APPENDIX F

DUPLICATE SAMPLE RESULTS

PARAGON ANALYTICS, INC.
225 Commerce Drive ◆ Fort Collins, CO 80524 ◆ (800) 443-1511 ◆ (970) 490-1511 ◆ FAX (970) 490-1522

July 19, 2001

Mr. Wade Fillingame
Allied Technology Group
671 Emory Valley Road
Oak Ridge, TN 37830

RE: Paragon Workorder: 01-07-007
Client Project Name: 10002.049.05
Client Project Number: Lake City Army Ammo Plant

Dear Mr. Fillingame:

Fifteen soil samples were received from Allied Technology Group on July 3, 2001. The samples were scheduled for Gamma Spectroscopy (pages 1-196) analysis. The results for this analysis are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.
Lance Steere
Senior Project Manager

LRS/mc
Enclosure: Report

1

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 1

SAMPLE RESULTS SUMMARY

Paragon Analytics, Incorporated

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0107007
Client Name: Allied Technology Group
Client Project Name: 10002.049.05
Client Project Number: Lake City Army Ammo Plant
Client PO Number: 109NU13469

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
20N-20E-2	0107007-1		SOIL	6/27/01	
30N-10E-1	0107007-2		SOIL	6/27/01	
40N-20E-2	0107007-3		SOIL	6/27/01	
20N-10E-1	0107007-4		SOIL	6/27/01	
30N-40E-4	0107007-5		SOIL	6/27/01	
30N-20E-2	0107007-6		SOIL	6/27/01	
0S-10W-3	0107007-7		SOIL	7/1/01	
20S-50E-1	0107007-8		SOIL	7/1/01	
10S-50E-2	0107007-9		SOIL	7/1/01	
10N-OE-4	0107007-10		SOIL	7/1/01	
40N-50E-1	0107007-11		SOIL	7/1/01	
10S-10W-4	0107007-12		SOIL	7/1/01	
10S-10E-1	0107007-13		SOIL	7/1/01	
30N-50E-2	0107007-14		SOIL	7/1/01	
10N-10E-3	0107007-15		SOIL	7/1/01	

2

PARAGON ANALYTICS, INC.

Radiochemistry Data Package

Section 2

QC RESULTS SUMMARY

Gamma Spectroscopy Results

Method PAI SOP 713R5

Method Blank Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID:

Lab ID: GS00995BLK1

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 06-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010485D08B

Final Aliquot: 85.19

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	-0.63 +/- 0.83	1.6	pCi/g	U

ments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

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

Y2 - Chemical Yield outside default limits.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

B - Analyte concentration greater than MDC.

SQ - Spectral iquality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

LCS Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID:

Lab ID: GS00995LCS1

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 06-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010479D01A

Final Aliquot: 100.0

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Cd-109	4560 +/- 750	24	4540	pCi/g	100%	85-115%	P
Co-60	480 +/- 79	1.4	510	pCi/g	94%	85-115%	P
Cs-137	394 +/- 65	1.1	375	pCi/g	105%	85-115%	P
U-238/Th-234	930 +/- 150	6.1	1010	pCi/g	93%	85-115%	P

Comments:

Data Package ID: *GSS0107007-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

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

Y2 - cal Yield outside default limits.

* - Duplicate DER not within control limits.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Gamma Spectroscopy Results

Method PAI SOP 713R5

Duplicate Sample Results (DER)

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

		Prep Date	Analysis Date	Prep Batch	Final Aliquot
Field ID:	20N-20E-2				
Lab ID:	0107007-01	7/6/2001	7/10/2001	GS00995	89.10
DUP ID:	0107007-1-D1	7/6/2001	7/10/2001	GS00995	86.00

Sample Matrix: Soil
Date Collected: 27-Jun-01
Analytical SOP: PAI 713R6
Prep SOP: PAI 739R4
Aliquot Units: g
Report Basis: Dry Weight

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-238/Th-234	0.4 +/- 1.2	1.84 +/- 0.93	pCi/g	1	< 1.42	

ıments:

Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42

H - DER is Higher han Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

DER - Duplicate Error Ratio

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Duplicate Sample Results (DER)

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Field ID: 10N-OE-4				
Lab ID: 0107007-10	7/6/2001	7/10/2001	GS00995	96.20
DUP ID: 0107007-10-D1	7/6/2001	7/10/2001	GS00995	91.00

Sample Matrix: Soil
Date Collected: 01-Jul-01
Analytical SOP: PAI 713R6
Prep SOP: PAI 739R4
Aliquot Units: g
Report Basis: Dry Weight

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-238/Th-234	1.3 +/- 1.3	1.5 +/- 1.0	pCi/g	0.17	< 1.42	

ıments:

Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42

H - DER is Higher han Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

DER - Duplicate Error Ratio

Data Package ID: *GSS0107007-1*

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

3

Section 3

INDIVIDUAL SAMPLE RESULTS

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group
Client Project Name: 10002.049.05
Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.
PAI Work Order: 0107007

Field ID: 20N-20E-2
Lab ID: 0107007-1

Sample Matrix: Soil
Date Prepared: 06-Jul-01
Prep SOP: PAI 739R4
Prep Batch: GS00995

Date Collected: 27-Jun-01
Date Analyzed: 10-Jul-01
Analytical SOP: PAI 713R6
Spectrum Code: 010454D01B

Final Aliquot: 89.10
Aliquot Units: g
Report Basis: Dry Weight
Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.4 +/- 1.2	2.0	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y2 - Chemical Yield outside default limits.
* - Duplicate DER not within control limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.

Abbreviations:

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

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 30N-10E-1

Lab ID: 0107007-2

Sample Matrix: Soil
Date Prepared: 06-Jul-01
Prep SOP: PAI 739R4
Prep Batch: GS00995

Date Collected: 27-Jun-01
Date Analyzed: 10-Jul-01
Analytical SOP: PAI 713R6
Spectrum Code: 010480D08B

Final Aliquot: 94.40
Aliquot Units: g
Report Basis: Dry Weight
Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	2.7 +/- 1.4	2.0	pCi/g	TI

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 40N-20E-2

Lab ID: 0107007-3

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 27-Jun-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010455D01B

Final Aliquot: 78.00

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.8 +/- 1.4	2.4	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 20N-10E-1

Lab ID: 0107007-4

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 27-Jun-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010448D07B

Final Aliquot: 82.70

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.8 +/- 1.1	2.2	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 30N-40E-4

Lab ID: 0107007-5

Sample Matrix: Soil
Date Prepared: 06-Jul-01
Prep SOP: PAI 739R4
Prep Batch: GS00995

Date Collected: 27-Jun-01
Date Analyzed: 10-Jul-01
Analytical SOP: PAI 713R6
Spectrum Code: 010481D08B

Final Aliquot: 94.70
Aliquot Units: g
Report Basis: Dry Weight
Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.6 +/- 1.2	1.8	pCi/g	U

Co' ents:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 30N-20E-2

Lab ID: 0107007-6

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 27-Jun-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010456D01B

Final Aliquot: 93.80

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.4 +/- 1.2	2.0	pCi/g	U

Cor nts:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 0S-10W-3

Lab ID: 0107007-7

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010449D07B

Final Aliquot: 93.10

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.42 +/- 0.98	1.9	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 20S-50E-1

Lab ID: 0107007-8

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010482D08B

Final Aliquot: 78.50

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.1 +/- 1.0	1.7	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 10S-50E-2

Lab ID: 0107007-9

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010457D01B

Final Aliquot: 77.50

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.3 +/- 1.5	2.5	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 10N-OE-4

Lab ID: 0107007-10

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010450D07B

Final Aliquot: 96.20

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.3 +/- 1.3	2.0	pCi/g	U

Cor nts:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 40N-50E-1

Lab ID: 0107007-11

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010458D01B

Final Aliquot: 69.20

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.1 +/- 1.3	2.2	pCi/g	U

Cor nts:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 10S-10W-4

Lab ID: 0107007-12

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010451D07B

Final Aliquot: 69.70

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.5 +/- 1.1	2.2	pCi/g	U

Cor nts:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation

SI - Nuclide identification and/or quantitation is tentative

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 10S-10E-1

Lab ID: 0107007-13

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010484D08B

Final Aliquot: 87.00

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.7 +/- 1.1	1.9	pCi/g	U

Cor nts:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 30N-50E-2

Lab ID: 0107007-14

Sample Matrix: Soil
Date Prepared: 06-Jul-01
Prep SOP: PAI 739R4
Prep Batch: GS00995

Date Collected: 01-Jul-01
Date Analyzed: 10-Jul-01
Analytical SOP: PAI 713R6
Spectrum Code: 010459D01B

Final Aliquot: 76.50
Aliquot Units: g
Report Basis: Dry Weight
Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	0.1 +/- 1.5	2.5	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Tuesday, July 17, 2001 16:35:44

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107007

Field ID: 10N-10E-3

Lab ID: 0107007-15

Sample Matrix: Soil

Date Prepared: 06-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS00995

Date Collected: 01-Jul-01

Date Analyzed: 10-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010452D07B

Final Aliquot: 90.80

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.40 +/- 0.94	2.0	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107007-1*

PARAGON ANALYTICS, INC.
225 Commerce Drive ◆ Fort Collins, CO 80524 ◆ (800) 443-1511 ◆ (970) 490-1511 ◆ FAX (970) 490-1522

July 19, 2001

Mr. Wade Fillingame
Allied Technology Group
671 Emory Valley Road
Oak Ridge, TN 37830

RE: Paragon Workorder: 01-07-039
Client Project Name: 10002.049.05
Client Project Number: Lake City Army Ammo Plant

Dear Mr. Fillingame:

Four soil samples were received from Allied Technology Group on July 9, 2001. The samples were scheduled for Gamma Spectroscopy (pages 1-153) analysis. The results for this analysis are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.
Lance Steere
Senior Project Manager

LRS/mc
Enclosure: Report

1

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

Section 1

SAMPLE RESULTS SUMMARY

Paragon Analytics, Incorporated

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0107039
Client Name: Allied Technology Group
Client Project Name: 10002.049.05
Client Project Number: Lake City Army Ammo Plant
Client PO Number: 109NU13469

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
OS-30E 1	0107039-1		SOIL	7/6/01	15:00
OS-30E 2	0107039-2		SOIL	7/6/01	15:00
OS-30E 3	0107039-3		SOIL	7/6/01	15:00
OS-30E 4	0107039-4		SOIL	7/6/01	15:00

2

PARAGON ANALYTICS, INC.

Radiochemistry Data Package

Section 2

QC RESULTS SUMMARY

Gamma Spectroscopy Results

Method PAI SOP 713R5

Method Blank Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID:

Lab ID: GS01012BLK1

Sample Matrix: Soil
Date Prepared: 17-Jul-01
Prep SOP: PAI 739R4
Prep Batch: GS01012

Date Collected: 17-Jul-01
Date Analyzed: 17-Jul-01
Analytical SOP: PAI 713R6
Spectrum Code: 010469D09A

Final Aliquot: 399.9
Aliquot Units: g
Report Basis: Dry Weight
Count Time (min.): 30

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	-0.17 +/- 0.59	1.1	pCi/g	U

ments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

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

Y2 - Chemical Yield outside default limits.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

B - Analyte concentration greater than MDC.

