1

PARAGON ANALYTICS
Radiochemistry Data Package

Section 1

SAMPLE RESULTS SUMMARY

Strontium-90 Analysis by GFPC Sample Results Summary

Client Name: Allwest Remediation, Inc.
Client Project Name: Sterling
Client Project Number: 05-8513EI

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Reported on: Tuesday, March 28, 2006
9:28:41 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0603120-1	F4-N	Sample	Sr-90	0.30 +/- 0.13	0.21	pCi/g	SOIL	SR060322-2	3/25/2006	LT
0603120-2	B5-S	Sample	Sr-90	0.038 +/- 0.099	0.217	pCi/g	SOIL	SR060322-2	3/25/2006	U
0603120-3	C10-W	Sample	Sr-90	0.043 +/- 0.093	0.202	pCi/g	SOIL	SR060322-2	3/25/2006	Y1,U
0603120-4	N8-W	Sample	Sr-90	0.35 +/- 0.14	0.21	pCi/g	SOIL	SR060322-2	3/25/2006	LT
0603120-5	M10-W	Sample	Sr-90	0.12 +/- 0.10	0.21	pCi/g	SOIL	SR060322-2	3/25/2006	U

Comments:

Data Package ID: *SR0603120-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

000003

PARAGON ANALYTICS

Radiochemistry Data Package

2

Section 2

QC RESULTS SUMMARY

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Method Blank Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Lab ID: SR060322-2MB

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 22-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes

Final Aliquot: 1.96 g
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0 15 +/- 0 13	0 25	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1022	909 1	ug	89 0	40 - 110 %	

omments:

ualifiers/Flags:

- Result is less than the sample specific MDC
1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed
2 - Chemical Yield outside default limits.
T - Result is less than Requested MDC greater than sample specific MDC

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

- Requested MDC not met
- Analyte concentration greater than MDC
3 - Analyte concentration greater than MDC but less than Requested MDC

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Laboratory Control Sample(s)

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Lab ID: SR060322-2LCS

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 22-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 26-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes

Final Aliquot: 1.96 g
Result Units: pCi/g
File Name: SRA0326B

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10098-97-2	Sr-90	5.5 +/- 1.3	0.2	5.72	95.4	75 - 125	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1019	997.6	ug	97.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC
LT - Result is less than Requested MDC greater than sample specific MDC
Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit
H - LCS Recovery above upper control limit
P - LCS Recovery within control limits.
M - The requested MDC was not met
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Duplicate Sample Results (DER)

Lab Name: Paragon Analytics
k Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

ID: F4-N ID: 0603120-1DUP	Sample Matrix: SOIL Prep SOP: PAI 707 Rev 8 Date Collected: 17-Mar-06 Date Prepared: 22-Mar-06 Date Analyzed: 25-Mar-06	Prep Batch: SR060322-2 QCBatchID: SR060322-2-1 Run ID: SR060322-2A Count Time: 150 minutes Report Basis: Dry Weight	Final Aliquot: 1.98 g Prep Basis: Dry Weight Moisture(%): NA Result Units: pCi/g File Name: SRA0325D

ASNO	Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	DER	Control Limit	Lab Qualifiers
98-97-2	Sr-90	0.30 +/- 0.13	0.07 +/- 0.10	1.36	2.13	U

omments:

to Qualifiers/Flags:

it is less than the sample specific MDC
mical Yield is in control at 100-110% Quantitative yield is assumed
mical Yield outside default limits
: is greater than Warning Limit of 1.42
is greater than Control Limit of 2.13
it is less than Request MDC greater than sample specific MDC
osted MDC not met
requested MDC was not met, but the reported
vity is greater than the reported MDC
Recovery below lower control limit
Recovery above upper control limit
Matrix Spike Recovery within control limits.
: Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
DER - Duplicate Error Ratio (see PAI SOP 715)
BDL - Below Detection Limit
NR - Not Reported

Package ID: *SR0603120-1*

PARAGON ANALYTICS
Radiochemistry Data Package

3

Section 3

INDIVIDUAL SAMPLE RESULTS

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID	F4-N
Lab ID	0603120-1

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 2 02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0 30 +/- 0 13	0.21	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1070	1041	ug	97 3	40 - 110 %	

omments:

Qualifiers/Flags:

J - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC greater than sample specific MDC

13 - The requested MDC was not met, but the reported activity is greater than the reported MDC

1 - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Duplicate Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc.
ClientProject ID: Sterling 05-8513EI

Field ID: F4-N
Lab ID: 0603120-1DUP

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 1 98 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0.07 +/- 0.10	0.22	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1081	1024	ug	94 7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC
Y1 - Chemical Yield is in control at 100-110% Quantitative yield is assumed
Y2 - Chemical Yield outside default limits
LT - Result is less than Requested MDC greater than sample specific MDC
M - The requested MDC was not met
M3 - The requested MDC was not met but thereported activity is greater than the reported MDC
W - DER is greater than Warning Limit of 1 42
D - DER is greater than Control Limit of 2 13

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: B5-S
Lab ID: 0603120-2

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 2 04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0 038 +/- 0 099	0 217	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1170	1133	ug	96 8	40 - 110 %	

Comments:

Qualifiers/Flags:

U -- Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: C10-W
Lab ID: 0603120-3

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 1.97 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0.043 +/- 0.093	0.202	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1071	1125	ug	105	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID	N8-W
Lab ID	0603120-4

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 2 03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0 35 +/- 0 14	0 21	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1064	1033	ug	97 1	40 - 110 %	

omments:

ualifiers/Flags:

- Result is less than the sample specific MDC
1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed
2 - Chemical Yield outside default limits.
T - Result is less than Requested MDC greater than sample specific MDC
3 - The requested MDC was not met, but the reported activity is greater than the reported MDC
- The requested MDC was not met

bbreviations:

PU - Total Propagated Uncertainty (see PAI SOP 743)
DC - Minimum Detectable Concentration (see PAI SOP 709)
DL - Below Detection Limit

Data Package ID: *SR0603120-1*

Strontium-90 Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: M10-W
Lab ID: 0603120-5

Sample Matrix: SOIL
Prep SOP: PAI 707 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: SR060322-2
QCBatchID: SR060322-2-1
Run ID: SR060322-2A
Count Time: 150 minutes
Report Basis: Dry Weight

Final Aliquot: 2 00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: SRA0325D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10098-97-2	Sr-90	0 12 +/- 0 10	0.21	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1117	1088	ug	97.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *SR0603120-1*

PARAGON ANALYTICS
Radiochemistry Data Package

4

Section 4

RAW DATA

Strontium-90 Analysis by GFPC Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Prep SOP: PAI 707
Analytical SOP: PAI 724

Reported on: Tuesday, March 28, 2006
9:27:10 AM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	GrossCPM BkgCPM	BaseEff ProgEff	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0603120-1	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.03 g	LB4100-A	SR060322-2A	3/25/2006	2.500	41.91%	150	0.30	0.21	pCi/g	NA	
SMP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	2.02 g	B2	SRA0325D	11:11 AM	1.755	NA	97.3%	0.13	NA	Dry Weight	NA	LT
0603120-1	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.02 g	LB4100-A	SR060322-2A	3/25/2006	2.073	43.59%	150	0.07	0.22	pCi/g	1.36	
DUP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	1.98 g	B3	SRA0325D	11:11 AM	1.891	NA	94.7%	0.10	NA	Dry Weight	NA	U
0603120-2	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.03 g	LB4100-A	SR060322-2A	3/25/2006	1.973	41.32%	150	0.038	0.217	pCi/g	NA	
SMP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	2.04 g	B4	SRA0325D	11:11 AM	1.879	NA	96.8%	0.099	NA	Dry Weight	NA	U
0603120-3	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.01 g	LB4100-A	SR060322-2A	3/25/2006	1.787	42.30%	150	0.043	0.202	pCi/g	NA	
SMP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	1.97 g	C1	SRA0325D	11:11 AM	1.677	NA	105.0%	0.093	NA	Dry Weight	NA	Y1,U
0603120-4	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.07 g	LB4100-A	SR060322-2A	3/25/2006	2.767	42.56%	150	0.35	0.21	pCi/g	NA	
SMP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	2.03 g	C2	SRA0325D	11:11 AM	1.879	NA	97.1%	0.14	NA	Dry Weight	NA	LT
0603120-5	Sr-90	3/17/2006	SR060322-2	3/23/2006	NA	SOIL	2.04 g	LB4100-A	SR060322-2A	3/25/2006	2.100	43.35%	150	0.12	0.21	pCi/g	NA	
SMP	Trg. Analyte		SR060322-2-1	4:31:00 PM	NA	NA	2 g	C3	SRA0325D	11:11 AM	1.787	NA	97.5%	0.10	NA	Dry Weight	NA	U
SR060322-2	Sr-90	3/22/2006	SR060322-2	3/23/2006	NA	SOIL	2 g	LB4100-A	SR060322-2A	3/25/2006	2.313	41.43%	150	0.15	0.25	pCi/g	NA	
MB	Trg. Analyte	1:29:22 PM	SR060322-2-1	4:31:00 PM	NA	NA	1.96 g	C4	SRA0325D	11:11 AM	1.978	NA	89.0%	0.13	NA	Dry Weight	NA	U
SR060322-2	Sr-90	3/22/2006	SR060322-2	3/23/2006	NA	SOIL	2 g	LB4100-A	SR060322-2A	3/26/2006	17.493	43.59%	150	5.5	0.2	pCi/g	NA	95.4
LCS	Trg. Analyte	1:29:22 PM	SR060322-2-1	4:31:00 PM	NA	NA	1.96 g	B3	SRA0326B	4:26 PM	1.891	NA	97.9%	1.3	NA	Dry Weight	NA	P

Comments:

Data Package ID: *SR0603120-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
+ - Duplicate RPD not within limits.
LT - Result is less than Request MDC, greater than sample specific MDC
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).
2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
DER - Duplicate Error Ratio
BDL - Below Detection Limit

0010016

Unit Type: LB4100-A/W
Counting Unit ID: Orange
High Voltage Mode: Simultaneous
Application Revision: C
Application Version: PAI
Rev.12/29/03 JE

Data file name: SRA0325D
Batch ID: SR060322-2
Count Preset (m): 150
Batch Ended: 3/25/06 13:37

Background logfile: BKGAB
Date of Bkg. Cal: 3/25/06
Alpha efficiency logfile: Am241R-03/06
Alpha attenuation calibration: Am0206
Beta efficiency logfile: Sr90F-02/06
Beta attenuation calibration: Sr0206

Alpha prog. logfile: n/a
Alpha prog. attenuation: n/a
Beta prog. logfile: n/a
Beta prog. attenuation: n/a

y = b*m^(a*(mass-x0))		y = b*m^(a*(mass-x0))	
Alpha b=	1.23910	Beta b=	1.0428
m=	0.81968	m=	0.9990
a=	0.4942	a=	1.3098
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk y = b*m^-mass		Beta to Alpha X-talk y = b*mass + m	
a->b xtalk b=	0.2399	b->a xtalk b=	0.715E-07
a->b xtalk m=	1.6002	b->a xtalk m=	0.0012

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
C1	0603120-3	3/25/06 13:36	150.00	0.0	0.033	0.061	0.002	0.2339	1.233	n/a	n/a	1.787	1.677	0.0080	0.4230	1.042	n/a	n/a
C2	0603120-4	3/25/06 13:36	150.00	0.0	0.133	0.083	0.003	0.2514	1.233	n/a	n/a	2.767	1.879	0.0320	0.4256	1.042	n/a	n/a
C3	0603120-5	3/25/06 13:36	150.00	0.0	0.153	0.076	0.003	0.2451	1.233	n/a	n/a	2.100	1.787	0.0368	0.4335	1.042	n/a	n/a
C4	SR060322-2MB	3/25/06 13:36	150.00	0.0	0.133	0.083	0.003	0.2411	1.233	n/a	n/a	2.313	1.978	0.0320	0.4143	1.042	n/a	n/a
B2	0603120-1	3/25/06 13:37	150.00	0.0	0.133	0.088	0.003	0.2522	1.233	n/a	n/a	2.500	1.755	0.0320	0.4191	1.042	n/a	n/a
B3	0603120-1D	3/25/06 13:37	150.00	0.0	0.067	0.080	0.002	0.2363	1.233	n/a	n/a	2.073	1.891	0.0160	0.4359	1.042	n/a	n/a
B4	0603120-2	3/25/06 13:37	150.00	0.0	0.147	0.111	0.002	0.2391	1.233	n/a	n/a	1.973	1.879	0.0352	0.4132	1.042	n/a	n/a

000017

CF 3/26/06

PAI - Gas Flow Proportional Sample Analysis - LB4100-A

Unit Type: LB4100-A/W
Counting Unit ID: Orange
High Voltage Mode: Simultaneous
Application Revision: C
Application Version: PAI
Rev.12/29/03 JE

Data file name: SRA0326B
Batch ID: SR060322-2
Count Preset (m): 150
Batch Ended: 3/26/06 19:53

Background logfile: BKGAB
Date of Bkg. Cal: 3/25/06
Alpha efficiency logfile: Am241R-03/06
Alpha attenuation calibration: Am0206
Beta efficiency logfile: Sr90F-02/06
Beta attenuation calibration: Sr0206

Alpha prog. logfile: n/a
Alpha prog. attenuation: n/a
Beta prog. logfile: n/a
Beta prog. attenuation: n/a

Alpha Attenuation Calibration y = b*m^(a*(mass-x0))		Beta Attenuation Calibration y = b*m^(a*(mass-x0))	
Alpha b=	1.23319	Beta b=	1.0429
m=	0.93959	m=	0.8999
a=	0.4942	a=	1.3898
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk y = b*m^-mass		**Beta to Alpha X-talk y = b*mass + m**	
a->b xtalk b=	0.2361	b->a xtalk b=	6.711E-07
a->b xtalk m=	1.0502	b->a xtalk m=	0.0012

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
B3	SR060322-2LCS	3/26/06 18:58	150.00	0.0	0.067	0.080	0.021	0.2363	1.233	n/a	n/a	17.493	1.891	0.0160	0.4359	1.042	n/a	n/a

000018

Chr. 3/28/06

Date 3/25/06 SOP 724r 8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Instrument Daily Response and Background Checks

Det.	Daily Response Check Start 1	Status	Start 2	Status	Background Check Start 1	Status	Start 2	Status	Det Status
1	C/m	P			*				P
2									
3									
4									
5									
6									
7									
8									
9									
10									
11		HB	C/m	P					
12		P							
13	OL				OL				OL
14									
15									
16									

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

Weekly Background Calibration

	Current Calib. File ID	Weekly Calib. Started	Status	File ID
Dr A	BKA0324W			
Dr B				
Dr C				
Dr D	OL			

Dr = Drawer

Gas Supply

P-10 Supply		P-10 Flow	
Tank 1	1100	Dr A	0.1
		Dr B	
Tank 2	1000	Dr C	
		Dr D	

Comments: * Daily BKG need not to be performed the day following WKLY BKG Calibration C/m 3/25/06

Page No : 369977 A Form 780r7 doc (6 19/04) Reviewed By / Date CK 3/26/06

000019

Date 3/25/06

SOP 724r 8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
6	0603120-1	SR060322-2	Sr-90	150	1106	CAM	SRA0325D	CK
7	1DUP							
8	2							
9	3							
10	4							
11	5							
12	SR060322-2MB							

CK 5/26/06

Comments:

Page No: 309978 B
(cont from page 309977 B)

Form 780r7 doc (6/19/04)

Reviewed By / Date CK 3/26/06

000020

Date 3/26/02

SOP 724r 8

Paragon Analytics

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

Instrument Daily Response and Background Checks

Det.	Daily Response Check Start 1	Status	Start 2	Status	Background Check Start 1	Status	Start 2	Status	Det Status
1	CF	L α L β	CF	L β	CF	P			OL β
2		P							
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13	OL				OL				OL
14									
15									
16									

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

Weekly Background Calibration

	Current Calib. File ID	Weekly Calib. Started	Status	File ID
Dr A	BKA0324W			
Dr B				
Dr C				
Dr D	OL			

Dr = Drawer

Gas Supply

P-10 Supply		P-10 Flow	
Tank 1	1100	Dr A	0.1
		Dr B	
Tank 2	800	Dr C	
		Dr D	

Comments:

000021

Page No.: 309979 A

Form 780r7 doc (6/19/04)

Reviewed By / Date CB 3/30/02

Date 3/26/06

SOP 7241 8

Paragon Analytics

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
1-12	Daily EFF	—	—	30	1449	CF	EFA0326	CF
1	Daily OFF	—	—	30	1459	CF	EFA0726R	↓
1-12	Daily BKG	—	—	60	1516	CF	BKA0326	CF
2	0603044-2	SR060321-1	90Sr	1000	1624	CF	SRA0326	CM
3	0601153-3	SR060307-3	↓	↓	1625	↓	SRA0326A	CM
4	SR060307-3MB	↓	↓	↓	↓	↓	↓	↓
5	-3LCS							
6	-3LCSD							
7	SR060322-2LCS	SR060322-2	↓	150	1626	↓	SRA0326B	CM

CM 3/27/06

Comments:

000022

Page No: 309979 B

(cont from page NA B)

Form 780r7 doc (6/19/04)

Reviewed By / Date CF 3/30/06

Paragon Analytics

Radiochemistry ICP Worksheet

Prep Batch: SR060322-2

Prep Procedure: **SR90**

Reviewed By: ATF DLB for ATF 3/24/06 Review Date: 3/24/06

STRONTIUM Recovery Results

Reference Carrier

LabID	QC Type	Carr Vol	Ref Carr Dil Vol	Ref Carr ICP Alq	Ref Carr ICP Dil Vol	Ref Carr ICP Run	Ref Carr ICP Conc
SR060322-2	CAR	0.5	50	0.5	10	IR060324-1A1	1.016334

Samples

Prep Num	LabID	QC Type	Init Samp Alq (g)	Car Vol (ml)	Samp Dil Vol (ml)	Init ICP Alq (ml)	Init ICP Dil Vol (ml)	Pre-Con Vol (ml)	Post Con Vol (ml)	Pre-Sep Vol (ml)	Post Sep Vol (ml)	Fin ICP Alq (ml)	Fin ICP Dil Vol (ml)	Initial ICP Run	Final ICP Run	Init ICP Conc (ug/ml)	Fin ICP Conc (ug/ml)	Init Samp Mass (ug)	Ref Mass (ug)	Flag	Fin Samp Mass (ug)	% Yield	Final Sample Alq
1	0603120-1	SMP	2.0635	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.08082	1.040644	1070.007	1006.17		1040.644	97.26%	2.022
1	0603120-1	DUP	2.0212	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.09237	1.023814	1081.441	1006.17		1023.814	94.67%	1.981
1	0603120-2	SMP	2.0832	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.18188	1.132605	1170.063	1006.17		1132.605	96.80%	2.042
1	0603120-3	SMP	2.0058	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.08176	1.124882	1070.942	1006.17		1124.882	105.04%	1.966
1	0603120-4	SMP	2.0679	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.07449	1.032644	1063.742	1006.17		1032.644	97.08%	2.027
1	0603120-5	SMP	2.037	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.1278	1.088307	1116.52	1006.17		1088.307	97.47%	1.996
1	SR060322-2	MB	2	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.03237	0.909134	1022.044	1006.17		909.1339	88.95%	1.960
1	SR060322-2	LCS	2	0.5	50	0.5	10	49.5	49.5	49.5	10	0.1	10	IR060324-1A1	IR060324-1A1	1.02883	0.997579	1018.54	1006.17		997.5793	97.94%	1.980

FLAG - LB: low bias (<= 15%) 15%: low bias (>15%)

Z: Negative Init. conc. treated as zer

Supersedes: N/A

000023

Sample Id1	Sr	Ba
I 0603072-6D	1.11679	0.16985
F 0603072-6D	1.08935	0.06630
I 0603072-7	1.13812	0.16611
F 0603072-7	1.13598	0.06683
I 0603072-8	1.11588	0.17359
F 0603072-8	1.08728	0.08537
I 0603072-9	1.10125	0.21013
F 0603072-9	1.08081	0.10123
CCV	0.99602	2.43245
CCB	0.00024	0.00054
I 0603072-10	1.10443	0.17930
F 0603072-10	1.09294	0.09054
I 0603072-11	1.09710	0.15488
F 0603072-11	1.02026	0.07432
I 0603072-12	1.10153	0.15702
F 0603072-12	1.05223	0.11656
I 0603072-13	1.11338	0.17555
F 0603072-13	1.06360	0.08002
I 0603072-14	1.10313	0.15363
F 0603072-14	1.07768	0.10177
CCV	0.99763	2.43406
CCB	0.00073	0.00143
I SR060322-1MB	1.00542	-0.00143
F SR060322-1MB	0.95676	-0.00089
I SR060322-1LCS	1.01931	0.31742
F SR060322-1LCS	0.96728	-0.00071
SR060322-1RC	1.02341	-0.00143
I 0603120-1	1.08081	0.21227
F 0603120-1	1.04064	-0.00071
I 0603120-1D	1.09237	0.21049
F 0603120-1D	1.02381	-0.00071
I 0603120-2	1.18188	0.37517
CCV	0.99455	2.42301
CCB	0.00115	0.00214
F 0603120-2	1.13260	0.00000
I 0603120-3	1.08176	0.27215
F 0603120-3	1.12488	-0.00036
I 0603120-4	1.07449	0.26306
F 0603120-4	1.03264	0.00196
I 0603120-5	1.12780	0.26431
F 0603120-5	1.08831	0.00000
I SR060322-2MB	1.03237	-0.00125
F SR060322-2MB	0.90913	-0.00143
I SR060322-2LCS	1.02883	-0.00160

Sample Id1	Sr	Ba
CCV	0.98528	2.39520
CCB	0.00103	0.00214
F SR060322-2LCS	0.99758	-0.00143
SR060322-2RC	1.01633	0.00481
CCV	0.98141	2.38290
CCB	0.00104	0.00214
CCV	0.99365	2.41267
CCB	0.00103	0.00196
I 0603127-1	0.16520	0.00820
F 0603127-1	0.01603	0.57977
I 0603127-1D	0.16798	0.00927
F 0603127-1D	0.01505	0.56962
I 0603127-2	0.10740	0.00160
F 0603127-2	0.00529	0.57835
I TR060323-1MB	-0.00065	-0.00036
F TR060323-1MB	-0.00053	0.59386
I TR060323-1LCS	-0.00073	-0.00107
F TR060323-1LCS	-0.00046	0.58352
CCV	0.97685	2.36045
CCB	0.00106	0.00249
TR060323-1RC	-0.00042	1.54737
CCV	0.97477	2.35314
CCB	0.00106	0.00249

PARAGON ANALYTICS
Radiochemistry Data Package

Section 5

QUALITY ASSURANCE SUMMARY REPORTS

5

No *NON-CONFORMANCE REPORTS* or *QUALITY ASSURANCE SUMMARY SHEETS* are included in this data package.

PARAGON ANALYTICS
Radiochemistry Data Package

Section 6

LABORATORY BENCH SHEETS

6

Paragon Analytics

Radiochemistry Instrument Worksheet

Prep Batch: SR060322-2

Prep Procedure: SR90

Analytical QASS / NCR? Y / (N) NA

Prep Num	LabID	QC Type	Init Alq	Fin Alq	Units	Residual Mass (mg)	Cnt 1 File	Cnt 1 Inst/Det	Cnt 1 Pos Chk By	Cnt 2 File	Cnt 2 Inst/Det	Cnt 2 Pos Chk By	Cnt 3 File	Cnt 3 Inst/Det	Cnt 3 Pos Chk By	Notes
1	0603120-1	SMP	2.0635	2.022436	g		SRA032517	6	CK							
1	0603120-1	DUP	2.0212	1.980978	g			7								
1	0603120-2	SMP	2.0832	2.041744	g			8								
1	0603120-3	SMP	2.0058	1.965884	g			9								
1	0603120-4	SMP	2.0679	2.026749	g			10								
1	0603120-5	SMP	2.037	1.996463	g			11								
1	SR060322-2	MB	2	1.9602	g			12								
1	SR060322-2	LCS	2	1.9602	g		SRA032518	7	CK							

CK 3/29/06

Tracer/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	STRONTIUM	247933	2,004.381	ppm	NA	0.5	ppm.	RS-010

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.96	50.769	DPM/ml	03/22/06	0.5	ml	RS-010

000029

Paragon Analytics

Radiochemistry Prep Worksheet

Prep Batch: SR060322-2

Prep Procedure: SR90

Reviewed By: ATF AB for ATF 3/24/06 Review Date: 3/24/06

Non-Routine Pre-Treatment? Y / (N) Batch: N/A Re-Prep? Y / (N) Batch: N/A Prep QASS / NCR? Y / (N) N/A

Prep SOP: PAI 707 Rev: 8
Prep SOP: NONE
Matrix Class: solid

Prep Analyst: Amanda Barlage
Prep Date: 3/22/06
Prep Dept: RS

Balance: 13
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq g	Fin Alq g	Prep Basis	Column #	Ingrowth Date/Time	Standards	Prep Notes
1	1	0603120-1	SMP		2.0635	2.022436	Dry Weight	7737	03/23/06 16:31	T1	
2	1	0603120-1	DUP		2.0212	1.980978	Dry Weight	7856	03/23/06 16:31	T1	
3	1	0603120-2	SMP		2.0832	2.041744	Dry Weight	7860	03/23/06 16:31	T1	
4	1	0603120-3	SMP		2.0068	1.965884	Dry Weight	7724	03/23/06 16:31	T1	
5	1	0603120-4	SMP		2.0679	2.026749	Dry Weight	7824	03/23/06 16:31	T1	
6	1	0603120-5	SMP		2.037	1.996463	Dry Weight	7854	03/23/06 16:31	T1	
7	1	SR060322-2	MB		2	1.9602	Dry Weight	7897	03/23/06 16:31	T1	
8	1	SR060322-2	LCS		2	1.9602	Dry Weight	7901	03/23/06 16:31	T1,S1	

AB 3/24/06

Spiked By: Amanda Barlage Date: 3/22/06
Witnessed By: Jeff Kujawa Date: 3/22/06

Relinquished By: AB
Date: 3/24/06
Received By: [illegible]
Date: 3/24/06

Tracer/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	STRONTIUM	247933	2,004.381	ppm	NA	0.5	ppm	RS-010

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.96	50.769	DPM/ml	03/22/06	0.5	ml	RS-010

000030

Comments

Paragon Analytics

Prep Batch: SR060322-2

Prep Procedure: SR90

Prep Batch Not Validated!!!

Reviewed By:

Review Date:

Non-Routine Pre-Treatment? Y / N Batch: _____ Re-Prep? Y / N Batch: _____ Prep QASS / NCR? Y / N _____

Prep SOP: PAI 707 Rev: 8
Prep SOP: NONE
Matrix Class: solid

Prep Analyst: Amanda Barlage AB
Prep Date: 3/22/06
Prep Dept: RS

Balance: 13
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Aiq g	Fin Aiq g	Prep Basis	Column #	Ingrowth Date/Time	Standards	Prep Notes
1	1	0603120-1	SMP		2.0635	2	Dry Weight	7737	3/23/06 16:31	T1	
2	1	0603120-1	DUP		2.0212	2	Dry Weight	7854		T1	
3	1	0603120-2	SMP		2.0832	2	Dry Weight	7860		T1	
4	1	0603120-3	SMP		2.0058	2	Dry Weight	7724		T1	
5	1	0603120-4	SMP		2.0978	2	Dry Weight	7824		T1	
6	1	0603120-5	SMP		2.037	2	Dry Weight	7854		T1	
7	1	SR060322-2	MB		2	2	Dry Weight	7897		T1	
8	1	SR060322-2	LCS		2	2	Dry Weight	7901		T1,S1	

Spiked By: Amanda Barlage AB Date: 3/22/06 3/22/06

Witnessed By: [illegible] Date: 3/22/06

Relinquished By: _____
Date: _____
Received By: _____
Date: _____

Trace/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	STRONTIUM..	247933	2,004.361	ppm	NA	0.5	ppm	RS-010

Exp. 9/08/06

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.96	50.769	DPM/ml	03/22/06	0.5	ml	RS-010

Exp. 11/14/06

000031

Comments

Paragon Analytics
LIMS Version: 5.333A

Supersedes: N/A

PROJECT Allwest Remediation - Rush

Continued From Page

3/22/06 W.O. # 06-03-120 (Pu-239, 5.90)

S.O.P. - 721 - R12

in oven - 3/21 @ 1710 balance #15, oven #1

out oven - 3/22 @ 0910 5 balls, shake 15 min.

Sample #	sample/can/balls(g)	can/balls(g)	ground sample(g)	Type Sample
06-03-120-1	126.1	98.7	27.4	SOIL
-2	117.1	98.1	19.0	
-3	122.6	98.1	24.5	
-4	120.2	98.0	22.2	
-5	119.6	98.1	21.5	

G.O. - 3/22/06

Continued on Page

Read and Understood By

Carson R. O'Dell 3/22/06 Signed Date

R. Fox 3/22/06 Signed Date

SAMPLE CONDITION FORM (SOLIDS)

ANALYST: KAA

ANALYSIS DATE: 3/22/06 METHOD: ^{90}Sr

WORK ORDER	SAMPLE ID	SAMPLE CONDITION		
		Dry/Wet	TEXTURE	Remarks
06031200	1	Dry(AR)	Ground	N/A
	2			
	3			
	4			
	5			

KAA 3/22/06

PARAGON ANALYTICS
Radiochemistry Data Package

Section 7

STANDARDS TRACEABILITY DOCUMENTS

7

96
PROJECT 600.2613.96 Sr-90 Notebook No. 2613
Continued From Page

Prep: 9/28/05

Prepare a working level dilution of ^{90}Sr @ ~50 dpm/ml by diluting 600.2613.30 (2234.71 dpm/ml) with 0.1N HCl
HCl Lot #: 050150

1) Determine density of 0.1N HCl:
Mass of 100 ml volumetric flask, class A: 68.2978g Bal 12
Mass of flask + 100 ml 0.1N HCl: 168.1236g
Net mass of .1N HCl: 99.8258g

ρ = .998258 g/ml

2) Transfer ^{90}Sr 600.2613.30 to a Nalgene bottle: Bal 12
Mass of 1L bottle w/o lid: 74.3785g
Mass of bottle + standard: 76.9060g
Net mass of standard transferred: 2.5275g

3) Dilute to final volume w/ 0.1N HCl
Mass of bottle w/o lid (from above): 74.3785g
Mass of bottle + std + 0.1N HCl: 1072.6g Bal 26
Net mass of diluted standard: 998.2g

4) Final activity calculation:
9/28/05 RG 12/5/05

$$\frac{(2.5275\,g)(2234.71\,dpm/g\,ml)}{998.2\,g} = 56.57\ dpm/ml$$

$$\frac{(22{,}390.967\ dpm/g)(2.5275\,g)(0.99825\,g/ml)}{(998.2\,g)} = \boxed{56.60\ dpm/ml}$$

Stnd ID: 600.2613.96 Bal 12/5/05
Description: Sr-90
Expiration: 11/4/06
Activity: 56.60 dpm/mL
Uncertainty: 1.89 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 9/28/05 Prep by: AF
Matrix/Comp. 0.1N HCl
Half Life (y): 2.88E+01
RG 12/5/05

Continued on Page

Read and Understood By

IR required for ICPT work

Signed 9/28/05 Date Signed 12/5/05 Date

000035

30
PROJECT 600.2613.30 Sr-90 Notebook No. 2613
Continued From Page

Transfer contents of ampoule 600 to a 125 mL glass bottle for a 1° solution.

