800	4768.780
CM-244	4320A	2/28/06	5795.020	5795.021

Energy/Channel Equation : see above
 Energy Calibration Zero : 2378.634
 Energy Calibration Slope : 4.949142
 Energy Calibration Quadratic : 3.4029011E-04
 Energy Calibration Range : 7803.000

Instrument : CHAMBER 104
 Detector : 30436
 Calibration Date/Time : 3-APR-2006 23:12:05
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.656
NP-237	4341	2/28/06	4768.800	4768.710
CM-244	4320A	2/28/06	5795.020	5794.893

Energy/Channel Equation : see above
 Energy Calibration Zero : 2402.033
 Energy Calibration Slope : 4.941638
 Energy Calibration Quadratic : 3.3733863E-04
 Energy Calibration Range : 7816.000

Instrument : CHAMBER 106
 Detector : 45382
 Calibration Date/Time : 3-APR-2006 23:13:35
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.390
NP-237	4341	2/28/06	4768.800	4768.938
CM-244	4320A	2/28/06	5795.020	5795.081

Energy/Channel Equation : see above
 Energy Calibration Zero : 2377.948
 Energy Calibration Slope : 4.942991
 Energy Calibration Quadratic : 3.4093895E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 107
 Detector : 31697
 Calibration Date/Time : 3-APR-2006 23:13:46
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2398.373
 Energy Calibration Slope : 4.985534
 Energy Calibration Quadratic : 2.7872290E-04
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 109
 Detector : 31693
 Calibration Date/Time : 3-APR-2006 23:14:12
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4769.000
CM-244	4320A	2/28/06	5795.020	5795.208

Energy/Channel Equation : see above
 Energy Calibration Zero : 2387.754
 Energy Calibration Slope : 4.924148
 Energy Calibration Quadratic : 3.0788378E-04
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 110
 Detector : 30447
 Calibration Date/Time : 4-APR-2006 21:08:36
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.635
NP-237	4341	2/28/06	4768.800	4768.800
CM-244	4320A	2/28/06	5795.020	5795.020

Energy/Channel Equation : see above
 Energy Calibration Zero : 2419.221
 Energy Calibration Slope : 4.999035
 Energy Calibration Quadratic : 2.2320703E-04
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 111
 Detector : 30448
 Calibration Date/Time : 3-APR-2006 23:15:36
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.627
NP-237	4341	2/28/06	4768.800	4768.799
CM-244	4320A	2/28/06	5795.020	5795.021

Energy/Channel Equation : see above
 Energy Calibration Zero : 2388.052
 Energy Calibration Slope : 4.962283
 Energy Calibration Quadratic : 2.9634466E-04
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 112
 Detector : 30449
 Calibration Date/Time : 3-APR-2006 23:15:47
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.664
CM-244	4320A	2/28/06	5795.020	5795.019

Energy/Channel Equation : see above
 Energy Calibration Zero : 2375.519
 Energy Calibration Slope : 4.935473
 Energy Calibration Quadratic : 2.8306872E-04
 Energy Calibration Range : 7726.000

Instrument : CHAMBER 113
 Detector : 45-111B4
 Calibration Date/Time : 4-APR-2006 17:02:58
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3182.303
NP-237	4341	2/28/06	4768.800	4767.615
CM-244	4320A	2/28/06	5795.020	5794.404

Energy/Channel Equation : see above
 Energy Calibration Zero : 2393.614
 Energy Calibration Slope : 4.990646
 Energy Calibration Quadratic : 3.0610454E-04
 Energy Calibration Range : 7825.000

Instrument : CHAMBER 114
 Detector : 45-111B5
 Calibration Date/Time : 4-APR-2006 17:03:22
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.771
NP-237	4341	2/28/06	4768.800	4767.996
CM-244	4320A	2/28/06	5795.020	5794.695

Energy/Channel Equation : see above
 Energy Calibration Zero : 2391.292
 Energy Calibration Slope : 4.957956
 Energy Calibration Quadratic : 3.2139214E-04
 Energy Calibration Range : 7805.000

Instrument : CHAMBER 115
 Detector : 45-132EE5
 Calibration Date/Time : 4-APR-2006 17:03:37
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3183.000
NP-237	4341	2/28/06	4768.800	4768.468
CM-244	4320A	2/28/06	5795.020	5794.664

Energy/Channel Equation : see above
 Energy Calibration Zero : 2372.417
 Energy Calibration Slope : 4.988519
 Energy Calibration Quadratic : 2.9488039E-04
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 116
 Detector : 45-132FF2
 Calibration Date/Time : 4-APR-2006 17:03:51
 Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.985
NP-237	4341	2/28/06	4768.800	4767.986
CM-244	4320A	2/28/06	5795.020	5794.612

Energy/Channel Equation : see above
 Energy Calibration Zero : 2377.594
 Energy Calibration Slope : 4.965635
 Energy Calibration Quadratic : 3.1974592E-04
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 117
 Detector : 45-132FF3
 Calibration Date/Time : 4-APR-2006 17:04:04
 Calibration Source Id : AESS-003
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.825
 NP-237 4341 2/28/06 4768.800 4767.294
 CM-244 4320A 2/28/06 5795.020 5794.289
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2399.138
 Energy Calibration Slope : 4.995797
 Energy Calibration Quadratic : 2.8692893E-04
 Energy Calibration Range : 7816.000

Instrument : CHAMBER 118
 Detector : 45-132FF4
 Calibration Date/Time : 4-APR-2006 17:04:21
 Calibration Source Id : AESS-009
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.738
 NP-237 4341 2/28/06 4768.800 4767.705
 CM-244 4320A 2/28/06 5795.020 5794.733
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2382.726
 Energy Calibration Slope : 4.977871
 Energy Calibration Quadratic : 3.1087140E-04
 Energy Calibration Range : 7806.000

Instrument : CHAMBER 119
 Detector : 45-132FF5
 Calibration Date/Time : 4-APR-2006 17:04:33
 Calibration Source Id : AESS-004
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.725
 NP-237 4341 2/28/06 4768.800 4768.406
 CM-244 4320A 2/28/06 5795.020 5794.422
 Energy/Channel Equation : see above
 Energy Calibration Zero : 2394.460
 Energy Calibration Slope : 4.945233
 Energy Calibration Quadratic : 3.2115451E-04
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 120
 Detector : 45-142F1
 Calibration Date/Time : 4-APR-2006 17:05:08
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.702
NP-237	4341	2/28/06	4768.800	4767.716
CM-244	4320A	2/28/06	5795.020	5794.385

Energy/Channel Equation : see above
 Energy Calibration Zero : 2370.954
 Energy Calibration Slope : 4.969444
 Energy Calibration Quadratic : 2.9560321E-04
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 121
 Detector : 45-142J4
 Calibration Date/Time : 4-APR-2006 17:05:19
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.854
NP-237	4341	2/28/06	4768.800	4767.926
CM-244	4320A	2/28/06	5795.020	5794.359

Energy/Channel Equation : see above
 Energy Calibration Zero : 2388.517
 Energy Calibration Slope : 4.957601
 Energy Calibration Quadratic : 3.2604721E-04
 Energy Calibration Range : 7807.000

Instrument : CHAMBER 122
 Detector : 45-142J5
 Calibration Date/Time : 4-APR-2006 17:05:33
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.708
NP-237	4341	2/28/06	4768.800	4767.643
CM-244	4320A	2/28/06	5795.020	5794.644

Energy/Channel Equation : see above
 Energy Calibration Zero : 2379.562
 Energy Calibration Slope : 4.966173
 Energy Calibration Quadratic : 3.1077259E-04
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 123
 Detector : 45-142V1
 Calibration Date/Time : 4-APR-2006 17:05:57
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3180.927
NP-237	4341	2/28/06	4768.800	4767.132
CM-244	4320A	2/28/06	5795.020	5794.117

Energy/Channel Equation : see above
 Energy Calibration Zero : 2393.486
 Energy Calibration Slope : 4.981727
 Energy Calibration Quadratic : 2.8783656E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 124
 Detector : 45-142V2
 Calibration Date/Time : 4-APR-2006 17:06:12
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.329
NP-237	4341	2/28/06	4768.800	4767.124
CM-244	4320A	2/28/06	5795.020	5794.622

Energy/Channel Equation : see above
 Energy Calibration Zero : 2394.312
 Energy Calibration Slope : 4.963425
 Energy Calibration Quadratic : 3.1662040E-04
 Energy Calibration Range : 7809.000

Instrument : CHAMBER 125
 Detector : 45-142V3
 Calibration Date/Time : 4-APR-2006 17:06:28
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.749
NP-237	4341	2/28/06	4768.800	4766.709
CM-244	4320A	2/28/06	5795.020	5794.138

Energy/Channel Equation : see above
 Energy Calibration Zero : 2389.743
 Energy Calibration Slope : 4.991052
 Energy Calibration Quadratic : 2.6156937E-04
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 126
 Detector : 45-142V5
 Calibration Date/Time : 4-APR-2006 17:06:44
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.536
NP-237	4341	2/28/06	4768.800	4766.676
CM-244	4320A	2/28/06	5795.020	5794.299

Energy/Channel Equation : see above
 Energy Calibration Zero : 2392.589
 Energy Calibration Slope : 5.019009
 Energy Calibration Quadratic : 2.5404955E-04
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 127
 Detector : 45-142W1
 Calibration Date/Time : 4-APR-2006 17:07:12
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.047
NP-237	4341	2/28/06	4768.800	4767.379
CM-244	4320A	2/28/06	5795.020	5794.462

Energy/Channel Equation : see above
 Energy Calibration Zero : 2390.982
 Energy Calibration Slope : 4.949072
 Energy Calibration Quadratic : 3.2237647E-04
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 128
 Detector : 45-142W2
 Calibration Date/Time : 4-APR-2006 17:07:27
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.794
NP-237	4341	2/28/06	4768.800	4767.351
CM-244	4320A	2/28/06	5795.020	5794.426

Energy/Channel Equation : see above
 Energy Calibration Zero : 2376.436
 Energy Calibration Slope : 4.990520
 Energy Calibration Quadratic : 2.8923506E-04
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 129
 Detector : 45-142W3
 Calibration Date/Time : 4-APR-2006 17:07:43
 Calibration Source Id : AESS-015
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.920
 NP-237 4341 2/28/06 4768.800 4767.431
 CM-244 4320A 2/28/06 5795.020 5794.286

Energy/Channel Equation : see above
 Energy Calibration Zero : 2397.947
 Energy Calibration Slope : 4.950837
 Energy Calibration Quadratic : 3.2286491E-04
 Energy Calibration Range : 7806.000

Instrument : CHAMBER 130
 Detector : 45-142W5
 Calibration Date/Time : 4-APR-2006 17:07:58
 Calibration Source Id : AESS-021
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.779
 NP-237 4341 2/28/06 4768.800 4767.779
 CM-244 4320A 2/28/06 5795.020 5794.289

Energy/Channel Equation : see above
 Energy Calibration Zero : 2390.948
 Energy Calibration Slope : 5.005381
 Energy Calibration Quadratic : 2.9957382E-04
 Energy Calibration Range : 7831.000

Instrument : CHAMBER 131
 Detector : 45-145K1
 Calibration Date/Time : 4-APR-2006 17:08:16
 Calibration Source Id : AESS-016
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy
 GD-148 6445-278 2/28/06 3183.000 3181.832
 NP-237 4341 2/28/06 4768.800 4767.927
 CM-244 4320A 2/28/06 5795.020 5794.474

Energy/Channel Equation : see above
 Energy Calibration Zero : 2383.200
 Energy Calibration Slope : 4.971618
 Energy Calibration Quadratic : 3.1435001E-04
 Energy Calibration Range : 7804.000

Instrument : CHAMBER 132
 Detector : 45-145K2
 Calibration Date/Time : 4-APR-2006 17:08:32
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.897
NP-237	4341	2/28/06	4768.800	4767.248
CM-244	4320A	2/28/06	5795.020	5794.594

Energy/Channel Equation : see above
 Energy Calibration Zero : 2374.090
 Energy Calibration Slope : 5.015432
 Energy Calibration Quadratic : 2.7181130E-04
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 133
 Detector : 45-145K3
 Calibration Date/Time : 4-APR-2006 17:09:47
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.967
NP-237	4341	2/28/06	4768.800	4767.767
CM-244	4320A	2/28/06	5795.020	5794.419

Energy/Channel Equation : see above
 Energy Calibration Zero : 2364.883
 Energy Calibration Slope : 4.958282
 Energy Calibration Quadratic : 2.8459914E-04
 Energy Calibration Range : 7741.000

Instrument : CHAMBER 134
 Detector : 45-145K4
 Calibration Date/Time : 4-APR-2006 17:11:02
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.715
NP-237	4341	2/28/06	4768.800	4767.525
CM-244	4320A	2/28/06	5795.020	5794.621

Energy/Channel Equation : see above
 Energy Calibration Zero : 2384.888
 Energy Calibration Slope : 4.989409
 Energy Calibration Quadratic : 2.7175582E-04
 Energy Calibration Range : 7779.000

Instrument : CHAMBER 135
 Detector : 45-145K5
 Calibration Date/Time : 4-APR-2006 17:11:53
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.833
NP-237	4341	2/28/06	4768.800	4768.171
CM-244	4320A	2/28/06	5795.020	5794.435

Energy/Channel Equation : see above
 Energy Calibration Zero : 2394.605
 Energy Calibration Slope : 4.968740
 Energy Calibration Quadratic : 2.9795556E-04
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 136
 Detector : 45-145L1
 Calibration Date/Time : 4-APR-2006 17:12:12
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/06	3183.000	3181.493
NP-237	4341	2/28/06	4768.800	4767.151
CM-244	4320A	2/28/06	5795.020	5794.044

Energy/Channel Equation : see above
 Energy Calibration Zero : 2384.309
 Energy Calibration Slope : 5.003936
 Energy Calibration Quadratic : 2.5798104E-04
 Energy Calibration Range : 7779.000

Subsection 2: Background Calibration

Instrument : CHAMBER 001
Detector : 33088
Background Analysis Date/Time : 2-APR-2006 11:38:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.456	3298.943	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.436	4903.018	13.00000	3.119998	27.73501	95.00000
CM-244	5530.638	5887.374	28.00000	6.719995	18.89822	95.00000

Instrument : CHAMBER 003
Detector : 20659
Background Analysis Date/Time : 2-APR-2006 11:38:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.599	3300.169	5.000000	1.199999	44.72136	95.00000
NP-237	4434.674	4902.844	22.00000	5.279996	21.32007	95.00000
CM-244	5535.248	5883.783	33.00000	7.919994	17.40777	95.00000

Instrument : CHAMBER 004
Detector : 33077
Background Analysis Date/Time : 2-APR-2006 11:38:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.545	3299.456	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.646	4906.400	4.000000	0.9599993	50.00000	95.00000
CM-244	5531.494	5886.867	18.00000	4.319997	23.57022	95.00000

Instrument : CHAMBER 005
Detector : 28642
Background Analysis Date/Time : 2-APR-2006 11:38:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.709	3298.775	3.000000	0.7199995	57.73503	95.00000
NP-237	4434.190	4905.248	19.00000	4.559997	22.94157	95.00000
CM-244	5530.463	5883.921	31.00000	7.439995	17.96053	95.00000

Instrument : CHAMBER 007
 Detector : 30416
 Background Analysis Date/Time : 2-APR-2006 11:38:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.797	3298.358	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.556	4903.394	25.00000	5.999996	20.00000	95.00000
CM-244	5533.897	5887.491	49.00000	11.75999	14.28572	95.00000

Instrument : CHAMBER 009
 Detector : 13285
 Background Analysis Date/Time : 2-APR-2006 11:38:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.740	3302.180	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.826	4904.306	10.00000	2.399998	31.62278	95.00000
CM-244	5530.853	5882.488	30.00000	7.199995	18.25742	95.00000

Instrument : CHAMBER 010
 Detector : 33083
 Background Analysis Date/Time : 2-APR-2006 11:38:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.233	3300.495	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.514	4905.914	11.00000	2.639998	30.15113	95.00000
CM-244	5535.151	5882.345	27.00000	6.479995	19.24501	95.00000

Instrument : CHAMBER 011
 Detector : 9537
 Background Analysis Date/Time : 2-APR-2006 11:38:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.769	3298.475	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.776	4901.438	2.000000	0.4799997	70.71068	95.00000
CM-244	5533.457	5885.193	35.00000	8.399994	16.90309	95.00000

Instrument : CHAMBER 012
 Detector : 33085
 Background Analysis Date/Time : 2-APR-2006 11:38:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.283	3299.978	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.454	4901.598	3.000000	0.7199995	57.73503	95.00000
CM-244	5534.285	5885.751	13.00000	3.119998	27.73501	95.00000

Instrument : CHAMBER 013
 Detector : 21084
 Background Analysis Date/Time : 2-APR-2006 11:38:34
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.308	3301.307	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.829	4905.476	4.000000	0.9599993	50.00000	95.00000
CM-244	5530.551	5886.625	27.00000	6.479995	19.24501	95.00000

Instrument : CHAMBER 016
 Detector : 21086
 Background Analysis Date/Time : 2-APR-2006 11:38:34
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.386	3300.792	3.000000	0.7199995	57.73503	95.00000
NP-237	4437.111	4903.407	9.000000	2.159998	33.33334	95.00000
CM-244	5533.819	5884.776	38.00000	9.119993	16.22214	95.00000

Instrument : CHAMBER 017
 Detector : 33203
 Background Analysis Date/Time : 2-APR-2006 11:38:34
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.693	3298.212	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.905	4905.400	9.000000	2.159998	33.33334	95.00000
CM-244	5532.198	5886.394	44.00000	10.55999	15.07557	95.00000

Instrument : CHAMBER 018
 Detector : 21063
 Background Analysis Date/Time : 2-APR-2006 11:38:34
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.076	3298.134	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.036	4905.011	4.000000	0.9599993	50.00000	95.00000
CM-244	5535.243	5885.674	34.00000	8.159994	17.14986	95.00000

Instrument : CHAMBER 019
 Detector : 23882
 Background Analysis Date/Time : 2-APR-2006 11:38:35
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.511	3300.144	16916.00	4059.841	0.7688669	95.00000
NP-237	4435.855	4902.151	5184.000	1244.160	1.388889	95.00000
CM-244	5531.789	5884.041	1897.000	455.2801	2.295970	95.00000

Instrument : CHAMBER 020
 Detector : 33093
 Background Analysis Date/Time : 2-APR-2006 11:38:35
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.758	3298.111	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.838	4901.523	7.000000	1.680000	37.79645	95.00000
CM-244	5530.915	5883.311	45.00000	10.80000	14.90712	95.00000

Instrument : CHAMBER 021
 Detector : 33893
 Background Analysis Date/Time : 2-APR-2006 11:38:35
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.969	3300.683	1.000000	0.2400001	100.0000	95.00000
NP-237	4434.165	4904.181	5.000000	1.200000	44.72136	95.00000
CM-244	5533.125	5885.623	21.00000	5.040001	21.82179	95.00000

Instrument : CHAMBER 023
 Detector : 22873
 Background Analysis Date/Time : 2-APR-2006 11:38:35
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.365	3300.653	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.587	4902.786	9.000000	2.160001	33.33334	95.00000
CM-244	5533.585	5885.616	41.00000	9.840002	15.61738	95.00000

Instrument : CHAMBER 026
 Detector : 34427
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.396	3300.299	1.000000	0.2400001	100.0000	95.00000
NP-237	4432.951	4903.551	14.00000	3.360001	26.72612	95.00000
CM-244	5534.085	5882.486	27.00000	6.480001	19.24501	95.00000

Instrument : CHAMBER 027
 Detector : 31436
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.641	3298.501	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.554	4903.960	9.000000	2.160001	33.33334	95.00000
CM-244	5535.178	5885.600	13.00000	3.120001	27.73501	95.00000

Instrument : CHAMBER 028
 Detector : 21056
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.862	3298.519	1.000000	0.2400001	100.0000	95.00000
NP-237	4437.162	4904.527	5.000000	1.200000	44.72136	95.00000
CM-244	5534.678	5884.670	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 029
 Detector : 30419
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.643	3298.009	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.124	4903.513	4.000000	0.9600002	50.00000	95.00000
CM-244	5533.909	5884.139	20.00000	4.800001	22.36068	95.00000

Instrument : CHAMBER 030
 Detector : 30420
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.381	3300.032	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.171	4901.399	1.000000	0.2400001	100.0000	95.00000
CM-244	5532.938	5887.226	28.00000	6.720002	18.89822	95.00000

Instrument : CHAMBER 032
 Detector : 33207
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.438	3301.011	4.000000	0.9599994	50.00000	95.00000
NP-237	4437.450	4903.298	8.000000	1.919999	35.35534	95.00000
CM-244	5533.518	5886.674	40.00000	9.599994	15.81139	95.00000

Instrument : CHAMBER 033
 Detector : 28647
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.128	3301.778	10.00000	2.399998	31.62278	95.00000
NP-237	4433.277	4905.752	9.000000	2.159999	33.33334	95.00000
CM-244	5531.202	5887.135	39.00000	9.359994	16.01282	95.00000

Instrument : CHAMBER 034
 Detector : 32697
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.740	3297.727	18.00000	4.319997	23.57022	95.00000
NP-237	4436.424	4906.295	31.00000	7.439995	17.96053	95.00000
CM-244	5532.067	5883.683	33.00000	7.919995	17.40777	95.00000

Instrument : CHAMBER 035
 Detector : 29271
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.597	3300.316	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.093	4902.062	25.00000	5.999996	20.00000	95.00000
CM-244	5533.546	5887.289	24.00000	5.759996	20.41241	95.00000

Instrument : CHAMBER 036
 Detector : 29275
 Background Analysis Date/Time : 2-APR-2006 11:38:36
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.101	3302.011	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.212	4902.690	21.00000	5.039997	21.82179	95.00000
CM-244	5530.586	5883.211	28.00000	6.719995	18.89822	95.00000

Instrument : CHAMBER 037
 Detector : 32690
 Background Analysis Date/Time : 2-APR-2006 11:38:37
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.331	3300.070	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.120	4902.289	15.00000	3.600001	25.81989	95.00000
CM-244	5534.121	5882.713	34.00000	8.160002	17.14986	95.00000

Instrument : CHAMBER 038
 Detector : 19323
 Background Analysis Date/Time : 2-APR-2006 11:38:37
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.203	3301.129	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.340	4904.950	11.00000	2.640001	30.15113	95.00000
CM-244	5534.574	5885.451	22.00000	5.280001	21.32007	95.00000

Instrument : CHAMBER 040
 Detector : 30446
 Background Analysis Date/Time : 2-APR-2006 11:38:37
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.636	3301.603	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.733	4904.719	11.00000	2.640001	30.15113	95.00000
CM-244	5532.976	5885.423	19.00000	4.560001	22.94157	95.00000

Instrument : CHAMBER 041
 Detector : 22834
 Background Analysis Date/Time : 2-APR-2006 11:38:37
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.681	3302.193	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.502	4905.743	8.000000	1.920000	35.35534	95.00000
CM-244	5533.298	5885.604	23.00000	5.520001	20.85144	95.00000

Instrument : CHAMBER 042
 Detector : 32695
 Background Analysis Date/Time : 2-APR-2006 11:38:37
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.651	3300.194	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.708	4903.810	19.00000	4.560001	22.94157	95.00000
CM-244	5531.417	5883.758	26.00000	6.240001	19.61161	95.00000

Instrument : CHAMBER 043
 Detector : 42470
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.168	3298.326	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.901	4902.013	2.000000	0.4799997	70.71068	95.00000
CM-244	5535.121	5886.262	19.00000	4.559997	22.94157	95.00000

Instrument : CHAMBER 044
 Detector : 34433
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.004	3298.648	28.00000	6.719995	18.89822	95.00000
NP-237	4433.632	4906.174	35.00000	8.399995	16.90309	95.00000
CM-244	5532.967	5887.129	38.00000	9.119994	16.22214	95.00000

Instrument : CHAMBER 045
 Detector : 34430
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.438	3301.033	4.000000	0.9599994	50.00000	95.00000
NP-237	4436.365	4906.490	17.00000	4.079998	24.25356	95.00000
CM-244	5535.004	5886.982	17.00000	4.079998	24.25356	95.00000

Instrument : CHAMBER 046
 Detector : 42471
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.741	3299.741	14.00000	3.359998	26.72612	95.00000
NP-237	4435.900	4904.967	49.00000	11.75999	14.28572	95.00000
CM-244	5532.671	5884.488	25.00000	5.999996	20.00000	95.00000

Instrument : CHAMBER 047
 Detector : 30449
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.322	3298.103	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.780	4903.899	14.00000	3.359998	26.72612	95.00000
CM-244	5532.276	5884.114	29.00000	6.959996	18.56953	95.00000

Instrument : CHAMBER 048
 Detector : 42483
 Background Analysis Date/Time : 2-APR-2006 11:38:38
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.922	3300.161	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.180	4904.923	20.00000	4.799997	22.36068	95.00000
CM-244	5533.436	5885.010	24.00000	5.759996	20.41241	95.00000

Instrument : CHAMBER 065
 Detector : 21087
 Background Analysis Date/Time : 2-APR-2006 11:38:39
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.500	3301.569	5.000000	1.199999	44.72136	95.00000
NP-237	4436.593	4904.814	10.00000	2.399998	31.62278	95.00000
CM-244	5533.641	5883.942	18.00000	4.319997	23.57022	95.00000

Instrument : CHAMBER 066
 Detector : 38159
 Background Analysis Date/Time : 2-APR-2006 11:38:39
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.351	3299.570	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.367	4906.503	12.00000	2.879998	28.86751	95.00000
CM-244	5531.751	5885.195	19.00000	4.559997	22.94157	95.00000

Instrument : CHAMBER 068
 Detector : 33204
 Background Analysis Date/Time : 2-APR-2006 11:38:39
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.458	3302.482	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.019	4902.188	5.000000	1.199999	44.72136	95.00000
CM-244	5531.579	5884.315	15.00000	3.599998	25.81989	95.00000

Instrument : CHAMBER 069
 Detector : 39172
 Background Analysis Date/Time : 2-APR-2006 11:38:39
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.937	3302.037	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.758	4901.912	5.000000	1.199999	44.72136	95.00000
CM-244	5535.302	5884.863	13.00000	3.119998	27.73501	95.00000

Instrument : CHAMBER 070
 Detector : 33207
 Background Analysis Date/Time : 2-APR-2006 11:38:39
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.764	3299.302	3.000000	0.7199996	57.73503	95.00000
NP-237	4432.603	4904.338	13.00000	3.119998	27.73501	95.00000
CM-244	5531.790	5887.167	12.00000	2.879998	28.86751	95.00000

Instrument : CHAMBER 072
 Detector : 33210
 Background Analysis Date/Time : 2-APR-2006 11:38:40
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.642	3302.500	4.000000	0.9599994	50.00000	95.00000
NP-237	4434.229	4902.517	7.000000	1.679999	37.79645	95.00000
CM-244	5533.565	5883.889	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 073
 Detector : 33211
 Background Analysis Date/Time : 2-APR-2006 11:38:40
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.209	3299.359	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.813	4905.119	6.000000	1.439999	40.82483	95.00000
CM-244	5530.447	5887.394	15.00000	3.599998	25.81989	95.00000

Instrument : CHAMBER 075
 Detector : 29976
 Background Analysis Date/Time : 2-APR-2006 11:38:40
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.804	3301.738	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.078	4904.005	18.00000	4.319997	23.57022	95.00000
CM-244	5532.428	5882.500	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 076
 Detector : 33213
 Background Analysis Date/Time : 2-APR-2006 11:38:40
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.982	3301.271	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.792	4906.032	9.000000	2.159999	33.33334	95.00000
CM-244	5532.284	5884.164	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 077
 Detector : 28239
 Background Analysis Date/Time : 2-APR-2006 11:38:41
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.320	3302.291	3.000000	0.7200001	57.73503	95.00000
NP-237	4434.458	4904.534	18.00000	4.320001	23.57022	95.00000
CM-244	5534.090	5887.188	14.00000	3.360001	26.72612	95.00000

Instrument : CHAMBER 078
 Detector : 34425
 Background Analysis Date/Time : 2-APR-2006 11:38:41
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.430	3298.209	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.493	4903.776	8.000000	1.920000	35.35534	95.00000
CM-244	5534.483	5883.260	14.00000	3.360001	26.72612	95.00000

Instrument : CHAMBER 079
 Detector : 28408
 Background Analysis Date/Time : 2-APR-2006 11:38:41
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.549	3301.048	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.951	4904.750	7.000000	1.680000	37.79645	95.00000
CM-244	5532.313	5884.158	23.00000	5.520001	20.85144	95.00000

Instrument : CHAMBER 080
 Detector : 29269
 Background Analysis Date/Time : 2-APR-2006 11:38:41
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.355	3300.887	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.124	4904.027	11.00000	2.640001	30.15113	95.00000
CM-244	5534.833	5882.541	24.00000	5.760001	20.41241	95.00000

Instrument : CHAMBER 081
 Detector : 28243
 Background Analysis Date/Time : 2-APR-2006 11:38:41
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.337	3300.967	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.244	4901.705	5.000000	1.199999	44.72136	95.00000
CM-244	5534.853	5883.115	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 083
 Detector : 34436
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.885	3297.745	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.182	4902.448	13.00000	3.119998	27.73501	95.00000
CM-244	5533.629	5886.856	19.00000	4.559997	22.94157	95.00000

Instrument : CHAMBER 084
 Detector : 29953
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.809	3299.845	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.274	4905.090	36.00000	8.639995	16.66667	95.00000
CM-244	5535.465	5886.345	11.00000	2.639998	30.15113	95.00000

Instrument : CHAMBER 085
 Detector : 30451
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.388	3298.321	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.734	4902.750	2.000000	0.4799997	70.71068	95.00000
CM-244	5530.623	5885.465	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 086
 Detector : 29278
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.939	3300.647	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.832	4902.859	8.000000	1.919999	35.35534	95.00000
CM-244	5530.458	5886.876	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 087
 Detector : 34430
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.850	3299.145	8.000000	1.919999	35.35534	95.00000
NP-237	4433.685	4904.783	101.0000	24.23998	9.950372	95.00000
CM-244	5533.892	5885.860	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 088
 Detector : 30434
 Background Analysis Date/Time : 2-APR-2006 11:38:42
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.733	3298.324	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.854	4901.741	3.000000	0.7199996	57.73503	95.00000
CM-244	5531.597	5882.583	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 089
 Detector : 21087
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.018	3301.225	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.655	4904.531	3.000000	0.7199995	57.73503	95.00000
CM-244	5531.146	5885.550	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 090
 Detector : 38159
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.511	3299.809	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.211	4904.337	4.000000	0.9599993	50.00000	95.00000
CM-244	5530.381	5887.548	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 091
 Detector : 33205
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.614	3302.446	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.933	4903.299	6.000000	1.439999	40.82483	95.00000
CM-244	5530.786	5885.646	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 092
 Detector : 33204
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.837	3299.694	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.184	4904.789	3.000000	0.7199995	57.73503	95.00000
CM-244	5534.672	5882.398	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 093
 Detector : 33206
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.432	3297.831	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.503	4906.496	4.000000	0.9599993	50.00000	95.00000
CM-244	5534.120	5886.021	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 094
 Detector : 33207
 Background Analysis Date/Time : 2-APR-2006 11:38:43
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.673	3298.910	1.000000	0.2399998	100.0000	95.00000
NP-237	4437.305	4902.611	3.000000	0.7199995	57.73503	95.00000
CM-244	5532.741	5886.161	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 096
 Detector : 30429
 Background Analysis Date/Time : 2-APR-2006 11:38:44
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.567	3301.392	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.899	4903.007	4.000000	0.9600002	50.00000	95.00000
CM-244	5534.841	5883.364	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 098
 Detector : 30431
 Background Analysis Date/Time : 2-APR-2006 11:38:44
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.193	3297.595	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.217	4902.776	10.00000	2.400000	31.62278	95.00000
CM-244	5531.761	5884.598	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 099
 Detector : 30432
 Background Analysis Date/Time : 2-APR-2006 11:38:44
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.302	3301.806	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.583	4904.427	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.529	5887.439	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 101
 Detector : 31696
 Background Analysis Date/Time : 2-APR-2006 11:38:45
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.838	3300.184	2.000000	0.4800001	70.71068	95.00000
NP-237	4437.473	4904.200	4.000000	0.9600002	50.00000	95.00000
CM-244	5533.420	5882.862	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 102
 Detector : 30438
 Background Analysis Date/Time : 2-APR-2006 11:38:45
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.981	3300.175	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.167	4905.013	14.00000	3.360001	26.72612	95.00000
CM-244	5534.874	5885.847	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 103
 Detector : 30437
 Background Analysis Date/Time : 2-APR-2006 11:38:45
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.494	3300.797	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.628	4906.553	4.000000	0.9600002	50.00000	95.00000
CM-244	5534.963	5885.168	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 104
 Detector : 30436
 Background Analysis Date/Time : 2-APR-2006 11:38:45
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.844	3302.458	1.000000	0.2400000	100.0000	95.00000
NP-237	4432.663	4904.432	2.000000	0.4800001	70.71068	95.00000
CM-244	5531.252	5885.942	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 106
 Detector : 45382
 Background Analysis Date/Time : 2-APR-2006 11:38:45
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.094	3299.001	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.781	4902.986	7.000000	1.680000	37.79645	95.00000
CM-244	5530.755	5886.020	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 107
 Detector : 31697
 Background Analysis Date/Time : 2-APR-2006 11:38:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.547	3299.714	1.000000	0.2400000	100.0000	95.00000
NP-237	4437.183	4902.948	1.000000	0.2400000	100.0000	95.00000
CM-244	5532.612	5885.240	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 109
 Detector : 31693
 Background Analysis Date/Time : 2-APR-2006 11:38:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.084	3299.184	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.535	4905.875	1.000000	0.2400000	100.0000	95.00000
CM-244	5532.554	5883.883	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 110
 Detector : 30447
 Background Analysis Date/Time : 2-APR-2006 11:38:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.012	3300.888	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.842	4901.474	1.000000	0.2400000	100.0000	95.00000
CM-244	5530.607	5884.669	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 111
 Detector : 30448
 Background Analysis Date/Time : 2-APR-2006 11:38:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.793	3301.004	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.981	4906.484	6.000000	1.440000	40.82483	95.00000
CM-244	5530.639	5883.341	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 112
 Detector : 30449
 Background Analysis Date/Time : 2-APR-2006 11:38:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.870	3298.269	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.313	4903.586	3.000000	0.7200001	57.73503	95.00000
CM-244	5533.752	5883.818	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 113
 Detector : 45-111B4
 Background Analysis Date/Time : 2-APR-2006 10:57:16
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.835	3301.848	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.613	4901.946	2.000000	0.4800001	70.71068	95.00000
CM-244	5530.358	5885.560	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 114
 Detector : 45-111B5
 Background Analysis Date/Time : 2-APR-2006 10:57:20
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.875	3299.211	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.329	4903.130	1.000000	0.2400000	100.0000	95.00000
CM-244	5535.235	5884.346	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 115
 Detector : 45-132EE5
 Background Analysis Date/Time : 2-APR-2006 10:57:23
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.466	3300.287	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.908	4903.427	1.000000	0.2400000	100.0000	95.00000
CM-244	5530.487	5884.796	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 116
 Detector : 45-132FF2
 Background Analysis Date/Time : 2-APR-2006 10:57:26
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.161	3302.097	1.000000	0.2400000	100.0000	95.00000
NP-237	4435.898	4903.366	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.965	5885.878	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 117
 Detector : 45-132FF3
 Background Analysis Date/Time : 2-APR-2006 10:57:29
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.574	3297.481	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.916	4905.417	3.000000	0.7200001	57.73503	95.00000
CM-244	5531.962	5885.886	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 118
 Detector : 45-132FF4
 Background Analysis Date/Time : 2-APR-2006 10:57:33
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.600	3298.996	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.069	4901.807	2.000000	0.4800001	70.71068	95.00000
CM-244	5534.903	5884.430	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 119
 Detector : 45-132FF5
 Background Analysis Date/Time : 2-APR-2006 10:57:36
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.490	3300.068	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.344	4905.254	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.554	5884.197	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 120
 Detector : 45-142F1
 Background Analysis Date/Time : 2-APR-2006 10:57:39
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.710	3300.418	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.274	4903.259	1.000000	0.2400000	100.0000	95.00000
CM-244	5533.634	5886.862	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 121
 Detector : 45-142J4
 Background Analysis Date/Time : 2-APR-2006 10:57:42
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.124	3301.600	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.163	4906.581	1.000000	0.2400000	100.0000	95.00000
CM-244	5533.976	5883.453	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 122
 Detector : 45-142J5
 Background Analysis Date/Time : 2-APR-2006 10:57:46
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.061	3298.780	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.620	4903.419	1.000000	0.2400000	100.0000	95.00000
CM-244	5535.258	5884.098	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 123
 Detector : 45-142V1
 Background Analysis Date/Time : 2-APR-2006 10:57:49
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.387	3299.522	2.000000	0.4800001	70.71068	95.00000
NP-237	4437.442	4903.641	1.000000	0.2400000	100.0000	95.00000
CM-244	5534.110	5887.297	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 124
 Detector : 45-142V2
 Background Analysis Date/Time : 2-APR-2006 10:57:52
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.443	3297.987	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.559	4902.411	2.000000	0.4800001	70.71068	95.00000
CM-244	5534.467	5883.494	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 125
 Detector : 45-142V3
 Background Analysis Date/Time : 2-APR-2006 10:57:55
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.436	3301.693	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.216	4903.410	2.000000	0.4800001	70.71068	95.00000
CM-244	5531.615	5883.226	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 126
 Detector : 45-142V5
 Background Analysis Date/Time : 2-APR-2006 10:57:59
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.369	3299.131	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.618	4902.366	1.000000	0.2400000	100.0000	95.00000
CM-244	5532.732	5885.449	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 127
 Detector : 45-142W1
 Background Analysis Date/Time : 2-APR-2006 10:58:02
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.513	3302.392	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.606	4903.961	1.000000	0.2400000	100.0000	95.00000
CM-244	5535.216	5883.874	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 128
 Detector : 45-142W2
 Background Analysis Date/Time : 2-APR-2006 10:58:05
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.584	3299.388	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.590	4901.786	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5533.622	5887.583	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 129
 Detector : 45-142W3
 Background Analysis Date/Time : 2-APR-2006 10:58:09
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.668	3299.558	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.149	4901.376	2.000000	0.4800001	70.71068	95.00000
CM-244	5532.751	5886.867	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 130
 Detector : 45-142W5
 Background Analysis Date/Time : 2-APR-2006 10:58:13
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.831	3301.623	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.787	4904.916	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5534.223	5884.439	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 131
 Detector : 45-145K1
 Background Analysis Date/Time : 2-APR-2006 10:58:17
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.369	3298.448	1.000000	0.2400000	100.0000	95.00000
NP-237	4432.591	4905.330	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.857	5887.665	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 132
 Detector : 45-145K2
 Background Analysis Date/Time : 2-APR-2006 10:58:20
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.018	3301.016	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.219	4902.195	2.000000	0.4800001	70.71068	95.00000
CM-244	5534.644	5883.351	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 133
 Detector : 45-145K3
 Background Analysis Date/Time : 2-APR-2006 10:58:23
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.115	3302.033	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.237	4904.688	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.486	5884.151	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 134
 Detector : 45-145K4
 Background Analysis Date/Time : 2-APR-2006 10:58:26
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.530	3301.962	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.547	4905.459	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5534.869	5887.271	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 135
 Detector : 45-145K5
 Background Analysis Date/Time : 2-APR-2006 10:58:30
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.104	3298.632	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.981	4906.088	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5531.074	5884.261	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 136
Detector : 45-145L1
Background Analysis Date/Time : 2-APR-2006 10:58:33
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.496	3298.473	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.582	4903.436	1.000000	0.240000	100.0000	95.00000
CM-244	5532.704	5884.860	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Subsection 3: Efficiency Calibration

Instrument : CHAMBER 001
 Detector : 33088
 Standard ID : AESS-001
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:15
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:30:52
 Average Efficiency : 0.2781914
 Average Efficiency Error : 7.6626688E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2990.456	3298.943	14076.00	0.2746735	1.1824497E-02	65.35928
NP-237	211.8600	28-FEB-2006	4433.436	4903.018	14340.00	0.2819934	1.4295015E-02	71.99430
CM-244	248.8200	28-FEB-2006	5530.638	5887.374	14794.00	0.2795064	1.4163047E-02	64.69388

Instrument : CHAMBER 003
 Detector : 20659
 Standard ID : AESS-003
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:15
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:32:34
 Average Efficiency : 0.2880620
 Average Efficiency Error : 7.9304650E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.3600	28-FEB-2006	2988.599	3300.169	14554.00	0.2846224	1.2245077E-02	49.78555
NP-237	211.3800	28-FEB-2006	4434.674	4902.844	14694.00	0.2895928	1.4675476E-02	61.61686
CM-244	248.2800	28-FEB-2006	5535.248	5883.783	15396.00	0.2915129	1.4763834E-02	53.23063

Instrument : CHAMBER 004
 Detector : 33077
 Standard ID : AESS-004
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:15
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:32:51
 Average Efficiency : 0.3098668
 Average Efficiency Error : 8.5239913E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2987.545	3299.456	15401.00	0.3014340	1.2955099E-02	59.94693
NP-237	211.2000	28-FEB-2006	4433.646	4906.400	15919.00	0.3140544	1.5898786E-02	66.99142
CM-244	248.1000	28-FEB-2006	5531.494	5886.867	16816.00	0.3186174	1.6119311E-02	64.44215

Instrument : CHAMBER 005
 Detector : 28642
 Standard ID : AESS-005
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:15
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:33:05
 Average Efficiency : 0.3158097
 Average Efficiency Error : 8.6822659E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.709	3298.775	16078.00	0.3139968	1.3485039E-02	54.11107
NP-237	211.6800	28-FEB-2006	4434.190	4905.248	16264.00	0.3200765	1.6199514E-02	58.77632
CM-244	248.6400	28-FEB-2006	5530.463	5883.921	16620.00	0.3142197	1.5898999E-02	55.82949

Instrument : CHAMBER 007
 Detector : 30416
 Standard ID : AESS-007
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:16
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:35:21
 Average Efficiency : 0.3047189
 Average Efficiency Error : 8.3812820E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2990.797	3298.358	15695.00	0.3066845	1.3176420E-02	50.85197
NP-237	211.5600	28-FEB-2006	4432.556	4903.394	15403.00	0.3033007	1.5360770E-02	59.57014
CM-244	248.5200	28-FEB-2006	5533.897	5887.491	16043.00	0.3034657	1.5361345E-02	53.08852

Instrument : CHAMBER 009
 Detector : 13285
 Standard ID : AESS-009
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:16
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:39:51
 Average Efficiency : 0.3341929
 Average Efficiency Error : 9.1806399E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6000	28-FEB-2006	2987.740	3302.180	16955.00	0.3312147	1.4212075E-02	53.77267
NP-237	211.6200	28-FEB-2006	4436.826	4904.306	17080.00	0.3362575	1.7008657E-02	68.28894
CM-244	248.5800	28-FEB-2006	5530.853	5882.488	17788.00	0.3363935	1.7007809E-02	56.00669

Instrument : CHAMBER 010
 Detector : 33083
 Standard ID : AESS-010
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:16
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:40:04
 Average Efficiency : 0.3340436
 Average Efficiency Error : 9.1786785E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2992.233	3300.495	16676.00	0.3259426	1.3989601E-02	68.92194
NP-237	211.5000	28-FEB-2006	4435.514	4905.914	17301.00	0.3408116	1.7236479E-02	78.65460
CM-244	248.4600	28-FEB-2006	5535.151	5882.345	17946.00	0.3395274	1.7164614E-02	63.81354

Instrument : CHAMBER 011
 Detector : 9537
 Standard ID : AESS-011
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:16
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:40:58
 Average Efficiency : 0.3105724
 Average Efficiency Error : 8.5400529E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2988.769	3298.475	15819.00	0.3089387	1.3271471E-02	48.37308
NP-237	211.6800	28-FEB-2006	4433.776	4901.438	15834.00	0.3116739	1.5779305E-02	60.99158
CM-244	248.6400	28-FEB-2006	5533.457	5885.193	16490.00	0.3117799	1.5776988E-02	49.82006

Instrument : CHAMBER 012
 Detector : 33085
 Standard ID : AESS-012
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:16
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:41:13
 Average Efficiency : 0.2681623
 Average Efficiency Error : 7.3903115E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2992.283	3299.978	13668.00	0.2665664	1.1482058E-02	61.90531
NP-237	211.9200	28-FEB-2006	4432.454	4901.598	13787.00	0.2710549	1.3747970E-02	71.13239
CM-244	248.9400	28-FEB-2006	5534.285	5885.751	14169.00	0.2675734	1.3566247E-02	62.43946

Instrument : CHAMBER 013
 Detector : 21084
 Standard ID : AESS-013
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:17
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:41:26
 Average Efficiency : 0.3412675
 Average Efficiency Error : 9.3716113E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	220.5600	28-FEB-2006	2992.308	3301.307	17507.00	0.3405094	1.4603521E-02	45.62738
NP-237	212.5200	28-FEB-2006	4433.829	4905.476	17346.00	0.3400816	1.7199026E-02	62.98444
CM-244	249.6600	28-FEB-2006	5530.551	5886.625	18245.00	0.3435482	1.7364752E-02	51.62660

Instrument : CHAMBER 016
 Detector : 21086
 Standard ID : AESS-016
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:17
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:45:33
 Average Efficiency : 0.3303408
 Average Efficiency Error : 9.0769110E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2992.386	3300.792	16669.00	0.3255388	1.3972365E-02	50.42868
NP-237	211.6800	28-FEB-2006	4437.111	4903.407	16820.00	0.3310585	1.6748626E-02	58.68690
CM-244	248.6400	28-FEB-2006	5533.819	5884.776	17810.00	0.3367283	1.7024504E-02	54.94007

Instrument : CHAMBER 017
 Detector : 33203
 Standard ID : AESS-017
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:17
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:45:52
 Average Efficiency : 0.2902693
 Average Efficiency Error : 7.9895537E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7200	28-FEB-2006	2988.693	3298.212	15015.00	0.2931568	1.2605052E-02	49.49680
NP-237	211.7400	28-FEB-2006	4432.905	4905.400	14650.00	0.2882629	1.4608623E-02	61.60561
CM-244	248.7000	28-FEB-2006	5532.198	5886.394	15257.00	0.2883977	1.4607739E-02	50.89099

Instrument : CHAMBER 018
 Detector : 21063
 Standard ID : AESS-018
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:17
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 16:46:43
 Average Efficiency : 0.2559204
 Average Efficiency Error : 7.0582652E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7800	28-FEB-2006	2988.076	3298.134	13144.00	0.2565568	1.1059588E-02	50.10976
NP-237	211.8000	28-FEB-2006	4433.036	4905.011	12933.00	0.2544221	1.2916340E-02	58.60687
CM-244	248.7600	28-FEB-2006	5535.243	5885.674	13576.00	0.2565605	1.3015677E-02	54.43167

Instrument : CHAMBER 019
 Detector : 23882
 Standard ID : AESS-019
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:18
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 16:46:59
 Average Efficiency : 0.2848921
 Average Efficiency Error : 7.8617986E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2989.511	3300.144	15017.00	0.2934360	1.2617028E-02	46.50811
NP-237	211.5600	28-FEB-2006	4435.855	4902.151	15150.00	0.2626681	1.3361575E-02	61.07557
CM-244	248.5200	28-FEB-2006	5531.789	5884.041	15932.00	0.3013749	1.5256786E-02	50.77583

Instrument : CHAMBER 020
 Detector : 33093
 Standard ID : AESS-020
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:18
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 16:47:46
 Average Efficiency : 0.3374673
 Average Efficiency Error : 9.2702135E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2988.758	3298.111	16991.00	0.3315554	1.4226208E-02	58.22562
NP-237	211.8000	28-FEB-2006	4435.838	4901.523	17420.00	0.3426790	1.7329575E-02	71.40521
CM-244	248.8200	28-FEB-2006	5530.915	5883.311	18048.00	0.3409902	1.7237470E-02	64.18688

Instrument : CHAMBER 021
 Detector : 33893
 Standard ID : AESS-021
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:18
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 16:48:06
 Average Efficiency : 0.3097920
 Average Efficiency Error : 8.5189342E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2987.969	3300.683	16019.00	0.3130153	1.3443721E-02	48.52213
NP-237	211.5600	28-FEB-2006	4434.165	4904.181	15665.00	0.3085031	1.5620876E-02	57.03367
CM-244	248.5200	28-FEB-2006	5533.125	5885.623	16217.00	0.3067660	1.5526365E-02	49.52942

Instrument : CHAMBER 023
 Detector : 22873
 Standard ID : AESS-023
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 12:02:18
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 16:49:38
 Average Efficiency : 0.2765626
 Average Efficiency Error : 7.6345578E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2988.365	3300.653	13199.00	0.2577709	1.1110976E-02	64.03100
NP-237	211.6800	28-FEB-2006	4432.587	4902.786	15014.00	0.2955187	1.4971492E-02	68.68533
CM-244	248.6400	28-FEB-2006	5533.585	5885.616	15406.00	0.2912842	1.4752124E-02	67.86546

Instrument : CHAMBER 026
 Detector : 34427
 Standard ID : AESS-002
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:51
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:02:00
 Average Efficiency : 0.3111628
 Average Efficiency Error : 5.9400578E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2988.396	3300.299	15946.00	0.3116805	7.0337788E-03	55.54451
NP-237	211.5000	28-FEB-2006	4432.951	4903.551	15774.00	0.3107190	1.5731754E-02	60.78556
CM-244	248.4000	28-FEB-2006	5534.085	5882.486	16328.00	0.3090416	1.5640259E-02	54.94981

Instrument : CHAMBER 027
 Detector : 31436
 Standard ID : AESS-003
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:51
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:02:17
 Average Efficiency : 0.2851310
 Average Efficiency Error : 5.4681562E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.3600	28-FEB-2006	2990.641	3298.501	14516.00	0.2838850	6.4452491E-03	62.80336
NP-237	211.3800	28-FEB-2006	4435.554	4903.960	14590.00	0.2875520	1.4573419E-02	61.53238
CM-244	248.2800	28-FEB-2006	5535.178	5885.600	15268.00	0.2891185	1.4644115E-02	66.27240

Instrument : CHAMBER 028
 Detector : 21056
 Standard ID : AESS-004
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:51
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:02:41
 Average Efficiency : 0.2688177
 Average Efficiency Error : 5.1718531E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2991.862	3298.519	13660.00	0.2673638	6.0955230E-03	60.48663
NP-237	211.2000	28-FEB-2006	4437.162	4904.527	13850.00	0.2732216	1.3856977E-02	78.59827
CM-244	248.1000	28-FEB-2006	5534.678	5884.670	14348.00	0.2718943	1.3782959E-02	69.00627

Instrument : CHAMBER 029
 Detector : 30419
 Standard ID : AESS-005
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:51
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:02:56
 Average Efficiency : 0.2803768
 Average Efficiency Error : 5.3804033E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2991.643	3298.009	14347.00	0.2801967	6.3665169E-03	50.13651
NP-237	211.6800	28-FEB-2006	4436.124	4903.513	14180.00	0.2791024	1.4150602E-02	62.17907
CM-244	248.6400	28-FEB-2006	5533.909	5884.139	14945.00	0.2825924	1.4317507E-02	55.61591

Instrument : CHAMBER 030
 Detector : 30420
 Standard ID : AESS-006
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:51
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:03:11
 Average Efficiency : 0.3032622
 Average Efficiency Error : 5.7966388E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2992.381	3300.032	15532.00	0.3040040	6.8717906E-03	53.70943
NP-237	211.2000	28-FEB-2006	4435.171	4901.399	15235.00	0.3005646	1.5224237E-02	63.92149
CM-244	248.1000	28-FEB-2006	5532.938	5887.226	15953.00	0.3023090	1.5303830E-02	56.83110

Instrument : CHAMBER 032
 Detector : 33207
 Standard ID : AESS-008
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:53
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:04:09
 Average Efficiency : 0.3210600
 Average Efficiency Error : 9.3805837E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2992.438	3301.011	16394.00	0.3199127	1.6193897E-02	48.92264
NP-237	211.8600	28-FEB-2006	4437.450	4903.298	16174.00	0.3180676	1.6098870E-02	62.34297
CM-244	248.8800	28-FEB-2006	5533.518	5886.674	17224.00	0.3253718	1.6456470E-02	58.56594

Instrument : CHAMBER 033
 Detector : 28647
 Standard ID : AESS-009
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:53
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:04:20
 Average Efficiency : 0.3189350
 Average Efficiency Error : 9.3192765E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6000	28-FEB-2006	2991.128	3301.778	16210.00	0.3166678	1.6031807E-02	50.20483
NP-237	211.6200	28-FEB-2006	4433.277	4905.752	16119.00	0.3173501	1.6063211E-02	65.81153
CM-244	248.5800	28-FEB-2006	5531.202	5887.135	17074.00	0.3229274	1.6334468E-02	56.14278

Instrument : CHAMBER 034
 Detector : 32697
 Standard ID : AESS-010
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:53
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:04:32
 Average Efficiency : 0.3285644
 Average Efficiency Error : 9.5973080E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2987.740	3297.727	16717.00	0.3267508	1.6536236E-02	46.19645
NP-237	211.5000	28-FEB-2006	4436.424	4906.295	16590.00	0.3267619	1.6533978E-02	65.57603
CM-244	248.4600	28-FEB-2006	5532.067	5883.683	17561.00	0.3322987	1.6803153E-02	52.60378

Instrument : CHAMBER 035
 Detector : 29271
 Standard ID : AESS-011
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:53
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:04:44
 Average Efficiency : 0.3070081
 Average Efficiency Error : 8.9746779E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.597	3300.316	15823.00	0.3090232	1.5649391E-02	58.07399
NP-237	211.6800	28-FEB-2006	4435.093	4902.062	15491.00	0.3048278	1.5437050E-02	77.73704
CM-244	248.6400	28-FEB-2006	5533.546	5887.289	16248.00	0.3072308	1.5549533E-02	61.23973

Instrument : CHAMBER 036
 Detector : 29275
 Standard ID : AESS-012
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:53
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:04:58
 Average Efficiency : 0.3204660
 Average Efficiency Error : 9.3638916E-03
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2990.101	3302.011	16111.00	0.3142187	1.5908994E-02	70.87608
NP-237	211.9200	28-FEB-2006	4436.212	4902.690	16497.00	0.3243046	1.6410707E-02	86.38094
CM-244	248.9400	28-FEB-2006	5530.586	5883.211	17117.00	0.3232544	1.6350558E-02	83.27386

Instrument : CHAMBER 037
 Detector : 32690
 Standard ID : AESS-013
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:55
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:05:37
 Average Efficiency : 0.3298278
 Average Efficiency Error : 6.2852711E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	220.5600	28-FEB-2006	2990.331	3300.070	16648.00	0.3238085	7.2884769E-03	65.32179
NP-237	212.5200	28-FEB-2006	4435.120	4902.289	17586.00	0.3447773	1.7433835E-02	73.49030
CM-244	249.6600	28-FEB-2006	5534.121	5882.713	18584.00	0.3498755	1.7681209E-02	65.58303

Instrument : CHAMBER 038
 Detector : 19323
 Standard ID : AESS-014
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:55
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:05:48
 Average Efficiency : 0.3550652
 Average Efficiency Error : 6.7386958E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2992.203	3301.129	18140.00	0.3537907	7.9244133E-03	44.64486
NP-237	211.9800	28-FEB-2006	4436.340	4904.950	18294.00	0.3595673	1.8173877E-02	68.25054
CM-244	249.0000	28-FEB-2006	5534.574	5885.451	18924.00	0.3572362	1.8049749E-02	49.98671

Instrument : CHAMBER 040
 Detector : 30446
 Standard ID : AESS-016
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:55
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:06:33
 Average Efficiency : 0.3232525
 Average Efficiency Error : 6.1597549E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.636	3301.603	16579.00	0.3237876	7.2898054E-03	47.52289
NP-237	211.6800	28-FEB-2006	4435.733	4904.719	16163.00	0.3181213	1.6101720E-02	60.46703
CM-244	248.6400	28-FEB-2006	5532.976	5885.423	17235.00	0.3258936	1.6482741E-02	51.53939

Instrument : CHAMBER 041
 Detector : 22834
 Standard ID : AESS-017
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:55
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:06:46
 Average Efficiency : 0.3322699
 Average Efficiency Error : 6.3254358E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7200	28-FEB-2006	2987.681	3302.193	16913.00	0.3302204	7.4258945E-03	49.34238
NP-237	211.7400	28-FEB-2006	4432.502	4905.743	17206.00	0.3385508	1.7123217E-02	64.06297
CM-244	248.7000	28-FEB-2006	5533.298	5885.604	17818.00	0.3368361	1.7029859E-02	51.09551

Instrument : CHAMBER 042
 Detector : 32695
 Standard ID : AESS-018
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:55
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 12:07:02
 Average Efficiency : 0.3361240
 Average Efficiency Error : 6.3955071E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7800	28-FEB-2006	2990.651	3300.194	17115.00	0.3340732	7.5073489E-03	62.01425
NP-237	211.8000	28-FEB-2006	4435.708	4903.810	17181.00	0.3379442	1.7092843E-02	71.83335
CM-244	248.7600	28-FEB-2006	5531.417	5883.758	18276.00	0.3453112	1.7453661E-02	58.83952

Instrument : CHAMBER 043
 Detector : 42470
 Standard ID : AESS-019
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:07:20
 Average Efficiency : 0.3229622
 Average Efficiency Error : 6.1558355E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2988.168	3298.326	16460.00	0.3216395	7.2445576E-03	53.07267
NP-237	211.5600	28-FEB-2006	4436.901	4902.013	16611.00	0.3271490	1.6553231E-02	63.02407
CM-244	248.5200	28-FEB-2006	5535.121	5886.262	17214.00	0.3256539	1.6470846E-02	50.82504

Instrument : CHAMBER 044
 Detector : 34433
 Standard ID : AESS-020
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:07:31
 Average Efficiency : 0.3240791
 Average Efficiency Error : 6.1765807E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2989.004	3298.648	16495.00	0.3218836	7.2491337E-03	50.22718
NP-237	211.8000	28-FEB-2006	4433.632	4906.174	16705.00	0.3285425	1.6622754E-02	66.23325
CM-244	248.8200	28-FEB-2006	5532.967	5887.129	17532.00	0.3312699	1.6751442E-02	56.69666

Instrument : CHAMBER 045
 Detector : 34430
 Standard ID : AESS-021
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:07:49
 Average Efficiency : 0.2941546
 Average Efficiency Error : 5.6320531E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2992.438	3301.033	14988.00	0.2928756	6.6353632E-03	49.71279
NP-237	211.5600	28-FEB-2006	4436.365	4906.490	15086.00	0.2970952	1.5050440E-02	64.58119
CM-244	248.5200	28-FEB-2006	5535.004	5886.982	15743.00	0.2978074	1.5078431E-02	59.00225

Instrument : CHAMBER 046
 Detector : 42471
 Standard ID : AESS-022
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:08:03
 Average Efficiency : 0.3344716
 Average Efficiency Error : 6.3659614E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2987.741	3299.741	16999.00	0.3319905	7.4634906E-03	48.96851
NP-237	211.6800	28-FEB-2006	4435.900	4904.967	17273.00	0.3399139	1.7191468E-02	65.78371
CM-244	248.6400	28-FEB-2006	5532.671	5884.488	18104.00	0.3422939	1.7302830E-02	53.33138

Instrument : CHAMBER 047
 Detector : 30449
 Standard ID : AESS-023
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:08:14
 Average Efficiency : 0.2966904
 Average Efficiency Error : 5.6765815E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2989.322	3298.103	15222.00	0.2972857	6.7285444E-03	49.84683
NP-237	211.6800	28-FEB-2006	4433.780	4903.899	15016.00	0.2955441	1.4972775E-02	59.65280
CM-244	248.6400	28-FEB-2006	5532.276	5884.114	15597.00	0.2948985	1.4932883E-02	51.68388

Instrument : CHAMBER 048
 Detector : 42483
 Standard ID : AESS-024
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 07:45:57
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 12:08:24
 Average Efficiency : 0.3119769
 Average Efficiency Error : 5.9553082E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4200	28-FEB-2006	2989.922	3300.161	15954.00	0.3119224	7.0390208E-03	55.83012
NP-237	211.4400	28-FEB-2006	4434.180	4904.923	15787.00	0.3110589	1.5748808E-02	72.44879
CM-244	248.4000	28-FEB-2006	5533.436	5885.010	16547.00	0.3131823	1.5847316E-02	61.06746

Instrument : CHAMBER 065
 Detector : 21087
 Standard ID : AESS-001
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:10
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:05:24
 Average Efficiency : 0.3027465
 Average Efficiency Error : 5.7869283E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2992.500	3301.569	15511.00	0.3026739	6.8422910E-03	49.27271
NP-237	211.8600	28-FEB-2006	4436.593	4904.814	15341.00	0.3016613	1.5278513E-02	63.47648
CM-244	248.8200	28-FEB-2006	5533.641	5883.942	16102.00	0.3042169	1.5398668E-02	52.45229

Instrument : CHAMBER 066
 Detector : 38159
 Standard ID : AESS-002
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:10
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:05:41
 Average Efficiency : 0.2898386
 Average Efficiency Error : 5.5523221E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2991.351	3299.570	14848.00	0.2902116	6.5790205E-03	54.22055
NP-237	211.5000	28-FEB-2006	4435.367	4906.503	14731.00	0.2901337	1.4702437E-02	64.20898
CM-244	248.4000	28-FEB-2006	5531.751	5885.195	15203.00	0.2877176	1.4573953E-02	57.41096

Instrument : CHAMBER 068
 Detector : 33204
 Standard ID : AESS-004
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:10
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:06:11
 Average Efficiency : 0.2982503
 Average Efficiency Error : 5.7051168E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2989.458	3302.482	15312.00	0.2996904	6.7803976E-03	66.72219
NP-237	211.2000	28-FEB-2006	4437.019	4902.188	15036.00	0.2966104	1.5026535E-02	82.73407
CM-244	248.1000	28-FEB-2006	5531.579	5884.315	15461.00	0.2929541	1.4836024E-02	72.39137

Instrument : CHAMBER 069
 Detector : 39172
 Standard ID : AESS-005
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:10
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:06:22
 Average Efficiency : 0.2872442
 Average Efficiency Error : 5.5063334E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2991.937	3302.037	14638.00	0.2858726	6.4867456E-03	52.69576
NP-237	211.6800	28-FEB-2006	4433.758	4901.912	14877.00	0.2928176	1.4836427E-02	60.78927
CM-244	248.6400	28-FEB-2006	5535.302	5884.863	15275.00	0.2888012	1.4627955E-02	53.21272

Instrument : CHAMBER 070
 Detector : 33207
 Standard ID : AESS-006
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:10
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:06:32
 Average Efficiency : 0.3410026
 Average Efficiency Error : 6.4845588E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2987.764	3299.302	17333.00	0.3392459	7.6180245E-03	53.32024
NP-237	211.2000	28-FEB-2006	4432.603	4904.338	17596.00	0.3470635	1.7549409E-02	63.32718
CM-244	248.1000	28-FEB-2006	5531.790	5887.167	18166.00	0.3442082	1.7398918E-02	55.68260

Instrument : CHAMBER 072
 Detector : 33210
 Standard ID : AESS-008
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:11
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:07:20
 Average Efficiency : 0.2718624
 Average Efficiency Error : 5.2260533E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2989.642	3302.500	13882.00	0.2708864	6.1688591E-03	78.20691
NP-237	211.8600	28-FEB-2006	4434.229	4902.517	13764.00	0.2706604	1.3728318E-02	68.85778
CM-244	248.8800	28-FEB-2006	5533.565	5883.889	14730.00	0.2782284	1.4099089E-02	58.98390

Instrument : CHAMBER 073
 Detector : 33211
 Standard ID : AESS-009
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:11
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:07:31
 Average Efficiency : 0.3248378
 Average Efficiency Error : 6.1892127E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6000	28-FEB-2006	2990.209	3299.359	16628.00	0.3248250	7.3118629E-03	52.98417
NP-237	211.6200	28-FEB-2006	4435.813	4905.119	16178.00	0.3184740	1.6119437E-02	62.15504
CM-244	248.5800	28-FEB-2006	5530.447	5887.394	17545.00	0.3317996	1.6778087E-02	56.17911

Instrument : CHAMBER 075
 Detector : 29976
 Standard ID : AESS-011
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:11
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:07:53
 Average Efficiency : 0.3238373
 Average Efficiency Error : 6.1713755E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2987.804	3301.738	16526.00	0.3227443	7.2676861E-03	50.99773
NP-237	211.6800	28-FEB-2006	4436.078	4904.005	16602.00	0.3267108	1.6531264E-02	64.22369
CM-244	248.6400	28-FEB-2006	5532.428	5882.500	17275.00	0.3266147	1.6518781E-02	59.07774

Instrument : CHAMBER 076
 Detector : 33213
 Standard ID : AESS-012
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:11
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:08:02
 Average Efficiency : 0.3136021
 Average Efficiency Error : 5.9847333E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2990.982	3301.271	16036.00	0.3127477	7.0554069E-03	52.31974
NP-237	211.9200	28-FEB-2006	4435.792	4906.032	16070.00	0.3159233	1.5991600E-02	63.89199
CM-244	248.9400	28-FEB-2006	5532.284	5884.164	16716.00	0.3156649	1.5971025E-02	56.41280

Instrument : CHAMBER 077
 Detector : 28239
 Standard ID : AESS-013
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:12
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 12:08:16
 Average Efficiency : 0.3282876
 Average Efficiency Error : 6.2494567E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	220.5600	28-FEB-2006	2990.320	3302.291	16964.00	0.3299461	7.4184034E-03	49.98071
NP-237	212.5200	28-FEB-2006	4434.458	4904.534	16485.00	0.3231252	1.6351206E-02	66.72607
CM-244	249.6600	28-FEB-2006	5534.090	5887.188	17279.00	0.3253554	1.6455045E-02	48.65668

Instrument : CHAMBER 078
 Detector : 34425
 Standard ID : AESS-014
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:12
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 12:08:26
 Average Efficiency : 0.3266231
 Average Efficiency Error : 6.2230360E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2992.430	3298.209	16615.00	0.3240396	7.2945217E-03	49.76765
NP-237	211.9800	28-FEB-2006	4433.493	4903.776	16900.00	0.3321434	1.6802609E-02	62.23470
CM-244	249.0000	28-FEB-2006	5534.483	5883.260	17741.00	0.3349401	1.6934805E-02	53.02275

Instrument : CHAMBER 079
 Detector : 28408
 Standard ID : AESS-015
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:12
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 12:08:37
 Average Efficiency : 0.3381511
 Average Efficiency Error : 6.4334050E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2989.549	3301.048	17162.00	0.3348904	7.5245029E-03	58.89482
NP-237	211.8600	28-FEB-2006	4435.951	4904.750	17588.00	0.3458672	1.7488951E-02	69.24126
CM-244	248.8800	28-FEB-2006	5532.313	5884.158	18433.00	0.3481725	1.7596556E-02	62.07035

Instrument : CHAMBER 080
 Detector : 29269
 Standard ID : AESS-016
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:12
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 12:08:46
 Average Efficiency : 0.3413618
 Average Efficiency Error : 6.4887921E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.355	3300.887	17518.00	0.3421173	7.6778606E-03	54.84035
NP-237	211.6800	28-FEB-2006	4437.124	4904.027	17076.00	0.3360595	1.6998719E-02	70.53491
CM-244	248.6400	28-FEB-2006	5534.833	5882.541	18143.00	0.3430255	1.7339373E-02	59.19316

Instrument : CHAMBER 081
 Detector : 28243
 Standard ID : AESS-017
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 5-APR-2006 09:52:15
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 5-APR-2006 14:20:00
 Average Efficiency : 0.2709154
 Average Efficiency Error : 5.2182535E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7200	28-FEB-2006	2988.337	3300.967	13526.00	0.2640979	6.0252789E-03	74.73094
NP-237	211.7400	28-FEB-2006	4435.244	4901.705	14659.00	0.2884400	1.4617478E-02	76.53771
CM-244	248.7000	28-FEB-2006	5534.853	5883.115	15575.00	0.2944268	1.4909291E-02	67.72768

Instrument : CHAMBER 083
 Detector : 34436
 Standard ID : AESS-019
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:09:35
 Average Efficiency : 0.3063384
 Average Efficiency Error : 5.8566006E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2991.885	3297.745	15476.00	0.3024036	6.8371557E-03	53.97715
NP-237	211.5600	28-FEB-2006	4435.182	4902.448	16168.00	0.3183721	1.6114395E-02	65.19810
CM-244	248.5200	28-FEB-2006	5533.629	5886.856	16706.00	0.3160093	1.5988560E-02	59.26429

Instrument : CHAMBER 084
 Detector : 29953
 Standard ID : AESS-020
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:09:48
 Average Efficiency : 0.3377420
 Average Efficiency Error : 6.4240936E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2988.809	3299.845	17241.00	0.3364322	7.5571463E-03	45.28139
NP-237	211.8000	28-FEB-2006	4435.274	4905.090	17241.00	0.3390163	1.7146526E-02	64.38337
CM-244	248.8200	28-FEB-2006	5535.465	5886.345	18173.00	0.3433445	1.7355187E-02	52.99788

Instrument : CHAMBER 085
 Detector : 30451
 Standard ID : AESS-021
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:10:02
 Average Efficiency : 0.2997026
 Average Efficiency Error : 5.7319975E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2988.388	3298.321	15330.00	0.2995507	6.7767296E-03	51.54943
NP-237	211.5600	28-FEB-2006	4434.734	4902.750	15266.00	0.3006592	1.5228639E-02	59.35664
CM-244	248.5200	28-FEB-2006	5530.623	5885.465	15834.00	0.2995146	1.5163762E-02	54.82895

Instrument : CHAMBER 086
 Detector : 29278
 Standard ID : AESS-022
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:10:24
 Average Efficiency : 0.2629639
 Average Efficiency Error : 5.0652758E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.939	3300.647	13365.00	0.2610116	5.9599294E-03	51.29673
NP-237	211.6800	28-FEB-2006	4432.832	4902.859	13621.00	0.2680805	1.3599468E-02	59.09101
CM-244	248.6400	28-FEB-2006	5530.458	5886.876	14175.00	0.2680037	1.3587984E-02	51.32809

Instrument : CHAMBER 087
 Detector : 34430
 Standard ID : AESS-023
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:10:36
 Average Efficiency : 0.2783446
 Average Efficiency Error : 5.3436500E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2988.850	3299.145	14228.00	0.2778656	6.3170986E-03	45.75569
NP-237	211.6800	28-FEB-2006	4433.685	4904.783	14271.00	0.2804829	1.4219985E-02	56.29552
CM-244	248.6400	28-FEB-2006	5533.892	5885.860	14737.00	0.2786293	1.4119316E-02	52.11374

Instrument : CHAMBER 088
 Detector : 30434
 Standard ID : AESS-024
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 06:54:13
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 12:10:54
 Average Efficiency : 0.2708718
 Average Efficiency Error : 5.2093272E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4200	28-FEB-2006	2991.733	3298.324	13762.00	0.2690588	6.1309491E-03	70.44978
NP-237	211.4400	28-FEB-2006	4434.854	4901.741	13876.00	0.2734241	1.3866881E-02	84.52332
CM-244	248.4000	28-FEB-2006	5531.597	5882.583	14679.00	0.2778009	1.4078071E-02	70.46585

Instrument : CHAMBER 089
 Detector : 21087
 Standard ID : AESS-001
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:42
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 23:05:32
 Average Efficiency : 0.2906057
 Average Efficiency Error : 8.5010817E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2988.018	3301.225	14810.00	0.2889985	1.4647639E-02	48.13472
NP-237	211.8600	28-FEB-2006	4432.655	4904.531	14711.00	0.2893088	1.4660804E-02	59.05686
CM-244	248.8200	28-FEB-2006	5531.146	5885.550	15539.00	0.2935953	1.4867556E-02	51.89399

Instrument : CHAMBER 090
 Detector : 38159
 Standard ID : AESS-002
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:42
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 23:06:16
 Average Efficiency : 0.3262078
 Average Efficiency Error : 9.5290253E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2989.511	3299.809	16611.00	0.3246745	1.6432377E-02	43.47319
NP-237	211.5000	28-FEB-2006	4434.211	4904.337	16570.00	0.3264199	1.6516838E-02	66.74939
CM-244	248.4000	28-FEB-2006	5530.381	5887.548	17307.00	0.3275529	1.6565884E-02	47.20604

Instrument : CHAMBER 091
 Detector : 33205
 Standard ID : AESS-003
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 16:38:39
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 21:06:36
 Average Efficiency : 0.3295136
 Average Efficiency Error : 9.6244970E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.3600	28-FEB-2006	2988.614	3302.446	16877.00	0.3300617	1.6701948E-02	49.16127
NP-237	211.3800	28-FEB-2006	4435.933	4903.299	16753.00	0.3302219	1.6707057E-02	67.62949
CM-244	248.2800	28-FEB-2006	5530.786	5885.646	17335.00	0.3282727	1.6601983E-02	54.15368

Instrument : CHAMBER 092
 Detector : 33204
 Standard ID : AESS-004
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:42
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 23:08:02
 Average Efficiency : 0.3230760
 Average Efficiency Error : 9.4387615E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2991.837	3299.694	16466.00	0.3222808	1.6312918E-02	54.19599
NP-237	211.2000	28-FEB-2006	4434.184	4904.789	16328.00	0.3221140	1.6301801E-02	61.31636
CM-244	248.1000	28-FEB-2006	5534.672	5882.398	17144.00	0.3248603	1.6431469E-02	53.39663

Instrument : CHAMBER 093
 Detector : 33206
 Standard ID : AESS-005
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:42
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 23:08:14
 Average Efficiency : 0.3278230
 Average Efficiency Error : 9.5757600E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2991.432	3297.831	16618.00	0.3245451	1.6425749E-02	53.44844
NP-237	211.6800	28-FEB-2006	4432.503	4906.496	16789.00	0.3304530	1.6718345E-02	71.37048
CM-244	248.6400	28-FEB-2006	5534.120	5886.021	17378.00	0.3285792	1.6617021E-02	55.20338

Instrument : CHAMBER 094
 Detector : 33207
 Standard ID : AESS-006
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:42
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 3-APR-2006 23:08:34
 Average Efficiency : 0.3064194
 Average Efficiency Error : 8.9583928E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2991.673	3298.910	15769.00	0.3086388	1.5630580E-02	47.47134
NP-237	211.2000	28-FEB-2006	4437.305	4902.611	15693.00	0.3095863	1.5675372E-02	59.32807
CM-244	248.1000	28-FEB-2006	5532.741	5886.161	15901.00	0.3013068	1.5253706E-02	48.40099

Instrument : CHAMBER 096
 Detector : 30429
 Standard ID : AESS-008
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:43
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:09:48
 Average Efficiency : 0.3211957
 Average Efficiency Error : 9.3840715E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2988.567	3301.392	16420.00	0.3204154	1.6219035E-02	48.33763
NP-237	211.8600	28-FEB-2006	4433.899	4903.007	16366.00	0.3218482	1.6287910E-02	62.84891
CM-244	248.8800	28-FEB-2006	5534.841	5883.364	17011.00	0.3213297	1.6254338E-02	53.34020

Instrument : CHAMBER 098
 Detector : 30431
 Standard ID : AESS-010
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:43
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:10:26
 Average Efficiency : 0.3423861
 Average Efficiency Error : 9.9960957E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2991.193	3297.595	17461.00	0.3412881	1.7263338E-02	48.27054
NP-237	211.5000	28-FEB-2006	4433.217	4902.776	17377.00	0.3422896	1.7310398E-02	71.89059
CM-244	248.4600	28-FEB-2006	5531.761	5884.598	18159.00	0.3435947	1.7367978E-02	56.75472

Instrument : CHAMBER 099
 Detector : 30432
 Standard ID : AESS-011
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 16:38:43
 Calibration Count Time : 239.9998
 Efficiency Calibration Date/Time : 4-APR-2006 21:07:16
 Average Efficiency : 0.3424250
 Average Efficiency Error : 9.9976454E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2989.302	3301.806	17277.00	0.3374230	1.7069872E-02	61.73035
NP-237	211.6800	28-FEB-2006	4434.583	4904.427	17554.00	0.3455301	1.7472234E-02	70.83485
CM-244	248.6400	28-FEB-2006	5532.529	5887.439	18221.00	0.3445468	1.7415471E-02	58.75341

Instrument : CHAMBER 101
 Detector : 31696
 Standard ID : AESS-013
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:11:17
 Average Efficiency : 0.3289411
 Average Efficiency Error : 6.2637404E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	220.5600	28-FEB-2006	2988.838	3300.184	16815.00	0.3270522	7.3571443E-03	74.97670
NP-237	212.5200	28-FEB-2006	4437.473	4904.200	16905.00	0.3314256	1.6766205E-02	82.64299
CM-244	249.6600	28-FEB-2006	5533.420	5882.862	17869.00	0.3364823	1.7011438E-02	82.36337

Instrument : CHAMBER 102
 Detector : 30438
 Standard ID : AESS-014
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:11:38
 Average Efficiency : 0.3398052
 Average Efficiency Error : 6.4618774E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2990.981	3300.175	17329.00	0.3379689	7.5894571E-03	50.78636
NP-237	211.9800	28-FEB-2006	4436.167	4905.013	17442.00	0.3427780	1.7334390E-02	60.55743
CM-244	249.0000	28-FEB-2006	5534.874	5885.847	18355.00	0.3465500	1.7515350E-02	55.09371

Instrument : CHAMBER 103
 Detector : 30437
 Standard ID : AESS-015
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:11:50
 Average Efficiency : 0.3428698
 Average Efficiency Error : 6.5169050E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2987.494	3300.797	17526.00	0.3419976	7.6749846E-03	52.55986
NP-237	211.8600	28-FEB-2006	4433.628	4906.553	17575.00	0.3456304	1.7477097E-02	70.84139
CM-244	248.8800	28-FEB-2006	5534.963	5885.168	18244.00	0.3446204	1.7418953E-02	56.82663

Instrument : CHAMBER 104
 Detector : 30436
 Standard ID : AESS-016
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:12:05
 Average Efficiency : 0.3178734
 Average Efficiency Error : 6.0614208E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2989.844	3302.458	16342.00	0.3191546	7.1916869E-03	48.79966
NP-237	211.6800	28-FEB-2006	4432.663	4904.432	16000.00	0.3149317	1.5942214E-02	61.83171
CM-244	248.6400	28-FEB-2006	5531.252	5885.942	16635.00	0.3145305	1.5914533E-02	54.39241

Instrument : CHAMBER 106
 Detector : 45382
 Standard ID : AESS-018
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:13:35
 Average Efficiency : 0.3366815
 Average Efficiency Error : 6.4043794E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7800	28-FEB-2006	2991.094	3299.001	17214.00	0.3360010	7.5481492E-03	67.49383
NP-237	211.8000	28-FEB-2006	4435.781	4902.986	17151.00	0.3373776	1.7064495E-02	78.07959
CM-244	248.7600	28-FEB-2006	5530.755	5886.020	17964.00	0.3394951	1.7162759E-02	66.37016

Instrument : CHAMBER 107
 Detector : 31697
 Standard ID : AESS-019
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:45
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:13:46
 Average Efficiency : 0.3279476
 Average Efficiency Error : 6.2480466E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2990.547	3299.714	16632.00	0.3249958	7.3156110E-03	56.35443
NP-237	211.5600	28-FEB-2006	4437.183	4902.948	17025.00	0.3353024	1.6960930E-02	65.36469
CM-244	248.5200	28-FEB-2006	5532.612	5885.240	17789.00	0.3365124	1.7013798E-02	57.27279

Instrument : CHAMBER 109
 Detector : 31693
 Standard ID : AESS-021
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:45
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:14:12
 Average Efficiency : 0.3172656
 Average Efficiency Error : 6.0536368E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2988.084	3299.184	16099.00	0.3145808	7.0950659E-03	55.32108
NP-237	211.5600	28-FEB-2006	4432.535	4905.875	16551.00	0.3259623	1.6493894E-02	66.04156
CM-244	248.5200	28-FEB-2006	5532.554	5883.883	17073.00	0.3229679	1.6336529E-02	53.16661

Instrument : CHAMBER 110
 Detector : 30447
 Standard ID : AESS-022
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 16:38:46
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 21:08:36
 Average Efficiency : 0.2903691
 Average Efficiency Error : 5.5707125E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2992.012	3300.888	14540.00	0.2839686	6.4464426E-03	65.21424
NP-237	211.6800	28-FEB-2006	4433.842	4901.474	15514.00	0.3053748	1.5464325E-02	67.45113
CM-244	248.6400	28-FEB-2006	5530.607	5884.669	16569.00	0.3133079	1.5853422E-02	61.19852

Instrument : CHAMBER 111
 Detector : 30448
 Standard ID : AESS-023
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:45
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:15:36
 Average Efficiency : 0.3388006
 Average Efficiency Error : 6.4431382E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2987.793	3301.004	17314.00	0.3381375	7.5936201E-03	56.34806
NP-237	211.6800	28-FEB-2006	4435.981	4906.484	17500.00	0.3444386	1.7417673E-02	71.36749
CM-244	248.6400	28-FEB-2006	5530.639	5883.341	17810.00	0.3367471	1.7025441E-02	55.06728

Instrument : CHAMBER 112
 Detector : 30449
 Standard ID : AESS-024
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 3-APR-2006 18:48:45
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 3-APR-2006 23:15:47
 Average Efficiency : 0.3139323
 Average Efficiency Error : 5.9938701E-03
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4200	28-FEB-2006	2991.870	3298.269	15891.00	0.3106862	7.0128250E-03	50.73674
NP-237	211.4400	28-FEB-2006	4436.313	4903.586	16308.00	0.3213587	1.6263809E-02	62.04948
CM-244	248.4000	28-FEB-2006	5533.752	5883.818	17126.00	0.3241271	1.6394578E-02	52.78824

Instrument : CHAMBER 113
 Detector : 45-111B4
 Standard ID : AESS-001
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:36
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:02:58
 Average Efficiency : 0.3703099
 Average Efficiency Error : 1.0161426E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2991.835	3301.848	18597.00	0.3629034	1.5549773E-02	64.50990
NP-237	211.8600	28-FEB-2006	4433.613	4901.946	18886.00	0.3714283	1.8767057E-02	90.91785
CM-244	248.8200	28-FEB-2006	5530.358	5885.560	20134.00	0.3804419	1.9210188E-02	71.11305

Instrument : CHAMBER 114
 Detector : 45-111B5
 Standard ID : AESS-007
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:40
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:03:22
 Average Efficiency : 0.3901447
 Average Efficiency Error : 1.0698882E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2990.875	3299.211	19570.00	0.3824124	1.6373768E-02	64.95810
NP-237	211.5600	28-FEB-2006	4436.329	4903.130	20139.00	0.3966328	2.0027624E-02	80.48977
CM-244	248.5200	28-FEB-2006	5535.235	5884.346	20889.00	0.3951845	1.9947579E-02	69.68978

Instrument : CHAMBER 115
 Detector : 45-132EE5
 Standard ID : AESS-002
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:44
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:03:37
 Average Efficiency : 0.3799683
 Average Efficiency Error : 1.0422695E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2990.466	3300.287	19152.00	0.3743467	1.6033292E-02	67.16986
NP-237	211.5000	28-FEB-2006	4435.908	4903.427	19268.00	0.3795908	1.9175535E-02	85.64700
CM-244	248.4000	28-FEB-2006	5530.487	5884.796	20541.00	0.3887886	1.9627862E-02	69.09605

Instrument : CHAMBER 116
 Detector : 45-132FF2
 Standard ID : AESS-008
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:47
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:03:51
 Average Efficiency : 0.3906634
 Average Efficiency Error : 1.0711731E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2988.161	3302.097	19763.00	0.3856568	1.6510434E-02	61.93254
NP-237	211.8600	28-FEB-2006	4435.898	4903.366	20060.00	0.3945222	1.9921809E-02	83.61416
CM-244	248.8800	28-FEB-2006	5530.965	5885.878	20861.00	0.3940839	1.9892277E-02	67.87167

Instrument : CHAMBER 117
 Detector : 45-132FF3
 Standard ID : AESS-003
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:52
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:04:04
 Average Efficiency : 0.3838457
 Average Efficiency Error : 1.0529065E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.3600	28-FEB-2006	2987.574	3297.481	19157.00	0.3746493	1.6046192E-02	69.46350
NP-237	211.3800	28-FEB-2006	4432.916	4905.417	19746.00	0.3892191	1.9657088E-02	87.03203
CM-244	248.2800	28-FEB-2006	5531.962	5885.886	20722.00	0.3924041	1.9808734E-02	73.89016

Instrument : CHAMBER 118
 Detector : 45-132FF4
 Standard ID : AESS-009
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:56
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:04:21
 Average Efficiency : 0.3946549
 Average Efficiency Error : 1.0820382E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6000	28-FEB-2006	2989.600	3298.996	19935.00	0.3894384	1.6670343E-02	63.05709
NP-237	211.6200	28-FEB-2006	4434.069	4901.807	20060.00	0.3949601	1.9943934E-02	82.03598
CM-244	248.5800	28-FEB-2006	5534.903	5884.430	21258.00	0.4020683	2.0291740E-02	65.29355

Instrument : CHAMBER 119
 Detector : 45-132FF5
 Standard ID : AESS-004
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:00:59
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:04:33
 Average Efficiency : 0.3958072
 Average Efficiency Error : 1.0851006E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2987.490	3300.068	20085.00	0.3931205	1.6826242E-02	64.97130
NP-237	211.2000	28-FEB-2006	4434.344	4905.254	20104.00	0.3966229	2.0027457E-02	79.50690
CM-244	248.1000	28-FEB-2006	5530.554	5884.197	21046.00	0.3988287	2.0130115E-02	68.84389

Instrument : CHAMBER 120
 Detector : 45-142F1
 Standard ID : AESS-010
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:03
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:05:08
 Average Efficiency : 0.3892356
 Average Efficiency Error : 1.0674394E-02
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4800	28-FEB-2006	2991.710	3300.418	19511.00	0.3813637	1.6329555E-02	65.80540
NP-237	211.5000	28-FEB-2006	4437.274	4903.259	19969.00	0.3933960	1.9865829E-02	87.35593
CM-244	248.4600	28-FEB-2006	5533.634	5886.862	20972.00	0.3968505	2.0030931E-02	68.58372

Instrument : CHAMBER 121
 Detector : 45-142J4
 Standard ID : AESS-005
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:07
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:05:19
 Average Efficiency : 0.3879517
 Average Efficiency Error : 1.0639026E-02
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2988.124	3301.600	19515.00	0.3811294	1.6319472E-02	66.81467
NP-237	211.6800	28-FEB-2006	4434.163	4906.581	19891.00	0.3915263	1.9772179E-02	83.76527
CM-244	248.6400	28-FEB-2006	5533.976	5883.453	20862.00	0.3944832	1.9912424E-02	67.69315

Instrument : CHAMBER 122
 Detector : 45-142J5
 Standard ID : AESS-011
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:10
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:05:33
 Average Efficiency : 0.3964319
 Average Efficiency Error : 1.0868002E-02
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.061	3298.780	20106.00	0.3926716	1.6806791E-02	65.77823
NP-237	211.6800	28-FEB-2006	4436.620	4903.419	20147.00	0.3965701	2.0024376E-02	83.48605
CM-244	248.6400	28-FEB-2006	5535.258	5884.098	21247.00	0.4017632	2.0276442E-02	70.88770

Instrument : CHAMBER 123
 Detector : 45-142V1
 Standard ID : AESS-006
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:15
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:05:57
 Average Efficiency : 0.3805304
 Average Efficiency Error : 1.0439763E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.1800	28-FEB-2006	2990.387	3299.522	18959.00	0.3710815	1.5895747E-02	68.66263
NP-237	211.2000	28-FEB-2006	4437.442	4903.641	19446.00	0.3836367	1.9378122E-02	86.99185
CM-244	248.1000	28-FEB-2006	5534.110	5887.297	20682.00	0.3919307	1.9785201E-02	66.84405

Instrument : CHAMBER 124
 Detector : 45-142V2
 Standard ID : AESS-012
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:18
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:06:12
 Average Efficiency : 0.3873872
 Average Efficiency Error : 1.0623961E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2989.443	3297.987	19472.00	0.3797709	1.6261807E-02	64.41782
NP-237	211.9200	28-FEB-2006	4435.559	4902.411	19887.00	0.3909993	1.9745609E-02	86.15575
CM-244	248.9400	28-FEB-2006	5534.467	5883.494	20923.00	0.3951599	1.9946033E-02	70.30408

Instrument : CHAMBER 125
 Detector : 45-142V3
 Standard ID : AESS-013
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:21
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:06:28
 Average Efficiency : 0.3867655
 Average Efficiency Error : 1.0609177E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	220.5600	28-FEB-2006	2992.436	3301.693	19282.00	0.3750422	1.6061539E-02	55.83823
NP-237	212.5200	28-FEB-2006	4433.216	4903.410	20074.00	0.3935665	1.9873424E-02	88.64875
CM-244	249.6600	28-FEB-2006	5531.615	5883.226	21143.00	0.3981633	2.0095672E-02	68.92764

Instrument : CHAMBER 126
 Detector : 45-142V5
 Standard ID : AESS-019
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:25
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:06:44
 Average Efficiency : 0.3776715
 Average Efficiency Error : 1.0360188E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2988.369	3299.131	19021.00	0.3716846	1.5920833E-02	61.61137
NP-237	211.5600	28-FEB-2006	4435.618	4902.366	19293.00	0.3799706	1.9194474E-02	87.82700
CM-244	248.5200	28-FEB-2006	5532.732	5885.449	20309.00	0.3842119	1.9398922E-02	63.11655

Instrument : CHAMBER 127
 Detector : 45-142W1
 Standard ID : AESS-014
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:29
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:07:12
 Average Efficiency : 0.3934290
 Average Efficiency Error : 1.0787830E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.9600	28-FEB-2006	2989.513	3302.392	19757.00	0.3853294	1.6496489E-02	64.47871
NP-237	211.9800	28-FEB-2006	4432.606	4903.961	20292.00	0.3988588	2.0138543E-02	84.68309
CM-244	249.0000	28-FEB-2006	5535.216	5883.874	21190.00	0.4001061	2.0193312E-02	70.60645

Instrument : CHAMBER 128
 Detector : 45-142W2
 Standard ID : AESS-020
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:34
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:07:27
 Average Efficiency : 0.3859246
 Average Efficiency Error : 1.0586893E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2989.584	3299.388	19162.00	0.3739288	1.6015276E-02	59.93734
NP-237	211.8000	28-FEB-2006	4434.590	4901.786	20058.00	0.3945944	1.9925477E-02	79.19832
CM-244	248.8200	28-FEB-2006	5533.622	5887.583	20951.00	0.3958796	1.9982109E-02	66.89229

Instrument : CHAMBER 129
 Detector : 45-142W3
 Standard ID : AESS-015
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:38
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:07:43
 Average Efficiency : 0.3895081
 Average Efficiency Error : 1.0681822E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.8400	28-FEB-2006	2991.668	3299.558	19525.00	0.3810124	1.6314350E-02	61.82140
NP-237	211.8600	28-FEB-2006	4435.149	4901.376	20156.00	0.3964100	2.0016206E-02	81.45658
CM-244	248.8800	28-FEB-2006	5532.751	5886.867	20929.00	0.3953595	1.9956063E-02	71.15770

Instrument : CHAMBER 130
 Detector : 45-142W5
 Standard ID : AESS-021
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:42
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:07:58
 Average Efficiency : 0.3877107
 Average Efficiency Error : 1.0633443E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.5400	28-FEB-2006	2990.831	3301.623	19394.00	0.3789733	1.6228566E-02	61.42154
NP-237	211.5600	28-FEB-2006	4435.787	4904.916	20099.00	0.3958496	1.9988457E-02	82.39708
CM-244	248.5200	28-FEB-2006	5534.223	5884.439	20760.00	0.3927440	1.9825550E-02	67.39270

Instrument : CHAMBER 131
 Detector : 45-145K1
 Standard ID : AESS-016
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:46
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:08:16
 Average Efficiency : 0.3897060
 Average Efficiency Error : 1.0686211E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2989.369	3298.448	19647.00	0.3837073	1.6428316E-02	64.42750
NP-237	211.6800	28-FEB-2006	4432.591	4905.330	20018.00	0.3940307	1.9897401E-02	82.42314
CM-244	248.6400	28-FEB-2006	5532.857	5887.665	20846.00	0.3941807	1.9897297E-02	71.83934

Instrument : CHAMBER 132
 Detector : 45-145K2
 Standard ID : AESS-022
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:49
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:08:32
 Average Efficiency : 0.3905833
 Average Efficiency Error : 1.0710652E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2990.018	3301.016	19613.00	0.3830433	1.6400279E-02	65.20789
NP-237	211.6800	28-FEB-2006	4434.219	4902.195	20056.00	0.3947787	1.9934803E-02	89.44299
CM-244	248.6400	28-FEB-2006	5534.644	5883.351	21028.00	0.3976221	2.0069377E-02	68.53607

Instrument : CHAMBER 133
 Detector : 45-145K3
 Standard ID : AESS-017
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:52
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:09:47
 Average Efficiency : 0.3868218
 Average Efficiency Error : 1.0608377E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7200	28-FEB-2006	2989.115	3302.033	19459.00	0.3799319	1.6268853E-02	67.58065
NP-237	211.7400	28-FEB-2006	4435.237	4904.688	19979.00	0.3931513	1.9853372E-02	78.76342
CM-244	248.7000	28-FEB-2006	5532.486	5884.151	20667.00	0.3907017	1.9723292E-02	68.61700

Instrument : CHAMBER 134
 Detector : 45-145K4
 Standard ID : AESS-023
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:56
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:11:02
 Average Efficiency : 0.3909511
 Average Efficiency Error : 1.0721575E-02
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.6600	28-FEB-2006	2987.530	3301.962	19533.00	0.3814809	1.6334314E-02	58.87649
NP-237	211.6800	28-FEB-2006	4434.547	4905.459	20169.00	0.3970030	2.0046022E-02	84.02620
CM-244	248.6400	28-FEB-2006	5534.869	5887.271	21114.00	0.3992483	2.0150691E-02	67.90365

Instrument : CHAMBER 135
 Detector : 45-145K5
 Standard ID : AESS-018
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:01:59
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:11:53
 Average Efficiency : 0.3932157
 Average Efficiency Error : 1.0781703E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.7800	28-FEB-2006	2990.104	3298.632	19831.00	0.3870894	1.6570982E-02	66.57359
NP-237	211.8000	28-FEB-2006	4434.981	4906.088	20001.00	0.3934731	1.9869408E-02	92.58358
CM-244	248.7600	28-FEB-2006	5531.074	5884.261	21277.00	0.4021365	2.0295015E-02	73.11333

Instrument : CHAMBER 136
 Detector : 45-145L1
 Standard ID : AESS-024
 Standard Reference Date : 7-FEB-2003 00:00:00
 Calibration Analysis Date/Time : 4-APR-2006 12:02:04
 Calibration Count Time : 240.0000
 Efficiency Calibration Date/Time : 4-APR-2006 17:12:12
 Average Efficiency : 0.3798372
 Average Efficiency Error : 1.0422947E-02
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	219.4200	28-FEB-2006	2988.496	3298.473	18764.00	0.3668631	1.5717393E-02	63.35145
NP-237	211.4400	28-FEB-2006	4437.582	4903.436	19751.00	0.3892161	1.9656880E-02	93.25786
CM-244	248.4000	28-FEB-2006	5532.704	5884.860	20649.00	0.3908328	1.9730078E-02	69.15901

General Engineering Laboratories, LLC

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

Gamma Spectrometer Geometry Calibration Package

Detector: GAMMA 3

Geometry: 2L-MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	N/A
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the detector efficiency curve printout included?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: *M. H. Patton*

Date: 3/28/06

Reviewed By: *J. H. Austin*

Date: 3/29/2006

Effective Date: 3/25/06



CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytical maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

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

Q A APPROVED: LM. May 5-12-05

This standard will expire one year after the calibration date.

Library Title :
 Library file name : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
 Date printed : 8-JUL-2005 17:13:45.13
 Number of nuclides : 10
 Number of lines : 17

Nuclide		Nuclide	Key	Energy		Abundance
Name	Half-Life	Type	Line			
CO-57	271.74D		*	122.06	keV	85.51 %
				136.47	keV	10.47 %
CO-60	5.27Y		*	1173.24	keV	99.90 %
				1332.50	keV	99.98 %
Y-88	106.63D		*	898.04	keV	93.40 %
				1836.06	keV	99.38 %
CD-109	461.40D		*	88.03	keV	3.79 %
SN-113	115.09D		*	391.70	keV	64.90 %
CS-137	30.00Y		*	661.66	keV	85.12 %
CE-139	137.64D		*	165.85	keV	80.35 %
HG-203	46.60D			70.83	keV	4.75 %
				72.87	keV	8.00 %
				82.60	keV	3.55 %
				279.20	keV	77.30 %
PB-210	22.26Y		*	46.50	keV	4.05 %
AM-241	432.20Y		*	59.54	keV	35.90 %

Print Time : 14-JUN-2005 17:33:53.22
Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
Certificate title : 2L_MB
Certificate date : 1-APR-2005 12:00:00.00
Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01

Configuration : MCA0:[GAMMA]GAMMA3\$1
 Analyses by : CALIBRATE V1.7, PEAK V16.4, ENBACK V1.5
 Detector Name : GAMMA3 Energy Calib Time: 24-MAR-2006 14:18:51
 Efficiency type : Empirical Effncy Calib Time: 25-MAR-2006 12:15:10
 Detector Geometry: GAMMA3 Shelf : 0

Energy Calibration Report

$$\text{Energy} = -0.4854 + 0.5009 * \text{Channel} + -6.6053E-08 * (\text{Channel} ** 2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	93.86	46.50	46.53	-0.028
2	119.71	59.54	59.47	0.064
3	176.73	88.03	88.03	-0.001
4	244.61	122.06	122.03	0.030
5	332.21	165.85	165.91	-0.057
6	783.12	391.70	391.73	-0.026
7	1322.16	661.66	661.66	0.004
8	1794.29	898.04	898.04	0.000
9	2343.97	1173.24	1173.22	0.020
10	2662.17	1332.50	1332.50	0.002
11	3668.37	1836.06	1836.07	-0.008

FWHM Calibration Report

$$\text{FWHM} = 0.7852 + 4.4197E-02 * (\text{Energy} ** 1/2)$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	1.16	1.09	0.077
2	59.54	1.23	1.13	0.103
3	88.03	1.21	1.20	0.013
4	122.06	1.29	1.27	0.020
5	165.85	1.34	1.35	-0.014
6	391.70	1.54	1.66	-0.117
7	661.66	1.77	1.92	-0.148
8	898.04	1.93	2.11	-0.176
9	1173.24	2.31	2.30	0.010
10	1332.50	2.46	2.40	0.060
11	1836.06	2.85	2.68	0.172

Efficiency Calibration Report

$$\text{Eff} = \exp(a2 + a3 * x + a4 * x ** 2 + a5 * x ** 3 + a6 * x ** 4 + a7 * x ** 5), \quad x = \ln(a1 / \text{energy})$$

a1 a2 a3 a a5 a6 a7
 941.3 -4.837 0.8489 -4.0453E-02 -0.2440 0.2194 -5.9626E-02

Average Deviation = 2.64 % Reduced Chi-Square = 2.78

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
-----	--------------	---------------------	------------------	---------------------	-------------	--------

1	46.50	2.37E-03	7.93E-05	2.45E-03	-0.99	-3.32
---	-------	----------	----------	----------	-------	-------

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	9.24E-03	2.84E-04	8.63E-03	2.17	6.64
3	88.03	2.01E-02	6.71E-04	2.16E-02	-2.23	-7.45
4	122.06	2.59E-02	8.10E-04	2.59E-02	-0.10	-0.30
5	165.85	2.51E-02	7.56E-04	2.45E-02	0.75	2.27
6	391.70	1.53E-02	4.55E-04	1.52E-02	0.29	0.85
7	661.66	1.06E-02	3.22E-04	1.06E-02	-0.02	-0.05
8	898.04	7.95E-03	2.29E-04	8.25E-03	-1.34	-3.86
9	1173.24	6.71E-03	1.84E-04	6.59E-03	0.68	1.88
10	1332.50	6.05E-03	1.60E-04	5.96E-03	0.57	1.50
11	1836.06	4.96E-03	1.39E-04	5.00E-03	-0.34	-0.95

Approved by: Michael D. Brown

Approval Date: 3 / 28 / 06

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]CAL_GAMMA3_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 24-MAR-2006 14:19:23
Sample ID          : CAL_GAMMA3_2LMB           Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA3                     Detector geometry: 2L_MB
Elapsed live time : 0 02:00:00.00             Elapsed real time: 0 02:00:40.14  0.6%
Energy tolerance  : 2.00000 KEV               Analyst Initials  : MJH1
Abundance limit   : 75.00000                 Sensitivity       : 3.00000
Batch ID          :                           Detector SN#      : 12922955
Matrix Spike DPM  :                           LCS DPM       :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	44.20*	628	11288	1.19	89.22	88	11	8.73E-02	22.5	1.04E+01
2	2	46.50*	20374	25061	1.19	93.80	88	11	2.83E+00	1.5	
3	7	51.45	2222	32787	1.95	103.69	99	27	3.09E-01	15.1	6.96E+01
4	7	56.96	6054	36660	1.98	114.69	99	27	8.41E-01	7.3	
5	7	59.52	55204	22930	1.38	119.79	99	27	7.67E+00	0.6	
6	0	67.11	532	20665	1.19	134.96	133	6	7.39E-02	42.8	
7	0	88.02	98031	39926	1.24	176.69	171	13	1.36E+01	0.5	
8	0	103.34	224	12792	1.00	207.28	205	6	3.11E-02	80.2	
9	0	122.03	45211	26355	1.26	244.60	238	14	6.28E+00	0.9	
10	0	136.49	5588	14146	1.33	273.48	270	9	7.76E-01	4.1	
11	0	165.88	25733	15259	1.30	332.16	326	11	3.57E+00	1.1	
12	0	171.90	231	7171	1.44	344.18	342	6	3.21E-02	58.3	
13	0	255.47*	595	6825	1.50	511.04	508	7	8.26E-02	23.5	
14	0	279.06	1545	8990	1.45	558.14	553	11	2.15E-01	12.2	
15	0	327.00	165	3790	1.38	653.86	651	6	2.29E-02	59.6	
16	0	364.56	116	2934	1.33	728.86	727	5	1.61E-02	70.7	
17	0	391.76	14874	7436	1.51	783.18	777	13	2.07E+00	1.5	
18	0	404.87	187	3154	1.16	809.35	807	6	2.60E-02	48.1	
19	0	511.22*	494	5659	3.02	1021.73	1015	14	6.86E-02	32.8	
20	0	629.39*	146	2686	1.13	1257.73	1255	8	2.03E-02	61.9	
21	0	661.68	56950	6351	1.79	1322.21	1313	18	7.91E+00	0.5	
22	0	670.45*	240	2332	1.94	1339.73	1337	8	3.34E-02	35.5	
23	0	743.16	90	1632	1.43	1484.94	1482	6	1.25E-02	71.9	
24	0	814.08*	260	2667	1.87	1626.58	1623	9	3.61E-02	36.4	
25	0	898.02*	17029	5547	2.02	1794.25	1786	16	2.37E+00	1.2	
26	0	1127.75	97	1539	1.48	2253.13	2250	8	1.35E-02	70.9	
27	0	1173.27	60443	3470	2.29	2344.07	2332	22	8.39E+00	0.5	
28	0	1211.79	109	685	1.38	2421.02	2417	9	1.51E-02	44.5	
29	3	1326.20	508	1032	3.19	2649.58	2636	36	7.05E-02	18.3	1.18E+01
30	3	1332.58	55035	758	2.45	2662.33	2636	36	7.64E+00	0.4	
31	0	1704.73	15	248	2.88	3405.91	3402	11	2.02E-03	211.3	
32	0	1737.84	75	257	6.04	3472.08	3466	20	1.05E-02	53.2	
33	0	1836.14	11093	296	3.04	3668.50	3655	25	1.54E+00	1.0	
34	0	1936.13*	39	77	1.21	3868.34	3862	15	5.40E-03	52.6	
35	1	1960.98	47	91	2.74	3918.00	3907	32	6.58E-03	49.5	1.69E+00
36	1	1965.26	53	122	3.02	3926.55	3907	32	7.41E-03	49.0	
37	0	1973.93*	20	48	0.87	3943.87	3942	7	2.78E-03	61.9	
38	0	2002.79	19	23	0.99	4001.56	4000	5	2.70E-03	43.6	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	2014.50	16	35	0.74	4024.95	4022	7	2.22E-03	68.0	
40	0	2027.50	55	99	7.83	4050.94	4041	20	7.58E-03	46.9	

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


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*****
*                                     GENERAL ENG. LABS, LLC.
*                                     2040 Savage Road
*                                     Charleston, SC 29414
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA3_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 25-MAR-2006 12:15:42
Sample ID          : VER_GAMMA3_2LMB           Sample quantity  : 1.00000E+00 LITER
Detector name     : GAMMA3                   Detector geometry: 2L_MB
Elapsed live time : 0 02:00:00.00           Elapsed real time: 0 02:00:40.17  0.6%
Energy tolerance  : 2.00000 KEV             Analyst Initials   : MJH1
Abundance limit   : 75.00000                Sensitivity        : 3.00000
Batch ID          :                          Detector SN#       : 12922955
Matrix Spike DPM  :                          LCS DPM        :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.31*	22306	38270	1.25	93.42	87	11	3.10E+00	1.8	
2	0	50.70	239	21601	0.80	102.18	101	6	3.32E-02	97.4	
3	0	59.43	51982	37800	1.24	119.63	114	11	7.22E+00	0.9	
4	0	68.96*	1332	38053	3.34	138.65	134	11	1.85E-01	28.5	
5	0	87.99	98251	35390	1.24	176.65	172	12	1.36E+01	0.5	
6	0	102.51	211	10600	1.23	205.63	204	5	2.94E-02	73.3	
7	0	122.00	45023	26523	1.27	244.55	238	14	6.25E+00	0.9	
8	0	126.47*	356	9694	1.71	253.46	251	6	4.94E-02	44.1	
9	0	136.50	5834	15624	1.32	273.50	269	10	8.10E-01	4.2	
10	0	165.86	26424	17073	1.35	332.12	326	13	3.67E+00	1.2	
11	0	255.08	989	8479	1.67	510.26	506	9	1.37E-01	17.1	
12	0	279.29*	1341	7267	1.68	558.59	555	9	1.86E-01	11.8	
13	0	363.12	178	4820	1.37	725.99	723	8	2.47E-02	68.0	
14	0	391.77	14658	7413	1.53	783.20	777	13	2.04E+00	1.5	
15	0	396.85	232	4199	1.07	793.35	790	8	3.23E-02	48.8	
16	0	463.87	160	3728	1.73	927.18	925	7	2.23E-02	63.6	
17	0	511.11*	295	4751	2.15	1021.52	1016	11	4.09E-02	45.9	
18	0	527.99	40	3074	1.24	1055.21	1052	8	5.52E-03	242.6	
19	0	564.27	174	2670	1.52	1127.66	1124	8	2.42E-02	52.0	
20	0	661.72	57398	5713	1.78	1322.30	1313	17	7.97E+00	0.5	
21	0	692.28	72	2535	1.31	1383.32	1380	8	9.93E-03	122.4	
22	0	814.12*	169	3018	2.32	1626.66	1621	10	2.34E-02	61.6	
23	0	882.72*	106	3278	0.78	1763.68	1759	10	1.48E-02	101.3	
24	0	888.78	160	3124	1.34	1775.80	1771	10	2.23E-02	65.6	
25	0	898.16*	16680	5764	2.01	1794.53	1787	16	2.32E+00	1.3	
26	0	1103.06	144	2288	2.18	2203.81	2199	9	2.01E-02	60.3	
27	0	1131.07	54	1459	1.27	2259.76	2258	8	7.44E-03	124.3	
28	0	1173.38	61273	3182	2.28	2344.29	2332	22	8.51E+00	0.5	
29	0	1227.58	83	797	1.38	2452.56	2447	11	1.16E-02	66.7	
30	0	1246.59*	37	487	1.32	2490.55	2486	8	5.11E-03	105.4	
31	3	1290.37	137	663	2.37	2578.00	2572	15	1.90E-02	38.1	4.57E+00
32	3	1292.92	94	415	1.73	2583.10	2572	15	1.31E-02	39.3	
33	3	1325.70	410	913	3.19	2648.58	2641	32	5.69E-02	16.5	1.12E+01
34	3	1332.71	55322	839	2.47	2662.59	2641	32	7.68E+00	0.4	
35	0	1436.49	53	404	3.55	2869.93	2864	11	7.30E-03	75.4	
36	0	1493.79	42	393	1.34	2984.42	2980	10	5.79E-03	90.4	
37	0	1504.48	42	382	1.04	3005.79	2999	10	5.78E-03	89.6	
38	0	1524.49	49	623	2.97	3045.76	3040	15	6.74E-03	113.0	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1561.89	58	329	1.70	3120.49	3118	8	8.11E-03	55.3	
40	0	1836.37	10911	190	3.05	3668.97	3657	25	1.52E+00	1.0	
41	0	1870.62	25	36	1.56	3737.42	3734	7	3.48E-03	45.3	
42	0	2038.82	18	26	1.46	4073.56	4071	6	2.48E-03	50.8	

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

VAX/VMS Nuclide Identification Report Generated

 * General Eng. Labs, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

DETECTOR DATA

* Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA3_2 *
 * Acquisition date : 25-MAR-2006 12:15:42 Detector SN# : 12922955 *
 * Detector ID : GAMMA3 Sensitivity : 3.000 *
 * Geometry : 2L_MB Energy tolerance: 2.000 *
 * Elapsed live time: 0 02:00:00.00 Abundance limit : 75.000 *
 * Elapsed real time: 0 02:00:40.17 Half life ratio : 8.000 *

SAMPLE DATA

* Sample date : 1-APR-2005 12:00:00 Nuclide Library : *
 * Sample ID : VER_GAMMA3_2LMB Analyst initials: MJH1 *
 * Batch Number : Sample Quantity : 1.0000E+00 LITER *
 * Recovery : 1.00000 Carrier Weight : 0.00000 *

QC DATA

* Standard Weight : 0.00000 *
 * CALIB. DATE/TIME : 25-MAR-2006 12:15:10 MS Isotope : *
 * MSD DPM : 0.000 MSD Isotope : *
 * LCS DPM : 0.000 LCS Isotope : *
 * LCSD DPM : 0.000 LCSD Isotope : *

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.899E+04	1.247E+03	2.190E+02	0.000E+00
CO-60	3.966E+04	2.468E+03	8.477E+01	0.000E+00
Y-88	8.445E+04	5.250E+03	5.045E+02	0.000E+00
CD-109	7.728E+05	1.260E+05	5.080E+03	0.000E+00
SN-113	4.834E+04	3.537E+03	1.074E+03	0.000E+00
CS-137	2.451E+04	1.520E+03	1.159E+02	0.000E+00
CE-139	3.058E+04	2.476E+03	5.184E+02	0.000E+00
HG-203	7.183E+04	1.789E+04	2.015E+04	0.000E+00
PB-210	8.933E+05	9.806E+04	2.476E+04	0.000E+00
AM-241	6.352E+04	1.024E+04	7.857E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)
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*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA3_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 25-MAR-2006 12:15:42
Sample ID          : VER_GAMMA3_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA3                   Detector geometry: 2L_MB
Elapsed live time : 0 02:00:00.00           Elapsed real time: 0 02:00:40.17 0.6%
Energy tolerance  : 2.00000 KEV             Analyst Initials  : MJH1
Abundance limit   : 75.00000                Sensitivity       : 3.00000
Batch ID          :                          Detector SN#     : 12922955
Matrix Spike DPM  :                          LCS DPM      :
*****
    
```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	45023	85.51*	2.594E+00	7.620E+03	1.899E+04	6.57
	136.47	5834	10.47	2.584E+00	8.093E+03	2.017E+04	11.28
CO-60	1173.24	61273	99.90	6.587E-01	3.495E+04	3.976E+04	6.84
	1332.50	55322	99.98*	5.958E-01	3.486E+04	3.966E+04	6.22
Y-88	898.04	16680	93.40	8.254E-01	8.122E+03	8.327E+04	9.67
	1836.06	10911	99.38*	5.004E-01	8.237E+03	8.445E+04	6.22
CD-109	88.03	98251	3.79*	2.156E+00	4.513E+05	7.728E+05	16.30
SN-113	391.70	14658	64.90*	1.515E+00	5.594E+03	4.834E+04	7.32
CS-137	661.66	57398	85.12*	1.056E+00	2.396E+04	2.451E+04	6.20
CE-139	165.85	26424	80.35*	2.450E+00	5.039E+03	3.058E+04	8.10
HG-203	70.83	1332	4.75	1.377E+00	7.644E+03	1.571E+06	59.71
	72.87	-----	8.00	1.573E+00	-----	Line Not Found	-----
	82.60	-----	3.55	1.982E+00	-----	Line Not Found	-----
	279.20	1341	77.30*	1.864E+00	3.494E+02	7.183E+04	24.90
PB-210	46.50	22306	4.05*	2.386E-01	8.665E+05	8.933E+05	10.98
AM-241	59.54	51982	35.90*	8.570E-01	6.342E+04	6.352E+04	16.12

Flag: "*" = Keyline

Total number of lines in spectrum 42
 Number of unidentified lines 28
 Number of lines tentatively identified by NID 14 33.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	2.49	7.620E+03	1.899E+04	0.125E+04	6.57	
CO-60	5.27Y	1.14	3.486E+04	3.966E+04	0.247E+04	6.22	
Y-88	106.63D	10.3	8.237E+03	8.445E+04	0.525E+04	6.22	
CD-109	461.40D	1.71	4.513E+05	7.728E+05	1.260E+05	16.30	
SN-113	115.09D	8.64	5.594E+03	4.834E+04	0.354E+04	7.32	
CS-137	30.00Y	1.02	2.396E+04	2.451E+04	0.152E+04	6.20	
CE-139	137.64D	6.07	5.039E+03	3.058E+04	0.248E+04	8.10	
HG-203	46.60D	206.	3.494E+02	7.183E+04	1.789E+04	24.90	
PB-210	22.26Y	1.03	8.665E+05	8.933E+05	0.981E+05	10.98	
AM-241	432.20Y	1.00	6.342E+04	6.352E+04	1.024E+04	16.12	
Total Activity :			1.467E+06	2.048E+06			

Grand Total Activity : 1.467E+06 2.048E+06

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	50.70	239	21601	0.80	102.18	101	6	3.32E-02	****	4.12E-01	
0	102.51	211	10600	1.23	205.63	204	5	2.94E-02	****	2.46E+00	
0	126.47	356	9694	1.71	253.46	251	6	4.94E-02	88.2	2.60E+00	
0	255.08	989	8479	1.67	510.26	506	9	1.37E-01	34.2	1.97E+00	
0	363.12	178	4820	1.37	725.99	723	8	2.47E-02	****	1.59E+00	
0	396.85	232	4199	1.07	793.35	790	8	3.23E-02	97.6	1.50E+00	
0	463.87	160	3728	1.73	927.18	925	7	2.23E-02	****	1.36E+00	
0	511.11	295	4751	2.15	1021.52	1016	11	4.09E-02	91.9	1.27E+00	
0	527.99	40	3074	1.24	1055.21	1052	8	5.52E-03	****	1.25E+00	
0	564.27	174	2670	1.52	1127.66	1124	8	2.42E-02	****	1.19E+00	
0	692.28	72	2535	1.31	1383.32	1380	8	9.93E-03	****	1.02E+00	
0	814.12	169	3018	2.32	1626.66	1621	10	2.34E-02	****	8.96E-01	
0	882.72	106	3278	0.78	1763.68	1759	10	1.48E-02	****	8.38E-01	
0	888.78	160	3124	1.34	1775.80	1771	10	2.23E-02	****	8.33E-01	
0	1103.06	144	2288	2.18	2203.81	2199	9	2.01E-02	****	6.93E-01	
0	1131.07	54	1459	1.27	2259.76	2258	8	7.44E-03	****	6.79E-01	
0	1227.58	83	797	1.38	2452.56	2447	11	1.16E-02	****	6.35E-01	
0	1246.59	37	487	1.32	2490.55	2486	8	5.11E-03	****	6.27E-01	
3	1290.37	137	663	2.37	2578.00	2572	15	1.90E-02	76.1	6.11E-01	
3	1292.92	94	415	1.73	2583.10	2572	15	1.31E-02	78.5	6.10E-01	
3	1325.70	410	913	3.19	2648.58	2641	32	5.69E-02	33.1	5.98E-01	
0	1436.49	53	404	3.55	2869.93	2864	11	7.30E-03	****	5.65E-01	
0	1493.79	42	393	1.34	2984.42	2980	10	5.79E-03	****	5.50E-01	
0	1504.48	42	382	1.04	3005.79	2999	10	5.78E-03	****	5.48E-01	
0	1524.49	49	623	2.97	3045.76	3040	15	6.74E-03	****	5.44E-01	
0	1561.89	58	329	1.70	3120.49	3118	8	8.11E-03	****	5.36E-01	
0	1870.62	25	36	1.56	3737.42	3734	7	3.48E-03	90.6	4.98E-01	
0	2038.82	18	26	1.46	4073.56	4071	6	2.48E-03	****	4.94E-01	

Flags: "T" = Tentatively associated

```

*****
*                                     GENERAL ENG. LABS, LLC.                                     *
*                                     2040 Savage Road                                       *
*                                     Charleston, SC 29414                                   *
*****
*
*                                     DETECTOR DATA                                       *
*
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA3_2LMB.CNF;1*
* Acquisition date   : 25-MAR-2006 12:15:42  Detector SN#      : 12922955          *
* Detector ID        : GAMMA3                  Sensitivity       : 3.00000          *
* Geometry           : 2L MB                   Energy tolerance: 2.00000          *
* Elapsed live time  : 0 02:00:00.00           Abundance limit  : 75.00000          *
* Elapsed real time  : 0 02:00:40.17           Half life ratio  : 8.00000          *
*****
*
*                                     SAMPLE DATA                                       *
*
* Sample date        : 1-APR-2005 12:00:00.  Nuclide Library : CAL                *
* Sample ID          : VER_GAMMA3_2LMB        Analyst initials: MJH1              *
* Batch Number       :                        Sample Quantity : 1.00000E+00 LITER *
*****
*
*                                     QC DATA                                           *
*
* CALIB. DATE/TIME  : 25-MAR-2006 12:15:10.6MS Isotope      :                    *
* MSD DPM            :                          MSD Isotope   :                    *
* LCS DPM            :                          LCS Isotope   :                    *
*****

```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.899E+04	1.247E+03	2.190E+02	1.380E+01	86.712
CO-60	3.966E+04	2.468E+03	8.477E+01	5.222E+00	467.849
Y-88	8.445E+04	5.250E+03	5.045E+02	2.964E+01	167.394
CD-109	7.728E+05	1.260E+05	5.080E+03	8.267E+02	152.134
SN-113	4.834E+04	3.537E+03	1.074E+03	7.203E+01	44.985
CS-137	2.451E+04	1.520E+03	1.159E+02	7.090E+00	211.397
CE-139	3.058E+04	2.476E+03	5.184E+02	4.012E+01	58.979
HG-203	7.183E+04	1.789E+04	2.015E+04	1.606E+03	3.564
PB-210	8.933E+05	9.806E+04	2.476E+04	2.506E+03	36.084
AM-241	6.352E+04	1.024E+04	7.857E+02	1.260E+02	80.847

QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_GAMMA3.QAF;1

Sample ID : BKG_GAMMA3 Sample quantity : 1.80 LITER
Sample date : 18-MAR-2006 00:00:00 Acquisition date : 18-MAR-2006 14:54:54
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:05.61

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	9.29E+04	9.86E+04	9.68E+04	
BACKGROUND (CPS)	1.54	1.64	1.61	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by:  _____ Approval Date: 3 / 19 / 06

Gamma Spectroscopy Calibration Verification

Instrument: Gamma 3

Calibration Date: 3/24/2006

Geometry: 2L_MB

Standard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Pb-210		8.2015E+05	8.933E+05	8.92
Am-241		6.2561E+04	6.352E+04	1.53
Cd-109		8.2579E+05	7.728E+05	-6.42
Co-57		1.9081E+04	1.899E+04	-0.48
Ce-139		2.8981E+04	3.058E+04	5.52
Sn-113		4.8349E+04	4.834E+04	-0.02
Cs-137		2.4325E+04	2.451E+04	0.76
Co-60	1332.5	3.8845E+04	3.966E+04	2.10
Y-88	1836.06	8.6210E+04	8.445E+04	-2.04

Prepared By: Michael J. Sutton

Date: 3/28/06 ^{TMA 3/29/2006}

Reviewed By: J. L. Austin

Date: 3/29/2006

General Engineering Laboratories, LLC

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

Gamma Spectrometer Front End Electronics Setup

Detector: GAMMA 3

Date Performed: 3/24/06

Performed By: Michael Wilson

<p>High Voltage Power Supply</p> <p>Model No. <u>3106 D</u> High Voltage <u>2.5 kV</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2025</u> Course Gain <u>20</u> Fine Gain <u>0.575</u> Time Constant <u>4 μsec.</u> Input polarity <u>POSITIVE</u> BSLR rate <u>NORMAL</u> BSLR mode <u>SYM</u> Threshold <u>OFF</u></p>
<p>ADC</p> <p>Model No. <u>8701</u> Gain <u>4K</u></p>	
<p>AIM Module</p> <p>Model No. <u>ND556</u> Address <u>NI3F7:1</u></p>	

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
 (803)556-8171

Gamma Spectrometer Geometry Calibration Package

Detector: GAMMA 6

Geometry: ZL-MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	N/A
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the detector efficiency curve printout included?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Michael Patten

Date: 12/29/05

Reviewed By: John J. Lavett

Date: 12/29/2005

Effective Date: 12/29/05

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
(803)556-8171

Gamma Spectrometer Front End Electronics Setup

Detector: GAMMA b

Date Performed: 12/27/05

Performed By: Mikhael Pitta

<p>High Voltage Power Supply</p> <p>Model No. <u>3106D</u> High Voltage <u>3000V</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2026</u> Course Gain <u>100</u> Fine Gain <u>0.577</u> Time Constant <u>6 μsec.</u> Input polarity <u>POSITIVE</u> BSLR rate <u>N/A</u> BSLR mode <u>N/A</u> Threshold <u>N/A</u></p>
<p>ADC</p> <p>Model No. <u>8701</u> Gain <u>4000</u></p>	
<p>AIM Module</p> <p>Model No. <u>ND556</u> Address <u>NI4DC:1</u></p>	

Gamma Spectroscopy Calibration Verification

Instrument: Gamma 6

Calibration Date: 12/29/2005

Geometry: 2L_MB

Standard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Pb-210		8.2015E+05	8.572E+05	4.52
Am-241		6.2561E+04	6.197E+04	-0.94
Cd-109		8.2579E+05	7.723E+05	-6.48
Co-57		1.9081E+04	1.907E+04	-0.06
Ce-139		2.8981E+04	3.023E+04	4.31
Sn-113		4.8349E+04	4.902E+04	1.39
Cs-137		2.4325E+04	2.423E+04	-0.39
Y-88	1836.06	8.6210E+04	8.618E+04	-0.03
Co-60	1332.5	3.8845E+04	3.974E+04	2.30

Prepared By: *Michael Nations*

Date: 12/29/05

Reviewed By: *Jh Lanoie*

Date: 12/29/2005

Verified:

QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_GAMMA6.QAF;2

Sample ID : BKG_GAMMA6 Sample quantity : 1.80 LITER
Sample date : 24-DEC-2005 00:00:00 Acquisition date : 24-DEC-2005 19:01:51
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.45

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	1.07E+05	1.24E+05	1.10E+05	
BACKGROUND (CPS)	1.79	2.07	1.84	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: SRB

Approval Date: 12 / 25 / 05

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA6_2LMB.CNF;1
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 29-DEC-2005 05:34:59
 Sample ID : VER_GAMMA6_2LMB Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA6 Detector geometry: 2L_MB
 Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:53.92 0.7%
 Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 1922827
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.40*	17259	33023	1.02	94.07	89	9	2.40E+00	2.0	
2	4	57.32	1924	15819	1.37	115.86	114	11	2.67E-01	9.2	2.72E+01
3	4	59.51	42854	20590	0.95	120.23	114	11	5.95E+00	0.7	
4	0	66.73*	615	25393	2.01	134.64	132	7	8.55E-02	43.0	
5	0	70.50	587	22915	1.80	142.16	140	6	8.15E-02	41.0	
6	0	88.01	99704	37187	0.99	177.10	172	11	1.38E+01	0.5	
7	0	122.04	51226	25234	1.01	245.03	239	12	7.11E+00	0.8	
8	0	136.48	6598	15797	1.05	273.83	270	9	9.16E-01	3.7	
9	0	165.87*	36739	19666	1.11	332.49	325	13	5.10E+00	0.9	
10	0	255.32	970	8225	1.14	511.02	508	8	1.35E-01	16.5	
11	0	279.23	3904	7800	1.18	558.75	555	9	5.42E-01	4.4	
12	0	341.00	156	5215	1.37	682.03	679	8	2.16E-02	80.8	
13	0	366.83	210	4201	1.61	733.60	731	7	2.92E-02	51.5	
14	0	391.77	22191	6497	1.26	783.38	778	11	3.08E+00	1.0	
15	0	446.46*	218	4180	1.84	892.55	889	8	3.03E-02	51.7	
16	0	465.52	216	4353	1.62	930.60	928	8	3.00E-02	53.3	
17	0	510.83*	157	4145	1.59	1021.05	1017	9	2.19E-02	74.7	
18	0	603.30	34	2613	0.56	1205.65	1203	7	4.72E-03	249.9	
19	0	661.72*	50415	5892	1.48	1322.28	1314	16	7.00E+00	0.6	
20	0	777.51	163	1908	1.25	1553.48	1551	7	2.27E-02	45.0	
21	0	814.25	382	2683	1.44	1626.84	1622	9	5.31E-02	25.0	
22	0	821.51	131	2062	1.46	1641.34	1639	7	1.82E-02	58.3	
23	0	898.08*	26605	5337	1.59	1794.24	1786	16	3.70E+00	0.9	
24	0	1086.05	76	1740	1.35	2169.62	2167	7	1.06E-02	91.8	
25	0	1173.20	54911	2988	1.82	2343.69	2334	19	7.63E+00	0.5	
26	0	1183.47	61	693	1.06	2364.20	2362	6	8.46E-03	69.8	
27	0	1325.19*	145	858	2.81	2647.28	2645	8	2.02E-02	36.6	
28	0	1332.41	50394	1355	1.91	2661.72	2652	18	7.00E+00	0.5	
29	0	1445.89	23	376	1.40	2888.40	2884	7	3.19E-03	141.6	
30	0	1594.55	79	466	2.05	3185.42	3182	7	1.10E-02	46.8	
31	0	1598.22	32	421	0.87	3192.75	3188	6	4.45E-03	102.7	
32	0	1617.97*	45	204	1.42	3232.21	3230	5	6.30E-03	49.8	
33	0	1727.18*	41	113	1.95	3450.44	3447	7	5.72E-03	45.6	
34	0	1836.18	16739	376	2.21	3668.26	3657	22	2.32E+00	0.8	
35	0	1877.53	39	61	2.42	3750.88	3747	10	5.47E-03	40.2	
36	0	1973.63	47	79	4.75	3942.95	3935	16	6.59E-03	44.5	
37	0	2000.75	22	21	1.37	3997.15	3995	5	3.05E-03	38.0	
38	1	2024.69	64	67	2.19	4045.00	4039	26	8.94E-03	25.1	4.79E+00

Peak Search Report (continued)
Sample ID : VER_GAMMA6_2LMB

Page : 2
Acquisition date : 29-DEC-2005 05:34:59

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	1	2027.19*	30	73	2.19	4050.00	4039	26	4.16E-03	63.0	

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

VAX/VMS Nuclide Identification Report Generated

 * General Eng. Labs, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

DETECTOR DATA

* Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER GAMMA6_2 *
 * Acquisition date : 29-DEC-2005 05:34:59 Detector SN# : 1922827 *
 * Detector ID : GAMMA6 Sensitivity : 3.000 *
 * Geometry : 2L_MB Energy tolerance: 2.000 *
 * Elapsed live time: 0 02:00:00.00 Abundance limit : 75.000 *
 * Elapsed real time: 0 02:00:53.92 Half life ratio : 8.000 *

SAMPLE DATA

* Sample date : 1-APR-2005 12:00:00 Nuclide Library : FERMC *
 * Sample ID : VER_GAMMA6_2LMB Analyst initials: MJH1 *
 * Batch Number : Sample Quantity : 1.0000E+00 LITER *
 * Recovery : 1.00000 Carrier Weight : 0.00000 *

QC DATA

* Standard Weight : 0.00000 *
 * CALIB. DATE/TIME : 29-DEC-2005 05:08:19 MS Isotope : *
 * MSD DPM : ***** MSD Isotope : *
 * LCS DPM : 0.000 LCS Isotope : *
 * LCSD DPM : 0.000 LCSD Isotope : *

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.907E+04	2.909E+02	1.820E+02	0.000E+00
CO-60	3.974E+04	3.790E+02	1.098E+02	0.000E+00
Y-88	8.618E+04	1.426E+03	3.030E+02	0.000E+00
CD-109	7.723E+05	7.634E+03	4.738E+03	0.000E+00
SN-113	4.902E+04	9.538E+02	6.617E+02	0.000E+00
CS-137	2.423E+04	2.716E+02	1.211E+02	0.000E+00
CE-139	3.023E+04	5.702E+02	3.514E+02	0.000E+00
HG-203	6.460E+04	5.665E+03	5.695E+03	0.000E+00
PB-210	8.572E+05	3.512E+04	2.870E+04	0.000E+00
AM-241	6.197E+04	8.989E+02	8.638E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)
---------	--------------------------------------	--------------------------	---------------------

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA6_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 29-DEC-2005 05:34:59
Sample ID          : VER_GAMMA6_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name      : GAMMA6                  Detector geometry: 2L_MB
Elapsed live time  : 0 02:00:00.00          Elapsed real time: 0 02:00:53.92  0.7%
Energy tolerance   : 2.00000 KEV            Analyst Initials  : MJH1
Abundance limit    : 75.00000              Sensitivity       : 3.00000
Batch ID           :                        Detector SN#      : 1922827
Matrix Spike DPM   :                        LCS DPM        :
*****

```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	51226	85.51*	2.359E+00	9.534E+03	1.907E+04	1.53
	136.47	6598	10.47	2.355E+00	1.005E+04	2.009E+04	7.30
CO-60	1173.24	54911	99.90	5.826E-01	3.541E+04	3.906E+04	0.98
	1332.50	50394	99.98*	5.251E-01	3.603E+04	3.974E+04	0.95
Y-88	898.04	26605	93.40	7.308E-01	1.463E+04	8.561E+04	1.74
	1836.06	16739	99.38*	4.293E-01	1.473E+04	8.618E+04	1.65
CD-109	88.03	99704	3.79*	1.923E+00	5.134E+05	7.723E+05	0.99
SN-113	391.70	22191	64.90*	1.345E+00	9.539E+03	4.902E+04	1.95
CS-137	661.66	50415	85.12*	9.336E-01	2.381E+04	2.423E+04	1.12
CE-139	165.85	36739	80.35*	2.231E+00	7.693E+03	3.023E+04	1.89
HG-203	70.83	587	4.75	1.263E+00	3.674E+03	2.093E+05	82.05
	72.87	-----	8.00	1.371E+00	-----	Line Not Found	-----
	82.60	-----	3.55	1.756E+00	-----	Line Not Found	-----
	279.20	3904	77.30*	1.672E+00	1.134E+03	6.460E+04	8.77
PB-210	46.50	17259	4.05*	1.910E-01	8.376E+05	8.572E+05	4.10
AM-241	59.54	42854	35.90*	7.239E-01	6.190E+04	6.197E+04	1.45

Flag: "*" = Keyline

Total number of lines in spectrum 39
 Number of unidentified lines 25
 Number of lines tentatively identified by NID 14 35.90%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	2.00	9.534E+03	1.907E+04	0.029E+04	1.53	
CO-60	5.27Y	1.10	3.603E+04	3.974E+04	0.038E+04	0.95	
Y-88	106.63D	5.85	1.473E+04	8.618E+04	0.143E+04	1.65	
CD-109	461.40D	1.50	5.134E+05	7.723E+05	0.076E+05	0.99	
SN-113	115.09D	5.14	9.539E+03	4.902E+04	0.095E+04	1.95	
CS-137	30.00Y	1.02	2.381E+04	2.423E+04	0.027E+04	1.12	
CE-139	137.64D	3.93	7.693E+03	3.023E+04	0.057E+04	1.89	
HG-203	46.60D	57.0	1.134E+03	6.460E+04	0.567E+04	8.77	
PB-210	22.26Y	1.02	8.376E+05	8.572E+05	0.351E+05	4.10	
AM-241	432.20Y	1.00	6.190E+04	6.197E+04	0.090E+04	1.45	
Total Activity :			1.515E+06	2.005E+06			

Grand Total Activity : 1.515E+06 2.005E+06

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	57.32	1924	15819	1.37	115.86	114	11	2.67E-01	18.5	6.19E-01	
0	66.73	615	25393	2.01	134.64	132	7	8.55E-02	86.0	1.08E+00	
0	255.32	970	8225	1.14	511.02	508	8	1.35E-01	33.0	1.77E+00	
0	341.00	156	5215	1.37	682.03	679	8	2.16E-02	****	1.47E+00	
0	366.83	210	4201	1.61	733.60	731	7	2.92E-02	****	1.40E+00	
0	446.46	218	4180	1.84	892.55	889	8	3.03E-02	****	1.23E+00	
0	465.52	216	4353	1.62	930.60	928	8	3.00E-02	****	1.20E+00	
0	510.83	157	4145	1.59	1021.05	1017	9	2.19E-02	****	1.13E+00	
0	603.30	34	2613	0.56	1205.65	1203	7	4.72E-03	****	1.00E+00	
0	777.51	163	1908	1.25	1553.48	1551	7	2.27E-02	90.0	8.23E-01	
0	814.25	382	2683	1.44	1626.84	1622	9	5.31E-02	50.0	7.93E-01	
0	821.51	131	2062	1.46	1641.34	1639	7	1.82E-02	****	7.87E-01	
0	1086.05	76	1740	1.35	2169.62	2167	7	1.06E-02	****	6.22E-01	
0	1183.47	61	693	1.06	2364.20	2362	6	8.46E-03	****	5.78E-01	
0	1325.19	145	858	2.81	2647.28	2645	8	2.02E-02	73.3	5.27E-01	
0	1445.89	23	376	1.40	2888.40	2884	7	3.19E-03	****	4.93E-01	
0	1594.55	79	466	2.05	3185.42	3182	7	1.10E-02	93.5	4.62E-01	
0	1598.22	32	421	0.87	3192.75	3188	6	4.45E-03	****	4.61E-01	
0	1617.97	45	204	1.42	3232.21	3230	5	6.30E-03	99.6	4.58E-01	
0	1727.18	41	113	1.95	3450.44	3447	7	5.72E-03	91.2	4.41E-01	
0	1877.53	39	61	2.42	3750.88	3747	10	5.47E-03	80.4	4.26E-01	
0	1973.63	47	79	4.75	3942.95	3935	16	6.59E-03	89.1	4.20E-01	
0	2000.75	22	21	1.37	3997.15	3995	5	3.05E-03	75.9	4.18E-01	
1	2024.69	64	67	2.19	4045.00	4039	26	8.94E-03	50.3	4.17E-01	
1	2027.19	30	73	2.19	4050.00	4039	26	4.16E-03	****	4.17E-01	

Flags: "T" = Tentatively associated

```
*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
```

DETECTOR DATA

```
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA6_2LMB.CNF;1*
* Acquisition date   : 29-DEC-2005 05:34:59  Detector SN#      : 1922827
* Detector ID        : GAMMA6                  Sensitivity         : 3.00000
* Geometry           : 2L_MB                   Energy tolerance    : 2.00000
* Elapsed live time  : 0 02:00:00.00           Abundance limit    : 75.00000
* Elapsed real time  : 0 02:00:53.92           Half life ratio    : 8.00000
*****
```

SAMPLE DATA

```
* Sample date        : 1-APR-2005 12:00:00.  Nuclide Library   : CAL
* Sample ID          : VER_GAMMA6_2LMB        Analyst initials  : MJH1
* Batch Number       :                       Sample Quantity   : 1.00000E+00 LITER
*****
```

QC DATA

```
* CALIB. DATE/TIME  : 29-DEC-2005 05:08:19.2MS Isotope      :
* MSD DPM           :                          MSD Isotope   :
* LCS DPM           :                          LCS Isotope   :
*****
```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.907E+04	2.909E+02	1.820E+02	0.000E+00	104.758
CO-60	3.974E+04	3.790E+02	1.098E+02	0.000E+00	361.821
Y-88	8.618E+04	1.426E+03	3.030E+02	0.000E+00	284.472
CD-109	7.723E+05	7.634E+03	4.738E+03	0.000E+00	163.003
SN-113	4.902E+04	9.538E+02	6.617E+02	0.000E+00	74.080
CS-137	2.423E+04	2.716E+02	1.211E+02	0.000E+00	200.130
CE-139	3.023E+04	5.702E+02	3.514E+02	0.000E+00	86.044
HG-203	6.460E+04	5.665E+03	5.695E+03	0.000E+00	11.342
PB-210	8.572E+05	3.512E+04	2.870E+04	0.000E+00	29.864
AM-241	6.197E+04	8.989E+02	8.638E+02	0.000E+00	71.739

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]CAL_GAMMA6_2L_MB.CNF;3
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 28-DEC-2005 16:02:00
 Sample ID : CAL_GAMMA6_2L_MB Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA6 Detector geometry: 2L_MB
 Elapsed live time: 0 08:00:00.00 Elapsed real time: 0 08:03:35.88 0.7%
 Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 1922827
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.38*	65073	152559	1.04	94.03	88	10	2.26E+00	1.2	
2	2	55.89*	6858	78352	0.93	113.00	99	26	2.38E-01	6.7	4.54E+02
3	2	59.53	183650	73569	1.07	120.28	99	26	6.38E+00	0.3	
4	10	68.68*	6559	156832	2.48	138.53	133	19	2.28E-01	11.9	1.51E+01
5	10	72.49	2085	147084	1.71	146.13	133	19	7.24E-02	34.4	
6	10	81.50	11427	211154	2.54	164.12	156	27	3.97E-01	8.5	3.30E+02
7	10	84.38*	28152	161612	1.92	169.87	156	27	9.78E-01	2.9	
8	10	88.07	411454	68944	1.04	177.22	156	27	1.43E+01	0.2	
9	7	120.52*	4535	74408	2.04	241.98	238	13	1.57E-01	13.0	2.50E+00
10	7	122.12	197963	51209	1.00	245.17	238	13	6.87E+00	0.3	
11	0	136.51	26079	63217	1.02	273.90	270	9	9.06E-01	1.8	
12	0	165.92*	145537	72180	1.11	332.59	327	12	5.05E+00	0.5	
13	0	187.98*	484	31182	1.96	376.62	374	6	1.68E-02	58.1	
14	0	255.15	4015	32963	1.16	510.69	507	8	1.39E-01	8.0	
15	0	279.27	16778	34760	1.18	558.81	554	10	5.83E-01	2.2	
16	0	310.76	444	17697	1.49	621.68	619	6	1.54E-02	47.6	
17	0	391.76	88976	30447	1.26	783.36	777	13	3.09E+00	0.5	
18	0	398.67*	150	17944	1.23	797.16	794	8	5.20E-03	155.5	
19	0	443.59	299	17663	1.93	886.82	885	8	1.04E-02	77.1	
20	0	491.34	113	12841	0.83	982.13	979	7	3.92E-03	167.0	
21	0	510.92*	1995	21126	1.97	1021.22	1016	12	6.93E-02	14.9	
22	5	657.01	1426	13443	2.48	1312.87	1308	21	4.95E-02	14.7	2.06E+01
23	5	661.66*	200294	13106	1.46	1322.17	1308	21	6.95E+00	0.2	
24	0	743.72	257	8163	1.19	1486.02	1484	7	8.93E-03	58.6	
25	0	764.62*	135	6916	0.90	1527.73	1525	6	4.70E-03	97.8	
26	0	813.98	1335	10911	1.36	1626.30	1622	9	4.64E-02	14.4	
27	0	822.79	308	9724	0.70	1643.89	1641	8	1.07E-02	56.0	
28	0	875.78	178	6299	0.82	1749.69	1748	5	6.20E-03	67.1	
29	0	897.95*	105971	24434	1.61	1793.98	1785	18	3.68E+00	0.5	
30	0	1173.02	220671	11794	1.86	2343.34	2334	19	7.66E+00	0.2	
31	0	1204.15	82	3135	0.60	2405.50	2402	8	2.85E-03	118.8	
32	0	1230.90*	60	2565	0.70	2458.94	2457	8	2.08E-03	147.3	
33	4	1324.88*	2057	4244	2.78	2646.67	2639	31	7.14E-02	7.2	3.30E+01
34	4	1332.21	200753	3198	1.97	2661.31	2639	31	6.97E+00	0.2	
35	0	1391.50	154	1759	2.44	2779.76	2776	9	5.34E-03	49.7	
36	0	1608.53	110	2313	0.59	3213.36	3211	9	3.83E-03	79.4	
37	0	1645.52	96	1410	1.20	3287.26	3284	9	3.33E-03	71.3	
38	0	1650.94*	79	1444	1.32	3298.09	3295	9	2.76E-03	87.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1742.50	51	430	0.98	3481.04	3478	6	1.78E-03	65.4	
40	2	1789.53	88	473	1.77	3575.03	3571	15	3.06E-03	45.6	1.25E+00
41	2	1792.94	87	409	1.70	3581.85	3571	15	3.03E-03	41.3	
42	0	1835.87	66461	1581	2.27	3667.64	3657	22	2.31E+00	0.4	
43	0	1921.94	33	275	1.72	3839.65	3835	9	1.15E-03	92.3	

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

Configuration : MCA0:[GAMMA]GAMMA6\$1
 Analyses by : CALIBRATE V1.7,PEAK V16.4
 Detector Name : GAMMA6 Energy Calib Time: 28-DEC-2005 15:47:34
 Efficiency type : Empirical Effncy Calib Time: 29-DEC-2005 05:08:19
 Detector Geometry: GAMMA6 Shelf :

Energy Calibration Report

$$\text{Energy} = -0.7387 + 0.5011 \cdot \text{Channel} + -9.9579\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	94.29	46.50	46.51	-0.012
2	120.03	59.54	59.41	0.126
3	177.11	88.03	88.01	0.019
4	245.08	122.06	122.07	-0.009
5	332.57	165.85	165.91	-0.056
6	783.42	391.70	391.79	-0.089
7	1322.31	661.66	661.73	-0.070
8	1794.17	898.04	898.05	-0.007
9	2343.66	1173.24	1173.18	0.056
10	2661.69	1332.50	1332.40	0.103
11	3668.14	1836.06	1836.12	-0.062

FWHM Calibration Report

$$\text{FWHM} = 0.6805 + 3.3519\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	0.93	0.91	0.023
2	59.54	1.04	0.94	0.096
3	88.03	1.00	0.99	0.008
4	122.06	1.02	1.05	-0.031
5	165.85	1.12	1.11	0.006
6	391.70	1.28	1.34	-0.064
7	661.66	1.44	1.54	-0.104
8	898.04	1.65	1.68	-0.037
9	1173.24	1.81	1.83	-0.020
10	1332.50	1.94	1.90	0.035
11	1836.06	2.20	2.12	0.087

Efficiency Calibration Report

$$\text{Eff} = \exp(a_2 + a_3 \cdot x + a_4 \cdot x^2 + a_5 \cdot x^3 + a_6 \cdot x^4 + a_7 \cdot x^5), \quad x = \ln(a_1 / \text{energy})$$

a1 a2 a3 a4 a5 a6 a7
 941.3 -4.958 0.8460 -6.6067E-02 -0.1874 0.1945 -5.7096E-02

Average Deviation = 2.69 % Reduced Chi-Square = 2.29

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/Error	% Diff
-----	--------------	---------------------	------------------	---------------------	------------	--------

1	46.50	1.88E-03	6.07E-05	1.94E-03	-0.90	-2.89
---	-------	----------	----------	----------	-------	-------

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	7.68E-03	2.32E-04	7.25E-03	1.85	5.60
3	88.03	1.85E-02	6.12E-04	1.92E-02	-1.16	-3.85
4	122.06	2.27E-02	6.86E-04	2.36E-02	-1.23	-3.70
5	165.85	2.30E-02	6.53E-04	2.23E-02	1.08	3.06
6	391.70	1.36E-02	3.62E-04	1.35E-02	0.50	1.32
7	661.66	9.23E-03	2.78E-04	9.34E-03	-0.36	-1.10
8	898.04	7.08E-03	1.87E-04	7.31E-03	-1.23	-3.25
9	1173.24	5.94E-03	1.61E-04	5.83E-03	0.72	1.94
10	1332.50	5.35E-03	1.40E-04	5.25E-03	0.70	1.83
11	1836.06	4.25E-03	1.12E-04	4.29E-03	-0.38	-1.01

Approved by: *Michael Hutton*

Approval Date: 12 / 29 / 05

```

Library Title      :
Library file name : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
Date printed      : 6-DEC-2004 10:31:17.67
Number of nuclides : 10
Number of lines   : 17

```

Nuclide Name	Half-Life	Nuclide Type	Key Line	Energy	Abundance
CO-57	271.74D		*	122.06 keV	85.51 %
				136.47 keV	10.47 %
CO-60	5.27Y		*	1173.24 keV	99.90 %
				1332.50 keV	99.98 %
Y-88	106.63D		*	898.04 keV	93.40 %
				1836.06 keV	99.38 %
CD-109	461.40D		*	88.03 keV	3.79 %
SN-113	115.09D		*	391.70 keV	64.90 %
CS-137	30.00Y		*	661.66 keV	85.12 %
CE-139	137.64D		*	165.85 keV	80.35 %
HG-203	46.60D			70.83 keV	4.75 %
				72.87 keV	8.00 %
				82.60 keV	3.55 %
				279.20 keV	77.30 %
PB-210	22.26Y		*	46.50 keV	4.05 %
AM-241	432.20Y		*	59.54 keV	35.90 %

Print Time : 14-JUN-2005 17:33:53.22
 Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
 Certificate title : 2L_MB
 Certificate date : 1-APR-2005 12:00:00.00
 Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01



CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

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

Q A APPROVED: M. M. [Signature] 5-12-05

This standard will expire one year after the calibration date.

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
(803)556-8171

Gamma Spectrometer Geometry Calibration Package

Detector: GAMMA 9

Geometry: ZL-MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondard standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	N/A
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	
2) Is the detector efficiency curve printout included?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Muhaupt

Date: 7/8/05

Reviewed By: ltt

Date: 7/8/05

EFFECTIVE DATE: 7/8/05

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
(803)556-8171

Gamma Spectrometer Front End Electronics Setup

Detector: GAMMA 9

Date Performed: 7/6/05

Performed By: Lt. C. R. Hill

<p>High Voltage Power Supply</p> <p>Model No. <u>31060</u> High Voltage <u>2.50</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2026</u> Course Gain <u>100</u> Fine Gain <u>1.17</u> Time Constant <u>4.000</u> Input polarity <u>+</u> BSLR rate <u>N/A</u> BSLR mode <u>N/A</u> Threshold <u>N/A</u></p>
<p>ADC</p> <p>Model No. <u>8701</u> Gain <u>4K</u></p>	
<p>AIM Module</p> <p>Model No. <u>N0556</u> Address <u>226:i</u></p>	

Gamma Spectroscopy Calibration Verification

Instrument: GAMMA 9

Calibration Date: 7/8/2005

Geometry: 2L_MB

Standard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Am-241		6.2561E+04	6.635E+04	6.06
Cd-109		8.2579E+05	7.664E+05	-7.19
Co-57		1.9081E+04	1.868E+04	-2.10
Ce-139		2.8981E+04	2.951E+04	1.83
Sn-113		4.8349E+04	4.923E+04	1.82
Cs-137		2.4325E+04	2.417E+04	-0.64
Y-88	1836.06	8.6210E+04	8.447E+04	-2.02
Co-60	1332.5	3.8845E+04	4.049E+04	4.23
Pb-210		8.2015E+05	8.161E+05	-0.49

Prepared By: Michael N. ...

Date: 7/8/05

Reviewed By: Stt - ...

Date: 7/8/05

Verified:

QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_GAMMA9.QAF;1

Sample ID : BKG_GAMMA9 Sample quantity : 1.80 LITER
Sample date : 6-JUL-2005 00:00:00 Acquisition date : 6-JUL-2005 12:48:25
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:44:21.13

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	8.37E+04	9.18E+04	9.01E+04	
BACKGROUND (CPS)	1.39	1.53	1.50	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: OK Approval Date: 7/7/05

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA9_2LMB.CNF;1
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 8-JUL-2005 13:23:24.
 Sample ID : VER_GAMMA9_2LMB Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA9 Detector geometry: 2L_MB
 Elapsed live time: 0 01:30:00.00 Elapsed real time: 0 01:31:49.73 2.0%
 Energy tolerance : 2.00000 KEV Analyst Initials : AKB
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 10017452
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	4	44.42	1057	22315	1.43	69.10	67	11	1.96E-01	21.5	1.40E+00
2	4	46.35*	13289	30960	1.17	72.98	67	11	2.46E+00	2.4	
3	0	59.30*	35705	64111	1.21	99.07	92	14	6.61E+00	1.6	
4	5	70.72	977	15149	0.87	122.07	120	10	1.81E-01	16.9	2.18E+00
5	5	72.77*	1971	30022	0.99	126.19	120	10	3.65E-01	14.1	
6	0	88.02*	97845	72667	1.24	156.91	150	14	1.81E+01	0.7	
7	0	122.13	58461	50381	1.25	225.60	219	14	1.08E+01	0.9	
8	0	136.48	6907	26658	1.25	254.51	250	9	1.28E+00	4.4	
9	0	156.11	224	21296	1.38	294.05	293	8	4.15E-02	112.9	
10	0	165.95	64080	36272	1.28	313.87	308	13	1.19E+01	0.7	
11	0	211.03*	152	9264	1.21	404.66	402	5	2.81E-02	95.5	
12	0	239.93*	333	13100	1.54	462.85	459	8	6.16E-02	59.9	
13	0	255.05*	2385	14832	1.59	493.31	489	10	4.42E-01	9.8	
14	5	279.20*	41393	10105	1.38	541.96	535	20	7.67E+00	0.6	4.55E+01
15	5	282.95	1860	13965	2.35	549.50	535	20	3.45E-01	14.8	
16	0	391.72	49548	15168	1.47	768.59	762	15	9.18E+00	0.7	
17	0	510.70*	1255	8844	2.57	1008.25	1001	16	2.32E-01	17.0	
18	0	661.47*	41295	12637	1.66	1311.96	1303	18	7.65E+00	0.8	
19	0	768.60*	95	3145	1.57	1527.76	1526	9	1.77E-02	106.4	
20	0	813.59	899	3887	1.93	1618.40	1614	11	1.66E-01	13.8	
21	0	897.73*	67798	11122	1.88	1787.91	1778	20	1.26E+01	0.5	
22	0	1064.58*	135	2182	0.59	2124.07	2122	8	2.50E-02	60.6	
23	0	1098.42*	77	3092	1.51	2192.23	2190	11	1.43E-02	139.8	
24	0	1172.79	50638	6114	2.11	2342.08	2330	24	9.38E+00	0.6	
25	6	1324.56	1811	3107	4.09	2647.90	2638	40	3.35E-01	8.1	5.43E+01
26	6	1331.90	46577	2077	2.55	2662.68	2638	40	8.63E+00	0.5	
27	0	1452.45	37	704	1.29	2905.61	2904	6	6.77E-03	116.0	
28	0	1598.19	157	1289	2.53	3199.29	3196	8	2.90E-02	40.5	
29	0	1609.30*	140	1518	1.69	3221.68	3218	10	2.60E-02	52.7	
30	0	1672.59*	46	465	1.32	3349.24	3348	6	8.48E-03	76.3	
31	0	1835.64*	44995	1763	2.60	3677.84	3667	25	8.33E+00	0.5	
32	0	1866.70	27	93	0.70	3740.45	3738	8	5.06E-03	63.8	
33	0	1923.38*	18	126	1.24	3854.68	3850	11	3.40E-03	122.0	
34	0	2009.34	38	146	3.56	4027.95	4021	13	7.11E-03	66.9	

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

VAX/VMS Nuclide Identification Report Generated

General Eng. Labs, LLC.
 2040 Savage Road
 Charleston, SC 29414

DETECTOR DATA

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA9_2
 Acquisition date : 8-JUL-2005 13:23:24 Detector SN# : 10017452
 Detector ID : GAMMA9 Sensitivity : 3.000
 Geometry : 2L_MB Energy tolerance: 2.000
 Elapsed live time: 0 01:30:00.00 Abundance limit : 75.000
 Elapsed real time: 0 01:31:49.73 Half life ratio : 8.000

SAMPLE DATA

Sample date : 1-APR-2005 12:00:00 Nuclide Library :
 Sample ID : VER_GAMMA9_2LMB Analyst initials: AKB
 Batch Number : Sample Quantity : 1.0000E+00 LITER
 Recovery : 1.00000 Carrier Weight : 0.00000

QC DATA

Standard Weight : 0.00000
 CALIB. DATE/TIME : 8-JUL-2005 12:59:09 MS Isotope :
 MSD DPM : 0.000 MSD Isotope :
 LCS DPM : 0.000 LCS Isotope :
 LCSD DPM : 0.000 LCSD Isotope :

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.868E+04	1.746E+03	2.328E+02	0.000E+00
CO-60	4.049E+04	3.147E+03	1.638E+02	0.000E+00
Y-88	8.447E+04	4.941E+03	2.444E+02	0.000E+00
CD-109	7.664E+05	8.285E+04	6.707E+03	0.000E+00
SN-113	4.923E+04	3.486E+03	4.072E+02	0.000E+00
CS-137	2.417E+04	1.680E+03	2.111E+02	0.000E+00
CE-139	2.951E+04	2.329E+03	2.981E+02	0.000E+00
HG-203	6.789E+04	5.533E+03	7.618E+02	0.000E+00
PB-210	8.161E+05	1.012E+05	4.660E+04	0.000E+00
AM-241	6.635E+04	1.064E+04	1.457E+03	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)
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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA9_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 8-JUL-2005 13:23:24.
Sample ID          : VER_GAMMA9_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA9                   Detector geometry: 2L MB
Elapsed live time : 0 01:30:00.00           Elapsed real time: 0 01:31:49.73  2.0%
Energy tolerance  : 2.00000 KEV             Analyst Initials  : AKB
Abundance limit   : 75.00000                Sensitivity       : 3.00000
Batch ID          :                          Detector SN#      : 10017452
Matrix Spike DPM  :                          LCS DPM       :
*****
    
```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	58461	85.51*	2.352E+00	1.455E+04	1.868E+04	9.35
	136.47	6907	10.47	2.341E+00	1.410E+04	1.811E+04	12.80
CO-60	1173.24	50638	99.90	6.550E-01	3.873E+04	4.013E+04	6.32
	1332.50	46577	99.98*	5.965E-01	3.909E+04	4.049E+04	7.77
Y-88	898.04	67798	93.40	8.071E-01	4.501E+04	8.516E+04	8.31
	1836.06	44995	99.38*	5.076E-01	4.464E+04	8.447E+04	5.85
CD-109	88.03	97845	3.79*	1.954E+00	6.614E+05	7.664E+05	10.81
SN-113	391.70	49548	64.90*	1.401E+00	2.727E+04	4.923E+04	7.08
CS-137	661.66	41295	85.12*	1.011E+00	2.402E+04	2.417E+04	6.95
CE-139	165.85	64080	80.35*	2.217E+00	1.801E+04	2.951E+04	7.89
HG-203	70.83	977	4.75	1.317E+00	7.814E+03	3.362E+04	36.96
	72.87	1971	8.00	1.410E+00	8.745E+03	3.762E+04	31.69
	82.60	-----	3.55	1.792E+00	-----	Line Not Found	-----
	279.20	41393	77.30*	1.698E+00	1.578E+04	6.789E+04	8.15
PB-210	46.50	13289	4.05*	2.029E-01	8.093E+05	8.161E+05	12.41
AM-241	59.54	35705	35.90*	7.505E-01	6.633E+04	6.635E+04	16.04

Flag: "*" = Keyline

Total number of lines in spectrum 34
 Number of unidentified lines 19
 Number of lines tentatively identified by NID 15 44.12%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	1.28	1.455E+04	1.868E+04	0.175E+04	9.35	
CO-60	5.27Y	1.04	3.909E+04	4.049E+04	0.315E+04	7.77	
Y-88	106.63D	1.89	4.464E+04	8.447E+04	0.494E+04	5.85	
CD-109	461.40D	1.16	6.614E+05	7.664E+05	0.828E+05	10.81	
SN-113	115.09D	1.81	2.727E+04	4.923E+04	0.349E+04	7.08	
CS-137	30.00Y	1.01	2.402E+04	2.417E+04	0.168E+04	6.95	
CE-139	137.64D	1.64	1.801E+04	2.951E+04	0.233E+04	7.89	
HG-203	46.60D	4.30	1.578E+04	6.789E+04	0.553E+04	8.15	
PB-210	22.26Y	1.01	8.093E+05	8.161E+05	1.012E+05	12.41	
AM-241	432.20Y	1.00	6.633E+04	6.635E+04	1.064E+04	16.04	

Total Activity : 1.720E+06 1.963E+06

Grand Total Activity : 1.720E+06 1.963E+06

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	44.42	1057	22315	1.43	69.10	67	11	1.96E-01	43.0	1.50E-01	
0	156.11	224	21296	1.38	294.05	293	8	4.15E-02	****	2.27E+00	
0	211.03	152	9264	1.21	404.66	402	5	2.81E-02	****	1.98E+00	
0	239.93	333	13100	1.54	462.85	459	8	6.16E-02	****	1.85E+00	
0	255.05	2385	14832	1.59	493.31	489	10	4.42E-01	19.5	1.79E+00	
5	282.95	1860	13965	2.35	549.50	535	20	3.45E-01	29.6	1.69E+00	
0	510.70	1255	8844	2.57	1008.25	1001	16	2.32E-01	34.1	1.20E+00	
0	768.60	95	3145	1.57	1527.76	1526	9	1.77E-02	****	9.08E-01	
0	813.59	899	3887	1.93	1618.40	1614	11	1.66E-01	27.6	8.70E-01	
0	1064.58	135	2182	0.59	2124.07	2122	8	2.50E-02	****	7.06E-01	
0	1098.42	77	3092	1.51	2192.23	2190	11	1.43E-02	****	6.89E-01	
6	1324.56	1811	3107	4.09	2647.90	2638	40	3.35E-01	16.2	5.99E-01	
0	1452.45	37	704	1.29	2905.61	2904	6	6.77E-03	****	5.63E-01	
0	1598.19	157	1289	2.53	3199.29	3196	8	2.90E-02	81.1	5.34E-01	
0	1609.30	140	1518	1.69	3221.68	3218	10	2.60E-02	****	5.32E-01	
0	1672.59	46	465	1.32	3349.24	3348	6	8.48E-03	****	5.23E-01	
0	1866.70	27	93	0.70	3740.45	3738	8	5.06E-03	****	5.06E-01	
0	1923.38	18	126	1.24	3854.68	3850	11	3.40E-03	****	5.04E-01	
0	2009.34	38	146	3.56	4027.95	4021	13	7.11E-03	****	5.03E-01	

Flags: "T" = Tentatively associated

```
*****
*                                     *
*                               GENERAL ENG. LABS, LLC.                       *
*                               2040 Savage Road                             *
*                               Charleston, SC 29414                         *
*                                     *
*****
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DETECTOR DATA

```
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA9_2LMB.CNF;1*
* Acquisition date   : 8-JUL-2005 13:23:24.  Detector SN#      : 10017452
* Detector ID        : GAMMA9                Sensitivity         : 3.00000
* Geometry           : 2L_MB                 Energy tolerance:     2.00000
* Elapsed live time  : 0 01:30:00.00        Abundance limit      : 75.00000
* Elapsed real time  : 0 01:31:49.73        Half life ratio      : 8.00000
*****
```

SAMPLE DATA

```
* Sample date       : 1-APR-2005 12:00:00.  Nuclide Library   : CAL
* Sample ID         : VER_GAMMA9_2LMB        Analyst initials  : AKB
* Batch Number      :                       Sample Quantity   : 1.00000E+00 LITER
*****
```

QC DATA

```
* CALIB. DATE/TIME : 8-JUL-2005 12:59:09.79MS Isotope      :
* MSD DPM           :                       MSD Isotope     :
* LCS DPM           :                       LCS Isotope     :
*****
```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.868E+04	1.746E+03	2.328E+02	2.135E+01	80.239
CO-60	4.049E+04	3.147E+03	1.638E+02	1.263E+01	247.231
Y-88	8.447E+04	4.941E+03	2.444E+02	1.405E+01	345.592
CD-109	7.664E+05	8.285E+04	6.707E+03	7.194E+02	114.271
SN-113	4.923E+04	3.486E+03	4.072E+02	2.826E+01	120.907
CS-137	2.417E+04	1.680E+03	2.111E+02	1.427E+01	114.493
CE-139	2.951E+04	2.329E+03	2.981E+02	2.312E+01	98.985
HG-203	6.789E+04	5.533E+03	7.618E+02	6.130E+01	89.107
PB-210	8.161E+05	1.012E+05	4.660E+04	5.240E+03	17.511
AM-241	6.635E+04	1.064E+04	1.457E+03	2.287E+02	45.553

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]CAL_GAMMA9_2L.CNF;4
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 8-JUL-2005 11:11:03.
 Sample ID : CAL_GAMMA9_2L Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA9 Detector geometry: 2L_MB
 Elapsed live time: 0 01:26:40.00 Elapsed real time: 0 01:28:25.84 2.0%
 Energy tolerance : 2.00000 KEV Analyst Initials : AKB
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 10017452
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	6	44.36	418	8772	0.66	68.97	68	9	8.04E-02	27.8	4.65E+00
2	6	46.34*	12656	30340	1.19	72.97	68	9	2.43E+00	2.5	
3	0	59.23*	35153	60909	1.24	98.94	92	14	6.76E+00	1.6	
4	0	67.09*	325	27696	1.16	114.76	113	6	6.25E-02	81.0	
5	0	72.66*	1310	39231	1.08	125.98	123	8	2.52E-01	26.4	
6	7	83.86*	7135	71697	2.57	148.52	139	37	1.37E+00	8.6	9.16E+01
7	7	88.00*	98389	31957	1.38	156.87	139	37	1.89E+01	0.5	
8	0	107.98	216	28554	1.36	197.11	194	8	4.15E-02	135.8	
9	0	122.11	55537	49150	1.27	225.56	219	14	1.07E+01	0.9	
10	0	136.54	7090	28494	1.30	254.64	250	10	1.36E+00	4.6	
11	0	165.95	62141	37543	1.28	313.86	307	14	1.20E+01	0.8	
12	0	255.20*	2065	14253	1.26	493.60	489	10	3.97E-01	11.0	
13	0	279.27*	40658	22099	1.39	542.09	534	16	7.82E+00	1.0	
14	0	391.73	47741	14732	1.44	768.60	762	15	9.18E+00	0.7	
15	0	510.57*	953	7303	2.51	1007.97	1002	13	1.83E-01	18.8	
16	0	538.76	110	3001	0.69	1064.76	1063	6	2.12E-02	79.4	
17	0	579.27	141	2878	1.03	1146.37	1144	6	2.71E-02	60.8	
18	0	661.51*	39463	12890	1.66	1312.03	1303	18	7.59E+00	0.8	
19	0	752.44	177	3244	2.54	1495.21	1491	9	3.40E-02	58.5	
20	0	813.65	739	4211	2.26	1618.51	1613	12	1.42E-01	17.9	
21	0	846.01*	230	3311	1.64	1683.72	1679	10	4.42E-02	47.4	
22	0	897.76*	65187	11255	1.86	1787.97	1778	20	1.25E+01	0.6	
23	0	1056.23	124	2436	2.01	2107.24	2104	9	2.39E-02	72.2	
24	0	1172.81	47348	6755	2.08	2342.14	2331	22	9.11E+00	0.6	
25	0	1218.59	94	935	1.93	2434.38	2431	8	1.81E-02	57.3	
26	5	1324.81	1711	3098	3.72	2648.41	2637	40	3.29E-01	9.0	4.03E+01
27	5	1331.98	44188	2225	2.51	2662.85	2637	40	8.50E+00	0.5	
28	0	1554.30	148	1145	2.27	3110.84	3107	8	2.85E-02	40.4	
29	0	1584.16	277	1762	3.25	3171.02	3165	12	5.32E-02	31.0	
30	0	1835.77*	43729	1745	2.57	3678.10	3665	27	8.41E+00	0.5	
31	0	1856.04	42	70	2.07	3718.96	3716	7	8.01E-03	37.7	
32	0	1859.67	56	105	2.98	3726.27	3723	11	1.07E-02	37.7	
33	0	2036.02*	21	68	1.10	4081.71	4079	6	3.95E-03	67.2	

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

Configuration : MCA0:[GAMMA]GAMMA9\$1
 Analyses by : CALIBRATE V1.7,PEAK V16.4
 Detector Name : GAMMA9 Energy Calib Time: 8-JUL-2005 09:26:09
 Efficiency type : Empirical Effncy Calib Time: 8-JUL-2005 12:59:09
 Detector Geometry: GAMMA9 Shelf :

Energy Calibration Report

$$\text{Energy} = 10.11 + 0.4966 \cdot \text{Channel} + -5.2601\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	73.18	46.50	46.45	0.052
2	99.27	59.54	59.40	0.138
3	156.73	88.03	87.93	0.101
4	225.56	122.06	122.11	-0.049
5	314.03	165.85	166.03	-0.181
6	768.84	391.70	391.85	-0.145
7	1312.33	661.66	661.66	0.000
8	1788.59	898.04	898.07	-0.026
9	2342.81	1173.24	1173.15	0.093
10	2663.72	1332.50	1332.41	0.086
11	3678.84	1836.06	1836.13	-0.069

FWHM Calibration Report

$$\text{FWHM} = 0.9917 + 3.6239\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	1.32	1.24	0.081
2	59.54	1.28	1.27	0.010
3	88.03	1.45	1.33	0.123
4	122.06	1.56	1.39	0.172
5	165.85	1.35	1.46	-0.104
6	391.70	1.51	1.71	-0.202
7	661.66	1.74	1.92	-0.182
8	898.04	1.92	2.08	-0.156
9	1173.24	2.20	2.23	-0.037
10	1332.50	2.37	2.31	0.060
11	1836.06	2.78	2.54	0.235

Efficiency Calibration Report

$$\text{Eff} = \exp(a_2 + a_3 \cdot x + a_4 \cdot x^2 + a_5 \cdot x^3 + a_6 \cdot x^4 + a_7 \cdot x^5), \quad x = \ln(a_1 / \text{energy})$$

a1 941.3 a2 -4.856 a3 0.7829 a4 -5.6787E-02 a5 -0.2295 a6 0.2247 a7 -6.2173E-02

Average Deviation = 2.82 % Reduced Chi-Square = 2.22

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
-----	--------------	---------------------	------------------	---------------------	-------------	--------

1	46.50	2.00E-03	7.74E-05	2.07E-03	-0.99	-3.84
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Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	8.14E-03	2.76E-04	7.62E-03	1.87	6.33
3	88.03	1.89E-02	6.30E-04	1.95E-02	-0.98	-3.26
4	122.06	2.27E-02	7.15E-04	2.35E-02	-1.13	-3.55
5	165.85	2.27E-02	6.60E-04	2.22E-02	0.83	2.42
6	391.70	1.43E-02	3.85E-04	1.40E-02	0.66	1.79
7	661.66	9.97E-03	3.11E-04	1.01E-02	-0.45	-1.41
8	898.04	7.81E-03	2.08E-04	8.07E-03	-1.24	-3.29
9	1173.24	6.63E-03	1.84E-04	6.55E-03	0.46	1.28
10	1332.50	6.13E-03	1.63E-04	5.96E-03	1.00	2.65
11	1836.06	5.02E-03	1.33E-04	5.08E-03	-0.44	-1.16

Approved by: Muhammad Iqbal Khan

Approval Date: 7 / 8 / 05

Print Time : 14-JUN-2005 17:33:53.22
 Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
 Certificate title : 2L_MB
 Certificate date : 1-APR-2005 12:00:00.00
 Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01

```

Library Title      :
Library file name  : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
Date printed      : 8-JUL-2005 17:13:45.13
Number of nuclides : 10
Number of lines   : 17

```

Nuclide		Nuclide	Key	Energy		Abundance
Name	Half-Life	Type	Line			
CO-57	271.74D		*	122.06	keV	85.51 %
				136.47	keV	10.47 %
CO-60	5.27Y		*	1173.24	keV	99.90 %
				1332.50	keV	99.98 %
Y-88	106.63D		*	898.04	keV	93.40 %
				1836.06	keV	99.38 %
CD-109	461.40D		*	88.03	keV	3.79 %
SN-113	115.09D		*	391.70	keV	64.90 %
CS-137	30.00Y		*	661.66	keV	85.12 %
CE-139	137.64D		*	165.85	keV	80.35 %
HG-203	46.60D			70.83	keV	4.75 %
				72.87	keV	8.00 %
				82.60	keV	3.55 %
				279.20	keV	77.30 %
PB-210	22.26Y		*	46.50	keV	4.05 %
AM-241	432.20Y		*	59.54	keV	35.90 %



CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytical maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

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

Q A APPROVED: UM. M. J. 5-12-05

This standard will expire one year after the calibration date.