SQ - Spectral iquality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107039-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

LCS Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID:

Lab ID: GS01012LCS1

Sample Matrix: Soil

Date Prepared: 17-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS01012

Date Collected: 17-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010486D01A

Final Aliquot: 500.0

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	201 +/- 33	2.6	198	pCi/g	101%	85-115%	P
Cd-109	1400 +/- 230	11	1270	pCi/g	110%	85-115%	P
Co-57	19.9 +/- 3.3	0.27	19.4	pCi/g	102%	85-115%	P
Co-60	110 +/- 18	0.42	111	pCi/g	99%	85-115%	P
Cs-137	92 +/- 15	0.38	83.2	pCi/g	110%	85-115%	P

Comments:

Data Package ID: *GSS0107039-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

LT - [illegible] is less than Requested MDC, greater than sample specific MDC.

Y2 [illegible]cal Yield outside default limits.

* - Duplicate DER not within control limits

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Gamma Spectroscopy Results

Method PAI SOP 713R5

Duplicate Sample Results (DER)

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID:	OS-30E 1	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID:	0107039-01	7/17/2001	7/17/2001	GS01012	406.5
DUP ID:	0107039-1-D1	7/17/2001	7/17/2001	GS01012	406.5

Sample Matrix: Soil
Date Collected: 06-Jul-01
Analytical SOP: PAI 713R6
Prep SOP: PAI 739R4
Aliquot Units: g
Report Basis: Dry Weight

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-238/Th-234	1.51 +/- 0.86	1.4 +/- 1.4	pCi/g	0.05	< 1.42	

ments:

Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42

H - DER is Higher han Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

DER - Duplicate Error Ratio

Data Package ID: *GSS0107039-1*

PARAGON ANALYTICS, INC.
Radiochemistry Data Package

3

Section 3

INDIVIDUAL SAMPLE RESULTS

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID: OS-30E 1

Lab ID: 0107039-1

Sample Matrix: Soil

Date Prepared: 17-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS01012

Date Collected: 06-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010485D01A

Final Aliquot: 406.5

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.51 +/- 0.86	1.3	pCi/g	TI

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107039-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID: OS-30E 2

Lab ID: 0107039-2

Sample Matrix: Soil

Date Prepared: 17-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS01012

Date Collected: 06-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010366D02A

Final Aliquot: 375.0

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	7.0 +/- 2.1	2.6	pCi/g	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107039-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID: OS-30E 3

Lab ID: 0107039-3

Sample Matrix: Soil

Date Prepared: 17-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS01012

Date Collected: 06-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010313D04A

Final Aliquot: 376.3

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	3.0 +/- 1.3	1.8	pCi/g	TI

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107039-1*

Gamma Spectroscopy Results

Method PAI SOP 713R5

Sample Results

Reported on: Wednesday, July 18, 2001 09:31:59

Client Name: Allied Technology Group

Client Project Name: 10002.049.05

Client Project Number: Lake City Army Ammo Plant

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0107039

Field ID: OS-30E 4

Lab ID: 0107039-4

Sample Matrix: Soil

Date Prepared: 17-Jul-01

Prep SOP: PAI 739R4

Prep Batch: GS01012

Date Collected: 06-Jul-01

Date Analyzed: 17-Jul-01

Analytical SOP: PAI 713R6

Spectrum Code: 010529D08A

Final Aliquot: 435.2

Aliquot Units: g

Report Basis: Dry Weight

Count Time (min.): 30

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-238/Th-234	1.08 +/- 0.86	1.4	pCi/g	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

* - Duplicate DER not within control limits.

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative

Abbreviations.

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *GSS0107039-1*

APPENDIX G

REMAINING DRAIN PIPE DISPOSITION EVALUATION

Final Radiological Status Report
Lake City Army Ammunition Plant
Building 3-A Depleted Uranium Wing
Allied Technology Group Inc.

Replace this page with actual document upon submittal.

Appendix G

Remaining Drain Pipe Disposition Evaluation

1.0 INTRODUCTION

The purpose of this appendix is to provide a detailed summary of industrial sewer line decommissioning activities associated with the Lake City Army Ammunition Plant (LCAAP) Building 3A DU Wing decommissioning project. This appendix describes remedial activities, radiological survey techniques, and radiological survey results associated with the scope of work described in Section 2.0 of this appendix.

Decommissioning activities summarized herein were performed by Cabrera Services, Inc. (CABRERA). Additional decommissioning actions were taken previously by various contractors including Chem-Nuclear and others and, more recently, Allied Technical Group (ATG). Building 3A DU Wing (hereafter referred to as "Wing") decommissioning activities performed by ATG and other contractors prior to CABRERA's involvement include, but are not limited to:

- removal of floor drain lines under the Wing's slab,
- decontamination of Sump numbers 02 and 03, which were fed by the floor drains and contaminated with depleted uranium (DU),
- removal of header lines south of the slab/footer, but north of Sumps 02, 03, and 04 (i.e., the header line south of the sumps was left attached to the sumps and intact),
- Removal of contaminated surface soil/asphalt, and
- demolition of the Wing.

A building print of the industrial sewer lines and former Wing is provided as Attachment I to this appendix (taken from LCAAP Drawing Number 3A:M5). Collection points of soil/sediment samples are also identified on the print.

2.0 SCOPE OF WORK

CABRERA's scope was to decommission all remaining lines and sumps impacted by DU operations that exceeded the radiological release criteria established in the NRC-approved Decommissioning Plan (35 pCi/gram of total uranium). Specifically, this included:

- removal and packaging of Sumps 02, 03, and 04 for disposal,
- removal of portion of the header line south of the sumps,

- radiological survey of the first industrial manhole downstream of the Wing,
- performance of direct radiation measurements and sample collection/gamma spectroscopy analyses for remedial support and final status demonstration,
- excavation/packaging of soil/materials that exceeded release criteria, and
- backfill of excavated areas.

3.0 RADIOLOGICAL INSTRUMENTATION

This section describes radiological instruments that were used during remedial support and final status surveys.

3.1 Pancake GM Detectors

Pancake GM detectors were used prior to and during remedial activates to identify potentially contaminated soil/sediment. Ludlum model 44-9 pancake GM detectors coupled to Ludlum model 3 ratemeters were used to perform the surveys. The typical background count rate was approximately 50 counts per minute (cpm) yielding an approximate detection sensitivity of 1,000 dpm/100 cm^2.

These instruments were calibrated within six months of the survey activities, by Ludlum Measurements, Inc., using NIST traceable sources. Pancake GM detectors were operated in accordance with a written and approved procedure. Quality control checks were performed daily, at a minimum, using a ^{99}Tc electroplated source. The quality control criterion for acceptance was ±20% of the average reading established as soon as practical following calibration. Results of quality control measurements and instrument calibration certificates are provided in Attachment III to this appendix.

3.2 Two-inch by Two-inch Sodium Iodide Detectors

Two-inch by two-inch sodium iodide (NaI) detectors were used prior to and during remedial activates to identify potentially contaminated soil/sediment. Ludlum model 44-11 NaI detectors coupled to Ludlum model 2221 scaler/ratemeters were used to perform the surveys. The typical background count rate was approximately 12,000 cpm yielding an approximate detection sensitivity of 15,000 cpm (assuming a 25% increase in response is discernable).

These instruments were calibrated within six months of the survey activities, by Ludlum Measurements, Inc., using NIST traceable sources. NaI detectors were operated in accordance with a written and approved procedure. Quality control checks were performed daily, at a minimum, using a ^{137}Cs gamma button source. The quality control criterion for acceptance was ±20% of the average reading established as soon as practical following calibration. Results of quality control measurements and instrument calibration certificates are provided in Attachment III to this appendix.

3.3 High Purity Germanium Gamma Spectroscopy System

A 60% relative efficiency coaxial high purity germanium detector (HPGe) detector was used to quantify DU activity concentrations in soil/sediment samples. A Canberra Industries, Inc. model GC6020 HPGe detector coupled to an Inspector-2000 digital signal processor/power supply/multi-channel analyzer was used to perform the analyses. An ISOXSHLD lead shield assembly was used to provide detector shielding. Canberra Genie-2K Version 1.4 gamma analysis software was used to control the system and analyze/store spectral data. Efficiency/energy calibration of the system utilized sources traceable to NIST. The system was operated in accordance with a written and approved procedure. Daily quality control checks were performed by measuring peak energy, resolution, and efficiency for a low energy (88.01 keV from ^{109}Cd) and a high energy (1,332.5 keV from ^{60}Co) peak. Control charts were plotted and reviewed daily for each of these parameters and are included in Attachment III to this appendix.

Samples were analyzed for ^{238}U activity concentration based on a weighed average of ^{234}Th (63.29, 92.4, and 92.8 keV gamma lines) and ^{234m}Pa (1,001 keV gamma line), which were assumed to be in secular equilibrium with ^{238}U. Total uranium activity concentrations were inferred from measured ^{238}U using a site-specific activity ratio of ^{238}U : ^{Total}U of 0.831 : 1. Sample mass was estimated using a triple-beam balance, which was checked daily using calibration weights. It should be noted that samples were analyzed "as received" and were not dried, ground, or homogenized. However, during the sample collection process samples were homogenized, as the procedure included thorough mixing of the material in a stainless steel bowl.

As samples were not dried prior to analysis, gamma spectroscopy results were reported as pCi per gram of total sample mass (including adsorbed water). Release criteria established in the Decommissioning Plan apply to pCi per gram of dry soil. In order to evaluate sample results against the criteria, wet-weight results were converted into dry-weight concentrations assuming 25% soil moisture by mass (i.e., multiplying wet-weight results by 1.25). For the purpose of conservatism, this factor is based on the assumption that the soil was fully saturated. Table E.2 of the *Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0*, Argonne National Laboratory, reports that fully saturated loamy sand contains 0.41 water by volume (soil samples were primarily sand). Thus, in a 500ml container of fully saturated soil there is approximately 205ml (205 grams) of water (500 x .41 = 205). The average total sample mass, including adsorbed water, was approximately 820 grams. Assuming 205 grams of a sample is adsorbed water and its total mass is 820 grams, 25% of the mass is water (205 ÷ 820 x 100% = 25%). This factor was applied, along with the ^{238}U to total uranium ratio, to convert all measured ^{238}U wet-weight concentrations into total uranium dry-weight concentrations. All references to measured total uranium concentrations in this appendix refer to dry-weight concentrations.

4.0 RADIOLOGICAL SURVEY RESULTS

This section describes the surveys that were performed and summaries their results. Radiological surveys using GM and NaI handheld detectors were primarily used for remedial support evaluations only, as contamination was volumetric in nature (i.e., not surficial) and

DU concentrations were estimated through sample collection and gamma spectroscopy analyses. The results of sample analyses are summarized in Table I and spectral analysis reports are included as Attachment IV to this appendix.

4.1 Sump Surveys

Radiological surveys of Sumps 02 and 03 were performed by ATG. Their surveys indicated that these sumps were not internally or externally contaminated in accordance with the Reference 1 requirements. This was expected as Chem-Nuclear has decontaminated these sumps during a previous effort. However, the ATG surveys did indicate that some inlet and outlet lines associated with these sumps exceeded surface release criteria. ATG decontaminated and resurveyed these inlet/outlets until release criteria were met.