1) Transfer ampoule 600 to a 125 mL bottle

mass of open ampoule + std	139.6110 g
mass of empty ampoule	89.5551 g
Net mass of std	50.0559 g

RG 12/12/03

SD 12/10/03 Density from following page .D= 0.9978 g/mL

2) Final Activity Calculation

$$\frac{(1.808\times10^4\ dps)(60\ dpm/dps)}{50.0559\ g} = \left(\frac{22,390.967\ dpm}{g}\right)\left(\frac{0.9978\ g}{mL}\right)$$

50.0559
~~50.3054~~ g
CW 12/10/03

CW 12/10/03
22,341.707
= ~~22,730.898~~ dpm/mL

SD 12/10/03

CW 12/11/03

Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 12/28/05
Activity: 22341.71 dpm/mL
2s Uncertainty: 744.72 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01

RG 12/12/03

ANALYTICS
1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Sr-90
SRS 62751-307 Amount 0.505 µCi QA
Date 12/01/01 12:00 EST Exp. -----
PO.# 00/7/03, Item 1
50.3054 g 0.1M HCl solution

CAUTION RADIOACTIVE MATERIAL.

CW 12/1/03 RG 12/12/03

Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 11/29/05
Activity: 22341.71 dpm/mL
REQUIRES NOL FOR. ICPT W OR K.
2s Uncertainty: 744.72 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01

RG 12/12/03

Stnd ID: 600.2613.30
Description: Sr 90
Expiration: 12/2/04
Activity: 22341.71 dpm/mL
2s Uncertainty: 744.72 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CW
Matrix/Comp 0.1 M HCl
Half Life (y): 2.88E+01

SD 12/11/03

SD 12/11/03

Continued on Page

Read and Understood By

Signed: Chad Wangler Date: 12/11/03
Signed: [illegible] Date: 12/10/03

ANALYTICS

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

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

PAI 00600
rec'd 12-05-01

62751-307

Sr-90 50 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 25931.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

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

ISOTOPE:	Sr-90
ACTIVITY (dps):	1.868 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	December 1, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.0%

*99% Confidence Level

Impurities: γ-impurities <0.1%

50.3054 grams 0.1M HCl solution with 30 μg/g Sr carrier

P O NUMBER 001703, Item 1

SOURCE PREPARED BY: M Taskaeva
M Taskaeva, Radiochemist

Q A APPROVED: 12-4-01

PARAGON ANALYTICS
Radiochemistry Data Package

Section 8

CHAIN OF CUSTODY

8

Paragon Analytics

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0603120
Client Name: Allwest Remediation, Inc.
Client Project Name: Sterling
Client Project Number: 05-8513EI
Client PO Number:

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
F4-N	0603120-1		SOIL	17-Mar-06	
B5-S	0603120-2		SOIL	17-Mar-06	
C10-W	0603120-3		SOIL	17-Mar-06	
N8-W	0603120-4		SOIL	17-Mar-06	
M10-W	0603120-5		SOIL	17-Mar-06	

DATA CHEM LABORATORIES, INC.

DataChem Laboratories, Inc.
Field Chain-of-Custody Record

0603120

Page ____ of ____

Client Name & Address:
Allwest Remediation
1201 N Barsten Way
Anaheim CA 92806

Phone: 714.237.1201
FAX: 714.237 1202
e-mail: rscott@allwestrem.com

Project No.: 05 - ~~8580~~ 8513EI
Project Name: Sterling
Sampler: (Signature)

Field Sample Number	Site ID	Date	Time	Depth	DCL Sample Number	Preservation Code	Sample Matrix Code	Sample Type/Matrix QC	Analyses Requested: 5.00	Analyses Requested: TV 235.2 240							No. of Containers	Remarks
FL-N		3/17/06			1				X	X								
B5-S		↓			2				X	X								
C10-W					3				X	X								
N8-W					4				X	X								
M10-W					5				X	X								

Matrix Codes: W Water, SL Sludge, L Liquid, SD Solid, S Soil, O Other, SE Sediment, M Media, A Air, F Filter, I Ice, T Tissue

Preservation Codes: 1 None, 2 HCl, 3 HNO3, 4 H2SO4, 5 NaOH, 6 ZnAc/NaOH, 7 4°C, 8 Freeze, 9 Other

Possible Hazard Identification
☐ Non-Hazard ☐ Skin Irritant ☐ Rad
☐ Flammable ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Archive for ____ Months
☐ Disposal by Lab
(a fee may be assessed if samples are retained longer than 3 months)

Requested Turn Around Time
☐ 48 Hours (Rush) ☐ 7 Days ☐ 21 Days
☐ 72 Hours (Rush) ☒ 14 Days ☐ Other
(Rush is email or fax data unless previously approved)

Carrier/Airbill #:

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
		3.20.06	0255
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

Shipped to:
DataChem Laboratories, Inc.
960 West LeVoy Drive
Salt Lake City, UT 84123
Phone: (800) 356-9135
Phone: (801) 266-7700
FAX: (801) 268-9992
www.datachem.com

CoC.xls

7/30/2004 Revision

000040

CONDITION OF SAMPLE UPON RECEIPT FORM

Paragon Analytics

Client: Allwest

Workorder No: 0603120

Project Manager: LS

Initials: JLR Date: 3/20/06

1	Does this project require any special handling in addition to standard Paragon procedures?		YES	NO
2	Are custody seals on shipping containers intact?	NONE	YES	NO
3	Are Custody seals on sample containers intact?	NONE	YES	NO
4	Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5	Are the COC and bottle labels complete and legible?		YES	NO
6	Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no of containers, matrix, requested analyses, etc.)		YES	NO
7	Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8	Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10	Is there sufficient sample for the requested analyses?		YES	NO
11	Were all samples placed in the proper containers for the requested analyses?		YES	NO
12	Are all samples within holding times for the requested analyses?		YES	NO
13	Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14	Are all samples requiring no headspace (VOC, GRO, Rx CN/S, radon), headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15	Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	N/A	YES	NO
16	Were the samples shipped on ice?		YES	NO
17	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #: 1

Temperature (°C): AMB

No. of custody seals on cooler: 0

DOT Survey/ Acceptance Information

External µR/hr reading: 13

Background µR/hr reading: 12

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 3/20/06

*IR Gun #2: Oakton SN 29922500201-0066 *IR Gun #4: Oakton SN 2372220101-0002

Form 201r19 xls (1/13/06)

FedEx Express US Airbill 8482 4418 0825

Recipient's Copy

1 From This portion can be removed for Recipient's records. 8482441808 25

Date 3/17/06 FedEx Tracking Number

Sender's Name Richard Scott Phone 714 237-1201

Company ALLWEST REMEDIATION INC

Address 1201 N BARSTEN WAY Dept./Floor/Suite/Room

City ANAHEIM State CA ZIP 92806-1522

2 Your Internal Billing Reference 05-2513 CI

3 To Recipient's Name Project Manager Phone 800 443-1511

Company Paragon Analytics

Recipient's Address

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address 225 Commerce Dr.

To request a package be held at a specific FedEx location, print FedEx address here.

City Fort Collins State CO ZIP 80524

8482 4418 0825

4a Express Package Service — Packages up to 150 lbs.

- [x] FedEx Priority Overnight
- [ ] FedEx Standard Overnight
- [ ] FedEx First Overnight
- [ ] FedEx 2Day
- [ ] FedEx Express Saver

13

4b Express Freight Service — Packages over 150 lbs.

- [ ] FedEx 1Day Freight
- [ ] FedEx 2Day Freight

2

5 Packaging

- [ ] FedEx Envelope
- [ ] FedEx Pak
- [x] FedEx Tube
- [ ] Other

6 Special Handling

- [x] SATURDAY Delivery
- [ ] HOLD at FedEx Location

AMB

Does this shipment contain dangerous goods?

- [x] No
- [ ] Yes Shipper's declaration
- [ ] Yes Shipper's Declaration not required
- [ ] Dry Ice
- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.

- [ ] Sender
- [x] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Obtain Recip. Acct. No.

Total Packages 1 Total Weight 5 Total Charges

Your liability is limited to $100 unless you declare a higher value. See the FedEx Service Guide for details.

8 Sign to Authorize Delivery Without a Signature

466

RECIPIENT: PEEL HERE

0250933512

000042

PARAGON ANALYTICS
Radiochemistry Data Package

Section 9

ADDITIONAL SUPPORTING DOCUMENTATION

9

Gas Proportional Counter

Instrument Calibration

Background Calibration

LB4100-A Weekly Instrument Calibration and Check
Background Determinations

Detector ID	Alpha CPM	Alpha LCL	Alpha UCL	Alpha Flag	Beta CPM	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.091	0.0010	0.190	PASS	2.047	0.942	2.826	PASS	A1 (01)
A2 (02)	0.098	0.0008	0.154	PASS	2.008	0.881	2.642	PASS	A2 (02)
A3 (03)	0.104	0.0010	0.196	PASS	2.169	0.984	2.951	PASS	A3 (03)
A4 (04)	0.082	0.0006	0.124	PASS	2.056	0.940	2.820	PASS	A4 (04)
B1 (05)	0.111	0.0010	0.204	PASS	2.129	0.920	2.759	PASS	B1 (05)
B2 (06)	0.088	0.0007	0.136	PASS	1.755	0.823	2.468	PASS	B2 (06)
B3 (07)	0.080	0.0006	0.122	PASS	1.891	0.943	2.828	PASS	B3 (07)
B4 (08)	0.111	0.0008	0.158	PASS	1.879	0.874	2.622	PASS	B4 (08)
C1 (09)	0.051	0.0005	0.102	PASS	1.677	0.878	2.634	PASS	C1 (09)
C2 (10)	0.083	0.0008	0.160	PASS	1.879	0.927	2.781	PASS	C2 (10)
C3 (11)	0.076	0.0007	0.148	PASS	1.787	0.842	2.526	PASS	C3 (11)
C4 (12)	0.083	0.0007	0.144	PASS	1.978	0.941	2.823	PASS	C4 (12)
D1 (13)	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	#REF!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

Reviewed by: CJM Date: 3/25/06

Interim Control Limits set 2/13/06 by CJM.

BKA0324W.XLD

Printed 3/25/06 8:43 AM

000045

Gas Proportional Counter

Quality Control Data

Daily Background Checks

Paragon Analytics

QUALITY ASSURANCE SUMMARY SHEET

PAI W O # / BATCH Gas Flow Proportional Counter
TEST GFPC / All
METHOD GFPC
278402 SOP/REV (PREP) —
SOP/REV (ANAL) 224 R8

Briefly document any QA or other problems or deviations associated with the analysis of samples Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics

KF 1.31.05

- for Daily BKG on 3/25/06 cf 3/28/06

XF 1 31 05

'Daily Background Checks' are not necessary, and therefore not performed, the day following 'Weekly Background Calibration'. The result of the 'Weekly Background Calibration' will be used as that day's 'Daily Background Check' If the 'Weekly Background Calibration' is outside control limits for a detector, the 'Weekly Background Calibration' will be performed a second time and will be considered the second 'Daily Background Check' for that day

XF 1 31 05

XF 1.31.05

TECHNICIAN/ANALYST [signature] DATE 1.31.05

DEPARTMENT MANAGER [signature] DATE 1/31/05

FORM 302r6 doc (4/22/04)

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector ID	Alpha CPM	Alpha LCL	Alpha UCL	Alpha Flag	Beta CPM	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.083	-0.026	0.208	PASS	1.867	1.493	2.601	PASS	A1 (01)
A2 (02)	0.033	-0.023	0.219	PASS	2.050	1.459	2.557	PASS	A2 (02)
A3 (03)	0.117	-0.021	0.229	PASS	2.267	1.599	2.739	PASS	A3 (03)
A4 (04)	0.133	-0.029	0.193	PASS	1.917	1.501	2.611	PASS	A4 (04)
B1 (05)	0.083	-0.018	0.240	PASS	2.150	1.564	2.694	PASS	B1 (05)
B2 (06)	0.100	-0.027	0.203	PASS	1.867	1.242	2.268	PASS	B2 (06)
B3 (07)	0.100	-0.030	0.190	PASS	1.950	1.358	2.424	PASS	B3 (07)
B4 (08)	0.200	-0.018	0.240	PASS	1.800	1.348	2.410	PASS	B4 (08)
C1 (09)	0.017	-0.036	0.138	PASS	2.083	1.175	2.179	PASS	C1 (09)
C2 (10)	0.033	-0.029	0.195	PASS	1.917	1.348	2.410	PASS	C2 (10)
C3 (11)	0.100	-0.031	0.183	PASS	1.750	1.269	2.305	PASS	C3 (11)
C4 (12)	0.033	-0.029	0.195	PASS	1.850	1.433	2.523	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D4 (16)

Reviewed by: CF Date: 3/26/06

Control limits established from previous weekly background determinations.
Weekly Background File: BKA0324W Date: 3/24/06 Analyst: CJM

BKA0326.XLD

Printed 3/26/06 4:17 PM

000048

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector ID	Alpha CPM	Alpha LCL	Alpha UCL	Alpha Flag	Beta CPM	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.050	-0.026	0.208	PASS	2.167	1.493	2.601	PASS	A1 (01)
A2 (02)	0.050	-0.023	0.219	PASS	2.300	1.459	2.557	PASS	A2 (02)
A3 (03)	0.017	-0.021	0.229	PASS	1.967	1.599	2.739	PASS	A3 (03)
A4 (04)	0.100	-0.029	0.193	PASS	2.017	1.501	2.611	PASS	A4 (04)
B1 (05)	0.067	-0.018	0.240	PASS	2.100	1.564	2.694	PASS	B1 (05)
B2 (06)	0.067	-0.027	0.203	PASS	1.733	1.242	2.268	PASS	B2 (06)
B3 (07)	0.117	-0.030	0.190	PASS	1.867	1.358	2.424	PASS	B3 (07)
B4 (08)	0.133	-0.018	0.240	PASS	1.783	1.348	2.410	PASS	B4 (08)
* C1 (09)	0.017	-0.036	0.138	PASS	2.217	1.175	2.179	FLAG-HIGH	C1 (09)
C2 (10)	0.033	-0.029	0.195	PASS	1.800	1.348	2.419	PASS	C2 (10)
C3 (11)	0.050	-0.031	0.183	PASS	1.933	1.269	2.305	PASS	C3 (11)
C4 (12)	0.033	-0.029	0.195	PASS	1.800	1.433	2.523	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D4 (16)

* Recount. See file BKA0327R. CJM 3/27/06

Reviewed by: CJM Date: 3/27/06

Control limits established from prevolus weekly background determinations.
Weekly Background File: BKA0324W Date: 3/24/06 Analyst: CJM

BKA0327.XLD

Printed 3/27/06 10:40 AM

000049

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector ID	Alpha CPM	Alpha LCL	Alpha UCL	Alpha Flag	Beta CPM	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	A1 (01)
A2 (02)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	A2 (02)
A3 (03)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	A3 (03)
A4 (04)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	A4 (04)
B1 (05)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	B1 (05)
B2 (06)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	B2 (06)
B3 (07)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	B3 (07)
B4 (08)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	B4 (08)
C1 (09)	0.067	-0.036	0.138	PASS	1.817	1.175	2.179	PASS	C1 (09)
C2 (10)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	C2 (10)
C3 (11)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	C3 (11)
C4 (12)	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFF-LINE	#REF!	#REF!	#REF!	OFF-LINE	D4 (16)

Reviewed by: CJM Date: 3/27/06

Control limits established from previous weekly background determinations.
Weekly Background File: BKA0324W Date: 3/24/06 Analyst: CJM

BKA0327R.XLD

Printed 3/27/06 12:13 PM

000030

Gas Proportional Counter

Quality Control Data

Daily Instrument Performance Checks

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.2490	0.2278	0.2659	PASS	0.4157	0.3855	0.4540	PASS	A1 (01)
A2 (02)	0.2527	0.2199	0.2740	PASS	0.4166	0.3676	0.4585	PASS	A2 (02)
A3 (03)	0.2664	0.2344	0.2851	PASS	0.4126	0.3578	0.4297	PASS	A3 (03)
A4 (04)	0.2532	0.2176	0.2658	PASS	0.3790	0.3419	0.3998	PASS	A4 (04)
B1 (05)	0.2531	0.2373	0.2573	PASS	0.3882	0.3668	0.4205	PASS	B1 (05)
B2 (06)	0.2482	0.2341	0.2575	PASS	0.4118	0.3918	0.4306	PASS	B2 (06)
B3 (07)	0.2422	0.2274	0.2487	PASS	0.4187	0.3917	0.4224	PASS	B3 (07)
B4 (08)	0.2516	0.2374	0.2604	PASS	0.4219	0.3981	0.4339	PASS	B4 (08)
C1 (09)	0.2492	0.2355	0.2550	PASS	0.4004	0.3804	0.4053	PASS	C1 (09)
C2 (10)	0.2489	0.2382	0.2565	PASS	0.4234	0.4095	0.4360	PASS	C2 (10)
* C3 (11)	0.2600	0.2454	0.2613	PASS	0.4373	0.4120	0.4333	FLAG-HIGH	C3 (11)
C4 (12)	0.2409	0.2325	0.2537	PASS	0.4198	0.4029	0.4304	PASS	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

* Recount. See file EFA0325R. CJM 3/25/06

Reviewed by: CJM Date: 3/25/06

Control Limits Established 2/24/06 by CJM

000052

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	#VALUE!	0.2278	0.2659	#VALUE!	#VALUE!	0.3855	0.4540	#VALUE!	A1 (01)
A2 (02)	#VALUE!	0.2199	0.2740	#VALUE!	#VALUE!	0.3676	0.4585	#VALUE!	A2 (02)
A3 (03)	#VALUE!	0.2344	0.2851	#VALUE!	#VALUE!	0.3578	0.4297	#VALUE!	A3 (03)
A4 (04)	#VALUE!	0.2176	0.2658	#VALUE!	#VALUE!	0.3419	0.3998	#VALUE!	A4 (04)
B1 (05)	#VALUE!	0.2373	0.2573	#VALUE!	#VALUE!	0.3668	0.4205	#VALUE!	B1 (05)
B2 (06)	#VALUE!	0.2341	0.2575	#VALUE!	#VALUE!	0.3918	0.4306	#VALUE!	B2 (06)
B3 (07)	#VALUE!	0.2274	0.2487	#VALUE!	#VALUE!	0.3917	0.4224	#VALUE!	B3 (07)
B4 (08)	#VALUE!	0.2374	0.2604	#VALUE!	#VALUE!	0.3981	0.4339	#VALUE!	B4 (08)
C1 (09)	#VALUE!	0.2355	0.2550	#VALUE!	#VALUE!	0.3804	0.4053	#VALUE!	C1 (09)
C2 (10)	#VALUE!	0.2382	0.2565	#VALUE!	#VALUE!	0.4096	0.4360	#VALUE!	C2 (10)
C3 (11)	0.2542	0.2454	0.2613	PASS	0.4330	0.4120	0.4333	PASS	C3 (11)
C4 (12)	#VALUE!	0.2325	0.2537	#VALUE!	#VALUE!	0.4029	0.4304	#VALUE!	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

Reviewed by: Cjm Date: 3/25/06

Control Limits Established 2/24/06 by CJM

000053

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.2246	0.2278	0.2659	FLAG-LOW	0.3777	0.3855	0.4540	FLAG-LOW	A1 (01)
A2 (02)	0.2369	0.2199	0.2740	PASS	0.3832	0.3676	0.4585	PASS	A2 (02)
A3 (03)	0.2460	0.2344	0.2851	PASS	0.3698	0.3578	0.4297	PASS	A3 (03)
A4 (04)	0.2292	0.2176	0.2658	PASS	0.3467	0.3419	0.3998	PASS	A4 (04)
B1 (05)	0.2476	0.2373	0.2573	PASS	0.4014	0.3668	0.4205	PASS	B1 (05)
B2 (06)	0.2512	0.2341	0.2575	PASS	0.4025	0.3918	0.4306	PASS	B2 (06)
B3 (07)	0.2356	0.2274	0.2487	PASS	0.4012	0.3917	0.4224	PASS	B3 (07)
B4 (08)	0.2502	0.2374	0.2604	PASS	0.4105	0.3981	0.4339	PASS	B4 (08)
C1 (09)	0.2489	0.2355	0.2550	PASS	0.3923	0.3804	0.4053	PASS	C1 (09)
C2 (10)	0.2437	0.2382	0.2565	PASS	0.4224	0.4095	0.4360	PASS	C2 (10)
C3 (11)	0.2588	0.2454	0.2613	PASS	0.4311	0.4120	0.4333	PASS	C3 (11)
C4 (12)	0.2419	0.2325	0.2537	PASS	0.4167	0.4029	0.4304	PASS	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

- Recount See file EFA0326R. CF 7/26/06

Reviewed by: CF Date: 3/26/06

Control Limits Established 2/24/06 by CJM

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.2317	0.2278	0.2659	PASS	0.3752	0.3855	0.4540	FLAG-LOW	A1 (01)
A2 (02)	#VALUE!	0.2199	0.2740	#VALUE!	#VALUE!	0.3676	0.4585	#VALUE!	A2 (02)
A3 (03)	#VALUE!	0.2344	0.2851	#VALUE!	#VALUE!	0.3578	0.4297	#VALUE!	A3 (03)
A4 (04)	#VALUE!	0.2176	0.2658	#VALUE!	#VALUE!	0.3419	0.3998	#VALUE!	A4 (04)
B1 (05)	#VALUE!	0.2373	0.2573	#VALUE!	#VALUE!	0.3668	0.4205	#VALUE!	B1 (05)
B2 (06)	#VALUE!	0.2341	0.2575	#VALUE!	#VALUE!	0.3918	0.4306	#VALUE!	B2 (06)
B3 (07)	#VALUE!	0.2274	0.2487	#VALUE!	#VALUE!	0.3917	0.4224	#VALUE!	B3 (07)
B4 (08)	#VALUE!	0.2374	0.2604	#VALUE!	#VALUE!	0.3981	0.4339	#VALUE!	B4 (08)
C1 (09)	#VALUE!	0.2355	0.2550	#VALUE!	#VALUE!	0.3804	0.4053	#VALUE!	C1 (09)
C2 (10)	#VALUE!	0.2382	0.2565	#VALUE!	#VALUE!	0.4095	0.4360	#VALUE!	C2 (10)
C3 (11)	#VALUE!	0.2454	0.2613	#VALUE!	#VALUE!	0.4120	0.4333	#VALUE!	C3 (11)
C4 (12)	#VALUE!	0.2325	0.2537	#VALUE!	#VALUE!	0.4029	0.4304	#VALUE!	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

- Det 1 OLD. CK 3/26/06

Reviewed by: CK Date: 3/26/06

Control Limits Established 2/24/06 by CJM

000055

EFA0326R.XLD Printed 3/26/06 3:12 PM Printed 3/26/063:12 PM

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	0.2434	0.2278	0.2659	PASS	0.4177	0.3855	0.4540	PASS	A1 (01)
A2 (02)	0.2541	0.2199	0.2740	PASS	0.4211	0.3676	0.4585	PASS	A2 (02)
A3 (03)	0.2556	0.2344	0.2851	PASS	0.4018	0.3578	0.4297	PASS	A3 (03)
A4 (04)	0.2420	0.2176	0.2658	PASS	0.3737	0.3419	0.3998	PASS	A4 (04)
B1 (05)	0.2420	0.2373	0.2573	PASS	0.3828	0.3668	0.4205	PASS	B1 (05)
B2 (06)	0.2431	0.2341	0.2575	PASS	0.4080	0.3918	0.4306	PASS	B2 (06)
B3 (07)	0.2425	0.2274	0.2487	PASS	0.4062	0.3917	0.4224	PASS	B3 (07)
B4 (08)	0.2413	0.2374	0.2604	PASS	0.4013	0.3981	0.4339	PASS	B4 (08)
C1 (09)	0.2510	0.2355	0.2550	PASS	0.3925	0.3804	0.4053	PASS	C1 (09)
C2 (10)	0.2489	0.2382	0.2565	PASS	0.4202	0.4095	0.4360	PASS	C2 (10)
* C3 (11)	0.2624	0.2454	0.2613	FLAG-HIGH	0.4285	0.4120	0.4333	PASS	C3 (11)
C4 (12)	0.2424	0.2325	0.2537	PASS	0.4145	0.4029	0.4304	PASS	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

*Recount. See file EFA0327R. CJM 3/27/06

Reviewed by: CJM Date: 3/27/06

Control Limits Established 2/24/06 by CJM

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector ID	Alpha Eff.	Alpha LCL	Alpha UCL	Alpha Flag	Beta Eff.	Beta LCL	Beta UCL	Beta Flag	Detector ID
A1 (01)	#VALUE!	0.2278	0.2659	#VALUE!	#VALUE!	0.3855	0.4540	#VALUE!	A1 (01)
A2 (02)	#VALUE!	0.2199	0.2740	#VALUE!	#VALUE!	0.3676	0.4585	#VALUE!	A2 (02)
A3 (03)	#VALUE!	0.2344	0.2851	#VALUE!	#VALUE!	0.3578	0.4297	#VALUE!	A3 (03)
A4 (04)	#VALUE!	0.2176	0.2658	#VALUE!	#VALUE!	0.3419	0.3998	#VALUE!	A4 (04)
B1 (05)	#VALUE!	0.2373	0.2573	#VALUE!	#VALUE!	0.3668	0.4205	#VALUE!	B1 (05)
B2 (06)	#VALUE!	0.2341	0.2575	#VALUE!	#VALUE!	0.3918	0.4306	#VALUE!	B2 (06)
B3 (07)	#VALUE!	0.2274	0.2487	#VALUE!	#VALUE!	0.3917	0.4224	#VALUE!	B3 (07)
B4 (08)	#VALUE!	0.2374	0.2604	#VALUE!	#VALUE!	0.3981	0.4339	#VALUE!	B4 (08)
C1 (09)	#VALUE!	0.2355	0.2550	#VALUE!	#VALUE!	0.3804	0.4053	#VALUE!	C1 (09)
C2 (10)	#VALUE!	0.2382	0.2565	#VALUE!	#VALUE!	0.4095	0.4360	#VALUE!	C2 (10)
C3 (11)	0.2591	0.2454	0.2613	PASS	0.4285	0.4120	0.4333	PASS	C3 (11)
C4 (12)	#VALUE!	0.2325	0.2537	#VALUE!	#VALUE!	0.4029	0.4304	#VALUE!	C4 (12)
D1 (13)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D1 (13)
D2 (14)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D2 (14)
D3 (15)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D3 (15)
D4 (16)	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	#VALUE!	#DIV/0!	#DIV/0!	OFF-LINE	D4 (16)

Reviewed by: CJM Date: 3/27/06

Control Limits Established 2/24/06 by CJM

EFA0327R.XLD Printed 3/27/06 9:36 AM Printed 3/27/069:36 AM

000057

Gas Proportional Counter

Instrument Calibration

Initial Efficiency Calibration Standards Traceability

Instrument: LB4100-A

Calibration: Sr-90 FLAT PLANCHET

Date of Calibration: 2/18/2006

Efficiency Data File(s): ESF0218A
ESF0218B
ESF0218C

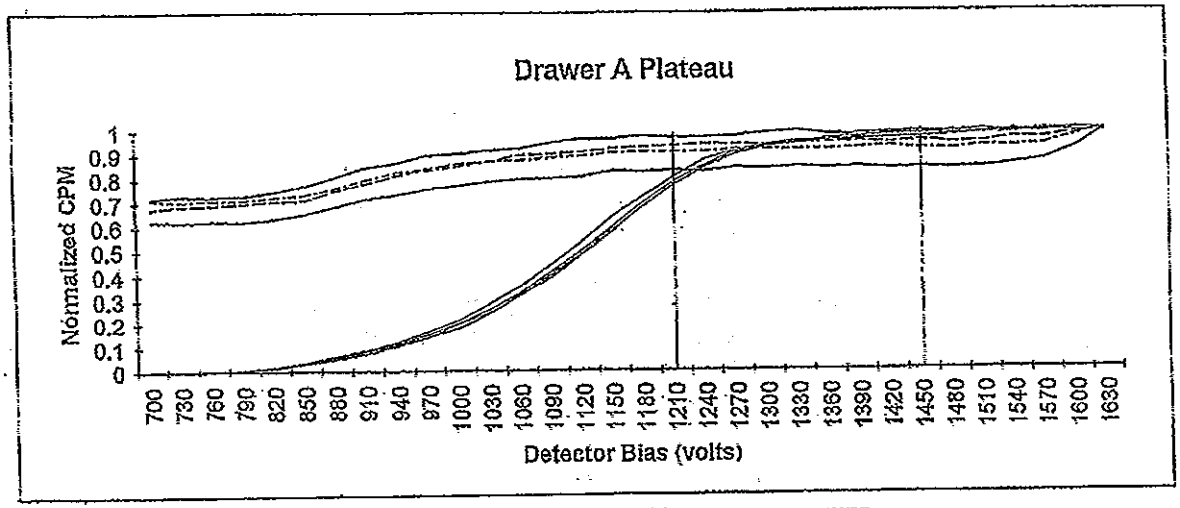
Efficiency Log File: Sr-90F-02/06

Source ID: Sr-90 -- 514.1572.73

OKB
2/22/06

Unit Type: LB4100/W-A
Date Performed: 1/23/06 13:31
FileName: PTA0123A
Batch ID: PLATEAU CHECK

Unit Id: Orange
Application Revision: B
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1450