General Engineering Laboratories, LLC

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

Gamma Spectrometer Geometry Calibration Package

Detector: GAMMA ID

Geometry: 2L-MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? the nuclide library used? the VMS certificate file?	✓		
			N/A
	✓		
	✓		
2) Is the detector efficiency curve printout included?		✓	
3) Is the efficiency calibration report included and reviewed?	✓		
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	✓		
	✓		
	✓		
	✓		
5) Are the calibration verification calculations included?	✓		
6) Are the instrument settings included: amp, HVPS, ADC settings?	✓		

Prepared By: Michael Patton

Date: 2/15/06

Reviewed By: JL Austin

Date: 2/16/2006

Effective Date: 2/1/06

General Engineering Laboratories, LLC

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

Gamma Spectrometer Front End Electronics Setup

Detector: GAMMA 10

Date Performed: 2/1/06

Performed By: *Michael P. [Signature]*

<p>High Voltage Power Supply</p> <p>Model No. <u>3105</u> High Voltage <u>5 kV</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2022</u> Course Gain <u>100</u> Fine Gain <u>0.471</u> Time Constant <u>4 μsec</u> Input polarity <u>POSITIVE</u> BSLR rate <u>N/A</u> BSLR mode <u>N/A</u> Threshold <u>N/A</u></p>
<p>ADC</p> <p>Model No. <u>ND579</u> Gain <u>4k</u></p>	
<p>AIM Module</p> <p>Model No. <u>ND556</u> Address <u>NI226:2</u></p>	

Gamma Spectroscopy Calibration Verification

Instrument: Gamma 10

Calibration Date: 2/1/2006

Geometry: 2L_MB

Standard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Pb-210		8.2015E+05	7.857E+05	-4.20
Am-241		6.2561E+04	6.262E+04	0.09
Cd-109		8.2579E+05	8.027E+05	-2.80
Co-57		1.9081E+04	1.911E+04	0.15
Ce-139		2.8981E+04	2.923E+04	0.86
Sn-113		4.8349E+04	4.867E+04	0.66
Cs-137		2.4325E+04	2.455E+04	0.92
Y-88	1836.06	8.6210E+04	8.565E+04	-0.65
Co-60	1332.5	3.8845E+04	3.956E+04	1.84

Prepared By: *Muband Patton*

Date: 2/15/06

Reviewed By: *JL J. Austin*

Date: 2/16/2006

QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_GAMMA10.QAF;2

Sample ID : BKG_GAMMA10 Sample quantity : 1.80 LITER
Sample date : 28-JAN-2006 00:00:00 Acquisition date : 28-JAN-2006 17:11:57
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:05.44

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	6.70E+04	1.20E+05	8.81E+04	
BACKGROUND (CPS)	1.12	1.99	1.47	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: WGH Approval Date: 1 / 29 / 06

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA10_2LMB.CNF;1
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 1-FEB-2006 14:14:01.
 Sample ID : VER_GAMMA10_2LMB Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA10 Detector geometry: 2L_MB
 Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:56.29 0.8%
 Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 2605
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.50*	10746	32430	1.11	85.69	81	10	1.49E+00	3.3	
2	0	50.07	405	19092	1.26	92.86	91	6	5.63E-02	54.1	
3	7	58.13	3825	29272	2.09	109.04	105	13	5.31E-01	9.4	6.50E+00
4	7	59.58	34467	18215	1.08	111.95	105	13	4.79E+00	0.8	
5	0	67.91	431	20218	1.74	128.68	126	6	5.99E-02	52.3	
6	0	88.02*	93336	41474	1.14	169.05	163	13	1.30E+01	0.6	
7	0	122.04*	48615	28636	1.19	237.35	230	14	6.75E+00	0.9	
8	0	136.41	6012	17426	1.19	266.21	262	10	8.35E-01	4.3	
9	0	165.86	32155	16463	1.20	325.32	320	11	4.47E+00	1.0	
10	0	254.99	904	8245	1.23	504.26	501	8	1.26E-01	17.7	
11	0	279.06*	2742	8845	1.35	552.59	548	10	3.81E-01	6.7	
12	0	311.14	349	5942	2.56	616.98	613	8	4.84E-02	38.7	
13	0	371.46	111	5012	1.27	738.07	734	8	1.55E-02	110.5	
14	0	378.96	157	4949	0.48	753.13	750	8	2.19E-02	77.7	
15	0	382.69	201	4907	0.93	760.62	757	8	2.79E-02	60.8	
16	0	391.68	19481	7169	1.36	778.66	774	12	2.71E+00	1.1	
17	0	443.47*	167	4352	1.91	882.63	880	8	2.32E-02	68.9	
18	0	510.98*	338	4669	2.64	1018.13	1013	10	4.70E-02	38.4	
19	0	592.31*	109	2604	1.43	1181.37	1179	7	1.51E-02	78.6	
20	0	661.65	55407	5587	1.58	1320.55	1313	15	7.70E+00	0.5	
21	0	726.05*	149	1735	1.52	1449.80	1447	6	2.07E-02	45.0	
22	0	813.29	247	3138	1.47	1624.88	1621	10	3.44E-02	42.8	
23	0	898.02	23198	4929	1.74	1794.94	1789	14	3.22E+00	0.9	
24	0	1086.71	79	1836	1.47	2173.57	2172	7	1.09E-02	91.0	
25	0	1173.21	59620	3116	1.92	2347.15	2339	19	8.28E+00	0.5	
26	5	1325.55*	597	1229	3.22	2652.80	2643	35	8.29E-02	14.1	2.63E+00
27	5	1332.48	54997	667	2.01	2666.71	2643	35	7.64E+00	0.4	
28	0	1549.40	14	547	1.05	3101.89	3098	9	1.89E-03	310.8	
29	0	1594.00	81	424	1.52	3191.37	3188	7	1.12E-02	43.7	
30	0	1678.30	38	300	0.98	3360.47	3356	10	5.32E-03	86.4	
31	0	1805.23*	15	157	0.56	3615.08	3612	12	2.14E-03	164.2	
32	0	1836.00	14671	284	2.38	3676.81	3665	22	2.04E+00	0.9	
33	0	1879.73	75	111	6.43	3764.51	3757	17	1.05E-02	34.4	
34	0	1886.33	32	51	1.05	3777.75	3774	8	4.51E-03	41.7	
35	0	2008.46	62	118	5.79	4022.69	4014	19	8.56E-03	44.3	

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

VAX/VMS Nuclide Identification Report Generated

```
*****
*                                     *
*                               General Eng. Labs, LLC.                       *
*                               2040 Savage Road                             *
*                               Charleston, SC 29414                         *
*****
```

DETECTOR DATA

```

* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA10_
* Acquisition date   : 1-FEB-2006 14:14:01 Detector SN#      : 2605
* Detector ID        : GAMMA10          Sensitivity           : 3.000
* Geometry           : 2L_MB            Energy tolerance     : 2.000
* Elapsed live time  : 0 02:00:00.00   Abundance limit     : 75.000
* Elapsed real time  : 0 02:00:56.29   Half life ratio     : 8.000
*****
```

SAMPLE DATA

```

* Sample date       : 1-APR-2005 12:00:00 Nuclide Library :
* Sample ID         : VER_GAMMA10_2LMB       Analyst initials: MJH1
* Batch Number      :                       Sample Quantity : 1.0000E+00 LITER
* Recovery          : 1.00000               Carrier Weight   : 0.00000
*****
```

QC DATA

```

* Standard Weight   : 0.00000
* CALIB. DATE/TIME : 1-FEB-2006 14:13:13 MS Isotope      :
* MSD DPM           : 0.000                MSD Isotope      :
* LCS DPM           : 0.000                LCS Isotope      :
* LCSD DPM          : 0.000                LCSD Isotope     :
*****
```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.911E+04	1.360E+03	2.027E+02	0.000E+00
CO-60	3.956E+04	2.439E+03	8.695E+01	0.000E+00
Y-88	8.565E+04	5.081E+03	3.581E+02	0.000E+00
CD-109	8.027E+05	7.494E+04	5.419E+03	0.000E+00
SN-113	4.867E+04	3.335E+03	7.772E+02	0.000E+00
CS-137	2.455E+04	1.544E+03	1.164E+02	0.000E+00
CE-139	2.923E+04	1.964E+03	4.127E+02	0.000E+00
HG-203	6.922E+04	1.046E+04	9.210E+03	0.000E+00
PB-210	7.857E+05	9.616E+04	4.488E+04	0.000E+00
AM-241	6.262E+04	5.774E+03	1.105E+03	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)
---------	--------------------------------------	--------------------------	---------------------

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA10_2LMB.CNF;1
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 1-FEB-2006 14:14:01.
Sample ID          : VER_GAMMA10_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA10                   Detector geometry: 2L_MB
Elapsed live time : 0 02:00:00.00            Elapsed real time: 0 02:00:56.29 0.8%
Energy tolerance  : 2.00000 KEV              Analyst Initials  : MJH1
Abundance limit   : 75.00000                Sensitivity       : 3.00000
Batch ID          :                          Detector SN#     : 2605
Matrix Spike DPM :                          LCS DPM      :
*****

```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	48615	85.51*	2.438E+00	8.754E+03	1.911E+04	7.11
	136.47	6012	10.47	2.480E+00	8.692E+03	1.898E+04	11.38
CO-60	1173.24	59620	99.90	6.448E-01	3.474E+04	3.879E+04	6.33
	1332.50	54997	99.98*	5.828E-01	3.543E+04	3.956E+04	6.17
Y-88	898.04	23198	93.40	8.013E-01	1.163E+04	8.512E+04	8.79
	1836.06	14671	99.38*	4.733E-01	1.171E+04	8.565E+04	5.93
CD-109	88.03	93336	3.79*	1.824E+00	5.068E+05	8.027E+05	9.34
SN-113	391.70	19481	64.90*	1.463E+00	7.701E+03	4.867E+04	6.85
CS-137	661.66	55407	85.12*	1.015E+00	2.408E+04	2.455E+04	6.29
CE-139	165.85	32155	80.35*	2.402E+00	6.255E+03	2.923E+04	6.72
HG-203	70.83	-----	4.75	1.109E+00	-----	Line Not Found	-----
	72.87	-----	8.00	1.206E+00	-----	Line Not Found	-----
	82.60	-----	3.55	1.627E+00	-----	Line Not Found	-----
	279.20	2742	77.30*	1.827E+00	7.289E+02	6.922E+04	15.11
PB-210	46.50	10746	4.05*	1.301E-01	7.655E+05	7.857E+05	12.24
AM-241	59.54	34467	35.90*	5.763E-01	6.253E+04	6.262E+04	9.22

Flag: "*" = Keyline

Total number of lines in spectrum 35
 Number of unidentified lines 22
 Number of lines tentatively identified by NID 13 37.14%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	2.18	8.754E+03	1.911E+04	0.136E+04	7.11	
CO-60	5.27Y	1.12	3.543E+04	3.956E+04	0.244E+04	6.17	
Y-88	106.63D	7.32	1.171E+04	8.565E+04	0.508E+04	5.93	
CD-109	461.40D	1.58	5.068E+05	8.027E+05	0.749E+05	9.34	
SN-113	115.09D	6.32	7.701E+03	4.867E+04	0.334E+04	6.85	
CS-137	30.00Y	1.02	2.408E+04	2.455E+04	0.154E+04	6.29	
CE-139	137.64D	4.67	6.255E+03	2.923E+04	0.196E+04	6.72	
HG-203	46.60D	95.0	7.289E+02	6.922E+04	1.046E+04	15.11	
PB-210	22.26Y	1.03	7.655E+05	7.857E+05	0.962E+05	12.24	
AM-241	432.20Y	1.00	6.253E+04	6.262E+04	0.577E+04	9.22	
Total Activity :			1.429E+06	1.967E+06			

Grand Total Activity : 1.429E+06 1.967E+06

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	50.07	405	19092	1.26	92.86	91	6	5.63E-02	****	2.20E-01	
7	58.13	3825	29272	2.09	109.04	105	13	5.31E-01	18.8	5.13E-01	
0	67.91	431	20218	1.74	128.68	126	6	5.99E-02	****	9.69E-01	
0	254.99	904	8245	1.23	504.26	501	8	1.26E-01	35.5	1.93E+00	
0	311.14	349	5942	2.56	616.98	613	8	4.84E-02	77.4	1.70E+00	
0	371.46	111	5012	1.27	738.07	734	8	1.55E-02	****	1.52E+00	
0	378.96	157	4949	0.48	753.13	750	8	2.19E-02	****	1.50E+00	
0	382.69	201	4907	0.93	760.62	757	8	2.79E-02	****	1.49E+00	
0	443.47	167	4352	1.91	882.63	880	8	2.32E-02	****	1.35E+00	
0	510.98	338	4669	2.64	1018.13	1013	10	4.70E-02	76.8	1.22E+00	
0	592.31	109	2604	1.43	1181.37	1179	7	1.51E-02	****	1.10E+00	
0	726.05	149	1735	1.52	1449.80	1447	6	2.07E-02	89.9	9.46E-01	
0	813.29	247	3138	1.47	1624.88	1621	10	3.44E-02	85.6	8.67E-01	
0	1086.71	79	1836	1.47	2173.57	2172	7	1.09E-02	****	6.86E-01	
5	1325.55	597	1229	3.22	2652.80	2643	35	8.29E-02	28.2	5.85E-01	
0	1549.40	14	547	1.05	3101.89	3098	9	1.89E-03	****	5.22E-01	
0	1594.00	81	424	1.52	3191.37	3188	7	1.12E-02	87.4	5.13E-01	
0	1678.30	38	300	0.98	3360.47	3356	10	5.32E-03	****	4.96E-01	
0	1805.23	15	157	0.56	3615.08	3612	12	2.14E-03	****	4.77E-01	
0	1879.73	75	111	6.43	3764.51	3757	17	1.05E-02	68.9	4.68E-01	
0	1886.33	32	51	1.05	3777.75	3774	8	4.51E-03	83.4	4.68E-01	
0	2008.46	62	118	5.79	4022.69	4014	19	8.56E-03	88.6	4.57E-01	

Flags: "T" = Tentatively associated

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****

```

DETECTOR DATA

```

* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA10_2LMB.CNF;*
* Acquisition date   : 1-FEB-2006 14:14:01.  Detector SN#      : 2605           *
* Detector ID        : GAMMA10                 Sensitivity         : 3.00000         *
* Geometry           : 2L_MB                   Energy tolerance     : 2.00000         *
* Elapsed live time  : 0 02:00:00.00           Abundance limit     : 75.00000         *
* Elapsed real time  : 0 02:00:56.29           Half life ratio     : 8.00000         *
*****

```

SAMPLE DATA

```

* Sample date        : 1-APR-2005 12:00:00.  Nuclide Library   : CAL             *
* Sample ID          : VER_GAMMA10_2LMB       Analyst initials  : MJH1            *
* Batch Number       :                        Sample Quantity  : 1.00000E+00 LITER *
*****

```

QC DATA

```

* CALIB. DATE/TIME  : 1-FEB-2006 14:13:13.96MS Isotope      :
* MSD DPM            :                               MSD Isotope     :
* LCS DPM            :                               LCS Isotope     :
*****

```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.911E+04	1.360E+03	2.027E+02	1.399E+01	94.281
CO-60	3.956E+04	2.439E+03	8.695E+01	5.307E+00	454.941
Y-88	8.565E+04	5.081E+03	3.581E+02	2.029E+01	239.191
CD-109	8.027E+05	7.494E+04	5.419E+03	5.023E+02	148.115
SN-113	4.867E+04	3.335E+03	7.772E+02	5.029E+01	62.625
CS-137	2.455E+04	1.544E+03	1.164E+02	7.223E+00	210.812
CE-139	2.923E+04	1.964E+03	4.127E+02	2.660E+01	70.813
HG-203	6.922E+04	1.046E+04	9.210E+03	6.465E+02	7.516
PB-210	7.857E+05	9.616E+04	4.488E+04	4.634E+03	17.505
AM-241	6.262E+04	5.774E+03	1.105E+03	1.003E+02	56.644

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : MCA0:[GAMMA]GAMMA10\$1
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 1-FEB-2006 12:13:30.
 Sample ID : CAL_GAMMA10_2LMB Sample quantity : 1.00000E+00 LITER
 Detector name : GAMMA10 Detector geometry: GAMMA10
 Elapsed live time: 0 01:58:21.72 Elapsed real time: 0 01:59:17.26 0.8%
 Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 2605
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.50	10821	29057	1.15	85.69	81	9	1.52E+00	3.0	
2	9	58.07	3426	23668	2.52	108.91	105	11	4.82E-01	8.0	7.47E+00
3	9	59.58	34737	20470	1.08	111.96	105	11	4.89E+00	0.9	
4	0	88.02	93467	39785	1.17	169.06	163	13	1.32E+01	0.6	
5	0	103.13	359	13576	1.33	199.39	197	6	5.05E-02	51.7	
6	0	106.11	379	13415	1.06	205.37	203	6	5.33E-02	48.7	
7	0	122.05	47152	27065	1.19	237.37	230	13	6.64E+00	0.9	
8	0	128.62	420	10330	1.53	250.57	248	6	5.91E-02	38.6	
9	0	136.47	6226	16930	1.17	266.32	262	10	8.77E-01	4.1	
10	0	165.84	31777	20749	1.20	325.30	318	14	4.47E+00	1.1	
11	0	255.03	639	7264	1.18	504.35	502	7	9.00E-02	22.5	
12	0	263.17	178	7667	0.92	520.68	517	8	2.50E-02	85.8	
13	0	279.22	2916	7732	1.35	552.91	549	9	4.11E-01	5.7	
14	0	295.21	196	6301	1.83	585.00	583	8	2.76E-02	70.4	
15	0	310.90	177	6057	1.55	616.50	612	8	2.49E-02	76.7	
16	0	391.69	19287	6605	1.38	778.68	773	11	2.72E+00	1.1	
17	0	474.15	136	4355	0.77	944.20	941	8	1.92E-02	84.4	
18	0	510.74	576	4947	1.82	1017.66	1012	11	8.12E-02	24.0	
19	0	549.76	86	2199	0.94	1095.97	1093	6	1.21E-02	87.2	
20	0	612.61	143	2906	1.76	1222.13	1220	8	2.01E-02	65.9	
21	0	661.65	54391	5829	1.59	1320.55	1313	16	7.66E+00	0.5	
22	0	701.43	78	1854	0.93	1400.39	1398	6	1.10E-02	87.6	
23	0	743.96	96	1405	0.88	1485.76	1484	5	1.35E-02	59.5	
24	0	757.85	163	2306	1.46	1513.64	1511	8	2.29E-02	51.6	
25	0	802.25	101	1744	1.31	1602.74	1600	6	1.43E-02	66.0	
26	0	813.77	254	2704	1.72	1625.86	1622	9	3.57E-02	37.6	
27	0	821.85	143	2428	0.78	1642.08	1639	8	2.02E-02	60.1	
28	0	872.28	91	2244	1.12	1743.27	1741	7	1.28E-02	87.0	
29	0	878.86	137	2175	1.78	1756.48	1754	7	1.93E-02	57.2	
30	0	898.05	22821	5262	1.72	1795.00	1788	15	3.21E+00	1.0	
31	0	1049.55	70	1747	0.98	2099.02	2097	7	9.83E-03	99.9	
32	0	1134.65	94	1283	1.63	2269.77	2267	7	1.33E-02	63.7	
33	0	1138.98	218	2103	1.30	2278.45	2273	12	3.07E-02	42.7	
34	0	1173.25	59156	3057	1.88	2347.22	2338	19	8.33E+00	0.5	
35	0	1240.04	126	610	2.30	2481.23	2478	9	1.77E-02	36.3	
36	0	1301.38	71	360	1.56	2604.32	2602	7	1.00E-02	46.0	
37	4	1325.35	431	1210	2.93	2652.40	2645	32	6.08E-02	17.6	1.14E+00
38	4	1332.51	54058	759	2.01	2666.77	2645	32	7.61E+00	0.4	

Sample ID : CAL_GAMMA10_2LMB

Acquisition date : 1-FEB-2006 12:13:30

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1352.86	24	308	0.68	2707.59	2702	7	3.35E-03	124.3	
40	0	1382.27	39	311	1.21	2766.61	2764	8	5.44E-03	80.8	
41	0	1471.56	57	465	1.58	2945.74	2942	10	8.00E-03	72.1	
42	0	1520.57	32	516	0.71	3044.06	3041	10	4.57E-03	132.1	
43	0	1590.65	28	349	1.23	3184.64	3180	6	3.94E-03	107.5	
44	0	1636.79	48	210	1.42	3277.21	3274	6	6.81E-03	49.5	
45	0	1681.78	51	308	1.40	3367.46	3362	11	7.25E-03	67.5	
46	0	1836.06	14456	302	2.36	3676.91	3668	19	2.04E+00	0.9	
47	0	1864.95	41	94	4.78	3734.86	3727	15	5.80E-03	53.6	
48	0	1890.37	31	78	1.74	3785.85	3782	10	4.33E-03	56.6	
49	0	1916.95	17	30	1.38	3839.17	3837	5	2.42E-03	54.1	
50	0	1925.45	22	80	0.60	3856.22	3851	10	3.05E-03	80.2	

Configuration : MCA0:[GAMMA]GAMMA10\$1
 Analyses by : CALIBRATE V1.7, PEAK V16.4
 Detector Name : GAMMA10 Energy Calib Time: 1-FEB-2006 14:13:13
 Efficiency type : Empirical Effncy Calib Time: 1-FEB-2006 14:13:13
 Detector Geometry: GAMMA10 Shelf :

Energy Calibration Report

$$\text{Energy} = 3.819 + 0.4981 \cdot \text{Channel} + 6.7959\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	85.69	46.50	46.50	0.002
2	111.96	59.54	59.58	-0.046
3	169.06	88.03	88.02	0.013
4	237.37	122.06	122.05	0.013
5	325.30	165.85	165.84	0.010
6	778.68	391.70	391.69	0.015
7	1320.55	661.66	661.65	0.011
8	1795.00	898.04	898.05	-0.012
9	2347.22	1173.24	1173.25	-0.005
10	2666.77	1332.50	1332.51	-0.008
11	3676.91	1836.06	1836.06	0.007

FWHM Calibration Report

$$\text{FWHM} = 0.8260 + 3.2280\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	1.15	1.05	0.101
2	59.54	1.08	1.08	0.010
3	88.03	1.17	1.13	0.040
4	122.06	1.19	1.18	0.007
5	165.85	1.20	1.24	-0.038
6	391.70	1.38	1.46	-0.082
7	661.66	1.59	1.66	-0.068
8	898.04	1.72	1.79	-0.072
9	1173.24	1.88	1.93	-0.053
10	1332.50	2.01	2.00	0.003
11	1836.06	2.36	2.21	0.152

Efficiency Calibration Report

$$\text{Eff} = \exp(a2 + a3 \cdot x + a4 \cdot x^2 + a5 \cdot x^3 + a6 \cdot x^4 + a7 \cdot x^5), \quad x = \ln(a1/\text{energy})$$

a1 941.3 a2 -4.865 a3 0.8096 a4 -6.0320E-02 a5 -0.1347 a6 0.1606 a7 -5.3407E-02

Average Deviation = 1.59 % Reduced Chi-Square = 0.774

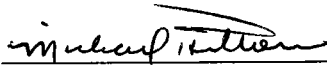
Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
-----	--------------	---------------------	------------------	---------------------	-------------	--------

1	46.50	1.27E-03	5.40E-05	1.30E-03	-0.53	-2.25
---	-------	----------	----------	----------	-------	-------

Sample ID : CAL_GAMMA10_2LMB

Acquisition date : 1-FEB-2006 12:13:30

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	5.90E-03	1.85E-04	5.75E-03	0.85	2.66
3	88.03	1.80E-02	6.02E-04	1.82E-02	-0.45	-1.50
4	122.06	2.40E-02	7.49E-04	2.44E-02	-0.50	-1.57
5	165.85	2.43E-02	7.31E-04	2.40E-02	0.34	1.03
6	391.70	1.48E-02	4.16E-04	1.46E-02	0.35	0.97
7	661.66	1.02E-02	3.11E-04	1.01E-02	0.14	0.43
8	898.04	7.75E-03	2.15E-04	8.01E-03	-1.25	-3.45
9	1173.24	6.54E-03	1.79E-04	6.45E-03	0.52	1.41
10	1332.50	5.91E-03	1.56E-04	5.83E-03	0.55	1.45
11	1836.06	4.70E-03	1.29E-04	4.73E-03	-0.27	-0.75

Approved by: Approval Date: 2 / 15 / 06

Print Time : 14-JUN-2005 17:33:53.22
 Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
 Certificate title : 2L_MB
 Certificate date : 1-APR-2005 12:00:00.00
 Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01

Library Title :
 Library file name : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
 Date printed : 8-JUL-2005 17:13:45.13
 Number of nuclides : 10
 Number of lines : 17

Nuclide Name	Half-Life	Nuclide Type	Key Line	Energy	Abundance
CO-57	271.74D		*	122.06 keV	85.51 %
				136.47 keV	10.47 %
CO-60	5.27Y		*	1173.24 keV	99.90 %
				1332.50 keV	99.98 %
Y-88	106.63D		*	898.04 keV	93.40 %
				1836.06 keV	99.38 %
CD-109	461.40D		*	88.03 keV	3.79 %
SN-113	115.09D		*	391.70 keV	64.90 %
CS-137	30.00Y		*	661.66 keV	85.12 %
CE-139	137.64D		*	165.85 keV	80.35 %
HG-203	46.60D			70.83 keV	4.75 %
				72.87 keV	8.00 %
				82.60 keV	3.55 %
				279.20 keV	77.30 %
PB-210	22.26Y		*	46.50 keV	4.05 %
AM-241	432.20Y		*	59.54 keV	35.90 %

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytix maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

SOURCE PREPARED BY:

M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED:

W.M. [Signature] 5-12-05

This standard will expire one year after the calibration date.

General Engineering Laboratories, LLC

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

Gamma Spectrometer Geometry Calibration Package

Detector: GAMMA 11

Geometry: ZL-MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	N/A
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the detector efficiency curve printout included?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Michael H. Feltner

Date: 3/14/06

Reviewed By: John J. Austin

Date: 3/16/2006

Effective Date: 3/14/06

General Engineering Laboratories, LLC

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

Gamma Spectrometer Front End Electronics Setup

Detector: GAMMA 11

Date Performed: 3/14/06

Performed By: Michael Patton 3/14/06

<p>High Voltage Power Supply</p> <p>Model No. <u>3106 D</u> High Voltage <u>3.00 kV</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2026</u> Course Gain <u>10</u> Fine Gain <u>0.861</u> Time Constant <u>6 μ sec.</u> Input polarity <u>POSITIVE</u> BSLR rate <u>N/A</u> BSLR mode <u>N/A</u> Threshold <u>N/A</u></p>
<p>ADC</p> <p>Model No. <u>ND579</u> Gain <u>4K</u></p>	
<p>AIM Module</p> <p>Model No. <u>ND556</u> Address <u>ZAC:2 NIZAC:2</u> <small>MAN 3/14/06</small></p>	

Gamma Spectroscopy Calibration VerificationInstrument: Gamma 11Calibration Date: 3/14/2006Geometry: 2L_MBStandard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Pb-210		8.2015E+05	8.131E+05	-0.86
Am-241		6.2561E+04	6.401E+04	2.32
Cd-109		8.2579E+05	7.683E+05	-6.96
Co-57		1.9081E+04	1.919E+04	0.57
Ce-139		2.8981E+04	3.018E+04	4.14
Sn-113		4.8349E+04	4.926E+04	1.88
Cs-137		2.4325E+04	2.407E+04	-1.05
Y-88	1836.06	8.6210E+04	8.511E+04	-1.28
Co-60	1332.5	3.8845E+04	3.974E+04	2.30

Prepared By: Mukul KatariaDate: 3/14/06Reviewed By: Shen Z. AustinDate: 3/16/2006

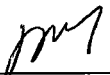
QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_GAMMA11.QAF;2

Sample ID : BKG_GAMMA11 Sample quantity : 1.80 LITER
Sample date : 13-MAR-2006 00:00:00 Acquisition date : 13-MAR-2006 16:08:27
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.84

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	7.38E+04	8.40E+04	7.98E+04	
BACKGROUND (CPS)	1.23	1.40	1.33	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by:  Approval Date: 3 / 13 / 06

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA11_2LMB.CNF;4
Sample date        : 1-APR-2005 00:00:00. Acquisition date : 14-MAR-2006 14:49:41
Sample ID          : VER_GAMMA11_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA11                   Detector geometry: 2L_MB
Elapsed live time : 0 02:00:00.00            Elapsed real time: 0 02:01:02.28 0.9%
Energy tolerance  : 2.00000 KEV              Analyst Initials  : MJH1
Abundance limit   : 75.00000                 Sensitivity       : 3.00000
Batch ID          :                          Detector SN#     : 11912863
Matrix Spike DPM  :                          LCS DPM       :
*****

```

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.40	19535	42618	1.68	96.40	89	14	2.71E+00	2.4	
2	0	59.45	49193	48795	1.66	122.50	114	16	6.83E+00	1.1	
3	0	66.78*	992	27940	2.69	137.17	133	9	1.38E-01	30.5	
4	0	88.06	92803	44972	1.65	179.72	173	15	1.29E+01	0.6	
5	0	122.06	43600	30310	1.67	247.73	239	16	6.06E+00	1.0	
6	0	136.45	5957	18591	1.67	276.52	271	12	8.27E-01	4.8	
7	0	165.88	25570	16071	1.72	335.37	330	12	3.55E+00	1.2	
8	0	254.89	618	8682	1.72	513.39	510	9	8.59E-02	27.5	
9	0	279.18*	1304	8338	1.78	561.99	558	10	1.81E-01	13.4	
10	0	351.29*	103	3072	1.07	706.19	704	5	1.43E-02	81.6	
11	0	362.31*	193	3498	1.47	728.24	725	6	2.68E-02	49.1	
12	0	391.66*	14521	7886	1.86	786.94	781	14	2.02E+00	1.5	
13	0	409.13	84	3697	1.28	821.88	819	7	1.17E-02	120.4	
14	0	510.45*	201	3816	1.96	1024.50	1021	9	2.79E-02	56.5	
15	0	626.48*	41	3366	0.69	1256.55	1251	9	5.74E-03	253.8	
16	0	661.53	51047	6638	2.03	1326.64	1316	19	7.09E+00	0.6	
17	0	814.32	242	2990	1.24	1632.18	1628	10	3.36E-02	42.9	
18	0	897.85	16595	6580	2.22	1799.21	1789	20	2.30E+00	1.4	
19	0	1053.85	139	2307	1.80	2111.15	2108	9	1.94E-02	62.5	
20	0	1172.99	54225	3333	2.34	2349.37	2338	22	7.53E+00	0.5	
21	0	1258.28*	27	534	1.24	2519.91	2516	7	3.72E-03	144.6	
22	1	1325.59	317	1240	2.62	2654.48	2642	36	4.41E-02	24.9	9.65E+00
23	1	1332.25	49358	906	2.50	2667.79	2642	36	6.86E+00	0.5	
24	0	1346.92*	53	260	0.76	2697.13	2694	8	7.37E-03	54.3	
25	0	1525.39	66	616	3.30	3053.94	3046	15	9.21E-03	82.5	
26	0	1554.50	60	298	1.04	3112.15	3109	7	8.34E-03	49.4	
27	0	1570.08	33	381	0.48	3143.29	3142	8	4.61E-03	103.0	
28	0	1666.45*	27	117	1.12	3335.96	3333	6	3.79E-03	66.3	
29	0	1703.66*	40	169	1.14	3410.35	3407	8	5.55E-03	58.9	
30	0	1780.02	37	160	4.26	3563.01	3555	12	5.20E-03	69.8	
31	0	1835.63	10084	415	2.73	3674.18	3662	24	1.40E+00	1.1	
32	0	1868.73	26	45	1.29	3740.34	3737	8	3.63E-03	48.3	
33	0	1922.00	24	59	2.60	3846.84	3843	10	3.40E-03	61.5	
34	0	1928.83	18	88	0.54	3860.50	3854	13	2.53E-03	111.3	
35	0	1979.48	37	39	1.83	3961.74	3958	9	5.20E-03	34.0	
36	3	1983.33*	29	39	2.03	3969.43	3966	17	3.96E-03	37.4	1.98E+00
37	3	1987.36	41	58	3.17	3977.49	3966	17	5.67E-03	40.3	
38	0	2032.67	29	42	1.33	4068.06	4064	8	4.05E-03	42.7	

Peak Search Report (continued)
Sample ID : VER_GAMMA11_2LMB

Page : 2
Acquisition date : 14-MAR-2006 14:49:41

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
----	----	--------	------	-------	------	---------	------	----	---------	------	-----

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

VAX/VMS Nuclide Identification Report Generated

 * General Eng. Labs, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

DETECTOR DATA

 * Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA11_ *
 * Acquisition date : 14-MAR-2006 14:49:41 Detector SN# : 11912863 *
 * Detector ID : GAMMA11 Sensitivity : 3.000 *
 * Geometry : 2L_MB Energy tolerance: 2.000 *
 * Elapsed live time: 0 02:00:00.00 Abundance limit : 75.000 *
 * Elapsed real time: 0 02:01:02.28 Half life ratio : 8.000 *

SAMPLE DATA

 * Sample date : 1-APR-2005 00:00:00 Nuclide Library : *
 * Sample ID : VER_GAMMA11_2LMB Analyst initials: MJH1 *
 * Batch Number : Sample Quantity : 1.0000E+00 LITER *
 * Recovery : 1.00000 Carrier Weight : 0.00000 *

QC DATA

 * Standard Weight : 0.00000 *
 * CALIB. DATE/TIME : 14-MAR-2006 14:49:10 MS Isotope : *
 * MSD DPM : 0.000 MSD Isotope : *
 * LCS DPM : 0.000 LCS Isotope : *
 * LCSD DPM : 0.000 LCSD Isotope : *

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.919E+04	1.391E+03	2.572E+02	0.000E+00
CO-60	3.974E+04	2.429E+03	1.071E+02	0.000E+00
Y-88	8.511E+04	5.395E+03	5.987E+02	0.000E+00
CD-109	7.683E+05	8.976E+04	6.027E+03	0.000E+00
SN-113	4.926E+04	4.126E+03	1.191E+03	0.000E+00
CS-137	2.407E+04	1.682E+03	1.360E+02	0.000E+00
CE-139	3.018E+04	2.276E+03	5.989E+02	0.000E+00
HG-203	6.503E+04	1.823E+04	2.008E+04	0.000E+00
PB-210	8.131E+05	9.623E+04	2.950E+04	0.000E+00
AM-241	6.401E+04	8.458E+03	9.324E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error) Ided	MDA (pCi/LITER)
---------	--------------------------------------	--------------------------	---------------------

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*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA11_2LMB.CNF;4
Sample date        : 1-APR-2005 00:00:00. Acquisition date : 14-MAR-2006 14:49:41
Sample ID          : VER_GAMMA11_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA11                   Detector geometry: 2L MB
Elapsed live time : 0 02:00:00.00             Elapsed real time: 0 02:01:02.28 0.9%
Energy tolerance  : 2.00000 KEV               Analyst Initials  : MJH1
Abundance limit   : 75.00000                 Sensitivity       : 3.00000
Batch ID          :                           Detector SN#      : 11912863
Matrix Spike DPM :                           LCS DPM       :
*****

```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	43600	85.51*	2.422E+00	7.904E+03	1.919E+04	7.25
	136.47	5957	10.47	2.411E+00	8.859E+03	2.150E+04	12.26
CO-60	1173.24	54225	99.90	5.884E-01	3.463E+04	3.925E+04	6.71
	1332.50	49358	99.98*	5.284E-01	3.507E+04	3.974E+04	6.11
Y-88	898.04	16595	93.40	7.434E-01	8.972E+03	8.597E+04	8.40
	1836.06	10084	99.38*	4.289E-01	8.881E+03	8.511E+04	6.34
CD-109	88.03	92803	3.79*	2.017E+00	4.557E+05	7.683E+05	11.68
SN-113	391.70	14521	64.90*	1.384E+00	6.069E+03	4.926E+04	8.38
CS-137	661.66	51047	85.12*	9.560E-01	2.355E+04	2.407E+04	6.99
CE-139	165.85	25570	80.35*	2.280E+00	5.240E+03	3.018E+04	7.54
HG-203	70.83	-----	4.75	1.378E+00	-----	Line Not Found	-----
	72.87	-----	8.00	1.472E+00	-----	Line Not Found	-----
	82.60	-----	3.55	1.853E+00	-----	Line Not Found	-----
	279.20	1304	77.30*	1.716E+00	3.692E+02	6.503E+04	28.03
PB-210	46.50	19535	4.05*	2.294E-01	7.894E+05	8.131E+05	11.83
AM-241	59.54	49193	35.90*	8.049E-01	6.391E+04	6.401E+04	13.21

Flag: "*" = Keyline

Total number of lines in spectrum 38
 Number of unidentified lines 25
 Number of lines tentatively identified by NID 13 34.21%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	2.43	7.904E+03	1.919E+04	0.139E+04	7.25	
CO-60	5.27Y	1.13	3.507E+04	3.974E+04	0.243E+04	6.11	
Y-88	106.63D	9.58	8.881E+03	8.511E+04	0.540E+04	6.34	
CD-109	461.40D	1.69	4.557E+05	7.683E+05	0.898E+05	11.68	
SN-113	115.09D	8.12	6.069E+03	4.926E+04	0.413E+04	8.38	
CS-137	30.00Y	1.02	2.355E+04	2.407E+04	0.168E+04	6.99	
CE-139	137.64D	5.76	5.240E+03	3.018E+04	0.228E+04	7.54	
HG-203	46.60D	176.	3.692E+02	6.503E+04	1.823E+04	28.03	
PB-210	22.26Y	1.03	7.894E+05	8.131E+05	0.962E+05	11.83	
AM-241	432.20Y	1.00	6.391E+04	6.401E+04	0.846E+04	13.21	
Total Activity :			1.396E+06	1.958E+06			

Grand Total Activity : 1.396E+06 1.958E+06

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	66.78	992	27940	2.69	137.17	133	9	1.38E-01	60.9	1.18E+00	
0	254.89	618	8682	1.72	513.39	510	9	8.59E-02	55.0	1.81E+00	
0	351.29	103	3072	1.07	706.19	704	5	1.43E-02	****	1.48E+00	
0	362.31	193	3498	1.47	728.24	725	6	2.68E-02	98.1	1.46E+00	
0	409.13	84	3697	1.28	821.88	819	7	1.17E-02	****	1.34E+00	
0	510.45	201	3816	1.96	1024.50	1021	9	2.79E-02	****	1.16E+00	
0	626.48	41	3366	0.69	1256.55	1251	9	5.74E-03	****	9.97E-01	
0	814.32	242	2990	1.24	1632.18	1628	10	3.36E-02	85.7	8.08E-01	
0	1053.85	139	2307	1.80	2111.15	2108	9	1.94E-02	****	6.46E-01	
0	1258.28	27	534	1.24	2519.91	2516	7	3.72E-03	****	5.54E-01	
1	1325.59	317	1240	2.62	2654.48	2642	36	4.41E-02	49.7	5.31E-01	
0	1346.92	53	260	0.76	2697.13	2694	8	7.37E-03	****	5.24E-01	
0	1525.39	66	616	3.30	3053.94	3046	15	9.21E-03	****	4.77E-01	
0	1554.50	60	298	1.04	3112.15	3109	7	8.34E-03	98.7	4.70E-01	
0	1570.08	33	381	0.48	3143.29	3142	8	4.61E-03	****	4.67E-01	
0	1666.45	27	117	1.12	3335.96	3333	6	3.79E-03	****	4.50E-01	
0	1703.66	40	169	1.14	3410.35	3407	8	5.55E-03	****	4.45E-01	
0	1780.02	37	160	4.26	3563.01	3555	12	5.20E-03	****	4.35E-01	
0	1868.73	26	45	1.29	3740.34	3737	8	3.63E-03	96.6	4.26E-01	
0	1922.00	24	59	2.60	3846.84	3843	10	3.40E-03	****	4.22E-01	
0	1928.83	18	88	0.54	3860.50	3854	13	2.53E-03	****	4.21E-01	
0	1979.48	37	39	1.83	3961.74	3958	9	5.20E-03	68.0	4.18E-01	
3	1983.33	29	39	2.03	3969.43	3966	17	3.96E-03	74.7	4.18E-01	
3	1987.36	41	58	3.17	3977.49	3966	17	5.67E-03	80.5	4.18E-01	
0	2032.67	29	42	1.33	4068.06	4064	8	4.05E-03	85.4	4.16E-01	

Flags: "T" = Tentatively associated

```
*****
*                                     *
*                               GENERAL ENG. LABS, LLC.                       *
*                               2040 Savage Road                             *
*                               Charleston, SC 29414                         *
*****
```

DETECTOR DATA

```
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAMMA11_2LMB.CNF;*
* Acquisition date   : 14-MAR-2006 14:49:41  Detector SN#      : 11912863      *
* Detector ID        : GAMMA11                Sensitivity         : 3.00000      *
* Geometry           : 2L_MB                  Energy tolerance     : 2.00000      *
* Elapsed live time  : 0 02:00:00.00          Abundance limit      : 75.00000      *
* Elapsed real time  : 0 02:01:02.28          Half life ratio      : 8.00000      *
*****
```

SAMPLE DATA

```
* Sample date        : 1-APR-2005 00:00:00.  Nuclide Library    : CAL
* Sample ID          : VER_GAMMA11_2LMB       Analyst initials   : MJH1
* Batch Number       :                       Sample Quantity   : 1.00000E+00 LITER
*****
```

QC DATA

```
* CALIB. DATE/TIME  : 14-MAR-2006 14:49:10.4MS Isotope       :
* MSD DPM           :                       MSD Isotope       :
* LCS DPM           :                       LCS Isotope       :
*****
```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.919E+04	1.391E+03	2.572E+02	1.790E+01	74.595
CO-60	3.974E+04	2.429E+03	1.071E+02	6.467E+00	371.007
Y-88	8.511E+04	5.395E+03	5.987E+02	3.546E+01	142.148
CD-109	7.683E+05	8.976E+04	6.027E+03	7.006E+02	127.466
SN-113	4.926E+04	4.126E+03	1.191E+03	9.272E+01	41.360
CS-137	2.407E+04	1.682E+03	1.360E+02	9.369E+00	176.960
CE-139	3.018E+04	2.276E+03	5.989E+02	4.292E+01	50.385
HG-203	6.503E+04	1.823E+04	2.008E+04	1.623E+03	3.238
PB-210	8.131E+05	9.623E+04	2.950E+04	3.165E+03	27.562
AM-241	6.401E+04	8.458E+03	9.324E+02	1.214E+02	68.645

```

*****
*                                     GENERAL ENG. LABS, LLC.                               *
*                                     2040 Savage Road                                   *
*                                     Charleston, SC 29414                             *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]CAL_GAMMA11_2LMB.CNF;3
Sample date        : 1-APR-2005 00:00:00. Acquisition date : 14-MAR-2006 09:00:53
Sample ID          : CAL_GAMMA11_2LMB          Sample quantity : 1.00000E+00 LITER
Detector name     : GAMMA11                   Detector geometry: 2L MB
Elapsed live time : 0 02:00:00.00             Elapsed real time: 0 02:01:02.21  0.9%
Energy tolerance  : 2.00000 KEV               Analyst Initials  : MJH1
Abundance limit   : 75.00000                 Sensitivity       : 3.00000
Batch ID          :                           Detector SN#      : 11912863
Matrix Spike DPM  :                           LCS DPM       :
*****

```

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.40	19352	43185	1.55	96.41	89	14	2.69E+00	2.4	
2	0	59.44	50947	45009	1.58	122.48	114	15	7.08E+00	1.0	
3	0	66.98*	988	24835	2.42	137.56	134	8	1.37E-01	27.7	
4	0	88.02	96107	50242	1.57	179.64	171	17	1.33E+01	0.6	
5	0	122.09	42764	24998	1.56	247.80	241	13	5.94E+00	0.9	
6	0	136.52	5280	14257	1.54	276.65	273	9	7.33E-01	4.3	
7	0	165.86	25067	17694	1.61	335.34	330	13	3.48E+00	1.3	
8	0	239.51*	325	8446	1.86	482.65	479	8	4.51E-02	49.4	
9	0	255.22	490	7757	1.32	514.06	511	8	6.81E-02	31.5	
10	0	272.66	470	6518	2.18	548.94	546	8	6.52E-02	30.2	
11	0	279.12*	1363	8996	1.85	561.85	557	11	1.89E-01	13.8	
12	0	391.64*	14609	7941	1.71	786.89	780	14	2.03E+00	1.5	
13	0	412.82	255	4207	1.06	829.26	826	8	3.54E-02	44.5	
14	0	501.18*	109	2095	0.91	1005.97	1003	5	1.51E-02	63.9	
15	0	509.63*	224	5233	2.86	1022.86	1018	12	3.11E-02	65.2	
16	0	553.23	129	2903	1.36	1110.06	1107	8	1.79E-02	72.7	
17	0	661.57	50731	7009	1.92	1326.72	1316	20	7.05E+00	0.6	
18	0	784.06	65	1721	0.55	1571.68	1568	6	9.04E-03	101.6	
19	0	791.37	78	2594	1.34	1586.29	1582	9	1.08E-02	118.1	
20	0	897.93	16556	5624	2.09	1799.37	1791	17	2.30E+00	1.3	
21	0	1001.57*	175	3052	2.35	2006.61	2003	11	2.43E-02	61.6	
22	0	1043.88	35	2696	0.94	2091.22	2090	10	4.88E-03	277.1	
23	0	1093.40	40	2694	1.15	2190.24	2187	10	5.62E-03	240.1	
24	0	1173.07	54101	3431	2.24	2349.53	2338	22	7.51E+00	0.5	
25	0	1236.90*	45	581	1.45	2477.15	2472	8	6.31E-03	93.3	
26	0	1281.12	219	1360	8.15	2565.57	2555	21	3.04E-02	42.6	
27	0	1315.42	62	419	1.40	2634.15	2632	6	8.62E-03	53.7	
28	3	1325.64	434	1296	3.17	2654.58	2646	31	6.02E-02	18.7	1.02E+01
29	3	1332.33	48918	807	2.41	2667.96	2646	31	6.79E+00	0.5	
30	0	1402.41	60	481	4.19	2808.08	2801	13	8.29E-03	77.1	
31	0	1466.56*	51	443	3.69	2936.33	2930	12	7.09E-03	84.1	
32	0	1523.84	78	287	0.91	3050.85	3048	8	1.08E-02	39.5	
33	0	1595.61	39	347	0.91	3194.34	3191	7	5.44E-03	80.6	
34	0	1620.40	15	447	1.23	3243.89	3243	12	2.14E-03	275.2	
35	0	1658.78*	72	276	1.78	3320.63	3316	11	9.95E-03	46.6	
36	0	1676.52	40	200	0.90	3356.09	3351	9	5.54E-03	65.8	
37	0	1682.71*	27	393	6.00	3368.46	3363	16	3.74E-03	165.7	
38	0	1711.43*	28	104	1.46	3425.88	3424	6	3.82E-03	62.4	

Sample ID : CAL_GAMMA11_2LMB

Acquisition date : 14-MAR-2006 09:00:53

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	0	1771.20*	18	127	0.88	3545.37	3540	9	2.57E-03	113.7	
40	0	1794.40	126	335	9.93	3591.76	3579	27	1.76E-02	41.4	
41	0	1835.75	10162	344	2.70	3674.41	3662	27	1.41E+00	1.1	

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

Configuration : MCA0:[GAMMA]GAMMA11\$1
 Analyses by : CALIBRATE V1.7,PEAK V16.4
 Detector Name : GAMMA11 Energy Calib Time: 13-MAR-2006 15:42:15
 Efficiency type : Empirical Effncy Calib Time: 14-MAR-2006 14:49:10
 Detector Geometry: GAMMA11 Shelf :

Energy Calibration Report

$$\text{Energy} = -1.798 + 0.5000 \cdot \text{Channel} + 3.6954\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	96.53	46.50	46.46	0.035
2	122.64	59.54	59.52	0.020
3	179.67	88.03	88.03	0.002
4	247.68	122.06	122.04	0.026
5	335.46	165.85	165.92	-0.067
6	787.12	391.70	391.75	-0.048
7	1326.93	661.66	661.67	-0.013
8	1799.49	898.04	897.99	0.051
9	2349.89	1173.24	1173.25	-0.008
10	2668.28	1332.50	1332.49	0.012
11	3675.06	1836.06	1836.07	-0.011

FWHM Calibration Report

$$\text{FWHM} = 1.344 + 2.8621\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	1.64	1.54	0.100
2	59.54	1.64	1.56	0.076
3	88.03	1.60	1.61	-0.008
4	122.06	1.64	1.66	-0.022
5	165.85	1.62	1.71	-0.095
6	391.70	1.87	1.91	-0.036
7	661.66	1.90	2.08	-0.175
8	898.04	2.31	2.20	0.104
9	1173.24	2.40	2.32	0.076
10	1332.50	2.29	2.39	-0.098
11	1836.06	2.65	2.57	0.079

Efficiency Calibration Report

$$\text{Eff} = \exp(a2 + a3 \cdot x + a4 \cdot x^2 + a5 \cdot x^3 + a6 \cdot x^4 + a7 \cdot x^5), \quad x = \ln(a1/\text{energy})$$

a1 a2 a3 a a5 a6 a7
 941.3 -4.943 0.8722 -7.2749E-02 -0.1987 0.1973 -5.6169E-02

Average Deviation = 2.39 % Reduced Chi-Square = 1.57

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
-----	--------------	---------------------	------------------	---------------------	-------------	--------

1	46.50	2.25E-03	8.64E-05	2.33E-03	-0.86	-3.30
---	-------	----------	----------	----------	-------	-------

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	8.53E-03	2.70E-04	8.10E-03	1.60	5.07
3	88.03	1.94E-02	6.51E-04	2.02E-02	-1.20	-4.02
4	122.06	2.38E-02	7.47E-04	2.42E-02	-0.51	-1.61
5	165.85	2.32E-02	7.13E-04	2.28E-02	0.56	1.71
6	391.70	1.41E-02	4.26E-04	1.38E-02	0.66	2.01
7	661.66	9.40E-03	2.88E-04	9.56E-03	-0.55	-1.68
8	898.04	7.23E-03	2.10E-04	7.43E-03	-0.97	-2.81
9	1173.24	5.99E-03	1.65E-04	5.88E-03	0.64	1.75
10	1332.50	5.36E-03	1.42E-04	5.28E-03	0.52	1.37
11	1836.06	4.25E-03	1.20E-04	4.29E-03	-0.33	-0.94

Approved by: *Michael Peterson*

Approval Date: 3 / 14 / 06

Print Time : 14-JUN-2005 17:33:53.22
 Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
 Certificate title : 2L_MB
 Certificate date : 1-APR-2005 12:00:00.00
 Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01

Library Title :
 Library file name : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
 Date printed : 8-JUL-2005 17:13:45.13
 Number of nuclides : 10
 Number of lines : 17

Nuclide		Nuclide	Key	Energy		Abundance
Name	Half-Life	Type	Line			
CO-57	271.74D		*	122.06	keV	85.51 %
				136.47	keV	10.47 %
CO-60	5.27Y		*	1173.24	keV	99.90 %
				1332.50	keV	99.98 %
Y-88	106.63D		*	898.04	keV	93.40 %
				1836.06	keV	99.38 %
CD-109	461.40D		*	88.03	keV	3.79 %
SN-113	115.09D		*	391.70	keV	64.90 %
CS-137	30.00Y		*	661.66	keV	85.12 %
CE-139	137.64D		*	165.85	keV	80.35 %
HG-203	46.60D			70.83	keV	4.75 %
				72.87	keV	8.00 %
				82.60	keV	3.55 %
				279.20	keV	77.30 %
PB-210	22.26Y		*	46.50	keV	4.05 %
AM-241	432.20Y		*	59.54	keV	35.90 %

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

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

Q A APPROVED: W.M. [Signature] 5-12-05

This standard will expire one year after the calibration date.

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
(803)556-8171

Gamma Spectrometer Geometry Calibration Package

Detector: WELL

Geometry: ZL_MB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondard standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	N/A
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the detector efficiency curve printout included?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Michael J. Hite

Date: 12/14/05

Reviewed By: John C. Hite

Date: 12/14/05

Effective Date: 12/13/05

General Engineering Laboratories, LLC

2040 Savage Road, Charleston, SC 29414
(803)556-8171

Gamma Spectrometer Front End Electronics Setup

Detector: Well

Date Performed: 12/12/05

Performed By: Muhafitton

<p>High Voltage Power Supply</p> <p>Model No. <u>3106D</u> High Voltage <u>2.5KV</u></p>	<p>Spectroscopy Amplifier</p> <p>Model No. <u>2026</u> Course Gain <u>20</u> Fine Gain <u>0.542</u> Time Constant <u>4 μ sec.</u> Input polarity <u>POSITIVE</u> BSLR rate <u>N/A</u> BSLR mode <u>N/A</u> Threshold <u>N/A</u></p>
<p>ADC</p> <p>Model No. <u>8701</u> Gain <u>4000</u></p>	
<p>AIM Module</p> <p>Model No. <u>556A</u> Address <u>NIE04:2</u></p>	

Gamma Spectroscopy Calibration Verification

Instrument: Well

Calibration Date: 12/13/2005

Geometry: 2L_MB

Standard Id: 70528-278

Isotope		CALIBRATED ACTIVITY (PCI)	MEASURED ACTIVITY (PCI)	DIFFERENCE %
Pb-210		8.2015E+05	7.874E+05	-3.99
Am-241		6.2561E+04	6.587E+04	5.29
Cd-109		8.2579E+05	8.252E+05	-0.07
Co-57		1.9081E+04	1.870E+04	-2.00
Ce-139		2.8981E+04	2.896E+04	-0.07
Sn-113		4.8349E+04	4.870E+04	0.73
Cs-137		2.4325E+04	2.518E+04	3.51
Y-88	1836.06	8.6210E+04	8.641E+04	0.23
Co-60	1332.5	3.8845E+04	3.874E+04	-0.27

Prepared By: M. [Signature]

Date: 12/13/05

Reviewed By: [Signature]

Date: 12/14/05

Verified:

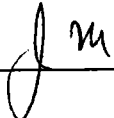
QA filename : DKA300:[CANBERRA.GAMMA]QC_BKG_WELL.QAF;2

Sample ID : BKG_WELL Sample quantity : 1.80 LITER
Sample date : 10-DEC-2005 00:00:00 Acquisition date : 10-DEC-2005 19:27:01
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:12.72

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
BACKGROUND (GROSS COUNTS)	8.07E+04	1.24E+05	1.01E+05	
BACKGROUND (CPS)	1.34	2.06	1.68	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by:  Approval Date: 2 / 11 / 05

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_WELL_2LMB.CNF;2
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 13-DEC-2005 11:29:45
Sample ID          : VER_WELL_2LMB           Sample quantity  : 1.00000E+00 LITER
Detector name     : WELL                    Detector geometry: 2L_MB
Elapsed live time : 0 02:30:00.00           Elapsed real time: 0 02:31:43.86  1.1%
Energy tolerance  : 2.00000 KEV             Analyst Initials  : MJH1
Abundance limit   : 75.00000                Sensitivity       : 3.00000
Batch ID          :                          Detector SN#      : 3941466
Matrix Spike DPM :                          LCS DPM       :
*****

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	33.09	1432	52446	1.30	65.14	63	7	1.59E-01	26.6	
2	1	38.18*	1164	31197	1.37	75.25	73	24	1.29E-01	21.4	2.24E+02
3	1	40.69*	4583	61276	1.37	80.25	73	24	5.09E-01	9.5	
4	1	46.50*	52806	57740	1.39	91.79	73	24	5.87E+00	0.9	
5	0	50.00	934	50839	1.88	98.74	97	7	1.04E-01	40.1	
6	0	59.39	81406	92583	1.34	117.40	110	15	9.05E+00	0.9	
7	10	67.14	2659	27609	2.19	132.80	130	18	2.95E-01	9.6	3.07E+00
8	10	70.36	3216	100881	3.40	139.18	130	18	3.57E-01	23.3	
9	0	88.03*	137668	71721	1.33	174.29	167	15	1.53E+01	0.5	
10	0	122.11	63509	37512	1.37	242.00	236	13	7.06E+00	0.7	
11	0	136.53	7730	21196	1.33	270.65	266	9	8.59E-01	3.6	
12	0	165.91*	46765	29021	1.40	329.03	321	15	5.20E+00	0.9	
13	0	222.40	203	12987	1.28	441.27	438	8	2.25E-02	97.8	
14	0	254.88	1317	12753	1.71	505.82	502	10	1.46E-01	16.3	
15	0	279.30*	5604	11863	1.49	554.34	549	11	6.23E-01	4.0	
16	0	297.77*	75	6443	1.41	591.04	590	7	8.28E-03	179.3	
17	0	343.13*	75	5547	0.98	681.17	679	7	8.35E-03	165.1	
18	0	348.63	205	3815	1.43	692.11	690	5	2.27E-02	45.9	
19	0	391.73*	26457	9321	1.57	777.76	772	13	2.94E+00	1.0	
20	0	415.30	148	3973	1.43	824.61	823	6	1.65E-02	67.6	
21	0	432.51	223	5208	0.71	858.80	856	8	2.47E-02	56.5	
22	0	466.83*	289	5167	1.56	927.02	924	8	3.21E-02	43.5	
23	0	487.16	341	4927	1.64	967.42	964	9	3.79E-02	37.5	
24	0	510.88*	598	5898	2.43	1014.56	1009	11	6.65E-02	25.3	
25	0	661.65*	52330	7856	1.75	1314.25	1306	17	5.81E+00	0.6	
26	0	707.69	257	3271	1.59	1405.77	1402	9	2.86E-02	40.5	
27	0	770.29*	112	2701	0.85	1530.22	1527	8	1.24E-02	81.0	
28	0	774.63	183	2373	1.51	1538.86	1536	7	2.03E-02	44.8	
29	0	799.95*	68	2408	1.38	1589.19	1588	7	7.60E-03	119.7	
30	0	813.73*	624	3838	1.30	1616.58	1611	11	6.93E-02	19.7	
31	0	819.82*	79	2143	1.39	1628.69	1627	6	8.78E-03	93.2	
32	0	897.98*	29940	7548	1.92	1784.10	1774	19	3.33E+00	0.9	
33	0	924.35	149	2774	1.91	1836.53	1834	7	1.66E-02	59.0	
34	0	959.15	92	3358	0.67	1905.73	1904	8	1.02E-02	109.5	
35	0	1070.18	153	2302	1.40	2126.51	2123	8	1.70E-02	54.8	
36	0	1144.88*	21	1819	0.53	2275.07	2274	9	2.28E-03	375.5	
37	0	1173.19*	56593	3919	2.12	2331.38	2320	23	6.29E+00	0.5	
38	4	1325.83	897	1524	3.22	2634.98	2623	36	9.97E-02	11.5	2.33E+01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	4	1332.46*	50796	1062	2.32	2648.17	2623	36	5.64E+00	0.5	
40	0	1686.14	76	324	2.38	3351.82	3349	9	8.41E-03	44.5	
41	0	1690.00	42	158	1.23	3359.49	3357	5	4.65E-03	47.7	
42	0	1744.42	28	148	1.19	3467.77	3464	9	3.16E-03	79.7	
43	0	1813.79	15	257	3.86	3605.82	3601	13	1.61E-03	229.0	
44	0	1836.05*	18059	625	2.51	3650.13	3638	24	2.01E+00	0.8	
45	0	1954.67	16	37	1.33	3886.21	3884	5	1.78E-03	62.5	

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

VAX/VMS Nuclide Identification Report Generated

 * General Eng. Labs, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

DETECTOR DATA

* Configuration : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_WELL_2LM *
 * Acquisition date : 13-DEC-2005 11:29:45 Detector SN# : 3941466 *
 * Detector ID : WELL Sensitivity : 3.000 *
 * Geometry : 2L_MB Energy tolerance: 2.000 *
 * Elapsed live time: 0 02:30:00.00 Abundance limit : 75.000 *
 * Elapsed real time: 0 02:31:43.86 Half life ratio : 8.000 *

SAMPLE DATA

* Sample date : 1-APR-2005 12:00:00 Nuclide Library : FERMC *
 * Sample ID : VER_WELL_2LMB Analyst initials: MJH1 *
 * Batch Number : Sample Quantity : 1.0000E+00 LITER *
 * Recovery : 1.00000 Carrier Weight : 0.00000 *

QC DATA

* Standard Weight : 0.00000 *
 * CALIB. DATE/TIME : 13-DEC-2005 09:34:01 MS Isotope : *
 * MSD DPM : ***** MSD Isotope : *
 * LCS DPM : 0.000 LCS Isotope : *
 * LCSD DPM : 0.000 LCSD Isotope : *

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	
CO-57	1.870E+04	2.791E+02	1.953E+02	0.000E+00
CO-60	3.874E+04	3.608E+02	1.054E+02	0.000E+00
Y-88	8.641E+04	1.434E+03	3.479E+02	0.000E+00
CD-109	8.252E+05	8.358E+03	5.046E+03	0.000E+00
SN-113	4.870E+04	9.472E+02	6.806E+02	0.000E+00
CS-137	2.518E+04	2.947E+02	1.497E+02	0.000E+00
CE-139	2.896E+04	5.322E+02	3.423E+02	0.000E+00
HG-203	6.242E+04	4.989E+03	4.823E+03	0.000E+00
PB-210	7.874E+05	1.451E+04	1.518E+04	0.000E+00
AM-241	6.587E+04	1.177E+03	7.545E+02	0.000E+00

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

Nuclide	Key-Line Activity (pCi/LITER)	K.L. Act error ()	Ided	MDA (pCi/LITER)	
---------	--------------------------------	--------------------	------	------------------	--

```

*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                   *
*                               Charleston, SC 29414                               *
*****
Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_WELL_2LMB.CNF;2
Sample date        : 1-APR-2005 12:00:00. Acquisition date : 13-DEC-2005 11:29:45
Sample ID          : VER_WELL_2LMB          Sample quantity  : 1.00000E+00 LITER
Detector name     : WELL                   Detector geometry: 2L_MB
Elapsed live time : 0 02:30:00.00         Elapsed real time: 0 02:31:43.86  1.1%
Energy tolerance  : 2.00000 KEV          Analyst Initials  : MJH1
Abundance limit   : 75.00000             Sensitivity       : 3.00000
Batch ID          :                       Detector SN#      : 3941466
Matrix Spike DPM  :                       LCS DPM         :
*****

```

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	63509	85.51*	2.292E+00	9.731E+03	1.870E+04	1.49
	136.47	7730	10.47	2.297E+00	9.654E+03	1.855E+04	7.17
CO-60	1173.24	56593	99.90	4.757E-01	3.576E+04	3.922E+04	1.02
	1332.50	50796	99.98*	4.318E-01	3.533E+04	3.874E+04	0.93
Y-88	898.04	29940	93.40	5.833E-01	1.650E+04	8.717E+04	1.81
	1836.06	18059	99.38*	3.336E-01	1.636E+04	8.641E+04	1.66
CD-109	88.03	137668	3.79*	1.942E+00	5.617E+05	8.252E+05	1.01
SN-113	391.70	26457	64.90*	1.175E+00	1.042E+04	4.870E+04	1.95
CS-137	661.66	52330	85.12*	7.452E-01	2.478E+04	2.518E+04	1.17
CE-139	165.85	46765	80.35*	2.191E+00	7.976E+03	2.896E+04	1.84
HG-203	70.83	3216	4.75	1.453E+00	1.399E+04	6.305E+05	46.57
	72.87	-----	8.00	1.538E+00	-----	Line Not Found	-----
	82.60	-----	3.55	1.818E+00	-----	Line Not Found	-----
	279.20	5604	77.30*	1.572E+00	1.385E+03	6.242E+04	7.99
PB-210	46.50	52806	4.05*	5.082E-01	7.704E+05	7.874E+05	1.84
AM-241	59.54	81406	35.90*	1.035E+00	6.579E+04	6.587E+04	1.79

Flag: "*" = Keyline

Summary of Nuclide Activity

Sample ID : VER_WELL_2LMB

Acquisition date : 13-DEC-2005 11:29:45

Total number of lines in spectrum 45
 Number of unidentified lines 31
 Number of lines tentatively identified by NID 14 31.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	1.92	9.731E+03	1.870E+04	0.028E+04	1.49	
CO-60	5.27Y	1.10	3.533E+04	3.874E+04	0.036E+04	0.93	
Y-88	106.63D	5.28	1.636E+04	8.641E+04	0.143E+04	1.66	
CD-109	461.40D	1.47	5.617E+05	8.252E+05	0.084E+05	1.01	
SN-113	115.09D	4.67	1.042E+04	4.870E+04	0.095E+04	1.95	
CS-137	30.00Y	1.02	2.478E+04	2.518E+04	0.029E+04	1.17	
CE-139	137.64D	3.63	7.976E+03	2.896E+04	0.053E+04	1.84	
HG-203	46.60D	45.1	1.385E+03	6.242E+04	0.499E+04	7.99	
PB-210	22.26Y	1.02	7.704E+05	7.874E+05	0.145E+05	1.84	
AM-241	432.20Y	1.00	6.579E+04	6.587E+04	0.118E+04	1.79	
Total Activity :			1.504E+06	1.988E+06			

Grand Total Activity : 1.504E+06 1.988E+06

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	33.09	1432	52446	1.30	65.14	63	7	1.59E-01	53.3	1.11E-01	
1	38.18	1164	31197	1.37	75.25	73	24	1.29E-01	42.7	2.29E-01	
1	40.69	4583	61276	1.37	80.25	73	24	5.09E-01	19.0	3.03E-01	
0	50.00	934	50839	1.88	98.74	97	7	1.04E-01	80.2	6.47E-01	
10	67.14	2659	27609	2.19	132.80	130	18	2.95E-01	19.1	1.34E+00	
0	222.40	203	12987	1.28	441.27	438	8	2.25E-02	****	1.87E+00	
0	254.88	1317	12753	1.71	505.82	502	10	1.46E-01	32.6	1.69E+00	
0	297.77	75	6443	1.41	591.04	590	7	8.28E-03	****	1.49E+00	
0	343.13	75	5547	0.98	681.17	679	7	8.35E-03	****	1.32E+00	
0	348.63	205	3815	1.43	692.11	690	5	2.27E-02	91.8	1.30E+00	
0	415.30	148	3973	1.43	824.61	823	6	1.65E-02	****	1.12E+00	
0	432.51	223	5208	0.71	858.80	856	8	2.47E-02	****	1.08E+00	
0	466.83	289	5167	1.56	927.02	924	8	3.21E-02	87.1	1.01E+00	
0	487.16	341	4927	1.64	967.42	964	9	3.79E-02	75.0	9.69E-01	
0	510.88	598	5898	2.43	1014.56	1009	11	6.65E-02	50.7	9.29E-01	
0	707.69	257	3271	1.59	1405.77	1402	9	2.86E-02	81.0	7.05E-01	
0	770.29	112	2701	0.85	1530.22	1527	8	1.24E-02	****	6.58E-01	
0	774.63	183	2373	1.51	1538.86	1536	7	2.03E-02	89.7	6.55E-01	
0	799.95	68	2408	1.38	1589.19	1588	7	7.60E-03	****	6.39E-01	
0	813.73	624	3838	1.30	1616.58	1611	11	6.93E-02	39.3	6.30E-01	
0	819.82	79	2143	1.39	1628.69	1627	6	8.78E-03	****	6.26E-01	
0	924.35	149	2774	1.91	1836.53	1834	7	1.66E-02	****	5.70E-01	
0	959.15	92	3358	0.67	1905.73	1904	8	1.02E-02	****	5.54E-01	
0	1070.18	153	2302	1.40	2126.51	2123	8	1.70E-02	****	5.10E-01	
0	1144.88	21	1819	0.53	2275.07	2274	9	2.28E-03	****	4.85E-01	
4	1325.83	897	1524	3.22	2634.98	2623	36	9.97E-02	23.0	4.33E-01	
0	1686.14	76	324	2.38	3351.82	3349	9	8.41E-03	89.0	3.58E-01	
0	1690.00	42	158	1.23	3359.49	3357	5	4.65E-03	95.3	3.58E-01	
0	1744.42	28	148	1.19	3467.77	3464	9	3.16E-03	****	3.48E-01	
0	1813.79	15	257	3.86	3605.82	3601	13	1.61E-03	****	3.37E-01	
0	1954.67	16	37	1.33	3886.21	3884	5	1.78E-03	****	3.16E-01	

Flags: "T" = Tentatively associated

```
*****
*                               GENERAL ENG. LABS, LLC.                               *
*                               2040 Savage Road                                       *
*                               Charleston, SC 29414                                   *
*****
```

DETECTOR DATA

```
* Configuration      : DKA300:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_WELL_2LMB.CNF;2 *
* Acquisition date   : 13-DEC-2005 11:29:45  Detector SN#      : 3941466         *
* Detector ID        : WELL                      Sensitivity       : 3.00000         *
* Geometry           : 2L_MB                     Energy tolerance: 2.00000         *
* Elapsed live time : 0 02:30:00.00             Abundance limit : 75.00000         *
* Elapsed real time : 0 02:31:43.86             Half life ratio  : 8.00000         *
*****
```

SAMPLE DATA

```
* Sample date       : 1-APR-2005 12:00:00.  Nuclide Library : CAL           *
* Sample ID         : VER_WELL_2LMB          Analyst initials: MJH1          *
* Batch Number      :                       Sample Quantity : 1.00000E+00 LITER *
*****
```

QC DATA

```
* CALIB. DATE/TIME : 13-DEC-2005 09:34:01.1MS Isotope      :           *
* MSD DPM           :                       MSD Isotope     :           *
* LCS DPM           :                       LCS Isotope     :           *
*****
```

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER)	Act error	MDA (pCi/LITER)	MDA error	Act/MDA
CO-57	1.870E+04	2.791E+02	1.953E+02	0.000E+00	95.764
CO-60	3.874E+04	3.608E+02	1.054E+02	0.000E+00	367.458
Y-88	8.641E+04	1.434E+03	3.479E+02	0.000E+00	248.354
CD-109	8.252E+05	8.358E+03	5.046E+03	0.000E+00	163.524
SN-113	4.870E+04	9.472E+02	6.806E+02	0.000E+00	71.551
CS-137	2.518E+04	2.947E+02	1.497E+02	0.000E+00	168.230
CE-139	2.896E+04	5.322E+02	3.423E+02	0.000E+00	84.587
HG-203	6.242E+04	4.989E+03	4.823E+03	0.000E+00	12.942
PB-210	7.874E+05	1.451E+04	1.518E+04	0.000E+00	51.866
AM-241	6.587E+04	1.177E+03	7.545E+02	0.000E+00	87.303

 * GENERAL ENG. LABS, LLC. *
 * 2040 Savage Road *
 * Charleston, SC 29414 *

Configuration : MCA0:[GAMMA]WELL\$1
 Sample date : 1-APR-2005 12:00:00. Acquisition date : 12-DEC-2005 13:33:22
 Sample ID : CAL_WELL_2LMB Sample quantity : 1.00000E+00 LITER
 Detector name : WELL Detector geometry: WELL
 Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:01:23.60 1.1%
 Energy tolerance : 2.00000 KEV Analyst Initials : MJH1
 Abundance limit : 75.00000 Sensitivity : 3.00000
 Batch ID : Detector SN# : 3941466
 Matrix Spike DPM : LCS DPM :

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	32.59	1042	48353	1.44	64.15	63	8	1.45E-01	36.7	
2	1	39.69	1232	26337	1.37	78.25	76	21	1.71E-01	18.5	1.32E+02
3	1	46.49	42811	48105	1.39	91.77	76	21	5.95E+00	1.0	
4	0	59.42	65118	69944	1.33	117.44	110	14	9.04E+00	1.0	
5	10	68.76	3875	53665	3.39	136.01	130	20	5.38E-01	12.1	2.72E+00
6	10	72.74	1216	49822	1.84	143.92	130	20	1.69E-01	35.7	
7	0	88.04	108976	58670	1.33	174.31	167	15	1.51E+01	0.6	
8	0	122.09	52212	36478	1.37	241.97	234	16	7.25E+00	0.9	
9	0	136.53	6296	19037	1.33	270.66	266	10	8.74E-01	4.3	
10	0	165.93	37138	20508	1.39	329.06	322	13	5.16E+00	0.9	
11	0	184.11	120	10693	0.55	365.18	362	8	1.67E-02	149.3	
12	0	207.62	181	6366	1.28	411.90	410	5	2.51E-02	66.7	
13	0	255.23	1017	8126	1.42	506.51	503	8	1.41E-01	15.7	
14	0	279.22	4771	9449	1.41	554.17	549	11	6.63E-01	4.2	
15	0	310.35	183	3477	1.40	616.04	614	5	2.54E-02	48.9	
16	0	321.38	135	5518	0.91	637.96	636	8	1.87E-02	95.8	
17	0	391.76	21207	8213	1.53	777.81	771	14	2.95E+00	1.1	
18	0	419.40	180	3614	1.60	832.74	829	7	2.50E-02	55.8	
19	0	510.70	794	4500	1.82	1014.21	1009	11	1.10E-01	16.7	
20	0	532.76	51	2635	1.22	1058.06	1055	7	7.04E-03	168.5	
21	0	584.01	135	2080	1.29	1159.92	1157	6	1.88E-02	54.1	
22	0	639.97	247	2426	1.83	1271.16	1268	7	3.43E-02	33.6	
23	0	652.34	155	2536	0.91	1295.74	1293	7	2.15E-02	54.5	
24	0	661.67	41764	6504	1.76	1314.30	1305	17	5.80E+00	0.7	
25	0	813.96	451	2793	1.98	1617.04	1613	10	6.26E-02	22.5	
26	0	848.57	111	2636	0.92	1685.85	1683	9	1.54E-02	83.9	
27	0	854.51	160	2194	1.59	1697.67	1694	8	2.22E-02	51.3	
28	0	876.44	147	2353	1.97	1741.27	1737	8	2.04E-02	57.7	
29	0	898.03	23855	4660	1.92	1784.19	1777	14	3.31E+00	0.9	
30	0	981.35	217	2537	1.52	1949.86	1946	10	3.01E-02	44.0	
31	0	1082.73	96	1364	0.97	2151.46	2150	6	1.33E-02	61.9	
32	0	1128.22	173	1847	1.56	2241.95	2237	11	2.41E-02	48.6	
33	0	1173.19	44711	3264	2.09	2331.38	2320	21	6.21E+00	0.6	
34	0	1258.60	29	443	1.04	2501.25	2496	7	4.04E-03	122.0	
35	1	1325.06	439	1159	2.42	2633.44	2624	35	6.09E-02	16.2	1.61E+01
36	1	1332.49	40523	955	2.33	2648.23	2624	35	5.63E+00	0.5	
37	0	1489.27	31	301	0.53	2960.11	2958	6	4.28E-03	90.6	
38	1	1645.30	102	290	2.56	3270.54	3266	19	1.41E-02	31.0	3.60E+00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
39	1	1648.31	129	439	2.56	3276.54	3266	19	1.79E-02	37.8	
40	1	1651.29	117	132	2.57	3282.46	3266	19	1.63E-02	17.1	
41	0	1775.32	21	103	1.47	3529.28	3526	9	2.93E-03	90.0	
42	0	1836.09	14647	430	2.53	3650.20	3639	25	2.03E+00	0.9	
43	0	1933.32	17	91	1.46	3843.72	3843	13	2.35E-03	117.4	
44	0	1958.91	14	19	0.95	3894.64	3892	6	1.98E-03	56.3	
45	0	2008.67	27	23	0.68	3993.69	3990	8	3.68E-03	37.3	

Configuration : MCA0:[GAMMA]WELL\$1
 Analyses by : CALIBRATE V1.7,PEAK V16.4
 Detector Name : WELL Energy Calib Time: 13-DEC-2005 09:34:01
 Efficiency type : Empirical Effncy Calib Time: 13-DEC-2005 09:34:01
 Detector Geometry: WELL Shelf : 0

Energy Calibration Report

$$\text{Energy} = 0.2987 + 0.5034 * \text{Channel} + -1.2315E-07 * (\text{Channel} ** 2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	91.73	46.50	46.47	0.026
2	117.44	59.54	59.42	0.121
3	174.31	88.03	88.04	-0.006
4	242.00	122.06	122.11	-0.050
5	329.06	165.85	165.93	-0.073
6	777.81	391.70	391.76	-0.055
7	1314.30	661.66	661.67	-0.014
8	1784.19	898.04	898.03	0.016
9	2331.37	1173.24	1173.19	0.051
10	2648.23	1332.50	1332.49	0.008
11	3650.20	1836.06	1836.09	-0.024

FWHM Calibration Report

$$\text{FWHM} = 1.046 + 3.1639E-02 * (\text{Energy} ** 1/2)$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.50	1.48	1.26	0.215
2	59.54	1.33	1.29	0.036
3	88.03	1.33	1.34	-0.010
4	122.06	1.37	1.40	-0.028
5	165.85	1.39	1.45	-0.064
6	391.70	1.52	1.67	-0.148
7	661.66	1.76	1.86	-0.102
8	898.04	1.92	1.99	-0.075
9	1173.24	2.09	2.13	-0.043
10	1332.50	2.30	2.20	0.094
11	1836.06	2.53	2.40	0.124

Efficiency Calibration Report

$$\text{Eff} = \exp(a2 + a3 * x + a4 * x ** 2 + a5 * x ** 3 + a6 * x ** 4 + a7 * x ** 5), \quad x = \ln(a1 / \text{energy})$$

a1 a2 a3 a4 a5 a6 a7
 941.3 -5.181 0.7697 6.0649E-02 7.6903E-02 -6.1801E-02 0.0000E+00

Average Deviation = 1.73 % Reduced Chi-Square = 0.889

Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
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1	46.50	4.95E-03	1.58E-04	5.08E-03	-0.83	-2.65
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Nbr	Energy (KEV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	59.54	1.09E-02	3.43E-04	1.04E-02	1.42	4.47
3	88.03	1.92E-02	6.42E-04	1.94E-02	-0.41	-1.39
4	122.06	2.28E-02	7.15E-04	2.29E-02	-0.15	-0.46
5	165.85	2.16E-02	6.40E-04	2.19E-02	-0.43	-1.27
6	391.70	1.18E-02	3.35E-04	1.18E-02	0.12	0.33
7	661.66	7.69E-03	2.36E-04	7.45E-03	1.03	3.16
8	898.04	5.73E-03	1.58E-04	5.83E-03	-0.62	-1.72
9	1173.24	4.79E-03	1.32E-04	4.76E-03	0.22	0.61
10	1332.50	4.24E-03	1.12E-04	4.32E-03	-0.72	-1.90
11	1836.06	3.37E-03	9.29E-05	3.34E-03	0.38	1.04

Approved by: *Michael P. ...*
Let's check

Approval Date: 12 / 14 / 05
12/14/05

Print Time : 14-JUN-2005 17:33:53.22
 Certificate file name : DKA300:[CANBERRA.GAMMA]70528-278.CER;1
 Certificate title : 2L MB
 Certificate date : 1-APR-2005 12:00:00.00
 Certificate quantity : 1.00000E+00

Rcd	Nuclide	Halflife	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	8.3100E+02	35.90	6.2561E-02
2	CD-109	462.60D	No	88.03	1.1580E+03	3.79	8.2579E-01
3	Co-57	271.79D	No	122.06	6.0370E+02	85.51	1.9081E-02
4	CE-139	137.60D	No	165.85	8.6160E+02	80.35	2.8981E-02
5	SN-113	115.10D	No	391.70	1.1610E+03	64.90	4.8349E-02
6	CS-137	30.07Y	Yes	661.66	7.6610E+02	85.12	2.4325E-02
7	Y-88	106.60D	No	898.04	3.0350E+03	93.40	8.7823E-02
8	Y-88	106.60D	Yes	1836.06	3.1700E+03	99.38	8.6210E-02
9	CO-60	5.27Y	Yes	1173.24	1.4220E+03	99.90	3.8471E-02
10	CO-60	5.27Y	No	1332.50	1.4370E+03	99.98	3.8845E-02
11	PB-210	22.30Y	No	46.50	1.2290E+03	4.05	8.2015E-01

Library Title :
 Library file name : DKA300:[CANBERRA.GAMMA]CAL.NLB;1
 Date printed : 6-DEC-2004 10:31:17.67
 Number of nuclides : 10
 Number of lines : 17

Nuclide Name	Half-Life	Nuclide Type	Key Line	Energy	Abundance
CO-57	271.74D		*	122.06 keV	85.51 %
				136.47 keV	10.47 %
CO-60	5.27Y		*	1173.24 keV	99.90 %
				1332.50 keV	99.98 %
Y-88	106.63D		*	898.04 keV	93.40 %
				1836.06 keV	99.38 %
CD-109	461.40D		*	88.03 keV	3.79 %
SN-113	115.09D		*	391.70 keV	64.90 %
CS-137	30.00Y		*	661.66 keV	85.12 %
CE-139	137.64D		*	165.85 keV	80.35 %
HG-203	46.60D			70.83 keV	4.75 %
				72.87 keV	8.00 %
				82.60 keV	3.55 %
PB-210	22.26Y		*	279.20 keV	77.30 %
				46.50 keV	4.05 %
AM-241	432.20Y		*	59.54 keV	35.90 %



CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70528-278

2.0 Liter Solid in 230G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 and Pb-210 were calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytical maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in US NRC Regulatory Guide 4.15, Revision 1, February 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration Date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Pb-210	46.5	22.3	y	1229	3.0
Am-241	59.5	432.2	y	831.0	3.0
Cd-109	88	462.6	d	1158	3.3
Co-57	122	271.79	d	603.7	3.0
Ce-139	166	137.6	d	861.6	2.8
Hg-203	279	46.61	d	1864	2.7
Sn-113	392	115.1	d	1161	2.6
Cs-137	662	30.07	y	766.1	3.0
Y-88	898	106.6	d	3035	2.6
Co-60	1173	5.271	y	1422	2.7
Co-60	1332	5.271	y	1437	2.6
Y-88	1836	106.6	d	3170	2.6

P O NUMBER 2832RD, Item 1

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

Q A APPROVED: W.M. [Signature] 5-12-05

This standard will expire one year after the calibration date.

General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

Lucas Cell Calibration Package

101-112

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

Prepared By: Aidan Baul

Date: 3/14/06

Reviewed By: Amanda L. Lehn

Date: 3/27/06

Effective Date: 3/27/06

Ra-226 Cell Constants

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

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	Bkg Counts	cpm	Activity dpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
101	1.835	Average	3/18/2006 10:15	3/18/2006 7:05	3/15/2006 10:20	6	0.200	176.97	244.63	2.86458	0.13194	2285	0.9973
101	2.017	Stdev	2/8/2006 12:50	2/8/2006 9:40	2/5/2006 11:00	8	0.267	198.73	244.63	2.94444	0.13194	2248	0.9973
101	1.727	1	2/13/2006 12:30	2/13/2006 8:35	2/10/2006 7:30	6	0.200	173.50	244.63	3.04514	0.16319	2253	0.9973
102	1.712	Average	2/3/2006 11:45	2/3/2006 8:40	1/31/2006 13:10	6	0.200	162.93	244.63	2.81250	0.12847	2242	0.9973
102	2.003	Stdev	3/18/2006 10:45	3/18/2006 7:35	3/15/2006 10:20	5	0.167	194.17	244.63	2.88542	0.13194	2285	0.9973
102	1.906	2	2/13/2006 13:05	2/13/2006 9:20	2/10/2006 7:30	7	0.233	193.13	244.63	3.07639	0.15625	2253	0.9973
103	1.864	Average	2/3/2006 17:10	2/3/2006 9:15	1/31/2006 13:10	5	0.167	172.13	244.63	2.83681	0.32966	2243	0.9973
103	1.773	Stdev	3/18/2006 14:34	3/18/2006 7:50	3/15/2006 10:20	7	0.233	167.90	244.63	2.89583	0.28056	2286	0.9973
103	1.782	3	2/13/2006 13:40	2/13/2006 10:00	2/10/2006 7:30	5	0.167	181.90	244.63	3.10417	0.15278	2253	0.9973
104	1.869	Average	2/3/2006 17:52	2/3/2006 9:40	1/31/2006 13:10	2	0.087	182.20	244.63	2.85417	0.34167	2243	0.9973
104	1.997	Stdev	2/8/2006 14:50	2/8/2006 11:50	2/5/2006 11:00	2	0.067	201.33	244.63	3.03472	0.12500	2248	0.9973
104	1.903	4	2/13/2006 14:15	2/13/2006 10:35	2/10/2006 7:30	5	0.167	195.40	244.63	3.12847	0.15278	2253	0.9973
105	1.486	Average	2/3/2006 18:37	2/3/2006 10:20	1/31/2006 13:10	1	0.033	138.37	244.63	2.88194	0.34514	2243	0.9973
105	1.581	Stdev	2/8/2006 15:30	2/8/2006 12:30	2/5/2006 11:00	1	0.033	160.47	244.63	3.06250	0.12500	2248	0.9973
105	1.587	2	2/13/2006 18:50	2/13/2006 5:45	2/10/2006 7:30	4	0.133	153.70	244.63	2.87847	0.12847	2262	0.9973
106	1.638	Average	3/18/2006 15:17	3/18/2006 8:15	3/15/2006 10:20	1	0.033	155.27	244.63	2.91319	0.26306	2266	0.9973
106	1.850	Stdev	2/8/2006 16:20	2/8/2006 13:15	2/5/2006 11:00	6	0.200	189.20	244.63	3.09375	0.12847	2248	0.9973
106	1.667	6	2/13/2006 15:55	2/13/2006 12:20	2/10/2006 7:30	5	0.167	174.17	244.63	3.20139	0.14931	2253	0.9973
107	1.658	Average	2/3/2006 19:45	2/3/2006 11:15	1/31/2006 13:10	4	0.133	155.87	244.63	2.92014	0.36417	2243	0.9973
107	1.733	Stdev	2/8/2006 17:00	2/8/2006 14:00	2/5/2006 11:00	4	0.133	178.60	244.63	3.12500	0.12500	2248	0.9973
107	1.745	7	2/13/2006 16:37	2/13/2006 13:15	2/10/2006 7:30	6	0.200	184.23	244.63	3.23958	0.14028	2253	0.9973
108	2.011	Average	3/18/2006 16:14	3/18/2006 8:45	3/15/2006 10:20	1	0.033	191.00	244.63	2.93403	0.31181	2286	0.9973
108	1.794	Stdev	2/9/2006 10:05	2/9/2006 6:55	2/5/2006 11:00	6	0.200	213.80	244.63	3.82986	0.13194	2248	0.9973
108	1.826	8	2/13/2006 17:10	2/13/2006 13:55	2/10/2006 7:30	8	0.267	204.90	244.63	3.26736	0.19542	2253	0.9973
109	1.784	Average	2/4/2006 9:05	2/3/2006 11:55	1/31/2006 13:10	6	0.200	153.57	244.63	2.84792	0.88194	2243	0.9973
109	1.851	Stdev	2/9/2006 10:45	2/9/2006 7:45	2/5/2006 11:00	6	0.200	198.27	244.63	3.86458	0.12500	2248	0.9973
109	1.764	9	2/13/2006 17:40	2/13/2006 14:20	2/10/2006 7:30	5	0.167	188.17	244.63	3.28472	0.13889	2253	0.9973
110	1.593	Average	2/4/2006 13:17	2/3/2006 12:15	1/31/2006 13:10	6	0.200	142.60	244.63	2.96181	1.04306	2244	0.9973
110	1.583	Stdev	2/20/2006 10:20	2/20/2006 7:25	2/14/2006 7:00	7	0.233	262.37	244.63	6.01736	0.12153	2259	0.9973
110	1.649	3	2/23/2006 9:30	2/23/2006 6:20	2/20/2006 8:40	8	0.267	160.77	244.63	2.90278	0.13194	2262	0.9973
111	1.537	Average	2/4/2006 14:06	2/3/2006 12:30	1/31/2006 13:10	4	0.133	128.73	244.63	2.97222	1.06667	2244	0.9973
111	1.583	Stdev	2/17/2006 15:10	2/17/2006 10:55	2/14/2006 7:00	7	0.233	163.20	244.63	3.16319	0.17708	2267	0.9973
111	1.649	4	2/23/2006 10:05	2/23/2006 6:55	2/20/2006 8:40	1	0.033	161.50	244.63	2.92708	0.13194	2262	0.9973
112	1.639	Average	2/23/2006 10:45	2/23/2006 7:30	2/20/2006 8:40	6	0.200	161.63	244.63	2.95139	0.13542	2262	0.9973
112	1.774	Stdev	2/17/2006 15:45	2/17/2006 11:50	2/14/2006 7:00	8	0.267	185.03	244.63	3.20139	0.16319	2257	0.9973
112	1.503	12	2/13/2006 20:40	2/13/2006 15:30	2/10/2006 7:30	6	0.200	159.93	244.63	3.33333	0.21628	2253	0.9973

Ad Bail 3/14/06
 Amanda J. Feh 3/27/06

Ra-226 Verification Sheet

Sample ID	Vol (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Bkg CPM	Total Counts
CAL 1	500	3-15-06 1020	3/18/06 705	3/18/06 1015	101	1	6	5309
CAL 2	500	3-15-06 1020	3/18/06 735	3/18/06 1045	102	1	5	5825
CAL 3	500	3-15-06 1020	3/18/06 750	3/18/06 1474	103	1	7	5037
CAL 4	500	3-15-06 1020	3/18/06 815	3/18/06 1577	106	1	1	4658
CAL 5	500	3-15-06 1020	3/18/06 845	3/18/06 1614	108	1	1	5730
CAL 6	500	3-15-06 1020						
CAL 7	500	3-15-06 1020						
CAL 8	500	3-15-06 1020						
CAL 9	500	3-15-06 1020						
CAL 10	500	3-15-06 1020						
CAL 11	500	3-15-06 1020		AB1				
CAL 12	500	3-15-06 1020		3/14/06				

AB1 3/14/06
 AB1 3/12/06

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 1	500	1/31/06 1310	2/3/06 710	2/2/06 1040	101	1	1	24
Cal 2	500	1/21/04 1310	2/3/06 840	2/3/06 1145	102	1	6	4888
Cal 3	500	1/31/06 1310	2/3/06 845	2/3/06 1710	103	1	5	5164 5114
Cal 4	500	1/31/06 1310	2/3/06 940	2/3/06 1752	104	1	2	5466 5013
Cal 5	500	1/21/04 1310	2/3/06 1020	2/3/06 1837	105	1	1	4151 4224
Cal 6	500	1/31/06 1310	2/3/06 1050	2/3/06 1911	106	1	6	4275 4263
Cal 7	500	1/21/04 1310	2/3/06 1115	2/3/06 1945	107	1	4	4676
Cal 8	500	1/31/06 1310	2/3/06 1135	2/3/06 2015	108	1	6	4794
Cal 9	500	1/21/06 1310	2/3/06 1155	2/3/06 2140	109	1	6	4607
Cal 10	500	1/31/06 1310	2/3/06 1215	2/3/06 2140	110	1	6	4278
Cal 11	500	1/31/04 1310	2/3/06 1230	2/3/06 2140	111	1	4	3862
Cal 12	500	1/21/06 1310	2/3/06 1240	2/3/06 2140	112	1	8	3731

ABI 3/14/06

ABI 3/12/06

ABI 3/12/06

ABI 3/14/06

ABI 3/14/06

3/27/06

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	2-10-06 / 0730	2/13/06 835	2/13/06 / 1230	101	1	6	5205
CAL 2	500	2-10-06 / 0730	2/13/06 920	2/13/06 / 1205	102	1	7	5794
CAL 3	500	2-10-06 / 0730	2/13/06 1000	2/13/06 / 1340	103	1	5	5457
CAL 4	500	2-10-06 / 0730	2/13/06 1035	2/13/06 / 1415	104	1	5	5862
CAL 5	500	2-10-06 / 0730	2/13/06 1120	2/13/06 / 1445	105	1	3	4380
CAL 6	500	2-10-06 / 0730	2/13/06 1220	2/13/06 1555	106	1	5	5225
CAL 7	500	2-10-06 / 0730	2/13/06 1315	2/13/06 1637	107	1	6	5527
CAL 8	500	2-10-06 / 0730	2/13/06 1355	2/13/06 1710	108	1	8	6147
CAL 9	500	2-10-06 / 0730	2/13/06 1420	2/13/06 1740	109	1	5	5645
CAL 10	500	2-10-06 / 0730	2/13/06 1440	2/13/06 1810	110	1	5	4774
CAL 11	500	2-10-06 / 0730	2/13/06 1510	2/13/06 2000	111	1	8	4641
CAL 12	500	2-10-06 / 0730	2/13/06 1530	2/13/06 2040	112	1	6	4798

ABI 3/14/06

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	2/5/06 1100	2/8/06 940	2/8/06 1250	101	1	8	5962
CAL 2	500	2/5/06 1100 SKEI 2/10/06	2/8/06 1020	2/8/06 1530	102	1	8	7256
CAL 3	500	2/5/06 1100	2/8/06 1105	2/8/06 1405	103	1	5	7066
CAL 4	500	2/5/06 1100 SKEI 2/10/06	2/8/06 1115 AB1 3/14/06	2/8/06 1450	104	1	2	6040
CAL 5	500	2/5/06 1100	2/8/06 1230	2/8/06 1530	105	1	1	4814
CAL 6	500	2/5/06 1100	2/8/06 1315	2/8/06 1620	106	1	6	5676 -6625 SKEI 2/10/06
CAL 7	500	2/5/06 1100	2/8/06 1400	2/8/06 1700	107	1	4	5358
CAL 8	500	2-5-06 1100	2-9-06 0655	2-9-06 1005	108	1	6	6414
CAL 9	500	2-5-06 1100	2-9-06 0745	2-9-06 1045	109	1	6	5948
CAL 10	500	2-5-06 1100	2-9-06 0815	2-9-06 1220	110	1	6	7216
CAL 11	500	2-5-06 1100	2-9-06 1010	2-9-06 1350	111	1	4	7447
CAL 12	500	2-5-06 1100	2-9-06 1100	2-9-06 1405	112	1	8	7363
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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca 11	500	2/14/06 700	2/17/06 1055	2/17/06 1510	111	1	7	4896
Ca 12	500	2/14/06 700	2/17/06 1650	2/17/06 1545	112	1	8	5551
Ca 4	500	2-14-06 0700 2-20-06	2-20-06 0450	2-20-06 0750	101	1	5	7807
Ca 6	500	2-14-06 0700	2-20-06 0515	2-20-06 0805	102	1	5	7189
Ca 7	500	2-14-06 0700	2-20-06 0600	2-20-06 0900 0935	103	1	6	7663
Ca 8	500	2-14-06 0700	2-20-06 0645	2-20-06 0935	105	1	3	5557
Ca 9	500	2-14-06 0700	2-20-06 0725	2-20-06 1020	110	1	7	7571
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 ABI 3/14/06

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 7/1/2006
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Ra-226 Verification Sheet

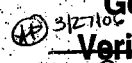
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	2-20-06 0840	2-23-06 0500	2-23-06 0940	101	1	8	4649
CAL 2	500	2-20-06 0840	2-23-06 0545	2-23-06 0950	105	1	4	4611
CAL 3	500	2-20-06 0840	2-23-06 0620	2-23-06 0930	110	1	8	4823
CAL 4	500	2-20-06 0840	2-23-06 0655	2-23-06 1005	111	1	1	4845
CAL 5	500	2-20-06 0840	2-23-06 0730	2-23-06 1045	112	1	6	4849
CAL 6								
CAL 7								
CAL 8								
CAL 9								
CAL 10								
CAL 11								
CAL 12								

AB1 3/14/06

AB1

3/14/06

AB1 3/14/06
CAL 3/17/06


General Engineering Laboratories
Verification Source Preparation Sheet
 Calibration

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 4/5/05 Cocktail Type Used N/A
 Standard ID 0299-6 Matrix of Vial/Planchett N/A
 Amount Used (g or ml) 0.1 N/A
 Standard Activity (DPM/g or ml) 2446.3471 Type of Scintillation Vial N/A
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 4/6/06 Balance ID Used 36040216
 Residue/Carrier Agent 0.5 M HCL Quenching Agent N/A

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	CAL 1				
2	CAL 2				
3	CAL 3				
4	CAL 4				
5	CAL 5				
6	CAL 6				
7	CAL 7		ABI		
8	CAL 8			3/14/06	
9	CAL 9				
10	CAL 10				
11	CAL 11				
12	CAL 12				
13	CAL 13				
14	CAL 14				
15	CAL 15				

Prepared By: Ad Bal Date: 3/14/06
 Reviewed By: Amanda L. Tehe Date: 3/27/06

Rev 1 RLM 9/10/97

AP 31271a
General Engineering Laboratories
Verification-Source Preparation Sheet
 Calibration

Applicable SOP Number <u>GL-RAD-A-008</u>	Isotope <u>Ra-226</u>
Date Standards Prepared <u>4/5/05</u>	Cocktail Type Used <u>NIA</u>
Standard ID <u>0299-G</u>	Matrix of Vial/Planchett <u>NIA</u>
Amount Used (g or ml) <u>0.1</u>	<u>NIA</u>
Standard Activity (DPM/g or ml) <u>2446.3471</u>	Type of Scintillation Vial <u>NIA</u>
Reference Date <u>12/15/99</u>	Pipette ID Used <u>1429303</u>
Expiration Date <u>4/6/06</u>	Balance ID Used <u>36040214</u>
Residue/Carrier Agent <u>0.5 M HCl</u>	Quenching Agent <u>NIA</u>

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21	ABI			
22	CAL 22		3/14/06		
23	CAL 23				
24	CAL 24				

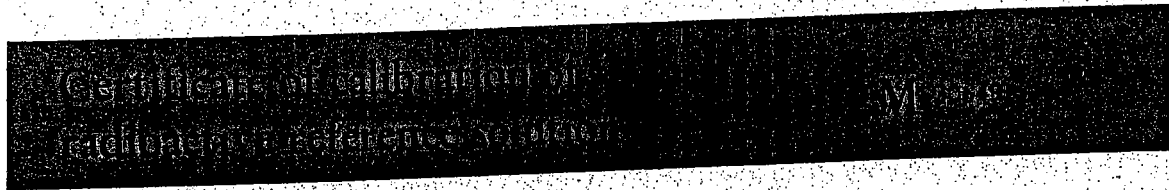
Prepared By: Ad Bail Date: 3/14/06

Reviewed By: _____ Date: _____

8-21-00

Nycomed Amersham plc
Amersham Laboratories

0279



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

ISSUED
FOR:

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

ion. Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

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Date of
issue

17th December 1999

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Amersham

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3/27/00

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

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

Calibration date: 15 December 1999

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

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

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

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

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

Chemical composition: Carrier free in 0.5M HCl

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

1 year = 365.25 days

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



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	12/15/2005
Ampoule Mass (g):	5.0368 g	Expiration Date:	12/15/2006
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012

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

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

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Johnson	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Johnson	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Johnson	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/06/2005	04/06/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-G

4/6/2005	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Mass. Used (G)	Source DPM/G
A.Fehr	0299-G N1	515.6000	31.0000	484.6000	3.38485694	0.0626	2287.013657
	0299-G N2	531.0000	31.0000	500.0000	3.38485694	0.0621	2378.691308
	0299-G N3	534.1000	31.0000	503.1000	3.38485694	0.0624	2381.932275
						Average =	2349.212414

Mean Value (Counting) = 2349.212414 Pass
 Stdev = 53.89007259 Rule 3 (Pass/Fail)

Certificate Value = 2440.7 dpm/mL
 Lower Limit = 2241.432269 dpm/mL
 Upper Limit = 2456.992559 dpm/mL
 Rule 1 Pass/Fail Pass
 Two sigma = 107.7801452 dpm/mL
 10 % of Mean = 234.9212414 dpm/mL
 Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 8/26/04 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

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

where:

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

RAD.SOP.M-001

Amanda L. Fehr 417105
Alicia Tucker 417105

PROTOCOL : 23 Radium Std Ver.
DATE : 2005/04/06
TIME : 17:42
ID : P23AS008

Wallac 1414 WinSpectral v1.40 S/N 4140127

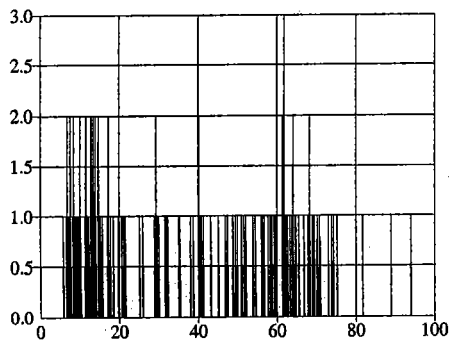
Counting mode : CPM
Isotope(s) : H3
H3 = 5- 350,12.43 y
Protocol name : Radium Std Ver.
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Output to Display :
POS,CTIME,DATE,TIME,RACKPOS,CPMw1,CPM,SQPI,CPM1
Additions to Display : Spectrum,Header,Listing
Spectrum : Beta
Window 1 : 1-1024 /Beta
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total count rate:

H3 284.2 CPM

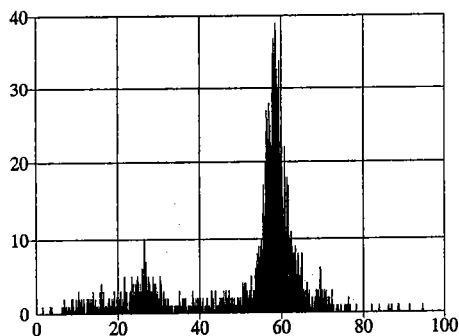
all 417105
HU 417105

POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
1	300	4/6/2005	5:42 PM	1	31.00	31.00
					15.60	



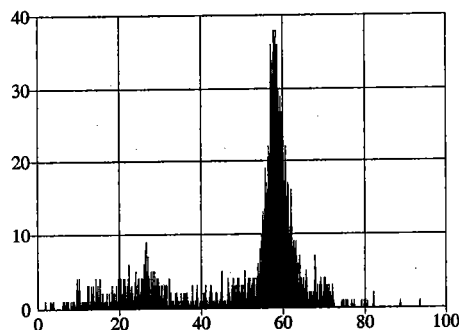
Counts
Beta

2	300	4/6/2005	5:48 PM	2	515.60	515.60
					90.00	



Counts
Beta

3	300	4/6/2005	5:53 PM	3	531.00	531.00
					92.50	

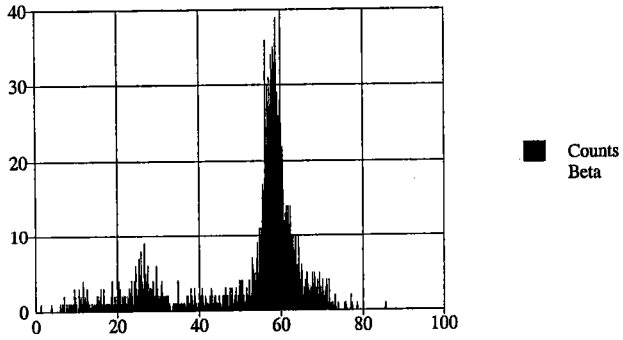


Counts
Beta

ALF 417105

ALU 417105

POS	CTIME	DATE	TIME	RACKPOS	CPMW1	CPM
4	300	4/6/2005	5:59 PM	4	534.10	534.10
					86.20	



OLF 417105

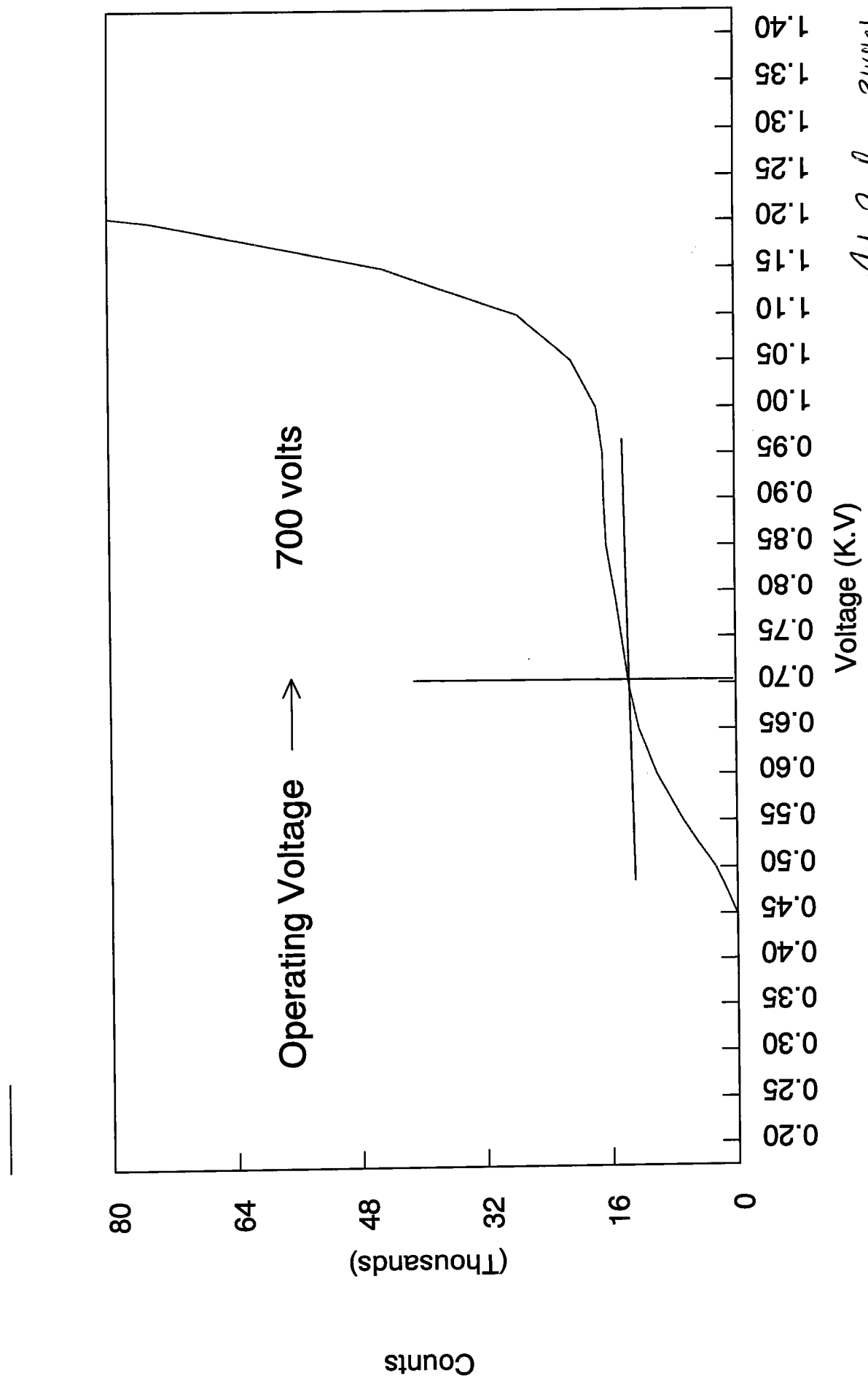
Hu 417105

Voltage Curve Ludlum # 1				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	2/1/2006	7:45	1
0.25	0	2/1/2006	7:45	1
0.30	0	2/1/2006	7:45	1
0.35	0	2/1/2006	7:45	1
0.40	0	2/1/2006	7:45	1
0.45	45	2/1/2006	7:45	1
0.50	2701	2/1/2006	7:46	1
0.55	6850	2/1/2006	7:46	1
0.60	10154	2/1/2006	7:46	1
0.65	12384	2/1/2006	7:46	1
0.70	13645	2/1/2006	7:46	1
0.75	14504	2/1/2006	7:46	1
0.80	15361	2/1/2006	7:46	1
0.85	16335	2/1/2006	7:47	1
0.90	16652	2/1/2006	7:47	1
0.95	16751	2/1/2006	7:47	1
1.00	17566	2/1/2006	7:47	1
1.05	20727	2/1/2006	7:47	1
1.10	27536	2/1/2006	7:47	1
1.15	44772	2/1/2006	7:47	1
1.20	74675	2/1/2006	7:47	1
1.25	121633	2/1/2006	7:48	1
1.30	182981	2/1/2006	7:48	1
1.35	243485	2/1/2006	7:48	1
1.40	307154	2/1/2006	7:48	1

Ad Baul 3/14/06
Amanda L. Lech 3/27/06

Plateau February, 2006

Ludlum # 1



Adl Baid 3/14/06

Amanda D. Fuku 3/22/06

Ra-226 WATER

Batch : LCSVER
 Date : 3/2/2006
 Analyst : AB1

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
V1	0.800	30	928	101	1.860	6	0.200	0.1941	12.6693	0.8231	3/2/2006 15:05
V2	0.800	30	485	102	1.873	5	0.167	0.3520	12.8686	1.1632	2/22/2006 8:30
V3	0.800	30	524	103	1.806	6	0.200	0.3912	14.3454	1.2496	2/22/2006 9:30
V4	0.800	30	671	104	1.957	3	0.100	0.2736	16.9491	1.2911	2/22/2006 10:00
V5	0.800	30	420	105	1.551	7	0.233	0.4780	13.1260	1.2872	2/22/2006 10:35
V6	0.800	30	510	106	1.718	8	0.267	0.4532	14.3158	1.2721	2/22/2006 11:15
V7	0.800	30	572	107	1.712	2	0.067	0.2638	16.1682	1.3320	2/22/2006 11:45
V8	0.800	30	596	108	1.910	4	0.133	0.3046	14.9906	1.2157	2/22/2006 12:30
V9	0.800	30	899	109	1.733	2	0.067	0.1388	13.3841	0.8778	3/2/2006 17:05
V10	0.800	30	544	110	1.647	8	0.267	0.4619	15.5819	1.3387	2/22/2006 13:40
V11	0.800	30	567	111	1.590	8	0.267	0.4781	16.8197	1.4141	2/22/2006 14:20
V12	0.800	30	592	112	1.639	3	0.100	0.3141	17.1591	1.3928	2/22/2006 14:55

Ad Bail 3/14/06
Amanda L. Fuhr 3/27/06

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
V1		1	3/2/2006 15:05	LCS	0638-B	15.70	pCi/L	81%
V2		1	2/22/2006 8:30	LCS	0638-B	15.70	pCi/L	82%
V3		1	2/22/2006 9:30	LCS	0638-B	15.70	pCi/L	91%
V4		1	2/22/2006 10:00	LCS	0638-B	15.70	pCi/L	108%
V5		1	2/22/2006 10:35	LCS	0638-B	15.70	pCi/L	84%
V6		1	2/22/2006 11:15	LCS	0638-B	15.70	pCi/L	91%
V7		1	2/22/2006 11:45	LCS	0638-B	15.70	pCi/L	103%
V8		1	2/22/2006 12:30	LCS	0638-B	15.70	pCi/L	96%
V9		1	3/2/2006 17:05	LCS	0638-B	15.70	pCi/L	85%
V10		1	2/22/2006 13:40	LCS	0638-B	15.70	pCi/L	99%
V11		1	2/22/2006 14:20	LCS	0638-B	15.70	pCi/L	107%
V12		1	2/22/2006 14:55	LCS	0638-B	15.70	pCi/L	109%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM cpm	Ingrowth constant
2/22/2006 13:25	3/2/2006 10:20	188.92	4.75	0.7598	0.9648	1.0019	30.7333	0.7344
2/19/2006 13:35	2/22/2006 5:20	63.75	3.17	0.3820	0.9764	1.0019	16.0000	0.3737
2/19/2006 13:35	2/22/2006 5:55	64.33	3.58	0.3847	0.9733	1.0019	17.2667	0.3752
2/19/2006 13:35	2/22/2006 6:30	64.92	3.50	0.3874	0.9739	1.0019	22.2667	0.3781
2/19/2006 13:35	2/22/2006 7:05	65.50	3.50	0.3901	0.9739	1.0019	13.7667	0.3807
2/19/2006 13:35	2/22/2006 7:40	66.08	3.58	0.3928	0.9733	1.0019	16.7333	0.3831
2/19/2006 13:35	2/22/2006 8:20	66.75	3.42	0.3959	0.9745	1.0019	19.0000	0.3865
2/19/2006 13:35	2/22/2006 8:50	67.25	3.67	0.3981	0.9727	1.0019	19.7333	0.3880
2/22/2006 13:25	3/2/2006 10:40	189.25	6.42	0.7604	0.9527	1.0019	29.9000	0.7258
2/19/2006 13:35	2/22/2006 9:50	68.25	3.83	0.4027	0.9715	1.0019	17.8667	0.3919
2/19/2006 13:35	2/22/2006 10:10	68.58	4.17	0.4042	0.9690	1.0019	18.6333	0.3924
2/19/2006 13:35	2/22/2006 10:30	68.92	4.42	0.4057	0.9672	1.0019	19.6333	0.3931

Ad Bail 3/14/06
Amanda F. Feh 3/17/06

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	800	2-19-06 1335	2-22-06 0445	2-22-06 0755	101	1	5	425
VER 2	800	2-19-06 1335	2-22-06 0520	2-22-06 0830	102	1	5	485
VER 3	800	2-19-06 1335	2-22-06 0555	2-22-06 0930	103	1	6	524
VER 4	800	2-19-06 1335	2-22-06 0630	2-22-06 1000	104	1	3	671
VER 5	800	2-19-06 1335	2-22-06 0705	2-22-06 1035	105	1	7	470
VER 6	800	2-19-06 1335	2-22-06 0740	2-22-06 1115	106	1	8	510
VER 7	800	2-19-06 1335	2-22-06 0820	2-22-06 1145	107	1	2	572
VER 8	800	2-19-06 1335	2-22-06 0850	2-22-06 1200	108	1	4	596
VER 9	800	2-19-06 1335	2-22-06 0910	2-22-06 1300	109	1	5	742
VER 10	800	2-19-06 1335	2-22-06 0950	2-22-06 1340	110	1	8	544
VER 11	800	2-19-06 1335	2-22-06 1010	2-22-06 1420	111	1	8	567
VER 12	800	2-19-06 1335	2-22-06 1030	2-22-06 1455	112	1	5	552
			ABI					
				3/14/06				

ABI 3/14/06

3/14/06 ABI

ABI 3/14/06
091213+230
091317109

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226

Date Standards Prepared 1/17/06 Cocktail Type Used NIA

Standard ID Abi 3/14/06
032+0638-B Matrix of Vial/Planchett NIA

Amount Used (g or ml) 0.1 NIA

Standard Activity (DPM/g or ml) 279.0211 Type of Scintillation Vial NIA

Reference Date 1/23/04 Pipette ID Used 1429303

Expiration Date 1/17/07 Balance ID Used 36040216

Residue/Carrier Agent 0.5M HCl Quenching Agent NIA

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER 1				
2	VER 2				
3	VER 3				
4	VER 4				
5	VER 5		ABI		
6	VER 6			3/14/06	
7	VER 7				
8	VER 8				
9	VER 9				
10	VER 10				
11	VER 11				
12	VER 12				
	ABI				
	3/14/06				

Prepared By: Ad Bail Date 3/14/06

Reviewed By: Amanda L. Lehe Date 3/27/06

Rev 1 RLM 9/10/97

Standard Traceability Log Rad

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

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

$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13613.8856 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (59.9 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13260.8293 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/17/2006	Amanda Fehr	2.1041	100	0638-B	279.0211 dpm/mL	01/17/2006	01/17/2007

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Handwritten signature

Verification for Ra-226 Standard 0638-B

A. Fehr
1/20/2006

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass, Used (mL)	Standard Source DPM/mL
0638-B N1	534.4000	3.1000	531.3000	1.88956511	281.1758103
0638-B N2	544.4000	3.1000	541.3000	1.88956511	286.4680333
0638-B N3	539.1000	3.1000	536.0000	1.88956511	283.6631551
Average =					283.7689996

Mean Value (Counting) = 283.7689996 101.789218 Pass
 Stdev = 2.647698713 0.00933047 Rule 3 (Pass/Fail)

Certificate Value = 278.8
 Lower Limit = 278.4736022
 Upper Limit = 289.064397
 Rule 1 Pass/Fail Pass
 Two sigma = 5.295397425
 10 % of Mean = 28.37689996
 Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0638-B by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 1/20/06 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 1/20/06

General Engineering Laboratories

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

Lucas Cell Calibration Package

CALIBRATION 201-212

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

Prepared By: Ad Beal

Date: 5/6/05

Reviewed By: Cezela A. Johnson

Date: 5/9/05

Effective Date: 5/9/05

Ra-226 Cell Constants

Standard Reference date: 12/15/1999
 Standard ID: 0299-E
 Volume added (mL): 0.1
 Standard Reference Activity (DPM/mL): 2434.34

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count		
201	1.890	Average	1.872	CAL 1	4/25/2005 14:05	4/25/2005 10:15	4/22/2005 17:15	0.267	5180	30	172.67	243.02	2.70833	0.15972	1959	0.9977
201	1.999	Stdev	0.137	CAL 7	5/2/2005 17:10	5/2/2005 14:10	4/29/2005 15:00	0.233	5908	30	196.83	243.02	2.96528	0.12500	1966	0.9977
201	1.727			CAL 1	4/28/2005 12:20	4/28/2005 9:05	4/25/2005 16:00	0.267	4759	30	158.63	243.02	2.71181	0.13542	1962	0.9977
202	1.855	Average	1.775	CAL 8	5/2/2005 17:45	5/2/2005 14:40	4/29/2005 15:00	0.233	5508	30	183.60	243.02	2.98611	0.12847	1966	0.9977
202	1.706	Stdev	0.075	CAL 14	4/26/2005 15:30	4/26/2005 11:40	4/22/2005 17:15	0.167	5960	30	198.67	243.02	3.76736	0.15972	1960	0.9977
202	1.763			CAL 13	4/29/2005 15:20	4/29/2005 12:05	4/26/2005 15:00	0.267	5086	30	169.53	243.02	2.87847	0.13542	1963	0.9977
203	1.910	Average	1.823	CAL 3	4/25/2005 15:40	4/25/2005 11:50	4/22/2005 17:15	0.267	5333	30	177.77	243.02	2.77431	0.15972	1959	0.9977
203	1.788	Stdev	0.076	CAL 9	5/2/2005 20:40	5/2/2005 15:15	4/29/2005 15:00	0.267	5249	30	174.97	243.02	3.01042	0.22569	1966	0.9977
203	1.771			CAL 14	4/29/2005 15:55	4/29/2005 12:45	4/26/2005 15:00	0.267	5149	30	171.63	243.02	2.90625	0.13194	1963	0.9977
204	1.713	Average	1.753	CAL 4	4/25/2005 16:15	4/25/2005 12:40	4/22/2005 17:15	0.167	4836	30	161.20	243.02	2.80903	0.14981	1959	0.9977
204	1.762	Stdev	0.036	CAL 16	4/26/2005 16:35	4/26/2005 12:50	4/22/2005 17:15	0.267	6218	30	207.27	243.02	3.81597	0.15625	1960	0.9977
204	1.783			CAL 10	5/2/2005 22:05	5/2/2005 15:45	4/29/2005 15:00	0.200	5222	30	174.07	243.02	3.03125	0.26389	1966	0.9977
205	1.949	Average	1.967	CAL 5	4/25/2005 16:50	4/25/2005 13:20	4/22/2005 17:15	0.200	5847	30	184.90	243.02	2.86881	0.14583	1959	0.9977
205	1.964	Stdev	0.020	CAL 17	4/26/2005 17:50	4/26/2005 13:30	4/22/2005 17:15	0.267	6932	30	231.07	243.02	3.84375	0.18056	1960	0.9977
205	1.989			CAL 16	4/29/2005 17:05	4/29/2005 14:00	4/26/2005 15:00	0.267	5865	30	195.50	243.02	2.95633	0.12847	1963	0.9977
206	1.840	Average	1.880	CAL 6	4/25/2005 17:35	4/25/2005 13:55	4/22/2005 17:15	0.133	5263	30	175.43	243.02	2.86111	0.15278	1959	0.9977
206	1.943	Stdev	0.056	CAL 11	5/3/2005 8:30	5/2/2005 16:20	4/29/2005 15:00	0.267	5319	30	177.30	243.02	3.05556	0.67361	1966	0.9977
206	1.855			CAL 17	4/29/2005 17:35	4/29/2005 14:35	4/26/2005 15:00	0.200	5505	30	183.50	243.02	2.98264	0.12500	1963	0.9977
207	1.805	Average	1.725	CAL 7	4/25/2005 18:05	4/25/2005 14:25	4/22/2005 17:15	0.200	5192	30	173.07	243.02	2.88194	0.15278	1959	0.9977
207	1.826	Stdev	0.081	CAL 19	4/27/2005 15:15	4/27/2005 11:10	4/22/2005 17:15	0.267	6615	30	220.50	243.02	4.74653	0.17014	1961	0.9977
207	1.743			CAL 1	5/2/2005 13:35	5/2/2005 9:20	4/29/2005 15:00	0.267	4838	30	161.27	243.02	2.76389	0.17708	1966	0.9977
208	1.796	Average	1.786	CAL 8	4/25/2005 18:45	4/25/2005 14:55	4/22/2005 17:15	0.267	5192	30	173.07	243.02	2.90278	0.15972	1959	0.9977
208	1.713	Stdev	0.068	CAL 2	5/2/2005 14:15	5/2/2005 10:05	4/29/2005 15:00	0.133	4794	30	159.80	243.02	2.79514	0.17361	1966	0.9977
208	1.848			CAL 8	4/28/2005 17:30	4/28/2005 14:20	4/25/2005 16:00	0.133	5403	30	180.10	243.02	2.93056	0.13194	1962	0.9977
209	1.832	Average	1.744	CAL 9	4/25/2005 21:45	4/25/2005 15:25	4/22/2005 17:15	0.267	5223	30	174.10	243.02	2.92361	0.26389	1959	0.9977
209	1.693	Stdev	0.076	CAL 21	4/27/2005 16:25	4/27/2005 12:15	4/22/2005 17:15	0.233	6921	30	230.70	243.02	4.79167	0.17361	1961	0.9977
209	1.707			CAL 6	5/2/2005 16:30	5/2/2005 13:15	4/29/2005 15:00	0.267	4988	30	166.27	243.02	2.92708	0.13542	1966	0.9977
210	1.702	Average	1.726	CAL 10	4/26/2005 12:45	4/26/2005 8:30	4/22/2005 17:15	0.033	5778	30	192.60	243.02	3.63542	0.17708	1960	0.9977
210	1.679	Stdev	0.063	CAL 22	4/27/2005 17:00	4/27/2005 12:45	4/22/2005 17:15	0.267	6879	30	229.30	243.02	4.81250	0.17708	1961	0.9977
210	1.798			CAL 3	5/2/2005 14:50	5/2/2005 10:50	4/29/2005 15:00	0.200	5084	30	169.47	243.02	2.82639	0.16667	1966	0.9977
211	1.559	Average	1.703	CAL 12	5/3/2005 14:35	5/3/2005 10:10	4/29/2005 15:00	0.267	5457	30	181.90	243.02	3.79861	0.18403	1967	0.9977
211	1.776	Stdev	0.124	CAL 4	5/2/2005 15:25	5/2/2005 11:40	4/29/2005 15:00	0.167	5078	30	169.27	243.02	2.86111	0.15625	1966	0.9977
211	1.772			CAL 11	4/29/2005 13:35	4/29/2005 10:25	4/26/2005 15:00	0.267	5021	30	167.37	243.02	2.80903	0.13194	1963	0.9977
212	1.708	Average	1.808	CAL 12	4/26/2005 14:10	4/26/2005 10:00	4/22/2005 17:15	0.133	5875	30	195.83	243.02	3.69792	0.17361	1960	0.9977
212	1.905	Stdev	0.098	CAL 5	5/2/2005 16:00	5/2/2005 12:30	4/29/2005 15:00	0.267	5509	30	183.63	243.02	2.89583	0.14583	1966	0.9977
212	1.809			CAL 12	4/29/2005 14:15	4/29/2005 11:15	4/26/2005 15:00	0.267	5181	30	172.70	243.02	2.84375	0.12500	1963	0.9977

Angela D. Johnson 5/19/05
 Ad Beard 5/19/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	4/22/05 1715	4/25/05 1015	4/25/05 1405	201	2	8=0.267	5180
CAL 2	500	4/22/05 1715	4/25/05 1055	4/25/05 1410	202	2	7=0.220	47744
CAL 3	500	4/22/05 1715	4/25/05 1150	4/25/05 1540 1445 Abs 4/25/05	203	2	8=0.267	5333
CAL 4	500	4/22/05 1715	4/25/05 1240	4/25/05 1615	204	2	5=0.167	4836
CAL 5	500	4/22/05 1715	4/25/05 1320	4/25/05 1650	205	2	6=0.200	5547
CAL 6	500	4/22/05 1715	4/25/05 1355	4/25/05 1735	206	2	4=0.133	5263
CAL 7	500	4/22/05 1715	4/25/05 1425	4/25/05 1805	207	2	6=0.200	5192
CAL 8	500	4/22/05 1715	4/25/05 1455	4/25/05 1845	208	2	8=0.267	5192
CAL 9	500	4/22/05 1715	4/25/05 1525	4/25/05 2145	209	2	8=0.267	8223
CAL 10	500	4/22/05 1715	4/25/05 830 4/25/05 Abs 4/25/05	4/25/05 1245 7/26/05 Abs 7/26/05	210	2	1=0.033	5778
CAL 11	500	4/22/05 1715	4/26/05 915	4/26/05 1335	211	2	6=0.200	5261
CAL 12	500	4/22/05 1715	4/26/05 1000	4/26/05 1410	212	2	4=0.133	5875

5/16/05
Abs
5/16/05
1744
5/16/05
Abs

Abs 5/16/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 13	500	4/22/05 1715	4/26/05 1040	4/26/05 1455	201	2	5791 AB1 5/16/05	5791
CAL 14	500	4/22/05 1715	4/26/05 1140	4/26/05 1530	202	2	5760 5/16/05	5760
CAL 15	500	4/22/05 1715	4/26/05 1220	4/26/05 1600	203	2	822277 8/22/05	5854
CAL 16	500	4/22/05 1715	4/26/05 1250	4/26/05 1635	204	2	8=0267	6218
CAL 17	500	4/22/05 1715	4/26/05 1330	4/26/05 1750	205	2	8=0267	6932
CAL 18	500	4/22/05 1715	4/27/05 1045	4/27/05 1440	206	2	8=0267	6555
CAL 19	500	4/22/05 1715	4/27/05 1110	4/27/05 1515	207	2	8=0267	6615
CAL 20	500	4/22/05 1715	4/27/05 1145	4/27/05 1550	208	2	6=0220	3323
CAL 21	500	4/22/05 1715	4/27/05 1215	4/27/05 1625	209	2	7=0233	6921
CAL 22	500	4/22/05 1715	4/27/05 1245	4/27/05 1700	210	2	8=0267	6879
CAL 23	500	4/22/05 1715	4/27/05 1315	4/27/05 1735	211	2	4=0133	5863
CAL 24	500	4/22/05 1715	4/27/05 1350	4/27/05 1815	212	2	7=0233	6942

AB1 5/16/05

AB1 5/16/05
AB1 5/16/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	4/25/05 1600	4/28/05 905	4/28/05 1220	201	2	8=0.267	4759
CAL 2	500	4/25/05 1600	4/28/05 945	4/28/05 1310	202	2	8=0.267	3237
CAL 3	500	4/25/05 1600	4/28/05 1035	4/28/05 1350	203	2	8=0.267	3814
CAL 4	500	4/25/05 1600	4/28/05 1120	4/28/05 1425	204	2	8=0.267	3379
CAL 5	500	4/25/05 1600	4/28/05 1200	4/28/05 1505	205	2	8=0.267	3268
CAL 6	500	4/25/05 1600	4/28/05 1245	4/28/05 1545	206	2	5=0.112	3608
CAL 7	500	4/25/05 1600	4/28/05 1335	4/28/05 1635	207	2	8=0.267	4643
CAL 8	500	4/25/05 1600	4/28/05 1420	4/28/05 1730	208	2	4=0.113	5403
CAL 9	500	4/25/05 1600	4/28/05 1500	4/28/05 2120	209	2	8=0.267	4903
CAL 10	500	4/26/05 1500	4/29/05 920	4/29/05 1255	210	2	8=0.267	1113
CAL 11	500	4/26/05 1500	4/29/05 1025	4/29/05 1335	211	2	8=0.267	5021
CAL 12	500	4/26/05 1500	4/29/05 1115	4/29/05 1415	212	2	8=0.267	5181
AB1 5/6/05								

AB1 5/6/05
 CAL 12
 5/16/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 13	500	4/26/05 1500	4/29/05 1205	4/29/05 1520	202	2	8=0.267	5086
CAL 14	500	4/26/05 1500	4/29/05 1245	4/29/05 1555	203	2	8=0.267	5149
CAL 15	500	4/26/05 1500	4/29/05 1320	4/29/05 1630	204	2	8=0.267	4907
CAL 16	500	4/26/05 1500	4/29/05 1400	4/29/05 1705	205	2	8=0.267	5865
CAL 17	500	4/26/05 1500	4/29/05 1435	4/29/05 1735	206	2	6=0.200	5505
				5/2/05				
CAL 1	500	4/29/05 1500	5/2/05 920	5/2/05 1335	207	2	8=0.267	4838
CAL 2	500	4/29/05 1500	5/2/05 1005	5/2/05 1415	208	2	4=0.132	4774
CAL 3	500	4/29/05 1500	5/2/05 1050	5/2/05 1450	210	2	6=0.200	5084
CAL 4	500	4/29/05 1500	5/2/05 1140	5/2/05 1525	211	2	5=0.167	5078
CAL 5	500	4/29/05 1500	5/2/05 1230	5/2/05 1600	212	2	8=0.267	5509
CAL 6	500	4/29/05 1500	5/2/05 1315	5/2/05 1630	209	2	8=0.267	4989
CAL 7	500	4/29/05 1500	5/2/05 1410	5/2/05 1710	201	2	7=0.233	5908
CAL 8	500	4/29/05 1500	5/2/05 1440	5/2/05 1745	202	2	7=0.233	5508
CAL 9	500	4/29/05 1500	5/2/05 1515	5/2/05 2040	203	2	8=0.267	5249
CAL 10	500	4/29/05 1500	5/2/05 1545	5/2/05 2805	204	2	6=0.200	5222
CAL 11	500	4/29/05 1500	5/2/05 1620	5/2/05 2815	206	2	8=0.267	5319
				5/3/05 8:30				
CAL 12	500	4/29/05 1500	5/3/05 1010	5/3/05 1435	211	2	8=0.267	5457

ABI 5/6/05

ABI 5/6/05

ATG 5/6/05

ABI 5/6/05

ABI 5/6/05

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008, Rev. 2 Isotope Ra-226
 Date Standards Prepared 8/26/03 Cocktail Type Used N/A
 Standard ID 0299-E Matrix of Vial/Planchett N/A
 Amount Used (g or ml) 0.1 N/A
 Standard Activity (DPM/g or ml) 2434.34 Type of Scintillation Vial N/A
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 8/26/05 Balance ID Used 36040216
 Residue/Carrier Agent 0.5 M HCl Quenching Agent N/A

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

ADL
5/6/05

Prepared By: Ad Beil Date: 5/6/05
 Reviewed By: Angela A. Johnson Date: 5/9/05

Rev 1 RLM.9/10/97

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-608, Rev. 8 Isotope Ra-226
 Date Standards Prepared 8/26/03 Cocktail Type Used N/A
 Standard ID 0299-E Matrix of Vial/Planchett N/A
 Amount Used (g or ml) 0.1 N/A
 Standard Activity (DPM/g or ml) 2434.34 Type of Scintillation Vial N/A
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 8/26/05 Balance ID Used 36040216
 Residue/Carrier Agent 0.5 m HCl Quenching Agent N/A

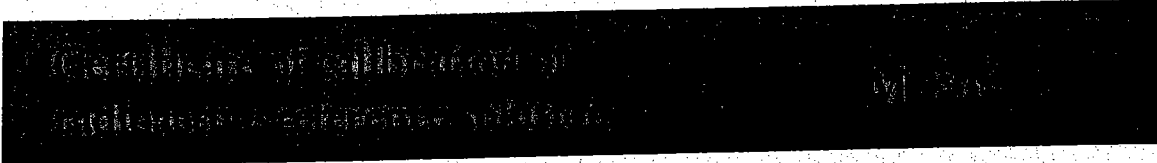
	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24	ABJ 5/6/05			

Prepared By: Ad Bail Date 5/6/05
 Reviewed By: Angela A. Johnson Date 5/9/05

8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299



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

ISSUED
FOR:

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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

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ory

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Date of
issue

17th December 1999

Nycomed
Amersham

0299



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

Method of measurement:

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

Calibration date: 15 December 1999

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

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

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

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

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

Carrier free in 0.5M HCl.

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

1 year = 365.25 days

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



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Albee	Prepared By:	Angela Albee
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	08/26/2004
Ampoule Mass (g):	5.0368 g	Expiration Date:	08/26/2005
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012

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

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

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Albee	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Albee	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Albee	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Albee	1.9909	100	0299-E	2434.34 dpm/mL	08/26/2004	08/26/2005
08/26/2003	Angela Albee	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-E

8/26/2004	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
A. Fehr	0299-F N1	561.0000	26.9000	534.1000	3.38485694	0.0645	2446.372267
	0299-F N2	567.3000	26.9000	540.4000	3.38485694	0.0658	2426.325867
	0299-F N3	540.4000	26.9000	513.5000	3.38485694	0.0652	2326.765061

Mean Value (Counting) = 2399.821065 % of known
 Stdev = 64.05739118 0.02669257

Certificate Value = 2429.4 dpm/mL
 Lower Limit = 2271.706283 dpm/mL
 Upper Limit = 2527.935847 dpm/mL
 Rule 1 Pass/Fail Pass
 Two sigma = 128.1147824 dpm/mL
 10 % of Mean = 239.9821065 dpm/mL
 Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0299-E by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 8/26/04 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

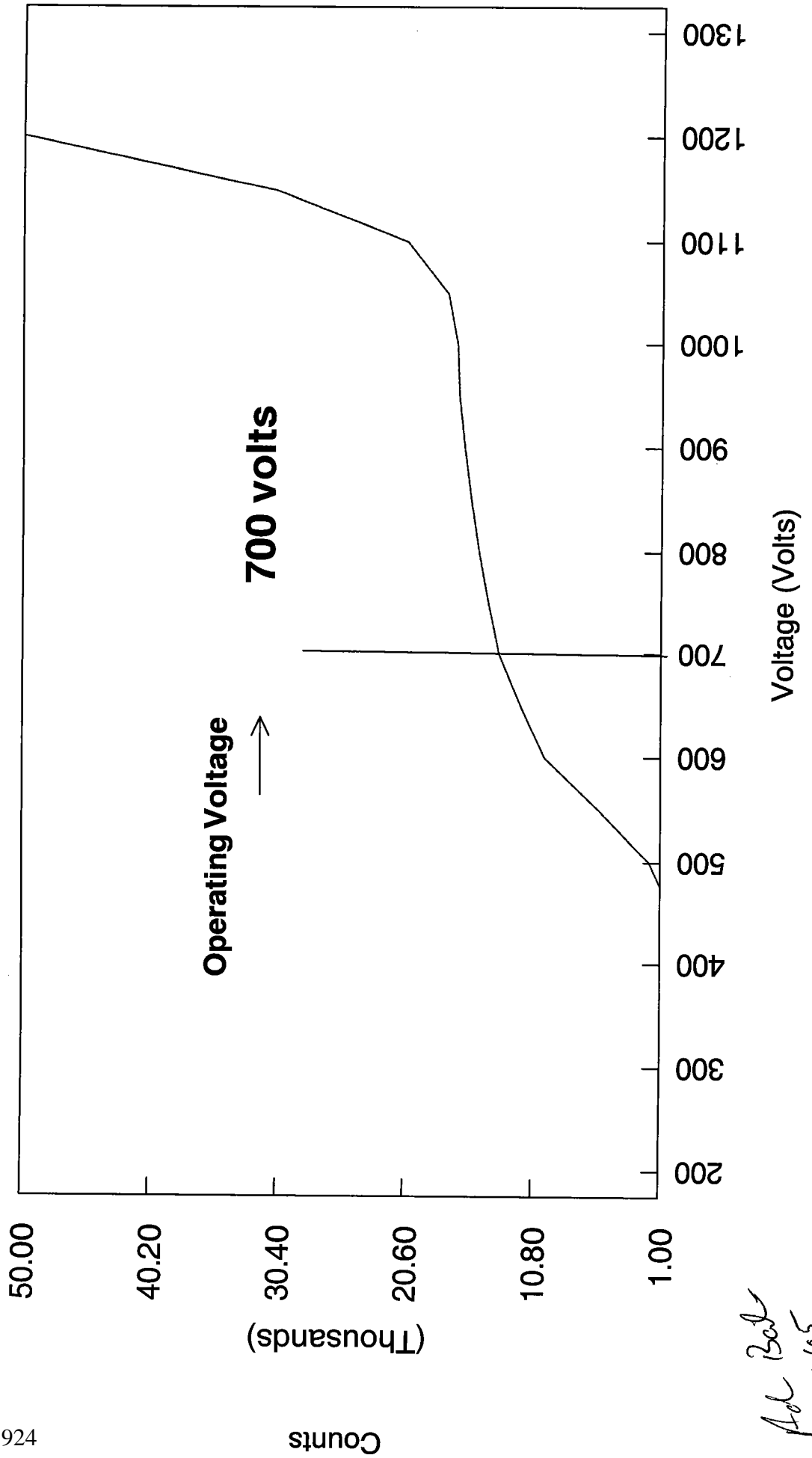
Source dpm/g = (A - B)/(C)(D)
 where:
 A = Ver. source cpm,
 B = BKG cpm,
 C = System efficiency, (cpm/dpm), and
 D = mass used for standard verification.

RAD SOP M-001

Amanda L. Fehr 8/26/04
 Heather W. W. 8/26/04

Plateau April, 2005

Ludlum # 2



Ad. Beck
5/6/05

ADD
5/9/05

Ra-226 WATER

Sample ID

Batch : LCSVER
 Date : 5/4/2005
 Analyst : AB1

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

Bkg Count Time: 30 min

- 201
- 202
- 203
- 204
- 205
- 206
- 207
- 208
- 209
- 210
- 211
- 212

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME	DEGASSING DATE/TIME
VER 1	0.500	30	506	201	1.87	0.267	0.6922	21.6828	1.9348	5/6/2005 12:10	5/3/2005 18:00
VER 8	0.500	30	780	202	1.78	0.167	0.3911	23.0678	1.6346	5/4/2005 13:00	4/29/2005 15:00
VER 2	0.500	30	544	203	1.82	0.267	0.7034	23.7135	2.0374	5/6/2005 12:45	5/3/2005 18:00
VER 10	0.500	30	797	204	1.75	0.200	0.4221	23.6367	1.6597	5/4/2005 14:35	4/29/2005 15:00
VER 2	0.500	30	766	205	1.97	0.167	0.4096	23.7204	1.6964	5/3/2005 16:00	4/29/2005 15:00
VER 11	0.500	30	860	206	1.88	0.167	0.3650	23.7490	1.6012	5/4/2005 15:10	4/29/2005 15:00
VER 3	0.500	30	732	207	1.73	0.267	0.5609	25.5427	1.8811	5/3/2005 16:30	4/29/2005 15:00
VER 3	0.500	30	484	208	1.79	0.233	0.6728	21.3535	1.9442	5/6/2005 13:20	5/3/2005 18:00
VER 4	0.500	30	582	209	1.74	0.267	0.7214	26.0445	2.1602	5/6/2005 13:55	5/3/2005 18:00
VER 6	0.500	30	663	210	1.73	0.267	0.5649	23.2734	1.8040	5/3/2005 22:05	4/29/2005 15:00
VER 5	0.500	30	545	211	1.70	0.067	0.4293	25.0218	2.1124	5/6/2005 15:10	5/3/2005 18:00
VER 6	0.500	30	610	212	1.81	0.067	0.4014	26.1947	2.0891	5/6/2005 15:40	5/3/2005 18:00

AN Bob 5/19/05

Omega A. Johnson 5/19/05

Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
	2	5/6/2005 12:10	LCS	0321-G	25.42	pCi/L	85%
	2	5/4/2005 13:00	LCS	0321-G	25.42	pCi/L	91%
	2	5/6/2005 12:45	LCS	0321-G	25.42	pCi/L	93%
	2	5/4/2005 14:35	LCS	0321-G	25.42	pCi/L	93%
	2	5/3/2005 16:00	LCS	0321-G	25.42	pCi/L	93%
	2	5/4/2005 15:10	LCS	0321-G	25.42	pCi/L	93%
	2	5/3/2005 16:30	LCS	0321-G	25.42	pCi/L	100%
	2	5/6/2005 13:20	LCS	0321-G	25.42	pCi/L	84%
	2	5/6/2005 13:55	LCS	0321-G	25.42	pCi/L	102%
	2	5/3/2005 22:05	LCS	0321-G	25.42	pCi/L	92%
	2	5/6/2005 15:10	LCS	0321-G	25.42	pCi/L	98%
	2	5/6/2005 15:40	LCS	0321-G	25.42	pCi/L	103%
DE-EMAN. DATE/TIME	DEGASS- DE-EM	dE-EM- COUNT	constant	constant	constant	Net CPM	Ingrowth constant
5/6/2005 8:45	62.75	3.42	0.3773	0.9745	1.0019	16.5997	0.3684
5/4/2005 10:00	115.00	3.00	0.5803	0.9776	1.0019	25.8330	0.5684
5/6/2005 9:30	63.50	3.25	0.3809	0.9758	1.0019	17.8663	0.3723
5/4/2005 11:35	116.58	3.00	0.5853	0.9776	1.0019	26.3667	0.5733
5/3/2005 11:55	92.92	4.08	0.5042	0.9696	1.0019	25.3663	0.4898
5/4/2005 12:10	117.17	3.00	0.5871	0.9776	1.0019	28.4997	0.5751
5/3/2005 12:40	93.67	3.83	0.5070	0.9715	1.0019	24.1330	0.4934
5/6/2005 10:10	64.17	3.17	0.3840	0.9764	1.0019	15.9003	0.3756
5/6/2005 10:55	64.92	3.00	0.3874	0.9776	1.0019	19.1330	0.3795
5/3/2005 15:00	96.00	7.08	0.5156	0.9479	1.0019	21.8330	0.4897
5/6/2005 11:50	65.83	3.33	0.3917	0.9751	1.0019	18.0997	0.3827
5/6/2005 12:25	66.42	3.25	0.3943	0.9758	1.0019	20.2663	0.3855

5/19/05
Add Data

Angela J. Johnson 5/19/05

CALIBRATION STANDARD DETECTOR # 2

CELL #	END DEGAS TIME	END DE-EM TIME	COUNT TIME	DET #	BKG COUNTS	TOTAL COUNTS	SAMPLE #
201	4/29/05 1500	5/23/05 1055	5/30/05 1515	2	8	637	VER 1
202	4/29/05 1500	5/4/05 1000	5/4/05 1300	2	5	780	VER 8
203	4/29/05 1500	5/4/05 1045	5/4/05 1345	2	6	731	VER 9
204	4/29/05 1500	5/4/05 1135	5/4/05 1435	2	6	797	VER 10
205	4/29/05 1500	5/2/05 1155	5/2/05 1600	2	5	766	VER 2
206	4/29/05 1500	5/4/05 1210	5/4/05 1510	2	5	860	VER 11
207	4/29/05 1500	5/3/05 1240	5/3/05 1630	2	8	732	VER 3
208	4/29/05 1500	5/3/05 1330	5/3/05 1745	2	8	844	VER 4
209	4/29/05 1500	5/3/05 1430	5/3/05 1755	2	8	853	VER 5
210	4/29/05 1500	5/3/05 1500	5/3/05 1805	2	8	663	VER 6
211	4/29/05 1500	5/4/05 1240	5/4/05 1540	2	5	719	VER 12
212	5/2/05 1500	5/2/05 1540	5/2/05 2055	2	6	903	VER 7

ABI 5/6/05

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General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008, Rev. 8 Isotope Ra-226
 Date Standards Prepared 9/13/04 Cocktail Type Used N/A
 Standard ID 0321-G Matrix of Vial/Planchett N/A
 Amount Used (g or mL) 0.1 N/A
 Standard Activity (DPM/g or mL) 283.81 Type of Scintillation Vial N/A
 Reference Date 9/9/91 Pipette ID Used 1429303
 Expiration Date 9/13/05 Balance ID Used 36040216
 Residue/Carrier Agent 1 M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER 1				
2	VER 2				
3	VER 3				
4	VER 4				
5	VER 5				
6	VER 6				
7	VER 7				
8	VER 8				
9	VER 9		ABI 51615		
10	VER 10				
11	VER 11				
12	VER 12				
	ABI 516105				

Prepared By: Ade Baird Date: 5/6/05
 Reviewed By: Angela J. Johnson Date: 5/9/05

Rev 1 RLM.9/10/97

Verification for Ra-226 Standard 0321-G

A. Fehr
9/14/2004

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Mass. Used (g)	Standard	Source DPM/g
0321-E N1	1049.0000	68.4000	980.6000	3.416301	1.0000		287.0355979
0321-E N2	1051.6000	68.4000	983.2000	3.416301	1.0000		287.7966549
0321-E N3	1036.2000	68.4000	967.8000	3.416301	1.0000		283.2888554
					Average =		286.0403694

Mean Value (Counting) = 286.0403694
Stdev = 2.413073537

Certificate Value = 282.2
Lower Limit = 281.2142223
Upper Limit = 290.8665165
Rule 1 Pass/Fail Pass Pass
Two sigma = 4.826147074
10 % of Mean = 28.60403694
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.