Sometime before 1957 Sump 04 was filled with crushed stone and a loading dock was constructed over it. Thus, the sump was not decontaminated by Chem-Nuclear, as their decontamination activities occurred in the mid 1980's. Upon removal of the sump, remedial support surveys performed with GM and NaI detectors indicated that is was internally contaminated with DU clearly in excess of background. In addition, petroleum product contamination was also identified; chemical sampling performed by The IT Group, however, indicated that the chemical contamination were not regulated by RCRA (i.e., the material was not a mixed-waste). In addition, soil beneath the sump was found to be contaminated with DU and non-RCRA concentrations of petroleum products.

4.2 Evaluation of Southern Header Line

Following removal of Sump 04, which was the furthermost downstream sump, ATG radiological surveys identified contamination in the southern header line. These results indicated the potential for contamination in downstream and upstream portions (up to but not beyond Sump 02) of the header. The header consists of six inch clay vitrified pipe in 2 ½ foot sections.

4.2.1 Survey of the First Downstream Industrial Waste Manhole

A radiological survey of the first manhole downstream of the Wing was performed on 29 June 2001 to determine whether DU contamination had collected in the manhole and potentially impacted the header up to the Wing. This survey consisted of GM scans of the entire manhole bottom and collection and gamma spectroscopy analyses of sediment samples from the inlets, outlet, and bottom of the manhole. A copy of the radiological survey is included as Attachment II to this appendix. GM scans did not identify gross beta emission rates in excess of the 150 cpm instrument background. In addition, a gross gamma survey performed by ATG prior to the CABRERA survey did not identify gross gamma fluence rates in excess of background. During the CABRERA survey, five composite sediment samples were collected at the following locations (see Attachment II for sample locations) by transferring the sediment into a stainless steel bowl, thoroughly mixing it, and filling a 500ml container:

1. South inlet pipe from 3A Wing: collected off the top of the sediment (sediment was approximately three inches deep) – Measured DU concentration of 2.6 pCi/gram with an MDC of 3.1 pCi/gram.

2. South inlet pipe from 3A Wing: collected off the bottom of the sediment – Measured DU concentration of 2.7 pCi/gram with an MDC of 2.1 pCi/gram.

3. West inlet pipe from another portion of 3A Wing – Measured DU concentration of 0.15 pCi/gram with an MDC of 1.7 pCi/gram.

4. Composite of sediment on manhole bottom (material that was not in wastewater flow path) – Measured DU concentration of 0.034 pCi/gram with an MDC of 2.5 pCi/gram.

5. Sediment in center of manhole wastewater flow path – Measured DU concentration of 1.2 pCi/gram with an MDC of 2.0 pCi/gram.

Gamma spectroscopy analyses of the samples collected in manhole (see Table I "Manhole" 1-5 results) did not identify DU above the release criteria (maximum concentration of 2.7 pCi/gram). Based on the results of these surveys, it was concluded that contamination in excess of release criteria was not present in or downstream of the manhole.

4.2.2 Evaluation of the Header Line Between Sump 04 and First Industrial Manhole

The radiological surveys performed in the first manhole downstream of Sump 04 indicated that DU contamination in excess of the release criteria was no further downstream than the manhole. However, the ATG surveys performed after the removal of Sump 04 indicated that the upstream end of that portion of the header had sediments that were contaminated. Thus, surveys were performed to identify contaminated sections of the line.

Radiological surveys were initiated at the point of the line where ATG identified contamination. Three 2 ½ -foot sections were removed and evaluated from upstream to downstream. Each section was scanned with NaI and GM detectors upon removal. In addition, a composite sample of all sediment in each section was collected by transferring the sediment into a stainless steel bowl, thoroughly mixing it, and filling a 500ml container.

Results are summarized below:

- Direct radiation measurements performed on the first section (furthest upstream) indicated that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-1 Outflow 1) was 27 pCi/gram.

- Direct radiation measurements performed on the second section also indicated that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-2 Outflow 2) was 27 pCi/gram.

- Direct radiation measurements performed on the third section also indicated that DU contamination was present. However, the DU concentration measured in the composite sample from this section (LC-3A-3 Outflow 3) was 22 pCi/gram.

Based on the gravity-feed transport mechanism in the lines it is assumed that DU concentrations decrease in the direction of flow. This is supported by the fact that DU concentrations measured in the composite sediment samples (map locations 1 through 3)

decrease in the direction of flow. As the DU concentration measured in the each section meets the release criteria, remaining downstream portions of the line are considered suitable for release for unrestricted use.

4.2.3 Evaluation of Southern Header Line Between Sump 02 and 04 Tie-ins

Radiological surveys of Sumps 02 and 03 performed by ATG indicated that some of the inlet and outlet lines associated with these sumps exceeded release criteria. As such, and based on the fact that portions of the header line were found to exceed the release criteria, there was some potential for the header line between Sumps 02 and 04 to exceed the criteria.

In order to establish whether the header line between Sumps 02 and 04 to exceeded the criteria, two 2 ½ -foot sections upstream of Sump 04 and two sections downstream of Sump 02 were radiologically surveyed. Each section was scanned with NaI and GM detectors upon removal. In addition, a composite sample of all sediment in each section was collected by transferring the sediment into a stainless steel bowl, thoroughly mixing it, and filling a 500ml container.

Results of these surveys are summarized below:

- Direct radiation measurements performed on the first upstream section from Sump 04 did not indicate that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-11 04 Left 1) was 0.67 pCi/gram with an MDC of 3.0 pCi/gram. A sample was also collected beneath this pipe section (LC-3A-13 Below 04 Left 1) with a measured DU concentration of 2.5 pCi/gram and an MDC of 2.2 pCi/gram.

- Direct radiation measurements performed on the second upstream section from Sump 04 (one section further upstream) did not indicate that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-12 04 Left 2) was 2.3 pCi/gram with an MDC of 2.8 pCi/gram.

- Direct radiation measurements performed on the first downstream section from Sump 02 did not indicate that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-14 Sump 02 Right) was 0.07 pCi/gram with an MDC of 2.7 pCi/gram.

- Direct radiation measurements performed on the second downstream section from Sump 02 (one section further downstream) did not indicate that DU contamination was present. The DU concentration measured in the composite sample from this section (LC-3A-15 Sump 02 Right 1) was 2.8 pCi/gram with an MDC of 2.7 pCi/gram.

As DU concentrations in the two ends of the header line between Sumps 02 and 04 (map locations 11 through 15) were less than the release criteria, this portion of the line is considered suitable for release for unrestricted use and was left in place.

4.3 Evaluation of the Bottom of the Trench

Excavation and removal of sumps, sewer lines, and soil performed by ATG and CABRERA resulted in an open trench approximately 100 feet long. The trench quickly filled with groundwater following excavation activities, as ongoing rains had raised the groundwater level. While portions of the trench were above groundwater, most portions were one to two feet below the water level. The presence of this water prevented collection of useful radiological data using direct radiation measurements. As, such collection and gamma spectroscopy analyses of soil samples were performed to confirm soil/sediment concentrations at the bottom of the excavation met release criteria.

A total of eight soil samples were collected for this purpose. Three soil samples were collected below the former locations of Sumps 02, 03, and 04 (map numbers 4, 6, and 9). Measured DU concentrations in each of these samples were less than the release criteria, ranging from 0.62 to 12 pCi/gram. In addition, four soil samples (map numbers 5, 7, 8, and 10) were collected in the vicinity of the 90° portion of the header feeds from the Wing to the sumps (these lines were removed during ATG remedial activities). Measured DU concentrations in these samples were less than the release criteria, ranging from -1.2 to 26 pCi/gram. The sample collected in the vicinity of the 90° portion of the western header feed to Sump 04 (LC-3A-5 Left to 04) was 26 pCi/gram. A small volume of soil in that area was removed and packaged for disposal for ALARA purposes. The result of the post remediation sample in this location (LC-3A-16 01-01-011 Under) was 11 pCi/gram with an MDA of 3.3 pCi/gram.

As DU concentrations in all soil/sediment samples collected at the bottom of the trench were less than the release criteria (map locations 4 through 10 and 16), the soil is considered suitable for release for unrestricted and the trench was backfilled.

5.0 SUMMARY OF REMEDIAL ACTIVITIES

The section summarizes sump, industrial sewer line, and soil/sediment remedial activities performed during execution of the scope of work described in Section 2.0 of this appendix.

5.1 Removal of Overburden and Pile Management

As soil excavation to potentially contaminated and confirmed contaminated materials was performed, soil pile management was implemented to ensure that cross contamination of soil did not occur. Considering that sumps were gravity-fed by drain lines and surface contamination in and around the excavation area was not identified by ATG radiological surveys, it was assumed that soil overburden was not impacted by DU operations. Thus, excavated soil overburden was kept separate from potentially contaminated soil.

Soil above sewer lines and around sumps was assumed to be non-impacted. When an excavation neared the top of a sewer line a separate pile was established for potentially contaminated soil/drain lines. Such piles were placed on polyethylene in locations removed from the clean overburden. If the results of radiological surveys/sample analyses indicated that suspect soil/materials were contaminated above release criteria, such materials were

containerized in IP1 hard-top intermodals for shipment to Waste Control Specialists (WCS) in Andrews Texas for disposal. Soil/materials that were not contaminated were used as backfill along with clean overburden.

5.2 Sump Removal

Sumps 02, 03, and 04 were removed intact using a John Deere 690 excavator. Final radiological surveys performed by ATG indicated that Sumps 02 and 03 were not internally or externally contaminated in accordance with the requirements of Reference 1. These sumps were later crushed and shipped to a local industrial landfill by Browning-Ferris Industries, Inc. (BFI). Radiological surveys indicated that Sump 04 was internally contaminated and that soil excavated from beneath Sump 04 was contaminated in excess of release criteria. The sump and soil was packaged in a IP1 hard-top intermodal for shipment to WCS for disposal.

5.3 Industrial Sewer Line Removal

Portions of the southern industrial sewer line were removed using a John Deere 690 excavator. The industrial sewer line consists of six inch clay vitrified pipe in 2 ½ foot sections. The exit pipe and associated "Y" type tie-in to the header line from each sump were removed and packaged as radiological waste. In addition, the first three two-foot sections of pipe downstream from Sump 04 were removed and packaged as radiological waste. Other sections of pipe were removed for remedial support surveys and were found to meet the release criteria (in accordance with the requirements of Reference 1), as discussed in Section 4.2 of this appendix.

5.4 Soil/sediment Removal

Soil/sediment excavated, along with sewer pipe sections that were removed because they exceeded or were near the release criteria, was packaged as radiological waste for disposal. In addition, a small volume of soil in the vicinity of the 90° portion of the eastern feed to Sump 04 (this line was removed during ATG remedial activities) was remediated for ALARA purposes and was packaged as radiological waste for disposal.

6.0 CONCLUSION

Based on the data summarized herein, remedial actions associated with Building 3a DU Wing industrial sewer line decommissioning activities successful removed soil/materials in excess of the release criteria. Wastes in excess of the release criteria were packaged in DOT approved shipping containers and have been shipped to WCS for disposal.