Optimum alpha only operating voltage: 1210

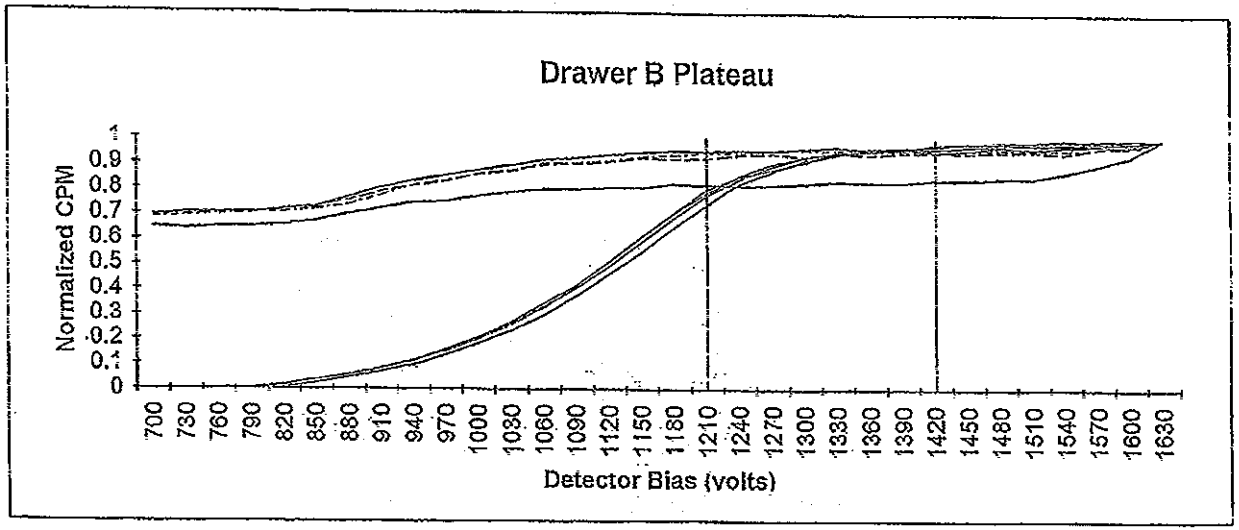
	A1	A2	A3	A4
Beta slope at beta voltage	0.37%	1.21%	1.92%	0.88%
Alpha slope at beta voltage	1.12%	-0.35%	-0.30%	0.05%
Alpha slope at alpha voltage	0.65%	1.54%	1.02%	0.84%

Printed 1/24/06 12:14 PM

000060

Unit Type: LB4100/W-A
Date Performed: 1/23/06 13:47
FileName: PTA0123B.
Batch ID: PLATEAU CHECKS

Unit Id: Orange
Application Revision: B
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1417.5

Optimum alpha only operating voltage: 1210

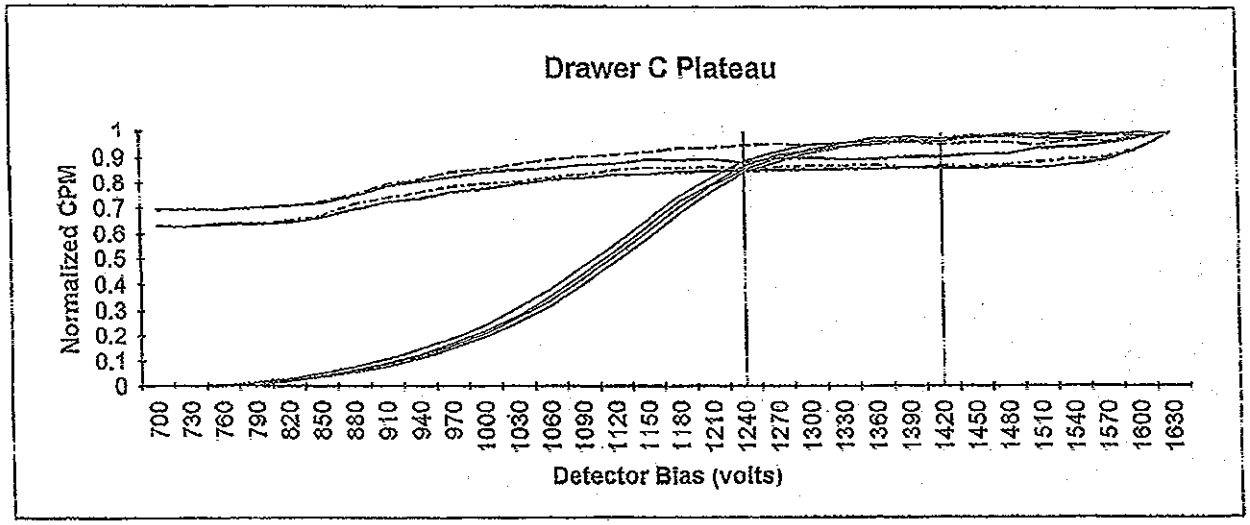
	B1	B2	B3	B4
Beta slope at beta voltage	2.64%	1.88%	2.06%	3.08%
Alpha slope at beta voltage	1.65%	0.95%	0.71%	0.63%
Alpha slope at alpha voltage	0.63%	2.06%	0.79%	2.43%

Printed 2/1/06 4:44 PM

190000

Unit Type: LB4100/W-A
Date Performed: 1/24/06 10:20
FileName: PTA0124C
Batch ID: PLATEAU CHECK

Unit Id: Orange
Application Revision: B
Application Version: Standard.



Optimum alpha beta simultaneous operating voltage: 1417.5

Optimum alpha only operating voltage: 1240

	C1	C2	C3	C4
Beta slope at beta voltage	2.26%	2.46%	2.76%	0.75%
Alpha slope at beta voltage	1.85%	-0.19%	0.58%	0.32%
Alpha slope at alpha voltage	0.79%	1.24%	1.00%	0.55%

Printed 2/1/06 4:45 PM

290000

Date 1/23/06

SOP 724r 8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
1-12	DAILY EFF	–	–	30	0910	C/M	EFA0123	C/M
1,3	DAILY EFF	–	–	30	0926	C/M	EFA0123R	C/M
1-12	DAILY BKG	–	–	60	0936	C/M	BKA0123	C/M
2	AB060119-1LCS	AB060119-1	GAB	30	1055	C/M	ABA0123	C/M
5	TR060103-1MB	TR060103-1	Ra-226	30	1058	C/M	RDA0123	C/M
7	↓ LCS	↓	↓	↓	↓	↓	↓	↓
1-4	Plateau Check	–	–	5 min step	1326	C/M	PTA0123A	C/M
5-8	Plateau Check	–	–	↓	1347	C/M	PTA0123B	C/M

C/M 1/24/06

Comments:

Page No.: 309910 B

(cont from page NA B)

Form 780r7.doc (6/19/04)

Reviewed By / Date: C/M 1/24/06

SOP 724r 8

Date 1/24/06

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
1-12	DAILY EFF	–	–	30	0849	CM	EFA0124	CM
1,6	DAILY EFF	–	–	30	0857	CM	EFA0124R	CM
1-12	DAILY BKG	–	–	60	0909	CM	BKA0124	CM
4	DAILY BKG	–	–	60	1011	CM	BKA0124R	CM
9-12	Plateau Check	–	–	5min-Step	1015	CM	PTA0124C	CM
9	0514007-9	Activity check	GAB	5	1644	CM	ABA0124	CM

CM 1/26/06

Comments:

Page No: 309911 B
(cont. from page MA B)

Form 780r7 doc (6/19/04)

Reviewed By / Date: CF 1/26/06

Sr-90 FLAT Planchet Efficiency Calibration
LB4100-A
Date: 2/18/06
Source ID: 1141

Det ID	A1	A2	A3	A4	B1	B2	B3	B4
File Name	ESF0218A	ESF0218A	ESF0218A	ESF0218A	EDF0218B	EDF0218B	EDF0218B	EDF0218B
Cnt Time	24.58	24.68	24.84	26.04	25.41	25.30	24.33	25.65
Tot Cnts	10004	10004	10004	10006	10001	10003	10007	10002
Bkg CPM	1.791	1.725	1.991	1.826	1.763	1.643	1.743	1.660
CPM	405.206559	403.62346	400.7465201	382.4289923	391.822	393.732	409.560	388.282
Efficiency	0.4313	0.4296	0.4265	0.4070	0.4170	0.4191	0.4359	0.4132

Det ID	C1	C2	C3	C4	D1	D2	D3	D4
File Name	ESF0218C	ESF0218C	ESF0218C	ESF0218C	OFF-LINE	OFF-LINE	OFF-LINE	OFF-LINE
Cnt Time	25.06	24.90	24.47	25.57	NA	NA	NA	NA
Tot Cnts	10001	10002	10007	10001	NA	NA	NA	NA
Bkg CPM	1.675	1.778	1.637	1.808	NA	NA	NA	NA
CPM	397.407	399.909	407.313	389.314	NA	NA	NA	NA
Efficiency	0.4230	0.4256	0.4335	0.4143	NA	NA	NA	NA

000065

Source Database for OSUM for LB4100-A
Number of sources in table: 119

Application Revision: A

Control ID	Isotope	Type	Half-Life (Days)	DPM	Std dev	Date	Status	Alpha/Beta Archive File
1141	Sr-90/Y-90	Beta	10519.2	1110	55.50	18-Mar-99	PA	Sr90F-02/06

000066

Sr-90 Flat Calibration ICVs

Sample ID	Initial Aliquot	Final Sam. Size	Count Date	Count Dur.	Residual Mass (mg)	Gross CPM	Bkg CPM	α > β X-Talk	Net CPM	Atten.	Efficiency	Decay Corr	Act (pCi/	TPU (2 sig)	MDC	% Recov.	Beta CU (1 sig)	Beta TPU (1 sig)
0523004-S1	1.000	1.000	2/20/2006	30	0.0	46.267	1.791	na	44.476	na	0.4316	0.9034	51.38	8.6	1.28	100.1%	1.2969	4.2989
0523004-S2	1.000	1.000	2/20/2006	30	0.0	46.333	1.725	na	44.608	na	0.4296	0.9034	51.78	8.7	1.26	100.8%	1.3038	4.3308
0523004-S3	1.000	1.000	2/20/2006	30	0.0	45.567	1.991	na	43.576	na	0.4265	0.9034	50.95	8.5	1.36	99.2%	1.3025	4.2673
0523004-S4	1.000	1.000	2/20/2006	30	0.0	44.133	1.854	na	42.279	na	0.4070	0.9034	51.80	8.7	1.38	100.9%	1.3432	4.3445

Ave Rec. = 100.2%

Spike Information

Sample ID	Beta Std ID	Ref. Date	Act (pCi/ml)	Spike Vol (mL)	Spike Act. Added
0523004-S1	600.2613.82	12/1/2001	25.68	1.0	51.4
0523004-S2				1.0	51.4
0523004-S3				1.0	51.4
0523004-S4				1.0	51.4

CJM 2/20/06

R:\INST\GFPW\ISC\0523004 Sr ICV

000067

PAI - Gas Flow Proportional Sample Analysis LB4100-A

Unit Type: LB4100-A/W
Counting Unit ID: Orange
High Voltage Mode: Simultaneous
Application Revision: C
Application Version: PAI
Rev.12/25/03 JE

Data file name: SRA0220B
Batch ID: 290440A
Count Preset (m): 30
Batch Ended: 2/20/06 12:21

Background logfile: BKGAB
Date of Bkg. Cal: 2/11/06
Alpha efficiency logfile: Am241R-02/05
Alpha attenuation calibration: Am0205
Beta efficiency logfile: Sr90F-02/06
Beta attenuation calibration: Sr0205

Alpha prog. logfile: n/a
Alpha prog. attenuation: n/a
Beta prog. logfile: n/a
Beta prog. attenuation: n/a

Alpha Attenuation Calibration y = b*m*(x*(mass-x0))		Beta Attenuation Calibration y = b*m*(x*(mass-x0))	
Alpha b=	1.21614	Beta b=	1.0406
m=	0.01129	m=	0.0016
x=	0.5718	x=	-1.3051
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk y = b*m*mass		Beta to Alpha X-talk y = b*mass + m	
a->b xtalk b=	0.32378	b->a xtalk b=	-7.65E-03
a->b xtalk m=	0.0000	b->a xtalk m=	0.0017

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
A1	0523004-S1	2/20/06 12:21	30.00	0.0	0.133	0.069	0.079	0.2136	1.261	n/a	n/a	46.267	1.791	0.0306	0.4313	1.049	n/a	n/a
A2	0523004-S2	2/20/06 12:21	30.00	0.0	0.133	0.063	0.079	0.2238	1.261	n/a	n/a	46.333	1.725	0.0306	0.4298	1.049	n/a	n/a
A3	0523004-S3	2/20/06 12:21	30.00	0.0	0.333	0.073	0.077	0.2145	1.261	n/a	n/a	45.567	1.991	0.0766	0.4265	1.049	n/a	n/a
A4	0523004-S4	2/20/06 12:21	30.00	0.0	0.333	0.206	0.075	0.2009	1.261	n/a	n/a	44.133	1.854	0.0766	0.4070	1.049	n/a	n/a

CJM 2/20/06

000068

Date 2/18/06

SOP 724r 8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Instrument Daily Response and Background Checks

Det.	Daily Response Check Start 1	Status	Start 2	Status	Background Check Start 1	Status	Start 2	Status	Det. Status
1	CM	P			*				P
2									
3									
4								OLα	Has Weekly
5									P
6									
7									
8									
9									
10									
11									
12									
13	OL				OL				OL
14									
15									
16									

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

Weekly Background Calibration

	Current Calib. File ID	Weekly Calib. Started	Status	File ID
Dr A	BKA0217W			
Dr B				
Dr C				
Dr D	OL			

Dr = Drawer

Gas Supply

P-10 Supply		P-10 Flow	
Tank 1	1100	Dr A	0.1
		Dr B	
Tank 2	2000	Dr C	
		Dr D	

Comments: * Daily BKG not performed day after Weekly BKG Calibration CM 2/18/06

Page No: 309937 A

Form 780r7.doc (6/19/04)

Reviewed By / Date CM 2/18/06

000069

Date 2/18/06

SOP 724r 8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
1-12	DAILY EFF	—	—	30 1108	~~1059~~	c/m	EFA0218	c/m
1-4	0424028-S1,S2,S4,S5	Sr-90 FLAT EFF	Sr-90	30	1203	c/m	ESF0218A	c/m
5-8	↓	↓	↓	↓	1232	c/m	ESF0218B	c/m
9-12					1305	c/m	ESF0218C	c/m

c/m 2/18/06

Comments:

Page No.: 309337 B

(cont. from page NA B)

Form 780r7 doc (6/19/04)

Reviewed By / Date c/m 2/18/06

Date 2/20/06

SOP 724r8

Paragon Analytics
Low Background Gas Flow Proportional Counter Log
Instrument: LB4100A

Instrument Daily Response and Background Checks

Det.	Daily Response Check Start 1	Status	Start 2	Status	Background Check Start 1	Status	Start 2	Status	Det Status
1	cpm	P			cpm	P			P
2									
3									αxWXLY
4									P
5						H α	cpm	P	
6						P			
7									
8									
9									
10									
11									
12									OL
13	OL				α				
14									
15									
16									

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

Weekly Background Calibration

	Current Calib. File ID	Weekly Calib. Started	Status	File ID
Dr A	BKA0217W, BKA0218W			
Dr B				
Dr C				
Dr D	OL			

Dr = Drawer

Gas Supply

P-10 Supply		P-10 Flow	
Tank 1	1100	Dr A	0.1
		Dr B	
Tank 2	1608	Dr C	
		Dr D	

Comments:

Page No.: 309939 A

Form 780r7 doc (6/19/04)

Reviewed By / Date [illegible] 2/20/06

000071

Date 2/20/06

SOP 724I 8

Paragon Analytics

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

Det.	Sample ID	Batch	Test	Count Dur (min)	Start Time	Analyst Initials	File ID	Output Initials
1-12	DAILY EF	—	—	30	0909	CM	EFA0220	CM
1-12	DAILY BKG	—	—	60	0918	CM	BKA0220	CM
6	DAILY BKG Retab/06	—	—	60	1038	CM	BKA0220R	CM
1	SR060214-LABQC	SR060214-1	Sr-90	30	1040	CM	SRA0220	CM
4	SR060215-LCS	SR060215-1	Sr-90	30	1042	CM	SRA0220A	CM
1	0523004-S1	290490A	Sr-90	30	1151	CM	SRA0220B	CM
2	53							
3	53							
4	54							

CM 2/20/06

Comments:

Page No.: 309939 B

(cont. from page N/ B)

Form 780r7.doc (6/19/04)

Reviewed By/ Date CM 2/20/06

279055A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

Matrix LIQUID Prep Analyst [illegible] Prep Date 12/15/04 Analyte 90Sr Analytical Batch LogFile: Sr-90F-02/06

Pretreatment? (Y / N) Batch NA Count Date / Time 2/18/2006 Superseded NA

Paragon WO No.	Sample Wt. (g/L)	Sample Aliq. (g/L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0424028-S1	NA	→	→	S1	INST (A) - 1141	A1→A4	ESF0218A	c/m
S2						B1→B4	ESF0218B	c/m
S3						C1→C4	ESF0218C	c/m
S4								
S5								

[illegible] 12/15/04

Balance No. NA Spiked By [illegible] Date 12/15/04 Spike Witness [illegible] Date 12/15/04 QASS? (Y / N) No. NA

	Isotope	No ~~Exp. 11/4/06~~ ~~Exp. 2/20/06~~	Act / mL	Vol	P	Total Act (dpm)	Decay Corrected	PIPET	Relinquished by / Date	Received by / Date
Spike 1	90Sr	514.1572.73	~55.5	10.0		~5500	RS-007	1	[illegible] 12/15/04	
Spike 2										
Spike 3						[illegible] 12/15/04		2		
Spike 4										

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date [illegible] 12/15/04

000073

279055 B

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

Paragon Analytics

Initials [illegible] Date 12/15/04 Method (SOP / Rev) 907R8 Matrix LIQUID

COMMENTS

^{90}Sr CALIBRATION

- ~2.5 ml 16N HNO_3 ADDED TO PLANCHETS
- SPIKE ADDED TO PLANCHETS
- DRIED ON HOTPLATE

[illegible] 12/15/04

Reviewed by / Date [illegible] 12/15/04

000074

290449 A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

Matrix NA Prep Analyst JKK Prep Date 11/7/05 Analyte ^{90}Sr Analytical Batch NA

Pretreatment? (Y / (N)) Batch ____ Count Date / Time 2/20/06 Superseded NA

Paragon WO No.	Sample Wt. (g/L)	Sample Aliq. (g/L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0523004-S1	NA	NA	As Rec'd	S1, S2	NA	A1	SRA0220B	C/M
-S2	↓	↓	↓	↓	↓	A2	↓	↓
-S3						A3		
-S4						A4		

JKK 11/7/05

Balance No. NA Spiked By JKK Date 11/7/05 Spike Witness NA Date 11/7/05 QASS? (Y / (N)) No. NA

	Isotope	No	Act / mL	Vol	P	Total Act (dpm)	Dilut ~~Decay~~ ~~Corrected~~		Relinquished by / Date	Received by / Date
Spike 1	^{90}Sr	600.263.82 exp. 4/5/06	57.00	1.0		57.00	RS-005	1		
Spike 2	Sr Carrier	247933 exp. 4/10/06	NA	1.0		NA	RS-005			
Spike 3								2		
Spike 4										

JKK 11/7/05

JKK 11/7/05

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date 11/7/05

000075

290449

B

Paragon Analytics

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

Initials PLC Date 11/7/15 Method (SOP / Rev): NA Matrix NA

COMMENTS

^{90}Sr ICV, Flat Blanket

- 1.0 mL Sr Carrier, 1.0 mL ^{90}Sr and 5 mL 16 N HNO_3 added to all samples.
- Dried on hot plate
- Submitted to instrument lab for analysis

Reviewed by / Date 11/7/15

000076

PROJECT 514.1572.73 Notebook No. _____ 73

Continued From Page _____

Sr 90 Working Standard

1.) Transfer a fraction of std 514.1572.72 to a 500 ml poly bottle + dilute w/ 0.1 M HCl to a final activity conc of approx 25 pCi/ml

a) 500 ml bottle empty 37.9693 g (Bal 12)
" + 1° std 40.5067
Net 1° std transferred 2.5374 g

b) 500 ml bottle empty 37.9693 g from above
bottle + std + 0.1 M HCl 542.5 g (Bal 20)
Total diluted mass ~~216.5 g~~ 504.5 g

2) Calculation

$$\frac{(4984.3\ pCi/g)(2.5374\ g)(.9971\ g/ml)}{504.5\ g\ \cancel{216.5\ g}} = \cancel{24.50\ pCi/ml}$$

$$= 25.00\ pCi/ml$$

Ref Date = 3/18/99
Calc Date = 3/23/99

Verified 3/25/99 DCB

Stnd ID: 514.1572.73 RG 12/13/04

Description: Sr-90
Expiration: 11/29/05
Activity: 55.50 dpm/mL
2s Uncertainty: 1.48 dpm/mL
Ref. Date: 3/18/99
Ref Time: N/A
Prep Date: 3/23/99 Prep by: DCB
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
NCR required for ICPT work

RG 12/13/04

RG 12/13/04

RG 12/13/04

RG 12/6/05 Standard reverified & new label added after E-out. RG 12/13/04

RG 12/6/05
Stnd ID: 514.1572.73

Description: Sr-90
Expiration: 11/4/06
Activity: 55.50 dpm/mL
2s Uncertainty: 1.48 dpm/mL
Ref. Date: 3/18/99
Ref Time: N/A
Prep Date: 3/23/99 Prep by: DCB
Matrix/Comp. 0.1M HCl
Half Life (y): 2.88E+01

RG 12/6/05

RG 12/6/05

RG 12/6/05

12/13/04

Continued on Page _____

Read and Understood By

Signed	Date	Signed	Date
[signature]	3/23/99	[signature]	3/24/99

72
PROJECT 514.1572.72

Notebook No. _____
Continued From Page _____

5-90 Primary Standard

1) Transfer RSO# 514 (Analytics 573:20-307) to a 250 ml poly bottle & dilute to final conc. of approx 500 pCi/ml w/ 0.1 M HCl.

a) Ampule, full w/ beaker 36.5791 g (Bal 12)
Ampule, empty w/ beaker 31.7310
Net std transferred 4.8601 g

b) 250 ml poly, empty 26.4146 g (Bal 12)
bottle w/ std & 0.1 M HCl 223.6 g (Bal 16)
Total diluted std mass 197.2 g

2) Density of 0.1 M HCl using 100 ml class A flask

99.7100 g / 100 ml = .9971 g/ml

3) Calculations

orig. std: $\left(\frac{5.757 \text{ EM dpm}}{5.02081 \text{ g}}\right)\left(\frac{60 \text{ dpm}}{2.22 \text{ pCi}}\right) = 202,389.4$ pCi/g

dil std by mass $\frac{(202,389.4 \text{ pCi/g})(4.8601 \text{ g})}{(197.2 \text{ g})} = 4984.3$ pCi/g

dil std by vol (4984.3 pCi/g)(.9971 g/ml) = 4969.8 pCi/ml

Ref Date = 3/18/99 Verified 3/23/99 DCS
Exp Date = 3/23/04

Continued on Page

Read and Understood By

Signed: [illegible] Date: 3/23/99 Signed: [illegible] Date: 3/24/99

000078

ANALYTICS

PAL 514
Rec'd 3-23-99

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.
Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

57370-307

Sr-90 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 by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.757 E+04
HALF-LIFE:	28.74 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

5.02081 grams of solution 30 ppm Sr carrier in 0.1M HCl

P O NUMBER 22170, Item 2

SOURCE PREPARED BY: _____ for
M. D. Currie, Radiochemist

Q A APPROVED: _____ 3-18-99

000079

82
PROJECT Sr-90 600.2613.82 Notebook No. 2613
Continued From Page

Prep: 3/24/05

Prepare a working level dilution of ^{90}Sr @ ~50 dpm/ml by diluting 600.2613.30 with 0.1 N HCl. (Lot #44328)

① Determine density of 0.1 N HCl

mass of 100 ml volumetric flask (class A)	67.7967 g	Bal 12
mass of 100 ml flask + 100 ml 0.1 N HCl	167.6017 g	↓
net mass of 0.1 N HCl	99.8050 g	

ρ = 0.99805 g/ml

② Transfer ^{90}Sr 600.2613.30 to a Nalgene bottle

mass of 1 L Nalgene bottle w/o lid	74.6088 g	Bal 12
mass of bottle + standard	77.2344 g	↓
net mass of standard transferred	2.5446 g	

③ Dilute to final volume w/ 0.1 N HCl

mass of bottle w/o lid (from above)	74.6088 g	
mass of bottle + standard + 0.1 N HCl	1073.0 g	Bal 26
net mass of diluted standard	998.3312 g	

④ Final activity calculation

Activity of 600.2613.30 = 22,390.967 dpm/g

$$\frac{(22390.967\ dpm/g)(2.5446\ g)(0.99805\ g/ml)}{998.3312\ g} = 56.570\ dpm/ml$$

gs 4/26/05

Stnd ID: 600.2613.82 RG 4/26/05

Description: Sr-90
Expiration: 4/5/06
Activity: 57.00 dpm/mL
2s Uncertainty: 1.90 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 3/24/05 Prep by: AF
Matrix/Comp: 0.1 N HCl
Half Life (y): 2.88E+01

4/26/05 RG 4/26/05 RG

REQUIRES NCR FOR ICPT WORK
RG 4/26/05

Continued on Page

Read and Understood By

Signed 3/24/05 Date — Signed 4/26/05 Date

000080

30
PROJECT 600.2613.30 Sr-90

Notebook No. 2613

Continued From Page

Transfer contents of ampoule 600 to a 125 ml glass bottle for a 1° solution.

1) Transfer ampoule 600 to a 125 ml bottle

mass of open ampoule + std.	139.6110 g	Bl #12
mass of empty ampoule	89.5551 g	L
Net mass of std.	50.0559 g	

SD 2/10/03 Density from following page D = 0.99789 g/mL

2) Final Activity Calculation

$(1.868 \times 10^4 \text{ dps})(60 \text{ dpm/dps})$ SD 12/10/03

50.0559
50.3054 g
CW 12/10/03

$\left(\frac{22,390.967}{\text{CW } 2/10/03}\right)\left(\frac{\text{dpm}}{\text{g}}\right)(0.99789 \text{ g/mL})$

CW 12/10/03
22,341.707
= 22,230.898 dpm/mL SD 12/10/03

SD 12/11/03

ANALYTICS
2190 Sandersville Road, Atlanta, GA 30318 USA
Sr-90
Sr-90 Activity 22341.707 dpm/g
Input: 12/01/03 12:00 EST Exp
H2O: 0.001706 Theoretical
50.0559g 0.1 M HCl solution
CAUTION: RADIOACTIVE MATERIAL
CW 12/10/03

Std ID: 600.2613.30
Description: Sr 90
Expiration: 12/2/04
Activity: 22341.71 dpm/mL
2s Uncertainty: 744.72 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
SD 12/11/03

Std ID: 600.2613.30
Description: Sr-90
Expiration: 11/29/06
Activity: 22341.71 dpm/mL
2s Uncertainty: 744.72 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
REQUIRES NCR FOR ICP TRACE
12/12/03

Continued on Page

Read and Understood By

Chris Waugh
Signed

12/12/03
Date

Signed

12/10/03
Date

000081

ANALYTICS

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

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

PAI 00600
rec'd 12-05-01

62751-307

Sr-90 50 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 25931.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

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

ISOTOPE:	Sr-90
ACTIVITY (dps):	1.868 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	December 1, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.0%

*99% Confidence Level

Impurities: γ-impurities <0.1%

50.3054 grams 0.1M HCl solution with 30 μg/g Sr carrier.

P O NUMBER 001703, Item 1

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: DM Rity 12-4-01

Paragon Analytics

Radiochemistry Case Narrative
Isotopic Plutonium

Allwest Remediation, Inc.

Sterling / 05-8513EI

PA WO 0603120

1. This report consists of the analytical results and supporting documentation for five soil samples received by Paragon on 3/20/06.

2. These samples were prepared according to Paragon Analytics procedures PA SOP721R12, PA SOP773R9, and PA SOP778R10. The samples were muffled for four hours at 600°C

3. The samples were analyzed for the presence of isotopic plutonium according to Paragon Analytics procedure PA SOP714R9. The analyses were completed on 3/27/06.

4. The isotopic analysis results for these samples are reported on a dry weight basis in units of pCi/gram.

5. Pu-240 is indistinguishable from Pu-239. In this report, any plutonium in this region of interest will be reported as Pu-239/240.

6. Paragon Analytics follows the convention outlined in ANSI N42.23 for reporting significant digits in the TPU and MDC results. ANSI N42.23 states that the TPU result should be rounded to two significant digits and that the MDC result should be rounded to the same decimal place as the TPU result. In practice, this could result in an MDC result with a reported value of 0 for samples with significant activity, including the batch laboratory control sample.

7. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Emily Walter
Radiochemistry Instrumentation

3/30/06
Date

Sharon Muller
Radiochemistry Final Data Review

3/30/06
Date

1

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 1

SAMPLE RESULTS SUMMARY

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: Allwest Remediation, Inc.
Client Project Name: Sterling
Client Project Number: 05-8513EI

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Reported on: Thursday, March 30, 2006
3:08:00 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0603120-1	F4-N	Sample	Pu-238	0.005 +/- 0.011	0.016	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-1	F4-N	Sample	Pu-239/240	0.006 +/- 0.011	0.008	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-2	B5-S	Sample	Pu-238	0.002 +/- 0.011	0.016	pCi/g	SOIL	AS060322-1	3/27/2006	U
0603120-2	B5-S	Sample	Pu-239/240	0.019 +/- 0.016	0.009	pCi/g	SOIL	AS060322-1	3/27/2006	LT
0603120-3	C10-W	Sample	Pu-238	0.003 +/- 0.012	0.009	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-3	C10-W	Sample	Pu-239/240	-0.001 +/- 0.012	0.017	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-4	N8-W	Sample	Pu-238	0.003 +/- 0.013	0.019	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-4	N8-W	Sample	Pu-239/240	0.019 +/- 0.018	0.023	pCi/g	SOIL	AS060322-1	3/25/2006	U
0603120-5	M10-W	Sample	Pu-238	-0.002 +/- 0.012	0.020	pCi/g	SOIL	AS060322-1	3/25/2006	U

Comments:

Data Package ID: *PU0603120-1*

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

00004

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: Allwest Remediation, Inc.
Client Project Name: Sterling
Client Project Number: 05-8513EI

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Reported on: Thursday, March 30, 2006
3:08:00 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0603120-5	M10-W	Sample	Pu-239/240	0.016 +/- 0.016	0.023	pCi/g	SOIL	AS060322-1	3/25/2006	U

Comments:

Data Package ID: *PU0603120-1*

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
LY - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

000005

PARAGON ANALYTICS, INC.