The analyst prepared three standard verification sources for Ra-226 source 0321-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 1/9/04 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

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

Reference RAD SOP M-001

Amanda J. Fehr 9/14/04

Amelia S. Johnson 10/20/04

General Engineering Laboratories

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

Lucas Cell Calibration Package

301-311

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

Prepared By: Angela L. Johnson

Date: 11/23/05

Reviewed By: [Signature]

Date: 11/23/05

Effective Date: 11/23/05

Ra-226 Cell Constants

Standard Reference date: 12/15/1999
 standard ID: 0299-E
 Volume added (mL): 0.1
 Standard Reference Activity (DPM/mL): 2434.34

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	1.779	Average	11/15/2005 7:20	11/15/2005 4:20	11/9/2005 15:30	0.267	7998	30	266.60	5.53472	0.12500	2162	0.9974
301	1.673	Stdev	11/22/2005 16:50	11/22/2005 8:45	11/15/2005 12:40	0.267	8118	30	270.60	6.83681	0.33681	2170	0.9974
301	1.835		11/9/2005 6:30	11/9/2005 5:15	10/30/2005 13:15	0.267	6316	30	210.53	3.66667	0.13542	2150	0.9975
302	1.770	Average	11/15/2005 9:20	11/15/2005 5:00	11/9/2005 15:30	0.267	7901	30	263.37	5.56250	0.18056	2162	0.9974
302	1.796	Stdev	11/9/2005 8:50	11/9/2005 5:40	11/4/2005 14:20	0.133	7237	30	241.23	4.63889	0.13194	2156	0.9974
302	1.891		11/2/2005 11:25	11/2/2005 8:05	10/30/2005 13:15	0.267	5309	30	176.97	2.78472	0.13889	2149	0.9975
303	1.980	Average	11/22/2005 17:20	11/22/2005 9:25	11/15/2005 12:40	0.267	9639	30	321.30	6.86458	0.32986	2170	0.9974
303	2.103	Stdev	11/8/2005 7:50	11/8/2005 4:30	11/4/2005 14:20	0.267	7124	30	237.47	3.59028	0.13889	2155	0.9974
303	2.104		11/2/2005 10:50	11/2/2005 7:30	10/30/2005 13:15	0.267	5867	30	195.57	2.76042	0.13889	2149	0.9975
304	1.777	Average	11/15/2005 10:05	11/15/2005 5:30	11/9/2005 15:30	0.267	7935	30	264.50	5.58333	0.19097	2162	0.9974
304	1.867	Stdev	11/8/2005 11:35	11/8/2005 8:35	11/4/2005 14:20	0.200	6549	30	218.30	3.76042	0.12500	2155	0.9974
304	1.999		11/3/2005 10:40	11/3/2005 7:40	10/30/2005 13:15	0.267	7022	30	234.07	3.76736	0.12500	2150	0.9975
305	1.763	Average	10/31/2005 11:10	10/31/2005 7:30	10/16/2005 14:30	0.267	11585	30	386.17	14.70883	0.15278	2147	0.9975
305	1.787	Stdev	11/8/2005 8:25	11/8/2005 5:10	11/4/2005 14:20	0.133	6089	30	202.97	3.61806	0.13542	2155	0.9974
305	1.728		11/15/2005 10:40	11/15/2005 6:30	11/9/2005 15:30	0.267	7776	30	259.20	5.62500	0.17361	2162	0.9974
306	1.845	Average	11/15/2005 11:10	11/15/2005 7:10	11/9/2005 15:30	0.267	8332	30	277.73	5.65278	0.16667	2162	0.9974
306	1.779	Stdev	11/8/2005 12:10	11/8/2005 9:10	11/4/2005 14:20	0.267	6270	30	209.00	3.78472	0.12500	2156	0.9974
306	1.854		11/22/2005 17:35	11/22/2005 10:15	11/15/2005 12:40	0.267	9139	30	304.63	6.89931	0.30556	2170	0.9974
307	1.908	Average	11/15/2005 11:45	11/15/2005 7:45	11/9/2005 15:30	0.267	8637	30	287.90	5.67708	0.16667	2162	0.9974
307	1.850	Stdev	11/8/2005 9:55	11/8/2005 6:55	11/4/2005 14:20	0.267	6409	30	213.63	3.69097	0.12500	2155	0.9974
307	1.949		11/3/2005 10:10	11/3/2005 7:10	10/30/2005 13:15	0.267	6822	30	227.40	3.74653	0.12500	2150	0.9975
308	1.914	Average	11/15/2005 15:30	11/15/2005 8:20	11/9/2005 15:30	0.267	8483	30	282.77	5.70139	0.29861	2163	0.9974
308	1.746	Stdev	11/8/2005 10:25	11/8/2005 7:25	11/4/2005 14:20	0.133	6089	30	202.30	3.71181	0.12500	2155	0.9974
308	2.059		11/2/2005 9:30	11/2/2005 5:55	10/30/2005 13:15	0.267	5626	30	187.53	2.69444	0.14931	2149	0.9975
309	1.831	Average	11/15/2005 15:30	11/15/2005 9:00	11/9/2005 15:30	0.267	8177	30	272.57	5.72917	0.27083	2163	0.9974
309	1.921	Stdev	11/22/2005 19:30	11/22/2005 12:15	11/15/2005 12:40	0.267	9480	30	316.00	6.98264	0.30208	2170	0.9974
309	1.934		11/3/2005 13:10	11/3/2005 9:15	10/30/2005 13:15	0.267	6829	30	227.63	3.83333	0.16319	2151	0.9975
310	1.834	Average	11/22/2005 19:30	11/22/2005 14:50	11/15/2005 12:40	0.200	9298	30	309.93	7.09028	0.19444	2170	0.9974
310	2.007	Stdev	11/8/2005 13:10	11/8/2005 9:50	11/4/2005 14:20	0.267	7093	30	236.43	3.81250	0.13889	2156	0.9974
310	2.125		11/2/2005 7:50	11/2/2005 4:30	10/30/2005 13:15	0.267	5717	30	190.57	2.63542	0.13889	2149	0.9975
311	1.916	Average	11/18/2005 7:40	11/18/2005 7:40	11/15/2005 12:40	0.267	5527	30	184.23	2.79167	0.00000	2165	0.9974
311	1.783	Stdev	11/8/2005 14:15	11/8/2005 10:30	11/4/2005 14:20	0.267	6315	30	210.50	3.84028	0.15625	2156	0.9974
311	1.882		11/2/2005 8:25	11/2/2005 5:15	10/30/2005 13:15	0.267	5118	30	170.60	2.66667	0.13194	2149	0.9975

Owens Lab. Johnson
11/23/05

CALS 3

AAQ
11/23/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 12	500	10/16/05 1430	10/31/05 450	10/31/05 850	301	3	8	9387
CAL 13	500	10/16/05 1430	10/31/05 530	10/31/05 930	302	3	8	10818
CAL 17	500	10/16/05 1430	10/31/05 625	10/31/05 1010	303	3	8	12225
CAL 18	500	10/16/05 1430	10/31/05 700	10/31/05 1040	304	3	8	11119
CAL 19	500	10/16/05 1430	10/31/05 730	10/31/05 1110	305	3	8	11585
CAL 20	500	10/16/05 1430	10/31/05 800	10/31/05 1145	306	3	8	10159
CAL 21	500	10/16/05 1430	10/31/05 830	10/31/05 1230	307	3	8	9445
CAL 22	500	10/16/05 1430	10/31/05 930	10/31/05 1415	308	3	8	9343
CAL 24	500	10/16/05 1430	11/1/05 415	11/1/05 725	309	3	8	10301
CAL 14	500	10/16/05 1430	11/5/05 1030	11/5/05 1420	310	3	6	7913
CAL 15	500	10/16/05 1430	11/5/05 1110	11/5/05 1550	311	3	8	6007
/								

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ADG 11/23/05 Ra-226 Verification Sheet

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ADG 11/23/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1		10/30/05 1315	11/21/05 430	11/21/05 750	310	3	8	5717
CAL 2		10/30/05 1315	11/21/05 515	11/21/05 825	311	3	8	5118
CAL 3		10/30/05 1315	11/21/05 555	11/21/05 930	308	3	8	5626
CAL 4		10/30/05 1315	11/21/05 655	11/21/05 1005	306	3	8	6292
CAL 5		10/30/05 1315	11/21/05 730	11/21/05 1050	303	3	8	5867
CAL 6		10/30/05 1315	11/21/05 805	11/21/05 1125	302	3	8	5309
CAL 7		10/30/05 1315	11/21/05 515	11/21/05 830	301	3	8	6316
CAL 8		10/30/05 1315	11/21/05 630	11/21/05 930	305	3	8	7239
CAL 9		10/30/05 1315	11/21/05 710	11/21/05 1010	307	3	8	4822
CAL 10		10/30/05 1315	11/21/05 740	11/21/05 1040	304	3	8	7022
CAL 11		10/30/05 1315	11/21/05 915	11/21/05 1310	309	3	8	6829

CAL 3 ADQ 11/23/05

Ra-226 Verification Sheet

ADQ 11/23/05

ADQ 11/23/05

ADQ 11/23/05

ADQ 11/23/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1		11/4/05 1420	11/8/05 430	11/8/05 750	303	3	8	7124
CAL 2		11/4/05 1420	11/8/05 510	11/8/05 825	305	3	4	6089
CAL 3		11/4/05 1420	11/8/05 545	11/8/05 900	307	3	2	6349
CAL 4		11/4/05 1420	11/8/05 655	11/8/05 955	307	3	8	6409
CAL 5		11/4/05 1420	11/8/05 725	11/8/05 1025	308	3	4	6069
CAL 6		11/4/05 1420	11/8/05 800	11/8/05 1105	309	3	7	6116
CAL 7		11/4/05 1420	11/8/05 835	11/8/05 1135	304	3	6	6549
CAL 8		11/4/05 1420	11/8/05 910	11/8/05 1210	306	3	8	6270
CAL 9		11/4/05 1420	11/8/05 950	11/8/05 1310	310	3	8	7093
CAL 10		11/4/05 1420	11/8/05 1030	11/8/05 1415	311	3	8	6315
CAL 11		11/4/05 1420	11/9/05 540	11/9/05 850	302	3	4	7237
/								

CALS 3

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 10		11/9/05 1530	11/15/05 420	11/15/05 720	301	3	8	7998
CAL 12		11/9/05 1530	11/15/05 860	11/15/05 920	302	3	8	7901
CAL 14		11/9/05 1530	11/15/05 6530	11/15/05 1005	304	3	8	7935
CAL 15		11/9/05 1530	11/15/05 630	11/15/05 1040	305	3	8	7776
CAL 16		11/9/05 1530	11/15/05 710	11/15/05 1110	306	3	8	8332
CAL 17		11/9/05 1530	11/15/05 745	11/15/05 1145	307	3	8	8637
CAL 18		11/9/05 1530	11/15/05 820	11/15/05 1415	308	3	8	8483
CAL 19		11/9/05 1530	11/15/05 900	11/15/05 1530	309	3	8	9177
CAL 20		11/9/05 1530	11/15/05 950	11/15/05 1600	311	3	8	7127
/								

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL1		11/15/05 1240	11/18/05 440	11/18/05 740	311	3	8	5527

AF 11/23/05

AF 11/23/05

**General Engineering Laboratories
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 8/26/03 Cocktail Type Used NA
 Standard ID 0299-E Matrix of Vial/Planchett NA
 Amount Used (g or mL) 0.1 NA
 Standard Activity (DPM/g or mL) 2434.34 Type of Scintillation Vial NA
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 11/4/06 Balance ID Used 28488
 Residue/Carrier Agent 0.5 M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	CAL1				
2	CAL2				
3	CAL3				
4	CAL4				
5	CAL5				
6	CAL6				
7	CAL7				
8	CAL8				
9	CAL9				
10	CAL10				
11	CAL11				
12	CAL12				
13	CAL13				
14	CAL14				
15	CAL15				

JLQ 11/23/05

Prepared By: Angela J. Johnson Date 11/23/05
 Reviewed By: Est. C. L. L. Date 11/2/06

Rev 1 RLM 9/10/97

**General Engineering Laboratories
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 8/26/03 Cocktail Type Used NA
 Standard ID 0299-E Matrix of Vial/Planchett NA
 Amount Used (g or ml) 0.1 NA
 Standard Activity (DPM/g or ml) 2434.34 Type of Scintillation Vial NA
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 11/4/06 Balance ID Used 28488
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

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

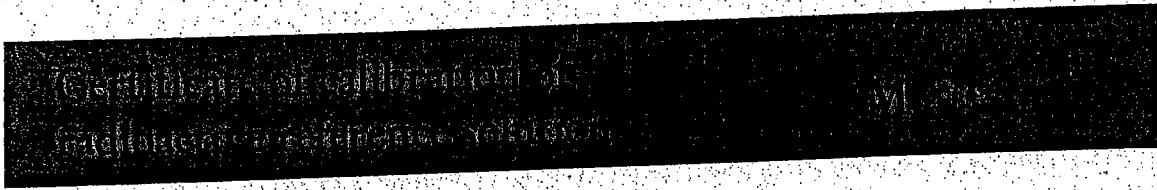
AQ 11/23/05
AQ 11/23/05

Prepared By: Angela Johnson Date 11/23/05
 Reviewed By: Let C. Wald Date 11/23/05

8-21-00

Nycomed Amersham plc
Amersham Laboratories

02.7



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

ISSUED
FOR:

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

Principal radionuclide: Radium-226

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

Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

[Handwritten signature]
Page 694 of 924

Date of issue

17th December 1999

Nycomed
Amersham

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

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

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

- Expanded uncertainty in the radioactive concentration quoted above: $\pm 2.5 \%$
- Combined Type A uncertainty: $\pm 0.2 \%$
- Combined Type B uncertainty: $\pm 1.3 \%$

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

Chemical Carrier free in 0.5M HCl

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

1 year = 365.25 days

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

Verification for Ra-226 Standard 0299-E

11/14/2005
A.Fehr

Isotope
0299-F N1
0299-F N2
0299-F N3

Detector CPM
1340.3000
1313.2000
1298.1000

BKG CPM
0.6000
0.6000
0.6000

NET CPM
1339.7000
1312.6000
1297.5000

Detector Eff
2.72177002
2.72177002
2.72177002

Standard
mL used
0.2000
0.2000
0.2000

Source DPM/G
2461.082289
2411.298509
2383.559208
2418.646669

Mean Value (Counting) = 2418.646669
Stdev = 39.28044852

Certificate Value = 2428.1
Lower Limit = 2340.085772
Upper Limit = 2497.207566
Rule 1 Pass/Fail Pass
Two sigma = 78.56089703
10 % of Mean = 241.8646669
Rule 2 (Pass/Fail) Pass

99.6090287 % of known
0.01624067

dpm/mL
dpm/mL
dpm/mL
Pass
dpm/mL
dpm/mL

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0299-E by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 8 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 11/4/05 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

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

where:

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

RAD SOP M-001

*Amenda L. Fehr 11/14/05
Amenda L. Fehr 11/14/05*

PROTOCOL : 8 Ra-226 ver
DATE : 2005/11/04
TIME : 11:47
ID : P08AS001

Ra226

Wallac 1414 WinSpectral v1.40 S/N 4140127
Counting mode : CPM
Isotope(s) : Ra226
Ra226 = 400- 900,Alpha,1602.12 y
Protocol name : Ra-226 ver
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Advanced modes : Halflife,PSA,Chemilum
Halflife zerotime : Start of assay
PSA level : low
Output to Display :
POS,DATE,CTIME,RACK,RACKPOS,ETIME,SQPE,CPM1,CPM
Additions to Display : Spectrum,Header,Listing
Header : Ra226
Spectrum : Rnd.Cos,Alpha
Window 1 : 1-1024 /Alpha
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

Total count rate:

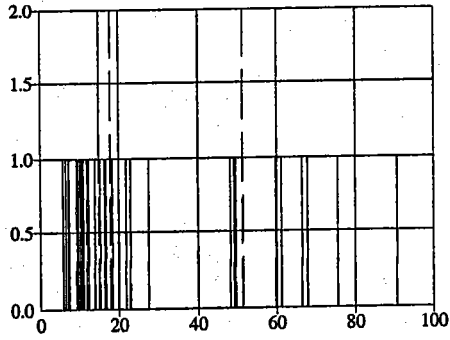
Ra226 10537.9 CPM

Amanda L. Feh
11/4/05

AQ
11/4/05

POS CTIME SQPI CPM CPM1

1 300 23.50 1.90

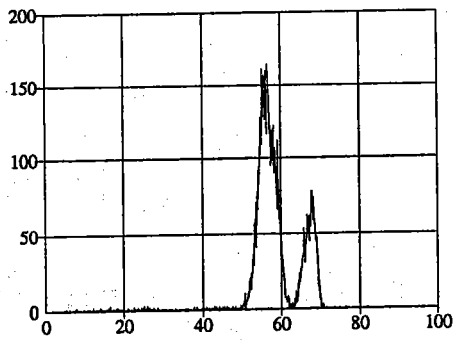


Counts Chem

Counts Alpha

Blg

2 300 4697.50 2217.70

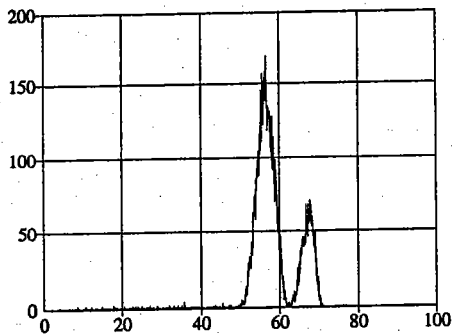


Counts Chem

Counts Alpha

0321-A

3 300 4542.00 2191.80



Counts Chem

Counts Alpha

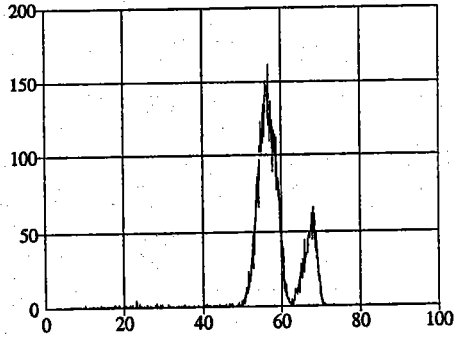
0321-A

ALF 11/4/05

ALF 11/4/05

POS CTIME SQPI CPM CPM1

4 300 4376.00 2174.30

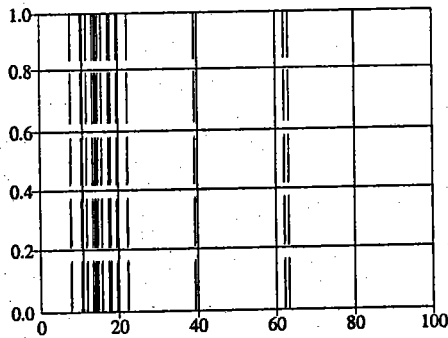


Counts Chem

Counts Alpha

0321-A

5 300 19.50 0.60

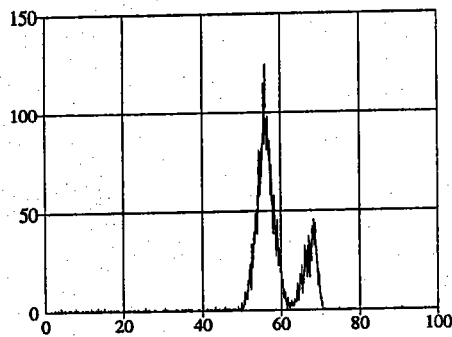


Counts Chem

Counts Alpha

Bkg

6 300 1930.20 1340.30



Counts Chem

Counts Alpha

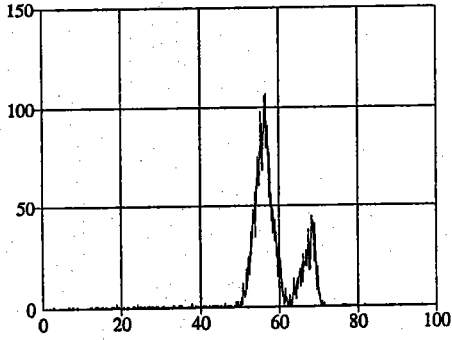
0299-E

ALF 11/4/05

AQ
11/4/05

POS CTIME SQPI CPM CPM1

7 300 1906.90 1313.20

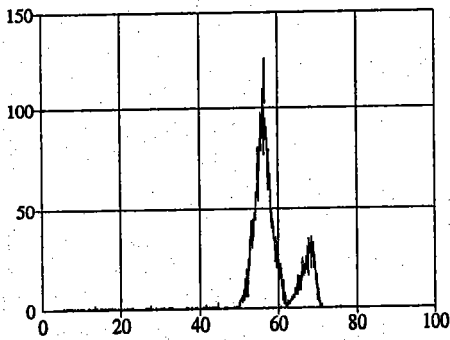


Counts Chem

Counts Alpha

0299-E

8 300 1835.40 1298.10



Counts Chem

Counts Alpha

0299-E

JKD
11/4/05

Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Albee	Prepared By:	Angela Albee
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	08/26/2004
Ampoule Mass (g):	5.0368 g	Expiration Date:	08/26/2005
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012

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

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

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Albee	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Albee	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Albee	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Albee	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Albee	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/06/2005	04/06/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

AIQ
11/4/05

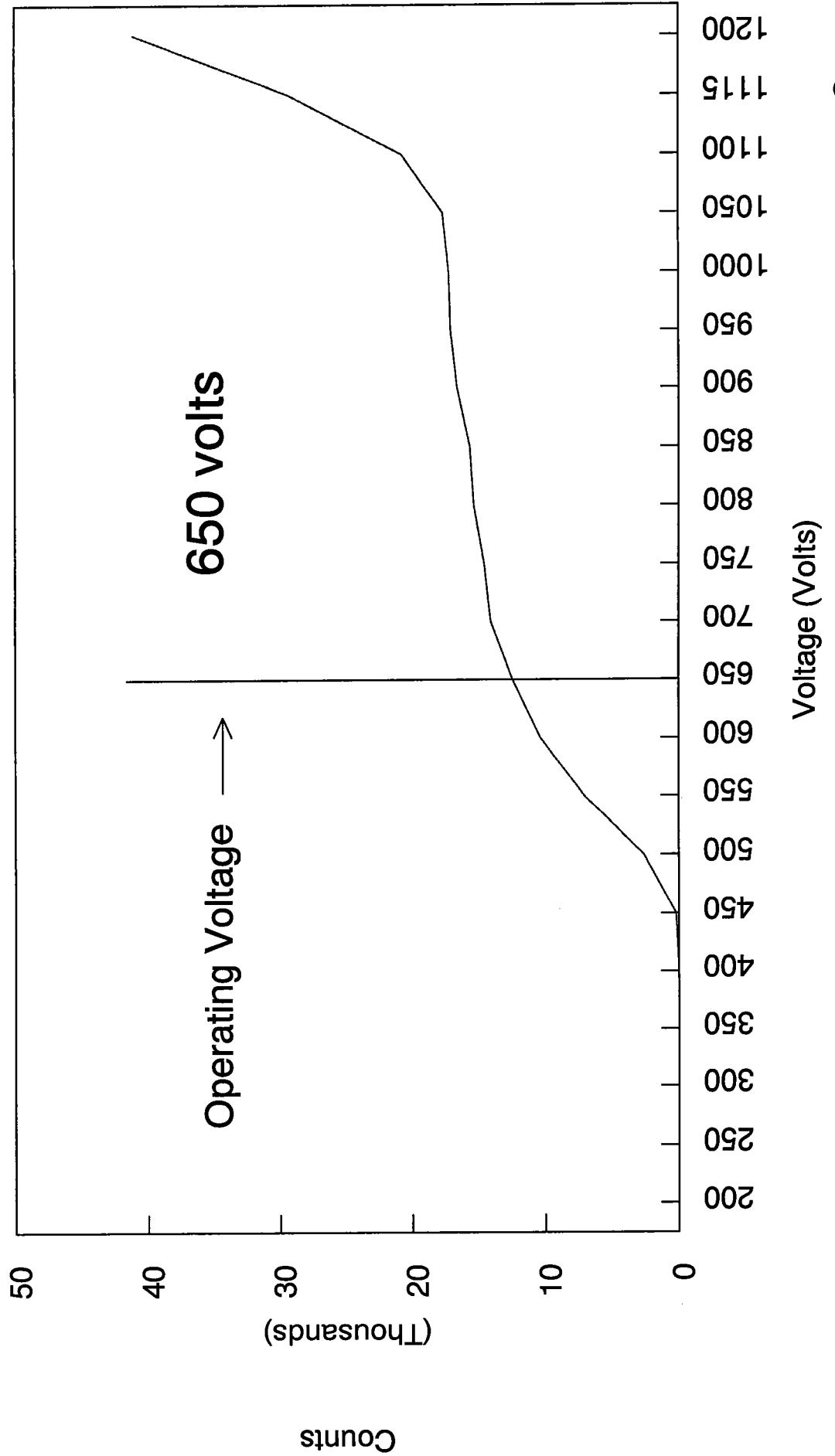
VOLTAGE CURVE DET 10-03

Voltage Curve Ludlum # 3				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	11/14/2005	14:00	3
0.25	0	11/14/2005	14:01	3
0.30	0	11/14/2005	14:02	3
0.35	0	11/14/2005	14:03	3
0.40	0	11/14/2005	14:04	3
0.45	5	11/14/2005	14:05	3
0.50	235	11/14/2005	14:06	3
0.55	329	11/14/2005	14:07	3
0.60	412	11/14/2005	14:08	3
0.65	452	11/14/2005	14:09	3
0.70	463	11/14/2005	14:10	3
0.75	448	11/14/2005	14:11	3
0.80	483	11/14/2005	14:12	3
0.85	511	11/14/2005	14:13	3
0.90	465	11/14/2005	14:14	3
0.95	491	11/14/2005	14:15	3
1.00	495	11/14/2005	14:16	3
1.05	506	11/14/2005	14:17	3
1.10	733	11/14/2005	14:18	3
1.15	1398	11/14/2005	14:19	3
1.20	2869	11/14/2005	14:20	3

Handwritten signature
11/23/05

Plateau November, 2005

Ludlum # 3



AD
11/23/05

Ra-226 WATER

Sample ID

Batch : LCSVER
 Date : 11/1/2005
 Analyst : JMB1

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

- 1
- 2
- 3
- 4
- 5
- 4
- 7
- 5
- 6
- 10
- 11

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME	DEGASSING DATE/TIME
1	0.500	30	694	301	1.762	0.267	0.5476	23.6277	1.7887	11/5/2005 13:14	11/1/2005 12:15
2	0.500	30	594	302	1.819	0.267	0.5181	19.0959	1.5671	11/5/2005 13:50	11/1/2005 12:15
3	0.500	30	911	303	2.062	0.200	0.4087	26.1845	1.7173	11/18/2005 13:00	11/14/2005 12:00
4	0.500	30	1120	304	1.881	0.233	0.3092	22.8964	1.3536	11/10/2005 7:30	11/1/2005 12:15
5	0.500	30	1017	305	1.759	0.267	0.3662	23.2385	1.4452	11/9/2005 10:45	11/1/2005 12:15
4	0.500	30	836	306	1.829	0.233	0.4975	27.4401	1.8836	11/18/2005 15:45	11/14/2005 12:00
7	0.500	30	987	307	1.902	0.267	0.3353	20.6474	1.3039	11/9/2005 10:25	11/1/2005 12:15
5	0.500	30	920	308	1.907	0.267	0.5062	29.0398	1.9012	11/18/2005 17:15	11/14/2005 12:00
6	0.500	30	885	309	1.895	0.267	0.5070	27.9649	1.8677	11/18/2005 17:46	11/14/2005 12:00
10	0.500	30	981	310	1.989	0.267	0.3079	18.8463	1.1939	11/10/2005 10:35	11/1/2005 12:15
11	0.500	30	965	311	1.861	0.233	0.3113	19.8446	1.2658	11/10/2005 9:55	11/1/2005 12:15

Angela L. Johnson
 11/23/05

Cell #	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
301	3	11/5/2005 13:14	LCS	0321-H	24.14	pCi/L	98%
302	3	11/5/2005 13:50	LCS	0321-H	24.14	pCi/L	79%
303	3	11/18/2005 13:00	LCS	0321-H	24.14	pCi/L	108%
304	3	11/10/2005 7:30	LCS	0321-H	24.14	pCi/L	95%
305	3	11/9/2005 10:45	LCS	0321-H	24.14	pCi/L	96%
306	3	11/18/2005 15:45	LCS	0321-H	24.14	pCi/L	114%
307	3	11/9/2005 10:25	LCS	0321-H	24.14	pCi/L	86%
308	3	11/18/2005 17:15	LCS	0321-H	24.14	pCi/L	120%
309	3	11/18/2005 17:46	LCS	0321-H	24.14	pCi/L	116%
310	3	11/10/2005 10:35	LCS	0321-H	24.14	pCi/L	78%
311	3	11/10/2005 9:55	LCS	0321-H	24.14	pCi/L	82%

DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
11/5/2005 9:50	93.58	3.40	0.5067	0.9747	1.0019	22.8663	0.4948
11/5/2005 11:45	95.50	2.08	0.5137	0.9844	1.0019	19.5330	0.5067
11/18/2005 10:45	94.75	2.25	0.5110	0.9832	1.0019	30.1667	0.5033
11/10/2005 4:30	208.25	3.00	0.7924	0.9776	1.0019	37.1003	0.7761
11/9/2005 7:40	187.42	3.08	0.7571	0.9770	1.0019	33.6330	0.7411
11/18/2005 11:10	95.17	4.58	0.5125	0.9660	1.0019	27.6337	0.4960
11/9/2005 8:25	188.17	2.00	0.7584	0.9850	1.0019	32.6330	0.7485
11/18/2005 11:45	95.75	5.50	0.5147	0.9598	1.0019	30.3997	0.4947
11/18/2005 12:20	96.33	5.43	0.5168	0.9598	1.0019	29.2330	0.4970
11/10/2005 7:25	211.17	3.17	0.7970	0.9764	1.0019	32.4330	0.7796
11/10/2005 6:50	210.58	3.08	0.7961	0.9770	1.0019	31.9337	0.7792

Angelica Johnson
11/23/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 2	500	11/1/05 12:15	11/5/05 9:50	11/5/05 13:14	301	3	8	694
VER 3	500	11/1/05 12:15	11/5/05 11:45	11/5/05 13:50	302	3	8	594
VER 4	500	11/1/05 12:15	11/9/05 7:00	11/9/05 10:00 11/9/05 10:00	303	3	4	990
VER 5	500	11/1/05 12:15	11/9/05 7:40	11/9/05 10:45	305	3	8	1017
VER 6	500	11/1/05 12:15	11/9/05 8:25	11/9/05 10:25	307	3	8	987
VER 7	500	11/1/05 12:15	11/9/05 9:00	11/9/05 12:00	308	3	5	705
VER 8	500	11/1/05 12:15	11/10/05 4:30	11/10/05 7:30	304	3	8	1120
VER 9	500	11/1/05 12:15	11/10/05 5:05	11/10/05 8:20	306	3	8	951
VER 10	500	11/1/05 12:15	11/10/05 5:40	11/10/05 9:00	309	3	8	888
VER 11	500	11/1/05 12:15	11/10/05 6:50	11/10/05 9:55	311	3	8	966
VER 12	500	11/1/05 12:15	11/10/05 7:25	11/10/05 10:35	310	3	8	981

AKD 11/23/05

AKD 11/23/05

Ra-226 Verification Sheet

50/2211
JAP

50/2211
JAP

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	11/14/05 1200	11/17/05 625	11/17/05 1030	302	3	8 = 0.267	954
VER 3	500	11/14/05 1200	11/18/05 1045	11/18/05 1300	303	3	8 = 0.267	911
VER 4	500	11/14/05 1200	11/18/05 1110	11/18/05 1545	306	3	8 = 0.267	834
VER 5	500	11/14/05 1200	11/18/05 1145	11/18/05 1715	308	3	8 = 0.267	920
VER 6	500	11/14/05 1200	11/18/05 1220	11/18/05 1746	309	3	8 = 0.267	885
/								

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number EL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 5/18/05 Cocktail Type Used NA
 Standard ID 0321-H Matrix of Vial/Planchett NA
 Amount Used (g or ml) 0.1 NA
 Standard Activity (DPM/g or ml) 269.6188 Type of Scintillation Vial NA
 Reference Date 9/9/91 Pipette ID Used 1429303
 Expiration Date 5/20/06 Balance ID Used 28488
 Residue/Carrier Agent 1M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER1				
2	VER2				
3	VER3				
4	VER4				
5	VER5				
6	VER6				
7	VER7				
8	VER8				
9	VER9				
10	VER10				
11	VER11				
12	VER12				

AQ 11/23/05

AQ 11/23/05

Prepared By: Angela J. Johnson Date 11/23/05
 Reviewed By: HTC RLL Date 11/24/05

Verification for Ra-226 Standard 0321-H

A. Fehr
5/20/2005

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
0321-H N1	1170.1000	34.2000	1135.9000	4.20643586	270.0385881
0321-H N2	1137.8000	34.2000	1103.6000	4.20643586	262.3598783
0321-H N3	1149.6000	34.2000	1115.4000	4.20643586	265.1651036
					Average = 265.8545233

Mean Value (Counting) = 265.8545233
Stdev = 3.885501322

99.1905663
0.01461514 Rule 3 (Pass/Fail)

Certificate Value = 268.0
Lower Limit = 258.0835207
Upper Limit = 273.625526
Rule 1 Pass/Fail Pass
Two sigma = 7.771002644
10 % of Mean = 26.58545233
Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0321-H by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 5/20/05 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 5/20/05
Angela A. Johnson 5/24/05

General Engineering Laboratories

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

Lucas Cell Calibration Package

401 - 412

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

Prepared By: Adh Bal Date: 11/4/05
 Reviewed By: Angela Johnson Date: 11/4/05
 Effective Date: 11/4/05

Ra-226 Cell Constants

Standard Reference date: 12/15/1999
standard ID: 0.299-E
Volume added (mL): 0.1
Standard Reference Activity (DPM/mL): 2434.34

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	activity dpm	t1 (days) end-to-flush to count	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count	
401	1.984	1	9/29/2005 8:40	9/29/2005 5:30	9/29/2005 12:30	0.033	5453	30	181.77	242.82	2.70833	0.13194	2115	0.9975
401	1.871	2	10/3/2005 10:45	10/3/2005 5:00	9/30/2005 11:15	0.267	5096	30	169.87	242.82	2.73958	0.23958	2119	0.9975
401	1.882	10	10/20/2005 9:55	10/20/2005 6:35	10/16/2005 14:30	0.267	6477	30	215.90	242.82	3.67014	0.13889	2136	0.9975
402	1.914	2	9/29/2005 10:05	9/29/2005 6:50	9/28/2005 12:30	0.133	5343	30	178.10	242.82	2.76389	0.13542	2115	0.9975
402	1.952	5	10/4/2005 8:25	10/4/2005 5:05	9/30/2005 11:15	0.267	6812	30	227.07	242.82	3.74306	0.13889	2120	0.9975
402	2.131	5	10/19/2005 12:50	10/19/2005 8:30	10/16/2005 14:30	0.267	5880	30	196.00	242.82	2.75000	0.18056	2136	0.9975
403	1.895	8	9/30/2005 8:20	9/30/2005 5:10	9/28/2005 12:30	0.167	6556	30	218.53	242.82	3.69444	0.13194	2116	0.9975
403	1.838	8	10/13/2005 10:40	10/13/2005 7:40	10/7/2005 12:40	0.267	8481	30	282.70	242.82	5.79167	0.12500	2129	0.9975
403	1.941	9	10/20/2005 8:55	10/20/2005 5:20	10/16/2005 14:30	0.133	6597	30	219.90	242.82	3.61806	0.14931	2136	0.9975
404	1.731	10	10/14/2005 8:35	10/14/2005 5:00	10/7/2005 12:40	0.200	8589	30	286.30	242.82	6.68056	0.14931	2130	0.9975
404	1.730	2	10/19/2005 8:55	10/19/2005 5:50	10/16/2005 14:30	0.033	4662	30	155.40	242.82	2.63889	0.12847	2135	0.9975
404	1.848	14	10/24/2005 8:35	10/24/2005 5:05	10/16/2005 14:30	0.267	9777	30	325.90	242.82	7.60764	0.14583	2140	0.9975
405	1.911	4	9/29/2005 11:15	9/29/2005 8:15	9/28/2005 12:30	0.267	5435	30	181.17	242.82	2.82292	0.12500	2115	0.9975
405	1.917	11	9/30/2005 10:55	9/30/2005 9:25	9/27/2005 11:00	0.200	5679	30	189.30	242.82	2.93403	0.06250	2116	0.9975
405	1.807	4	10/3/2005 13:15	10/3/2005 6:20	9/30/2005 11:15	0.267	4953	30	165.10	242.82	2.79514	0.28819	2120	0.9975
406	1.782	3	10/12/2005 9:20	10/12/2005 5:50	10/7/2005 12:40	0.200	7239	30	241.30	242.82	4.71528	0.14583	2128	0.9975
406	2.074	4	10/19/2005 12:05	10/19/2005 7:50	10/16/2005 14:30	0.267	5684	30	189.47	242.82	2.72222	0.17708	2136	0.9975
406	1.867	16	10/24/2005 10:10	10/24/2005 6:45	10/16/2005 14:30	0.267	9925	30	330.83	242.82	7.67708	0.14236	2140	0.9975
407	1.808	5	9/29/2005 11:55	9/29/2005 8:55	9/26/2005 12:30	0.200	5179	30	172.63	242.82	2.85069	0.12500	2115	0.9975
407	1.820	9	9/30/2005 9:50	9/30/2005 5:45	9/26/2005 12:30	0.267	6285	30	209.50	242.82	3.71875	0.17014	2116	0.9975
407	1.781	6	10/4/2005 9:00	10/4/2005 5:45	9/30/2005 11:15	0.067	6245	30	208.17	242.82	3.77083	0.13542	2120	0.9975
408	1.866	1	10/3/2005 7:10	10/3/2005 4:05	9/30/2005 11:15	0.033	5121	30	170.70	242.82	2.70139	0.12847	2119	0.9975
408	1.886	2	10/12/2005 8:30	10/12/2005 5:15	10/7/2005 12:40	0.200	7651	30	255.03	242.82	4.69097	0.13542	2128	0.9975
408	1.991	7	10/19/2005 13:50	10/19/2005 10:10	10/16/2005 14:30	0.267	5631	30	187.70	242.82	2.81944	0.15278	2136	0.9975
409	1.950	6	9/29/2005 12:40	9/29/2005 9:30	9/26/2005 12:30	0.267	5619	30	187.30	242.82	2.87500	0.13194	2116	0.9975
409	1.986	8	10/20/2005 7:50	10/20/2005 4:40	10/16/2005 14:30	0.200	6737	30	224.57	242.82	3.59028	0.13194	2136	0.9975
409	1.693	23	11/1/2005 7:25	11/1/2005 4:15	10/16/2005 14:30	0.267	11289	30	376.30	242.81	15.57292	0.13194	2148	0.9975
410	1.752	6	10/13/2005 9:25	10/13/2005 6:25	10/7/2005 12:40	0.267	8042	30	268.07	242.82	5.73958	0.12500	2129	0.9975
410	1.793	1	10/19/2005 8:00	10/19/2005 5:00	10/16/2005 14:30	0.267	4793	30	159.77	242.82	2.60417	0.12500	2135	0.9975
410	1.829	13	10/24/2005 7:50	10/24/2005 4:25	10/16/2005 14:30	0.267	9669	30	322.30	242.82	7.57986	0.14236	2140	0.9975
411	1.928	12	9/30/2005 11:25	9/30/2005 8:10	9/27/2005 11:00	0.133	5558	30	185.27	242.82	2.88194	0.13542	2116	0.9975
411	1.775	7	10/13/2005 10:05	10/13/2005 7:00	10/7/2005 12:40	0.033	8158	30	271.93	242.82	5.76389	0.12847	2129	0.9975
411	1.944	6	10/19/2005 13:20	10/19/2005 9:00	10/16/2005 14:30	0.267	5396	30	179.87	242.82	2.77083	0.18056	2136	0.9975
412	1.856	10	9/30/2005 10:25	9/30/2005 6:50	9/26/2005 12:30	0.033	6483	30	216.10	242.82	3.76389	0.14931	2116	0.9975
412	1.921	3	10/19/2005 9:55	10/19/2005 6:50	10/16/2005 14:30	0.067	5241	30	174.70	242.82	2.68056	0.12847	2135	0.9975
412	1.704	15	10/24/2005 9:30	10/24/2005 5:45	10/16/2005 14:30	0.267	9016	30	300.53	242.82	7.63542	0.15625	2140	0.9975

Adl Bird 11/4/05
Margaret Johnson 11/4/05

CAL

Ra-226 Verification Sheet

Adl Back 11/4/05

Adl 11/4/05

Adl 11/4/05

Adl 11/4/05

Adl 11/4/05

Adl 11/4/05

Adl 11/4/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL1	500	9/26/05 1230	9/29/05 530	9/29/05 840	401	4	1	5453
CAL2	500	9/26/05 1230	9/29/05 650	9/29/05 1005	402	4	4	5343
CAL3	500	9/26/05 1230	9/29/05 730	9/29/05 1040	404	4	8	---
CAL4	500	9/26/05 1230	9/29/05 815	9/29/05 1115	405	4	8	5435
CAL5	500	9/26/05 1230	9/29/05 855	9/29/05 1155	407	4	6	5179
CAL6	500	9/26/05 1230	9/29/05 930	9/29/05 1240	409	4	8	5619
CAL7	500	9/26/05 1230	9/30/05 435	9/30/05 740	401	4	8	5503
CAL8	500	9/26/05 1230	9/30/05 510	9/30/05 820	403	4	5	6556
CAL9	500	9/26/05 1230	9/30/05 545	9/30/05 950	407	4	8	6285
CAL10	500	9/26/05 1230	9/30/05 650	9/30/05 1025	412	4	1	6483
CAL11	500	9/27/05 1100	9/30/05 725	9/30/05 1055	405	4	6	5679
CAL12	500	9/27/05 1100	9/30/05 810	9/30/05 1125	411	4	4	5558
CAL1	500	9/30/05 1115	10/31/05 405	10/31/05 710	408	4	1	5121
CAL2	500	9/30/05 1115	10/31/05 500	10/31/05 1045	401	4	8	5096
CAL3	500	9/30/05 1115	10/31/05 540	10/31/05 1240	409	4	8	5244
CAL4	500	9/30/05 1115	10/31/05 620	10/31/05 1315	405	4	8	4953
CAL5	500	9/30/05 1115	10/14/05 505	10/14/05 825	402	4	8	6812
CAL6	500	9/30/05 1115	10/14/05 545	10/14/05 900	407	4	2	6245
CAL7	500	9/30/05 1115	10/15/05 800	10/15/05 1340	401	4	8	6812
CAL8	500	9/30/05 1115	10/16/05 875	10/16/05 1225	403	4	6	3217

Ra-226 Verification Sheet

Adc BCL 11/14/05

APR 11/14/05

APR 11/14/05

APR 11/14/05

APR 11/14/05

APR 11/14/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	1017105 1240	1017105 435	1017105 745	405	4	8	7984
CAL 2	500	1017105 1240	1017105 515	1017105 830	408	4	6	7651
CAL 3	500	1017105 1240	1017105 550	1017105 920	406	4	6	7239
CAL 4	500	1017105 1240	1017105 680	1017105 955	407	4	8	---
CAL 5	500	1017105 1240	1017105 730	1017105 1030	409	4	1	6608
CAL 6	500	1017105 1240	1017105 625	1017105 925	416	4	8	8042
CAL 7	500	1017105 1240	1017105 700	1017105 1005	411	4	1	8158
CAL 8	500	1017105 1240	1017105 740	1017105 1040	403	4	8	8481
CAL 9	500	1017105 1240	1017105 425	1017105 800	407	4	1	8694
CAL 10	500	1017105 1240	1017105 500	1017105 835	404	4	6	8589
CAL 11	500	1017105 1430	1017105 500	1017105 800	416	4	18	4773
CAL 12	500	1017105 1430	1017105 550	1017105 855	404	4	1	4662
CAL 13	500	1017105 1430	1017105 650	1017105 955	412	4	2	5241
CAL 14	500	1017105 1430	1017105 750	1017105 1205	406	4	8	5684
CAL 15	500	1017105 1430	1017105 830	1017105 1250	402	4	8	5880
CAL 16	500	1017105 1430	1017105 900	1017105 1320	411	4	8	5396
CAL 17	500	1017105 1430	1017105 1010	1017105 1350	408	4	8	5631
CAL 18	500	1017105 1430	1017105 440	1017105 750	409	4	6	6737
CAL 19	500	1017105 1430	1017105 520	1017105 855	403	4	4	4597
CAL 10	500	1017105 1430	1017105 635	1017105 955	401	4	8	6477

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 9	500	9/20/05 1415	10/15/05 935		409	4		
CAL 13	500	10/16/05 1430	10/24/05 425	10/24/05 730	410	4	8	9669
CAL 14	500	10/16/05 1430	10/24/05 505	10/24/05 835	404	4	8	9777
CAL 15	500	10/16/05 1430	10/24/05 545	10/24/05 930	412	4	8	9016
CAL 16	500	10/16/05 1430	10/24/05 645	10/24/05 1010	406	4	8	9925
CAL 23	500	10/16/05 1430	11/1/05 415	11/1/05 725	409	4	8	11289

AB1 11/4/05

AB1
11/4/05

Ad Bil = 11/4/05

AB1 11/4/05

**General Engineering Laboratories
Verification Source Preparation Sheet**

401-412

Applicable SOP Number GL-RAD-A-028 Isotope Po-226

Date Standards Prepared 8/26/03 Cocktail Type Used _____

Standard ID 0299-E Matrix of Vial/Planchett _____

Amount Used (g or ml) 0.1 ml _____

Standard Activity (DPM/g or ml) 2434.34 Type of Scintillation Vial _____

Reference Date 12/15/99 Pipette ID Used 1429303

Expiration Date 11/4/06 Balance ID Used 28488

Residue/Carrier Agent 0.5M HCl Quenching Agent _____

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

AB1
11/4/05

Prepared By: Ad Bail Date: 11/4/05

Reviewed By: Angela A. Johnson Date: 11/4/05

Rev 1 RLM 9/10/97

**General Engineering Laboratories
Verification Source Preparation Sheet**

401 - 412

Applicable SOP Number (G) - RAD - A - 028

Isotope Po-226

Date Standards Prepared 8/26/03

Cocktail Type Used ---

Standard ID 0299-E

Matrix of Vial/Planchett ---

Amount Used (g or ml) 0.1 ml

Standard Activity (DPM/g or mL) 2434.34

Type of Scintillation Vial ---

Reference Date 12/15/99

Pipette ID Used 1429303

Expiration Date 11/4/06

Balance ID Used 28488

Residue/Carrier Agent 0.5 m Hcl

Quenching Agent ---

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24	Abi 11/4/05			

Prepared By: Ad Bil Date 11/4/05

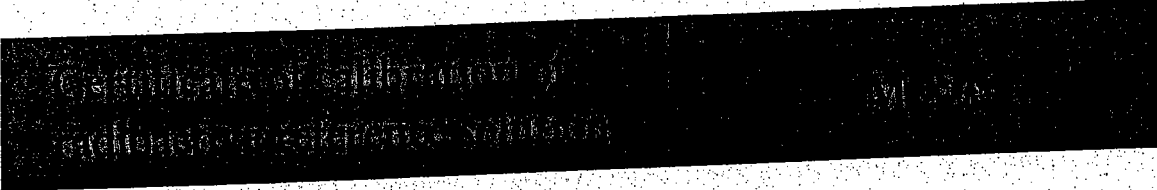
Reviewed By: Angela Johnson Date 11/4/05

Rev 1 RLM 9/10/97

8-21-00

Nycomed Amersham plc
Amersham Laboratories

02.9



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

ISSUED
FOR:

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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

ved
ory

Page 617 of 924

Date of
issue

17th December 1999

Nycomed
Amersham

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Reference time for solution number R4/131/89:

1200 GMT on 15 December 1999

Radioactive concentration of radium-226;

43.75 kilobecquerels per gram of solution

which is equivalent to:

1.183 microcuries per gram of solution

Mass of solution:

5.0368 grams

Total activity of radium-226:

220.4 kilobecquerels

which is equivalent to:

5.956 microcuries

Recommended half life:

1600 years

Method of measurement:

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

Calibration date: 15 December 1999

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

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

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

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

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

Carrier free in 0.5M HCl.

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

1 year = 365.25 days

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

Verification for Ra-226 Standard 0299-E

11/4/2005
A. Fehr

Standard mL used	Source DPM/G
0.2000	2461.082289
0.2000	2411.298509
0.2000	2383.559208
0.2000	2418.646669

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff
0299-F N1	1340.3000	0.6000	1339.7000	2.72177002
0299-F N2	1313.2000	0.6000	1312.6000	2.72177002
0299-F N3	1298.1000	0.6000	1297.5000	2.72177002

Mean Value (Counting) = 2418.646669
Stdev = 39.28044852

Certificate Value = 2428.1 dpm/mL
Lower Limit = 2340.085772 dpm/mL
Upper Limit = 2497.207566 dpm/mL
Rule 1 Pass/Fail Pass
Two sigma = 78.56089703 dpm/mL
10 % of Mean = 241.8646669 dpm/mL
Rule 2 (Pass/Fail) Pass

99.6090287 % of known
0.01624067

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0299-E by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 8 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 11/4/05 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

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

where:

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

RAD SOP M-001

*Amanda J. Fehr 11/4/05
Angela J. Johnson 11/4/05*

PROTOCOL : 8 Ra-226 ver
DATE : 2005/11/04
TIME : 11:47
ID : P08AS001

Ra226

Wallac 1414 WinSpectral v1.40 S/N 4140127

Counting mode : CPM
Isotope(s) : Ra226
Ra226 = 400- 900,Alpha,1602.12 y
Protocol name : Ra-226 ver
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Advanced modes : Halflife,PSA,Chemilum
Halflife zerotime : Start of assay
PSA level : low
Output to Display :
 POS,DATE,CTIME,RACK,RACKPOS,ETIME,SQPE,CPM1,CPM
Additions to Display : Spectrum,Header,Listing
Header : Ra226
Spectrum : Rnd.Cos,Alpha
Window 1 : 1-1024 /Alpha
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

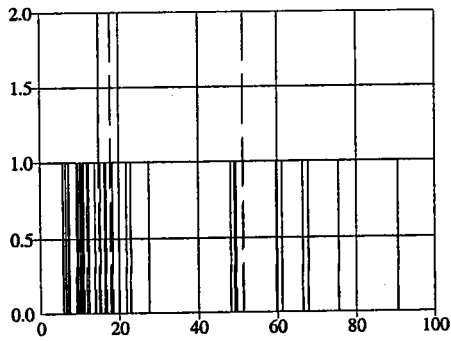
Total count rate:
 Ra226 10537.9 CPM

Amanda L. Leh
 11/4/05

AQ
 11/4/05

POS CTIME SQPI CPM CPM1

1 300 23.50 1.90

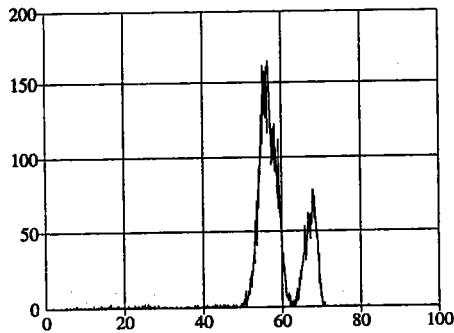


Counts Chem

Counts Alpha

Bkg

2 300 4697.50 2217.70

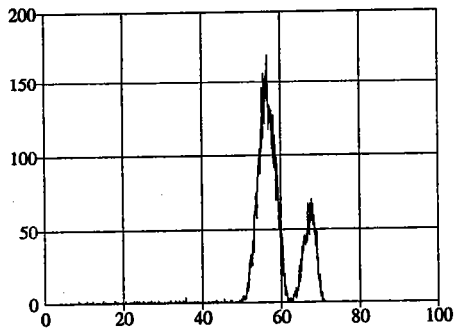


Counts Chem

Counts Alpha

0321-A

3 300 4542.00 2191.80



Counts Chem

Counts Alpha

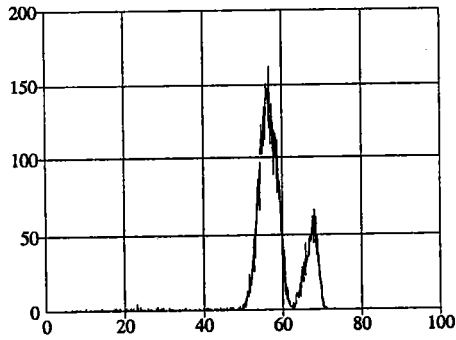
0321-A

ALF 11/4/05

HQ
11/4/05

POS CTIME SQPI CPM CPM1

4 300 4376.00 2174.30

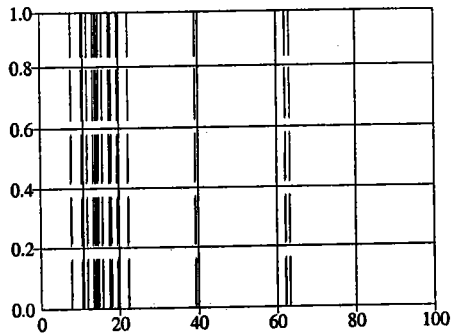


Counts Chem

Counts Alpha

0321-A

5 300 19.50 0.60

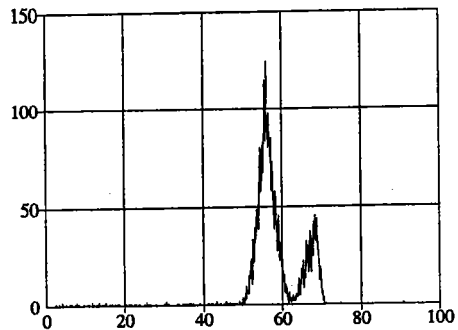


Counts Chem

Counts Alpha

Blkg

6 300 1930.20 1340.30



Counts Chem

Counts Alpha

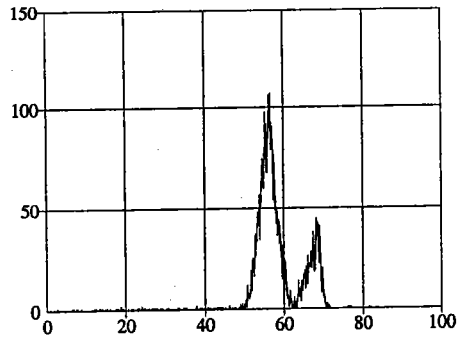
0299-E

ALF 11/4/05

AQ
11/4/05

POS CTIME SQPI CPM CPM1

7 300 1906.90 1313.20

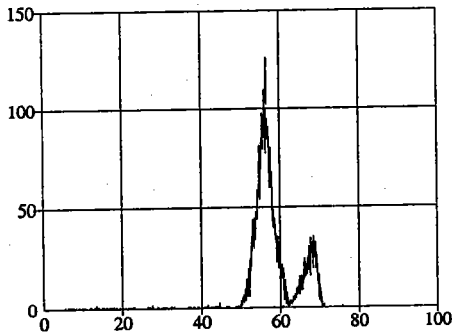


Counts Chem

Counts Alpha

0299-E

8 300 1835.40 1298.10



Counts Chem

Counts Alpha

0299-E

ADQ
11/4/05



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Albee	Prepared By:	Angela Albee
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	08/26/2004
Ampoule Mass (g):	5.0368 g	Expiration Date:	08/26/2005
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012

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

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

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Albee	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Albee	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Albee	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Albee	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Albee	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/06/2005	04/06/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Handwritten signature: AJD
11/4/05

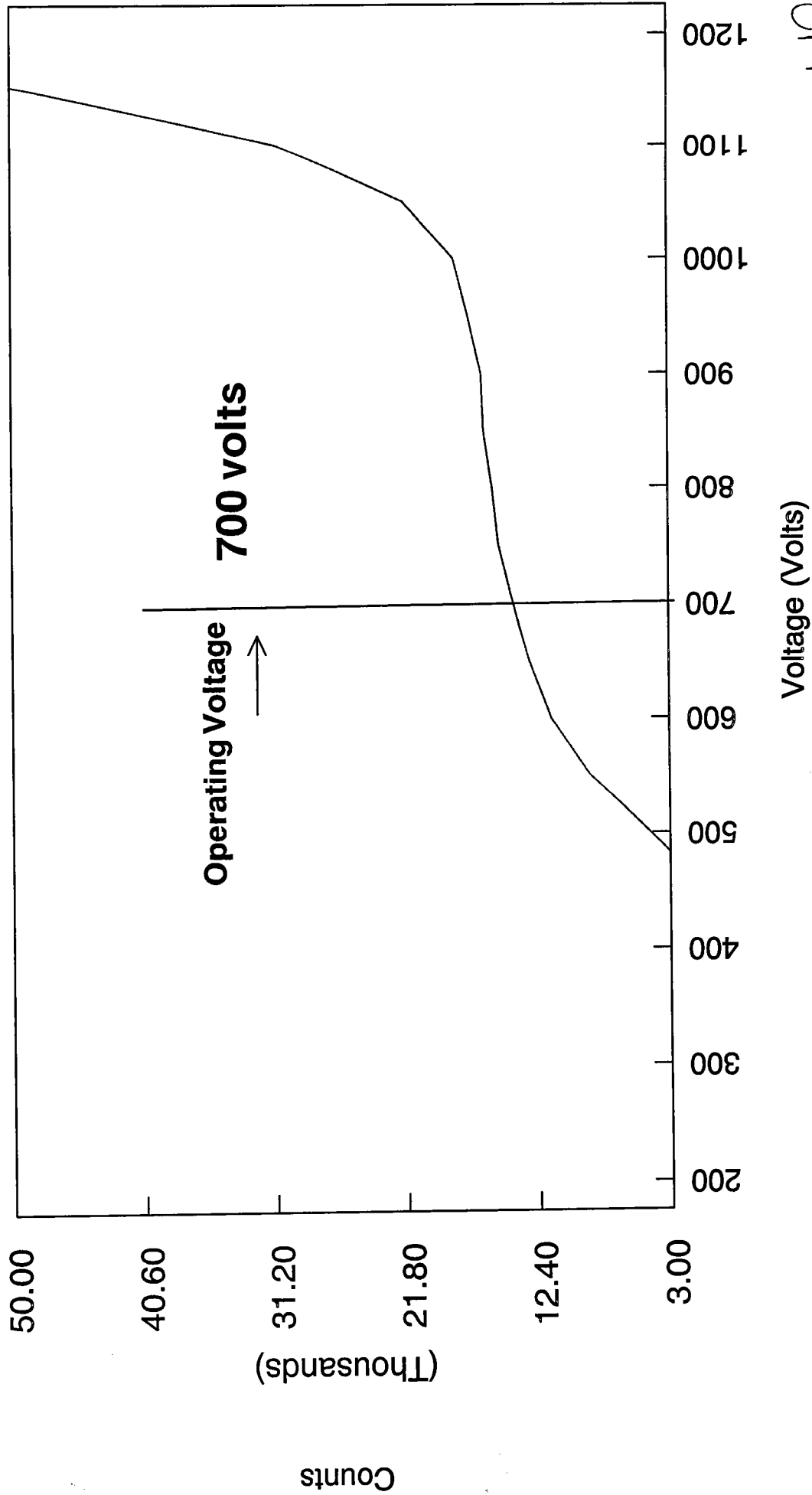
VoltageCurve

Voltage Curve Ludlum # 4				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	9/28/2005	5:00	4
0.25	0	9/28/2005	5:00	4
0.30	0	9/28/2005	5:00	4
0.35	0	9/28/2005	5:00	4
0.40	0	9/28/2005	5:00	4
0.45	412	9/28/2005	5:00	4
0.50	4405	9/28/2005	5:00	4
0.55	8652	9/28/2005	5:00	4
0.60	11406	9/28/2005	5:00	4
0.65	12952	9/28/2005	5:00	4
0.70	14079	9/28/2005	5:00	4
0.75	15092	9/28/2005	5:00	4
0.80	15535	9/28/2005	5:00	4
0.85	16113	9/28/2005	5:00	4
0.90	16272	9/28/2005	5:00	4
0.95	17183	9/28/2005	5:00	4
1.00	18234	9/28/2005	5:00	4
1.05	21861	9/28/2005	5:00	4
1.10	30890	9/28/2005	5:00	4
1.15	48646	9/28/2005	5:00	4
1.20	70725	9/28/2005	5:00	4

Handwritten: AQ
11/4/05

Plateau September, 2005

Ludlum # 4



ADD
w/4/05

Ra-226 WATER

Batch : LCSVER
 Date : 11/4/2005
 Analyst : JMB

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
1	0.500	30	840	401	1.91	0.267	0.3963	20.7520	1.4236	10/31/2005 9:30
2	0.500	30	1132	402	2.00	0.267	0.3774	26.6781	1.5707	10/31/2005 10:10
3	0.500	30	881	403	1.89	0.267	0.3975	21.8387	1.4619	10/31/2005 10:40
4	0.500	30	893	404	1.77	0.267	0.4238	23.6048	1.5692	10/31/2005 11:10
5	0.500	30	888	405	1.88	0.267	0.3989	22.0913	1.4728	10/31/2005 11:45
6	0.500	30	834	406	1.91	0.267	0.3926	20.4075	1.4051	10/31/2005 12:30
7	0.500	30	826	407	1.80	0.267	0.4162	21.4235	1.4824	10/31/2005 14:15
8	0.500	30	1050	408	1.91	0.267	0.3614	23.6991	1.4500	11/1/2005 8:05
9	0.500	30	603	409	1.88	0.267	0.6681	25.0149	2.0368	11/4/2005 9:05
10	0.500	30	879	410	1.79	0.267	0.4245	23.2686	1.5594	10/31/2005 8:50
11	0.500	30	1087	411	1.88	0.267	0.3696	25.0943	1.5084	11/1/2005 9:45
12	0.500	30	976	412	1.83	0.267	0.3783	23.0455	1.4637	11/1/2005 10:20

Ach Bail 11/4/05
Angela Johnson 11/4/05

Adh Beite 11/4/05

*Angela S. Johnson
11/4/05*

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
401		4	10/31/2005 9:30	LCS	0321-H	24.14	pCi/L	86%
402		4	10/31/2005 10:10	LCS	0321-H	24.14	pCi/L	111%
403		4	10/31/2005 10:40	LCS	0321-H	24.14	pCi/L	90%
404		4	10/31/2005 11:10	LCS	0321-H	24.14	pCi/L	98%
405		4	10/31/2005 11:45	LCS	0321-H	24.14	pCi/L	92%
406		4	10/31/2005 12:30	LCS	0321-H	24.14	pCi/L	85%
407		4	10/31/2005 14:15	LCS	0321-H	24.14	pCi/L	89%
408		4	11/1/2005 8:05	LCS	0321-H	24.14	pCi/L	98%
409		4	11/4/2005 9:05	LCS	0321-H	24.14	pCi/L	104%
410		4	10/31/2005 8:50	LCS	0321-H	24.14	pCi/L	96%
411		4	11/1/2005 9:45	LCS	0321-H	24.14	pCi/L	104%
412		4	11/1/2005 10:20	LCS	0321-H	24.14	pCi/L	95%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
10/25/2005 11:25	10/31/2005 5:30	138.08	4.00	0.6474	0.9703	1.0019	27.7333	0.6294
10/25/2005 11:25	10/31/2005 6:25	139.00	3.75	0.6499	0.9721	1.0019	37.4663	0.6329
10/25/2005 11:25	10/31/2005 7:00	139.58	3.67	0.6514	0.9727	1.0019	29.1000	0.6348
10/25/2005 11:25	10/31/2005 7:30	140.08	3.67	0.6527	0.9727	1.0019	29.5000	0.6361
10/25/2005 11:25	10/31/2005 8:00	140.58	3.75	0.6540	0.9721	1.0019	29.3333	0.6370
10/25/2005 11:25	10/31/2005 8:30	141.08	4.00	0.6553	0.9703	1.0019	27.5333	0.6370
10/25/2005 11:25	10/31/2005 9:30	142.08	4.75	0.6579	0.9648	1.0019	27.2667	0.6359
10/25/2005 11:25	11/1/2005 5:00	161.58	3.08	0.7048	0.9770	1.0019	34.7333	0.6898
11/1/2005 12:15	11/4/2005 5:40	65.42	3.42	0.3898	0.9745	1.0019	19.8333	0.3805
10/25/2005 11:25	10/31/2005 4:50	137.42	4.00	0.6457	0.9703	1.0019	29.0333	0.6276
10/25/2005 11:25	11/1/2005 5:40	162.25	4.08	0.7062	0.9696	1.0019	35.9667	0.6861
10/25/2005 11:25	11/1/2005 6:40	163.25	3.67	0.7084	0.9727	1.0019	32.2667	0.6904

CALIBRATION STANDARD DETECTOR # 4

CELL #	END DEGAS TIME	END DE-EM TIME	COUNT TIME	DET #	BKG COUNTS	TOTAL COUNTS	SAMPLE #
401	10/25/05 1125	10/31/05 530	10/31/05 930	4	8	840	VER 1
402	10/25/05 1125	10/31/05 625	10/31/05 1010	4	8	1132	VER 2
403	10/25/05 1125	10/31/05 700	10/31/05 1040	4	8	881	VER 3
404	10/25/05 1125	10/31/05 730	10/31/05 1110	4	8	893	VER 4
405	10/25/05 1125	10/31/05 800	10/31/05 1145	4	4	888	VER 5
406	10/25/05 1125	10/31/05 830	10/31/05 1230	4	8	834	VER 6
407	10/25/05 1125	10/31/05 930	10/31/05 1415	4	8	826	VER 7
408	10/25/05 1125	11/1/05 500	11/1/05 805	4	8	1050	VER 8
409	11/1/05 1215	11/4/05 540	11/4/05 905	4	0	603	VER 9
410	10/25/05 1125	10/31/05 450	10/31/05 850 10/31/05 850	4	8	879	VER 10
411	10/25/05 1125	11/1/05 540	11/1/05 945	4	8	1087	VER 11
412	10/25/05 1125	11/1/05 640	11/1/05 1020	4	8	976	VER 12

10/31/05

Ad. Belt 11/4/05

Angela A. Johnson
11/4/05

General Engineering Laboratories Verification Source Preparation Sheet

401-412

Applicable SOP Number GL-RAD-A-028 Isotope Ra-226

Date Standards Prepared 5/18/05 Cocktail Type Used _____

Standard ID 0321-14 Matrix of Vial/Planchett _____

Amount Used (g or ml) 0.1 ml _____

Standard Activity (DPM/g or ml) 269.6188 Type of Scintillation Vial _____

Reference Date 9/9/91 Pipette ID Used 1429303

Expiration Date 5/20/06 Balance ID Used 28488

Residue/Carrier Agent 1 m HCl Quenching Agent _____

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER 1				
2	VER 2				
3	VER 3				
4	VER 4				
5	VER 5				
6	VER 6				
7	VER 7			Abi	
8	VER 8			11/4/05	
9	VER 9				
10	VER 10				
11	VER 11				
12	VER 12				
Abi 11/4/05					

Prepared By: Ad Bil Date: 11/4/05

Reviewed By: Angela Johnson Date: 11/4/05

Rev 1 RLM 9/10/97

Verification for Ra-226 Standard 0321-H

A. Fehr
5/20/2005

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
0321-H N1	1170.1000	34.2000	1135.9000	4.20643586	1.0000 270.0385881
0321-H N2	1137.8000	34.2000	1103.6000	4.20643586	1.0000 262.3598783
0321-H N3	1149.6000	34.2000	1115.4000	4.20643586	1.0000 265.1651036
					Average = 265.8545233

Mean Value (Counting) = 265.8545233
Stdev = 3.885501322

99.1905663
0.01461514 Rule 3 (Pass/Fail)

Pass

Certificate Value = 268.0
Lower Limit = 258.0835207
Upper Limit = 273.625526
Rule 1 Pass/Fail Pass
Two sigma = 7.771002644
10 % of Mean = 26.58545233
Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0321-H by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 5/20/05 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 5/20/05
Angela A. Johnson 5/24/05

General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

Lucas Cell Calibration Package

501-512

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

Prepared By: Ad Bail

Date: 12/9/05

Reviewed By: Angela Johnson

Date: 12/8/05

Effective Date: 12/9/05

Ra-226 Cell Constants

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

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
501	1.919	Average	11/14/2005 7:20	11/14/2005 4:20	11/19/2005 15:30	0.267	7643	30	254.77	243.03	4.53472	0.12500	2161	0.9974
501	1.814	Stdev	11/15/2005 9:20	11/15/2005 5:00	11/19/2005 15:30	0.267	8103	30	270.10	243.03	5.56250	0.18056	2162	0.9974
501	1.933		11/10/2005 7:30	11/10/2005 4:30	11/14/2005 14:20	0.233	8747	30	291.57	243.03	5.59028	0.12500	2157	0.9974
502	2.003	Average	11/18/2005 7:40	11/18/2005 4:40	11/15/2005 12:40	0.200	5456	30	181.87	243.03	2.66667	0.12500	2165	0.9974
502	1.878	Stdev	11/14/2005 8:15	11/14/2005 5:10	11/19/2005 15:30	0.267	7511	30	250.37	243.03	4.56944	0.12847	2161	0.9974
502	1.830		11/9/2005 8:50	11/9/2005 5:40	11/14/2005 14:20	0.133	7380	30	246.00	243.03	4.63889	0.13194	2156	0.9974
503	2.039	Average	11/18/2005 10:20	11/18/2005 5:15	11/15/2005 12:40	0.267	5507	30	183.57	243.03	2.89097	0.21181	2165	0.9974
503	1.891	Stdev	11/14/2005 9:00	11/14/2005 5:40	11/19/2005 15:30	0.267	7571	30	252.37	243.03	4.59028	0.13889	2161	0.9974
503	1.896		11/9/2005 10:00	11/9/2005 7:00	11/14/2005 14:20	0.200	7717	30	257.23	243.03	4.69444	0.12500	2156	0.9974
504	1.774	Average	11/18/2005 12:40	11/18/2005 5:50	11/15/2005 12:40	0.033	4757	30	158.57	243.03	2.71528	0.28472	2166	0.9974
504	1.742	Stdev	11/15/2005 7:20	11/15/2005 4:20	11/19/2005 15:30	0.267	7838	30	261.27	243.03	5.53472	0.12500	2162	0.9974
504	1.692		11/10/2005 8:20	11/10/2005 5:05	11/14/2005 14:20	0.133	7658	30	255.27	243.03	5.61458	0.13542	2157	0.9974
505	2.126	Average	11/18/2005 11:25	11/18/2005 7:00	11/15/2005 12:40	0.200	5826	30	194.20	243.03	2.76389	0.18403	2165	0.9974
505	2.090	Stdev	11/19/2005 10:45	11/19/2005 7:40	11/14/2005 14:20	0.267	8534	30	284.47	243.03	4.72222	0.12847	2156	0.9974
505	2.186		12/1/2005 9:50	12/1/2005 5:20	11/28/2005 15:15	0.267	5750	30	191.67	243.03	2.58681	0.18750	2178	0.9974
506	2.134	Average	11/18/2005 12:00	11/18/2005 7:45	11/15/2005 12:40	0.267	5973	30	199.10	243.03	2.79514	0.17708	2166	0.9974
506	2.038	Stdev	12/1/2005 11:10	12/1/2005 6:05	11/28/2005 15:15	0.267	5389	30	179.63	243.03	2.61806	0.21181	2178	0.9974
506	1.990		12/2/2005 12:20	12/2/2005 7:30	11/28/2005 15:15	0.267	6786	30	226.20	243.03	3.67708	0.20139	2180	0.9974
508	2.090	Average	11/18/2005 12:45	11/18/2005 8:20	11/15/2005 12:40	0.067	5874	30	195.80	243.03	2.81944	0.18403	2166	0.9974
508	1.847	Stdev	11/14/2005 10:35	11/14/2005 7:15	11/19/2005 15:30	0.267	7462	30	248.73	243.03	4.65625	0.13889	2161	0.9974
508	1.890		11/9/2005 10:25	11/9/2005 8:25	11/14/2005 14:20	0.200	7813	30	260.43	243.03	4.75347	0.08333	2156	0.9974
509	2.082	Average	11/18/2005 13:20	11/18/2005 9:20	11/15/2005 12:40	0.267	5942	30	198.07	243.03	2.86111	0.16667	2166	0.9974
509	1.906	Stdev	11/14/2005 11:10	11/14/2005 7:50	11/19/2005 15:30	0.267	7726	30	257.53	243.03	4.68056	0.13889	2161	0.9974
509	1.973		11/10/2005 9:00	11/10/2005 5:40	11/14/2005 14:20	0.267	8953	30	298.43	243.03	5.63889	0.13889	2157	0.9974
510	2.063	Average	11/18/2005 13:50	11/18/2005 10:05	11/15/2005 12:40	0.033	5942	30	198.07	243.03	2.89236	0.15625	2166	0.9974
510	2.009	Stdev	11/14/2005 11:40	11/14/2005 8:30	11/19/2005 15:30	0.267	8185	30	272.83	243.03	4.70833	0.13194	2161	0.9974
510	2.027		11/9/2005 12:00	11/9/2005 9:00	11/14/2005 14:20	0.167	8342	30	278.07	243.03	4.77778	0.12500	2157	0.9974
511	2.033	Average	12/1/2005 12:05	12/1/2005 6:45	11/28/2005 15:15	0.267	5409	30	180.30	243.03	2.64583	0.22222	2179	0.9974
511	2.112	Stdev	11/14/2005 12:10	11/14/2005 9:10	11/19/2005 15:30	0.267	8645	30	288.17	243.03	4.79611	0.12500	2162	0.9974
511	1.837		11/9/2005 15:00	11/9/2005 9:55	11/14/2005 14:20	0.133	7480	30	249.33	243.03	4.81597	0.21181	2157	0.9974
512	1.934	Average	12/1/2005 7:30	12/1/2005 12:40	11/28/2005 15:15	0.267	5966	30	198.87	243.03	2.89236	-0.21528	2178	0.9974
512	2.119	Stdev	11/14/2005 13:20	11/14/2005 10:00	11/19/2005 15:30	0.267	8693	30	289.77	243.03	4.77083	0.13889	2162	0.9974
512	1.809		11/10/2005 9:55	11/10/2005 6:50	11/14/2005 14:20	0.067	8259	30	275.30	243.03	5.68750	0.12847	2157	0.9974

Adi Bat 12/9/05
Onofelia Johnson 12/18/05

CAL 5 AB1 12/8/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 12	500	11/4/05 1420	11/9/05 540	11/9/05 850	502	5	4	7380
CAL 13	500	11/4/05 1420	11/9/05 700	11/9/05 1000	503	5	6	7717
CAL 17	500	11/4/05 1420	11/9/05 740	11/9/05 1045	505	5	8	8534
CAL 18	500	11/4/05 1420	11/9/05 825	11/9/05 1025	508	5	6	7813
CAL 19	500	11/4/05 1420	11/9/05 900	11/9/05 1200	510	5	5	8342
CAL 20	500	11/4/05 1420	11/9/05 955	11/9/05 1500	511	5	4	7480
CAL 21	500	11/4/05 1420	11/10/05 430	11/10/05 730	501	5	7	8747
CAL 22	500	11/4/05 1420	11/10/05 505	11/10/05 820	504	5	4	7658
CAL 23	500	11/4/05 1420	11/10/05 540	11/10/05 900	509	5	8	8953
CAL 24	500	11/4/05 1420	11/10/05 650	11/10/05 955	512	5	2	8259
[The rest of the table is crossed out with a diagonal line.]								

AB1 12/9/05

JAG
12/18/05

JAG 12/28/05

CALS 5 *ADQ*
12/18/05

Ra-226 Verification Sheet

ADQ
12/19/05

ADQ
12/19/05

ADQ
12/19/05

ADQ
12/18/05

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	11/9/05 1530	11/14/05 420	11/14/05 720	501	5	8	7643
CAL 2	500	11/9/05 1530	11/14/05 510	11/14/05 815	502	5	8	7511
CAL 3	500	11/9/05 1530	11/14/05 540	11/14/05 900	503	5	8	7571
CAL 4		11/9/05 1530	11/14/05					
CAL 5	500	11/9/05 1530	11/14/05 715	11/14/05 1035	508	5	8	7462
CAL 6	500	11/9/05 1530	11/14/05 750	11/14/05 1110	509	5	8	7726
CAL 7	500	11/9/05 1530	11/14/05 830	11/14/05 1140	510	5	8	8185
CAL 9	500	11/9/05 1530	11/14/05 910	11/14/05 1210	511	5	8	8645
CAL 8	500	11/9/05 1530	11/14/05 1000	11/14/05 1320	512	5	8	8693
CAL 11	500	11/9/05 1530	11/15/05 420	11/15/05 720	504	5	8	7828
CAL 13	500	11/9/05 1530	11/15/05 500	11/14/05 920	501	5	8	8103
/								

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 2	500	11/15/05 1240	11/18/05 440	11/18/05 740	502	5	6	5456
CAL 3	500	11/15/05 1240	11/18/05 515	11/18/05 1020	503	5	8	5507
CAL 4	500	11/15/05 1240	11/18/05 550	11/18/05 1055	504	5	1	4757
CAL 5	500	11/15/05 1240	11/18/05 700	11/18/05 1125	505	5	6	5826
CAL 6	500	11/15/05 1240	11/18/05 745	11/18/05 1200	506	5	8	5973
CAL 7	500	11/15/05 1240	11/18/05 820	11/18/05 1245	508	5	2	5874
CAL 8	500	11/15/05 1240	11/18/05 920	11/16/05 1320	509	5	8	5942
CAL 9	500	11/15/05 1240	11/18/05 1005	11/18/05 1350	510	5	1	5942
CAL 10		11/15/05 1240	11/18/05 1045	11/18/05 1420	511	5	6	5911
CAL 11		11/15/05 1240	11/18/05 1110	11/18/05 1545	512	5	8	4618

4926
12/18/05

4926
12/18/05

AB1 12/18/05

12/18/05

12/18/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 18	500	11/28/05 1515	12/1/05 605	12/1/05 956	505	5	8	5750
CAL 19	500	11/28/05 1515	12/1/05 605	12/1/05 1110	506	5	8	5389
CAL 22	500	11/28/05 1515	12/1/05 6745	12/1/05 1205	511	5	8	56409
CAL 23	500	11/28/05 1515	12/1/05 730	12/1/05 1240	512	5	8	5964
CAL 24	500	11/28/05 1515	12/2/05 730	12/2/05 1220	506	5	8	6623
CAL 8	500	11/28/05 1515	12/2/05 660	12/2/05 1150	511	5	8	6786
CAL 12	500	11/28/05 1515	12/2/05 550	12/2/05 1110	512	5	8	6578
/								

AD 12/18/05
AD 12/18/05
AD 12/18/05

AD 12/18/05

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AD 12/18/05

General Engineering Laboratories Calibration Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 8/26/03 Cocktail Type Used NA
 Standard ID 0299-E Matrix of Vial/Planchett NA
 Amount Used (g or (mL)) 0.1 NA
 Standard Activity (DPM/g or (mL)) 2434.34 Type of Scintillation Vial NA
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 11/4/06 Balance ID Used 28488
 Residue/Carrier Agent NA Quenching Agent NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	CAL1				
2	CAL2				
3	CAL3				
4	CAL4				
5	CAL5				
6	CAL6				
7	CAL7				
8	CAL8				
9	CAL9				
10	CAL10				
11	CAL11				
12	CAL12				
13	CAL13				
14	CAL14				
15	CAL15				

Prepared By: Ad Burt Date 12/8/05
 Reviewed By: Angela Johnson Date 12/8/05
 Rev 1 RLM 9/10/97 12/8/05

**General Engineering Laboratories
Calibration Source Preparation Sheet**

Applicable SOP Number <u>EL-RAD-A-008</u>	Isotope <u>Ra-226</u>
Date Standards Prepared <u>8/26/03</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0299-E</u>	Matrix of Vial/Planchett <u>NA</u>
Amount Used (g or <u>ml</u>) <u>0.1</u>	<u>NA</u>
Standard Activity (DPM/g or <u>mL</u>) <u>2434.34</u>	Type of Scintillation Vial <u>NA</u>
Reference Date <u>12/15/99</u>	Pipette ID Used <u>1429303</u>
Expiration Date <u>11/4/04</u>	Balance ID Used <u>28488</u>
Residue/Carrier Agent <u>NA</u>	Quenching Agent <u>NA</u>

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

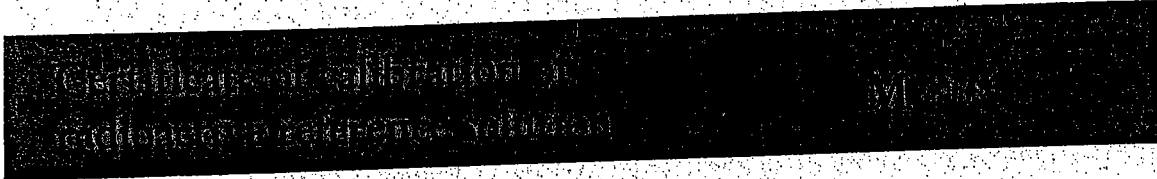
add 12/8/05

add 12/8/05

Prepared By: <u>Adl Basil</u>	Date: <u>12/8/05</u>
Reviewed By: <u>Angela A. Johnson</u>	Date: <u>12/8/05</u>

Rev 1 RLM 9/10/97

02.9



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

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

ion. Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.
ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, which
inties for a t -distribution with $v_{eff} = \infty$ effective degrees of freedom corresponds to a coverage probability of approximately
95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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

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

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

17th December 1999

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

Method of measurement:

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

Calibration date: 15 December 1999

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

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

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

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

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

Carrier free in 0.5M HCl

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

1 year = 365.25 days

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

Verification for Ra-226 Standard 0299-E

11/4/2005	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard mL used	Source DPM/G
A.Fehr	0299-F N1	1340.3000	0.6000	1339.7000	2.72177002	0.2000	2461.082289
	0299-F N2	1313.2000	0.6000	1312.6000	2.72177002	0.2000	2411.298509
	0299-F N3	1298.1000	0.6000	1297.5000	2.72177002	0.2000	2383.559208
				99.6090287	% of known		2418.646669
				0.01624067			

Mean Value (Counting) = 2418.646669
 Stdev = 39.28044852

Certificate Value = 2428.1 dpm/mL
 Lower Limit = 2340.085772 dpm/mL
 Upper Limit = 2497.207566 dpm/mL
 Rule 1 Pass/Fail Pass
 Two sigma = 78.56089703 dpm/mL
 10 % of Mean = 241.8646669 dpm/mL
 Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0299-E by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 8 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 11/4/05 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

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

where:

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

RAD SOP M-001

Amanda J. Feehe 11/4/05
Amanda J. Feehe 11/4/05

PROTOCOL : 8 Ra-226 ver
DATE : 2005/11/04
TIME : 11:47
ID : P08AS001

Ra226

Wallac 1414 WinSpectral v1.40 S/N 4140127

Counting mode : CPM
Isotope(s) : Ra226
Ra226 = 400- 900,Alpha,1602.12 y
Protocol name : Ra-226 ver
Counting time : 300
Repeats : 1
Cycles : 1
Replicates : 1
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Advanced modes : Halflife,PSA,Chemilum
Halflife zerotime : Start of assay
PSA level : low
Output to Display :
 POS,DATE,CTIME,RACK,RACKPOS,ETIME,SQPE,CPM1,CPM
Additions to Display : Spectrum,Header,Listing
Header : Ra226
Spectrum : Rnd.Cos,Alpha
Window 1 : 1-1024 /Alpha
Window 2 : 1-1024 /Beta
Window 3 : 1-1024 /Beta
Window 4 : 1-1024 /Beta
Window 5 : 1-1024 /Beta
Window 6 : 1-1024 /Beta
FNCT1 = FNCT1 :
FNCT2 = FNCT2 :
FNCT3 = FNCT3 :
FNCT4 = FNCT4 :

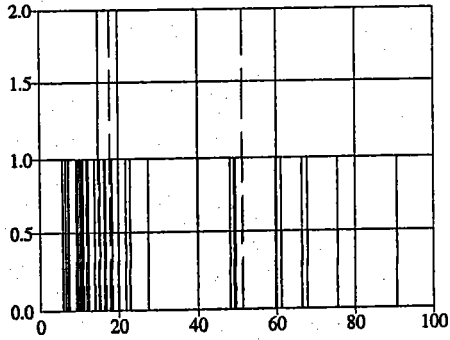
Total count rate:
 Ra226 10537.9 CPM

Amanda L. Lehn
11/4/05

ALQ
11/4/05

POS CTIME SQPI CPM CPM1

1 300 23.50 1.90

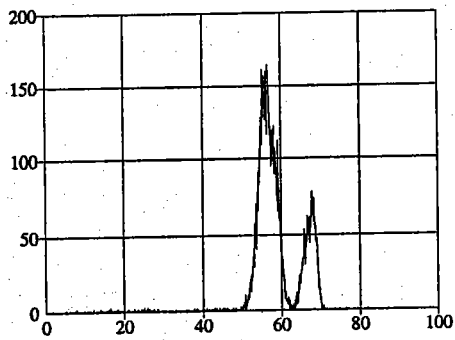


Counts Chem

Counts Alpha

Blcg

2 300 4697.50 2217.70

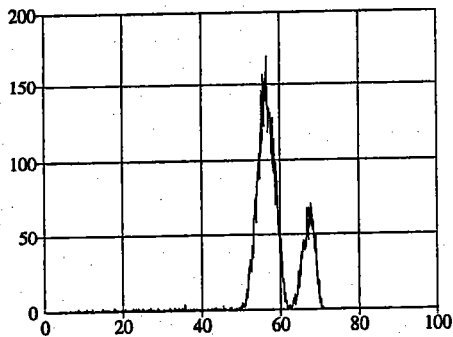


Counts Chem

Counts Alpha

0321-A

3 300 4542.00 2191.80



Counts Chem

Counts Alpha

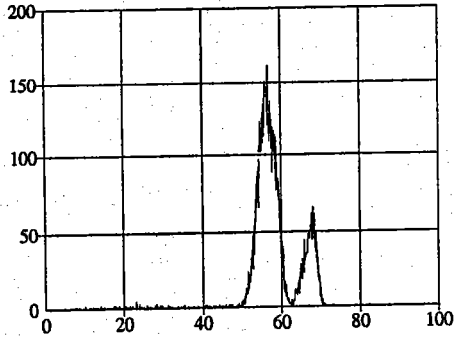
0321-A

ALF 11/4/05

*ALF
11/4/05*

POS CTIME SQPI CPM CPM1

4 300 4376.00 2174.30

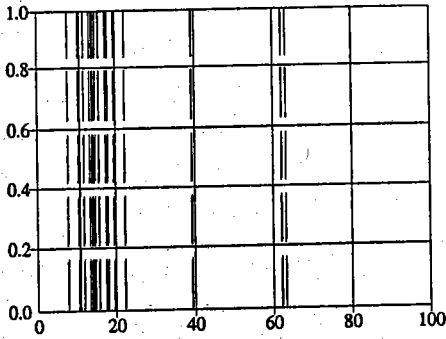


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Counts Alpha

0321-A

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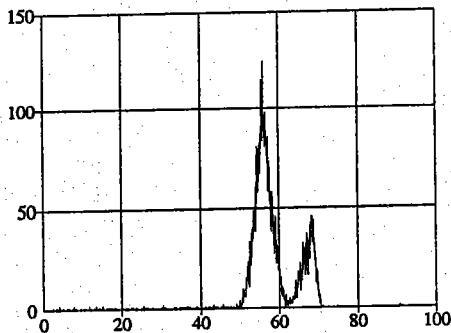


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Counts Alpha

Blky

6 300 1930.20 1340.30



Counts Chem

Counts Alpha

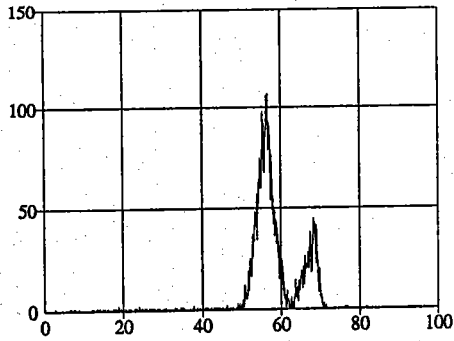
0299-E

ALF 11/4/05

AHQ
11/4/05

POS CTIME SQPI CPM CPM1

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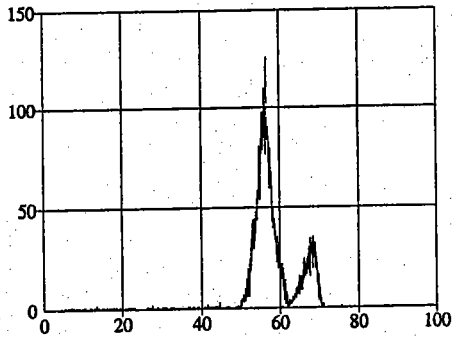


Counts Chem

Counts Alpha

0299-E

8 300 1835.40 1298.10



Counts Chem

Counts Alpha

0299-E

Handwritten signature and date:
11/4/05



Standard Traceability Log Rad

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

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Albee
Prep Date:	09/15/2000
Verification Date:	08/26/2004
Expiration Date:	08/26/2005
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0012

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

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

Secondary Standards

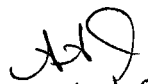
Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Albee	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Albee	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Albee	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Albee	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Albee	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/06/2005	04/06/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Handwritten signature: AJQ
11/4/05

Voltage Curve Ludlum # 5				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	11/4/2005	10:01	5
0.25	0	11/4/2005	10:02	5
0.30	0	11/4/2005	10:03	5
0.35	0	11/4/2005	10:04	5
0.40	0	11/4/2005	10:05	5
0.45	188	11/4/2005	10:06	5
0.50	2505	11/4/2005	10:07	5
0.55	6400	11/4/2005	10:08	5
0.60	10095	11/4/2005	10:09	5
0.65	11888	11/4/2005	10:10	5
0.70	13799	11/4/2005	10:11	5
0.75	14773	11/4/2005	10:12	5
0.80	15200	11/4/2005	10:13	5
0.85	16084	11/4/2005	10:14	5
0.90	16485	11/4/2005	10:15	5
0.95	16792	11/4/2005	10:16	5
1.00	17342	11/4/2005	10:17	5
1.05	18321	11/4/2005	10:18	5
1.10	24605	11/4/2005	10:19	5
1.15	41208	11/4/2005	10:20	5
1.20	79240	11/4/2005	10:21	5

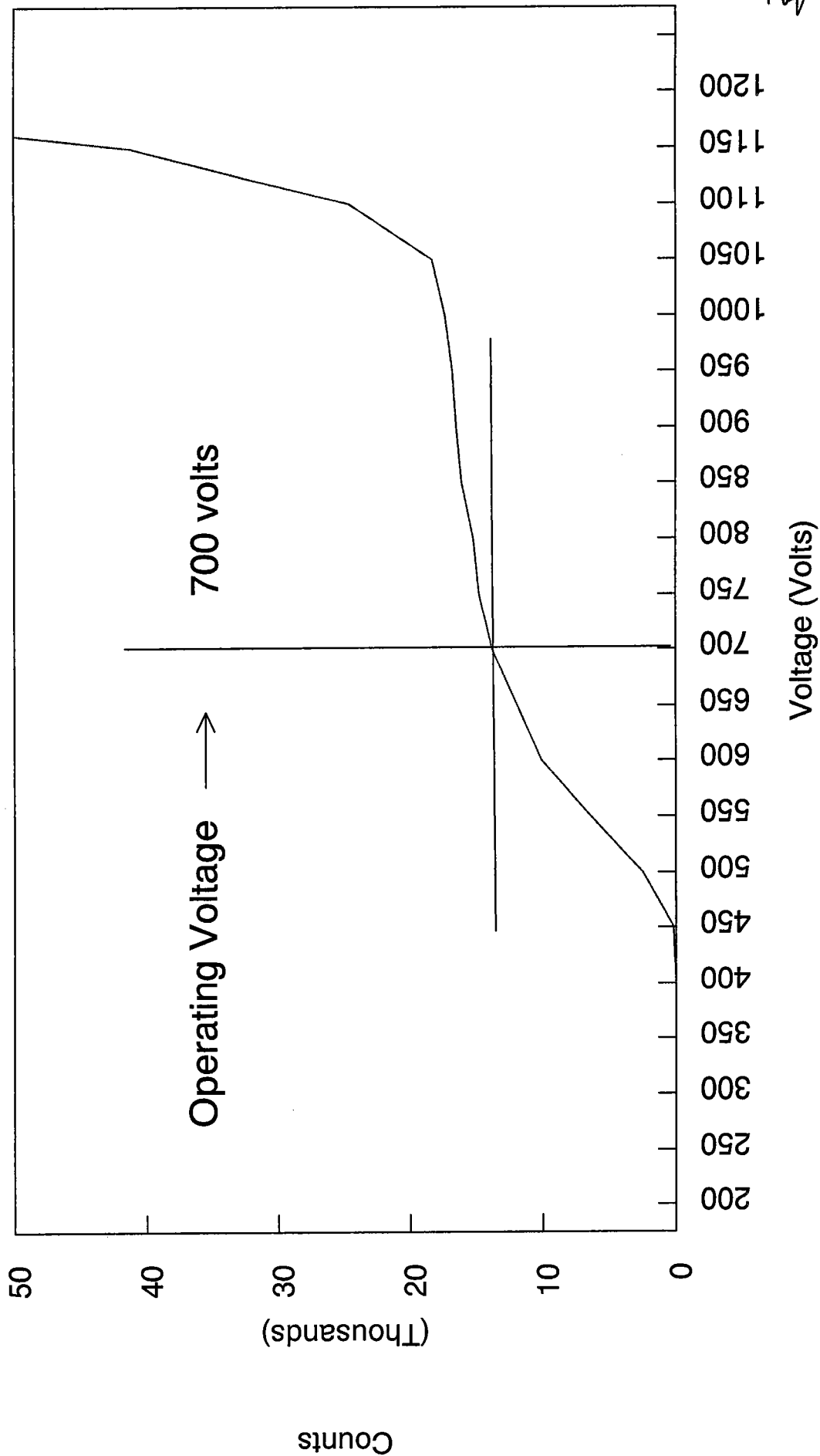
ABI 12/8/05



12/8/05

Plateau Novemver, 2005

Ludlum # 5



12/8/05
HBI
508/21
ATD

Ra-226 WATER

Batch : LCSVER
 Date : 12/6/2005
 Analyst : JMB1

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
VER 2	0.500	30	634	501	1.889	0.267	0.5139	20.2337	1.6052	12/6/2005 14:30
VER 3	0.500	30	784	502	1.904	0.133	0.3824	24.7965	1.7491	12/6/2005 15:00
VER 4	0.500	30	678	503	1.942	0.267	0.4931	20.7902	1.5930	12/6/2005 15:35
VER 5	0.500	30	650	504	1.736	0.200	0.4891	22.3018	1.7384	12/6/2005 16:15
VER 6	0.500	30	953	505	2.126	0.133	0.3308	26.0930	1.6671	12/6/2005 16:45
VER 12	0.500	30	951	506	2.054	0.267	0.3693	21.9160	1.4106	12/8/2005 13:05
VER 7	0.500	30	769	508	1.942	0.133	0.3321	21.1178	1.5043	12/7/2005 12:55
VER 8	0.500	30	778	509	1.987	0.267	0.4287	20.7621	1.4817	12/7/2005 13:50
VER 9	0.500	30	986	510	2.033	0.200	0.3706	25.7153	1.6199	12/7/2005 14:25
VER 10	0.500	30	915	511	1.994	0.267	0.4227	24.1275	1.5840	12/7/2005 15:05
VER 11	0.500	30	1016	512	1.954	0.267	0.4296	27.2513	1.6956	12/7/2005 15:50

Ad Bail 12/8/05
~~12/9/05~~ 12/19/05
Angela Johnson 12/18/05

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
VER 2		5	12/6/2005 14:30	LCS	0321-H	24.14	pCi/L	84%
VER 3		5	12/6/2005 15:00	LCS	0321-H	24.14	pCi/L	103%
VER 4		5	12/6/2005 15:35	LCS	0321-H	24.14	pCi/L	86%
VER 5		5	12/6/2005 16:15	LCS	0321-H	24.14	pCi/L	92%
VER 6		5	12/6/2005 16:45	LCS	0321-H	24.14	pCi/L	108%
VER 12		5	12/8/2005 13:05	LCS	0321-H	24.14	pCi/L	91%
VER 7		5	12/7/2005 12:55	LCS	0321-H	24.14	pCi/L	87%
VER 8		5	12/7/2005 13:50	LCS	0321-H	24.14	pCi/L	86%
VER 9		5	12/7/2005 14:25	LCS	0321-H	24.14	pCi/L	107%
VER 10		5	12/7/2005 15:05	LCS	0321-H	24.14	pCi/L	100%
VER 11		5	12/7/2005 15:50	LCS	0321-H	24.14	pCi/L	113%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
12/2/2005 14:25	12/6/2005 11:10	92.75	3.33	0.5035	0.9751	1.0019	20.8663	0.4920
12/2/2005 14:25	12/6/2005 12:00	93.58	3.00	0.5067	0.9776	1.0019	26.0000	0.4962
12/2/2005 14:25	12/6/2005 12:35	94.17	3.00	0.5088	0.9776	1.0019	22.3333	0.4984
12/2/2005 14:25	12/6/2005 13:05	94.67	3.17	0.5107	0.9764	1.0019	21.4667	0.4996
12/2/2005 14:25	12/6/2005 15:15	96.83	1.50	0.5186	0.9887	1.0019	31.6333	0.5137
12/2/2005 14:25	12/8/2005 8:50	138.42	4.25	0.6483	0.9684	1.0019	31.4333	0.6290
12/2/2005 14:25	12/7/2005 8:35	114.17	4.33	0.5777	0.9678	1.0019	25.5000	0.5601
12/2/2005 14:25	12/7/2005 9:10	114.75	4.67	0.5795	0.9654	1.0019	25.6663	0.5605
12/2/2005 14:25	12/7/2005 9:50	115.42	4.58	0.5816	0.9660	1.0019	32.6667	0.5629
12/2/2005 14:25	12/7/2005 10:40	116.25	4.42	0.5843	0.9672	1.0019	30.2333	0.5662
12/2/2005 14:25	12/7/2005 11:25	117.00	4.42	0.5866	0.9672	1.0019	33.6000	0.5684

12/8/05
~~12/9/05~~ #B1 12/9/05
Ad Bail
Cingela S. Johnson 12/8/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 27	500	12/2/05 1425	12/6/05 1110	12/6/05 1430	501	5	8	634
VER 3	500	12/2/05 1425	12/6/05 1200	12/6/05 1500	502	5	4	784
VER 4	500	12/2/05 1425	12/6/05 1235	12/6/05 1535	503	5	8	678
VER 5	500	12/2/05 1425	12/6/05 1305	12/6/05 1615	504	5	4	650
VER 6	500	12/2/05 1425	12/6/05 1315	12/6/05 1645	505	5	4	953
VER 7	500	12/2/05 1425	12/7/05 835	12/7/05 1255	508	5	4	769
VER 8	500	12/2/05 1425	12/7/05 910	12/7/05 1350	509	5	8	778
VER 9	500	12/2/05 1425	12/7/05 950	12/7/05 1425	510	5	6	986
VER 10	500	12/2/05 1425	12/7/05 1040	12/7/05 1505	511	5	8	915
VER 11	500	12/2/05 1425	12/7/05 1125	12/7/05 1550	512	5	8	1016

AB 12/21/05

5018/21

5018/21/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER-12		12/2/05 1425	12/8/05 850	12/8/05 1305	506	5	8	951

ADJ 12/7/05

ADJ 12/8/05

ADJ 12/8/05

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008 Isotope Ra-226
 Date Standards Prepared 5/18/05 Cocktail Type Used NA
 Standard ID 0321-H Matrix of Vial/Planchett NA
 Amount Used (g or ml) 0.1 NA
 Standard Activity (DPM/g or ml) 269.6188 Type of Scintillation Vial NA
 Reference Date 9/9/91 Pipette ID Used 1429303
 Expiration Date 5/20/04 Balance ID Used 28488
 Residue/Carrier Agent NA Quenching Agent NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER 1				
2	VER 2				
3	VER 3				
4	VER 4				
5	VER 5				
6	VER 6				
7	VER 7				
8	VER 8				
9	VER 9				
10	VER 10				
11	VER 11				
12	VER 12				
12/18/05					

Prepared By: Adri Bail Date 12/9/05
 Reviewed By: Angela Johnson Date 12/8/05

Rev 1 RLM 9/10/97

Verification for Ra-226 Standard 0321-H

A. Fehr
5/20/2005

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
0321-H N1	1170.1000	34.2000	1135.9000	4.20643586	270.0385881
0321-H N2	1137.8000	34.2000	1103.6000	4.20643586	262.3598783
0321-H N3	1149.6000	34.2000	1115.4000	4.20643586	265.1651036
					Average = 265.8545233

Mean Value (Counting) = 265.8545233
Stdev = 3.895501322

99.1905663
0.01461514 Rule 3 (Pass/Fail)

Certificate Value = 268.0
Lower Limit = 258.0835207
Upper Limit = 273.625526
Rule 1 Pass/Fail Pass
Two sigma = 7.771002644
10 % of Mean = 26.58545233
Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0321-H by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 5/20/05 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 5/20/05
Angela A. Johnson 5/24/05

General Engineering Laboratories

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

Lucas Cell Calibration Package

601-612

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

Prepared By: Ad Bair

Date: 12/29/05

Reviewed By: Angela Johnson

Date: 12/29/05

Effective Date: 12/29/05

Ra-226 Cell Constants

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

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count			
														cpm	min	dpm
601	1.935	Average	2.064	10	12/9/2005 12:35	12/9/2005 6:40	12/2/2005 13:20	0.133	4742	15	316.13	243.02	6.72222	0.24653	2187	0.9974
601	2.050	Stdev	0.137	1	12/6/2005 15:05	12/6/2005 9:50	12/2/2005 13:20	0.033	7192	30	239.73	243.02	3.85417	0.21875	2184	0.9974
601	2.207			1	12/1/2005 11:00	12/1/2005 5:20	11/28/2005 15:15	0.267	5755	30	191.83	243.02	2.58681	0.23611	2178	0.9974
602	1.968	Average	1.884	11	12/9/2005 13:40	12/9/2005 6:00	12/2/2005 13:20	0.133	4750	15	316.67	243.02	6.69444	0.31944	2187	0.9974
602	1.842	Stdev	0.073	2	12/6/2005 15:35	12/6/2005 10:35	12/2/2005 13:20	0.133	6515	30	217.17	243.02	3.88542	0.20833	2184	0.9974
602	1.842			13	8/24/2005 7:30	8/24/2005 4:25	8/19/2005 16:30	0.133	7286	30	242.87	243.02	4.49653	0.12847	2079	0.9975
603	1.933	Average	1.798	3	12/6/2005 16:15	12/6/2005 11:10	12/2/2005 13:20	0.267	6864	30	228.80	243.02	3.90972	0.21181	2184	0.9974
603	1.754	Stdev	0.118	3	8/22/2005 17:40	8/22/2005 11:35	8/19/2005 16:30	0.267	4842	30	161.40	243.02	2.79514	0.25347	2078	0.9975
603	1.709			12	12/9/2005 13:25	12/9/2005 9:00	12/2/2005 13:20	0.200	4269	15	284.60	243.02	6.81944	0.18403	2187	0.9974
604	1.845	Average	1.798	13	12/9/2005 14:00	12/9/2005 9:40	12/2/2005 13:20	0.200	4620	15	308.00	243.02	6.84722	0.18056	2187	0.9974
604	1.750	Stdev	0.048	4	8/22/2005 18:15	8/22/2005 12:25	8/19/2005 16:30	0.267	4886	30	162.87	243.02	2.82986	0.24306	2078	0.9975
604	1.800			4	12/4/2005 9:00	12/2/2005 5:50	11/28/2005 15:15	0.267	4271	30	142.37	243.02	3.60764	2.13194	2181	0.9974
605	1.828	Average	1.843	11	8/19/2005 14:50	8/19/2005 10:35	8/12/2005 8:30	0.233	9306	30	310.20	243.02	7.06681	0.17708	2075	0.9975
605	1.909	Stdev	0.060	14	12/9/2005 14:30	12/9/2005 5:20	12/2/2005 13:20	0.200	4547	15	303.13	243.02	6.66667	0.38194	2187	0.9974
605	1.791			5	12/4/2005 11:50	12/2/2005 9:30	11/28/2005 15:15	0.267	4404	30	146.80	243.02	3.76042	2.09722	2181	0.9974
607	1.876	Average	1.985	15	12/9/2005 15:05	12/9/2005 7:25	12/2/2005 13:20	0.267	4551	15	303.40	243.02	6.75347	0.31944	2187	0.9974
607	1.886	Stdev	0.179	4	12/6/2005 16:45	12/6/2005 12:00	12/2/2005 13:20	0.267	6758	30	225.27	243.02	3.94444	0.19792	2184	0.9974
607	2.192			3	12/1/2005 12:15	12/1/2005 6:45	11/28/2005 15:15	0.267	5824	30	194.13	243.02	2.64583	0.22917	2179	0.9974
608	1.868	Average	1.958	16	12/9/2005 15:20	12/9/2005 11:00	12/2/2005 13:20	0.267	4899	15	313.27	243.02	6.90278	0.18056	2187	0.9974
608	2.036	Stdev	0.085	5	12/6/2005 17:20	12/6/2005 12:35	12/2/2005 13:20	0.267	7324	30	244.13	243.02	3.96875	0.19792	2184	0.9974
608	1.971			13	12/4/2005 12:25	12/2/2005 10:50	11/28/2005 15:15	0.267	4921	30	164.03	243.02	3.81597	2.06597	2182	0.9974
609	1.848	Average	1.984	17	12/9/2005 15:45	12/9/2005 11:25	12/2/2005 13:20	0.133	4651	15	310.07	243.02	6.92014	0.18056	2187	0.9974
609	2.015	Stdev	0.124	6	12/6/2005 18:00	12/6/2005 13:05	12/2/2005 13:20	0.267	7266	30	242.20	243.02	3.98958	0.20486	2184	0.9974
609	2.090			9	12/1/2005 13:25	12/1/2005 10:05	11/28/2005 15:15	0.267	5872	30	195.73	243.02	2.78472	0.13889	2179	0.9974
610	1.774	Average	1.792	7	12/6/2005 18:35	12/6/2005 15:15	12/2/2005 13:20	0.200	6570	30	219.00	243.02	4.07986	0.13889	2184	0.9974
610	1.762	Stdev	0.043	10	8/23/2005 11:15	8/23/2005 8:15	8/19/2005 16:30	0.267	6068	30	202.27	243.02	3.65625	0.12500	2078	0.9975
610	1.841			18	12/9/2005 16:05	12/9/2005 11:45	12/2/2005 13:20	0.067	4638	15	309.20	243.02	6.93403	0.18056	2187	0.9974
611	1.963	Average	1.944	8	12/7/2005 14:25	12/7/2005 8:35	12/2/2005 13:20	0.267	7936	30	264.53	243.02	4.80208	0.24306	2185	0.9974
611	1.843	Stdev	0.093	11	8/23/2005 15:10	8/23/2005 9:10	8/19/2005 16:30	0.233	6248	30	208.27	243.02	3.69444	0.25000	2079	0.9975
611	2.026			11	12/1/2005 14:10	12/1/2005 8:15	11/28/2005 15:15	0.267	5464	30	182.13	243.02	2.70633	0.24653	2179	0.9974
612	2.041	Average	1.927	16	12/2/2005 10:30	12/2/2005 11:30	11/28/2005 15:15	0.267	5223	30	174.10	243.02	3.84375	1.95833	2181	0.9974
612	1.867	Stdev	0.099	20	12/9/2005 16:25	12/9/2005 12:20	12/2/2005 13:20	0.067	4720	15	314.67	243.02	6.95633	0.17014	2187	0.9974
612	1.873			9	12/7/2005 13:50	12/7/2005 9:10	12/2/2005 13:20	0.267	7663	30	255.43	243.02	4.82639	0.19444	2185	0.9974

Ad Baik 12/29/05
Angela A. Johnson 12/29/05

Ra-226 Verification Sheet

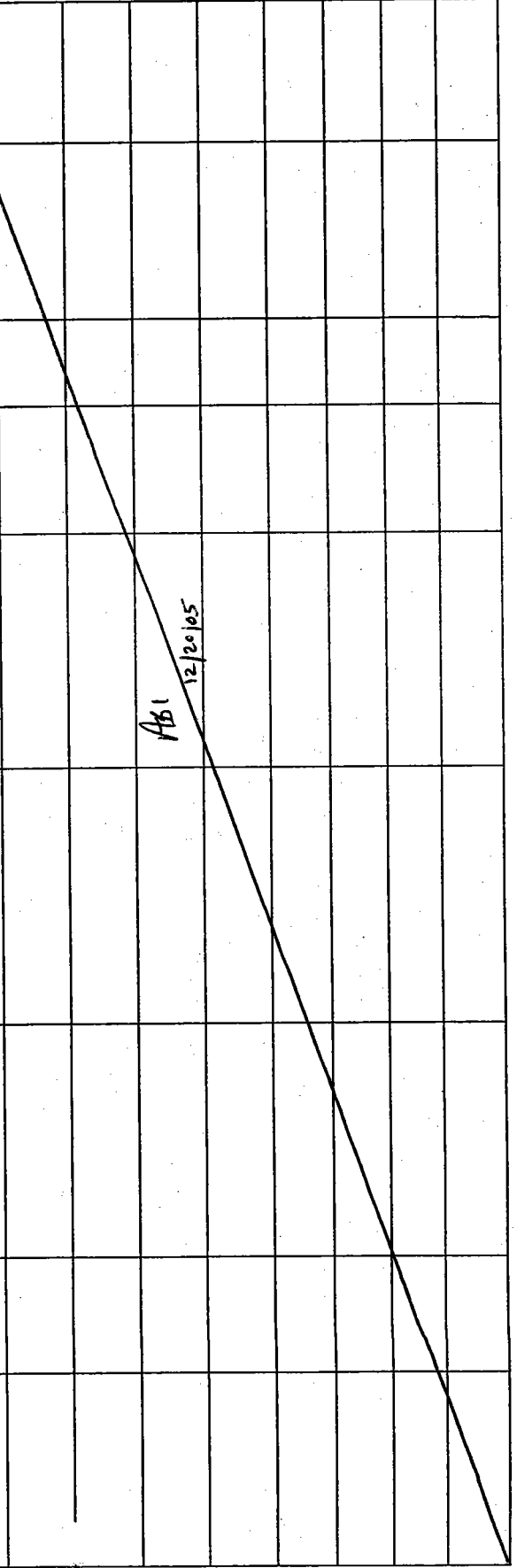
Count time 15 min

Abi 12/29/05

12/29/05
ATC
D

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 10	500	12/2/05 1320	12/19/05 0640	12/19/05 1235	601	6	4	4742
CAL 11	500	12/2/05 1320 12/15/05 1320	12/19/05 0600	12/19/05 1340	602	6	4	4750
CAL 12	500	12/2/05 1320	12/19/05 0900	12/19/05 1325	603	6	6	4269
CAL 13	500	12/2/05 1320	12/19/05 0940	12/19/05 1400	604	6	6	4620
CAL 14	500	12/2/05 1320	12/19/05 0520	12/19/05 1430	605	6	6	4547
CAL 15	500	12/2/05 1320	12/19/05 0725	12/19/05 1505	607	6	8	4551
CAL 16	500	12/2/05 1320	12/19/05 1100	12/19/05 1520	608	6	8	4699
CAL 17	500	12/2/05 1320	12/19/05 1125	12/19/05 1545	609	6	4	4651
CAL 18	500	12/2/05 1320	12/19/05 1145	12/19/05 1605	610	6	2	4638
CAL 19	500	12/2/05 1320	12/19/05 1220	12/19/05 1625	612	6	2	4720

Abi 12/20/05



Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	12/2/05 1320	12/6/05 950	12/6/05 1505	601	6	1	7192
CAL 2	500	12/2/05 1320	12/6/05 1035	12/6/05 1535	602	4	4	6515
CAL 3	500	12/2/05 1320	12/6/05 1110	12/6/05 1615	603	4	6	6864
CAL 4	500	12/2/05 1320	12/6/05 1200	12/6/05 1645	607	6	8	6708
CAL 5	500	12/2/05 1320	12/6/05 1235	12/6/05 1720	608	6	8	7324
CAL 6	500	12/2/05 1320	12/6/05 1305	12/6/05 1800	609	6	8	7266
CAL 7	500	12/2/05 1320	12/6/05 1515	12/6/05 1835	610	6	6	6570
CAL 8	500	12/2/05 1320	12/7/05 835	12/7/05 1255	611	6	6	3920 769
CAL 9	500	12/2/06 1320	12/7/05 910	12/7/05 1350	612	4	8	7663
CAL 8	500	12/2/05 1320	12/7/05 835	12/7/05 1425	611	6	8	7936

15 mins Abi
12/20/05

Abi
12/21/05

Abi
12/21/05

Abi
12/20/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	11/28/05 1515	12/1/05 520	12/1/05 1100	601	6	8	5755
CAL 4	500	11/28/05 1515	12/2/05 550	12/4/05 900	604	6	8	4271
CAL 5	500	11/28/05 1515	12/2/05 930	12/4/05 1150	605	6	8	4409
CAL 3	500	11/28/05 1515	12/1/05 645	12/1/05 1215	607	6	8	5824
CAL 13	500	11/28/05 1515	12/2/05 1050	12/4/05 1225	608	6	8	4921
CAL 9	500	11/28/05 1515	12/1/05 1005	12/1/05 1325	609	6	8	5872
CAL 11	500	11/28/05 1515	12/1/05 815	12/1/05 1410	611	6	8	5464
CAL 16	500	11/28/05 1515	12/2/05 1130	12/4/05 1030	612	6	8	5223

12/29/05
12/29/05

12/29/05
12/29/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 13	500	8/19/05 1630	8/24/05 425	8/24/05 730	602	6	4	7286
CAL 14	500	8/24/05 1630	8/24/05 455	8/24/05 755	608	6	8	7449
CAL 1	500	8/24/05 1140	9/10/05 423	9/10/05 730	601	6	3	8623
CAL 2	500	8/24/05 1140	9/10/05 505	9/10/05 805	602	6	6	8178
CAL 3	500	8/24/05 1140	9/10/05 545	9/10/05 845	603	6	8	8730
CAL 4	500	8/24/05 1140	9/10/05 655	9/10/05 955	606	6	6	8603
CAL 5	500	8/24/05 1140	9/10/05 735	9/10/05 1035	607	6	7	8462
CAL 6	500	8/24/05 1140	9/10/05 810	9/10/05 1110	608	6	8	8080
CAL 7	500	8/24/05 1140	9/10/05 850	9/10/05 1150	609	6	8	7578

ABI 12/20/05

ABI 12/20/05

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ABI 12/20/05

ABI 12/20/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CA1	500	8/17/05 830	8/17/05 510	8/17/05 1005	607	6	8	6837
CA2	500	8/12/05 830	8/17/05 625	8/17/05 1045	608	6	8	7369
CA3	500	8/12/05 830	8/17/05 730	8/17/05 1120	609	6	2	6229
CA4	500	8/12/05 830	8/17/05 820	8/17/05 1155	610	6	6	6945
CA5	500	8/12/05 830	8/17/05 955	8/17/05 1315	611	6	8	6811
CA6	500	8/12/05 830	8/17/05 1020	8/17/05 1515	612	6	5	3252
CA7	500	8/12/05 830	8/17/05 1105	8/17/05 1600	601	6	1	7261
CA8	500	8/12/05 830	8/17/05 1140	8/17/05 1640	603	6	8	6512
CA9	500	8/12/05 830	8/19/05 910	8/19/05 1335	602	6	5	7636
CA10	500	8/12/05 830	8/19/05 955	8/19/05 1415	604	6	6	8361
CA11	500	8/12/05 830	8/19/05 1035	8/19/05 1450	605	6	7	9306
CA12	500	8/12/05 830	8/19/05 1105	8/19/05 1525	606	6	5	7361
_____ _____ _____ _____ _____ _____ _____ _____ _____								
AA1 12/20/05								

AA1 12/20/05

AA1 12/20/05

AA1 12/20/05

AA1 12/20/05

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AA1 12/20/05

AA1 12/20/05

AA1
12/29/05

AA1

AA1
12/29/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
CAL 1	500	8/19/05 1630	8/22/05 1005	8/22/05 1305	601	6	8	5175
CAL 2	500	8/19/05 1630	8/22/05 1040	8/22/05 1350	602	6	4	4515
CAL 3	500	8/19/05 1630	8/22/05 1135	8/22/05 1740	603	6	8	4842
CAL 4	500	8/19/05 1630	8/22/05 1225	8/22/05 1815	604	6	8	4886
CAL 5	500	8/19/05 1630	8/22/05 1310	8/22/05 2340	605	6	8	4467
CAL 6	500	8/19/05 1630	8/22/05 1430	8/22/05 740	606	6	8	5573
CAL 7	500	8/19/05 1630	8/22/05 510	8/23/05 815	607	6	8	5367
CAL 8	500	8/19/05 1630	8/23/05 630	8/23/05 925	608	6	8	5786
CAL 9	500	8/19/05 1630	8/23/05 715	8/23/05 1045	609	6	8	4991
CAL 10	500	8/19/05 1630	8/23/05 815	8/23/05 1115	610	6	8	6068
CAL U	500	8/19/05 1630	8/23/05 910	8/23/05 1245 1510 1245	611	6	7	6248
CAL 12	500	8/19/05 1630	8/23/05 1015	8/23/05 1420	612	6	7	5899
CAL								

ABI 12/20/05

ABI 12/20/05

ABI 12/20/05

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ABI 12/20/05

ABI 12/20/05

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008

Isotope Ra-226

Date Standards Prepared 8/26/03

Cocktail Type Used N/A

Standard ID 0299-E

Matrix of Vial/Planchett N/A

Amount Used (g or ml) 0.1

N/A
N/A

Standard Activity (DPM/g or ml) 2434.34

Type of Scintillation Vial N/A

Reference Date 12/15/99

Pipette ID Used 1429303

Expiration Date 11/4/06

Balance ID Used 3640216

Residue/Carrier Agent 0.5 m HCl

Quenching Agent N/A

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

Prepared By: Ad Bail Date 12/29/05

Reviewed By: Angela A. Johnson Date 12/29/05

Rev 1 RLM 9/10/97

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-009 Isotope Po-226
 Date Standards Prepared 8/26/03 Cocktail Type Used N/A
 Standard ID 0299-E Matrix of Vial/Planchett N/A
 Amount Used (g or ml) 0.1 N/A
 Standard Activity (DPM/g or ml) 2434.34 Type of Scintillation Vial N/A
 Reference Date 12/15/99 Pipette ID Used 1429303
 Expiration Date 11/4/06 Balance ID Used 36040216
 Residue/Carrier Agent 0.5 M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24	<u>AB1</u>			
		<u>12/29/05</u>			

Prepared By: Ad Beck Date 12/29/05
 Reviewed By: Angela A. Johnson Date 12/29/05

Rev 1 RLM 9/10/97

8-21-00

Nycomed Amersham plc
Amersham Laboratories

0279



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

ISSUED
FOR:

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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

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ory

Page 666 of 924

Date of
issue

17th December 1999

**Nycomed
Amersham**

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

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

Calibration date: 15 December 1999

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

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

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

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

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

Carrier free in 0.5M HCl

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

1 year = 365.25 days

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



Standard Traceability Log Rad

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

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Albee
Prep Date:	09/15/2000
Verification Date:	08/26/2004
Expiration Date:	08/26/2005
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0012

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

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

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
09/26/2000	Angela Albee	2.1096	100	0299-C	2579.62 dpm/mL	10/10/2002	10/10/2003
09/15/2000	Angela Albee	.2004	100	0299-B	245.05 dpm/mL	09/15/2000	09/15/2001
08/23/2002	Angela Albee	2.0443	100	0299-D	2499.77 dpm/mL	08/23/2002	08/23/2003
08/26/2003	Angela Albee	1.9909	100	0299-E	2434.34 dpm/mL	08/26/2004	08/26/2005
08/26/2003	Angela Albee	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-E

8/26/2004
A. Fehr

Isotope
0299-F N1
0299-F N2
0299-F N3

Detector CPM
561.0000
567.3000
540.4000

BKG CPM
26.9000
26.9000
26.9000

NET CPM
534.1000
540.4000
513.5000

Detector Eff
3.38485694
3.38485694
3.38485694

Mass. Used (G)
0.0645
0.0658
0.0652

Standard
Source DPM/G
2446.372267
2426.325867
2326.765061
2399.821065

Mean Value (Counting) = 2399.821065
Stdev = 64.05739118

Certificate Value = 2429.4 dpm/mL
Lower Limit = 2271.706283 dpm/mL
Upper Limit = 2527.935847 dpm/mL

Rule 1 Pass/Fail Pass
Two sigma = 128.1147824 dpm/mL
10 % of Mean = 239.9821065 dpm/mL

Rule 2 (Pass/Fail) Pass
98.7828559 % of known
0.02669257

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.

The analyst prepared three standard verification sources for Ra-226 source 0299-E by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 8/26/04 using source 0321-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0321. Each verification source calculation was performed as follows:

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

where:

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

RAD SOP M-001

Amanda L. Fehr 8/26/04
Heather B. Coe
8/26/04

Voltage Curve Ludlum # 6				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	8/22/2005	9:15	6
0.25	0	8/22/2005	9:16	6
0.30	0	8/22/2005	9:17	6
0.35	0	8/22/2005	9:18	6
0.40	0	8/22/2005	9:19	6
0.45	0	8/22/2005	9:20	6
0.50	0	8/22/2005	9:21	6
0.55	76	8/22/2005	9:22	6
0.60	1407	8/22/2005	9:23	6
0.65	5153	8/22/2005	9:24	6
0.70	8502	8/22/2005	9:25	6
0.75	11150	8/22/2005	9:26	6
0.80	12291	8/22/2005	9:27	6
0.85	13641	8/22/2005	9:28	6
0.90	14585	8/22/2005	9:29	6
0.95	15162	8/22/2005	9:30	6
1.00	15489	8/22/2005	9:31	6
1.05	16151	8/22/2005	9:32	6
1.10	16340	8/22/2005	9:33	6
1.15	16607	8/22/2005	9:34	6
1.20	16845	8/22/2005	9:35	6
1.25	18048	8/22/2005	9:36	6
1.30	21465	8/22/2005	9:37	6
1.35	31258	8/22/2005	9:38	6

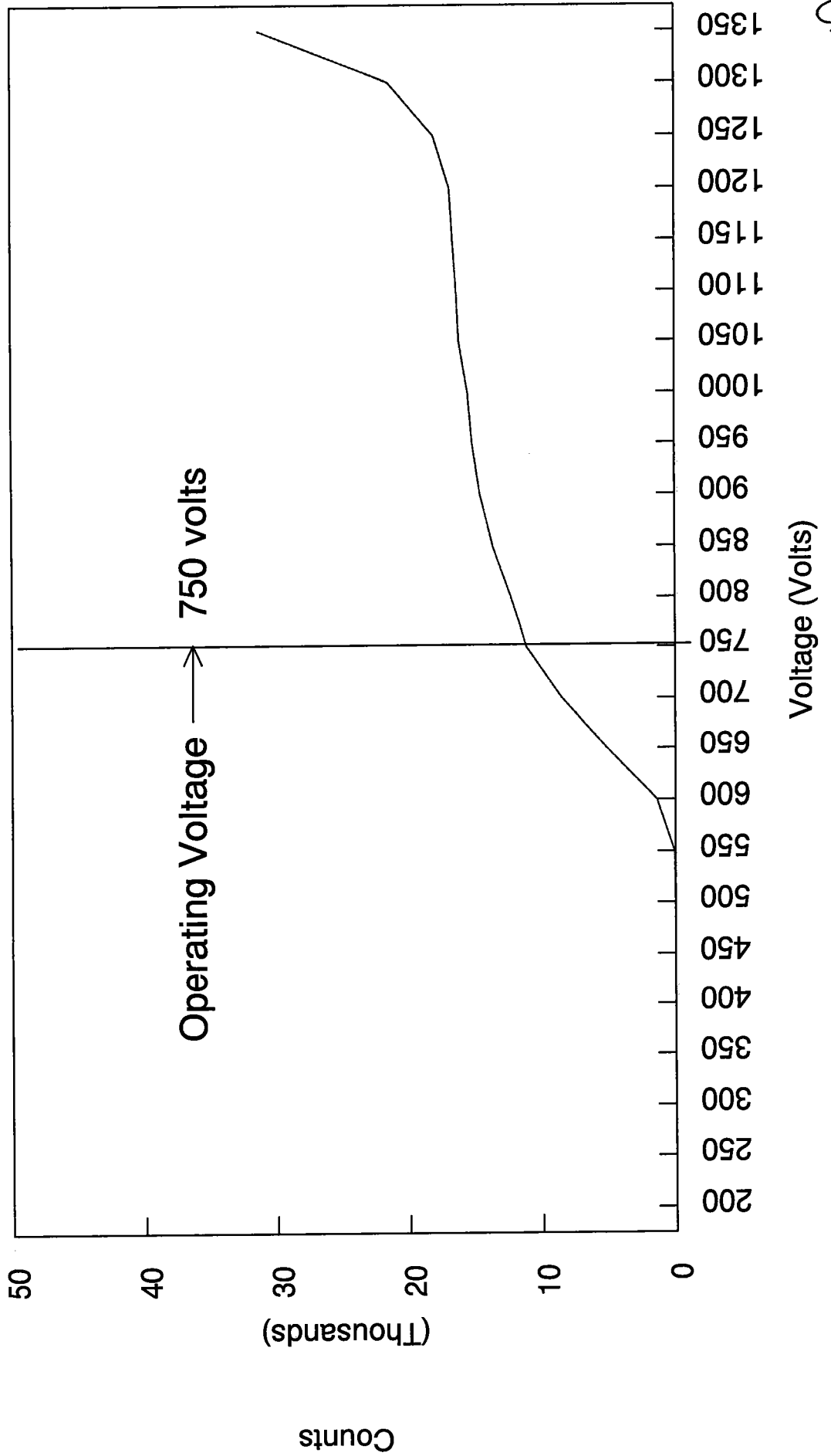
Ad Bal - 12/29/05

*AdQ
12/29/05*

Plateau August, 2005

Ludlum # 6

Hot Bank 12/29/05



*ATD
12/29/05*

Ra-226 WATER

Batch : LCSVER
 Date : 12/27/2005
 Analyst : SSE

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
5	0.500	30	967	601	2.064	0.267	0.3672	22.1465	1.4134	12/28/2005 17:20
7	0.500	30	1032	602	1.884	0.267	0.4018	25.8803	1.5975	12/28/2005 18:20
8	0.500	30	947	603	1.798	0.267	0.4161	24.5773	1.5854	12/22/2005 14:00
9	0.500	30	816	604	1.798	0.167	0.3429	21.1635	1.4656	12/22/2005 14:45
10	0.500	30	803	605	1.843	0.267	0.4043	20.2180	1.4195	12/22/2005 15:30
4	0.500	30	819	607	1.985	0.267	0.4100	20.9156	1.4537	12/27/2005 16:30
6	0.500	30	791	608	1.958	0.200	0.4514	25.0896	1.7685	12/20/2005 10:50
8	0.500	30	844	609	1.984	0.267	0.3807	20.0188	1.3700	12/28/2005 18:55
7	0.500	30	767	610	1.792	0.200	0.4913	26.4718	1.8956	12/20/2005 11:20
2	0.500	30	608	611	1.944	0.167	0.5458	25.0449	2.0156	12/19/2005 10:00
3	0.500	30	561	612	1.927	0.200	0.5861	23.0297	1.9366	12/19/2005 10:40

Adl Bork 12/29/05

Angela D. Johnson 12/29/05

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
5		6	12/28/2005 17:20	LCS	0321-H	24.14	pCi/L	92%
7		6	12/28/2005 18:20	LCS	0321-H	24.14	pCi/L	107%
8		6	12/22/2005 14:00	LCS	0321-H	24.14	pCi/L	102%
9		6	12/22/2005 14:45	LCS	0321-H	24.14	pCi/L	88%
10		6	12/22/2005 15:30	LCS	0321-H	24.14	pCi/L	84%
4		6	12/27/2005 16:30	LCS	0321-H	24.14	pCi/L	87%
6		6	12/20/2005 10:50	LCS	0321-H	24.14	pCi/L	104%
8		6	12/28/2005 18:55	LCS	0321-H	24.14	pCi/L	83%
7		6	12/20/2005 11:20	LCS	0321-H	24.14	pCi/L	110%
2		6	12/19/2005 10:00	LCS	0321-H	24.14	pCi/L	104%
3		6	12/19/2005 10:40	LCS	0321-H	24.14	pCi/L	95%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
12/22/2005 12:30	12/28/2005 11:05	142.58	6.25	0.6592	0.9539	1.0019	31.9663	0.6300
12/22/2005 12:30	12/28/2005 11:50	143.33	6.50	0.6611	0.9521	1.0019	34.1330	0.6307
12/16/2005 14:40	12/22/2005 10:45	140.08	3.25	0.6527	0.9758	1.0019	31.2997	0.6381
12/16/2005 14:40	12/22/2005 11:30	140.83	3.25	0.6547	0.9758	1.0019	27.0330	0.6400
12/16/2005 14:40	12/22/2005 12:05	141.42	3.42	0.6562	0.9745	1.0019	26.4997	0.6407
12/22/2005 12:30	12/27/2005 13:30	121.00	3.00	0.5989	0.9776	1.0019	27.0330	0.5866
12/16/2005 14:40	12/20/2005 7:50	89.17	3.00	0.4899	0.9776	1.0019	26.1667	0.4799
12/22/2005 12:30	12/28/2005 12:25	143.92	6.50	0.6626	0.9521	1.0019	27.8663	0.6321
12/16/2005 14:40	12/20/2005 8:20	89.67	3.00	0.4919	0.9776	1.0019	25.3667	0.4817
12/16/2005 14:40	12/19/2005 6:20	63.67	3.67	0.3816	0.9727	1.0019	20.0997	0.3719
12/16/2005 14:40	12/19/2005 7:05	64.42	3.58	0.3851	0.9733	1.0019	18.5000	0.3756

Ad Bail 12/29/05

Angela D. Johnson 12/29/05

Ra-226 Verification Sheet

0

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	12/14/05 1440	12/19/05 540	12/19/05 9:00	602	6	8	487
VER 2	500	12/16/05 1440	12/19/05 620	12/19/05 1000	611	6	5	608
VER 3	500	12/16/05 1440	12/19/05 705	12/19/05 1040	612	6	6	561
VER 4	500	12/16/05 1440	12/20/05 610	12/20/05 910	601	6	8	678
VER 5	500	12/16/05 1440	12/20/05 640	12/20/05 945	607	6	8	602
VER 6	500	12/16/05 1440	12/20/05 750	12/20/05 1050 1220 1220	608	6	6	791
VER 7	500	12/16/05 1440	12/20/05 820	12/20/05 1120	610	6	6	767
VER 8	500	12/16/05 1440 12/22/05 1445	12/22/05 1045	12/22/05 1400	603	6	8	947
VER 9	500	12/16/05 1440	12/22/05 1130	12/22/05 1445	604	6	5	816
VER 10	500	12/16/05 1440	12/22/05 1205	12/22/05 1530	605	6	8	803
VER 11					607	6		
VER 12						6		

AB1 12/27/05

AB1 12/27/05

AB1
12/29/05

AB1
12/27/05

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	12/22/05 1230	12/22/05 1135	12/22/05 1445	602	6	8	557
VER 2	500	12/22/05 1230	12/22/05 1210	12/22/05 1520	609	6	8	633
VER 3	500	12/22/05 1230	12/22/05 1250	12/22/05 1600	601	6	4	601
VER 4	500	12/22/05 1230	12/22/05 1330	12/22/05 1630	607	6	8	819
			ABI					
			12/29/05					
VER 5	500	12/22/05 1230	12/28/05 1105	12/20/05 1720	601	6	8	967
VER 6	500	12/22/05 1230	12/28/05 1150	12/28/05 1820	602	6	8	1032
VER 8	500	12/22/05 1230	12/28/05 1225	12/28/05 1855	609	6	8	844
			ABI					
			12/29/05					

ABI 12/27/05
 ABI 12/29/05
 ABI 12/29/05

ABI
 12/29/05

**General Engineering Laboratories
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008

Isotope Ra-226

Date Standards Prepared 5/18/05

Cocktail Type Used N/A

Standard ID 0321-H

Matrix of Vial/Planchett N/A

Amount Used (g or ml) 0.1

N/A
N/A

Standard Activity (DPM/g or ml) 269.6188

Type of Scintillation Vial N/A

Reference Date 9/9/91

Pipette ID Used 1429303

Expiration Date 5/20/06

Balance ID Used 36040216

Residue/Carrier Agent 1M HCl

Quenching Agent N/A

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VER 1				
2	VER 2				
3	VER 3				
4	VER 4				
5	VER 5				
6	VER 6		ABI		
7	VER 7			12/29/05	
8	VER 8				
9	VER 9				
10	VER 10				
11	VER 11				
12	VER 12				
	ABI				
	12/29/05				

Prepared By: Ad Bail Date 12/29/05

Reviewed By: Angela Johnson Date 12/29/05

Rev 1 RLM 9/10/97

Verification for Ra-226 Standard 0321-H

A. Fehr
5/20/05

Standard	Detector Eff Mass. Used (mL)	Source DPM/mL
1.0000	4.20643586	270.0385881
1.0000	4.20643586	262.3598783
1.0000	4.20643586	265.1651036
Average =		265.8545233

NET CPM	BKG CPM	Detector CPM
1135.9000	34.2000	1170.1000
1103.6000	34.2000	1137.8000
1115.4000	34.2000	1149.6000

Mean Value (Counting) = 265.8545233
Stdev = 3.885501322

99.1905663
0.01461514 Rule 3 (Pass/Fail)

Certificate Value = 268.0
Lower Limit = 258.0835207
Upper Limit = 273.625526
Rule 1 Pass/Fail Pass
Two sigma = 7.771002644
10 % of Mean = 26.58545233
Rule 2 (Pass/Fail) Pass

Verification Rules

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

The analyst prepared three standard verification sources for Ra-226 source 0321-H by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 5/20/05 using source 0299-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0299-A). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 5/20/05
Angela A. Johnson 5/24/05

CONTINUING CALIBRATION DATA



Gas Flow Proportional Counter Checks for 17-APR-2006

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LB4100A1	ALPHA BKG	09:11	60	0	0	-1.7	GOOD	
	BETA BKG	09:11	60	52.0	0.87	-0.53	GOOD	
	ALPHA EFF	09:44	30	24564	819	1.02	GOOD	
	BETA EFF	09:44	30	1.74E+05	5800	-0.73	GOOD	
LB4100A2	ALPHA BKG	09:11	60	8.00	0.13	1.69	GOOD	
	BETA BKG	09:11	60	54.0	0.9	0.29	GOOD	
	ALPHA EFF	09:44	30	16694	556	0.73	GOOD	
	BETA EFF	09:44	30	1.27E+05	4230	-0.44	GOOD	
LB4100A3	ALPHA BKG	09:11	60	7.00	0.12	0.22	GOOD	
	BETA BKG	09:11	60	50.0	0.83	-0.59	GOOD	
	ALPHA EFF	09:44	30	23437	781	0.75	GOOD	
	BETA EFF	09:44	30	1.54E+05	5130	-0.57	GOOD	
LB4100A4	ALPHA BKG	09:11	60	2.00	0.03	-0.41	GOOD	
	BETA BKG	09:11	60	74.0	1.23	0.85	PEND	
	ALPHA EFF	09:44	30	19723	657	-0.91	GOOD	
	BETA EFF	09:44	30	1.70E+05	5670	0.67	GOOD	
LB4100B1	ALPHA BKG	09:11	60	1.00	0.02	-0.6	GOOD	
	BETA BKG	09:11	60	58.0	0.97	0.45	GOOD	
	ALPHA EFF	09:44	30	21624	721	0.91	GOOD	
	BETA EFF	09:44	30	1.84E+05	6150	-0.57	GOOD	
LB4100B2	ALPHA BKG	09:11	60	3.00	0.05	0.24	GOOD	
	BETA BKG	09:11	60	40.0	0.67	-0.43	GOOD	
	ALPHA EFF	09:44	30	21412	714	0.65	GOOD	
	BETA EFF	09:44	30	1.59E+05	5300	-0.47	GOOD	
LB4100B3	ALPHA BKG	09:11	60	3.00	0.05	0.02	GOOD	
	BETA BKG	09:11	60	73.0	1.22	0.07	GOOD	
	ALPHA EFF	09:44	30	16457	549	1.32	GOOD	
	BETA EFF	09:44	30	1.20E+05	4010	-0.39	GOOD	
<u>LB4100B4</u>	ALPHA BKG	09:11	60	1.00	0.02	-0.74	GOOD	
	BETA BKG	09:11	60	234	3.9	<u>28.4</u>	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	09:44	30	19216	641	0.83	GOOD	
	BETA EFF	09:44	30	1.52E+05	5080	0.05	GOOD	
LB4100C1	ALPHA BKG	09:11	60	15.0	0.25	0.12	GOOD	
	BETA BKG	09:11	60	71.0	1.18	-0.32	GOOD	
	ALPHA EFF	09:44	30	22132	738	1	GOOD	
	BETA EFF	09:44	30	1.29E+05	4310	-1.9	GOOD	
LB4100C2	ALPHA BKG	09:11	60	2.00	0.03	-0.84	GOOD	
	BETA BKG	09:11	60	56.0	0.93	0.21	GOOD	
	ALPHA EFF	09:44	30	21503	717	0.25	GOOD	
	BETA EFF	09:44	30	1.85E+05	6180	-1.4	GOOD	
LB4100C3	ALPHA BKG	09:11	60	1.00	0.02	-1.1	GOOD	
	BETA BKG	09:11	60	56.0	0.93	0.47	GOOD	

= only lockout

= B lockout

	ALPHA EFF	09:44	30	16351	545	-0.28	GOOD	
	BETA EFF	09:44	30	1.32E+05	4390	-1.5	GOOD	
LB4100C4	ALPHA BKG	09:11	60	2.00	0.03	-0.68	GOOD	
	BETA BKG	09:11	60	49.0	0.82	-0.03	GOOD	
	ALPHA EFF	09:44	30	24460	815	0.64	GOOD	
	BETA EFF	09:44	30	2.13E+05	7120	0	GOOD	
<u>LB4100D1</u>	ALPHA BKG	09:11	60	32.0	0.53	9.62	DETL	Outside 2 sigma for >= 2 days
	BETA BKG	09:11	60	58.0	0.97	1	GOOD	
	ALPHA EFF	09:44	30	27291	910	0.38	GOOD	
	BETA EFF	09:44	30	2.35E+05	7820	-0.15	GOOD	
LB4100D2	ALPHA BKG	09:11	60	7.00	0.12	-0.48	GOOD	
	BETA BKG	09:11	60	60.0	1	0.03	GOOD	
	ALPHA EFF	09:44	30	19541	651	0.25	GOOD	
	BETA EFF	09:44	30	1.46E+05	4860	-1.8	GOOD	
LB4100D3	ALPHA BKG	09:11	60	0	0	-1.1	GOOD	
	BETA BKG	09:11	60	56.0	0.93	1.34	GOOD	
	ALPHA EFF	09:44	30	18903	630	0.55	GOOD	
	BETA EFF	09:44	30	1.47E+05	4890	-0.64	GOOD	
<u>LB4100D4</u>	ALPHA BKG	09:11	60	3.00	0.05	-0.57	GOOD	
	BETA BKG	09:11	60	41.0	0.68	-1.3	GOOD	
	ALPHA EFF	09:44	30	20.0	0.67	-3.1	DETL	Outside 3 sigma for > 2 days
	BETA EFF	09:44	30	1.81E+05	6020	0.46	GOOD	
LB4100E1	ALPHA BKG	09:16	60	8.00	0.13	-0.89	GOOD	
	BETA BKG	09:16	60	71.0	1.18	-0.78	GOOD	
	ALPHA EFF	09:49	30	34410	1147	0.66	GOOD	
	BETA EFF	09:49	30	2.07E+05	6900	-1.5	GOOD	
LB4100E2	ALPHA BKG	09:16	60	9.00	0.15	0.46	GOOD	
	BETA BKG	09:16	60	104	1.73	0.27	GOOD	
	ALPHA EFF	09:49	30	35467	1180	0.33	GOOD	
	BETA EFF	09:49	30	2.84E+05	9480	-0.27	GOOD	
LB4100E3	ALPHA BKG	09:16	60	3.00	0.05	-0.61	GOOD	
	BETA BKG	09:16	60	72.0	1.2	1	GOOD	
	ALPHA EFF	09:49	30	36973	1230	1.03	GOOD	
	BETA EFF	09:49	30	2.22E+05	7396	-1.7	GOOD	
LB4100E4	ALPHA BKG	09:16	60	7.00	0.12	-0.21	GOOD	
	BETA BKG	09:16	60	114	1.9	0.18	GOOD	
	ALPHA EFF	09:49	30	31063	1040	0.55	GOOD	
	BETA EFF	09:49	30	2.21E+05	7370	-1	GOOD	
LB4100F1	ALPHA BKG	09:16	60	6.00	0.1	0.65	GOOD	
	BETA BKG	09:16	60	64.0	1.07	0.99	GOOD	
	ALPHA EFF	09:49	30	29124	971	0.75	GOOD	
	BETA EFF	09:49	30	1.98E+05	6600	-0.45	GOOD	
<u>LB4100F2</u>	ALPHA BKG	09:16	60	5.00	0.08	-0.65	GOOD	
	BETA BKG	09:16	60	90.0	1.5	3.13	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	09:49	30	27716	924	2.12	DETL	Outside 2 sigma for >= 2 days
	BETA EFF	09:49	30	2.09E+05	6970	-1.9	GOOD	
LB4100F3	ALPHA BKG	09:16	60	4.00	0.07	-1.5	GOOD	

	BETA BKG	09:16	60	90.0	1.5	0.8	GOOD	
	ALPHA EFF	09:49	30	27990	933	0.99	GOOD	
	BETA EFF	09:49	30	2.61E+05	8680	1.19	GOOD	
LB4100F4	ALPHA BKG	09:16	60	2.00	0.03	-0.25	GOOD	
	BETA BKG	09:16	60	60.0	1	0.31	GOOD	
	ALPHA EFF	09:49	30	25540	851	-0.83	GOOD	
	BETA EFF	09:49	30	1.95E+05	6500	0.12	GOOD	
LB4100G1	ALPHA BKG	09:16	60	7.00	0.12	-0.67	GOOD	
	BETA BKG	09:16	60	117	1.95	2.88	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	09:49	30	33064	1100	2.19	GOOD	
	BETA EFF	09:49	30	2.18E+05	7270	-1.4	GOOD	
LB4100G2	ALPHA BKG	09:16	60	6.00	0.1	1.11	GOOD	
	BETA BKG	09:16	60	69.0	1.15	3.3	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	09:49	30	32160	1072	0.57	GOOD	
	BETA EFF	09:49	30	2.80E+05	9330	-0.94	GOOD	
LB4100G3	ALPHA BKG	09:16	60	16.0	0.27	0.93	GOOD	
	BETA BKG	09:16	60	59.0	0.98	-0.11	GOOD	
	ALPHA EFF	09:49	30	22682	756	0.96	GOOD	
	BETA EFF	09:49	30	2.43E+05	8100	-1.8	GOOD	
LB4100G4	ALPHA BKG	09:16	60	7.00	0.12	1.46	GOOD	
	BETA BKG	09:16	60	55.0	0.92	-0.2	GOOD	
	ALPHA EFF	09:49	30	15480	516	1.88	GOOD	
	BETA EFF	09:49	30	1.50E+05	5000	-0.86	GOOD	
LB4100H1	ALPHA BKG	09:16	60	3.00	0.05	-0.1	GOOD	
	BETA BKG	09:16	60	55.0	0.92	2.12	GOOD	
	ALPHA EFF	09:49	30	31163	1040	0.46	GOOD	
	BETA EFF	09:49	30	1.35E+05	4500	-1.8	GOOD	
LB4100H2	ALPHA BKG	09:16	60	3.00	0.05	-0.46	GOOD	
	BETA BKG	09:16	60	54.0	0.9	-0.03	GOOD	
	ALPHA EFF	09:49	30	19884	663	1.18	GOOD	
	BETA EFF	09:49	30	1.43E+05	4780	-1.2	GOOD	
LB4100H3	ALPHA BKG	09:16	60	2.00	0.03	-1.6	GOOD	
	BETA BKG	09:16	60	48.0	0.8	-0.1	GOOD	
	ALPHA EFF	09:49	30	20767	692	1.52	GOOD	
	BETA EFF	09:49	30	1.47E+05	4890	-1.8	GOOD	
LB4100H4	ALPHA BKG	09:16	60	1.00	0.02	-1.5	GOOD	
	BETA BKG	09:16	60	33.0	0.55	-2.3	GOOD	
	ALPHA EFF	09:49	30	19606	654	0.7	GOOD	
	BETA EFF	09:49	30	1.20E+05	4010	-1	GOOD	
PIC1A	ALPHA BKG	09:06	60	7.00	0.12	-0.46	GOOD	
	BETA BKG	09:06	60	29.0	0.48	-0.32	GOOD	
	ALPHA EFF	09:41	30	9735	325	-1.2	GOOD	
	BETA EFF	09:41	30	1.95E+05	6480	-1.9	GOOD	
PIC1B	ALPHA BKG	09:06	60	4.00	0.07	-0.71	GOOD	
	BETA BKG	09:06	60	38.0	0.63	2.4	GOOD	
	ALPHA EFF	09:41	30	11315	377	-0.79	GOOD	
	BETA EFF	09:41	30	2.13E+05	7090	-1.6	GOOD	

PIC1C	ALPHA BKG	09:06	60	5.00	0.08	-0.3	GOOD
	BETA BKG	09:06	60	11.0	0.18	-1.2	GOOD
	ALPHA EFF	09:41	30	16719	557	1.49	GOOD
	BETA EFF	09:41	30	2.43E+05	8110	-2.1	GOOD
PIC1D	ALPHA BKG	09:06	60	1.00	0.02	-1.9	GOOD
	BETA BKG	09:06	60	28.0	0.47	0.16	GOOD
	ALPHA EFF	09:41	30	17670	589	0.91	GOOD
	BETA EFF	09:41	30	1.86E+05	6210	-2.3	GOOD
PIC2A	ALPHA BKG	09:06	60	4.00	0.07	-0.61	GOOD
	BETA BKG	09:06	60	26.0	0.43	-0.28	GOOD
	ALPHA EFF	09:41	30	16717	557	0.11	GOOD
	BETA EFF	09:41	30	2.30E+05	7680	-1	GOOD
PIC2B	ALPHA BKG	09:06	60	3.00	0.05	-0.7	GOOD
	BETA BKG	09:06	60	19.0	0.32	-0.35	GOOD
	ALPHA EFF	09:42	30	13599	453	-1.7	GOOD
	BETA EFF	09:42	30	2.29E+05	7630	-0.21	GOOD
PIC2C	ALPHA BKG	09:06	60	4.00	0.07	-0.98	GOOD
	BETA BKG	09:06	60	21.0	0.35	-0.18	GOOD
	ALPHA EFF	09:42	30	20214	674	1	GOOD
	BETA EFF	09:42	30	1.92E+05	6390	-1.5	GOOD
PIC2D	ALPHA BKG	09:06	60	3.00	0.05	-1.3	GOOD
	BETA BKG	09:06	60	34.0	0.57	1.07	GOOD
	ALPHA EFF	09:42	30	18369	612	0.45	GOOD
	BETA EFF	09:42	30	2.22E+05	7400	-1.4	GOOD
PIC3A	ALPHA BKG	09:07	60	4.00	0.07	-1.2	GOOD
	BETA BKG	09:07	60	14.0	0.23	-1.3	GOOD
	ALPHA EFF	09:42	30	23596	787	-0.4	GOOD
	BETA EFF	09:42	30	1.77E+05	5890	0.18	GOOD
PIC3B	ALPHA BKG	09:07	60	4.00	0.07	-1.2	GOOD
	BETA BKG	09:07	60	24.0	0.4	-0.31	GOOD
	ALPHA EFF	09:42	30	22067	736	0.34	GOOD
	BETA EFF	09:42	30	1.95E+05	6500	-0.65	GOOD
PIC3C	ALPHA BKG	09:07	60	4.00	0.07	-0.95	GOOD
	BETA BKG	09:07	60	25.0	0.42	0.05	GOOD
	ALPHA EFF	09:42	30	18372	612	0.01	GOOD
	BETA EFF	09:42	30	2.12E+05	7050	0.09	GOOD
PIC3D	ALPHA BKG	09:07	60	10.0	0.17	1.28	GOOD
	BETA BKG	09:07	60	19.0	0.32	-0.9	GOOD
	ALPHA EFF	09:42	30	25982	866	-0.08	GOOD
	BETA EFF	09:42	30	2.13E+05	7090	-1.7	GOOD
PIC4A	ALPHA BKG	09:07	60	4.00	0.07	-0.85	GOOD
	BETA BKG	09:07	60	18.0	0.3	-1.1	GOOD
	ALPHA EFF	09:43	30	13493	450	0.33	GOOD
	BETA EFF	09:43	30	1.74E+05	5790	-1.7	GOOD
PIC4B	ALPHA BKG	09:07	60	12.0	0.2	1.88	GOOD
	BETA BKG	09:07	60	27.0	0.45	0.01	GOOD
	ALPHA EFF	09:43	30	18227	608	0.11	GOOD

	BETA EFF	09:43	30	2.22E+05	7390	-1.9	GOOD	
PIC4C	ALPHA BKG	09:07	60	8.00	0.13	0	GOOD	
	BETA BKG	09:07	60	27.0	0.45	-0.13	GOOD	
	ALPHA EFF	09:43	30	21497	717	0.17	GOOD	
	BETA EFF	09:43	30	2.00E+05	6670	-0.85	GOOD	
PIC4D	ALPHA BKG	09:08	60	8.00	0.13	0.05	GOOD	
	BETA BKG	09:08	60	21.0	0.35	-0.6	GOOD	
	ALPHA EFF	09:43	30	22061	735	0.07	GOOD	
	BETA EFF	09:43	30	2.10E+05	7000	-0.26	GOOD	
PIC5A	ALPHA BKG	09:08	60	3.00	0.05	-0.55	GOOD	
	BETA BKG	09:08	60	27.0	0.45	0.11	GOOD	
	ALPHA EFF	09:44	30	12050	402	0.47	GOOD	
	BETA EFF	09:44	30	3.97E+05	13200	-2.7	DETL	Outside 2 sigma for >= 2 days
PIC5B	ALPHA BKG	09:08	60	5.00	0.08	0.04	GOOD	
	BETA BKG	09:08	60	112	1.87	0.23	GOOD	
	ALPHA EFF	09:44	30	11056	369	0.42	GOOD	
	BETA EFF	09:44	30	3.50E+05	11700	0.09	GOOD	
PIC5C	ALPHA BKG	09:08	60	5.00	0.08	1.59	GOOD	
	BETA BKG	09:08	60	24.0	0.4	0.32	GOOD	
	ALPHA EFF	09:44	30	11123	371	0.69	GOOD	
	BETA EFF	09:44	30	3.85E+05	12800	-3.1	DETL	Outside 2 sigma for >= 2 days
PIC5D	ALPHA BKG	09:08	60	5.00	0.08	1.19	GOOD	
	BETA BKG	09:08	60	25.0	0.42	0.99	GOOD	
	ALPHA EFF	09:44	30	9473	316	0.41	GOOD	
	BETA EFF	09:44	30	3.08E+05	10300	-2.7	DETL	Outside 2 sigma for >= 2 days
PIC6A	ALPHA BKG	09:08	60	3.00	0.05	-0.18	GOOD	
	BETA BKG	09:08	60	16.0	0.27	-0.9	GOOD	
	ALPHA EFF	09:44	30	8572	286	0.66	GOOD	
	BETA EFF	09:44	30	2.79E+05	9290	-3.1	RERUN	
PIC6B	ALPHA BKG	09:08	60	3.00	0.05	0.22	GOOD	
	BETA BKG	09:08	60	14.0	0.23	-0.54	GOOD	
	ALPHA EFF	09:44	30	11273	376	0.88	GOOD	
	BETA EFF	09:44	30	2.88E+05	9610	-2.5	DETL	Outside 2 sigma for >= 2 days
PIC6C	ALPHA BKG	09:09	60	1.00	0.02	-0.93	GOOD	
	BETA BKG	09:09	60	17.0	0.28	-0.06	GOOD	
	ALPHA EFF	09:44	30	15595	520	0.66	GOOD	
	BETA EFF	09:44	30	3.48E+05	11600	-3.3	DETL	Outside 2 sigma for >= 2 days
PIC6D	ALPHA BKG	09:09	60	3.00	0.05	0.05	GOOD	
	BETA BKG	09:09	60	32.0	0.53	1.2	GOOD	
	ALPHA EFF	09:45	30	12304	410	0.98	GOOD	
	BETA EFF	09:45	30	3.59E+05	12000	-1.4	GOOD	
PIC7A	ALPHA BKG	09:09	60	2.00	0.03	-0.95	GOOD	
	BETA BKG	09:09	60	20.0	0.33	-0.7	GOOD	
	ALPHA EFF	09:45	30	10585	353	0.28	GOOD	
	BETA EFF	09:45	30	3.76E+05	12500	-2.1	GOOD	
PIC7B	ALPHA BKG	09:09	60	17.0	0.28	-0.42	GOOD	
	BETA BKG	09:09	60	18.0	0.3	-0.73	GOOD	

	ALPHA EFF	09:45	30	10606	354	-0.07	GOOD	
	BETA EFF	09:45	30	3.15E+05	10513	-0.95	GOOD	
PIC7C	ALPHA BKG	09:09	60	6.00	0.1	-0.56	GOOD	
	BETA BKG	09:09	60	27.0	0.45	-0.67	GOOD	
	ALPHA EFF	09:45	30	12328	411	0.38	GOOD	
	BETA EFF	09:45	30	3.82E+05	12700	-0.47	GOOD	
PIC7D	ALPHA BKG	09:09	60	13.0	0.22	-0.3	GOOD	
	BETA BKG	09:09	60	19.0	0.32	-0.66	GOOD	
	ALPHA EFF	09:45	30	8947	298	0.59	GOOD	
	BETA EFF	09:45	30	2.82E+05	9410	-0.34	GOOD	
PIC8A	ALPHA BKG	09:10	60	7.00	0.12	-0.42	GOOD	
	BETA BKG	09:10	60	35.0	0.58	-0.7	GOOD	
	ALPHA EFF	09:45	30	14099	470	1.37	GOOD	
	BETA EFF	09:45	30	3.72E+05	12400	-1.8	GOOD	
PIC8B	ALPHA BKG	09:10	60	3.00	0.05	-0.54	GOOD	
	BETA BKG	09:10	60	68.0	1.13	-0.13	GOOD	
	ALPHA EFF	09:46	30	10202	340	0.46	GOOD	
	BETA EFF	09:46	30	3.69E+05	12300	-0.54	GOOD	
PIC8C	ALPHA BKG	09:10	60	18.0	0.3	-0.37	GOOD	
	BETA BKG	09:10	60	33.0	0.55	-0.24	GOOD	
	ALPHA EFF	09:46	30	15496	517	0.66	GOOD	
	BETA EFF	09:46	30	4.27E+05	14200	-0.61	GOOD	
PIC8D	ALPHA BKG	09:10	60	9.00	0.15	-0.72	GOOD	
	BETA BKG	09:10	60	72.0	1.2	-0.42	GOOD	
	ALPHA EFF	09:46	30	12305	410	3.37	DETL	Outside 2 sigma for >= 2 days
	BETA EFF	09:46	30	3.70E+05	12300	-0.0	GOOD	

Reviewed by 

Date 4/17/06

General Engineering Laboratories, LLC

Gas Flow Proportional Counter Checks for 26-APR-2006

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LB4100A1	ALPHA BKG	09:49	60	7.00	0.12	1.7	GOOD	<i>α only lockout</i>
	BETA BKG	09:49	60	64.0	1.07	0.94	GOOD	
	ALPHA EFF	10:21	30	23430	781	-0.3	GOOD	
	BETA EFF	10:21	30	1.78E+05	5930	0.54	GOOD	
LB4100A2	ALPHA BKG	09:49	60	2.00	0.03	-0.95	GOOD	
	BETA BKG	09:49	60	51.0	0.85	-0.04	GOOD	
	ALPHA EFF	10:21	30	15486	516	-1	GOOD	
	BETA EFF	10:21	30	1.31E+05	4370	1.02	GOOD	
LB4100A3	ALPHA BKG	09:49	60	7.00	0.12	0.22	GOOD	
	BETA BKG	09:49	60	49.0	0.82	-0.68	GOOD	
	ALPHA EFF	10:21	30	20122	671	-2.3	GOOD	
	BETA EFF	10:21	30	1.65E+05	5520	2.28	GOOD	
<u>LB4100A4</u>	ALPHA BKG	09:49	60	0	0	-1.1	GOOD	
	BETA BKG	09:49	60	70.0	1.17	0.65	PEND	
	ALPHA EFF	10:21	30	18130	604	-4.2	RERUN	
	BETA EFF	10:21	30	1.76E+05	5870	3.26	DETL	Outside 2 sigma for >= 2 days
LB4100B1	ALPHA BKG	09:49	60	0	0	-1.1	GOOD	
	BETA BKG	09:49	60	70.0	1.17	1.68	GOOD	
	ALPHA EFF	10:21	30	21364	712	0.29	PEND	
	BETA EFF	10:21	30	1.85E+05	6180	-0.29	GOOD	
LB4100B2	ALPHA BKG	09:49	60	1.00	0.02	-0.74	GOOD	
	BETA BKG	09:49	60	48.0	0.8	-0.25	GOOD	
	ALPHA EFF	10:21	30	20873	696	-0.16	GOOD	
	BETA EFF	10:21	30	1.62E+05	5410	-0.06	GOOD	
LB4100B3	ALPHA BKG	09:49	60	0	0	-1.3	GOOD	
	BETA BKG	09:49	60	60.0	1	-1.5	GOOD	
	ALPHA EFF	10:21	30	15856	529	0.01	PEND	
	BETA EFF	10:21	30	1.22E+05	4070	0.41	GOOD	
<u>LB4100B4</u>	ALPHA BKG	09:49	60	4.00	0.07	0.86	GOOD	
	BETA BKG	09:49	60	232	3.87	28.1	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	10:21	30	19133	638	0.67	PEND	
	BETA EFF	10:21	30	1.54E+05	5130	0.5	GOOD	
LB4100C1	ALPHA BKG	09:49	60	16.0	0.27	0.39	GOOD	
	BETA BKG	09:49	60	66.0	1.1	-0.62	GOOD	
	ALPHA EFF	10:21	30	22226	741	1.09	PEND	
	BETA EFF	10:21	30	1.35E+05	4500	0.22	PEND	
LB4100C2	ALPHA BKG	09:49	60	4.00	0.07	-0.14	GOOD	
	BETA BKG	09:49	60	43.0	0.72	-1.4	GOOD	
	ALPHA EFF	10:21	30	21916	731	0.68	GOOD	
	BETA EFF	10:21	30	1.91E+05	6360	0.13	PEND	

α only lockout
β lockout

LB4100C3	ALPHA BKG	09:49	60	1.00	0.02	-1.1	GOOD	
	BETA BKG	09:49	60	55.0	0.92	0.33	GOOD	
	ALPHA EFF	10:21	30	16960	565	0.54	GOOD	
	BETA EFF	10:21	30	1.36E+05	4540	0.67	GOOD	
LB4100C4	ALPHA BKG	09:49	60	1.00	0.02	-1.2	GOOD	
	BETA BKG	09:49	60	28.0	0.47	-2.1	GOOD	
	ALPHA EFF	10:21	30	24728	824	0.75	GOOD	
	BETA EFF	10:21	30	2.20E+05	7320	0.71	GOOD	
<u>LB4100D1</u>	ALPHA BKG	09:49	60	22.0	0.37	6.14	DETL	Outside 2 sigma for >= 2 days
	BETA BKG	09:49	60	56.0	0.93	0.77	GOOD	
	ALPHA EFF	10:21	30	26583	886	-0.38	GOOD	
	BETA EFF	10:21	30	2.38E+05	7950	0.3	GOOD	
LB4100D2	ALPHA BKG	09:49	60	10.0	0.17	0.26	GOOD	
	BETA BKG	09:49	60	65.0	1.08	0.6	GOOD	
	ALPHA EFF	10:21	30	19466	649	0.1	GOOD	
	BETA EFF	10:21	30	1.47E+05	4920	-1	GOOD	
LB4100D3	ALPHA BKG	09:49	60	6.00	0.1	1.02	GOOD	
	BETA BKG	09:49	60	47.0	0.78	0.12	GOOD	
	ALPHA EFF	10:21	30	18434	614	-0.36	GOOD	
	BETA EFF	10:21	30	1.48E+05	4940	0.07	GOOD	
LB4100D4	ALPHA BKG	09:49	60	1.00	0.02	-1.3	GOOD	
	BETA BKG	09:49	60	39.0	0.65	-1.5	GOOD	
	ALPHA EFF	10:21	30	20767	692	-0.96	GOOD	
	BETA EFF	10:21	30	1.82E+05	6050	0.65	GOOD	
LB4100E1	ALPHA BKG	09:26	60	13.0	0.22	0.59	GOOD	
	BETA BKG	09:26	60	81.0	1.35	0.48	GOOD	
	ALPHA EFF	10:10	30	33167	1110	-0.69	GOOD	
	BETA EFF	10:10	30	2.13E+05	7100	0.43	GOOD	
LB4100E2	ALPHA BKG	09:26	60	6.00	0.1	-0.52	GOOD	
	BETA BKG	09:26	60	105	1.75	0.32	GOOD	
	ALPHA EFF	10:10	30	35074	1170	-0.03	GOOD	
	BETA EFF	10:10	30	2.88E+05	9600	0.28	GOOD	
LB4100E3	ALPHA BKG	09:26	60	2.00	0.03	-1.1	GOOD	
	BETA BKG	09:26	60	67.0	1.12	0.37	GOOD	
	ALPHA EFF	10:10	30	35451	1180	-0.34	GOOD	
	BETA EFF	10:10	30	2.26E+05	7540	-0.99	GOOD	
LB4100E4	ALPHA BKG	09:26	60	7.00	0.12	-0.21	GOOD	
	BETA BKG	09:26	60	108	1.8	-0.29	GOOD	
	ALPHA EFF	10:10	30	30748	1020	0.19	GOOD	
	BETA EFF	10:10	30	2.24E+05	7470	-0.28	GOOD	
<u>LB4100F1</u>	ALPHA BKG	09:26	60	1.00	0.02	-1.5	GOOD	
	BETA BKG	09:26	60	74.0	1.23	2.48	GOOD	
	ALPHA EFF	10:10	30	29117	971	0.74	GOOD	
	BETA EFF	10:10	30	207	6.9	-34	DETL	Outside 3 sigma for > 2 days

<u>LB4100F2</u>	ALPHA BKG	09:26	60	2.00	0.03	-1.6	GOOD	
	BETA BKG	09:26	60	79.0	1.32	1.7	PEND	
	ALPHA EFF	10:10	30	27901	930	<u>2.36</u>	DETL	Outside 2 sigma for >= 2 days
	BETA EFF	10:10	30	2.14E+05	7130	-1.1	GOOD	
LB4100F3	ALPHA BKG	09:26	60	5.00	0.08	-1.3	GOOD	
	BETA BKG	09:26	60	100	1.67	1.79	GOOD	
	ALPHA EFF	10:10	30	27411	914	0.16	GOOD	
	BETA EFF	10:10	30	2.62E+05	8740	1.39	GOOD	
LB4100F4	ALPHA BKG	09:26	60	2.00	0.03	-0.25	GOOD	
	BETA BKG	09:26	60	53.0	0.88	-0.05	GOOD	
	ALPHA EFF	10:10	30	25102	837	-1.3	GOOD	
	BETA EFF	10:10	30	1.99E+05	6630	0.8	GOOD	
<u>LB4100G1</u>	ALPHA BKG	09:26	60	6.00	0.1	-1	GOOD	
	BETA BKG	09:26	60	120	2	<u>3.02</u>	DETL	Outside 2 sigma for >= 2 days
	ALPHA EFF	10:10	30	32099	1070	0.88	GOOD	
	BETA EFF	10:10	30	2.21E+05	7370	-0.4	GOOD	
LB4100G2	ALPHA BKG	09:26	60	2.00	0.03	-0.79	GOOD	
	BETA BKG	09:26	60	51.0	0.85	0.61	GOOD	
	ALPHA EFF	10:10	30	31533	1050	-0.21	GOOD	
	BETA EFF	10:10	30	2.81E+05	9370	-0.73	GOOD	
LB4100G3	ALPHA BKG	09:26	60	12.0	0.2	-0.09	GOOD	
	BETA BKG	09:26	60	61.0	1.02	0.14	GOOD	
	ALPHA EFF	10:10	30	22621	754	0.71	GOOD	
	BETA EFF	10:10	30	2.44E+05	8140	-1.1	GOOD	
LB4100G4	ALPHA BKG	09:26	60	8.00	0.13	1.84	GOOD	
	BETA BKG	09:26	60	57.0	0.95	0.01	GOOD	
	ALPHA EFF	10:10	30	15439	515	1.6	GOOD	
	BETA EFF	10:10	30	1.51E+05	5040	0.06	GOOD	
LB4100H1	ALPHA BKG	09:26	60	5.00	0.08	-0.19	GOOD	
	BETA BKG	09:26	60	46.0	0.77	0.55	GOOD	
	ALPHA EFF	10:10	30	29137	971	-0.92	GOOD	
	BETA EFF	10:10	30	1.39E+05	4630	-0.97	GOOD	
LB4100H2	ALPHA BKG	09:26	60	2.00	0.03	-0.77	GOOD	
	BETA BKG	09:26	60	51.0	0.85	-0.37	GOOD	
	ALPHA EFF	10:10	30	18262	609	-0.42	GOOD	
	BETA EFF	10:10	30	1.45E+05	4850	-0.6	GOOD	
LB4100H3	ALPHA BKG	09:26	60	6.00	0.1	-0.34	GOOD	
	BETA BKG	09:26	60	42.0	0.7	-0.89	GOOD	
	ALPHA EFF	10:10	30	19378	646	0.06	GOOD	
	BETA EFF	10:10	30	1.52E+05	5080	-0.04	GOOD	
LB4100H4	ALPHA BKG	09:26	60	7.00	0.12	1.14	GOOD	
	BETA BKG	09:26	60	41.0	0.68	-0.9	GOOD	
	ALPHA EFF	10:10	30	18492	616	-0.35	GOOD	
	BETA EFF	10:10	30	1.24E+05	4140	0.43	GOOD	

PIC1A	ALPHA BKG	09:15	60	3.00	0.05	-1.7	GOOD	
	BETA BKG	09:15	60	26.0	0.43	-0.63	GOOD	
	ALPHA EFF	09:56	30	9792	326	-0.99	GOOD	
	BETA EFF	09:56	30	1.95E+05	6510	-0.96	PEND	
PIC1B	ALPHA BKG	09:15	60	5.00	0.08	-0.36	GOOD	
	BETA BKG	09:15	60	15.0	0.25	-1.1	GOOD	
	ALPHA EFF	09:57	30	10974	366	-1.7	GOOD	
	BETA EFF	09:57	30	2.14E+05	7120	-0.64	GOOD	
PIC1C	ALPHA BKG	09:16	60	3.00	0.05	-0.89	GOOD	
	BETA BKG	09:16	60	34.0	0.57	1.08	GOOD	
	ALPHA EFF	09:57	30	15656	522	-0.59	GOOD	
	BETA EFF	09:57	30	2.44E+05	8130	-1.6	GOOD	
PIC1D	ALPHA BKG	09:16	60	5.00	0.08	-0.97	GOOD	
	BETA BKG	09:16	60	38.0	0.63	1.35	GOOD	
	ALPHA EFF	09:57	30	16272	542	-0.84	GOOD	
	BETA EFF	09:57	30	1.88E+05	6250	-0.94	GOOD	
PIC2A	ALPHA BKG	09:16	60	4.00	0.07	-0.61	GOOD	
	BETA BKG	09:16	60	28.0	0.47	-0.17	GOOD	
	ALPHA EFF	09:57	30	15445	515	-1.5	GOOD	
	BETA EFF	09:57	30	2.31E+05	7700	-0.47	GOOD	
<u>PIC2B</u>	ALPHA BKG	09:16	60	5.00	0.08	0.02	GOOD	
	BETA BKG	09:16	60	17.0	0.28	-0.51	GOOD	
	ALPHA EFF	09:57	30	13473	449	2.2	DETL	Outside 2 sigma for >= 2 days
	BETA EFF	09:57	30	2.28E+05	7600	-1.3	GOOD	
PIC2C	ALPHA BKG	09:16	60	5.00	0.08	-0.69	GOOD	
	BETA BKG	09:16	60	20.0	0.33	-0.28	GOOD	
	ALPHA EFF	09:57	30	19133	638	-0.48	GOOD	
	BETA EFF	09:57	30	1.93E+05	6430	-0.47	GOOD	
PIC2D	ALPHA BKG	09:16	60	2.00	0.03	-1.6	GOOD	
	BETA BKG	09:16	60	18.0	0.3	-0.74	GOOD	
	ALPHA EFF	09:57	30	16837	561	-1.4	GOOD	
	BETA EFF	09:57	30	2.24E+05	7460	0.37	GOOD	
PIC3A	ALPHA BKG	09:16	60	6.00	0.1	-0.51	GOOD	
	BETA BKG	09:16	60	18.0	0.3	-0.94	GOOD	
	ALPHA EFF	09:57	30	21922	731	-1.6	GOOD	
	BETA EFF	09:57	30	1.77E+05	5910	0.4	GOOD	
PIC3B	ALPHA BKG	09:16	60	3.00	0.05	-1.5	GOOD	
	BETA BKG	09:16	60	18.0	0.3	-0.94	GOOD	
	ALPHA EFF	09:58	30	20717	691	-0.91	GOOD	
	BETA EFF	09:58	30	1.96E+05	6550	0.47	GOOD	
PIC3C	ALPHA BKG	09:17	60	5.00	0.08	-0.66	GOOD	
	BETA BKG	09:17	60	19.0	0.32	-0.74	GOOD	
	ALPHA EFF	09:58	30	17513	584	-0.98	GOOD	
	BETA EFF	09:58	30	2.11E+05	7030	-0.4	GOOD	

PIC3D	ALPHA BKG	09:17	60	3.00	0.05	-1.5	GOOD	
	BETA BKG	09:17	60	16.0	0.27	-1.3	GOOD	
	ALPHA EFF	09:58	30	24881	829	-1.3	GOOD	
	BETA EFF	09:58	30	2.14E+05	7130	-0.67	GOOD	
PIC4A	ALPHA BKG	09:17	60	6.00	0.1	-0.25	GOOD	
	BETA BKG	09:17	60	23.0	0.38	-0.69	GOOD	
	ALPHA EFF	09:58	30	12769	426	-1.2	GOOD	
	BETA EFF	09:58	30	1.75E+05	5820	-0.35	GOOD	
PIC4B	ALPHA BKG	09:17	60	14.0	0.23	2.44	GOOD	
	BETA BKG	09:17	60	26.0	0.43	-0.06	GOOD	
	ALPHA EFF	09:58	30	17786	593	-1.9	GOOD	
	BETA EFF	09:58	30	2.22E+05	7410	-0.97	GOOD	
PIC4C	ALPHA BKG	09:17	60	10.0	0.17	0.57	GOOD	
	BETA BKG	09:17	60	18.0	0.3	-0.7	GOOD	
	ALPHA EFF	09:58	30	20086	670	-1.7	GOOD	
	BETA EFF	09:58	30	2.01E+05	6710	0.24	GOOD	
PIC4D	ALPHA BKG	09:17	60	5.00	0.08	-0.62	GOOD	
	BETA BKG	09:17	60	16.0	0.27	-1.1	GOOD	
	ALPHA EFF	09:59	30	20236	675	-1.5	GOOD	
	BETA EFF	09:59	30	2.11E+05	7050	0.66	GOOD	
<u>PIC5A</u>	ALPHA BKG	09:17	60	5.00	0.08	0.05	GOOD	
	BETA BKG	09:17	60	17.0	0.28	-0.97	GOOD	
	ALPHA EFF	09:59	30	11363	379	-0.6	GOOD	
	BETA EFF	09:59	30	3.97E+05	13200	-2.7	DETL	Outside 2 sigma for >= 2 days
<u>PIC5B</u>	ALPHA BKG	09:18	60	3.00	0.05	-0.64	GOOD	
	BETA BKG	09:18	60	129	2.15	0.55	RERUN	
	ALPHA EFF	09:59	30	10243	341	-0.13	GOOD	
	BETA EFF	09:59	30	3.48E+05	11600	0.06	GOOD	
<u>PIC5C</u>	ALPHA BKG	09:18	60	3.00	0.05	0.41	GOOD	
	BETA BKG	09:18	60	14.0	0.23	-1.5	GOOD	
	ALPHA EFF	09:59	30	10120	337	-0.87	GOOD	
	BETA EFF	09:59	30	3.85E+05	12800	3.1	DETL	Outside 2 sigma for >= 2 days
PIC5D	ALPHA BKG	09:18	60	2.00	0.03	-0.36	GOOD	
	BETA BKG	09:18	60	20.0	0.33	0.04	GOOD	
	ALPHA EFF	09:59	30	8726	291	-0.97	GOOD	
	BETA EFF	09:59	30	3.09E+05	10300	-1.1	GOOD	
<u>PIC6A</u>	ALPHA BKG	09:18	60	5.00	0.08	0.38	GOOD	
	BETA BKG	09:18	60	22.0	0.37	0	GOOD	
	ALPHA EFF	09:59	30	8019	267	-0.47	GOOD	
	BETA EFF	09:59	30	2.79E+05	9310	-2.5	DETL	Outside 2 sigma for >= 2 days
PIC6B	ALPHA BKG	09:18	60	3.00	0.05	0.22	GOOD	
	BETA BKG	09:18	60	21.0	0.35	1.07	GOOD	
	ALPHA EFF	10:00	30	10229	341	-0.66	GOOD	
	BETA EFF	10:00	30	2.89E+05	9630	-1.9	GOOD	