Table I
Lake City Army Ammunition Plant
Cabrera Services, Inc.
Soil/Sediment Samples from Building 3A - Analysis by Gamma Spectroscopy

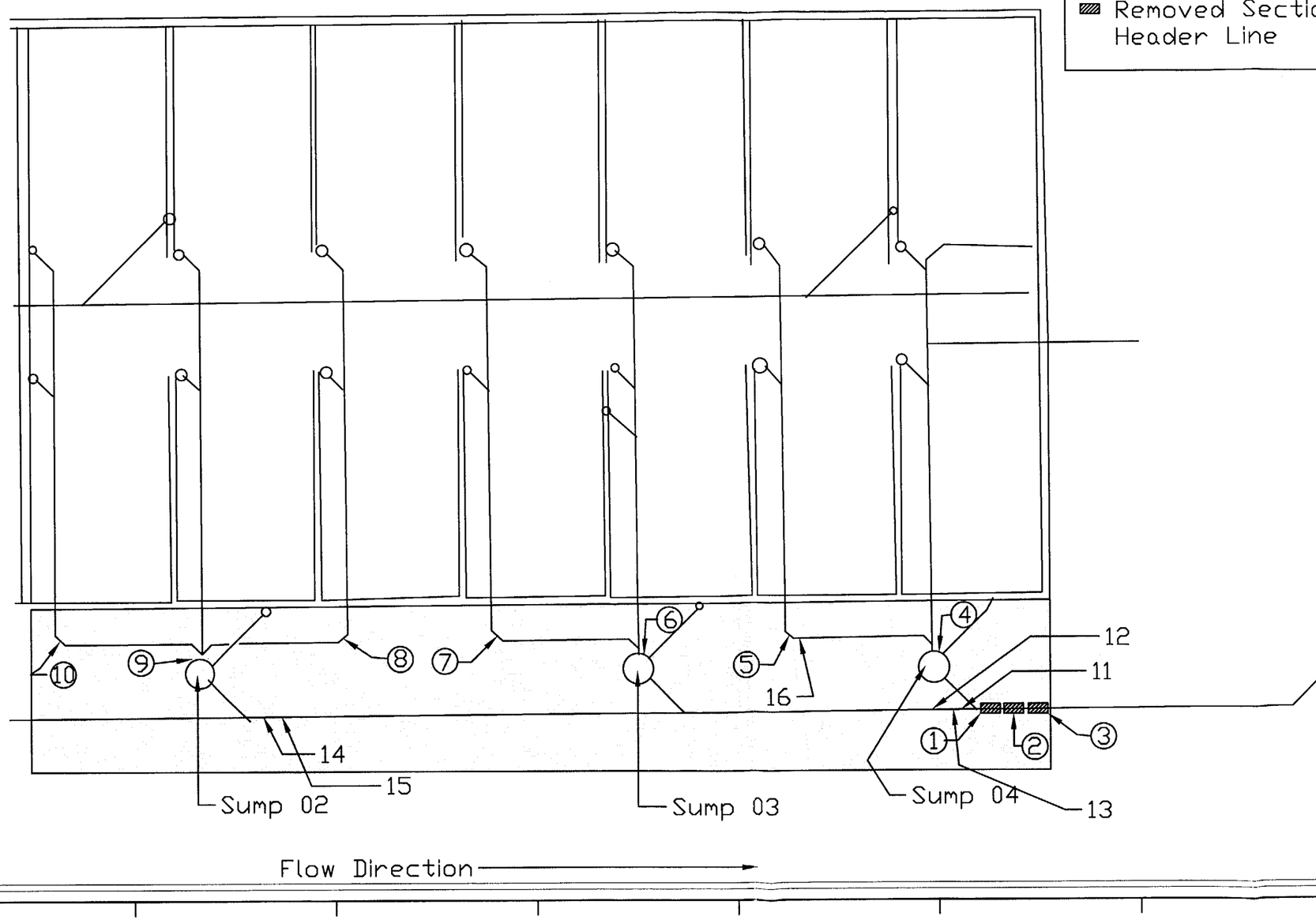
Map #		Sample ID	Sample Mass (grams)	Measured Activity Concentration (pCi/gram) [1]			
				U-238 [2, 3, 4]		Total-U [5, 6]	
				Result	MDC	Result	MDC
Sewer Lines	1	LC-3A-1 Outflow 1	855	18	2.9	27	4.4
	2	LC-3A-2 Outflow 2	865	18	4.0	27	5.9
	3	LC-3A-3 Outflow 3	745	15	3.1	22	4.6
	4	LC-3A-4 Sump 04	905	0.41	1.9	0.62	2.8
	5	LC-3A-5 Left to 04	852	17	4.3	26	6.4
	6	LC-3A-6 Sump 03	796	1.1	2.3	1.6	3.4
	7	LC-3A-7 Left to 03	800	0.82	2.3	1.2	3.5
	8	LC-3A-8 Right to 02	787	-0.80	2.1	-1.2	3.2
	9	LC-3A-9 Sump 02	724	8.2	2.6	12	3.9
	10	LC-3A-10 Left to 02	744	0.44	2.2	0.66	3.3
	11	LC-3A-11 04 Left 1	934	0.45	2.0	0.67	3.0
	12	LC-3A-12 04 Left 2	889	1.5	1.9	2.3	2.8
	13	LC-3A-13 Below 04 Left 1	920	1.6	1.5	2.5	2.2
	14	LC-3A-14 Sump 02 Right	941	0.049	1.8	0.07	2.7
	15	LC-3A-15 Sump 02 Right 1	899	1.9	1.8	2.8	2.7
	16	LC-3A-16 01-01-011 Under	871	7.6	2.2	11	3.3
Manhole	1	S Pipe top	664	1.8	2.1	2.6	3.1
	2	S Pipe bottom	796	1.8	1.4	2.7	2.1
	3	West Pipe	959	0.10	1.1	0.15	1.7
	4	Bottom	541	0.023	1.6	0.034	2.5
	5	Center	750	0.83	1.3	1.2	2.0

Notes:
[1] Minimum detectable activity concentrations (MDCs) reported at the 95% confidence level
[2] U-238 reported on wet-weight basis (i.e., pCi per gram of total soil/water)
[3] U-238 activity concentrations based on weighed average of Th-234 (63.29, 92.4, and 92.8 keV) and Pa-234m (1,001 keV)
[4] U-238 activity concentrations less than the 95% critical level based most sensitive gamma line
[5] Total uranium based on site-specific activity ratio of U-238:U-total of 0.831:1
[6] Total uranium reported on dry-weight basis (i.e., pCi per gram of dry soil) assuming fully saturated soil (25% moisture content by mass). Wet-weight results were multiplied by 1.25.

Note: Taken from LCAAP drawing # 3A:M5

KEY

- Excavated Area
- Sample Locations
- Sump Locations
- Removed Sections of Header Line



Symbol	Description	Date	Approved
	Revisions		

CABRERA SERVICES, INC.

Designed by: D WATTERS Date: 8/11/01
Drawn by: S HOLDER Date: 8/11/01
Reviewed by: D WATTERS Date: 8/11/01
Approved by: Date:
File Name:

DEPT. OF THE ARMY
LAKE CITY ARMY AMMUNITION PLANT
INDEPENDENCE, MISSOURI

BUILDING 3A DU WING
INDUSTRIAL SEWER SYSTEM
&
SAMPLE LOCATIONS

Contract Number: 01-3030.03
Delivery Order Number: N/A
Project Number: 01-3030.03
Drawing Number: Attachment 1

Attachment II

Radiological Survey of Manhole

RADIOLOGICAL SURVEY REPORT

IGS #: N/A

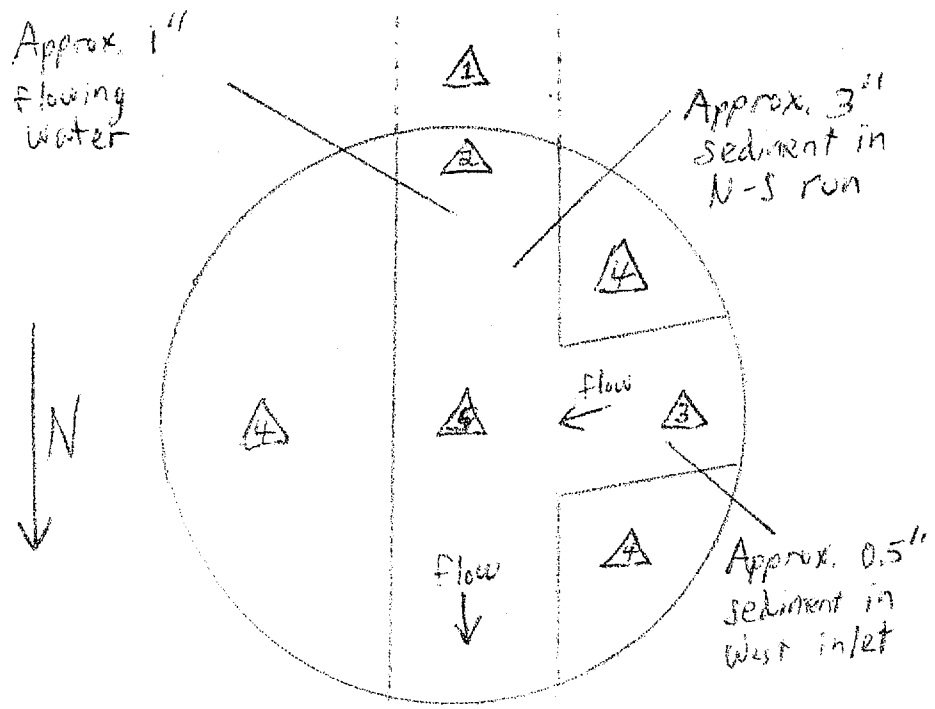
DATE: 6/29/01	INSTRUMENTATION USED				
TIME: 11:30 AM	MODEL	S/N	EFF.%	BKRD	CAL. DUE DATE
SURVEYOR: D. Walters	Ludlum 3	173414 PR 179127	≈15% B	≈150cpm	20 April 02
LOCATION: IW Manhole LCAAP				NA	
REVIEWED BY: CHP		NA			

Smear Locations Circled; Dose Rates= mR/hr

PURPOSE OF SURVEY: Investigative survey of first manhole downstream of Building 3A DU Wing Industrial Sumps

SMEAR RESULTS
RESULTS = DPM/100cm²
UNLESS NOTED

#	βγ	α
	NA	



Samples Collected for γ Spec
1. S Pipe top – Collected off top of sediment
2. S Pipe bottom – collected off bottom of sediment
3. West Pipe – composite of West inlet
4. Bottom – composite of manhole bottom
5. Center – of N-S run

Remarks: 100% scan of manhole bottom w/ GM (excluding areas under water). No sustained readings in excess of background.