Radiochemistry Data Package

Section 2

QC RESULTS SUMMARY

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Method Blank Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Lab ID: AS060322-1MB

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 22-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0 +/- 0.013	0.010	U
10-12-8	Pu-239/240	0 +/- 0.013	0.010	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.243	1.59	pCi/g	70.7	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed
Y2 - Chemical Yield outside default limits
LT - Result is less than Requested MDC, greater than sample specific MDC

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

M - Requested MDC not met
B - Analyte concentration greater than MDC
B3 - Analyte concentration greater than MDC but less than Requested MDC

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Laboratory Control Sample(s)

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc.
ClientProject ID: Sterling 05-8513EI

Lab ID: AS060322-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 22-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #2

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10-12-8	Pu-239/240	2.3 +/- 2.2	0	2.25	104	82 - 118	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.243	1.60	pCi/g	71.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC
LT - Result is less than Requested MDC, greater than sample specific MDC
Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed
Y2 - Chemical Yield outside default limits
L - LCS Recovery below lower control limit
H - LCS Recovery above upper control limit
P - LCS Recovery within control limits
M - The requested MDC was not met
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Duplicate Sample Results (DER)

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: B5-S
Lab ID: 0603120-2DUP

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2 00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	DER	Control Limit	Lab Qualifiers
13981-16-3	Pu-238	0.002 +/- 0.011	0.002 +/- 0.012	0.00	2.13	U
10-12-8	Pu-239/240	0.019 +/- 0.016	0.007 +/- 0.012	0.61	2.13	U

Comments:

uplicate Qualifiers/Flags:

: Result is less than the sample specific MDC
1 - Chemical Yield is in control at 100-110% Quantitative yield is assumed
: - Chemical Yield outside default limits
- DER is greater than Warning Limit of 1 42
) - DER is greater than Control Limit of 2 13
T - Result is less than Request MDC, greater than sample specific MDC
- Requested MDC not met
) - The requested MDC was not met, but the reported activity is greater than the reported MDC
- LCS Recovery below lower control limit
LCS Recovery above upper control limit
LCS, Matrix Spike Recovery within control limits
- Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
DER - Duplicate Error Ratio (see PAI SOP 715)
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *PU0603120-1*

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

3

Section 3

INDIVIDUAL SAMPLE RESULTS

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc.
ClientProject ID: Sterling 05-8513EI

Field ID: F4-N
Lab ID: 0603120-1

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0.005 +/- 0.011	0.016	U
10-12-8	Pu-239/240	0.006 +/- 0.011	0.008	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.238	1.77	pCi/g	79.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC, greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc.
ClientProject ID: Sterling 05-8513EI

Field ID: B5-S	**Sample Matrix:** SOIL	**Prep Batch:** AS060322-1	**Final Aliquot:** 2.00 g
Lab ID: 0603120-2	**Prep SOP:** PAI 777 Rev 8	**QCBatchID:** AS060322-1-1	**Prep Basis:** Dry Weight
	Date Collected: 17-Mar-06	**Run ID:** AS060322-1A	**Moisture(%):** NA
	Date Prepared: 22-Mar-06	**Count Time:** 300 minutes	**Result Units:** pCi/g
	Date Analyzed: 27-Mar-06	**Report Basis:** Dry Weight	**File Name:** Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0.002 +/- 0.011	0.016	U
10-12-8	Pu-239/240	0.019 +/- 0.016	0.009	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.239	1.74	pCi/g	77.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC, greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Duplicate Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: B5-S
Lab ID: 0603120-2DUP

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0.002 +/- 0.012	0.017	U
10-12-8	Pu-239/240	0.007 +/- 0.012	0.023	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.239	1.64	pCi/g	73.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC
Y1 - Chemical Yield is in control at 100-110% Quantitative yield is assumed
Y2 - Chemical Yield outside default limits
LT - Result is less than Requested MDC greater than sample specific MDC
M - The requested MDC was not met
M3 - The requested MDC was not met but thereported activity is greater than the reported MDC
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 708)
BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc.
ClientProject ID: Sterling 05-8513EI

Field ID	C10-W
Lab ID	0603120-3

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0.003 +/- 0.012	0.009	U
10-12-8	Pu-239/240	-0.001 +/- 0.012	0.017	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.242	1.65	pCi/g	73.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID: N8-W
Lab ID: 0603120-4

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	0.003 +/- 0.013	0.019	U
10-12-8	Pu-239/240	0.019 +/- 0.018	0.023	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.231	1.48	pCi/g	66.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC, greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

Isotopic Plutonium By Alpha Spectroscopy

PAI 714 Rev 9

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0603120
Client Name: Allwest Remediation, Inc
ClientProject ID: Sterling 05-8513EI

Field ID	M10-W
Lab ID	0603120-5

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 8
Date Collected: 17-Mar-06
Date Prepared: 22-Mar-06
Date Analyzed: 25-Mar-06

Prep Batch: AS060322-1
QCBatchID: AS060322-1-1
Run ID: AS060322-1A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 2.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13981-16-3	Pu-238	-0.002 +/- 0.012	0.020	U
10-12-8	Pu-239/240	0.016 +/- 0.016	0.023	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Pu-242	2.233	1.64	pCi/g	73.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC

M - The requested MDC was not met

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *PU0603120-1*

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

4

Section 4

RAW DATA

Isotopic Plutonium By Alpha Spectroscopy Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Prep SOP: PAI 777
Analytical SOP: PAI 714

Reported on: Wednesday, March 29, 2006
8:25:43 AM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	Net Cnts Bkg Cnts	BaseEff Bkg(min)	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0603120-1	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	1.700	30.66%	300	0.005	0.016	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	11:27 AM	1.000	1000	79.2%	0.011	NA	Dry Weight	NA	U
0603120-1	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	2.000	30.66%	300	0.006	0.008	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	11:27 AM	0.000	1000	79.2%	0.011	NA	Dry Weight	NA	U
0603120-1	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	725.700	30.66%	300	1.77	0.01	pCi/g	NA	
SMP	Tracer		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	11:27 AM	1.000	1000	79.2%	0.29	NA	Dry Weight	NA	
0603120-2	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/27/2006	0.700	30.66%	300	0.002	0.016	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	1:45 PM	1.000	1000	77.9%	0.011	NA	Dry Weight	NA	U
0603120-2	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/27/2006	6.000	30.66%	300	0.019	0.009	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	1:45 PM	0.000	1000	77.9%	0.016	NA	Dry Weight	NA	LT
0603120-2	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/27/2006	713.700	30.66%	300	1.74	0.01	pCi/g	NA	
SMP	Tracer		AS060322-1-1	NA	NA	NA	2 g	4	Spectrum #1	1:45 PM	1.000	1000	77.9%	0.29	NA	Dry Weight	NA	
0603120-2	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	0.700	31.61%	300	0.002	0.017	pCi/g	0.00	
DUP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	7	Spectrum #1	11:27 AM	1.000	1000	73.1%	0.012	NA	Dry Weight	NA	U
0603120-2	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	2.100	31.61%	300	0.007	0.023	pCi/g	0.61	
DUP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	7	Spectrum #1	11:27 AM	3.000	1000	73.1%	0.012	NA	Dry Weight	NA	U
0603120-2	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	690.000	31.61%	300	1.64	0.01	pCi/g	NA	
DUP	Tracer		AS060322-1-1	NA	NA	NA	2 g	7	Spectrum #1	11:27 AM	0.000	1000	73.1%	0.27	NA	Dry Weight	NA	
0603120-3	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	1.000	31.71%	300	0.003	0.009	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	6	Spectrum #1	11:27 AM	0.000	1000	73.4%	0.012	NA	Dry Weight	NA	U
0603120-3	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	-0.300	31.71%	300	-0.001	0.017	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2 g	6	Spectrum #1	11:27 AM	1.000	1000	73.4%	0.012	NA	Dry Weight	NA	U

Comments:

Data Package ID: *PU0603120-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
+ - Duplicate RPD not within limits.
LT - Result is less than Request MDC, greater than sample specific MDC
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).
2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
DER - Duplicate Error Ratio
BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Prep SOP: PAI 777
Analytical SOP: PAI 714

Reported on: Wednesday, March 29, 2006
8:25:43 AM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Aiq Analy Aiq	Inst ID Det ID	AnRunID File Name	Count Date/Time	Net Cnts Bkg Cnts	BaseEff Bkg(min)	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0603120-3	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	695.400	31.71%	300	1.65	0.01	pCi/g	NA	
SMP	Tracer		AS060322-1-1	NA	NA	NA	2 g	8	Spectrum #1	11:27 AM	2.000	1000	73.4%	0.27	NA	Dry Weight	NA	
0603120-4	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	0.700	31.48%	300	0.003	0.019	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2.01 g	50	Spectrum #2	11:34 AM	1.000	1000	66.3%	0.013	NA	Dry Weight	NA	U
0603120-4	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	5.400	31.61%	300	0.019	0.023	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2.01 g	50	Spectrum #2	11:34 AM	2.000	1000	66.3%	0.018	NA	Dry Weight	NA	U
0603120-4	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	626.100	31.61%	300	1.48	0.02	pCi/g	NA	
SMP	Tracer		AS060322-1-1	NA	NA	NA	2.01 g	50	Spectrum #2	11:34 AM	3.000	1000	66.3%	0.25	NA	Dry Weight	NA	
0603120-5	Pu-238	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	-0.600	31.58%	300	-0.002	0.020	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2.01 g	51	Spectrum #2	11:34 AM	2.000	1000	73.6%	0.012	NA	Dry Weight	NA	U
0603120-5	Pu-239/240	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	5.100	31.58%	300	0.016	0.023	pCi/g	NA	
SMP	Trg. Analyte		AS060322-1-1	NA	NA	NA	2.01 g	51	Spectrum #2	11:34 AM	3.000	1000	73.6%	0.016	NA	Dry Weight	NA	U
0603120-5	Pu-242	3/17/2006	AS060322-1	NA	NA	SOIL	2.01 g	AlphaSpec2	AS060322-1A	3/25/2006	694.800	31.58%	300	1.64	0.02	pCi/g	NA	
SMP	Tracer		AS060322-1-1	NA	NA	NA	2.01 g	51	Spectrum #2	11:34 AM	4.000	1000	73.6%	0.27	NA	Dry Weight	NA	
AS060322-1	Pu-238	3/22/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	0.000	29.66%	300	0	0.010	pCi/g	NA	
MB	Trg. Analyte	9:46:34 AM	AS060322-1-1	NA	NA	NA	2 g	52	Spectrum #2	11:34 AM	0.000	1000	70.7%	0.013	NA	Dry Weight	NA	U
AS060322-1	Pu-239/240	3/22/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	0.000	29.66%	300	0	0.010	pCi/g	NA	
MB	Trg. Analyte	9:46:34 AM	AS060322-1-1	NA	NA	NA	2 g	52	Spectrum #2	11:34 AM	0.000	1000	70.7%	0.013	NA	Dry Weight	NA	U
AS060322-1	Pu-242	3/22/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	626.700	29.66%	300	1.59	0.01	pCi/g	NA	
MB	Tracer	9:46:34 AM	AS060322-1-1	NA	NA	NA	2 g	52	Spectrum #2	11:34 AM	1.000	1000	70.7%	0.26	NA	Dry Weight	NA	
AS060322-1	Pu-238/240	3/22/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	682.100	30.80%	300	2.3	0	pCi/g	NA	104
LCS	Trg. Analyte	9:46:34 AM	AS060322-1-1	NA	NA	NA	2 g	53	Spectrum #2	11:34 AM	3.000	1000	71.3%	2.2	NA	Dry Weight	NA	P

Comments:

Data Package ID: *PU0603120-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
+ - Duplicate RPD not within limits.
LT - Result is less than Request MDC, greater than sample specific MDC
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
\# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).
2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
DER - Duplicate Error Ratio
BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Prep SOP: PAI 777
Analytical SOP: PAI 714

Reported on: Wednesday, March 29, 2006
8:25:43 AM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	Net Cnts Bkg Cnts	BaseEff Bkg(min)	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
AS060322-1	Pu-242	3/22/2006	AS060322-1	NA	NA	SOIL	2 g	AlphaSpec2	AS060322-1A	3/25/2006	656.400	30.80%	300	1.60	0.02	pCi/g	NA	
LCS	Tracer	9:46:34 AM	AS060322-1-1	NA	NA	NA	2 g	53	Spectrum #2	11:34 AM	2.000	1000	71.3%	0.26	NA	Dry Weight	NA	

Comments:

Data Package ID: *PU0603120-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
+ - Duplicate RPD not within limits.
LT - Result is less than Request MDC, greater than sample specific MDC
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).
2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
DER - Duplicate Error Ratio
BDL - Below Detection Limit

Paragon Analytics

Alpha Spectroscopy Analysis Report

Sample

Sample: 0603120-1
Spectrum #1 Analysis #1

Sample Size : 2.00

Acquisition

Detector: 4
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute ROI Analysis, Set Name =
ROI Set: Iso-Pu

Acquisition Start Date: 3/25/2006 11:27:14AM
Live Time: 300.00 min
Real Time: 300.01 min
Dead Time: 0.00 %

Calibration

Bkgd Info: Sample: B6032104; Det: 4; Spectrum #1; Mar-21-2006 10:59

Calibration Date: 3/21/2006 9:16:00AM

Efficiency Calibration: C6032104

Efficiency: 30.66% +/- 0.21% TPU(2 sigma)

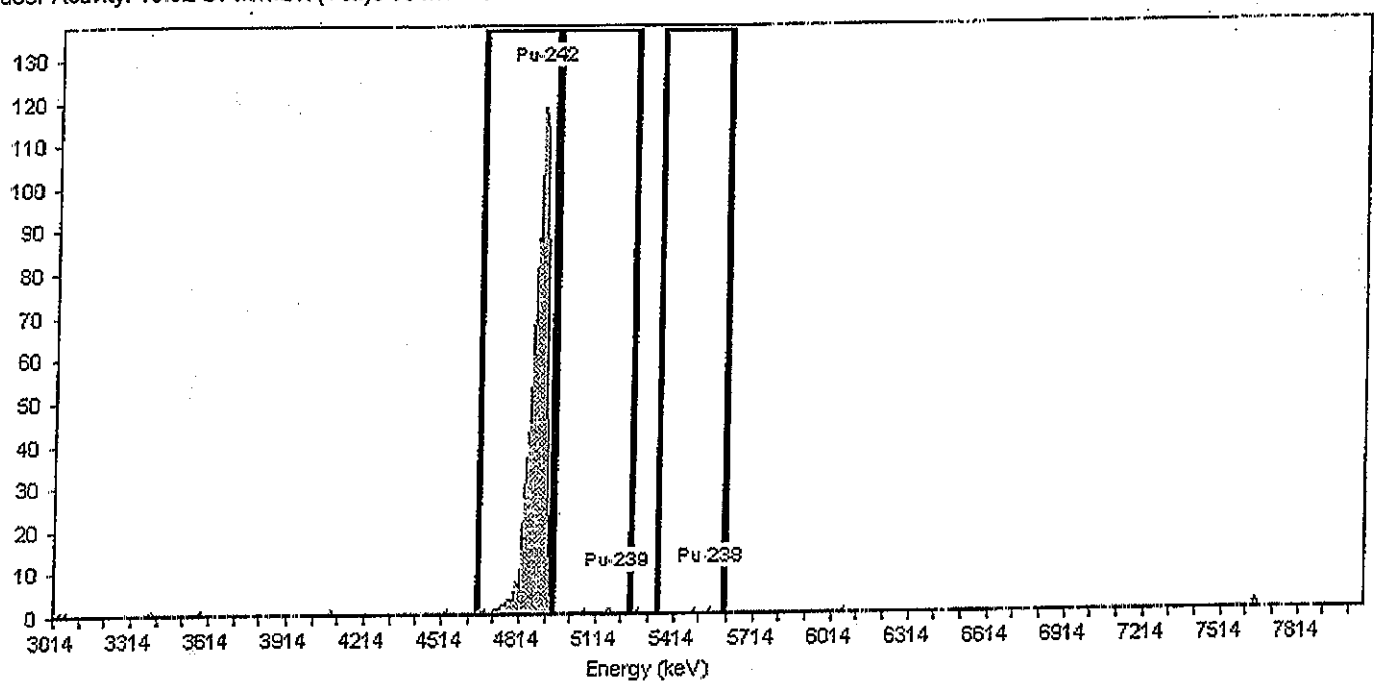
Energy Calibration: C6032104

Energy Cal: Gain = 9.9176 keV / Ch
Offset = 3,004.80 keV
Quadratic = 0.0000 keV / Ch^2

Tracer

Tracer Name: 803.3020.04
Tracer Activity: 19.92 DPM/mL x (Vol.)0.50 mL = 9.96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 78.82%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
u-242	4889.1	4651.1	4938.7	62.2	100.5	726.00	0.00	726.00	1.8E+000	1.3E-001	3.2E-003	1.5E-002
u-239	5196.6	4948.6	5246.2	24.3	100.0	2.00	0.00	2.00	6.2E-003	1.1E-002	0.0E+000	8.4E-003
u-238	5553.6	5345.3	5603.2	24.2	100.0	2.00	0.00	2.00	5.3E-003	9.4E-003	3.2E-003	1.5E-002

ewed By: GW SW

Date: 3/27/2006 10:21:26AM

AlphaVision v5.3
Custom Report Iteration: 03/07/06

000021

Paragon Analytics

Alpha Spectroscopy Analysis Report

Sample

Sample: 0603120-2
Spectrum #1 Analysis #1

Sample Size : 2 00

Acquisition

Detector: 4
Batch Name: PAS060322-1_B
Nuclide Library: ISO-Pu
Analysis Method: Absolute ROI Analysis, Set Name = ROISet: Iso-Pu

Acquisition Start Date: 3/27/2006 1:45:50PM
Live Time: 300 00 min
Real Time: 300 00 min
Dead Time: 0 00 %

Calibration

Bkgd Info: Sample: B6032104; Det: 4; Spectrum #1; Mar-21-2006 10:59

Calibration Date: 3/21/2006 9:16:00AM

Efficiency Calibration: C6032104

Efficiency: 30 66% +/- 0 21% TPU(2 sigma)

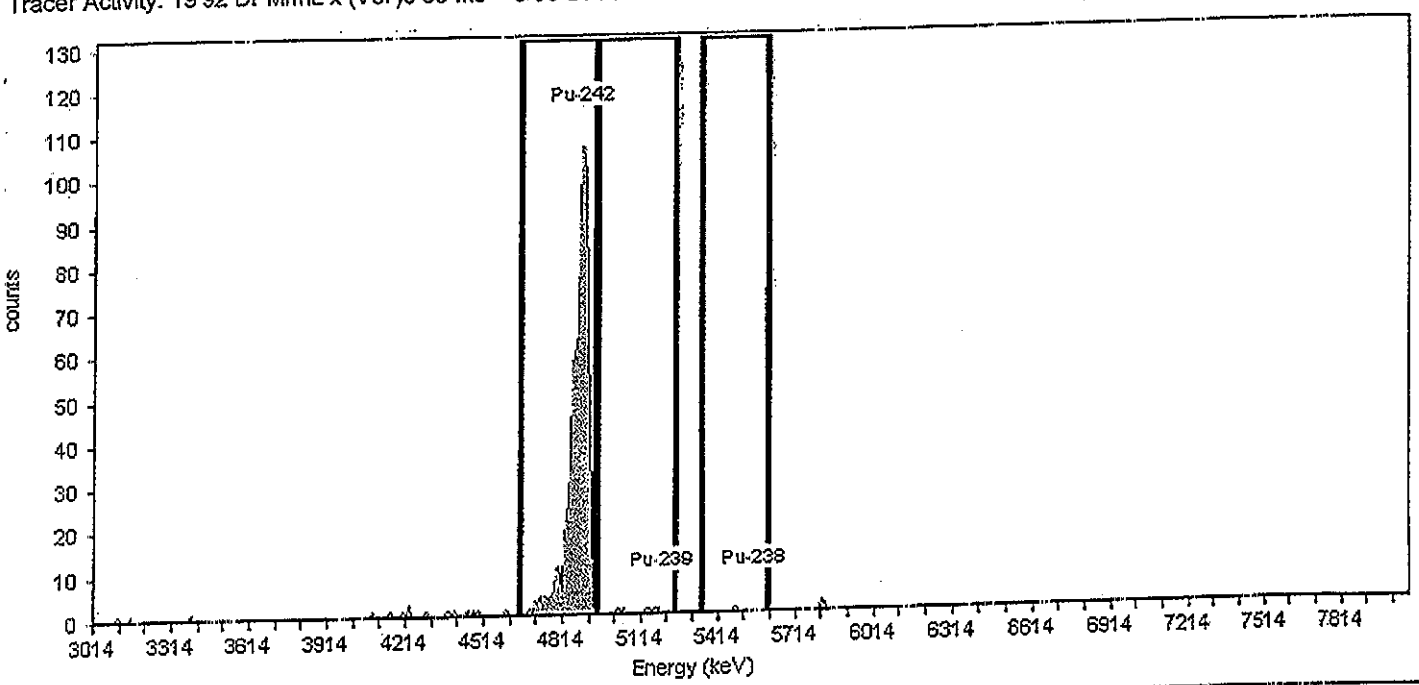
Energy Calibration: C6032104

Energy Cal: Gain = 9 9176 keV / Ch
Offset = 3,004 80 keV
Quadratic = 0 0000 keV / Ch^2

Tracer

Tracer Name: 803 3020 04
Tracer Activity: 19 92 DPM/mL x (Vol)0 50 mL = 9 96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 77 52%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R %.	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4889 1	4651 1	4938 7	72 1	100 5	714.00	0 00	714.00	1.7E+000	1 3E-001	3 2E-003	1 5E-002
Pu-239	5196 6	4948.6	5246 2	154 7	100 0	6 00	0 00	6.00	1 9E-002	1 7E-002	0.0E+000	8 5E-003
Pu-238	5553.6	5345.3	5603 2	24 3	100.0	1 00	0.00	1 00	2.2E-003	7 2E-003	3.2E-003	1.5E-002

Reviewed By: GW Sm

000022

int Date: 3/28/2006 2:52:21PM

AlphaVision V5.3
Custom Report Iteration: 03/07/06

Paragon Analytics

Alpha-Spectroscopy Analysis Report

Sample

Sample: 0603120-2D
Spectrum #1 Analysis #1

Sample Size : 2.00

Acquisition

Detector: 7
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute ROI Analysis, Set Name = ROISet: Iso-Pu

Acquisition Start Date: 3/25/2006 11:27:07AM
Live Time: 300.00 min
Real Time: 300 01 min
Dead Time: 0 00 %

Calibration

Bkgd Info: Sample: B6032107; Det: 7; Spectrum #1; Mar-21-2006 10:59

Calibration Date: 3/21/2006 9:17:56AM

Efficiency Calibration: C6032107

Efficiency: 31 61% +/- 0 18% TPU(2 sigma)

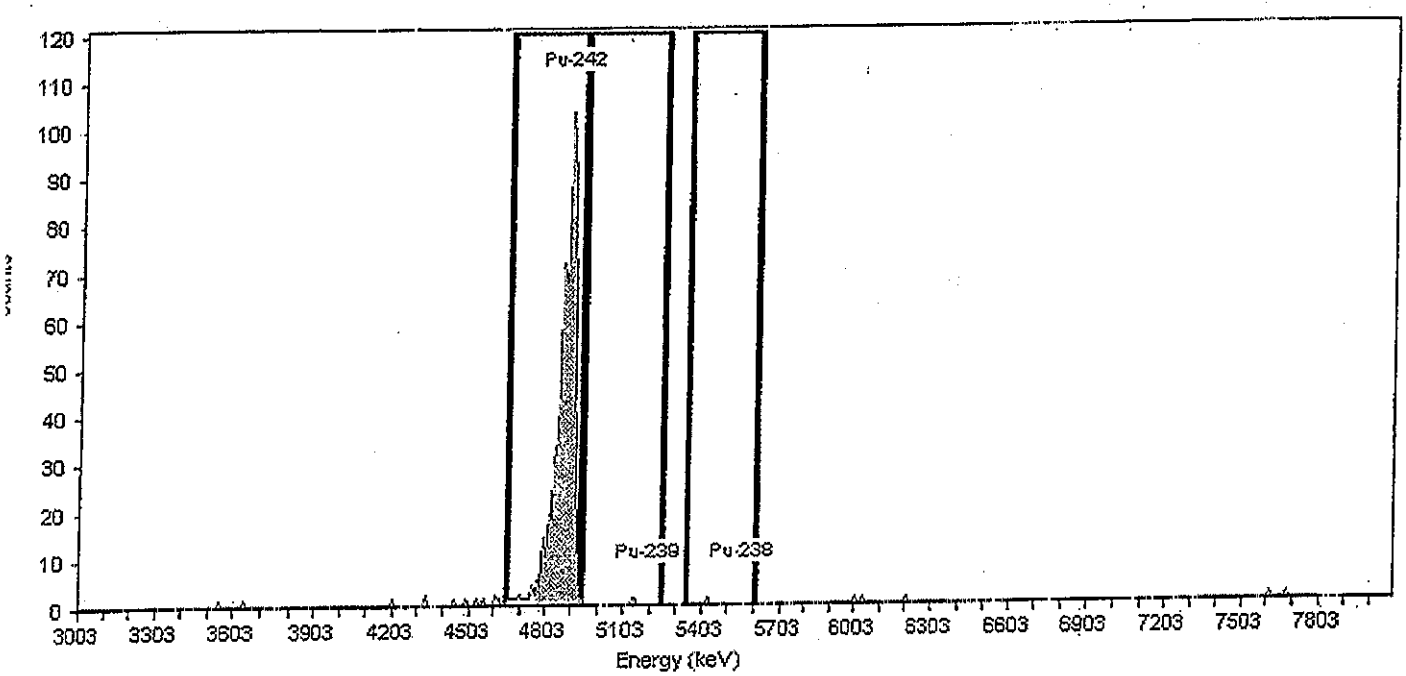
Energy Calibration: C6032107

Energy Cal: Gain = 9.9784 keV / Ch
Offset = 2,993.25 keV
Quadratic = 0 0000 keV / Ch^2

Tracer

Tracer Name: 803 3020 04
Tracer Activity: 19 92 DPM/mL x (Vol)0 50 mL = 9 96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 72 69%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4889.2	4649.7	4939 1	71.0	100 5	690 00	0 00	690.00	1.6E+000	1 2E-001	0 0E+000	8 8E-003
Pu-239	5198.5	4949.0	5248.4	.0	100.0	3.00	1.00	2.00	6.9E-003	1 3E-002	5.8E-003	2 0E-002
Pu-238	5557.7	5348 2	5607 6	24 4	100.0	1.00	0 00	1 00	2.3E-003	7.5E-003	3 4E-003	1 6E-002

iewed By: GW JM

000023

AlphaVision v5.3
Custom Report Iteration: 03/07/06

it Date: 3/27/2006 10:21:56AM

Paragon Analytics

Alpha-Spectroscopy Analysis Report

Sample

Sample: 0603120-3
Spectrum #1 Analysis #1

Sample Size : 2 00

Acquisition

Detector: 8
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute ROI Analysis, Set Name =
ROI Set: Iso-Pu

Acquisition Start Date: 3/25/2006 11:27:08AM
Live Time: 300 00 min
Real Time: 300 01 min
Dead Time: 0 00 %

Calibration

Bkgd Info: Sample: B6032108; Det: 8; Spectrum #1; Mar-21-2006 10:59

Calibration Date: 3/21/2006 9:18:20AM

Efficiency Calibration: C6032108

Efficiency: 31.71% +/- 0 12% TPU(2 sigma)

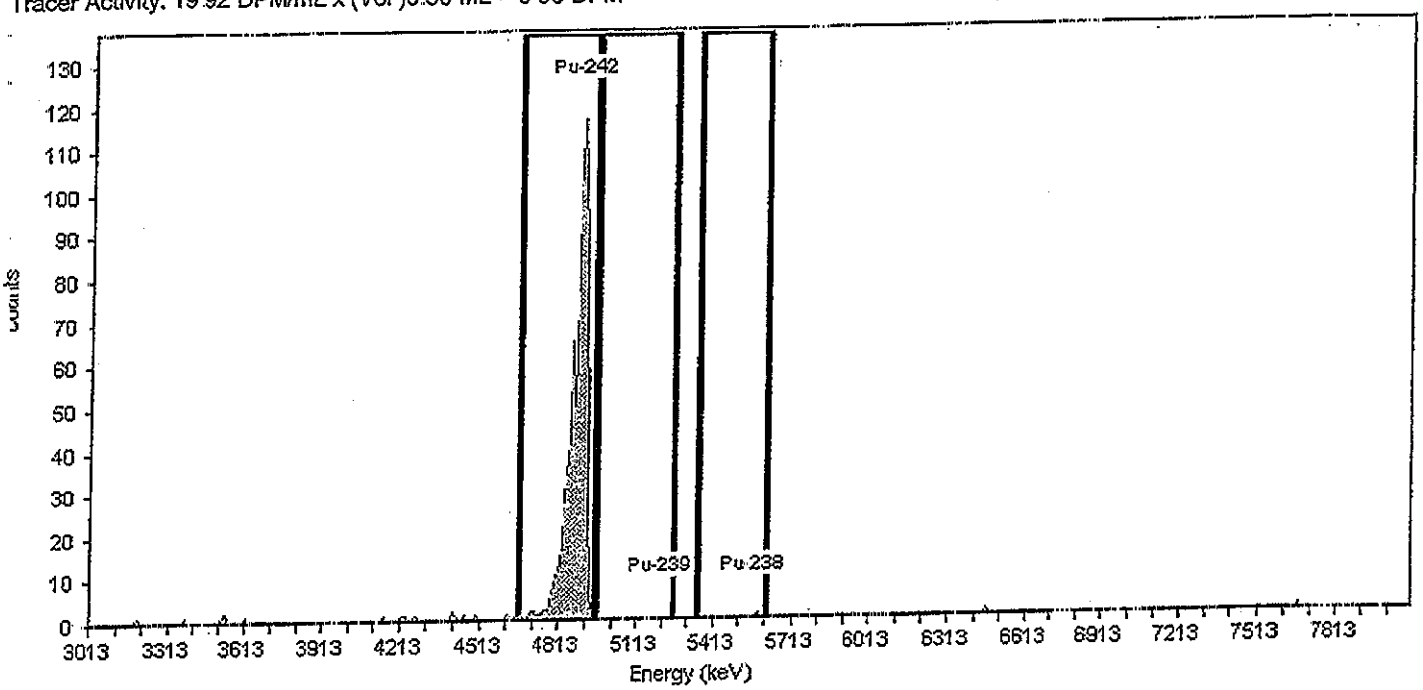
Energy Calibration: C6032108

Energy Cal: Gain = 9 9784 keV / Ch
Offset = 3,003 23 keV
Quadratic = 0 0000 keV / Ch^2