PIC6C	ALPHA BKG	09:18	60	2.00	0.03	-0.42	GOOD
	BETA BKG	09:18	60	22.0	0.37	0.89	GOOD
	ALPHA EFF	10:00	30	14504	483	-0.53	GOOD
	BETA EFF	10:00	30	3.50E+05	11700	-1.9	GOOD
PIC6D	ALPHA BKG	09:19	60	6.00	0.1	1.09	GOOD
	BETA BKG	09:19	60	29.0	0.48	0.85	GOOD
	ALPHA EFF	10:00	30	11114	370	-0.72	GOOD
	BETA EFF	10:00	30	3.58E+05	11900	-2	GOOD
PIC7A	ALPHA BKG	09:19	60	6.00	0.1	-0.2	GOOD
	BETA BKG	09:19	60	29.0	0.48	-0.47	GOOD
	ALPHA EFF	10:00	30	9833	328	-0.5	GOOD
	BETA EFF	10:00	30	3.76E+05	12500	-2.4	GOOD
PIC7B	ALPHA BKG	09:19	60	16.0	0.27	-0.5	GOOD
	BETA BKG	09:19	60	33.0	0.55	-0.47	GOOD
	ALPHA EFF	10:00	30	10200	340	-0.62	GOOD
	BETA EFF	10:00	30	3.17E+05	10600	-0.68	GOOD
PIC7C	ALPHA BKG	09:19	60	6.00	0.1	-0.56	GOOD
	BETA BKG	09:19	60	15.0	0.25	-1	GOOD
	ALPHA EFF	10:00	30	11661	389	-0.31	GOOD
	BETA EFF	10:00	30	3.79E+05	12600	-0.97	GOOD
PIC7D	ALPHA BKG	09:19	60	5.00	0.08	-0.8	GOOD
	BETA BKG	09:19	60	19.0	0.32	-0.66	GOOD
	ALPHA EFF	10:00	30	8179	273	-0.65	GOOD
	BETA EFF	10:00	30	2.81E+05	9380	-0.42	GOOD
PIC8A	ALPHA BKG	09:19	60	3.00	0.05	-0.83	GOOD
	BETA BKG	09:19	60	27.0	0.45	-0.75	GOOD
	ALPHA EFF	10:01	30	13226	441	0.28	GOOD
	BETA EFF	10:01	30	3.71E+05	12400	-2.2	GOOD
PIC8B	ALPHA BKG	09:19	60	2.00	0.03	-0.65	GOOD
	BETA BKG	09:19	60	61.0	1.02	-0.24	GOOD
	ALPHA EFF	10:01	30	9345	312	-1.1	GOOD
	BETA EFF	10:01	30	3.69E+05	12300	-0.52	GOOD
PIC8C	ALPHA BKG	09:20	60	16.0	0.27	-0.5	GOOD
	BETA BKG	09:20	60	30.0	0.5	-0.35	GOOD
	ALPHA EFF	10:01	30	14622	487	-0.31	GOOD
	BETA EFF	10:01	30	4.25E+05	14200	-0.86	GOOD
PIC8D	ALPHA BKG	09:20	60	12.0	0.2	-0.46	GOOD
	BETA BKG	09:20	60	61.0	1.02	-0.55	GOOD
	ALPHA EFF	10:01	30	10965	366	1.41	GOOD
	BETA EFF	10:01	30	3.70E+05	12300	-0.04	GOOD

Reviewed by 

Date 4/26/06

General Engineering Laboratories, LLC

Review of Alpha Spectrometer QA results (Daily checks) 26-APR-2006 14:21:05.85

Starting with bank 1

Ending with bank 19

	Detector	Parameter	Flag
26-APR-2006	6	PSFWHM-5000	Below
26-APR-2006	6	PSENERGY-5000	Above
26-APR-2006	6	PSCENTRD-5000	Above
26-APR-2006	14	PSFWHM-5000	Below
26-APR-2006	14	PSENERGY-5000	Above
26-APR-2006	22	PSENERGY-5000	Above
26-APR-2006	24	PSFWHM-5000	Below
26-APR-2006	25	PSFWHM-5000	Below
26-APR-2006	25	PSCENTRD-5000	Below
26-APR-2006	28	PSFWHM-5000	Above
26-APR-2006	39	PSENERGY-5000	Above
26-APR-2006	66	PSFWHM-5000	Above
26-APR-2006	67	PSFWHM-5000	Above
26-APR-2006	67	PSENERGY-5000	Above
26-APR-2006	68	PSFWHM-5000	Above
26-APR-2006	71	PSFWHM-5000	Below
26-APR-2006	71	PSENERGY-5000	Above
26-APR-2006	79	PSFWHM-5000	Below
26-APR-2006	79	PSENERGY-5000	Below
26-APR-2006	81	PSENERGY-5000	Above
26-APR-2006	84	PSENERGY-5000	Above
26-APR-2006	96	PSFWHM-5000	Above

26-APR-2006	97	PSENERGY-5000	Above
26-APR-2006	101	PSFWHM-5000	Above
26-APR-2006	105	PSENERGY-5000	Above
26-APR-2006	106	PSFWHM-5000	Above
26-APR-2006	108	PSFWHM-5000	Above
26-APR-2006	109	PSFWHM-5000	Above
26-APR-2006	115	PSFWHM-5000	Above
26-APR-2006	131	PSFWHM-5000	Above

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

APPROVAL DATE: 4.26.06

APPROVAL TIME: 14:25

APPROVED BY:

JKB

PROCEDURE # GL-RAD-I-009

Report completed at 26-APR-2006 14:22:45.80

Review of QA results (Daily checks) 26-APR-2006 14:22:46.96

Starting with bank 1

Ending with bank 19

This is a list of Detectors that may not have properly transferred to the QA file

APPROVAL DATE: 4.26.06 APPROVAL TIME: 14:25

APPROVED BY: SRB PROCEDURE # GL-RAD-I-009

Report completed at 26-APR-2006 14:23:33.03

Starting with bank 1
Ending with bank 19

	Detector	Parameter	Flag
27-APR-2006	6	PSFWHM-5000	Below
27-APR-2006	6	PSENERGY-5000	Above
27-APR-2006	6	PSCENTRD-5000	Above
27-APR-2006	14	PSFWHM-5000	Below
27-APR-2006	14	PSENERGY-5000	Above
27-APR-2006	22	PSENERGY-5000	Above
27-APR-2006	24	PSFWHM-5000	Below
27-APR-2006	25	PSFWHM-5000	Below
27-APR-2006	25	PSCENTRD-5000	Below
27-APR-2006	28	PSFWHM-5000	Above
27-APR-2006	39	PSENERGY-5000	Above
27-APR-2006	66	PSFWHM-5000	Above
27-APR-2006	67	PSFWHM-5000	Above
27-APR-2006	67	PSENERGY-5000	Above
27-APR-2006	67	PSCENTRD-5000	Above
27-APR-2006	68	PSFWHM-5000	Above
27-APR-2006	71	PSFWHM-5000	Below
27-APR-2006	71	PSENERGY-5000	Above
27-APR-2006	79	PSENERGY-5000	Above
27-APR-2006	79	PSCENTRD-5000	Above
27-APR-2006	81	PSENERGY-5000	Above
27-APR-2006	84	PSENERGY-5000	Above

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27-APR-2006	96	PSFWHM-5000	Above
27-APR-2006	97	PSENERGY-5000	Above
27-APR-2006	101	PSFWHM-5000	Above
27-APR-2006	105	PSENERGY-5000	Above
27-APR-2006	106	PSFWHM-5000	Above
27-APR-2006	108	PSFWHM-5000	Above
27-APR-2006	109	PSFWHM-5000	Above
27-APR-2006	115	PSFWHM-5000	Above
27-APR-2006	131	PSFWHM-5000	Above

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

APPROVAL DATE: *4/27/06* APPROVAL TIME: *1555*

APPROVED BY: *MB* PROCEDURE # GL-RAD-I-009

Report completed at 27-APR-2006 15:53:01.13

Review of QA results (Daily checks) 27-APR-2006 15:53:02.33

Starting with bank 1

Ending with bank 19

This is a list of Detectors that may not have properly transferred to the QA file

APPROVAL DATE: 4/27/06

APPROVAL TIME: 1555

APPROVED BY: *MD*

PROCEDURE # GL-RAD-I-009

Report completed at 27-APR-2006 15:53:48.65

Starting with bank 1

Ending with bank 19

	Detector	Parameter	Flag
28-APR-2006	6	PSFWHM-5000	Below
28-APR-2006	6	PSENERGY-5000	Above
28-APR-2006	6	PSCENTRD-5000	Above
28-APR-2006	14	PSFWHM-5000	Below
28-APR-2006	14	PSENERGY-5000	Above
28-APR-2006	22	PSENERGY-5000	Above
28-APR-2006	24	PSFWHM-5000	Below
28-APR-2006	25	PSFWHM-5000	Below
28-APR-2006	25	PSCENTRD-5000	Below
28-APR-2006	28	PSFWHM-5000	Above
28-APR-2006	39	PSENERGY-5000	Above
28-APR-2006	66	PSFWHM-5000	Above
28-APR-2006	67	PSFWHM-5000	Below
28-APR-2006	67	PSENERGY-5000	Above
28-APR-2006	68	PSFWHM-5000	Above
28-APR-2006	71	PSFWHM-5000	Below
28-APR-2006	71	PSENERGY-5000	Above
28-APR-2006	81	PSENERGY-5000	Above
28-APR-2006	84	PSENERGY-5000	Above
28-APR-2006	96	PSFWHM-5000	Above
28-APR-2006	97	PSENERGY-5000	Above
28-APR-2006	101	PSFWHM-5000	Above

MLD 4/24/06

28-APR-2006	105	PSFWHM-5000	Above
28-APR-2006	105	PSENERGY-5000	Above
28-APR-2006	106	PSFWHM-5000	Above
28-APR-2006	108	PSFWHM-5000	Above
28-APR-2006	109	PSFWHM-5000	Above
28-APR-2006	115	PSFWHM-5000	Above
28-APR-2006	131	PSFWHM-5000	Above

DETECTORS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

APPROVAL DATE: *4/28/06* APPROVAL TIME: *1605*

APPROVED BY: *[Signature]* PROCEDURE # GL-RAD-I-009

Report completed at 28-APR-2006 16:02:00.35

Review of QA results (Daily checks) 28-APR-2006 16:02:01.56

Starting with bank 1

Ending with bank 19

This is a list of Detectors that may not have properly transferred to the QA file

APPROVAL DATE: 4/28/06 APPROVAL TIME: 1605

APPROVED BY: *CLB* PROCEDURE # GL-RAD-I-009

Report completed at 28-APR-2006 16:02:43.18

QA filename : DKA300:[CANBERRA.GAMMA]QC_GAMMA3.QAF;3
 Sample ID : QC_GAMMA3 Sample quantity : 1.00 LITER
 Sample date : 1-APR-2002 12:00:00 Acquisition date : 24-APR-2006 12:15:23
 Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:00.96

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	174	180	176	
PEAK CENTROID (CHANS) CS-137	1320	1326	1321	
PEAK CENTROID (CHANS) CO-60	2659	2663	2660	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	661	
*PEAK ENERGY (keV) CO-60	1330	1334	1331	
*PEAK FWHM (keV) CD-109	0.1	2.0	1.3	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.7	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.6	
*DECAY CORR. ACT. (pCi) CD-109	7.59E+05	9.28E+05	8.26E+05	
*DECAY CORR. ACT. (pCi) CS-137	2.50E+04	3.06E+04	2.80E+04	
*DECAY CORR. ACT. (pCi) CO-60	3.67E+04	4.49E+04	4.09E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: *me*

Approval Date: 4 / 24 / 06

QA filename : DKA300:[CANBERRA.GAMMA]QC_GAMMA6.QAF;5

Sample ID : QC_GAMMA6 Sample quantity : 1.00 LITER
 Sample date : 1-JAN-2001 12:00:00 Acquisition date : 24-APR-2006 05:02:44
 Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:00.97

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	172	180	178	
PEAK CENTROID (CHANS) CS-137	1319	1327	1323	
PEAK CENTROID (CHANS) CO-60	2661	2669	2662	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	662	
*PEAK ENERGY (keV) CO-60	1330	1334	1333	
*PEAK FWHM (keV) CD-109	0.1	2.0	1.1	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.6	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.2	
DECAY CORR ACTIVITY (pCi) CD-109	7.32E+05	8.94E+05	8.78E+05	
DECAY CORR ACTIVITY (pCi) CS-137	2.42E+04	2.96E+04	2.78E+04	
DECAY CORR. ACTIVITY (pCi) CO-60	3.64E+04	4.45E+04	4.13E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: *pcy*

Approval Date: 4 / 24 / 06

QA filename : DKA300:[CANBERRA.GAMMA]QC_GAMMA9.QAF;3

Sample ID : QC_GAMMA9 Sample quantity : 1.00 LITER
Sample date : 1 JAN-2001 12:00:00 Acquisition date : 24-APR-2006 05:31:42
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:01.39

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	172	180	176	
PEAK CENTROID (CHANS) CS-137	1319	1327	1321	
PEAK CENTROID (CHANS) CO-60	2661	2669	2661	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	662	
*PEAK ENERGY (keV) CO-60	1330	1334	1332	
*PEAK FWHM (keV) CD-109	0.1	2.0	0.9	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.5	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.2	
DECAY CORR. ACT. (pCi) CD-109	7.14E+05	9.98E+05	8.71E+05	
DECAY CORR. ACT. (pCi) CS-137	2.66E+04	3.14E+04	3.13E+04	
DECAY CORR. ACT. (pCi) CO-60	3.84E+04	4.52E+04	4.37E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: *my* Approval Date: 4 / 24 / 06

QA filename : DKA300:[CANBERRA.GAMMA]QC_WELL.QAF;4

Sample ID : QC_WELL Sample quantity : 1.00 LITER
Sample date : 1-APR-2002 12:00:00 Acquisition date : 24-APR-2006 05:13:04
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:01.70

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	170	178	175	
PEAK CENTROID (CHANS) CS-137	1310	1318	1314	
PEAK CENTROID (CHANS) CO-60	2644	2652	2647	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	662	
*PEAK ENERGY (keV) CO-60	1330	1334	1332	
*PEAK FWHM (keV) CD-109	0.1	2.0	1.4	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.7	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.3	
*DECAY CORR. ACT. (pCi) CD-109	7.40E+05	9.90E+05	8.01E+05	
*DECAY CORR. ACT. (pCi) CS-137	2.50E+04	3.06E+04	2.85E+04	
*DECAY CORR. ACT. (pCi) CO-60	3.67E+04	4.49E+04	3.91E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: *pmj* Approval Date: 4 / 24 / 04

VMS Quality Assurance Report V1.3 Generated 25-APR-2006 05:49:03

QA filename : DKA300:[CANBERRA.GAMMA]QC_GAMMA3.QAF;3

Sample ID : QC_GAMMA3 Sample quantity : 1.00 LITER
 Sample date : 1-APR-2002 12:00:00 Acquisition date : 25-APR-2006 05:41:06
 Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:00.98

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	174	180	177	
PEAK CENTROID (CHANS) CS-137	1320	1326	1322	
PEAK CENTROID (CHANS) CO-60	2659	2663	2661	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	661	
*PEAK ENERGY (keV) CO-60	1330	1334	1332	
*PEAK FWHM (keV) CD-109	0.1	2.0	1.3	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.8	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.2	
*DECAY CORR. ACT. (pCi) CD-109	7.59E+05	9.28E+05	7.70E+05	
*DECAY CORR. ACT. (pCi) CS-137	2.50E+04	3.06E+04	2.86E+04	
*DECAY CORR. ACT. (pCi) CO-60	3.67E+04	4.49E+04	4.06E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: *mu* Approval Date: 4 / 25 / 06

QA filename : DKA300:[CANBERRA.GAMMA]QC_WELL.QAF;4

Sample ID : QC_WELL Sample quantity : 1.00 LITER
Sample date : 1-APR-2002 12:00:00 Acquisition date : 25-APR-2006 05:50:55
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:01.71

Out-of-range Test: BOUNDARY

Parameter Description	Lower	Upper	Value	Flag
PEAK CENTROID (CHANS) CD-109	170	178	175	
PEAK CENTROID (CHANS) CS-137	1310	1318	1314	
PEAK CENTROID (CHANS) CO-60	2644	2652	2648	
*PEAK ENERGY (keV) CD-109	86	90	88	
*PEAK ENERGY (keV) CS-137	660	664	662	
*PEAK ENERGY (keV) CO-60	1330	1334	1332	
*PEAK FWHM (keV) CD-109	0.1	2.0	1.4	
*PEAK FWHM (keV) CS-137	0.1	3.0	1.7	
*PEAK FWHM (keV) CO-60	0.1	3.0	2.1	
*DECAY CORR. ACT. (pCi) CD-109	7.40E+05	9.90E+05	8.86E+05	
*DECAY CORR. ACT. (pCi) CS-137	2.50E+04	3.06E+04	2.88E+04	
*DECAY CORR. ACT. (pCi) CO-60	3.67E+04	4.49E+04	4.02E+04	

Flags: "*" means the out-of-range test is parameter-dependent

Approved by: ym Approval Date: 4 / 25 / 06



Ludlum Alpha Scintillation Counter Checks for 11-APR-2006

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LUCAS1	EFF	09:10	.1	12686	126860	1.15	GOOD	
LUCAS2	EFF	09:10	.1	12535	125350	-2	GOOD	
LUCAS3	EFF	09:10	.1	12625	126250	0.15	GOOD	
LUCAS4	EFF	09:10	.1	13880	138800	0.53	GOOD	
LUCAS5	EFF	09:10	.1	13628	136280	-0.41	GOOD	
LUCAS6	EFF	09:10	.1	12443	124430	-0.73	GOOD	

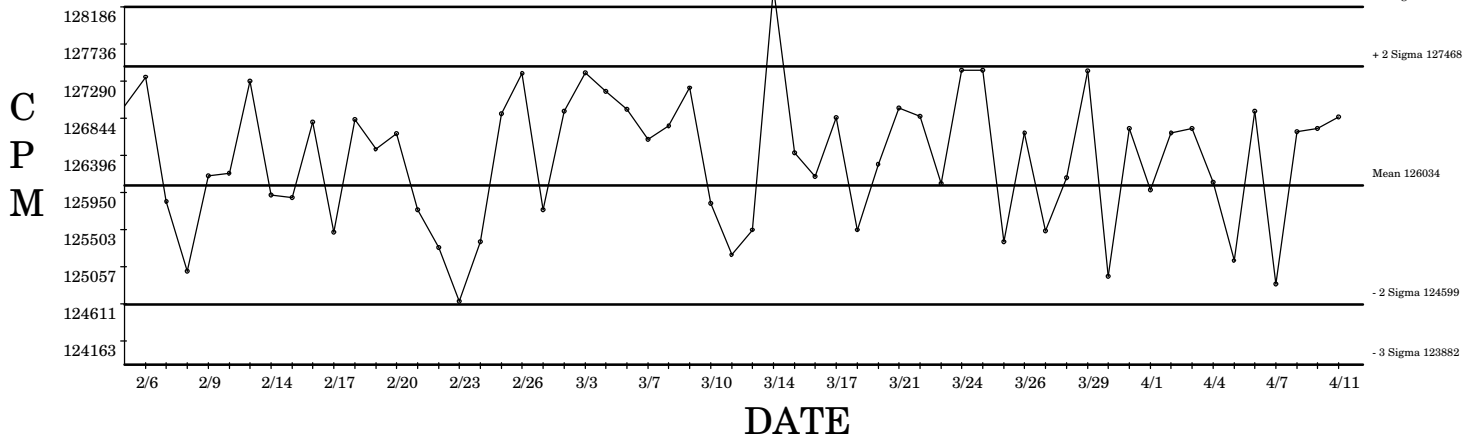
Reviewed by Date 4/11/06

General Engineering Laboratories, LLC

BACKGROUND AND EFFICIENCY DATA

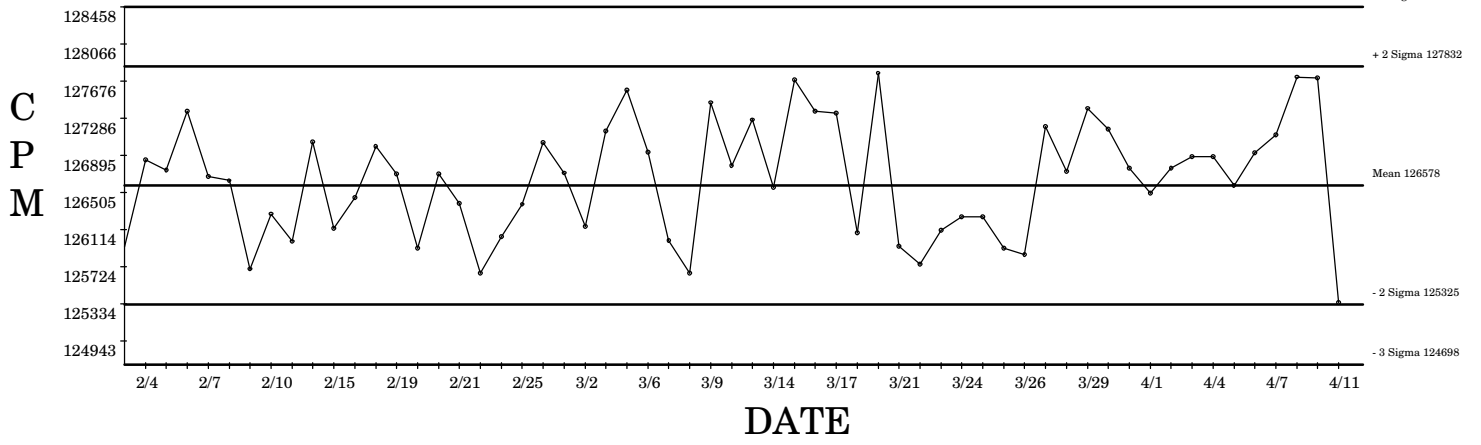
LUCAS1 04/11/2006

EFF

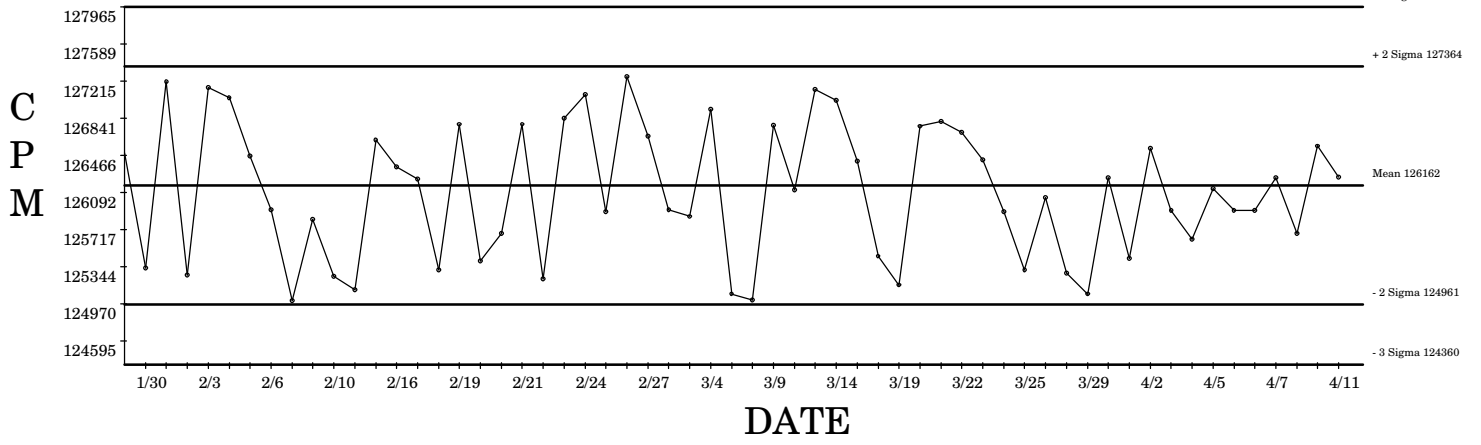


○ Denotes Outlier

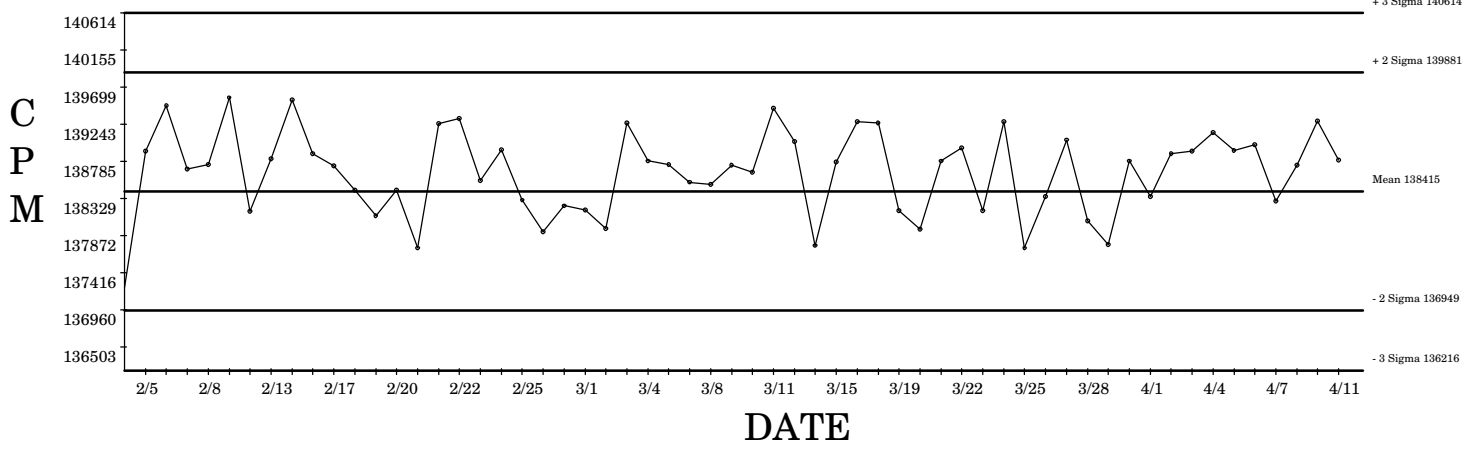
LUCAS2 04/11/2006 EFF



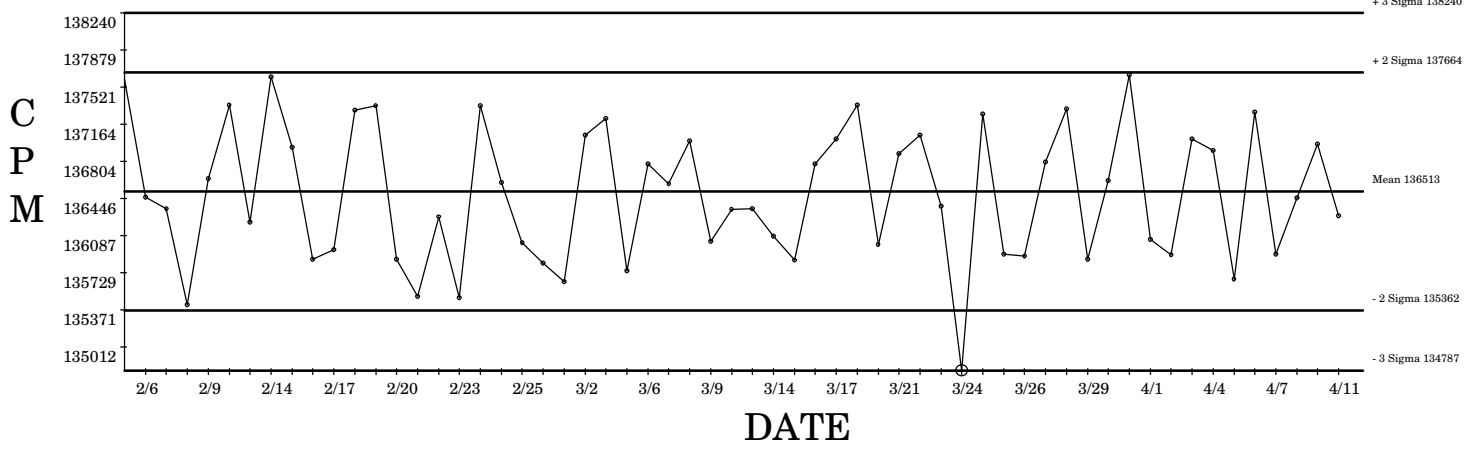
LUCAS3 04/11/2006 EFF



LUCAS4 04/11/2006 EFF

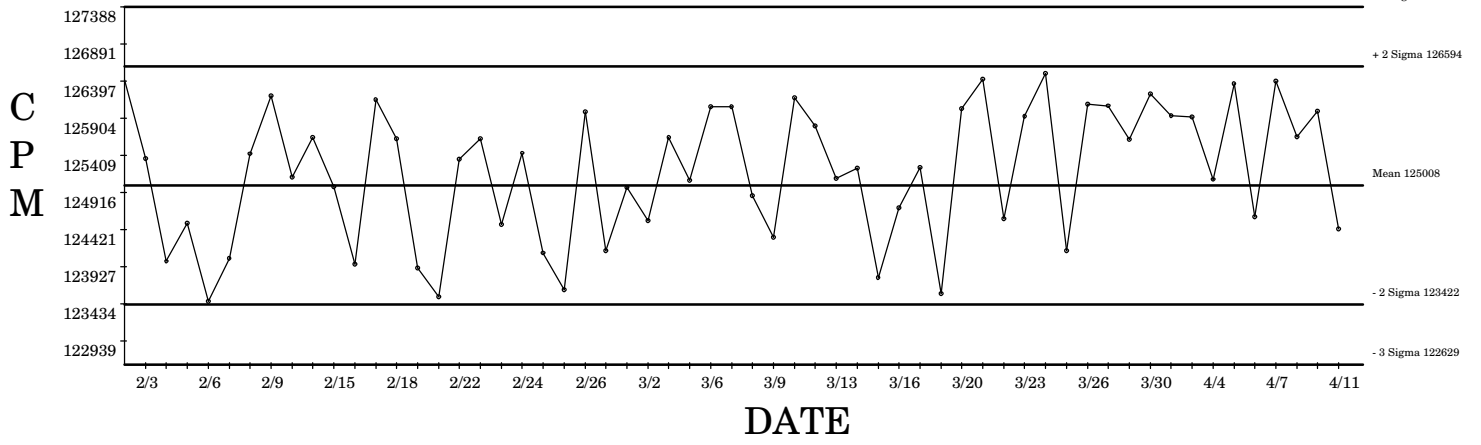


LUCAS5 04/11/2006 EFF

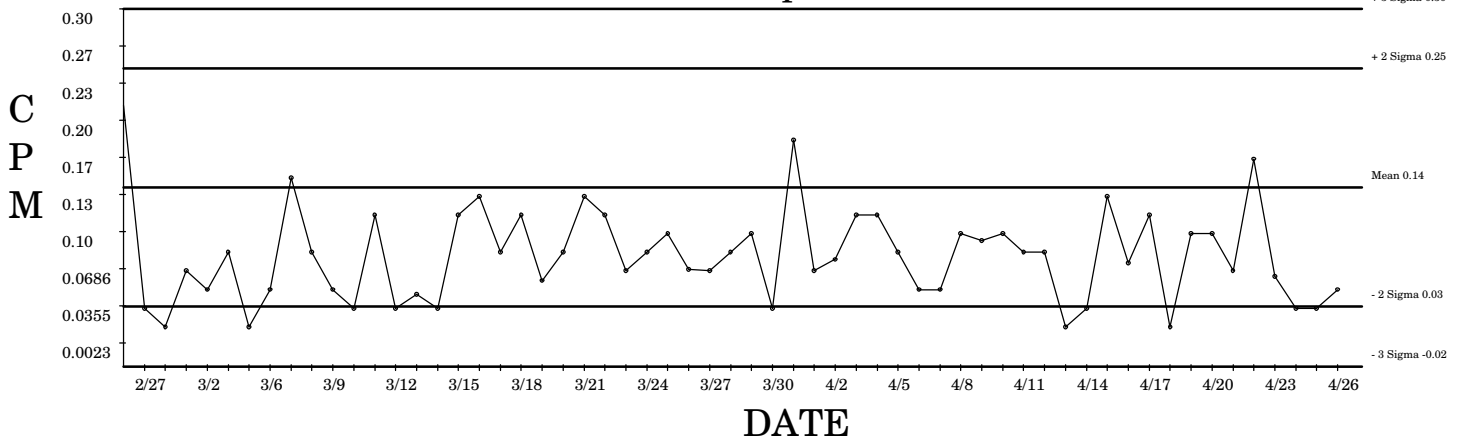


○ Denotes Outlier

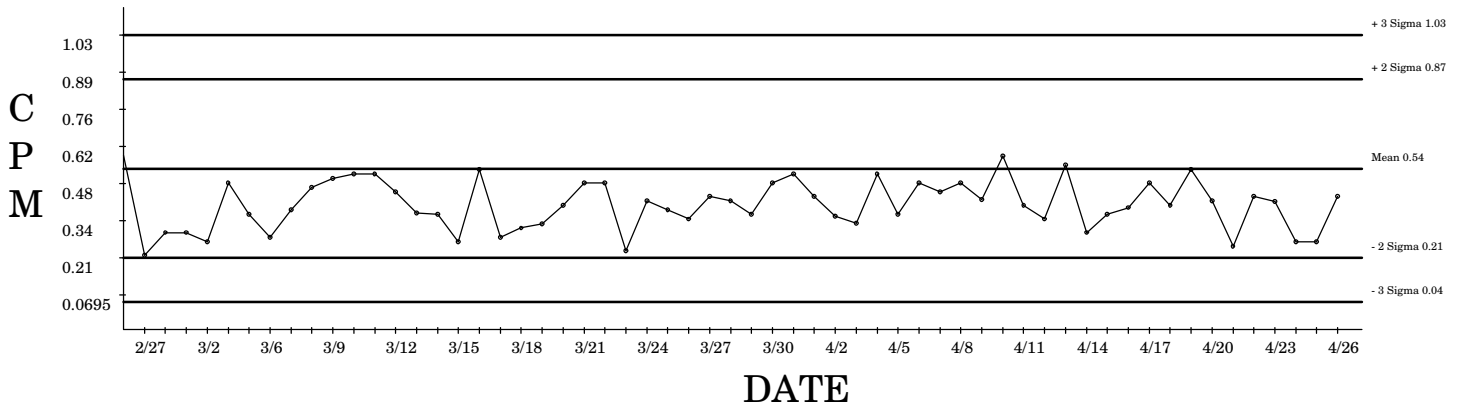
LUCAS6 04/11/2006 EFF



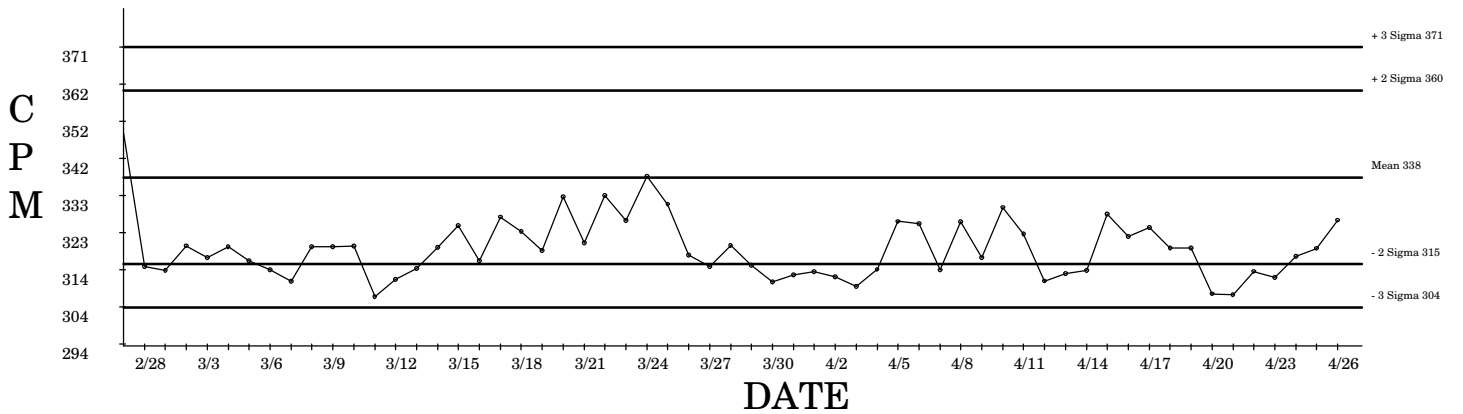
PIC1A 04/26/2006
Alpha BKG



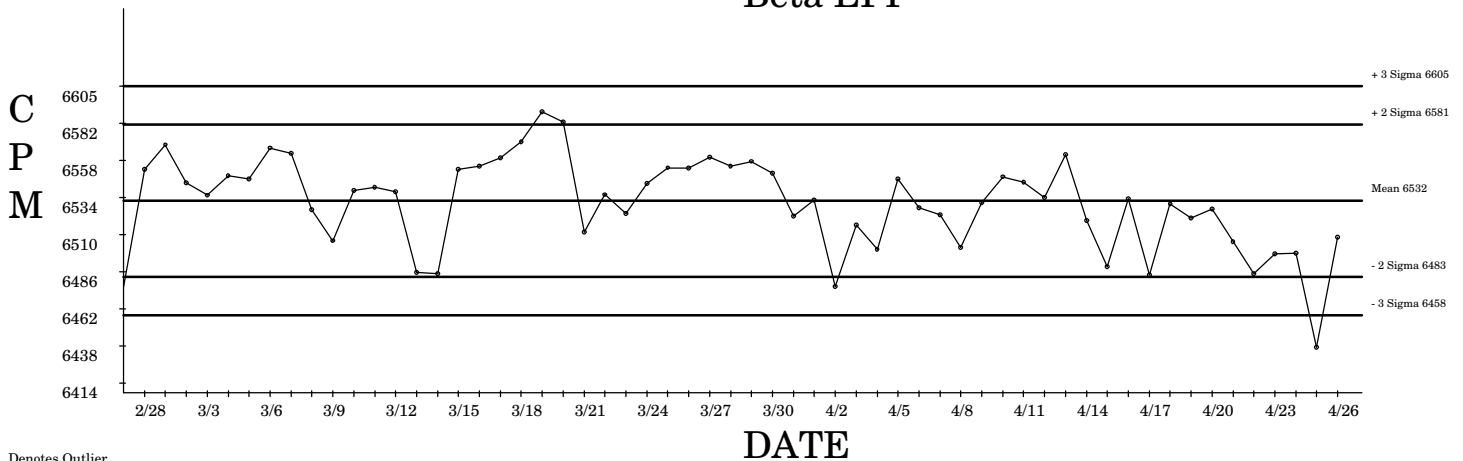
Beta BKG



Alpha EFF

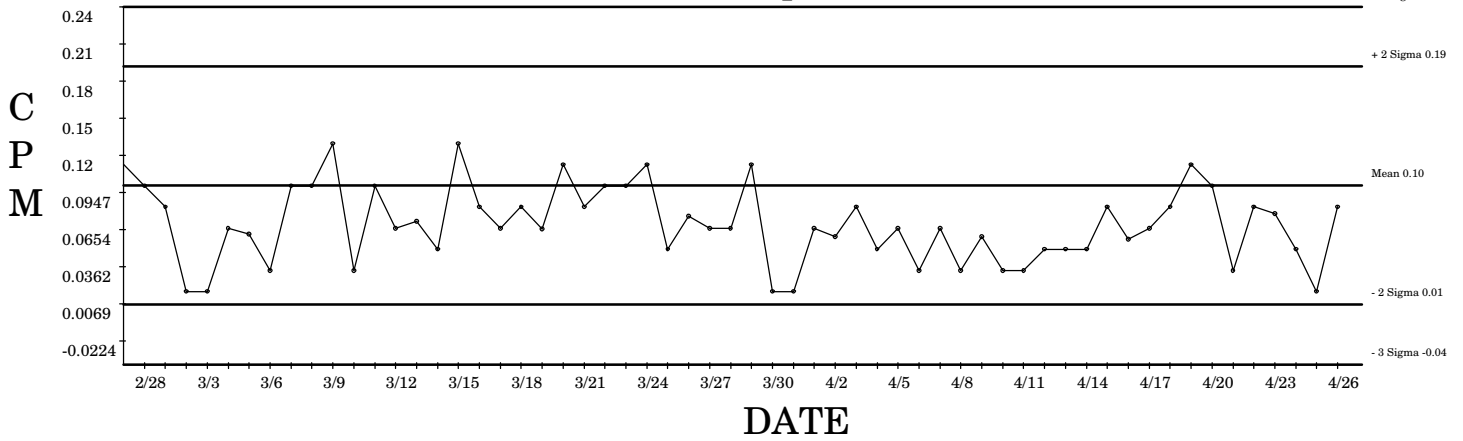


Beta EFF

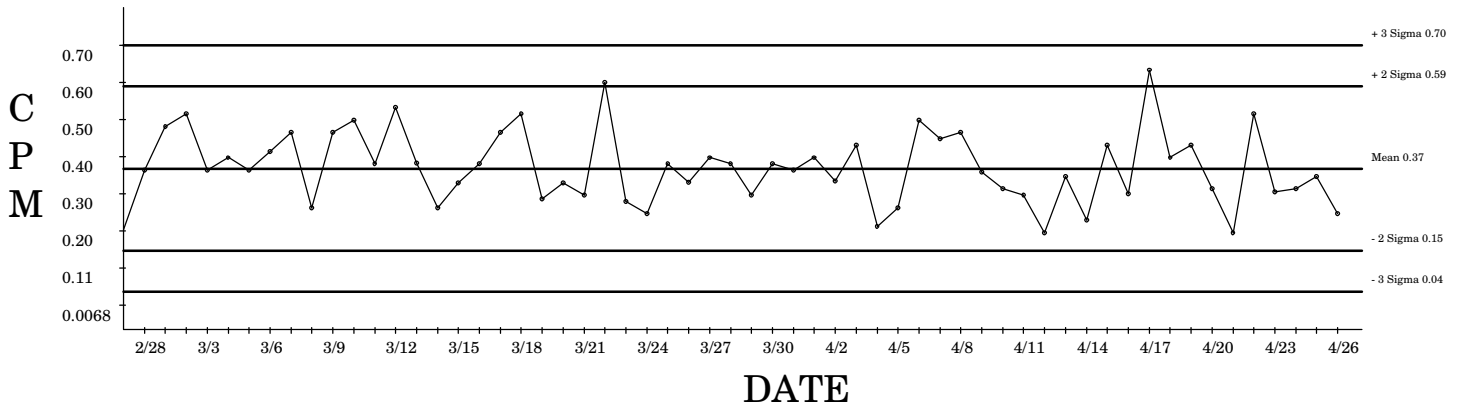


○ Denotes Outlier

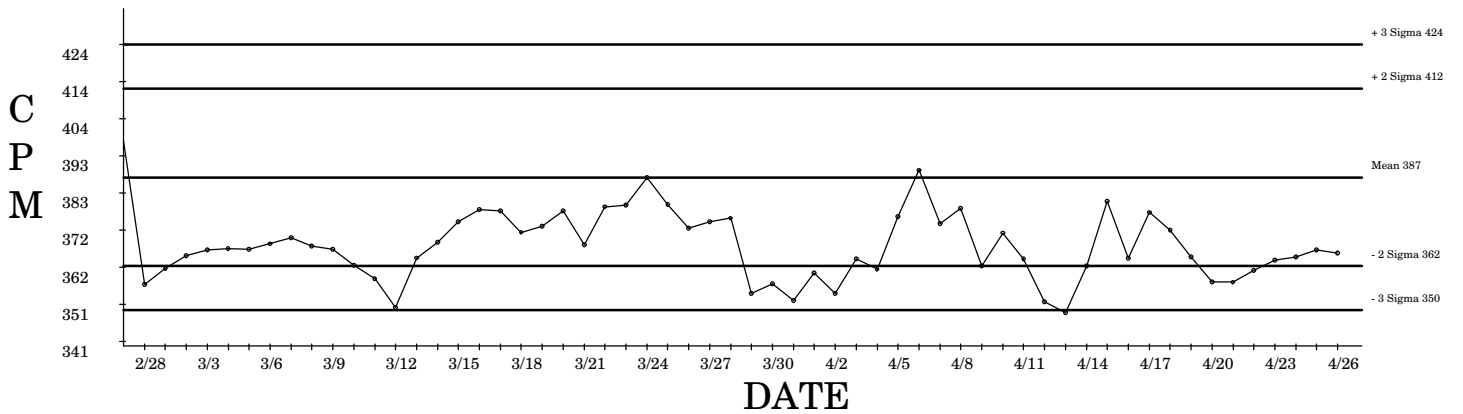
PIC1B 04/26/2006 Alpha BKG



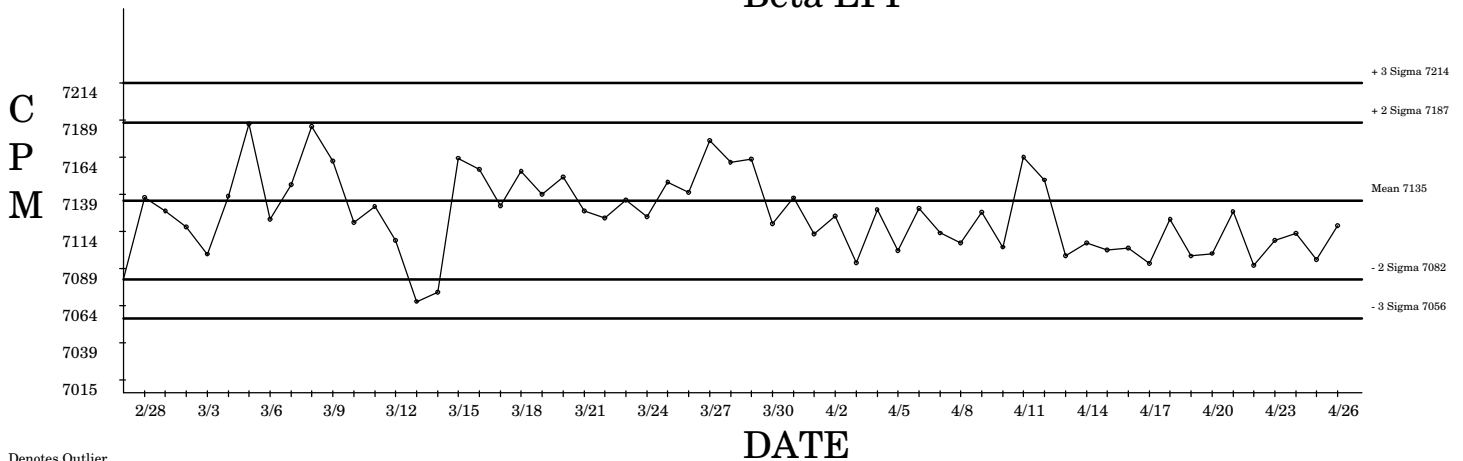
Beta BKG



Alpha EFF



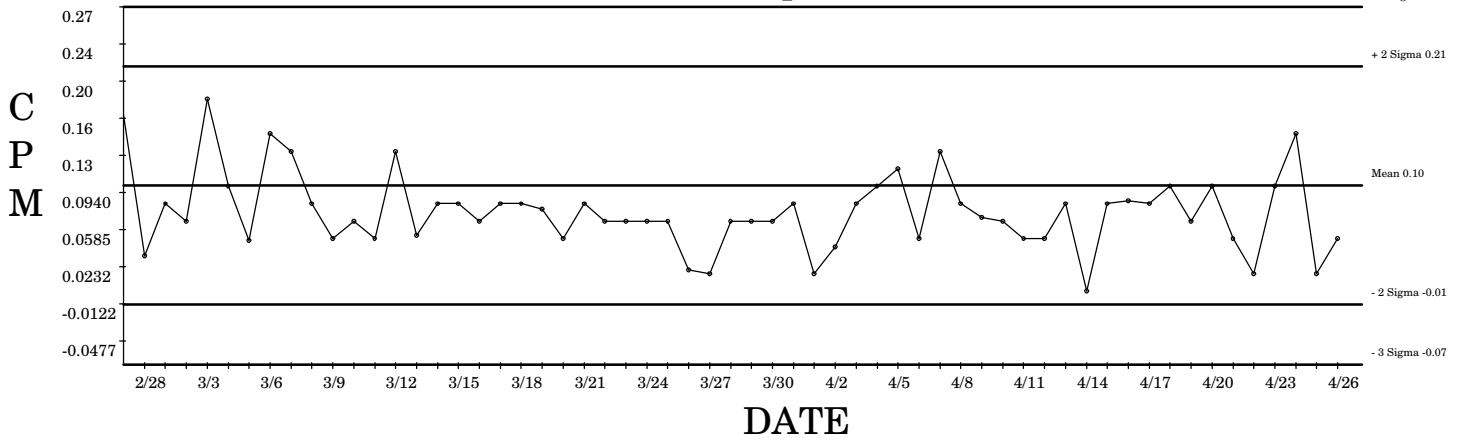
Beta EFF



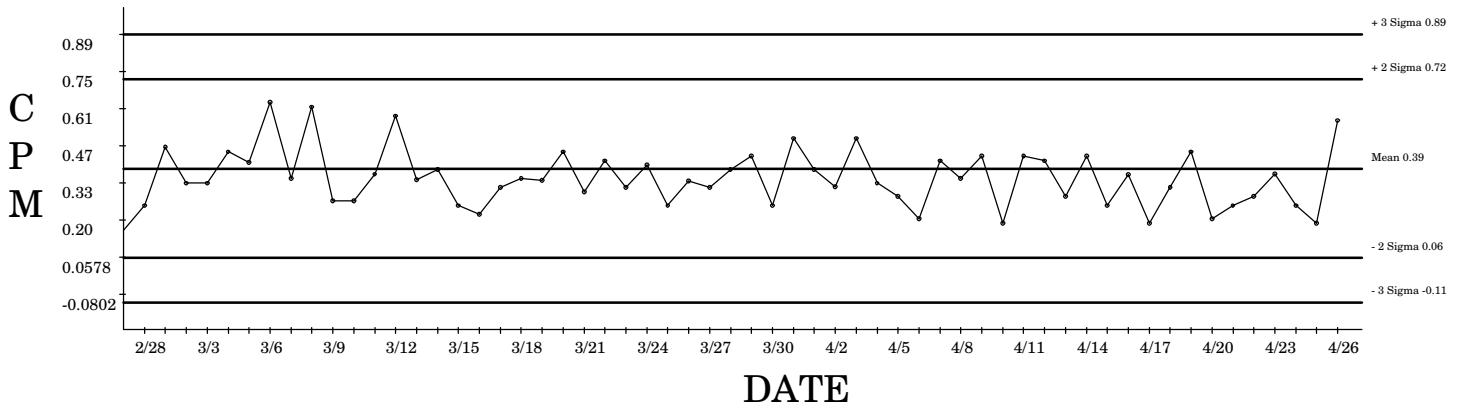
○ Denotes Outlier

PIC1C 04/26/2006

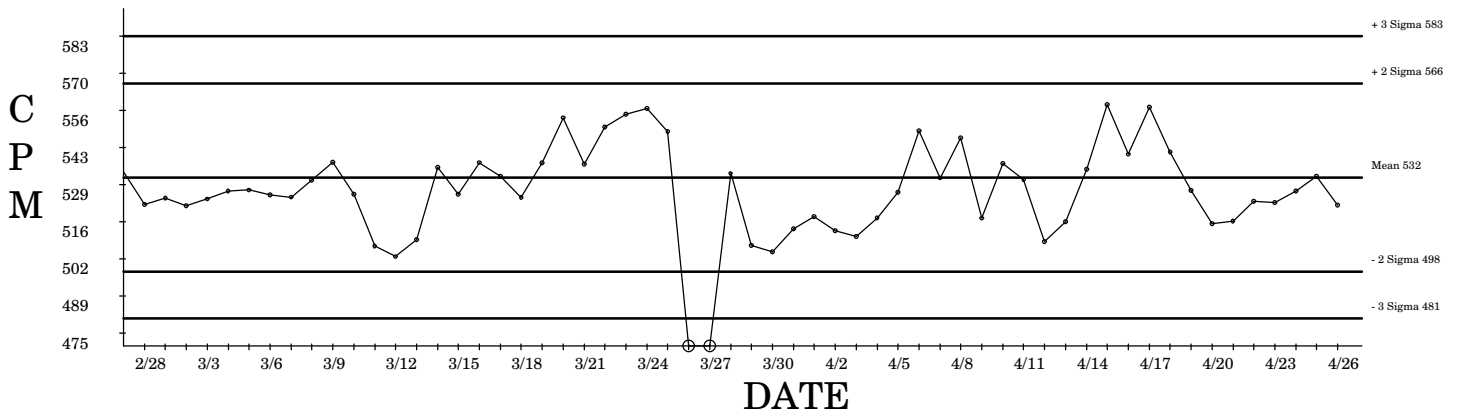
Alpha BKG



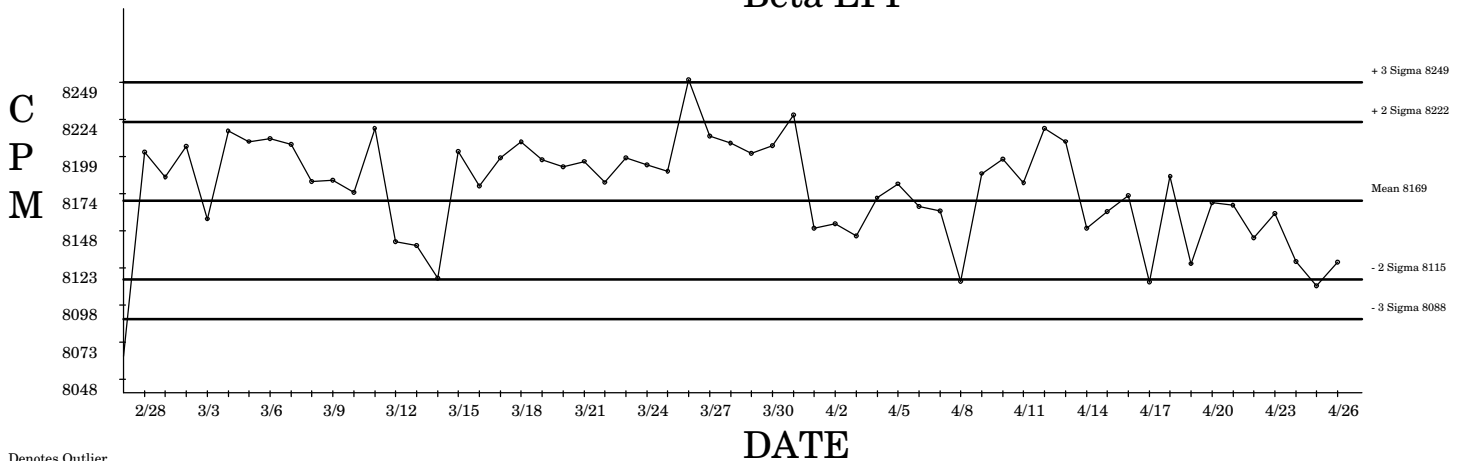
Beta BKG



Alpha EFF

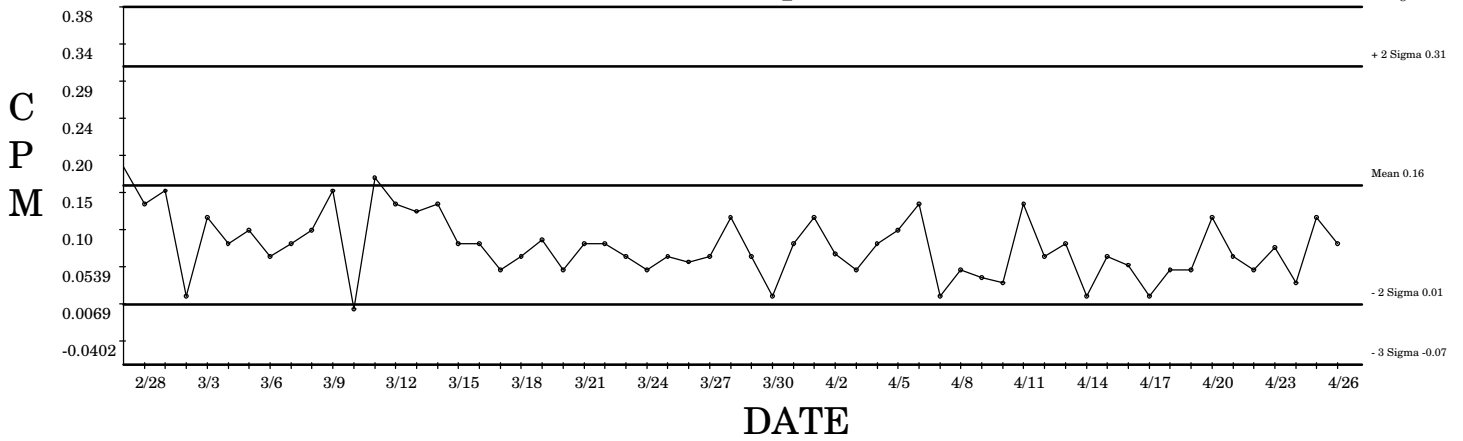


Beta EFF

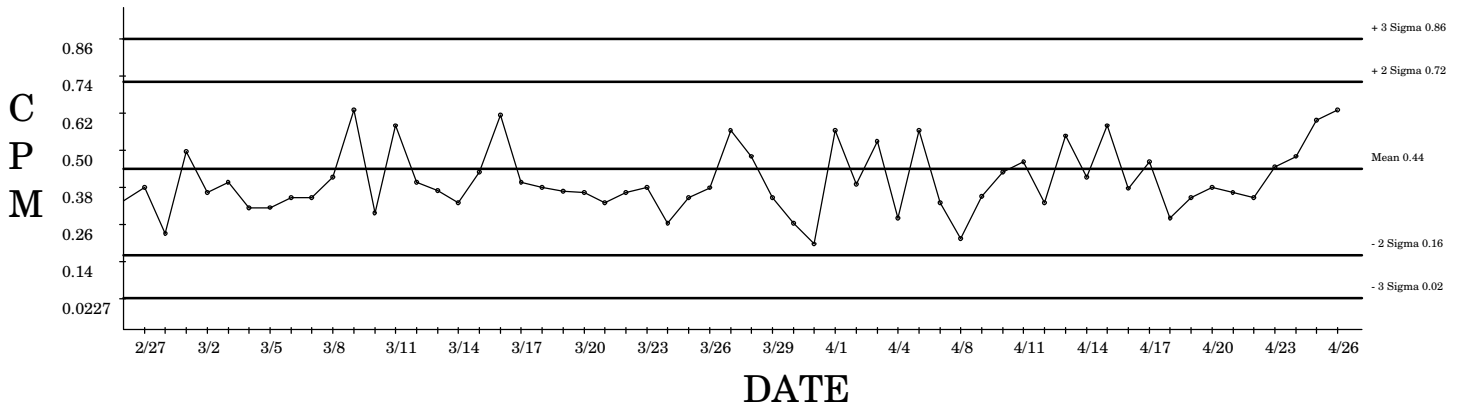


○ Denotes Outlier

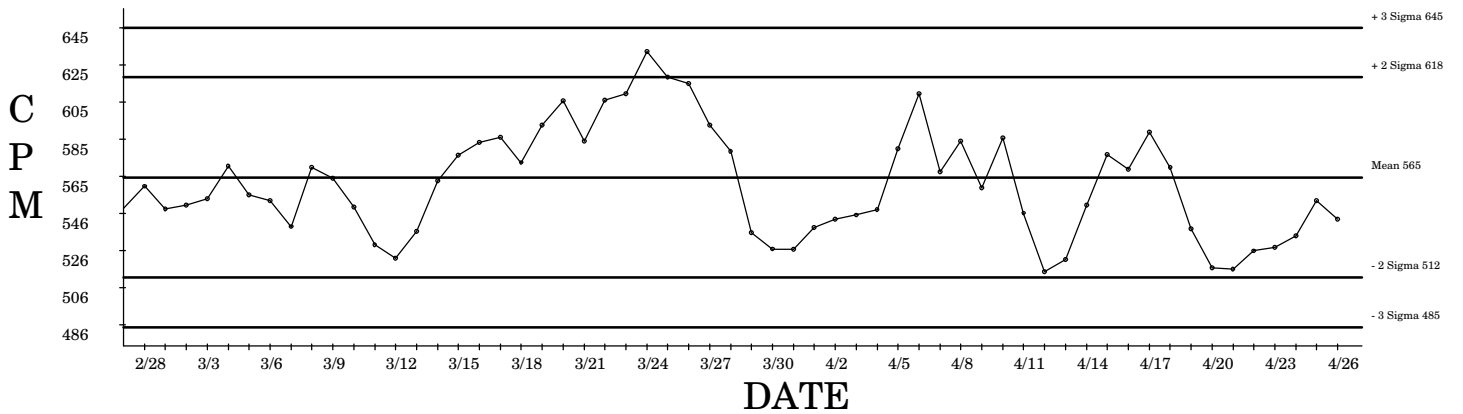
PIC1D 04/26/2006
Alpha BKG



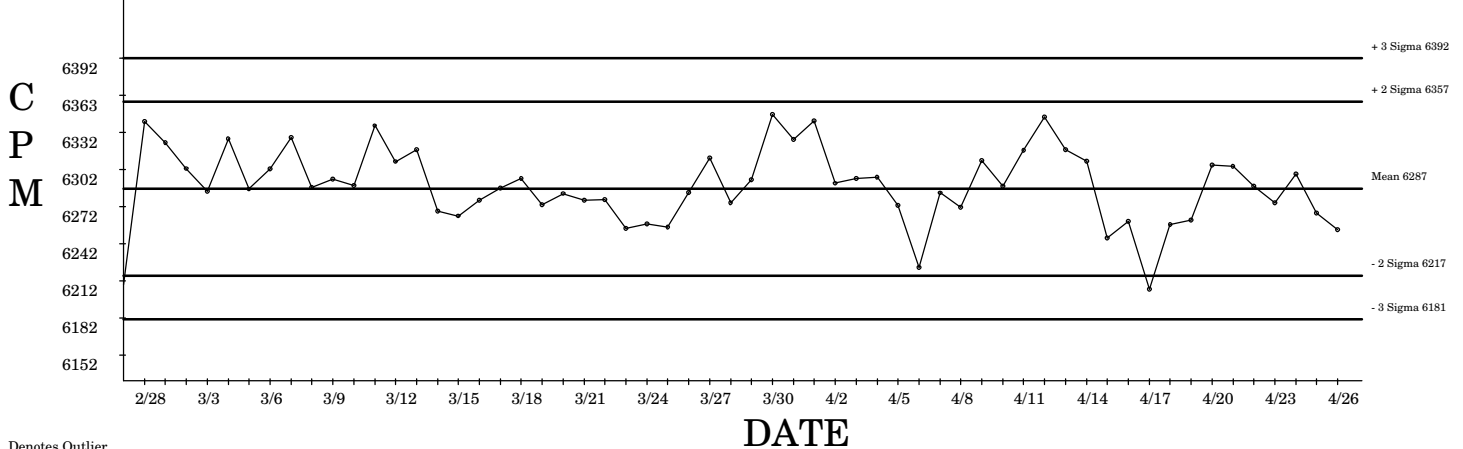
Beta BKG



Alpha EFF



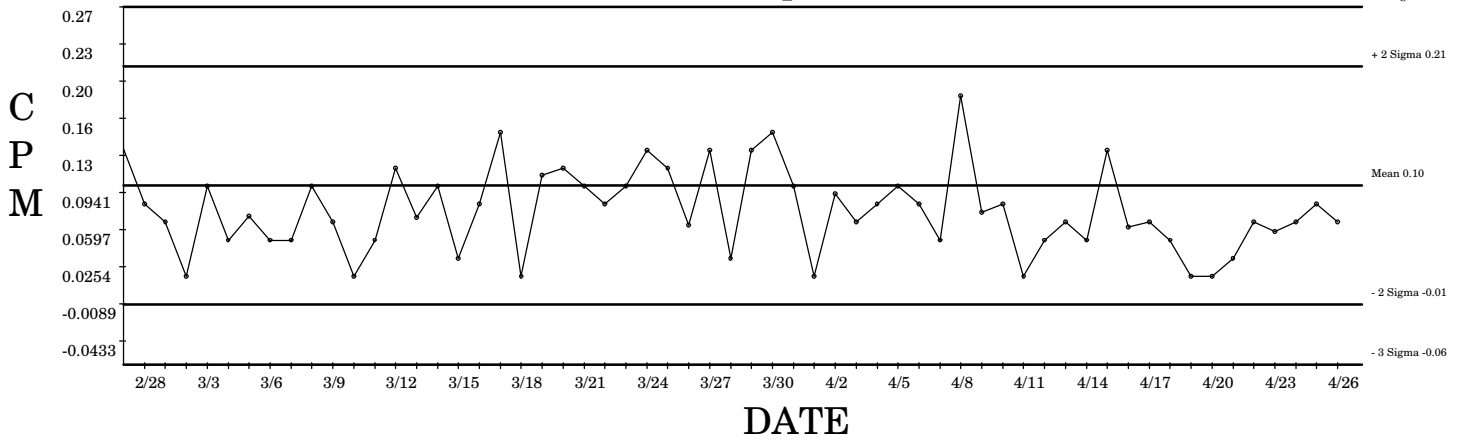
Beta EFF



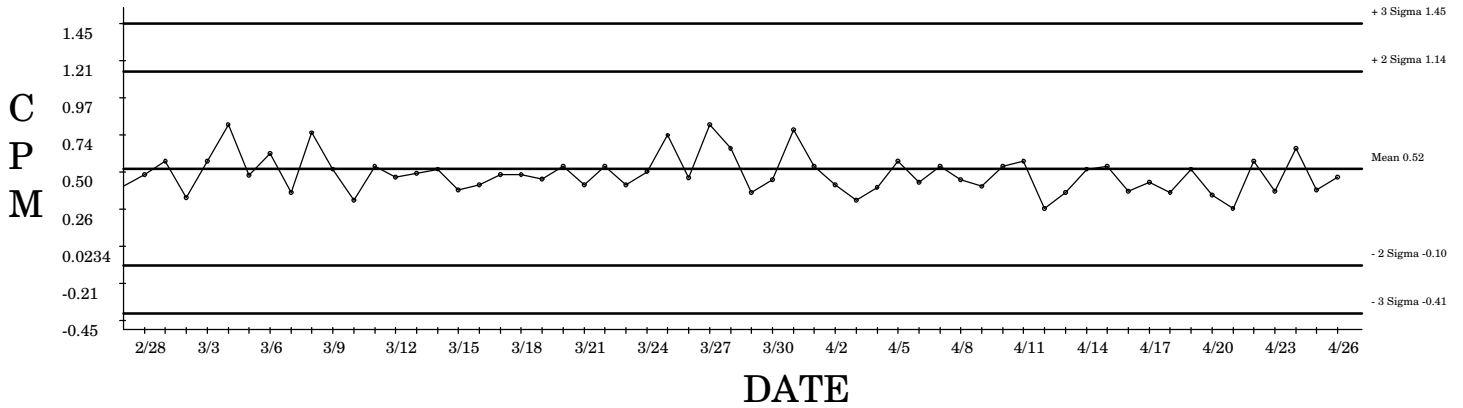
○ Denotes Outlier

PIC2A 04/26/2006

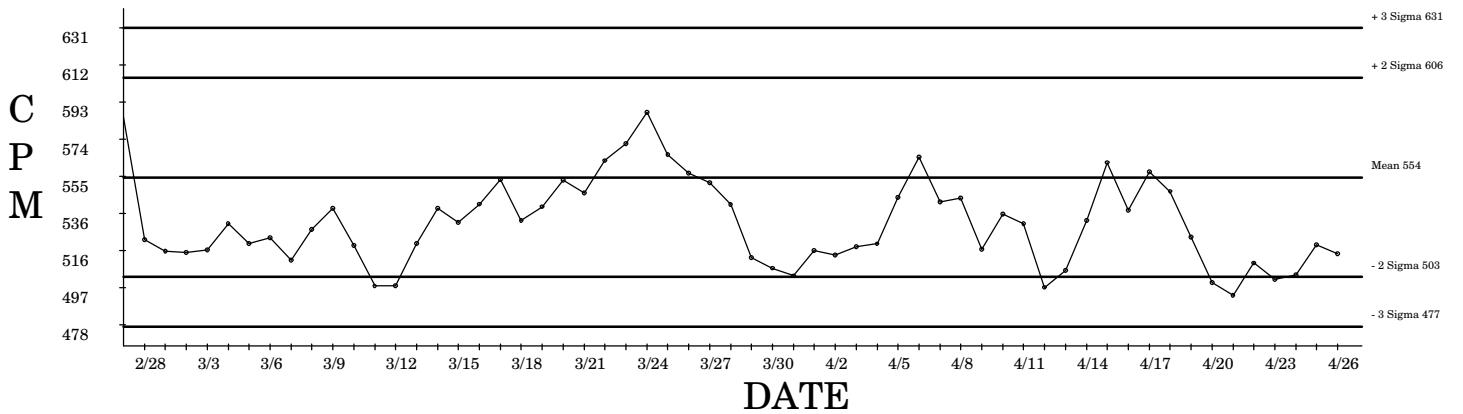
Alpha BKG



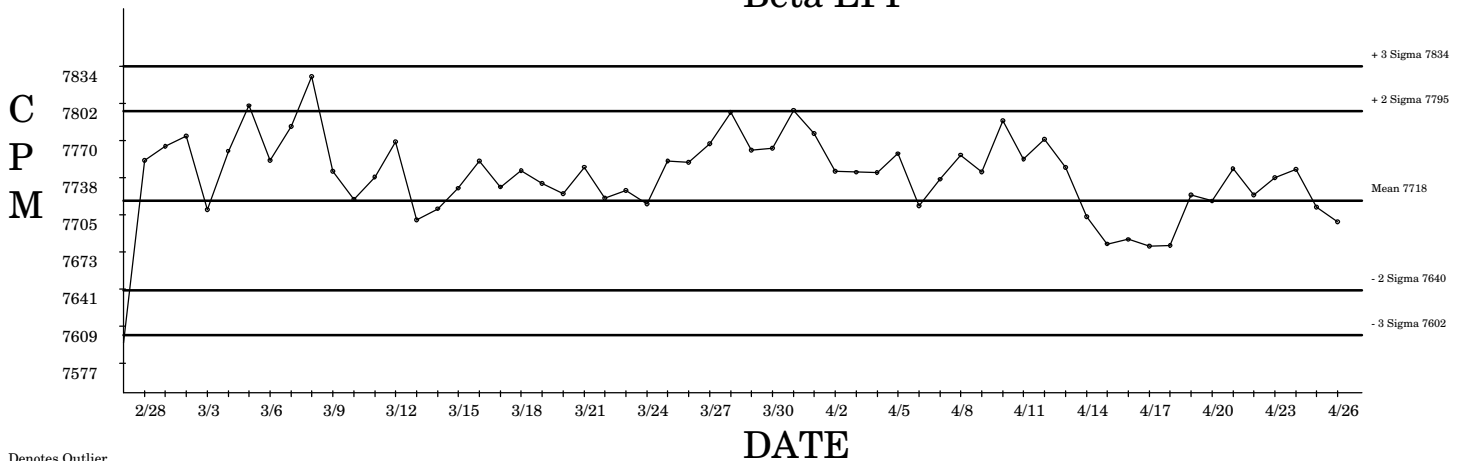
Beta BKG



Alpha EFF



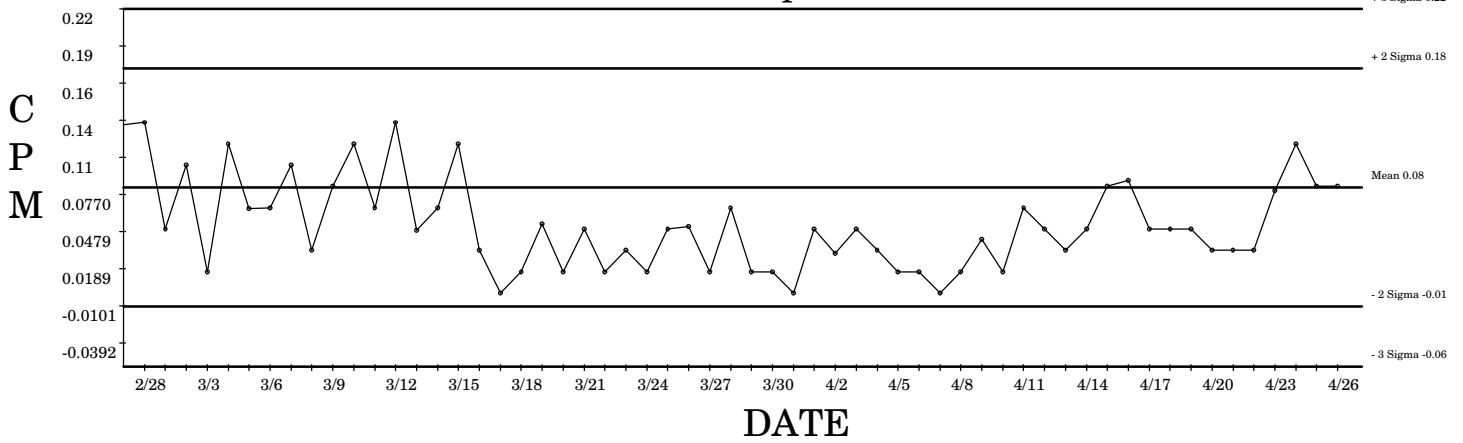
Beta EFF



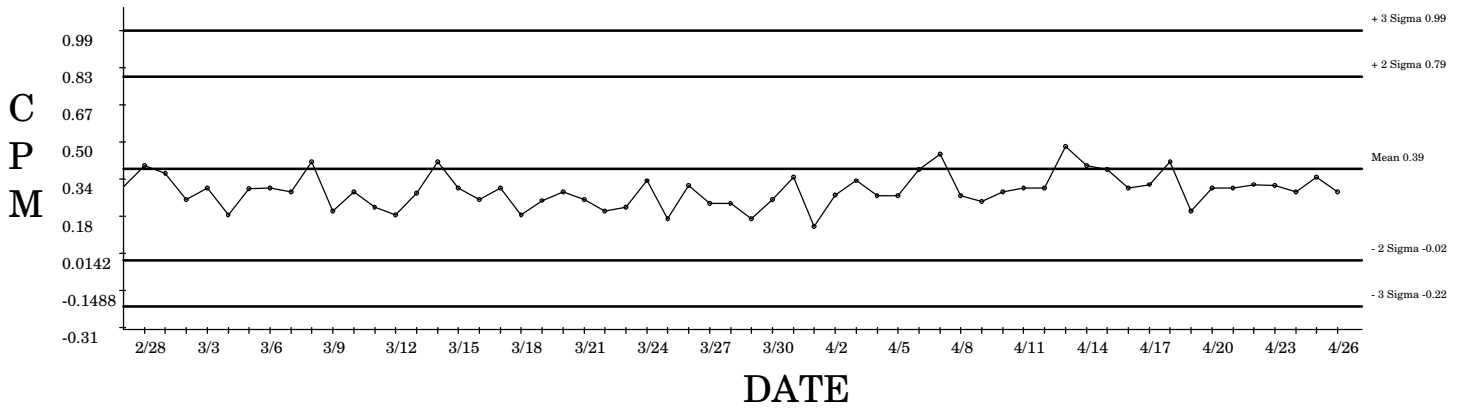
○ Denotes Outlier

PIC2B 04/26/2006

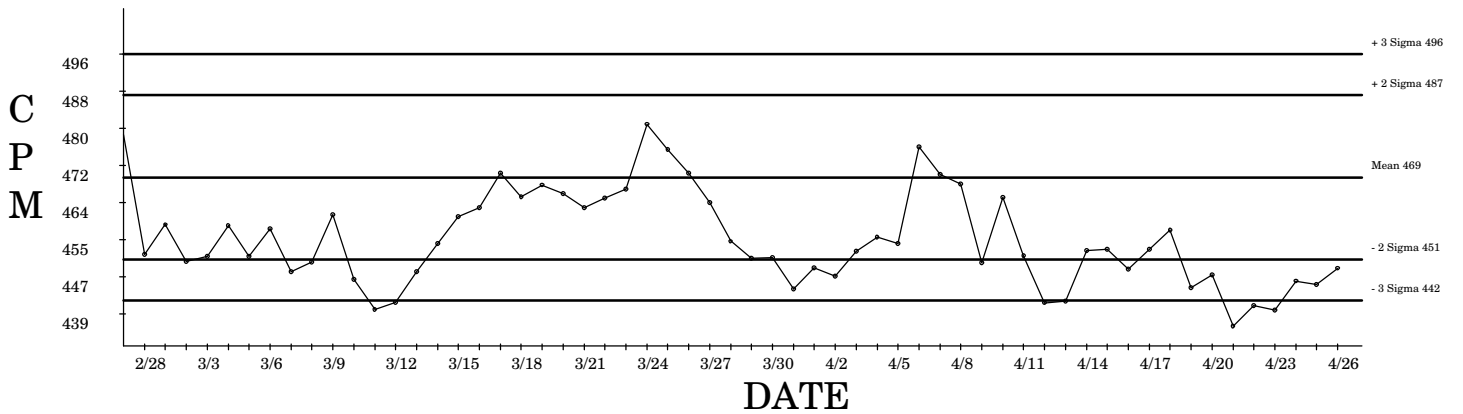
Alpha BKG



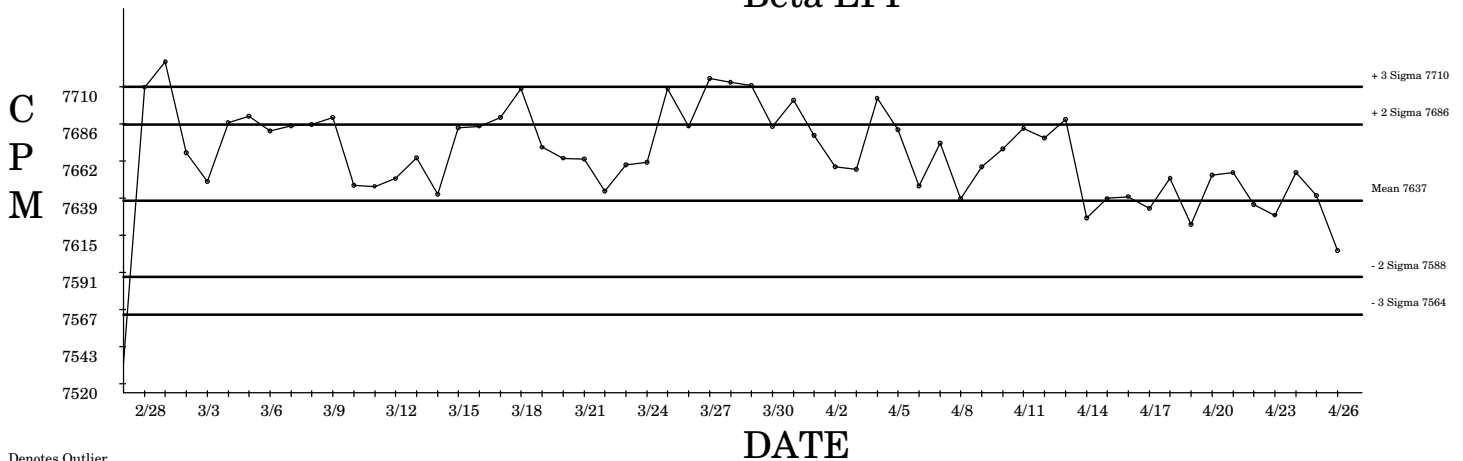
Beta BKG



Alpha EFF

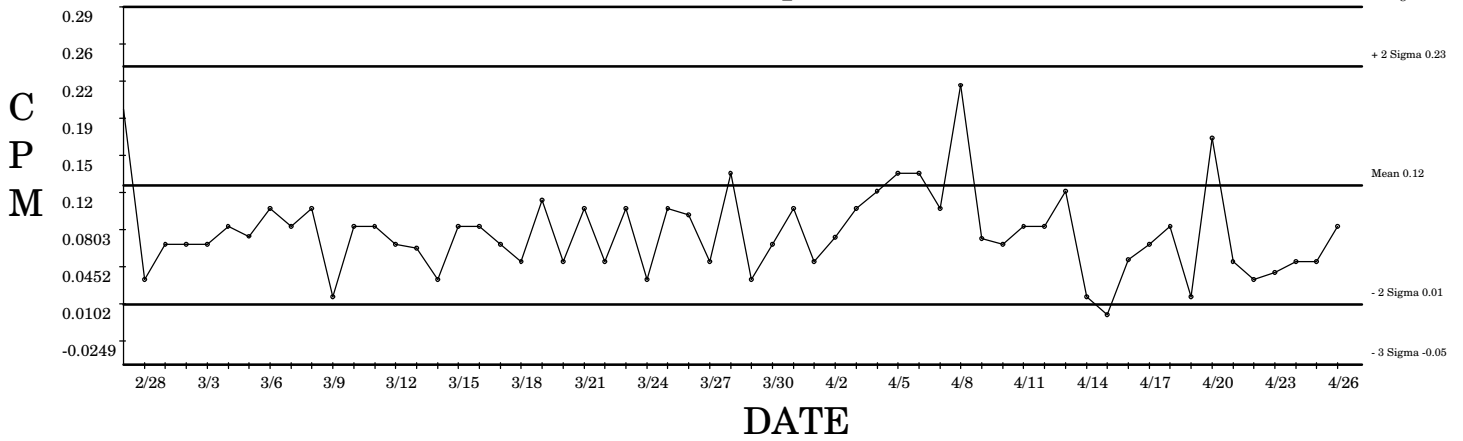


Beta EFF

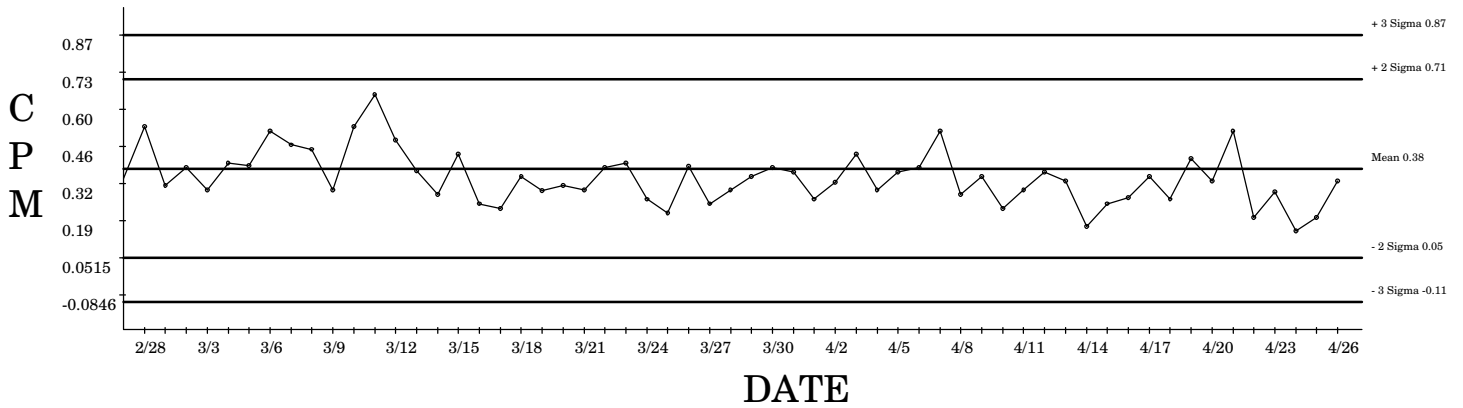


○ Denotes Outlier

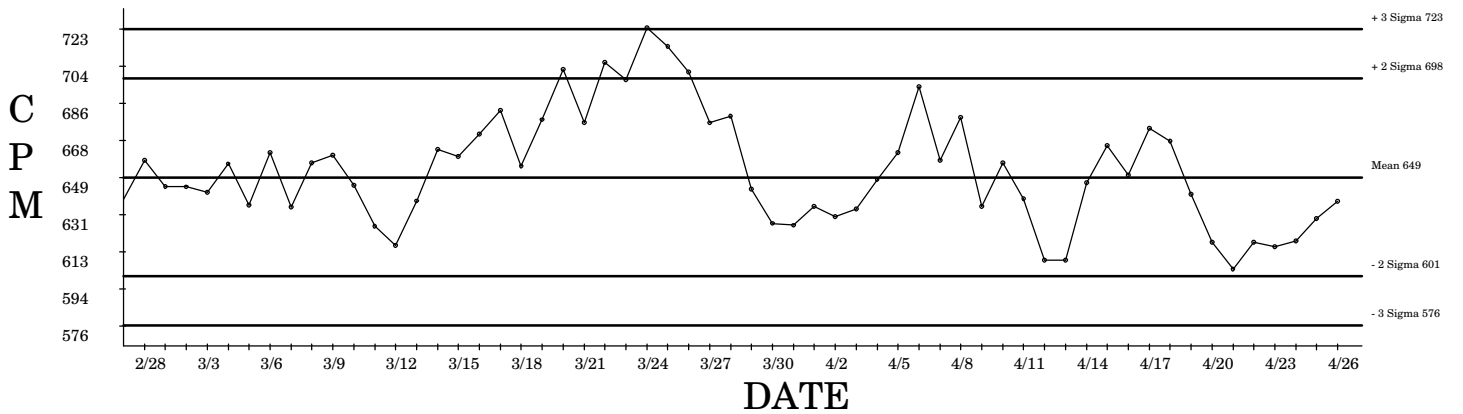
PIC2C 04/26/2006
Alpha BKG



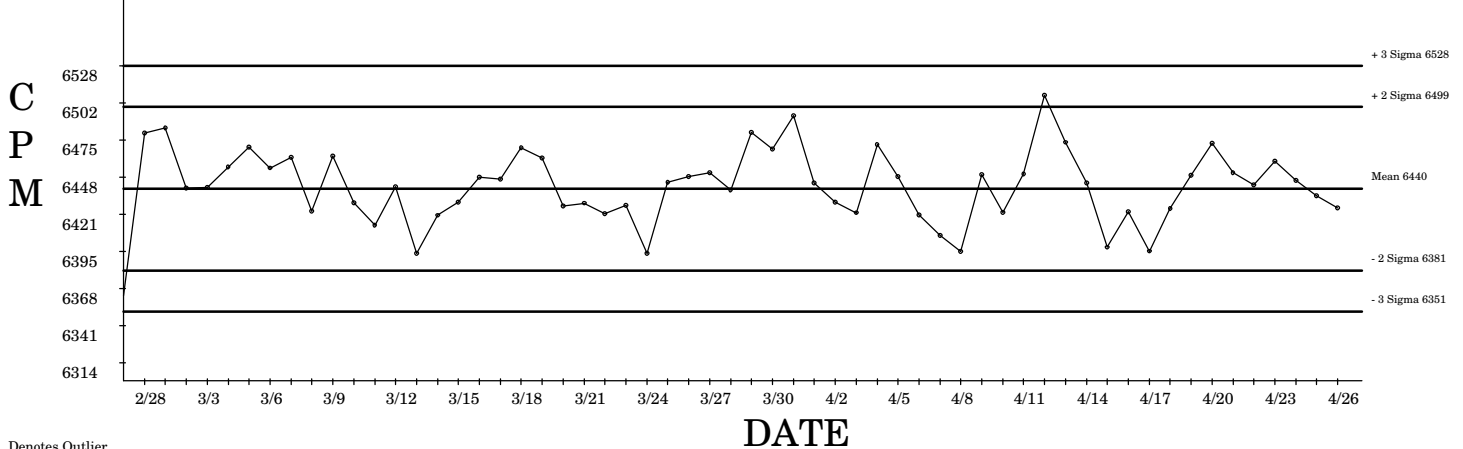
Beta BKG



Alpha EFF



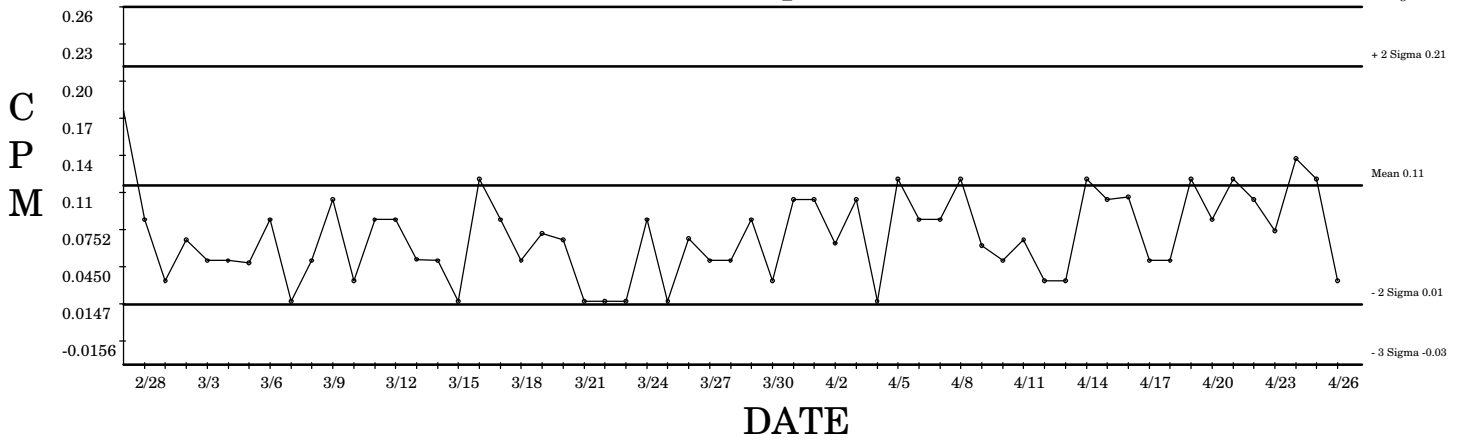
Beta EFF



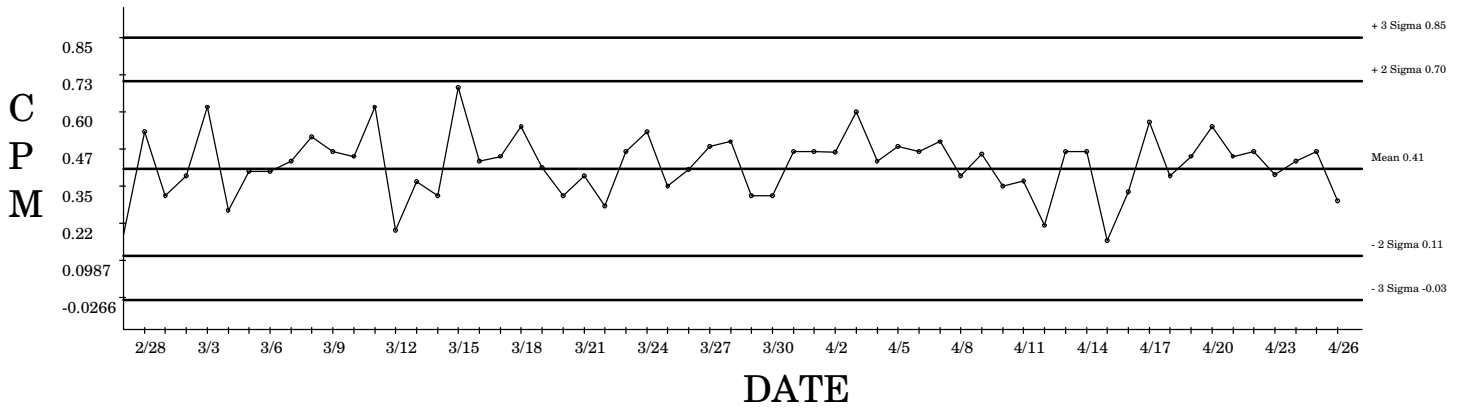
○ Denotes Outlier

PIC2D 04/26/2006

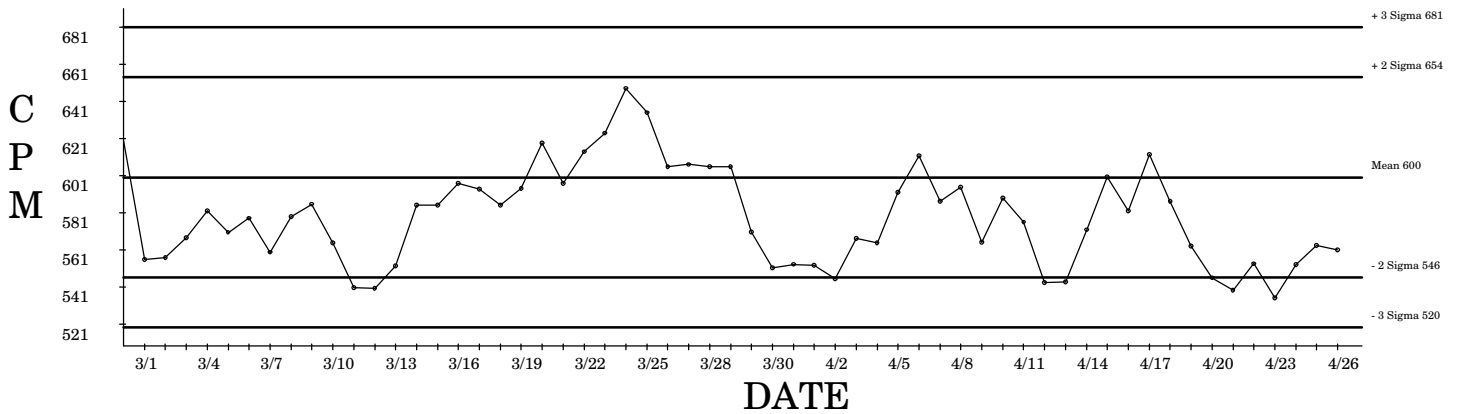
Alpha BKG



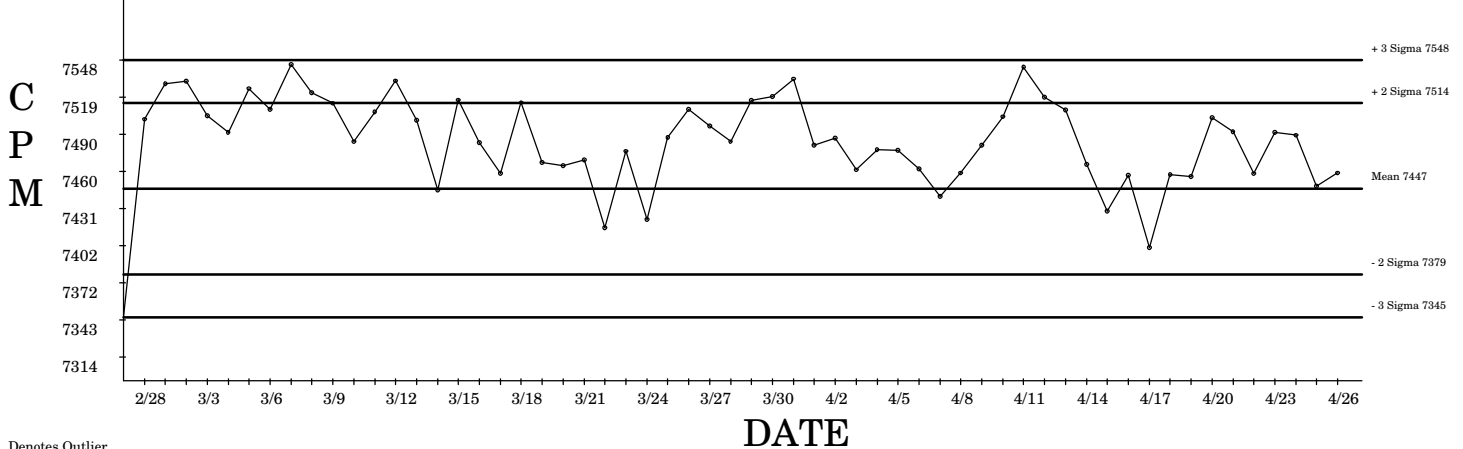
Beta BKG



Alpha EFF

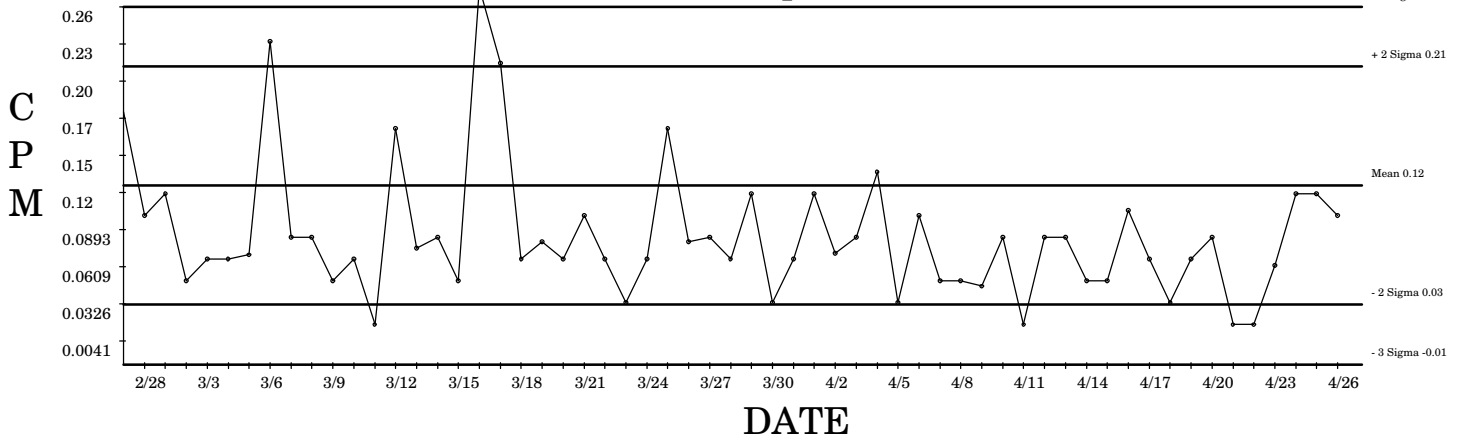


Beta EFF

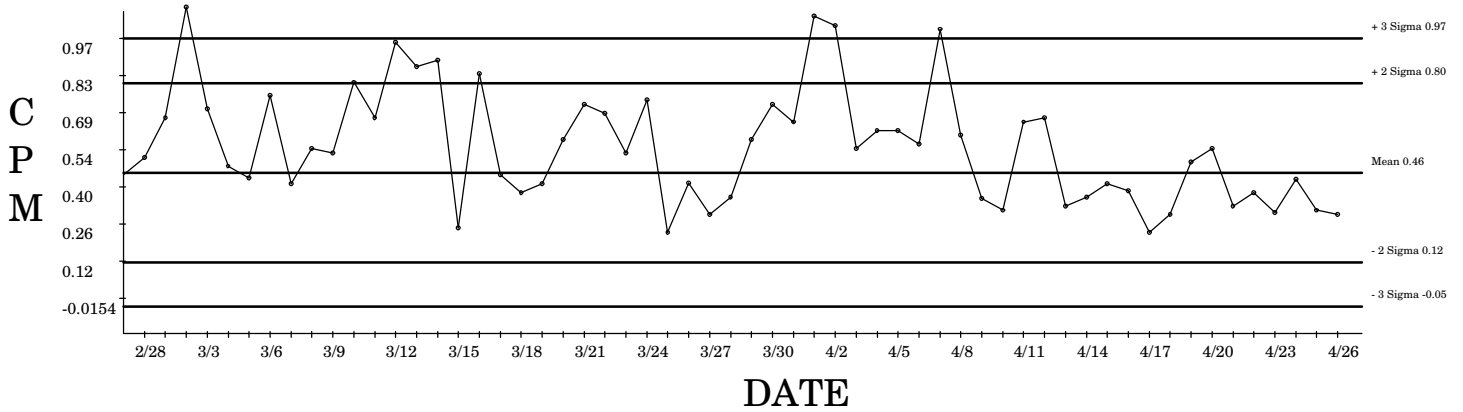


○ Denotes Outlier

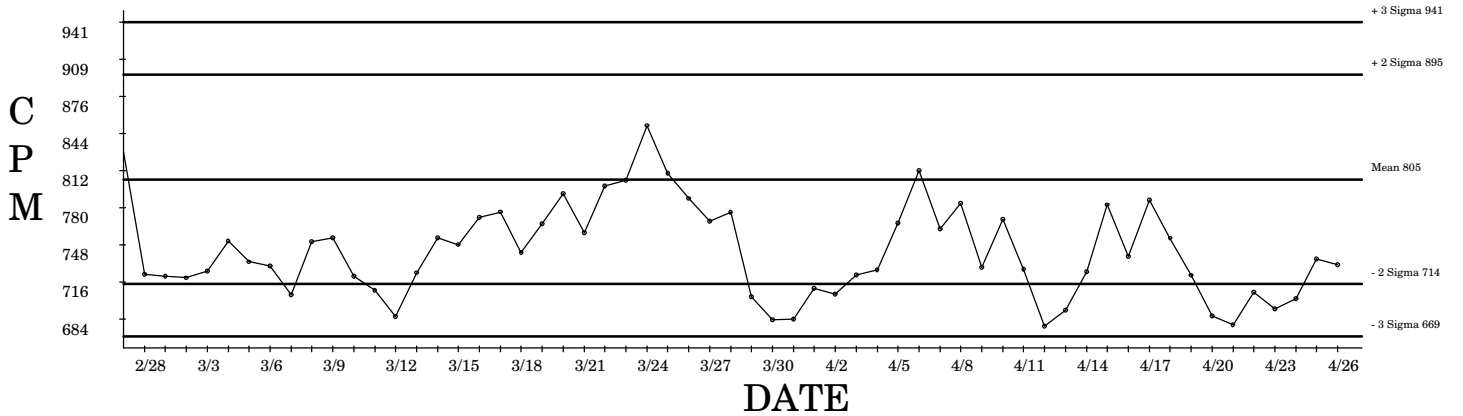
PIC3A 04/26/2006
Alpha BKG



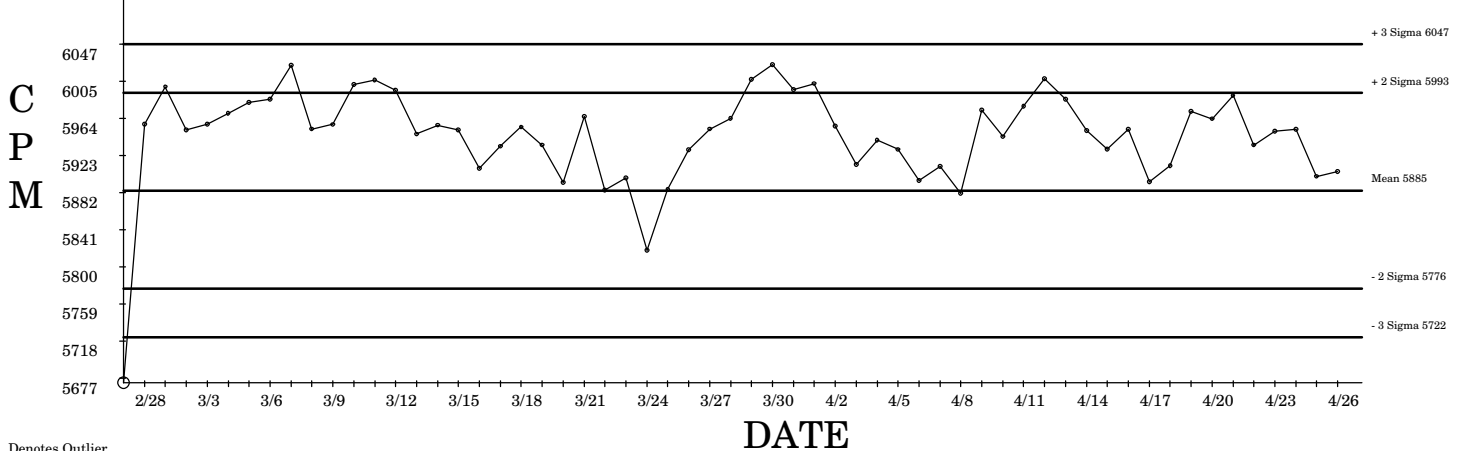
Beta BKG



Alpha EFF

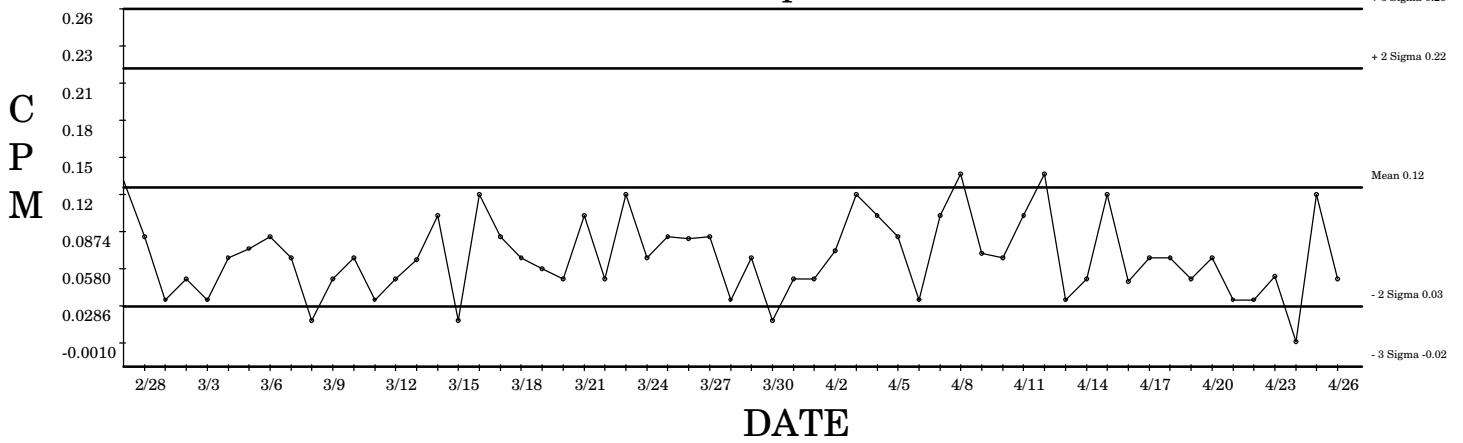


Beta EFF

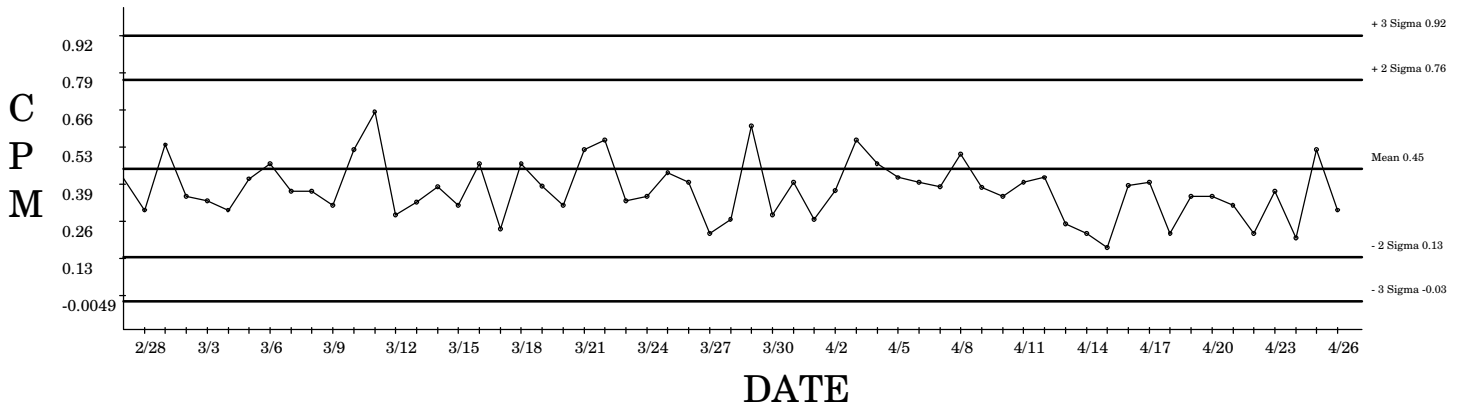


○ Denotes Outlier

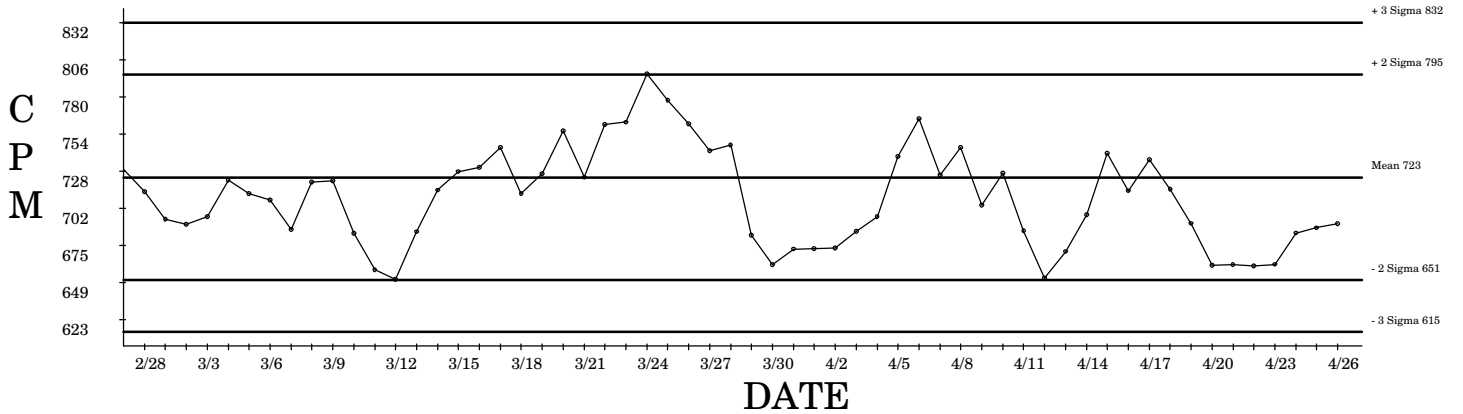
PIC3B 04/26/2006
Alpha BKG



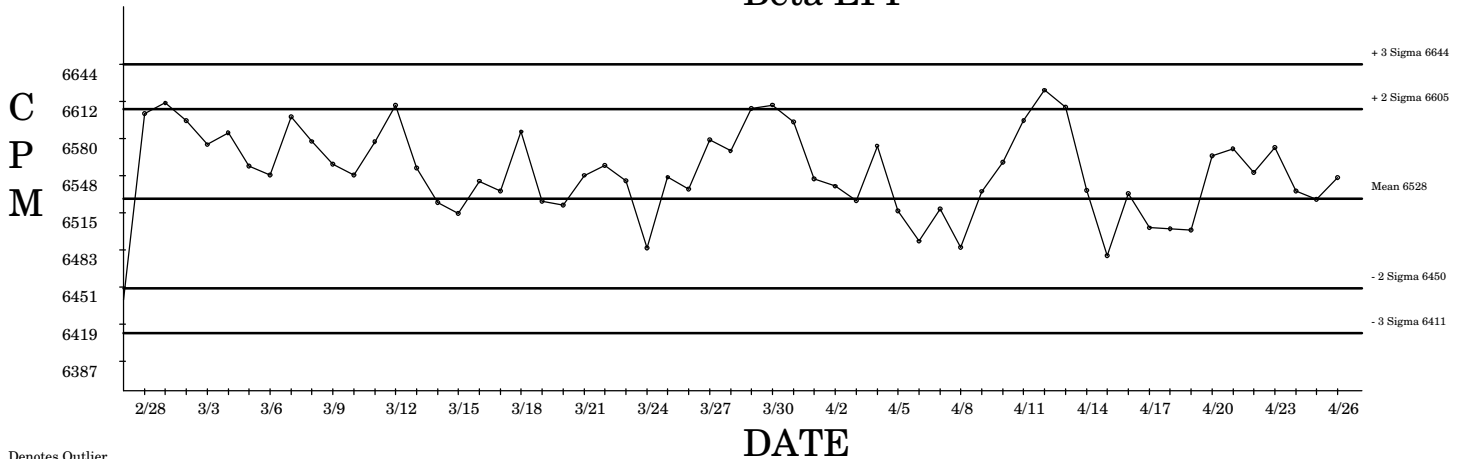
Beta BKG



Alpha EFF

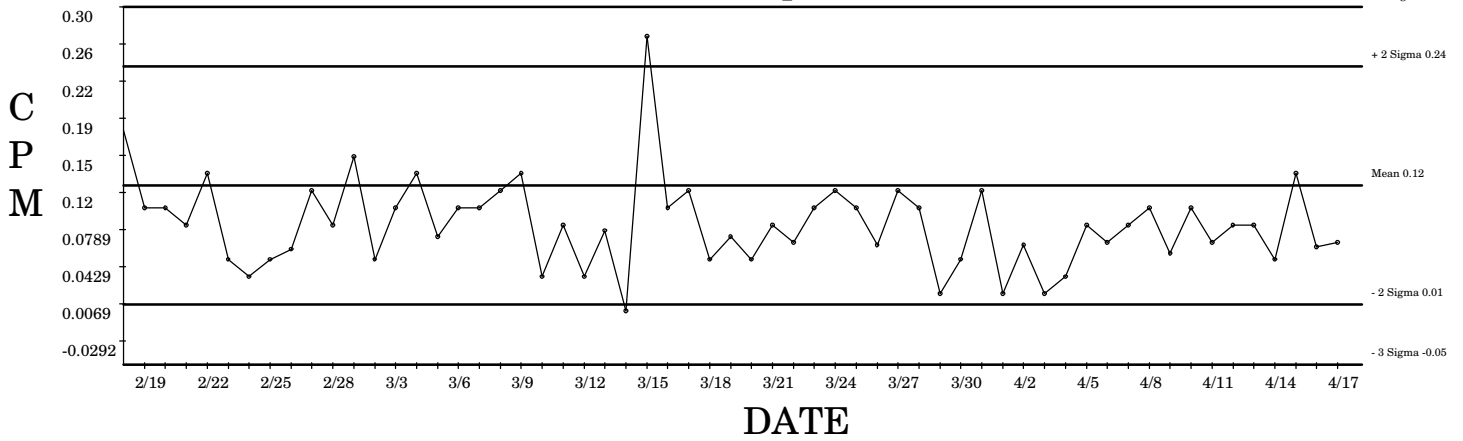


Beta EFF

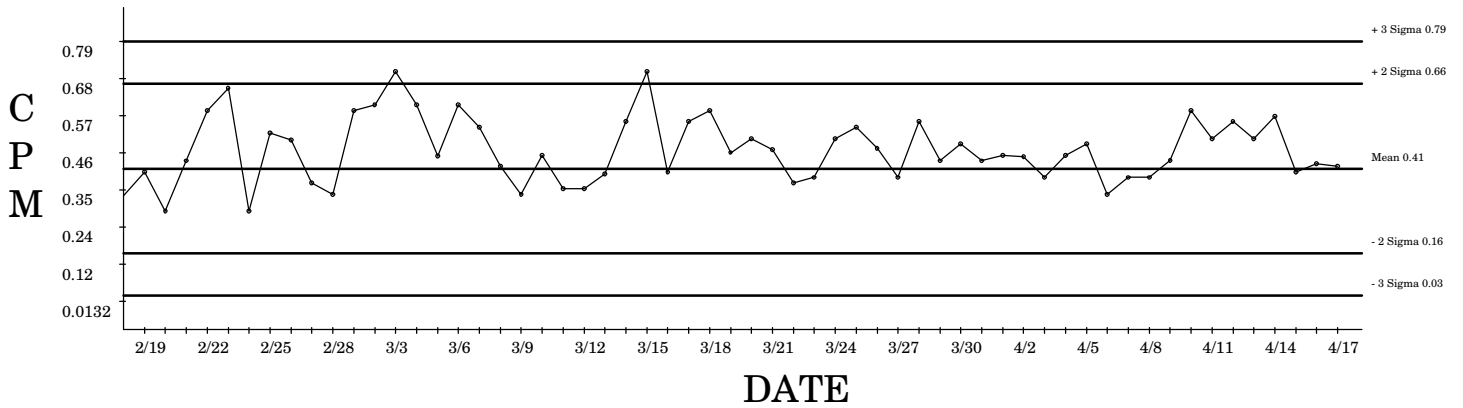


○ Denotes Outlier

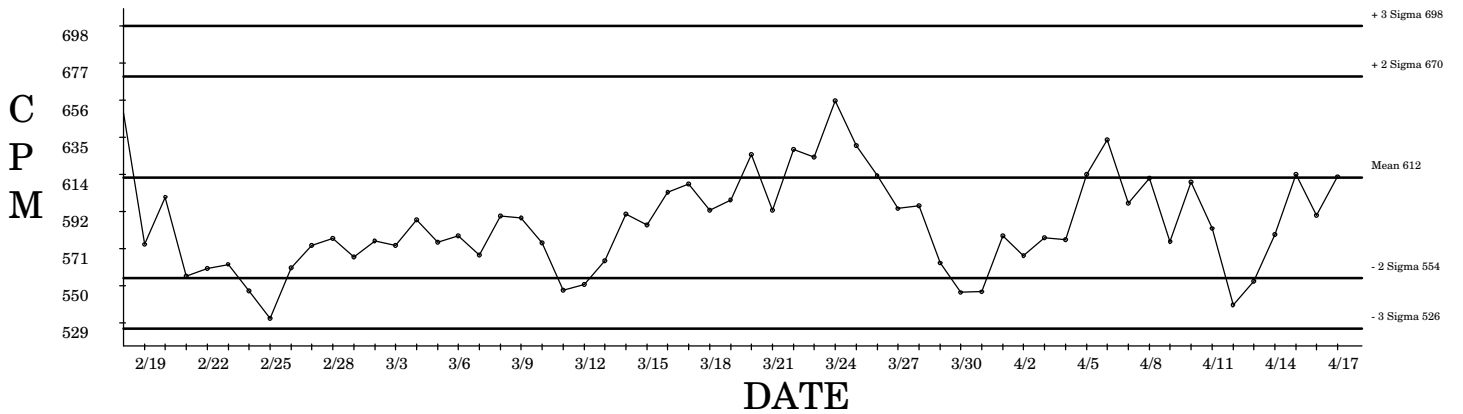
PIC3C 04/17/2006
Alpha BKG



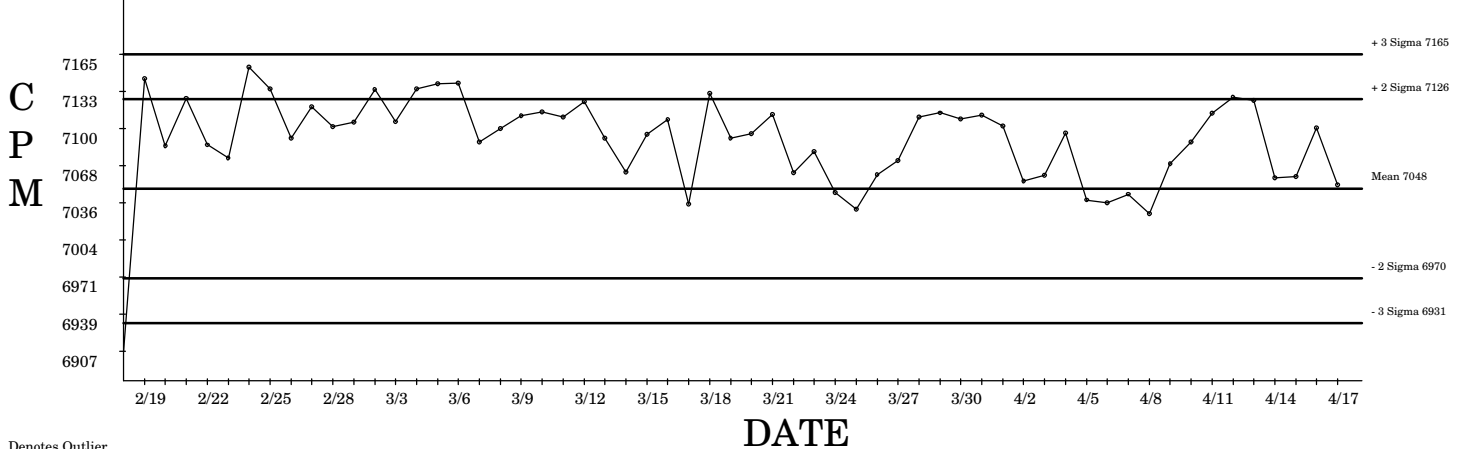
Beta BKG



Alpha EFF

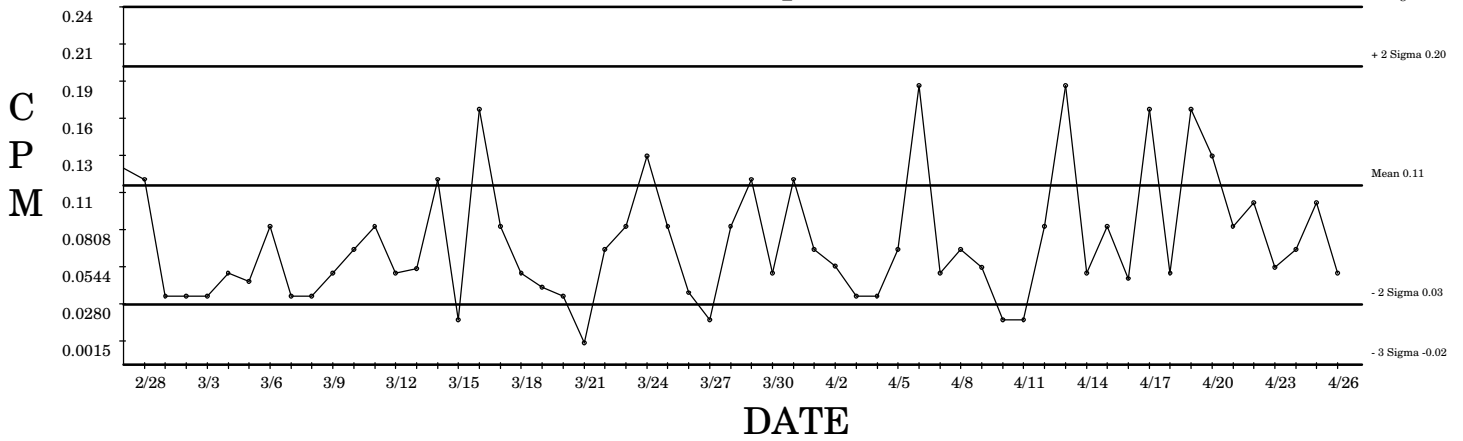


Beta EFF

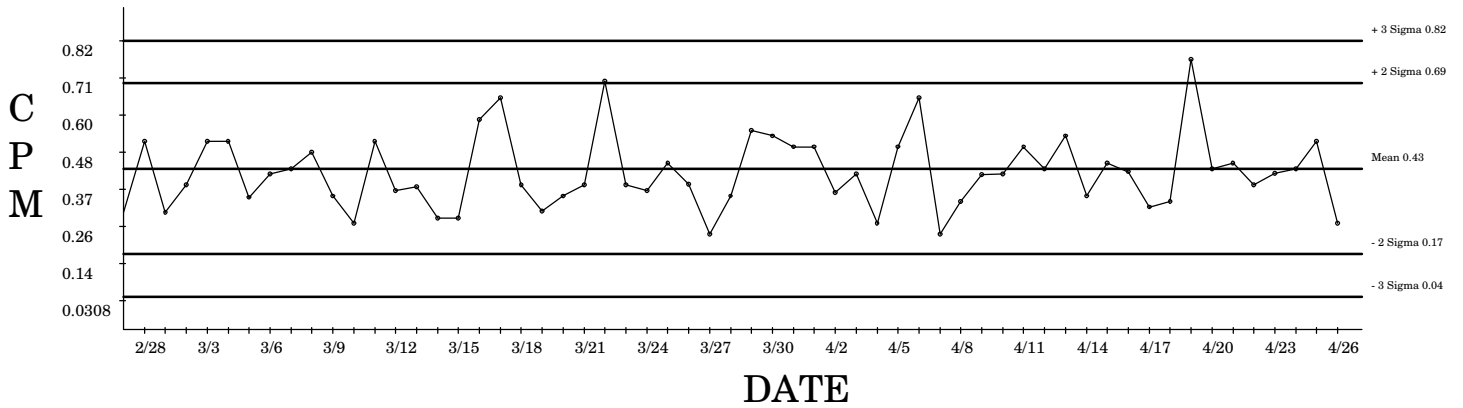


○ Denotes Outlier

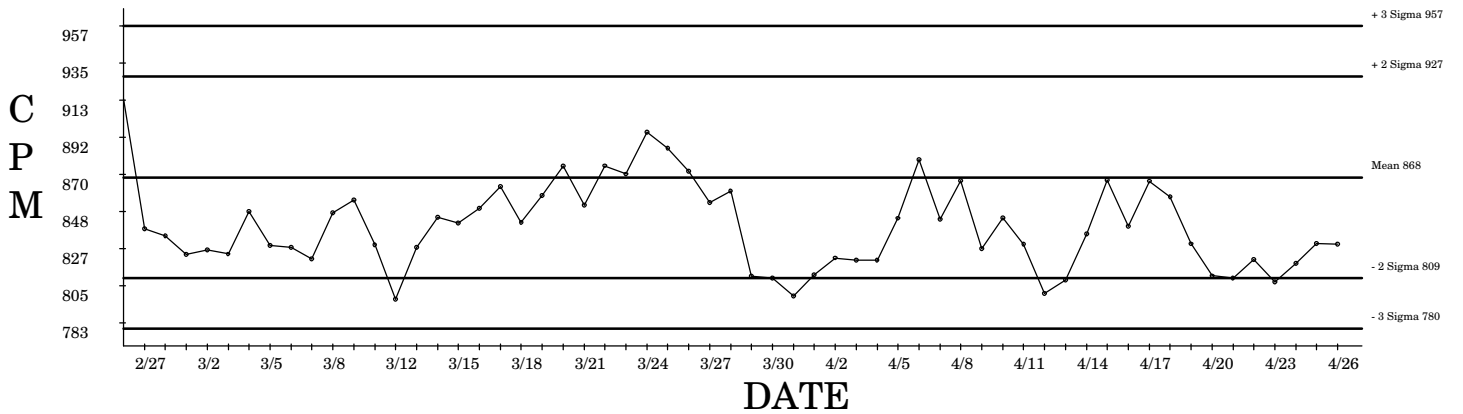
PIC3D 04/26/2006 Alpha BKG



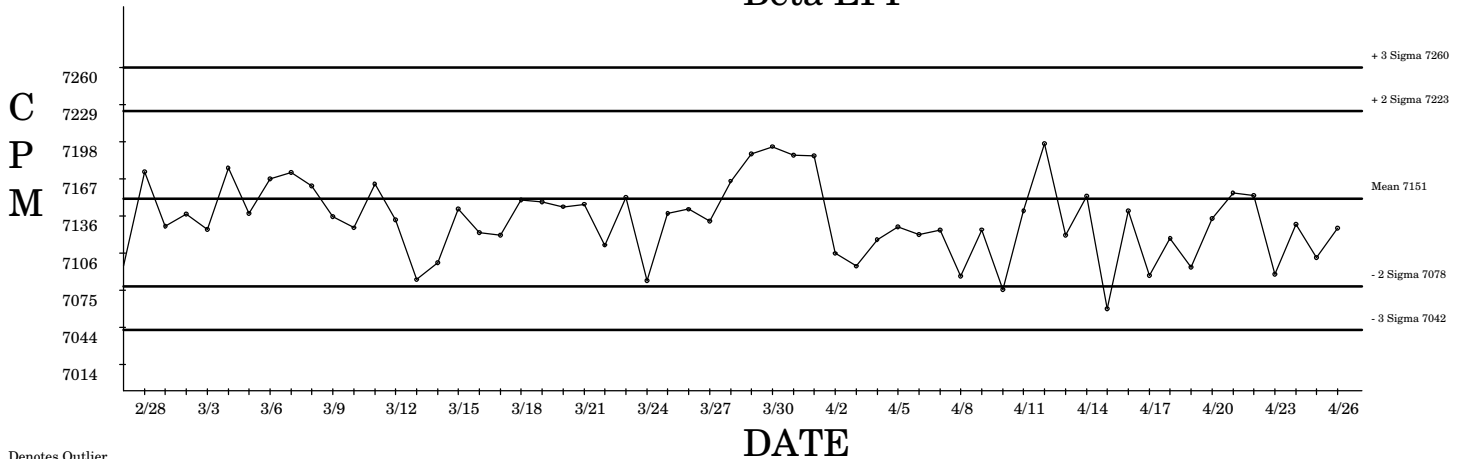
Beta BKG



Alpha EFF



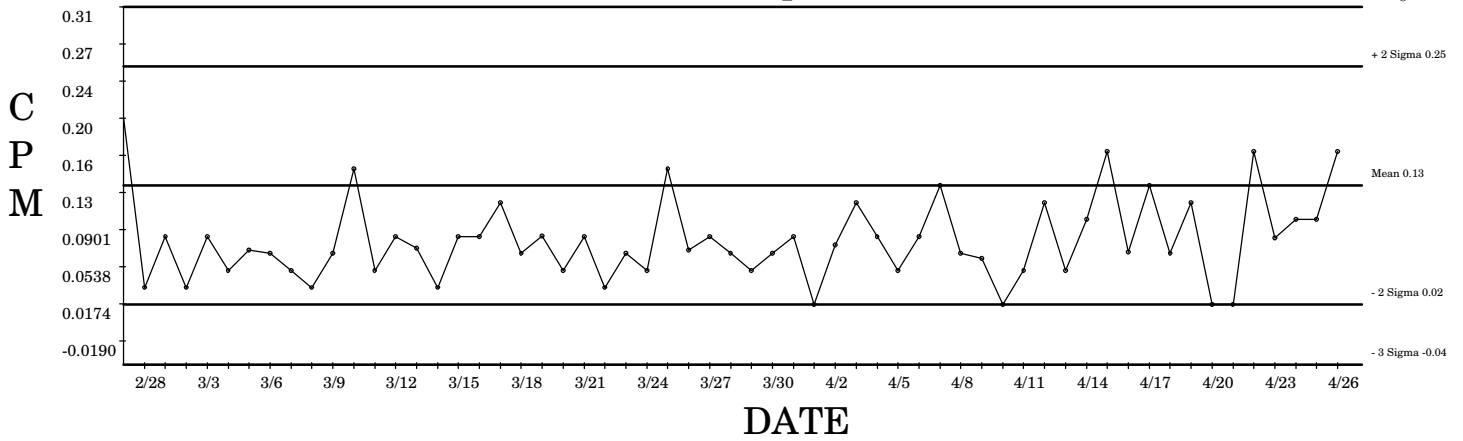
Beta EFF



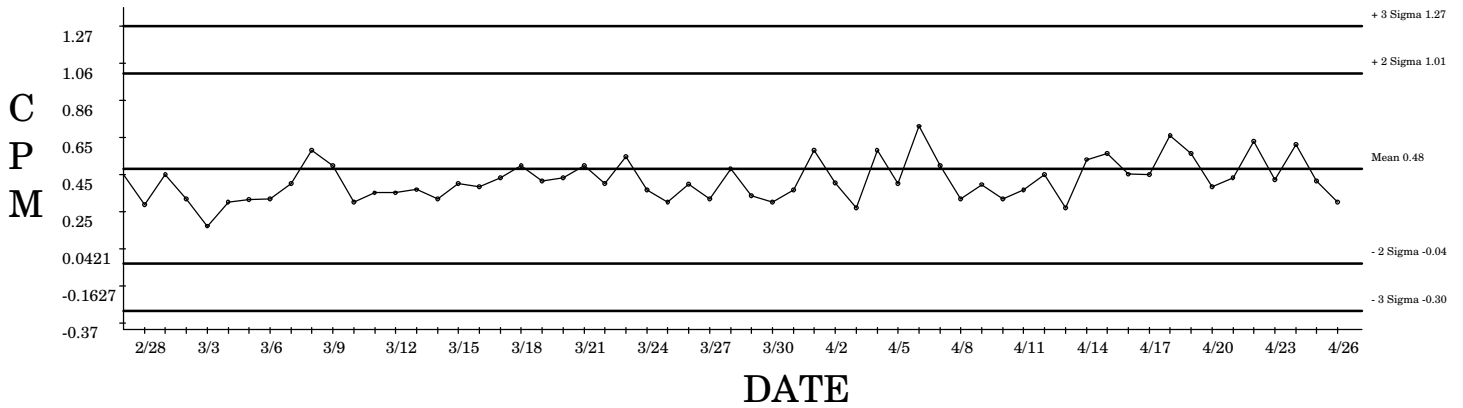
○ Denotes Outlier

PIC4C 04/26/2006

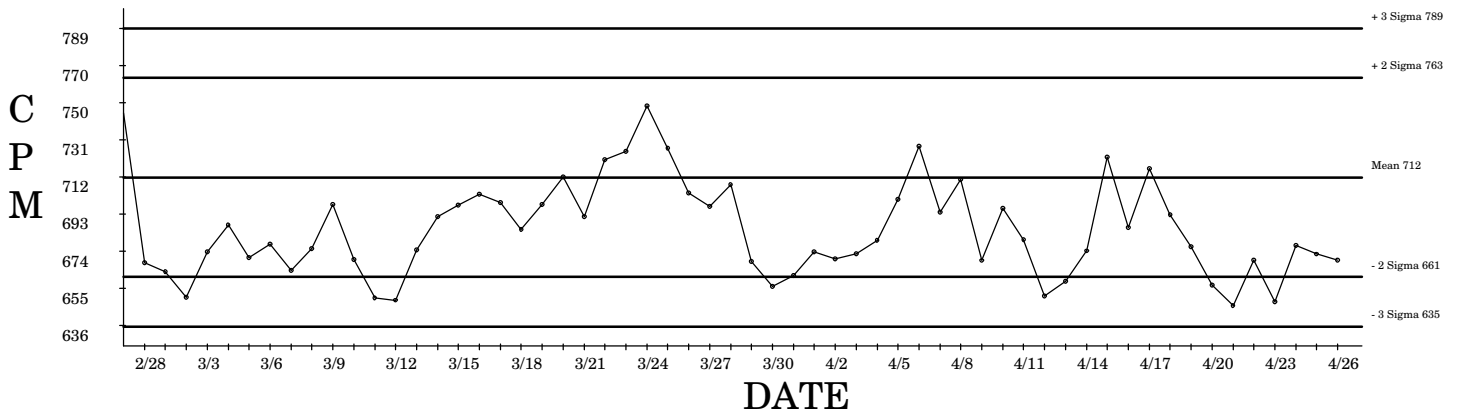
Alpha BKG



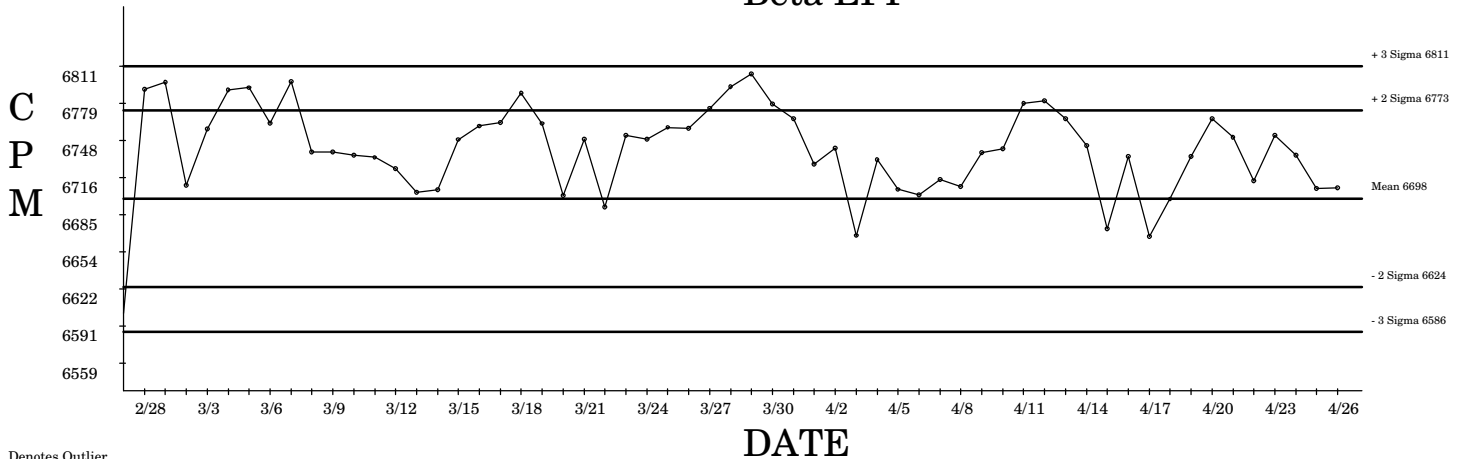
Beta BKG



Alpha EFF



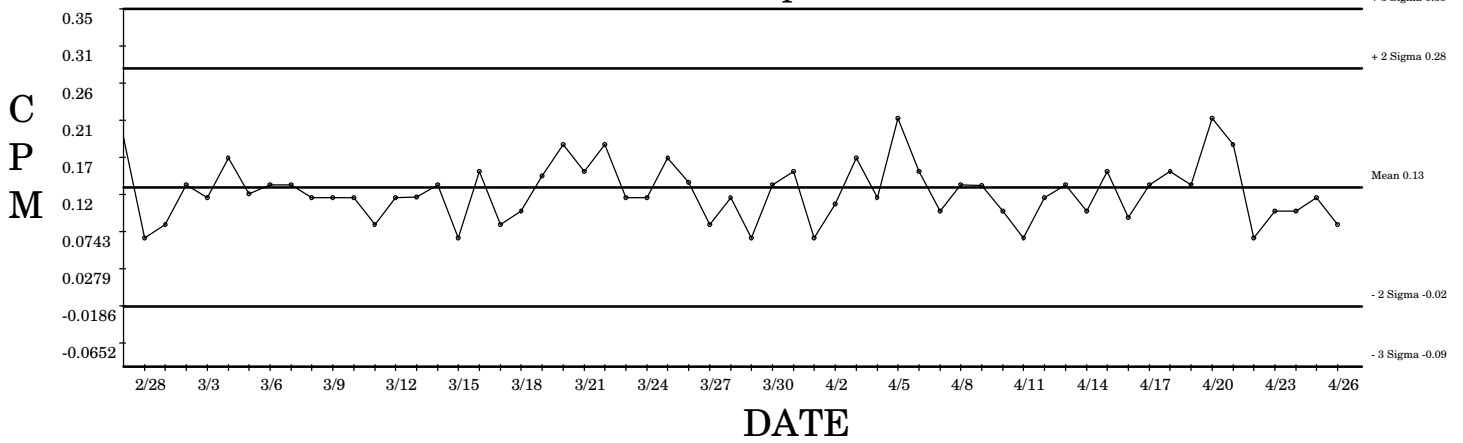
Beta EFF



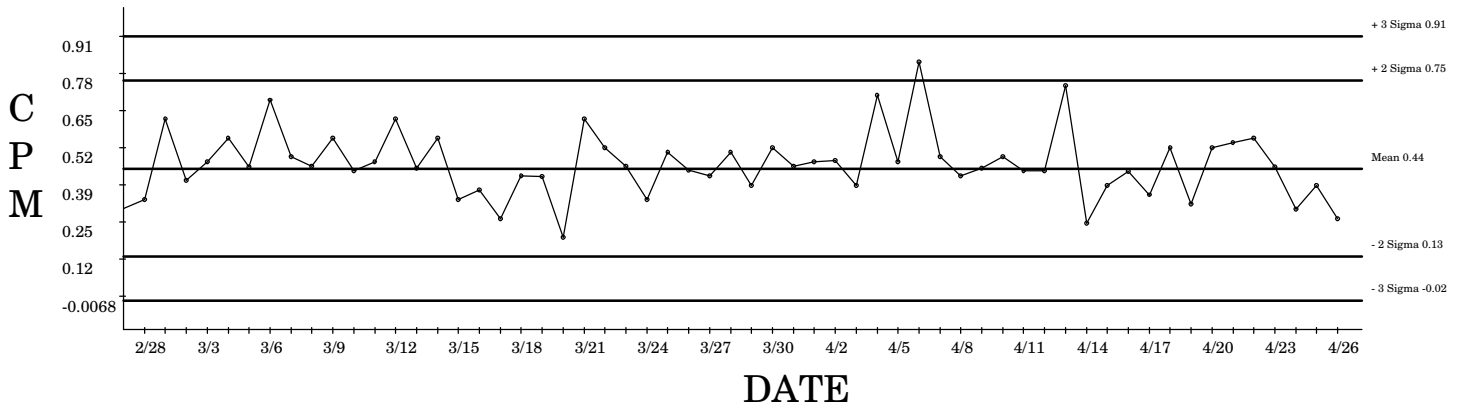
○ Denotes Outlier

PIC4D 04/26/2006

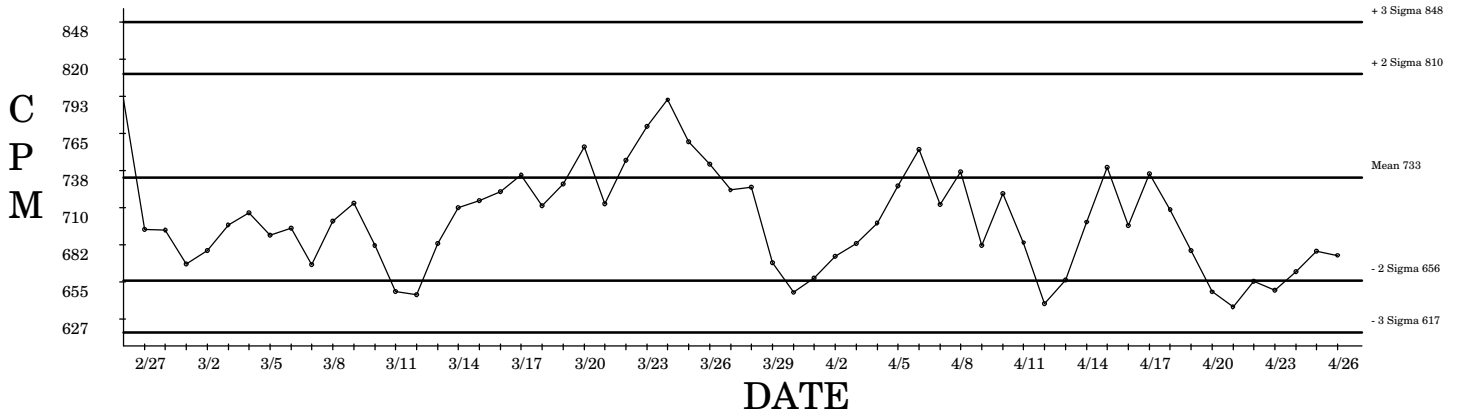
Alpha BKG



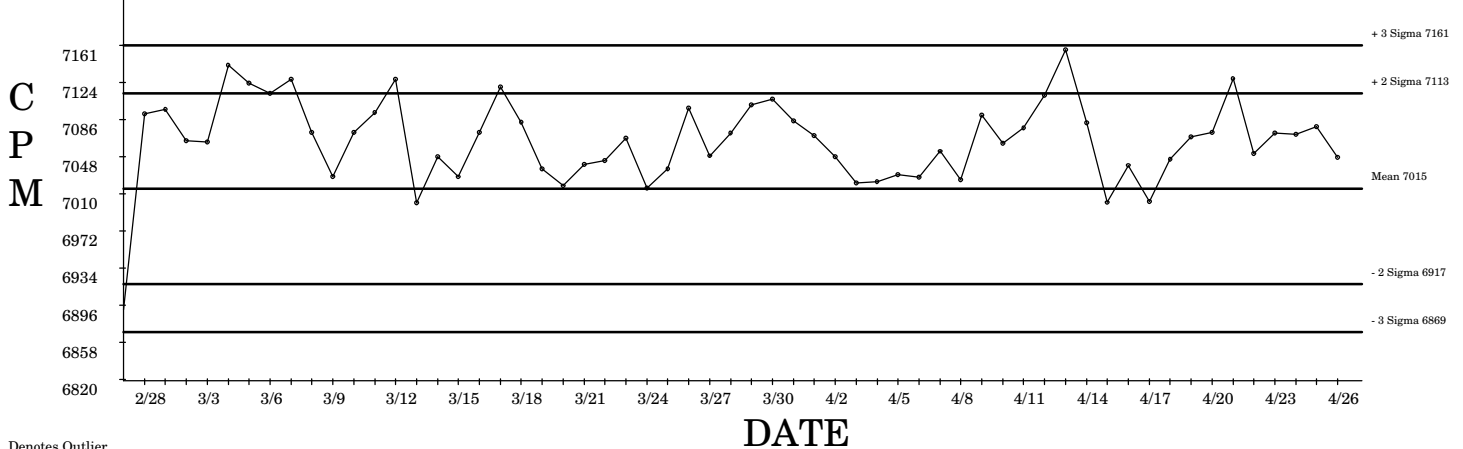
Beta BKG



Alpha EFF

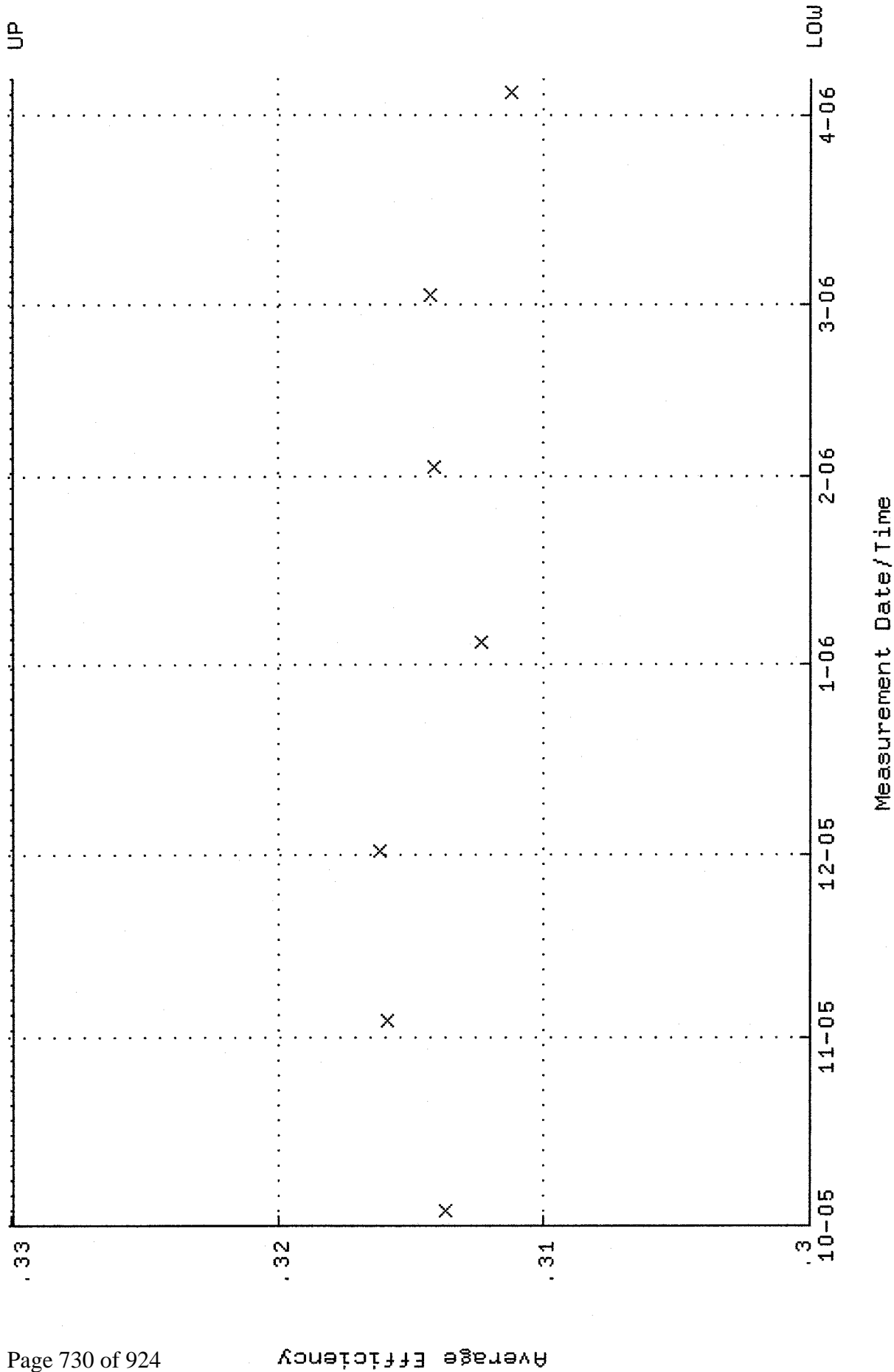


Beta EFF

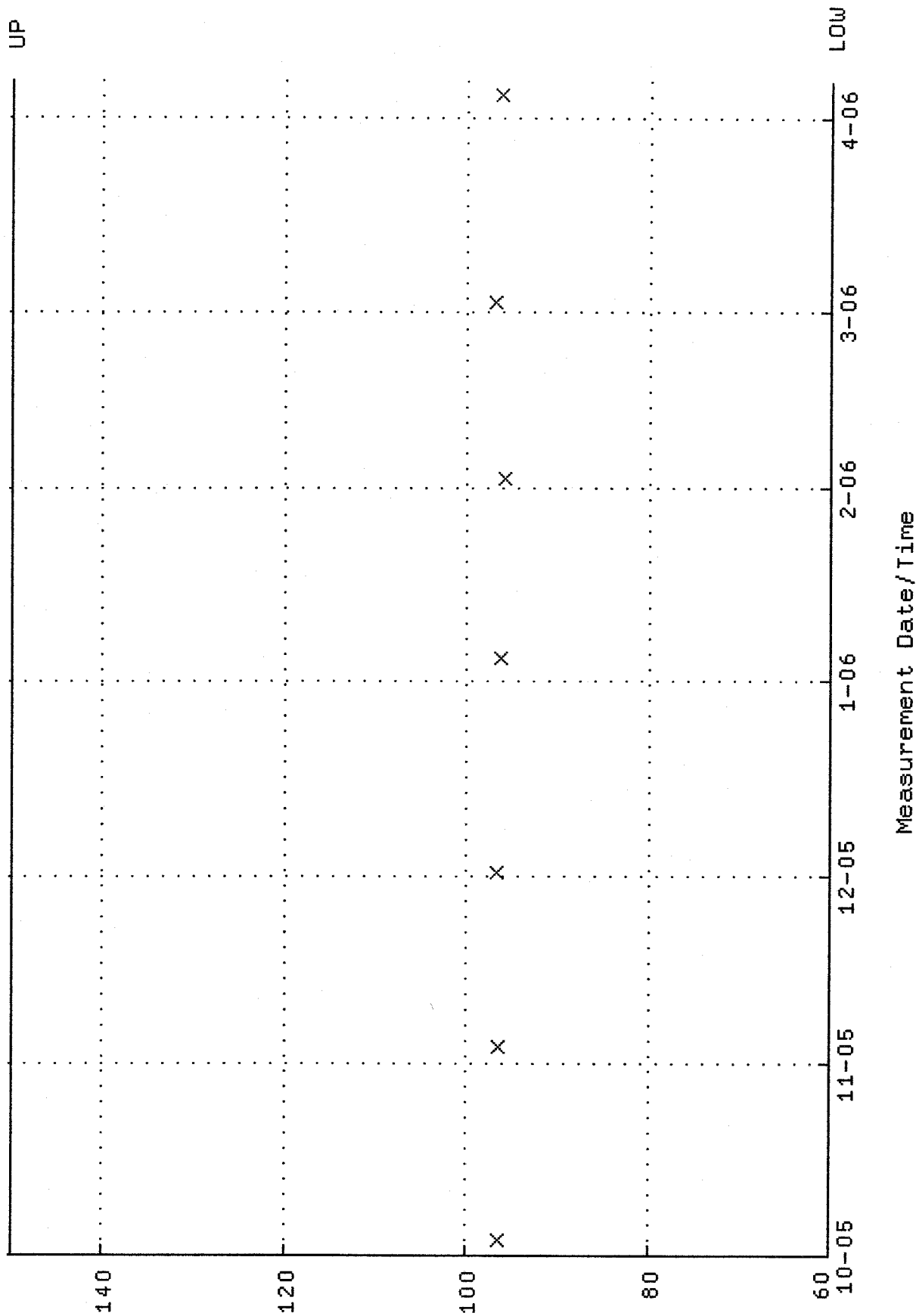


○ Denotes Outlier

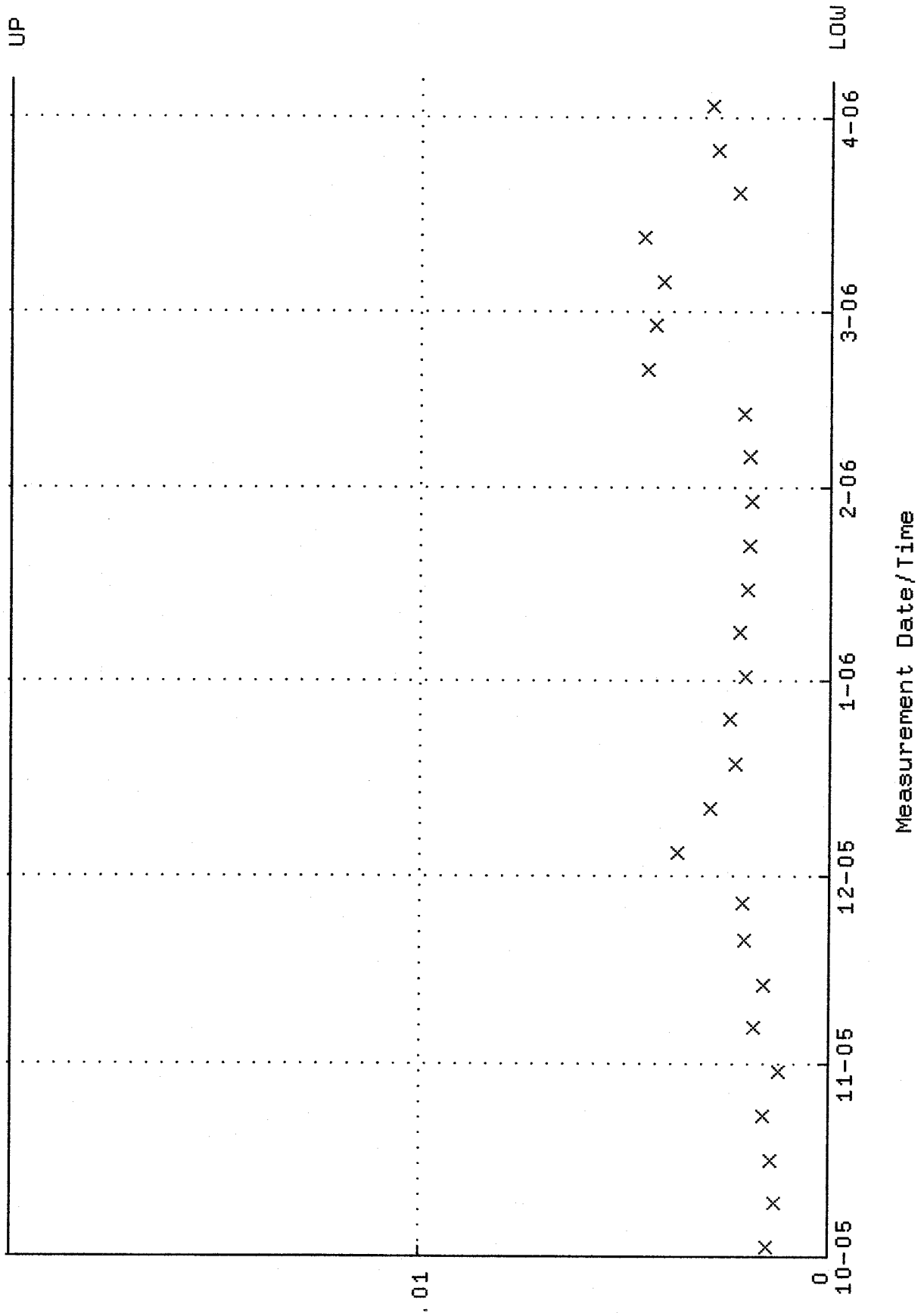
QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.300000 through 0.330000



QA filename : DKA100:[ENV_ALPHA.QA.W]W026.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.000

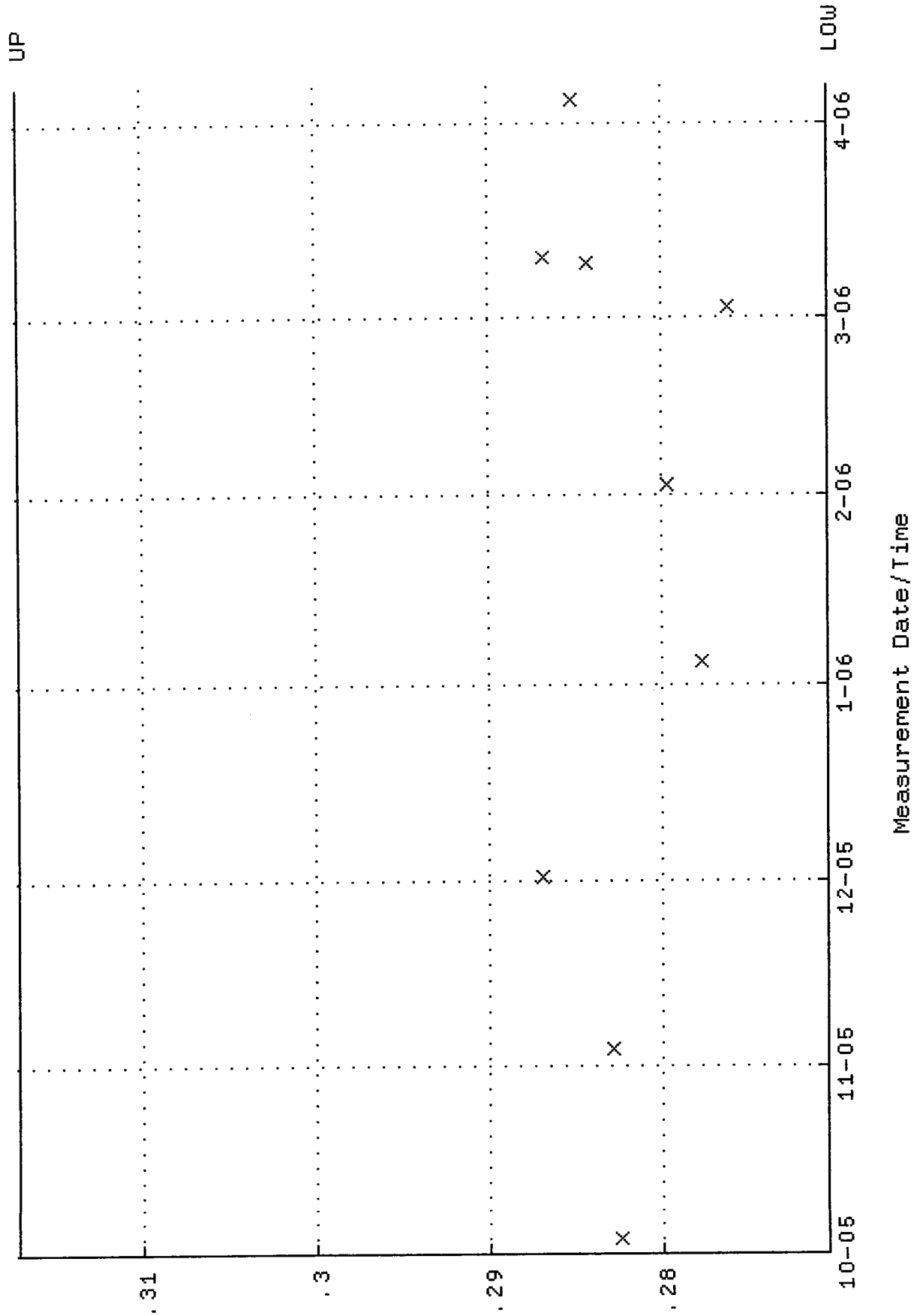


QA filename : DKA100:[ENVY_ALPHA.QA.B]B026.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:42 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

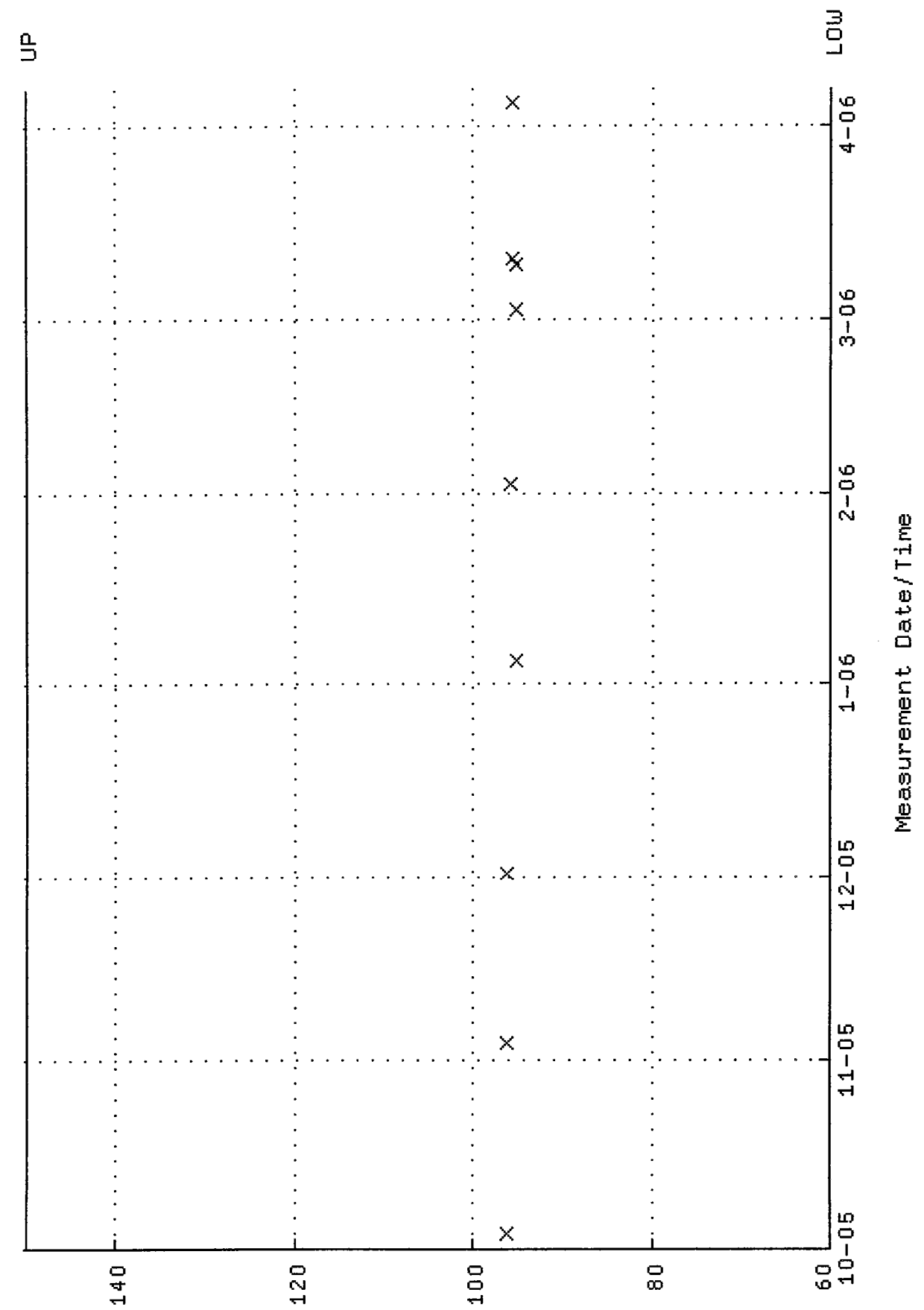


QA filename : DKA100:[ENV_ALPHA.QA.W]W027.QAF;4
 Parameter Name : AVREFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.270487 through 0.317113