Attachment III

Instrument QC Data, Calibration Certificates, and Control Charts

GM and NaI QC Data

DAILY INSTRUMENT PER[illegible]MANCE TEST LOG SHEET

Ludlum model 3

Page _____ of _____

PROJECT: LCAAP

79498

TC 99

635183

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
4-27-01	model 3	79498	N	2-19-02	635183	22900	40	5000	35%	P	CSH
4-30-01	↓	↓	↓	↓	↓	22900	50	4900	35%	P	CSH
5-01-01	model 3	79498	N	2-19-02	635183	22900	40	5500	35%	P	CSH
5-02-01	↓	↓	↓	↓	↓	22900	50	5000	35%	P	CSH
5-03-01	model 3	79498	N	2-19-02	635183	22900	50	6000	35%	P	CSH
5-4-01	↓	↓	↓	↓	↓	22900	40	5000	35%	P	CSH
5-7-01	model 3	79498	N	2-19-02	635183	22900	50	5500	35%	P	CSH
5-8-01	model 3	79498	N	2-19-02	635183	22900	60	5000	35%	P	CSH
5-9-01	model 3	79498	N	2-19-02	635183	22900	50	5000	35%	P	CSH
5-11-01	MODEL 3	79498	No	2-19-02	635183	22900	50	5000	35%	P	NH
5-14-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-15-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-16-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-17-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-18-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-22-01	MODEL 3	79498	No	2-19-02	635183	22,900	50	5000	35%	P	NH
5-23-01	model 3	79493	No	2-19-02	635183	22,900	50	5000	35%	P	CSH
5-24-01	MODEL 3	79493	No	2-19-02	635183	22,900	50	5000	35%	P	NH

DAILY INSTRUMENT PER MANCE TEST LOG SHEET

Page _____ of _____

PROJECT:

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
5-25-01	MODEL 3	79498	No	2-19-02	635183	22,900	60 cpm	5000 cpm	NA	P	NH
5-29-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	5000cpm	NA	P	TO
5-30-01	MODEL 3	79498	No	2-19-02	635183	22,900	60cpm	6000cpm	NA	P	NH
5-31-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	5000cpm	NA	P	CSH
6-1-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	6000 cpm	NA	P	CSH
6-2-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	5000cpm	NA	P	REB
6-3-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	5500cpm	NA	P	REB
6-5-01	MODEL 3	79498	No	2-19-02	635183	22,900	50cpm	5000 cpm	NA	P	TO
6-7-01	MODEL 3	79498	No	2-19-02	635183	22,900	40cpm	5500cpm	NA	P	TO
6-8-01	MODEL 3	79498	No	2-19-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-9-01	MODEL 3	79498	No	2-19-02	635183	22,900	40cpm	6000cpm	NA	P	NH
6-10-01	MODEL 3	79498	No.	2-19-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-11-01	MODEL 3	79498	No	2-19-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-12-01	MODEL 3	79498	No	2-19-02	635183	22,900	40cpm	5000 cpm	NA	P	NH
6-13-01	MODEL 3	79498	No	2-19-02	289801	17300	30cpm	2100cpm	12	P	TO
6-14-01	MODEL 3	79498	No	2-19-02	289801	17300	30cpm	2100 cpm	12	P	TO
6-16-01	Model 3	79498	NO	2-19-02	289801	17300	30cpm	2100cpm	12	P	TO
6-17-01	Model 3	79498	NO	2-19-02	289801	17300	40cpm	2100cpm	12	P	TO

DAILY INSTRUMENT PER' MANCE TEST LOG SHEET

Page _____ of _____

PROJECT:

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
6-18-01	Model 3	79498	No	2-19-02	289801	17300	30	2100	12	P	[illegible]
6-19-01	Model 3	79498	No	2-19-02	289801	17300	30	2100	12	P	[illegible]
6-20-01	Model 3	79498	No	2-19-02	289801	17300	30	2100	12	P	[illegible]
6-21-01	Model 3	79498	No	2-19-02	289801	17300	40	2200	12	P	[illegible]
6-22-01	MODEL 3	79498	No	2-19-02	289801	17,300	40	2200	12	P	NH
6-23-01	MODEL 3	79498	No	2-19-02	289801	17,300	40	2200	12	P	NH
6-23-01	MODEL 3	79498	No	2-19-02	289801	17,300	40	2200	12	P	NH
6-24-01	MODEL 3	79490	No	2-19-02	289801	17,300	40	2200	12	P	NH
6-25-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH
6-26-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH
6-27-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH
6-28-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH
6-29-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH
6-30-01	MODEL 3	79498	NO	2-19-02	289801	17,300	40	2200	12	P	NH

DAILY INSTRUMENT PER[illegible]MANCE TEST LOG SHEET

Ludlum model 3

Page _____ of _____

PROJECT: LCAAP

TC 99

173419

635183

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	DKRD	READING	EFF.	PASS/FAIL P/F	TECH INIT.
4-27-01	model 3	173419	N	4-20-02	635183	22900	40	5000	35%	P	CJN
4-30-01	↓	↓	↓	↓	↓	22900	50	4900	35%	P	CJN
5-01-01	model 3	173419	N	4-20-02	635183	22900	40	5500	35%	P	CJN
5-02-01	↓	↓	↓	↓	↓	22900	50	5000	35%	P	CJN
5-03-01	model 3	173419	N	4-20-02	635183	22900	50	6000	35%	P	CJN
5-4-01	↓	↓	↓	↓	↓	22900	40	5000	35%	P	CJN
5-7-01	model 3	173419	N	4-20-02	635183	22900	50	5500	35%	P	CJN
5-8-01	model 3	173419	N	4-20-02	635183	22900	60	5000	35%	P	CJN
5-9-01	model 3	173419	N	4-20-02	635183	22900	50	5000	35%	P	CJN
5-11-01	MODEL 3	173419	No	4-20-02	635183	22900	50	5000	35%	P	NH
5-14-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-15-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-16-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-17-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-18-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-22-01	MODEL 3	173419	No	4-20-02	635183	22,900	50	5000	35%	P	NH
5-23-01	model 3	173419	no	4-20-02	635183	22,900	50	5000	35%	P	CJN
5-24-01	MODEL 3	17341	No	4-20-02	635183	22,900	50	5000	35%	P	NH

DAILY INSTRUMENT PER MANCE TEST LOG SHEET

Page _____ of _____

PROJECT:

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/FAIL P/F	TECH INIT
5-25-01	MODEL 3	173419	No	4-20-02	635183	22,900	60 cpm	5000 cpm	NA	P	NH
5-29-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	5000cpm	NA	P	TO
5-30-01	MODEL 3	173419	No	4-20-02	635183	22,900	60cpm	6000cpm	NA	P	NH
5-31-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	5000cpm	NA	P	CSH
6-1-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	6000 cpm	NA	P	CSH
6-2-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	5000cpm	NA	P	REB
6-3-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	5500cpm	NA	P	REB
6-5-01	MODEL 3	173419	No	4-20-02	635183	22,900	50cpm	5000 cpm	NA	P	TO
6-7-01	MODEL 3	173419	No	4-20-02	635183	22,900	40cpm	5500cpm	NA	P	TO
6-8-01	MODEL 3	173419	No	4-20-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-9-01	MODEL 3	173419	No	4-20-02	635183	22,900	40cpm	6000cpm	NA	P	NH
6-10-01	MODEL 3	173419	No.	4-20-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-11-01	MODEL 3	173419	No	4-20-02	635183	22,900	40cpm	6000 cpm	NA	P	NH
6-12-01	MODEL 3	173419	No	4-20-02	635183	22,900	40cpm	5000 cpm	NA	P	NH
6-13-01	MODEL 3	173419	No	4-20-02	289801	17300	30cpm	2100cpm	12	P	TO
6-14-01	MODEL 3	173419	No	4-20-02	289801	17300	30cpm	2100 cpm	12	P	TO
6-16-01	Model 3	173419	No	4-20-02	289801	17300	30cpm	2100cpm	12	P	TO
6-17-01	Model 3	173419	No	4-20-02	289801	17300	40cpm	2100cpm	12	P	TO

DAILY INSTRUMENT PER' MANCE TEST LOG SHEET

Page _____ of _____

PROJECT:

DATE	MODEL/TYPE	S/N	PHYSICAL DAMAGE Y/N	CAL DUE DATE	SOURCE I.D.	ACTIVITY	BKRD	READING	EFF	PASS/ FAIL P/F	TECH INIT
6-18-01	Model 3	173419	No	4-20-02	289801	17300	30	2100	12	P	[illegible]
6-19-01	Model 3	173419	No	4-20-02	289801	17300	30	2100	12	P	[illegible]
6-20-01	Model 3	173419	No	4-20-02	289801	17300	30	2100	12	P	[illegible]
6-21-01	Model 3	173419	No	4-20-02	289801	17300	40	2200	12	P	[illegible]
6-22-01	MODEL 3	173419	No	4-20-02	289801	17,300	40	2200	12	P	NH
6-23-01	MODEL 3	173419	No	4-20-02	289801	17,300	40	2200	12	P	NH
6-23-01	MODEL 3	173419	No	4-20-02	289801	17,300	40	2200	12	P	NH
6-24-01	MODEL 3	173419	No	4-20-02	289801	17,300	40	2200	12	P	NH
6-25-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH
6-26-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH
6-27-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH
6-28-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH
6-29-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH
6-30-01	MODEL 3	173419	NO	4-20-02	289801	17,300	40	2200	12	P	NH

GM and NaI Calibration Certificates

Designer and Manufacturer of Scientific and Industrial Instruments

COPY

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER CABRERA SERVICES ORDER NO. 259530/253545

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 79498

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. PR 073107

Cal. Date 19-Feb-01 Cal Due Date 19-Feb-02 Cal. Interval 1 Year Meterface 202-002

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 20 % Alt 702.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☑ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 900 V Input Sens. 27 mV Det. Oper. 900 V at 27 mV Threshold Dial Ratio ____ = ____ mV

☐ HV Readout (2 points) Ref./Inst. ____ / ____ V Ref./Inst. ____ / ____ V

COMMENTS:

Isotope Tc-99 s/n NI-5V at 14100cpm read 5000cpm on screen of 44-9 detector less 60cpm background for an efficiency of 35% 2pi
Isotope Th-230 s/n 9802110121 at 2999cpm read 850cpm of screen of 44-9 detector less 60cpm background for an efficiency of 25% 2pi
No "as founds" - replaced noisy cable

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 100	400 Kcpm	N/A	4
X 100	100 Kcpm		1
X 10	40 Kcpm		4
X 10	10 Kcpm		1
X 1	4 Kcpm		4
X 1	1 Kcpm		1
X 0.1	400 cpm		4
X 0.1	100 cpm		1

*Uncertainty within ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

Lin dout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*

Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of ternational Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. ibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

rence Instruments and/or Sources:

7 Gamma S/N ☐ 1162 ☑ G112 ☐ M565 ☐ 5105 ☐ T1009 ☐ T879 ☐ E552 ☑ E551 ☐ Neutron Am-241 Be S/N T-304

/ S/N ____ ☐ Beta S/N ____ ☐ Other ____

m 500 S/N 54668 ☐ Oscilloscope S/N ____ ☑ Multimeter S/N 57770265

'ated By: [signature] Date 19 Feb 01

wed By: [signature] Date 22 Feb 01

ificate shall not be reproduced except in full, without the written approval of Ludlum Measurements Inc.