Tracer

Tracer Name: 803 3020 04
Tracer Activity: 19 92 DPM/mL x (Vol)0.50 mL = 9 96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 73 03%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4899 1	4659.7	4949 0	49.2	100.5	696.00	1 00	695 00	1 6E+000	1 2E-001	4 7E-003	1 8E-002
Pu-239	5208.5	4959 0	5258 4	0	100.0	0.00	0 00	0.00	-9.7E-004	7 4E-003	3 3E-003	1 5E-002
Pu-238	5567 7	5358.1	5617 6	24 2	100.0	1 00	0.00	1 00	3 2E-003	9.2E-003	0 0E+000	8.8E-003

Reviewed By: YW Sm

000024

AlphaVision v5.3
Custom Report Iteration: 03/07/06

nt Date: 3/27/2006 10:22:09AM

Paragon Analytics

Alpha Spectroscopy Analysis Report

Sample

Sample: 0603120-4
Spectrum #2 Analysis #1

Sample Size : 2.00

Acquisition

Detector: 50
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute Interactive ROI Analysis
ROI Set: Iso-Pu

Acquisition Start Date: 3/25/2006 11:34:00AM
Live Time: 300.00 min
Real Time: 300.01 min
Dead Time: 0.00 %

Calibration

Bkgd Info: Sample: B6032150; Det: 50; Spectrum #1; Mar-21-2006 11:02

Calibration Date: 3/21/2006 12:22:50PM

Efficiency Calibration: C6032150

Efficiency: 31.48% +/- 0.15% TPU(2 sigma)

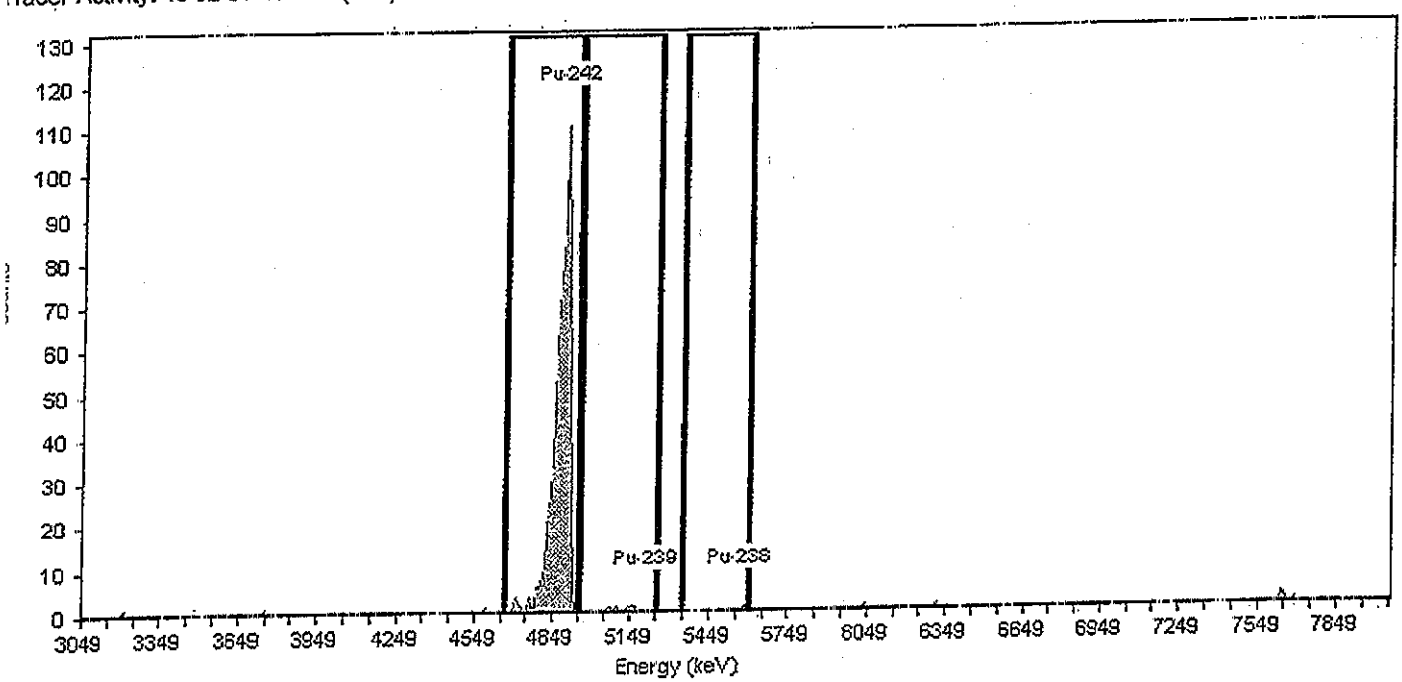
Energy Calibration: C6032150

Energy Cal: Gain = 9.8224 keV / Ch
Offset = 3,039.21 keV
Quadratic = 0.0000 keV / Ch^2

Tracer

Tracer Name: 803 3020 04
Tracer Activity: 19.92 DPM/mL x (Vol.)0.50 mL = 9.96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 66.24%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %.	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4895.7	4659.9	4944.8	56.3	100.5	627.00	1.00	626.00	1.5E+000	1.2E-001	6.4E-003	2.2E-002
Pu-239	5210.0	4954.6	5249.3	37.0	100.0	6.00	1.00	5.00	1.9E-002	1.9E-002	5.2E-003	2.0E-002
Pu-238	5563.6	5347.5	5602.9	14.5	100.0	1.00	0.00	1.00	2.5E-003	8.2E-003	3.7E-003	1.7E-002

Reviewed By: JW Sm

000025

Print Date: 3/27/2006 10:22:23AM

AlphaVision v5.3
Custom Report Iteration: 03/07/06

Paragon Analytics

Alpha-Spectroscopy Analysis Report

Sample

Sample: 0603120-5
Spectrum #2 Analysis #1

Sample Size : 2 00

Acquisition

Detector: 51
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute Interactive ROI Analysis
ROI Set: Iso-Pu

Acquisition Start Date: 3/25/2006 11:34:02AM
Live Time: 300.00 min
Real Time: 300 01 min
Dead Time: 0 00 %

Calibration

Bkgd Info: Sample: B6032151; Det: 51; Spectrum #1; Mar-21-2006 11:02

Calibration Date: 3/21/2006 12:23:41PM

Efficiency Calibration: C6032151

Efficiency: 31.58% +/- 0 16% TPU(2 sigma)

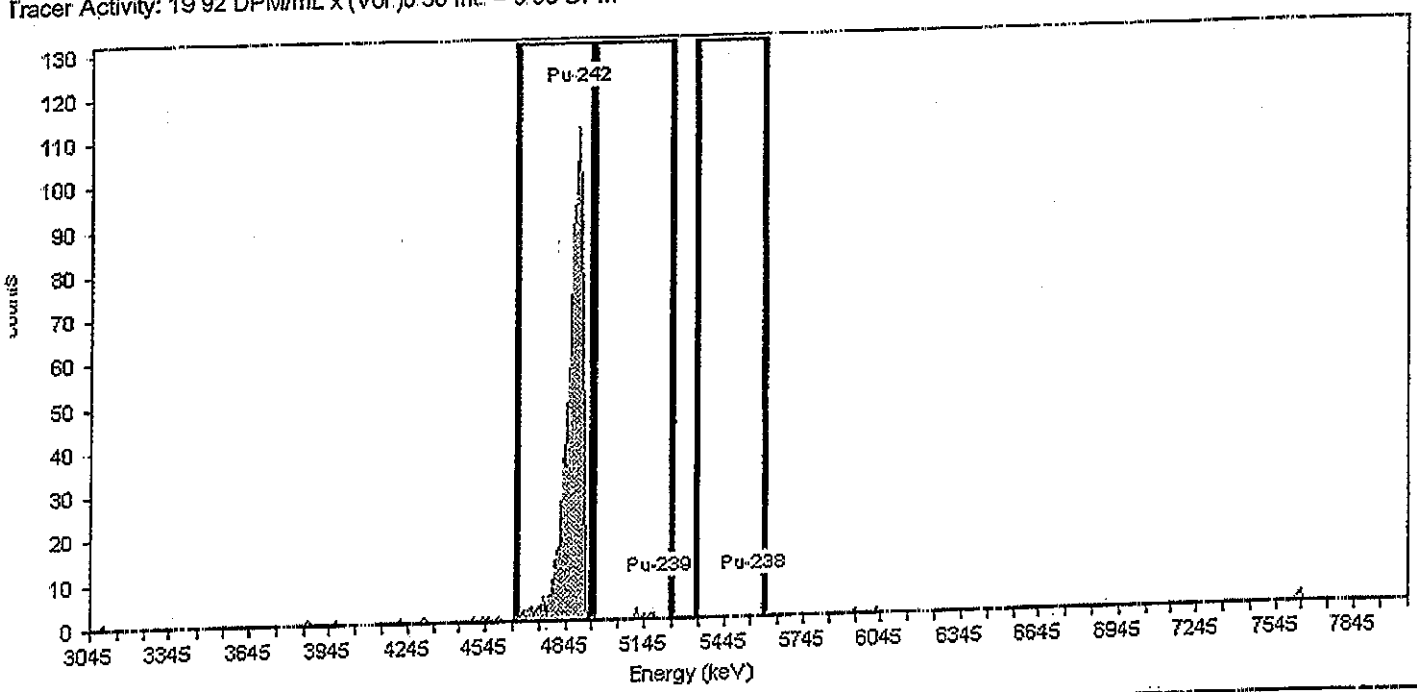
Energy Calibration: C6032151

Energy Cal: Gain = 9 8047 keV / Ch
Offset = 3,036 00 keV
Quadratic = 0.0000 keV / Ch^2

Tracer

Tracer Name: 803 3020.04
Tracer Activity: 19 92 DPM/mL x (Vol.)0.50 mL = 9.96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 73.26%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %.	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4889.1	4653.8	4938 1	52.3	100.5	696 00	1.00	695.00	1 6E+000	1 3E-001	6.6E-003	2 2E-002
Pu-239	5202 9	4947 9	5242 1	.0	100 0	6.00	1 00	5.00	1 7E-002	1 7E-002	5 8E-003	2.0E-002
Pu-238	5555 8	5340.1	5595.0	.0	100 0	0.00	1.00	-1 00	-1 9E-003	8 2E-003	4 7E-003	1.8E-002

000026

Reviewed By: YW dm

AlphaVision v5.3
Custom Report Iteration: 03/07/06

nt Date: 3/27/2006 10:22:48AM

Paragon Analytics

Alpha Spectroscopy Analysis Report

Sample

ample: AS060322-1MB
pectrum #2 Analysis #1

Sample Size : 2 00

Acquisition

etector: 52
atch Name: PAS060322-1_A
uclide Library: ISO-Pu
nalysis Method: Absolute ROI Analysis, Set Name =
OiPSet: Iso-Pu

Acquisition Start Date: 3/25/2006 11:34:03AM
Live Time: 300 00 min
Real Time: 300 01 min
Dead Time: 0.00 %

Calibration

kgd Info: Sample: B6032152; Det: 52; Spectrum #1; Mar 21 2006 11:02

alibration Date: 3/21/2006 12:24:10PM

fficiency Calibration: C6032152

fficiency: 29.66% +/- 0 21% TPU(2 sigma)

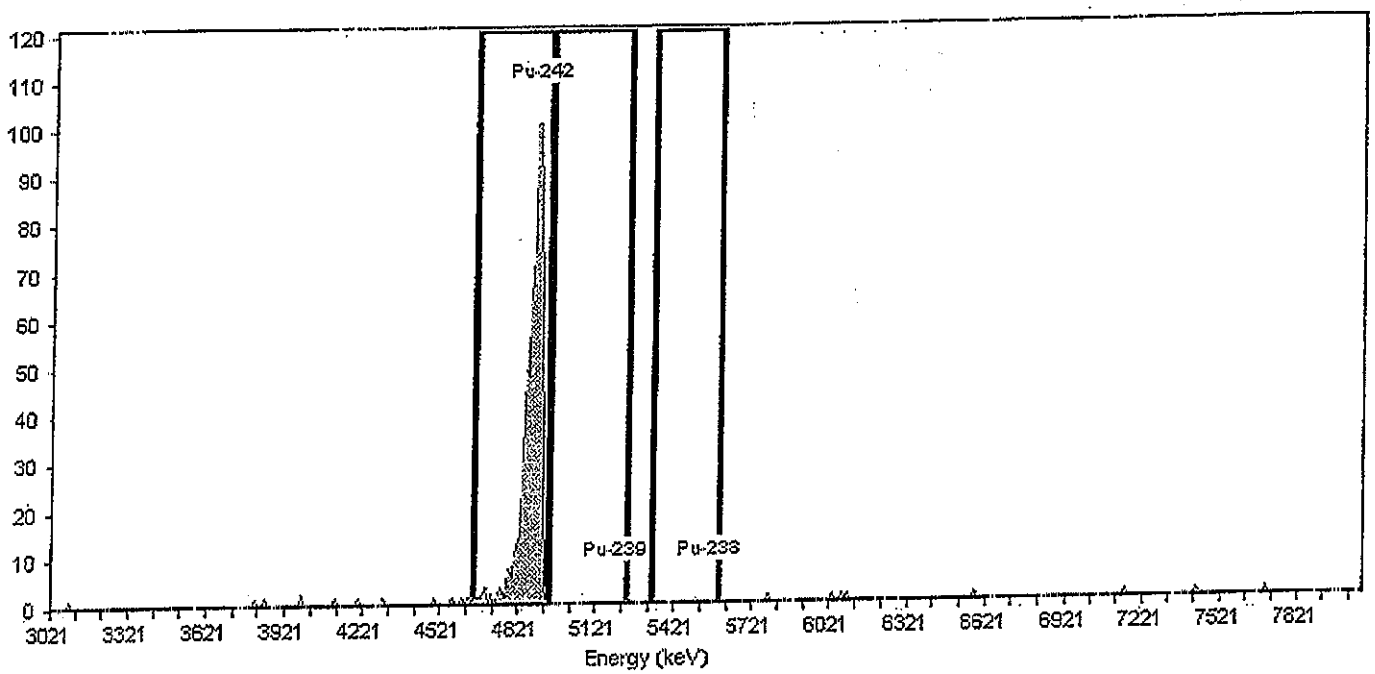
Energy Calibration: C6032152

Energy Cal: Gain = 9.9003 keV / Ch
Offset = 3,011 38 keV
Quadratic = 0 0000 keV / Ch^2

Tracer

racer Name: 803 3020 04
racer Activity: 19.92 DPM/mL x (Vol)0.50 mL = 9.96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 70.38%



Nuclide Summary (ROI)

uclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %.	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
u-242	4882.5	4644.9	4932 0	56.2	100 5	627 00	0.00	627 00	1 6E+000	1.3E-001	3.7E-003	1.7E-002
u 239	5189 4	4941 9	5238.9	.4	100.0	0 00	0 00	0.00	0 0E+000	1 0E-002	0 0E+000	9.7E-003
u-238	5545 9	5337 9	5595 4	0	100.0	0.00	0.00	0 00	0 0E+000	1.0E-002	0.0E+000	9.7E-003

ewed By: GN Sm

000027

Date: 3/27/2006 10:23:00AM

AlphaVision v5.3
Custom Report Iteration: 03/07/06

Paragon Analytics

Alpha Spectroscopy Analysis Report

Sample

Sample: AS060322-1LCS
Spectrum #2 Analysis #1

Sample Size : 2.00

Acquisition

Detector: 53
Batch Name: PAS060322-1_A
Nuclide Library: ISO-Pu
Analysis Method: Absolute Interactive ROI Analysis
ROI Set: Iso-Pu

Acquisition Start Date: 3/25/2006 11:34:05AM
Live Time: 300.00 min
Real Time: 300.01 min
Dead Time: 0.00 %

Calibration

Bkgd Info: Sample: B6032153; Det: 53; Spectrum #1; Mar-21-2006 11:02

Calibration Date: 3/21/2006 12:25:00PM

Efficiency Calibration: C6032153

Efficiency: 30.80% +/- 0.13% TPU(2 sigma)

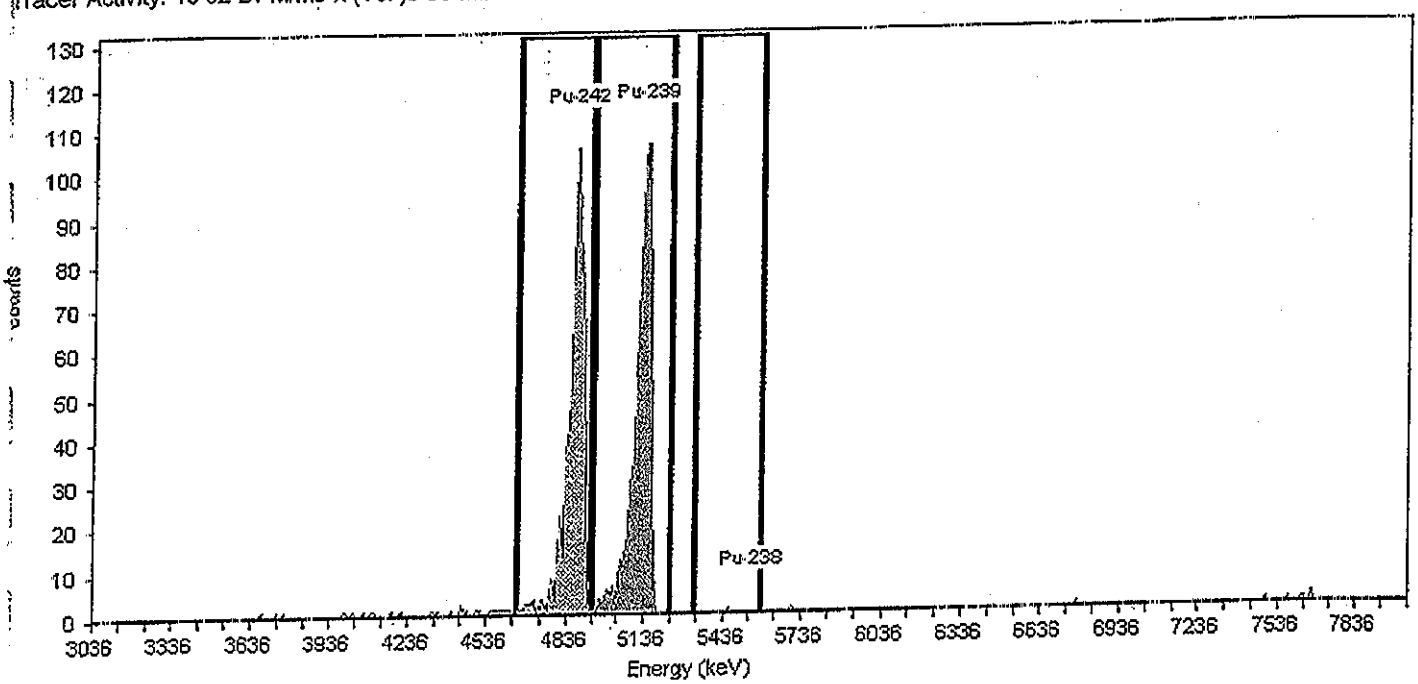
Energy Calibration: C6032153

Energy Cal: Gain = 9.8047 keV / Ch
Offset = 3,026.20 keV
Quadratic = 0.0000 keV / Ch^2

Tracer

Tracer Name: 803.3020.04
Tracer Activity: 19.92 DPM/mL x (Vol.)0.50 mL = 9.96 DPM

Tracer Nuclide: Pu-242
Tracer Recovery: 70.97%



Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Pu-242	4869.5	4644.0	4928.3	63.9	100.5	657.00	1.00	656.00	1.6E+000	1.2E-001	5.0E-003	1.9E-002
Pu-239	5144.0	4938.1	5232.3	52.3	100.0	683.00	1.00	682.00	2.3E+000	3.5E-001	6.1E-003	2.2E-002
Pu-238	5546.0	5330.3	5585.2	24.0	100.0	1.00	1.00	0.00	1.4E-003	8.7E-003	5.0E-003	1.9E-002

Reviewed By:

000028

Print Date: 3/27/2006 10:23:15AM

AlphaVision v5.3
Custom Report Iteration: 03/07/06

Paragon Analytics

FORM 7467.xls (2/13/06) **311082**

Alpha Spectrometer Instrument Run Log

Date: 3/25/06

Detector	Batch ID	Sample ID	Iso/Matrix	Duration	Initial	Prin/ Reviewed
9	UAS060309-2-A	0601153-2	Ur/F	1000	GW	GW
10		-2D				
11		-2RD2				
12		-2R2				
13		AS060309-2MB				
15		-2LCS				
16	UAS060321-6-A	0603044-2	Ur/S	300	GW	GW
17		-4				
18		-4D				
19		-5				
21		-6				
22		-8				
23		-9				
25		-10				
26		-11				
27		-12				
28		-14				
29		-14D				
30		-15				
31		-16				
32		-17				
57		AS060321-6MB				
58		-6LCS				
1	PAS060323-1-B	AS060323-1MB	Pu/W	1000	GW	GW
2		-1LCS				

Detector	Batch ID	Sample ID	Iso/Matrix	Duration	Initial	Prin/ Reviewed
4	PAS060322-1-A	0603120-1	Pu/S	300	GW	GW
5		-2				
7		-2D				
8		-3				
50		-4				
51		-5				
52		AS060322-1MB				
53		-1LCS				
54	PAS060320-1-A	0603072-6	Pu/S	300	GW	GW
55		-6D				
56		-7				
33		-8				
34		-9				
35		-10				
36		-11				
37		-12				
42		-13				
43		-14				
45		AS060320-1MB				
46		-1LCS				
47	PAS060323-1-C	0603090-2	Pu/W	1000	GW	GW

GW 3/27/06

Notes:

Reviewed by: GW

Date: 3/27/06

000029

Paragon Analytics

FORM 746r7.xls (2/13/06) **311083**

Alpha Spectrometer Instrument Run Log

Date: 3/27/06 (27) GW 3/27/06

Detector	Batch ID	Sample ID	Iso/Matrix	Duration	Initial	Print/ Reviewed
9	UAS0060323-2_A	0603124-1	Ur/S	180	GW	GW
10		-1D				
11		-2				
12		-3				
13		AS0060323-2MB				
15		-2LCS				
16	TAS0060323-3_A	0603124-1	Th/S	180	GW	
17		-2				
18		-2D				
19		-3				
21		AS0060323-3MB				
22		-3LCS				
1	NAS0060323-4_A	0603124-1	Np/S	180	GW	
2		-1SYS				
4		-2				
5		-2SYS				
7		-3				
8		-3SYS				
50		-3D				
51		AS0060323-4SYS				
52		-4MB				
53		-4LCS				
54	AAS0060317-1_A	0602089-1	Am/F	600	GW	Sm
55		-4				

Detector	Batch ID	Sample ID	Iso/Matrix	Duration	Initial	Print/ Reviewed
56	AAS0060317-1_A	0602089-5	Am/F	600	GW	Sm
33		-6				
34		-7				
35		-8				
36		-9				
37		-10				
42		-11				
43		-12				
45		-13				
46		-16				
47		AS0060317-1MB				
1	PAS0060317-1_C	0602089-16	Pu/F	720	GW	Sm
2		AS0060317-1MB				
4	PAS0060322-1_B	0603120-2	Pu/S	300		Sm
5	PAS0060320-1_B	0603072-13	Pu/S	300		Sm
7	AAS0060321-3_A	0602089-2	~~Am~~ Pu/F	600		Sm
8		-3				
50		-14				
51		-15				
52		-17				
53		-18				
9	UAS0060321-6_B	0603044-15	Ur/S	300		Sm
10	UAS0060308-3_A	0602193-1	Ur/F	1000		GW
11		-2				

Notes:

Reviewed by: GW
Date: 3/27/06

000030

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 5

QUALITY ASSURANCE SUMMARY REPORTS

5

No *NON-CONFORMANCE REPORTS* or *QUALITY ASSURANCE SUMMARY SHEETS* are included in this data package.

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 6

LABORATORY BENCH SHEETS

6

Paragon Analytics

Radiochemistry Instrument Worksheet

Prep Batch: AS060322-1

Prep Procedure: PuISO

Analytical QASS / NCR? Y / N / NA

Prep Num	LabID	QC Type	Init Alq	Fin Alq	Units	Cnt 1 File	Cnt 1 Inst/Det	Cnt 1 Pos Chk By	Cnt 2 File	Cnt 2 Inst/Det	Cnt 2 Pos Chk By	Cnt 3 File	Cnt 3 Inst/Det	Cnt 3 Pos Chk By	Notes
1	0603120-1	SMP	2.0049	2.0049	g	D _31201	4	GW	~~_31201~~		~~GW 3/29/06~~	_31201			A ~~GW 3/29/06~~
1	0603120-2	SMP	2.0036	2.0036	g	_31202	5		P _31202	R 4	Sm	_31202			
1	0603120-2	DUP	2.0037	2.0037	g	_31202D	7		_31202D			_31202D			-B low yield
1	0603120-3	SMP	2.0011	2.0011	g	_31203	8		_31203			_31203			
1	0603120-4	SMP	2.0107	2.0107	g	_31204	50		_31204			_31204			
1	0603120-5	SMP	2.0093	2.0093	g	_31205	51		_31205		~~GW 3/29/06~~	_31205			~~GW 3/29/06~~
1	AS060322-1	MB	2	2	g	_3221B	52		_3221B			_3221B			
1	AS060322-1	LCS	2	2	g	_3221L	53		_3221L			_3221L			

Tracer/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	Pu-242	803.3020.04	19.919	DPM/ml	03/22/06	0.5	ml	AW013

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Pu-239	733.2613.46	19.997	DPM/ml	03/22/06	0.5	ml	AW013

000034

 PuISO Instrument Sheet

Date Printed: 3/25/2006 10:08

Paragon Analytics
LIMS Version: 5.334A

Supersedes: NA

Paragon Analytics

Radiochemistry Prep Worksheet

Prep Batch: AS060322-1

Prep Procedure: PuISO

Reviewed By: tde TDE Review Date: 3/25/06 3/25/2006

Non-Routine Pre-Treatment? (Y) / N Batch: See Comments Re-Prep? Y / (N) Batch: NA Prep QASS / NCR? Y / (N) NA

Prep SOP: PAI 777 Rev: 8
Prep SOP: NONE
Matrix Class: solid

Prep Analyst: Heather Barker
Prep Date: 3/22/2006
Prep Dept: AP

Balance: 27
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq g	Fin Alq g	Prep Basis	Micro Init	Micro Date	Standards	Prep Notes
1	1	0603120-1	SMP		2.0049	2.0049	Dry Weight	TE	3/25/06	T1	
2	1	0603120-2	SMP		2.0036	2.0036	Dry Weight			T1	
3	1	0603120-2	DUP		2.0037	2.0037	Dry Weight			T1	
4	1	0603120-3	SMP		2.0011	2.0011	Dry Weight			T1	
5	1	0603120-4	SMP		2.0107	2.0107	Dry Weight			T1	
6	1	0603120-5	SMP		2.0093	2.0093	Dry Weight			T1	
7	1	AS060322-1	MB		2	2	Dry Weight			T1	
8	1	AS060322-1	LCS		2	2	Dry Weight	✓	✓	S1,T1	

TE 3/25/06

Spiked By: Heather Barker Date: 3/22/2006

Witnessed By: Ato Jackson-Kuofie Date: 3/22/2006

Relinquished By: TE
Date: 3/25/06
Received By: GWD
Date: 3/25/06

Tracer/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	Pu-242	803.3020.04	19.919	DPM/ml	03/22/06	0.5	ml	AW013

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Pu-239	733.2613.46	19.997	DPM/ml	03/22/06	0.5	ml	AW013

000035

Comments
Samples were muffeled for 4 hours at 600C. A PEG treatment was applied to all samples.

Paragon Analytics

Radiochemistry Prep Worksheet

Prep Batch: AS060322-1

Prep Procedure: PulSO

Prep Batch Not Validated!!!

Reviewed By: Review Date:

Non-Routine Pre-Treatment? Y / N Batch: _____ Re-Prep? Y / N Batch: _____ Prep QASS / NCR? Y / N _____

Prep SOP: PAI 777 Rev: 8
Prep SOP: NONE
Matrix Class: solid

Prep Analyst: Heather Barker HB
Prep Date: 3/22/06
Prep Dept: AP

Balance:
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq g	Fin Alq g	Prep Basis	Micro Init	Micro Date	Standards	Prep Notes
											funnel #'s
1	1	0603120-1	SMP		2	2	Dry Weight	E122	2.0049	T1	104
2	1	0603120-2	SMP		2	2	Dry Weight	E175	2.0036	T1	102
3	1	0603120-2	DUP		2	2	Dry Weight	E339	2.0037	T1	8
4	1	0603120-3	SMP		2	2	Dry Weight	E350	2.0011	T1	69
5	1	0603120-4	SMP		2	2	Dry Weight	E213	2.0107	T1	2
6	1	0603120-5	SMP		2	2	Dry Weight	E146	2.0093	T1	17
7	1	AS060322-1	MB		2	2	Dry Weight	E311	—	T1	80
8	1	AS060322-1	LCS		2	2	Dry Weight	E264	—	S1,T1	502

Spiked By: Heather Barker HB Date: 3/22/06 3/22/06
Witnessed By: AJK Date: 3/22/06 3/22/06

Relinquished By: _____
Date: _____
Received By: _____
Date: _____

Tracer/Carrier Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
T1	Pu-242	803.3020.04	19.919	DPM/ml	03/22/06	0.5	ml	AW013

T1 Exp: 12/13/06

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Pu-239	733.2613.46	19.997	DPM/ml	03/22/06	0.5	ml	AW013

S1 Exp 4/6/06

000036

Comments
Samples were muffeled for 4 hours at 600C. A PEG treatment was applied to all samples.