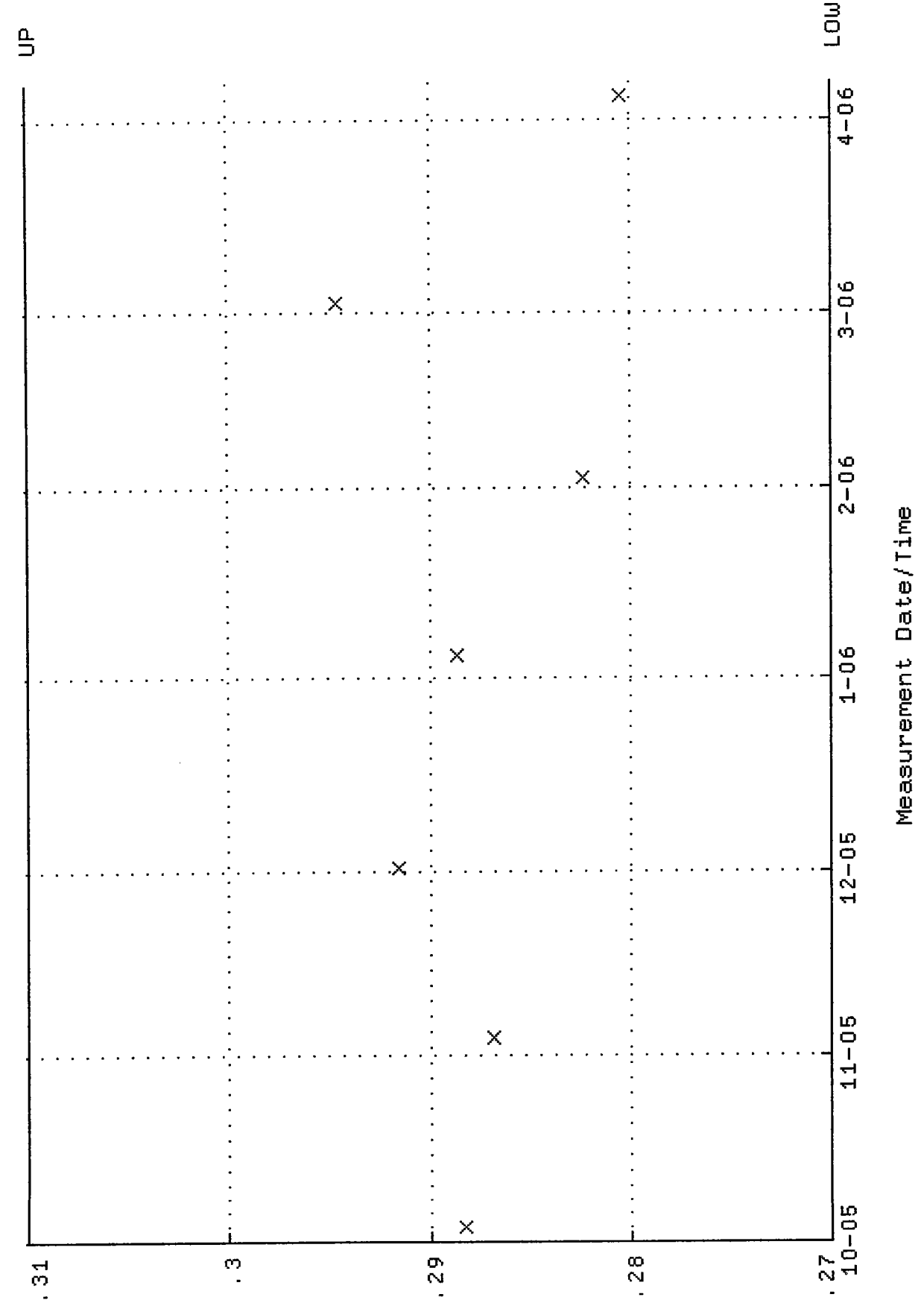
Average Efficiency



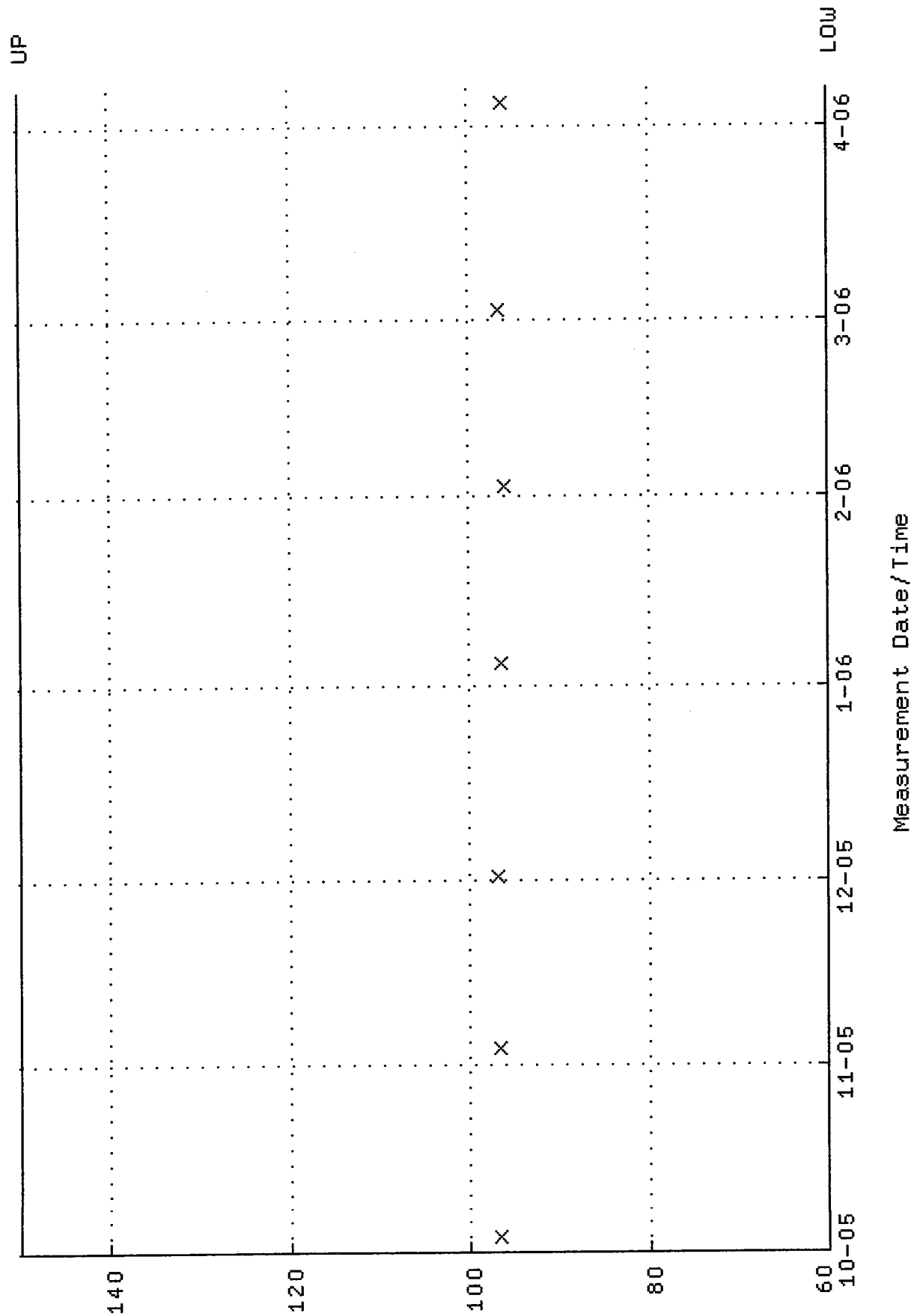
QA filename : DKA100:[ENV_ALPHA.QA.W]w027.QAF;4
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



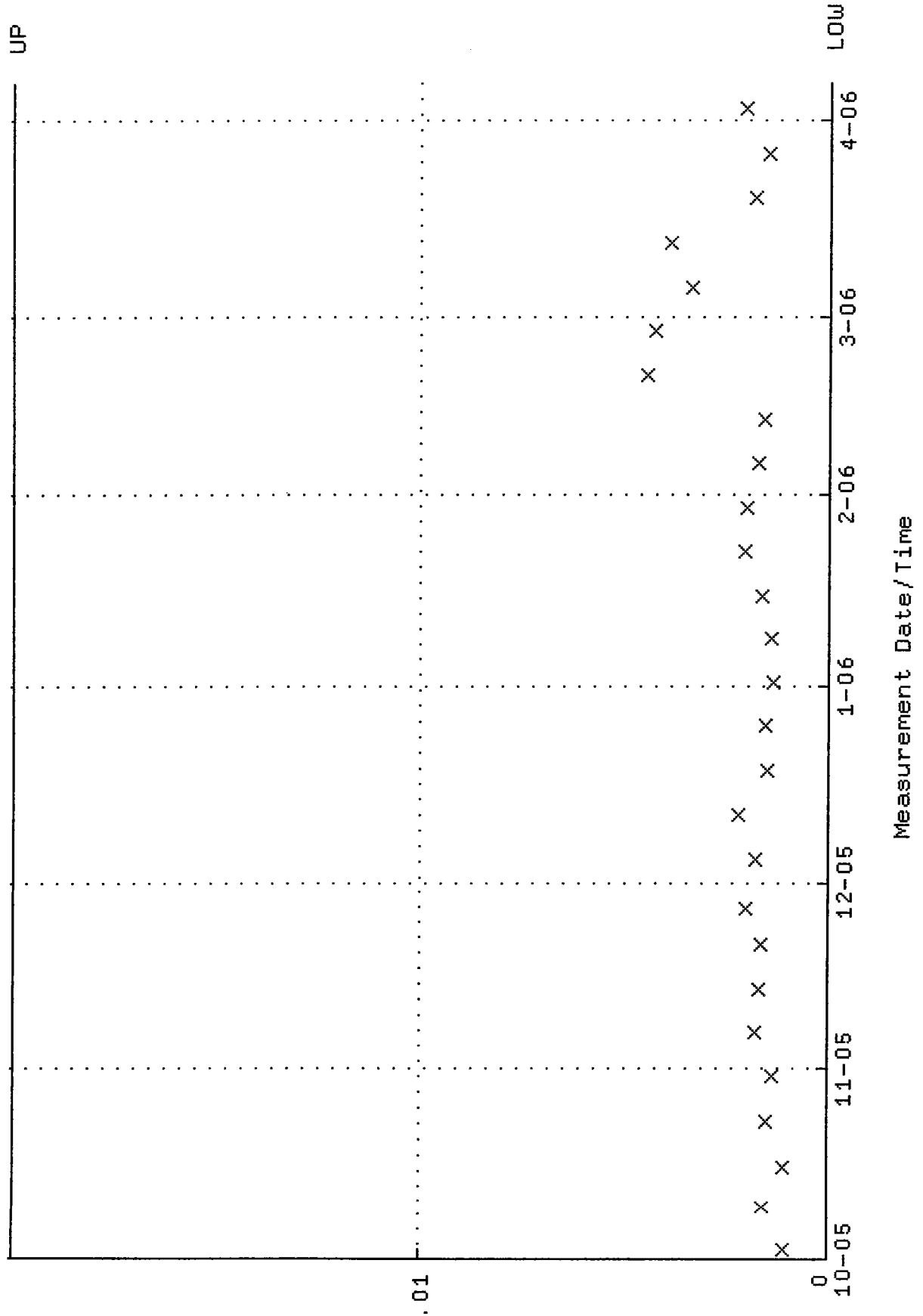
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;6
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.270000 through 0.310000



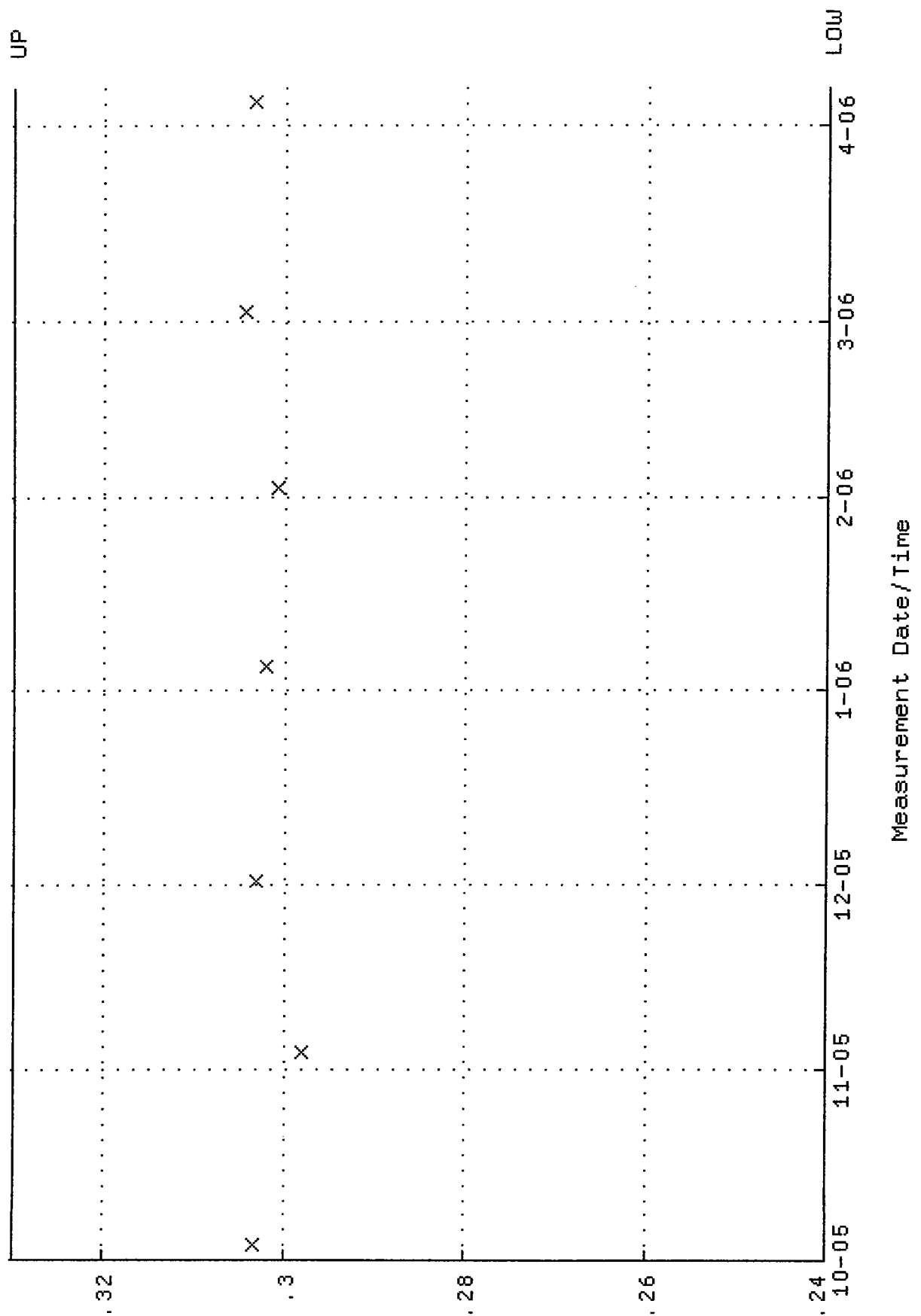
QA filename : DKA100:[ENV_ALPHA.QA.W]W029.QAF;6
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



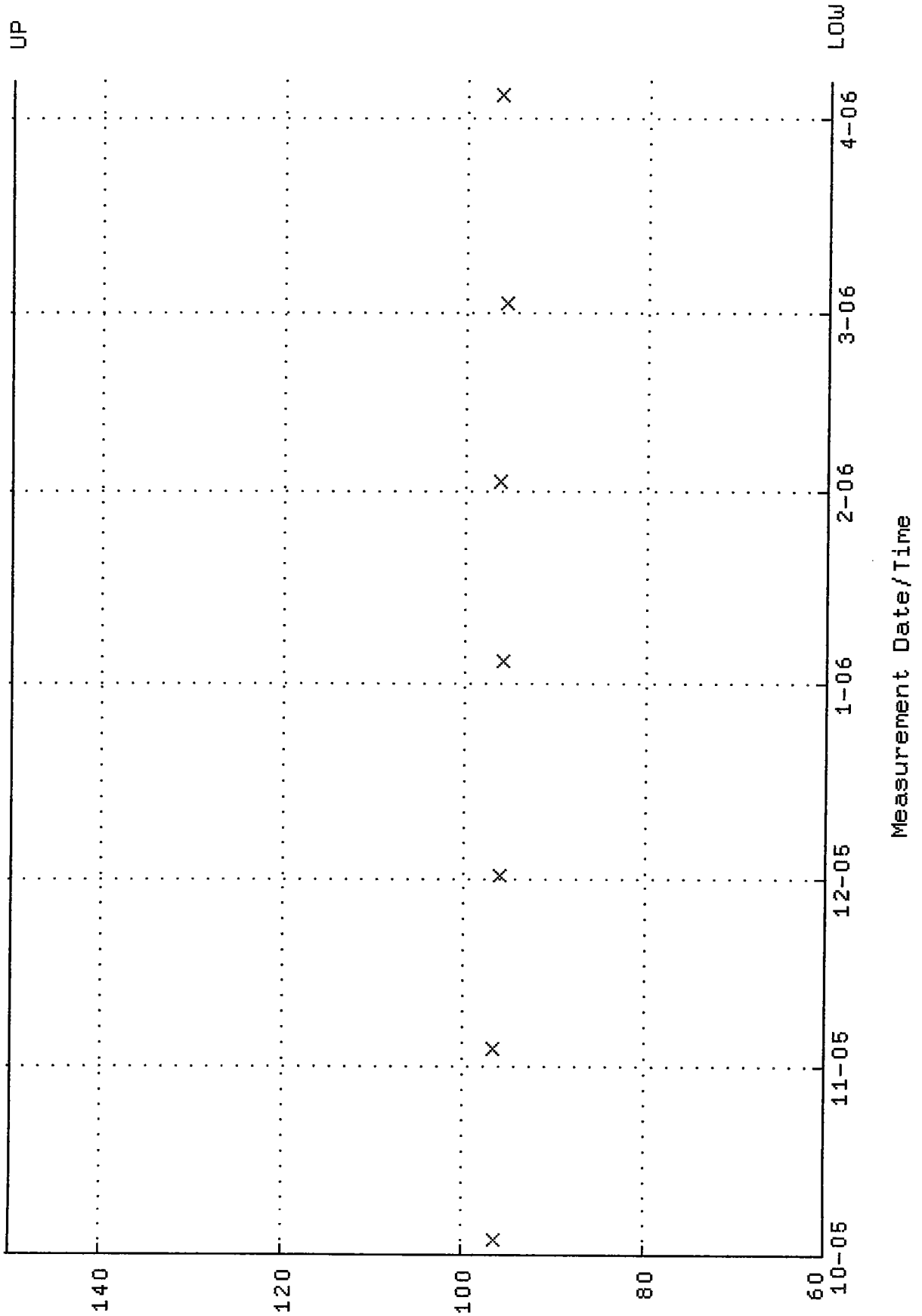
QA filename : DKA100:[ENV_ALPHA.QA.B]B029.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 2-OCT-2005 13:25:42 through 6-APR-2006 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



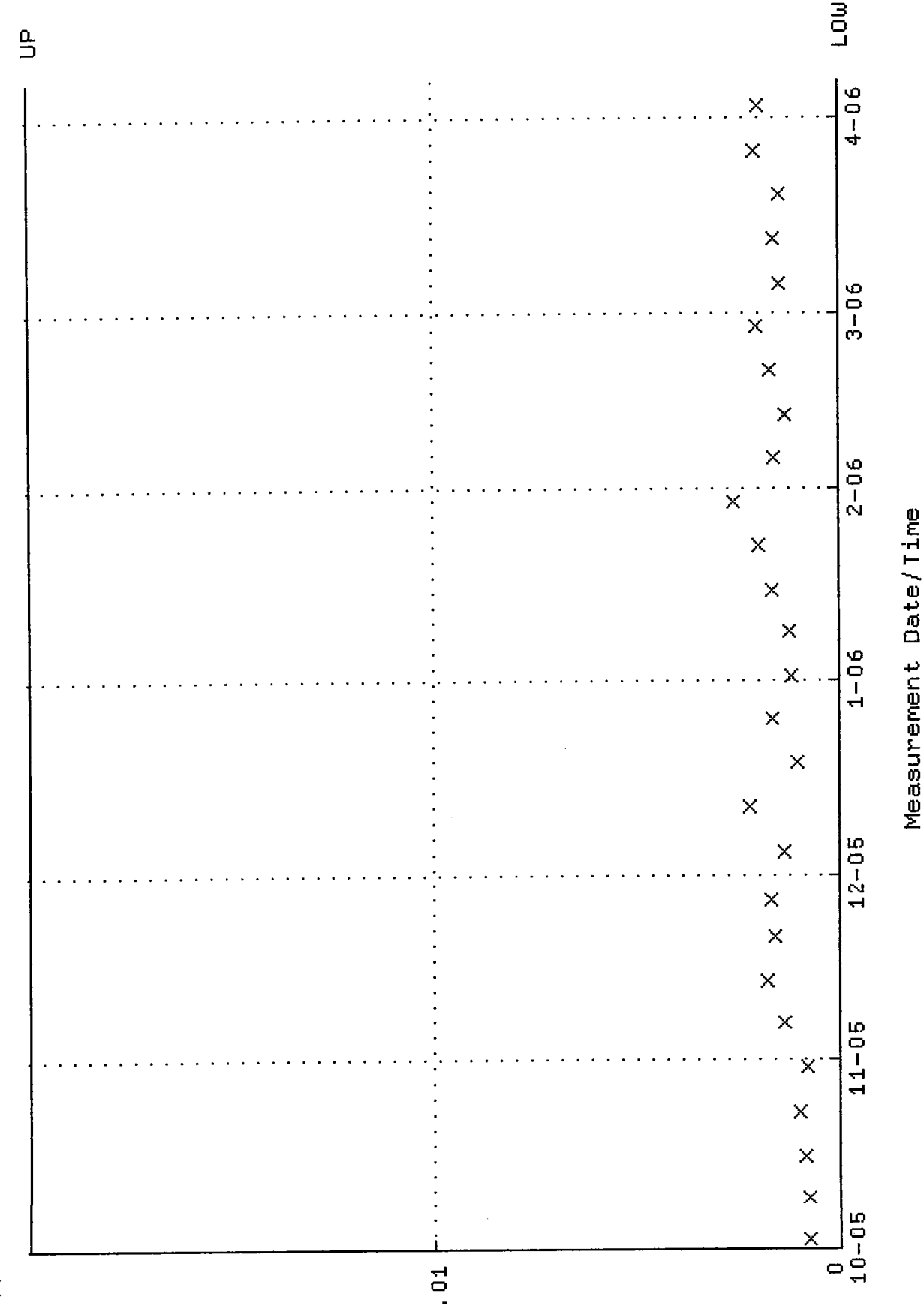
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.240000 through 0.330000



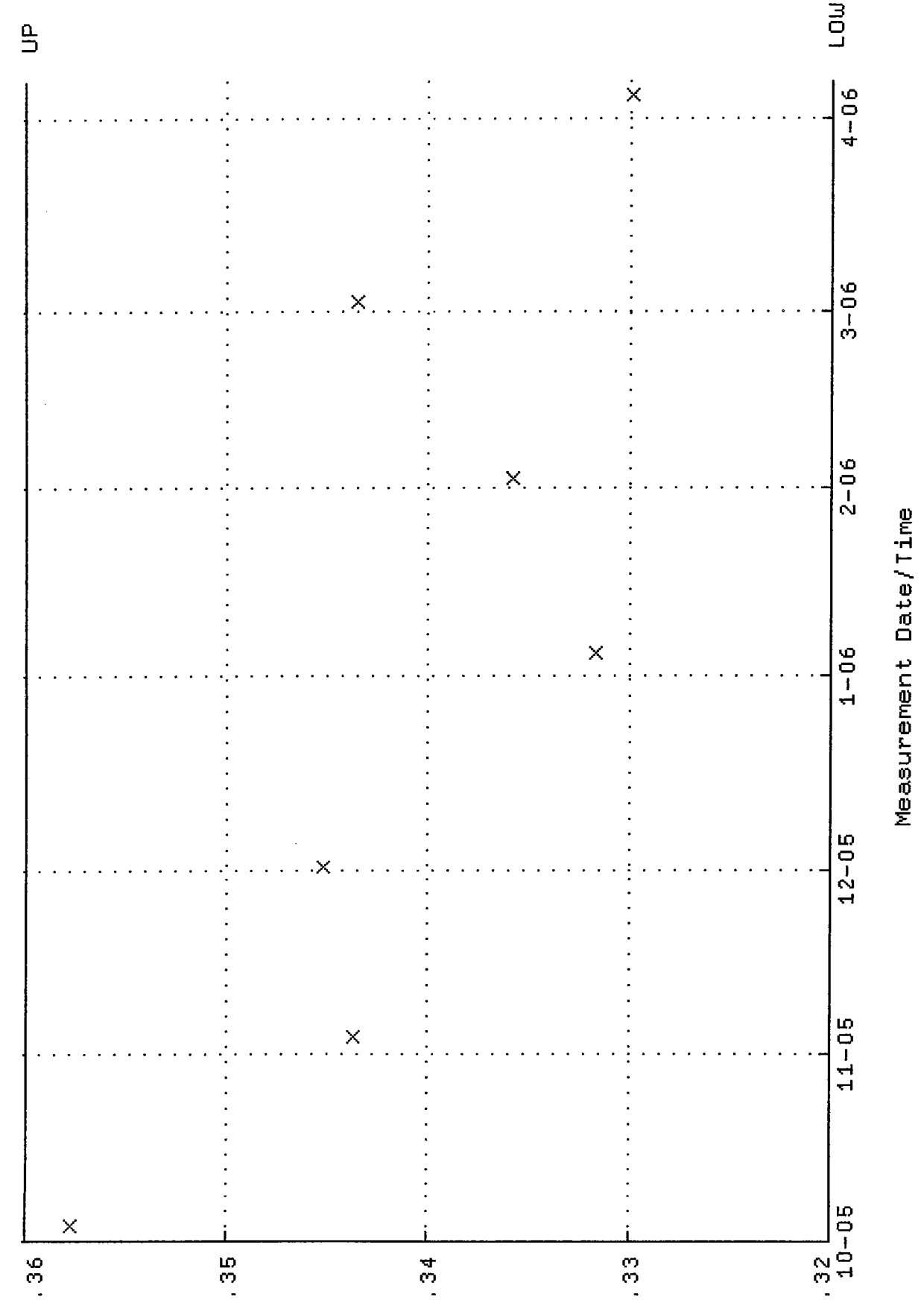
QA filename : DKA100:[ENV_ALPHA.QA.W]W030.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.000



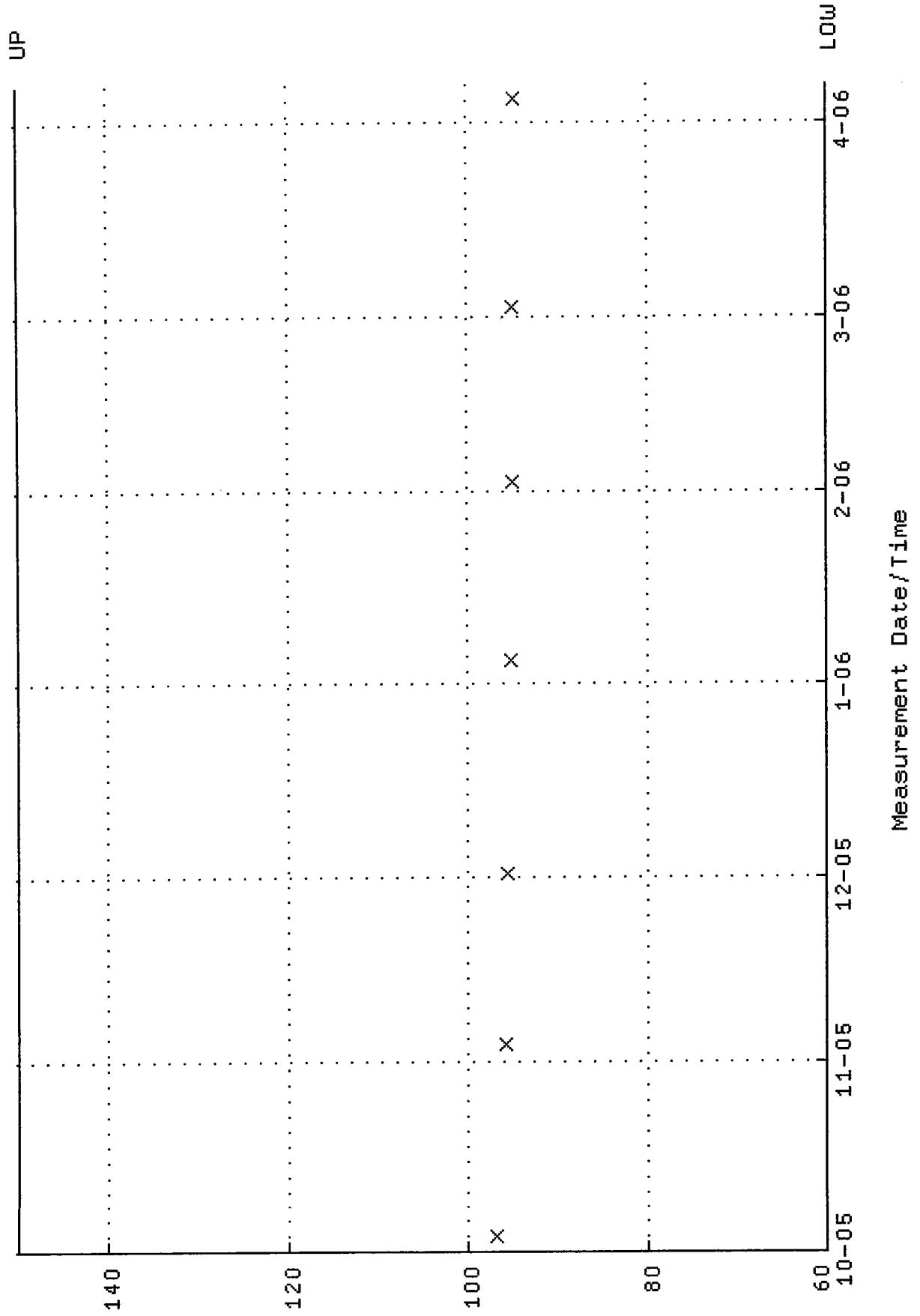
QA filename : DKA100:[ENV_ALPHA.QA.B]B030.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:42 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



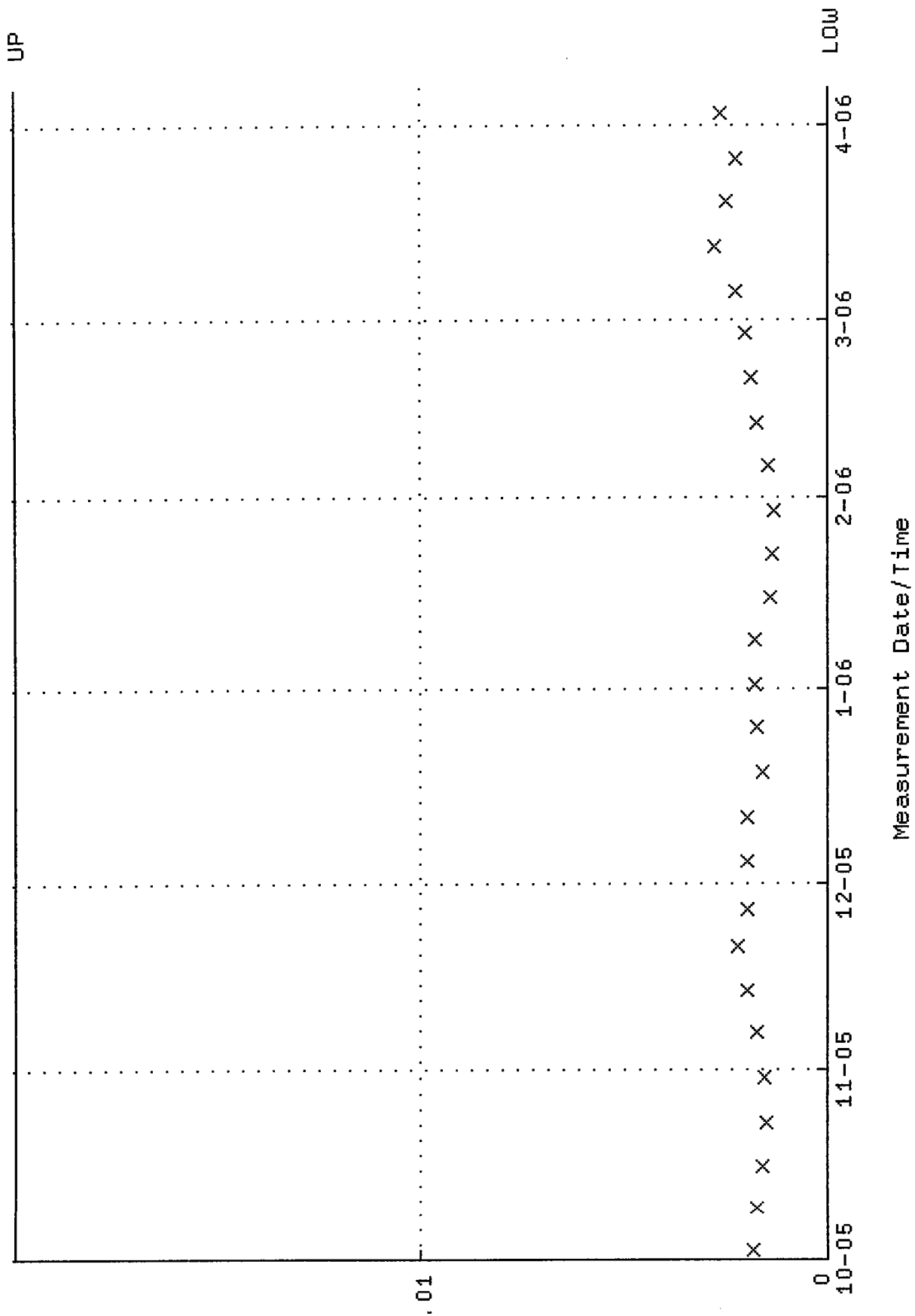
QA filename : DKA100:[ENV_ALPHA.QA.w]w037.QAF;4
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.320000 through 0.360000



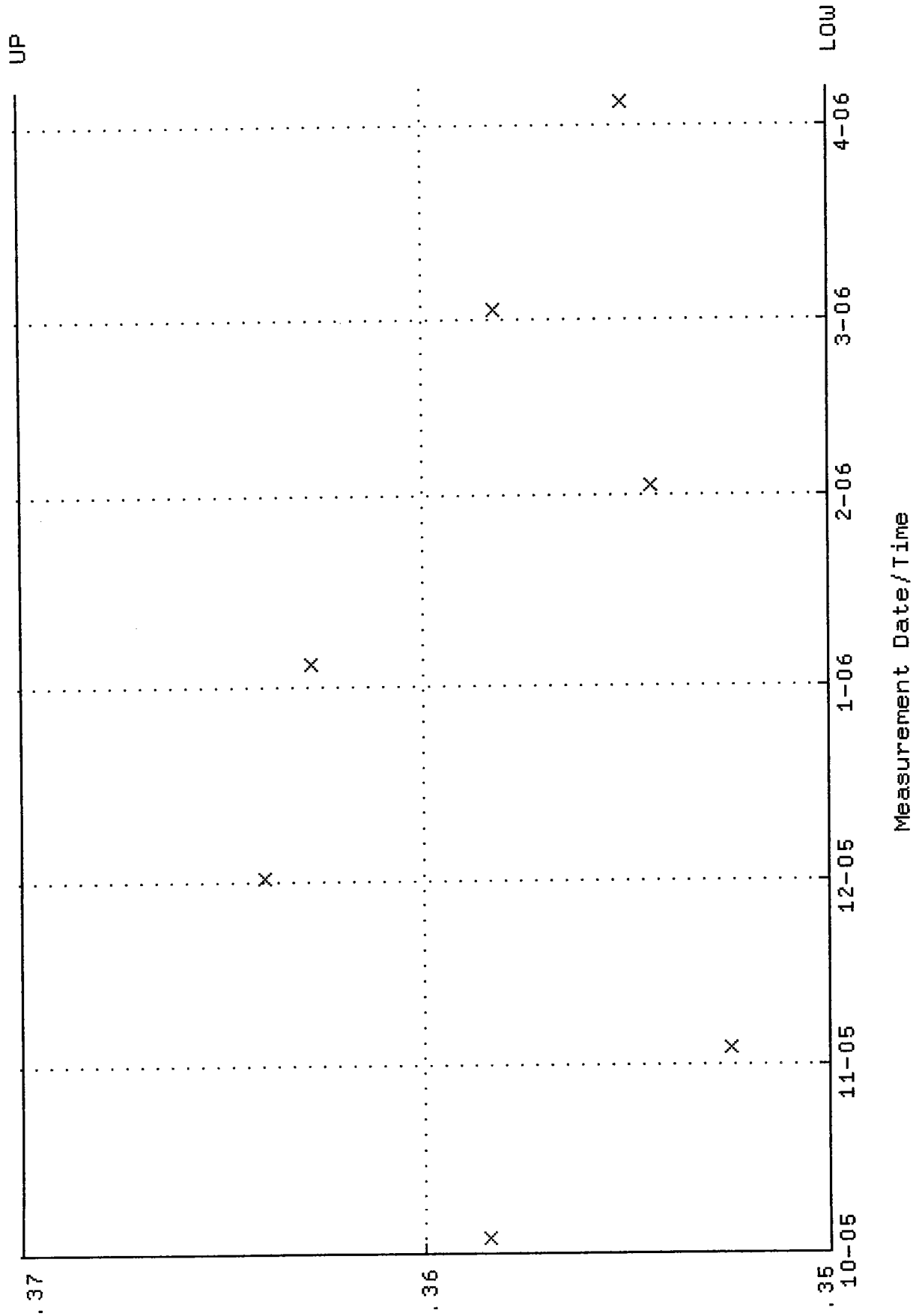
QA filename : DKA100:[ENV_ALPHA.QA.w]w037.QAF; 4
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.000



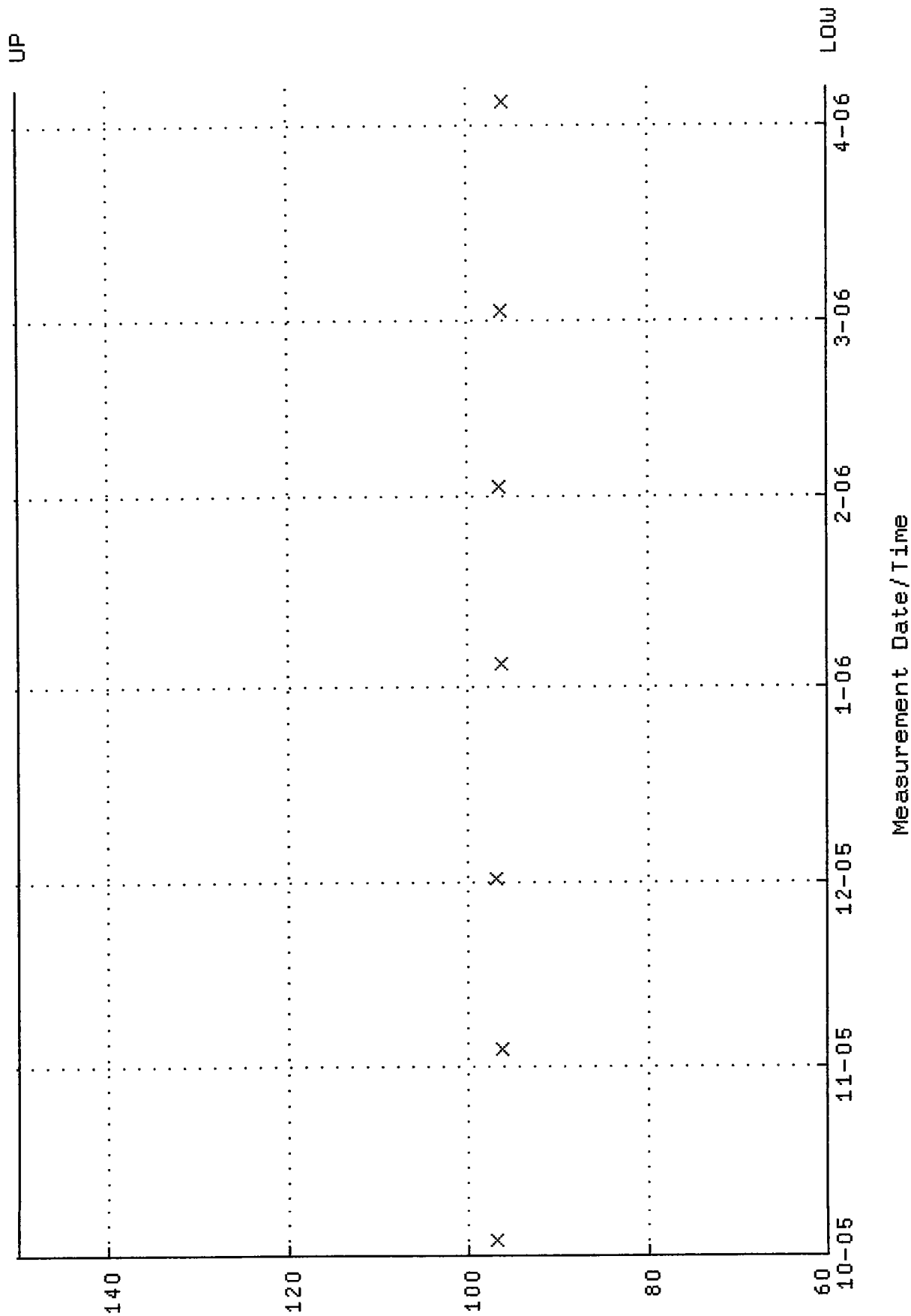
QA filename : DKA100:[ENV_ALPHA.QA.B]B037.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:43 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



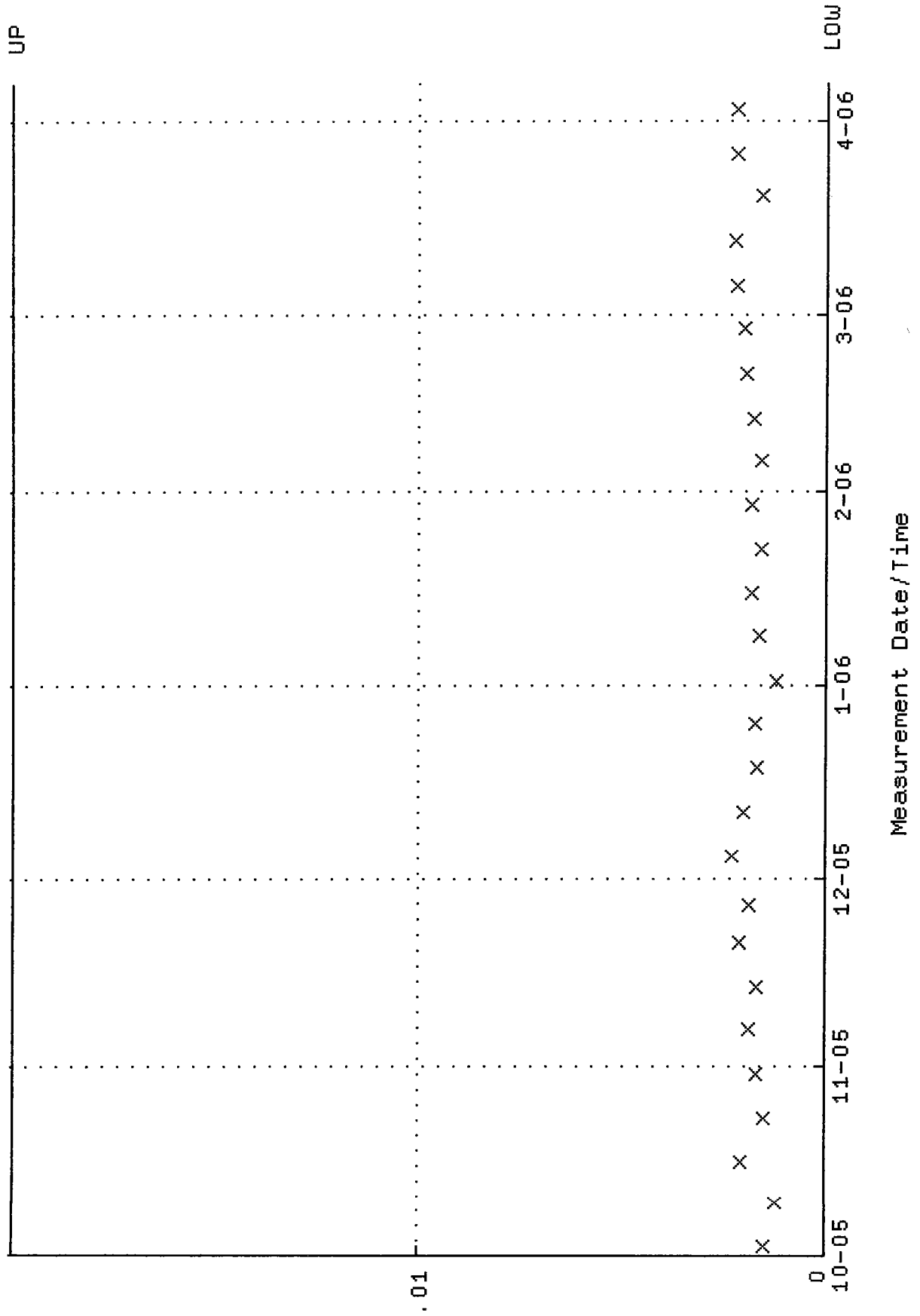
QA filename : DKA100: [ENV_ALPHA.QA.W]W038.QAF; 3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.370000



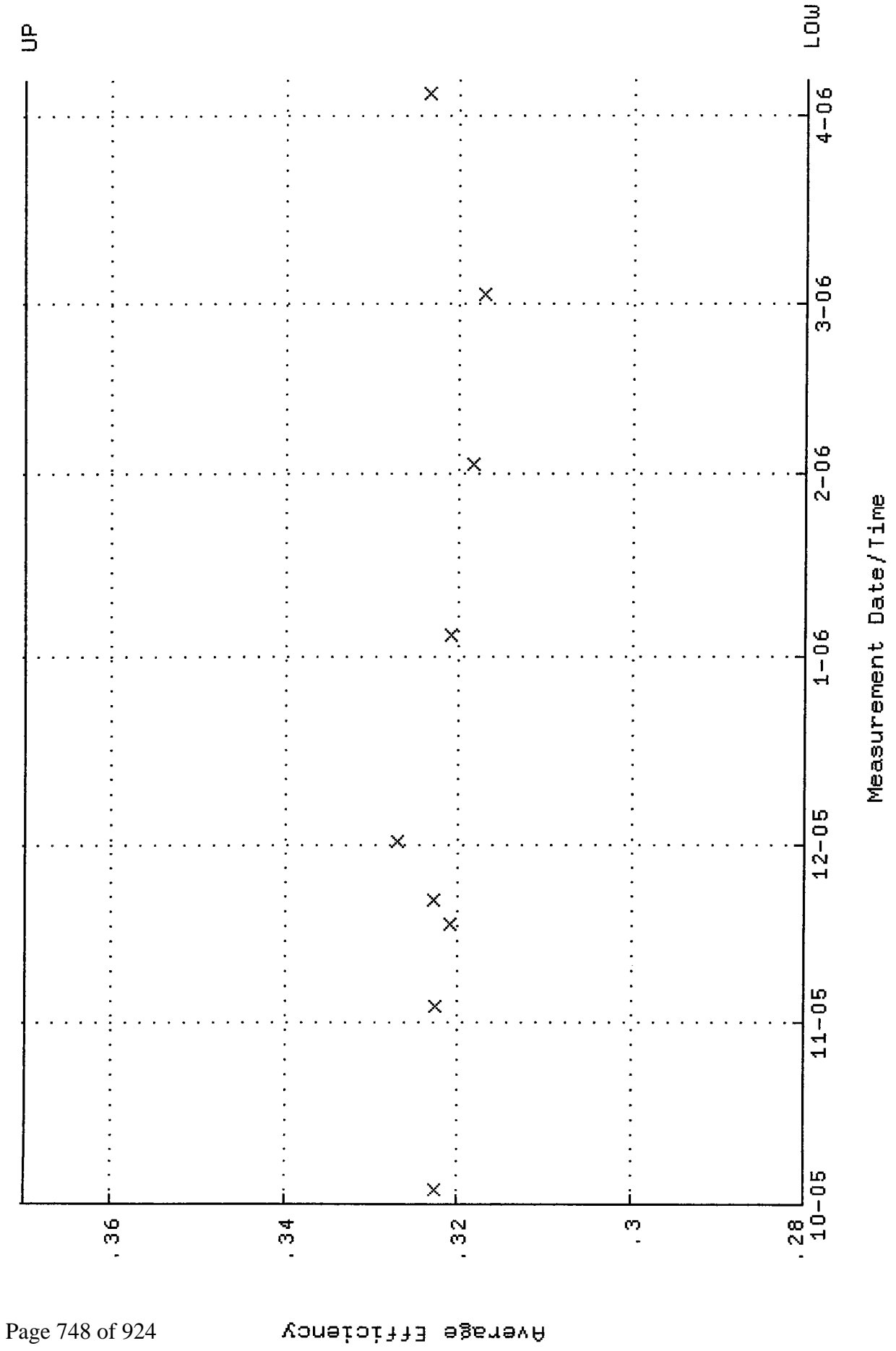
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



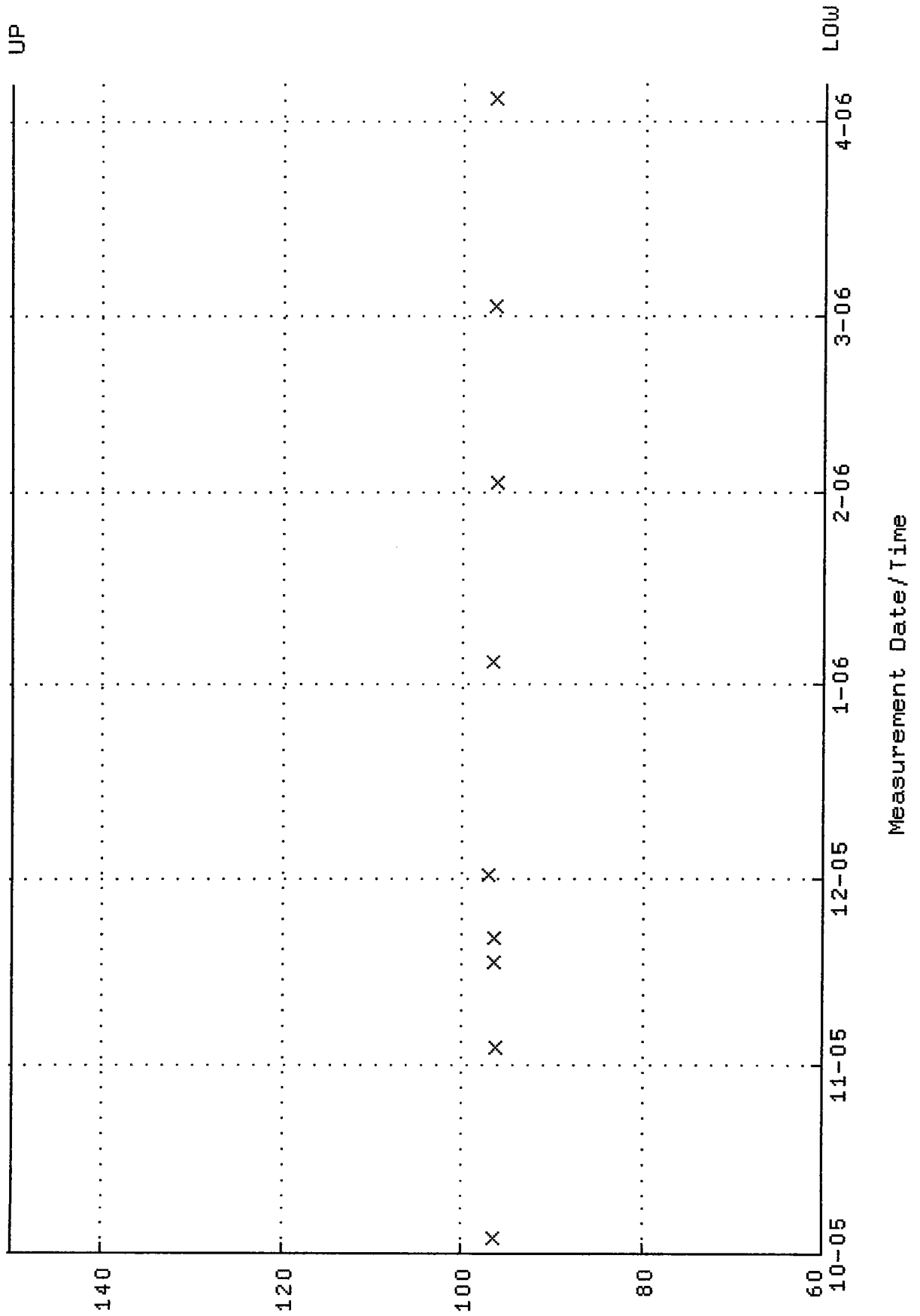
QA filename : DKA100:[ENV_ALPHA.QA.B]B038.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:43 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



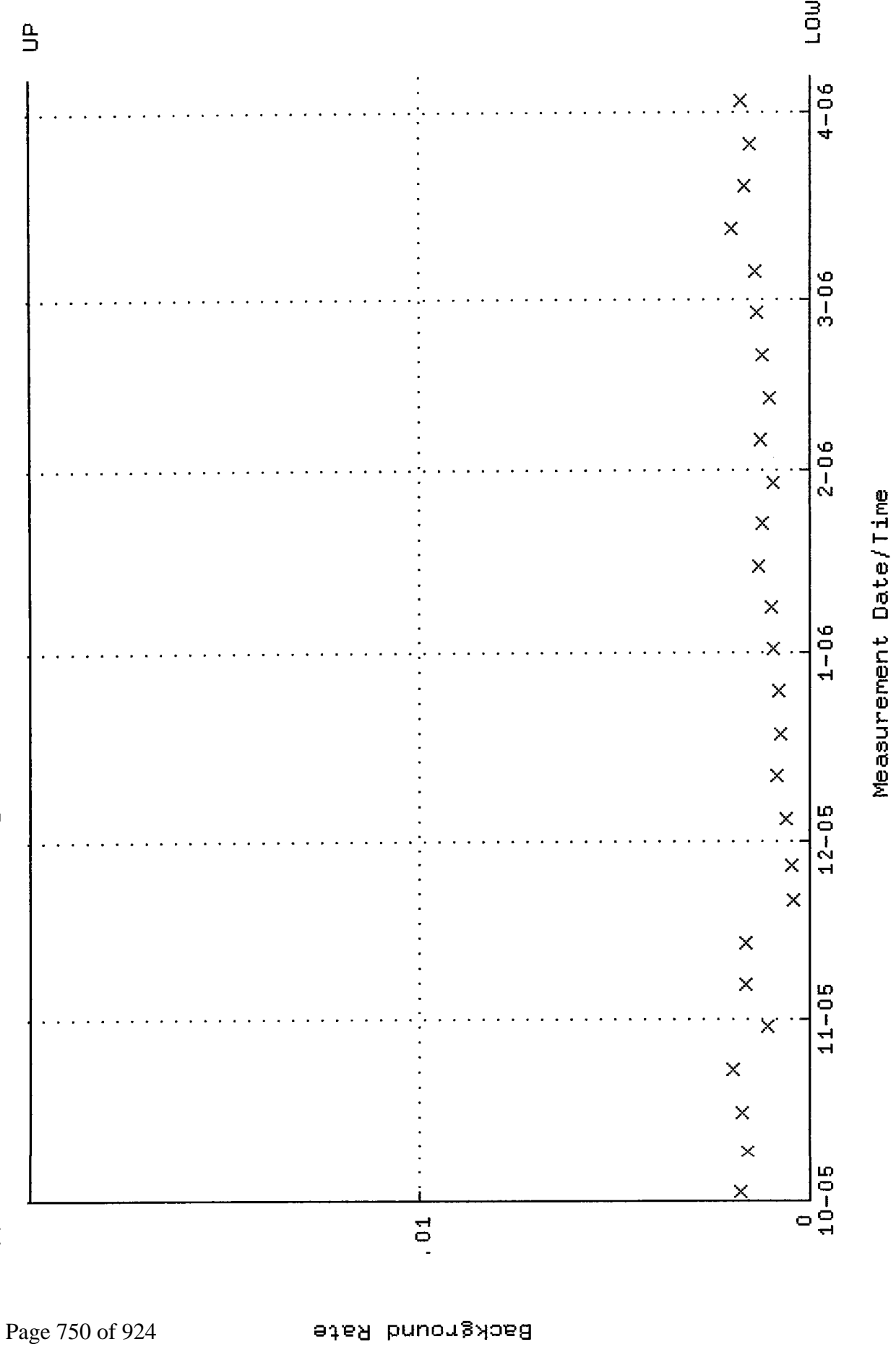
QA filename : DKA100:[ENV_ALPHA.QA.w]w040.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.280000 through 0.370000



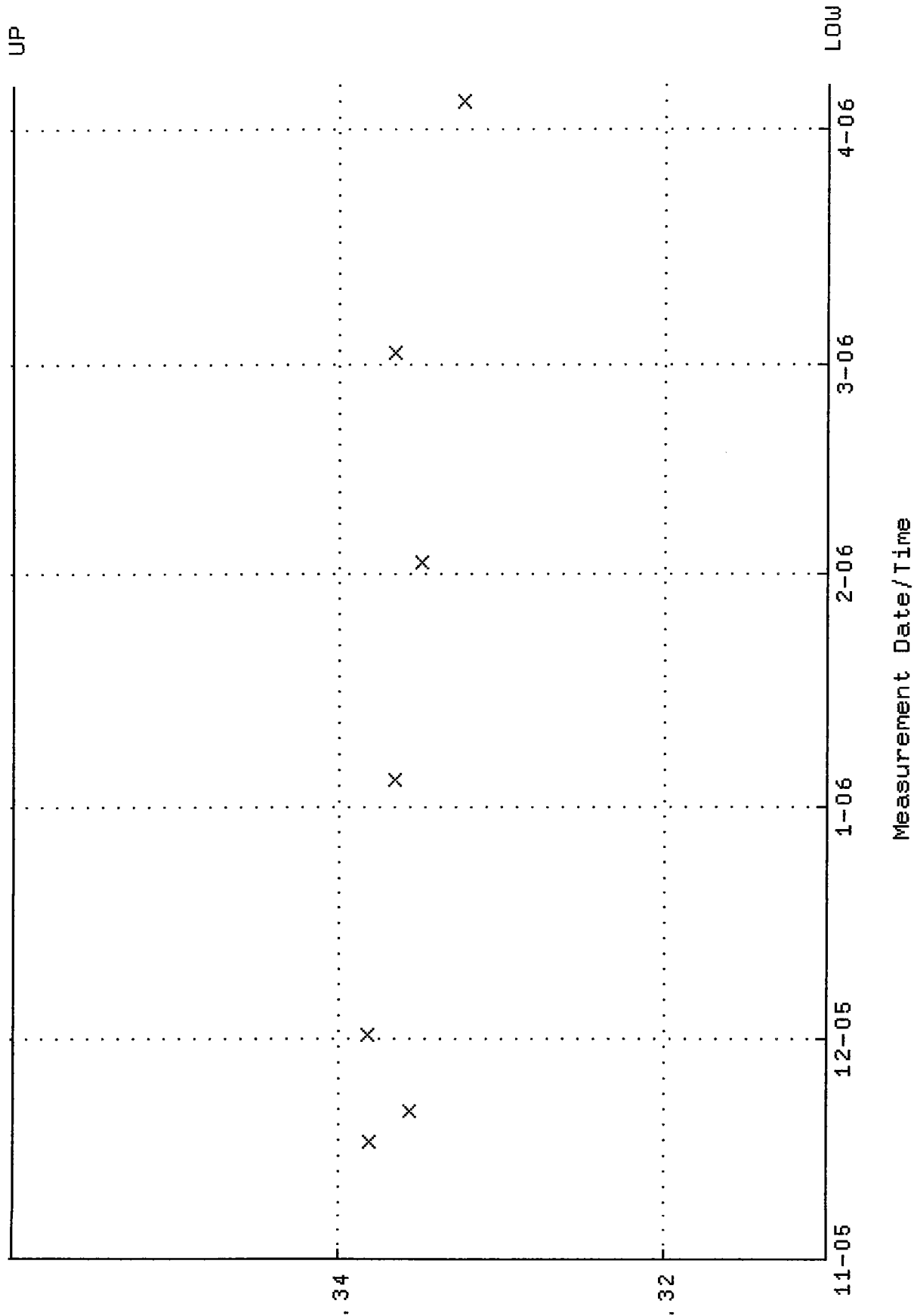
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;3
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



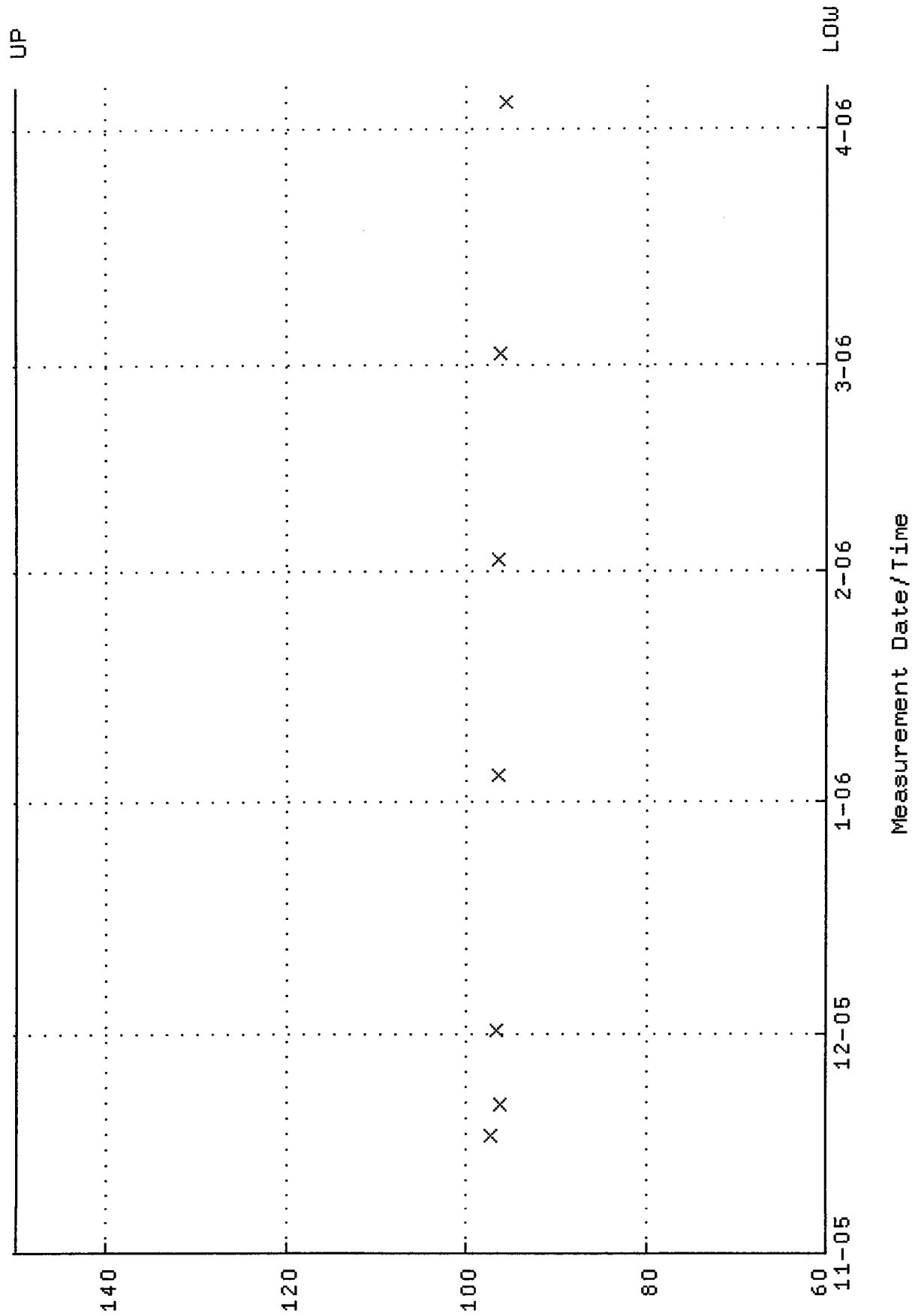
QA filename : DKA100:[ENV_ALPHA.QA.B]B040.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:43 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



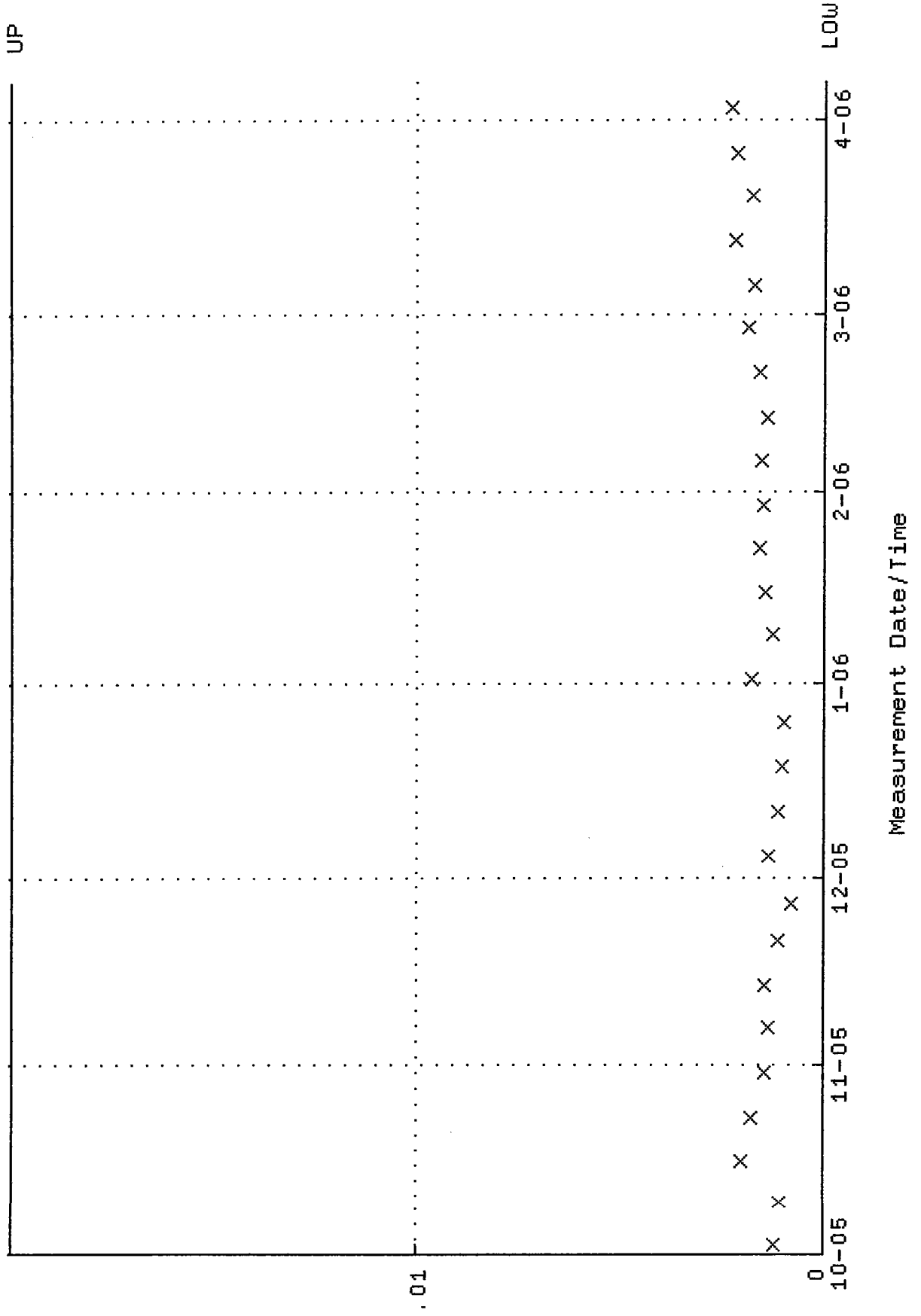
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;5
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 17-NOV-2005 07:55:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.310000 through 0.360000



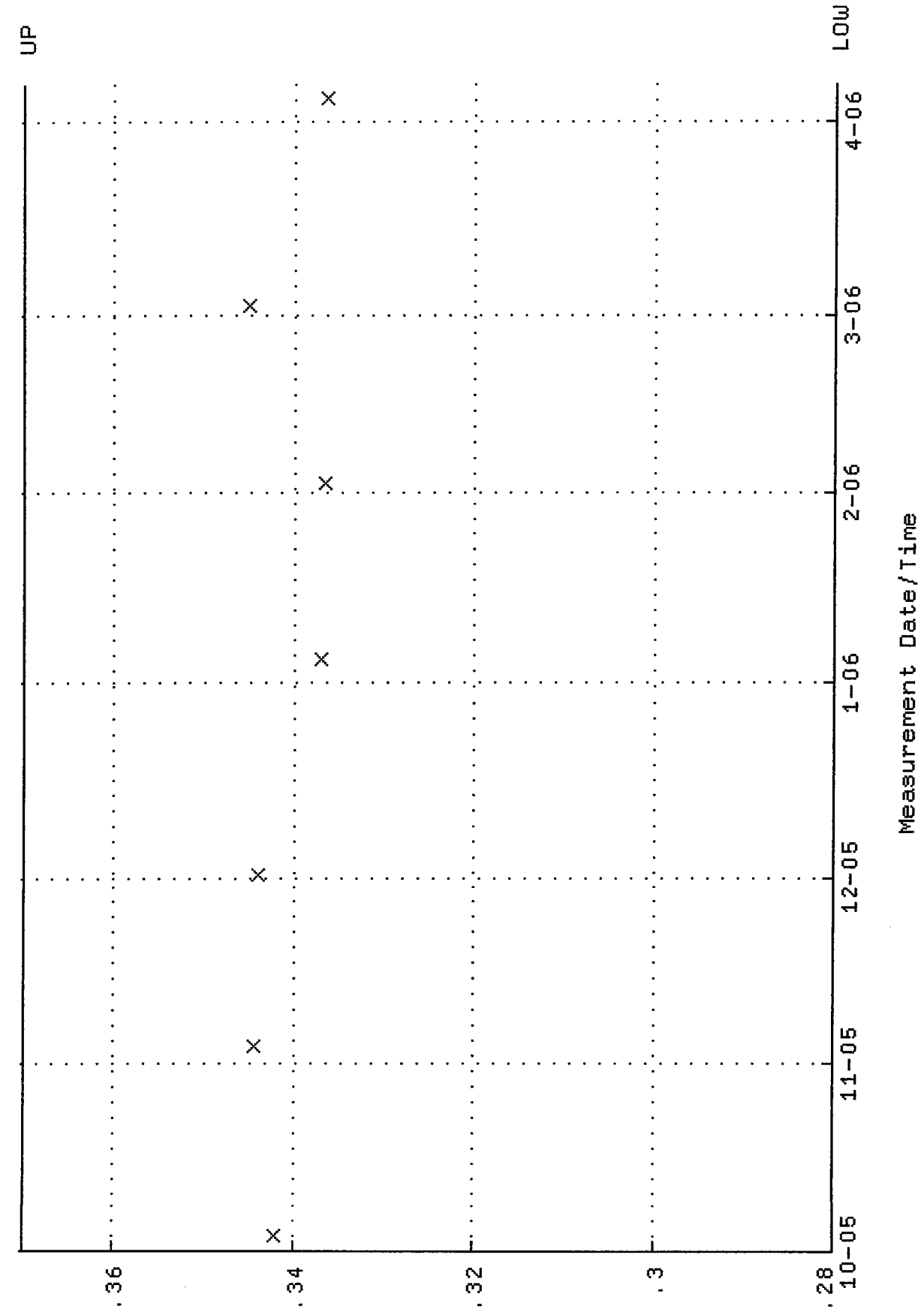
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;5
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 17-NOV-2005 07:55:07 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



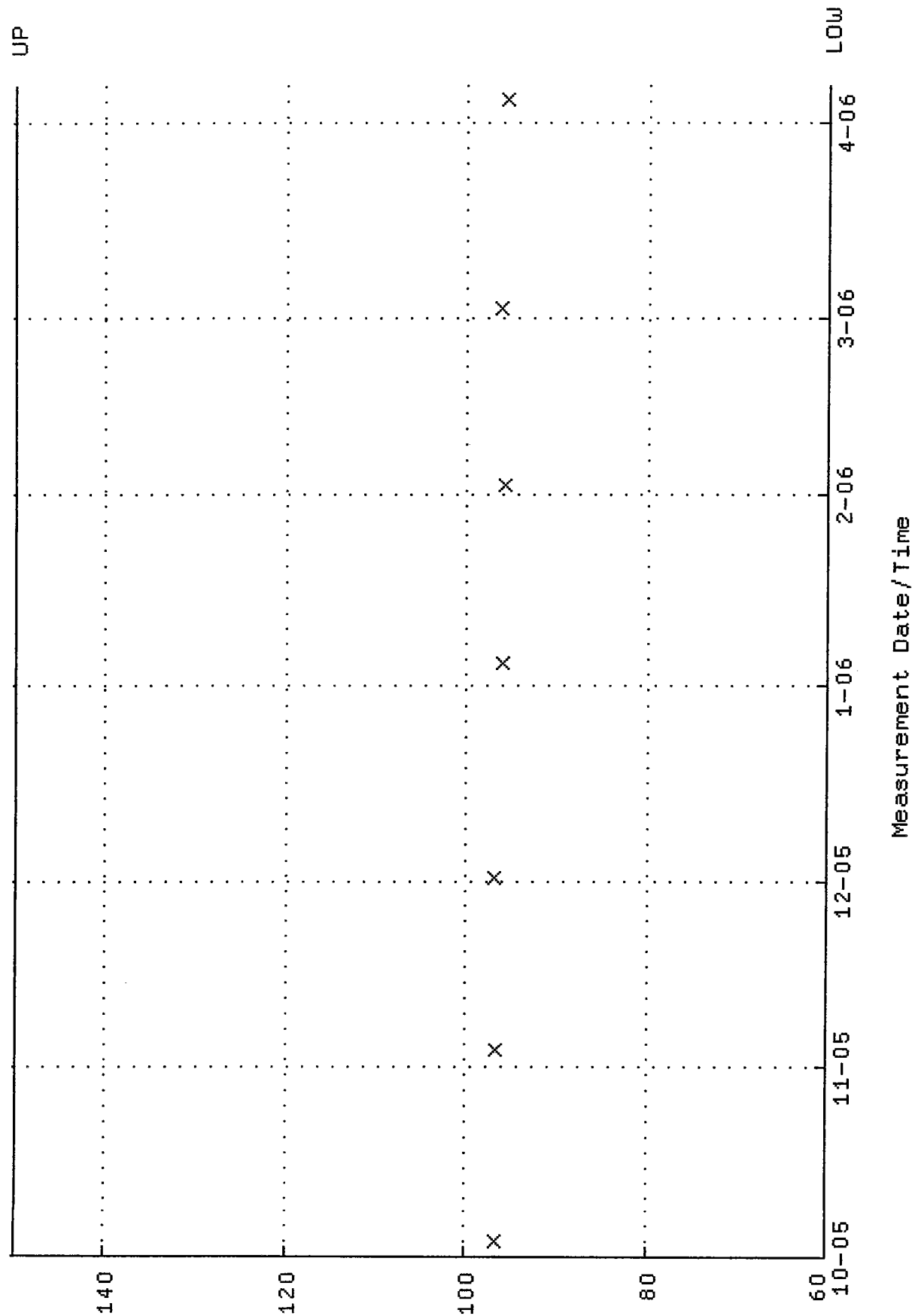
QA filename : DKA100:[ENV_ALPHA.QA.B]B041.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:43 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



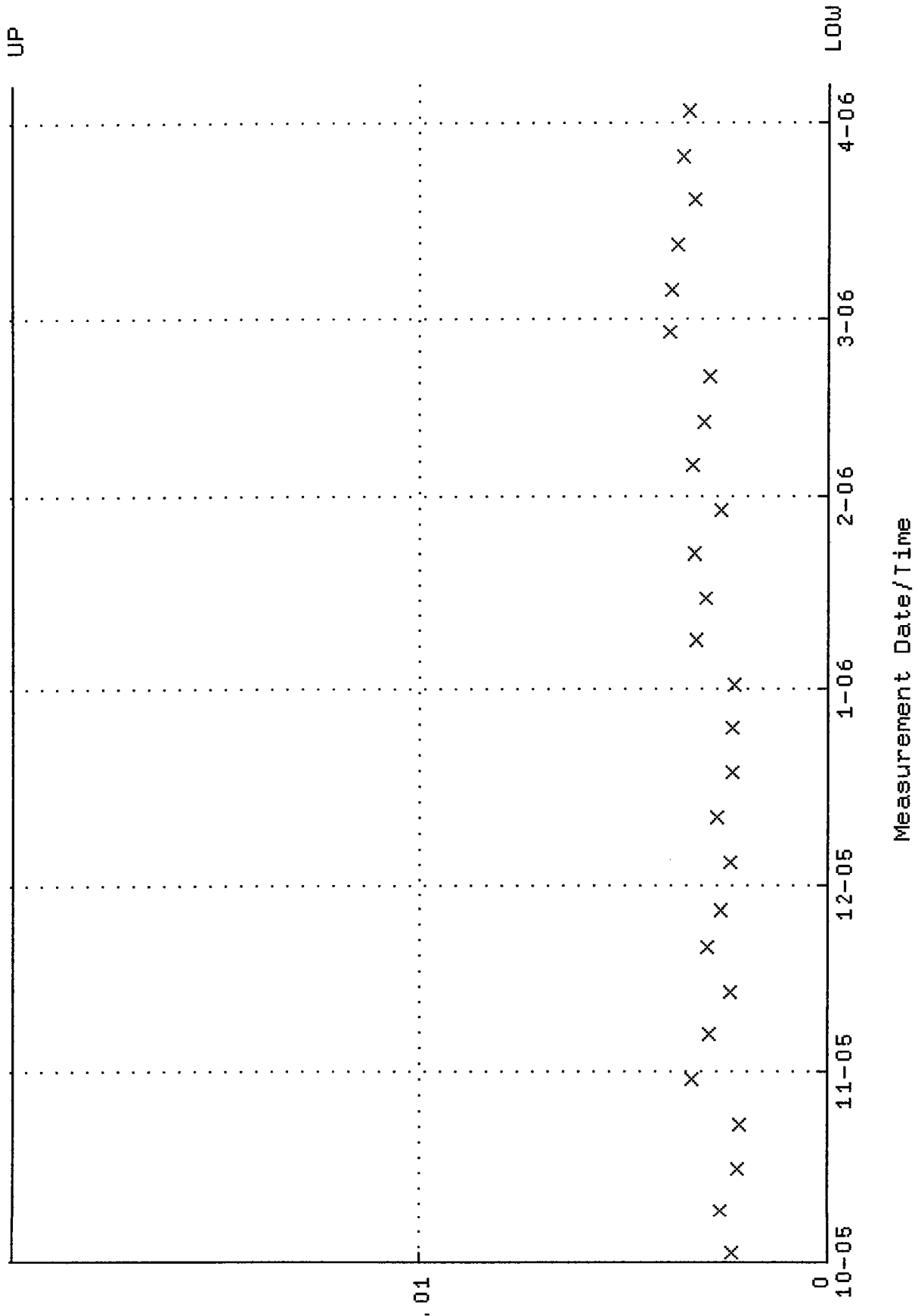
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.280000 through 0.370000



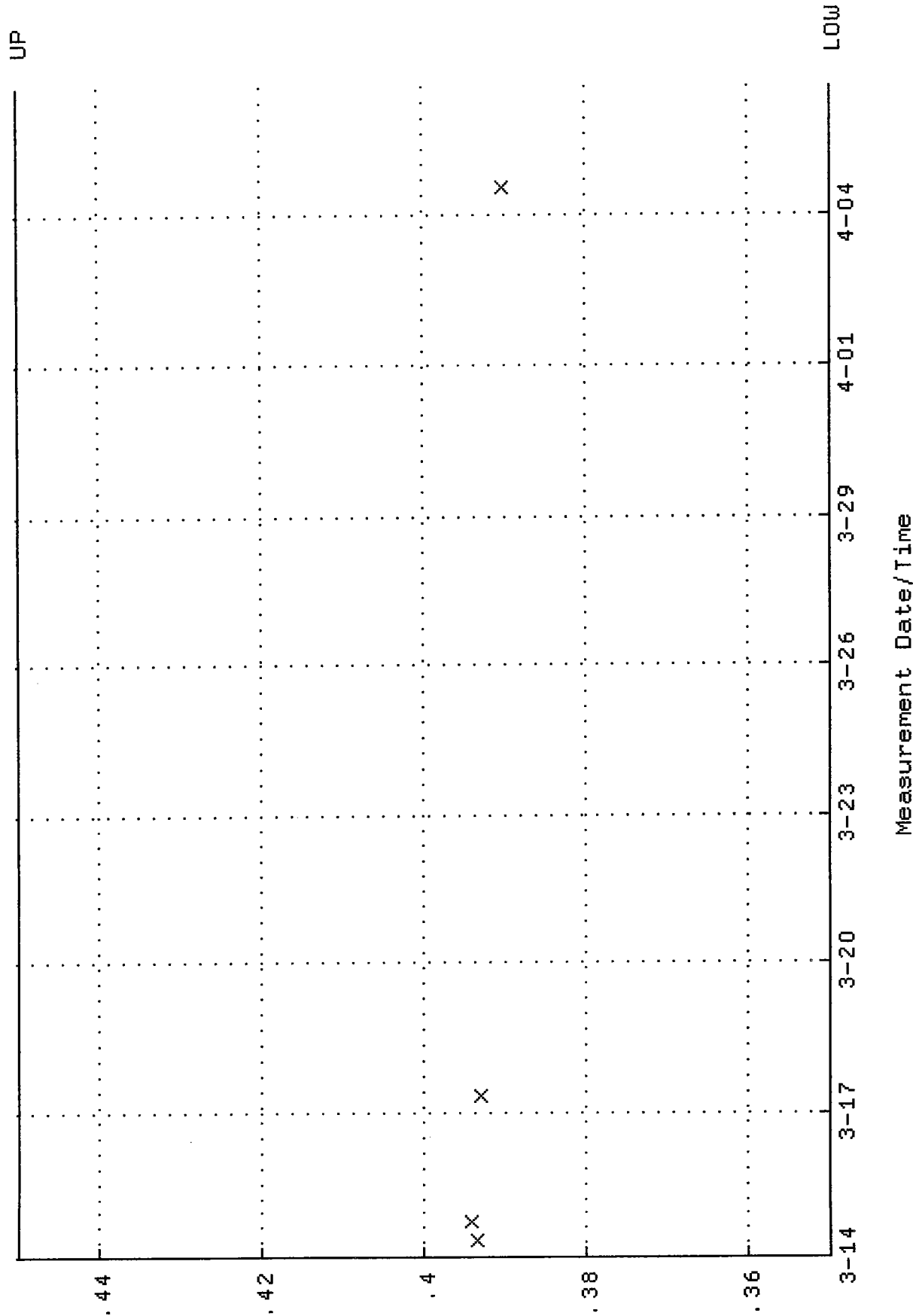
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 3-OCT-2005 12:02:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 60.0000 through 150.0000



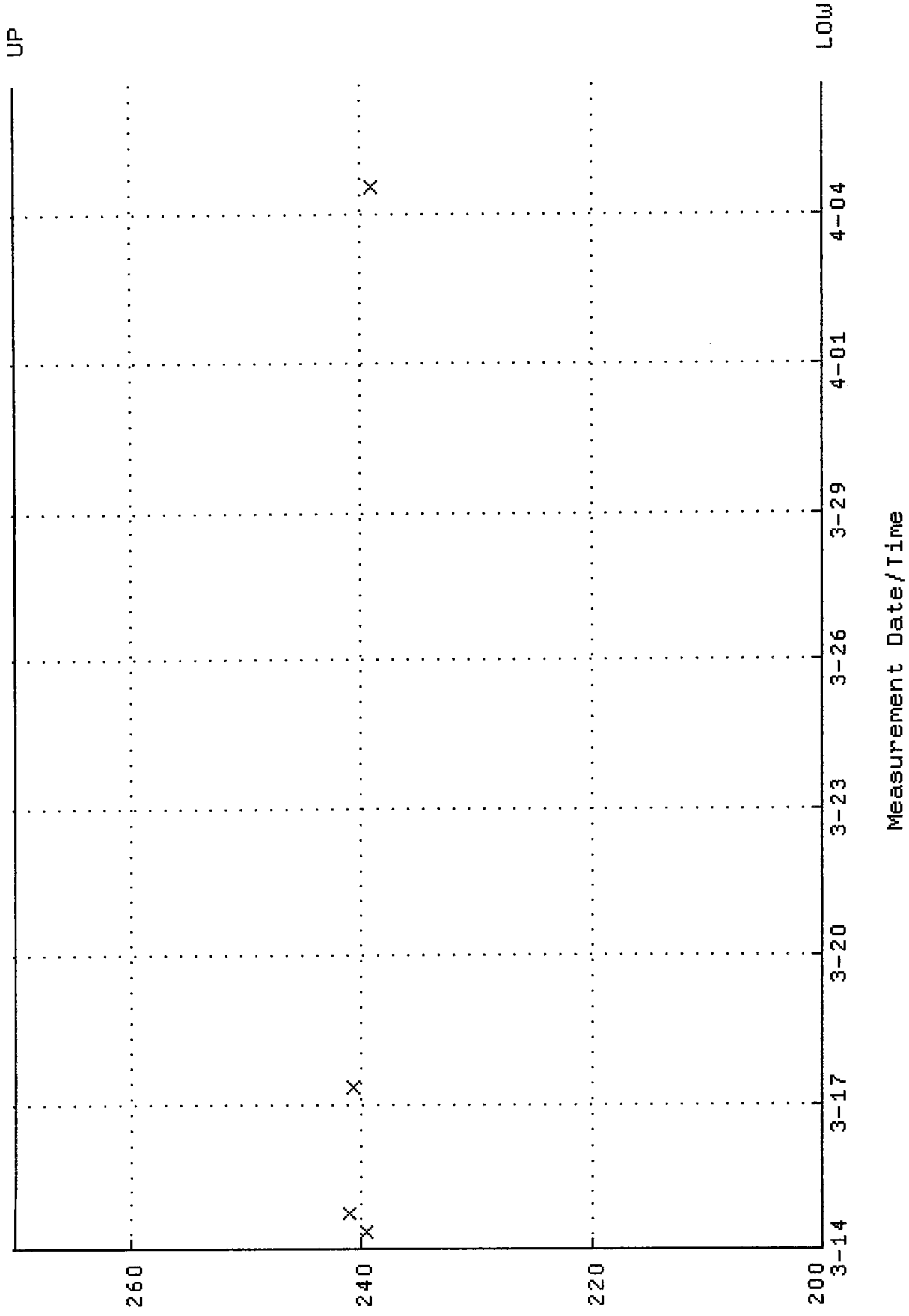
QA filename : DKA100:[ENV_ALPHA,QA,B]B042.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 2-OCT-2005 13:25:43 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



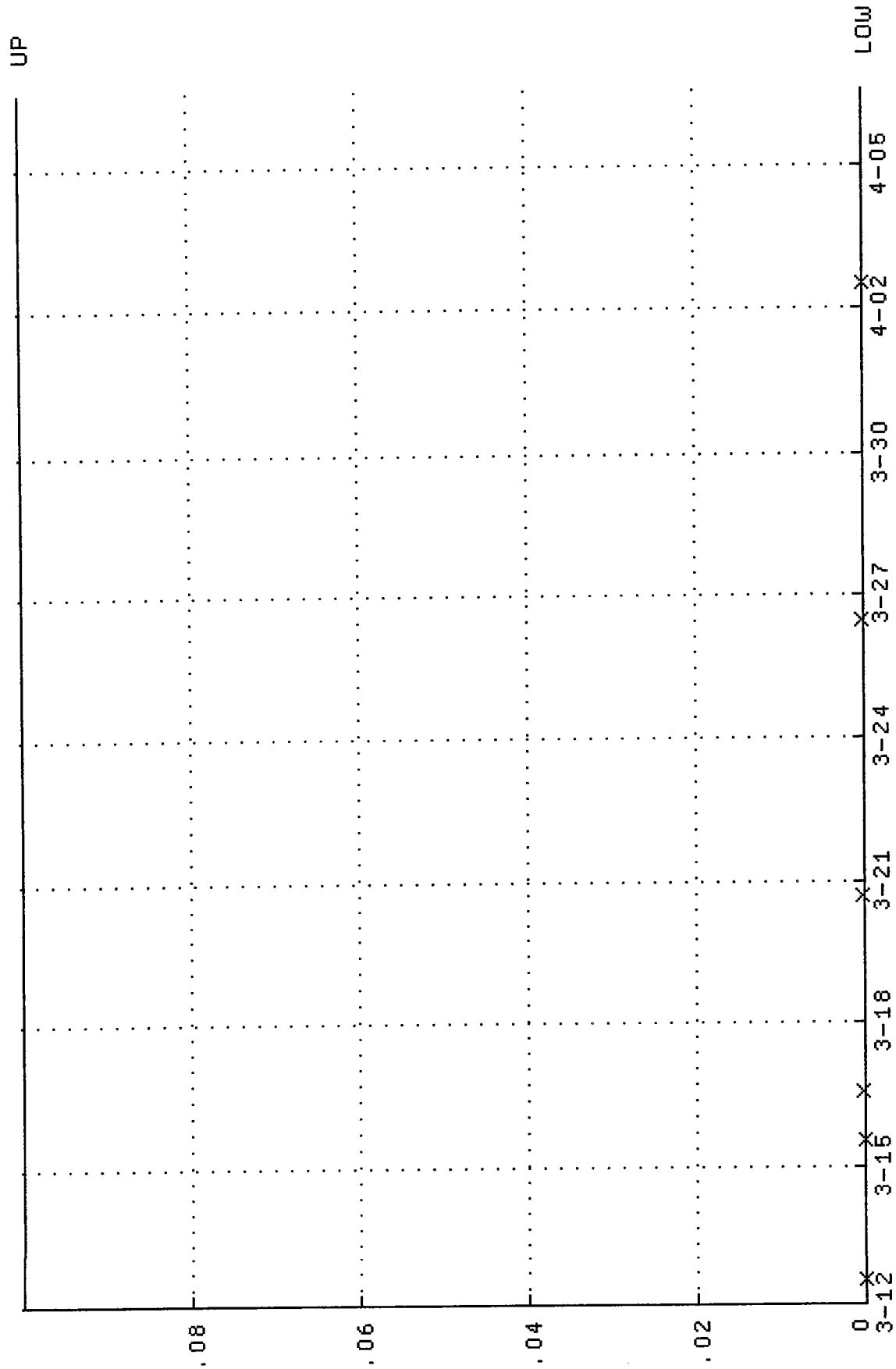
QA filename : DKA100: [ENV_ALPHA.QA.W]w114.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 14-MAR-2006 08:48:24 through 6-APR-2006 12:00:00
Lower/Upper Lmts: 0.350000 through 0.450000



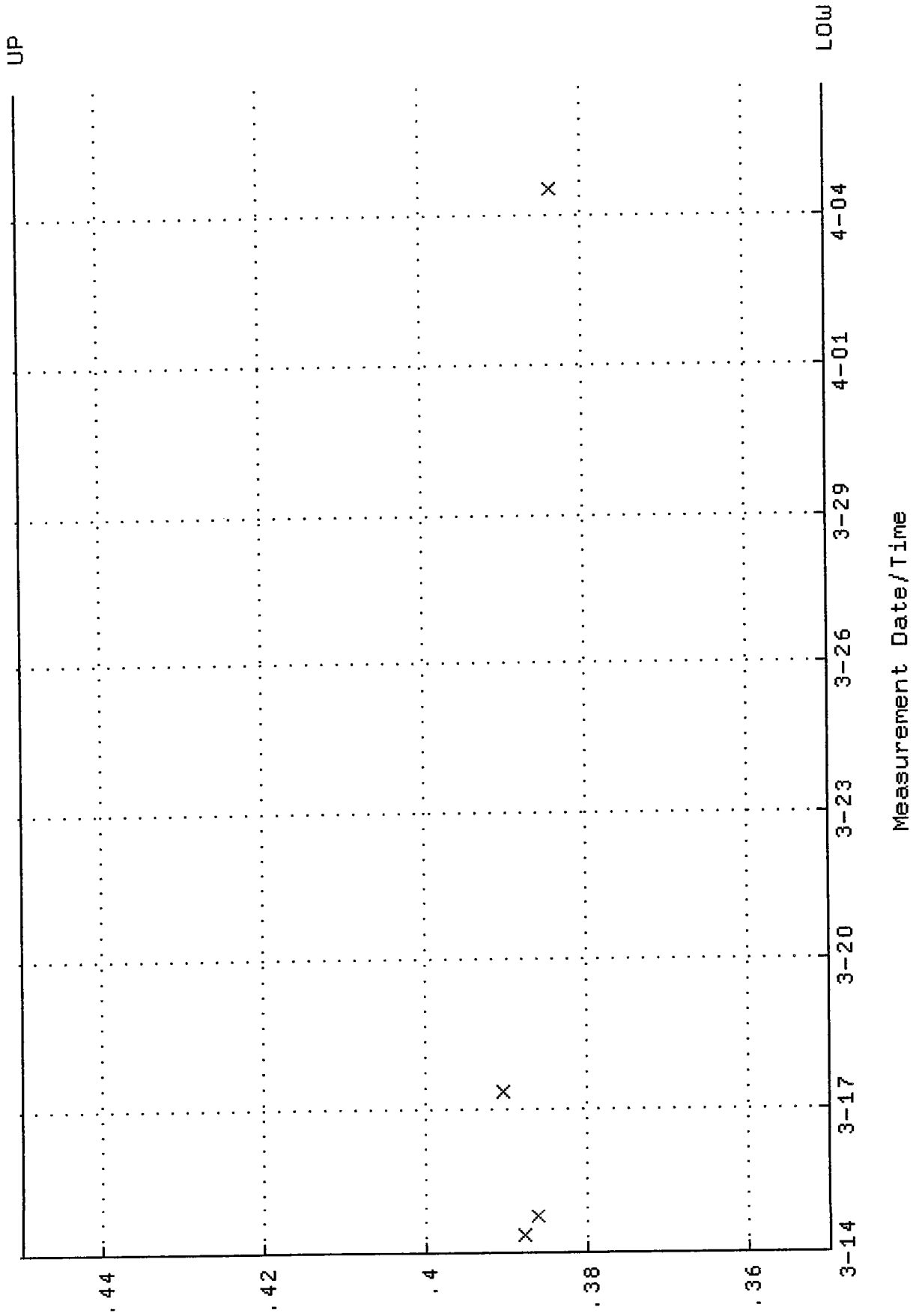
QA filename : DKA100:[ENV_ALPHA.QA.W]w114.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:24 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



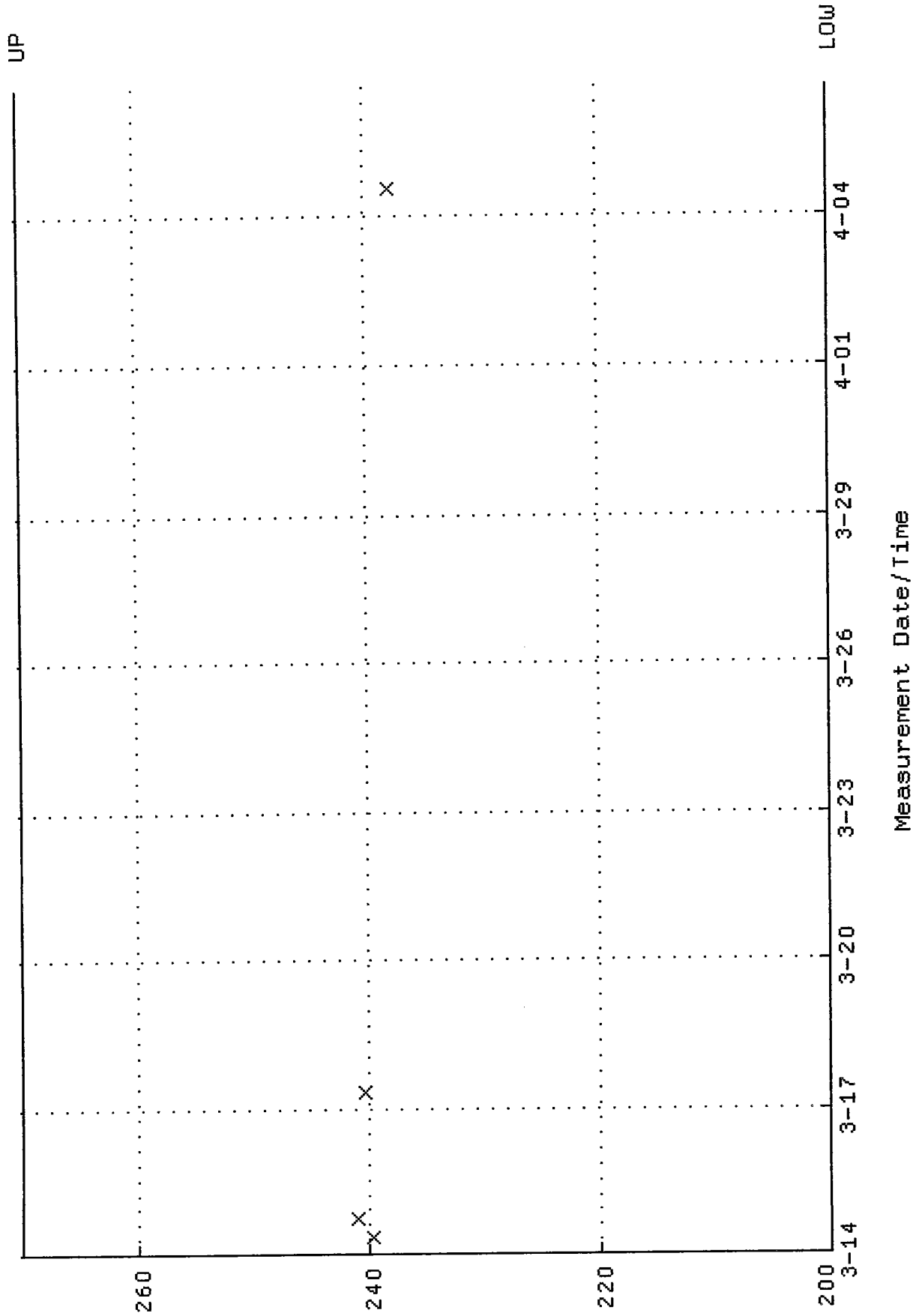
QA filename : DKA100:[ENV_ALPHA.QA.B]B114.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:13:25 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



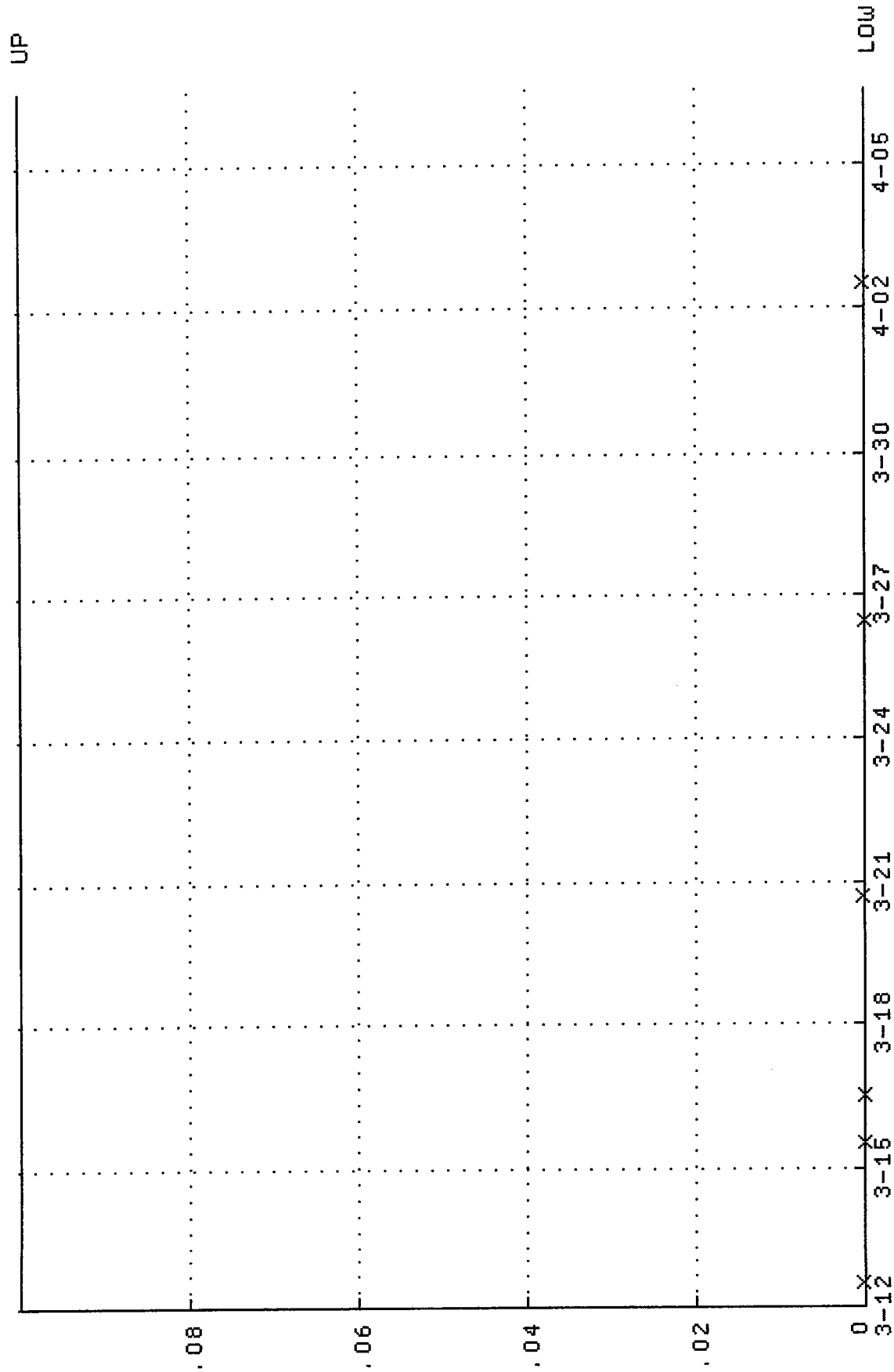
QA filename : DKA100:[ENV_ALPHA.QA.W]w117.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 14-MAR-2006 08:48:34 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



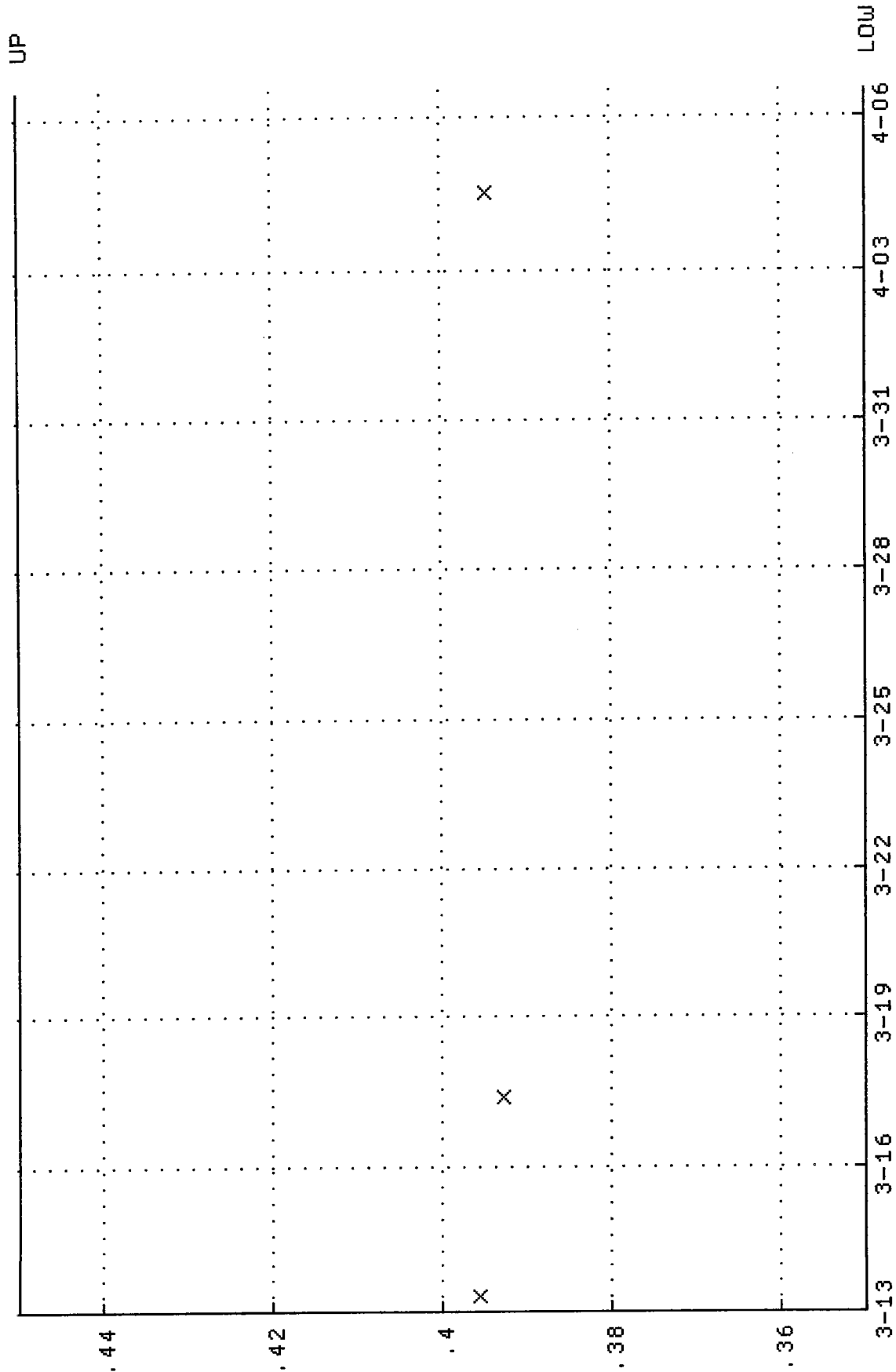
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:34 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



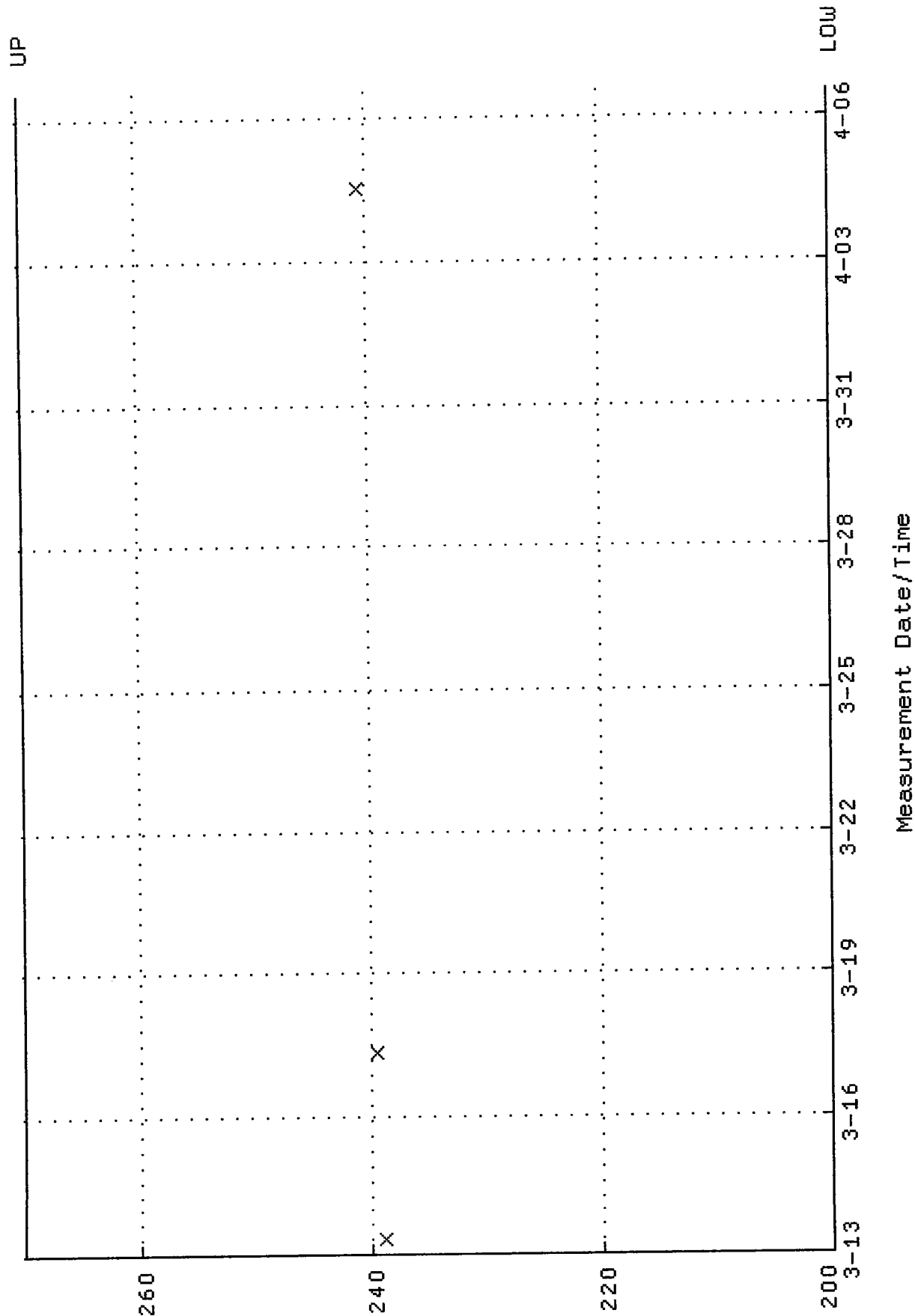
QA filename : DKA100:[ENV_ALPHA.QA,B]B117.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:14:39 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



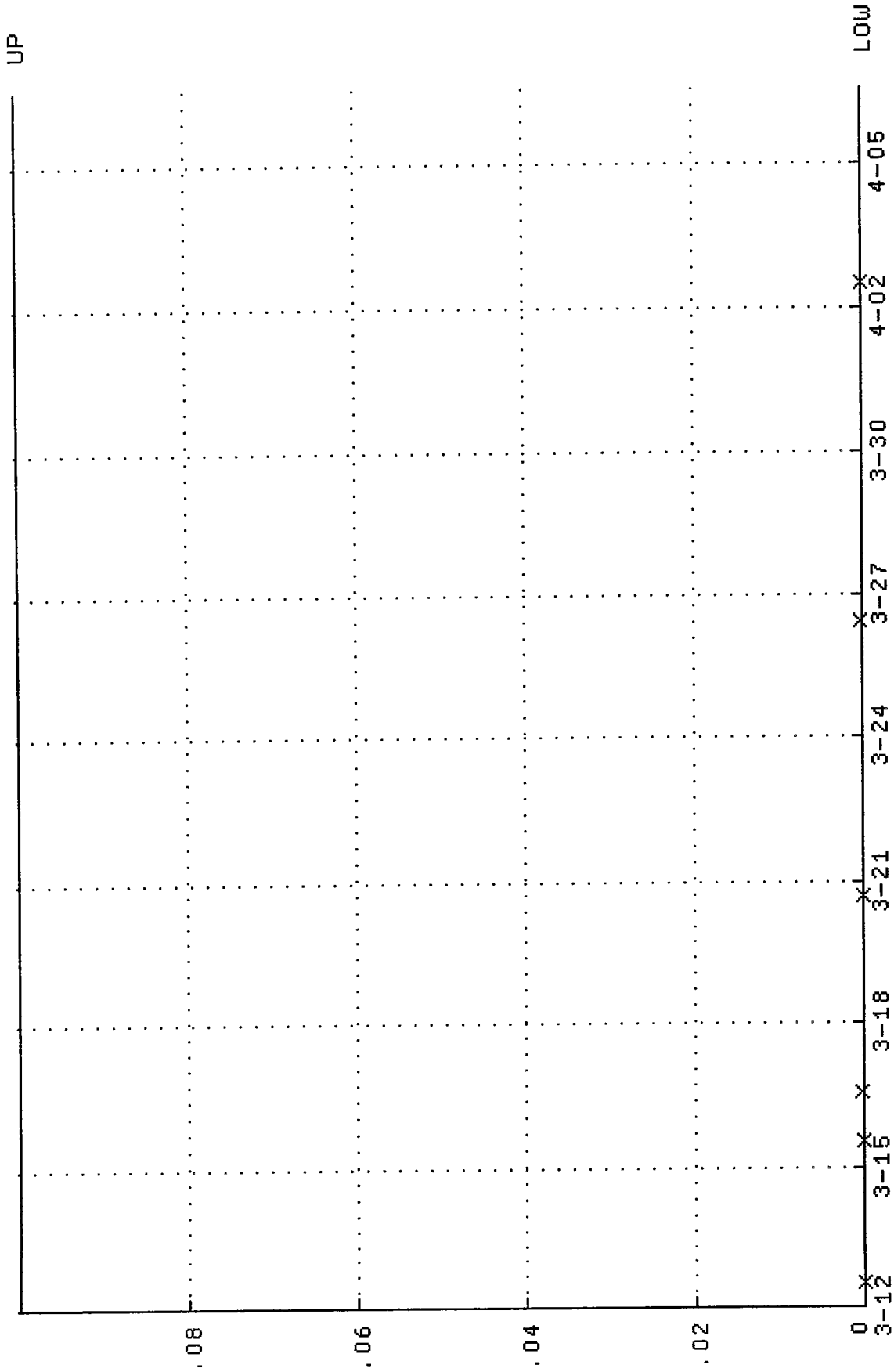
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;1
 Parameter Name : AVREFF (Average Efficiency)
 Start/End Dates : 13-MAR-2006 08:01:01 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



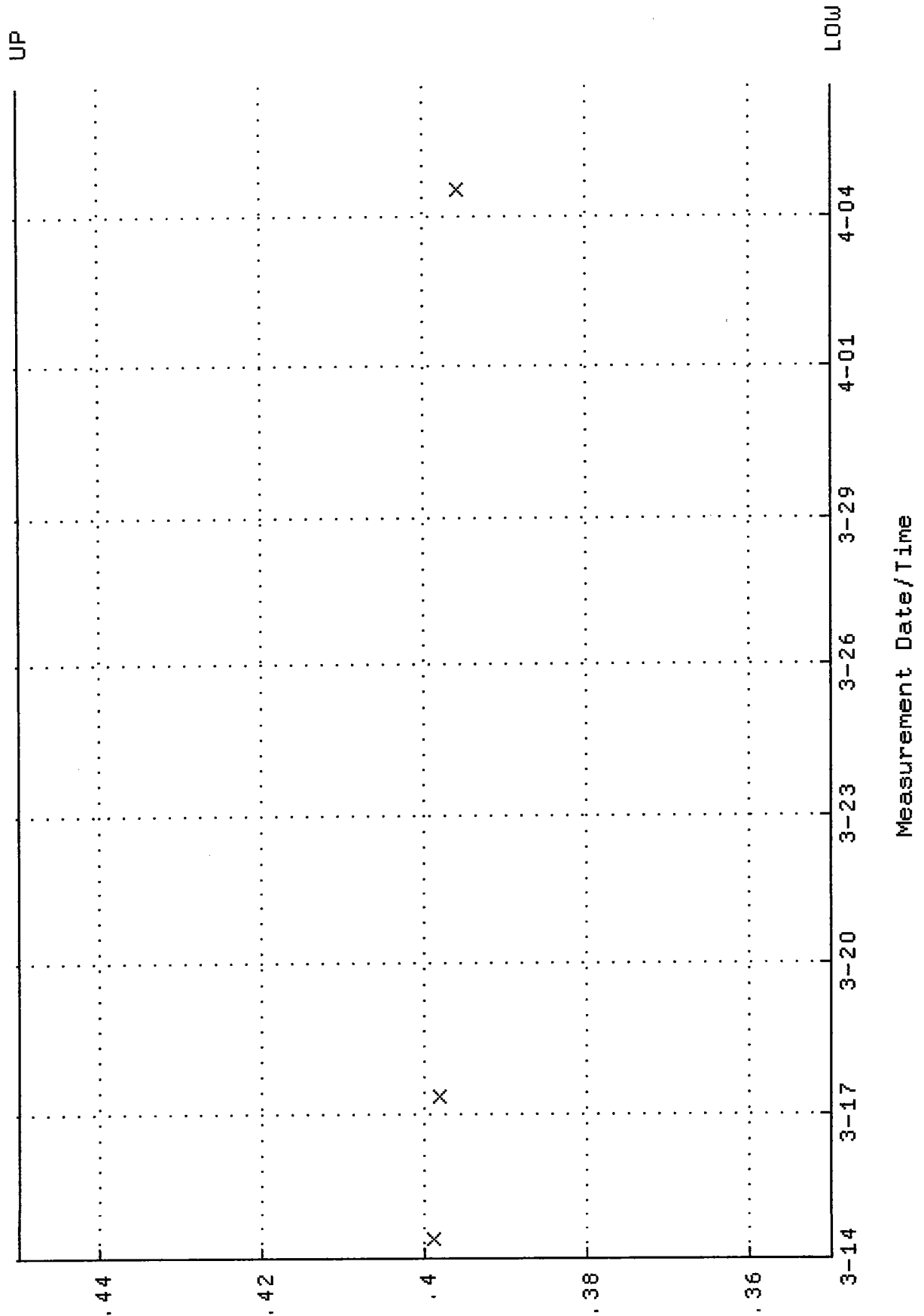
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 13-MAR-2006 08:01:01 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



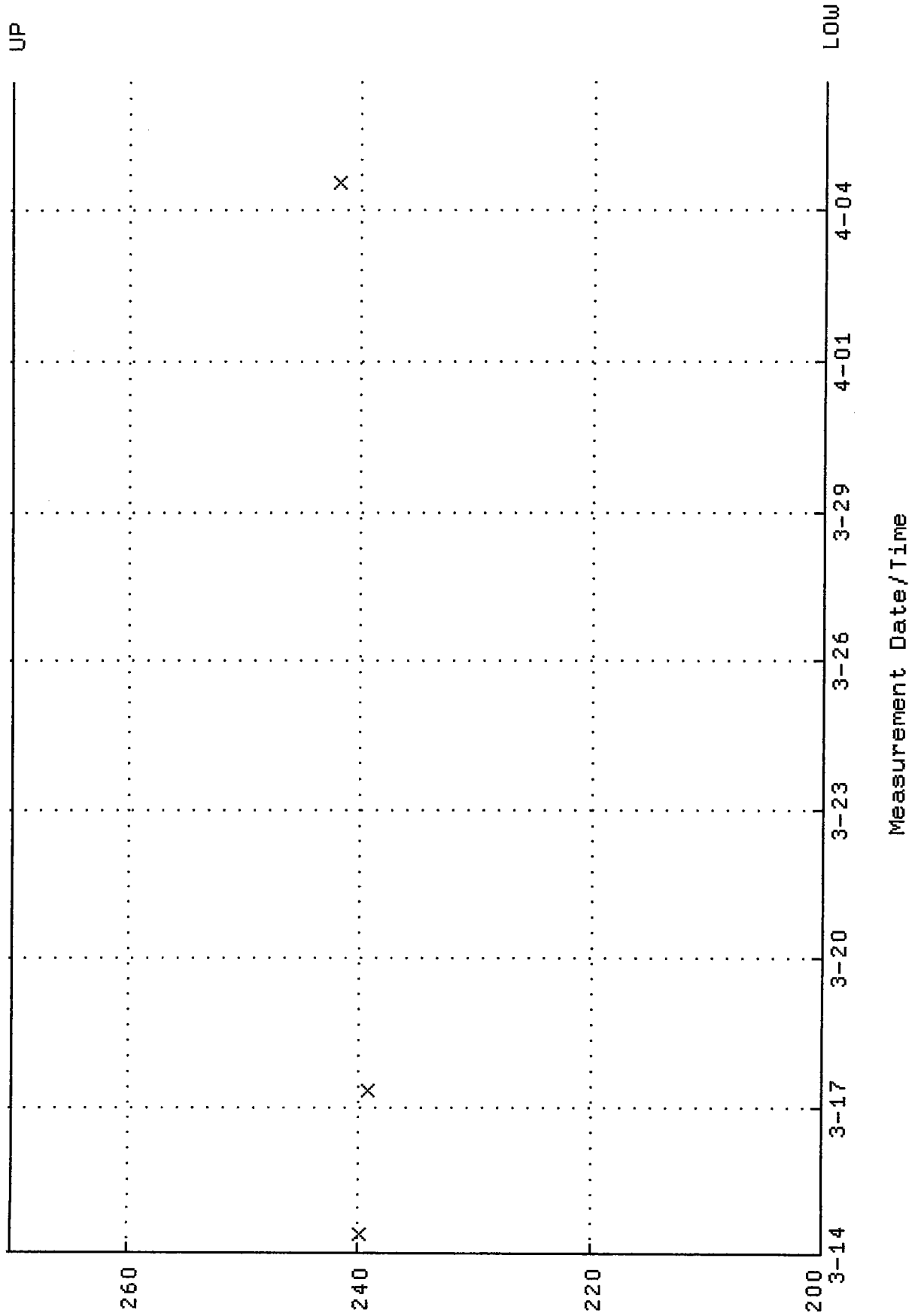
QA filename : DKA100:[ENV_ALPHA.QA.B]B118.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 12-MAR-2006 12:15:03 through 6-APR-2006 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



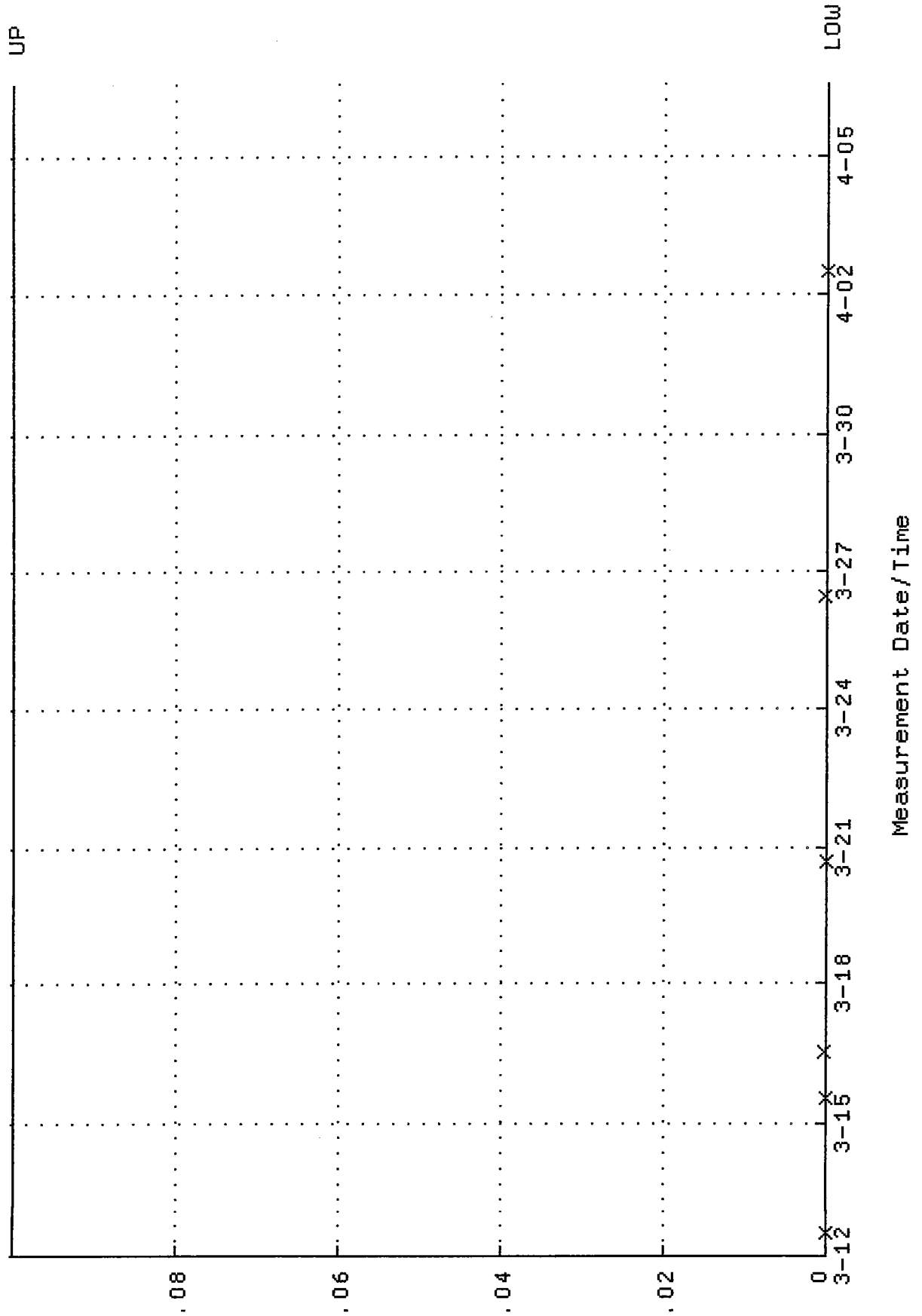
QA filename : DKA100:[ENV_ALPHA.QA.W]W119.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 14-MAR-2006 08:48:47 through 6-APR-2006 12:00:00
Lower/Upper Lmts: 0.350000 through 0.450000



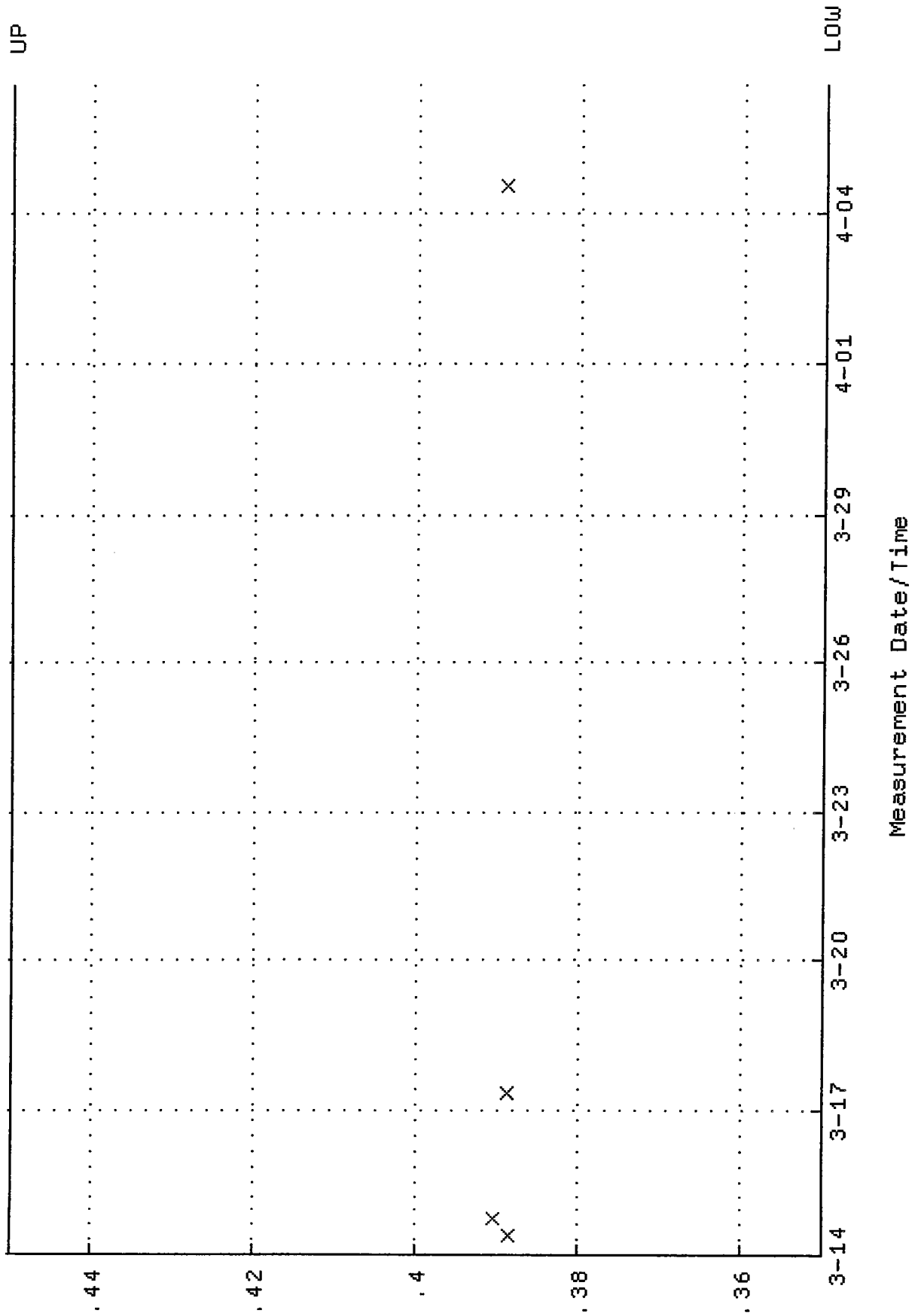
QA filename : DKA100:[ENV_ALPHA.QA.W]w119.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:47 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



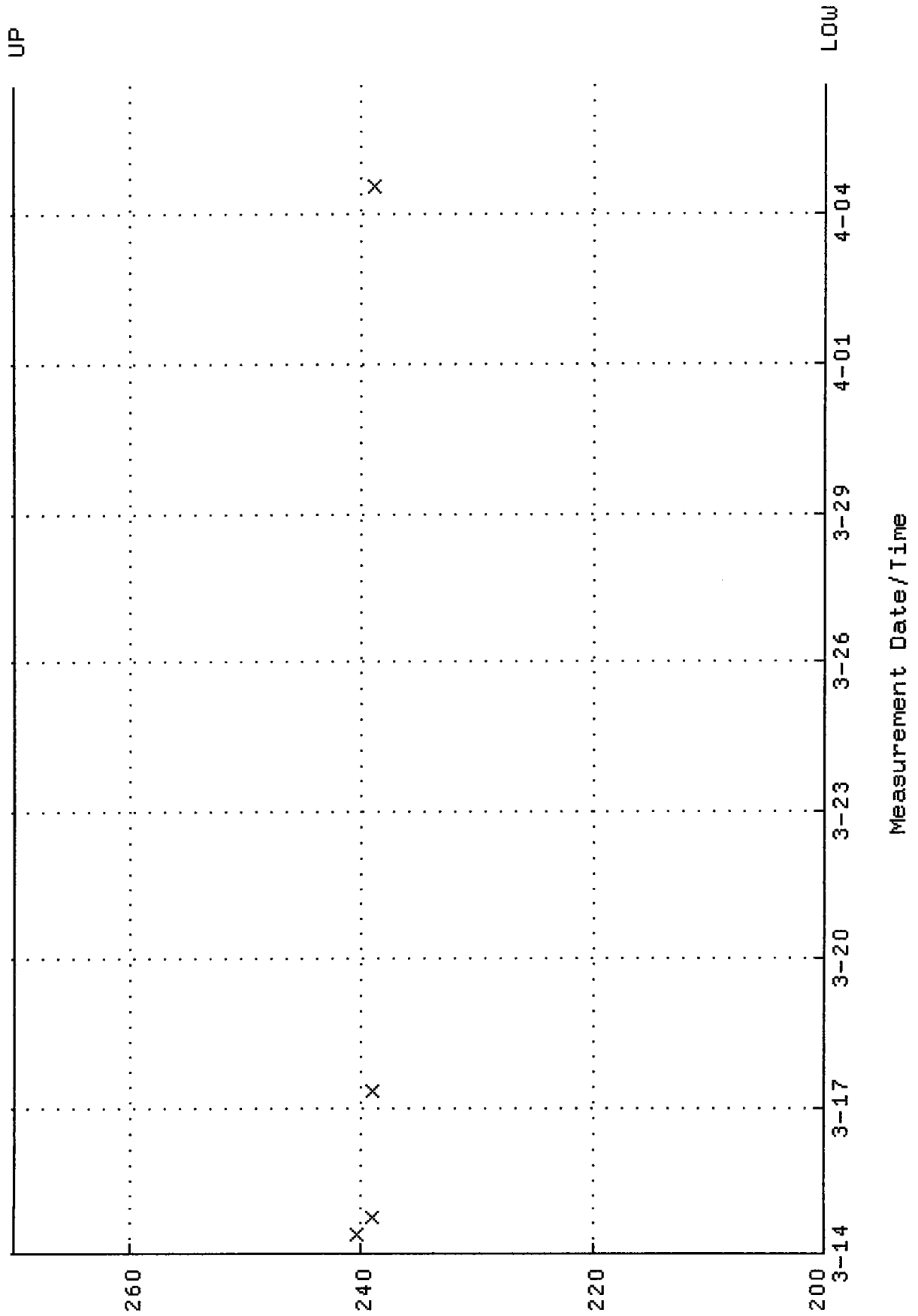
QA filename : DKA100:[ENV_ALPHA.QA,B]B119.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:15:29 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



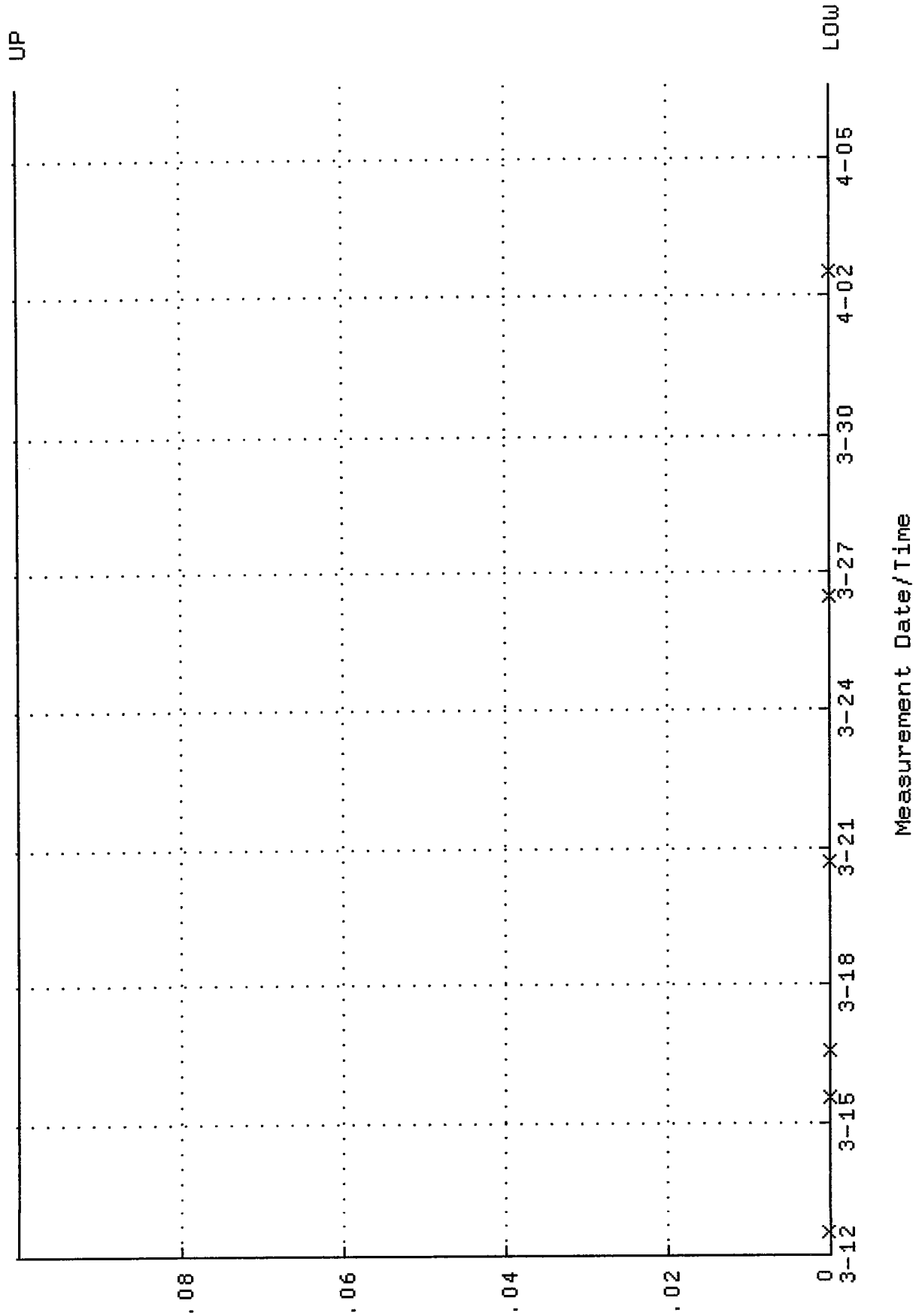
QA filename : DKA100:[ENV_ALPHA,QA,w]w120.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 14-MAR-2006 08:48:51 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



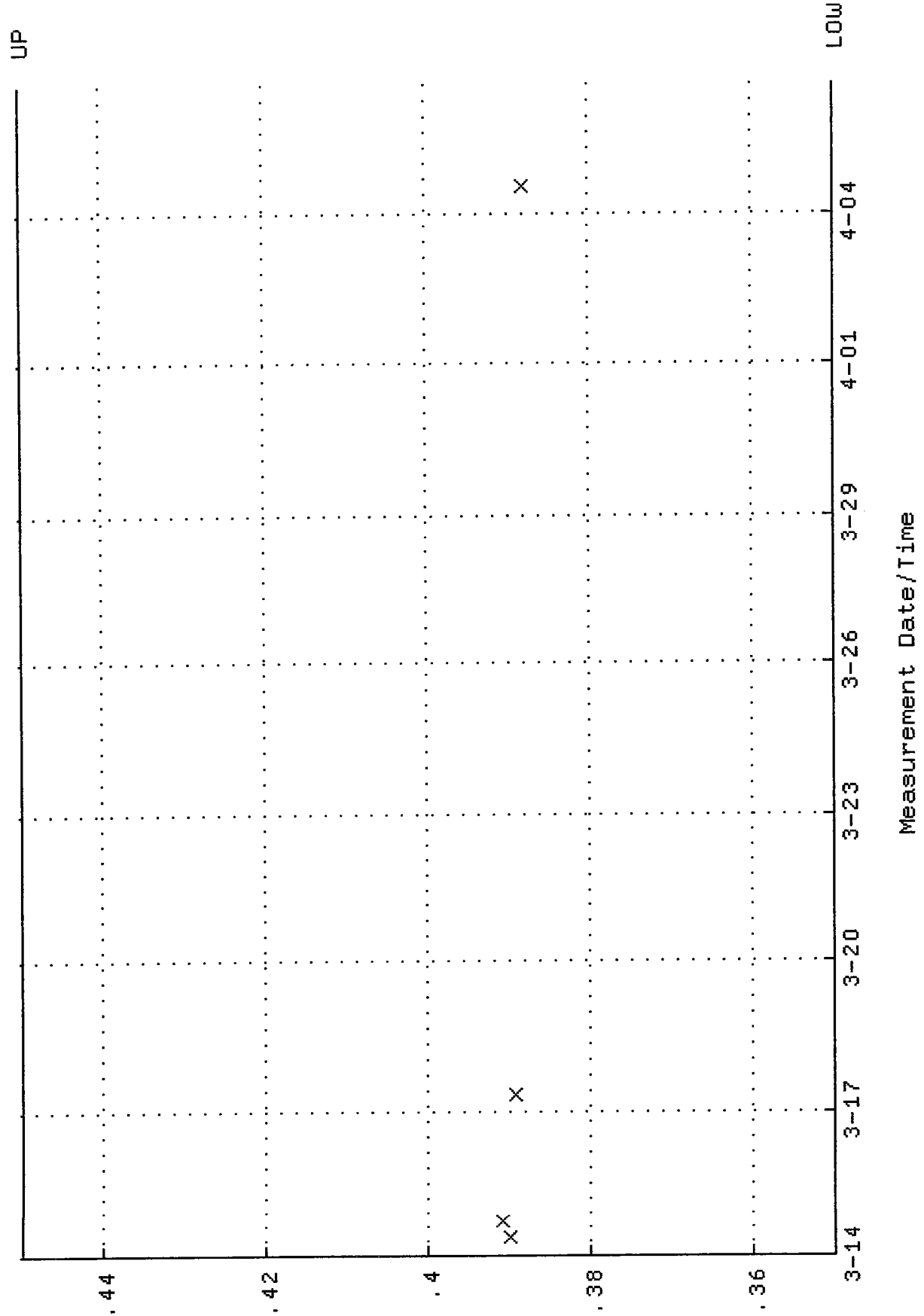
QA filename : DKA100:[ENV_ALPHA.QA.W]U120.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:51 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



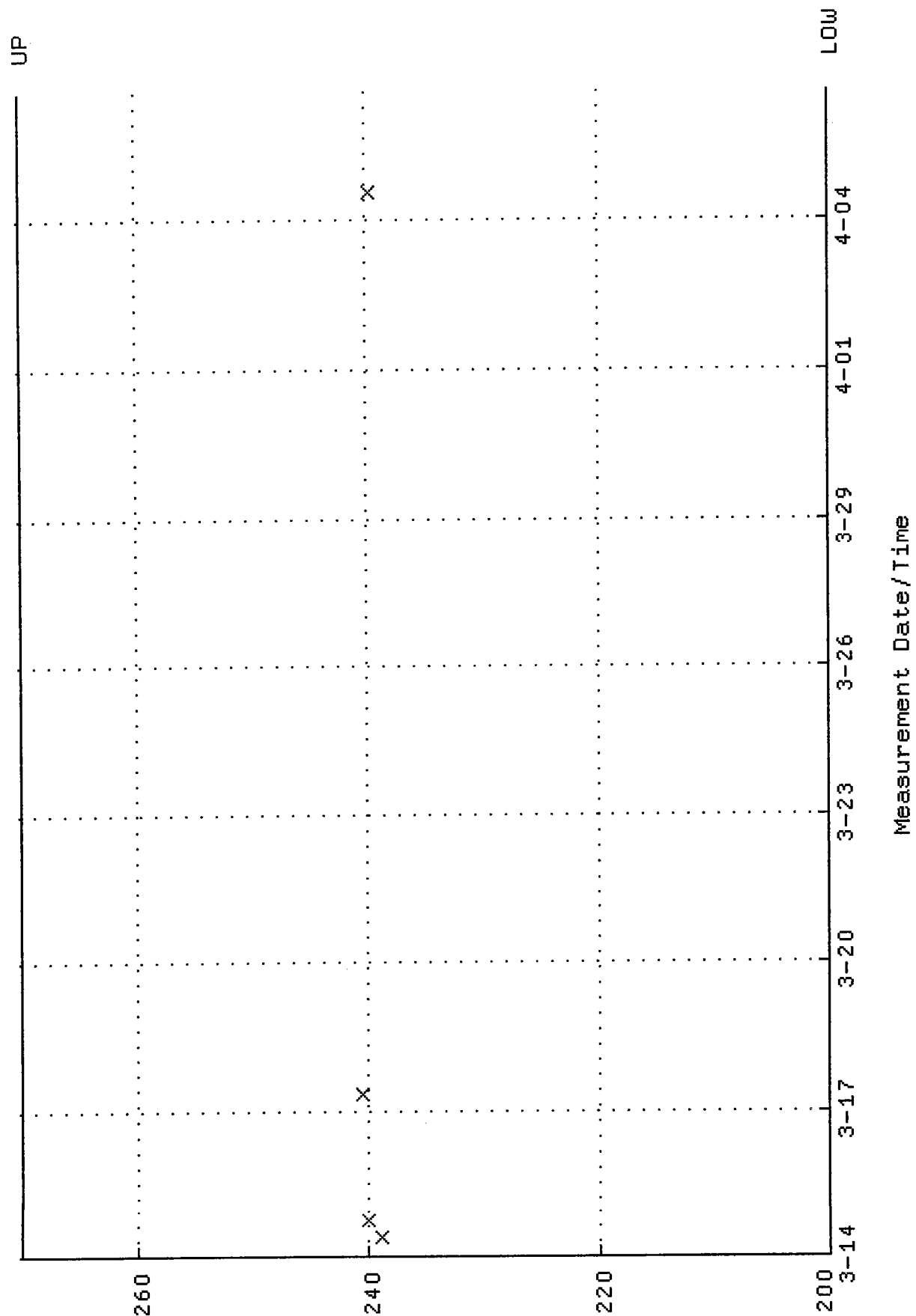
QA filename : DKA100:[ENV-ALPHA.QA.B]B120.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:15:51 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



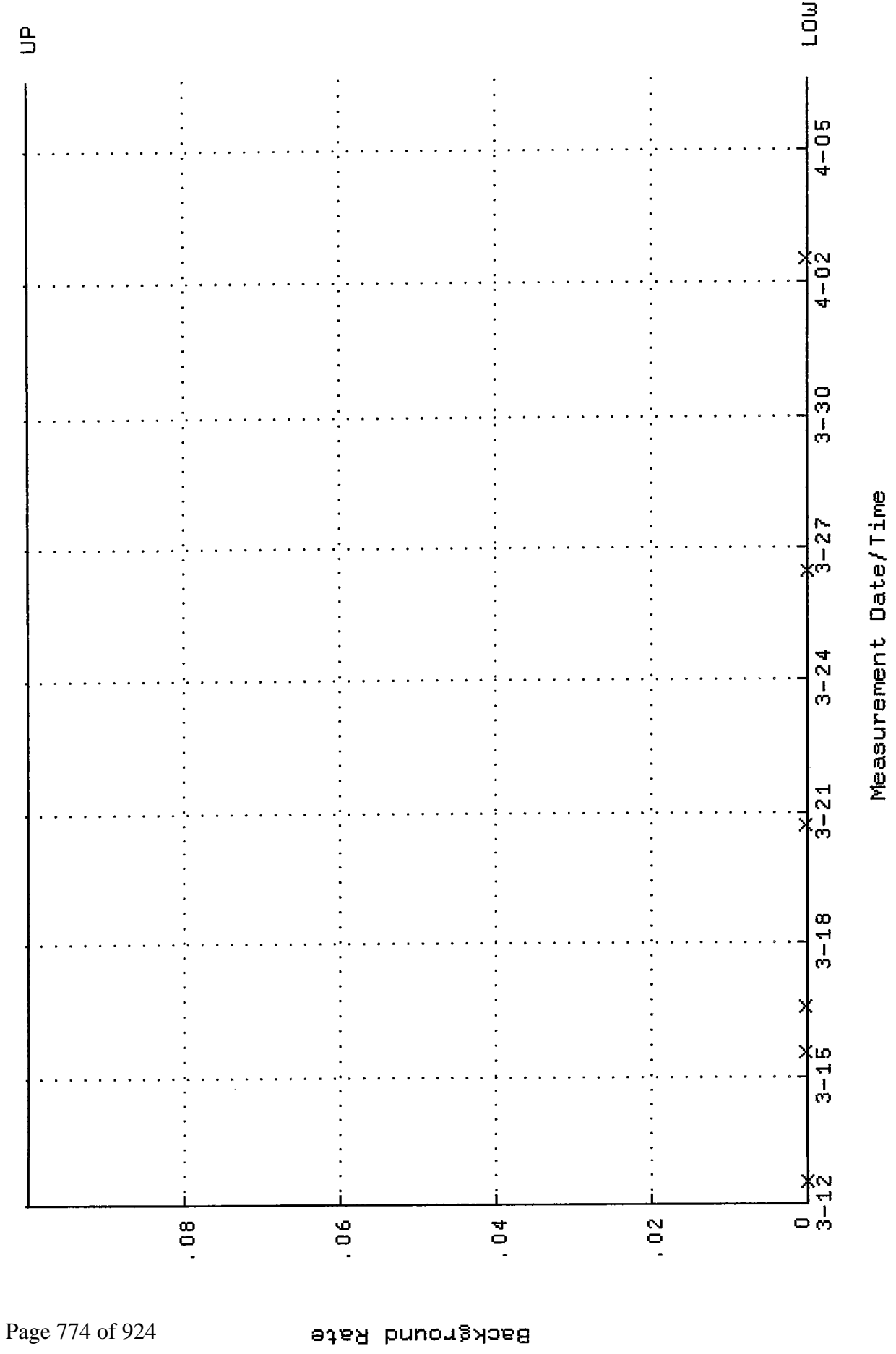
QA filename : DKA100:[ENV_ALPHA.QA.W]w121.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 14-MAR-2006 08:48:55 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



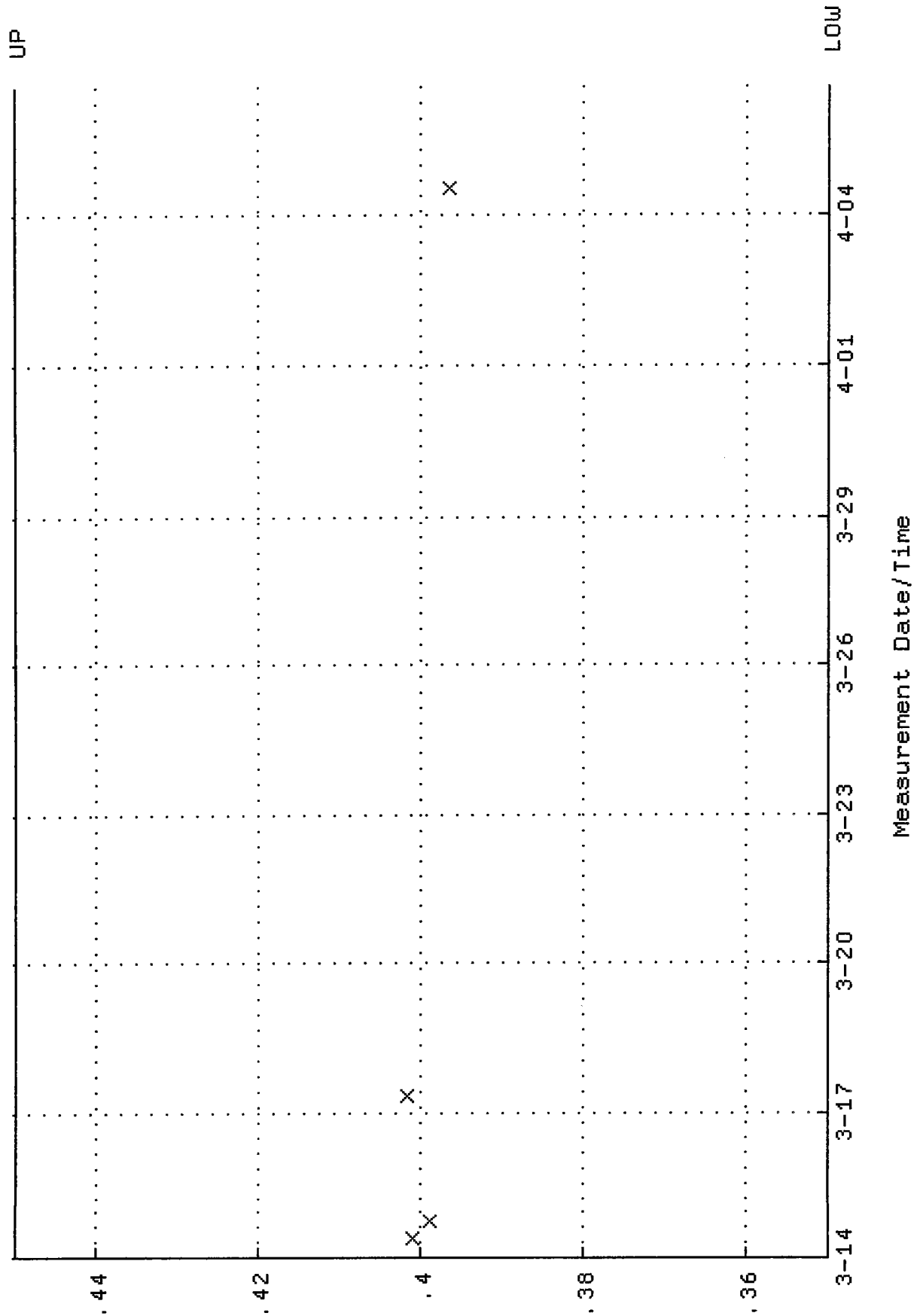
QA filename : DKA100:[ENV_ALPHA.QA.W]W121.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:55 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



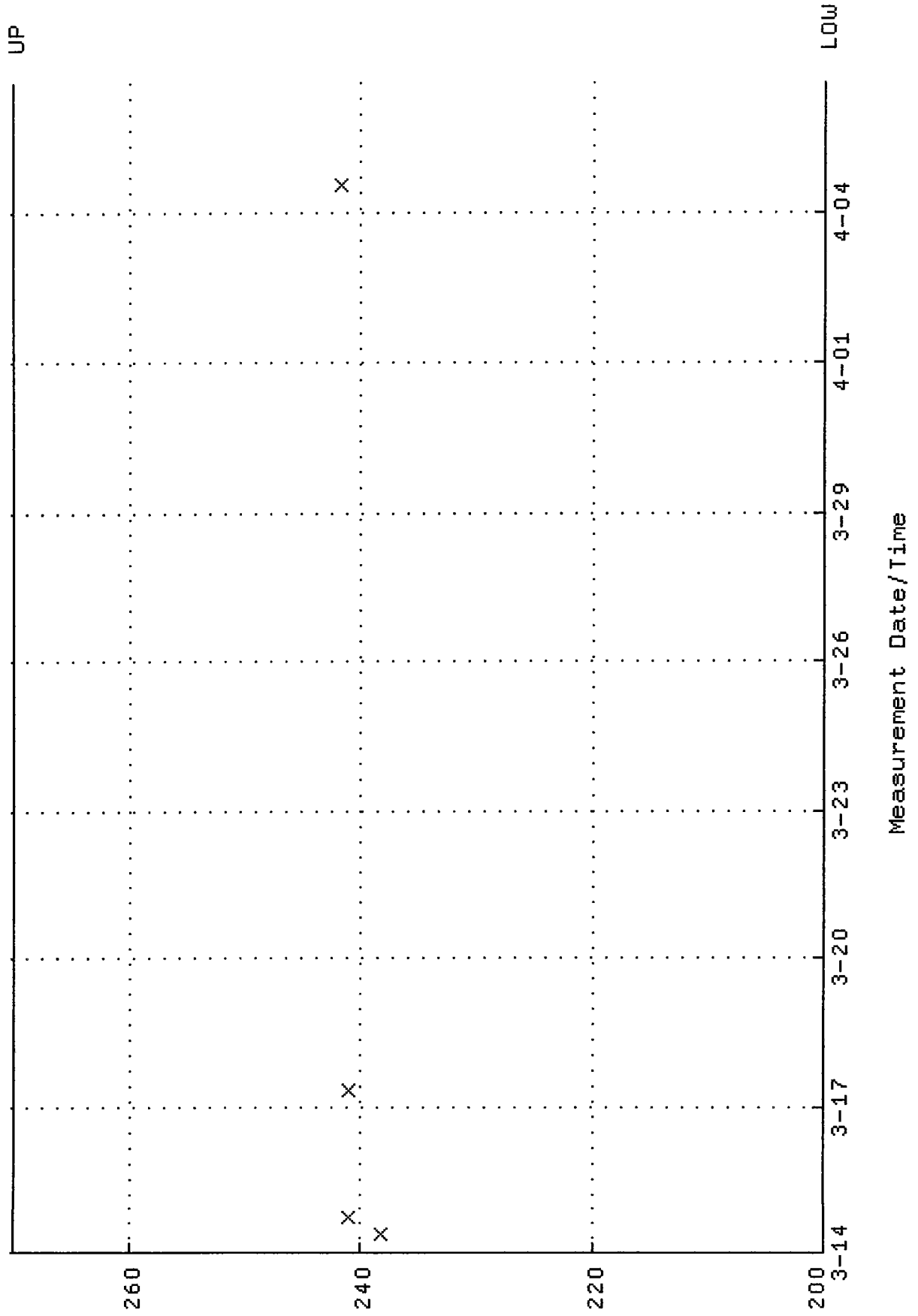
QA filename : DKA100:[ENV_ALPHA.QA,B]B121.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:16:12 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



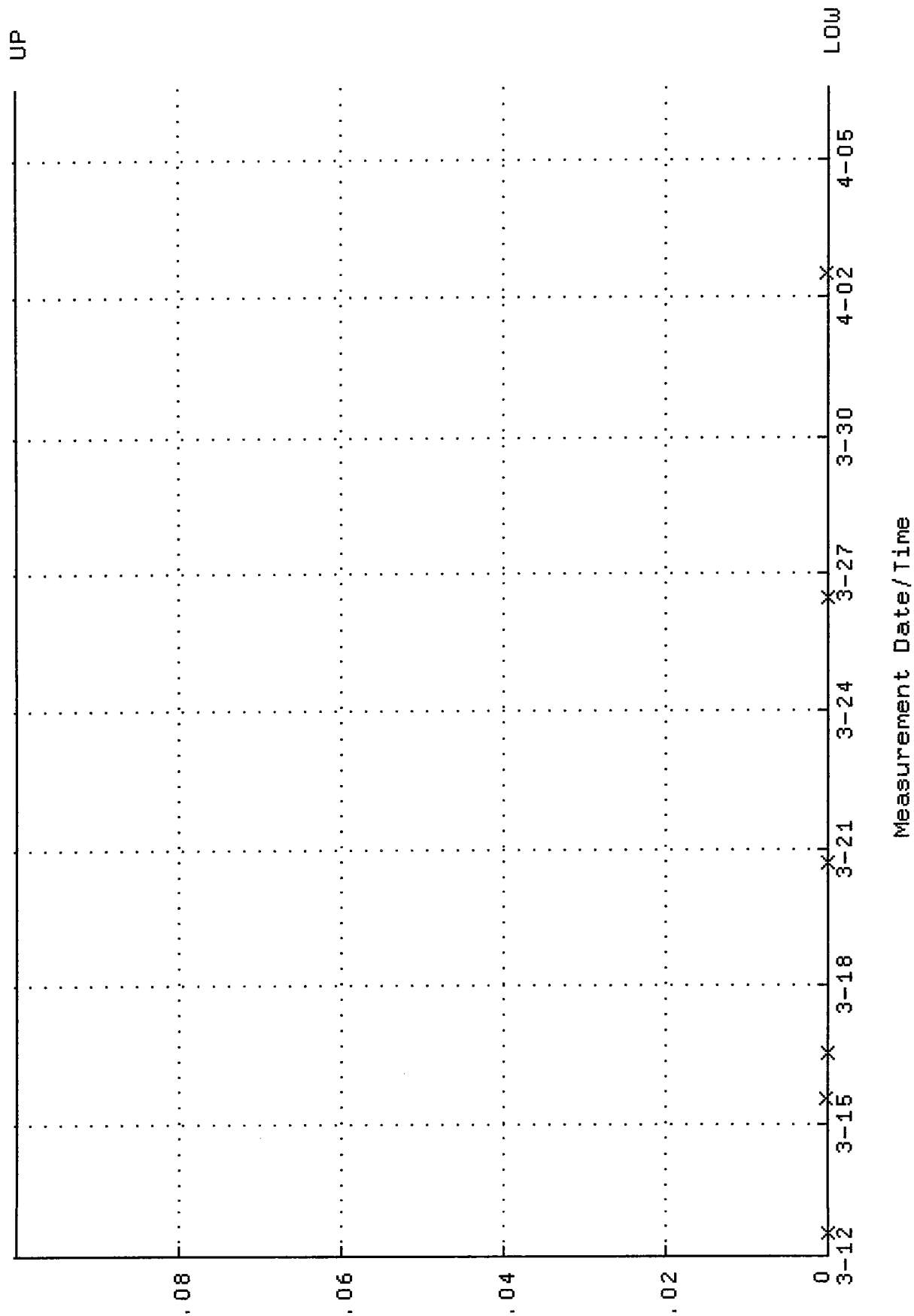
QA filename : DKA100:[ENV_ALPHA.QA.W]W122.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 14-MAR-2006 08:48:58 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



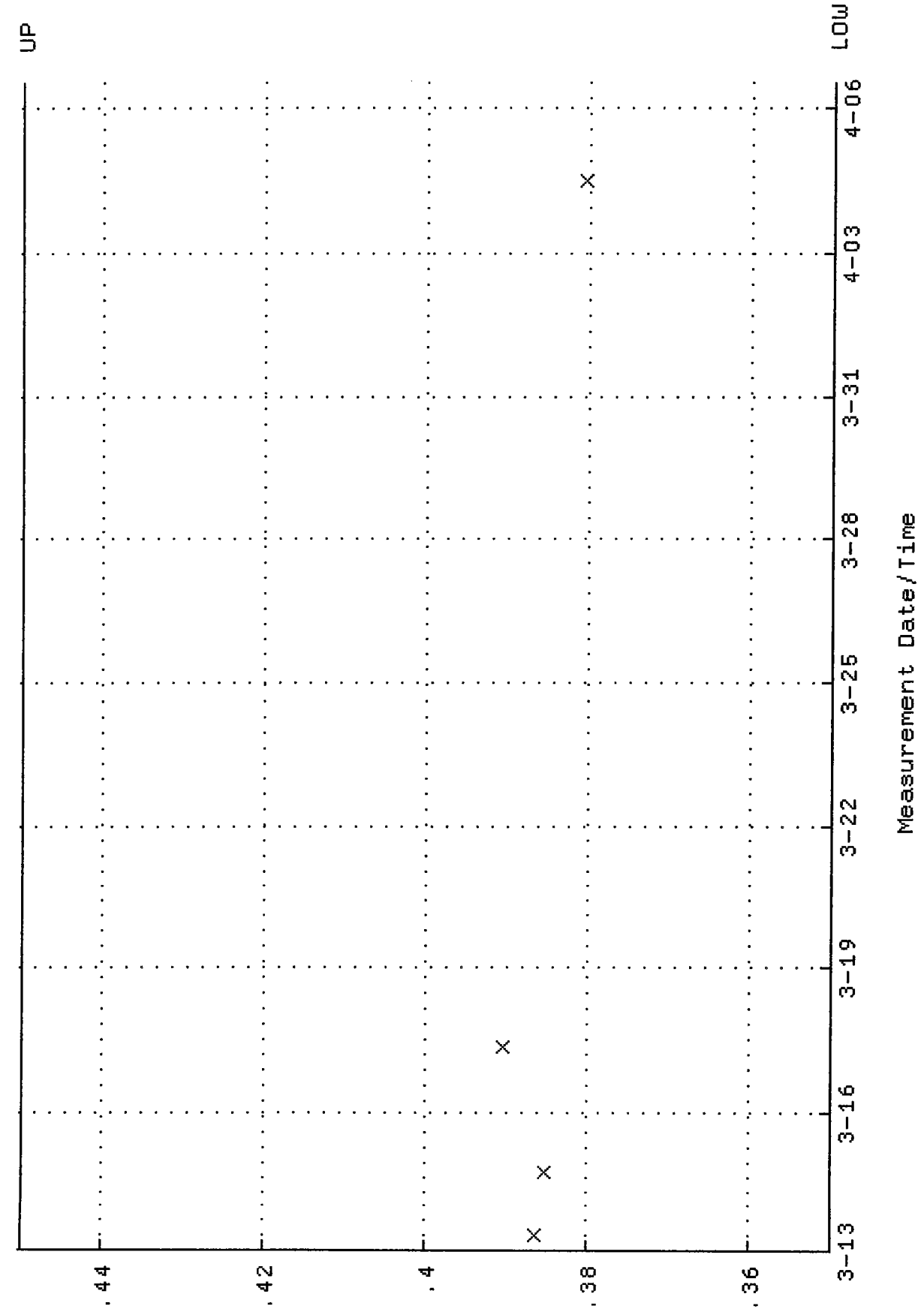
QA filename : DKA100:[ENV_ALPHA.QA.W]w122.QAF;1
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:48:58 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