Designer and Manufacturer of Scientific and Industrial Instruments

COPY

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CONVERSION CHART

Customer CABRERA SERVICES Date 19-Feb-01 Order #. 259530/253545

Model 3 Serial No. 79498 Detector Model 44-9 Serial No. PR 073107

Source Cs-137 194.6 mCi Cs-137 20 mCi

High Voltage 900 V

Input Sensitivity 27 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	N/A		2.1 (K)	x100
50 mR/hr			1.1	x100
15 mR/hr			4.2	x10
5 mR/hr			1.6	x10
1.5 mR/hr			0.5	x10
1.0 mR/hr			3.3	x1

Signature: [signature] Date 19 Feb 01

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER ATLANTIC NUCLEAR ORDER NO. 262372

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 173419

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. PR 179127

Cal. Date 20-Apr-01 Cal Due Date 20-Apr-02 Cal. Interval 1 Year Meterface 202-608

Check mark ✓ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 41 % Alt 698.8 mm Hg

☑ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 900 V Input Sens. 35 mV Det. Oper. 900 V at 35 mV Threshold Dial Ratio = m

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 100	150 mR/hr		1.5
X 100	50 mR/hr		0.5
X 10	15 mR/hr		1.5
X 10	5 mR/hr		0.51
X 1	1.5 mR/hr = 4930 cpm		1.5
X 1	1.0 mR/hr		1.0
X 0.1	493 cpm		1.5
X 0.1	164 cpm		0.5

*Uncertainty within ± 10% C.F. within ± 20% X 0.1 **Range(s) Calibrated Electronically**

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☑ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☑ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N ☐ Beta S/N ☐ Other

☑ m 500 S/N 141244 ☐ Oscilloscope S/N ☑ Multimeter S/N 68160950

Calibrated By: Joyce Allhof Date 20-Apr-01

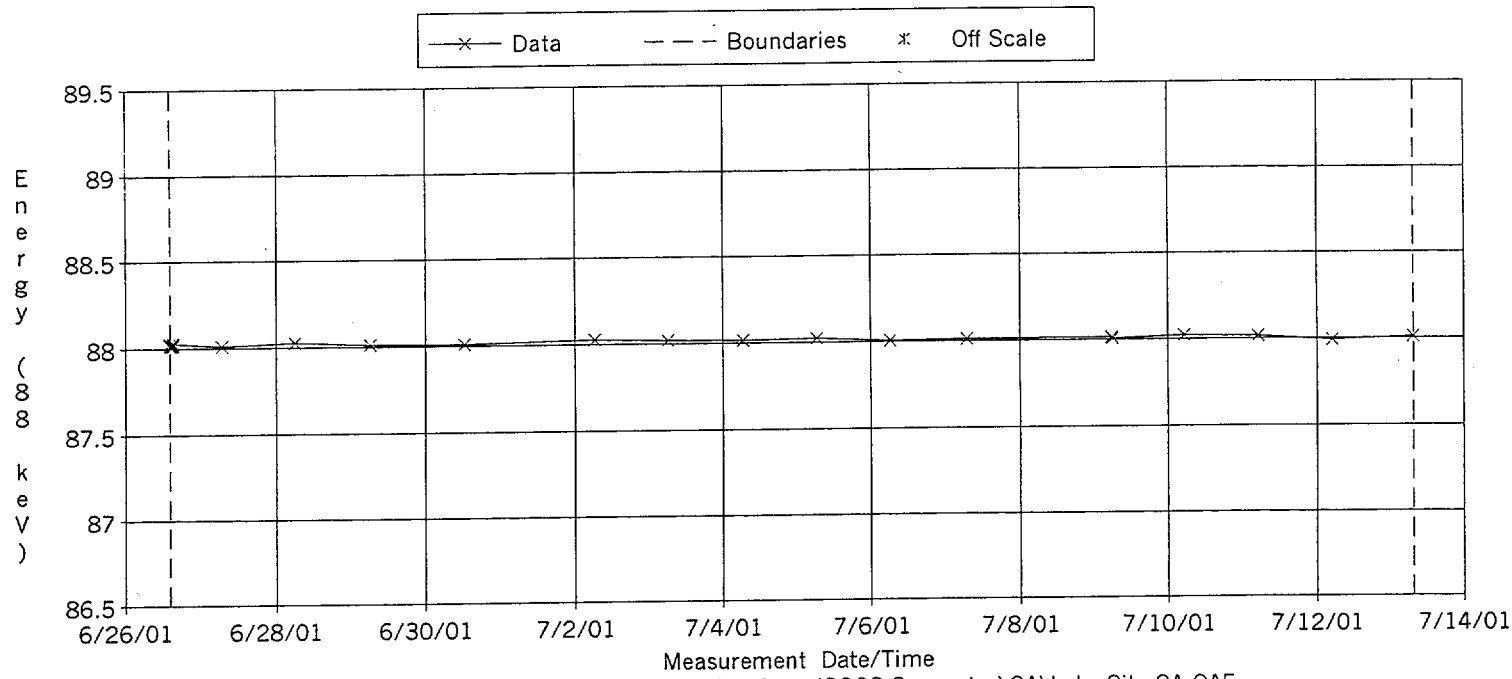
Reviewed By: Date 20-APR-01

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

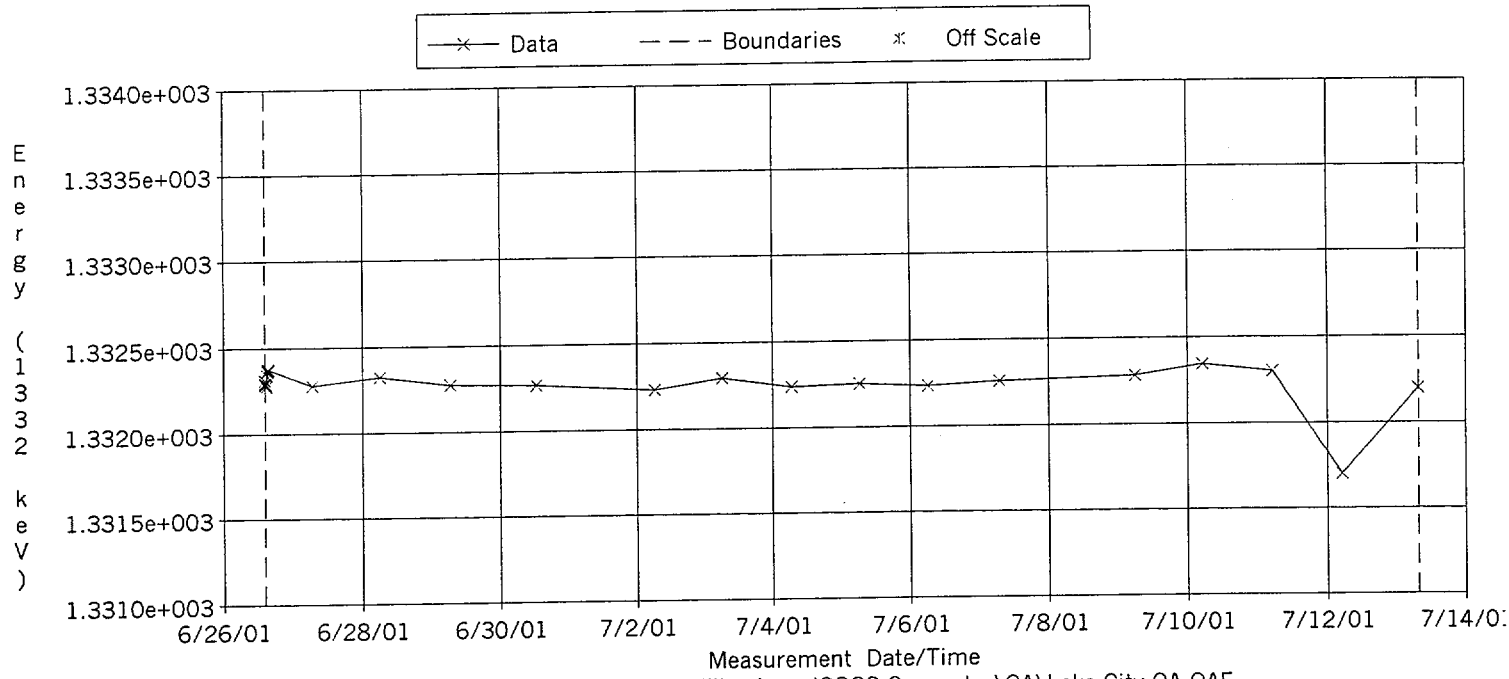
☐ Passed Dielectric (Hi-Pot) and Continuity Test

FORM C22A 12/28/2000

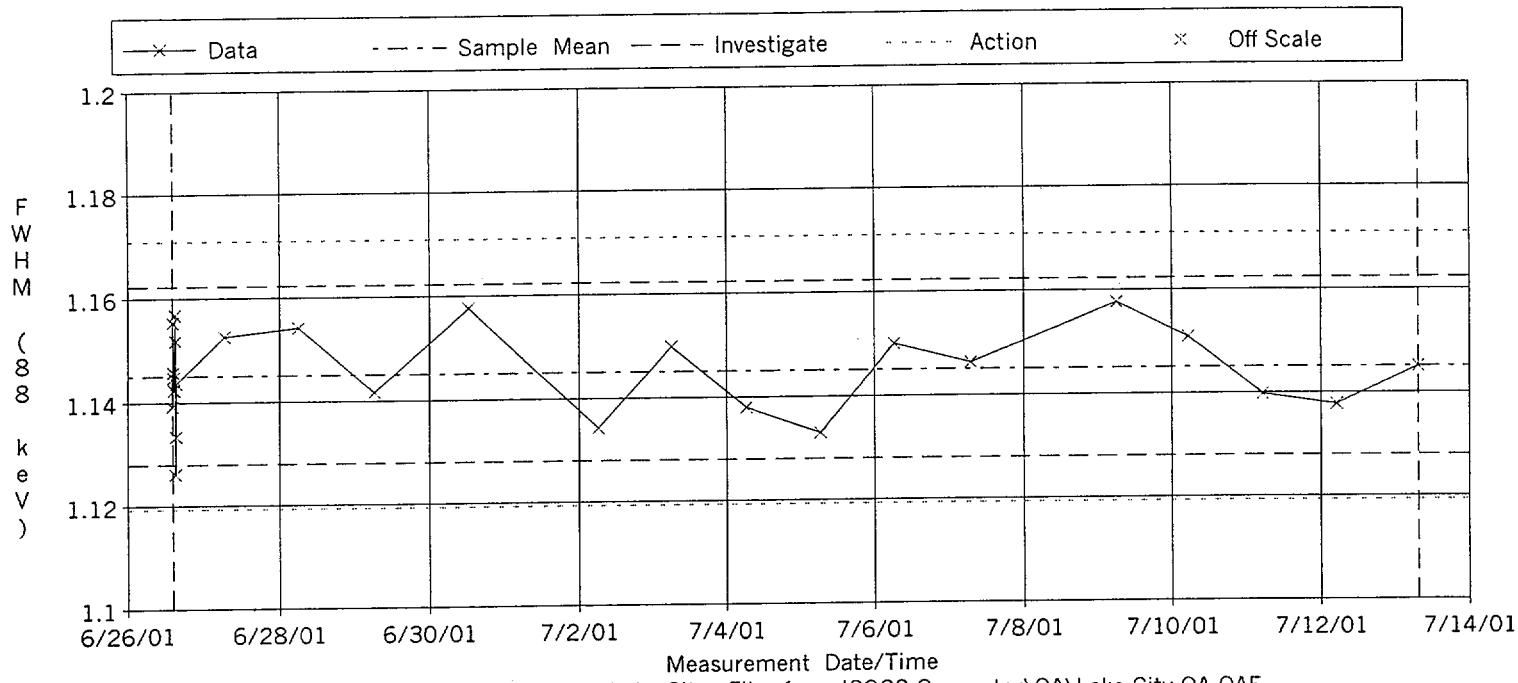
Gamma Spectroscopy System
Control Charts