Supersedes: N/A

SAMPLE CONDITION FORM (SOLIDS)

ANALYST: Heather Barker

ANALYSIS DATE: 3/22/06 METHOD: Prep

WORK ORDER	SAMPLE ID	SAMPLE CONDITION		
		Dry/Wet	TEXTURE	Remarks
06003120	1	Dry	Fine	Ground
	2			
	3			
	4			
	5			

HB 3/22/06

PROJECT Allwest Remediation - Rush

Continued From Page

3/22/06 W.O # 06-03-120 (Pu ±50, 5x90)

S.O. R-721-R12

in oven - 3/21 @1710 balance #15, oven #1

out oven - 3/22 @0910 5 balls, shake 15 min.

Sample #	sample/con/balls(g)	con/balls(g)	ground sample(g)	TYPE sample
06-03-120-1	126.1	98.7	27.4	SOIL
-2	117.1	98.1	19.0	
-3	122.6	98.1	24.5	
-4	120.2	98.0	22.2	
-5	119.6	98.1	21.5	

C.O. - 3/22/06

Continued on Page

Read and Understood By

Carson R. O'Dell 3/22/06 R. Fox 3/22/06

Signed Date Signed Date

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 7

STANDARDS TRACEABILITY DOCUMENTS

7

PROJECT 803.3020.04 Pu-242 Notebook No. 3020

Continued From Page

Prepare a working level dilution of Pu-242 (1ST SEM 4334) by diluting with 3N HNO_3 to approximately 20dpm/ml

1) Determine the density of 3 N HNO_3

bal 12 Mass of empty 100ml class A volumetric flask 56.4417 g
Mass of flask + 100ml 3N HNO_3 165.7718 g
Mass of 100ml 3N HNO_3 109.3301 g
lot # 051606 $\rho = 1.093301$ g/ml

2) Transfer contents of vial to a 500ml nalgene bottle

bal 13 Mass of empty 500ml nalgene bottle 48.1267 g
Mass of vial containing std + 50ml beaker before transfer 41.2611 g
Mass of vial containing std + 50ml beaker after transfer 35.8517 g
Net mass of std transferred 5.4094 g

3) Dilute w/ 3N HNO_3

bal 26 Mass of empty 500ml nalgene bottle w/out lid from above 48.1267 g
Mass of bottle, std + 3N HNO_3 516.82 g
Net mass of std + 3N HNO_3 468.693 g

4) Final activity calculation

$$\frac{(26.3\ \text{pg/g})(60\ \text{dpm/pg})(5.4094\ \text{g})(1.093301\ \text{g/ml})}{468.693\ \text{g}} = \boxed{19.92\ \text{dpm/ml}}$$

Std ID: 803.3020.04 PG 1/24/06

Description: Pu-242
Expiration: 12/13/06
Activity: 19.92 dpm/mL
2s Uncertainty: 0.14 dpm/mL
Ref. Date: 6/7/94
Ref Time: N/A
Prep Date: 12/13/05 Prep by: AB
Matrix/Comp. 3N HNO3
Half Life (y): 3.74E+05 PG 1/24/06

PG 1/24/06

Continued on Page

Read and Understood By

Amanda Barbag — Signed — 12/13/05 — Date

Renee Yellen — Signed — 1/24/06

RSO # 803

National Institute of Standards & Technology

Certificate

Rec'd 12/13/05 JB

Standard Reference Material 4334H
Plutonium-242 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive plutonium-242 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 plutonium-242 with a total activity of approximately 150 Bq. Plutonium-242 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 10 keV to 160 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 3 moles 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 °C and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least January 2015. 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, M.P. Unterweger, Acting Group Leader. The overall technical direction and physical measurements leading to certification were provided by I. 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.

Lisa R. Karam, Acting Chief
Ionizing Radiation Division

Robert L. Watters, Jr., Chief
Measurement Services Division

Gaithersburg, Maryland 20899
January 2005

*Notes and references are on pages 5 to 7

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH

9) Seal any unused SRM solution in a flame sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*

*Notes and references are on pages 5 to 7.

PROPERTIES OF SRM 4334H

Certified values

Radionuclide	Plutonium-242
Reference time	1200 EST, 07 June 1994 [b]*
Massic activity of the solution [c]	26.31 $Bq \cdot g^{-1}$
Relative expanded uncertainty (k=2)	0.72% [d] [e]
Solution density	(1.105 ± 0.002) $g \cdot mL^{-1}$ at 20 °C [f]

Uncertified values

Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall thickness Barium content Lead oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution mass	Approximately 5.5 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration ($mol \cdot L^{-1}$)	Mass Fraction ($g \cdot g^{-1}$)
	H_2O HNO_3 $^{242}Pu^{+6}$	50 3.2 8×10^{-7}	0.81 0.19 2×10^{-7}
Radiological Properties:			
Alpha-particle-emitting impurities	None detected [g] [h]. See table on page 5.		
Beta-particle-emitting impurities	Plutonium-241: (0.092 ± 0.018) $Bq \cdot g^{-1}$ [f] [h]		
Photon-emitting impurities	None detected [i]		
Half lives used	Plutonium-242: (373 500 ± 1100) a [j] [5] Plutonium-241: (14.35 ± 0.10) a [j] [5] Americium-241: (432.2 ± 0.7) a [j] [5]		
Calibration method and measuring instrument(s)	Three 4πα liquid scintillation counters, a calibrated germanium detector system, and a silicon surface-barrier detector		

*Notes and references are on pages 5 to 7

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d] [e]*

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, $u(x_i)/x_i$, (%) [k]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [m]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [n]
Massic alpha-particle emission rate, corrected for background and decay	Standard deviation of the mean for 80 sets of $4\pi\alpha$ liquid scintillation measurements (A)	0 05	1 0	0.05
Half life of Pu-242	Standard uncertainty of the half life (A)	0.32 [p]	0.00001 [q]	0.000003
Decay-scheme data	Standard uncertainty of the probability of decay by alpha particle emission (A)	0.001	1.0	0 001
Extrapolation of alpha-particle count rate versus energy to zero energy	Estimated (B)	0 25	1 0	0 25
Gravimetric measurements	Estimated (B)	0 10	1.0	0.10
Live time [r]	Estimated (B)	0.10	1.0	0.10
Alpha-particle detection efficiency of scintillators	Estimated (B)	0 15	1.0	0.15
Alpha particle-emitting impurities	Limit of detection (B) [s]	100	0 001	0 10
Photon-emitting impurities	Limit of detection (B) [s]	100	0.001	0 10
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0 36
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				0.72

*Notes and references are on pages 5 to 7.

RELATIVE ACTIVITIES OF RADIONUCLIDIC IMPURITIES AT THE REFERENCE TIME [b]

Radionuclide	Half Life (years) [j] [5]	Relative Activity As Determined By	
		LLNL	NIST
Plutonium-242	373 500 ± 1100	1.000 000	1.000 000
Plutonium-241	14.35 ± 0.10	--	0.0035 ± 0.0004 [t]
Plutonium-240	6 564 ± 11	$^{239}Pu + ^{240}Pu$ <0 000 001 [u]	$^{239}Pu + ^{240}Pu$ 0 000 020 ± 0.000 021 [v]
Plutonium-239	24 110 ± 30		
Plutonium-238	87 7 ± 0 1	$^{238}Pu + ^{241}Am$ <0.000 016 [u]	0.000 009 ± 0.000 016 [v]
Americium-241	432.2 ± 0.7		0.000 000 assumed [t]

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 (μSv/h): <0 1

[b] The plutonium-242 master solution was chemically purified at 1200 EST, 07 June 1994

[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 $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process. The value, x_i, used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) \equiv |\partial y/\partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y. The **combined standard uncertainty** of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty. The combined standard uncertainty is multiplied by a **coverage factor** of $k=2$ to obtain U, the **expanded uncertainty** of y

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each component of combined standard uncertainty, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic response is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] The stated uncertainty is two times the standard uncertainty.

[g] Estimated limits of detection for alpha particle-emitting impurities, expressed as massic alpha particle emission rates (numbers of alpha particles per second per gram), are:
0.003 $s^{-1} \cdot g^{-1}$ for energies less than 3.1 MeV,
0.03 $s^{-1} \cdot g^{-1}$ for energies between 3.1 and 4.4 MeV, and
0.003 $s^{-1} \cdot g^{-1}$ for energies greater than 5.0 MeV.

[h] The plutonium-242 master solution was chemically purified at 1200 EST, 07 June 1994. Americium-241, the daughter of plutonium-241, was removed but has been growing in since that time.

[i] Estimated limits of detection for photon-emitting impurities, expressed as massic photon emission rates (numbers of photons per second per gram), are:
5×10^{-5} $s^{-1} \cdot g^{-1}$ for energies between 19 and 39 keV,
7×10^{-5} $s^{-1} \cdot g^{-1}$ for energies between 49 and 92 keV,
2×10^{-5} $s^{-1} \cdot g^{-1}$ for energies between 106 and 507 keV,
1×10^{-5} $s^{-1} \cdot g^{-1}$ for energies between 515 and 1456 keV, and
5×10^{-6} $s^{-1} \cdot g^{-1}$ for energies between 1465 and 2750 keV,
provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of plutonium-242, plutonium-241, or americium-241.

[j] The stated uncertainty is the standard uncertainty.

[k] Relative standard uncertainty of the input quantity x_i.

[m] 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.

[n] 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.

[p] 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

[q] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[r] The live time is determined by counting the pulses from a gated crystal-controlled oscillator

[s] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i =$ 100%. $|\partial y/\partial x_i| \cdot (x_i/y) =$ {(response per Bq of impurity)/(response per Bq of Pu-242)}·{(Bq of impurity)/(Bq of Pu-242)}. 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.

[t] The stated uncertainty is the standard uncertainty. The plutonium-241 activity was calculated from a gamma-ray measurement of the americium-241 ingrowth as of 25 November 1998, assuming that americium-241 was completely removed at the time of chemical purification.

[u] Using alpha-particle spectrometry, no alpha-particle emission was detected that could reliably be ascribed to these radionuclides. The value shown is an estimated upper limit based upon background and counting statistics. Measurements were made at the Lawrence Livermore National Laboratory (LLNL) in July of 1994.

[v] Using alpha-particle spectrometry, no alpha-particle emission was detected that could reliably be ascribed to these radionuclides. The stated uncertainty is the standard uncertainty. Measurements were made at the National Institute of Standards and Technology (NIST) in June and July of 1999

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook "Quantities and Units*, 1993. Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993 (corrected and reprinted, 1995). Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[3] B.N. Taylor and C.E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), January 2005

PROJECT Pu-239 733.2613.46

Notebook No. 2613

Continued From Page

Pu-239 prep date 5/4/04

Prepare a working level dilution of Pu-239 (SRM 4330B) at approx. 20 dpm/ml by diluting w/ 3.1 M HNO_3 Lot # 43059

(1) Determine the density of 3.1 M HNO_3

Mass of empty 100 ml Class A Volumetric flask	68.2977 g (b2/12)
Mass of flask + 100 ml 3.1 M HNO_3	177.4652 g
Net mass of 3.1 M HNO_3	109.1675 g
	ρ = 1.0917 g/ml

(2) Transfer contents of ampule to a 1L nalgene bottle

Mass of Nalgene bottle without lid	73.1938 g (b2/12)
Mass of ampule, standard + 50 ml beaker	41.4365 g
Mass of empty ampule + 50 ml beaker	36.0166 g
Net mass of standard transferred	5.4199 g

(3) Dilute to final volume with 3.1 M HNO_3

Mass of nalgene bottle without lid from above	73.1938 g
Mass of bottle, standard + 3.1 M HNO_3	769.7 g (b2/26)
Net mass of standard.	696.5062 g

(4) Final Activity Calculation

$$\frac{(39.24\ \text{Bq/g})(60\ \text{dpm/Bq})(5.4199\ \text{g})(1.0917\ \text{g/mL})}{696.5062\ \text{g}} = 20.00\ \text{dpm/mL}$$

SD 5/27/04

RG 4/22/05

CDM 5/4/04

U.S. Department of Commerce
National Institute of Standards and Technology
SRM 4330B
Plutonium-239
<250 Bq in 18% nitric acid
CAUTION
RADIOACTIVE

CDM 5/4/04

SD 5/27/04

Std ID: 733.2613.46
Description: Pu-239
Expiration: 5/17/2005
Activity: 20.00 dpm/mL
2s Uncertainty: 0.14 dpm/mL
Ref. Date: 11/15/1999
Ref Time: N/A
Prep Date: 5/4/2004
Prep by: CDM
Matrix/Comp. 3.1 M HNO3
Half Life (y): 2.41E+04
Note: at 60 dpm, Pu-239 falls into the Pu-242 ROI at 0.53 pCi/g

SD 5/27/04

Std ID: 733.2613.46
Description: Pu-239
Expiration: 4/6/05
Activity: 20.00 dpm/mL
2s Uncertainty: 0.14 dpm/mL
Ref. Date: 11/15/99
Ref Time: N/A
Prep Date: 5/4/04 Prep by: CDM
Matrix/Comp. 3.1 M HNO3
Half Life (y): 2.41E+04
Note: At 80 dpm, Pu239 tail into the Pu242 ROI @ 1 pCi/g. RG 4/22/05

RG 4/22/05

Read and Understood By

SD 5/27/04

Signed: C Moncavage Date: 5/4/04

Signed: [illegible] Date: 5/27/04

National Institute of Standards & Technology

Certificate

PAF FO 0733
rec'd 11-26-03

Standard Reference Material 4330B
Plutonium-239 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive plutonium-239 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 plutonium-239 with a total activity of approximately 220 Bq. Plutonium-239 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 10 keV to 1 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 3 moles 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 December 2009.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity and because of the strong acid.

Preparation: This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, L.R. Karam, 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 J.W.L. Thomas.

Bert M. Coursey, Chief
Ionizing Radiation Division

Thomas E. Gills, Director
Office of Measurement Services

Gaithersburg, Maryland 20899
March 2000

*Notes and references are on pages 5 and 6

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood In addition to the radioactive material, the solution contains strong acid and is corrosive.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

*Notes and references are on pages 5 and 6.

PROPERTIES OF SRM 4330B

Certified values

Radionuclide	**Plutonium-239**
Reference time	**1200 EST, 15 November 1999**
Massic activity of the solution [b]*	**39.24 Bq·g^{-1}**
Relative expanded uncertainty (k=2)	**0.68% [c] [d]**
Solution density	**(1.101 ± 0.002) g·mL^{-1} at 21.4 °C [e]**

Uncertified values

Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule.		
Ampoule specifications	Body outside diameter Wall thickness Barium content Lead oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution mass	Approximately 5.5 grams		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L^{-1})	Mass Fraction (g·g^{-1})
	H_2O	50	0.82
	HNO_3	3.1	0.18
	HCl	0.02	0.0007
	$^{239}Pu(NO_3)_6$	8×10^{-8}	5×10^{-8}
Radiological Properties:			
Alpha-particle-emitting impurities	None detected [f]		
Photon-emitting impurities	None detected [g]		
Half lives used	Plutonium-239: (24110 ± 30) a [h] [5]		
Calibration method and measuring instrument(s)	Two 4πα liquid scintillation counting systems		

*Notes and references are on pages 5 and 6.

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [c] [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, $u(x_i)/x_i$, (%) [i]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [j]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [k]
Massic alpha-particle emission rate, corrected for background and decay	Standard deviation of the mean for 18 sets of $4\pi\alpha$ liquid scintillation measurements (A)	0.02	1.0	0.02
Half life of plutonium-239	Standard uncertainty of the half life (A)	0.11 [m]	0.0005 [n]	0.00005
Decay-scheme data	Standard uncertainty of the probability of decay by alpha particle emission (A)	0.001	1.0	0.001
Gravimetric measurements	Estimated (B)	0.10	1.0	0.10
Live-time [p]	Estimated (B)	0.10	1.0	0.10
Alpha particle detection efficiency of the liquid scintillation counting systems [q]	Estimated (B)	0.27	1.0	0.27
Alpha particle-emitting impurities	Limit of detection (B) [r]	100.	0.001	0.10
Photon emitting impurities	Limit of detection (B) [r]	100.	0.001	0.10
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.34
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				0.68

*Notes and references are on pages 5 and 6

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 (μSv/h):	<0.1	-	

[b] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[c] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| \cdot u(x_i)$, 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].

[d] The value of each component of combined standard uncertainty, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic 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).

[e] The stated uncertainty is two times the standard uncertainty.

[f] Estimated limits of detection for alpha-particle emitting impurities are:
0.04 $s^{-1} \cdot g^{-1}$ for energies less than 4.9 MeV and
0.001 $s^{-1} \cdot g^{-1}$ for energies greater than 5.2 MeV.
From mass-spectrometric measurements performed by the supplier, the massic activities of other detected radionuclides (in $Bq \cdot g^{-1}$ at the reference time) are:
^{240}Pu: 0.002; ^{241}Pu: ≈0.02; ^{242}Pu: ≈0.000003; ^{241}Am: ≈0.001
From the photon measurements below, we have ^{241}Am: ≤0.0006

[g] Estimated limits of detection for photon emitting impurities are:
0.000200 $s^{-1} \cdot g^{-1}$ for energies between 42.5 and 90 keV,
0.000080 $s^{-1} \cdot g^{-1}$ for energies between 102 and 125 keV,
0.000030 $s^{-1} \cdot g^{-1}$ for energies between 133 and 1456 keV, and
0.000008 $s^{-1} \cdot g^{-1}$ for energies between 1465 and 3500 keV,
provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of plutonium-239

[h] The stated uncertainty is the standard uncertainty.

[i] Relative standard uncertainty of the input quantity x_i.

[j] 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.

[k] 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.

[m] 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.

[n] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[p] The live time is determined by counting the pulses from a gated oscillator.

[q] Includes the uncertainty in the alpha-particle detection efficiency of the liquid-scintillation cocktail and the uncertainty associated with the finite detection threshold of the counting electronics.

[r] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{$(response per Bq of impurity)/(response per Bq of plutonium-239)$\} \cdot \{$(Bq of impurity)/(Bq of plutonium-239)$\}$. 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), March 2000.

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 8

CHAIN OF CUSTODY

8

Paragon Analytics

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0603120
Client Name: Allwest Remediation, Inc
Client Project Name: Sterling
Client Project Number: 05-8513EI
Client PO Number:

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
F4-N	0603120-1		SOIL	17-Mar-06	
B5-S	0603120-2		SOIL	17-Mar-06	
C10-W	0603120-3		SOIL	17-Mar-06	
N8-W	0603120-4		SOIL	17-Mar-06	
M10-W	0603120-5		SOIL	17-Mar-06	

DATA CHEM LABORATORIES, INC.

DataChem Laboratories, Inc.
Field Chain-of-Custody Record

06003120

Page ____ of ____

Client Name & Address:
Allwest Remediation
1201 N Barsten Way
Anaheim CA 92806

Phone: 714.237.1201
FAX: 714.237.1202
e-mail: rscott@allwestrem.com

Project No.: 05-~~8520~~ 8513EI
Project Name: Sterling
Sampler: (Signature)

Analyses Requested: S.:90 | TVZ35,235,240

Field Sample Number	Site ID	Date	Time	Depth	DCL Sample Number	Preservation Code	Sample Matrix Code	Sample for MS/MSD	S.:90	TVZ35,235,240	No. Containers	Remarks
F4-N		3/17/06			1				X	X		
B5-S		↓			2				X	X		
C10-W					3				X	X		
N8-W					4				X	X		
M10-W					5				X	X		

Matrix Codes: W Water, S Soil, L Liquid, F Filter, O Oil, A Air, SL Sludge, M Metals
Preservation Codes: 1) None, 2) HNO3 pH<2, 3) HCl pH<2, 4) H2SO4 pH<2, 5) NaOH pH>12, 6) ZnAc/NaOH pH>9, 7) Other

Possible Hazard Identification
☐ Non-Hazard ☐ Skin Irritant ☐ Rad
☐ Flammable ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client
☐ Disposal by Lab
☐ Archive for ____ Months
(a fee may be assessed if samples are retained longer than 3 months)

Requested Turn Around Time
☐ 48 Hours (Rush) ☐ 7 Days ☐ 21 Days
☐ 72 Hours (Rush) ☒ 14 Days ☐ Other
(Rush is email or fax data unless previously approved)

Carrier/Airbill #:

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
		3.20.06	0955
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

Shipped to:
DataChem Laboratories, Inc.
960 West LeVoy Drive
Salt Lake City, UT 84123
Phone: (800) 356-9135
Phone: (801) 266-7700
FAX: (801) 268-9992
www.datachem.com

CoC.xls

7/30/2004 Revision

000057

Paragon Analytics

CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Allwest

Workorder No: 0603120

Project Manager: LS

Initials: JLR Date: 3/20/06

1	Does this project require any **special handling** in addition to standard Paragon procedures?		YES	NO
2	Are custody **seals** on **shipping containers** intact?	NONE	YES	NO
3	Are Custody seals on **sample containers** intact?	NONE	YES	NO
4.	Is there a **COC (Chain-of-Custody) present** or other representative documents?		YES	NO
5.	Are the **COC and bottle labels complete and legible?**		YES	NO
6.	Is the **COC in agreement** with samples received? (IDs, dates, times, no of samples, no of containers, matrix, requested analyses, etc.)		YES	NO
7	Were **airbills / shipping documents** present and/or removable?	DROP OFF	YES	NO
8.	Are all aqueous **samples requiring preservation preserved correctly?** (excluding volatiles)	N/A	YES	NO
9.	Are all aqueous **non-preserved samples pH 4-9?**	N/A	YES	NO
10	Is there **sufficient sample** for the requested analyses?		YES	NO
11	Were all samples placed in the **proper containers** for the requested analyses?		YES	NO
12.	Are all samples **within holding times** for the requested analyses?		YES	NO
13.	Were all sample containers received **intact?** (not broken or leaking, etc.)		YES	NO
14	Are all samples requiring no headspace (VOC, GRO, Rx CN/S, radon), headspace free? **Size of bubble:** ____ < green pea ____ > green pea	N/A	YES	NO
15	Were samples checked for and free from the presence of **residual chlorine?** (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	N/A	YES	NO
16.	Were the samples **shipped on ice?**		YES	NO
17	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #: 1

Temperature (°C): AMB

No. of custody seals on cooler: 0

DOT Survey/ Acceptance Information

External µR/hr reading: 13

Background µR/hr reading: 12

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 3/20/06

*IR Gun #2: Oakton, SN 29922500201-0066 *IR Gun #4: Oakton SN 23722220101-0002

FedEx Express US Airbill 8482 4418 0825

Recipient's Copy

1 From This person can be removed for Recipient's records. 8482441808 25

Date 3/17/06 FedEx Tracking Number

Sender's Name Richard Scott Phone 714 237-1201

Company ALLWEST REMEDIATION INC

Address 1201 N BARSTEN WAY Dept./Floor/Suite/Room

City ANAHEIM State Zip 92806-1822

2 Your Internal Billing Reference 05-05-13-E1

3 To

Recipient's Name Project Manager Phone 800 943-1511

Company Paragon Analytics

Recipient's Address

Address 225 Commerce St.

City Fort Collins State CO Zip 80524

8482 4418 0825

4a Express Package Service

Packages up to 150 lbs.

FedEx Priority Overnight

FedEx Standard Overnight

FedEx First Overnight

FedEx 2Day

FedEx Express Saver

13

4b Express Freight Service

Packages over 150 lbs.

FedEx 1Day Freight

FedEx 2Day Freight

5 Packaging

FedEx Envelope

FedEx Pak

FedEx Tube

Other

6 Special Handling

SATURDAY Delivery

HOLD at FedEx Location

Does this shipment contain dangerous goods?

No

Yes Shipper's Declaration not required

Dry Ice

Cargo Aircraft Only

7 Payment Bill to:

Sender

Recipient

Third Party

Credit Card

Cash/Check

Total Packages 1

Total Weight 5

8 Sign to Authorize Delivery Without a Signature

AMB

4LB

See back for peel and stick shipping label, if any.

open

000059

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 9

ADDITIONAL SUPPORTING DOCUMENTATION

9

Alpha Spectroscopy

Quality Control Data

Weekly Background, Energy, and Efficiency Calibrations

Calibration Data Summary

Laboratory Name: Paragon Analytics
PAI Work Order: 0603120

Prep SOP: PAI 777
Analytical SOP: PAI 714

Reported on: Wednesday, March 29, 2006
8:25:43 AM

Lab Sample ID Spectrum Analysis Date	QC Type	Batch ID Analysis Run	Test Name	Detector Id	Eff Spectrum Bkg Spectrum Egy Spectrum	Eff Date Bkg Date Egy Date	RESULTS %Efficiency Bkg CPM Energy keV	FLAGS Efficiency Background Energy	LCL %Efficiency Bkg CPM Energy keV	LWL %Efficiency Bkg CPM Energy keV	UWL %Efficiency Bkg CPM Energy keV	UCL %Efficiency Bkg CPM Energy keV
0603120-1	SMP	AS060322-1	PulSO	4	C6032104	3/21/2006	30.66	Pass	28.67	29.17	31.19	31.69
Spectrum #1		AS060322-1A			B6032104	3/21/2006	0.0210	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032104	3/21/2006	5543.7	Pass	5505.7	5515.7	5595.7	5605.7
0603120-2	SMP	AS060322-1	PulSO	4	C6032104	3/21/2006	30.66	Pass	28.67	29.17	31.19	31.69
Spectrum #1		AS060322-1A			B6032104	3/21/2006	0.0210	Pass	0.0000	0.0102	0.1002	0.1500
3/27/2006					C6032104	3/21/2006	5543.7	Pass	5505.7	5515.7	5595.7	5605.7
0603120-2	DUP	AS060322-1	PulSO	7	C6032107	3/21/2006	31.61	Pass	29.98	30.51	32.61	33.14
Spectrum #1		AS060322-1A			B6032107	3/21/2006	0.0190	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032107	3/21/2006	5547.7	Pass	5495.9	5505.9	5585.9	5595.9
0603120-3	SMP	AS060322-1	PulSO	8	C6032108	3/21/2006	31.71	Warning	30.56	32.10	33.24	33.78
Spectrum #1		AS060322-1A			B6032108	3/21/2006	0.0180	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032108	3/21/2006	5557.7	Pass	5500.0	5510.0	5590.0	5600.0
0603120-4	SMP	AS060322-1	PulSO	50	C6032150	3/21/2006	31.48	Pass	29.52	30.03	32.11	32.62
Spectrum #2		AS060322-1A			B6032150	3/21/2006	0.0220	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032150	3/21/2006	5553.8	Pass	5486.2	5496.2	5576.2	5586.2
0603120-5	SMP	AS060322-1	PulSO	51	C6032151	3/21/2006	31.58	Pass	30.62	31.16	33.30	33.84
Spectrum #2		AS060322-1A			B6032151	3/21/2006	0.0250	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032151	3/21/2006	5546.0	Pass	5505.8	5515.8	5595.8	5605.8
AS060322-1	MB	AS060322-1	PulSO	52	C6032152	3/21/2006	29.66	Pass	28.67	29.17	31.19	31.69
Spectrum #2		AS060322-1A			B6032152	3/21/2006	0.0070	Warning	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032152	3/21/2006	5545.9	Pass	5496.0	5506.0	5586.0	5596.0
AS060322-1	LCS	AS060322-1	PulSO	53	C6032153	3/21/2006	30.80	Pass	29.09	29.60	31.64	32.15
Spectrum #2		AS060322-1A			B6032153	3/21/2006	0.0180	Pass	0.0000	0.0102	0.1002	0.1500
3/25/2006					C6032153	3/21/2006	5536.2	Pass	5486.2	5496.2	5576.2	5586.2

Data Package ID: *PU0603120-1*

Abbreviations:

Eff - Efficiency	Bkg - Background	LCL - Lower Control Limit	UWL - Upper Warning Limit
Egy - Energy	CPM - Counts per Minute	LWL - Lower Warning Limit	UCL - Upper Control Limit

CI - The Analysis Date exceeds the Calibration Date by more than 7 days.

Date Printed: Thursday, March 30, 2006

00062

Alpha Spec Calibration Source Re-Certification

F:\INSTV\ALPHA\CLCRTC705.XLS

Primary Certified Source
Source PAI ID 190 was recalibrated by Isotope Products Laboratories on 07-15-2005 and recieved by PAI on 03-04-2003.