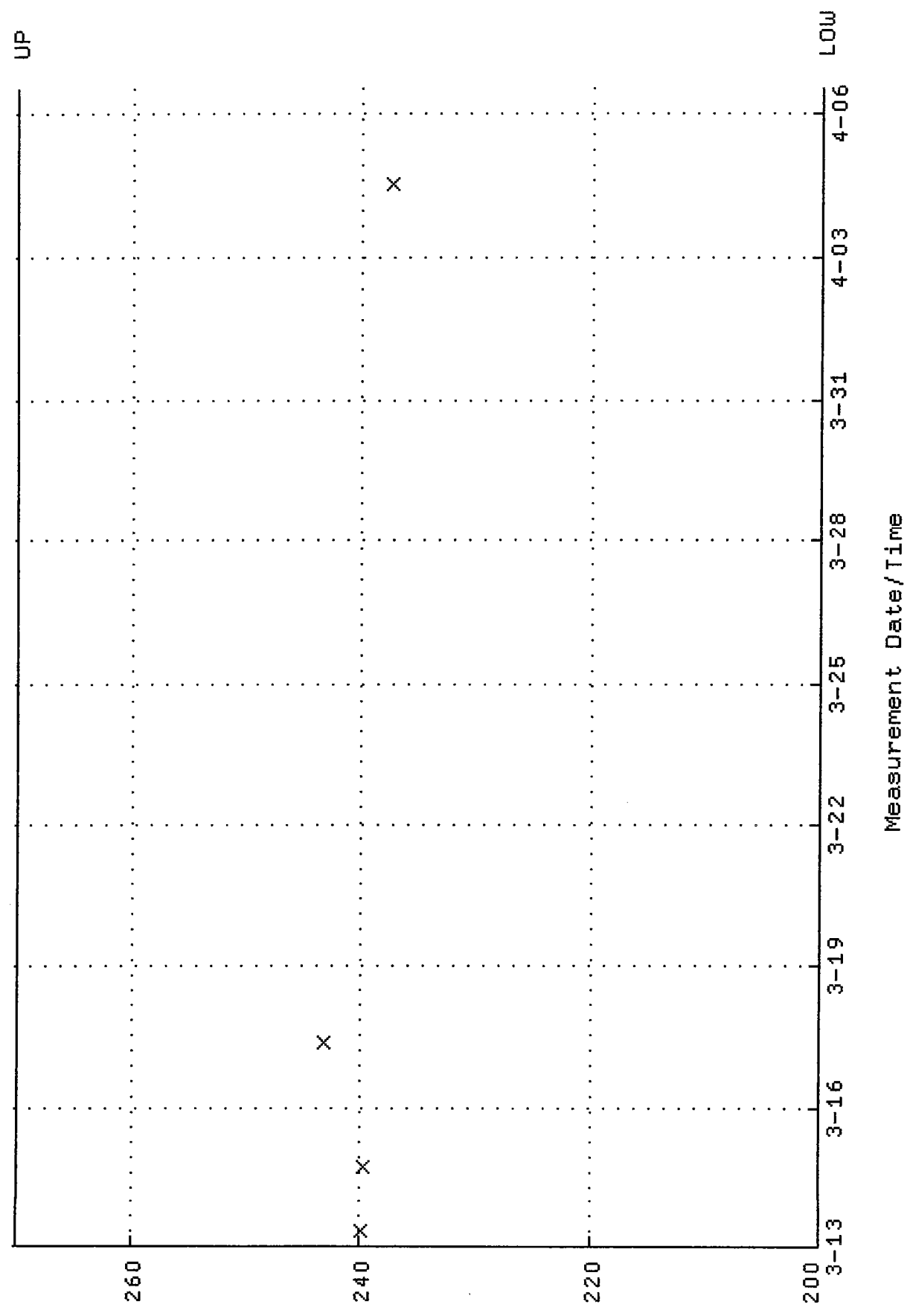
QA filename : DKA100:[ENV_ALPHA.QA.B]B122.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:16:33 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



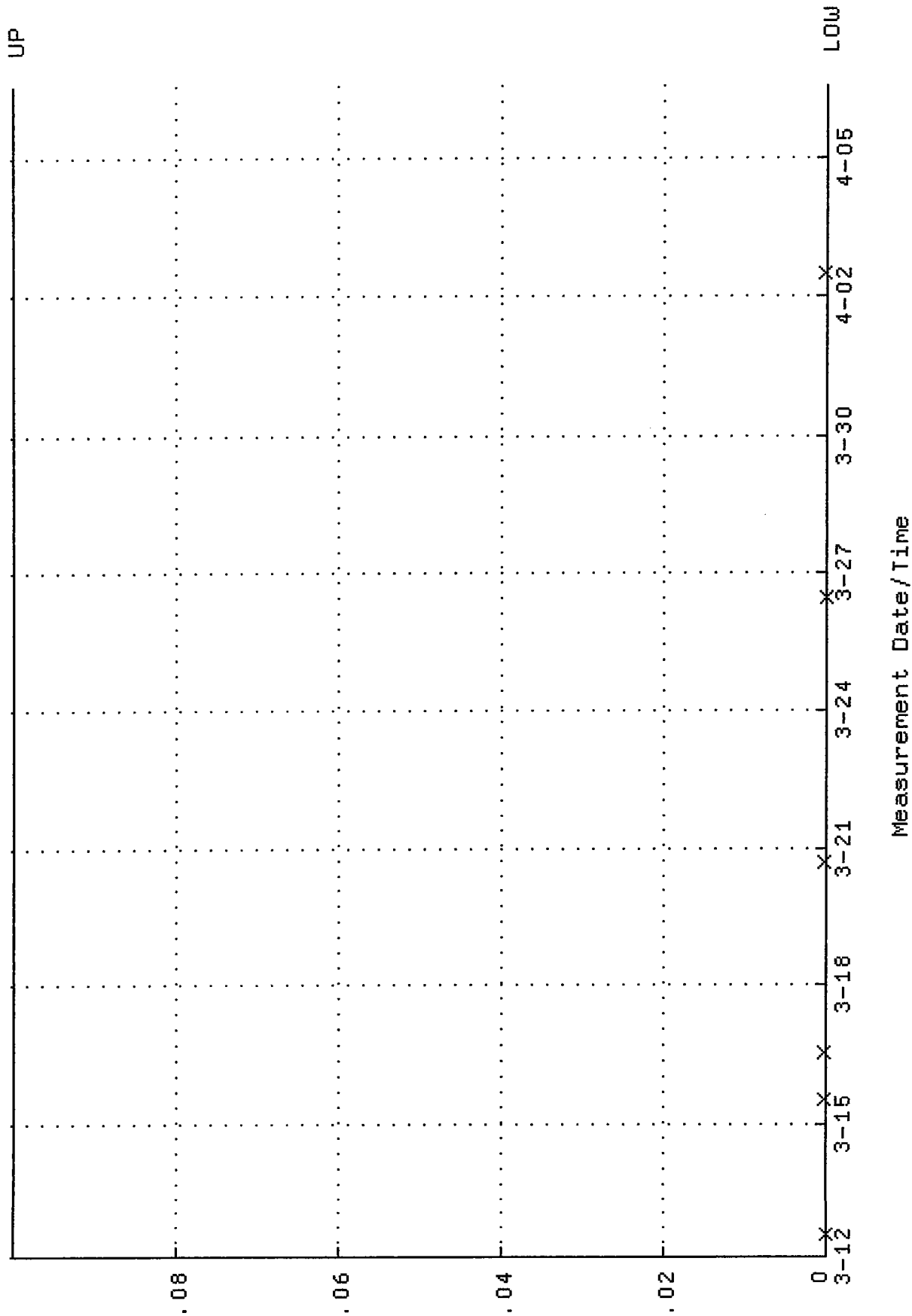
QA filename : DKA100:[ENV-ALPHA.QA.W]w123.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 13-MAR-2006 08:03:30 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



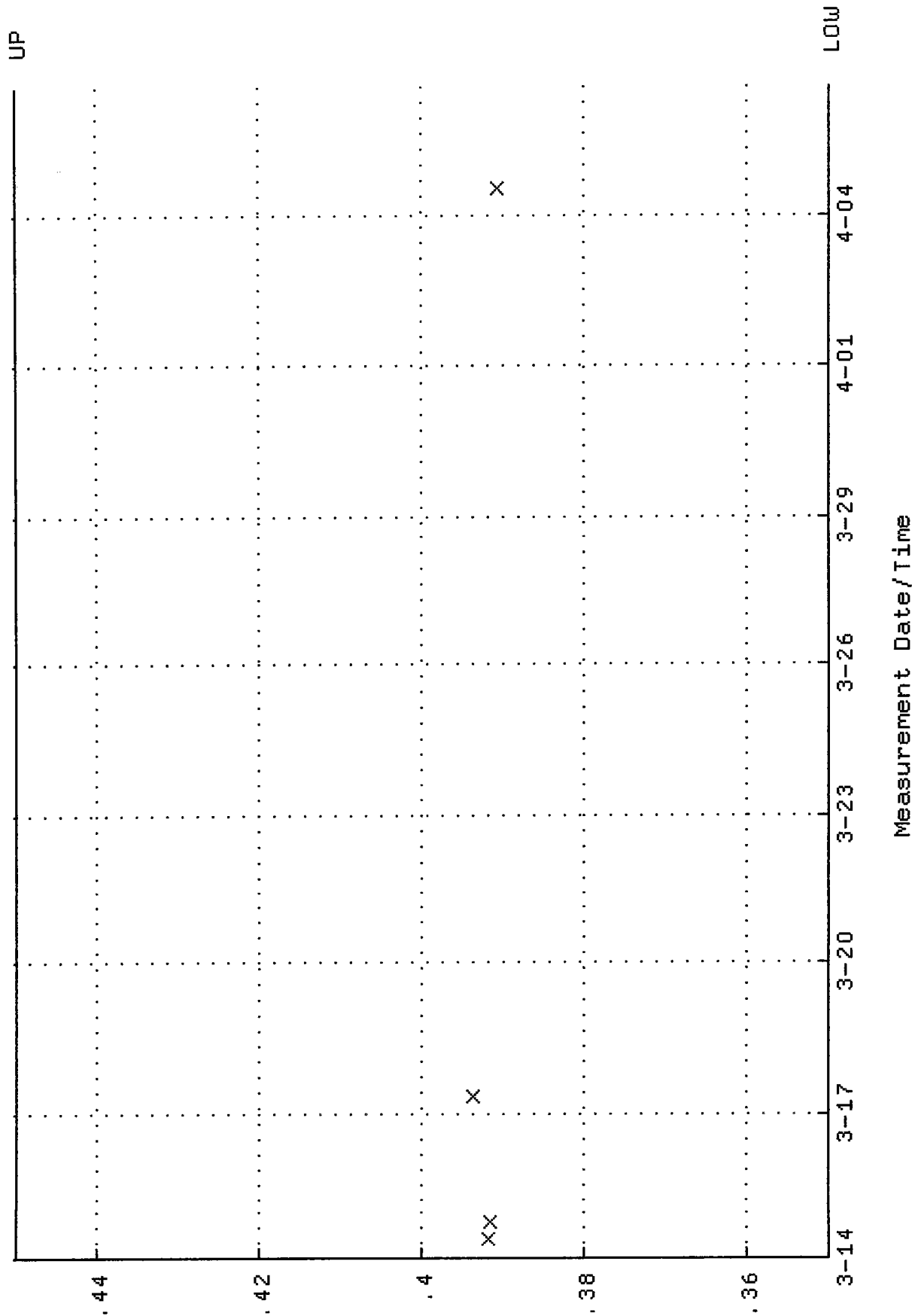
QA filename : DKA100:[ENV_ALPHA.QA.W]W123.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 13-MAR-2006 08:03:30 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



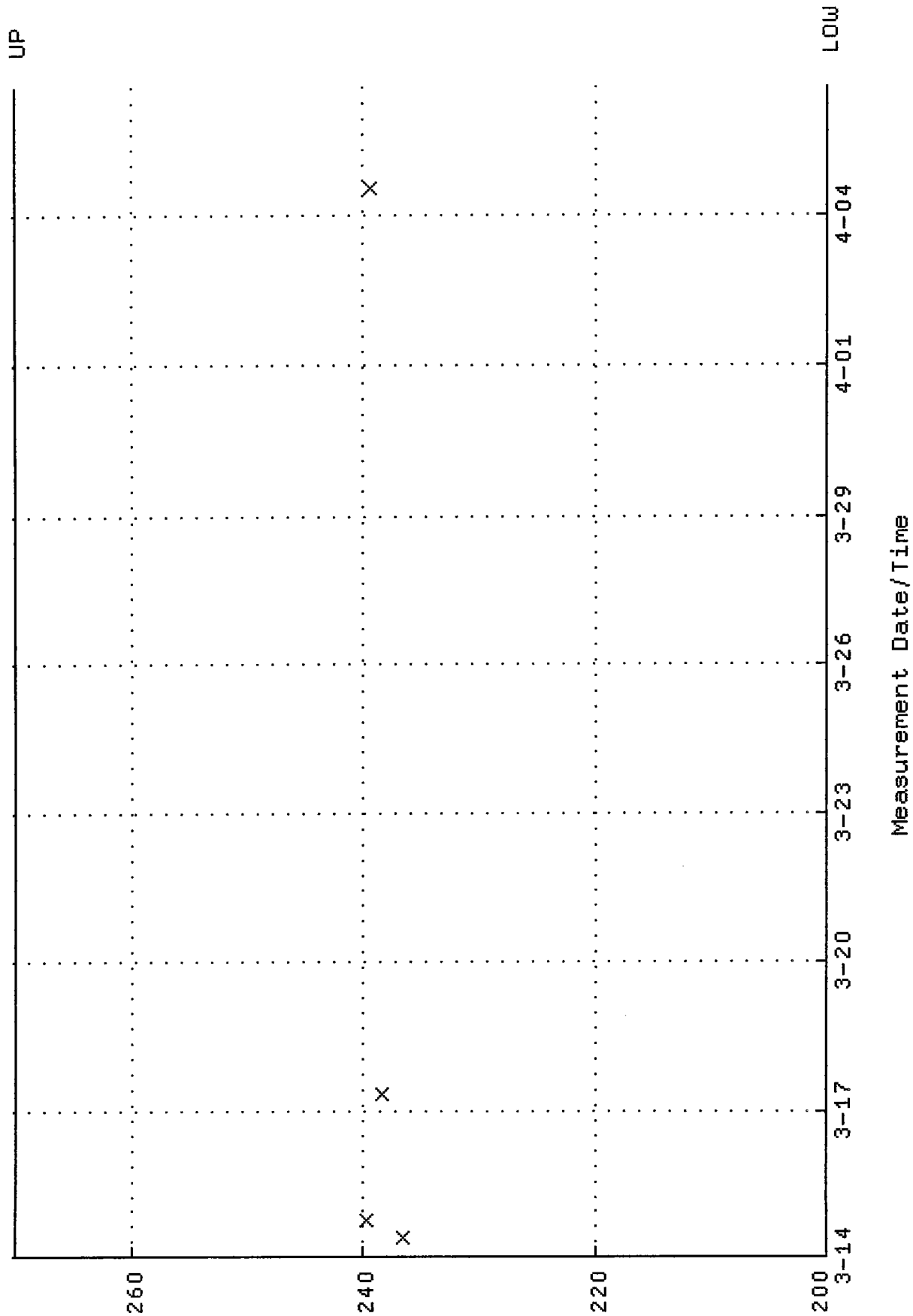
QA filename : DKA100:[ENV_ALPHA.QA.B]B123.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:16:55 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



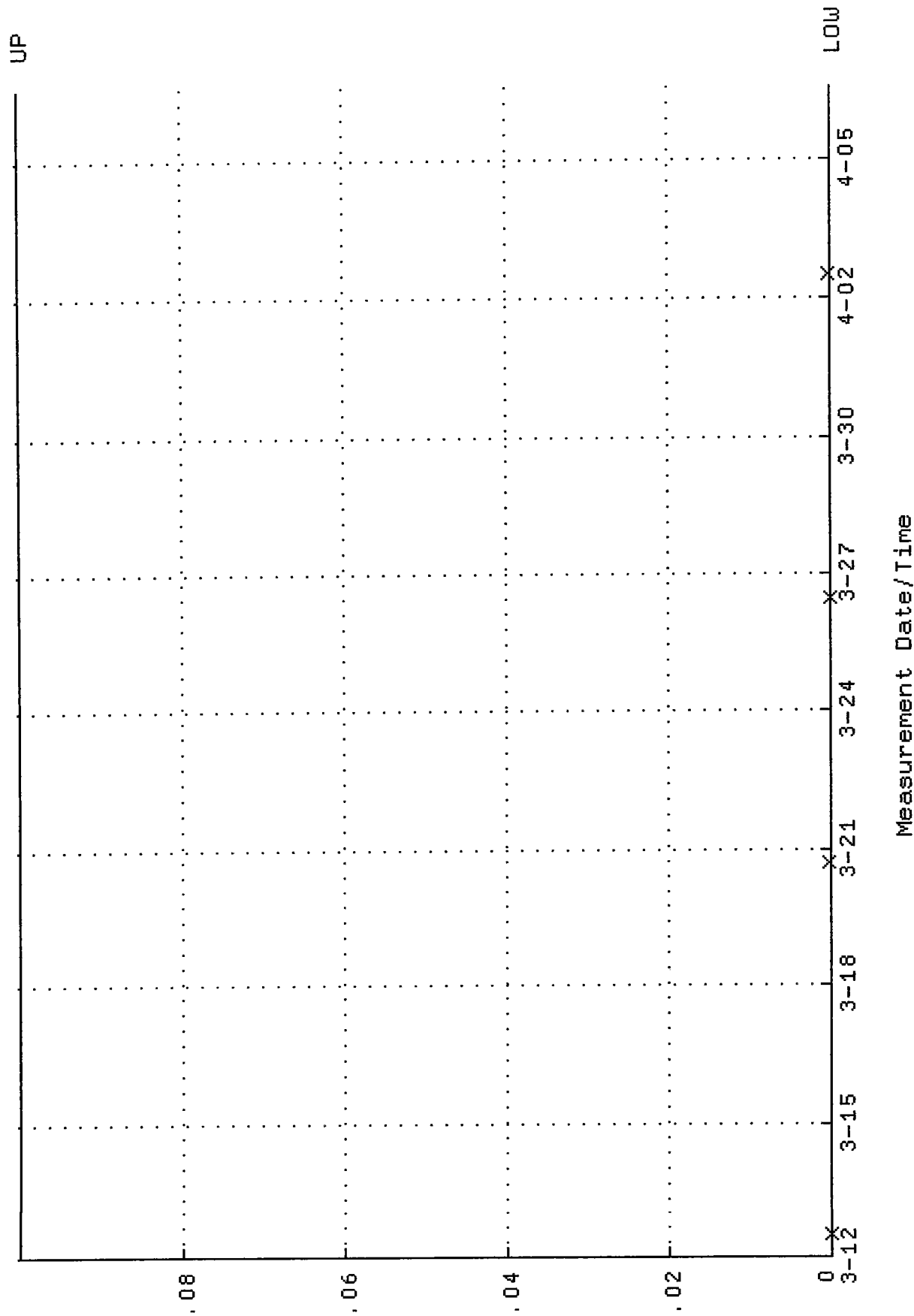
QA filename : DKA100:[ENV_ALPHA.QA.W]w132.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 14-MAR-2006 08:49:31 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.350000 through 0.450000



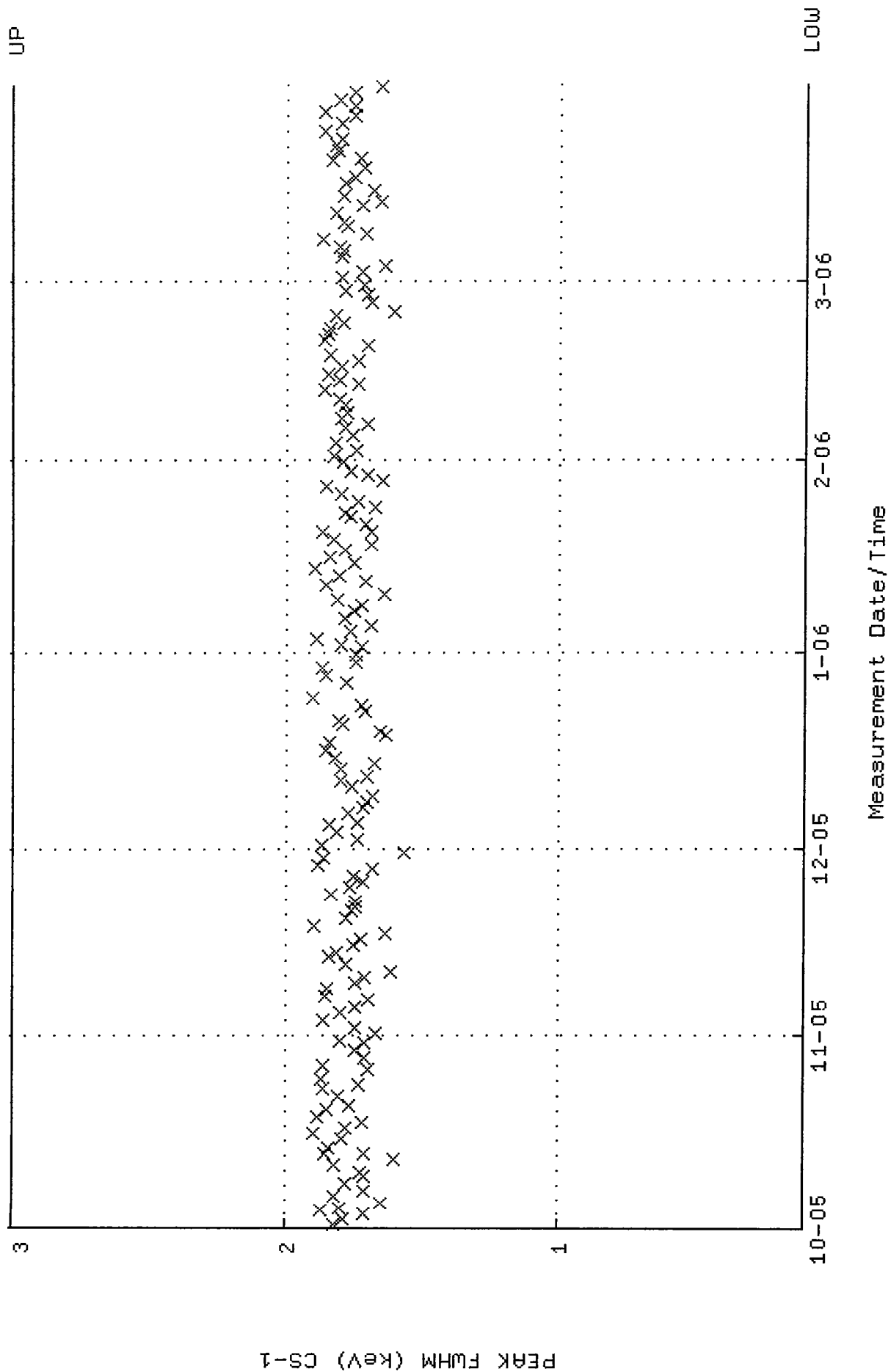
QA filename : DKA100:[ENV_ALPHA.QA.w]w132.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 14-MAR-2006 08:49:31 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 200.000 through 270.000



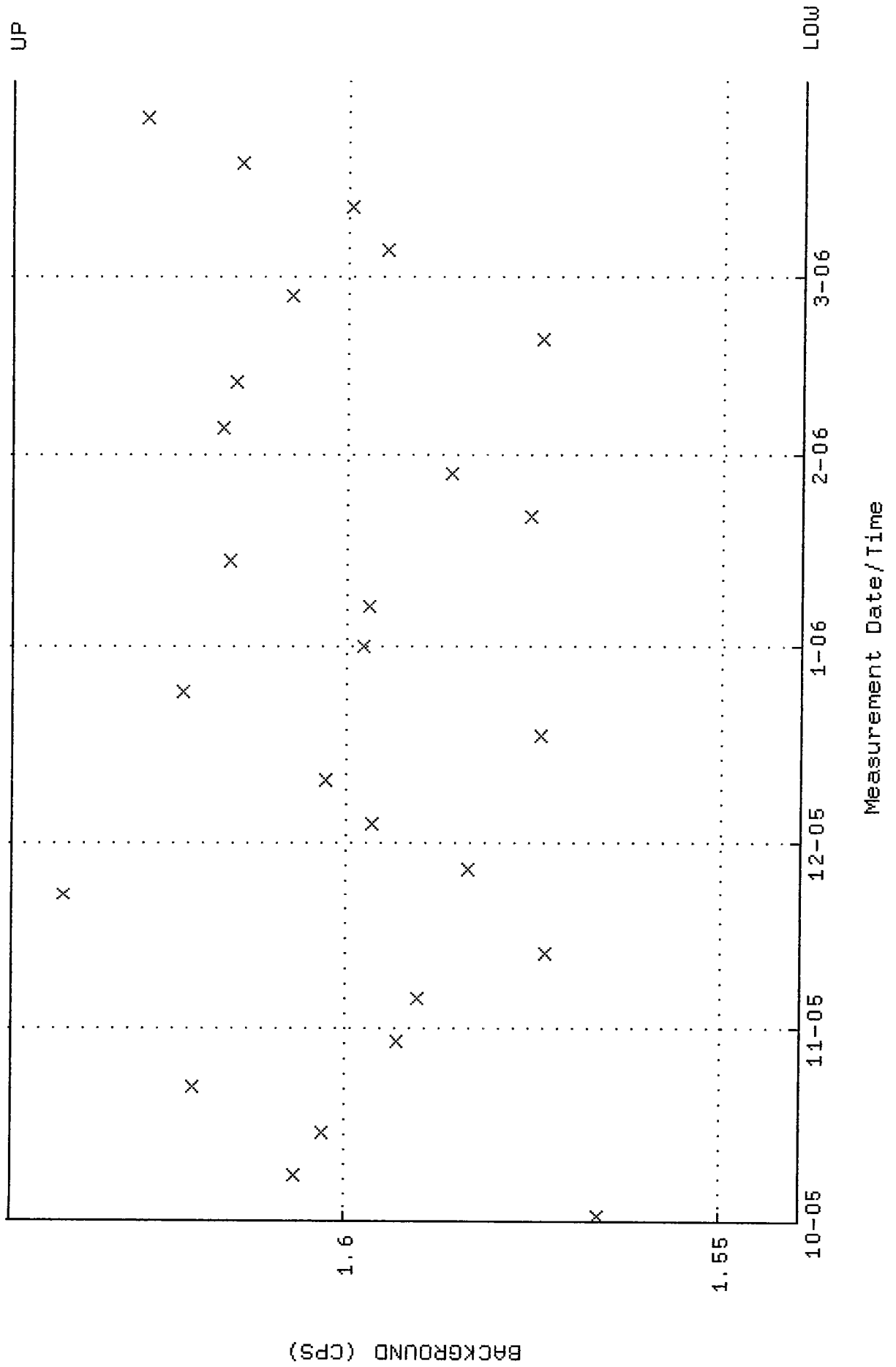
QA filename : DKA100:[ENV_ALPHA.QA.B]B132.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 12-MAR-2006 12:20:11 through 6-APR-2006 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



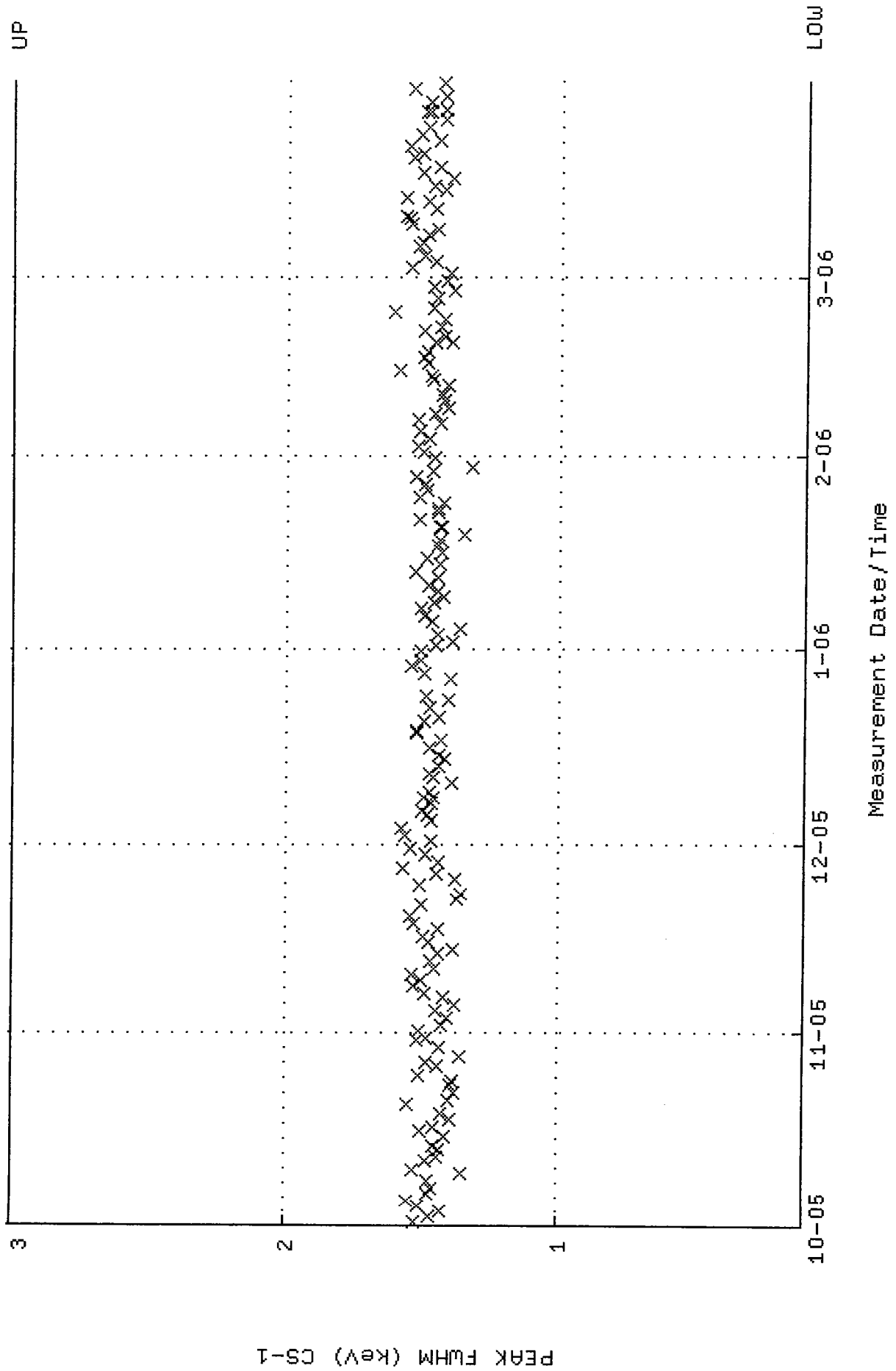
QA filename : DKA100:[ENV_ALPHA]QC_GAMMA3.QAF;3
Parameter Name : PSFWHM-661 (PEAK FWHM (key) CS-137)
Start/End Dates : 1-OCT-2005 12:16:03 through 31-MAR-2006 12:00:00
Lower/Upper Lmts: 0.100000 through 3.000000



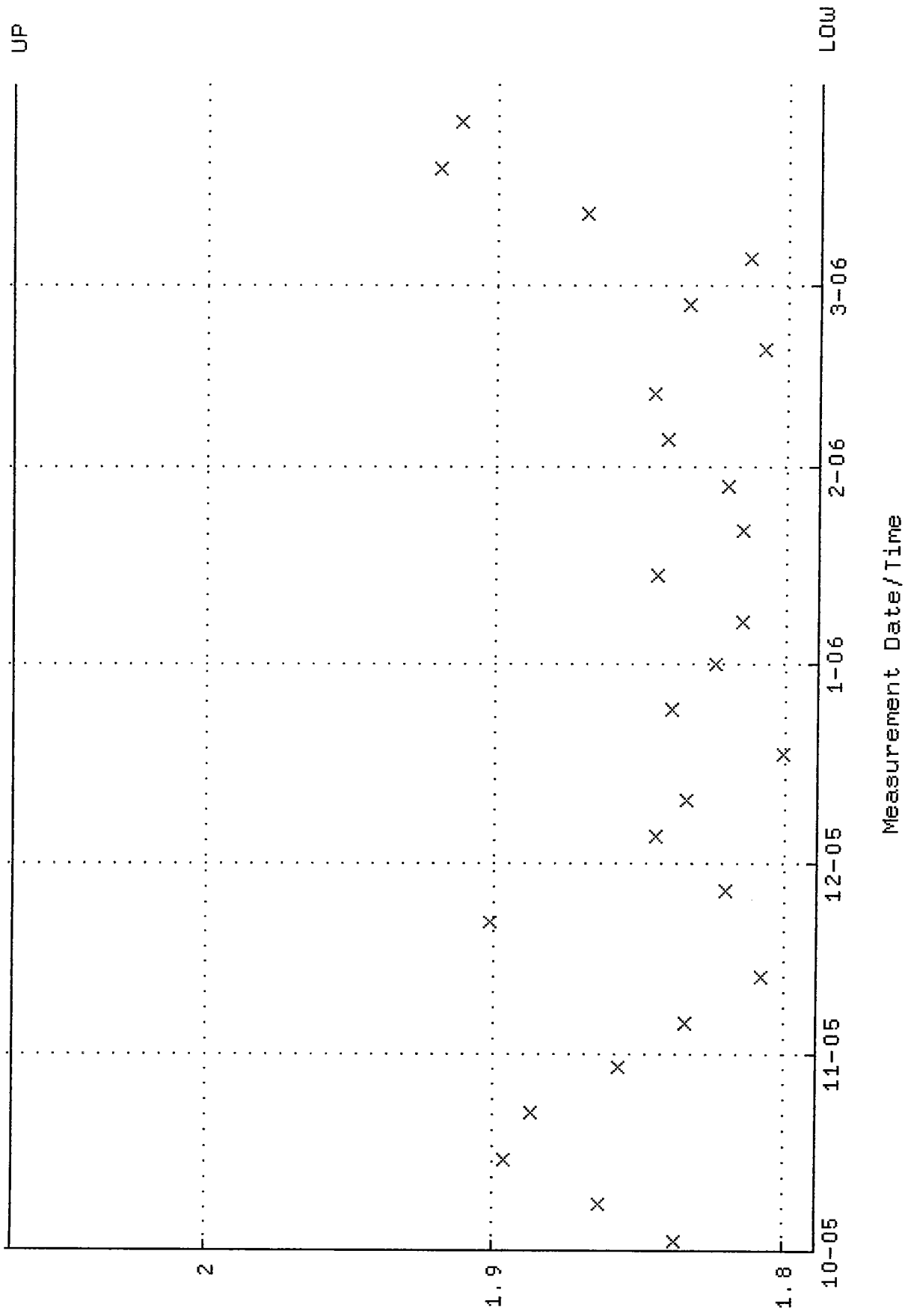
QA filename : DKA100:[ENV_ALPHA]QC_BKG_GAMMA3.QAF;1
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 1-OCT-2005 21:07:57 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.53950 through 1.64450



QA filename : DKA100:[ENV_ALPHA]QC_GAMMA6.QAF;5
Parameter Name : PSFUHM-661 (PEAK FWHM (keV) CS-137)
Start/End Dates : 1-OCT-2005 17:40:28 through 31-MAR-2006 12:00:00
Lower/Upper Lmts: 0.100000 through 3.000000

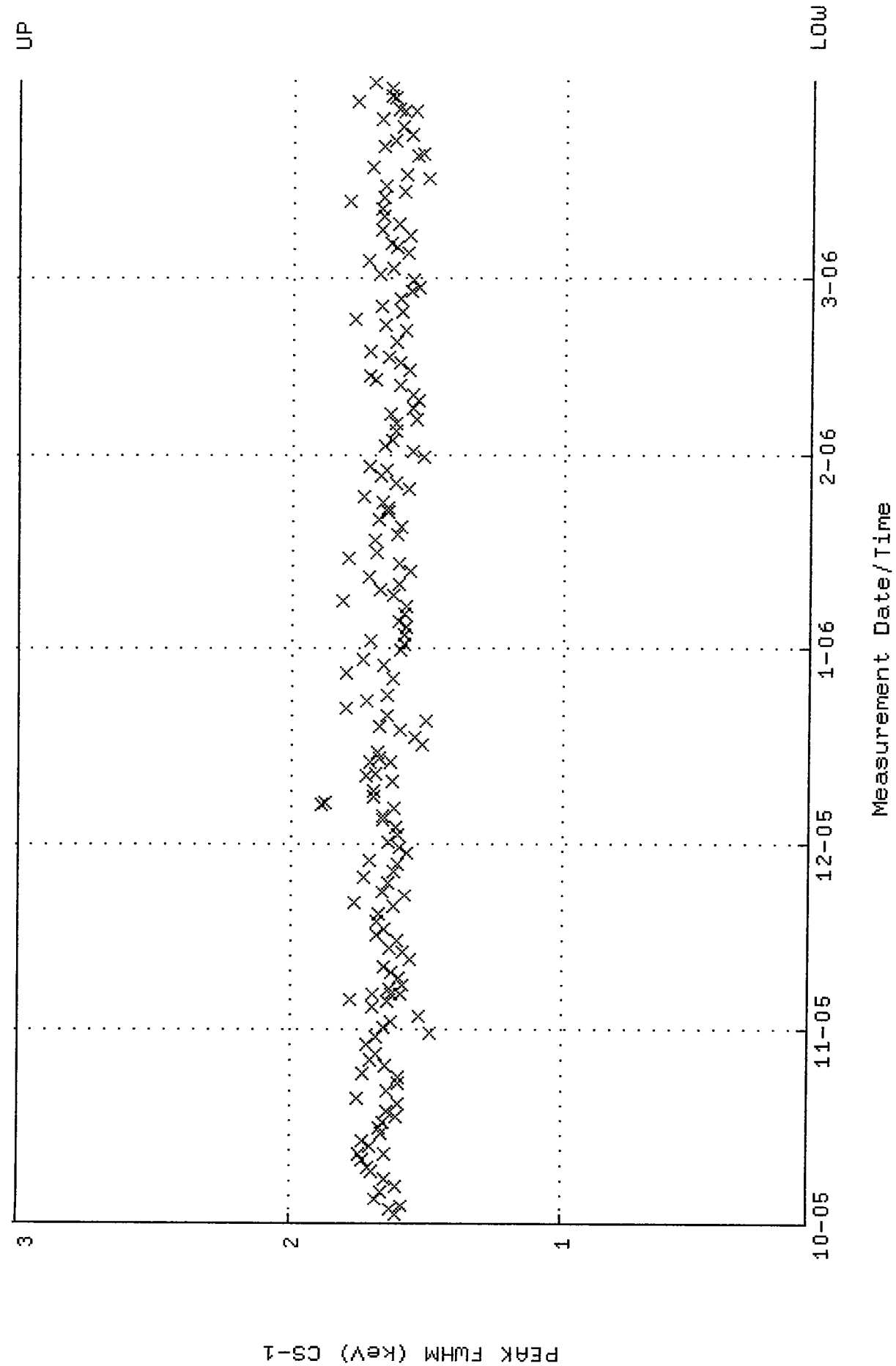


QA filename : DKA100:[ENV_ALPHA]QC_BKG_GAMMA6.QAF;2
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 2-OCT-2005 11:51:15 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.78850 through 2.06800

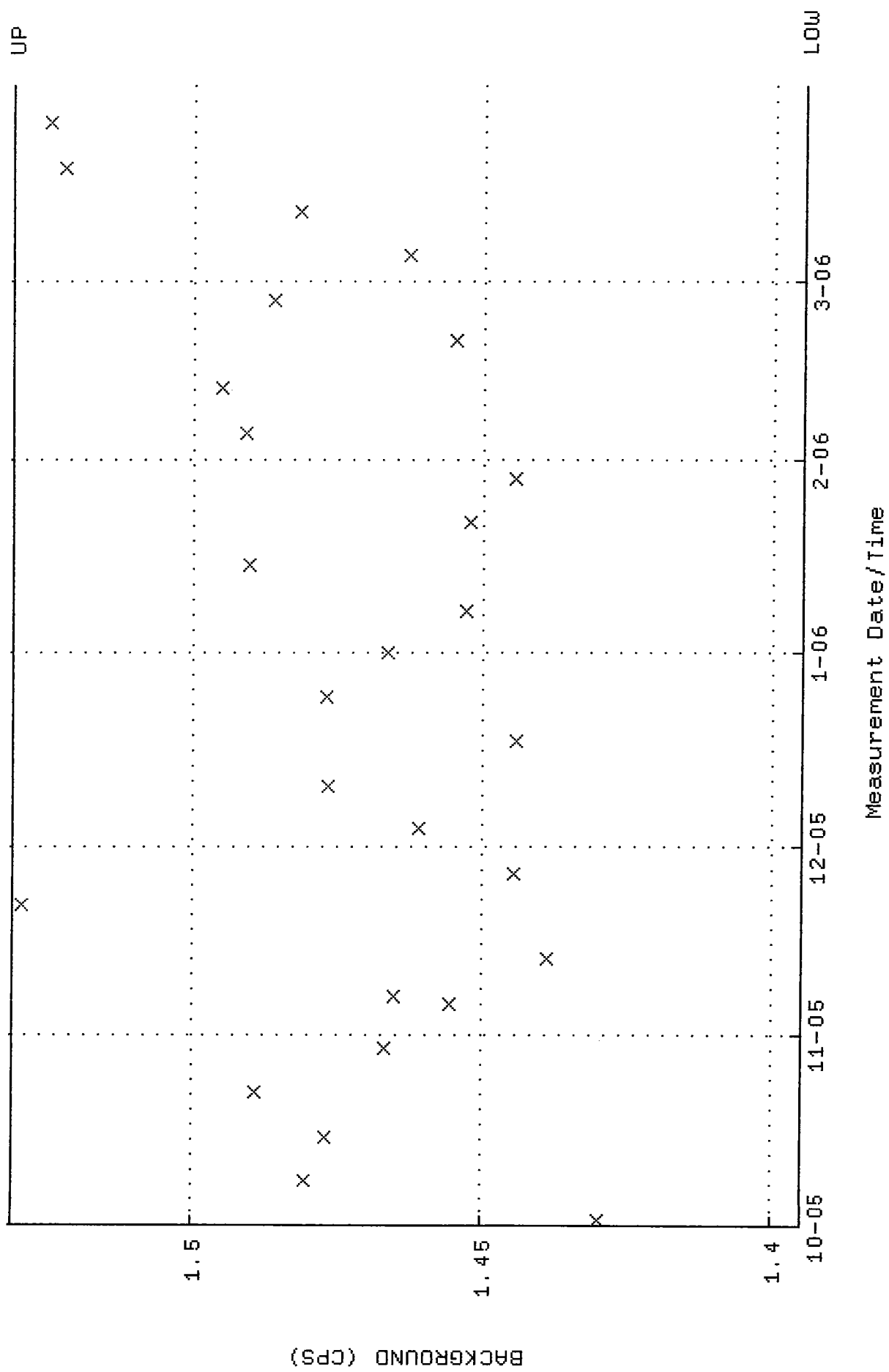


BACKGROUND (CPS)

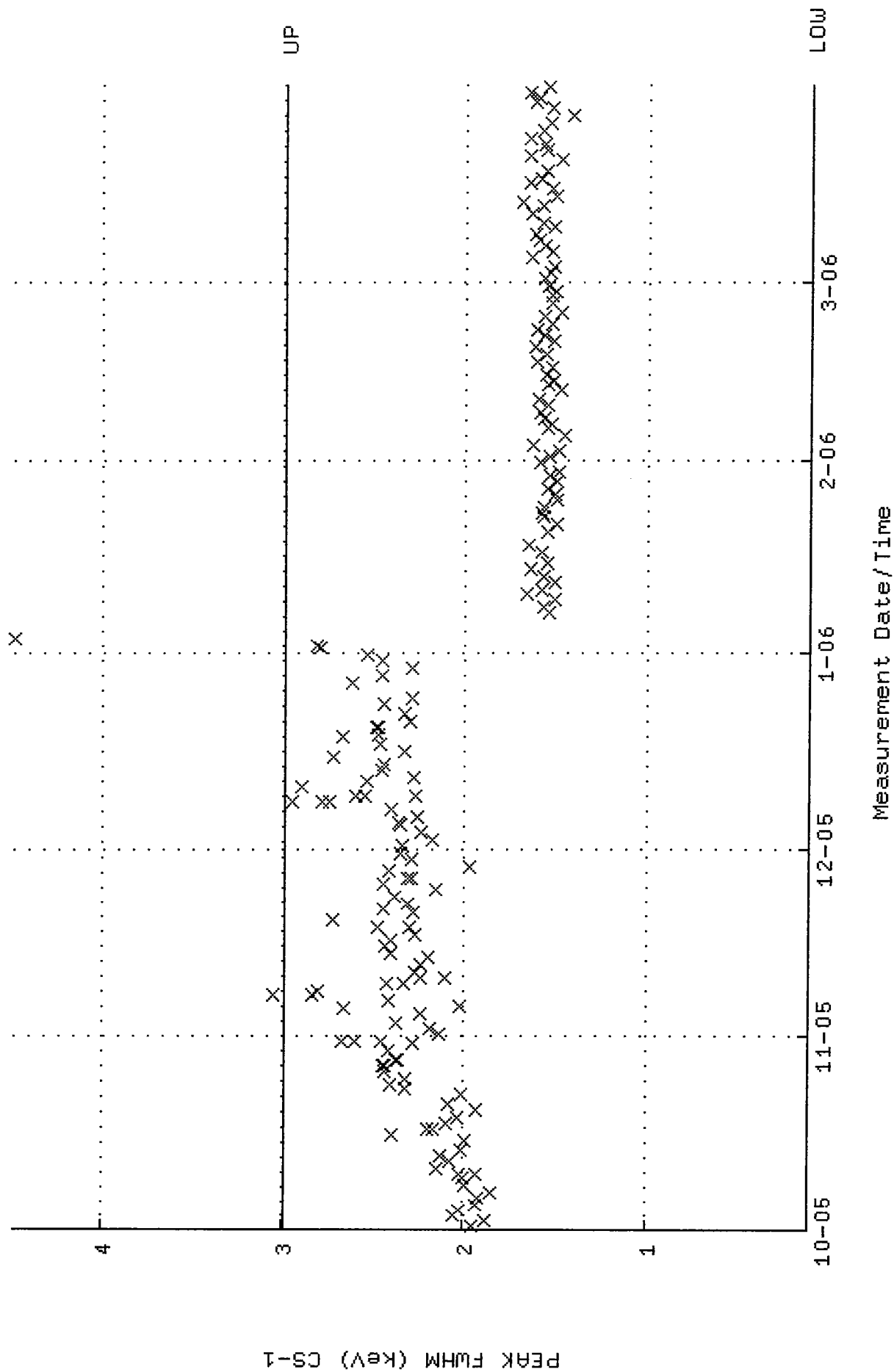
QA filename : DKA100:[ENV_ALPHA]QC_GAMMA9.QAF;3
Parameter Name : PSFWHM-661 (PEAK FWHM (keV) CS-137)
Start/End Dates : 2-OCT-2005 14:46:14 through 31-MAR-2006 12:00:00
Lower/Upper Lmts: 0.100000 through 3.000000



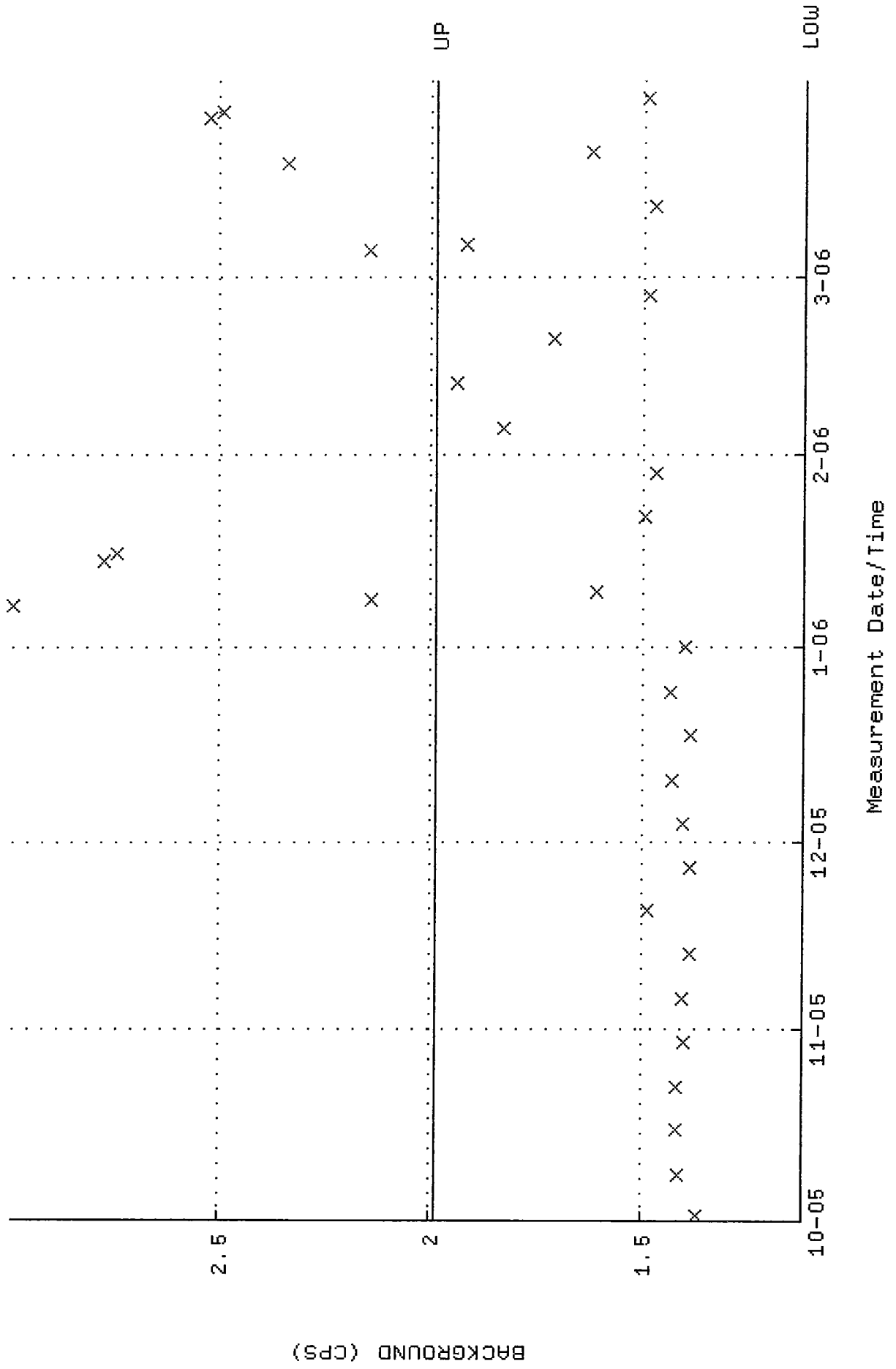
QA filename : DKA100:[ENV_ALPHA]QC_BKG_GAMMA9.QAF;1
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 1-OCT-2005 21:08:41 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.39487 through 1.53113



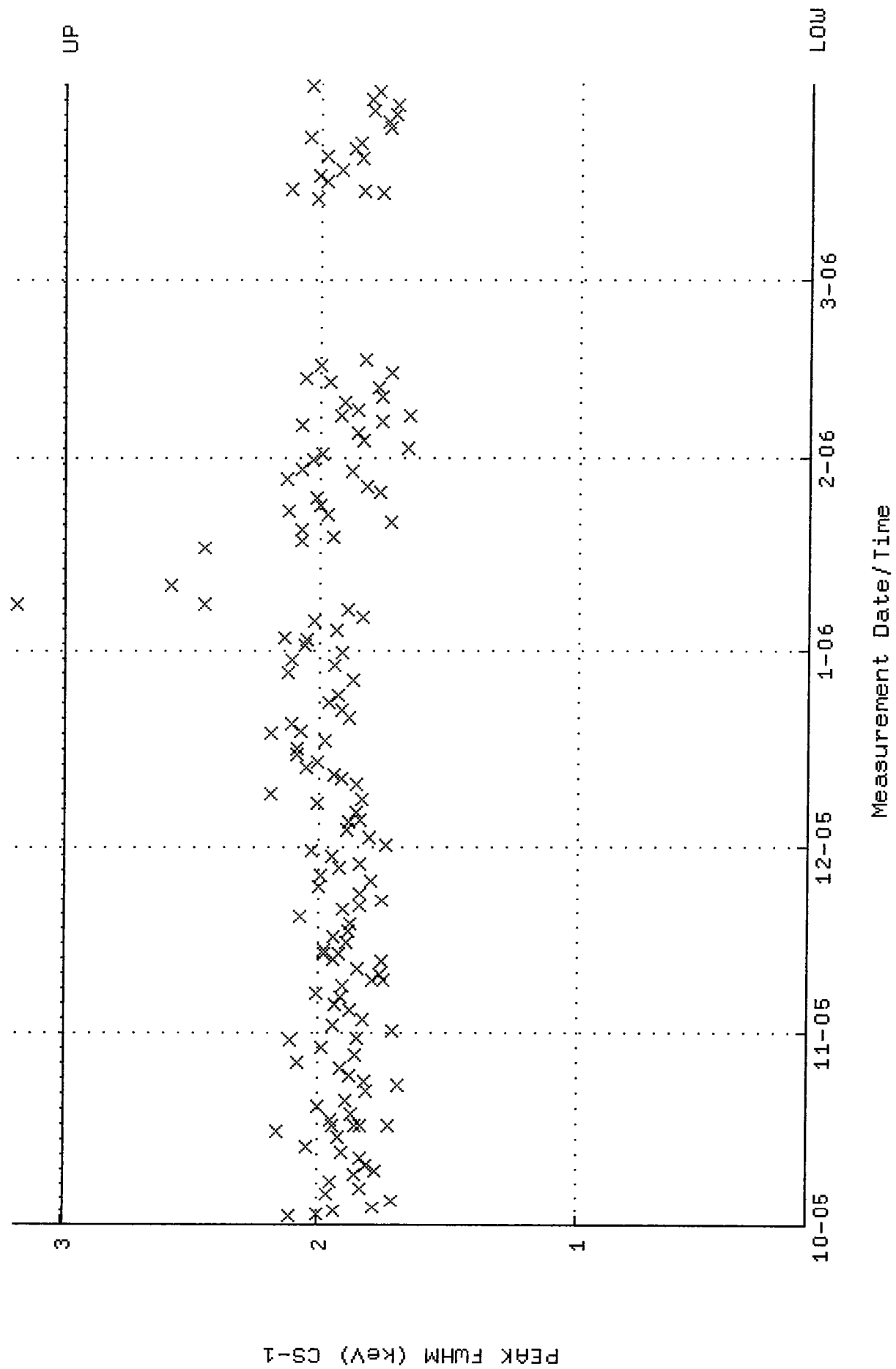
QA filename : DKA100:[ENV_ALPHA]QC_GAMMA10.QAF;3
Parameter Name : PSFWHM-661 (PEAK FWHM (keV) CS-137)
Start/End Dates : 1-OCT-2005 12:07:58 through 31-MAR-2006 12:00:00
Lower/Upper Lmts: 0.100000 through 3.000000



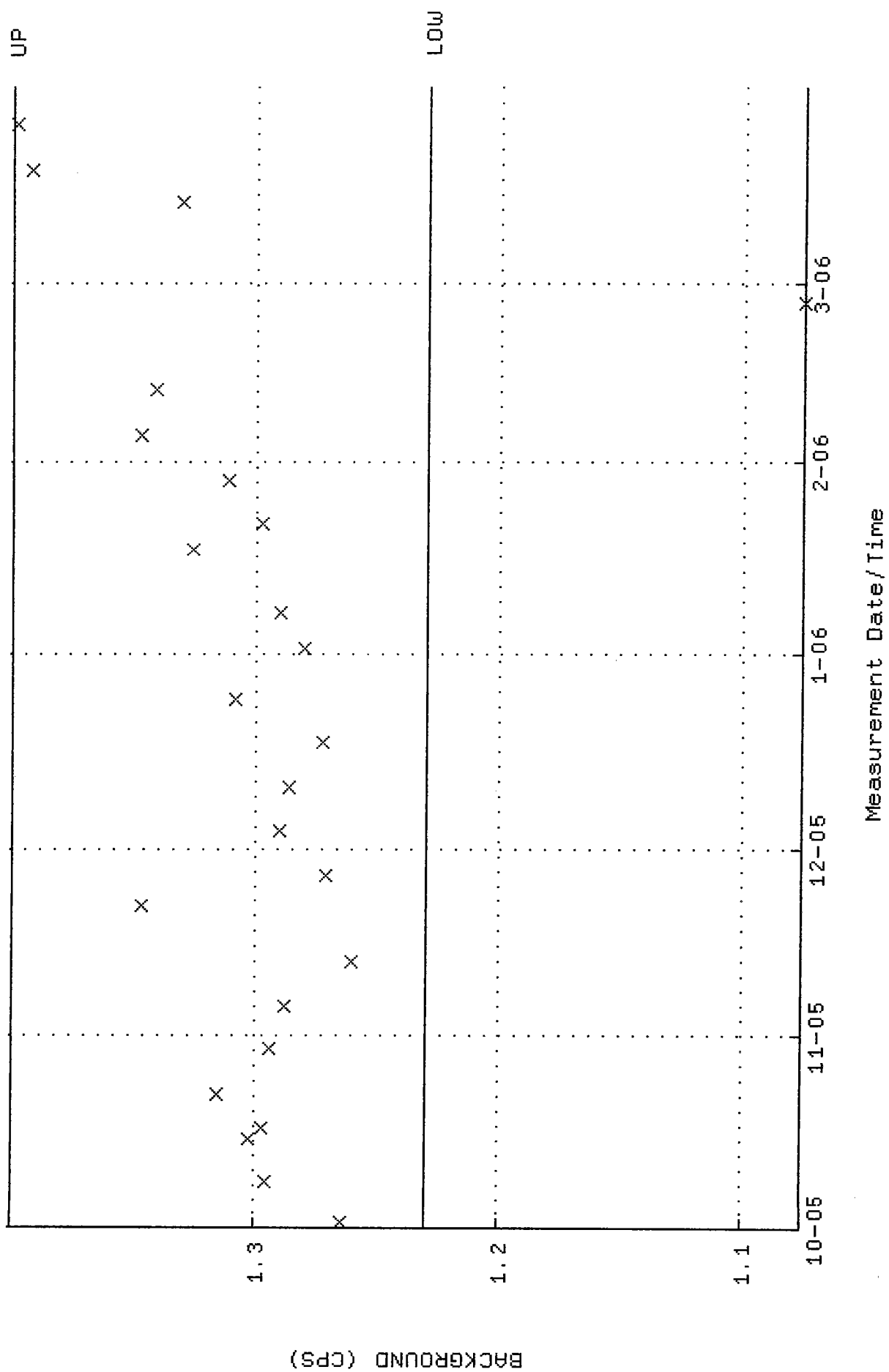
QA filename : DKA100:[ENV_ALPHA]QC-BKG_GAMMA10.QAF;2
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 1-OCT-2005 21:08:48 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.11730 through 1.98700



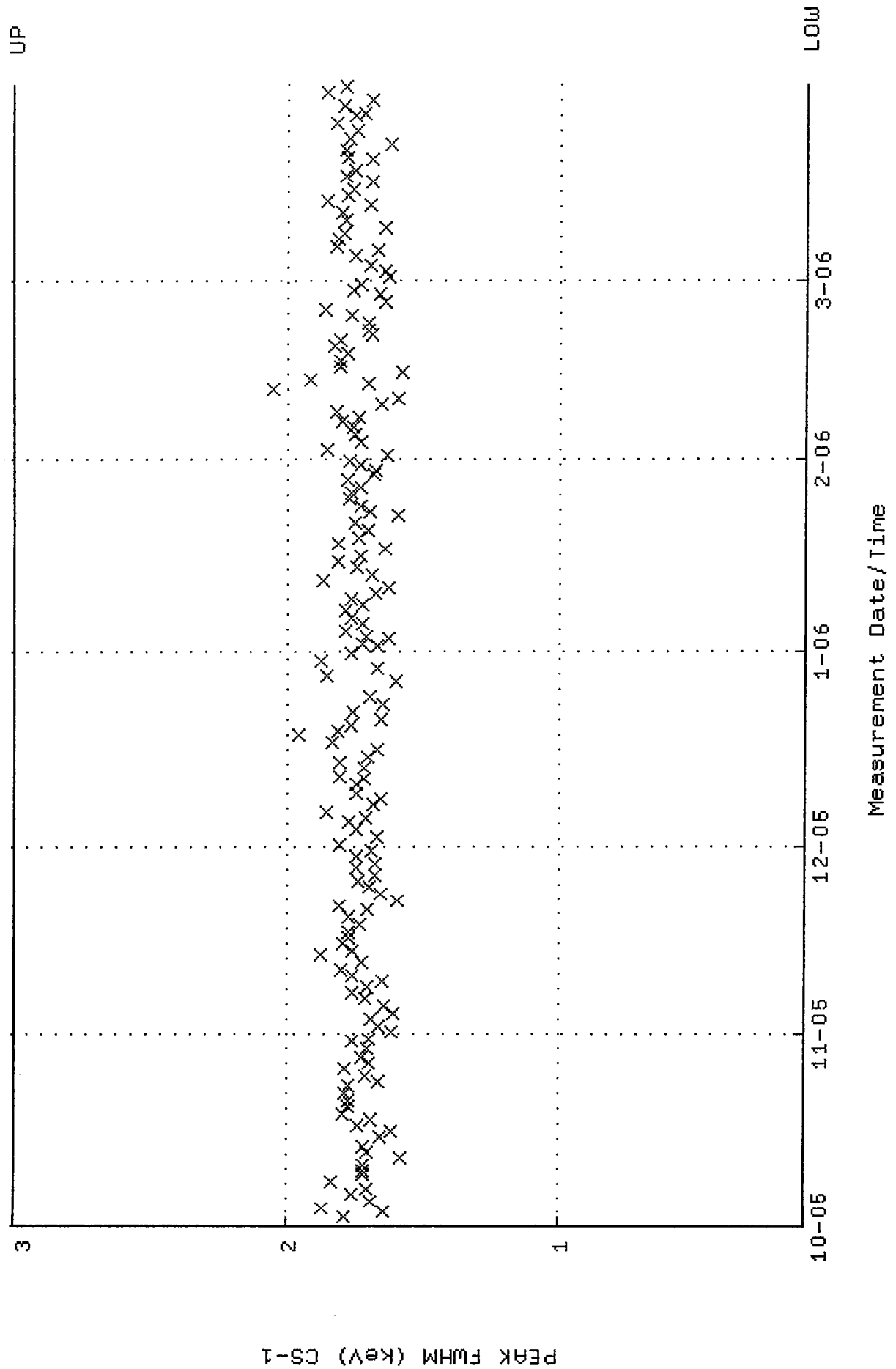
QA filename : DKA100:[ENV_ALPHA]QC_GAMMA11.QAF;2
 Parameter Name : PSFwHM-661 (PEAK FWHM (keV) CS-137)
 Start/End Dates : 2-OCT-2005 15:11:07 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 0.100000 through 3.000000



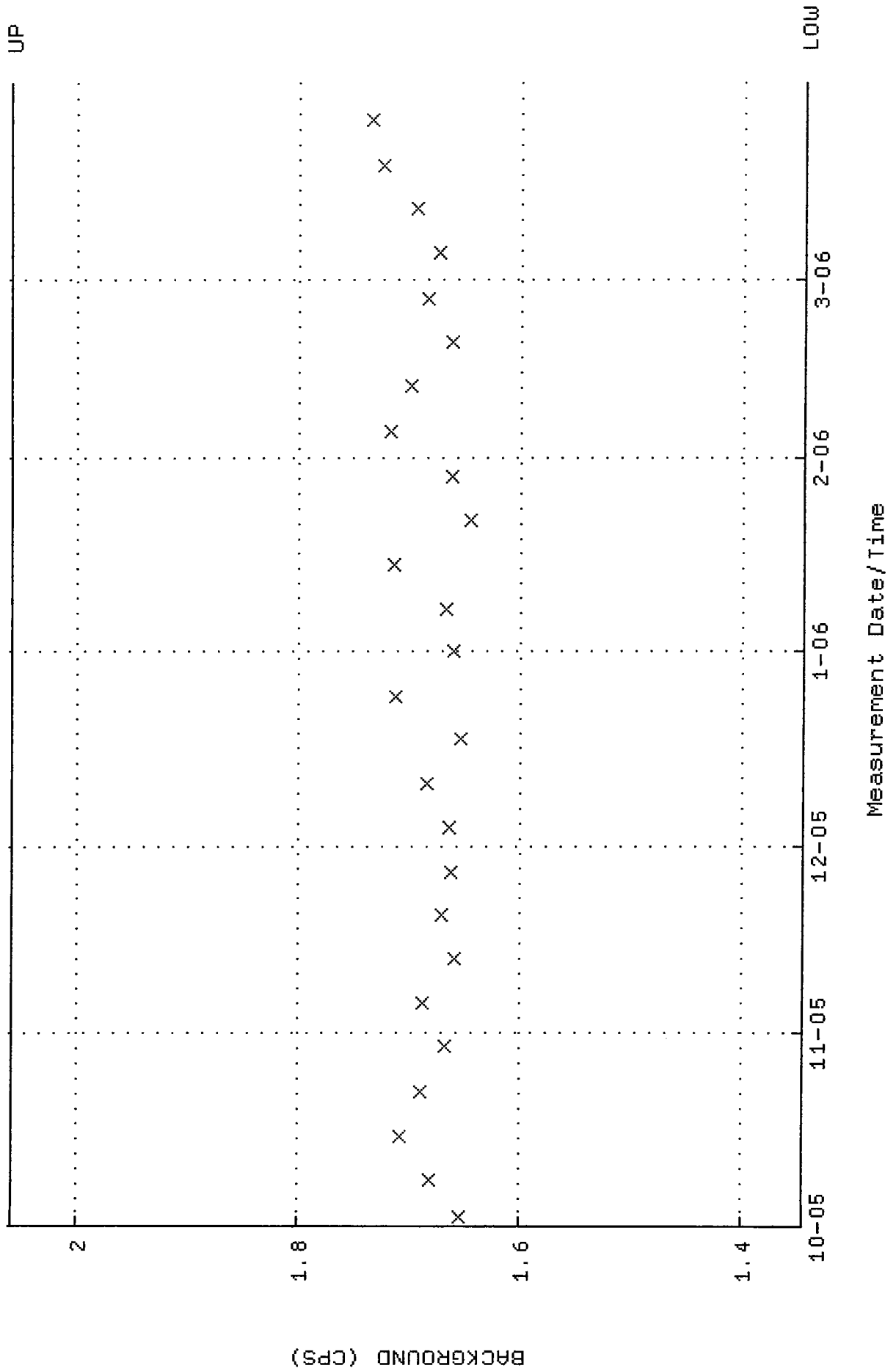
QA filename : DKA100:[ENV_ALPHA]QC_BKG_GAMMA11.QAF;2
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 1-OCT-2005 22:26:21 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.23000 through 1.40000



QA filename : DKA100:[ENV_ALPHA]QC_WELL.QAF;4
Parameter Name : PSFWHM-661 (PEAK FWHM (keV) CS-137)
Start/End Dates : 2-OCT-2005 11:34:54 through 31-MAR-2006 12:00:00
Lower/Upper Lmts: 0.100000 through 3.000000



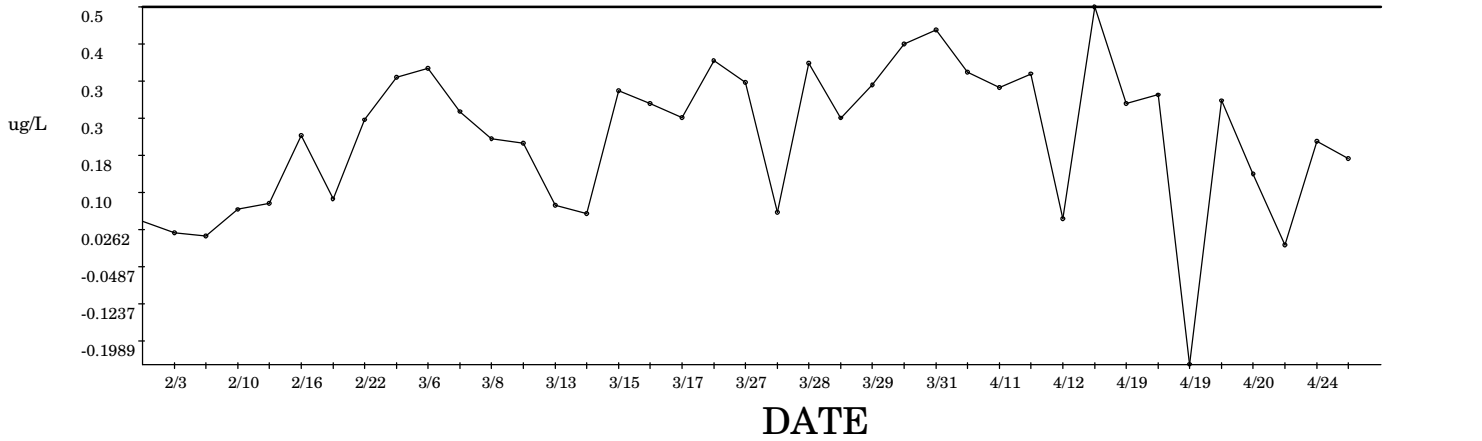
QA filename : DKA100:[ENV_ALPHA]QC_BKG_WELL.QAF;2
 Parameter Name : BACKRATE (BACKGROUND (CPS))
 Start/End Dates : 2-OCT-2005 11:46:24 through 31-MAR-2006 12:00:00
 Lower/Upper Lmts: 1.34470 through 2.05930



QUALITY CONTROL CHARTS

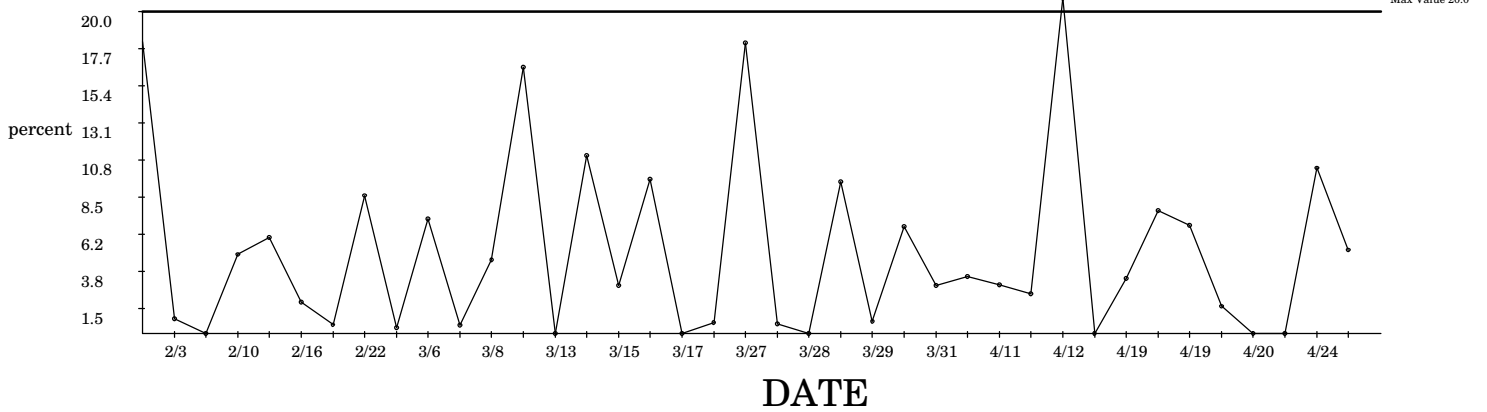
SPC Graph for Total Uranium KPA in Liquids 4/26/2006

Total Uranium BLANK



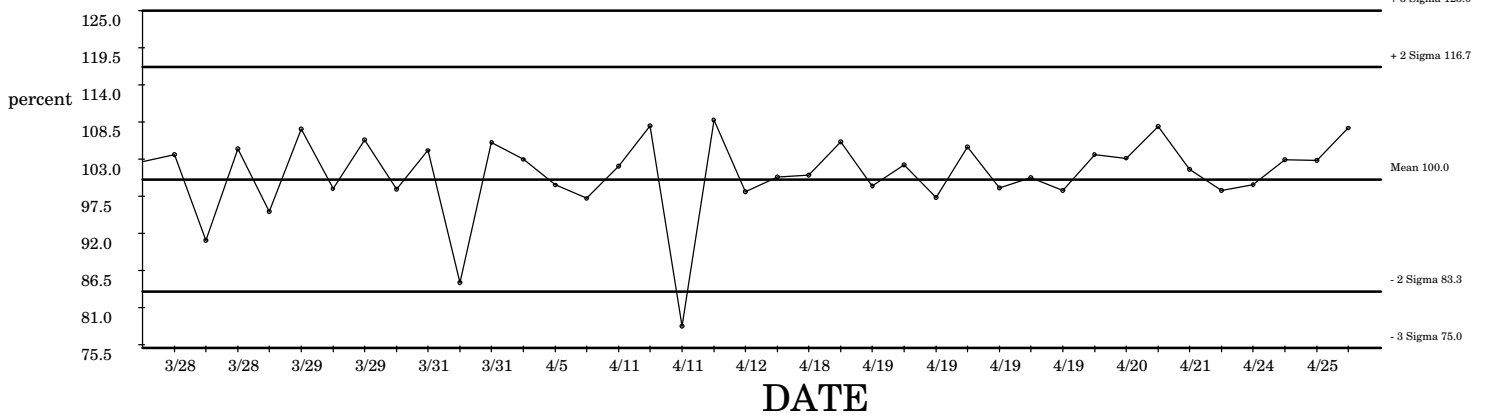
DATE

Total Uranium DUP



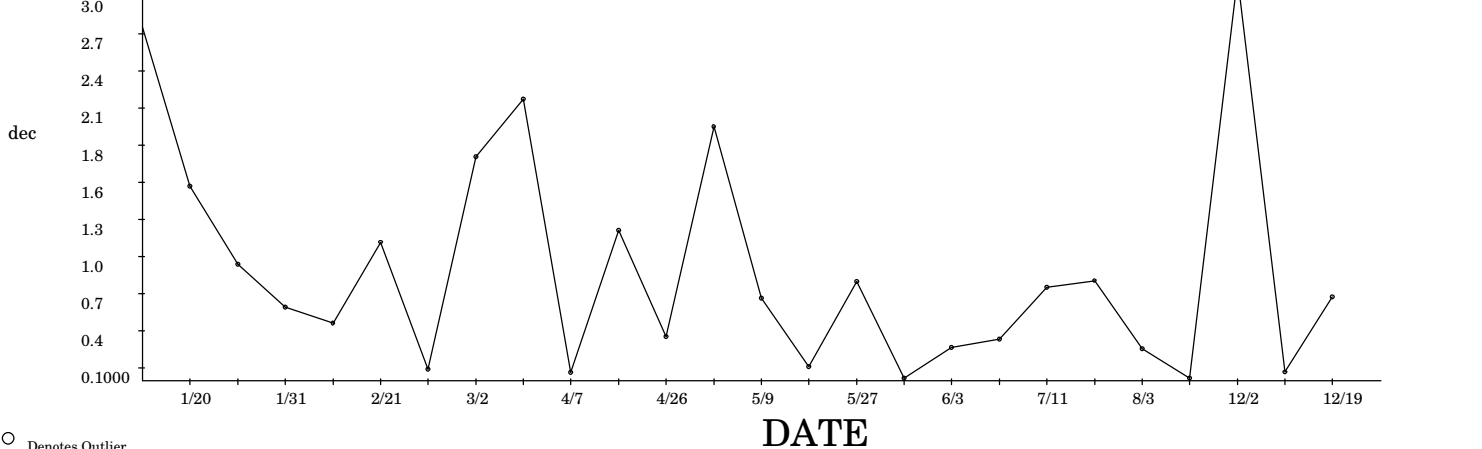
DATE

Total Uranium LCS



DATE

Total Uranium RER

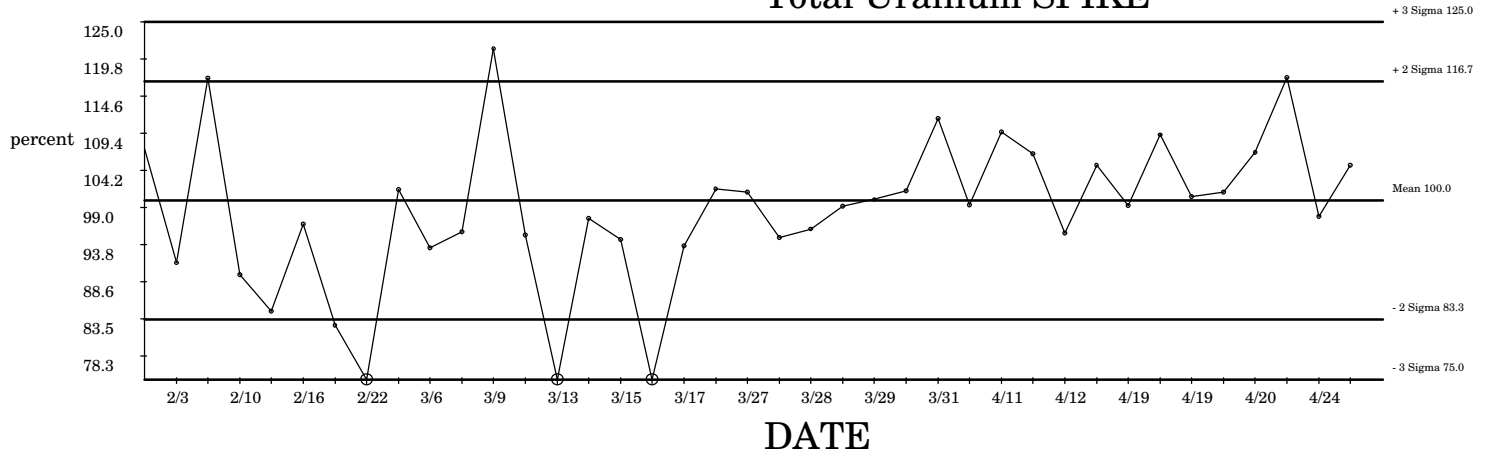


DATE

○ Denotes Outlier

SPC Graph for Total Uranium KPA in Liquids 4/26/2006

Total Uranium SPIKE



○ Denotes Outlier

Data used for Total Uranium KPA in Liquids 27-APR-2006

Total Uranium BLANK: Limits LCL = -.2 UCL = .7

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
499318	1201022161	01-FEB-2006 10:19	DONE	0	-0.19	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
499606	1201022799	03-FEB-2006 15:14	DONE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
495499	1201013559	09-FEB-2006 11:32	DONE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
499607	1201022804	10-FEB-2006 14:09	DONE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
502226	1201029167	14-FEB-2006 13:21	DONE	0	-0.93	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
502227	1201029172	16-FEB-2006 15:06	DONE	0	0.01	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
503735	1201032418	17-FEB-2006 14:35	DONE	0	-0.87	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
505123	1201035708	22-FEB-2006 14:58	DONE	0	0.22	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
505124	1201035713	23-FEB-2006 16:00	DONE	0	0.8	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
507732	1201041932	06-MAR-2006 14:19	DONE	0	0.92	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
509089	1201045163	08-MAR-2006 11:11	DONE	0	0.33	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
509091	1201045172	08-MAR-2006 13:41	DONE	0	-0.04	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
509093	1201045181	10-MAR-2006 10:26	DONE	0	-0.11	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
510519	1201048339	13-MAR-2006 13:18	DONE	0	-0.95	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
510315	1201048003	13-MAR-2006 15:02	DONE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
510361	1201048009	15-MAR-2006 10:13	DONE	0	0.62	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
512099	1201051952	17-MAR-2006 09:23	DONE	0	0.44	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
511794	1201051265	17-MAR-2006 10:39	DONE	0	0.25	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
513427	1201054892	23-MAR-2006 09:42	DONE	0	1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
514308	1201056608	27-MAR-2006 10:53	DONE	0	0.73	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
514304	1201056593	28-MAR-2006 11:58	DONE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
514306	1201056599	28-MAR-2006 15:01	DONE	0	0.99	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
514311	1201056621	29-MAR-2006 10:40	DONE	0	0.24	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
514314	1201056626	29-MAR-2006 11:19	DONE	0	0.7	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
515691	1201059799	31-MAR-2006 09:48	DONE	0	1.3	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
515693	1201059808	31-MAR-2006 10:42	DONE	0	1.4	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
515695	1201059813	05-APR-2006 10:15	DONE	0	0.87	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
518894	1201066876	11-APR-2006 10:02	DONE	0	0.66	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
518888	1201066855	11-APR-2006 11:40	DONE	0	0.85	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
518891	1201066864	12-APR-2006 10:57	DUSE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519925	1201069158	18-APR-2006 11:22	DONE	0	1.8	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519934	1201069195	19-APR-2006 10:39	DONE	0	0.44	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519938	1201069200	19-APR-2006 12:45	DONE	0	0.56	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519939	1201069206	19-APR-2006 13:28	DONE	0	-3	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519940	1201069211	19-APR-2006 15:31	DONE	0	0.48	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519941	1201069216	20-APR-2006 11:50	DONE	0	-0.52	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
519942	1201069226	21-APR-2006 11:45	DUSE	0	-1	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
522696	1201075707	24-APR-2006 10:06	DONE	0	-0.07	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15
523026	1201076467	25-APR-2006 14:22	DONE	0	-0.31	ug/L	0.22	-0.227	-0.079	0.51	0.66	0.15

Total Uranium DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
496182	1201015021	31-JAN-2006 10:06	DONE	2	-0.53	percent	4.65	0	-5.9	15.2	20.0	5.26
499606	1201022800	03-FEB-2006 15:19	DONE	1	-0.71	percent	4.65	0	-5.9	15.2	20.0	5.26
495499	1201013560	09-FEB-2006 11:34	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
499607	1201022805	10-FEB-2006 14:12	DONE	5	0.05	percent	4.65	0	-5.9	15.2	20.0	5.26

502226	1201029168	14-FEB-2006 13:25	DONE	6	0.25	percent	4.65	0	-5.9	15.2	20.0	5.26
502227	1201029173	16-FEB-2006 15:09	DONE	2	-0.51	percent	4.65	0	-5.9	15.2	20.0	5.26
503735	1201032419	17-FEB-2006 14:40	DONE	1	-0.78	percent	4.65	0	-5.9	15.2	20.0	5.26
505123	1201035709	22-FEB-2006 15:03	DONE	9	0.75	percent	4.65	0	-5.9	15.2	20.0	5.26
505124	1201035714	23-FEB-2006 16:03	DONE	0	-0.82	percent	4.65	0	-5.9	15.2	20.0	5.26
507732	1201041933	06-MAR-2006 14:22	DONE	7	0.47	percent	4.65	0	-5.9	15.2	20.0	5.26
509089	1201045164	08-MAR-2006 11:14	DONE	0	-0.79	percent	4.65	0	-5.9	15.2	20.0	5.26
509091	1201045173	08-MAR-2006 13:47	DONE	5	-0.02	percent	4.65	0	-5.9	15.2	20.0	5.26
509093	1201045182	10-MAR-2006 10:29	DONE	17	2.3	percent	4.65	0	-5.9	15.2	20.0	5.26
510519	1201048340	13-MAR-2006 13:21	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
510315	1201048004	13-MAR-2006 15:05	DONE	11	1.2	percent	4.65	0	-5.9	15.2	20.0	5.26
510361	1201048010	15-MAR-2006 10:16	DONE	3	-0.32	percent	4.65	0	-5.9	15.2	20.0	5.26
512099	1201051953	17-MAR-2006 09:27	DONE	10	0.94	percent	4.65	0	-5.9	15.2	20.0	5.26
511794	1201051266	17-MAR-2006 10:43	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
513427	1201054893	23-MAR-2006 09:47	DONE	1	-0.75	percent	4.65	0	-5.9	15.2	20.0	5.26
514308	1201056609	27-MAR-2006 10:56	DONE	18	2.5	percent	4.65	0	-5.9	15.2	20.0	5.26
514304	1201056594	28-MAR-2006 12:03	DONE	1	-0.78	percent	4.65	0	-5.9	15.2	20.0	5.26
514306	1201056600	28-MAR-2006 15:04	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
514311	1201056622	29-MAR-2006 10:01	DONE	9	0.91	percent	4.65	0	-5.9	15.2	20.0	5.26
514314	1201056627	29-MAR-2006 11:22	DONE	1	-0.74	percent	4.65	0	-5.9	15.2	20.0	5.26
515691	1201059800	31-MAR-2006 09:51	DONE	7	0.38	percent	4.65	0	-5.9	15.2	20.0	5.26
515693	1201059809	31-MAR-2006 10:47	DONE	3	-0.32	percent	4.65	0	-5.9	15.2	20.0	5.26
515695	1201059814	05-APR-2006 10:18	DONE	4	-0.21	percent	4.65	0	-5.9	15.2	20.0	5.26
518894	1201066877	11-APR-2006 10:07	DONE	3	-0.31	percent	4.65	0	-5.9	15.2	20.0	5.26
518888	1201066856	11-APR-2006 11:45	DONE	2	-0.41	percent	4.65	0	-5.9	15.2	20.0	5.26
518891	1201066865	12-APR-2006 13:12	DUSE	21	3.1	percent	4.65	0	-5.9	15.2	20.0	5.26
519925	1201069159	18-APR-2006 11:24	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
519934	1201069196	19-APR-2006 10:41	DONE	3	-0.23	percent	4.65	0	-5.9	15.2	20.0	5.26
519938	1201069201	19-APR-2006 12:49	DONE	8	0.57	percent	4.65	0	-5.9	15.2	20.0	5.26
519939	1201069207	19-APR-2006 13:30	DONE	7	0.4	percent	4.65	0	-5.9	15.2	20.0	5.26
519940	1201069212	19-APR-2006 15:34	DONE	2	-0.56	percent	4.65	0	-5.9	15.2	20.0	5.26
519941	1201069217	20-APR-2006 11:53	DONE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
519942	1201069227	21-APR-2006 11:48	DUSE	0	-0.88	percent	4.65	0	-5.9	15.2	20.0	5.26
522696	1201075708	24-APR-2006 10:09	DONE	10	1.1	percent	4.65	0	-5.9	15.2	20.0	5.26
523026	1201076468	25-APR-2006 14:25	DONE	5	0.1	percent	4.65	0	-5.9	15.2	20.0	5.26

Total Uranium LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
514308	1201056612	27-MAR-2006 11:06	DONE	97	-0.31	percent	100	75.0	83.3	117	125	8.33
514304	1201056597	28-MAR-2006 12:08	DONE	104	0.44	percent	100	75.0	83.3	117	125	8.33
514304	1201056596	28-MAR-2006 12:13	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
514306	1201056602	28-MAR-2006 15:10	DONE	105	0.55	percent	100	75.0	83.3	117	125	8.33
514306	1201056603	28-MAR-2006 15:15	DONE	95	-0.57	percent	100	75.0	83.3	117	125	8.33
514311	1201056625	29-MAR-2006 10:07	DONE	107	0.89	percent	100	75.0	83.3	117	125	8.33
514311	1201056624	29-MAR-2006 10:11	DONE	99	-0.17	percent	100	75.0	83.3	117	125	8.33
514314	1201056630	29-MAR-2006 11:28	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
514314	1201056629	29-MAR-2006 11:32	DONE	99	-0.18	percent	100	75.0	83.3	117	125	8.33
515691	1201059803	31-MAR-2006 09:57	DONE	104	0.51	percent	100	75.0	83.3	117	125	8.33
515691	1201059802	31-MAR-2006 10:02	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
515693	1201059812	31-MAR-2006 10:52	DONE	105	0.65	percent	100	75.0	83.3	117	125	8.33

515693	1201059811	31-MAR-2006 10:56	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
515695	1201059817	05-APR-2006 10:24	DONE	99	-0.1	percent	100	75.0	83.3	117	125	8.33
515695	1201059816	05-APR-2006 10:28	DONE	97	-0.34	percent	100	75.0	83.3	117	125	8.33
518894	1201066879	11-APR-2006 10:14	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
518894	1201066880	11-APR-2006 10:16	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
518888	1201066858	11-APR-2006 11:52	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
518888	1201066859	11-APR-2006 11:54	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
518891	1201066867	12-APR-2006 11:08	DUSE	98	-0.22	percent	100	75.0	83.3	117	125	8.33
518891	1201066868	12-APR-2006 11:09	DUSE	100	0.04	percent	100	75.0	83.3	117	125	8.33
519925	1201069161	18-APR-2006 11:33	DONE	101	0.08	percent	100	75.0	83.3	117	125	8.33
519925	1201069162	18-APR-2006 11:34	DONE	106	0.67	percent	100	75.0	83.3	117	125	8.33
519934	1201069198	19-APR-2006 10:50	DONE	99	-0.12	percent	100	75.0	83.3	117	125	8.33
519934	1201069199	19-APR-2006 10:51	DONE	102	0.25	percent	100	75.0	83.3	117	125	8.33
519938	1201069203	19-APR-2006 12:54	DONE	97	-0.32	percent	100	75.0	83.3	117	125	8.33
519938	1201069204	19-APR-2006 12:57	DONE	105	0.58	percent	100	75.0	83.3	117	125	8.33
519939	1201069209	19-APR-2006 13:36	DONE	99	-0.15	percent	100	75.0	83.3	117	125	8.33
519939	1201069210	19-APR-2006 13:38	DONE	100	0.03	percent	100	75.0	83.3	117	125	8.33
519940	1201069214	19-APR-2006 15:42	DONE	98	-0.2	percent	100	75.0	83.3	117	125	8.33
519940	1201069215	19-APR-2006 15:43	DONE	104	0.44	percent	100	75.0	83.3	117	125	8.33
519941	1201069219	20-APR-2006 11:59	DONE	103	0.38	percent	100	75.0	83.3	117	125	8.33
519941	1201069220	20-APR-2006 12:02	DONE	108	0.94	percent	100	75.0	83.3	117	125	8.33
519942	1201069229	21-APR-2006 11:56	DUSE	101	0.17	percent	100	75.0	83.3	117	125	8.33
519942	1201069230	21-APR-2006 11:58	DUSE	98	-0.2	percent	100	75.0	83.3	117	125	8.33
522696	1201075710	24-APR-2006 10:15	DONE	99	-0.1	percent	100	75.0	83.3	117	125	8.33
522696	1201075711	24-APR-2006 10:18	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
523026	1201076470	25-APR-2006 14:32	DONE	103	0.34	percent	100	75.0	83.3	117	125	8.33
523026	1201076471	25-APR-2006 14:34	DONE	108	0.91	percent	100	75.0	83.3	117	125	8.33

Total Uranium RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
392624	1200767846	10-JAN-2005 18:44	DONE	0.24	-0.55	dec	0.87	0	-1.4	3.2	3.00	1.16
395311	1200774051	20-JAN-2005 21:49	DONE	1.52	0.56	dec	0.87	0	-1.4	3.2	3.00	1.16
395311	1200774052	20-JAN-2005 21:52	DONE	0.91	0.03	dec	0.87	0	-1.4	3.2	3.00	1.16
397297	1200778619	31-JAN-2005 22:54	DONE	0.57	-0.26	dec	0.87	0	-1.4	3.2	3.00	1.16
399308	1200783560	10-FEB-2005 16:19	DONE	0.45	-0.37	dec	0.87	0	-1.4	3.2	3.00	1.16
403160	1200792687	21-FEB-2005 21:08	DONE	1.08	0.18	dec	0.87	0	-1.4	3.2	3.00	1.16
403533	1200793661	23-FEB-2005 14:20	DONE	0.09	-0.67	dec	0.87	0	-1.4	3.2	3.00	1.16
405087	1200797348	02-MAR-2005 18:20	DONE	1.75	0.75	dec	0.87	0	-1.4	3.2	3.00	1.16
410228	1200809516	25-MAR-2005 16:27	DONE	2.2	1.1	dec	0.87	0	-1.4	3.2	3.00	1.16
412929	1200815959	07-APR-2005 17:04	DONE	0.07	-0.7	dec	0.87	0	-1.4	3.2	3.00	1.16
413613	1200817441	11-APR-2005 16:50	DONE	1.18	0.26	dec	0.87	0	-1.4	3.2	3.00	1.16
419672	1200832042	26-APR-2005 16:51	DONE	0.35	-0.45	dec	0.87	0	-1.4	3.2	3.00	1.16
421104	1200835563	06-MAY-2005 16:48	DONE	1.98	0.96	dec	0.87	0	-1.4	3.2	3.00	1.16
423658	1200842019	09-MAY-2005 13:16	DONE	0.64	-0.2	dec	0.87	0	-1.4	3.2	3.00	1.16
425652	1200846824	21-MAY-2005 01:38	DONE	0.11	-0.66	dec	0.87	0	-1.4	3.2	3.00	1.16
429170	1200855475	27-MAY-2005 21:41	DONE	0.78	-0.08	dec	0.87	0	-1.4	3.2	3.00	1.16
428525	1200853979	28-MAY-2005 02:24	DONE	0.02	-0.74	dec	0.87	0	-1.4	3.2	3.00	1.16
430767	1200859375	03-JUN-2005 14:38	DONE	0.26	-0.53	dec	0.87	0	-1.4	3.2	3.00	1.16
439503	1200880211	05-JUL-2005 22:09	DONE	0.33	-0.47	dec	0.87	0	-1.4	3.2	3.00	1.16
437544	1200875750	11-JUL-2005 11:14	DONE	0.73	-0.12	dec	0.87	0	-1.4	3.2	3.00	1.16

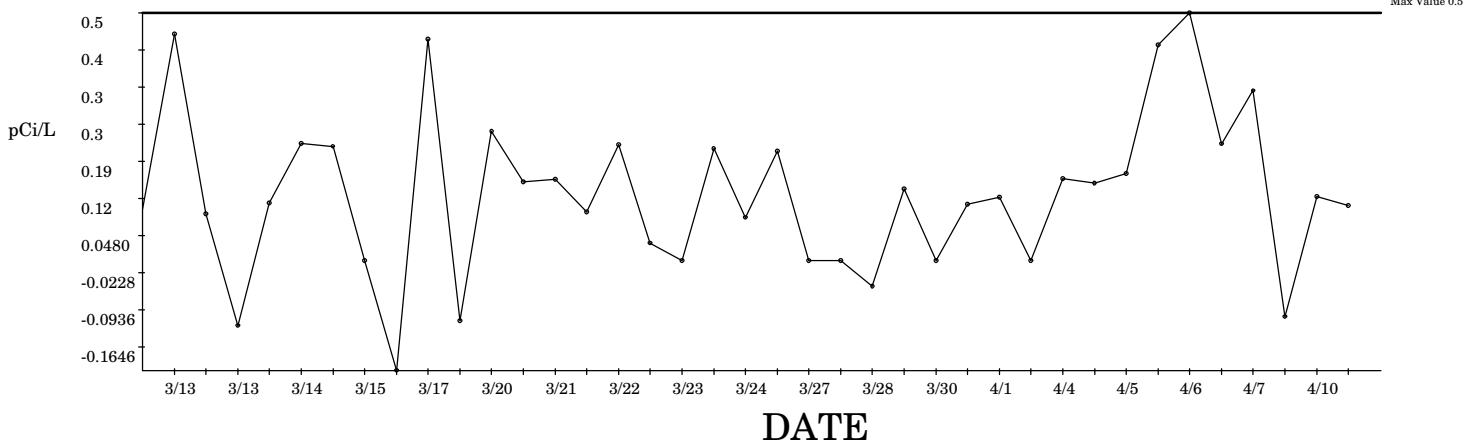
439502	1200880206	11-JUL-2005 17:17	DONE	0.78	-0.08	dec	0.87	0	-1.4	3.2	3.00	1.16
447932	1200900828	03-AUG-2005 16:59	DONE	0.25	-0.54	dec	0.87	0	-1.4	3.2	3.00	1.16
473187	1200961069	25-OCT-2005 08:47	DONE	0.02	-0.73	dec	0.87	0	-1.4	3.2	3.00	1.16
483935	1200986716	02-DEC-2005 16:03	DONE	5.7	4.2	dec	0.87	0	-1.4	3.2	3.00	1.16
486185	1200992391	12-DEC-2005 11:32	DONE	0.07	-0.69	dec	0.87	0	-1.4	3.2	3.00	1.16
486203	1200992443	19-DEC-2005 11:48	DONE	0.65	-0.19	dec	0.87	0	-1.4	3.2	3.00	1.16

Total Uranium SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
499318	1201022163	01-FEB-2006 10:27	DONE	93	-0.87	percent	100	75.0	83.3	117	125	8.33
499606	1201022801	03-FEB-2006 15:22	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
495499	1201013561	09-FEB-2006 11:38	DONE	117	2.1	percent	100	75.0	83.3	117	125	8.33
499607	1201022806	10-FEB-2006 14:16	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
502226	1201029169	14-FEB-2006 13:29	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
502227	1201029174	16-FEB-2006 15:13	DONE	97	-0.4	percent	100	75.0	83.3	117	125	8.33
503735	1201032420	17-FEB-2006 14:43	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
505123	1201035710	22-FEB-2006 15:06	DONE	75	-3	percent	100	75.0	83.3	117	125	8.33
505124	1201035715	23-FEB-2006 16:07	DONE	102	0.18	percent	100	75.0	83.3	117	125	8.33
507732	1201041934	06-MAR-2006 14:26	DONE	93	-0.8	percent	100	75.0	83.3	117	125	8.33
509089	1201045165	08-MAR-2006 11:18	DONE	96	-0.53	percent	100	75.0	83.3	117	125	8.33
509091	1201045174	09-MAR-2006 11:10	DONE	121	2.5	percent	100	75.0	83.3	117	125	8.33
509093	1201045183	10-MAR-2006 10:33	DONE	95	-0.58	percent	100	75.0	83.3	117	125	8.33
510519	1201048341	13-MAR-2006 13:25	DONE	71	-4	percent	100	75.0	83.3	117	125	8.33
510315	1201048005	13-MAR-2006 15:09	DONE	97	-0.3	percent	100	75.0	83.3	117	125	8.33
510361	1201048011	15-MAR-2006 10:21	DONE	95	-0.65	percent	100	75.0	83.3	117	125	8.33
512099	1201051954	17-MAR-2006 09:31	DONE	63	-4	percent	100	75.0	83.3	117	125	8.33
511794	1201051267	17-MAR-2006 10:47	DONE	94	-0.76	percent	100	75.0	83.3	117	125	8.33
513427	1201054894	23-MAR-2006 09:50	DONE	102	0.19	percent	100	75.0	83.3	117	125	8.33
514308	1201056610	27-MAR-2006 11:00	DONE	101	0.15	percent	100	75.0	83.3	117	125	8.33
514304	1201056595	28-MAR-2006 12:06	DONE	95	-0.62	percent	100	75.0	83.3	117	125	8.33
514306	1201056601	28-MAR-2006 15:08	DONE	96	-0.48	percent	100	75.0	83.3	117	125	8.33
514311	1201056623	29-MAR-2006 10:05	DONE	99	-0.1	percent	100	75.0	83.3	117	125	8.33
514314	1201056628	29-MAR-2006 11:26	DONE	100	0.02	percent	100	75.0	83.3	117	125	8.33
515691	1201059801	31-MAR-2006 09:55	DONE	101	0.17	percent	100	75.0	83.3	117	125	8.33
515693	1201059810	31-MAR-2006 10:50	DONE	111	1.4	percent	100	75.0	83.3	117	125	8.33
515695	1201059815	05-APR-2006 10:22	DONE	99	-0.07	percent	100	75.0	83.3	117	125	8.33
518894	1201066878	11-APR-2006 10:11	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
518888	1201066857	11-APR-2006 11:49	DONE	107	0.78	percent	100	75.0	83.3	117	125	8.33
518891	1201066866	12-APR-2006 11:04	DUSE	95	-0.54	percent	100	75.0	83.3	117	125	8.33
519925	1201069160	18-APR-2006 11:29	DONE	105	0.59	percent	100	75.0	83.3	117	125	8.33
519934	1201069197	19-APR-2006 10:46	DONE	99	-0.08	percent	100	75.0	83.3	117	125	8.33
519938	1201069202	19-APR-2006 12:51	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
519939	1201069208	19-APR-2006 13:35	DONE	101	0.07	percent	100	75.0	83.3	117	125	8.33
519940	1201069213	19-APR-2006 15:39	DONE	101	0.14	percent	100	75.0	83.3	117	125	8.33
519941	1201069218	20-APR-2006 11:56	DONE	107	0.81	percent	100	75.0	83.3	117	125	8.33
519942	1201069228	21-APR-2006 11:53	DUSE	117	2.1	percent	100	75.0	83.3	117	125	8.33
522696	1201075709	24-APR-2006 10:12	DONE	98	-0.27	percent	100	75.0	83.3	117	125	8.33
523026	1201076469	25-APR-2006 14:29	DONE	105	0.59	percent	100	75.0	83.3	117	125	8.33

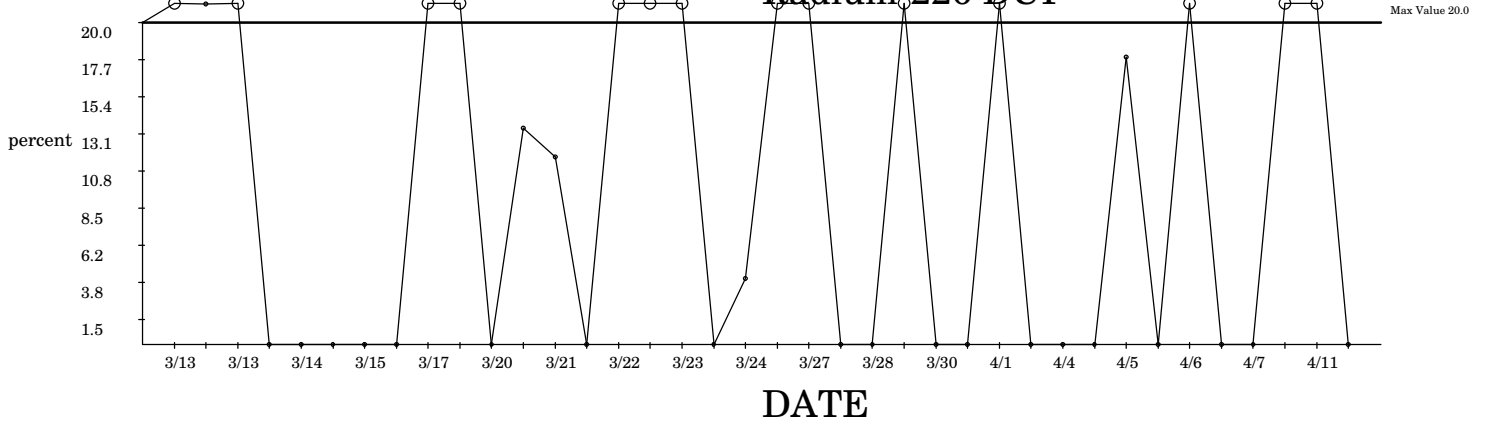
SPC Graph for Lucas Cell Radium 226 in Liquids 4/11/2006

Radium-226 BLANK



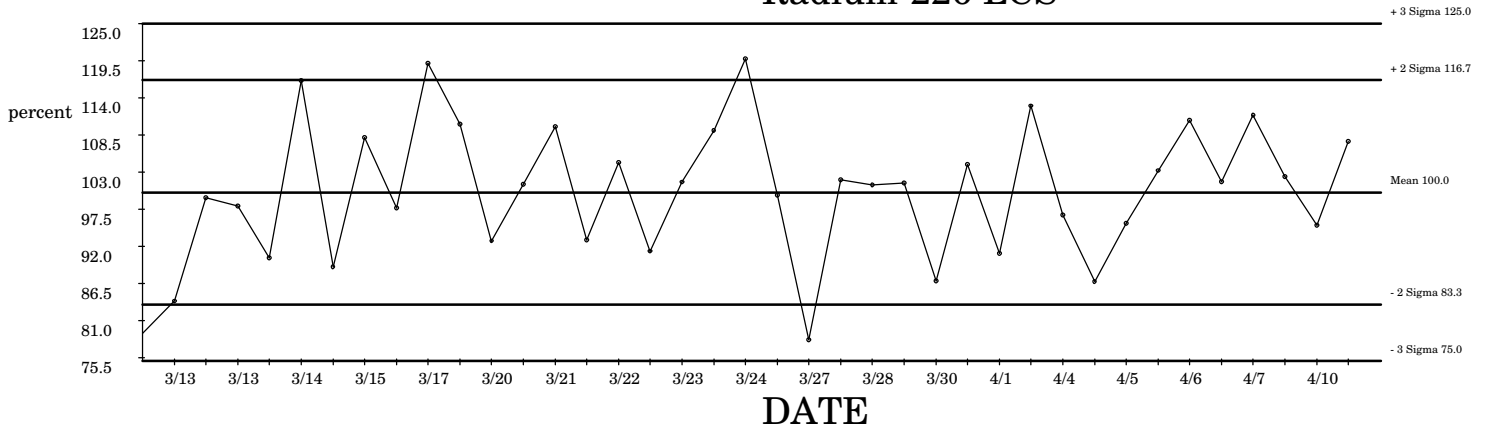
DATE

Radium-226 DUP



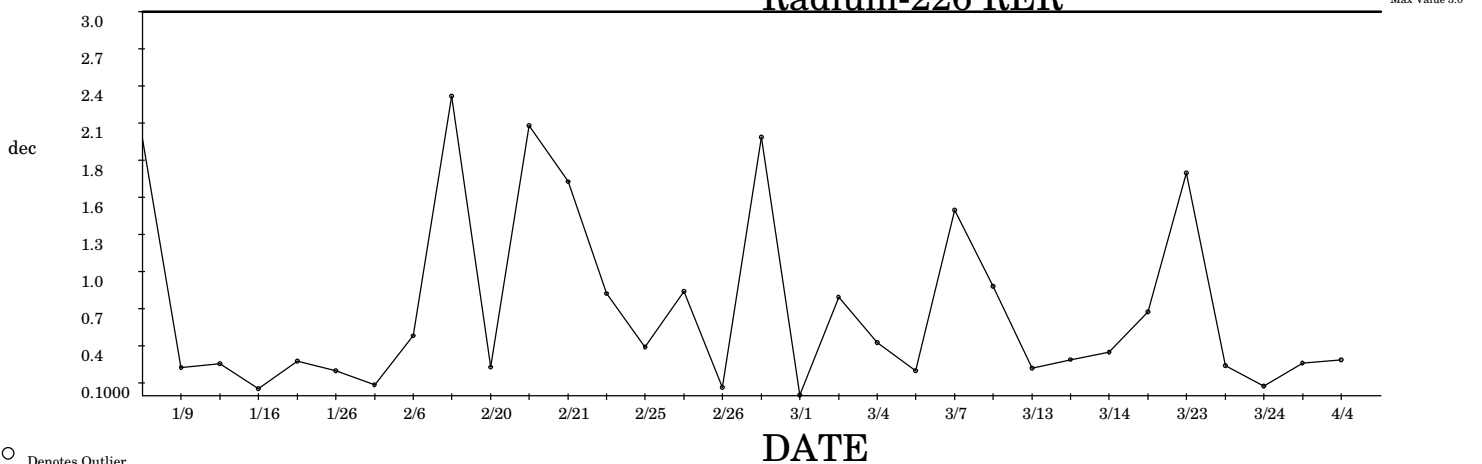
DATE

Radium-226 LCS



DATE

Radium-226 RER

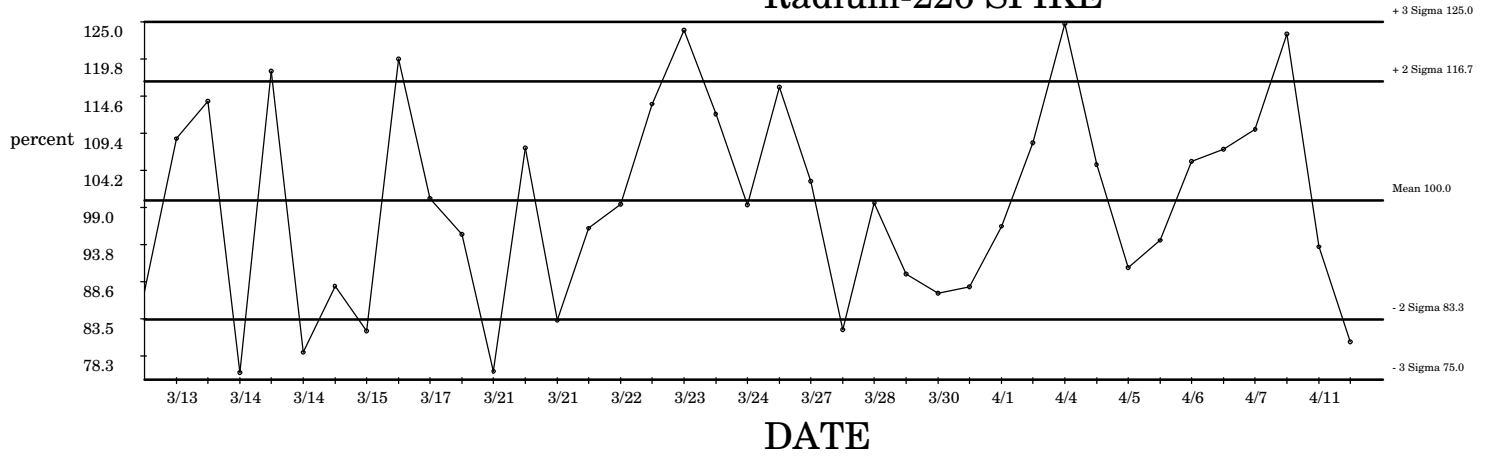


DATE

○ Denotes Outlier

SPC Graph for Lucas Cell Radium 226 in Liquids 4/11/2006

Radium-226 SPIKE



○ Denotes Outlier

Data used for Lucas Cell Radium 226 in Liquids 12-APR-2006

Radium-226 BLANK: Limits LCL = -.3 UCL = .6

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
508193	1201043049	11-MAR-2006 18:30	DONE	0	0.25	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510096	1201047336	13-MAR-2006 07:55	DONE	0	2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508847	1201044642	13-MAR-2006 09:00	DONE	0	-0.24	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
507422	1201041266	13-MAR-2006 23:05	DONE	0	-2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510100	1201047353	13-MAR-2006 23:05	DONE	0	-0.11	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508848	1201044646	14-MAR-2006 10:35	DONE	0	0.62	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508845	1201044630	14-MAR-2006 14:00	DONE	0	0.58	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510098	1201047344	15-MAR-2006 21:20	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508846	1201044634	16-MAR-2006 15:05	DONE	0	-2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510099	1201047349	17-MAR-2006 09:45	DONE	0	1.9	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510646	1201048626	17-MAR-2006 17:40	DONE	0	-2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510094	1201047328	20-MAR-2006 20:50	DONE	0	0.77	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508851	1201044655	21-MAR-2006 09:30	DONE	0	0.15	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
511412	1201050383	21-MAR-2006 13:45	DONE	0	0.18	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510095	1201047332	21-MAR-2006 15:30	DONE	0	-0.22	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510101	1201047357	22-MAR-2006 09:20	DONE	0	0.6	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
511384	1201050305	23-MAR-2006 11:50	DONE	0	-0.6	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
511905	1201051483	23-MAR-2006 20:10	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
513423	1201054876	24-MAR-2006 07:50	DONE	0	0.55	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
512638	1201053208	24-MAR-2006 08:30	DONE	0	-0.29	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
510097	1201047340	27-MAR-2006 12:05	DONE	0	0.53	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
508195	1201043053	27-MAR-2006 15:00	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
512753	1201053461	27-MAR-2006 20:00	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
513367	1201054753	28-MAR-2006 22:50	DONE	0	-1	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
512637	1201053204	29-MAR-2006 21:50	DONE	0	0.06	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
514680	1201057530	30-MAR-2006 20:04	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
514682	1201057534	31-MAR-2006 23:18	DONE	0	-0.13	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
512635	1201053196	01-APR-2006 13:00	DONE	0	-0.04	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
512634	1201053192	03-APR-2006 12:50	DONE	0	-0.82	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
516190	1201060833	04-APR-2006 05:15	DONE	0	0.19	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
511410	1201050375	04-APR-2006 10:50	DONE	0	0.13	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
511411	1201050379	05-APR-2006 11:40	DONE	0	0.25	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
514686	1201057554	05-APR-2006 12:40	DONE	0	1.8	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
514684	1201057546	06-APR-2006 11:30	DONE	0	2.2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
516172	1201060797	07-APR-2006 09:15	DONE	0	0.61	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
516170	1201060793	07-APR-2006 09:55	DONE	0	1.3	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
516189	1201060829	07-APR-2006 23:50	DONE	0	-2	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
515528	1201059359	10-APR-2006 23:50	DONE	0	-0.03	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16
517605	1201063978	11-APR-2006 11:25	DONE	0	-0.14	pCi/L	0.13	-0.34	-0.184	0.44	0.6	0.16

Radium-226 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
508193	1201043050	11-MAR-2006 18:30	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
510096	1201047337	13-MAR-2006 07:55	DONE	43	0.98	percent	18.1	0	-32	67.9	20.0	24.9
508847	1201044643	13-MAR-2006 09:00	DONE	21	0.12	percent	18.1	0	-32	67.9	20.0	24.9
510100	1201047354	13-MAR-2006 10:40	DONE	44	1	percent	18.1	0	-32	67.9	20.0	24.9

507422	1201041267	13-MAR-2006 23:05	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
508848	1201044647	14-MAR-2006 10:35	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
508845	1201044631	14-MAR-2006 14:00	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
510098	1201047345	15-MAR-2006 10:30	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
508846	1201044635	16-MAR-2006 13:15	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
510099	1201047350	17-MAR-2006 09:45	DONE	22	0.18	percent	18.1	0	-32	67.9	20.0	24.9
510646	1201048627	17-MAR-2006 17:40	DONE	40	0.87	percent	18.1	0	-32	67.9	20.0	24.9
510094	1201047329	20-MAR-2006 21:24	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
508851	1201044656	21-MAR-2006 11:30	DONE	13	-0.19	percent	18.1	0	-32	67.9	20.0	24.9
511412	1201050384	21-MAR-2006 13:45	DONE	12	-0.26	percent	18.1	0	-32	67.9	20.0	24.9
510095	1201047333	21-MAR-2006 16:10	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
510101	1201047358	22-MAR-2006 10:00	DONE	29	0.45	percent	18.1	0	-32	67.9	20.0	24.9
511384	1201050306	23-MAR-2006 11:50	DONE	50	1.3	percent	18.1	0	-32	67.9	20.0	24.9
511905	1201051484	23-MAR-2006 20:10	DONE	100	3.3	percent	18.1	0	-32	67.9	20.0	24.9
513423	1201054877	24-MAR-2006 07:50	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
512638	1201053209	24-MAR-2006 08:30	DONE	4	-0.56	percent	18.1	0	-32	67.9	20.0	24.9
508195	1201043054	25-MAR-2006 14:20	DONE	43	1	percent	18.1	0	-32	67.9	20.0	24.9
510097	1201047341	27-MAR-2006 12:05	DONE	36	0.73	percent	18.1	0	-32	67.9	20.0	24.9
512753	1201053462	27-MAR-2006 20:00	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
513367	1201054754	28-MAR-2006 22:50	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
512637	1201053205	29-MAR-2006 22:25	DONE	29	0.43	percent	18.1	0	-32	67.9	20.0	24.9
514680	1201057531	30-MAR-2006 20:04	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
514682	1201057535	31-MAR-2006 23:58	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
512635	1201053197	01-APR-2006 13:00	DONE	23	0.21	percent	18.1	0	-32	67.9	20.0	24.9
512634	1201053193	03-APR-2006 12:50	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
516190	1201060834	04-APR-2006 05:15	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
511410	1201050376	04-APR-2006 10:50	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
511411	1201050380	05-APR-2006 11:40	DONE	18	-0.01	percent	18.1	0	-32	67.9	20.0	24.9
514686	1201057555	05-APR-2006 14:55	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
514684	1201057547	06-APR-2006 12:05	DONE	48	1.2	percent	18.1	0	-32	67.9	20.0	24.9
516172	1201060798	07-APR-2006 09:15	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
516170	1201060794	07-APR-2006 09:55	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9
516189	1201060830	07-APR-2006 23:19	DONE	83	2.6	percent	18.1	0	-32	67.9	20.0	24.9
515528	1201059360	11-APR-2006 00:25	DONE	48	1.2	percent	18.1	0	-32	67.9	20.0	24.9
517605	1201063982	11-APR-2006 09:15	DONE	0	-0.73	percent	18.1	0	-32	67.9	20.0	24.9

Radium-226 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
508193	1201043052	13-MAR-2006 08:30	DONE	121	2.5	percent	100	75.0	83.3	117	125	8.33
510096	1201047339	13-MAR-2006 08:30	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
508847	1201044645	13-MAR-2006 09:00	DONE	99	-0.1	percent	100	75.0	83.3	117	125	8.33
510100	1201047356	13-MAR-2006 11:45	DONE	98	-0.25	percent	100	75.0	83.3	117	125	8.33
507422	1201041269	13-MAR-2006 23:40	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
508848	1201044649	14-MAR-2006 10:35	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
508845	1201044633	14-MAR-2006 14:40	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
510098	1201047348	15-MAR-2006 10:30	DONE	108	0.97	percent	100	75.0	83.3	117	125	8.33
510099	1201047352	17-MAR-2006 10:20	DONE	98	-0.28	percent	100	75.0	83.3	117	125	8.33
508846	1201044637	17-MAR-2006 11:30	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
510646	1201048629	17-MAR-2006 18:12	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
510094	1201047331	20-MAR-2006 20:50	DONE	93	-0.86	percent	100	75.0	83.3	117	125	8.33

508851	1201044658	21-MAR-2006 11:30	DONE	101	0.15	percent	100	75.0	83.3	117	125	8.33
511412	1201050386	21-MAR-2006 14:15	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
510095	1201047335	21-MAR-2006 16:50	DONE	93	-0.85	percent	100	75.0	83.3	117	125	8.33
510101	1201047360	22-MAR-2006 10:00	DONE	104	0.53	percent	100	75.0	83.3	117	125	8.33
511384	1201050308	23-MAR-2006 12:35	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
511905	1201051486	23-MAR-2006 20:10	DONE	102	0.18	percent	100	75.0	83.3	117	125	8.33
512638	1201053211	24-MAR-2006 08:30	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
513423	1201054879	24-MAR-2006 09:05	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
508195	1201043056	25-MAR-2006 14:20	DONE	100	-0.05	percent	100	75.0	83.3	117	125	8.33
510097	1201047343	27-MAR-2006 12:45	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
512753	1201053464	27-MAR-2006 20:00	DONE	102	0.22	percent	100	75.0	83.3	117	125	8.33
513367	1201054756	28-MAR-2006 23:30	DONE	101	0.14	percent	100	75.0	83.3	117	125	8.33
512637	1201053207	29-MAR-2006 12:20	DONE	101	0.16	percent	100	75.0	83.3	117	125	8.33
514680	1201057533	30-MAR-2006 20:04	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
514682	1201057537	31-MAR-2006 23:58	DONE	104	0.49	percent	100	75.0	83.3	117	125	8.33
512635	1201053199	01-APR-2006 13:35	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
512634	1201053195	03-APR-2006 13:20	DONE	113	1.5	percent	100	75.0	83.3	117	125	8.33
516190	1201060836	04-APR-2006 05:45	DONE	97	-0.4	percent	100	75.0	83.3	117	125	8.33
511410	1201050378	04-APR-2006 11:25	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
511411	1201050382	05-APR-2006 11:40	DONE	95	-0.55	percent	100	75.0	83.3	117	125	8.33
514686	1201057557	05-APR-2006 14:55	DONE	103	0.39	percent	100	75.0	83.3	117	125	8.33
514684	1201057549	06-APR-2006 12:05	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
516172	1201060800	07-APR-2006 09:15	DONE	102	0.19	percent	100	75.0	83.3	117	125	8.33
516170	1201060796	07-APR-2006 09:55	DONE	111	1.4	percent	100	75.0	83.3	117	125	8.33
516189	1201060832	07-APR-2006 23:19	DONE	102	0.28	percent	100	75.0	83.3	117	125	8.33
515528	1201059362	10-APR-2006 23:50	DONE	95	-0.58	percent	100	75.0	83.3	117	125	8.33
517605	1201063981	11-APR-2006 09:15	DONE	108	0.91	percent	100	75.0	83.3	117	125	8.33

Radium-226 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
491123	1201003602	06-JAN-2006 08:30	DONE	01	0.52	dec	0.65	0	-0.689	1.99	3.00	0.67
492281	1201006340	09-JAN-2006 14:10	DONE	0.22	-0.64	dec	0.65	0	-0.689	1.99	3.00	0.67
493744	1201009613	16-JAN-2006 12:35	DONE	0.25	-0.59	dec	0.65	0	-0.689	1.99	3.00	0.67
491603	1201004809	16-JAN-2006 17:40	DONE	0.05	-0.89	dec	0.65	0	-0.689	1.99	3.00	0.67
496175	1201015002	24-JAN-2006 12:30	DONE	0.27	-0.56	dec	0.65	0	-0.689	1.99	3.00	0.67
494116	1201010400	26-JAN-2006 11:30	DONE	0.19	-0.68	dec	0.65	0	-0.689	1.99	3.00	0.67
498307	1201019879	31-JAN-2006 11:50	DONE	0.09	-0.84	dec	0.65	0	-0.689	1.99	3.00	0.67
494113	1201010392	06-FEB-2006 12:23	DONE	0.47	-0.27	dec	0.65	0	-0.689	1.99	3.00	0.67
498877	1201021133	09-FEB-2006 14:10	DONE	2.34	2.5	dec	0.65	0	-0.689	1.99	3.00	0.67
502800	1201030385	20-FEB-2006 12:05	DONE	0.22	-0.64	dec	0.65	0	-0.689	1.99	3.00	0.67
502788	1201030379	20-FEB-2006 21:00	DONE	2.11	2.2	dec	0.65	0	-0.689	1.99	3.00	0.67
501470	1201027422	21-FEB-2006 12:05	DONE	1.67	1.5	dec	0.65	0	-0.689	1.99	3.00	0.67
504420	1201034005	22-FEB-2006 10:35	DONE	0.8	0.22	dec	0.65	0	-0.689	1.99	3.00	0.67
505540	1201036745	25-FEB-2006 12:15	DONE	0.38	-0.4	dec	0.65	0	-0.689	1.99	3.00	0.67
504418	1201033997	25-FEB-2006 13:50	DONE	0.81	0.25	dec	0.65	0	-0.689	1.99	3.00	0.67
505537	1201036733	26-FEB-2006 12:30	DONE	0.07	-0.87	dec	0.65	0	-0.689	1.99	3.00	0.67
504916	1201035200	28-FEB-2006 11:20	DONE	2.02	2.1	dec	0.65	0	-0.689	1.99	3.00	0.67
505541	1201036749	01-MAR-2006 11:00	DONE	00	-0.96	dec	0.65	0	-0.689	1.99	3.00	0.67
506091	1201038002	03-MAR-2006 11:15	DONE	0.77	0.18	dec	0.65	0	-0.689	1.99	3.00	0.67
506887	1201039889	04-MAR-2006 20:29	DONE	0.42	-0.35	dec	0.65	0	-0.689	1.99	3.00	0.67

506889	1201039897	06-MAR-2006 09:00	DONE	0.19	-0.68	dec	0.65	0	-0.689	1.99	3.00	0.67
506097	1201038018	07-MAR-2006 09:30	DONE	1.45	1.2	dec	0.65	0	-0.689	1.99	3.00	0.67
506099	1201038022	08-MAR-2006 09:55	DONE	0.85	0.31	dec	0.65	0	-0.689	1.99	3.00	0.67
508847	1201044643	13-MAR-2006 09:00	DONE	0.21	-0.65	dec	0.65	0	-0.689	1.99	3.00	0.67
510100	1201047354	13-MAR-2006 10:40	DONE	0.28	-0.55	dec	0.65	0	-0.689	1.99	3.00	0.67
508848	1201044647	14-MAR-2006 10:35	DONE	0.34	-0.46	dec	0.65	0	-0.689	1.99	3.00	0.67
510098	1201047345	15-MAR-2006 10:30	DONE	0.66	0.01	dec	0.65	0	-0.689	1.99	3.00	0.67
511905	1201051484	23-MAR-2006 20:10	DONE	1.74	1.6	dec	0.65	0	-0.689	1.99	3.00	0.67
513423	1201054877	24-MAR-2006 07:50	DONE	0.23	-0.62	dec	0.65	0	-0.689	1.99	3.00	0.67
512638	1201053209	24-MAR-2006 08:30	DONE	0.08	-0.85	dec	0.65	0	-0.689	1.99	3.00	0.67
510097	1201047341	27-MAR-2006 12:05	DONE	0.25	-0.59	dec	0.65	0	-0.689	1.99	3.00	0.67
511410	1201050376	04-APR-2006 10:50	DONE	0.28	-0.55	dec	0.65	0	-0.689	1.99	3.00	0.67

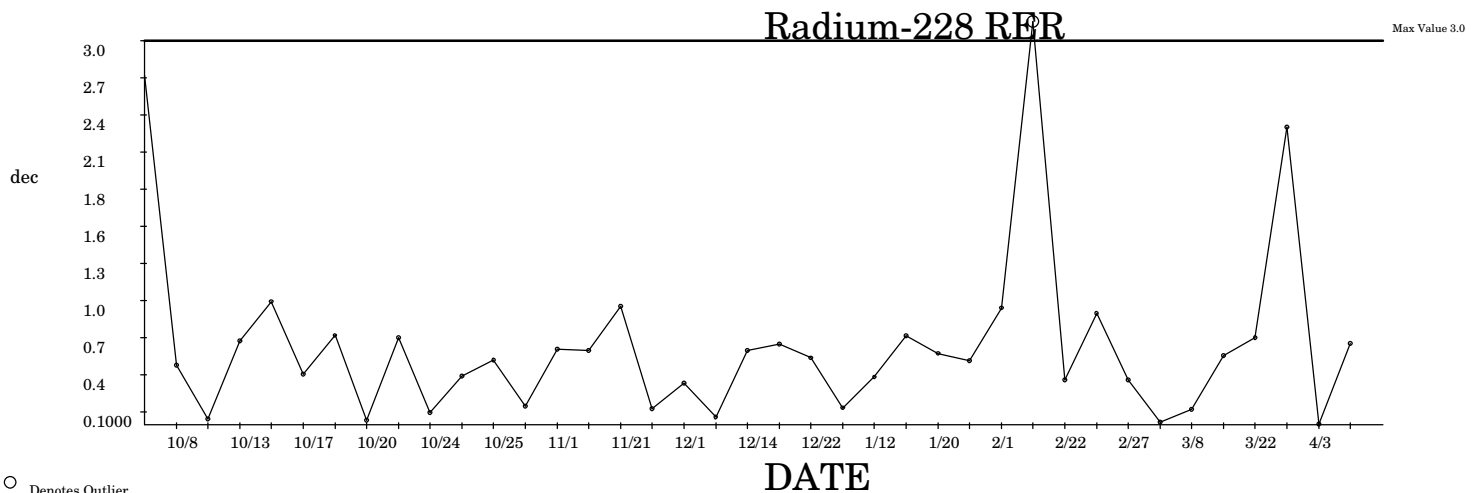
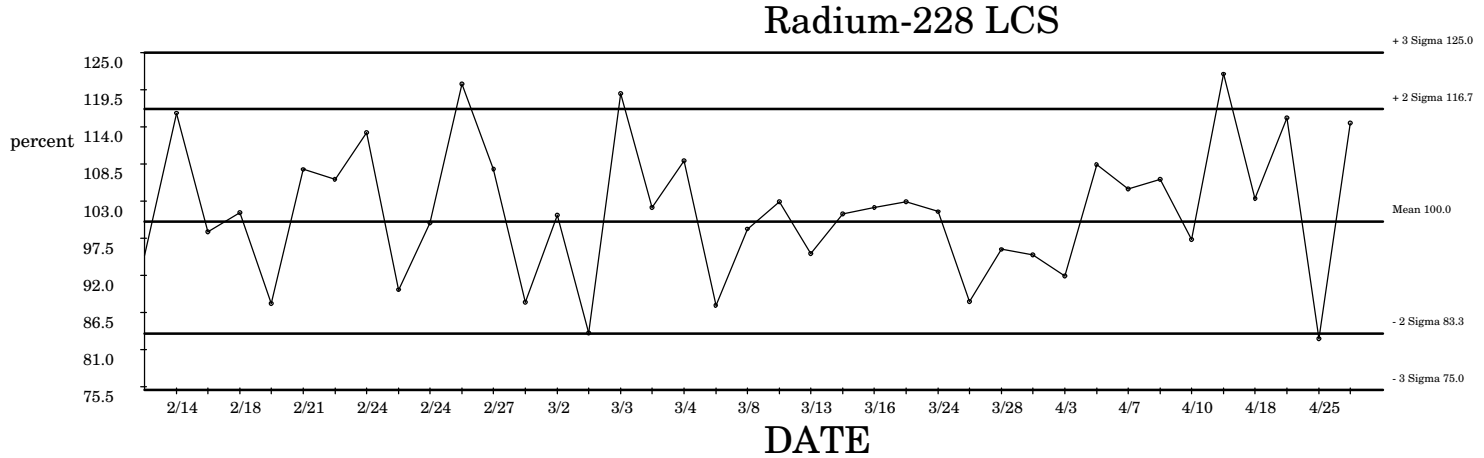
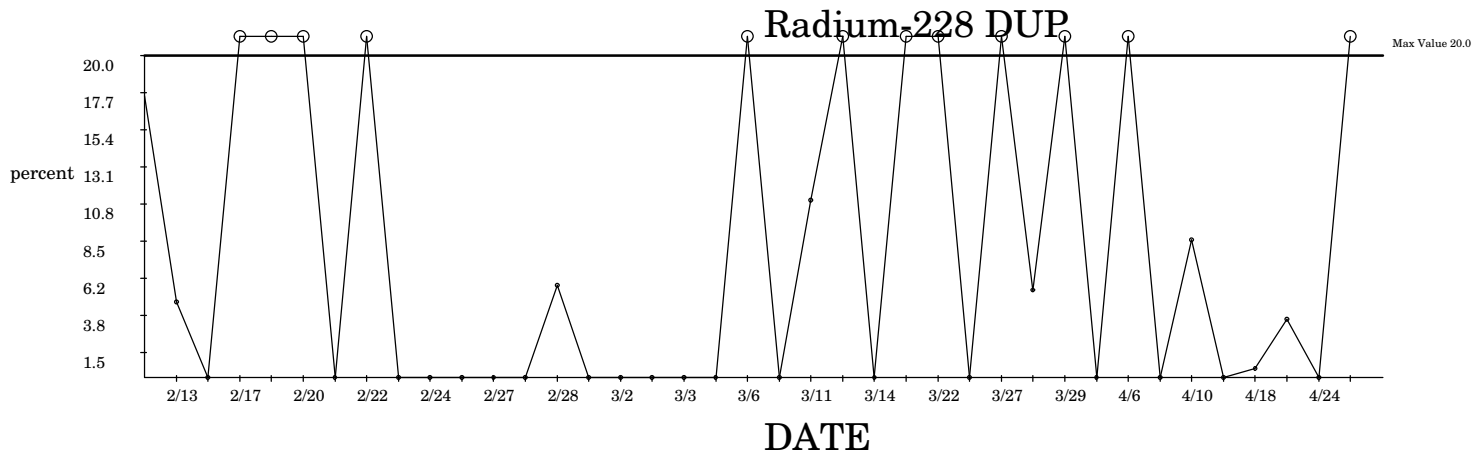
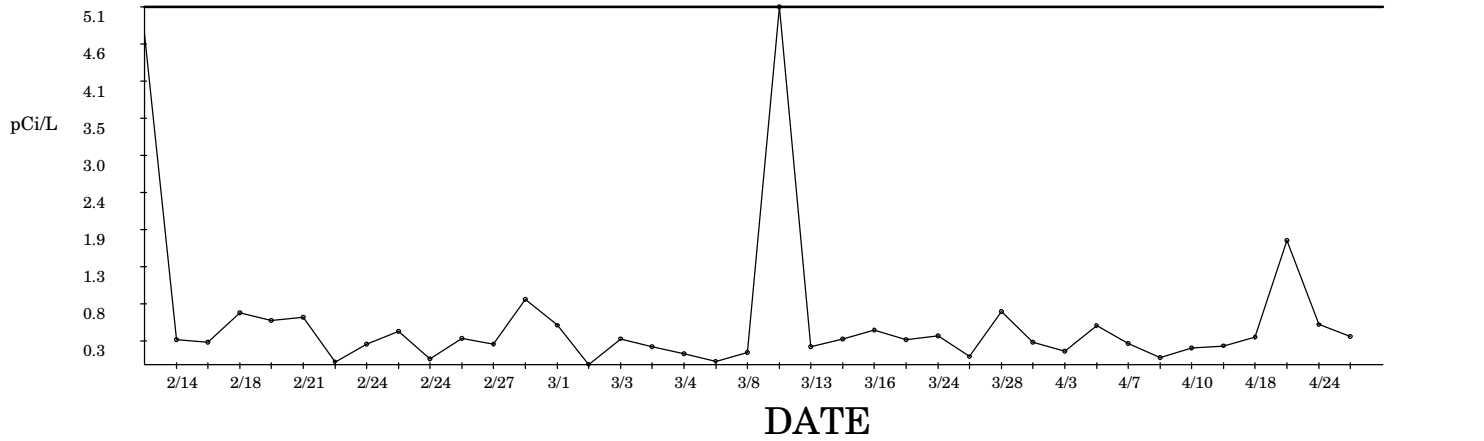
Radium-226 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510096	1201047338	13-MAR-2006 07:55	DONE	113	1.5	percent	100	75.0	83.3	117	125	8.33
508847	1201044644	13-MAR-2006 09:00	DONE	109	1	percent	100	75.0	83.3	117	125	8.33
510100	1201047355	13-MAR-2006 11:45	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
507422	1201041268	14-MAR-2006 07:25	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
508848	1201044648	14-MAR-2006 10:35	DONE	118	2.2	percent	100	75.0	83.3	117	125	8.33
508845	1201044632	14-MAR-2006 16:00	DONE	79	-3	percent	100	75.0	83.3	117	125	8.33
510098	1201047346	15-MAR-2006 10:30	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
510098	1201047347	15-MAR-2006 10:30	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
508846	1201044636	16-MAR-2006 13:15	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
510099	1201047351	17-MAR-2006 09:45	DONE	100	0.04	percent	100	75.0	83.3	117	125	8.33
510646	1201048628	17-MAR-2006 18:12	DONE	95	-0.57	percent	100	75.0	83.3	117	125	8.33
510094	1201047330	21-MAR-2006 11:10	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
508851	1201044657	21-MAR-2006 11:30	DONE	107	0.88	percent	100	75.0	83.3	117	125	8.33
511412	1201050385	21-MAR-2006 14:15	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
510101	1201047359	22-MAR-2006 10:00	DONE	96	-0.46	percent	100	75.0	83.3	117	125	8.33
510095	1201047334	22-MAR-2006 11:05	DONE	99	-0.06	percent	100	75.0	83.3	117	125	8.33
511384	1201050307	23-MAR-2006 12:35	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
511905	1201051485	23-MAR-2006 20:10	DONE	124	2.9	percent	100	75.0	83.3	117	125	8.33
513423	1201054878	24-MAR-2006 07:50	DONE	112	1.5	percent	100	75.0	83.3	117	125	8.33
512638	1201053210	24-MAR-2006 08:30	DONE	99	-0.07	percent	100	75.0	83.3	117	125	8.33
508195	1201043055	25-MAR-2006 14:20	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
510097	1201047342	27-MAR-2006 12:05	DONE	103	0.33	percent	100	75.0	83.3	117	125	8.33
512753	1201053463	27-MAR-2006 20:30	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
513367	1201054755	28-MAR-2006 22:50	DONE	100	-0.04	percent	100	75.0	83.3	117	125	8.33
512637	1201053206	29-MAR-2006 12:20	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
514680	1201057532	30-MAR-2006 20:04	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
514682	1201057536	31-MAR-2006 23:18	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
512635	1201053198	01-APR-2006 13:00	DONE	96	-0.43	percent	100	75.0	83.3	117	125	8.33
512634	1201053194	03-APR-2006 12:50	DONE	108	0.97	percent	100	75.0	83.3	117	125	8.33
516190	1201060835	04-APR-2006 05:45	DONE	125	3	percent	100	75.0	83.3	117	125	8.33
511410	1201050377	04-APR-2006 11:25	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
511411	1201050381	05-APR-2006 11:40	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
514686	1201057556	05-APR-2006 14:55	DONE	94	-0.67	percent	100	75.0	83.3	117	125	8.33
514684	1201057548	06-APR-2006 12:05	DONE	105	0.65	percent	100	75.0	83.3	117	125	8.33
516172	1201060799	07-APR-2006 09:15	DONE	107	0.86	percent	100	75.0	83.3	117	125	8.33

516170	1201060795	07-APR-2006 09:55	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
516189	1201060831	08-APR-2006 15:20	DONE	123	2.8	percent	100	75.0	83.3	117	125	8.33
517605	1201063983	11-APR-2006 09:15	DONE	94	-0.78	percent	100	75.0	83.3	117	125	8.33
515528	1201059361	11-APR-2006 09:50	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33

SPC Graph for Gas Flow Radium 228 in Liquids 4/27/2006

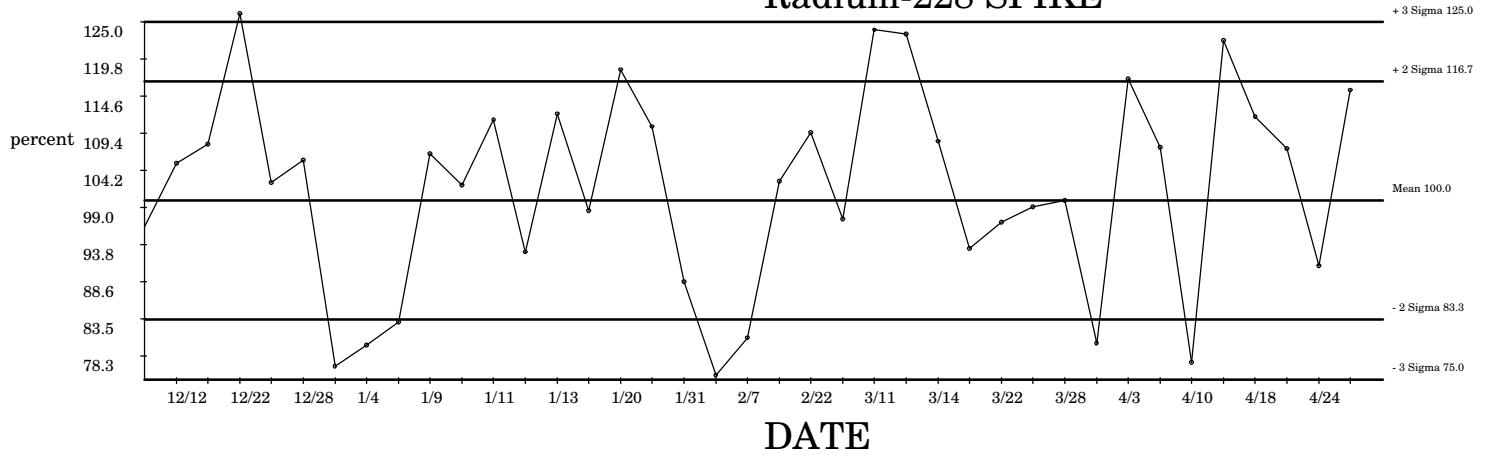
Radium-228 BLANK



○ Denotes Outlier

SPC Graph for Gas Flow Radium 228 in Liquids 4/27/2006

Radium-228 SPIKE



Data used for Gas Flow Radium 228 in Liquids 27-APR-2006

Radium-228 BLANK: Limits LCL = -2.1 UCL = 2.8

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
492836	1201007540	06-FEB-2006 11:47	DONE	1	0.19	pCi/L	0.39	-2.1	-1.2	2.01	2.83	0.81
500099	1201024109	08-FEB-2006 23:04	DONE	0	-0.41	pCi/L	0.39	-2.1	-1.2	2.01	2.83	0.81
500100	1201024112	09-FEB-2006 13:43	DONE	0	-0.07	pCi/L	0.39	-2.1	-1.2	2.01	2.83	0.81
500101	1201024115	10-FEB-2006 13:25	DONE	0	-0.6	pCi/L	0.39	-2.1	-1.2	2.01	2.83	0.81
500104	1201024129	13-FEB-2006 14:44	DONE	0	-0.36	pCi/L	0.42	-2	-1.2	2.02	2.82	0.8
500102	1201024122	13-FEB-2006 22:54	DONE	0	-0.12	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500103	1201024126	14-FEB-2006 12:33	DONE	0	-0.18	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500107	1201024135	17-FEB-2006 19:06	DONE	0	-0.22	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500106	1201024132	18-FEB-2006 20:37	DONE	1	0.33	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500108	1201024138	20-FEB-2006 13:18	DONE	1	0.18	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500109	1201024141	21-FEB-2006 21:51	DONE	1	0.24	pCi/L	0.41	-2	-1.2	2	2.79	0.79
503553	1201031967	22-FEB-2006 23:15	DONE	0	-0.58	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500111	1201024147	24-FEB-2006 13:04	DONE	0	-0.25	pCi/L	0.41	-2	-1.2	2	2.79	0.79
504736	1201034726	24-FEB-2006 19:27	DONE	0	-0.02	pCi/L	0.41	-2	-1.2	2	2.79	0.79
505206	1201035921	24-FEB-2006 23:05	DONE	0	-0.53	pCi/L	0.41	-2	-1.2	2	2.79	0.79
502697	1201030163	27-FEB-2006 20:34	DONE	0	-0.14	pCi/L	0.41	-2	-1.2	2	2.79	0.79
505945	1201037656	27-FEB-2006 21:44	DONE	0	-0.25	pCi/L	0.41	-2	-1.2	2	2.79	0.79
500110	1201024144	28-FEB-2006 11:44	DONE	1	0.57	pCi/L	0.41	-2	-1.2	2	2.79	0.79
505426	1201036460	01-MAR-2006 23:28	DONE	0	0.1	pCi/L	0.41	-2	-1.2	2	2.79	0.79
505422	1201036449	02-MAR-2006 20:45	DONE	0	-0.63	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507266	1201040783	03-MAR-2006 12:51	DONE	0	-0.15	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507261	1201040773	03-MAR-2006 19:46	DONE	0	-0.3	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507469	1201041345	04-MAR-2006 14:23	DONE	0	-0.43	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507481	1201041382	06-MAR-2006 15:43	DONE	0	-0.57	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507501	1201041440	08-MAR-2006 11:56	DONE	0	-0.41	pCi/L	0.41	-2	-1.2	2	2.79	0.79
507516	1201041476	11-MAR-2006 15:32	DONE	5	6	pCi/L	0.41	-2	-1.2	2	2.79	0.79
508232	1201043146	13-MAR-2006 12:33	DONE	0	-0.3	pCi/L	0.41	-2	-1.2	2	2.79	0.79
510236	1201047754	14-MAR-2006 13:30	DONE	0	-0.16	pCi/L	0.41	-2	-1.2	2	2.79	0.79
510245	1201047773	16-MAR-2006 14:08	DONE	0	00	pCi/L	0.41	-2	-1.2	2	2.79	0.79
513331	1201054714	22-MAR-2006 15:10	DONE	0	-0.17	pCi/L	0.41	-2	-1.2	2	2.79	0.79
510589	1201048485	24-MAR-2006 11:47	DONE	0	-0.1	pCi/L	0.41	-2	-1.2	2	2.79	0.79
508234	1201043153	27-MAR-2006 12:04	DONE	0	-0.48	pCi/L	0.41	-2	-1.2	2	2.79	0.79
510590	1201048488	28-MAR-2006 12:34	DONE	1	0.35	pCi/L	0.41	-2	-1.2	2	2.79	0.79
513290	1201054636	29-MAR-2006 15:21	DONE	0	-0.22	pCi/L	0.41	-2	-1.2	2	2.79	0.79
513295	1201054648	03-APR-2006 23:15	DONE	0	-0.39	pCi/L	0.41	-2	-1.2	2	2.79	0.79
517809	1201064414	06-APR-2006 22:35	DONE	0	0.08	pCi/L	0.41	-2	-1.2	2	2.79	0.79
515247	1201058669	07-APR-2006 21:32	DONE	0	-0.24	pCi/L	0.41	-2	-1.2	2	2.79	0.79
513299	1201054652	10-APR-2006 13:30	DONE	0	-0.5	pCi/L	0.41	-2	-1.2	2	2.79	0.79
515325	1201058924	10-APR-2006 18:53	DONE	0	-0.33	pCi/L	0.41	-2	-1.2	2	2.79	0.79
515982	1201060412	17-APR-2006 14:14	DONE	0	-0.28	pCi/L	0.41	-2	-1.2	2	2.79	0.79
513308	1201054680	18-APR-2006 17:10	DONE	0	-0.12	pCi/L	0.41	-2	-1.2	2	2.79	0.79
518844	1201066724	19-APR-2006 12:20	DONE	2	1.7	pCi/L	0.41	-2	-1.2	2	2.79	0.79
521944	1201074036	24-APR-2006 12:19	DONE	0	0.11	pCi/L	0.41	-2	-1.2	2	2.79	0.79
515983	1201060416	26-APR-2006 13:29	DONE	0	-0.11	pCi/L	0.41	-2	-1.2	2	2.79	0.79

Radium-228 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
492836	1201007541	06-FEB-2006 11:47	DONE	29	0.32	percent	19.6	0	-40	78.7	20.0	29.6
500099	1201024110	08-FEB-2006 23:04	DONE	9	-0.35	percent	19.6	0	-40	78.7	20.0	29.6
500100	1201024113	09-FEB-2006 15:17	DONE	0	-0.66	percent	19.6	0	-40	78.7	20.0	29.6
500101	1201024116	10-FEB-2006 13:25	DONE	62	1.4	percent	19.6	0	-40	78.7	20.0	29.6
500104	1201024130	13-FEB-2006 12:41	DONE	3	-0.57	percent	19.5	0	-40	79	20.0	29.7
500102	1201024123	13-FEB-2006 22:54	DONE	5	-0.5	percent	19.5	0	-40	79	20.0	29.7
500103	1201024127	14-FEB-2006 12:34	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
500107	1201024136	17-FEB-2006 19:06	DONE	23	0.12	percent	19.5	0	-40	79	20.0	29.7
500106	1201024133	18-FEB-2006 19:01	DONE	83	2.1	percent	19.5	0	-40	79	20.0	29.7
500108	1201024139	20-FEB-2006 12:19	DONE	27	0.24	percent	19.5	0	-40	79	20.0	29.7
500109	1201024142	21-FEB-2006 21:51	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
503553	1201031968	22-FEB-2006 23:14	DONE	64	1.5	percent	19.5	0	-40	79	20.0	29.7
500111	1201024148	24-FEB-2006 13:04	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
504736	1201034727	24-FEB-2006 19:27	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
505206	1201035922	24-FEB-2006 21:57	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
502697	1201030164	27-FEB-2006 20:34	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
505945	1201037657	27-FEB-2006 21:45	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
500110	1201024145	28-FEB-2006 11:44	DONE	6	-0.46	percent	19.5	0	-40	79	20.0	29.7
505426	1201036461	02-MAR-2006 00:22	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
505422	1201036450	02-MAR-2006 20:45	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
507266	1201040784	03-MAR-2006 12:51	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
507261	1201040774	03-MAR-2006 19:46	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
507469	1201041346	04-MAR-2006 13:18	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
507481	1201041383	06-MAR-2006 15:43	DONE	58	1.3	percent	19.5	0	-40	79	20.0	29.7
507501	1201041441	08-MAR-2006 13:57	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
507516	1201041477	11-MAR-2006 15:32	DONE	11	-0.29	percent	19.5	0	-40	79	20.0	29.7
508232	1201043147	13-MAR-2006 12:33	DONE	29	0.33	percent	19.5	0	-40	79	20.0	29.7
510236	1201047755	14-MAR-2006 12:29	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
510245	1201047774	16-MAR-2006 14:08	DONE	69	1.7	percent	19.5	0	-40	79	20.0	29.7
513331	1201054715	22-MAR-2006 15:10	DONE	68	1.6	percent	19.5	0	-40	79	20.0	29.7
510589	1201048486	24-MAR-2006 11:47	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
508234	1201043154	27-MAR-2006 12:04	DONE	42	0.75	percent	19.5	0	-40	79	20.0	29.7
510590	1201048489	28-MAR-2006 12:34	DONE	5	-0.47	percent	19.5	0	-40	79	20.0	29.7
513290	1201054637	29-MAR-2006 15:21	DONE	116	3.2	percent	19.5	0	-40	79	20.0	29.7
513295	1201054649	03-APR-2006 23:15	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
517809	1201064415	06-APR-2006 22:35	DONE	47	0.92	percent	19.5	0	-40	79	20.0	29.7
515247	1201058670	07-APR-2006 21:32	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
513299	1201054653	10-APR-2006 13:28	DONE	9	-0.37	percent	19.5	0	-40	79	20.0	29.7
515325	1201058925	10-APR-2006 18:53	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
513308	1201054681	18-APR-2006 17:10	DONE	1	-0.64	percent	19.5	0	-40	79	20.0	29.7
518844	1201066725	19-APR-2006 12:20	DONE	4	-0.54	percent	19.5	0	-40	79	20.0	29.7
521944	1201074037	24-APR-2006 14:55	DONE	0	-0.66	percent	19.5	0	-40	79	20.0	29.7
515983	1201060417	26-APR-2006 13:29	DONE	73	1.8	percent	19.5	0	-40	79	20.0	29.7

Radium-228 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
492836	1201007543	06-FEB-2006 11:47	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
500099	1201024111	08-FEB-2006 22:02	DONE	104	0.45	percent	100	75.0	83.3	117	125	8.33

500100	1201024114	09-FEB-2006 15:17	DONE	103	0.31	percent	100	75.0	83.3	117	125	8.33
500101	1201024117	10-FEB-2006 13:25	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
500104	1201024131	13-FEB-2006 15:47	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
500102	1201024125	13-FEB-2006 22:54	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
500103	1201024128	14-FEB-2006 14:36	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
500107	1201024137	17-FEB-2006 17:26	DONE	98	-0.19	percent	100	75.0	83.3	117	125	8.33
500106	1201024134	18-FEB-2006 17:56	DONE	101	0.16	percent	100	75.0	83.3	117	125	8.33
500108	1201024140	20-FEB-2006 13:22	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
500109	1201024143	21-FEB-2006 22:53	DONE	108	0.92	percent	100	75.0	83.3	117	125	8.33
503553	1201031970	23-FEB-2006 11:45	DONE	106	0.75	percent	100	75.0	83.3	117	125	8.33
500111	1201024149	24-FEB-2006 13:04	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
504736	1201034728	24-FEB-2006 19:27	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
505206	1201035923	24-FEB-2006 23:05	DONE	100	-0.03	percent	100	75.0	83.3	117	125	8.33
502697	1201030165	27-FEB-2006 20:34	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
505945	1201037659	27-FEB-2006 22:08	DONE	108	0.93	percent	100	75.0	83.3	117	125	8.33
500110	1201024146	28-FEB-2006 16:07	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
505426	1201036462	02-MAR-2006 00:22	DONE	101	0.11	percent	100	75.0	83.3	117	125	8.33
505422	1201036451	02-MAR-2006 22:34	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
507266	1201040785	03-MAR-2006 13:59	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
507261	1201040775	03-MAR-2006 19:46	DONE	102	0.25	percent	100	75.0	83.3	117	125	8.33
507469	1201041347	04-MAR-2006 13:19	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
507481	1201041384	06-MAR-2006 15:43	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
507501	1201041442	08-MAR-2006 13:57	DONE	99	-0.14	percent	100	75.0	83.3	117	125	8.33
507516	1201041479	11-MAR-2006 15:32	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
508232	1201043149	13-MAR-2006 12:33	DONE	95	-0.58	percent	100	75.0	83.3	117	125	8.33
510236	1201047757	14-MAR-2006 13:30	DONE	101	0.13	percent	100	75.0	83.3	117	125	8.33
510245	1201047776	16-MAR-2006 14:09	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
513331	1201054717	22-MAR-2006 15:10	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
510589	1201048487	24-MAR-2006 11:47	DONE	101	0.17	percent	100	75.0	83.3	117	125	8.33
508234	1201043156	27-MAR-2006 18:15	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
510590	1201048491	28-MAR-2006 12:34	DONE	96	-0.5	percent	100	75.0	83.3	117	125	8.33
513290	1201054639	29-MAR-2006 15:22	DONE	95	-0.59	percent	100	75.0	83.3	117	125	8.33
513295	1201054651	03-APR-2006 21:58	DONE	92	-0.98	percent	100	75.0	83.3	117	125	8.33
517809	1201064417	06-APR-2006 22:35	DONE	108	1	percent	100	75.0	83.3	117	125	8.33
515247	1201058671	07-APR-2006 21:32	DONE	105	0.57	percent	100	75.0	83.3	117	125	8.33
513299	1201054655	10-APR-2006 13:28	DONE	106	0.75	percent	100	75.0	83.3	117	125	8.33
515325	1201058927	10-APR-2006 18:53	DONE	97	-0.32	percent	100	75.0	83.3	117	125	8.33
515982	1201060415	17-APR-2006 15:09	DONE	122	2.6	percent	100	75.0	83.3	117	125	8.33
513308	1201054683	18-APR-2006 17:09	DONE	103	0.41	percent	100	75.0	83.3	117	125	8.33
518844	1201066727	19-APR-2006 13:32	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
521944	1201074039	25-APR-2006 11:06	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
515983	1201060419	26-APR-2006 14:35	DONE	115	1.7	percent	100	75.0	83.3	117	125	8.33

Radium-228 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
463468	1200937833	05-OCT-2005 22:41	DONE	0.84	0.28	dec	0.61	0	-1	2.24	3.00	0.81
465675	1200943225	08-OCT-2005 10:52	DONE	0.27	-0.42	dec	0.61	0	-0.994	2.22	3.00	0.8
467327	1200947063	08-OCT-2005 11:05	DONE	0.47	-0.18	dec	0.61	0	-0.994	2.22	3.00	0.8
469671	1200952476	11-OCT-2005 15:48	DONE	0.05	-0.7	dec	0.61	0	-0.994	2.22	3.00	0.8
467329	1200947073	13-OCT-2005 12:07	DONE	0.66	0.06	dec	0.61	0	-0.994	2.22	3.00	0.8

470537	1200954570	14-OCT-2005 11:01	DONE	0.96	0.44	dec	0.61	0	-0.994	2.22	3.00	0.8
467333	1200947087	17-OCT-2005 12:10	DONE	0.39	-0.27	dec	0.61	0	-0.994	2.22	3.00	0.8
472059	1200958291	19-OCT-2005 13:47	DONE	0.7	0.11	dec	0.61	0	-0.994	2.22	3.00	0.8
472636	1200959672	20-OCT-2005 11:10	DONE	0.03	-0.72	dec	0.61	0	-0.994	2.22	3.00	0.8
473145	1200960959	24-OCT-2005 16:07	DUSE	0.68	0.09	dec	0.61	0	-0.994	2.22	3.00	0.8
474248	1200963592	24-OCT-2005 17:21	DONE	0.1	-0.64	dec	0.61	0	-0.994	2.22	3.00	0.8
471617	1200961158	25-OCT-2005 12:00	DONE	0.38	-0.29	dec	0.61	0	-0.994	2.22	3.00	0.8
473716	1200962428	25-OCT-2005 17:59	DONE	0.5	-0.13	dec	0.61	0	-0.994	2.22	3.00	0.8
473230	1200961166	01-NOV-2005 11:28	DONE	0.15	-0.58	dec	0.61	0	-0.994	2.22	3.00	0.8
476181	1200968154	01-NOV-2005 15:51	DONE	0.59	-0.03	dec	0.61	0	-0.994	2.22	3.00	0.8
480012	1200977648	14-NOV-2005 20:22	DONE	0.58	-0.04	dec	0.61	0	-0.994	2.22	3.00	0.8
479062	1200975199	21-NOV-2005 12:41	DONE	0.92	0.39	dec	0.61	0	-0.994	2.22	3.00	0.8
481985	1200982102	30-NOV-2005 23:53	DONE	0.13	-0.6	dec	0.61	0	-0.994	2.22	3.00	0.8
483514	1200985776	01-DEC-2005 12:05	DONE	0.33	-0.35	dec	0.61	0	-0.994	2.22	3.00	0.8
484248	1200987654	12-DEC-2005 12:09	DONE	0.06	-0.69	dec	0.61	0	-0.994	2.22	3.00	0.8
486611	1200993396	14-DEC-2005 22:44	DONE	0.58	-0.04	dec	0.61	0	-0.994	2.22	3.00	0.8
487788	1200996153	19-DEC-2005 14:38	DONE	0.63	0.02	dec	0.61	0	-0.994	2.22	3.00	0.8
488990	1200998922	22-DEC-2005 13:45	DONE	0.52	-0.11	dec	0.61	0	-0.994	2.22	3.00	0.8
490300	1201001796	06-JAN-2006 11:10	DONE	0.13	-0.6	dec	0.61	0	-0.994	2.22	3.00	0.8
491608	1201004824	12-JAN-2006 16:38	DONE	0.37	-0.3	dec	0.61	0	-0.994	2.22	3.00	0.8
493731	1201009556	17-JAN-2006 17:54	DONE	0.69	0.1	dec	0.61	0	-0.994	2.22	3.00	0.8
494613	1201011524	20-JAN-2006 21:32	DONE	0.56	-0.07	dec	0.61	0	-0.994	2.22	3.00	0.8
498305	1201019873	31-JAN-2006 18:16	DONE	0.5	-0.14	dec	0.61	0	-0.994	2.22	3.00	0.8
496468	1201015687	01-FEB-2006 14:45	DONE	0.91	0.37	dec	0.61	0	-0.994	2.22	3.00	0.8
500108	1201024139	20-FEB-2006 12:19	DONE	4.89	5.3	dec	0.61	0	-0.994	2.22	3.00	0.8
503553	1201031968	22-FEB-2006 23:14	DONE	0.35	-0.32	dec	0.61	0	-0.994	2.22	3.00	0.8
504736	1201034727	24-FEB-2006 19:27	DONE	0.87	0.32	dec	0.61	0	-0.994	2.22	3.00	0.8
505945	1201037657	27-FEB-2006 21:45	DONE	0.35	-0.32	dec	0.61	0	-0.994	2.22	3.00	0.8
505422	1201036450	02-MAR-2006 20:45	DONE	0.02	-0.74	dec	0.61	0	-0.994	2.22	3.00	0.8
507501	1201041441	08-MAR-2006 13:57	DONE	0.12	-0.61	dec	0.61	0	-0.994	2.22	3.00	0.8
510245	1201047774	16-MAR-2006 14:08	DONE	0.54	-0.09	dec	0.61	0	-0.994	2.22	3.00	0.8
513331	1201054715	22-MAR-2006 15:10	DONE	0.68	0.08	dec	0.61	0	-0.994	2.22	3.00	0.8
513290	1201054637	29-MAR-2006 15:21	DONE	2.32	2.1	dec	0.61	0	-0.994	2.22	3.00	0.8
513295	1201054649	03-APR-2006 23:15	DONE	00	-0.76	dec	0.61	0	-0.994	2.22	3.00	0.8
521944	1201074037	24-APR-2006 14:55	DONE	0.64	0.03	dec	0.61	0	-0.994	2.22	3.00	0.8