Source ID: 92MIX223027; PAI ID 190 (Labled #9)
Total Activity: 3769 dpm
Ref. Date: 7/15/05
Count Date: 7/18/05

U-234 Activity:	79.16%	=	2983.80	dpm (decay corrected)
U-235 Activity:	1.74%	=	65.70	dpm (decay corrected)
Am-241 Activity:	19.09%	=	719.39	dpm (decay corrected)
Combined Activity:		=	3768.89	dpm (decay corrected)

Detector 13 Efficiency Determination

Source Serial #	PAI ID	Count Date	Am-241 net cts	U-234 net cts	U-235 net cts	count dur (s)	Combined cpm	Known dpm	detector efficiency
92MIX223027	190	7/18/05	7912	32697	846	2100	1184.429	3768.89	31.43%

Sources 1 through 8 activity determination

Source Serial #	PAI ID	Count Date	Am-241 net cts	U-234 net cts	U-235 net cts	count dur (s)	detector efficiency	Am-241 dpm	U-234 dpm	U-235 dpm	combined dpm
92MIX2203026	182	7/18/05	13745	81121	1977	2100	31.43%	1249.63	7375.13	179.74	8804.50
92MIX2203028	183	7/18/05	15998	156163	3408	2100	31.43%	1454.46	14197.59	309.84	15961.89
92MIX2203024	184	7/18/05	72865	75278	1967	2100	31.43%	6624.54	6843.92	178.83	13647.28
92MIX2203021	185	7/18/05	23414	64002	1955	2100	31.43%	2128.69	5818.76	177.74	8125.18
92MIX2203025	186	7/20/05	102858	124417	2881	2100	31.43%	9351.36	11311.40	261.93	20924.68
92MIX2203022	187	7/20/05	80030	84756	2049	2100	31.43%	7275.95	7705.61	186.29	15167.84
92MIX2203023	188	7/20/05	46260	71874	1614	2100	31.43%	4205.74	6534.44	146.74	10886.92
92MIX2203029	189	7/20/05	35161	218294	5201	2100	31.43%	3196.67	19846.25	472.85	23515.77

Detector 13 Efficiency Verification

Source Serial #	PAI ID	Count Date	Am-241 net cts	U-234 net cts	U-235 net cts	count dur (s)	Combined cpm	Known dpm	detector efficiency	% difference from 1st count
92MIX223027	190	7/20/05	7478	32440	803	2100	1140.514	3768.89	30.26%	3.71%

Sources 1 through 8 activity re-verification

Source Serial #	PAI ID	Combined Observed dpm	Combined Certified dpm*	Percent Difference %	Within 5% of Certified value Yes/No
92MIX2203026	182	8804.50	8872.93	-0.77%	Yes
92MIX2203028	183	15961.89	16017.90	0.35%	Yes
92MIX2203024	184	13647.28	13616.96	0.22%	Yes
92MIX2203021	185	8125.18	8124.40	0.01%	Yes
92MIX2203025	186	20924.68	21136.26	-1.00%	Yes
92MIX2203022	187	15167.84	15415.08	-1.60%	Yes
92MIX2203023	188	10886.92	10801.12	0.79%	Yes
92MIX2203029	189	23515.77	23650.94	-0.57%	Yes

*Certificate values decay corrected to the count date

All OK
Source 182-189
expire 7/18/06
8/10/05

000063

AlphaVision v5.3

Alpha-Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:48:38PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 190 (Source 9) Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Weight : 1 00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO#190
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

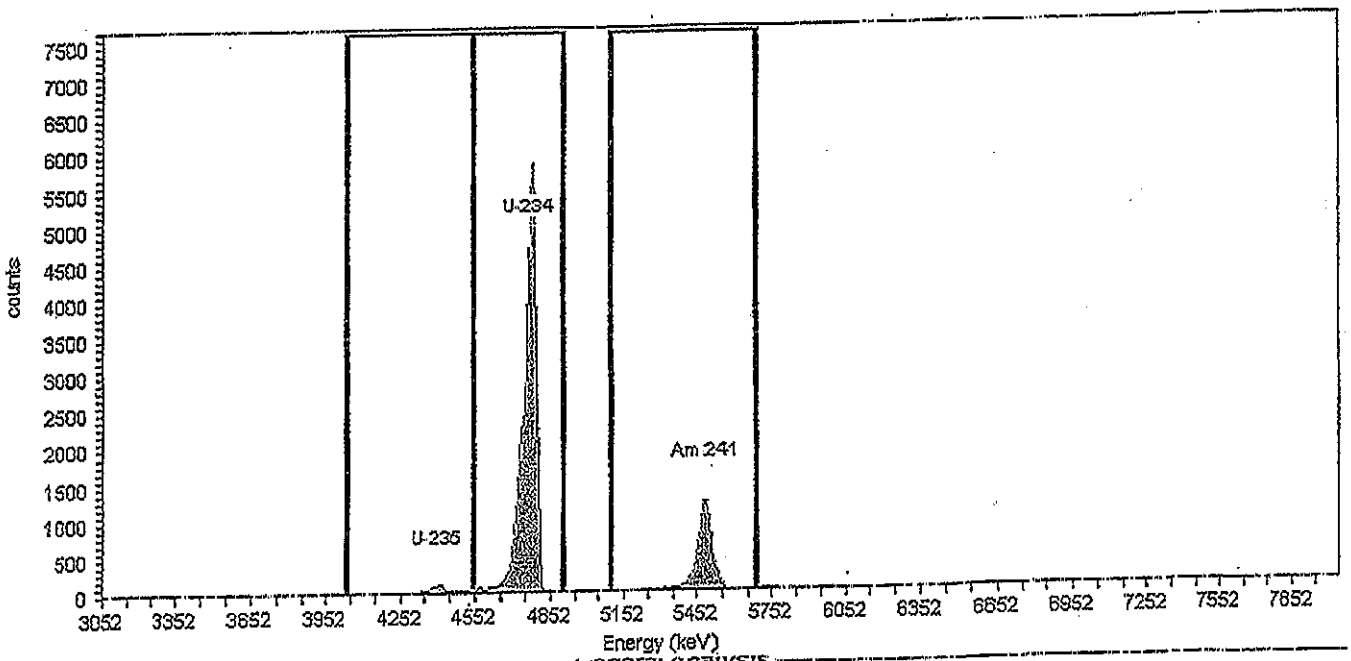
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/18/2005 1:18:16PM
Live Time: 35.00 min
Real Time: 35 01 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration:42 011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042.97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/15/2005 12:00:58PM
MDA Constants: Kα = 1 65 , Kβ = 1.65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393.315	4031 265	4540 092	70.412	99 7	846.00	0 0000	846	7 662E+001	2.643E+000	0 000E+000	2 451E-001
U-234	4765.150	4540.092	4902 142	66.677	100 0	32,697 00	0.0000	32,697	2 951E+003	1.779E+001	0 000E+000	2 442E-001
Am-241	5479.465	5097 845	5684 953	69.934	100 0	7,913 00	1 1667	7,912	7 146E+002	8 216E+000	2 362E-001	7 168E-001

AlphaVision v5.3

Alpha-Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:49:42PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 182 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 182 (source1)
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

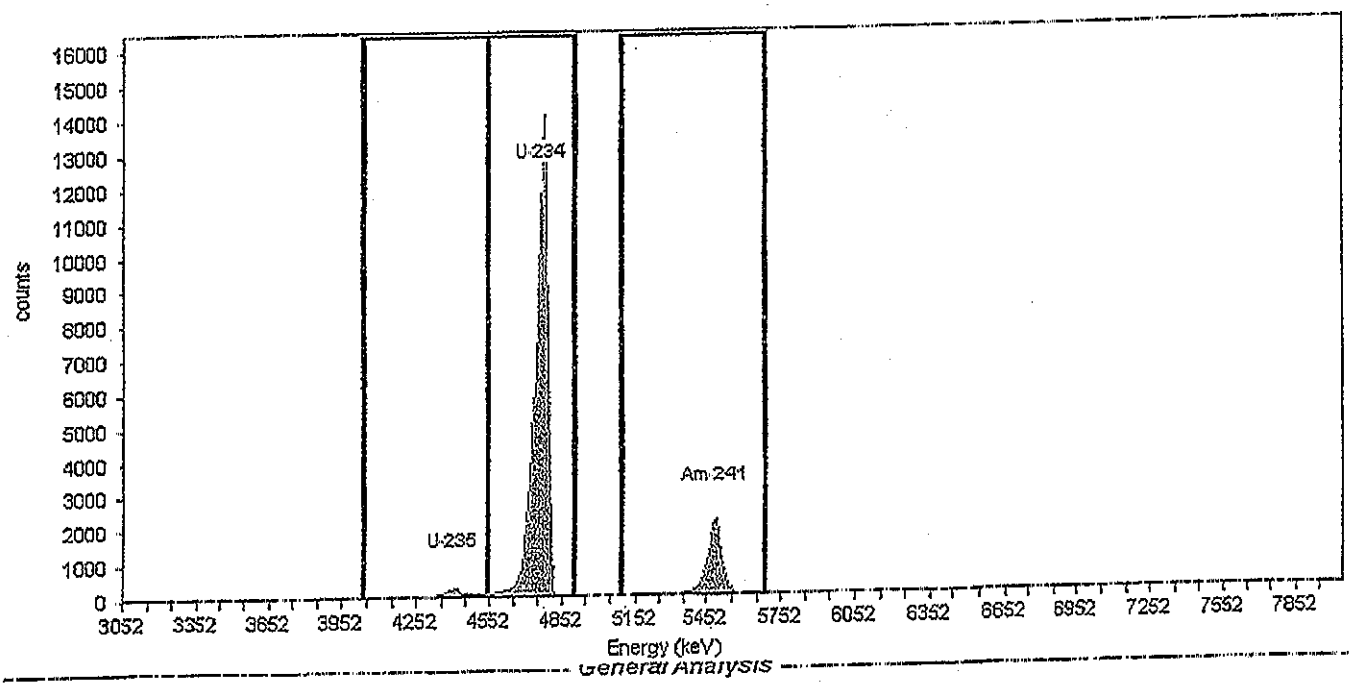
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/18/2005 2:38:53PM
Live Time: 35.00 min
Real Time: 35 03 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42 011005
Efficiency Calibration:42.011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9 7851 keV / Ch
Offset = 3,042.97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/15/2005 12:00:06PM
MDA Constants: Kα = 1.65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393 315	4031.265	4540.092	70 471	99 7	1,977 00	0 0000	1,977	1.791E+002	4 051E+000	0 000E+000	2 451E-001
U-234	4765.150	4540.092	4902.142	67 121	100 0	81,121.00	0.0000	81,121	7 322E+003	3 113E+001	0 000E+000	2 442E-001
Am-241	5479 465	5097.845	5684 953	70.197	100 0	13,746.00	1 1667	13,745	1 241E+003	1 100E+001	2 362E-001	7 168E-001

AlphaVision v5.3

Alpha-Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:50:24PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 183 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 183
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

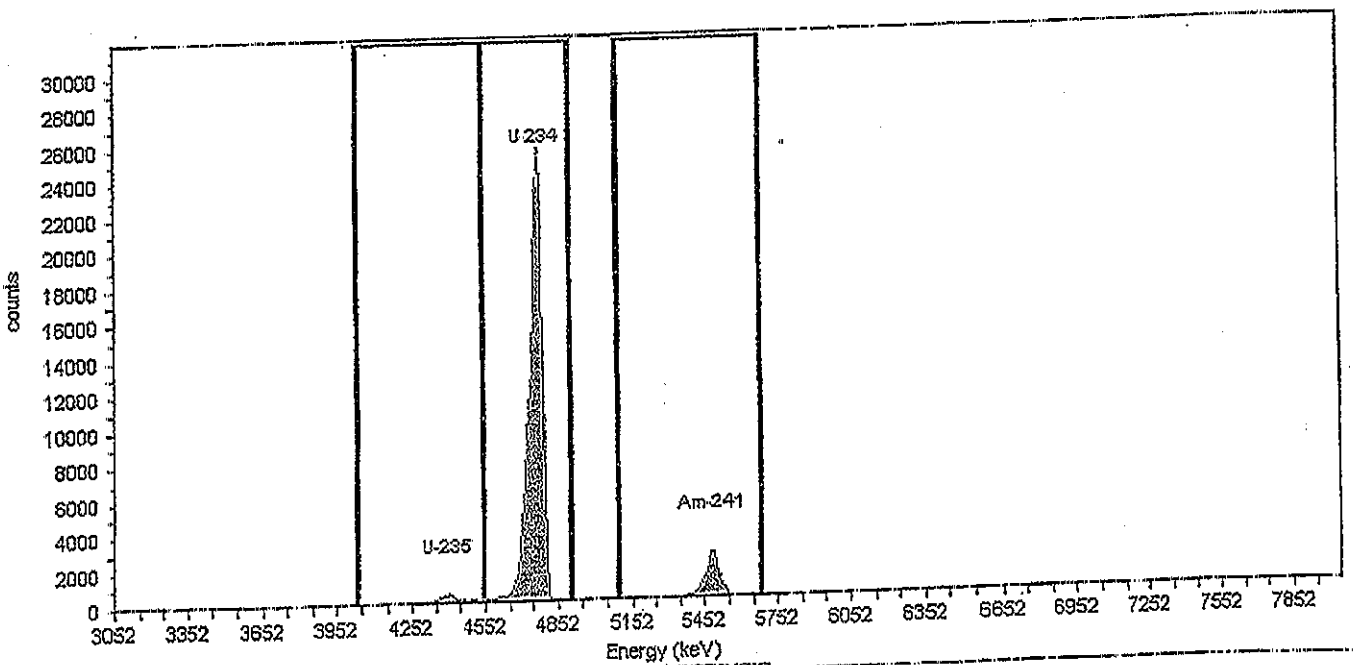
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/18/2005 3:33:05PM
Live Time: 35.00 min
Real Time: 35 06 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42 011005
Efficiency Calibration:42 011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042 97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/15/2005 12:00:31PM
MDA Constants: Kα = 1.65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393.315	4031 265	4540.092	71 711	99 7	3,408.00	0 0000	3,408	3.087E+002	5 340E+000	0.000E+000	2.451E-001
U-234	4785 150	4540.092	4902 142	67 457	100 0	156,163.00	0.0000	156,163	1 410E+004	4 913E+001	0 000E+000	2 442E-001
Am-241	5479 465	5097.845	5684 953	70.678	100 0	15,999 00	1.1667	15,998	1 445E+003	1 194E+001	2 362E-001	7 168E-001

AlphaVision v5.3

Alpha Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:50:56PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 184 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1 00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 184
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

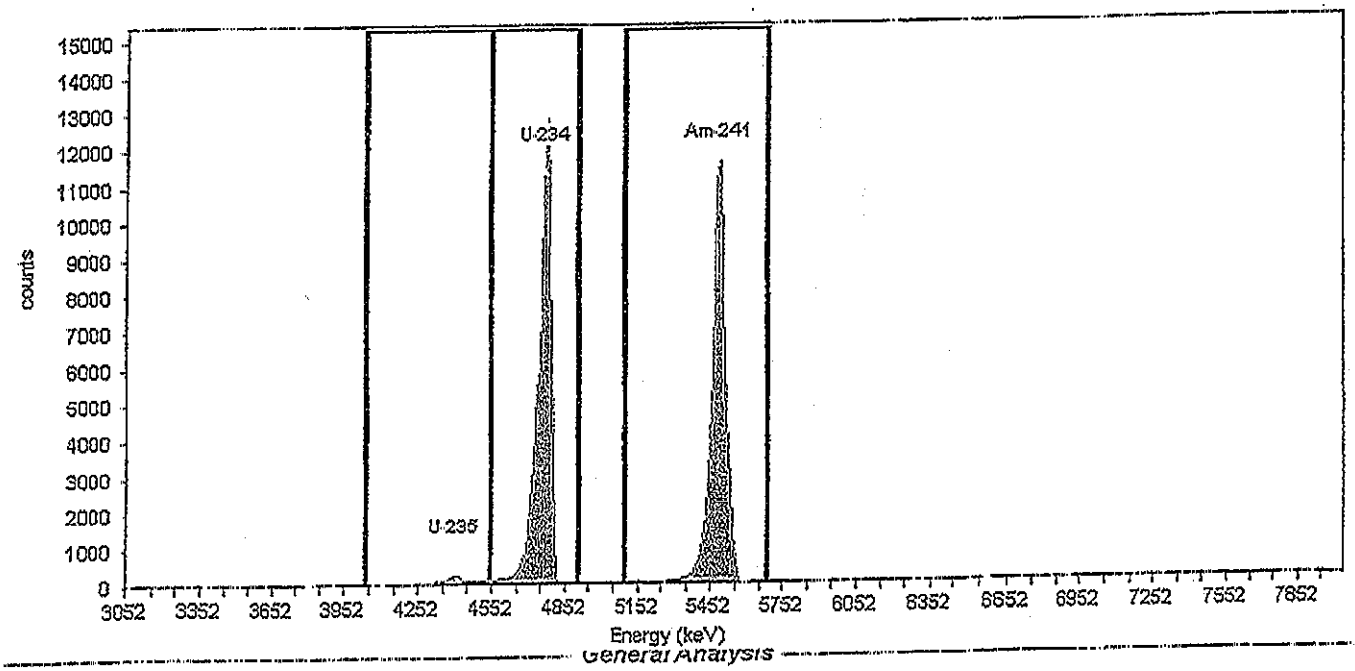
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/18/2005 4:34:58PM
Live Time: 35.00 min
Real Time: 35 05 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration:42.011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042.97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31.64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/15/2005 12:00:30PM
MDA Constants: Kα = 1 65 , Kβ = 1.65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1 00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393.315	4031.265	4540.092	70 907	99 7	1,967 00	0 0000	1,967	1 781E+002	4 041E+000	0 000E+000	2 451E-001
U 234	4765 150	4540.092	4902 142	67 844	100.0	75,278 00	0.0000	75,278	6 795E+003	2 964E+001	0 000E+000	2.442E-001
Am-241	5479 465	5097.845	5684.953	69.955	100 0	72,866.00	1 1667	72,865	6.581E+003	2 904E+001	2.362E-001	7 168E-001

AlphaVision v5.3

Alpha Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:51:53PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 185 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1 00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 185
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

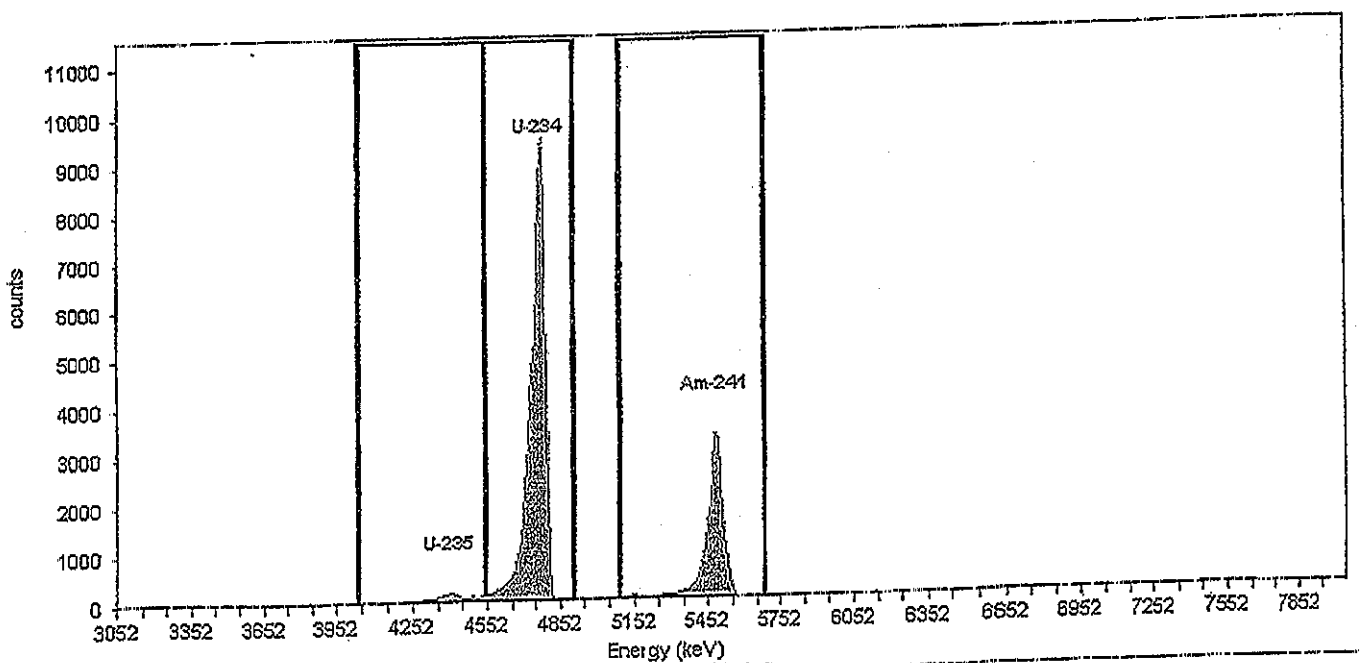
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/18/2005 5:19:30PM
Live Time: 35 00 min
Real Time: 35 03 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42 011005
Efficiency Calibration:42 011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042 97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31.64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/18/2005 5:19:13PM
MDA Constants: Kα = 1 65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1 00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393 315	4031 265	4540.092	135.566	99 7	1,955.00	0 0000	1,955	1 771E+002	4 029E+000	0 000E+000	2 451E-001
U-234	4765 150	4540 092	4902 142	71 276	100 0	64,002 00	0 0000	64,002	5 777E+003	2.670E+001	0 000E+000	2 442E-001
Am-241	5479 465	5097 845	5684 953	72.410	100 0	23,415 00	1 1667	23,414	2 115E+003	1 472E+001	2 362E-001	7 168E-001

AlphaVision v5.3

Alpha-Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:52:19PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 186 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 186
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

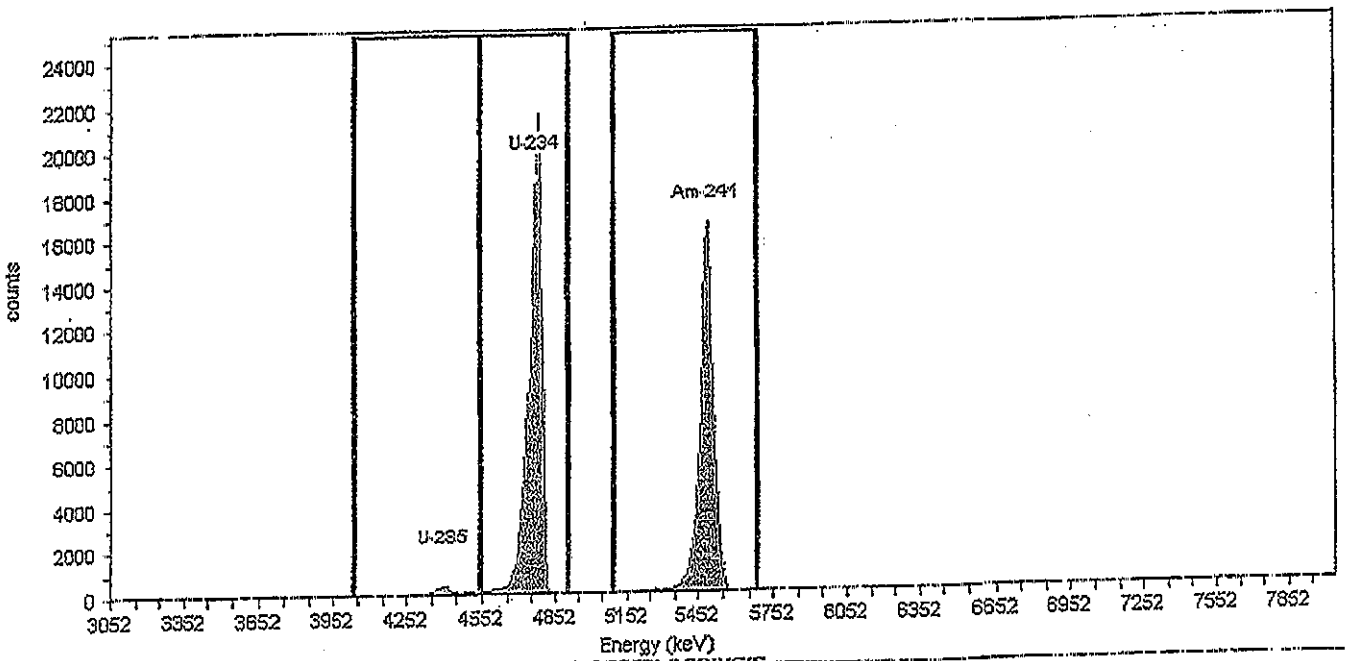
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/20/2005 10:34:14AM
Live Time: 35.00 min
Real Time: 35.07 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration: 42.011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042.97 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 31.64% +/- 0.15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction: 7/20/2005 10:33:57AM
MDA Constants: Kα = 1.65, Kβ = 1.65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393.315	4031.265	4540.092	71.040	99.7	2,881.00	0.0000	2,881	2.609E+002	4.903E+000	0.000E+000	2.451E-001
U-234	4765.150	4540.092	4902.142	67.413	100.0	124,417.00	0.0000	124,417	1.123E+004	4.169E+001	0.000E+000	2.442E-001
Am-241	5479.465	5097.845	5684.953	69.614	100.0	102,859.00	1.1667	102,858	9.290E+003	3.654E+001	2.362E-001	7.168E-001

AlphaVision v5.3 **Alpha Spectroscopy Analysis Report**

ORTEC
Oak Ridge, TN 37830
3:52:56PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 187 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1 00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSo 187
:
Description:

Client Name: Undefined
Client Contact:

Tracer

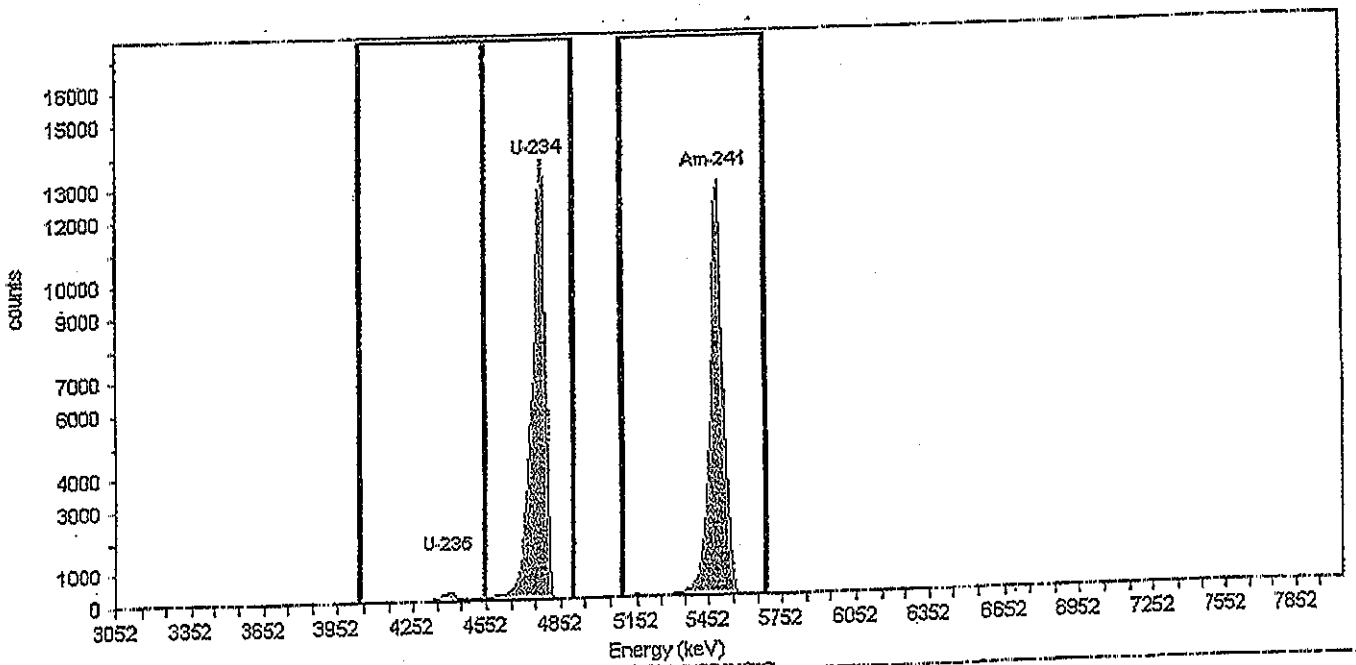
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/20/2005 11:46:26AM
Live Time: 35.00 min
Real Time: 35.05 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration:42 011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9.7851 keV / Ch
Offset = 3,042.97 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/20/2005 11:46:16AM
MDA Constants: Kα = 1.65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393.315	4031.265	4540.092	70.030	99 7	2,049.00	0.0000	2,049	1 856E+002	4 125E+000	0.000E+000	2 451E-001
U-234	4765 150	4540.092	4902 142	67 883	100 0	84,756.00	0.0000	84,756	7 650E+003	3.204E+001	0.000E+000	2.442E-001
Am-241	5479.465	5097.845	5684 953	69 660	100.0	80,031 00	1 1667	80,030	7 228E+003	3.087E+001	2 362E-001	7 168E-001

AlphaVision v5.3

Alpha Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:53:28PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 188 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 188
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

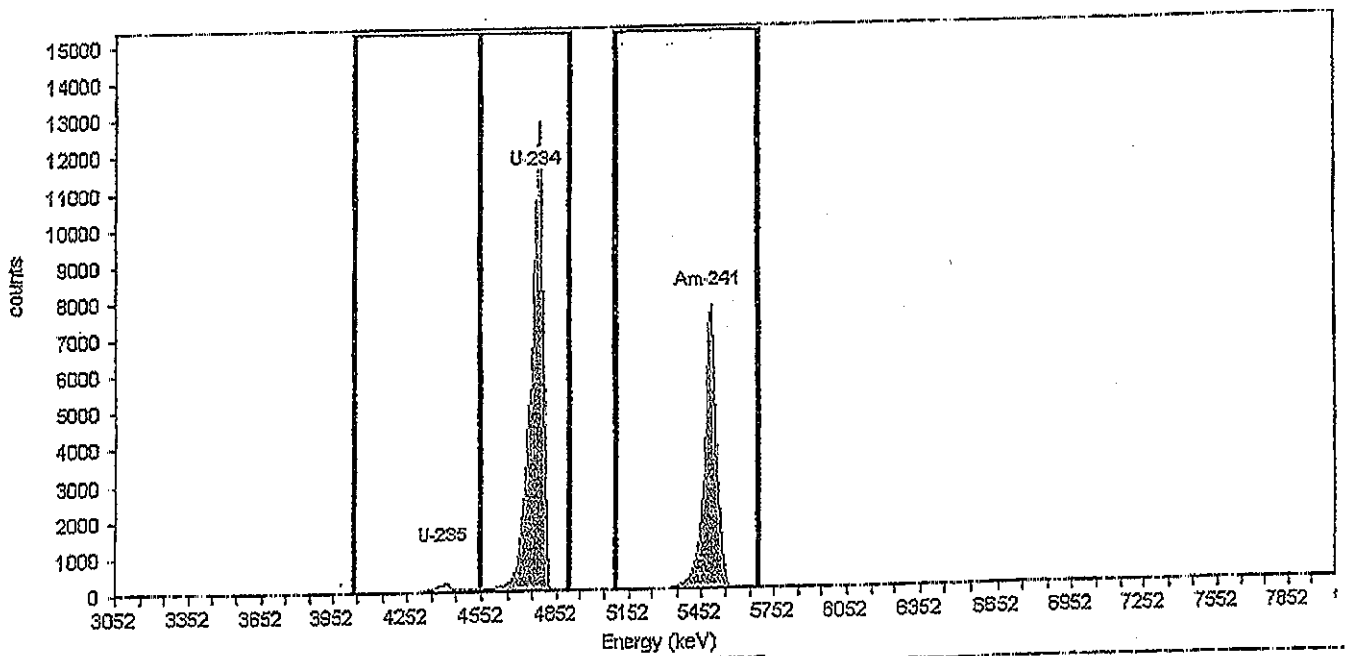
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/20/2005 12:39:14PM
Live Time: 35 00 min
Real Time: 35.04 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration:42.011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9 7851 keV / Ch
Offset = 3,042 97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31.64% +/- 0.15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/20/2005 12:38:56PM
MDA Constants: Kα = 1 65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1 00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393 315	4031 265	4540 092	69 745	99 7	1,614.00	0 0000	1,614	1 462E+002	3 657E+000	0.000E+000	2 451E-001
U-234	4765 150	4540 092	4902 142	66.493	100.0	71,874.00	0 0000	71,874	6 487E+003	2 876E+001	0.000E+000	2.442E-001
Am-241	5479 465	5097 845	5684 953	68 741	100.0	46,261 00	1 1667	46,260	4 178E+003	2 186E+001	2.362E-001	7 168E-001