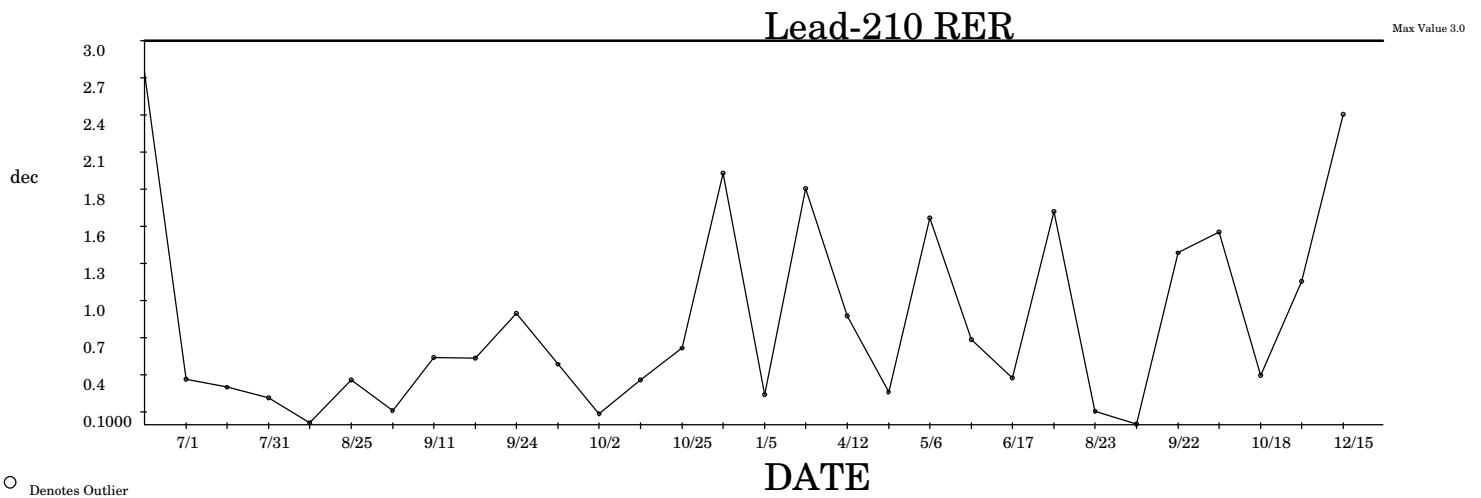
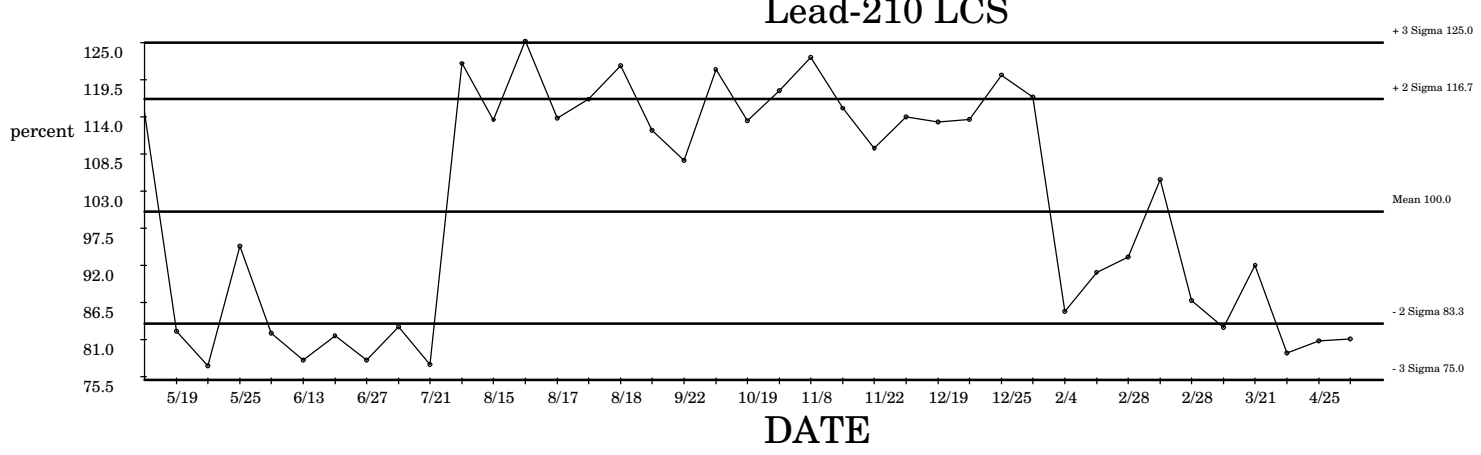
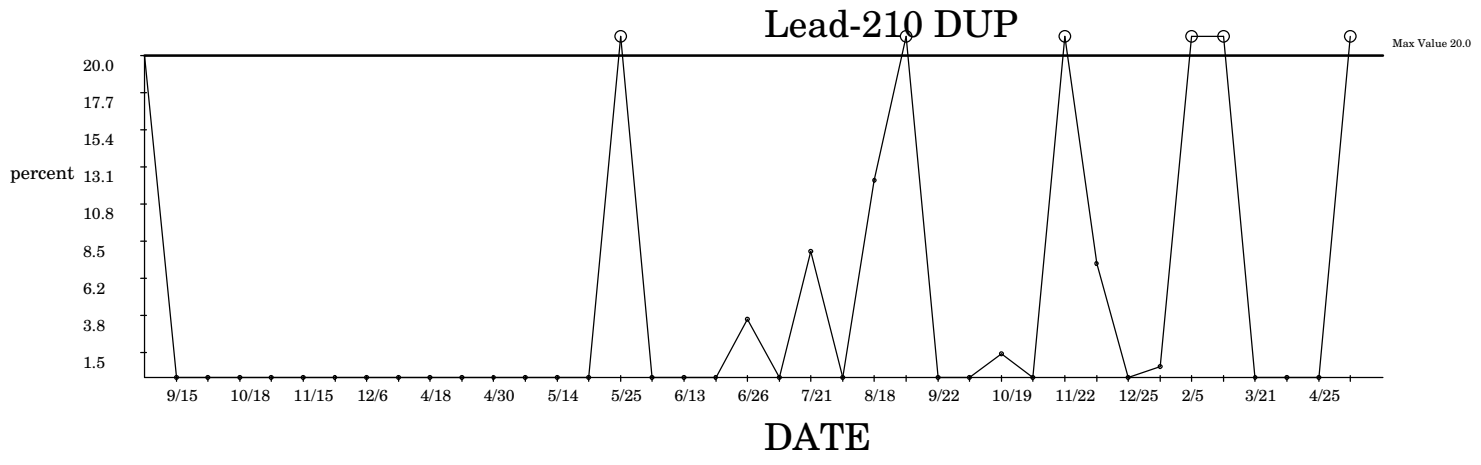
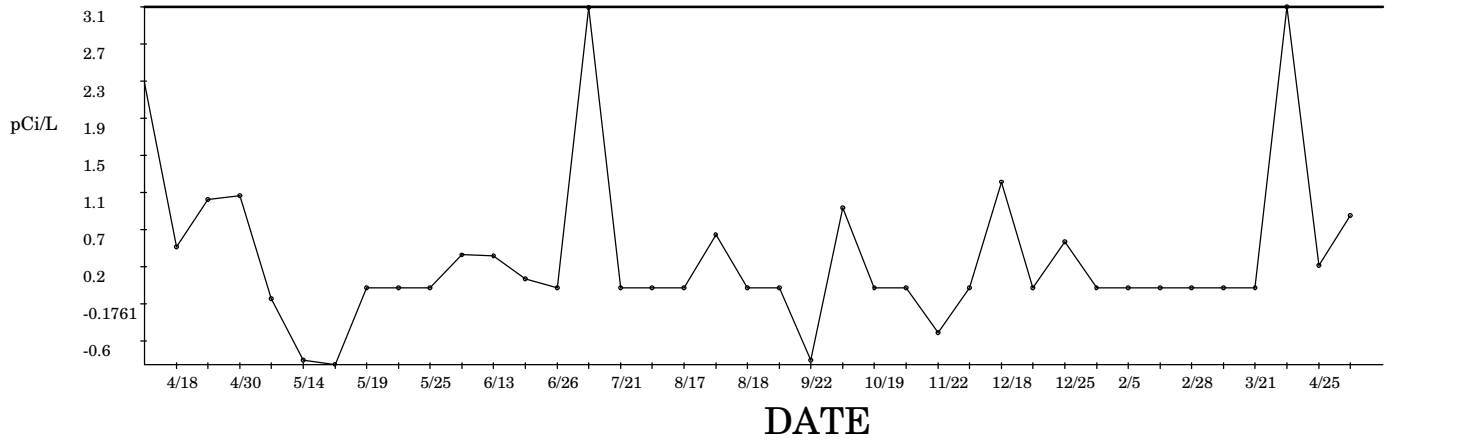
Radium-228 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
478180	1200973098	10-NOV-2005 12:21	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
480012	1200977649	14-NOV-2005 20:22	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
479064	1200975207	18-NOV-2005 10:41	DONE	101	0.16	percent	100	75.0	83.3	117	125	8.33
478891	1200974811	28-NOV-2005 18:07	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
484226	1200987599	05-DEC-2005 12:48	DONE	104	0.43	percent	100	75.0	83.3	117	125	8.33
484248	1200987655	12-DEC-2005 12:10	DONE	105	0.62	percent	100	75.0	83.3	117	125	8.33
486633	1200993447	16-DEC-2005 13:32	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
488990	1200998923	22-DEC-2005 13:45	DONE	126	3.1	percent	100	75.0	83.3	117	125	8.33
485415	1200990577	22-DEC-2005 18:38	DONE	103	0.31	percent	100	75.0	83.3	117	125	8.33
487960	1200996652	28-DEC-2005 22:36	DONE	106	0.68	percent	100	75.0	83.3	117	125	8.33
486030	1200992037	29-DEC-2005 20:57	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
490306	1201001825	04-JAN-2006 23:08	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33

488686	1200998269	06-JAN-2006 15:12	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
487814	1200996255	09-JAN-2006 13:54	DONE	107	0.79	percent	100	75.0	83.3	117	125	8.33
491352	1201004143	10-JAN-2006 13:01	DONE	102	0.26	percent	100	75.0	83.3	117	125	8.33
486289	1200992718	11-JAN-2006 17:36	DONE	111	1.4	percent	100	75.0	83.3	117	125	8.33
491608	1201004825	12-JAN-2006 16:38	DONE	93	-0.86	percent	100	75.0	83.3	117	125	8.33
492834	1201007534	13-JAN-2006 12:48	DONE	112	1.5	percent	100	75.0	83.3	117	125	8.33
493731	1201009557	17-JAN-2006 17:54	DONE	99	-0.17	percent	100	75.0	83.3	117	125	8.33
494613	1201011525	20-JAN-2006 21:33	DONE	118	2.2	percent	100	75.0	83.3	117	125	8.33
496446	1201015668	24-JAN-2006 23:12	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
495884	1201014389	31-JAN-2006 14:37	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
498305	1201019874	31-JAN-2006 18:16	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
492836	1201007542	07-FEB-2006 10:39	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
500102	1201024124	13-FEB-2006 22:54	DONE	103	0.32	percent	100	75.0	83.3	117	125	8.33
503553	1201031969	22-FEB-2006 23:15	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
505945	1201037658	27-FEB-2006 22:09	DONE	97	-0.31	percent	100	75.0	83.3	117	125	8.33
507516	1201041478	11-MAR-2006 15:32	DONE	124	2.9	percent	100	75.0	83.3	117	125	8.33
508232	1201043148	13-MAR-2006 12:33	DONE	123	2.8	percent	100	75.0	83.3	117	125	8.33
510236	1201047756	14-MAR-2006 13:30	DONE	108	01	percent	100	75.0	83.3	117	125	8.33
510245	1201047775	16-MAR-2006 14:09	DONE	93	-0.81	percent	100	75.0	83.3	117	125	8.33
513331	1201054716	22-MAR-2006 15:10	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
508234	1201043155	27-MAR-2006 18:14	DONE	99	-0.11	percent	100	75.0	83.3	117	125	8.33
510590	1201048490	28-MAR-2006 12:34	DONE	100	00	percent	100	75.0	83.3	117	125	8.33
513290	1201054638	29-MAR-2006 15:22	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
513295	1201054650	03-APR-2006 21:58	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
517809	1201064416	06-APR-2006 22:35	DONE	107	0.9	percent	100	75.0	83.3	117	125	8.33
513299	1201054654	10-APR-2006 14:51	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
515325	1201058926	10-APR-2006 18:53	DONE	122	2.7	percent	100	75.0	83.3	117	125	8.33
513308	1201054682	18-APR-2006 17:09	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
518844	1201066726	19-APR-2006 12:21	DONE	107	0.87	percent	100	75.0	83.3	117	125	8.33
521944	1201074038	24-APR-2006 14:55	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
515983	1201060418	26-APR-2006 13:44	DONE	115	1.9	percent	100	75.0	83.3	117	125	8.33

SPC Graph for Gas Flow Lead-210 in Liquids 4/25/2006

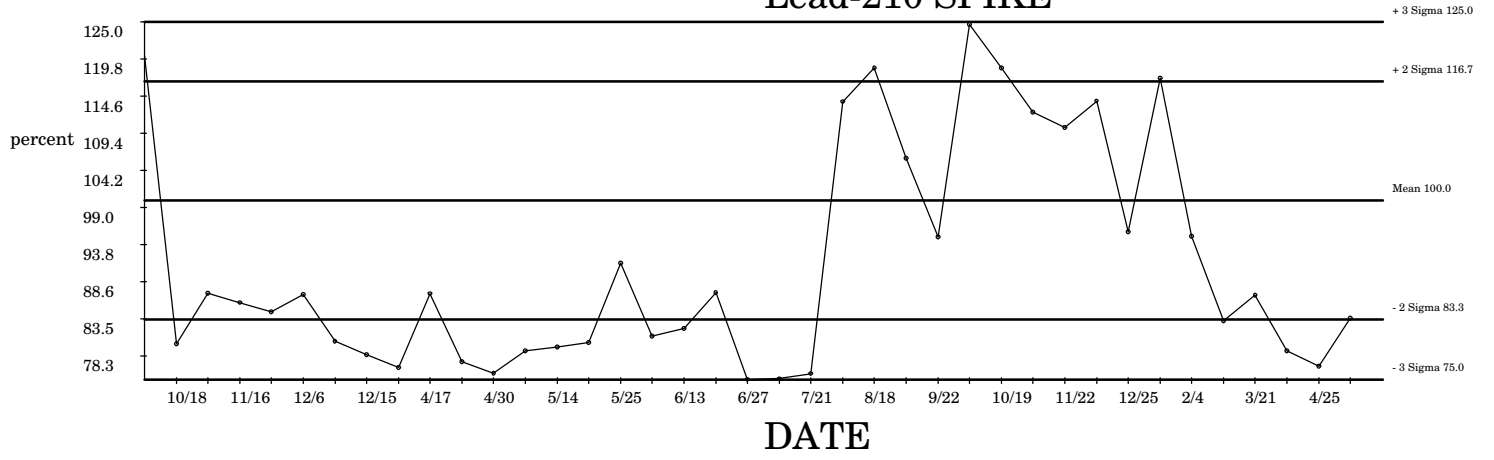
Lead-210 BLANK



○ Denotes Outlier

SPC Graph for Gas Flow Lead-210 in Liquids 4/25/2006

Lead-210 SPIKE



Data used for Gas Flow Lead-210 in Liquids 26-APR-2006

Lead-210 BLANK: Limits LCL = -2.2 UCL = 2.7

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
400109	1200785591	22-FEB-2005 07:24	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
415571	1200822191	18-APR-2005 00:50	DONE	0	0.23	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
417543	1200827004	24-APR-2005 19:55	DONE	1	0.88	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
419557	1200831804	30-APR-2005 15:21	DONE	1	0.93	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
422332	1200838732	11-MAY-2005 07:18	DONE	0	-0.48	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
419558	1200831808	14-MAY-2005 20:57	DONE	-1	-1	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
422819	1200839939	14-MAY-2005 21:00	DONE	-1	-1	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
419559	1200831812	19-MAY-2005 08:43	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
419560	1200831815	19-MAY-2005 10:21	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
421692	1200836959	25-MAY-2005 08:55	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
430106	1200857690	08-JUN-2005 09:03	DONE	0	0.12	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
430764	1200859365	13-JUN-2005 11:29	DONE	0	0.1	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
431616	1200861663	14-JUN-2005 06:26	DONE	0	-0.22	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
430541	1200858801	26-JUN-2005 18:15	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
441104	1200884260	18-JUL-2005 19:15	DONE	3	3.5	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
437246	1200875105	21-JUL-2005 22:20	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
450347	1200906423	15-AUG-2005 21:26	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
450351	1200906426	17-AUG-2005 11:33	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
450354	1200906438	17-AUG-2005 14:19	DONE	1	0.39	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
450352	1200906430	18-AUG-2005 14:14	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
461613	1200933183	19-SEP-2005 13:53	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
461895	1200933942	22-SEP-2005 10:16	DONE	-1	-1	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
471295	1200956478	19-OCT-2005 10:39	DONE	1	0.76	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
470692	1200954937	19-OCT-2005 16:56	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
475222	1200965926	08-NOV-2005 10:52	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
481294	1200980553	22-NOV-2005 09:21	DONE	0	-0.95	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
479208	1200975628	22-NOV-2005 14:07	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
486637	1200993457	18-DEC-2005 21:40	DONE	1	1.1	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
485399	1200990514	19-DEC-2005 12:14	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
489016	1200998991	25-DEC-2005 19:10	DONE	1	0.3	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
487146	1200994636	03-JAN-2006 10:19	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
495993	1201014597	05-FEB-2006 14:34	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
504804	1201034958	27-FEB-2006 11:25	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
503558	1201031984	28-FEB-2006 10:50	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
503559	1201031987	28-FEB-2006 23:10	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
512214	1201052258	21-MAR-2006 11:45	DONE	0	-0.34	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
517808	1201064410	16-APR-2006 23:19	DONE	3	3.5	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
520607	1201070733	25-APR-2006 14:15	DONE	0	-0.03	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81
522920	1201076207	26-APR-2006 10:19	DONE	1	0.66	pCi/L	0.28	-2.2	-1.3	1.9	2.71	0.81

Lead-210 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
364294	1200699138	15-SEP-2004 09:13	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
364295	1200699143	15-SEP-2004 10:11	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
371366	1200716015	13-OCT-2004 08:24	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
371367	1200716019	18-OCT-2004 07:44	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9

378642	1200734036	10-NOV-2004 09:46	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
378641	1200734032	15-NOV-2004 09:35	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
383936	1200746759	06-DEC-2004 09:02	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
383918	1200746688	06-DEC-2004 10:34	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
385729	1200751075	16-DEC-2004 04:06	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
415571	1200822192	18-APR-2005 00:50	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
417543	1200827005	24-APR-2005 19:55	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
419557	1200831805	30-APR-2005 15:21	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
422332	1200838733	11-MAY-2005 07:18	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
419558	1200831809	14-MAY-2005 20:57	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
422819	1200839940	14-MAY-2005 21:01	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
421692	1200836960	25-MAY-2005 10:35	DONE	22	0.85	percent	7.1	0	-27	40.9	20.0	16.9
430106	1200857691	08-JUN-2005 09:03	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
430764	1200859366	13-JUN-2005 11:29	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
431616	1200861664	14-JUN-2005 06:26	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
430541	1200858802	26-JUN-2005 18:15	DONE	4	-0.21	percent	7.1	0	-27	40.9	20.0	16.9
441104	1200884261	19-JUL-2005 15:04	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
437246	1200875106	21-JUL-2005 22:20	DONE	8	0.04	percent	7.1	0	-27	40.9	20.0	16.9
450354	1200906439	17-AUG-2005 14:19	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
450352	1200906431	18-AUG-2005 14:14	DONE	12	0.31	percent	7.1	0	-27	40.9	20.0	16.9
461613	1200933184	19-SEP-2005 13:52	DONE	28	1.2	percent	7.1	0	-27	40.9	20.0	16.9
461895	1200933943	22-SEP-2005 10:16	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
471295	1200956479	19-OCT-2005 11:41	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
470692	1200954938	19-OCT-2005 16:56	DONE	1	-0.33	percent	7.1	0	-27	40.9	20.0	16.9
481294	1200980554	22-NOV-2005 09:21	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
479208	1200975629	22-NOV-2005 14:07	DONE	34	1.6	percent	7.1	0	-27	40.9	20.0	16.9
486637	1200993458	18-DEC-2005 21:39	DONE	7	-0	percent	7.1	0	-27	40.9	20.0	16.9
489016	1200998992	25-DEC-2005 19:10	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
487146	1200994637	03-JAN-2006 10:19	DONE	1	-0.38	percent	7.1	0	-27	40.9	20.0	16.9
495993	1201014598	05-FEB-2006 14:34	DONE	84	4.6	percent	7.1	0	-27	40.9	20.0	16.9
504804	1201034959	27-FEB-2006 11:25	DONE	30	1.3	percent	7.1	0	-27	40.9	20.0	16.9
512214	1201052259	21-MAR-2006 11:45	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
517808	1201064411	12-APR-2006 10:37	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
520607	1201070734	25-APR-2006 14:15	DONE	0	-0.42	percent	7.1	0	-27	40.9	20.0	16.9
522920	1201076208	26-APR-2006 10:20	DONE	47	2.4	percent	7.1	0	-27	40.9	20.0	16.9

Lead-210 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
419559	1200831814	19-MAY-2005 08:42	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
419560	1200831817	19-MAY-2005 10:20	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
419560	1200831816	19-MAY-2005 10:21	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
421692	1200836962	25-MAY-2005 10:35	DONE	95	-0.62	percent	100	75.0	83.3	117	125	8.33
430106	1200857693	08-JUN-2005 09:03	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
430764	1200859368	13-JUN-2005 11:29	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
431616	1200861666	14-JUN-2005 06:26	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
430541	1200858804	27-JUN-2005 11:34	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
441104	1200884263	19-JUL-2005 15:04	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
437246	1200875108	21-JUL-2005 13:20	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
450347	1200906424	15-AUG-2005 21:26	DONE	122	2.6	percent	100	75.0	83.3	117	125	8.33
450347	1200906425	15-AUG-2005 22:29	DONE	114	1.6	percent	100	75.0	83.3	117	125	8.33

450351	1200906427	17-AUG-2005 11:33	DONE	125	3	percent	100	75.0	83.3	117	125	8.33
450351	1200906428	17-AUG-2005 11:33	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
450354	1200906441	17-AUG-2005 14:19	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
450352	1200906433	18-AUG-2005 14:14	DONE	122	2.6	percent	100	75.0	83.3	117	125	8.33
461613	1200933186	19-SEP-2005 14:56	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
461895	1200933945	22-SEP-2005 10:16	DONE	108	0.9	percent	100	75.0	83.3	117	125	8.33
471295	1200956481	19-OCT-2005 10:40	DONE	121	2.5	percent	100	75.0	83.3	117	125	8.33
470692	1200954940	19-OCT-2005 17:59	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
475222	1200965928	08-NOV-2005 10:52	DONE	118	2.1	percent	100	75.0	83.3	117	125	8.33
475222	1200965927	08-NOV-2005 10:52	DONE	123	2.7	percent	100	75.0	83.3	117	125	8.33
479208	1200975631	20-NOV-2005 23:00	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
481294	1200980556	22-NOV-2005 09:21	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
486637	1200993460	18-DEC-2005 21:40	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
485399	1200990515	19-DEC-2005 12:14	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
485399	1200990516	19-DEC-2005 12:14	DONE	114	1.6	percent	100	75.0	83.3	117	125	8.33
489016	1200998994	25-DEC-2005 19:10	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
487146	1200994639	03-JAN-2006 10:19	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
495993	1201014600	04-FEB-2006 17:44	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
503558	1201031985	28-FEB-2006 15:18	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
503558	1201031986	28-FEB-2006 15:19	DONE	93	-0.82	percent	100	75.0	83.3	117	125	8.33
503559	1201031988	28-FEB-2006 23:10	DONE	105	0.57	percent	100	75.0	83.3	117	125	8.33
503559	1201031989	28-FEB-2006 23:10	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
504804	1201034961	01-MAR-2006 21:40	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
512214	1201052261	21-MAR-2006 11:45	DONE	92	-0.96	percent	100	75.0	83.3	117	125	8.33
517808	1201064413	12-APR-2006 10:37	DONE	79	-3	percent	100	75.0	83.3	117	125	8.33
520607	1201070736	25-APR-2006 14:15	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
522920	1201076210	26-APR-2006 10:21	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33

Lead-210 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
259157	1200444733	01-JUL-2003 03:49	DONE	0.25	-0.69	dec	0.71	0	-0.612	2.04	3.00	0.66
259156	1200444730	01-JUL-2003 13:35	DONE	0.35	-0.54	dec	0.71	0	-0.612	2.04	3.00	0.66
260891	1200449200	08-JUL-2003 03:35	DONE	0.29	-0.63	dec	0.71	0	-0.612	2.04	3.00	0.66
263853	1200456689	31-JUL-2003 12:42	DONE	0.21	-0.76	dec	0.71	0	-0.612	2.04	3.00	0.66
268208	1200467300	05-AUG-2003 20:11	DONE	0.02	-1	dec	0.71	0	-0.612	2.04	3.00	0.66
270119	1200472396	25-AUG-2003 17:29	DONE	0.35	-0.55	dec	0.71	0	-0.612	2.04	3.00	0.66
273714	1200481578	09-SEP-2003 12:10	DONE	0.11	-0.91	dec	0.71	0	-0.612	2.04	3.00	0.66
274534	1200483528	11-SEP-2003 03:42	DONE	0.52	-0.28	dec	0.71	0	-0.612	2.04	3.00	0.66
276187	1200487560	18-SEP-2003 16:35	DONE	0.52	-0.29	dec	0.71	0	-0.612	2.04	3.00	0.66
277706	1200491283	24-SEP-2003 14:13	DONE	0.87	0.24	dec	0.71	0	-0.612	2.04	3.00	0.66
277704	1200491269	29-SEP-2003 09:58	DONE	0.47	-0.36	dec	0.71	0	-0.612	2.04	3.00	0.66
278927	1200494421	02-OCT-2003 05:44	DONE	0.09	-0.95	dec	0.71	0	-0.612	2.04	3.00	0.66
280680	1200498873	13-OCT-2003 19:59	DONE	0.35	-0.55	dec	0.71	0	-0.612	2.04	3.00	0.66
284404	1200508164	25-OCT-2003 10:17	DONE	0.6	-0.17	dec	0.71	0	-0.612	2.04	3.00	0.66
290245	1200523078	17-NOV-2003 18:45	DONE	1.96	1.9	dec	0.71	0	-0.612	2.04	3.00	0.66
299278	1200545020	05-JAN-2004 20:33	DONE	0.23	-0.72	dec	0.71	0	-0.612	2.04	3.00	0.66
301230	1200549730	13-JAN-2004 05:57	DONE	1.84	1.7	dec	0.71	0	-0.612	2.04	3.00	0.66
322627	1200600723	12-APR-2004 12:50	DONE	0.85	0.21	dec	0.71	0	-0.612	2.04	3.00	0.66
323105	1200601878	14-APR-2004 14:15	DONE	0.25	-0.69	dec	0.71	0	-0.612	2.04	3.00	0.66
328142	1200613508	06-MAY-2004 19:34	DONE	1.62	1.4	dec	0.71	0	-0.612	2.04	3.00	0.66

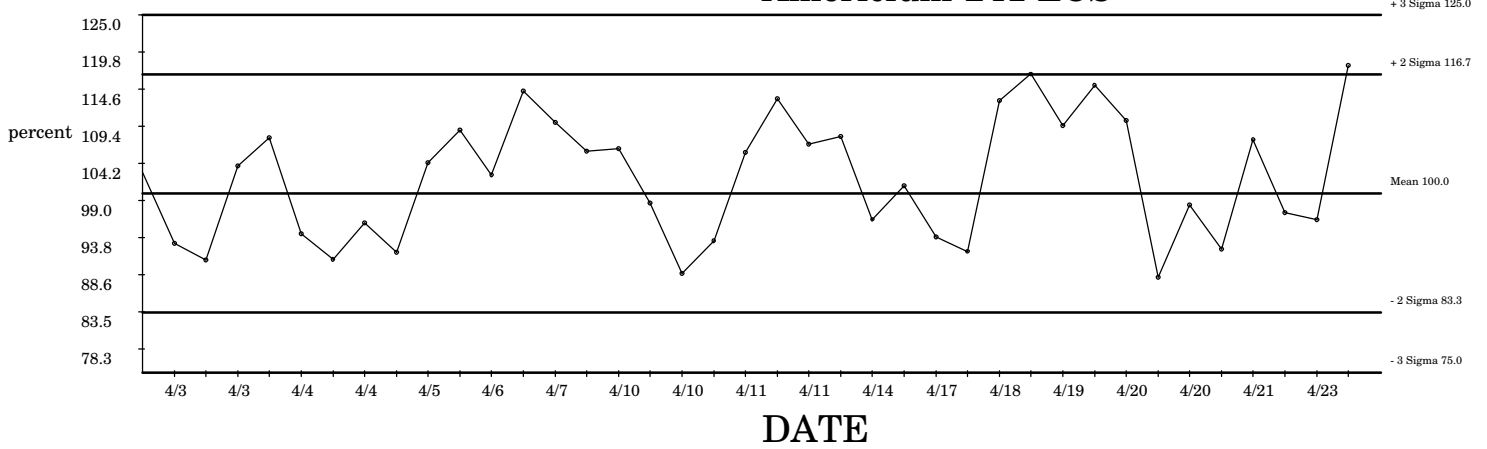
332226	1200623069	18-MAY-2004 21:56	DONE	0.67	-0.07	dec	0.71	0	-0.612	2.04	3.00	0.66
339666	1200640332	17-JUN-2004 20:36	DONE	0.36	-0.53	dec	0.71	0	-0.612	2.04	3.00	0.66
344859	1200653027	14-JUL-2004 01:14	DONE	1.67	1.4	dec	0.71	0	-0.612	2.04	3.00	0.66
355308	1200678102	23-AUG-2004 04:40	DONE	0.11	-0.91	dec	0.71	0	-0.612	2.04	3.00	0.66
356146	1200680029	25-AUG-2004 15:24	DONE	00	-1	dec	0.71	0	-0.612	2.04	3.00	0.66
365746	1200702829	22-SEP-2004 05:21	DONE	1.34	0.95	dec	0.71	0	-0.612	2.04	3.00	0.66
365744	1200702821	22-SEP-2004 06:27	DONE	1.51	1.2	dec	0.71	0	-0.612	2.04	3.00	0.66
372794	1200719620	18-OCT-2004 14:02	DONE	0.39	-0.49	dec	0.71	0	-0.612	2.04	3.00	0.66
385730	1200751079	15-DEC-2004 06:46	DONE	1.12	0.62	dec	0.71	0	-0.612	2.04	3.00	0.66
382363	1200742867	15-DEC-2004 13:22	DONE	2.42	2.6	dec	0.71	0	-0.612	2.04	3.00	0.66

Lead-210 SPIKE: Limits LCL = 75 UCL = 125

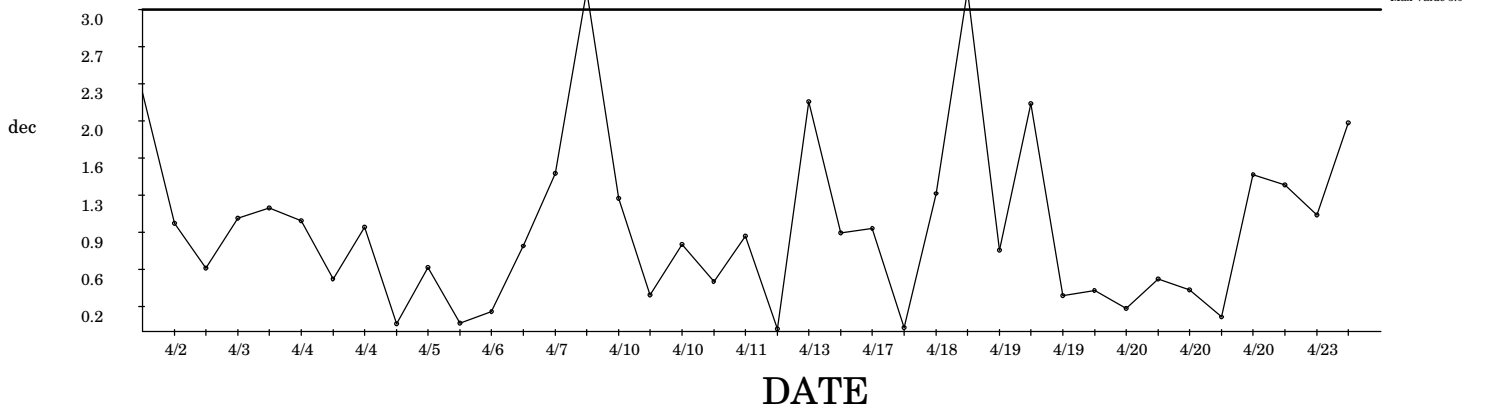
Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
371366	1200716016	13-OCT-2004 08:24	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
371367	1200716020	18-OCT-2004 07:44	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
378642	1200734037	10-NOV-2004 08:46	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
378641	1200734033	16-NOV-2004 18:49	DONE	86	-2	percent	100	75.0	83.3	117	125	8.33
383918	1200746689	06-DEC-2004 18:46	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
383936	1200746760	06-DEC-2004 19:50	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
385730	1200751080	15-DEC-2004 07:21	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
382363	1200742868	15-DEC-2004 13:22	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
385729	1200751076	16-DEC-2004 04:06	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
415571	1200822193	17-APR-2005 23:35	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
417543	1200827006	24-APR-2005 19:56	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
419557	1200831806	30-APR-2005 15:21	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
422332	1200838734	12-MAY-2005 10:27	DONE	79	-3	percent	100	75.0	83.3	117	125	8.33
422819	1200839941	14-MAY-2005 21:00	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
419558	1200831810	16-MAY-2005 13:46	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
421692	1200836961	25-MAY-2005 10:35	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
430106	1200857692	08-JUN-2005 09:03	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
430764	1200859367	13-JUN-2005 20:45	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
431616	1200861665	14-JUN-2005 06:26	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
430541	1200858803	27-JUN-2005 11:34	DONE	75	-3	percent	100	75.0	83.3	117	125	8.33
441104	1200884262	18-JUL-2005 19:44	DONE	75	-3	percent	100	75.0	83.3	117	125	8.33
437246	1200875107	21-JUL-2005 13:20	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
450354	1200906440	17-AUG-2005 14:19	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
450352	1200906432	18-AUG-2005 14:14	DONE	119	2.2	percent	100	75.0	83.3	117	125	8.33
461613	1200933185	19-SEP-2005 13:52	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
461895	1200933944	22-SEP-2005 10:16	DONE	95	-0.61	percent	100	75.0	83.3	117	125	8.33
471295	1200956480	19-OCT-2005 10:39	DONE	125	3	percent	100	75.0	83.3	117	125	8.33
470692	1200954939	19-OCT-2005 16:56	DONE	119	2.2	percent	100	75.0	83.3	117	125	8.33
479208	1200975630	20-NOV-2005 23:00	DONE	112	1.5	percent	100	75.0	83.3	117	125	8.33
481294	1200980555	22-NOV-2005 09:21	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
486637	1200993459	18-DEC-2005 21:39	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
489016	1200998993	25-DEC-2005 19:10	DONE	96	-0.52	percent	100	75.0	83.3	117	125	8.33
487146	1200994638	03-JAN-2006 10:19	DONE	117	2.1	percent	100	75.0	83.3	117	125	8.33
495993	1201014599	04-FEB-2006 17:44	DONE	95	-0.6	percent	100	75.0	83.3	117	125	8.33
504804	1201034960	27-FEB-2006 11:26	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
512214	1201052260	21-MAR-2006 11:45	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
517808	1201064412	12-APR-2006 10:37	DONE	79	-3	percent	100	75.0	83.3	117	125	8.33

520607	1201070735	25-APR-2006 14:15	DONE	77	-3	percent	100	75.0	83.3	117	125	8.33
522920	1201076209	26-APR-2006 10:20	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33

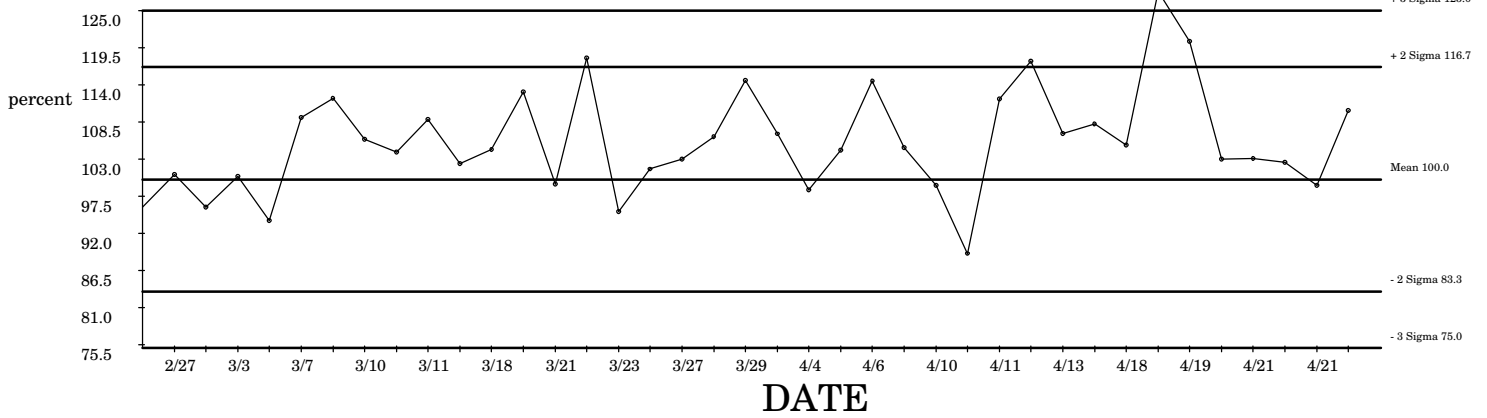
SPC Graph for Gamma Spec inLiquid 4/24/2006 Americium-241 LCS



Americium-241 RER

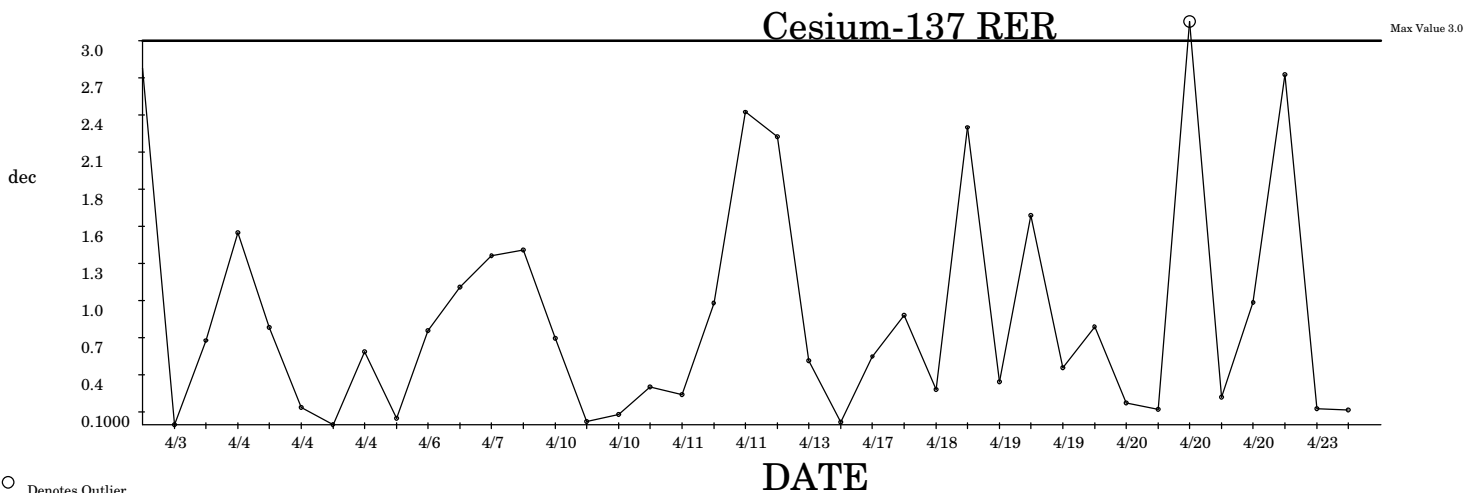
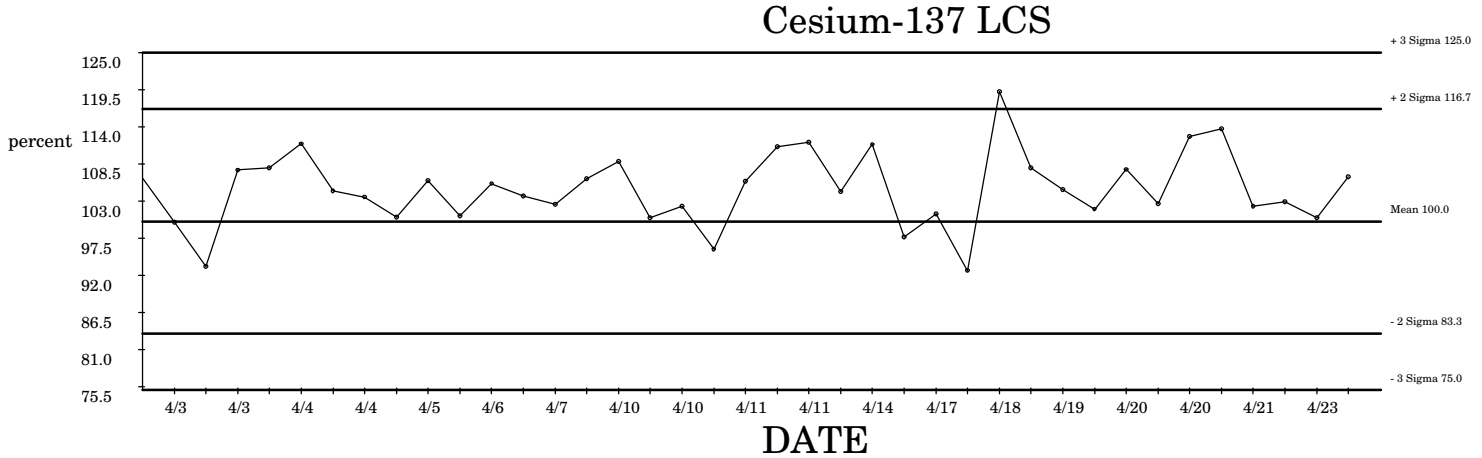
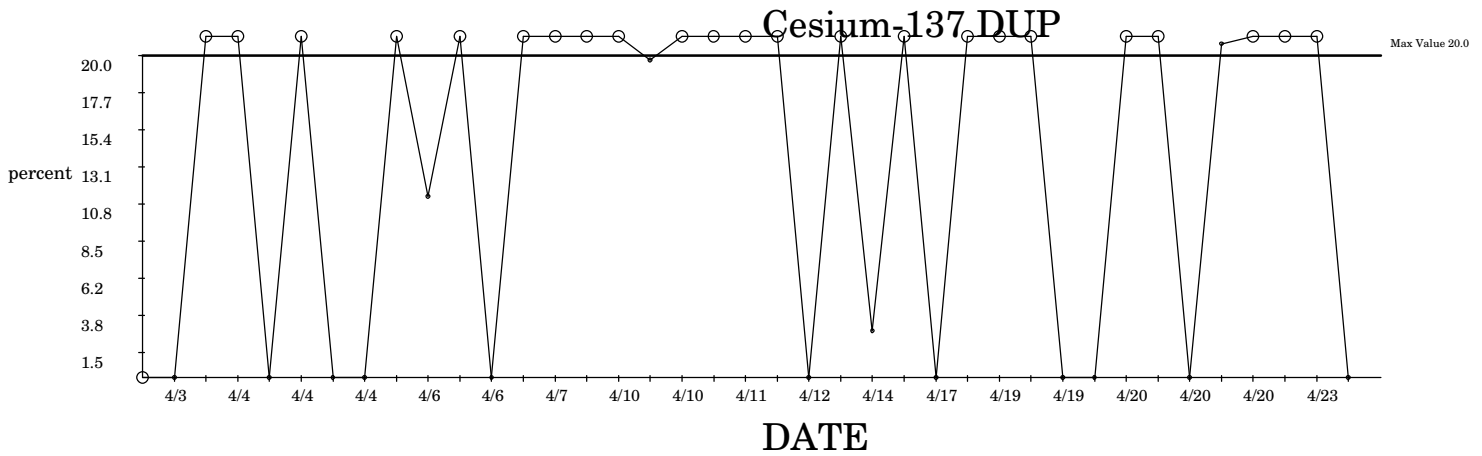
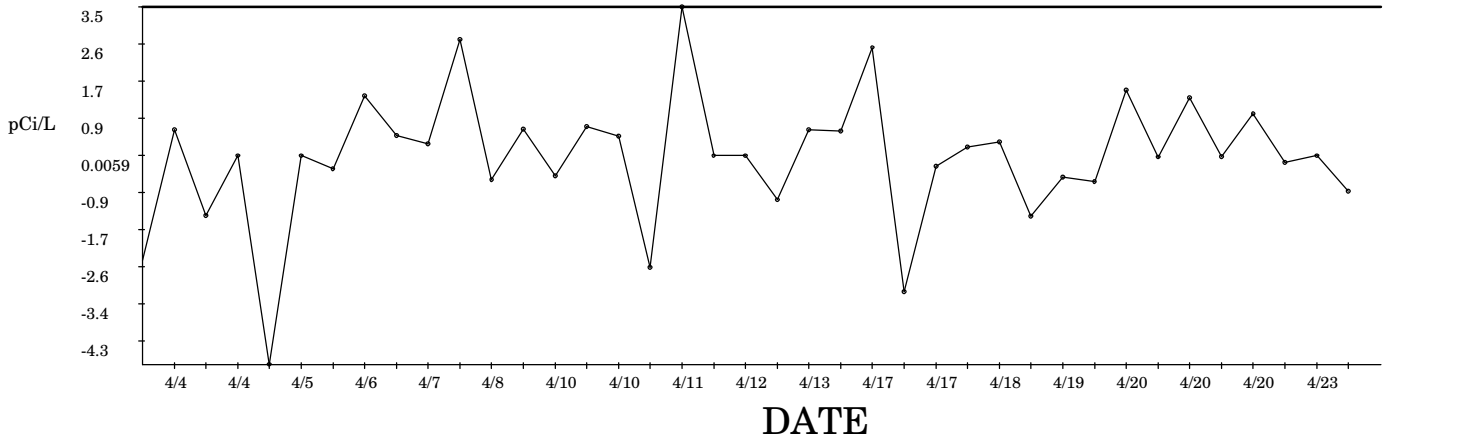


Americium-241 SPIKE



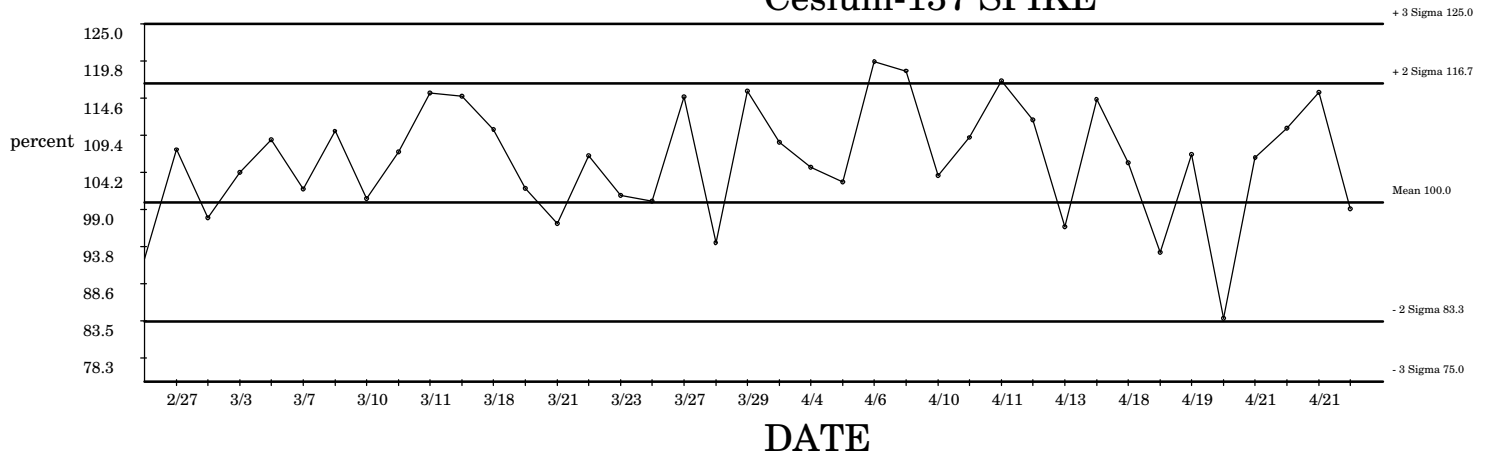
○ Denotes Outlier

SPC Graph for Gamma Spec inLiquid 4/24/2006 Cesium-137 BLANK



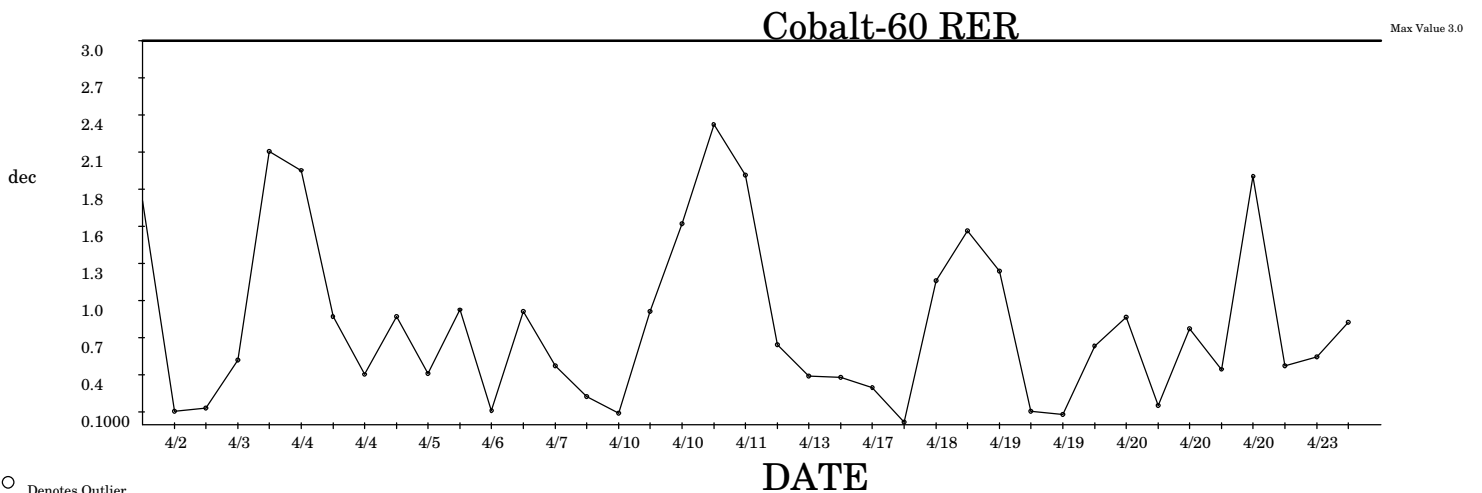
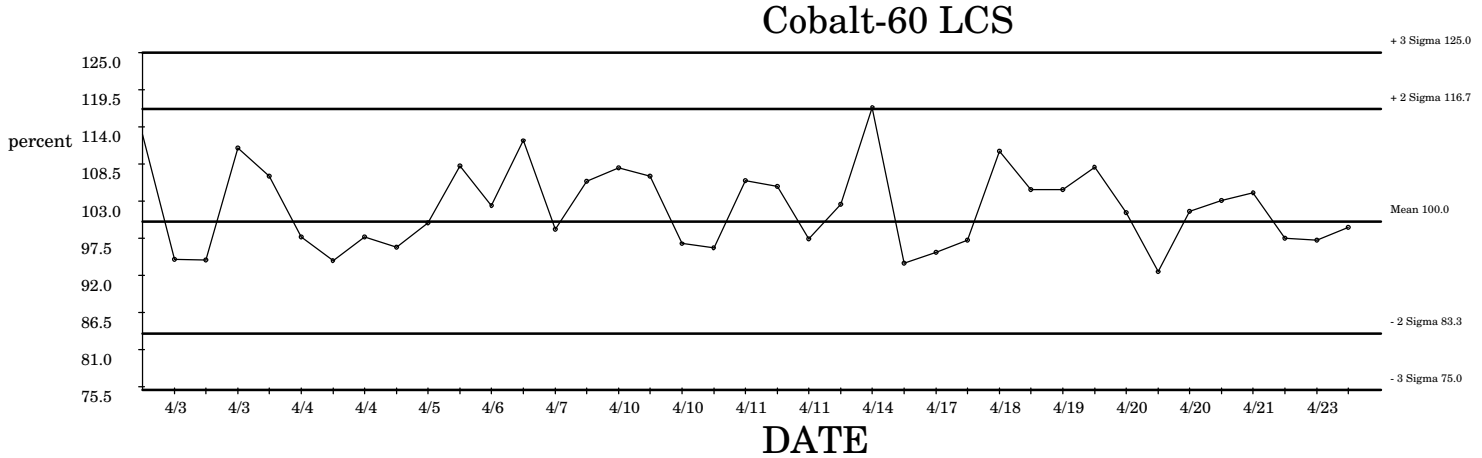
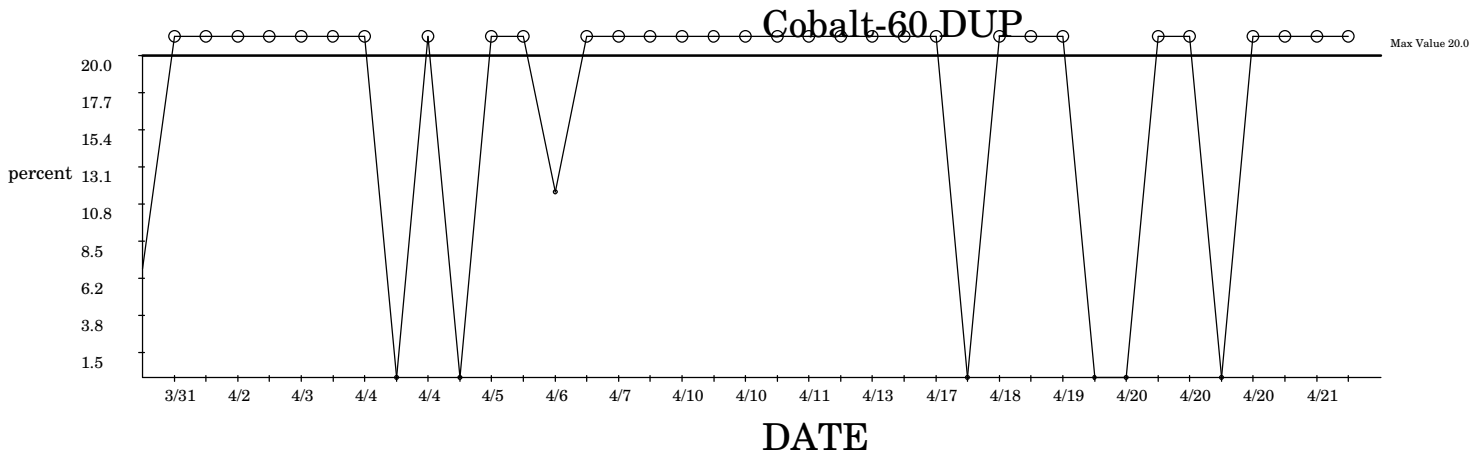
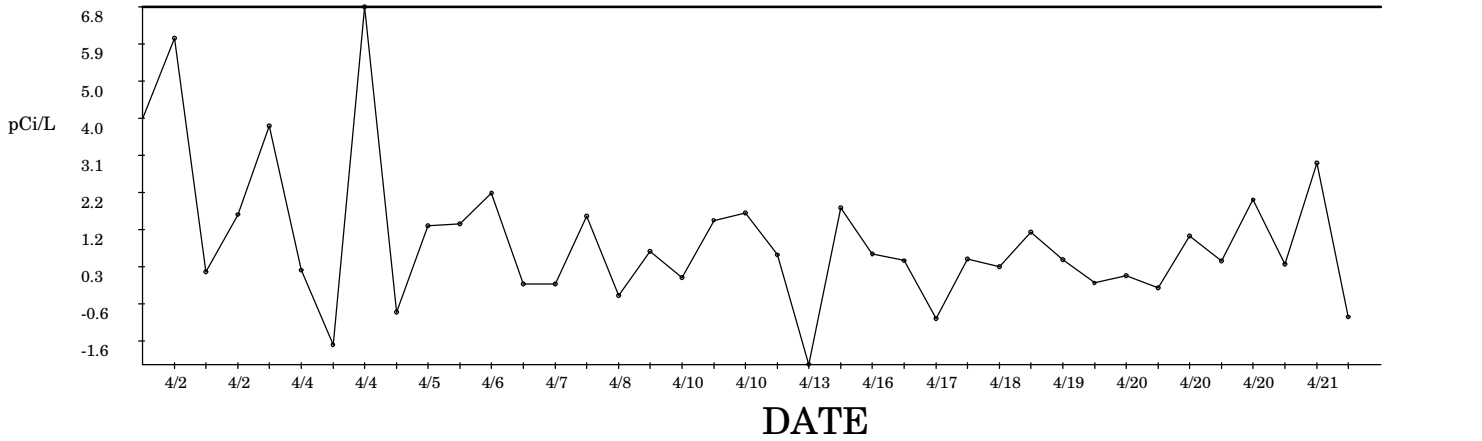
○ Denotes Outlier

SPC Graph for Gamma Spec inLiquid 4/24/2006 Cesium-137 SPIKE



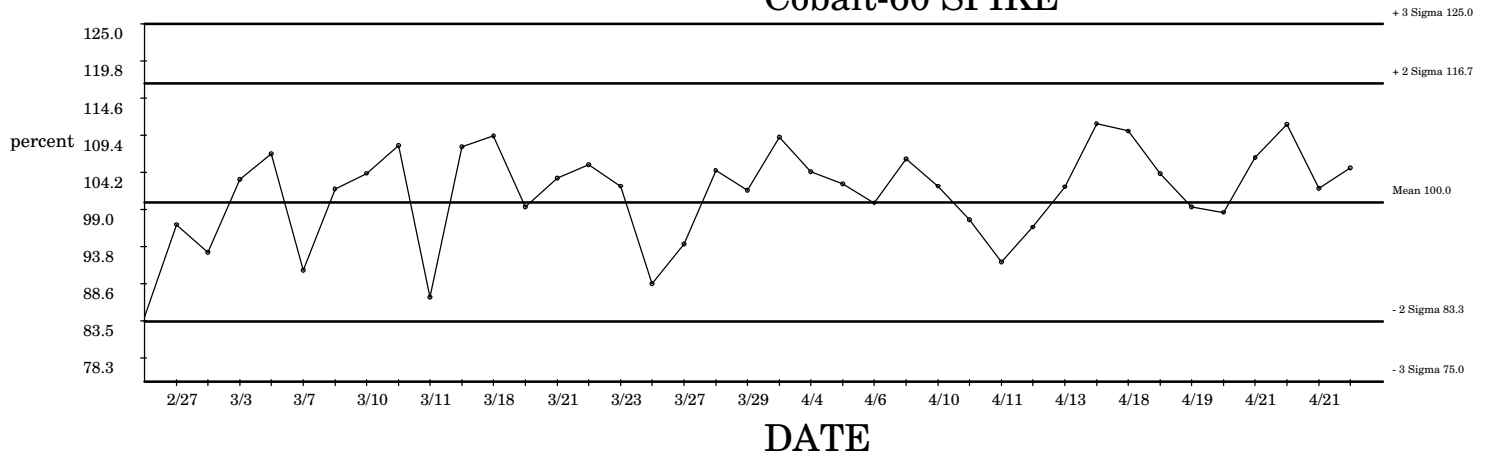
○ Denotes Outlier

SPC Graph for Gamma Spec inLiquid 4/24/2006 Cobalt-60 BLANK



○ Denotes Outlier

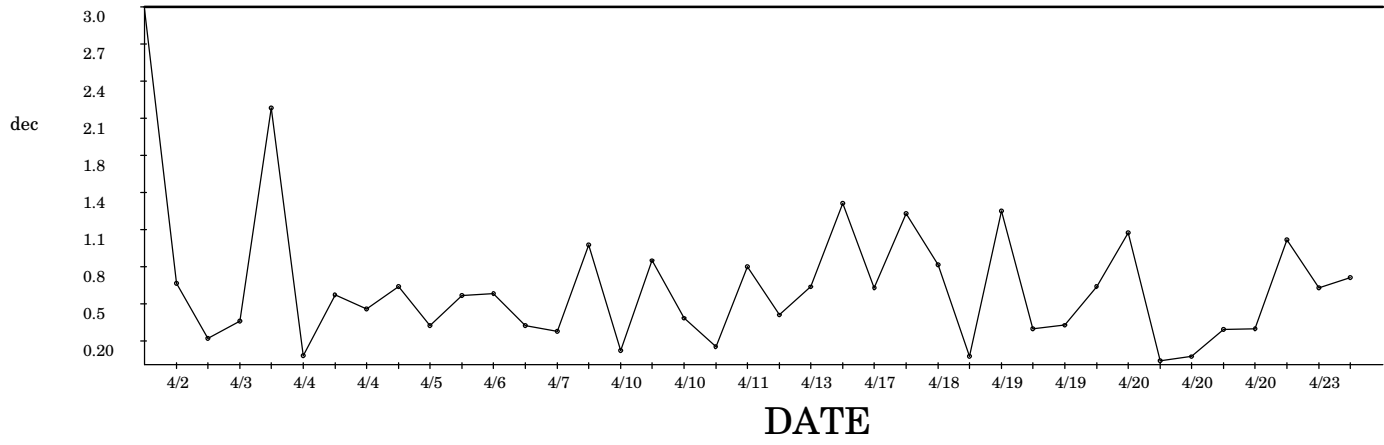
SPC Graph for Gamma Spec inLiquid 4/24/2006 Cobalt-60 SPIKE



○ Denotes Outlier

SPC Graph for Gamma Spec inLiquid 4/24/2006 Lead-212 RER

Max Value 3.0



Data used for Gamma Spec inLiquid 25-APR-2006

Americium-241 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
515677	1201059772	02-APR-2006 21:43	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
512910	1201053788	03-APR-2006 16:23	DONE	93	-0.84	percent	100	75.0	83.3	117	125	8.33
511298	1201050112	03-APR-2006 22:07	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
512870	1201053698	03-APR-2006 23:54	DUSE	104	0.47	percent	100	75.0	83.3	117	125	8.33
511297	1201050109	04-APR-2006 06:47	DONE	108	0.94	percent	100	75.0	83.3	117	125	8.33
516974	1201062509	04-APR-2006 07:59	DONE	94	-0.67	percent	100	75.0	83.3	117	125	8.33
516284	1201061022	04-APR-2006 10:09	DUSE	91	-1	percent	100	75.0	83.3	117	125	8.33
516477	1201061403	04-APR-2006 11:44	DONE	96	-0.49	percent	100	75.0	83.3	117	125	8.33
516727	1201061913	04-APR-2006 21:44	DONE	92	-0.98	percent	100	75.0	83.3	117	125	8.33
511296	1201050106	05-APR-2006 19:38	DONE	104	0.52	percent	100	75.0	83.3	117	125	8.33
515679	1201059782	06-APR-2006 21:11	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
516333	1201061132	06-APR-2006 22:33	DONE	103	0.31	percent	100	75.0	83.3	117	125	8.33
516981	1201062535	07-APR-2006 13:55	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
516331	1201061128	07-APR-2006 16:56	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
517019	1201062620	08-APR-2006 17:13	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
516976	1201062516	10-APR-2006 08:10	DONE	106	0.76	percent	100	75.0	83.3	117	125	8.33
517034	1201062660	10-APR-2006 20:35	DONE	99	-0.16	percent	100	75.0	83.3	117	125	8.33
516982	1201062538	10-APR-2006 21:32	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
517023	1201062632	10-APR-2006 22:38	DONE	93	-0.79	percent	100	75.0	83.3	117	125	8.33
517024	1201062641	11-APR-2006 06:58	DONE	106	0.68	percent	100	75.0	83.3	117	125	8.33
519523	1201068262	11-APR-2006 10:58	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
519011	1201067124	11-APR-2006 22:38	DUSE	107	0.83	percent	100	75.0	83.3	117	125	8.33
516978	1201062524	14-APR-2006 06:31	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
516977	1201062520	14-APR-2006 10:17	DONE	96	-0.43	percent	100	75.0	83.3	117	125	8.33
520998	1201071625	17-APR-2006 19:03	DONE	101	0.13	percent	100	75.0	83.3	117	125	8.33
517253	1201063139	17-APR-2006 22:49	DONE	94	-0.73	percent	100	75.0	83.3	117	125	8.33
520996	1201071617	18-APR-2006 05:54	DONE	92	-0.97	percent	100	75.0	83.3	117	125	8.33
520754	1201071041	18-APR-2006 19:10	DUSE	113	1.6	percent	100	75.0	83.3	117	125	8.33
516979	1201062528	19-APR-2006 13:02	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
516657	1201061779	19-APR-2006 18:10	DUSE	110	1.1	percent	100	75.0	83.3	117	125	8.33
516980	1201062532	19-APR-2006 22:50	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
521937	1201074024	20-APR-2006 06:04	DUSE	110	1.2	percent	100	75.0	83.3	117	125	8.33
519545	1201068320	20-APR-2006 09:41	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
517257	1201063155	20-APR-2006 12:11	DONE	98	-0.19	percent	100	75.0	83.3	117	125	8.33
519535	1201068291	21-APR-2006 06:15	DONE	92	-0.93	percent	100	75.0	83.3	117	125	8.33
517255	1201063147	21-APR-2006 07:39	DONE	108	0.9	percent	100	75.0	83.3	117	125	8.33
519516	1201068251	21-APR-2006 09:58	DONE	97	-0.32	percent	100	75.0	83.3	117	125	8.33
522386	1201075056	23-APR-2006 21:45	DONE	96	-0.44	percent	100	75.0	83.3	117	125	8.33
523017	1201076445	25-APR-2006 06:13	DONE	118	2.1	percent	100	75.0	83.3	117	125	8.33

Americium-241 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
514861	1201057810	01-APR-2006 20:22	DUSE	0.78	-0.24	dec	1.38	0	-3.7	6.45	3.00	2.54
511298	1201050111	02-APR-2006 22:51	DONE	1.01	-0.15	dec	1.38	0	-3.7	6.45	3.00	2.54
511295	1201050102	03-APR-2006 05:16	DONE	0.59	-0.31	dec	1.38	0	-3.7	6.45	3.00	2.54
515677	1201059771	03-APR-2006 10:09	DUSE	1.06	-0.13	dec	1.38	0	-3.7	6.45	3.00	2.54

511297	1201050108	04-APR-2006 05:50	DONE	1.15	-0.09	dec	1.38	0	-3.7	6.45	3.00	2.54
516974	1201062507	04-APR-2006 11:01	DONE	1.03	-0.14	dec	1.38	0	-3.7	6.45	3.00	2.54
512870	1201053697	04-APR-2006 12:02	DUSE	0.49	-0.35	dec	1.38	0	-3.7	6.45	3.00	2.54
516477	1201061402	04-APR-2006 12:18	DONE	0.97	-0.16	dec	1.38	0	-3.7	6.45	3.00	2.54
516284	1201061021	04-APR-2006 17:27	DUSE	0.07	-0.52	dec	1.38	0	-3.7	6.45	3.00	2.54
511296	1201050105	05-APR-2006 18:16	DUSE	0.6	-0.31	dec	1.38	0	-3.7	6.45	3.00	2.54
515679	1201059780	06-APR-2006 11:54	DONE	0.08	-0.51	dec	1.38	0	-3.7	6.45	3.00	2.54
516981	1201062534	06-APR-2006 23:55	DONE	0.18	-0.47	dec	1.38	0	-3.7	6.45	3.00	2.54
516976	1201062514	07-APR-2006 11:18	DONE	0.8	-0.23	dec	1.38	0	-3.7	6.45	3.00	2.54
516333	1201061130	07-APR-2006 16:54	DONE	1.47	0.04	dec	1.38	0	-3.7	6.45	3.00	2.54
517034	1201062659	10-APR-2006 18:58	DONE	11.8	4.1	dec	1.38	0	-3.7	6.45	3.00	2.54
517023	1201062631	10-APR-2006 19:02	DONE	1.24	-0.05	dec	1.38	0	-3.7	6.45	3.00	2.54
517019	1201062618	10-APR-2006 19:13	DUSE	0.34	-0.41	dec	1.38	0	-3.7	6.45	3.00	2.54
516982	1201062537	10-APR-2006 21:49	DONE	0.81	-0.23	dec	1.38	0	-3.7	6.45	3.00	2.54
517024	1201062639	11-APR-2006 10:13	DONE	0.46	-0.36	dec	1.38	0	-3.7	6.45	3.00	2.54
519523	1201068260	11-APR-2006 10:15	DONE	0.89	-0.19	dec	1.38	0	-3.7	6.45	3.00	2.54
516331	1201061126	12-APR-2006 13:16	DONE	0.02	-0.53	dec	1.38	0	-3.7	6.45	3.00	2.54
516977	1201062518	13-APR-2006 21:04	DONE	2.14	0.3	dec	1.38	0	-3.7	6.45	3.00	2.54
516978	1201062522	14-APR-2006 06:30	DONE	0.92	-0.18	dec	1.38	0	-3.7	6.45	3.00	2.54
517253	1201063138	17-APR-2006 11:51	DONE	0.96	-0.17	dec	1.38	0	-3.7	6.45	3.00	2.54
520754	1201071040	17-APR-2006 23:56	DUSE	0.03	-0.53	dec	1.38	0	-3.7	6.45	3.00	2.54
520996	1201071615	18-APR-2006 05:53	DONE	1.28	-0.04	dec	1.38	0	-3.7	6.45	3.00	2.54
520998	1201071623	19-APR-2006 06:01	DONE	12	4.2	dec	1.38	0	-3.7	6.45	3.00	2.54
516979	1201062526	19-APR-2006 07:25	DONE	0.76	-0.25	dec	1.38	0	-3.7	6.45	3.00	2.54
516657	1201061778	19-APR-2006 17:52	DUSE	2.12	0.29	dec	1.38	0	-3.7	6.45	3.00	2.54
516980	1201062530	19-APR-2006 23:19	DONE	0.33	-0.41	dec	1.38	0	-3.7	6.45	3.00	2.54
521937	1201074023	20-APR-2006 06:04	DUSE	0.38	-0.39	dec	1.38	0	-3.7	6.45	3.00	2.54
517257	1201063153	20-APR-2006 10:21	DONE	0.21	-0.46	dec	1.38	0	-3.7	6.45	3.00	2.54
519545	1201068318	20-APR-2006 15:32	DONE	0.49	-0.35	dec	1.38	0	-3.7	6.45	3.00	2.54
519011	1201067123	20-APR-2006 23:49	DUSE	0.39	-0.39	dec	1.38	0	-3.7	6.45	3.00	2.54
517255	1201063145	20-APR-2006 23:50	DONE	0.13	-0.49	dec	1.38	0	-3.7	6.45	3.00	2.54
519535	1201068296	20-APR-2006 23:55	DUSE	1.46	0.03	dec	1.38	0	-3.7	6.45	3.00	2.54
519516	1201068249	21-APR-2006 09:09	DONE	1.37	-0.01	dec	1.38	0	-3.7	6.45	3.00	2.54
522386	1201075055	23-APR-2006 23:51	DUSE	1.09	-0.12	dec	1.38	0	-3.7	6.45	3.00	2.54
523017	1201076444	25-APR-2006 06:13	DUSE	1.94	0.22	dec	1.38	0	-3.7	6.45	3.00	2.54

Americium-241 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
498898	1201021191	24-FEB-2006 19:13	DONE	104	0.49	percent	100	75.0	83.3	117	125	8.33
503740	1201032437	27-FEB-2006 06:22	DONE	101	0.08	percent	100	75.0	83.3	117	125	8.33
506274	1201038473	28-FEB-2006 09:00	DONE	96	-0.49	percent	100	75.0	83.3	117	125	8.33
506282	1201038480	03-MAR-2006 11:15	DONE	100	0.05	percent	100	75.0	83.3	117	125	8.33
507258	1201040767	05-MAR-2006 19:50	DONE	94	-0.74	percent	100	75.0	83.3	117	125	8.33
507638	1201041726	07-MAR-2006 10:55	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
508355	1201043465	08-MAR-2006 11:21	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
507632	1201041716	10-MAR-2006 10:00	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
510364	1201048016	10-MAR-2006 17:46	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
507647	1201041742	11-MAR-2006 15:34	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
507649	1201041746	18-MAR-2006 13:45	DONE	102	0.28	percent	100	75.0	83.3	117	125	8.33
507650	1201041750	18-MAR-2006 13:46	DONE	104	0.53	percent	100	75.0	83.3	117	125	8.33

507640	1201041730	20-MAR-2006 18:44	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
512038	1201051800	21-MAR-2006 11:50	DONE	99	-0.08	percent	100	75.0	83.3	117	125	8.33
508908	1201044773	22-MAR-2006 17:05	DONE	118	2.2	percent	100	75.0	83.3	117	125	8.33
507641	1201041734	23-MAR-2006 09:11	DONE	95	-0.58	percent	100	75.0	83.3	117	125	8.33
510369	1201048027	27-MAR-2006 06:50	DONE	102	0.18	percent	100	75.0	83.3	117	125	8.33
508910	1201044781	27-MAR-2006 19:42	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
511246	1201049992	28-MAR-2006 11:43	DONE	106	0.76	percent	100	75.0	83.3	117	125	8.33
508909	1201044777	29-MAR-2006 08:15	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
507644	1201041738	03-APR-2006 12:47	DONE	107	0.81	percent	100	75.0	83.3	117	125	8.33
516974	1201062508	04-APR-2006 09:02	DONE	98	-0.19	percent	100	75.0	83.3	117	125	8.33
515679	1201059781	06-APR-2006 21:11	DONE	104	0.52	percent	100	75.0	83.3	117	125	8.33
516333	1201061131	06-APR-2006 22:34	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
517019	1201062619	08-APR-2006 18:42	DONE	105	0.56	percent	100	75.0	83.3	117	125	8.33
516976	1201062515	10-APR-2006 06:39	DONE	99	-0.11	percent	100	75.0	83.3	117	125	8.33
517024	1201062640	11-APR-2006 05:39	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
519523	1201068261	11-APR-2006 08:15	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
516331	1201061127	11-APR-2006 12:05	DONE	118	2.1	percent	100	75.0	83.3	117	125	8.33
516977	1201062519	13-APR-2006 21:04	DONE	107	0.82	percent	100	75.0	83.3	117	125	8.33
516978	1201062523	14-APR-2006 06:30	DONE	108	0.98	percent	100	75.0	83.3	117	125	8.33
520996	1201071616	18-APR-2006 05:54	DONE	105	0.61	percent	100	75.0	83.3	117	125	8.33
520998	1201071624	19-APR-2006 06:01	DONE	468	44	percent	100	75.0	83.3	117	125	8.33
516979	1201062527	19-APR-2006 07:26	DONE	121	2.5	percent	100	75.0	83.3	117	125	8.33
516980	1201062531	19-APR-2006 11:25	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
517255	1201063146	21-APR-2006 06:23	DONE	103	0.37	percent	100	75.0	83.3	117	125	8.33
519516	1201068250	21-APR-2006 09:10	DONE	103	0.3	percent	100	75.0	83.3	117	125	8.33
517257	1201063154	21-APR-2006 12:55	DONE	99	-0.11	percent	100	75.0	83.3	117	125	8.33
519535	1201068297	21-APR-2006 13:59	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33

Cesium-137 BLANK: Limits LCL = -4.4 UCL = 4.5

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
516974	1201062506	04-APR-2006 06:44	DONE	1	0.68	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516284	1201061020	04-APR-2006 10:08	DONE	1	0.38	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516477	1201061401	04-APR-2006 10:18	DONE	-1	-0.97	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
510984	1201049364	04-APR-2006 11:04	DONE	0	-0.03	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516727	1201061912	04-APR-2006 21:43	DUSE	-5	-3	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
508904	1201044759	05-APR-2006 10:31	DUSE	0	-0.03	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
511296	1201050104	05-APR-2006 18:15	DONE	0	-0.24	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516981	1201062533	06-APR-2006 16:41	DONE	1	0.91	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
515679	1201059779	06-APR-2006 20:00	DONE	0	0.29	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516333	1201061129	07-APR-2006 16:54	DONE	0	0.15	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516331	1201061125	07-APR-2006 16:55	DONE	3	1.8	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517023	1201062630	08-APR-2006 01:11	DONE	-1	-0.4	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517019	1201062617	08-APR-2006 17:58	DONE	1	0.39	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517034	1201062658	10-APR-2006 14:44	DONE	0	-0.34	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516976	1201062513	10-APR-2006 15:40	DONE	1	0.43	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516982	1201062536	10-APR-2006 19:45	DONE	0	0.28	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517024	1201062638	10-APR-2006 23:56	DONE	-3	-2	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
519523	1201068259	11-APR-2006 06:19	DONE	3	2.3	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
512920	1201053810	11-APR-2006 17:05	DUSE	0	-0.03	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
513067	1201054116	12-APR-2006 12:55	DUSE	0	-0.03	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48

516977	1201062517	13-APR-2006 12:23	DONE	-1	-0.72	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516978	1201062521	13-APR-2006 23:22	DONE	1	0.38	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
520998	1201071622	16-APR-2006 20:07	DONE	1	0.36	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517253	1201063137	17-APR-2006 19:16	DONE	3	1.7	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
520996	1201071614	17-APR-2006 23:10	DONE	-3	-2	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
520754	1201071039	17-APR-2006 23:45	DONE	0	-0.2	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
519011	1201067122	18-APR-2006 19:02	DONE	0	0.1	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516657	1201061777	18-APR-2006 19:37	DONE	0	0.19	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516979	1201062525	19-APR-2006 11:15	DONE	-1	-0.98	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
516980	1201062529	19-APR-2006 22:49	DONE	0	-0.36	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
521937	1201074022	20-APR-2006 06:03	DONE	-1	-0.44	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517257	1201063152	20-APR-2006 10:17	DONE	2	1	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
519545	1201068317	20-APR-2006 12:30	DONE	0	-0.05	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
517255	1201063144	20-APR-2006 17:02	DONE	1	0.88	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
519535	1201068288	20-APR-2006 21:41	DONE	0	-0.04	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
519516	1201068248	20-APR-2006 23:48	DONE	1	0.63	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
522386	1201075054	21-APR-2006 23:16	DONE	0	-0.14	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
515884	1201060218	23-APR-2006 17:45	DUSE	0	-0.03	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48
523017	1201076443	24-APR-2006 23:31	DUSE	-1	-0.58	pCi/L	0.04	-4.4	-2.9	3.01	4.49	1.48

Cesium-137 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
515677	1201059771	03-APR-2006 10:09	DONE	32	-0.37	percent	165	0	-550	880	20.0	357
510367	1201048023	03-APR-2006 11:27	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
511297	1201050108	04-APR-2006 05:50	DONE	92	-0.2	percent	165	0	-550	880	20.0	357
516974	1201062507	04-APR-2006 11:01	DONE	266	0.28	percent	165	0	-550	880	20.0	357
512870	1201053697	04-APR-2006 12:02	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
516477	1201061402	04-APR-2006 12:18	DONE	65	-0.28	percent	165	0	-550	880	20.0	357
510984	1201049365	04-APR-2006 17:17	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
516284	1201061021	04-APR-2006 17:27	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
511296	1201050105	05-APR-2006 18:16	DONE	36	-0.36	percent	165	0	-550	880	20.0	357
515679	1201059780	06-APR-2006 11:54	DONE	11	-0.43	percent	165	0	-550	880	20.0	357
516981	1201062534	06-APR-2006 23:55	DONE	786	1.7	percent	165	0	-550	880	20.0	357
508904	1201044760	06-APR-2006 23:56	DUSE	0	-0.46	percent	165	0	-550	880	20.0	357
516976	1201062514	07-APR-2006 11:18	DONE	162	-0.01	percent	165	0	-550	880	20.0	357
516333	1201061130	07-APR-2006 16:54	DONE	126	-0.11	percent	165	0	-550	880	20.0	357
517034	1201062659	10-APR-2006 18:58	DONE	64	-0.28	percent	165	0	-550	880	20.0	357
517023	1201062631	10-APR-2006 19:02	DONE	24	-0.4	percent	165	0	-550	880	20.0	357
517019	1201062618	10-APR-2006 19:13	DONE	20	-0.41	percent	165	0	-550	880	20.0	357
516982	1201062537	10-APR-2006 21:49	DONE	135	-0.09	percent	165	0	-550	880	20.0	357
517024	1201062639	11-APR-2006 10:13	DONE	25	-0.39	percent	165	0	-550	880	20.0	357
519523	1201068260	11-APR-2006 10:15	DONE	110	-0.16	percent	165	0	-550	880	20.0	357
516331	1201061126	12-APR-2006 13:16	DONE	120	-0.13	percent	165	0	-550	880	20.0	357
513067	1201054117	12-APR-2006 16:58	DUSE	0	-0.46	percent	165	0	-550	880	20.0	357
516977	1201062518	13-APR-2006 21:04	DONE	60	-0.3	percent	165	0	-550	880	20.0	357
516978	1201062522	14-APR-2006 06:30	DONE	3	-0.45	percent	165	0	-550	880	20.0	357
517253	1201063138	17-APR-2006 11:51	DONE	1576	3.9	percent	165	0	-550	880	20.0	357
520754	1201071040	17-APR-2006 23:56	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
520996	1201071615	18-APR-2006 05:53	DONE	66	-0.28	percent	165	0	-550	880	20.0	357
520998	1201071623	19-APR-2006 06:01	DONE	1523	3.8	percent	165	0	-550	880	20.0	357

516979	1201062526	19-APR-2006 07:25	DONE	48	-0.33	percent	165	0	-550	880	20.0	357
516657	1201061778	19-APR-2006 17:52	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
521937	1201074023	20-APR-2006 06:04	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
517257	1201063153	20-APR-2006 10:21	DONE	82	-0.23	percent	165	0	-550	880	20.0	357
519545	1201068318	20-APR-2006 15:32	DONE	180	0.04	percent	165	0	-550	880	20.0	357
519011	1201067123	20-APR-2006 23:49	DONE	0	-0.46	percent	165	0	-550	880	20.0	357
517255	1201063145	20-APR-2006 23:50	DONE	21	-0.4	percent	165	0	-550	880	20.0	357
519535	1201068296	20-APR-2006 23:55	DONE	279	0.32	percent	165	0	-550	880	20.0	357
519516	1201068249	21-APR-2006 09:09	DONE	425	0.73	percent	165	0	-550	880	20.0	357
522386	1201075055	23-APR-2006 23:51	DONE	114	-0.14	percent	165	0	-550	880	20.0	357
515884	1201060219	24-APR-2006 05:36	DUSE	0	-0.46	percent	165	0	-550	880	20.0	357

Cesium-137 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
515677	1201059772	02-APR-2006 21:43	DONE	94	-0.77	percent	100	75.0	83.3	117	125	8.33
512910	1201053788	03-APR-2006 16:23	DONE	100	-0.01	percent	100	75.0	83.3	117	125	8.33
511298	1201050112	03-APR-2006 22:07	DONE	93	-0.8	percent	100	75.0	83.3	117	125	8.33
512870	1201053698	03-APR-2006 23:54	DONE	108	0.91	percent	100	75.0	83.3	117	125	8.33
511297	1201050109	04-APR-2006 06:47	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
516974	1201062509	04-APR-2006 07:59	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
516284	1201061022	04-APR-2006 10:09	DONE	105	0.54	percent	100	75.0	83.3	117	125	8.33
516477	1201061403	04-APR-2006 11:44	DONE	104	0.43	percent	100	75.0	83.3	117	125	8.33
516727	1201061913	04-APR-2006 21:44	DONE	101	0.07	percent	100	75.0	83.3	117	125	8.33
511296	1201050106	05-APR-2006 19:38	DONE	106	0.72	percent	100	75.0	83.3	117	125	8.33
515679	1201059782	06-APR-2006 21:11	DONE	101	0.1	percent	100	75.0	83.3	117	125	8.33
516333	1201061132	06-APR-2006 22:33	DONE	106	0.67	percent	100	75.0	83.3	117	125	8.33
516981	1201062535	07-APR-2006 13:55	DONE	104	0.45	percent	100	75.0	83.3	117	125	8.33
516331	1201061128	07-APR-2006 16:56	DONE	103	0.3	percent	100	75.0	83.3	117	125	8.33
517019	1201062620	08-APR-2006 17:13	DONE	106	0.76	percent	100	75.0	83.3	117	125	8.33
516976	1201062516	10-APR-2006 08:10	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
517034	1201062660	10-APR-2006 20:35	DONE	101	0.06	percent	100	75.0	83.3	117	125	8.33
516982	1201062538	10-APR-2006 21:32	DONE	102	0.27	percent	100	75.0	83.3	117	125	8.33
517023	1201062632	10-APR-2006 22:38	DONE	96	-0.49	percent	100	75.0	83.3	117	125	8.33
517024	1201062641	11-APR-2006 06:58	DONE	106	0.71	percent	100	75.0	83.3	117	125	8.33
519523	1201068262	11-APR-2006 10:58	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
519011	1201067124	11-APR-2006 22:38	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
516978	1201062524	14-APR-2006 06:31	DONE	104	0.53	percent	100	75.0	83.3	117	125	8.33
516977	1201062520	14-APR-2006 10:17	DONE	111	1.4	percent	100	75.0	83.3	117	125	8.33
520998	1201071625	17-APR-2006 19:03	DONE	98	-0.28	percent	100	75.0	83.3	117	125	8.33
517253	1201063139	17-APR-2006 22:49	DONE	101	0.13	percent	100	75.0	83.3	117	125	8.33
520996	1201071617	18-APR-2006 05:54	DONE	93	-0.88	percent	100	75.0	83.3	117	125	8.33
520754	1201071041	18-APR-2006 19:10	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
516979	1201062528	19-APR-2006 13:02	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
516657	1201061779	19-APR-2006 18:10	DONE	105	0.56	percent	100	75.0	83.3	117	125	8.33
516980	1201062532	19-APR-2006 22:50	DONE	102	0.22	percent	100	75.0	83.3	117	125	8.33
521937	1201074024	20-APR-2006 06:04	DONE	108	0.92	percent	100	75.0	83.3	117	125	8.33
519545	1201068320	20-APR-2006 09:41	DONE	103	0.31	percent	100	75.0	83.3	117	125	8.33
517257	1201063155	20-APR-2006 12:11	DONE	113	1.5	percent	100	75.0	83.3	117	125	8.33
519535	1201068291	21-APR-2006 06:15	DONE	114	1.6	percent	100	75.0	83.3	117	125	8.33
517255	1201063147	21-APR-2006 07:39	DONE	102	0.26	percent	100	75.0	83.3	117	125	8.33

519516	1201068251	21-APR-2006 09:58	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
522386	1201075056	23-APR-2006 21:45	DONE	101	0.06	percent	100	75.0	83.3	117	125	8.33
523017	1201076445	25-APR-2006 06:13	DONE	107	0.79	percent	100	75.0	83.3	117	125	8.33

Cesium-137 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
515677	1201059771	03-APR-2006 10:09	DONE	0.21	-0.53	dec	0.89	0	-1.7	3.45	3.00	1.28
510367	1201048023	03-APR-2006 11:27	DONE	0	-0.7	dec	0.89	0	-1.7	3.45	3.00	1.28
511297	1201050108	04-APR-2006 05:50	DONE	0.66	-0.18	dec	0.89	0	-1.7	3.45	3.00	1.28
516974	1201062507	04-APR-2006 11:01	DONE	1.5	0.48	dec	0.89	0	-1.7	3.45	3.00	1.28
512870	1201053697	04-APR-2006 12:02	DONE	0.76	-0.1	dec	0.89	0	-1.7	3.45	3.00	1.28
516477	1201061402	04-APR-2006 12:18	DONE	0.14	-0.59	dec	0.89	0	-1.7	3.45	3.00	1.28
510984	1201049365	04-APR-2006 17:17	DONE	0	-0.7	dec	0.89	0	-1.7	3.45	3.00	1.28
516284	1201061021	04-APR-2006 17:27	DONE	0.57	-0.25	dec	0.89	0	-1.7	3.45	3.00	1.28
511296	1201050105	05-APR-2006 18:16	DONE	0.05	-0.66	dec	0.89	0	-1.7	3.45	3.00	1.28
515679	1201059780	06-APR-2006 11:54	DONE	0.74	-0.12	dec	0.89	0	-1.7	3.45	3.00	1.28
516981	1201062534	06-APR-2006 23:55	DONE	1.08	0.15	dec	0.89	0	-1.7	3.45	3.00	1.28
516976	1201062514	07-APR-2006 11:18	DONE	1.32	0.34	dec	0.89	0	-1.7	3.45	3.00	1.28
516333	1201061130	07-APR-2006 16:54	DONE	1.37	0.37	dec	0.89	0	-1.7	3.45	3.00	1.28
517034	1201062659	10-APR-2006 18:58	DONE	0.67	-0.17	dec	0.89	0	-1.7	3.45	3.00	1.28
517023	1201062631	10-APR-2006 19:02	DONE	0.03	-0.67	dec	0.89	0	-1.7	3.45	3.00	1.28
517019	1201062618	10-APR-2006 19:13	DONE	0.08	-0.64	dec	0.89	0	-1.7	3.45	3.00	1.28
516982	1201062537	10-APR-2006 21:49	DONE	0.29	-0.47	dec	0.89	0	-1.7	3.45	3.00	1.28
517024	1201062639	11-APR-2006 10:13	DONE	0.23	-0.51	dec	0.89	0	-1.7	3.45	3.00	1.28
519523	1201068260	11-APR-2006 10:15	DONE	0.95	0.05	dec	0.89	0	-1.7	3.45	3.00	1.28
512920	1201053811	11-APR-2006 19:17	DUSE	2.44	1.2	dec	0.89	0	-1.7	3.45	3.00	1.28
516331	1201061126	12-APR-2006 13:16	DONE	2.25	1.1	dec	0.89	0	-1.7	3.45	3.00	1.28
516977	1201062518	13-APR-2006 21:04	DONE	0.5	-0.3	dec	0.89	0	-1.7	3.45	3.00	1.28
516978	1201062522	14-APR-2006 06:30	DONE	0.02	-0.68	dec	0.89	0	-1.7	3.45	3.00	1.28
517253	1201063138	17-APR-2006 11:51	DONE	0.53	-0.28	dec	0.89	0	-1.7	3.45	3.00	1.28
520754	1201071040	17-APR-2006 23:56	DONE	0.85	-0.03	dec	0.89	0	-1.7	3.45	3.00	1.28
520996	1201071615	18-APR-2006 05:53	DONE	0.28	-0.48	dec	0.89	0	-1.7	3.45	3.00	1.28
520998	1201071623	19-APR-2006 06:01	DONE	2.32	1.1	dec	0.89	0	-1.7	3.45	3.00	1.28
516979	1201062526	19-APR-2006 07:25	DONE	0.34	-0.43	dec	0.89	0	-1.7	3.45	3.00	1.28
516657	1201061778	19-APR-2006 17:52	DONE	1.63	0.58	dec	0.89	0	-1.7	3.45	3.00	1.28
516980	1201062530	19-APR-2006 23:19	DONE	0.44	-0.35	dec	0.89	0	-1.7	3.45	3.00	1.28
521937	1201074023	20-APR-2006 06:04	DONE	0.77	-0.1	dec	0.89	0	-1.7	3.45	3.00	1.28
517257	1201063153	20-APR-2006 10:21	DONE	0.17	-0.56	dec	0.89	0	-1.7	3.45	3.00	1.28
519545	1201068318	20-APR-2006 15:32	DONE	0.12	-0.6	dec	0.89	0	-1.7	3.45	3.00	1.28
519011	1201067123	20-APR-2006 23:49	DONE	7.26	5	dec	0.89	0	-1.7	3.45	3.00	1.28
517255	1201063145	20-APR-2006 23:50	DONE	0.21	-0.53	dec	0.89	0	-1.7	3.45	3.00	1.28
519535	1201068296	20-APR-2006 23:55	DONE	0.95	0.05	dec	0.89	0	-1.7	3.45	3.00	1.28
519516	1201068249	21-APR-2006 09:09	DONE	2.73	1.4	dec	0.89	0	-1.7	3.45	3.00	1.28
522386	1201075055	23-APR-2006 23:51	DONE	0.13	-0.6	dec	0.89	0	-1.7	3.45	3.00	1.28
523017	1201076444	25-APR-2006 06:13	DUSE	0.11	-0.61	dec	0.89	0	-1.7	3.45	3.00	1.28

Cesium-137 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
498898	1201021191	24-FEB-2006 19:13	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
503740	1201032437	27-FEB-2006 06:22	DONE	107	0.89	percent	100	75.0	83.3	117	125	8.33

506274	1201038473	28-FEB-2006 09:00	DONE	98	-0.25	percent	100	75.0	83.3	117	125	8.33
506282	1201038480	03-MAR-2006 11:15	DONE	104	0.5	percent	100	75.0	83.3	117	125	8.33
507258	1201040767	05-MAR-2006 19:50	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
507638	1201041726	07-MAR-2006 10:55	DONE	102	0.23	percent	100	75.0	83.3	117	125	8.33
508355	1201043465	08-MAR-2006 11:21	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
507632	1201041716	10-MAR-2006 10:00	DONE	101	0.07	percent	100	75.0	83.3	117	125	8.33
510364	1201048016	10-MAR-2006 17:46	DONE	107	0.85	percent	100	75.0	83.3	117	125	8.33
507647	1201041742	11-MAR-2006 15:34	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
507649	1201041746	18-MAR-2006 13:45	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
507650	1201041750	18-MAR-2006 13:46	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
507640	1201041730	20-MAR-2006 18:44	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
512038	1201051800	21-MAR-2006 11:50	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
508908	1201044773	22-MAR-2006 17:05	DONE	107	0.79	percent	100	75.0	83.3	117	125	8.33
507641	1201041734	23-MAR-2006 09:11	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
510369	1201048027	27-MAR-2006 06:50	DONE	100	0.02	percent	100	75.0	83.3	117	125	8.33
508910	1201044781	27-MAR-2006 19:42	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
511246	1201049992	28-MAR-2006 11:43	DONE	94	-0.67	percent	100	75.0	83.3	117	125	8.33
508909	1201044777	29-MAR-2006 08:15	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
507644	1201041738	03-APR-2006 12:47	DONE	108	1	percent	100	75.0	83.3	117	125	8.33
516974	1201062508	04-APR-2006 09:02	DONE	105	0.59	percent	100	75.0	83.3	117	125	8.33
515679	1201059781	06-APR-2006 21:11	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
516333	1201061131	06-APR-2006 22:34	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
517019	1201062619	08-APR-2006 18:42	DONE	118	2.2	percent	100	75.0	83.3	117	125	8.33
516976	1201062515	10-APR-2006 06:39	DONE	104	0.46	percent	100	75.0	83.3	117	125	8.33
517024	1201062640	11-APR-2006 05:39	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
519523	1201068261	11-APR-2006 08:15	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
516331	1201061127	11-APR-2006 12:05	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
516977	1201062519	13-APR-2006 21:04	DONE	97	-0.41	percent	100	75.0	83.3	117	125	8.33
516978	1201062523	14-APR-2006 06:30	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
520996	1201071616	18-APR-2006 05:54	DONE	106	0.67	percent	100	75.0	83.3	117	125	8.33
520998	1201071624	19-APR-2006 06:01	DONE	93	-0.84	percent	100	75.0	83.3	117	125	8.33
516979	1201062527	19-APR-2006 07:26	DONE	107	0.8	percent	100	75.0	83.3	117	125	8.33
516980	1201062531	19-APR-2006 11:25	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
517255	1201063146	21-APR-2006 06:23	DONE	106	0.76	percent	100	75.0	83.3	117	125	8.33
519516	1201068250	21-APR-2006 09:10	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
517257	1201063154	21-APR-2006 12:55	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
519535	1201068297	21-APR-2006 13:59	DONE	99	-0.1	percent	100	75.0	83.3	117	125	8.33

Cobalt-60 BLANK: Limits LCL = -4.4 UCL = 6.1

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
514861	1201057809	01-APR-2006 18:00	DONE	1	-0.13	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
515677	1201059770	02-APR-2006 20:37	DONE	6	2.9	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
511298	1201050110	02-APR-2006 22:50	DONE	0	-0.41	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
512870	1201053696	02-APR-2006 23:54	DONE	2	0.41	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
512910	1201053787	03-APR-2006 16:51	DUSE	4	1.7	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516974	1201062506	04-APR-2006 06:44	DONE	0	-0.39	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516284	1201061020	04-APR-2006 10:08	DONE	-2	-1	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516477	1201061401	04-APR-2006 10:18	DONE	7	3.4	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516727	1201061912	04-APR-2006 21:43	DUSE	-1	-0.99	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
511296	1201050104	05-APR-2006 18:15	DONE	1	0.25	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75

516981	1201062533	06-APR-2006 16:41	DONE	1	0.28	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
515679	1201059779	06-APR-2006 20:00	DONE	2	0.72	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516333	1201061129	07-APR-2006 16:54	DONE	0	-0.59	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516331	1201061125	07-APR-2006 16:55	DONE	0	-0.58	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517023	1201062630	08-APR-2006 01:11	DONE	2	0.39	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517019	1201062617	08-APR-2006 17:58	DUSE	0	-0.75	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517034	1201062658	10-APR-2006 14:44	DONE	1	-0.12	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516976	1201062513	10-APR-2006 15:40	DONE	0	-0.49	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516982	1201062536	10-APR-2006 19:45	DONE	1	0.33	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517024	1201062638	10-APR-2006 23:56	DONE	2	0.44	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
519523	1201068259	11-APR-2006 06:19	DONE	1	-0.17	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516977	1201062517	13-APR-2006 12:23	DONE	-2	-2	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516978	1201062521	13-APR-2006 23:22	DONE	2	0.51	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
520998	1201071622	16-APR-2006 20:07	DONE	1	-0.15	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517253	1201063137	17-APR-2006 19:16	DONE	0	-0.25	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
520996	1201071614	17-APR-2006 23:10	DONE	-1	-1	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
520754	1201071039	17-APR-2006 23:45	DONE	0	-0.23	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
519011	1201067122	18-APR-2006 19:02	DONE	0	-0.33	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516657	1201061777	18-APR-2006 19:37	DONE	1	0.16	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516979	1201062525	19-APR-2006 11:15	DONE	0	-0.23	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
516980	1201062529	19-APR-2006 22:49	DONE	0	-0.57	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
521937	1201074022	20-APR-2006 06:03	DUSE	0	-0.47	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517257	1201063152	20-APR-2006 10:17	DONE	0	-0.64	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
519545	1201068317	20-APR-2006 12:30	DONE	1	0.1	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
517255	1201063144	20-APR-2006 17:02	DONE	0	-0.26	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
519535	1201068288	20-APR-2006 21:41	DONE	2	0.62	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
519516	1201068248	20-APR-2006 23:48	DONE	0	-0.3	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
522386	1201075054	21-APR-2006 23:16	DONE	3	1.1	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75
523017	1201076443	24-APR-2006 23:31	DUSE	-1	-1	pCi/L	0.88	-4.4	-2.6	4.38	6.14	1.75

Cobalt-60 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510365	1201048019	30-MAR-2006 06:47	DONE	13	-0.61	percent	284	0	-610	1170	20.0	445
507644	1201041737	31-MAR-2006 18:43	DONE	98	-0.42	percent	284	0	-610	1170	20.0	445
514861	1201057810	01-APR-2006 20:22	DONE	184	-0.23	percent	284	0	-610	1170	20.0	445
511298	1201050111	02-APR-2006 22:51	DONE	79	-0.46	percent	284	0	-610	1170	20.0	445
511295	1201050102	03-APR-2006 05:16	DONE	73	-0.47	percent	284	0	-610	1170	20.0	445
515677	1201059771	03-APR-2006 10:09	DONE	711	0.96	percent	284	0	-610	1170	20.0	445
511297	1201050108	04-APR-2006 05:50	DONE	1210	2.1	percent	284	0	-610	1170	20.0	445
516974	1201062507	04-APR-2006 11:01	DONE	211	-0.16	percent	284	0	-610	1170	20.0	445
512870	1201053697	04-APR-2006 12:02	DONE	0	-0.64	percent	284	0	-610	1170	20.0	445
516477	1201061402	04-APR-2006 12:18	DONE	133	-0.34	percent	284	0	-610	1170	20.0	445
516284	1201061021	04-APR-2006 17:27	DONE	0	-0.64	percent	284	0	-610	1170	20.0	445
511296	1201050105	05-APR-2006 18:16	DONE	274	-0.02	percent	284	0	-610	1170	20.0	445
515679	1201059780	06-APR-2006 11:54	DONE	37	-0.56	percent	284	0	-610	1170	20.0	445
516981	1201062534	06-APR-2006 23:55	DONE	12	-0.61	percent	284	0	-610	1170	20.0	445
516976	1201062514	07-APR-2006 11:18	DONE	87	-0.44	percent	284	0	-610	1170	20.0	445
516333	1201061130	07-APR-2006 16:54	DONE	68	-0.49	percent	284	0	-610	1170	20.0	445
517034	1201062659	10-APR-2006 18:58	DONE	43	-0.54	percent	284	0	-610	1170	20.0	445
517023	1201062631	10-APR-2006 19:02	DONE	37	-0.56	percent	284	0	-610	1170	20.0	445

517019	1201062618	10-APR-2006 19:13	DUSE	214	-0.16	percent	284	0	-610	1170	20.0	445
516982	1201062537	10-APR-2006 21:49	DONE	259	-0.06	percent	284	0	-610	1170	20.0	445
517024	1201062639	11-APR-2006 10:13	DONE	301	0.04	percent	284	0	-610	1170	20.0	445
519523	1201068260	11-APR-2006 10:15	DONE	152	-0.3	percent	284	0	-610	1170	20.0	445
516331	1201061126	12-APR-2006 13:16	DONE	1655	3.1	percent	284	0	-610	1170	20.0	445
516977	1201062518	13-APR-2006 21:04	DONE	650	0.82	percent	284	0	-610	1170	20.0	445
516978	1201062522	14-APR-2006 06:30	DONE	65	-0.49	percent	284	0	-610	1170	20.0	445
517253	1201063138	17-APR-2006 11:51	DONE	1482	2.7	percent	284	0	-610	1170	20.0	445
520754	1201071040	17-APR-2006 23:56	DONE	0	-0.64	percent	284	0	-610	1170	20.0	445
520996	1201071615	18-APR-2006 05:53	DONE	102	-0.41	percent	284	0	-610	1170	20.0	445
520998	1201071623	19-APR-2006 06:01	DONE	688	0.91	percent	284	0	-610	1170	20.0	445
516979	1201062526	19-APR-2006 07:25	DONE	308	0.05	percent	284	0	-610	1170	20.0	445
516657	1201061778	19-APR-2006 17:52	DONE	0	-0.64	percent	284	0	-610	1170	20.0	445
521937	1201074023	20-APR-2006 06:04	DUSE	0	-0.64	percent	284	0	-610	1170	20.0	445
517257	1201063153	20-APR-2006 10:21	DONE	107	-0.4	percent	284	0	-610	1170	20.0	445
519545	1201068318	20-APR-2006 15:32	DONE	36	-0.56	percent	284	0	-610	1170	20.0	445
519011	1201067123	20-APR-2006 23:49	DONE	0	-0.64	percent	284	0	-610	1170	20.0	445
517255	1201063145	20-APR-2006 23:50	DONE	52	-0.52	percent	284	0	-610	1170	20.0	445
519535	1201068296	20-APR-2006 23:55	DONE	1505	2.7	percent	284	0	-610	1170	20.0	445
519516	1201068249	21-APR-2006 09:09	DONE	76	-0.47	percent	284	0	-610	1170	20.0	445
522386	1201075055	23-APR-2006 23:51	DONE	155	-0.29	percent	284	0	-610	1170	20.0	445

Cobalt-60 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
515677	1201059772	02-APR-2006 21:43	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
512910	1201053788	03-APR-2006 16:23	DONE	94	-0.67	percent	100	75.0	83.3	117	125	8.33
511298	1201050112	03-APR-2006 22:07	DONE	94	-0.69	percent	100	75.0	83.3	117	125	8.33
512870	1201053698	03-APR-2006 23:54	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
511297	1201050109	04-APR-2006 06:47	DONE	107	0.8	percent	100	75.0	83.3	117	125	8.33
516974	1201062509	04-APR-2006 07:59	DONE	98	-0.28	percent	100	75.0	83.3	117	125	8.33
516284	1201061022	04-APR-2006 10:09	DONE	94	-0.7	percent	100	75.0	83.3	117	125	8.33
516477	1201061403	04-APR-2006 11:44	DONE	98	-0.28	percent	100	75.0	83.3	117	125	8.33
516727	1201061913	04-APR-2006 21:44	DONE	96	-0.46	percent	100	75.0	83.3	117	125	8.33
511296	1201050106	05-APR-2006 19:38	DONE	100	-0.03	percent	100	75.0	83.3	117	125	8.33
515679	1201059782	06-APR-2006 21:11	DONE	108	0.98	percent	100	75.0	83.3	117	125	8.33
516333	1201061132	06-APR-2006 22:33	DONE	102	0.28	percent	100	75.0	83.3	117	125	8.33
516981	1201062535	07-APR-2006 13:55	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
516331	1201061128	07-APR-2006 16:56	DONE	99	-0.14	percent	100	75.0	83.3	117	125	8.33
517019	1201062620	08-APR-2006 17:13	DUSE	106	0.71	percent	100	75.0	83.3	117	125	8.33
516976	1201062516	10-APR-2006 08:10	DONE	108	0.95	percent	100	75.0	83.3	117	125	8.33
517034	1201062660	10-APR-2006 20:35	DONE	107	0.8	percent	100	75.0	83.3	117	125	8.33
516982	1201062538	10-APR-2006 21:32	DONE	97	-0.4	percent	100	75.0	83.3	117	125	8.33
517023	1201062632	10-APR-2006 22:38	DONE	96	-0.47	percent	100	75.0	83.3	117	125	8.33
517024	1201062641	11-APR-2006 06:58	DONE	106	0.72	percent	100	75.0	83.3	117	125	8.33
519523	1201068262	11-APR-2006 10:58	DONE	105	0.62	percent	100	75.0	83.3	117	125	8.33
519011	1201067124	11-APR-2006 22:38	DONE	97	-0.31	percent	100	75.0	83.3	117	125	8.33
516978	1201062524	14-APR-2006 06:31	DONE	103	0.3	percent	100	75.0	83.3	117	125	8.33
516977	1201062520	14-APR-2006 10:17	DONE	117	2	percent	100	75.0	83.3	117	125	8.33
520998	1201071625	17-APR-2006 19:03	DONE	94	-0.74	percent	100	75.0	83.3	117	125	8.33
517253	1201063139	17-APR-2006 22:49	DONE	95	-0.55	percent	100	75.0	83.3	117	125	8.33

520996	1201071617	18-APR-2006 05:54	DONE	97	-0.34	percent	100	75.0	83.3	117	125	8.33
520754	1201071041	18-APR-2006 19:10	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
516979	1201062528	19-APR-2006 13:02	DONE	105	0.56	percent	100	75.0	83.3	117	125	8.33
516657	1201061779	19-APR-2006 18:10	DONE	105	0.56	percent	100	75.0	83.3	117	125	8.33
516980	1201062532	19-APR-2006 22:50	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
521937	1201074024	20-APR-2006 06:04	DUSE	101	0.16	percent	100	75.0	83.3	117	125	8.33
519545	1201068320	20-APR-2006 09:41	DONE	93	-0.9	percent	100	75.0	83.3	117	125	8.33
517257	1201063155	20-APR-2006 12:11	DONE	102	0.18	percent	100	75.0	83.3	117	125	8.33
519535	1201068291	21-APR-2006 06:15	DONE	103	0.37	percent	100	75.0	83.3	117	125	8.33
517255	1201063147	21-APR-2006 07:39	DONE	104	0.5	percent	100	75.0	83.3	117	125	8.33
519516	1201068251	21-APR-2006 09:58	DONE	98	-0.3	percent	100	75.0	83.3	117	125	8.33
522386	1201075056	23-APR-2006 21:45	DONE	97	-0.34	percent	100	75.0	83.3	117	125	8.33
523017	1201076445	25-APR-2006 06:13	DONE	99	-0.11	percent	100	75.0	83.3	117	125	8.33

Cobalt-60 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
514861	1201057810	01-APR-2006 20:22	DONE	1.25	0.74	dec	0.78	0	-0.506	2.06	3.00	0.64
511298	1201050111	02-APR-2006 22:51	DONE	0.1	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
511295	1201050102	03-APR-2006 05:16	DONE	0.13	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
515677	1201059771	03-APR-2006 10:09	DONE	0.5	-0.42	dec	0.78	0	-0.506	2.06	3.00	0.64
511297	1201050108	04-APR-2006 05:50	DONE	2.13	2.1	dec	0.78	0	-0.506	2.06	3.00	0.64
516974	1201062507	04-APR-2006 11:01	DONE	1.99	1.9	dec	0.78	0	-0.506	2.06	3.00	0.64
512870	1201053697	04-APR-2006 12:02	DONE	0.84	0.11	dec	0.78	0	-0.506	2.06	3.00	0.64
516477	1201061402	04-APR-2006 12:18	DONE	0.39	-0.6	dec	0.78	0	-0.506	2.06	3.00	0.64
516284	1201061021	04-APR-2006 17:27	DONE	0.85	0.11	dec	0.78	0	-0.506	2.06	3.00	0.64
511296	1201050105	05-APR-2006 18:16	DONE	0.4	-0.59	dec	0.78	0	-0.506	2.06	3.00	0.64
515679	1201059780	06-APR-2006 11:54	DONE	0.9	0.19	dec	0.78	0	-0.506	2.06	3.00	0.64
516981	1201062534	06-APR-2006 23:55	DONE	0.11	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
516976	1201062514	07-APR-2006 11:18	DONE	0.88	0.17	dec	0.78	0	-0.506	2.06	3.00	0.64
516333	1201061130	07-APR-2006 16:54	DONE	0.46	-0.49	dec	0.78	0	-0.506	2.06	3.00	0.64
517034	1201062659	10-APR-2006 18:58	DONE	0.22	-0.87	dec	0.78	0	-0.506	2.06	3.00	0.64
517023	1201062631	10-APR-2006 19:02	DONE	0.09	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
517019	1201062618	10-APR-2006 19:13	DUSE	0.89	0.17	dec	0.78	0	-0.506	2.06	3.00	0.64
516982	1201062537	10-APR-2006 21:49	DONE	1.57	1.2	dec	0.78	0	-0.506	2.06	3.00	0.64
517024	1201062639	11-APR-2006 10:13	DONE	2.34	2.4	dec	0.78	0	-0.506	2.06	3.00	0.64
519523	1201068260	11-APR-2006 10:15	DONE	1.95	1.8	dec	0.78	0	-0.506	2.06	3.00	0.64
516331	1201061126	12-APR-2006 13:16	DONE	0.63	-0.23	dec	0.78	0	-0.506	2.06	3.00	0.64
516977	1201062518	13-APR-2006 21:04	DONE	0.38	-0.62	dec	0.78	0	-0.506	2.06	3.00	0.64
516978	1201062522	14-APR-2006 06:30	DONE	0.37	-0.63	dec	0.78	0	-0.506	2.06	3.00	0.64
517253	1201063138	17-APR-2006 11:51	DONE	0.29	-0.76	dec	0.78	0	-0.506	2.06	3.00	0.64
520754	1201071040	17-APR-2006 23:56	DONE	0.02	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
520996	1201071615	18-APR-2006 05:53	DONE	1.12	0.55	dec	0.78	0	-0.506	2.06	3.00	0.64
520998	1201071623	19-APR-2006 06:01	DONE	1.52	1.2	dec	0.78	0	-0.506	2.06	3.00	0.64
516979	1201062526	19-APR-2006 07:25	DONE	1.2	0.67	dec	0.78	0	-0.506	2.06	3.00	0.64
516657	1201061778	19-APR-2006 17:52	DONE	0.11	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
516980	1201062530	19-APR-2006 23:19	DONE	0.08	-1	dec	0.78	0	-0.506	2.06	3.00	0.64
521937	1201074023	20-APR-2006 06:04	DUSE	0.61	-0.25	dec	0.78	0	-0.506	2.06	3.00	0.64
517257	1201063153	20-APR-2006 10:21	DONE	0.84	0.1	dec	0.78	0	-0.506	2.06	3.00	0.64
519545	1201068318	20-APR-2006 15:32	DONE	0.15	-0.97	dec	0.78	0	-0.506	2.06	3.00	0.64
519011	1201067123	20-APR-2006 23:49	DONE	0.75	-0.04	dec	0.78	0	-0.506	2.06	3.00	0.64

517255	1201063145	20-APR-2006 23:50	DONE	0.43	-0.53	dec	0.78	0	-0.506	2.06	3.00	0.64
519535	1201068296	20-APR-2006 23:55	DONE	1.94	1.8	dec	0.78	0	-0.506	2.06	3.00	0.64
519516	1201068249	21-APR-2006 09:09	DONE	0.46	-0.49	dec	0.78	0	-0.506	2.06	3.00	0.64
522386	1201075055	23-APR-2006 23:51	DONE	0.53	-0.39	dec	0.78	0	-0.506	2.06	3.00	0.64
523017	1201076444	25-APR-2006 06:13	DUSE	0.8	0.04	dec	0.78	0	-0.506	2.06	3.00	0.64

Cobalt-60 SPIKE: Limits LCL = 75 UCL = 125

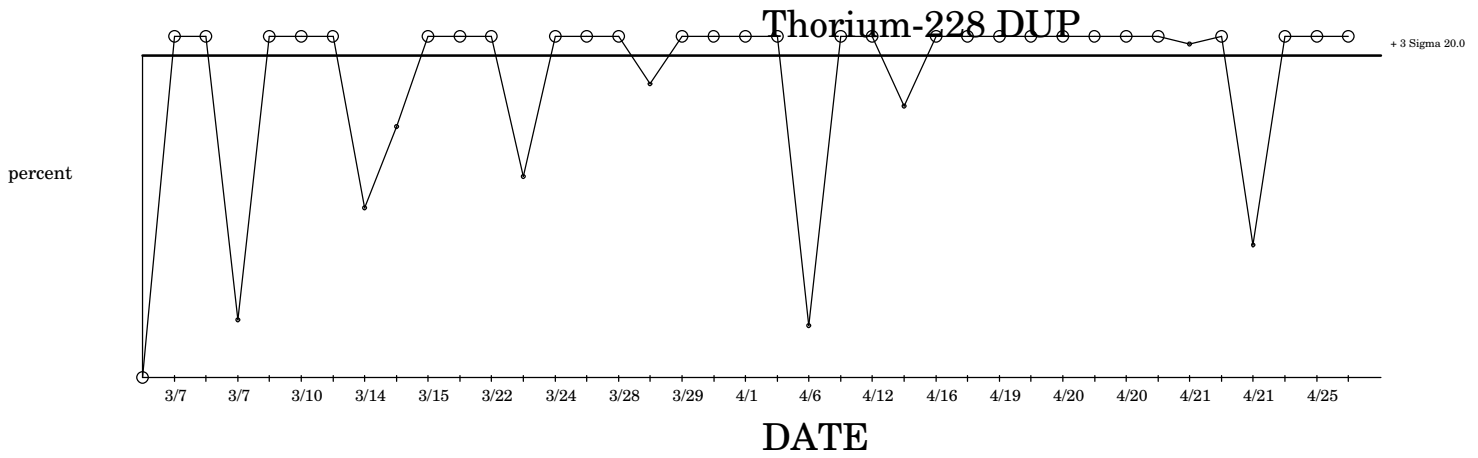
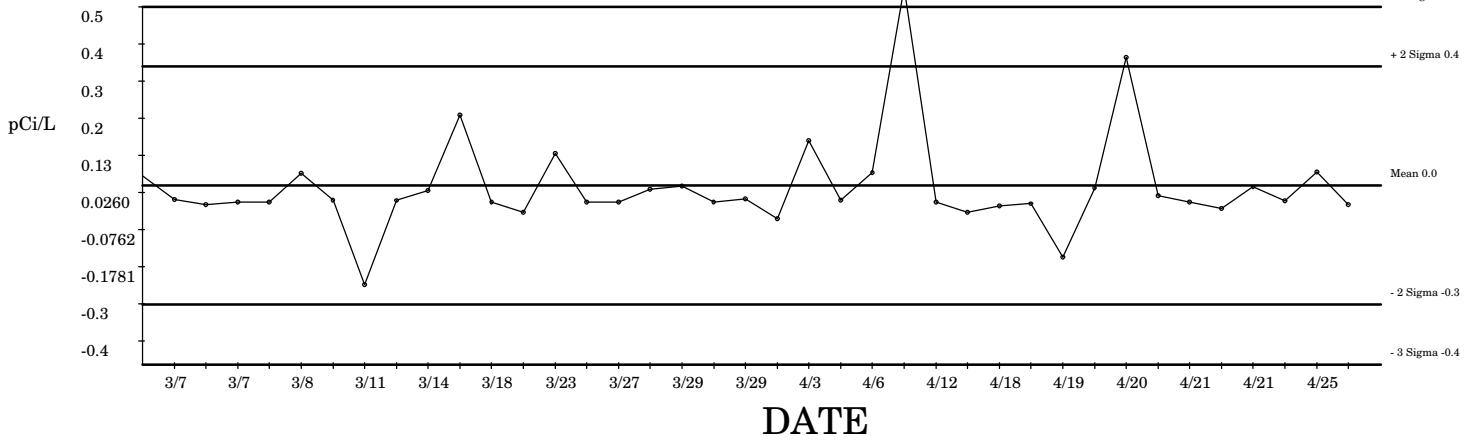
Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
498898	1201021191	24-FEB-2006 19:13	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
503740	1201032437	27-FEB-2006 06:22	DONE	97	-0.37	percent	100	75.0	83.3	117	125	8.33
506274	1201038473	28-FEB-2006 09:00	DONE	93	-0.84	percent	100	75.0	83.3	117	125	8.33
506282	1201038480	03-MAR-2006 11:15	DONE	103	0.38	percent	100	75.0	83.3	117	125	8.33
507258	1201040767	05-MAR-2006 19:50	DONE	107	0.82	percent	100	75.0	83.3	117	125	8.33
507638	1201041726	07-MAR-2006 10:55	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
508355	1201043465	08-MAR-2006 11:21	DONE	102	0.23	percent	100	75.0	83.3	117	125	8.33
507632	1201041716	10-MAR-2006 10:00	DONE	104	0.49	percent	100	75.0	83.3	117	125	8.33
510364	1201048016	10-MAR-2006 17:46	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
507647	1201041742	11-MAR-2006 15:34	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
507649	1201041746	18-MAR-2006 13:45	DONE	108	0.94	percent	100	75.0	83.3	117	125	8.33
507650	1201041750	18-MAR-2006 13:46	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
507640	1201041730	20-MAR-2006 18:44	DONE	99	-0.07	percent	100	75.0	83.3	117	125	8.33
512038	1201051800	21-MAR-2006 11:50	DONE	103	0.41	percent	100	75.0	83.3	117	125	8.33
508908	1201044773	22-MAR-2006 17:05	DONE	105	0.63	percent	100	75.0	83.3	117	125	8.33
507641	1201041734	23-MAR-2006 09:11	DONE	102	0.28	percent	100	75.0	83.3	117	125	8.33
510369	1201048027	27-MAR-2006 06:50	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
508910	1201044781	27-MAR-2006 19:42	DONE	94	-0.7	percent	100	75.0	83.3	117	125	8.33
511246	1201049992	28-MAR-2006 11:43	DONE	105	0.54	percent	100	75.0	83.3	117	125	8.33
508909	1201044777	29-MAR-2006 08:15	DONE	102	0.2	percent	100	75.0	83.3	117	125	8.33
507644	1201041738	03-APR-2006 12:47	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
516974	1201062508	04-APR-2006 09:02	DONE	104	0.52	percent	100	75.0	83.3	117	125	8.33
515679	1201059781	06-APR-2006 21:11	DONE	103	0.31	percent	100	75.0	83.3	117	125	8.33
516333	1201061131	06-APR-2006 22:34	DONE	100	-0	percent	100	75.0	83.3	117	125	8.33
517019	1201062619	08-APR-2006 18:42	DUSE	106	0.73	percent	100	75.0	83.3	117	125	8.33
516976	1201062515	10-APR-2006 06:39	DONE	102	0.28	percent	100	75.0	83.3	117	125	8.33
517024	1201062640	11-APR-2006 05:39	DONE	98	-0.29	percent	100	75.0	83.3	117	125	8.33
519523	1201068261	11-APR-2006 08:15	DONE	92	-01	percent	100	75.0	83.3	117	125	8.33
516331	1201061127	11-APR-2006 12:05	DONE	97	-0.41	percent	100	75.0	83.3	117	125	8.33
516977	1201062519	13-APR-2006 21:04	DONE	102	0.26	percent	100	75.0	83.3	117	125	8.33
516978	1201062523	14-APR-2006 06:30	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
520996	1201071616	18-APR-2006 05:54	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
520998	1201071624	19-APR-2006 06:01	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
516979	1201062527	19-APR-2006 07:26	DONE	99	-0.08	percent	100	75.0	83.3	117	125	8.33
516980	1201062531	19-APR-2006 11:25	DONE	99	-0.17	percent	100	75.0	83.3	117	125	8.33
517255	1201063146	21-APR-2006 06:23	DONE	106	0.76	percent	100	75.0	83.3	117	125	8.33
519516	1201068250	21-APR-2006 09:10	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
517257	1201063154	21-APR-2006 12:55	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
519535	1201068297	21-APR-2006 13:59	DONE	105	0.58	percent	100	75.0	83.3	117	125	8.33

Lead-212 RER: Limits LCL = 0 UCL = 3

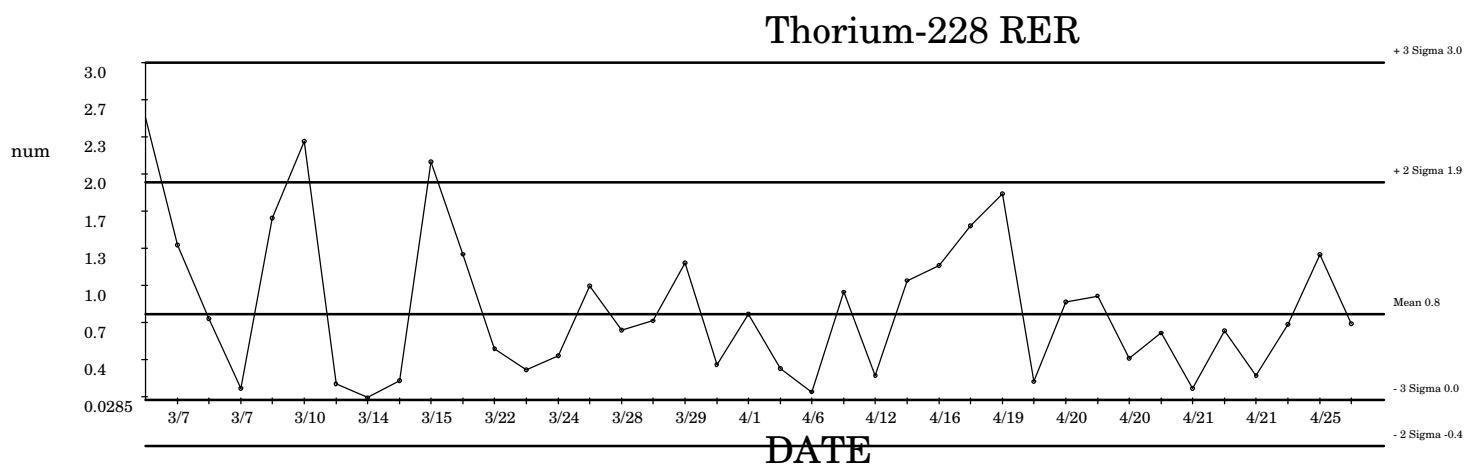
Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
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514861	1201057810	01-APR-2006 20:22	DUSE	0.02	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
511298	1201050111	02-APR-2006 22:51	DONE	0.68	0.22	dec	0.58	0	-0.31	1.47	3.00	0.45
511295	1201050102	03-APR-2006 05:16	DUSE	0.22	-0.81	dec	0.58	0	-0.31	1.47	3.00	0.45
515677	1201059771	03-APR-2006 10:09	DUSE	0.36	-0.49	dec	0.58	0	-0.31	1.47	3.00	0.45
511297	1201050108	04-APR-2006 05:50	DONE	2.15	3.5	dec	0.58	0	-0.31	1.47	3.00	0.45
516974	1201062507	04-APR-2006 11:01	DUSE	0.07	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
512870	1201053697	04-APR-2006 12:02	DUSE	0.58	0.01	dec	0.58	0	-0.31	1.47	3.00	0.45
516477	1201061402	04-APR-2006 12:18	DUSE	0.47	-0.26	dec	0.58	0	-0.31	1.47	3.00	0.45
516284	1201061021	04-APR-2006 17:27	DUSE	0.65	0.16	dec	0.58	0	-0.31	1.47	3.00	0.45
511296	1201050105	05-APR-2006 18:16	DUSE	0.33	-0.57	dec	0.58	0	-0.31	1.47	3.00	0.45
515679	1201059780	06-APR-2006 11:54	DONE	0.58	-0.01	dec	0.58	0	-0.31	1.47	3.00	0.45
516981	1201062534	06-APR-2006 23:55	DUSE	0.59	0.03	dec	0.58	0	-0.31	1.47	3.00	0.45
516976	1201062514	07-APR-2006 11:18	DUSE	0.33	-0.57	dec	0.58	0	-0.31	1.47	3.00	0.45
516333	1201061130	07-APR-2006 16:54	DONE	0.28	-0.68	dec	0.58	0	-0.31	1.47	3.00	0.45
517034	1201062659	10-APR-2006 18:58	DONE	1	0.95	dec	0.58	0	-0.31	1.47	3.00	0.45
517023	1201062631	10-APR-2006 19:02	DUSE	0.12	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
517019	1201062618	10-APR-2006 19:13	DONE	0.87	0.65	dec	0.58	0	-0.31	1.47	3.00	0.45
516982	1201062537	10-APR-2006 21:49	DUSE	0.39	-0.43	dec	0.58	0	-0.31	1.47	3.00	0.45
517024	1201062639	11-APR-2006 10:13	DONE	0.15	-0.97	dec	0.58	0	-0.31	1.47	3.00	0.45
519523	1201068260	11-APR-2006 10:15	DONE	0.82	0.54	dec	0.58	0	-0.31	1.47	3.00	0.45
516331	1201061126	12-APR-2006 13:16	DONE	0.41	-0.38	dec	0.58	0	-0.31	1.47	3.00	0.45
516977	1201062518	13-APR-2006 21:04	DUSE	0.65	0.16	dec	0.58	0	-0.31	1.47	3.00	0.45
516978	1201062522	14-APR-2006 06:30	DUSE	1.35	1.7	dec	0.58	0	-0.31	1.47	3.00	0.45
517253	1201063138	17-APR-2006 11:51	DONE	0.64	0.13	dec	0.58	0	-0.31	1.47	3.00	0.45
520754	1201071040	17-APR-2006 23:56	DUSE	1.26	1.5	dec	0.58	0	-0.31	1.47	3.00	0.45
520996	1201071615	18-APR-2006 05:53	DONE	0.84	0.57	dec	0.58	0	-0.31	1.47	3.00	0.45
520998	1201071623	19-APR-2006 06:01	DONE	0.07	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
516979	1201062526	19-APR-2006 07:25	DUSE	1.28	1.6	dec	0.58	0	-0.31	1.47	3.00	0.45
516657	1201061778	19-APR-2006 17:52	DUSE	0.3	-0.63	dec	0.58	0	-0.31	1.47	3.00	0.45
516980	1201062530	19-APR-2006 23:19	DUSE	0.33	-0.57	dec	0.58	0	-0.31	1.47	3.00	0.45
521937	1201074023	20-APR-2006 06:04	DUSE	0.65	0.16	dec	0.58	0	-0.31	1.47	3.00	0.45
517257	1201063153	20-APR-2006 10:21	DONE	1.11	1.2	dec	0.58	0	-0.31	1.47	3.00	0.45
519545	1201068318	20-APR-2006 15:32	DONE	0.03	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
519011	1201067123	20-APR-2006 23:49	DUSE	0.07	-1	dec	0.58	0	-0.31	1.47	3.00	0.45
517255	1201063145	20-APR-2006 23:50	DONE	0.29	-0.65	dec	0.58	0	-0.31	1.47	3.00	0.45
519535	1201068296	20-APR-2006 23:55	DUSE	0.3	-0.64	dec	0.58	0	-0.31	1.47	3.00	0.45
519516	1201068249	21-APR-2006 09:09	DONE	1.04	1	dec	0.58	0	-0.31	1.47	3.00	0.45
522386	1201075055	23-APR-2006 23:51	DUSE	0.64	0.14	dec	0.58	0	-0.31	1.47	3.00	0.45
523017	1201076444	25-APR-2006 06:13	DONE	0.73	0.33	dec	0.58	0	-0.31	1.47	3.00	0.45

SPC Graph for Alpha SpecThorium in Liquids 4/27/2006 Thorium-228 BLANK

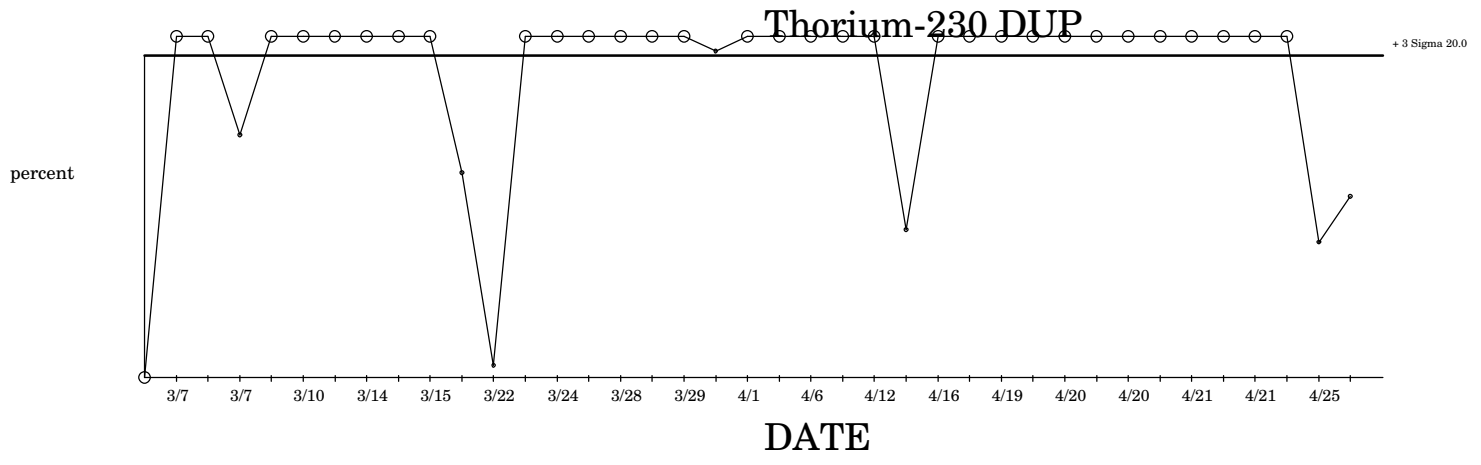
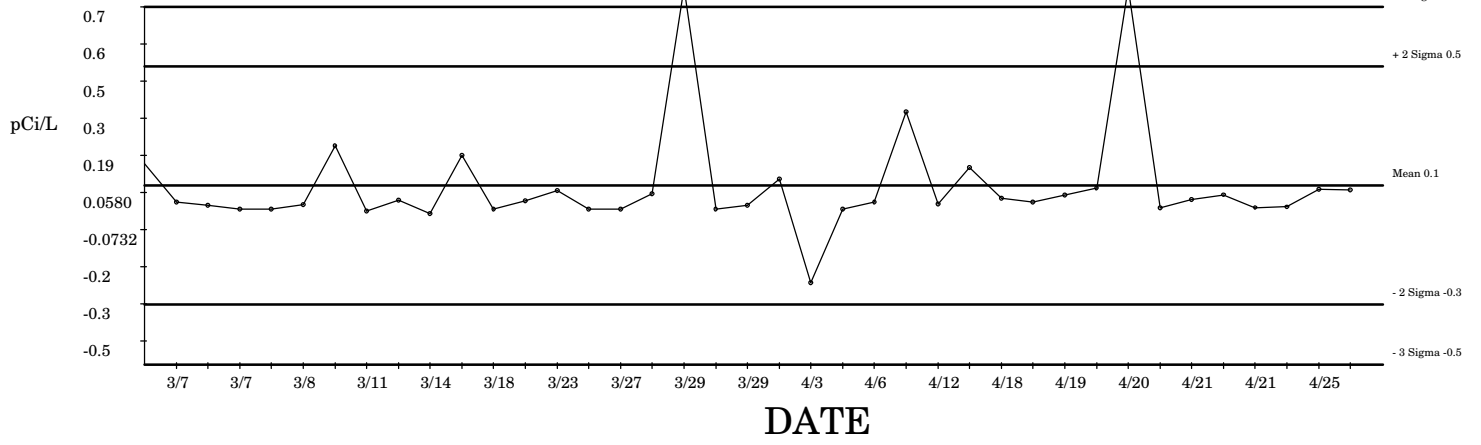


○ Denotes Outlier



SPC Graph for Alpha SpecThorium in Liquids 4/27/2006

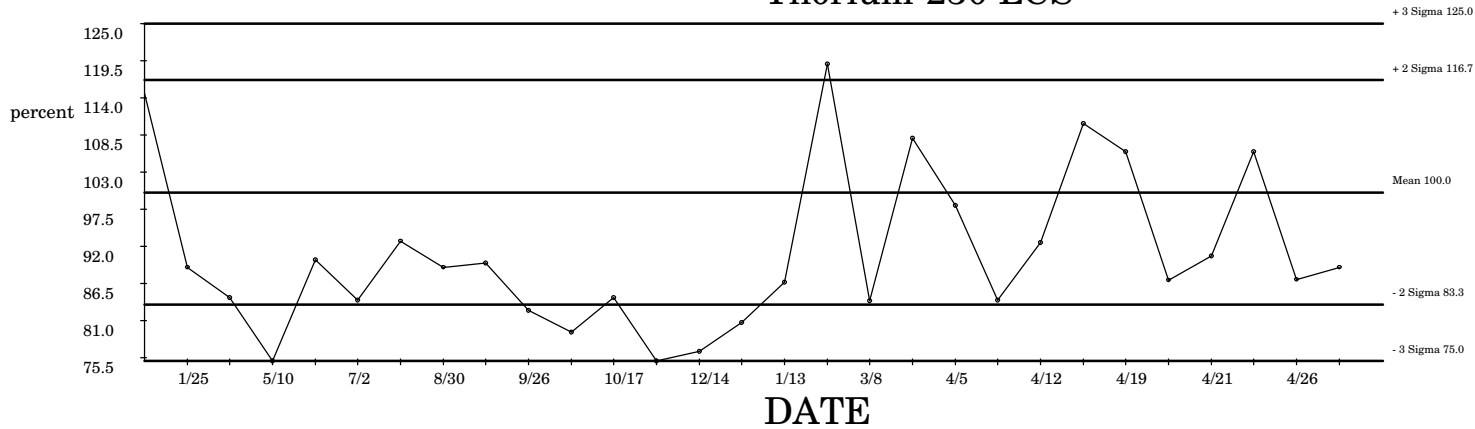
Thorium-230 BLANK



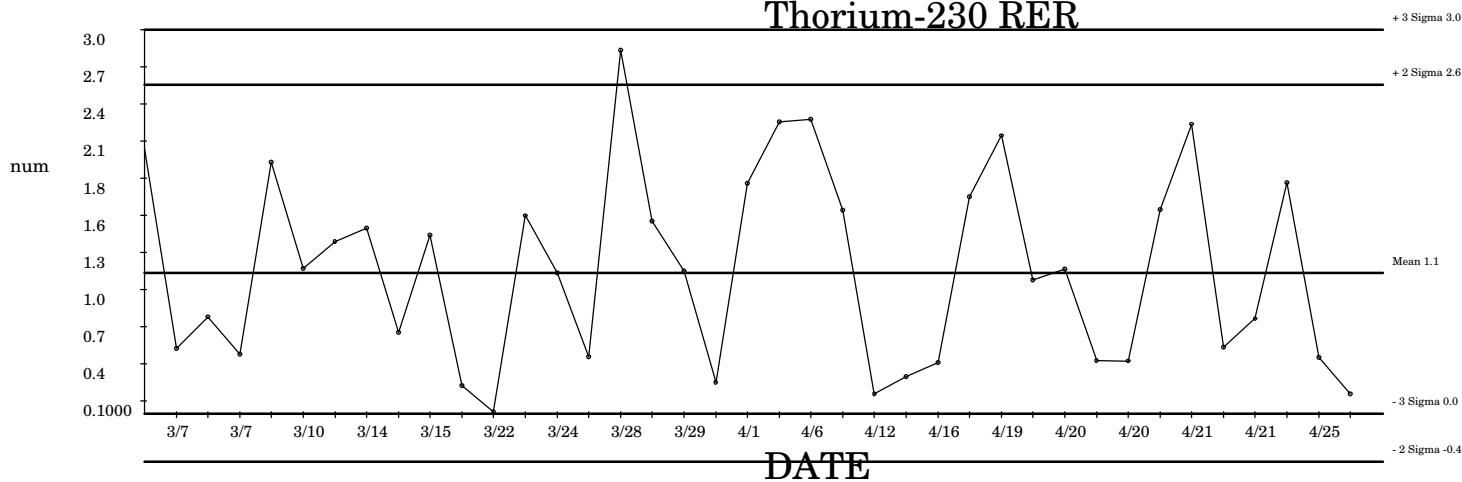
○ Denotes Outlier



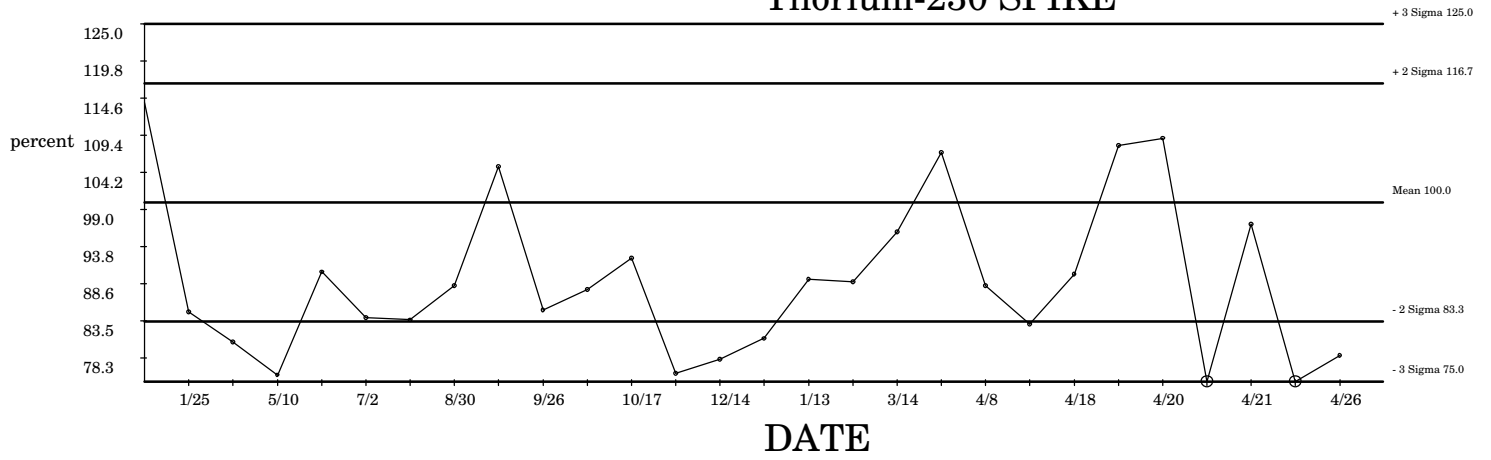
Thorium-230 LCS



Thorium-230 RER

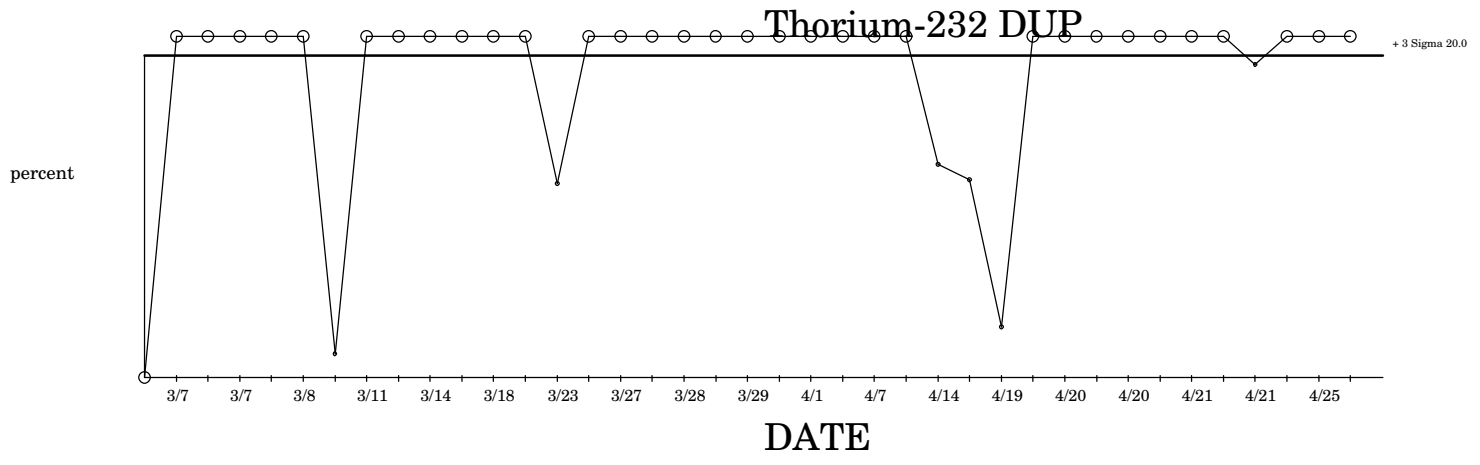
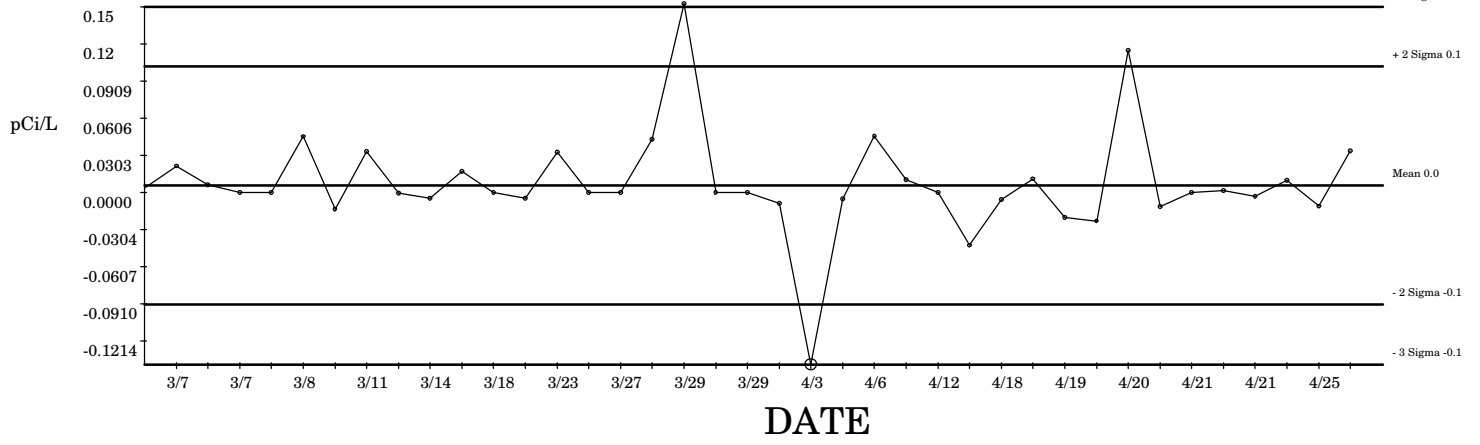


SPC Graph for Alpha SpecThorium in Liquids 4/27/2006 Thorium-230 SPIKE

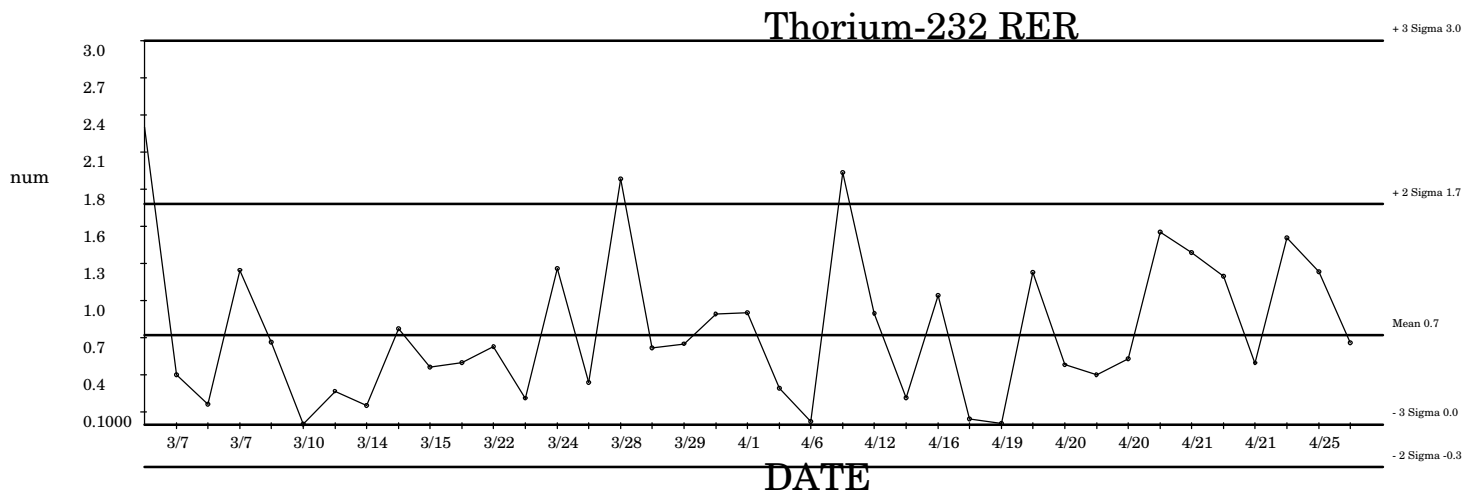
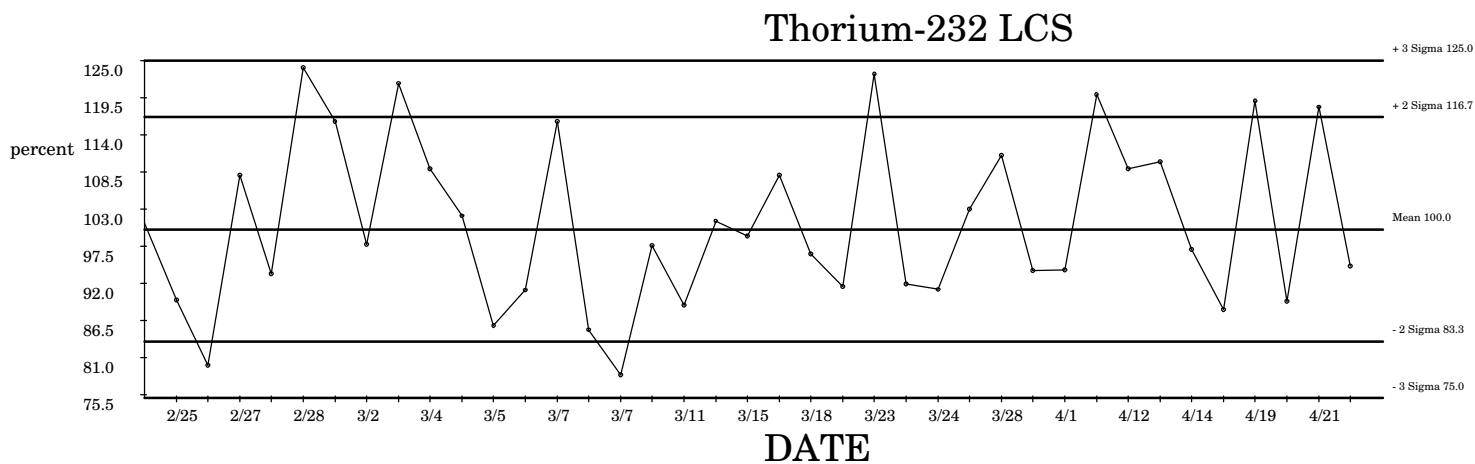
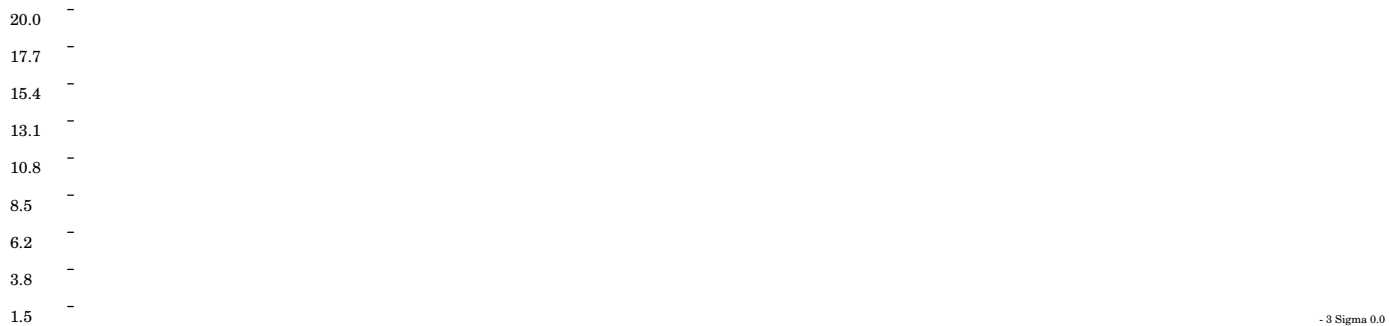


○ Denotes Outlier

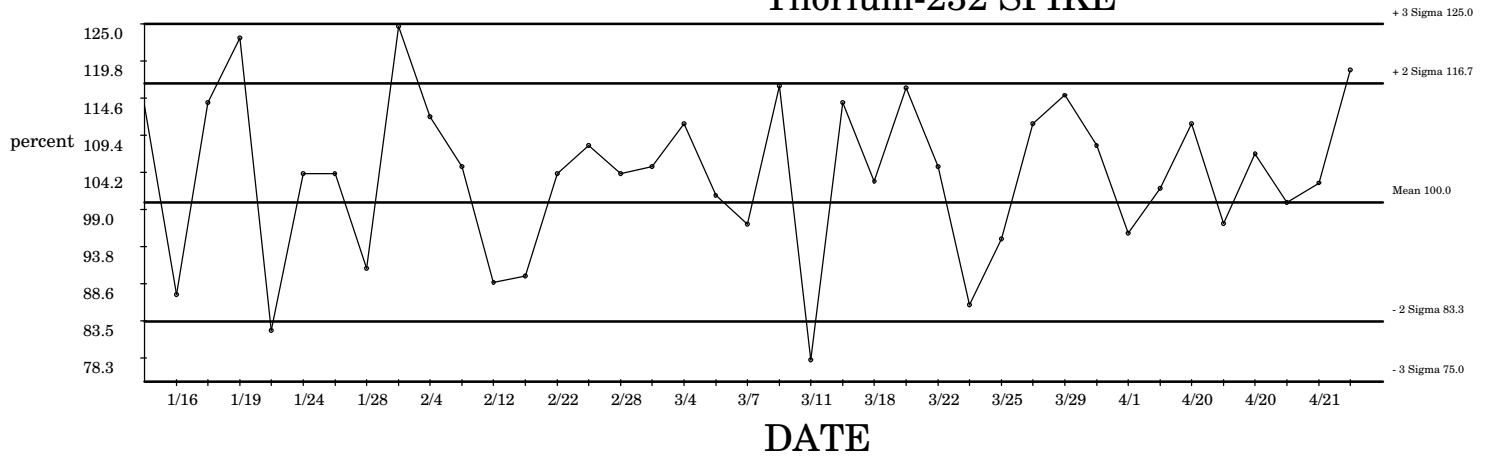
SPC Graph for Alpha SpecThorium in Liquids 4/27/2006 Thorium-232 BLANK



○ Denotes Outlier



SPC Graph for Alpha SpecThorium in Liquids 4/27/2006 Thorium-232 SPIKE



○ Denotes Outlier

Data used for Alpha SpecThorium in Liquids 28-APR-2006

Thorium-228 BLANK: Limits LCL = -.4 UCL = .5

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
507094	1201040358	07-MAR-2006 01:33	DONE	0	-0.16	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
506047	1201037914	07-MAR-2006 10:21	DONE	0	-0.23	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
507087	1201040340	07-MAR-2006 14:56	DONE	0	-0.32	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
507398	1201041204	07-MAR-2006 23:35	DONE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
507401	1201041212	07-MAR-2006 23:35	DONE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
509582	1201046244	08-MAR-2006 08:59	DONE	0	0.2	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
509840	1201046800	10-MAR-2006 11:48	DONE	0	-0.25	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
509118	1201045258	11-MAR-2006 09:34	DONE	0	-2	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
511062	1201049578	14-MAR-2006 17:18	DUSE	0	-0.25	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
509796	1201046675	14-MAR-2006 17:43	DONE	0	-0.08	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
510660	1201048675	15-MAR-2006 10:56	DONE	0	1.2	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
511207	1201049870	18-MAR-2006 12:05	DONE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
512010	1201051735	22-MAR-2006 20:59	DONE	0	-0.45	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
511986	1201051678	23-MAR-2006 08:32	DONE	0	0.54	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
512003	1201051718	25-MAR-2006 10:35	DONE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
512008	1201051727	27-MAR-2006 09:42	DUSE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
512781	1201053532	28-MAR-2006 07:34	DONE	0	-0.06	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
511549	1201050713	29-MAR-2006 08:24	DONE	0	-0.01	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
515678	1201059766	29-MAR-2006 10:23	DONE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
514263	1201056523	29-MAR-2006 22:27	DUSE	0	-0.23	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
515544	1201059406	01-APR-2006 09:22	DONE	0	-0.55	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
515266	1201058728	03-APR-2006 16:59	DONE	0	0.75	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
517136	1201062871	05-APR-2006 21:54	DUSE	0	-0.24	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
517718	1201064215	06-APR-2006 13:23	DONE	0	0.22	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
517716	1201064208	12-APR-2006 12:14	DUSE	1	4.9	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
518887	1201066848	12-APR-2006 19:27	DUSE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
518909	1201066925	16-APR-2006 08:06	DONE	0	-0.45	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
519439	1201068031	18-APR-2006 12:58	DUSE	0	-0.34	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
520797	1201071136	19-APR-2006 14:45	DUSE	0	-0.3	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
521038	1201071719	19-APR-2006 14:47	DONE	0	-1	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
520798	1201071140	20-APR-2006 07:49	DONE	0	-0.05	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
519427	1201067981	20-APR-2006 12:32	DONE	0	2.1	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
521959	1201074063	20-APR-2006 21:36	DONE	0	-0.17	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
521075	1201071844	21-APR-2006 10:18	DUSE	0	-0.28	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
522734	1201075816	21-APR-2006 23:46	DUSE	0	-0.39	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
518508	1201065950	21-APR-2006 23:47	DONE	0	-0.03	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
522200	1201074677	25-APR-2006 12:28	DUSE	0	-0.26	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
519440	1201068035	25-APR-2006 16:49	DONE	0	0.23	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16
523917	1201078559	26-APR-2006 08:23	DONE	0	-0.32	pCi/L	0.05	-0.446	-0.282	0.37	0.54	0.16

Thorium-228 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
506047	1201037915	07-MAR-2006 01:33	DONE	168	-0.11	percent	227	0	-810	1270	20.0	520
507094	1201040359	07-MAR-2006 01:33	DONE	402	0.34	percent	227	0	-810	1270	20.0	520
507087	1201040341	07-MAR-2006 14:56	DONE	93	-0.26	percent	227	0	-810	1270	20.0	520
507401	1201041213	07-MAR-2006 23:35	DONE	4	-0.43	percent	227	0	-810	1270	20.0	520

509582	1201046245	08-MAR-2006 08:59	DONE	145	-0.16	percent	227	0	-810	1270	20.0	520
509840	1201046801	10-MAR-2006 11:48	DONE	589	0.7	percent	227	0	-810	1270	20.0	520
509118	1201045259	11-MAR-2006 09:34	DONE	23	-0.39	percent	227	0	-810	1270	20.0	520
511062	1201049579	14-MAR-2006 17:18	DUSE	11	-0.42	percent	227	0	-810	1270	20.0	520
509796	1201046676	14-MAR-2006 17:43	DONE	16	-0.41	percent	227	0	-810	1270	20.0	520
510660	1201048676	15-MAR-2006 10:56	DONE	209	-0.03	percent	227	0	-810	1270	20.0	520
511207	1201049871	18-MAR-2006 12:05	DONE	61	-0.32	percent	227	0	-810	1270	20.0	520
512010	1201051736	22-MAR-2006 20:59	DONE	26	-0.39	percent	227	0	-810	1270	20.0	520
511986	1201051679	23-MAR-2006 08:32	DONE	12	-0.41	percent	227	0	-810	1270	20.0	520
512003	1201051719	24-MAR-2006 08:00	DONE	293	0.13	percent	227	0	-810	1270	20.0	520
512008	1201051728	27-MAR-2006 18:58	DUSE	81	-0.28	percent	227	0	-810	1270	20.0	520
512781	1201053533	28-MAR-2006 07:34	DONE	394	0.32	percent	227	0	-810	1270	20.0	520
511549	1201050714	28-MAR-2006 11:48	DONE	18	-0.4	percent	227	0	-810	1270	20.0	520
515678	1201059767	29-MAR-2006 10:23	DONE	68	-0.31	percent	227	0	-810	1270	20.0	520
514263	1201056524	29-MAR-2006 22:27	DUSE	185	-0.08	percent	227	0	-810	1270	20.0	520
515544	1201059407	01-APR-2006 09:22	DONE	269	0.08	percent	227	0	-810	1270	20.0	520
515266	1201058729	01-APR-2006 11:30	DONE	39	-0.36	percent	227	0	-810	1270	20.0	520
517718	1201064216	06-APR-2006 13:23	DONE	3	-0.43	percent	227	0	-810	1270	20.0	520
517136	1201062872	07-APR-2006 07:28	DUSE	348	0.23	percent	227	0	-810	1270	20.0	520
518887	1201066849	12-APR-2006 19:27	DUSE	230	0.01	percent	227	0	-810	1270	20.0	520
519427	1201067982	14-APR-2006 14:34	DONE	17	-0.4	percent	227	0	-810	1270	20.0	520
518909	1201066926	16-APR-2006 08:06	DONE	748	1	percent	227	0	-810	1270	20.0	520
519439	1201068032	18-APR-2006 12:58	DUSE	225	-0	percent	227	0	-810	1270	20.0	520
520797	1201071137	19-APR-2006 14:45	DUSE	247	0.04	percent	227	0	-810	1270	20.0	520
521038	1201071720	19-APR-2006 14:47	DONE	45	-0.35	percent	227	0	-810	1270	20.0	520
520798	1201071141	20-APR-2006 07:49	DONE	56	-0.33	percent	227	0	-810	1270	20.0	520
521959	1201074064	20-APR-2006 21:36	DONE	3215	5.8	percent	227	0	-810	1270	20.0	520
521959	1201074155	20-APR-2006 21:36	DONE	30	-0.38	percent	227	0	-810	1270	20.0	520
521075	1201071845	20-APR-2006 21:36	DUSE	215	-0.02	percent	227	0	-810	1270	20.0	520
521959	1201074156	21-APR-2006 23:46	DONE	21	-0.4	percent	227	0	-810	1270	20.0	520
522734	1201075817	21-APR-2006 23:46	DUSE	63	-0.32	percent	227	0	-810	1270	20.0	520
518508	1201065951	21-APR-2006 23:47	DONE	8	-0.42	percent	227	0	-810	1270	20.0	520
522200	1201074678	25-APR-2006 12:28	DUSE	206	-0.04	percent	227	0	-810	1270	20.0	520
519440	1201068036	25-APR-2006 16:49	DONE	24	-0.39	percent	227	0	-810	1270	20.0	520
523917	1201078560	26-APR-2006 08:24	DONE	31	-0.38	percent	227	0	-810	1270	20.0	520

Thorium-228 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
506047	1201037915	07-MAR-2006 01:33	DONE	0.49	-0.47	num	0.76	0	-0.411	1.94	3.00	0.59
507094	1201040359	07-MAR-2006 01:33	DONE	1.38	1	num	0.76	0	-0.411	1.94	3.00	0.59
507087	1201040341	07-MAR-2006 14:56	DONE	0.72	-0.07	num	0.76	0	-0.411	1.94	3.00	0.59
507401	1201041213	07-MAR-2006 23:35	DONE	0.1	-1	num	0.76	0	-0.411	1.94	3.00	0.59
509582	1201046245	08-MAR-2006 08:59	DONE	1.62	1.5	num	0.76	0	-0.411	1.94	3.00	0.59
509840	1201046801	10-MAR-2006 11:48	DONE	2.3	2.6	num	0.76	0	-0.411	1.94	3.00	0.59
509118	1201045259	11-MAR-2006 09:34	DONE	0.15	-1	num	0.76	0	-0.411	1.94	3.00	0.59
511062	1201049579	14-MAR-2006 17:18	DUSE	0.02	-1	num	0.76	0	-0.411	1.94	3.00	0.59
509796	1201046676	14-MAR-2006 17:43	DONE	0.17	-1	num	0.76	0	-0.411	1.94	3.00	0.59
510660	1201048676	15-MAR-2006 10:56	DONE	2.12	2.3	num	0.76	0	-0.411	1.94	3.00	0.59
511207	1201049871	18-MAR-2006 12:05	DONE	1.3	0.91	num	0.76	0	-0.411	1.94	3.00	0.59
512010	1201051736	22-MAR-2006 20:59	DONE	0.46	-0.52	num	0.76	0	-0.411	1.94	3.00	0.59

511986	1201051679	23-MAR-2006 08:32	DONE	0.27	-0.85	num	0.76	0	-0.411	1.94	3.00	0.59
512003	1201051719	24-MAR-2006 08:00	DONE	0.39	-0.63	num	0.76	0	-0.411	1.94	3.00	0.59
512008	1201051728	27-MAR-2006 18:58	DUSE	1.02	0.43	num	0.76	0	-0.411	1.94	3.00	0.59
512781	1201053533	28-MAR-2006 07:34	DONE	0.62	-0.24	num	0.76	0	-0.411	1.94	3.00	0.59
511549	1201050714	28-MAR-2006 11:48	DONE	0.7	-0.1	num	0.76	0	-0.411	1.94	3.00	0.59
515678	1201059767	29-MAR-2006 10:23	DONE	1.22	0.78	num	0.76	0	-0.411	1.94	3.00	0.59
514263	1201056524	29-MAR-2006 22:27	DUSE	0.31	-0.77	num	0.76	0	-0.411	1.94	3.00	0.59
515544	1201059407	01-APR-2006 09:22	DONE	0.76	-0	num	0.76	0	-0.411	1.94	3.00	0.59
515266	1201058729	01-APR-2006 11:30	DONE	0.28	-0.83	num	0.76	0	-0.411	1.94	3.00	0.59
517718	1201064216	06-APR-2006 13:23	DONE	0.07	-1	num	0.76	0	-0.411	1.94	3.00	0.59
517136	1201062872	07-APR-2006 07:28	DUSE	0.96	0.33	num	0.76	0	-0.411	1.94	3.00	0.59
518887	1201066849	12-APR-2006 19:27	DUSE	0.22	-0.93	num	0.76	0	-0.411	1.94	3.00	0.59
519427	1201067982	14-APR-2006 14:34	DONE	1.06	0.51	num	0.76	0	-0.411	1.94	3.00	0.59
518909	1201066926	16-APR-2006 08:06	DONE	1.2	0.74	num	0.76	0	-0.411	1.94	3.00	0.59
519439	1201068032	18-APR-2006 12:58	DUSE	1.55	1.3	num	0.76	0	-0.411	1.94	3.00	0.59
520797	1201071137	19-APR-2006 14:45	DUSE	1.83	1.8	num	0.76	0	-0.411	1.94	3.00	0.59
521038	1201071720	19-APR-2006 14:47	DONE	0.16	-1	num	0.76	0	-0.411	1.94	3.00	0.59
520798	1201071141	20-APR-2006 07:49	DONE	0.87	0.19	num	0.76	0	-0.411	1.94	3.00	0.59
521959	1201074064	20-APR-2006 21:36	DONE	0.93	0.28	num	0.76	0	-0.411	1.94	3.00	0.59
521959	1201074155	20-APR-2006 21:36	DONE	0.37	-0.67	num	0.76	0	-0.411	1.94	3.00	0.59
521075	1201071845	20-APR-2006 21:36	DUSE	0.6	-0.29	num	0.76	0	-0.411	1.94	3.00	0.59
521959	1201074156	21-APR-2006 23:46	DONE	0.1	-1	num	0.76	0	-0.411	1.94	3.00	0.59
522734	1201075817	21-APR-2006 23:46	DUSE	0.61	-0.26	num	0.76	0	-0.411	1.94	3.00	0.59
518508	1201065951	21-APR-2006 23:47	DONE	0.22	-0.93	num	0.76	0	-0.411	1.94	3.00	0.59
522200	1201074678	25-APR-2006 12:28	DUSE	0.67	-0.16	num	0.76	0	-0.411	1.94	3.00	0.59
519440	1201068036	25-APR-2006 16:49	DONE	1.29	0.9	num	0.76	0	-0.411	1.94	3.00	0.59
523917	1201078560	26-APR-2006 08:24	DONE	0.68	-0.15	num	0.76	0	-0.411	1.94	3.00	0.59