AlphaVision v5.3

Alpha Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:54:37PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 189 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1 00 Sample Units: ml
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 189
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

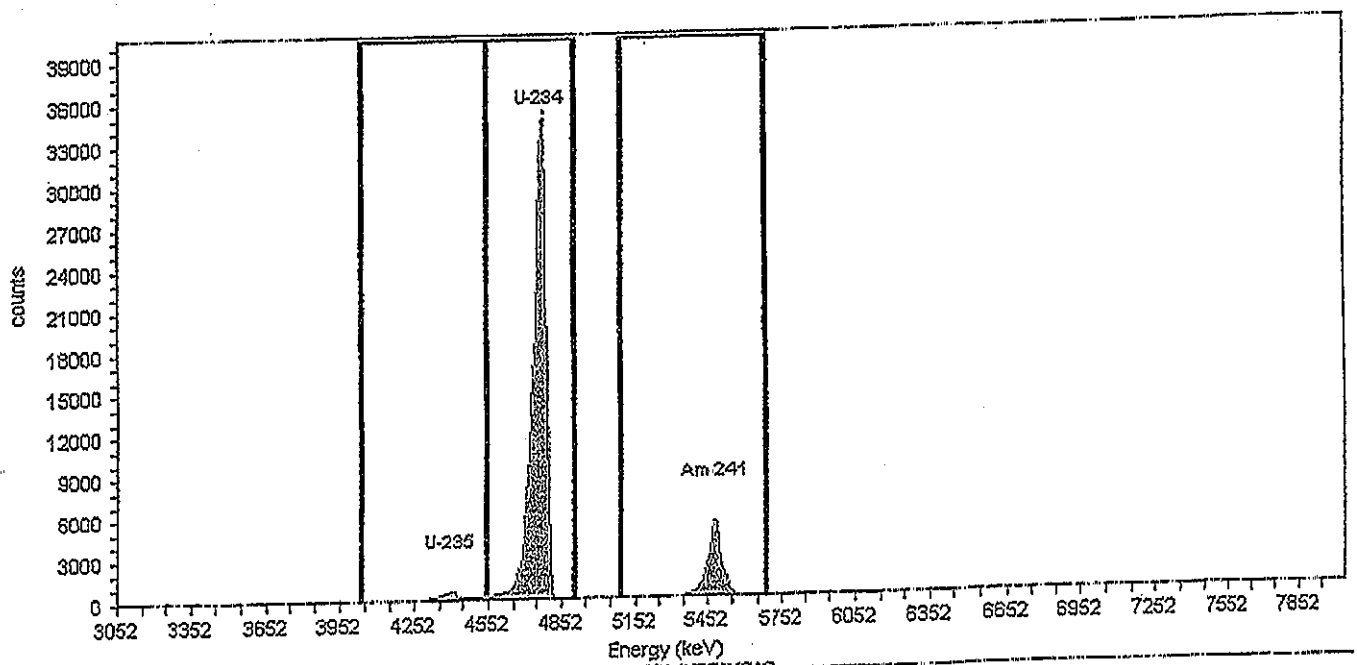
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/20/2005 1:23:20PM
Live Time: 35.00 min.
Real Time: 35 08 min.
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul 12 2005 16:29

Energy Calibration: 42.011005
Efficiency Calibration:42.011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9 7851 keV / Ch
Offset = 3,042 97 keV
Quadratic = 0 0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/20/2005 1:23:08PM
MDA Constants: Kα = 1 65 , Kβ = 1 65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393 315	4031 265	4540 092	73 209	99 7	5,201.00	0.0000	5,201	4 710E+002	6.629E+000	0.000E+000	2 461E-001
U-234	4765 150	4540.092	4902 142	69.004	100 0	218,294 00	0 0000	218,294	1 970E+004	6.332E+001	0.000E+000	2.442E-001
Am-241	5479 465	5097.845	5684.953	70.936	100 0	35,162 00	1 1667	35,161	3 176E+003	1.857E+001	2 362E-001	7.168E-001

AlphaVision v5.3

Alpha-Spectroscopy Analysis Report

ORTEC
Oak Ridge, TN 37830
3:55:11PM 7/25/2005

Analyst: ORTEC

Sample

Sample: RSO 190 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1 00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: RSO 190
:
Description:

Client Name: Paragon Analytics
Client Contact:

Tracer

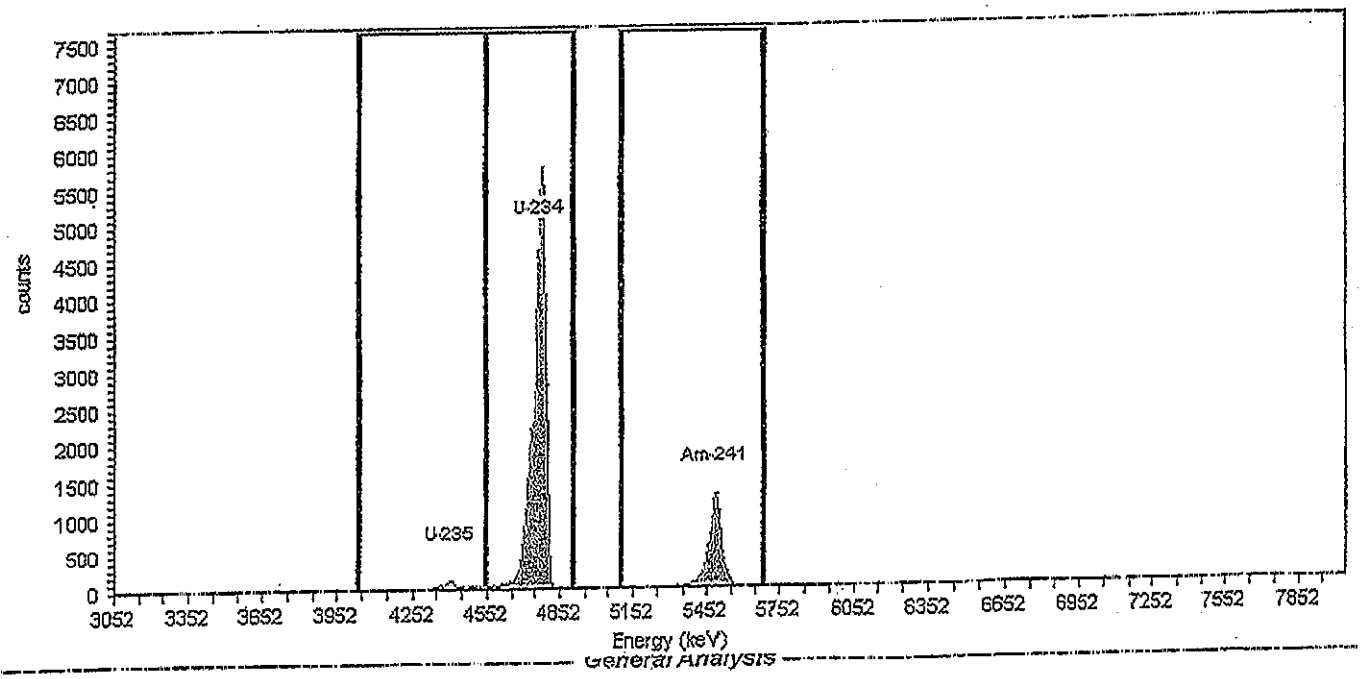
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100 00%

Acquisition

Detector: 33 SN:
Acquisition Start Date: 7/20/2005 2:35:46PM
Live Time: 35 00 min
Real Time: 35 01 min
Background Date: 7/12/2005 4:29:57PM
Bkgd Info: Sample: test33; Det: 33; Spectrum #1; Jul-12-2005 16:29

Energy Calibration: 42 011005
Efficiency Calibration:42 011005
Calibration Date: 1/10/2005 5:38:32PM
Energy Cal Gain = 9 7851 keV / Ch
Offset = 3,042 97 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 31 64% +/- 0 15% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Calibration
Decay Correction:7/20/2005 2:35:04PM
MDA Constants: Kα = 1 65 , Kβ = 1.65

Nuclide Library: Calibration
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-235	4393 315	4031 265	4540.092	71 000	99 7	803 00	0 0000	803	7 273E+001	2 575E+000	0.000E+000	2 451E-001
U-234	4765 150	4540.092	4902 142	66 425	100 0	32,440 00	0.0000	32,440	2.928E+003	1 771E+001	0 000E+000	2 442E-001
Am-241	5479.465	5097 845	5684 953	68 581	100 0	7,479 00	1.1667	7,478	6 754E+002	7 978E+000	2 362E-001	7 168E 001

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661 309-1010
Fax 661-257-8303

RSO # 190
Rec'd 7/18/05 DCB
RECERTIFICATION 7/15/05

49

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide A: U-234
Radionuclide B: U-235
Radionuclide C: Am-241
Half Life (U-234): (2.454 ± 0.006)E+05 years
Half Life (U-235): (7.037 ± 0.011)E+08 years
Half Life (Am-241): 432.17 ± 0.66 years

Customer: PARAGON ANALYTICS, INC
P.O. No.: 92MIX223027/R3232
Catalog No.: MISC-STD
Reference Date: 15-Jul-05 12:00 PST
Source No.: 92MIX223027

Contained Radioactivity:

U-234:	1.344	nCi	(49.73 Bq)
U-235:	0.02960	nCi	(1.095 Bq)
Am-241:	0.3241	nCi	(11.99 Bq)
Total Activity:	1.698	nCi	(62.82 Bq)

Physical description:

A. Capsule type: Disk (22 mm OD X 0.79 mm THK)
B. Nature of active deposit: Electrodeposited and diffusion bonded oxides
C. Active Diameter: 19 mm
D. Backing: Stainless steel
E. Cover: None

Radioimpurities: Not determined

Method of Calibration:
This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in May 2001.

Uncertainty of Measurement:

A. Type A (random) uncertainty: ± 1.1%
B. Type B (systematic) uncertainty: ± 3.0%
C. Uncertainty in aliquot weighing: ± 0.0%
D. Total uncertainty at the 99% confidence level: ± 3.2%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 1903 α/min in 2π on 14 Jul 05.

Quality Control

14 Jul 05
Date Signed

IPL Ref. No: 731-90

000074

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

α 1

P.A.T 187
recalibrated 4-15-03

CERTIFICATE OF CALIBRATION
MIXED ALPHA STANDARD SOURCE

Radionuclide A:	U-234	Customer:	PARAGON ANALYTICS, INC
Radionuclide B:	U-235	P.O No.:	EW040203/R2193
Radionuclide C:	Am-241	Catalog No.:	MISC-STD
Half Life (U-234):	(2.454 ± 0.006)E+05 years	Reference Date:	1-May-03 12:00 PST
Half Life (U-235):	(7.037 ± 0.011)E+08 years	Source No.:	92MIX2203026
Half Life (Am-241):	432.17 ± 0.66 years		

Contained Radioactivity:

U-234:	3.354	nCi	(124.1 Bq)	Am-241:	0.5793	nCi	(21.43 Bq)
U-235:	0.06566	nCi	(2.429 Bq)	Total Activity:	3.999	nCi	(148.0 Bq)

Physical description:

A. Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B. Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C. Active Diameter:	19 mm
D. Backing:	Stainless steel
E. Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Mar 1998

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.7%
B. Type B (systematic) uncertainty:	± 3.0%
C. Uncertainty in aliquot weighing:	± 0.0%
D. Total uncertainty at the 99% confidence level:	± 3.1%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 4483 α/min in 2π on 11 Apr 03

Daniel James Van Dalsem
Quality Control

15-Apr-03
Date Signed

IPL Ref No.: 987-7

000075

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309-1010
Fax 661-257-8303

α2
PAI 183
Recalibrated 4-15-03

CERTIFICATE OF CALIBRATION
MIXED ALPHA STANDARD SOURCE

Radionuclide A: U-234
Radionuclide B: U-235
Radionuclide C: Am-241
Half Life (U-234): (2.454 ± 0.006)E+05 years
Half Life (U-235): (7.037 ± 0.011)E+08 years
Half Life (Am-241): 432.17 ± 0.66 years

Customer: PARAGON ANALYTICS, INC
P.O. No.: EW040203/R2193
Catalog No.: MISC-STD
Reference Date: 1-May-03 12:00 PST
Source No.: 92MIX2203028

Contained Radioactivity:

U-234:	6.467	nCi	(239.3 Bq)
U-235:	0.1135	nCi	(4.200 Bq)
Am-241:	0.6366	nCi	(23.55 Bq)
Total Activity:	7.217	nCi	(267.1 Bq)

Physical description:

A Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C Active Diameter:	19 mm
D Backing:	Stainless steel
E Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Aug 1992.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.7%
B. Type B (systematic) uncertainty:	± 3.0%
C. Uncertainty in aliquot weighing:	± 0.0%
D. Total uncertainty at the 99% confidence level:	± 3.1%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 8091 α/min in 2π on 11 Apr 03

Daniel James Van Dalsem
Quality Control

15-Apr-03
Date Signed

IPL Ref No.: 987-7

000076

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661 309-1010
Fax 661-257-8303

α3

PAI I.D 184
recalibrated 4-15-03

CERTIFICATE OF CALIBRATION
MIXED ALPHA STANDARD SOURCE

Radionuclide A:	U-234	Customer:	PARAGON ANALYTICS, INC
Radionuclide B:	U-235	P O No.:	EW040203/R2193
Radionuclide C:	Am-241	Catalog No:	MISC-STD
Half Life (U-234):	(2 454 ± 0 006)E+05 years	Reference Date:	1-May-03 12:00 PST
Half Life (U-235):	(7 037 ± 0 011)E+08 years	Source No:	92MIX2203024
Half Life (Am-241):	432 17 ± 0 66 years		

Contained Radioactivity:

U-234:	3.227	nCi	(119 4 Bq)	Am-241:	2 866	nCi	(106 0 Bq)
U-235:	0 05205	nCi	(1 926 Bq)	Total Activity:	6 145	nCi	(227 3 Bq)

Physical description:

A Capsule type:	Disk (22 mm OD X 0 79 mm THK)
B Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C Active Diameter:	19 mm
D Backing:	Stainless steel
E Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity Individual nuclide ratios were taken from those determined in Aug 1992.

Uncertainty of Measurement:

A Type A (random) uncertainty:	± 0 6%
B Type B (systematic) uncertainty:	± 3 0%
C Uncertainty in aliquot weighing:	± 0 0%
D Total uncertainty at the 99% confidence level:	± 3 1%

Notes:

See reverse side for leak test(s) performed on this source

- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4 15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 6889 α/min in 2π on 11 Apr 03

Daniel Thomas Van Delsen
Quality Control

15-Apr-03
Date Signed

IPL Ref No.: 987-7

000077

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661 309-1010
Fax 661-257-8303

α4

PAI ID 0C185
recd from recalibration
3-28-03

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide A:	U-234	Customer:	PARAGON ANALYTICS, INC
Radionuclide B:	U-235	P.O. No.:	EW030603/R2155
Radionuclide C:	Am-241	Catalog No.:	MISC-STD
Half Life (U-234):	(2.454 ± 0.006)E+05 years	Reference Date:	1-Apr 03 12:00 PST
Half Life (U-235):	(7.037 ± 0.011)E+08 years	Source No.:	92MIX2203021
Half Life (Am-241):	432.17 ± 0.66 years		

Contained Radioactivity:

U-234:	2.731	nCi	(101.0 Bq)	Am-241:	0.9325	nCi	(34.50 Bq)
U-235:	0.03416	nCi	(1.264 Bq)	Total Activity:	3.698	nCi	(136.8 Bq)

Physical description:

A Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C Active Diameter:	19 mm
D Backing:	Stainless steel
E Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Aug 1992

Uncertainty of Measurement:

A Type A (random) uncertainty:	± 0.8%
B Type B (systematic) uncertainty:	± 3.1%
C Uncertainty in aliquot weighing:	± 0.0%
D Total uncertainty at the 99% confidence level:	± 3.2%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 4145 α/min in 2π on 18 Mar 03

Daniel James Van Dalsem
Quality Control

19-Mar-03
Date Signed

IPL Ref No.: 987-2

000078

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309-1010
Fax 661-257-8303

α5

PAT ID 00186
Specification
received 3-28-03

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide A:	U-234	Customer:	PARAGON ANALYTICS, INC
Radionuclide B:	U-235	P.O. No:	EW030603/R2155
Radionuclide C:	Am-241	Catalog No:	MISC-STD
Half Life (U-234):	(2.454 ± 0.006)E+05 years	Reference Date:	1 Apr 03 12:00 PST
Half Life (U-235):	(7.037 ± 0.011)E+08 years	Source No.:	92MIX2203025
Half Life (Am-241):	432.17 ± 0.66 years		

Contained Radioactivity:

U-234:	5.486	nCi	(203.0 Bq)	Am-241:	3.958	nCi	(146.4 Bq)
U-235:	0.09221	nCi	(3.412 Bq)	Total Activity:	9.536	nCi	(352.8 Bq)

Physical description:

A. Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B. Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C. Active Diameter:	19 mm
D. Backing:	Stainless steel
E. Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Aug 1992.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.8%
B. Type B (systematic) uncertainty:	± 3.1%
C. Uncertainty in aliquot weighing:	± 0.0%
D. Total uncertainty at the 99% confidence level:	± 3.2%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This source has a working life of 2 years.
- This source had a total alpha surface emission rate of 10690 α/min in 2π on 18 Mar 03

Daniel Kamerlin Dalsem
Quality Control

19-Mar-03
Date Signed

IPL Ref No: 987-2

000079

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309-1010
Fax 661-257-8303

α6

PAID CC 187
recd for recalibration
3-28-03

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide A: U-234
Radionuclide B: U-235
Radionuclide C: Am-241
Half Life (U-234): (2.454 ± 0.006)E+05 years
Half Life (U-235): (7.037 ± 0.011)E+08 years
Half Life (Am-241): 432.17 ± 0.66 years

Customer: PARAGON ANALYTICS, INC
P.O. No.: EW030603/R2155
Catalog No.: MISC STD
Reference Date: 1 Apr 03 12:00 PST
Source No.: 92MIX2203022

Contained Radioactivity:

U-234:	3.592	nCi	(132.9 Bq)
U-235:	0.08556	nCi	(3.166 Bq)
Am-241:	3.279	nCi	(121.3 Bq)
Total Activity:	6.957	nCi	(257.4 Bq)

Physical description:

A. Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B. Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C. Active Diameter:	19 mm
D. Backing:	Stainless steel
E. Cover:	None

Radioimpurities: Not determined

Method of Calibration:
This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Aug 1992.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.8%
B. Type B (systematic) uncertainty:	± 3.1%
C. Uncertainty in aliquot weighing:	± 0.0%
D. Total uncertainty at the 99% confidence level:	± 3.2%

Notes:
- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 7799 α/min in 2π on 18 Mar 03.

Daniel James Van Dalsem
Quality Control

19-Mar-03
Date Signed

IPL Ref No: 987-2

000080

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309 1010
Fax 661-257-8303

[α 7]

PA I.D. 188
rec'd for recalibration
3-28-03

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide A: U-234
Radionuclide B: U-235
Radionuclide C: Am-241
Half Life (U-234): (2.454 ± 0.006)E+05 years
Half Life (U-235): (7.037 ± 0.011)E+08 years
Half Life (Am-241): 432.17 ± 0.66 years

Customer: PARAGON ANALYTICS, INC
P.O. No: EW030603/R2155
Catalog No.: MISC-STD
Reference Date: 1 Apr 03 12:00 PST
Source No: 92MIX2203023

Contained Radioactivity:

U-234:	2.895	nCi	(107.1 Bq)	Am-241:	1.953	nCi	(72.26 Bq)
U-235:	0.02502	nCi	(0.9257 Bq)	Total Activity:	4.873	nCi	(180.3 Bq)

Physical description:

A Capsule type:	Disk (22 mm OD X 0.79 mm THK)
B Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C Active Diameter:	19 mm
D Backing:	Stainless steel
E Cover:	None

Radioimpurities: Not determined

Method of Calibration:
This source was assayed using a windowless internal gas flow proportional counter for total alpha activity. Individual nuclide ratios were taken from those determined in Aug 1992

Uncertainty of Measurement:

A Type A (random) uncertainty:	± 0.8%
B Type B (systematic) uncertainty:	± 3.1%
C. Uncertainty in aliquot weighing:	± 0.0%
D. Total uncertainty at the 99% confidence level:	± 3.2%

Notes:
See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 5463 α/min in 2π on 18 Mar 03

Daniel Stanner Van Dalsem
Quality Control

19-Mar-03
Date Signed

IPL Ref No: 987-2

000081

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

[α 8]

PAI ID 189
recd 9-2-03
recalibrated 4-15-03

CERTIFICATE OF CALIBRATION
MIXED ALPHA STANDARD SOURCE

Radionuclide A:	U-234	Customer:	PARAGON ANALYTICS, INC
Radionuclide B:	U-235	P O. No :	EW040203/R2193
Radionuclide C:	Am-241	Catalog No :	MISC STD
Half Life (U-234):	(2 454 ± 0 006)E+05 years	Reference Date:	1-May-03 12:00 PST
Half Life (U-235):	(7 037 ± 0.011)E+08 years	Source No :	92MIX2203029
Half Life (Am-241):	432 17 ± 0 66 years		

Contained Radioactivity:

U-234:	9 048	nCi	(334.8 Bq)	Am-241:	1.433	nCi	(53 02 Bq)
U-235:	0.1771	nCi	(6 553 Bq)	Total Activity:	10 66	nCi	(394 4 Bq)

Physical description:

A Capsule type:	Disk (22 mm OD X 0 79 mm THK)
B Nature of active deposit:	Electrodeposited and diffusion bonded oxides
C Active Diameter:	19 mm
D Backing:	Stainless steel
E Cover:	None

Radioimpurities: Not determined

Method of Calibration:

This source was assayed using a windowless internal gas flow proportional counter for total alpha activity Individual nuclide ratios were taken from those determined in Mar 1998.

Uncertainty of Measurement:

A Type A (random) uncertainty:	± 0 5%
B. Type B (systematic) uncertainty:	± 3 0%
C Uncertainty in aliquot weighing:	± 0 0%
D Total uncertainty at the 99% confidence level:	± 3 0%

Notes:

- See reverse side for leak test(s) performed on this source
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4 15)
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986
- This source has a working life of 2 years
- This source had a total alpha surface emission rate of 11950 α/min in 2π on 11 Apr 03

Daniel James Van Dalsem
Quality Control

15-Apr-03
Date Signed

IPL Ref No : 987 7

000082

COVER PAGE

Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code: SCA

California Certification No 05238CA

Laboratory Report Identification Code: 6813

Sample Matrix: Soil

Site Sample Number	Laboratory Sample Number
LCR-40	AWR06-6813-01
LCR-24	AWR06-6813-02
LCR-8	AWR06-6813-03

Comments: Other than the omission of the collection time from the chain of custody and the sample container labels, there were no problems encountered with sample receiving

"I certify that this sample data package is in compliance with contract requirements, both technically and for completeness Release of the data contained in this hard-copy sample data package has been authorized by the Vice President or the Vice President's designee, as verified by the following signature "

Signature

Edwin L. Sensintaffar	Vice President	06/15/2006
Name	Title	Date

TABLE OF CONTENTS

Section Number	Section Title	Page Number
1	Cover Page	N/A
2	Table of Contents	N/A
3	Chain of Custody(s)	1
4	Case Narrative	2
5	Sample and QC Sample Results Summary	4

Del Mar Analytical
2652 Alton Ave., Irvine, CA 92606 (949) 261-1022 FAX (949) 261-1228
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
7277 Hayvenhurst, Suite B-12, Van Nuys, CA 91406 (818) 779-1844 FAX (818) 779-1843
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-9596 FAX (858) 505-9689

SCA CABS
1000 Monticello Ct
Montgomery, Alabama
36117

CHAIN OF CUSTODY FORM

Page ____ of ____

Client Name/Address: Allwest Remediation, 1201 N Barsten Way, Anaheim, CA, 92806

Project/PO Number: ~~05-8513~~ 05-8513 EI

Project Manager: Richard Scott

Phone Number: 714-237-1201

Sampler: Richard Scott

Fax Number: 714-237-1202 RSCOTT@ALLWESTRM.COM

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	SR-90	PU-238/239/240								Special Instructions
LCR-40	SOIL	BAG	1	11/29/05	—	none	✓	✓								AWR06 6813 01
LCR-24	"	"	1	11/29/05	—	"	✓	✓								02
LCR-8	"	"	1	11/29/05	—	"	✓	✓								03

** Chain of Custody and Samples didn't have collection times. 6/2/06 CA

Relinquished By:	Date/Time:	Received by:	Date/Time:	Turnaround Time: (Check) 14 Day TAT
	6/1/06	C Clowns - SCA	6/2/06 11:30	same day ____ 72 hours ____
Relinquished By:	Date/Time:	Received by:	Date/Time:	24 hours ____ 5 days ____
				48 hours ____ normal ____
Relinquished By:	Date/Time:	Received in Lab by:	Date/Time:	Sample Integrity: (Check)
				intact ____ on ice ____

Note: By relinquishing samples to Del Mar Analytical, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

CASE NARRATIVE

California Certification No. 05238CA

Laboratory Report Identification Number: 6813

June 15, 2006

I. Introduction

On June 2, 2006, three soil samples were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The samples were requested to be reported within 14 days of receipt. The samples were analyzed in accordance with the Sanford Cohen and Associates, Southeastern Environmental Laboratory, Laboratory Quality Assurance Plan

II. Analytical Methodology

The radioanalytical results reported for the sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. The samples were analyzed by the following methods.

Radionuclide	Method Number	Method Name	Counting Method
Sr-90	SRW01	Eichrom Industries Extraction Chromatography	Gas Proportional Counting
Plutonium	ACW03	Eichrom Industries Extraction Chromatography	Alpha Spectrometry

III. Analytical Results

Deficiencies

There were no deficiencies to report.

Matrix Interferences

There were no indications of matrix interference

Detection Limits

The required detection limits (RDL) were met for all sample analyses

III. Analytical Results (continued)

Re-analysis

There were no re-analyses.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CIR

There were no contacts with the Technical Representative regarding these samples.

IV. Quality Control

Quality Control Sample Information

Site Sample Number	Laboratory Sample Number	Quality Control Type
Laboratory Type II Water	SCAQC-6813-PB1	Preparation Blank
Laboratory Type II Water	SCAQC-6813-LC1	Laboratory Control
LCR-40	SCAQC-6813-LD1	Laboratory Duplicate

The analytical results of all quality control samples met the acceptance criteria specified in SC&A's Laboratory Quality Assurance Plan.

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: S6813

Project Name: Allwest Remediation Chain-of-Custody Number: NONE Matrix: Soil
Site Sample ID: LCR-40
Other Sample ID: Collection Date: 12/1/2005 8:00:00 AM Date Received: 6/2/2006 11:30:00
Batch Number: 6813 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Analysis Date/Time	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	PU-238	AWR06-6813-01	06/09/06 15:01	0.000	0.000	0.000	0.046
ACW03	PU-239/240	AWR06-6813-01	06/09/06 15:01	0.000	0.000	0.000	0.046
SRW01	SR-90	AWR06-6813-01	06/12/06 12:23	-0.306	0.339	0.340	0.652

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB
Pu	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB1

1000 Monticello Court * Montgomery Alabama * 36117 * 334 272 2234 * FAX 334 213 0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: S6813

Project Name:	Allwest Remediation	Chain-of-Custody Number:	NONE	Matrix:	Soil
Site Sample ID:	LCR-24				
Other Sample ID:		Collection Date:	11/29/2005 8:00:00 AM	Date Received:	6/2/2006 11:30:00
		Batch Number:	6813	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Analysis Date/Time	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	PU-238	AWR06-6813-02	06/09/06 15:01	0 016	0 032	0 032	0 043
ACW03	PU-239/240	AWR06-6813-02	06/09/06 15:01	0 000	0 000	0.000	0 043
SRW01	SR-90	AWR06-6813-02	06/12/06 12:23	-0 198	0 362	0.363	0.674

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB
Pu	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB1

1000 Monticello Court * Montgomery Alabama * 36117 * 334 272 2234 * FAX 334 213 0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: S6813

Project Name: Allwest Remediation Chain-of-Custody Number: NONE Matrix: Soil
Site Sample ID: LCR-8
Other Sample ID: Collection Date: 11/29/2005 8:00:00 AM Date Received: 6/2/2006 11:30:00
Batch Number: 6813 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Analysis Date/Time	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	PU-238	AWR06-6813-03	06/09/06 15:02	0.000	0.000	0.000	0.043
ACW03	PU-239/240	AWR06-6813-03	06/09/06 15:02	0.000	0.000	0.000	0.043
SRW01	SR-90	AWR06-6813-03	06/12/06 12:24	0.013	0.293	0.293	0.523

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB
Pu	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB1

1000 Monticello Court * Montgomery Alabama 36117 * 334 272 2234 FAX 334 213 0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: S6813

Project Name: Allwest Remediation Chain-of-Custody Number: None Matrix: Soil
Site Sample ID: N/A
Other Sample ID: PB Collection Date: 6/2/2006 11:30:00 AM Date Received: 6/2/2006 11:30:00
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Analysis Date/Time	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	PU-238	SCAQC-6813-PB1	06/09/06 14:59	0 000	0 000	0 000	0 022
ACW03	PU-239/240	SCAQC-6813-PB1	06/09/06 14:59	0 000	0 000	0 000	0 022
SRW01	SR-90	SCAQC-6813-PB	06/12/06 12:23	-0.311	0 253	0.255	0.516

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB
Pu	SCAQC-6813-LC1	SCAQC-6813-LD1		SCAQC-6813-PB1

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: S6813

Project Name: Allwest Remediation
Matrix: Soil
Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/g)	(OV) Laboratory Control Sample Activity (pCi/g)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	PU-239/240	SCAQC-6813-LC1	2 04 ± 0 102	2 16 ± 0 543	106	0.344
SRW01	SR-90	SCAQC-6813-LC1	39 1 ± 0.899	39 0 ± 4.20	99.7	0.035

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activity and the Propagated Measurement at 1 σ (F/E)
ACW03	PU-238	SCAQC-6813-LD1	0 000 ± 0.000	-0 006 ± 0 012	0 006	0 994
ACW03	PU-239/240	SCAQC-6813-LD1	0 000 ± 0 000	0 000 ± 0 000	0 000	0 000
SRW01	SR-90	SCAQC-6813-LD1	-0 306 ± 0.340	-0.401 ± 0 381	0 095	0 372

1000 Monticello Court Montgomery Alabama 36117 334 272 2234 * FAX 334 213 0407