Thorium-230 BLANK: Limits LCL = -.5 UCL = .7

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
507094	1201040358	07-MAR-2006 01:33	DONE	0	-0.37	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
506047	1201037914	07-MAR-2006 10:21	DONE	0	-0.28	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
507087	1201040340	07-MAR-2006 14:56	DONE	0	-0.33	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
507398	1201041204	07-MAR-2006 23:35	DONE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
507401	1201041212	07-MAR-2006 23:35	DONE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
509582	1201046244	08-MAR-2006 08:59	DONE	0	-0.32	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
509840	1201046800	10-MAR-2006 11:48	DONE	0	0.67	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
509118	1201045258	11-MAR-2006 09:34	DONE	0	-0.43	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
511062	1201049578	14-MAR-2006 17:18	DONE	0	-0.25	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
509796	1201046675	14-MAR-2006 17:43	DONE	0	-0.47	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
510660	1201048675	15-MAR-2006 10:56	DONE	0	0.51	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
511207	1201049870	18-MAR-2006 12:05	DUSE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
512010	1201051735	22-MAR-2006 20:59	DONE	0	-0.26	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
511986	1201051678	23-MAR-2006 08:32	DUSE	0	-0.08	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
512003	1201051718	25-MAR-2006 10:35	DONE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
512008	1201051727	27-MAR-2006 09:42	DUSE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
512781	1201053532	28-MAR-2006 07:34	DONE	0	-0.14	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
511549	1201050713	29-MAR-2006 08:24	DONE	1	3.8	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
515678	1201059766	29-MAR-2006 10:23	DONE	0	-0.39	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
514263	1201056523	29-MAR-2006 22:27	DUSE	0	-0.33	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21

515544	1201059406	01-APR-2006 09:22	DONE	0	0.11	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
515266	1201058728	03-APR-2006 16:59	DUSE	0	-2	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
517136	1201062871	05-APR-2006 21:54	DONE	0	-0.4	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
517718	1201064215	06-APR-2006 13:23	DONE	0	-0.28	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
517716	1201064208	12-APR-2006 12:14	DUSE	0	1.2	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
518887	1201066848	12-APR-2006 19:27	DONE	0	-0.31	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
518909	1201066925	16-APR-2006 08:06	DONE	0	0.31	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
519439	1201068031	18-APR-2006 12:58	DONE	0	-0.22	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
520797	1201071136	19-APR-2006 14:45	DONE	0	-0.28	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
521038	1201071719	19-APR-2006 14:47	DONE	0	-0.16	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
520798	1201071140	20-APR-2006 07:49	DONE	0	-0.04	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
519427	1201067981	20-APR-2006 12:32	DONE	1	4	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
521959	1201074063	20-APR-2006 21:36	DONE	0	-0.38	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
521075	1201071844	21-APR-2006 10:18	DONE	0	-0.23	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
522734	1201075816	21-APR-2006 23:46	DONE	0	-0.16	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
518508	1201065950	21-APR-2006 23:47	DONE	0	-0.37	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
522200	1201074677	25-APR-2006 12:28	DONE	0	-0.36	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
519440	1201068035	25-APR-2006 16:49	DONE	0	-0.07	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21
523917	1201078559	26-APR-2006 08:23	DONE	0	-0.07	pCi/L	0.08	-0.548	-0.338	0.5	0.71	0.21

Thorium-230 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
506047	1201037915	07-MAR-2006 01:33	DONE	51	-0.39	percent	275	0	-890	1440	20.0	580
507094	1201040359	07-MAR-2006 01:33	DONE	62	-0.37	percent	275	0	-890	1440	20.0	580
507087	1201040341	07-MAR-2006 14:56	DONE	66	-0.36	percent	275	0	-890	1440	20.0	580
507401	1201041213	07-MAR-2006 23:35	DONE	15	-0.45	percent	275	0	-890	1440	20.0	580
509582	1201046245	08-MAR-2006 08:59	DONE	2795	4.3	percent	275	0	-890	1440	20.0	580
509840	1201046801	10-MAR-2006 11:48	DONE	106	-0.29	percent	275	0	-890	1440	20.0	580
509118	1201045259	11-MAR-2006 09:34	DONE	574	0.52	percent	275	0	-890	1440	20.0	580
511062	1201049579	14-MAR-2006 17:18	DONE	494	0.38	percent	275	0	-890	1440	20.0	580
509796	1201046676	14-MAR-2006 17:43	DONE	76	-0.34	percent	275	0	-890	1440	20.0	580
510660	1201048676	15-MAR-2006 10:56	DONE	913	1.1	percent	275	0	-890	1440	20.0	580
511207	1201049871	18-MAR-2006 12:05	DUSE	13	-0.45	percent	275	0	-890	1440	20.0	580
512010	1201051736	22-MAR-2006 20:59	DONE	1	-0.47	percent	275	0	-890	1440	20.0	580
511986	1201051679	23-MAR-2006 08:32	DUSE	33	-0.42	percent	275	0	-890	1440	20.0	580
512003	1201051719	24-MAR-2006 08:00	DONE	714	0.76	percent	275	0	-890	1440	20.0	580
512008	1201051728	27-MAR-2006 18:58	DUSE	32	-0.42	percent	275	0	-890	1440	20.0	580
512781	1201053533	28-MAR-2006 07:34	DONE	180	-0.16	percent	275	0	-890	1440	20.0	580
511549	1201050714	28-MAR-2006 11:48	DONE	60	-0.37	percent	275	0	-890	1440	20.0	580
515678	1201059767	29-MAR-2006 10:23	DONE	509	0.4	percent	275	0	-890	1440	20.0	580
514263	1201056524	29-MAR-2006 22:27	DUSE	20	-0.44	percent	275	0	-890	1440	20.0	580
515544	1201059407	01-APR-2006 09:22	DONE	192	-0.14	percent	275	0	-890	1440	20.0	580
515266	1201058729	01-APR-2006 11:30	DUSE	82	-0.33	percent	275	0	-890	1440	20.0	580
517718	1201064216	06-APR-2006 13:23	DONE	158	-0.2	percent	275	0	-890	1440	20.0	580
517136	1201062872	07-APR-2006 07:28	DONE	82	-0.33	percent	275	0	-890	1440	20.0	580
518887	1201066849	12-APR-2006 19:27	DONE	30	-0.42	percent	275	0	-890	1440	20.0	580
519427	1201067982	14-APR-2006 14:34	DONE	9	-0.46	percent	275	0	-890	1440	20.0	580
518909	1201066926	16-APR-2006 08:06	DONE	32	-0.42	percent	275	0	-890	1440	20.0	580
519439	1201068032	18-APR-2006 12:58	DONE	114	-0.28	percent	275	0	-890	1440	20.0	580
520797	1201071137	19-APR-2006 14:45	DONE	271	-0.01	percent	275	0	-890	1440	20.0	580

521038	1201071720	19-APR-2006 14:47	DONE	102	-0.3	percent	275	0	-890	1440	20.0	580
520798	1201071141	20-APR-2006 07:49	DONE	131	-0.25	percent	275	0	-890	1440	20.0	580
521959	1201074064	20-APR-2006 21:36	DONE	23	-0.44	percent	275	0	-890	1440	20.0	580
521959	1201074155	20-APR-2006 21:36	DONE	115	-0.28	percent	275	0	-890	1440	20.0	580
521075	1201071845	20-APR-2006 21:36	DONE	140	-0.23	percent	275	0	-890	1440	20.0	580
521959	1201074156	21-APR-2006 23:46	DONE	2335	3.5	percent	275	0	-890	1440	20.0	580
522734	1201075817	21-APR-2006 23:46	DONE	55	-0.38	percent	275	0	-890	1440	20.0	580
518508	1201065951	21-APR-2006 23:47	DONE	29	-0.43	percent	275	0	-890	1440	20.0	580
522200	1201074678	25-APR-2006 12:28	DONE	103	-0.3	percent	275	0	-890	1440	20.0	580
519440	1201068036	25-APR-2006 16:49	DONE	8	-0.46	percent	275	0	-890	1440	20.0	580
523917	1201078560	26-APR-2006 08:24	DONE	11	-0.46	percent	275	0	-890	1440	20.0	580

Thorium-230 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
394997	1200773390	19-JAN-2005 19:21	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
396381	1200776551	25-JAN-2005 17:25	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
421139	1200835683	05-MAY-2005 13:31	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
423378	1200841265	10-MAY-2005 17:51	DONE	75	-3.0	percent	100	75.0	83.3	117	125	8.33
430938	1200859789	09-JUN-2005 13:47	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
438579	1200878052	02-JUL-2005 21:23	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
450934	1200907752	12-AUG-2005 03:24	DONE	93	-0.86	percent	100	75.0	83.3	117	125	8.33
456441	1200920836	30-AUG-2005 17:32	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
457053	1200922083	09-SEP-2005 14:49	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
465256	1200942286	26-SEP-2005 15:33	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
468593	1200949998	08-OCT-2005 11:20	DONE	79	-2	percent	100	75.0	83.3	117	125	8.33
471081	1200955896	17-OCT-2005 21:18	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
478002	1200972583	10-NOV-2005 02:16	DONE	75	-3.0	percent	100	75.0	83.3	117	125	8.33
486414	1200993009	14-DEC-2005 08:11	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
490270	1201001730	29-DEC-2005 14:39	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
492212	1201006211	13-JAN-2006 08:17	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
505245	1201036055	22-FEB-2006 23:48	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
509582	1201046246	08-MAR-2006 08:59	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
511062	1201049581	14-MAR-2006 17:18	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
517136	1201062874	05-APR-2006 21:54	DONE	98	-0.23	percent	100	75.0	83.3	117	125	8.33
517718	1201064218	08-APR-2006 08:43	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
518887	1201066851	12-APR-2006 19:25	DONE	93	-0.89	percent	100	75.0	83.3	117	125	8.33
519439	1201068034	18-APR-2006 12:58	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
520797	1201071139	19-APR-2006 14:45	DONE	106	0.72	percent	100	75.0	83.3	117	125	8.33
520798	1201071143	20-APR-2006 07:49	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
522734	1201075819	21-APR-2006 23:46	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
521075	1201071847	22-APR-2006 09:26	DONE	106	0.72	percent	100	75.0	83.3	117	125	8.33
522200	1201074680	26-APR-2006 09:33	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
523917	1201078562	27-APR-2006 14:49	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33

Thorium-230 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
506047	1201037915	07-MAR-2006 01:33	DONE	0.93	-0.23	num	1.1	0	-0.373	2.57	3.00	0.74
507094	1201040359	07-MAR-2006 01:33	DONE	0.51	-0.8	num	1.1	0	-0.373	2.57	3.00	0.74
507087	1201040341	07-MAR-2006 14:56	DONE	0.76	-0.46	num	1.1	0	-0.373	2.57	3.00	0.74
507401	1201041213	07-MAR-2006 23:35	DONE	0.47	-0.86	num	1.1	0	-0.373	2.57	3.00	0.74

509582	1201046245	08-MAR-2006 08:59	DONE	1.97	1.2	num	1.1	0	-0.373	2.57	3.00	0.74
509840	1201046801	10-MAR-2006 11:48	DONE	1.14	0.05	num	1.1	0	-0.373	2.57	3.00	0.74
509118	1201045259	11-MAR-2006 09:34	DONE	1.35	0.34	num	1.1	0	-0.373	2.57	3.00	0.74
511062	1201049579	14-MAR-2006 17:18	DONE	1.45	0.48	num	1.1	0	-0.373	2.57	3.00	0.74
509796	1201046676	14-MAR-2006 17:43	DONE	0.64	-0.63	num	1.1	0	-0.373	2.57	3.00	0.74
510660	1201048676	15-MAR-2006 10:56	DONE	1.4	0.41	num	1.1	0	-0.373	2.57	3.00	0.74
511207	1201049871	18-MAR-2006 12:05	DUSE	0.22	-1	num	1.1	0	-0.373	2.57	3.00	0.74
512010	1201051736	22-MAR-2006 20:59	DONE	0.01	-1	num	1.1	0	-0.373	2.57	3.00	0.74
511986	1201051679	23-MAR-2006 08:32	DUSE	1.55	0.61	num	1.1	0	-0.373	2.57	3.00	0.74
512003	1201051719	24-MAR-2006 08:00	DONE	1.1	00	num	1.1	0	-0.373	2.57	3.00	0.74
512008	1201051728	27-MAR-2006 18:58	DUSE	0.44	-0.89	num	1.1	0	-0.373	2.57	3.00	0.74
512781	1201053533	28-MAR-2006 07:34	DONE	2.84	2.4	num	1.1	0	-0.373	2.57	3.00	0.74
511549	1201050714	28-MAR-2006 11:48	DONE	1.5	0.55	num	1.1	0	-0.373	2.57	3.00	0.74
515678	1201059767	29-MAR-2006 10:23	DONE	1.12	0.02	num	1.1	0	-0.373	2.57	3.00	0.74
514263	1201056524	29-MAR-2006 22:27	DUSE	0.24	-1	num	1.1	0	-0.373	2.57	3.00	0.74
515544	1201059407	01-APR-2006 09:22	DONE	1.8	0.95	num	1.1	0	-0.373	2.57	3.00	0.74
515266	1201058729	01-APR-2006 11:30	DUSE	2.28	1.6	num	1.1	0	-0.373	2.57	3.00	0.74
517718	1201064216	06-APR-2006 13:23	DONE	2.3	1.6	num	1.1	0	-0.373	2.57	3.00	0.74
517136	1201062872	07-APR-2006 07:28	DONE	1.59	0.67	num	1.1	0	-0.373	2.57	3.00	0.74
518887	1201066849	12-APR-2006 19:27	DONE	0.16	-1	num	1.1	0	-0.373	2.57	3.00	0.74
519427	1201067982	14-APR-2006 14:34	DONE	0.29	-1	num	1.1	0	-0.373	2.57	3.00	0.74
518909	1201066926	16-APR-2006 08:06	DONE	0.4	-0.95	num	1.1	0	-0.373	2.57	3.00	0.74
519439	1201068032	18-APR-2006 12:58	DONE	1.69	0.81	num	1.1	0	-0.373	2.57	3.00	0.74
520797	1201071137	19-APR-2006 14:45	DONE	2.17	1.5	num	1.1	0	-0.373	2.57	3.00	0.74
521038	1201071720	19-APR-2006 14:47	DONE	1.05	-0.07	num	1.1	0	-0.373	2.57	3.00	0.74
520798	1201071141	20-APR-2006 07:49	DONE	1.13	0.05	num	1.1	0	-0.373	2.57	3.00	0.74
521959	1201074064	20-APR-2006 21:36	DONE	0.42	-0.93	num	1.1	0	-0.373	2.57	3.00	0.74
521959	1201074155	20-APR-2006 21:36	DONE	0.41	-0.93	num	1.1	0	-0.373	2.57	3.00	0.74
521075	1201071845	20-APR-2006 21:36	DONE	1.59	0.67	num	1.1	0	-0.373	2.57	3.00	0.74
521959	1201074156	21-APR-2006 23:46	DONE	2.26	1.6	num	1.1	0	-0.373	2.57	3.00	0.74
522734	1201075817	21-APR-2006 23:46	DONE	0.52	-0.78	num	1.1	0	-0.373	2.57	3.00	0.74
518508	1201065951	21-APR-2006 23:47	DONE	0.74	-0.48	num	1.1	0	-0.373	2.57	3.00	0.74
522200	1201074678	25-APR-2006 12:28	DONE	1.8	0.96	num	1.1	0	-0.373	2.57	3.00	0.74
519440	1201068036	25-APR-2006 16:49	DONE	0.44	-0.89	num	1.1	0	-0.373	2.57	3.00	0.74
523917	1201078560	26-APR-2006 08:24	DONE	0.15	-1	num	1.1	0	-0.373	2.57	3.00	0.74

Thorium-230 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
394997	1200773389	19-JAN-2005 19:21	DONE	86	-2	percent	100	75.0	83.3	117	125	8.33
396381	1200776550	25-JAN-2005 22:09	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
421139	1200835681	04-MAY-2005 20:43	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
423378	1200841264	10-MAY-2005 17:51	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
430938	1200859788	09-JUN-2005 13:47	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
438579	1200878051	02-JUL-2005 21:23	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
450934	1200907751	12-AUG-2005 03:24	DONE	84	-2	percent	100	75.0	83.3	117	125	8.33
456441	1200920835	30-AUG-2005 17:32	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
457053	1200922082	09-SEP-2005 14:49	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
465256	1200942285	26-SEP-2005 15:33	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
468593	1200949997	12-OCT-2005 08:29	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
471081	1200955895	17-OCT-2005 21:18	DONE	92	-0.94	percent	100	75.0	83.3	117	125	8.33

478002	1200972582	08-NOV-2005 08:03	DONE	76	-3	percent	100	75.0	83.3	117	125	8.33
486414	1200993008	14-DEC-2005 08:11	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
490270	1201001729	29-DEC-2005 14:39	DONE	81	-2	percent	100	75.0	83.3	117	125	8.33
492212	1201006210	13-JAN-2006 08:17	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
505245	1201036054	22-FEB-2006 23:48	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
511062	1201049580	14-MAR-2006 17:18	DONE	96	-0.49	percent	100	75.0	83.3	117	125	8.33
517136	1201062873	05-APR-2006 21:54	DONE	107	0.84	percent	100	75.0	83.3	117	125	8.33
517718	1201064217	08-APR-2006 08:43	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
518887	1201066850	12-APR-2006 19:27	DONE	83	-2	percent	100	75.0	83.3	117	125	8.33
519439	1201068033	18-APR-2006 12:58	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
520797	1201071138	19-APR-2006 14:45	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
520798	1201071142	20-APR-2006 07:49	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
521075	1201071846	20-APR-2006 21:36	DONE	74	-3	percent	100	75.0	83.3	117	125	8.33
522734	1201075818	21-APR-2006 23:46	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
522200	1201074679	25-APR-2006 12:28	DONE	73	-3	percent	100	75.0	83.3	117	125	8.33
523917	1201078561	26-APR-2006 08:24	DONE	79	-3	percent	100	75.0	83.3	117	125	8.33

Thorium-232 BLANK: Limits LCL = -1 UCL = .2

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
507094	1201040358	07-MAR-2006 01:33	DONE	0	-0.27	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
506047	1201037914	07-MAR-2006 10:21	DONE	0	0.33	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
507087	1201040340	07-MAR-2006 14:56	DONE	0	0.02	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
507398	1201041204	07-MAR-2006 23:35	DONE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
507401	1201041212	07-MAR-2006 23:35	DONE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
509582	1201046244	08-MAR-2006 08:59	DONE	0	0.82	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
509840	1201046800	10-MAR-2006 11:48	DONE	0	-0.4	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
509118	1201045258	11-MAR-2006 09:34	DONE	0	0.57	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
511062	1201049578	14-MAR-2006 17:18	DUSE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
509796	1201046675	14-MAR-2006 17:43	DONE	0	-0.21	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
510660	1201048675	15-MAR-2006 10:56	DONE	0	0.24	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
511207	1201049870	18-MAR-2006 12:05	DONE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
512010	1201051735	22-MAR-2006 20:59	DONE	0	-0.21	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
511986	1201051678	23-MAR-2006 08:32	DONE	0	0.56	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
512003	1201051718	25-MAR-2006 10:35	DONE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
512008	1201051727	27-MAR-2006 09:42	DUSE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
512781	1201053532	28-MAR-2006 07:34	DONE	0	0.78	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
511549	1201050713	29-MAR-2006 08:24	DONE	0	3	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
515678	1201059766	29-MAR-2006 10:23	DONE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
514263	1201056523	29-MAR-2006 22:27	DUSE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
515544	1201059406	01-APR-2006 09:22	DONE	0	-0.3	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
515266	1201058728	03-APR-2006 16:59	DONE	0	-4	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
517136	1201062871	05-APR-2006 21:54	DUSE	0	-0.23	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
517718	1201064215	06-APR-2006 13:23	DONE	0	0.83	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
517716	1201064208	12-APR-2006 12:14	DONE	0	0.1	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
518887	1201066848	12-APR-2006 19:27	DUSE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
518909	1201066925	16-APR-2006 08:06	DONE	0	-1	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
519439	1201068031	18-APR-2006 12:58	DUSE	0	-0.23	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
520797	1201071136	19-APR-2006 14:45	DUSE	0	0.11	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
521038	1201071719	19-APR-2006 14:47	DONE	0	-0.54	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
520798	1201071140	20-APR-2006 07:49	DONE	0	-0.59	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05

519427	1201067981	20-APR-2006 12:32	DONE	0	2.3	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
521959	1201074063	20-APR-2006 21:36	DONE	0	-0.35	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
521075	1201071844	21-APR-2006 10:18	DUSE	0	-0.12	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
522734	1201075816	21-APR-2006 23:46	DUSE	0	-0.08	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
518508	1201065950	21-APR-2006 23:47	DONE	0	-0.18	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
522200	1201074677	25-APR-2006 12:28	DUSE	0	0.09	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
519440	1201068035	25-APR-2006 16:49	DONE	0	-0.35	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05
523917	1201078559	26-APR-2006 08:23	DONE	0	0.58	pCi/L	0.01	-0.14	-0.092	0.1	0.15	0.05

Thorium-232 DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
508121	1201042934	06-MAR-2006 16:33	DONE	484	-0.14	percent	2200	0	-22000	26300	20.0	12000
506047	1201037915	07-MAR-2006 01:33	DONE	156	-0.17	percent	2200	0	-22000	26300	20.0	12000
507094	1201040359	07-MAR-2006 01:33	DONE	58	-0.18	percent	2200	0	-22000	26300	20.0	12000
507087	1201040341	07-MAR-2006 14:56	DONE	200	-0.17	percent	2200	0	-22000	26300	20.0	12000
507401	1201041213	07-MAR-2006 23:35	DONE	44	-0.18	percent	2200	0	-22000	26300	20.0	12000
509582	1201046245	08-MAR-2006 08:59	DONE	91	-0.18	percent	2200	0	-22000	26300	20.0	12000
509840	1201046801	10-MAR-2006 11:48	DONE	1	-0.18	percent	2200	0	-22000	26300	20.0	12000
509118	1201045259	11-MAR-2006 09:34	DONE	37	-0.18	percent	2200	0	-22000	26300	20.0	12000
511062	1201049579	14-MAR-2006 17:18	DUSE	184	-0.17	percent	2200	0	-22000	26300	20.0	12000
509796	1201046676	14-MAR-2006 17:43	DONE	75	-0.18	percent	2200	0	-22000	26300	20.0	12000
510660	1201048676	15-MAR-2006 10:56	DONE	56	-0.18	percent	2200	0	-22000	26300	20.0	12000
511207	1201049871	18-MAR-2006 12:05	DONE	58	-0.18	percent	2200	0	-22000	26300	20.0	12000
512010	1201051736	22-MAR-2006 20:59	DONE	49	-0.18	percent	2200	0	-22000	26300	20.0	12000
511986	1201051679	23-MAR-2006 08:32	DONE	12	-0.18	percent	2200	0	-22000	26300	20.0	12000
512003	1201051719	24-MAR-2006 08:00	DONE	486	-0.14	percent	2200	0	-22000	26300	20.0	12000
512008	1201051728	27-MAR-2006 18:58	DUSE	22	-0.18	percent	2200	0	-22000	26300	20.0	12000
512781	1201053533	28-MAR-2006 07:34	DONE	282	-0.16	percent	2200	0	-22000	26300	20.0	12000
511549	1201050714	28-MAR-2006 11:48	DONE	70	-0.18	percent	2200	0	-22000	26300	20.0	12000
515678	1201059767	29-MAR-2006 10:23	DONE	72	-0.18	percent	2200	0	-22000	26300	20.0	12000
514263	1201056524	29-MAR-2006 22:27	DUSE	1828	-0.03	percent	2200	0	-22000	26300	20.0	12000
515544	1201059407	01-APR-2006 09:22	DONE	193	-0.17	percent	2200	0	-22000	26300	20.0	12000
515266	1201058729	01-APR-2006 11:30	DONE	41	-0.18	percent	2200	0	-22000	26300	20.0	12000
517718	1201064216	06-APR-2006 13:23	DONE	200	-0.17	percent	2200	0	-22000	26300	20.0	12000
517136	1201062872	07-APR-2006 07:28	DUSE	75400	6.1	percent	2200	0	-22000	26300	20.0	12000
518887	1201066849	12-APR-2006 19:27	DUSE	116	-0.17	percent	2200	0	-22000	26300	20.0	12000
519427	1201067982	14-APR-2006 14:34	DONE	13	-0.18	percent	2200	0	-22000	26300	20.0	12000
519439	1201068032	18-APR-2006 12:58	DUSE	12	-0.18	percent	2200	0	-22000	26300	20.0	12000
520797	1201071137	19-APR-2006 14:45	DUSE	3	-0.18	percent	2200	0	-22000	26300	20.0	12000
521038	1201071720	19-APR-2006 14:47	DONE	684	-0.13	percent	2200	0	-22000	26300	20.0	12000
520798	1201071141	20-APR-2006 07:49	DONE	64	-0.18	percent	2200	0	-22000	26300	20.0	12000
521959	1201074064	20-APR-2006 21:36	DONE	212	-0.17	percent	2200	0	-22000	26300	20.0	12000
521959	1201074155	20-APR-2006 21:36	DONE	112	-0.17	percent	2200	0	-22000	26300	20.0	12000
521075	1201071845	20-APR-2006 21:36	DUSE	3168	0.08	percent	2200	0	-22000	26300	20.0	12000
521959	1201074156	21-APR-2006 23:46	DONE	650	-0.13	percent	2200	0	-22000	26300	20.0	12000
522734	1201075817	21-APR-2006 23:46	DUSE	291	-0.16	percent	2200	0	-22000	26300	20.0	12000
518508	1201065951	21-APR-2006 23:47	DONE	19	-0.18	percent	2200	0	-22000	26300	20.0	12000
522200	1201074678	25-APR-2006 12:28	DUSE	424	-0.15	percent	2200	0	-22000	26300	20.0	12000
519440	1201068036	25-APR-2006 16:49	DONE	23	-0.18	percent	2200	0	-22000	26300	20.0	12000
523917	1201078560	26-APR-2006 08:24	DONE	62	-0.18	percent	2200	0	-22000	26300	20.0	12000

Thorium-232 LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
505996	1201037774	25-FEB-2006 18:05	DONE	99	-0.11	percent	100	75.0	83.3	117	125	8.33
505996	1201037775	25-FEB-2006 18:05	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
506001	1201037788	27-FEB-2006 08:26	DONE	80	-2	percent	100	75.0	83.3	117	125	8.33
506001	1201037789	27-FEB-2006 08:26	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
504486	1201034206	28-FEB-2006 15:46	DONE	93	-0.79	percent	100	75.0	83.3	117	125	8.33
504484	1201034200	28-FEB-2006 15:47	DUSE	124	2.9	percent	100	75.0	83.3	117	125	8.33
507036	1201040184	01-MAR-2006 20:40	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
506015	1201037823	02-MAR-2006 07:38	DONE	98	-0.26	percent	100	75.0	83.3	117	125	8.33
504514	1201034273	02-MAR-2006 12:09	DONE	122	2.6	percent	100	75.0	83.3	117	125	8.33
507398	1201041207	04-MAR-2006 12:45	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
508121	1201042936	04-MAR-2006 13:40	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
507079	1201040315	05-MAR-2006 08:42	DONE	86	-2	percent	100	75.0	83.3	117	125	8.33
506064	1201037942	06-MAR-2006 08:00	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
506047	1201037916	07-MAR-2006 01:33	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
507094	1201040360	07-MAR-2006 01:33	DONE	85	-2	percent	100	75.0	83.3	117	125	8.33
507087	1201040342	07-MAR-2006 14:56	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
507401	1201041215	07-MAR-2006 23:35	DONE	98	-0.29	percent	100	75.0	83.3	117	125	8.33
509118	1201045261	11-MAR-2006 09:34	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
509840	1201046803	11-MAR-2006 14:29	DONE	101	0.15	percent	100	75.0	83.3	117	125	8.33
509796	1201046678	15-MAR-2006 12:44	DONE	99	-0.12	percent	100	75.0	83.3	117	125	8.33
510660	1201048677	16-MAR-2006 10:10	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
511207	1201049873	18-MAR-2006 12:05	DONE	96	-0.43	percent	100	75.0	83.3	117	125	8.33
511549	1201050716	20-MAR-2006 07:43	DONE	92	-1	percent	100	75.0	83.3	117	125	8.33
511986	1201051681	23-MAR-2006 08:32	DONE	123	2.8	percent	100	75.0	83.3	117	125	8.33
512003	1201051721	24-MAR-2006 07:55	DONE	92	-0.97	percent	100	75.0	83.3	117	125	8.33
512010	1201051738	24-MAR-2006 08:00	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
512008	1201051730	27-MAR-2006 09:42	DUSE	103	0.36	percent	100	75.0	83.3	117	125	8.33
512781	1201053535	28-MAR-2006 07:34	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
515678	1201059769	29-MAR-2006 10:23	DONE	94	-0.73	percent	100	75.0	83.3	117	125	8.33
515266	1201058731	01-APR-2006 11:31	DONE	94	-0.72	percent	100	75.0	83.3	117	125	8.33
515544	1201059409	01-APR-2006 11:47	DONE	120	2.4	percent	100	75.0	83.3	117	125	8.33
517716	1201064210	12-APR-2006 12:14	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
517716	1201064211	12-APR-2006 12:14	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
519427	1201067984	14-APR-2006 14:35	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
518909	1201066927	16-APR-2006 08:06	DONE	88	-1	percent	100	75.0	83.3	117	125	8.33
521038	1201071722	19-APR-2006 14:47	DONE	119	2.3	percent	100	75.0	83.3	117	125	8.33
521959	1201074066	20-APR-2006 21:36	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
518508	1201065953	21-APR-2006 23:47	DONE	118	2.2	percent	100	75.0	83.3	117	125	8.33
519440	1201068038	26-APR-2006 14:37	DONE	95	-0.66	percent	100	75.0	83.3	117	125	8.33

Thorium-232 RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
506047	1201037915	07-MAR-2006 01:33	DONE	0.68	-0.04	num	0.7	0	-0.33	1.73	3.00	0.51
507094	1201040359	07-MAR-2006 01:33	DONE	0.39	-0.6	num	0.7	0	-0.33	1.73	3.00	0.51
507087	1201040341	07-MAR-2006 14:56	DONE	0.16	-1	num	0.7	0	-0.33	1.73	3.00	0.51
507401	1201041213	07-MAR-2006 23:35	DONE	1.21	0.99	num	0.7	0	-0.33	1.73	3.00	0.51
509582	1201046245	08-MAR-2006 08:59	DONE	0.64	-0.11	num	0.7	0	-0.33	1.73	3.00	0.51
509840	1201046801	10-MAR-2006 11:48	DONE	00	-1	num	0.7	0	-0.33	1.73	3.00	0.51

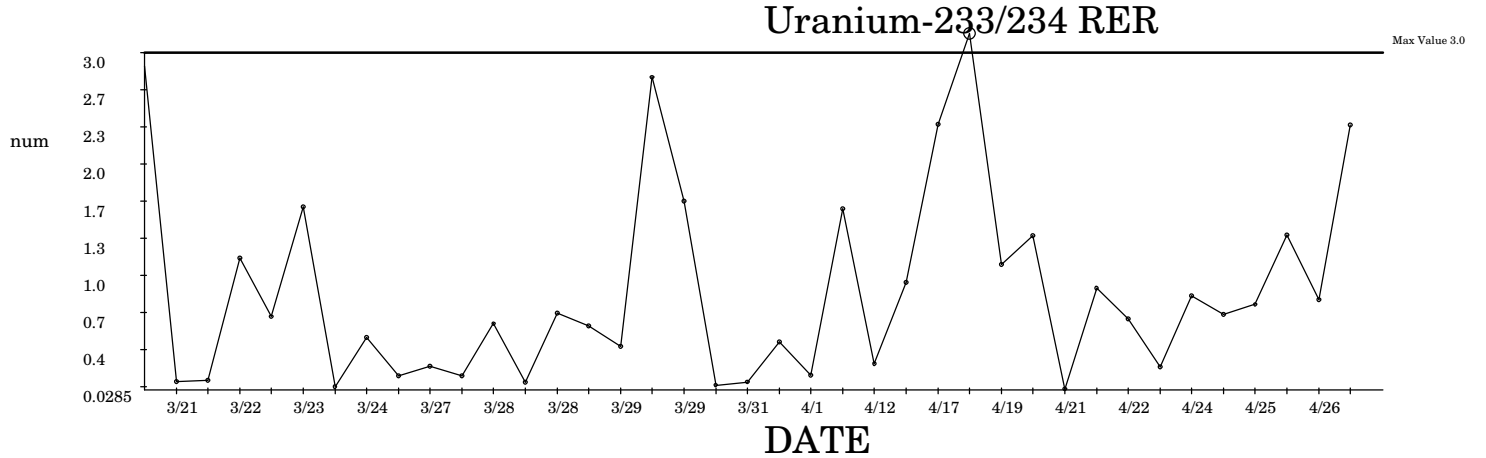
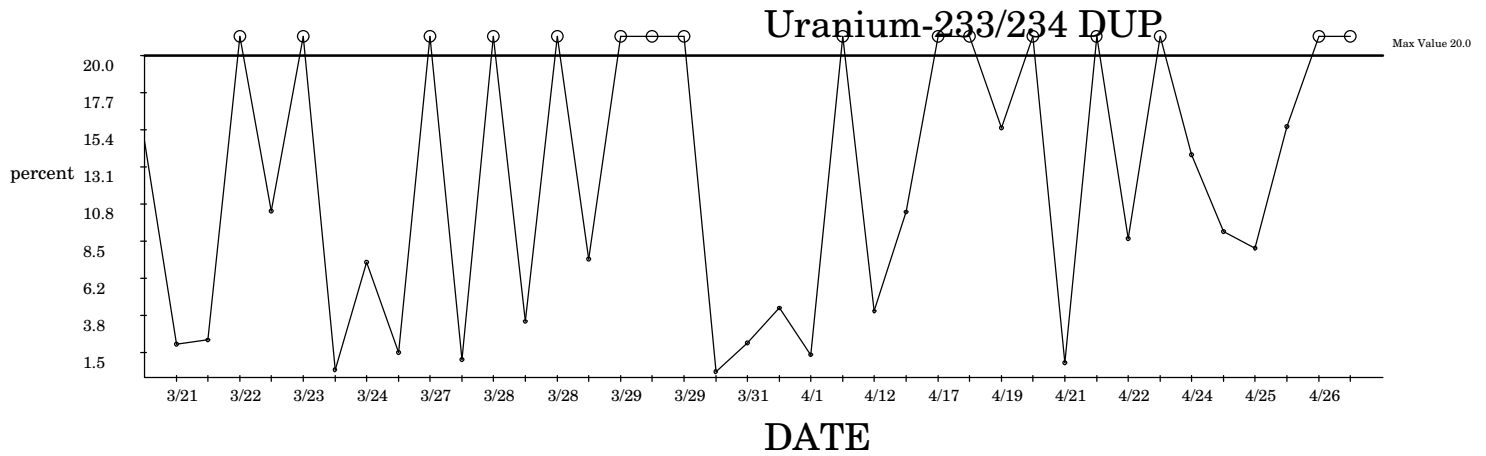
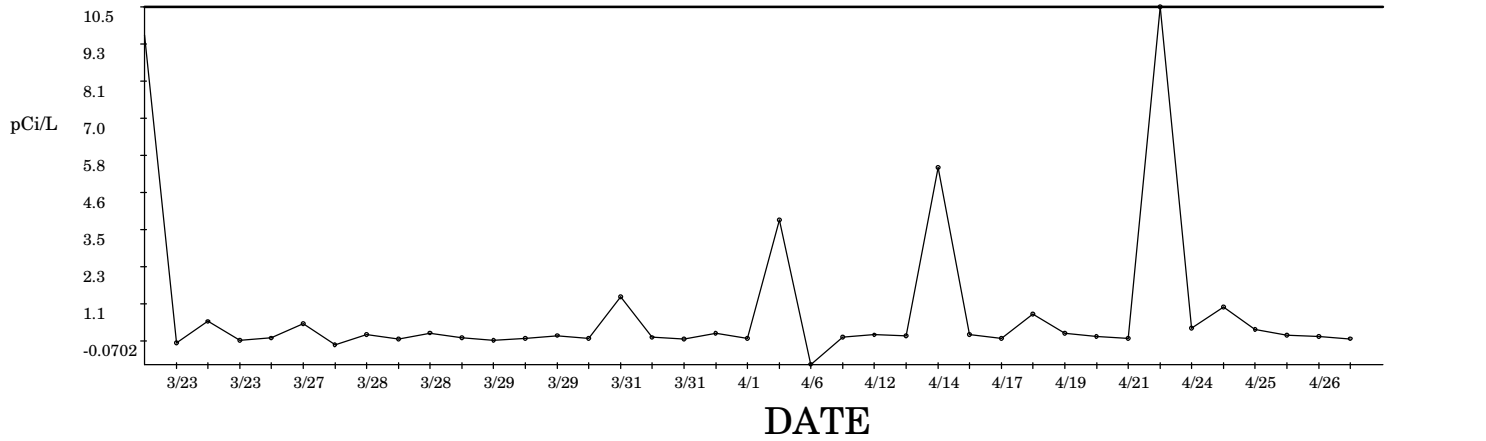
509118	1201045259	11-MAR-2006 09:34	DONE	0.26	-0.85	num	0.7	0	-0.33	1.73	3.00	0.51
511062	1201049579	14-MAR-2006 17:18	DUSE	0.15	-1	num	0.7	0	-0.33	1.73	3.00	0.51
509796	1201046676	14-MAR-2006 17:43	DONE	0.75	0.1	num	0.7	0	-0.33	1.73	3.00	0.51
510660	1201048676	15-MAR-2006 10:56	DONE	0.45	-0.48	num	0.7	0	-0.33	1.73	3.00	0.51
511207	1201049871	18-MAR-2006 12:05	DONE	0.49	-0.41	num	0.7	0	-0.33	1.73	3.00	0.51
512010	1201051736	22-MAR-2006 20:59	DONE	0.61	-0.17	num	0.7	0	-0.33	1.73	3.00	0.51
511986	1201051679	23-MAR-2006 08:32	DONE	0.21	-0.95	num	0.7	0	-0.33	1.73	3.00	0.51
512003	1201051719	24-MAR-2006 08:00	DONE	1.22	1	num	0.7	0	-0.33	1.73	3.00	0.51
512008	1201051728	27-MAR-2006 18:58	DUSE	0.33	-0.72	num	0.7	0	-0.33	1.73	3.00	0.51
512781	1201053533	28-MAR-2006 07:34	DONE	1.92	2.4	num	0.7	0	-0.33	1.73	3.00	0.51
511549	1201050714	28-MAR-2006 11:48	DONE	0.6	-0.19	num	0.7	0	-0.33	1.73	3.00	0.51
515678	1201059767	29-MAR-2006 10:23	DONE	0.63	-0.13	num	0.7	0	-0.33	1.73	3.00	0.51
514263	1201056524	29-MAR-2006 22:27	DUSE	0.87	0.33	num	0.7	0	-0.33	1.73	3.00	0.51
515544	1201059407	01-APR-2006 09:22	DONE	0.87	0.34	num	0.7	0	-0.33	1.73	3.00	0.51
515266	1201058729	01-APR-2006 11:30	DONE	0.28	-0.8	num	0.7	0	-0.33	1.73	3.00	0.51
517718	1201064216	06-APR-2006 13:23	DONE	0.02	-1	num	0.7	0	-0.33	1.73	3.00	0.51
517136	1201062872	07-APR-2006 07:28	DUSE	1.97	2.5	num	0.7	0	-0.33	1.73	3.00	0.51
518887	1201066849	12-APR-2006 19:27	DUSE	0.87	0.34	num	0.7	0	-0.33	1.73	3.00	0.51
519427	1201067982	14-APR-2006 14:34	DONE	0.21	-0.95	num	0.7	0	-0.33	1.73	3.00	0.51
518909	1201066926	16-APR-2006 08:06	DONE	1.01	0.61	num	0.7	0	-0.33	1.73	3.00	0.51
519439	1201068032	18-APR-2006 12:58	DUSE	0.05	-1	num	0.7	0	-0.33	1.73	3.00	0.51
520797	1201071137	19-APR-2006 14:45	DUSE	0.01	-1	num	0.7	0	-0.33	1.73	3.00	0.51
521038	1201071720	19-APR-2006 14:47	DONE	1.19	0.96	num	0.7	0	-0.33	1.73	3.00	0.51
520798	1201071141	20-APR-2006 07:49	DONE	0.47	-0.45	num	0.7	0	-0.33	1.73	3.00	0.51
521959	1201074064	20-APR-2006 21:36	DONE	0.39	-0.6	num	0.7	0	-0.33	1.73	3.00	0.51
521959	1201074155	20-APR-2006 21:36	DONE	0.52	-0.35	num	0.7	0	-0.33	1.73	3.00	0.51
521075	1201071845	20-APR-2006 21:36	DUSE	1.51	1.6	num	0.7	0	-0.33	1.73	3.00	0.51
521959	1201074156	21-APR-2006 23:46	DONE	1.35	1.3	num	0.7	0	-0.33	1.73	3.00	0.51
522734	1201075817	21-APR-2006 23:46	DUSE	1.16	0.89	num	0.7	0	-0.33	1.73	3.00	0.51
518508	1201065951	21-APR-2006 23:47	DONE	0.48	-0.42	num	0.7	0	-0.33	1.73	3.00	0.51
522200	1201074678	25-APR-2006 12:28	DUSE	1.46	1.5	num	0.7	0	-0.33	1.73	3.00	0.51
519440	1201068036	25-APR-2006 16:49	DONE	1.2	0.97	num	0.7	0	-0.33	1.73	3.00	0.51
523917	1201078560	26-APR-2006 08:24	DONE	0.64	-0.11	num	0.7	0	-0.33	1.73	3.00	0.51

Thorium-232 SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
491189	1201003738	12-JAN-2006 18:04	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
494226	1201010637	16-JAN-2006 16:49	DONE	87	-2	percent	100	75.0	83.3	117	125	8.33
494966	1201012326	19-JAN-2006 12:40	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
494595	1201011443	19-JAN-2006 12:40	DONE	123	2.8	percent	100	75.0	83.3	117	125	8.33
495880	1201014377	21-JAN-2006 10:02	DONE	82	-2	percent	100	75.0	83.3	117	125	8.33
496372	1201015511	24-JAN-2006 08:37	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
494599	1201011459	26-JAN-2006 14:49	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
497833	1201018880	28-JAN-2006 13:16	DONE	91	-1	percent	100	75.0	83.3	117	125	8.33
498151	1201019511	04-FEB-2006 07:58	DONE	125	3	percent	100	75.0	83.3	117	125	8.33
497915	1201019037	04-FEB-2006 12:32	DONE	112	1.4	percent	100	75.0	83.3	117	125	8.33
500802	1201025782	10-FEB-2006 17:25	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
500664	1201025410	12-FEB-2006 08:45	DONE	89	-1	percent	100	75.0	83.3	117	125	8.33
504422	1201034010	22-FEB-2006 09:56	DONE	90	-1	percent	100	75.0	83.3	117	125	8.33
502229	1201029180	22-FEB-2006 23:48	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33

505915	1201037584	25-FEB-2006 18:04	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
504484	1201034199	28-FEB-2006 15:47	DUSE	104	0.48	percent	100	75.0	83.3	117	125	8.33
507398	1201041206	03-MAR-2006 22:26	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
508121	1201042935	04-MAR-2006 13:40	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
507079	1201040314	04-MAR-2006 21:34	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
507401	1201041214	07-MAR-2006 23:35	DONE	97	-0.36	percent	100	75.0	83.3	117	125	8.33
509840	1201046802	10-MAR-2006 11:48	DONE	116	2	percent	100	75.0	83.3	117	125	8.33
509118	1201045260	11-MAR-2006 09:34	DONE	78	-3	percent	100	75.0	83.3	117	125	8.33
509796	1201046677	14-MAR-2006 17:43	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
511207	1201049872	18-MAR-2006 12:05	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
511549	1201050715	20-MAR-2006 07:43	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
512010	1201051737	22-MAR-2006 20:59	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
511986	1201051680	23-MAR-2006 08:32	DONE	86	-2	percent	100	75.0	83.3	117	125	8.33
512003	1201051720	25-MAR-2006 10:35	DONE	95	-0.61	percent	100	75.0	83.3	117	125	8.33
512781	1201053534	28-MAR-2006 07:34	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
515678	1201059768	29-MAR-2006 10:23	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
515544	1201059408	01-APR-2006 09:22	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
515266	1201058730	01-APR-2006 11:31	DONE	96	-0.52	percent	100	75.0	83.3	117	125	8.33
519427	1201067983	14-APR-2006 14:35	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
521038	1201071721	20-APR-2006 12:32	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
521959	1201074065	20-APR-2006 21:36	DONE	97	-0.35	percent	100	75.0	83.3	117	125	8.33
521959	1201074157	20-APR-2006 21:36	DONE	107	0.82	percent	100	75.0	83.3	117	125	8.33
521959	1201074158	20-APR-2006 21:36	DONE	100	00	percent	100	75.0	83.3	117	125	8.33
518508	1201065952	21-APR-2006 23:47	DONE	103	0.33	percent	100	75.0	83.3	117	125	8.33
519440	1201068037	26-APR-2006 14:37	DONE	119	2.2	percent	100	75.0	83.3	117	125	8.33

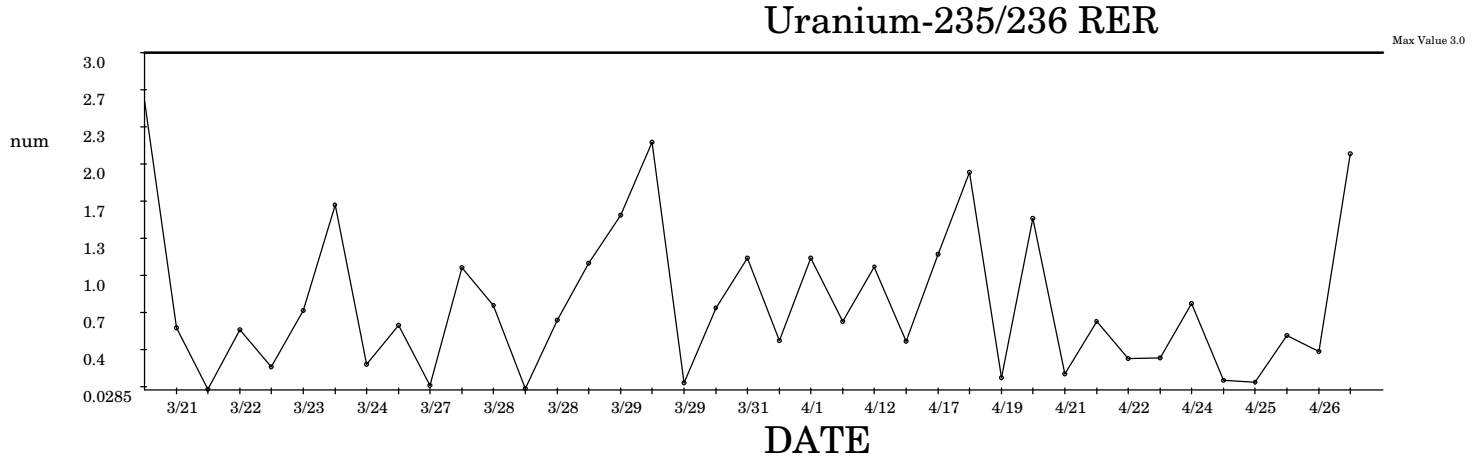
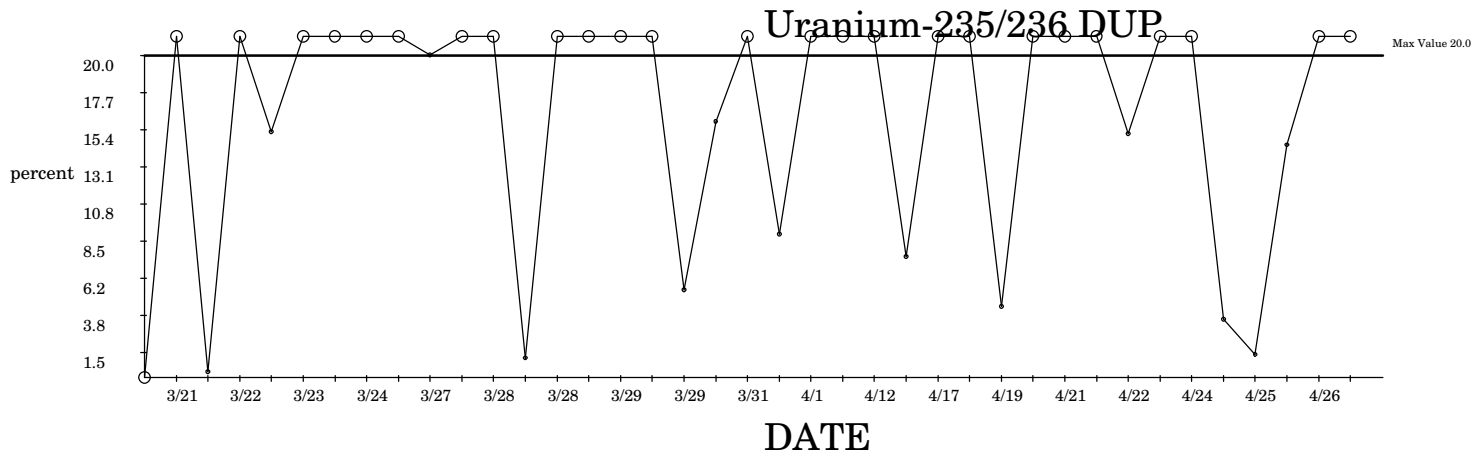
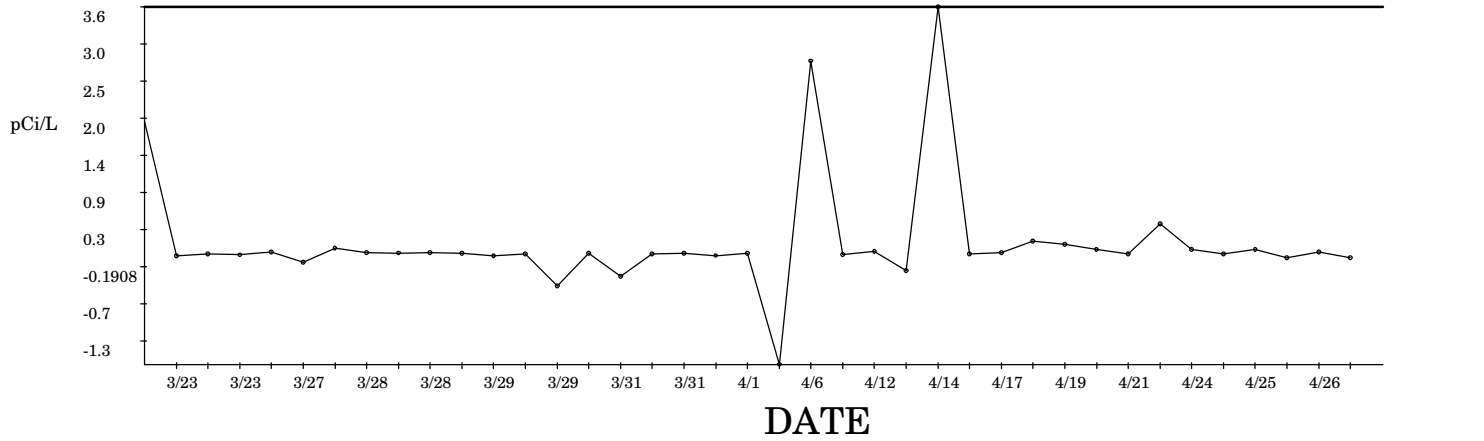
SPC Graph for Alpha SpecUranium in Liquids 4/27/2006 Uranium-233/234 BLANK



○ Denotes Outlier

SPC Graph for Alpha SpecUranium in Liquids 4/27/2006

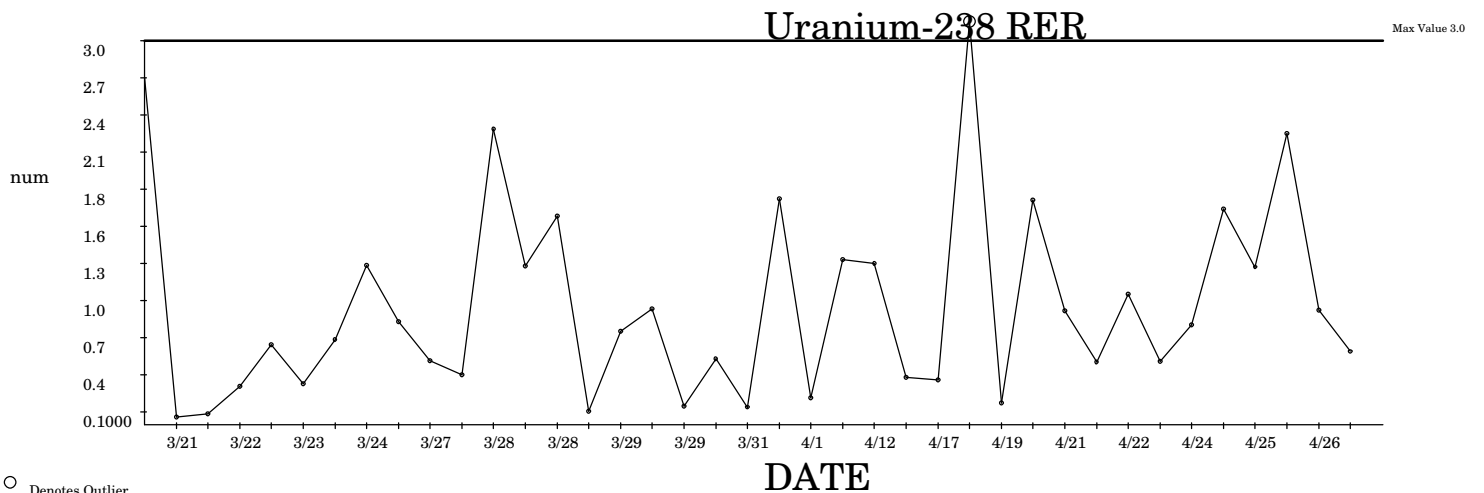
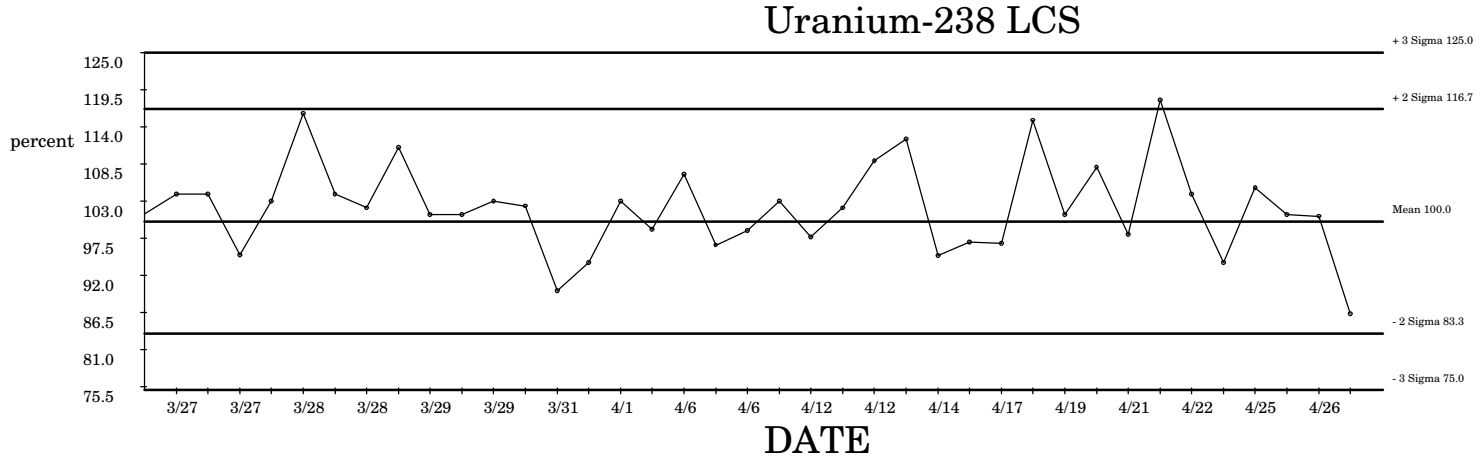
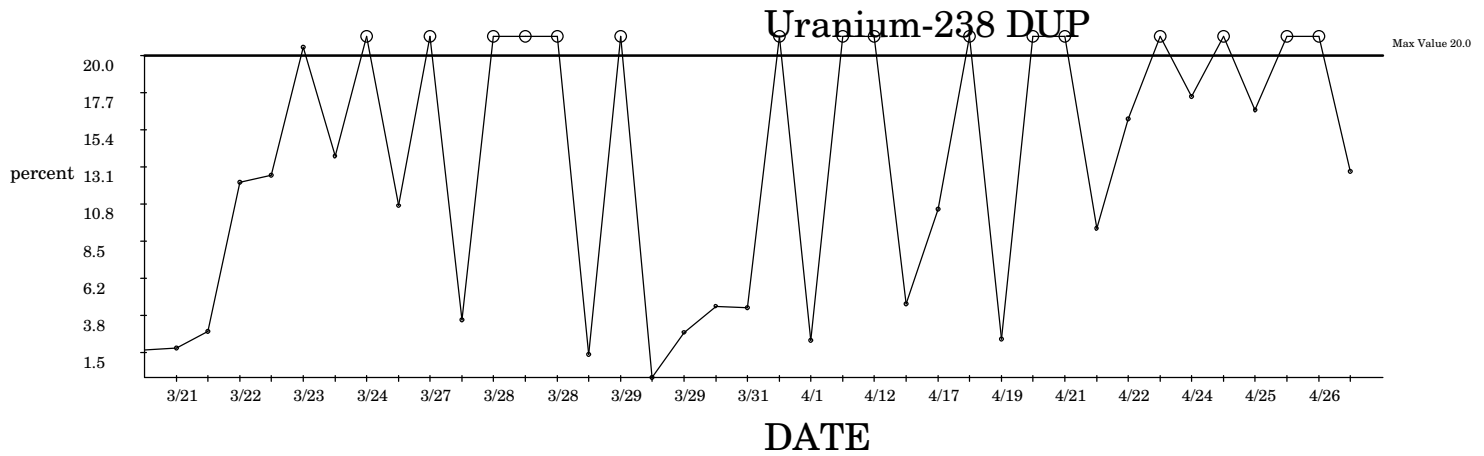
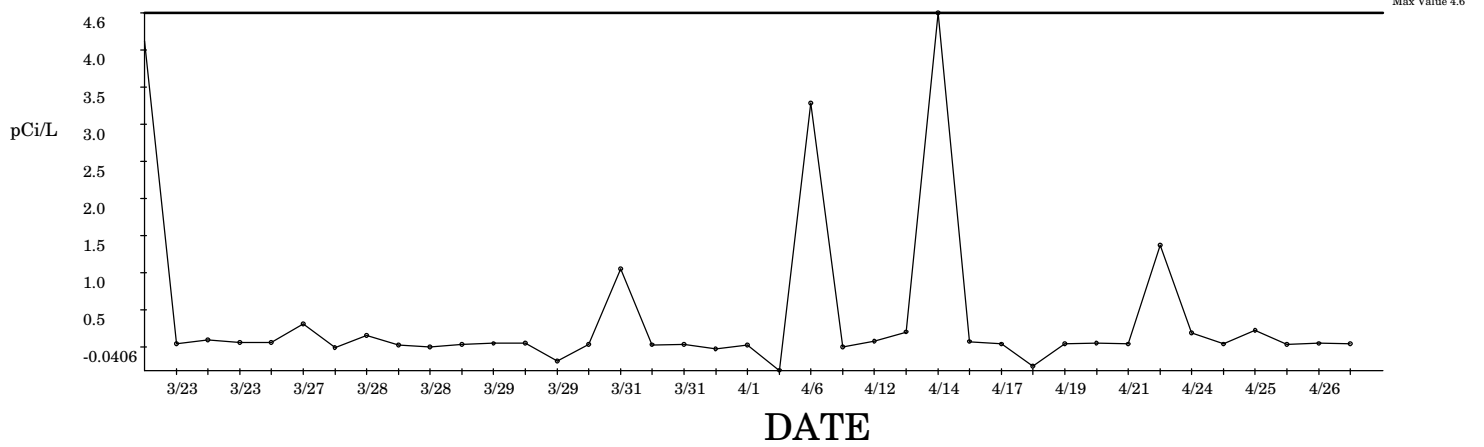
Uranium-235/236 BLANK



○ Denotes Outlier

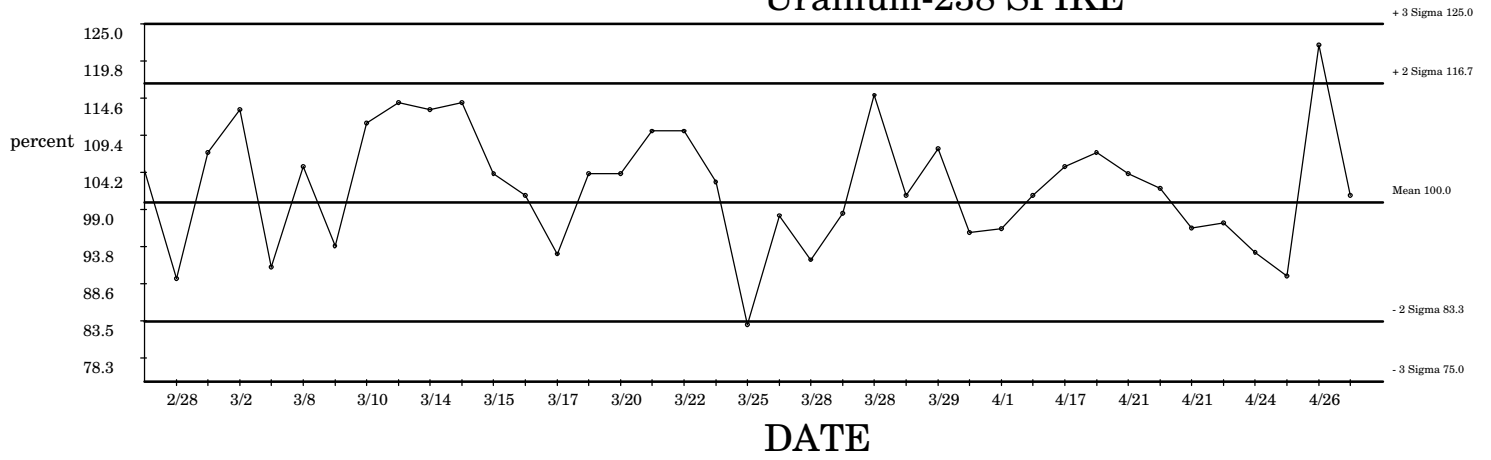
SPC Graph for Alpha SpecUranium in Liquids 4/27/2006

Uranium-238 BLANK



○ Denotes Outlier

SPC Graph for Alpha SpecUranium in Liquids 4/27/2006 Uranium-238 SPIKE



Data used for Alpha Spec Uranium in Liquids 28-APR-2006

Uranium-233/234BLANK: Limits LCL = -5.2 UCL = 6.5

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
511988	1201051682	23-MAR-2006 13:27	DONE	0.09	-0.28	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
510728	1201048852	23-MAR-2006 13:27	DONE	-0.138	-0.4	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511552	1201050721	23-MAR-2006 16:14	DONE	0.55	-0.05	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511560	1201050747	23-MAR-2006 18:20	DONE	-0.046	-0.35	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511709	1201051079	25-MAR-2006 15:09	DONE	0.02	-0.32	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511201	1201049856	27-MAR-2006 08:14	DONE	0.48	-0.08	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514936	1201057981	27-MAR-2006 14:43	DONE	-0.183	-0.42	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
512777	1201053518	28-MAR-2006 07:34	DONE	0.13	-0.26	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
512076	1201051895	28-MAR-2006 07:39	DONE	-0.013	-0.34	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
515153	1201058496	28-MAR-2006 12:29	DONE	0.18	-0.23	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514141	1201056267	28-MAR-2006 16:43	DONE	0.03	-0.31	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514267	1201056533	29-MAR-2006 07:59	DONE	-0.05	-0.35	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511652	1201050960	29-MAR-2006 16:04	DONE	0.02	-0.32	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
511564	1201050754	29-MAR-2006 19:53	DONE	0.1	-0.28	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514277	1201056551	29-MAR-2006 22:27	DONE	00	-0.33	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514320	1201056638	31-MAR-2006 08:29	DONE	1.32	0.35	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
512070	1201051881	31-MAR-2006 15:55	DONE	0.04	-0.31	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
515540	1201059382	31-MAR-2006 19:27	DONE	-0.016	-0.34	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
514261	1201056520	01-APR-2006 09:22	DONE	0.18	-0.24	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
516131	1201060706	01-APR-2006 16:30	DONE	0.02	-0.32	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
516497	1201061514	06-APR-2006 08:42	DONE	3.76	1.6	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
516532	1201061530	06-APR-2006 13:23	DONE	-0.808	-0.75	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
518879	1201066818	11-APR-2006 16:43	DONE	0.05	-0.3	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
518911	1201066929	12-APR-2006 14:20	DONE	0.12	-0.27	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
517717	1201064212	12-APR-2006 17:24	DONE	0.09	-0.28	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
519218	1201067494	14-APR-2006 09:06	DONE	5.41	2.5	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
520706	1201070943	15-APR-2006 09:12	DONE	0.14	-0.26	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
518916	1201066938	17-APR-2006 07:52	DUSE	0.01	-0.32	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
519428	1201067985	17-APR-2006 16:05	DONE	0.78	0.07	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
521040	1201071729	19-APR-2006 14:49	DONE	0.17	-0.24	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
520799	1201071144	21-APR-2006 07:38	DONE	0.07	-0.29	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
521962	1201074073	21-APR-2006 10:18	DONE	0.01	-0.33	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
520373	1201070134	21-APR-2006 19:20	DUSE	10.5	5.1	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
522160	1201074579	24-APR-2006 08:39	DONE	0.34	-0.16	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
521122	1201071943	24-APR-2006 16:32	DONE	1.01	0.19	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
522186	1201074646	25-APR-2006 09:34	DONE	0.3	-0.17	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
519442	1201068043	26-APR-2006 09:33	DONE	0.12	-0.27	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
521045	1201071747	26-APR-2006 18:43	DONE	0.08	-0.29	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94
524204	1201079208	28-APR-2006 07:18	DONE	00	-0.33	pCi/L	0.64	-5.2	-3.2	4.52	6.45	1.94

Uranium-233/234DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	5.33	-0.45	percent	42.3	0	-120	207	20.0	82.3
511648	1201050950	21-MAR-2006 16:38	DONE	2.05	-0.49	percent	42.3	0	-120	207	20.0	82.3
511653	1201050965	22-MAR-2006 12:29	DONE	2.33	-0.49	percent	42.3	0	-120	207	20.0	82.3
512077	1201051900	22-MAR-2006 14:23	DONE	40.0	-0.03	percent	42.3	0	-120	207	20.0	82.3
511988	1201051683	23-MAR-2006 13:27	DONE	10.3	-0.39	percent	42.3	0	-120	207	20.0	82.3
511552	1201050722	23-MAR-2006 16:14	DONE	73.8	0.38	percent	42.3	0	-120	207	20.0	82.3
511560	1201050748	23-MAR-2006 18:20	DONE	0.48	-0.51	percent	42.3	0	-120	207	20.0	82.3
511616	1201050866	24-MAR-2006 14:52	DONE	7.14	-0.43	percent	42.3	0	-120	207	20.0	82.3
511709	1201051080	25-MAR-2006 15:09	DONE	1.55	-0.5	percent	42.3	0	-120	207	20.0	82.3
514141	1201056268	27-MAR-2006 16:25	DONE	83.9	0.5	percent	42.3	0	-120	207	20.0	82.3
511652	1201050961	27-MAR-2006 16:59	DONE	1.11	-0.5	percent	42.3	0	-120	207	20.0	82.3
512777	1201053519	28-MAR-2006 07:34	DONE	35.3	-0.08	percent	42.3	0	-120	207	20.0	82.3
514320	1201056639	28-MAR-2006 07:34	DONE	3.48	-0.47	percent	42.3	0	-120	207	20.0	82.3
512076	1201051896	28-MAR-2006 07:39	DONE	32.8	-0.12	percent	42.3	0	-120	207	20.0	82.3
515153	1201058497	28-MAR-2006 12:29	DONE	7.34	-0.43	percent	42.3	0	-120	207	20.0	82.3
514267	1201056534	29-MAR-2006 07:59	DONE	90.3	0.58	percent	42.3	0	-120	207	20.0	82.3
514261	1201056521	29-MAR-2006 07:59	DONE	363	3.9	percent	42.3	0	-120	207	20.0	82.3
511564	1201050755	29-MAR-2006 19:53	DONE	34.7	-0.09	percent	42.3	0	-120	207	20.0	82.3
514277	1201056552	29-MAR-2006 22:27	DONE	0.36	-0.51	percent	42.3	0	-120	207	20.0	82.3
512070	1201051882	31-MAR-2006 15:55	DONE	2.14	-0.49	percent	42.3	0	-120	207	20.0	82.3
515540	1201059383	31-MAR-2006 19:27	DONE	4.31	-0.46	percent	42.3	0	-120	207	20.0	82.3
516131	1201060707	01-APR-2006 16:30	DONE	1.4	-0.5	percent	42.3	0	-120	207	20.0	82.3
518879	1201066819	11-APR-2006 16:43	DONE	74.1	0.39	percent	42.3	0	-120	207	20.0	82.3
518911	1201066930	12-APR-2006 14:20	DONE	4.11	-0.46	percent	42.3	0	-120	207	20.0	82.3
520706	1201070944	15-APR-2006 09:12	DONE	10.3	-0.39	percent	42.3	0	-120	207	20.0	82.3
519428	1201067986	17-APR-2006 07:52	DONE	67	0.3	percent	42.3	0	-120	207	20.0	82.3
518916	1201066939	18-APR-2006 14:03	DUSE	103	0.73	percent	42.3	0	-120	207	20.0	82.3
521040	1201071730	19-APR-2006 14:49	DONE	15.5	-0.33	percent	42.3	0	-120	207	20.0	82.3
521962	1201074074	21-APR-2006 10:18	DONE	378	4.1	percent	42.3	0	-120	207	20.0	82.3
521962	1201074159	21-APR-2006 10:18	DONE	0.9	-0.5	percent	42.3	0	-120	207	20.0	82.3
520373	1201070135	21-APR-2006 19:20	DUSE	28.9	-0.16	percent	42.3	0	-120	207	20.0	82.3
520799	1201071145	22-APR-2006 07:38	DONE	8.63	-0.41	percent	42.3	0	-120	207	20.0	82.3
521962	1201074160	22-APR-2006 09:26	DONE	42.5	00	percent	42.3	0	-120	207	20.0	82.3
522160	1201074580	24-APR-2006 08:39	DONE	13.9	-0.35	percent	42.3	0	-120	207	20.0	82.3
521122	1201071944	24-APR-2006 16:32	DONE	9.06	-0.4	percent	42.3	0	-120	207	20.0	82.3
522186	1201074647	25-APR-2006 09:34	DONE	8.02	-0.42	percent	42.3	0	-120	207	20.0	82.3
519442	1201068044	26-APR-2006 09:33	DONE	15.6	-0.33	percent	42.3	0	-120	207	20.0	82.3
521045	1201071748	26-APR-2006 18:43	DONE	26.9	-0.19	percent	42.3	0	-120	207	20.0	82.3
524204	1201079209	28-APR-2006 07:18	DONE	41.8	-0.01	percent	42.3	0	-120	207	20.0	82.3

Uranium-233/234RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	0.12	-0.63	num	0.91	0	-1.6	3.43	3.00	1.26
511648	1201050950	21-MAR-2006 16:38	DONE	0.07	-0.67	num	0.91	0	-1.6	3.43	3.00	1.26
511653	1201050965	22-MAR-2006 12:29	DONE	0.08	-0.66	num	0.91	0	-1.6	3.43	3.00	1.26
512077	1201051900	22-MAR-2006 14:23	DONE	1.17	0.21	num	0.91	0	-1.6	3.43	3.00	1.26
511988	1201051683	23-MAR-2006 13:27	DONE	0.65	-0.21	num	0.91	0	-1.6	3.43	3.00	1.26
511552	1201050722	23-MAR-2006 16:14	DONE	1.63	0.57	num	0.91	0	-1.6	3.43	3.00	1.26
511560	1201050748	23-MAR-2006 18:20	DONE	0.03	-0.7	num	0.91	0	-1.6	3.43	3.00	1.26
511616	1201050866	24-MAR-2006 14:52	DONE	0.47	-0.35	num	0.91	0	-1.6	3.43	3.00	1.26
511709	1201051080	25-MAR-2006 15:09	DONE	0.12	-0.63	num	0.91	0	-1.6	3.43	3.00	1.26
514141	1201056268	27-MAR-2006 16:25	DONE	0.21	-0.56	num	0.91	0	-1.6	3.43	3.00	1.26
511652	1201050961	27-MAR-2006 16:59	DONE	0.12	-0.63	num	0.91	0	-1.6	3.43	3.00	1.26
512777	1201053519	28-MAR-2006 07:34	DONE	0.59	-0.26	num	0.91	0	-1.6	3.43	3.00	1.26
514320	1201056639	28-MAR-2006 07:34	DONE	0.07	-0.67	num	0.91	0	-1.6	3.43	3.00	1.26
512076	1201051896	28-MAR-2006 07:39	DONE	0.68	-0.18	num	0.91	0	-1.6	3.43	3.00	1.26
515153	1201058497	28-MAR-2006 12:29	DONE	0.57	-0.27	num	0.91	0	-1.6	3.43	3.00	1.26
514267	1201056534	29-MAR-2006 07:59	DONE	0.39	-0.42	num	0.91	0	-1.6	3.43	3.00	1.26
514261	1201056521	29-MAR-2006 07:59	DONE	2.78	1.5	num	0.91	0	-1.6	3.43	3.00	1.26
511564	1201050755	29-MAR-2006 19:53	DONE	1.68	0.61	num	0.91	0	-1.6	3.43	3.00	1.26
514277	1201056552	29-MAR-2006 22:27	DONE	0.04	-0.69	num	0.91	0	-1.6	3.43	3.00	1.26
512070	1201051882	31-MAR-2006 15:55	DONE	0.07	-0.67	num	0.91	0	-1.6	3.43	3.00	1.26
515540	1201059383	31-MAR-2006 19:27	DONE	0.43	-0.38	num	0.91	0	-1.6	3.43	3.00	1.26
516131	1201060707	01-APR-2006 16:30	DONE	0.13	-0.62	num	0.91	0	-1.6	3.43	3.00	1.26
518879	1201066819	11-APR-2006 16:43	DONE	1.61	0.56	num	0.91	0	-1.6	3.43	3.00	1.26
518911	1201066930	12-APR-2006 14:20	DONE	0.23	-0.54	num	0.91	0	-1.6	3.43	3.00	1.26
520706	1201070944	15-APR-2006 09:12	DONE	0.96	0.03	num	0.91	0	-1.6	3.43	3.00	1.26
519428	1201067986	17-APR-2006 07:52	DONE	2.36	1.2	num	0.91	0	-1.6	3.43	3.00	1.26
518916	1201066939	18-APR-2006 14:03	DUSE	7.25	5	num	0.91	0	-1.6	3.43	3.00	1.26
521040	1201071730	19-APR-2006 14:49	DONE	1.12	0.16	num	0.91	0	-1.6	3.43	3.00	1.26
521962	1201074074	21-APR-2006 10:18	DONE	1.37	0.37	num	0.91	0	-1.6	3.43	3.00	1.26
521962	1201074159	21-APR-2006 10:18	DONE	0.01	-0.72	num	0.91	0	-1.6	3.43	3.00	1.26
520373	1201070135	21-APR-2006 19:20	DUSE	0.91	-0.01	num	0.91	0	-1.6	3.43	3.00	1.26
520799	1201071145	22-APR-2006 07:38	DONE	0.63	-0.22	num	0.91	0	-1.6	3.43	3.00	1.26
521962	1201074160	22-APR-2006 09:26	DONE	0.2	-0.56	num	0.91	0	-1.6	3.43	3.00	1.26
522160	1201074580	24-APR-2006 08:39	DONE	0.84	-0.06	num	0.91	0	-1.6	3.43	3.00	1.26
521122	1201071944	24-APR-2006 16:32	DONE	0.67	-0.19	num	0.91	0	-1.6	3.43	3.00	1.26
522186	1201074647	25-APR-2006 09:34	DONE	0.76	-0.12	num	0.91	0	-1.6	3.43	3.00	1.26
519442	1201068044	26-APR-2006 09:33	DONE	1.38	0.37	num	0.91	0	-1.6	3.43	3.00	1.26
521045	1201071748	26-APR-2006 18:43	DONE	0.8	-0.09	num	0.91	0	-1.6	3.43	3.00	1.26
524204	1201079209	28-APR-2006 07:18	DONE	2.36	1.1	num	0.91	0	-1.6	3.43	3.00	1.26

Uranium-235/236BLANK: Limits LCL = -2.2 UCL = 2.5

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
511988	1201051682	23-MAR-2006 13:27	DONE	0.05	-0.08	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
510728	1201048852	23-MAR-2006 13:27	DONE	-0.03	-0.19	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511552	1201050721	23-MAR-2006 16:14	DONE	0	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511560	1201050747	23-MAR-2006 18:20	DONE	-0.018	-0.17	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511709	1201051079	25-MAR-2006 15:09	DONE	0.03	-0.12	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511201	1201049856	27-MAR-2006 08:14	DONE	-0.122	-0.3	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514936	1201057981	27-MAR-2006 14:43	DONE	0.08	-0.05	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
512777	1201053518	28-MAR-2006 07:34	DONE	0.02	-0.13	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
512076	1201051895	28-MAR-2006 07:39	DONE	0.01	-0.14	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
515153	1201058496	28-MAR-2006 12:29	DONE	0.01	-0.14	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514141	1201056267	28-MAR-2006 16:43	DONE	00	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514267	1201056533	29-MAR-2006 07:59	DONE	-0.031	-0.19	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511652	1201050960	29-MAR-2006 16:04	DONE	-0.005	-0.16	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
511564	1201050754	29-MAR-2006 19:53	DONE	-0.47	-0.75	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514277	1201056551	29-MAR-2006 22:27	DONE	00	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514320	1201056638	31-MAR-2006 08:29	DONE	-0.331	-0.57	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
512070	1201051881	31-MAR-2006 15:55	DONE	-0.007	-0.16	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
515540	1201059382	31-MAR-2006 19:27	DONE	00	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
514261	1201056520	01-APR-2006 09:22	DONE	-0.028	-0.18	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
516131	1201060706	01-APR-2006 16:30	DONE	00	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
516497	1201061514	06-APR-2006 08:42	DONE	-1.6	-2	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
516532	1201061530	06-APR-2006 13:23	DONE	2.8	3.4	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
518879	1201066818	11-APR-2006 16:43	DONE	-0.012	-0.16	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
518911	1201066929	12-APR-2006 14:20	DONE	0.03	-0.11	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
517717	1201064212	12-APR-2006 17:24	DONE	-0.249	-0.47	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
519218	1201067494	14-APR-2006 09:06	DONE	3.59	4.4	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
520706	1201070943	15-APR-2006 09:12	DONE	0	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
518916	1201066938	17-APR-2006 07:52	DUSE	0.01	-0.14	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
519428	1201067985	17-APR-2006 16:05	DONE	0.18	0.09	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
521040	1201071729	19-APR-2006 14:49	DONE	0.14	0.02	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
520799	1201071144	21-APR-2006 07:38	DONE	0.06	-0.08	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
521962	1201074073	21-APR-2006 10:18	DONE	0	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
520373	1201070134	21-APR-2006 19:20	DUSE	0.44	0.41	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
522160	1201074579	24-APR-2006 08:39	DONE	0.06	-0.07	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
521122	1201071943	24-APR-2006 16:32	DONE	0	-0.15	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
522186	1201074646	25-APR-2006 09:34	DONE	0.06	-0.07	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
519442	1201068043	26-APR-2006 09:33	DONE	-0.058	-0.22	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
521045	1201071747	26-APR-2006 18:43	DONE	0.02	-0.12	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79
524204	1201079208	28-APR-2006 07:18	DONE	-0.059	-0.22	pCi/L	0.12	-2.2	-1.5	1.69	2.47	0.79

Uranium-235/236DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	142	0.09	percent	118	0	-420	654	20.0	268
511648	1201050950	21-MAR-2006 16:38	DONE	56.3	-0.23	percent	118	0	-420	654	20.0	268
511653	1201050965	22-MAR-2006 12:29	DONE	0.37	-0.44	percent	118	0	-420	654	20.0	268
512077	1201051900	22-MAR-2006 14:23	DONE	56.5	-0.23	percent	118	0	-420	654	20.0	268
511988	1201051683	23-MAR-2006 13:27	DONE	15.3	-0.39	percent	118	0	-420	654	20.0	268
511552	1201050722	23-MAR-2006 16:14	DONE	47.7	-0.26	percent	118	0	-420	654	20.0	268
511560	1201050748	23-MAR-2006 18:20	DONE	125	0.03	percent	118	0	-420	654	20.0	268
511616	1201050866	24-MAR-2006 14:52	DONE	27.9	-0.34	percent	118	0	-420	654	20.0	268
511709	1201051080	25-MAR-2006 15:09	DONE	21.9	-0.36	percent	118	0	-420	654	20.0	268
514141	1201056268	27-MAR-2006 16:25	DONE	20.1	-0.37	percent	118	0	-420	654	20.0	268
511652	1201050961	27-MAR-2006 16:59	DONE	25.6	-0.35	percent	118	0	-420	654	20.0	268
512777	1201053519	28-MAR-2006 07:34	DONE	780	2.5	percent	118	0	-420	654	20.0	268
514320	1201056639	28-MAR-2006 07:34	DONE	1.2	-0.44	percent	118	0	-420	654	20.0	268
512076	1201051896	28-MAR-2006 07:39	DONE	190	0.27	percent	118	0	-420	654	20.0	268
515153	1201058497	28-MAR-2006 12:29	DONE	59.4	-0.22	percent	118	0	-420	654	20.0	268
514267	1201056534	29-MAR-2006 07:59	DONE	254	0.5	percent	118	0	-420	654	20.0	268
514261	1201056521	29-MAR-2006 07:59	DONE	1530	5.3	percent	118	0	-420	654	20.0	268
511564	1201050755	29-MAR-2006 19:53	DONE	5.44	-0.42	percent	118	0	-420	654	20.0	268
514277	1201056552	29-MAR-2006 22:27	DONE	15.9	-0.38	percent	118	0	-420	654	20.0	268
512070	1201051882	31-MAR-2006 15:55	DONE	44	-0.28	percent	118	0	-420	654	20.0	268
515540	1201059383	31-MAR-2006 19:27	DONE	8.9	-0.41	percent	118	0	-420	654	20.0	268
516131	1201060707	01-APR-2006 16:30	DONE	43.2	-0.28	percent	118	0	-420	654	20.0	268
518879	1201066819	11-APR-2006 16:43	DONE	200	0.3	percent	118	0	-420	654	20.0	268
518911	1201066930	12-APR-2006 14:20	DONE	108	-0.04	percent	118	0	-420	654	20.0	268
520706	1201070944	15-APR-2006 09:12	DONE	7.52	-0.41	percent	118	0	-420	654	20.0	268
519428	1201067986	17-APR-2006 07:52	DONE	68.2	-0.19	percent	118	0	-420	654	20.0	268
518916	1201066939	18-APR-2006 14:03	DUSE	76.8	-0.16	percent	118	0	-420	654	20.0	268
521040	1201071730	19-APR-2006 14:49	DONE	4.4	-0.43	percent	118	0	-420	654	20.0	268
521962	1201074159	21-APR-2006 10:18	DONE	29.4	-0.33	percent	118	0	-420	654	20.0	268
521962	1201074074	21-APR-2006 10:18	DONE	301	0.68	percent	118	0	-420	654	20.0	268
520373	1201070135	21-APR-2006 19:20	DUSE	55.6	-0.23	percent	118	0	-420	654	20.0	268
520799	1201071145	22-APR-2006 07:38	DONE	15.2	-0.39	percent	118	0	-420	654	20.0	268
521962	1201074160	22-APR-2006 09:26	DONE	63.1	-0.21	percent	118	0	-420	654	20.0	268
522160	1201074580	24-APR-2006 08:39	DONE	49	-0.26	percent	118	0	-420	654	20.0	268
521122	1201071944	24-APR-2006 16:32	DONE	3.62	-0.43	percent	118	0	-420	654	20.0	268
522186	1201074647	25-APR-2006 09:34	DONE	1.43	-0.44	percent	118	0	-420	654	20.0	268
519442	1201068044	26-APR-2006 09:33	DONE	14.5	-0.39	percent	118	0	-420	654	20.0	268
521045	1201071748	26-APR-2006 18:43	DONE	38	-0.3	percent	118	0	-420	654	20.0	268
524204	1201079209	28-APR-2006 07:18	DONE	116	-0.01	percent	118	0	-420	654	20.0	268

Uranium-235/236RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	0.43	-0.48	num	0.72	0	-0.487	1.92	3.00	0.6
511648	1201050950	21-MAR-2006 16:38	DONE	0.55	-0.27	num	0.72	0	-0.487	1.92	3.00	0.6
511653	1201050965	22-MAR-2006 12:29	DONE	00	-1	num	0.72	0	-0.487	1.92	3.00	0.6
512077	1201051900	22-MAR-2006 14:23	DONE	0.53	-0.3	num	0.72	0	-0.487	1.92	3.00	0.6
511988	1201051683	23-MAR-2006 13:27	DONE	0.21	-0.85	num	0.72	0	-0.487	1.92	3.00	0.6
511552	1201050722	23-MAR-2006 16:14	DONE	0.7	-0.02	num	0.72	0	-0.487	1.92	3.00	0.6
511560	1201050748	23-MAR-2006 18:20	DONE	1.64	1.5	num	0.72	0	-0.487	1.92	3.00	0.6
511616	1201050866	24-MAR-2006 14:52	DONE	0.23	-0.81	num	0.72	0	-0.487	1.92	3.00	0.6
511709	1201051080	25-MAR-2006 15:09	DONE	0.58	-0.23	num	0.72	0	-0.487	1.92	3.00	0.6
514141	1201056268	27-MAR-2006 16:25	DONE	0.04	-1	num	0.72	0	-0.487	1.92	3.00	0.6
511652	1201050961	27-MAR-2006 16:59	DONE	1.09	0.62	num	0.72	0	-0.487	1.92	3.00	0.6
512777	1201053519	28-MAR-2006 07:34	DONE	0.75	0.06	num	0.72	0	-0.487	1.92	3.00	0.6
514320	1201056639	28-MAR-2006 07:34	DONE	0.01	-1	num	0.72	0	-0.487	1.92	3.00	0.6
512076	1201051896	28-MAR-2006 07:39	DONE	0.62	-0.16	num	0.72	0	-0.487	1.92	3.00	0.6
515153	1201058497	28-MAR-2006 12:29	DONE	1.13	0.69	num	0.72	0	-0.487	1.92	3.00	0.6
514267	1201056534	29-MAR-2006 07:59	DONE	1.55	1.4	num	0.72	0	-0.487	1.92	3.00	0.6
514261	1201056521	29-MAR-2006 07:59	DONE	2.2	2.5	num	0.72	0	-0.487	1.92	3.00	0.6
511564	1201050755	29-MAR-2006 19:53	DONE	0.06	-1	num	0.72	0	-0.487	1.92	3.00	0.6
514277	1201056552	29-MAR-2006 22:27	DONE	0.73	0.02	num	0.72	0	-0.487	1.92	3.00	0.6
512070	1201051882	31-MAR-2006 15:55	DONE	1.17	0.76	num	0.72	0	-0.487	1.92	3.00	0.6
515540	1201059383	31-MAR-2006 19:27	DONE	0.44	-0.46	num	0.72	0	-0.487	1.92	3.00	0.6
516131	1201060707	01-APR-2006 16:30	DONE	1.17	0.75	num	0.72	0	-0.487	1.92	3.00	0.6
518879	1201066819	11-APR-2006 16:43	DONE	0.61	-0.18	num	0.72	0	-0.487	1.92	3.00	0.6
518911	1201066930	12-APR-2006 14:20	DONE	1.1	0.63	num	0.72	0	-0.487	1.92	3.00	0.6
520706	1201070944	15-APR-2006 09:12	DONE	0.43	-0.48	num	0.72	0	-0.487	1.92	3.00	0.6
519428	1201067986	17-APR-2006 07:52	DONE	1.21	0.81	num	0.72	0	-0.487	1.92	3.00	0.6
518916	1201066939	18-APR-2006 14:03	DUSE	1.94	2	num	0.72	0	-0.487	1.92	3.00	0.6
521040	1201071730	19-APR-2006 14:49	DONE	0.11	-1	num	0.72	0	-0.487	1.92	3.00	0.6
521962	1201074074	21-APR-2006 10:18	DONE	1.53	1.3	num	0.72	0	-0.487	1.92	3.00	0.6
521962	1201074159	21-APR-2006 10:18	DONE	0.14	-0.95	num	0.72	0	-0.487	1.92	3.00	0.6
520373	1201070135	21-APR-2006 19:20	DUSE	0.61	-0.18	num	0.72	0	-0.487	1.92	3.00	0.6
520799	1201071145	22-APR-2006 07:38	DONE	0.28	-0.72	num	0.72	0	-0.487	1.92	3.00	0.6
521962	1201074160	22-APR-2006 09:26	DONE	0.29	-0.72	num	0.72	0	-0.487	1.92	3.00	0.6
522160	1201074580	24-APR-2006 08:39	DONE	0.77	0.08	num	0.72	0	-0.487	1.92	3.00	0.6
521122	1201071944	24-APR-2006 16:32	DONE	0.09	-1	num	0.72	0	-0.487	1.92	3.00	0.6
522186	1201074647	25-APR-2006 09:34	DONE	0.07	-1	num	0.72	0	-0.487	1.92	3.00	0.6
519442	1201068044	26-APR-2006 09:33	DONE	0.49	-0.38	num	0.72	0	-0.487	1.92	3.00	0.6
521045	1201071748	26-APR-2006 18:43	DONE	0.34	-0.62	num	0.72	0	-0.487	1.92	3.00	0.6
524204	1201079209	28-APR-2006 07:18	DONE	2.1	2.3	num	0.72	0	-0.487	1.92	3.00	0.6

Uranium-238BLANK: Limits LCL = -2.5 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
511988	1201051682	23-MAR-2006 13:27	DONE	0.03	-0.26	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
510728	1201048852	23-MAR-2006 13:27	DONE	00	-0.28	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511552	1201050721	23-MAR-2006 16:14	DONE	0.06	-0.23	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511560	1201050747	23-MAR-2006 18:20	DONE	0.02	-0.26	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511709	1201051079	25-MAR-2006 15:09	DONE	0.02	-0.26	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511201	1201049856	27-MAR-2006 08:14	DONE	0.28	0.01	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514936	1201057981	27-MAR-2006 14:43	DONE	-0.046	-0.33	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
512777	1201053518	28-MAR-2006 07:34	DONE	0.12	-0.16	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
512076	1201051895	28-MAR-2006 07:39	DONE	-0.018	-0.3	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
515153	1201058496	28-MAR-2006 12:29	DONE	-0.036	-0.32	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514141	1201056267	28-MAR-2006 16:43	DONE	-0.003	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514267	1201056533	29-MAR-2006 07:59	DONE	0.01	-0.27	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511652	1201050960	29-MAR-2006 16:04	DONE	0.01	-0.27	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
511564	1201050754	29-MAR-2006 19:53	DONE	-0.231	-0.54	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514277	1201056551	29-MAR-2006 22:27	DONE	-0.002	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514320	1201056638	31-MAR-2006 08:29	DONE	1.03	0.83	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
512070	1201051881	31-MAR-2006 15:55	DONE	-0.009	-0.3	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
515540	1201059382	31-MAR-2006 19:27	DONE	-0.007	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
514261	1201056520	01-APR-2006 09:22	DONE	-0.067	-0.36	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
516131	1201060706	01-APR-2006 16:30	DONE	-0.011	-0.3	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
516497	1201061514	06-APR-2006 08:42	DONE	-0.361	-0.68	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
516532	1201061530	06-APR-2006 13:23	DONE	3.31	3.3	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
518879	1201066818	11-APR-2006 16:43	DONE	-0.038	-0.33	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
518911	1201066929	12-APR-2006 14:20	DONE	0.04	-0.24	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
517717	1201064212	12-APR-2006 17:24	DONE	0.17	-0.1	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
519218	1201067494	14-APR-2006 09:06	DONE	4.55	4.6	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
520706	1201070943	15-APR-2006 09:12	DONE	0.04	-0.25	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
518916	1201066938	17-APR-2006 07:52	DUSE	0	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
519428	1201067985	17-APR-2006 16:05	DONE	-0.304	-0.61	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
521040	1201071729	19-APR-2006 14:49	DONE	00	-0.28	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
520799	1201071144	21-APR-2006 07:38	DONE	0.01	-0.27	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
521962	1201074073	21-APR-2006 10:18	DONE	-0	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
520373	1201070134	21-APR-2006 19:20	DUSE	1.36	1.2	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
522160	1201074579	24-APR-2006 08:39	DONE	0.15	-0.12	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
521122	1201071943	24-APR-2006 16:32	DONE	0	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
522186	1201074646	25-APR-2006 09:34	DONE	0.19	-0.08	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
519442	1201068043	26-APR-2006 09:33	DONE	-0.005	-0.29	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
521045	1201071747	26-APR-2006 18:43	DONE	0.01	-0.28	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92
524204	1201079208	28-APR-2006 07:18	DONE	00	-0.28	pCi/L	0.26	-2.5	-1.6	2.11	3.03	0.92

Uranium-238DUP: Limits LCL = 0 UCL = 20

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	18.3	-0.26	percent	84.4	0	-420	593	20.0	254
511648	1201050950	21-MAR-2006 16:38	DONE	1.83	-0.32	percent	84.4	0	-420	593	20.0	254
511653	1201050965	22-MAR-2006 12:29	DONE	2.87	-0.32	percent	84.4	0	-420	593	20.0	254
512077	1201051900	22-MAR-2006 14:23	DONE	12.1	-0.28	percent	84.4	0	-420	593	20.0	254
511988	1201051683	23-MAR-2006 13:27	DONE	12.6	-0.28	percent	84.4	0	-420	593	20.0	254
511552	1201050722	23-MAR-2006 16:14	DONE	20.5	-0.25	percent	84.4	0	-420	593	20.0	254
511560	1201050748	23-MAR-2006 18:20	DONE	13.7	-0.28	percent	84.4	0	-420	593	20.0	254
511616	1201050866	24-MAR-2006 14:52	DONE	23.9	-0.24	percent	84.4	0	-420	593	20.0	254
511709	1201051080	25-MAR-2006 15:09	DONE	10.7	-0.29	percent	84.4	0	-420	593	20.0	254
514141	1201056268	27-MAR-2006 16:25	DONE	124	0.16	percent	84.4	0	-420	593	20.0	254
511652	1201050961	27-MAR-2006 16:59	DONE	3.57	-0.32	percent	84.4	0	-420	593	20.0	254
512777	1201053519	28-MAR-2006 07:34	DONE	162	0.3	percent	84.4	0	-420	593	20.0	254
514320	1201056639	28-MAR-2006 07:34	DONE	126	0.16	percent	84.4	0	-420	593	20.0	254
512076	1201051896	28-MAR-2006 07:39	DONE	147	0.25	percent	84.4	0	-420	593	20.0	254
515153	1201058497	28-MAR-2006 12:29	DONE	1.43	-0.33	percent	84.4	0	-420	593	20.0	254
514267	1201056534	29-MAR-2006 07:59	DONE	1590	5.9	percent	84.4	0	-420	593	20.0	254
514261	1201056521	29-MAR-2006 07:59	DONE	0	-0.33	percent	84.4	0	-420	593	20.0	254
511564	1201050755	29-MAR-2006 19:53	DONE	2.79	-0.32	percent	84.4	0	-420	593	20.0	254
514277	1201056552	29-MAR-2006 22:27	DONE	4.42	-0.31	percent	84.4	0	-420	593	20.0	254
512070	1201051882	31-MAR-2006 15:55	DONE	4.32	-0.31	percent	84.4	0	-420	593	20.0	254
515540	1201059383	31-MAR-2006 19:27	DONE	81.7	-0.01	percent	84.4	0	-420	593	20.0	254
516131	1201060707	01-APR-2006 16:30	DONE	2.3	-0.32	percent	84.4	0	-420	593	20.0	254
518879	1201066819	11-APR-2006 16:43	DONE	101	0.07	percent	84.4	0	-420	593	20.0	254
518911	1201066930	12-APR-2006 14:20	DONE	45	-0.15	percent	84.4	0	-420	593	20.0	254
520706	1201070944	15-APR-2006 09:12	DONE	4.58	-0.31	percent	84.4	0	-420	593	20.0	254
519428	1201067986	17-APR-2006 07:52	DONE	10.5	-0.29	percent	84.4	0	-420	593	20.0	254
518916	1201066939	18-APR-2006 14:03	DUSE	140	0.22	percent	84.4	0	-420	593	20.0	254
521040	1201071730	19-APR-2006 14:49	DONE	2.37	-0.32	percent	84.4	0	-420	593	20.0	254
521962	1201074074	21-APR-2006 10:18	DONE	201	0.46	percent	84.4	0	-420	593	20.0	254
521962	1201074159	21-APR-2006 10:18	DONE	104	0.08	percent	84.4	0	-420	593	20.0	254
520373	1201070135	21-APR-2006 19:20	DUSE	9.26	-0.3	percent	84.4	0	-420	593	20.0	254
520799	1201071145	22-APR-2006 07:38	DONE	16.1	-0.27	percent	84.4	0	-420	593	20.0	254
521962	1201074160	22-APR-2006 09:26	DONE	140	0.22	percent	84.4	0	-420	593	20.0	254
522160	1201074580	24-APR-2006 08:39	DONE	17.5	-0.26	percent	84.4	0	-420	593	20.0	254
521122	1201071944	24-APR-2006 16:32	DONE	46	-0.15	percent	84.4	0	-420	593	20.0	254
522186	1201074647	25-APR-2006 09:34	DONE	16.6	-0.27	percent	84.4	0	-420	593	20.0	254
519442	1201068044	26-APR-2006 09:33	DONE	26.5	-0.23	percent	84.4	0	-420	593	20.0	254
521045	1201071748	26-APR-2006 18:43	DONE	27.2	-0.22	percent	84.4	0	-420	593	20.0	254
524204	1201079209	28-APR-2006 07:18	DONE	12.8	-0.28	percent	84.4	0	-420	593	20.0	254

Uranium-238LCS: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
514936	1201057982	27-MAR-2006 08:13	DONE	98.9	-0.13	percent	100	75.0	83.3	117	125	8.33
511201	1201049857	27-MAR-2006 08:14	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
511201	1201049858	27-MAR-2006 08:14	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
514141	1201056269	27-MAR-2006 16:25	DONE	95.1	-0.59	percent	100	75.0	83.3	117	125	8.33
511652	1201050963	27-MAR-2006 16:59	DONE	103	0.37	percent	100	75.0	83.3	117	125	8.33
512777	1201053521	28-MAR-2006 07:34	DONE	116	1.9	percent	100	75.0	83.3	117	125	8.33
514320	1201056641	28-MAR-2006 07:34	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
512076	1201051898	28-MAR-2006 07:44	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
515153	1201058498	28-MAR-2006 12:29	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
514267	1201056535	29-MAR-2006 07:59	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
514261	1201056522	29-MAR-2006 07:59	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
511564	1201050757	29-MAR-2006 19:53	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
514277	1201056554	29-MAR-2006 22:27	DONE	102	0.27	percent	100	75.0	83.3	117	125	8.33
512070	1201051883	31-MAR-2006 15:55	DONE	89.7	-1	percent	100	75.0	83.3	117	125	8.33
515540	1201059385	31-MAR-2006 19:27	DONE	93.9	-0.73	percent	100	75.0	83.3	117	125	8.33
516131	1201060709	01-APR-2006 16:30	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
516497	1201061516	06-APR-2006 08:42	DONE	98.8	-0.14	percent	100	75.0	83.3	117	125	8.33
516497	1201061515	06-APR-2006 08:42	DONE	107	0.84	percent	100	75.0	83.3	117	125	8.33
516532	1201061531	06-APR-2006 13:23	DONE	96.5	-0.42	percent	100	75.0	83.3	117	125	8.33
516532	1201061532	06-APR-2006 13:23	DONE	98.6	-0.17	percent	100	75.0	83.3	117	125	8.33
518879	1201066820	11-APR-2006 16:43	DONE	103	0.36	percent	100	75.0	83.3	117	125	8.33
518911	1201066931	12-APR-2006 14:20	DONE	97.7	-0.28	percent	100	75.0	83.3	117	125	8.33
517717	1201064213	12-APR-2006 17:24	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
517717	1201064214	12-APR-2006 17:24	DONE	109	1.1	percent	100	75.0	83.3	117	125	8.33
519218	1201067495	14-APR-2006 09:06	DONE	112	1.5	percent	100	75.0	83.3	117	125	8.33
519218	1201067496	14-APR-2006 09:06	DONE	94.9	-0.61	percent	100	75.0	83.3	117	125	8.33
520706	1201070946	15-APR-2006 09:12	DONE	96.9	-0.37	percent	100	75.0	83.3	117	125	8.33
518916	1201066940	17-APR-2006 07:52	DUSE	96.7	-0.4	percent	100	75.0	83.3	117	125	8.33
519428	1201067988	17-APR-2006 07:52	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
521040	1201071732	19-APR-2006 14:49	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
520799	1201071147	21-APR-2006 07:38	DONE	108	0.96	percent	100	75.0	83.3	117	125	8.33
521962	1201074076	21-APR-2006 10:18	DONE	98.1	-0.23	percent	100	75.0	83.3	117	125	8.33
520373	1201070136	21-APR-2006 19:20	DUSE	118	2.2	percent	100	75.0	83.3	117	125	8.33
522160	1201074581	22-APR-2006 12:03	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
521122	1201071946	24-APR-2006 16:32	DONE	93.9	-0.73	percent	100	75.0	83.3	117	125	8.33
522186	1201074649	25-APR-2006 09:35	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
519442	1201068046	26-APR-2006 09:33	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
521045	1201071749	26-APR-2006 18:43	DONE	101	0.09	percent	100	75.0	83.3	117	125	8.33
524204	1201079211	28-APR-2006 07:18	DONE	86.3	-2	percent	100	75.0	83.3	117	125	8.33

Uranium-238RER: Limits LCL = 0 UCL = 3

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
510734	1201048868	21-MAR-2006 16:38	DONE	0.29	-0.51	num	1.01	0	-1.8	3.86	3.00	1.43
511648	1201050950	21-MAR-2006 16:38	DONE	0.06	-0.67	num	1.01	0	-1.8	3.86	3.00	1.43
511653	1201050965	22-MAR-2006 12:29	DONE	0.08	-0.65	num	1.01	0	-1.8	3.86	3.00	1.43
512077	1201051900	22-MAR-2006 14:23	DONE	0.3	-0.5	num	1.01	0	-1.8	3.86	3.00	1.43
511988	1201051683	23-MAR-2006 13:27	DONE	0.63	-0.27	num	1.01	0	-1.8	3.86	3.00	1.43
511552	1201050722	23-MAR-2006 16:14	DONE	0.32	-0.48	num	1.01	0	-1.8	3.86	3.00	1.43
511560	1201050748	23-MAR-2006 18:20	DONE	0.67	-0.24	num	1.01	0	-1.8	3.86	3.00	1.43
511616	1201050866	24-MAR-2006 14:52	DONE	1.25	0.17	num	1.01	0	-1.8	3.86	3.00	1.43
511709	1201051080	25-MAR-2006 15:09	DONE	0.8	-0.14	num	1.01	0	-1.8	3.86	3.00	1.43
514141	1201056268	27-MAR-2006 16:25	DONE	0.5	-0.36	num	1.01	0	-1.8	3.86	3.00	1.43
511652	1201050961	27-MAR-2006 16:59	DONE	0.39	-0.43	num	1.01	0	-1.8	3.86	3.00	1.43
512777	1201053519	28-MAR-2006 07:34	DONE	2.31	0.91	num	1.01	0	-1.8	3.86	3.00	1.43
514320	1201056639	28-MAR-2006 07:34	DONE	1.24	0.16	num	1.01	0	-1.8	3.86	3.00	1.43
512076	1201051896	28-MAR-2006 07:39	DONE	1.63	0.44	num	1.01	0	-1.8	3.86	3.00	1.43
515153	1201058497	28-MAR-2006 12:29	DONE	0.11	-0.63	num	1.01	0	-1.8	3.86	3.00	1.43
514267	1201056534	29-MAR-2006 07:59	DONE	0.73	-0.2	num	1.01	0	-1.8	3.86	3.00	1.43
514261	1201056521	29-MAR-2006 07:59	DONE	0.9	-0.07	num	1.01	0	-1.8	3.86	3.00	1.43
511564	1201050755	29-MAR-2006 19:53	DONE	0.14	-0.61	num	1.01	0	-1.8	3.86	3.00	1.43
514277	1201056552	29-MAR-2006 22:27	DONE	0.52	-0.35	num	1.01	0	-1.8	3.86	3.00	1.43
512070	1201051882	31-MAR-2006 15:55	DONE	0.14	-0.61	num	1.01	0	-1.8	3.86	3.00	1.43
515540	1201059383	31-MAR-2006 19:27	DONE	1.77	0.53	num	1.01	0	-1.8	3.86	3.00	1.43
516131	1201060707	01-APR-2006 16:30	DONE	0.21	-0.56	num	1.01	0	-1.8	3.86	3.00	1.43
518879	1201066819	11-APR-2006 16:43	DONE	1.29	0.2	num	1.01	0	-1.8	3.86	3.00	1.43
518911	1201066930	12-APR-2006 14:20	DONE	1.26	0.18	num	1.01	0	-1.8	3.86	3.00	1.43
520706	1201070944	15-APR-2006 09:12	DONE	0.37	-0.45	num	1.01	0	-1.8	3.86	3.00	1.43
519428	1201067986	17-APR-2006 07:52	DONE	0.35	-0.46	num	1.01	0	-1.8	3.86	3.00	1.43
518916	1201066939	18-APR-2006 14:03	DUSE	8.87	5.5	num	1.01	0	-1.8	3.86	3.00	1.43
521040	1201071730	19-APR-2006 14:49	DONE	0.17	-0.59	num	1.01	0	-1.8	3.86	3.00	1.43
521962	1201074074	21-APR-2006 10:18	DONE	1.76	0.52	num	1.01	0	-1.8	3.86	3.00	1.43
521962	1201074159	21-APR-2006 10:18	DONE	0.89	-0.08	num	1.01	0	-1.8	3.86	3.00	1.43
520373	1201070135	21-APR-2006 19:20	DUSE	0.49	-0.37	num	1.01	0	-1.8	3.86	3.00	1.43
520799	1201071145	22-APR-2006 07:38	DONE	1.02	0.01	num	1.01	0	-1.8	3.86	3.00	1.43
521962	1201074160	22-APR-2006 09:26	DONE	0.5	-0.36	num	1.01	0	-1.8	3.86	3.00	1.43
522160	1201074580	24-APR-2006 08:39	DONE	0.78	-0.16	num	1.01	0	-1.8	3.86	3.00	1.43
521122	1201071944	24-APR-2006 16:32	DONE	1.68	0.47	num	1.01	0	-1.8	3.86	3.00	1.43
522186	1201074647	25-APR-2006 09:34	DONE	1.23	0.16	num	1.01	0	-1.8	3.86	3.00	1.43
519442	1201068044	26-APR-2006 09:33	DONE	2.28	0.89	num	1.01	0	-1.8	3.86	3.00	1.43
521045	1201071748	26-APR-2006 18:43	DONE	0.9	-0.08	num	1.01	0	-1.8	3.86	3.00	1.43
524204	1201079209	28-APR-2006 07:18	DONE	0.57	-0.31	num	1.01	0	-1.8	3.86	3.00	1.43

Uranium-238SPIKE: Limits LCL = 75 UCL = 125

Batch ID	Samp ID	Run Date	Status	Value	Deviation	Units	Mean	LCL	LWL	UWL	UCL	Stdev
504435	1201034050	24-FEB-2006 20:19	DONE	95.5	-0.54	percent	100	75.0	83.3	117	125	8.33
504458	1201034119	28-FEB-2006 15:46	DONE	89.4	-1	percent	100	75.0	83.3	117	125	8.33
506041	1201037899	01-MAR-2006 20:40	DONE	107	0.84	percent	100	75.0	83.3	117	125	8.33
506022	1201037840	02-MAR-2006 16:44	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
507076	1201040302	07-MAR-2006 10:22	DONE	91.0	-1	percent	100	75.0	83.3	117	125	8.33
507403	1201041222	08-MAR-2006 06:44	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
509051	1201045064	09-MAR-2006 07:20	DONE	93.9	-0.73	percent	100	75.0	83.3	117	125	8.33
509092	1201045179	10-MAR-2006 15:56	DONE	111	1.3	percent	100	75.0	83.3	117	125	8.33
509841	1201046806	10-MAR-2006 23:12	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
509802	1201046704	14-MAR-2006 11:55	DONE	113	1.6	percent	100	75.0	83.3	117	125	8.33
509797	1201046682	14-MAR-2006 13:07	DONE	114	1.7	percent	100	75.0	83.3	117	125	8.33
510658	1201048669	15-MAR-2006 09:16	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
511878	1201051445	16-MAR-2006 12:58	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
510654	1201048654	17-MAR-2006 13:41	DONE	92.8	-0.86	percent	100	75.0	83.3	117	125	8.33
510738	1201048879	20-MAR-2006 07:42	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
511552	1201050723	20-MAR-2006 07:42	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
510723	1201048838	20-MAR-2006 16:57	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
512077	1201051901	22-MAR-2006 14:23	DONE	110	1.2	percent	100	75.0	83.3	117	125	8.33
511988	1201051684	23-MAR-2006 13:27	DONE	103	0.35	percent	100	75.0	83.3	117	125	8.33
511709	1201051081	25-MAR-2006 15:09	DONE	82.9	-2	percent	100	75.0	83.3	117	125	8.33
511652	1201050962	27-MAR-2006 16:59	DONE	98.2	-0.22	percent	100	75.0	83.3	117	125	8.33
512777	1201053520	28-MAR-2006 07:34	DONE	92.0	-0.96	percent	100	75.0	83.3	117	125	8.33
514320	1201056640	28-MAR-2006 07:34	DONE	98.5	-0.18	percent	100	75.0	83.3	117	125	8.33
512076	1201051897	28-MAR-2006 07:44	DONE	115	1.8	percent	100	75.0	83.3	117	125	8.33
511564	1201050756	29-MAR-2006 19:53	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
514277	1201056553	29-MAR-2006 22:27	DONE	108	0.91	percent	100	75.0	83.3	117	125	8.33
515540	1201059384	31-MAR-2006 19:27	DONE	95.8	-0.5	percent	100	75.0	83.3	117	125	8.33
516131	1201060708	01-APR-2006 16:30	DONE	96.3	-0.44	percent	100	75.0	83.3	117	125	8.33
520706	1201070945	15-APR-2006 09:12	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33
519428	1201067987	17-APR-2006 07:52	DONE	105	0.6	percent	100	75.0	83.3	117	125	8.33
521040	1201071731	19-APR-2006 14:49	DONE	107	0.84	percent	100	75.0	83.3	117	125	8.33
520799	1201071146	21-APR-2006 07:38	DONE	104	0.48	percent	100	75.0	83.3	117	125	8.33
521962	1201074075	21-APR-2006 10:18	DONE	102	0.24	percent	100	75.0	83.3	117	125	8.33
521962	1201074162	21-APR-2006 10:18	DONE	97.1	-0.34	percent	100	75.0	83.3	117	125	8.33
521962	1201074161	21-APR-2006 10:18	DONE	96.4	-0.43	percent	100	75.0	83.3	117	125	8.33
521122	1201071945	24-APR-2006 16:32	DONE	93.0	-0.84	percent	100	75.0	83.3	117	125	8.33
522186	1201074648	25-APR-2006 09:34	DONE	89.7	-1	percent	100	75.0	83.3	117	125	8.33
519442	1201068045	26-APR-2006 09:33	DONE	122	2.6	percent	100	75.0	83.3	117	125	8.33
524204	1201079210	28-APR-2006 07:18	DONE	101	0.12	percent	100	75.0	83.3	117	125	8.33

STANDARDS DATA

CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

0159

Radionuclide: Th-230
Half Life: $(7.54 \pm 0.03) \times 10^4$ years
Catalog No.: 7230
Source No.: 678-28-1
Customer: GENERAL ENGINEERING LABS
P.O.No.: 2507 RD
Reference Date: 1 Sep 99 12:00 PST.
Contained Radioactivity: Th-230: 9.740 μ Ci (360.4 kBq)

Description of Solution

- a. Mass of solution: 4.89252 grams in 5 mL flame sealed ampoule
- b. Chemical form: Thorium nitrate in 0.1M nitric acid
- c. Carrier content: 10 μ g Th/mL of solution
- d. Density: 1.0016

gram/ml @ 20°C.

Radioimpurities

Am-241: See Technical Data Sheet

Radioactive Daughters

Ra-226: See Technical Data Sheet

Radionuclide Concentration

Th-230: 1.991 μ Ci/gram of solution (73.67 kBq/gram of solution)

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

- a. Systematic uncertainty in instrument calibration: $\pm 2.0\%$
- b. Random uncertainty in assay: $\pm 0.8\%$
- c. Random uncertainty in weighing(s): $\pm 0.0\%$
- d. Total uncertainty at the 99% confidence level: $\pm 2.2\%$

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)
2. Nuclear data were taken from Table of Radioactive Isotopes (1986), edited by Virginia Shirley.

Daniel James Van Dalsen
QUALITY CONTROL

26-Aug-99
Date Signed



ISOTOPE PRODUCTS LABORATORIES

1800 N. KEYSTONE STREET
BURBANK, CALIFORNIA 91504

818-843-7000 FAX 818-843-6168

0159



Th-230 TECHNICAL DATA

The Th-230 used to prepare your order was taken from Isotope Products Laboratories Lot #6481 and had the following composition as of December 15, 1994.

<u>NUCLIDE</u>	<u>ATOM%</u>	<u>ACTIVITY%</u>
Th-229	<0.001	<1.23 x 10 ⁻²
Th-230	83.71	99.79
Th-232	16.29	1.08 x 10 ⁻⁴
Ra-226 (daughter Th-230)	----	0.15
Am-241	----	0.05

Isotopic composition provided by Oak Ridge National Laboratory.

No other alpha emitting nuclides were detected.

If you have any questions, please contact Technical Service.

Corporate and
Sales Offices
1800 N. Keystone Street
Folsom, California
91504
818-843-7000
818-843-6163



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0159	Isotope:	Thorium-230
Prepared By:	Joe Davis	Prepared By:	Joe Davis
Carrier Conc:	0.1M HNO3	Prep Date:	09/21/1999
Reference Date:	09/01/1999	Verification Date:	06/19/2004
Ampoule Mass (g):	4.89252 g	Expiration Date:	06/19/2005
Uncertainty:	+/- 2.2 %	Primary Code:	0159-A
LogBook No:	RC S 023 102	Dilution(mL):	100 mL
		Mass of Parent(g):	4.7484 g
		Density(g/mL):	0.9992

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (uCi/g)}) * (\text{conversion dpm to uCi}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (uCi/g)}) * (\text{conversion dpm to uCi}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.7484 \text{ g}) * (1.991 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (100 \text{ mL}) = 209880.2297 \text{ dpm/mL}$
$(4.7484 \text{ g}) * (1.991 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (0.9992 \text{ g/mL}) / (100 \text{ mL}) = 210051.8397 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/29/2001	Angela Albee	.0992	100	0159-H	208.37 dpm/mL	01/29/2001	01/29/2002
02/28/2001	Angela Albee	1.0451	1000	0159-I-102	219.525 dpm/mL	03/06/2002	03/06/2003
02/28/2001	Angela Albee	1.0451	1000	0159-I-202	219.525 dpm/mL	03/12/2002	03/12/2003
09/21/1999	Joe Davis	.1172	100	0159-B	246.18 dpm/mL	09/21/1999	09/21/2000
09/23/1999	Joe Davis	.1016	100	0159-C	213.41 dpm/mL	09/23/1999	09/23/2000
01/10/2000	Joe Davis	.1008	100	0159-D	211.56 dpm/mL	01/10/2000	01/10/2001
02/16/2000	Richard Kinney	.2422	500	0159-E	101.75 dpm/mL	02/16/2000	02/16/2001
03/20/2000	Joe Davis	.0998	100	0159-F	209.63 dpm/mL	03/20/2000	03/20/2001
07/28/2000	Robert Timm	1.0046	1000	0159-G	211.02 dpm/mL	07/28/2000	07/28/2001
05/10/2001	Angela Albee	.0987	1000	0159-J	210.1569 dpm/mL	05/10/2001	05/10/2002
08/31/2001	Lonnie Morris	.0416	100	0159-K	87.31 dpm/mL	09/23/2002	09/23/2003
06/07/2002	Angela Albee	1.0002	1000	0159-L	207.278 dpm/mL	06/07/2002	06/07/2003
01/16/2003	Angela Albee	4.5144	1000	0159-M	947.483 dpm/mL	01/16/2003	01/16/2004
02/27/2003	Angela Albee	1.1079	1000	0159-N	232.526 dpm/mL	02/27/2004	02/27/2005
06/23/2004	Amanda Fehr	1.14	1000	0159-O	239.459 dpm/mL	07/03/2005	07/03/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Th-230 Standard 0159-O

A. Fehr
7/3/2005

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Amt Used (mL)	Source DPM/mL
0159-N N1	258.0000	23.3000	234.7000	0.9696	1.0000	242.0585809
0159-N N2	259.3000	23.3000	236.0000	0.9696	1.0000	243.3993399
0159-N N3	255.4000	23.3000	232.1000	0.9696	1.0000	239.3770627

Mean Value (Counting) =	241.6116612	dpm/mL	100.903182	% of known
Stdev =	2.048043318	dpm/mL	0.00847659	
Certificate Value =	239.449	dpm/mL		
Lower Limit =	237.5155745	dpm/mL		
Upper Limit =	245.7077478	dpm/mL		
Rule 1 Pass/Fail	Pass	Pass	Pass	
Two sigma =	4.096086636			
10 % of Mean =	24.16116612			
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.

The analyst prepared three standard verification sources for Th-230 source 0159-O by transferring 1.0 mL portions of the standard to glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 26 for alpha source standard verification. The alpha efficiency calibration which was used for verification calculations was performed using NIST source 0556-A (Th-230). Calibration data is recorded in this logbook under Th-230 0556-A. Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 7/3/05

Angela A. Johnson
7/5/05

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

61762-278

Ac-227 5 mL Liquid in Flame Sealed Vial

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

Radionuclide purity and calibration were checked by alpha spectroscopy. The nuclear decay rate and assay date for this source are given below.

Analytics maintains traceability to the National Institute of Standards and Technology through participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

ISOTOPE:	Ac-227
ACTIVITY (dps):	2.085 E5
HALF-LIFE:	21.77 years
CALIBRATION DATE:	June 8, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.0%
SYSTEMATIC:	2.0%
RANDOM:	3.0%

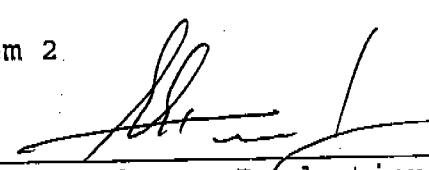
*99% Confidence Level

Impurities: γ -impurities (other than decay products) <0.1%
 α -impurities <0.3%

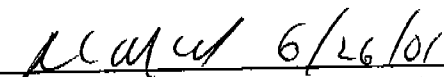
5.3136 grams 2M HNO₃ solution, carrier free.

P O NUMBER 2533RD, Item 2.

SOURCE PREPARED BY:


 E. A. Taskaev, Production Manager

Q A APPROVED:


 6/26/01



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0387	Isotope:	Actinium-227
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	2 M HNO3	Prep Date:	07/17/2001
Reference Date:	06/08/2001	Verification Date:	07/01/2002
Ampoule Mass (g):	5.3136 g	Expiration Date:	07/01/2003
Uncertainty:	+/- 5 %	Primary Code:	0387-A
LogBook No:	RC S 034	Dilution(mL):	100 mL
		Mass of Parent(g):	4.7794 g
		Density(g/mL):	1.0370

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

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

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

$$(4.7794 \text{ g}) * (208500 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.3136 \text{ g} * 100 \text{ mL}) = 112335.5983 \text{ dpm/mL}$$

$$(4.7794 \text{ g}) * (208500 \text{ dps}) * (59.9 \text{ dpm/dps}) / (1.0370 \text{ g/mL}) / (5.3136 \text{ g} * 100 \text{ mL}) = 108330.3019 \text{ dpm/g}$$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
07/17/2001	Lonnie Morris	.4684	1000	0387-B-102	50.8266 dpm/mL	07/11/2005	07/11/2006
07/17/2001	Lonnie Morris	.4684	1000	0387-B-202	50.827 dpm/mL	07/11/2004	07/11/2005

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ac-227 Standard 0387-B

A. Fehr 7/13/2005	Isotope	Value	Uncertainty
	0387-B #1	193.600	38.1000
	0387-B #2	181.200	36.2000
	0387-B #3	192.900	52.4000

Mean Value (Counting) = 189.233 0.9416936
 Stdev = 6.965869173

Target = 200.95
 Lower Limit = 175.301595
 Upper Limit = 203.1650717
 Rule 1 Pass/Fail **Pass Pass Pass**
 Two sigma = 13.93173835
 10 % of Mean = 18.92333333
 Rule 2 (Pass/Fail) **Pass**

The analyst prepared three standard verification sources for standard 0387-B using 0.1 mL for each source. Each standard was combined with 0.1 mL of Th-230 standard 0159-K and 50 micrograms of cerium carrier in a disposable centrifuge tube. Each standard was diluted to 20 mL with 0.1 M HCl. Three mL of 48% HF was added to precipitate cerium (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 Ac-227 were calculated by comparison to Th-230 certified values.

Amanda L. Fehr
 7/13/05

STANDARDIZATION OF LEAD CARRIER

DATE: 1/30/2006
 LOT NUMBER: 1006864

	LEAD PRECIPITATES				Average	Std. Dev.	
	1	2	3	4			
Weight of carrier added	1.00	1.01	1.00	1.01	13.88	± 0.05	0.003604
Aliquot (1.00 mL)	1	1	1	1	13.81	± 0.12	0.008355
filter + ppt	0.0975	0.0970	0.0979	0.0978			
filter	0.0836	0.0832	0.0840	0.0839			
Wt. of ppt., g	0.0139	0.0138	0.0139	0.0139	13.88	mg Pb/mL	
					13.81	mg Pb/g	
mg Ca/mL	13.90	13.80	13.90	13.90			
mg Ca/g	13.90	13.66	13.90	13.76			

0.5% of Mean Value = 0.069 Pass

A satisfactory standardization is obtained when results give a standard deviation of less than 0.5% of the mean value.

DEUTSCHER KALIBRIERDIENST (DKD)

Kalibrierlaboratorium für Meßgrößen der Radioaktivität
Calibration laboratory for measurements of radioactivity

AKKREDITIERT DURCH DIE PHYSIKALISCH-TECHNISCHE BUNDESANSTALT (PTB)



Amersham Buchler GmbH & Co KG
Postfach 11 49 Gieselweg 1
D-38001 Braunschweig D-38110 Braunschweig

Telefon (05307) 930-0
Telefax (05307) 930-293
Telefax-Zentrale 930-237

Kalibrierschein *Calibration Certificate*

Kalibrierzeichen
Calibration mark

02628
DKD-K- 06501
95-10

Gegenstand <i>Object</i>	Radioactive Reference Solution
Hersteller <i>Manufacturer</i>	Amersham Buchler GmbH & Co KG Postfach 11 49 Gieselweg 1 D-38001 Braunschweig D-38110 Braunschweig
Typ <i>Type</i>	RBZB44
Strahler-Nr. <i>Source number</i>	ET 491
Auftraggeber <i>Customer</i>	Amersham Corporation 2636 S. Clearbrook Drive Arlington Heights, IL 60005 USA-Arlington Heights, IL
Auftragsnummer <i>Work order number</i>	112116
Anzahl der Seiten des Kalibrierscheines <i>Number of pages of the certificate</i>	2
Referenzdatum <i>Reference date</i>	1 January 1995

Der Deutsche Kalibrierdienst ist Unterzeichner des multilateralen Übereinkommens der Western European Calibration Cooperation (WECC) zur gegenseitigen Anerkennung der Kalibrierscheine. Die Kalibrierung erfolgt auf der Grundlage des zwischen der Physikalisch-Technischen Bundesanstalt und dem Träger abgeschlossenen Vertrages. Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

The Deutscher Kalibrierdienst is signatory to the multilateral agreement of the Western European Calibration Cooperation (WECC) for the mutual recognition of calibration certificates. The calibration is performed according to the stipulations of the contract between the Physikalisch-Technische Bundesanstalt and the holder of the calibration laboratory. This calibration certificate documents the traceability to national standards, which realize the physical units of measurement according to the International System of Units (SI). The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Physikalisch-Technischen Bundesanstalt als auch des ausstellenden Kalibrierlaboratoriums.

Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the Physikalisch-Technische Bundesanstalt and the issuing laboratory.

Calibration certificates without signature and seal are not valid.

Stempel Seal	Datum Date	Leiter des Kalibrierlaboratoriums Head of the calibration laboratory	Stellvertreter Deputy	Bearbeiter Person responsible
	18 October 1995	Dr. Dornhöfer	 Dr. Thieme	 E. Schuber 21-5-013-4

02628
DKD-K-06501
95-10

Radioactive Reference Solution

Solution No.: ET 491

Drawing No.: VZ-2058

Nuclide: Lead-210

Radioactive concentration: 38.1 kBq/g

Reference date: 1 January 1995 at 12.00 GMT

Mass of solution: (5.182 ± 0.001) g

Volume of solution: approx. 5 ml

Chemical composition: Solution in 1.2 M HNO₃
Carrier: Pb (NO₃)₂, Bi (NO₃)₃; each 20 mg/l of the corresponding element.

Measuring method: The activity was determined by comparison with a reference solution by measurement with a Ge-detector with MCA.

Traceability: Additional to the direct traceability to the PTB through the DKD this product satisfies the quality assurance requirements of USNRC Regulatory Guide 4.15 Revision 1, February 1979, for achieving NIST traceability through Amersham's participation in the NEI-NIST Measurements Assurance Program of the Nuclear Power Industry.

Uncertainty: The relative uncertainty of the activity is ± 3 %.

The declared uncertainty U is an expanded uncertainty $U = k * u_c$ with a coverage factor of $k = 3$. The combined uncertainty u_c is the sum of all uncertainties which can be evaluated by statistical means (uncertainty type A, u_A) and all other uncertainties (uncertainty type B, u_B) whereby $u_c^2 = u_A^2 + u_B^2$.
(Ref.: NIST Technical Note 1297 / WECC-Doc. 19-1990)

Radioactive impurities: Related to Pb-210 (equal 100 %) the following radioactive impurities were detected:
Ra-226: 0.003 %



LC-5-013-47

TRACEABILITY TO NIST

Amersham Corporation
2636 S. Clearbrook Drive
Arlington Heights, IL 60005
tel (708) 593-6300
fax (708) 593-8091



Traceability is the ability to relate the accuracy of measurement of radionuclides to the National Institute of Standards and Technology (NIST). Traceability is achieved by participation in a Measurements Assurance Program linked to NIST and production of certified materials in accordance with a quality assurance program.

Amersham participates in measurement assurance programs conducted by NIST in cooperation with the Nuclear Energy Institute (NEI, formerly USCEA). Additionally, our production facilities and measurement laboratories operate under routinely audited quality assurance programs.

Therefore, Amersham certified standardized products meet or exceed, the NRC requirements for measurements traceable to NIST.

278004C



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	ET491	Isotope:	Lead-210
Prepared By:	Garret Ray	Prepared By:	Garret Ray
Carrier Conc:	1.2M HNO3	Prep Date:	03/01/1996
Reference Date:	01/01/1995	Verification Date:	07/12/2005
Ampoule Mass (g):	5.182 g	Expiration Date:	07/12/2006
Uncertainty:	+/- 3 %	Primary Code:	ET491-A
LogBook No:	RC S 014 004	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0547 g
		Density(g/mL):	1.0000

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(5.0547 \text{ g}) * (38.1 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 115550.4420 \text{ dpm/mL}$
$(5.0547 \text{ g}) * (38.1 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0000 \text{ g/mL}) / (100 \text{ mL}) = 115550.4420 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
10/20/1997	Richard Kinney	.467	100	ET491-B	524.45 dpm/ml	03/01/1997	03/01/1998
10/29/1997	Richard Kinney	3.0992	500	ET491-C	696.09 dpm/mL	10/29/1998	10/29/1999
04/03/2001	Angela Johnson	.5184	100	ET491-D	582.17 dpm/mL	04/16/2003	04/16/2004
09/15/2003	Angela Johnson	.5132	100	ET491-E	576.33 dpm/mL	11/11/2005	11/11/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Pb-210 Standard ET491-E

A. Fehr
11/11/2005

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
ET491-E N1	1098.1000	21.6000	1098.1000	1.0000	416.9502415
ET491-E N2	1124.3000	21.6000	1124.3000	1.0000	426.8984214
ET491-E N3	1105.2000	21.6000	1105.2000	1.0000	419.6461223
Average =					421.1649284

Mean Value (Counting) = 421.1649284 % of known
 Stdev = 5.145060708 102.491173 0.01221626

Certificate Value = 410.9
 Lower Limit = 410.874807
 Upper Limit = 431.4550498
 Rule 1 Pass/Fail Pass Pass
 Two sigma = 10.29012142
 10 % of Mean = 42.11649284
 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.

The analyst prepared three calibration sources for source ET491-E by transferring 1.0 mL portions of the standard to glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The calibration vials and background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 31 for Pb-210 standard verification. The efficiency calibration which was used for verification calculations was performed on 4/19/04 using source 0356-A (Pb-210). Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda L. Fehr 11/11/05

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

68509-278

U-232 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution standard. The master radionuclide solution standard was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 23236.

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

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

ISOTOPE:	U-232
ACTIVITY (dps):	3.779 E3
CALIBRATION DATE:	June 18, 2004 12:00 EST
HALF-LIFE:	68.9 years
RELATIVE EXPANDED: UNCERTAINTY (k=2):	3.3%

Impurities: Am-241 <0.15%
U-233 <0.3%

5.20343 grams 1M HNO₃ solution.

P O NUMBER 3243 RD, Item 1

SOURCE PREPARED BY:

M. Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED:

ACU/6/23/04

RECEIVED
11/26/04



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0688	Isotope:	Uranium-232
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	1M HNO3	Prep Date:	06/25/2004
Reference Date:	06/18/2004	Verification Date:	01/12/2006
Ampoule Mass (g):	5.20343 g	Expiration Date:	01/12/2007
Uncertainty:	+/- 3.3 %	Primary Code:	0688-A
LogBook No:	RC-S-037-087	Dilution(mL):	100 mL
		Mass of Parent(g):	4.9894 g
		Density(g/mL):	1.0276

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

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

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

$$(4.9894 \text{ g}) * (3779 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.20343 \text{ g} * 100 \text{ mL}) = 2170.5126 \text{ dpm/mL}$$

$$(4.9894 \text{ g}) * (3779 \text{ dps}) * (59.9 \text{ dpm/dps}) / (1.0276 \text{ g/mL}) / (5.20343 \text{ g} * 100 \text{ mL}) = 2112.2178 \text{ dpm/g}$$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
06/18/2004	Brenda Burke	2.203	250	0688-B	18.6439 g/mL	06/28/2005	06/28/2006
07/06/2004	Tim Chandler	2.2243	250	0688-C	18.8242 dpm/mL	08/14/2004	08/14/2005
07/06/2004	Amanda Fehr	26.03	1000	0688-D	55.0728 dpm/mL	07/06/2004	07/06/2005
04/19/2005	Amanda Fehr	26.01	1000	0688-E	55.0305 dpm/mL	05/04/2005	05/04/2006
05/27/2005	Brenda Burke	.612	250	0688-F	5.17934 dpm/mL	05/31/2005	05/31/2006
06/23/2005	Brenda Burke	2.227	250	0688-G	18.847 dpm/mL	06/28/2005	06/28/2006
01/06/2006	Mary Avins	26.01	1000	0688-H	55.0305 dpm/mL	01/12/2006	01/12/2007

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Uranium-232 Standard 0688-H

Analyst: M Avins	Isotope	Value	Uncertainty	
Date: 1/12/06	0688-H N1	2.46	pCi/L 0.292	pCi/L
	0688-H N2	2.49	pCi/L 0.383	pCi/L
	0688-H N3	2.48	pCi/L 0.315	pCi/L
Mean Value (Counting) =	2.477	pCi/L	0.9992767	% of known
Stdev =	0.015275252	pCi/L		
Target =	2.48	pCi/L		
Lower Limit =	2.446116162	pCi/L		
Upper Limit =	2.507217171	pCi/L		
Rule 1 Pass/Fail	Pass	Pass	Pass	
Two sigma =	0.030550505			
10 % of Mean =	0.247666667			
Rule 2 (Pass/Fail)	Pass			

The analyst prepared three standard verification sources for standard **0688-H** using 0.1 mL for each source. Each standard was combined with 0.1 mL of **U-238** standard **0858-B** and 50 micrograms of Nd carrier in a disposable centrifuge tube. Each standard was diluted to 4 mL with 2 M HCl, and 2 mL of DI water. One mL of TiCl₃ was added. Two mL of 48% HF was added to precipitate Nd (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.

Reference SOP RAD M-001

Mary L. Avins
1/12/06

Amanda L. Fike
1/24/06



National Institute of Standards & Technology

Certificate

Standard Reference Material 4321C Natural Uranium Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive natural uranium nitrate and nitric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of alpha-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains uranium-238, uranium-235, and uranium-234 with a total activity of approximately 2600 Bq. Uranium decays by alpha-particle emission. The progeny of uranium-238, uranium-235, and uranium-234 have a total activity of approximately 2600 Bq and decay by alpha- and beta-particle emission. None of the alpha or beta particles escape from the SRM ampoule. During the decay process X-rays and gamma rays with energies from 11 keV to 2.0 MeV are also emitted. Most of these photons escape from the SRM ampoule but their intensities are so small that they do not represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains nitric acid (HNO_3) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least August 2007.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
November 1997

Thomas E. Gills, Chief
Standard Reference Materials Program

Recommended Procedure for Opening the SRM Ampoule

- 1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.
- 2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.
- 3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.
- 4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.
- 5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.
- 6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.
- 7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.
- 8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. **NEVER PIPETTE BY MOUTH.**
- 9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

PROPERTIES OF SRM 4321C
(Certified values are shown in bold type)

Source identification number	NIST SRM 4321C		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution density	(1.053 ± 0.001) g·mL ⁻¹ at 21.4 °C [b]*		
Solution mass	(5.258 ± 0.002) g [b]		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L ⁻¹)	Mass Fraction (g·g ⁻¹)
	H ₂ O	53	0.91
	HNO ₃	1.0	0.06
	UO ₂ (NO ₃) ₂	0.09	0.03
Radiological Properties:			
Radionuclide	Natural Uranium (Mixture of U-238, U-235, and U-234)		
Reference time	1200 EST, 1 August 1997		
Massic activity of the solution [c]	U-238: 242.0 Bq·g ⁻¹ U-235: 11.14 Bq·g ⁻¹ U-234: 233.1 Bq·g ⁻¹		
Relative expanded uncertainty (k=2)	U-238: 0.60% [d] [e] U-235: 0.62% [d] [e] U-234: 0.98% [d] [e]		
Mass fraction of uranium	(0.01960 ± 0.00010) g·g ⁻¹ [b]		
Photon-emitting impurities	None detected [f]		
Half lives used	Uranium-238: (4.468 ± 0.003) × 10 ⁹ a [g] Uranium-235: (7.038 ± 0.005) × 10 ⁸ a [g] Uranium-234: (2.455 ± 0.006) × 10 ⁵ a [g]		
Measuring instruments	Mass spectrometer, silicon surface-barrier detector, and 4π(α+β) liquid-scintillation counting systems.		

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i , the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [h]	Relative Sensitivity Factor, $ \partial y/\partial x_i \cdot$ (x_i/y) [i]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [j]
Isotopic uranium atom fraction in SRM 960	Standard deviation of the mean for repeated mass-spectrometric measurements (A)	U-238: 0.001	1.0	0.001
		U-235: 0.07	1.0	0.07
		U-234: 0.31	1.0	0.31
Half life	Standard uncertainty of the half life (A)	U-238: 0.07	1.0	0.07
		U-235: 0.07	1.0	0.07
		U-234: 0.25	1.0	0.25
Uranium mass fraction in SRM 960	Certificate value (B)	0.003	1.0	0.003
Quantitative dissolution	Estimated (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.10	1.0	0.10
Photon-emitting impurities	Limit of detection (B) [k]	100.	0.001	0.10
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)			U-238:	0.30
			U-235:	0.31
			U-234:	0.49
Coverage Factor, k				<u>x 2</u>
Relative Expanded Uncertainty of the Output Quantity, U/y , (%)			U-238:	0.60
			U-235:	0.62
			U-234:	0.98

NOTES

- [a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.
 Distance from Ampoule (cm): 1 30 100
 Approximate Dose Rate ($\mu\text{Sv/h}$): <0.1
- [b] The stated uncertainty is two times the standard uncertainty.
- [c] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].
- [d] The reported value, y , of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \dots, x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.
- The value, x_i , used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y , $u_i(y) \equiv |\partial y / \partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y .
- The **combined standard uncertainty** of y , $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.
- The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U , the **expanded uncertainty** of y .
- Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.
- For further information on the expression of uncertainties, see references [2] and [3].
- [e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic count rate is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).
- [f] Estimated limits of detection for photon-emitting impurities are:
 1.4 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 8 and 59 keV,
 1.1 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 67 and 88 keV,
 0.5 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 102 and 197 keV,
 0.3 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 205 and 762 keV,
 0.2 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 770 and 996 keV, and
 0.1 $\gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 1006 and 1900 keV,
 provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of uranium-238, uranium-235, uranium-234, or their progeny.
- [g] The stated uncertainty is the standard uncertainty. See reference [5].

- [h] Relative standard uncertainty of the input quantity x_i .
- [i] The relative change in the output quantity y divided by the relative change in the input quantity x_i . If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y . If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y .
- [j] Relative component of combined standard uncertainty of output quantity y , rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y \equiv |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.
- [k] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of U-238})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of U-238})\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

- [1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.
- [2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)
- [3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.
- [4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.
- [5] Evaluated Nuclear Structure Data File (ENSDF), August 1997.



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0858	Isotope:	Uranium-238
Prepared By:	Mary Avins	Prepared By:	Mary Avins
Carrier Conc:	HNO3	Prep Date:	11/21/2005
Reference Date:	08/01/1997	Verification Date:	11/21/2005
Ampoule Mass (g):	5.258 g	Expiration Date:	11/21/2006
Uncertainty:	+/- .6 %	Primary Code:	0858-A
LogBook No:	RC-S-041-034	Dilution(mL):	100 mL
		Mass of Parent(g):	4.972 g
		Density(g/mL):	1.0155

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (Bq/g)}) * (\text{conversion dpm to Bq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (Bq/g)}) * (\text{conversion dpm to Bq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.972 \text{ g}) * (242 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (100 \text{ mL}) = 721.9344 \text{ dpm/mL}$
$(4.972 \text{ g}) * (242 \text{ Bq/g}) * (60 \text{ dpm/Bq}) / (1.0155 \text{ g/mL}) / (100 \text{ mL}) = 710.9460 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
11/21/2005	Mary Avins	8.2104	100	0858-B	58.3715 dpm/mL	11/21/2005	11/21/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

0112



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Methods of measurement The measurement techniques listed below are currently in use at Nycomed Amersham for the absolute standardisation of radioactive solutions. The methods used for this standardisation are indicated on page 2 of the certificate.

Using a gas flow proportional counter

- A 4 pi beta counting
- B 4 pi alpha counting
- C 4 pi internal conversion electron counting
- D 4 pi coincidence counting
- E 4 pi anticoincidence counting
- F 4 pi coincidence and anticoincidence counting

Using a liquid scintillation counter

- G 4 pi coincidence counting
- H 4 pi anticoincidence counting
- J 4 pi coincidence and anticoincidence counting
- K 4 pi efficiency tracing

SI unit of radioactivity The S.I. unit of radioactivity is the becquerel

- 1 becquerel (Bq) = 1 nuclear transformation per second, therefore
- 1 curie (Ci) = 3.7×10^{10} becquerels exactly

Useful conversion factors are:

- 1 microcurie (μ Ci) = 3.7×10^4 Bq = 37 kilobecquerels (kBq)
- 1 millicurie (mCi) = 3.7×10^7 Bq = 37 megabecquerels (MBq)
- 1 kilobecquerel (kBq) = 27.027 nanocuries (nCi)
- 1 megabecquerel (MBq) = 27.027 microcuries (μ Ci)

RC-5-024-038B



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0112	Isotope:	Barium-133
Prepared By:	Richard Kinney	Prepared By:	Richard Kinney
Carrier Conc:	0.1M HCL	Prep Date:	04/09/1999
Reference Date:	06/20/1997	Verification Date:	01/21/2004
Ampoule Mass (g):	5.129 g	Expiration Date:	01/21/2005
Uncertainty:	+/- 1.8 %	Primary Code:	0112-A
LogBook No:	RC S 023 038A	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0881 g
		Density(g/mL):	0.9935

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(5.0881 \text{ g}) * (474 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 1447055.6400 \text{ dpm/mL}$
$(5.0881 \text{ g}) * (474 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (0.9935 \text{ g/mL}) / (100 \text{ mL}) = 1456575.8226 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/09/1999	Joe Davis	.5846	100	0112-B	8514.6 dpm/ml	04/09/1999	04/09/2000
07/09/1999	Joe Davis	.5027	100	0112-C	7321.7 dpm/mL	07/09/1999	07/09/2000
11/11/1999	Joe Davis	.4993	100	0112-D	7272.22 dpm/mL	11/11/1999	11/11/2000
01/28/2000	Aadli Abdul-Kareem	5.2157	1000	0112-E	7596.58 dpm/mL	02/17/2001	02/17/2002
06/08/2001	Angela Johnson	10.6972	1000	0112-F-102	15580.3 dpm/mL	06/11/2002	06/11/2003
06/08/2001	Angela Johnson	10.6972	1000	0112-F-202	15580.3 dpm/mL	06/11/2002	06/11/2003
10/31/2002	Angela Johnson	10.11	1000	0112-G	14725.049 dpm/mL	10/31/2003	10/31/2004
01/19/2005	Amanda Fehr	10.431	1000	0112-H	15193.542 dpm/mL	01/18/2006	01/18/2007

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ba-133 Standard 0112-H

A. Fehr	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Vol. Used (mL)	Source DPM/mL
1/18/2006	0112-H N1	707.9000	39.2000	668.7000	0.7442	0.1000	8985.12049
	0112-H N2	685.8000	39.2000	646.6000	0.7442	0.1000	8688.169447
	0112-H N3	693.1000	39.2000	653.9000	0.7442	0.1000	8786.257348
						Average =	8819.849095

Mean Value (Counting) = 8819.849095 **102.144245** **Pass**
 Stdev = 151.2986605 0.01715434 **Rule 3 (Pass/Fail)**

Certificate Value = 8634.7
 Lower Limit = 8517.251774
 Upper Limit = 9122.446416
 Rule 1 Pass/Fail **Pass**
 Two sigma = 302.597321
 10 % of Mean = 881.9849095
 Rule 2 (Pass/Fail) **Pass**

Verification Rules

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

The analyst prepared three standard verification sources for Ba-133 source 0112-H by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 24 for Ba-133 source standard verification. The Ba-133 efficiency calibration which was used for verification calculations was performed on 1/18/06 using source 0487-A (Ba-133). Calibration data is recorded in this logbook under Ba-133 0487. Each verification source calculation was performed as follows:

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

where:

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

RAD SOP M-001

Amanda L. Fehr 2/2/06
 Amanda L. Fehr 1/19/06

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

64673-278

Ra-228 5 mL Liquid in Flame Sealed Vial

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

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

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

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

*99% Confidence Level

Impurities: γ -impurities <0.1%5.02617 grams 0.1M HCl solution with 110 μ g/g Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY:

M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

M. M. 10-2-02



Standard Traceability Log Rad

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

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10337.9473 \text{ dpm/mL}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (59.9 \text{ dpm/dps}) / (0.9992 \text{ g/mL}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10345.8102 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/02/2003	Lonnie Morris	39.71	1000	0503-B	411.518 dpm/mL	09/09/2005	09/09/2006

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Verification for Ra-228 Standard 0503-B

A. Fehr 9/9/2005	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
	0503-B N1	252.8000	14.4000	238.4000	0.8260783	1.0000 288.5924962
	0503-B N2	267.0000	14.4000	252.6000	0.8260783	1.0000 305.7821499
	0503-B N3	266.0000	14.4000	251.6000	0.8260783	1.0000 304.5716109
						Average = 299.6487523

Mean Value (Counting) = 299.6487523 dpm/mL 103.79387 % of known
 Stdev = 9.594110231 dpm/mL 0.03201785

Certificate Value = 288.7 dpm/mL
 Lower Limit = 280.4605319 dpm/mL
 Upper Limit = 318.8369728 dpm/mL
 Rule 1 Pass/Fail Pass
 Two sigma = 19.18822046
 10 % of Mean = 29.96487523
 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.

The analyst prepared three standard verification sources for Ra-228 source 0503-B by transferring portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Yellow (Wallac) using Protocol 23 for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 2/20/03 using Analytic's source 0503(Ra-228). Calibration data is recorded in this logbook under Ra-228 0503. Each verification source calculation was performed as follows:

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

where:

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

Reference RAD SOP M-001

Amanda D. Fehr 9/9/05
 Heather B. Urow 9/9/05

0638

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

67519-278

Ra-226 5 mL Liquid in Flame Sealed Vial

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

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

Analytics maintains traceability to the National Institute of Standards and Technology through participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

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

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

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

P O NUMBER 3231RD, Item 5

SOURCE PREPARED BY:

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

Q A APPROVED:

ACUW 1/26/04



Standard Traceability Log Rad

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

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

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

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

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (59.9 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13613.8856 \text{ dpm/mL}$$

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (59.9 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13260.8293 \text{ dpm/g}$$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/17/2006	Amanda Fehr	2.1041	100	0638-B	279.0211 dpm/mL	01/17/2006	01/17/2007

General Engineering Laboratories, LLC
Version 1.0 9/18/2000

Certificate of Analysis

0903

Catalog No: 060092-16

Lot No: 1006930

Storage: Ambient

Matrix: 1M HNO₃

Container: 250 ml Narrow Mouth, HDPE

Description: Uranium 250 µg/L ± 0.5% in 1M HNO₃

Quality System
Audited & Registered
by NSF-ISR to ISO 9001:2000

Received: 2/7/06

Issue Date: 3/1/2007

Element	Symbol	CAS No	Source Lot No	Purity %	Concentration ug/L
Uranium Total	U	7440-61-1	7075.42.5	100	250



Mark Filla

This standard was prepared gravimetrically using balances calibrated with NIST traceable weights (NIST Test Number 1000). Only calibrated Class A volumetric glassware was used to prepare this standard. Sub-boiled distilled acid and deionized water were used to stabilize the product. All raw materials were checked for stoichiometry and purity. This standard has been spectrometrically certified by an independent source, which is directly traceable to NIST.

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70361-278

5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. 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. Analytix maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

Calibration date: April 1, 2005 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE	GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432 Y	3372	4.5
Cd-109	88	462.6 d	4698	3.3
Co-57	122	271.79 d	2450	3.0
Ce-139	166	137.6 d	3496	2.8
Hg-203	279	46.61 d	7565	2.7
Sn-113	392	115.1 d	4711	2.6
Cs-137	662	30.07 Y	3109	3.0
Y-88	898	106.6 d	12320	2.6
Co-60	1173	5.2714 Y	5769	2.7
Co-60	1332	5.2714 Y	5830	2.6
Y-88	1836	106.6 d	12860	2.6

5.32720 grams 4M HCl solution.
P O NUMBER 2704RD, Item 1

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

Q A APPROVED: [Signature] 04-11-2005

This standard will expire one year after the calibration date.



U.S. DEPARTMENT OF COMMERCE
National Institute of Standards & Technology
Gaithersburg, MD 20899

Certificate of Participation

Analytics, Incorporated
Atlanta, Georgia

is a participant for the period January 1, 2005, through December 31, 2005, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with the Nuclear Energy Institute. Continued participation is evidenced by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value from that measured by the National Institute of Standards and Technology. The significance of these Reports is addressed below.*

For the Director,

A handwritten signature in black ink, appearing to read "Michael P. Unterweger".

Michael P. Unterweger, Acting Leader
Radioactivity Group
Physics Laboratory

* As guidance for the proper use of Reports of Traceability, it should be emphasized that the National Institute of Standards and Technology is concerned only with fostering good measurements capability and consistency with the national measurements system. The assurance of the proper application of that capability to the ultimate consumer products is the responsibility of each manufacturer of these products and of the Federal regulatory agencies.

A continuing traceability program in radioactivity demonstrates, to the degree established by the periodic assays of calibrated radioactivity samples, a continuing competence to maintain the methods and standards necessary for accurate measurement. Such a program cannot, however, endorse each and every measurement nor the final product, any more than a spot check can vouch for every unchecked item. Care should be taken, therefore, not to imply such endorsement. The proper use of this Report is governed by section 200.114 of Title 15 of the Code of Federal Regulations. These regulations may be met if Reports are quoted only in their entirety. Excerpts out of context may be misleading.

ANALYTICS

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ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS

BATCH 120

CALIBRATION DATE: April 1, 2005 12:00 EST

Isotope	Energy (keV)	Calibration Method ¹	Statistics ²	Calibration ²	Peak Fitting ²	Geometry ²	Impurities ²	Weighing ²	Combined Standard Uncertainty ²	Relative Expanded Uncertainty ² (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6

Optional Additional Isotopes

Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

Calibration Methods:

- 4π LS (4 pi Liquid Scintillation Counting)
- HPGe (High Purity Germanium Gamma Ray Spectrometer)
- IC (Gamma Ray Ionization Chamber)

²As Percent (%) from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0781	Isotope:	Mixed Gamma
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	4M HCL	Prep Date:	04/26/2005
Reference Date:	04/01/2005	Verification Date:	04/27/2005
Ampoule Mass (g):	5.3272 g	Expiration Date:	04/27/2006
Uncertainty:	+/- 3 %	Primary Code:	0781-A
LogBook No:	RC-S-039-065	Dilution(mL):	100 mL
		Mass of Parent(g):	5.1233 g
		Density(g/mL):	5.4962

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

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

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

$$(5.1233 \text{ g}) * (219149.436 \text{ dpm}) * (1 \text{ dpm/dpm}) / (5.3272 \text{ g} * 100 \text{ mL}) = 2107.6143 \text{ dpm/mL}$$

$$(5.1233 \text{ g}) * (219149.436 \text{ dpm}) * (1 \text{ dpm/dpm}) / (5.4962 \text{ g/mL}) / (5.3272 \text{ g} * 100 \text{ mL}) = 383.4709 \text{ dpm/g}$$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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General Engineering Laboratories, LLC

Version 1.0 9/18/2000

Verification for Mixed Gamma Standard 0781-A (AM-241 & Cs-137)

A. Fehr
4/29/2005

Am-241			Cs-137		
	Isotope	Result		Isotope	Result
	Mixed Gamma N1	9796		Mixed Gamma N1	3753
	Mixed Gamma N2	9930		Mixed Gamma N2	4015
	Mixed Gamma N3	10290		Mixed Gamma N3	3878
Mean Value (Counting) =	10005.33	102.47	Pass	3882.00	102.39
Stdev =	255.471	Rule 3 (Pass/Fail)		131.046	Pass
Certificate Value =	9764.6			3791.3	
Lower Limit =	9494.391719			3619.908413	
Upper Limit =	10516.27495			4144.091587	
Rule 1 (Pass/Fail)	Pass			Pass	
Two sigma =	510.9416144			262.091587	
10 % of Mean =	1000.53333333			388.20000000	
Rule 2 (Pass/Fail)	Pass			Pass	

Verification Rules

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

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

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

Amanda L. Fehr 4/29/05

Angela L. Johnson 5/6/05

Verification for Mixed Gamma Standard 0781-A (Co-60)

A. Fehr 4/29/2005	Isotope	Result pCi/L	
	Mixed Gamma N1	6132	
	Mixed Gamma N2	6073	
	Mixed Gamma N3	6240	
Mean Value (Counting) =	6148.33	pCi/L	102.365 Pass
Stdev =	84.690	pCi/L	Rule 3 (Pass/Fail)
Certificate Value =	6006.3	pCi/L	
Lower Limit =	5978.954074	pCi/L	
Upper Limit =	6317.712592	pCi/L	
Rule 1 Pass/Fail	Pass		
Two sigma =	169.3792589		
10 % of Mean =	614.8333333		
Rule 2 (Pass/Fail)	Pass		

Verification Rules

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

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

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

Amanda L. Fehr 4/29/05

*Angela L. Johnson
5/6/05*

RUNLOGS



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
158783001	SAMPLE	LCW1	1114		26-APR-2006 08:23	523917	DONE		
158783002	SAMPLE	LCW1	1117		26-APR-2006 08:23	523917	DONE		
158783003	SAMPLE	LCW1	1118		26-APR-2006 08:23	523917	DONE		
158783004	SAMPLE	LCW1	1119		26-APR-2006 08:23	523917	DONE		
158783005	SAMPLE	LCW1	1120		26-APR-2006 08:23	523917	DONE		
1201078559	MB	LCW1	1121		26-APR-2006 08:23	523917	DONE		
1201078560	DUP	LCW1	1122		26-APR-2006 08:24	523917	DONE		
1201078561	MS	LCW1	1123		26-APR-2006 08:24	523917	DONE		
1201078562	LCS	LCW1	1132		27-APR-2006 14:49	523917	DONE		

Version 1.1 9/5/05

General Engineering Laboratories, LLC



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
158783001	SAMPLE	LCW1	1026		28-APR-2006 07:18	524204	DONE		
158783002	SAMPLE	LCW1	1027		28-APR-2006 07:18	524204	DONE		
158783003	SAMPLE	LCW1	1029		28-APR-2006 07:18	524204	DONE		
158783004	SAMPLE	LCW1	1030		28-APR-2006 07:18	524204	DONE		
158783005	SAMPLE	LCW1	1037		28-APR-2006 07:18	524204	DONE		
1201079208	MB	LCW1	1038		28-APR-2006 07:18	524204	DONE		
1201079209	DUP	LCW1	1040		28-APR-2006 07:18	524204	DONE		
1201079210	MS	LCW1	1041		28-APR-2006 07:18	524204	DONE		
1201079211	LCS	LCW1	1042		28-APR-2006 07:18	524204	DONE		

Version 1.1 9/5/05

General Engineering Laboratories, LLC



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
158783001	SAMPLE	MJH1	GAMMA6		24-APR-2006 23:30	523017	DONE	2L_MB	04-JAN-2006
158783002	SAMPLE	MJH1	GAMMA9		24-APR-2006 23:30	523017	DONE	2L_MB	08-JUL-2005
158783003	SAMPLE	MJH1	WELL		24-APR-2006 23:30	523017	DONE	2L_MB	29-DEC-2005
158783004	SAMPLE	MJH1	GAMMA10		24-APR-2006 23:31	523017	DONE	2L_MB	15-FEB-2006
158783005	SAMPLE	MJH1	GAMMA11		24-APR-2006 23:31	523017	DONE	2L_MB	25-MAR-2006
1201076443	MB	MJH1	GAMMA3		24-APR-2006 23:31	523017	DONE	2L_MB	24-MAR-2006
1201076444	DUP	MJH1	GAMMA3		25-APR-2006 06:13	523017	DONE	2L_MB	24-MAR-2006
1201076445	LCS	MJH1	WELL		25-APR-2006 06:13	523017	DONE	2L_MB	29-DEC-2005

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Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
1201060412	MB	PXP1	PIC4C		17-APR-2006 14:14	515982	DONE	CeF on 25mm Filter	01-MAR-2006 4/22/05
1201060413	DUP	PXP1	PIC4D		17-APR-2006 14:14	515982	DONE	CeF on 25mm Filter	01-MAR-2006 4/22/05
158436001	SAMPLE	PXP1	PIC1A		17-APR-2006 14:14	515982	DONE	CeF on 25mm Filter	22-APR-2005
158783001	SAMPLE	PXP1	PIC1B		17-APR-2006 14:15	515982	DONE	CeF on 25mm Filter	22-APR-2005
158783002	SAMPLE	PXP1	PIC1C		17-APR-2006 14:15	515982	DONE	CeF on 25mm Filter	22-APR-2005
159251003	SAMPLE	PXP1	PIC1D		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159251004	SAMPLE	PXP1	PIC2A		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159251005	SAMPLE	PXP1	PIC2B		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159251006	SAMPLE	PXP1	PIC2C		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159252001	SAMPLE	PXP1	PIC2D		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159253001	SAMPLE	PXP1	PIC4A		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
159254001	SAMPLE	PXP1	PIC4B		17-APR-2006 14:16	515982	DONE	CeF on 25mm Filter	01-MAR-2006
1201060414	MS	PXP1	PIC3B		17-APR-2006 15:08	515982	DONE	CeF on 25mm Filter	01-MAR-2006 4/22/05
1201060415	LCS	PXP1	PIC3C		17-APR-2006 15:09	515982	DONE	CeF on 25mm Filter	01-MAR-2006 4/22/05

HOA
4/27/06

Version 1.1 9/5/05

General Engineering Laboratories, LLC



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
1201060416	MB	KSD1	PIC4C		26-APR-2006 13:29	515983	DONE	CeF on 25mm Filter	22-APR-2005
1201060417	DUP	KSD1	PIC4D		26-APR-2006 13:29	515983	DONE	CeF on 25mm Filter	22-APR-2005
158783003	SAMPLE	KSD1	PIC1A		26-APR-2006 13:29	515983	DONE	CeF on 25mm Filter	22-APR-2005
158783004	SAMPLE	KSD1	PIC1B		26-APR-2006 13:29	515983	DONE	CeF on 25mm Filter	22-APR-2005
158783005	SAMPLE	KSD1	PIC1C		26-APR-2006 13:29	515983	DONE	CeF on 25mm Filter	22-APR-2005
158971001	SAMPLE	KSD1	PIC1D		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
158971002	SAMPLE	KSD1	PIC2A		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
158971003	SAMPLE	KSD1	PIC2B		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
158971004	SAMPLE	KSD1	PIC2C		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159242001	SAMPLE	KSD1	PIC2D		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159242002	SAMPLE	KSD1	PIC3A		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159242003	SAMPLE	KSD1	PIC3B		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159243001	SAMPLE	KSD1	PIC3C		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159244001	SAMPLE	KSD1	PIC4A		26-APR-2006 13:30	515983	DONE	CeF on 25mm Filter	22-APR-2005
159247001	SAMPLE	KSD1	PIC4B		26-APR-2006 13:32	515983	DONE	CeF on 25mm Filter	22-APR-2005
1201060418	MS	KSD1	PIC3D		26-APR-2006 13:44	515983	DONE	CeF on 25mm Filter	22-APR-2005
1201060419	LCS	KSD1	PIC3B		26-APR-2006 14:35	515983	DONE	CeF on 25mm Filter	22-APR-2005

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Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
1201076207	MB	BXF1	PIC2B		26-APR-2006 10:19	522920	DONE	Tuffryn Filter	29-JUL-2005
1201076208	DUP	BXF1	PIC2C		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
1201076209	MS	BXF1	PIC2D		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
158783001	SAMPLE	BXF1	PIC1A		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
158783002	SAMPLE	BXF1	PIC1B		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
158783003	SAMPLE	BXF1	PIC1C		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
158783004	SAMPLE	BXF1	PIC1D		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
158783005	SAMPLE	BXF1	PIC2A		26-APR-2006 10:20	522920	DONE	Tuffryn Filter	29-JUL-2005
1201076210	LCS	BXF1	PIC3A		26-APR-2006 10:21	522920	DONE	Tuffryn Filter	29-JUL-2005

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General Engineering Laboratories, LLC



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
1201076467	MB	DRS1	KPA11AUTO2		25-APR-2006 14:22	523026	DONE		
1201076468	DUP	DRS1	KPA11AUTO2		25-APR-2006 14:25	523026	DONE		
1201076469	MS	DRS1	KPA11AUTO2		25-APR-2006 14:29	523026	DONE		
1201076470	LCS	DRS1	KPA11AUTO2		25-APR-2006 14:32	523026	DONE		
1201076471	LCSD	DRS1	KPA11AUTO2		25-APR-2006 14:34	523026	DONE		
158783001	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:37	523026	DONE		
158783002	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:39	523026	DONE		
158783003	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:41	523026	DONE		
158783004	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:43	523026	DONE		
158783005	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:45	523026	DONE		
159970001	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:47	523026	DONE		
160885001	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:49	523026	DONE		
161083001	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 14:52	523026	DONE		
161083002	SAMPLE	DRS1	KPA11AUTO2		25-APR-2006 16:22	523026	DONE		

Version 1.1 9/5/05

General Engineering Laboratories, LLC



Instrument Run Log

ID	Sample Type	Analyst	Instrument	Dil	Run Date	Batch Id	Status	Geometry	Cal Date
158276001	SAMPLE	SG	LUCAS2		11-APR-2006 08:00	517605	DONE	Lucas Cell	09-MAY-2005
158277001	SAMPLE	SG	LUCAS3		11-APR-2006 08:00	517605	DONE	Lucas Cell	23-NOV-2005
158436001	SAMPLE	SG	LUCAS4		11-APR-2006 08:00	517605	DONE	Lucas Cell	04-NOV-2005
158783001	SAMPLE	SG	LUCAS5		11-APR-2006 08:00	517605	DONE	Lucas Cell	09-DEC-2005
158783002	SAMPLE	SG	LUCAS6		11-APR-2006 08:00	517605	DONE	Lucas Cell	29-DEC-2005
158783003	SAMPLE	SG	LUCAS1		11-APR-2006 08:35	517605	DONE	Lucas Cell	27-MAR-2006
158783004	SAMPLE	SG	LUCAS2		11-APR-2006 08:35	517605	DONE	Lucas Cell	09-MAY-2005
158783005	SAMPLE	SG	LUCAS3		11-APR-2006 08:35	517605	DONE	Lucas Cell	23-NOV-2005
158971001	SAMPLE	SG	LUCAS4		11-APR-2006 08:35	517605	DONE	Lucas Cell	04-NOV-2005
158971002	SAMPLE	SG	LUCAS5		11-APR-2006 08:35	517605	DONE	Lucas Cell	09-DEC-2005
158971003	SAMPLE	SG	LUCAS6		11-APR-2006 08:35	517605	DONE	Lucas Cell	29-DEC-2005
158971004	SAMPLE	SG	LUCAS1		11-APR-2006 09:15	517605	DONE	Lucas Cell	27-MAR-2006
159242003	SAMPLE	SG	LUCAS2		11-APR-2006 09:15	517605	DONE	Lucas Cell	09-MAY-2005
1201063981	LCS	SG	LUCAS6		11-APR-2006 09:15	517605	DONE	Lucas Cell	29-DEC-2005
1201063982	DUP	SG	LUCAS4		11-APR-2006 09:15	517605	DONE	Lucas Cell	04-NOV-2005
1201063983	MS	SG	LUCAS5		11-APR-2006 09:15	517605	DONE	Lucas Cell	09-DEC-2005
158275001	SAMPLE	SG	LUCAS1		11-APR-2006 11:25	517605	DONE	Lucas Cell	27-MAR-2006
1201063978	MB	SG	LUCAS3		11-APR-2006 11:25	517605	DONE	Lucas Cell	23-NOV-2005

Version 1.1 9/5/05

General Engineering Laboratories, LLC