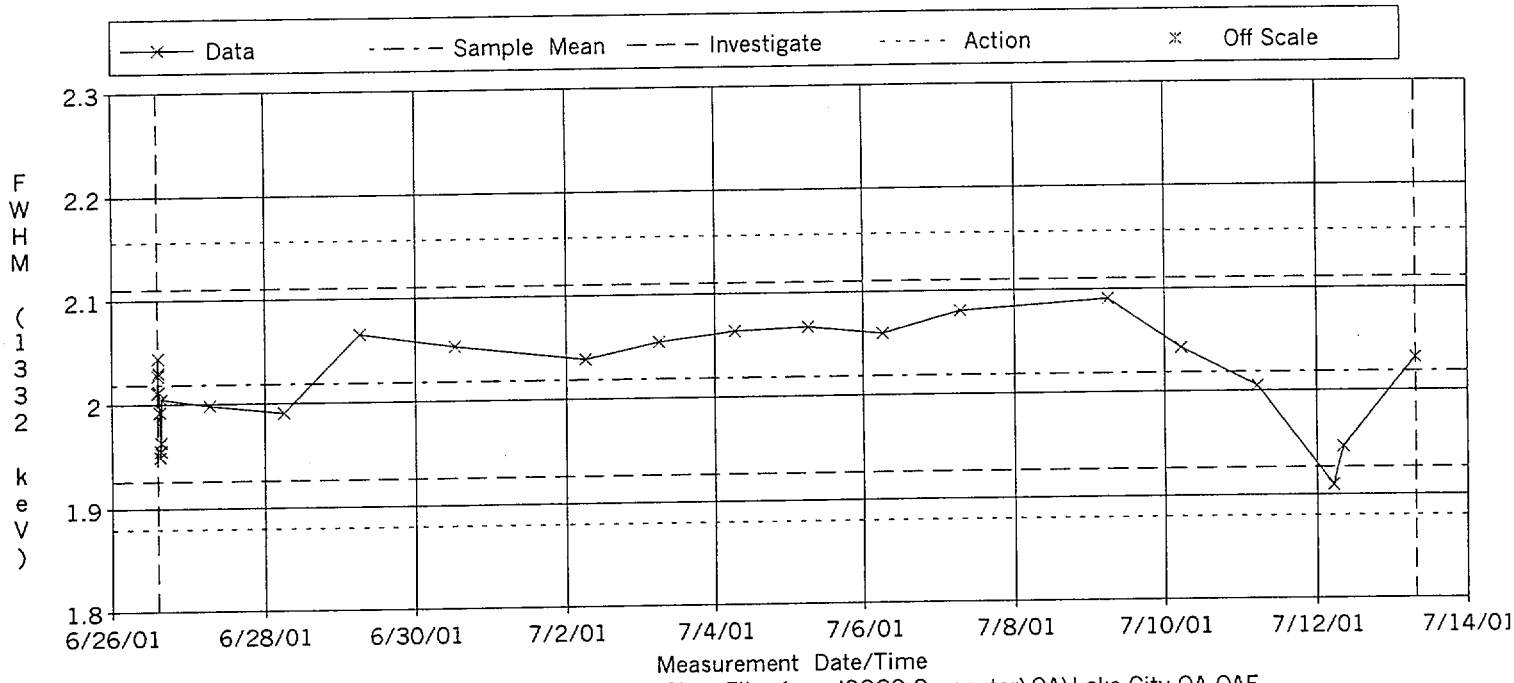
QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Lower/Upper Boundaries : 87.000 - 89.000



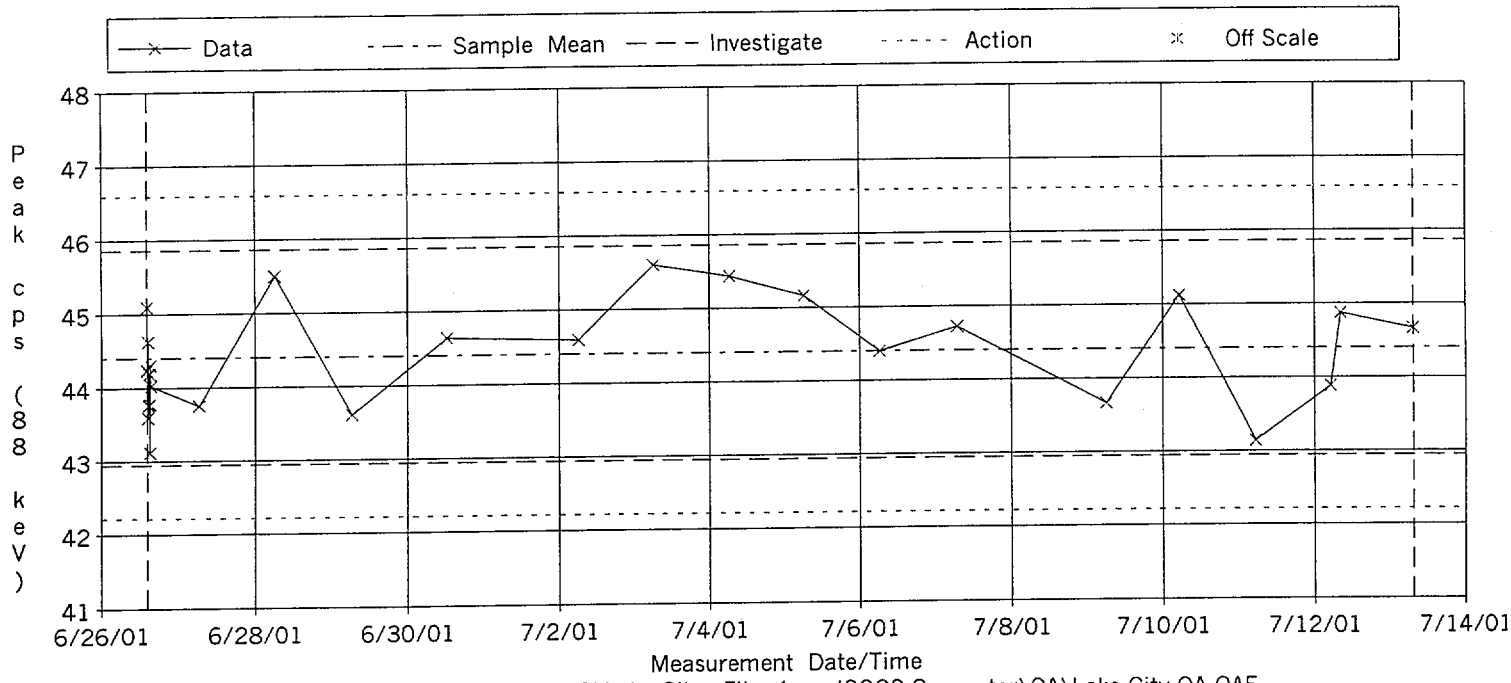
QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Lower/Upper Boundaries : 1331.500 - 1333.500



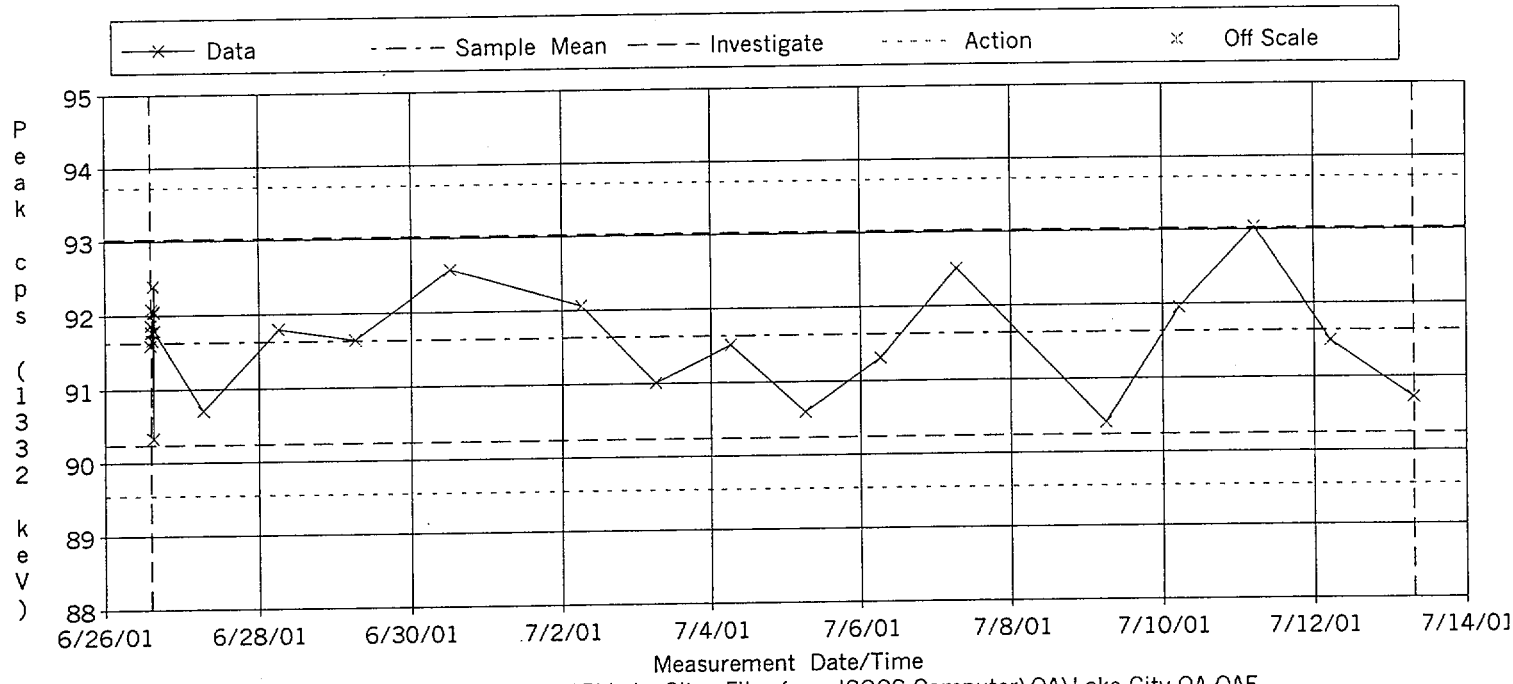
QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Sample Mean +/- Std Dev : 1.145 +/- 8.60e-003



QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Sample Mean +/- Std Dev : 2.018 +/- 0.046



QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Sample Mean +/- Std Dev : 44.404 +/- 0.729



QA Filename : V:\00-056 Lake City AAP\Lake City - Files from ISOCS Computer\QA\Lake City QA.QAF
Parameter Description : F
Selection Dates : 6/26/01 2:03:11 PM - 7/13/01 7:26:36 AM
Sample Mean +/- Std Dev : 91.633 +/- 0.696

Attachment IV
Sample Gamma Spectroscopy
Spectral Analysis Reports

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:53:47 PM
Sample Title	:	LC-3A-1 Outflow 1
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	8.548E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 10:40:11 AM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-1 Outflow 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.974	1461.00*		10.67	7.39739E+000	1.45494E+000
PB-212	0.449	74.81*	@	10.40	2.00812E+000	1.02010E+000
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	3.37687E-001	1.14029E-001
		300.09		3.28		
PB-214	0.531	74.81*	@	6.44	3.24292E+000	1.64737E+000
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	2.63159E-001	1.92155E-001
		351.93*		37.60	3.36592E-001	1.47349E-001
		785.96		1.07		
U-235	0.473	89.95	@	3.56		
		93.35*	@	5.81	1.98300E+001	3.31622E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	5.57653E-001	1.56907E-001
		202.11		1.08		
		205.31		5.01		
U-238	0.999	63.29*		4.80	1.34840E+001	4.26475E+000
		92.60*		5.60	2.05736E+001	3.44058E+000
		1001.03*		0.84	2.94238E+001	9.90259E+000

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.974	7.397389E+000	1.454943E+000
X	BI-211		0.809		
	PB-212	@	0.449	3.376870E-001	1.140291E-001
	PB-214	@	0.531	3.094009E-001	1.169284E-001
X	RA-226		0.940		
	U-235	@	0.473	5.613683E-001	1.556643E-001
	U-238		0.999	1.824331E+001	2.586566E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:53:45 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
3	84.62	1.3785E-001	54.75
9	608.86	6.5000E-002	44.76
10	910.57	3.8624E-002	54.14

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-1 Outflow 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.4045E+000	1.40E+000	7.3974E+000
	Co-60	1173.24	100.00	1.0945E-001	1.03E-001	-7.3776E-002
		1332.50	100.00	1.0340E-001		2.0163E-002
	CS-137	661.66	85.10	1.4704E-001	1.47E-001	7.0232E-002
	TL-208	277.36	6.31	1.4636E+000	1.63E-001	4.9855E-001
		510.77	22.60	6.0308E-001		7.3922E-001
		583.19	84.50	1.6326E-001		1.7928E-001
		763.13	1.81	7.2066E+000		8.1659E+000
		860.56	12.42	9.7252E-001		4.5419E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	2.1628E+001	6.04E-001	-1.7186E+001
		351.06*	12.91	6.0438E-001		9.8031E-001
	PB-211	404.85	3.78	2.7045E+000	2.70E+000	1.0278E+000
		427.09	1.76	5.9515E+000		1.5705E+000
		832.01	3.52	3.2392E+000		4.2448E-001
	BI-212	727.33	6.58	1.8571E+000	1.86E+000	1.3610E-001
		785.37	1.10	1.0716E+001		-9.2669E+000
		1620.50	1.49	5.9347E+000		-2.7352E+000
+	PB-212	74.81*	10.40	1.5833E+000	1.46E-001	2.0081E+000
		77.11	17.50	1.3671E+000		-1.0620E-001
		87.30	7.81	2.5232E+000		1.5114E-001
		238.63*	43.30	1.4573E-001		3.3769E-001
		300.09	3.28	3.4303E+000		3.6587E-001
	BI-214	609.31	46.10	3.2857E-001	3.29E-001	3.3323E-001
		768.36	4.94	2.8192E+000		9.6788E-001
		806.17	1.22	8.3925E+000		8.5398E-001
		934.06	3.03	3.8337E+000		-9.0987E-001
		1120.29	15.10	8.7280E-001		3.8795E-001
		1155.19	1.63	7.2212E+000		1.2204E+000
		1238.11	5.79	2.3681E+000		5.0128E-001
		1280.96	1.43	7.0758E+000		-4.7881E+000
		1377.67	4.00	2.9204E+000		1.9399E+000
		1401.50	1.27	9.4991E+000		1.3281E+000
		1407.98	2.15	6.1007E+000		1.5975E+000
		1509.23	2.11	4.2248E+000		8.3803E-001
		1661.28	1.15	6.9352E+000		1.5367E+000
		1729.60	2.92	3.8645E+000		-1.1902E+000
		1764.49	15.40	9.1465E-001		3.4283E-001
		1847.42	2.11	4.0296E+000		7.7252E-001
+	PB-214	74.81*	6.44	2.5568E+000	2.08E-001	3.2429E+000
		77.11	10.80	2.2152E+000		-1.7208E-001
		87.30	4.84	4.0716E+000		2.4389E-001

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.7376E+000	2.08E-001	-6.9717E-001
		295.22*	19.30	2.9651E-001		2.6316E-001
		351.93*	37.60	2.0751E-001		3.3659E-001
		785.96	1.07	1.1153E+001		-1.2587E+001
	RA-226	186.21*	3.28	3.7455E+000	3.75E+000	9.7249E+000
	AC-228	93.35	0.32	8.3201E+001	5.71E-001	3.6437E+002
		129.07	2.42	4.2939E+000		4.7336E-002
		209.25	3.89	2.4525E+000		-8.2846E-001
		270.24	3.46	2.6744E+000		2.0712E-001
		338.32	11.27	9.2163E-001		1.2416E-001
		409.46	1.92	5.0326E+000		-1.0131E+000
		463.00	4.40	2.4204E+000		-4.3546E-001
		794.95	4.25	3.0778E+000		2.2312E+000
		911.20	25.80	5.7149E-001		5.3734E-001
		964.77	4.99	2.6051E+000		5.1641E-001
		968.97	15.80	8.3475E-001		4.1652E-001
		1588.20	3.22	3.5456E+000		-1.7820E-001
+	U-235	89.95	3.56	7.9235E+000	2.15E-001	1.8264E+000
		93.35*	5.81	2.8292E+000		1.9830E+001
		105.00	2.69	4.1597E+000		-8.4658E-001
		109.16	1.54	7.7618E+000		1.9546E+000
		143.76	10.96	9.6810E-001		5.3472E-001
		163.33	5.08	1.9059E+000		-4.4571E-001
		185.72*	57.20	2.1478E-001		5.5765E-001
		202.11	1.08	9.4099E+000		4.5540E+000
		205.31	5.01	1.9383E+000		2.3584E-001
+	U-238	63.29*	4.80	5.7562E+000	2.94E+000	1.3484E+001
		92.60*	5.60	2.9353E+000		2.0574E+001
		1001.03*	0.84	1.1745E+001		2.9424E+001
	Am-241	59.54	35.90	9.4253E-001	9.43E-001	-2.2653E-002

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************

Report Generated On                 :  8/18/01  2:54:04 PM

Sample Title                        : LC-3A-2 Outlow 2
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  8.649E+002 gram

Sample Taken On                     :
Acquisition Started                 :  7/12/01 10:28:52 AM

Live Time                           :      600.0 seconds
Real Time                           :      600.2 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-2 Outlow 2
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.978	1461.00*		10.67	8.07744E+000	1.48859E+000
TL-208	0.625	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.80800E-001	6.51731E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.448	74.81*	@	10.40	1.27146E+000	9.68800E-001
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	3.61569E-001	1.31750E-001
		300.09		3.28		
BI-214	0.317	609.31*		46.10	3.25532E-001	1.27106E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29		15.10		
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49*		15.40	6.95683E-001	4.58765E-001
		1847.42		2.11		
PB-214	0.537	74.81*	@	6.44	2.05329E+000	1.56452E+000
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	1.94791E-001	2.05970E-001
		351.93*		37.60	2.13180E-001	1.25589E-001
		785.96		1.07		
U-235	0.669	89.95	@	3.56		
		93.35*	@	5.81	2.01714E+001	3.67143E+000
		105.00		2.69		
		109.16		1.54		
		143.76*		10.96	6.62888E-001	3.87172E-001
		163.33		5.08		
		185.72*		57.20	4.48323E-001	1.08623E-001

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
U-235	0.669	202.11	1.08		
		205.31	5.01		
U-238	0.997	63.29*	4.80	1.25081E+001	4.11892E+000
		92.60*	5.60	2.09278E+001	3.80911E+000
		1001.03*	0.84	3.47140E+001	9.80481E+000

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.978	8.077438E+000	1.488589E+000
	TL-208	@	0.625	1.807999E-001	6.517314E-002
X	BI-211		0.792		
	PB-212	@	0.448	3.615690E-001	1.317496E-001
	BI-214		0.317	3.519202E-001	1.224911E-001
	PB-214	@	0.537	2.081963E-001	1.072283E-001
X	RA-226		0.949		
	U-235	@	0.669	4.663599E-001	1.033528E-001
	U-238		0.997	1.813444E+001	2.689844E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:54:02 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
4	98.39	1.2143E-001	46.49

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-2 Outlow 2
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.3583E+000	1.36E+000	8.0774E+000
	Co-60	1173.24	100.00	1.2159E-001	7.40E-002	-4.6458E-002
		1332.50	100.00	7.4038E-002		-5.9255E-002
	CS-137	661.66	85.10	1.2766E-001	1.28E-001	3.3107E-003
+	TL-208	277.36	6.31	1.5656E+000	7.63E-002	2.7339E-001
		510.77	22.60	6.0245E-001		3.8562E-001
		583.19*	84.50	7.6294E-002		1.8080E-001
		763.13	1.81	8.0619E+000		6.5901E+000
		860.56	12.42	9.9694E-001		7.6675E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	2.1027E+001	5.48E-001	3.6980E+001
		351.06*	12.91	5.4753E-001		6.2088E-001
	PB-211	404.85	3.78	2.5926E+000	2.59E+000	1.1811E-002
		427.09	1.76	5.7024E+000		-2.0515E+000
		832.01	3.52	2.8747E+000		-1.6375E+000
	BI-212	727.33	6.58	1.6779E+000	1.68E+000	-3.4599E-001
		785.37	1.10	1.0717E+001		3.7648E+000
		1620.50	1.49	6.1605E+000		5.0831E-001
+	PB-212	74.81*	10.40	1.5729E+000	1.82E-001	1.2715E+000
		77.11	17.50	1.3650E+000		4.2038E-001
		87.30	7.81	2.6156E+000		2.8669E-001
		238.63*	43.30	1.8160E-001		3.6157E-001
		300.09	3.28	3.0919E+000		1.2389E-002
+	BI-214	609.31*	46.10	1.6045E-001	1.60E-001	3.2553E-001
		768.36	4.94	3.1527E+000		3.1759E+000
		806.17	1.22	9.9144E+000		9.0646E+000
		934.06	3.03	3.6132E+000		1.2146E+000
		1120.29	15.10	8.8668E-001		2.0653E-001
		1155.19	1.63	7.6480E+000		1.2395E+000
		1238.11	5.79	2.1990E+000		1.5300E-001
		1280.96	1.43	8.1072E+000		1.2051E-002
		1377.67	4.00	2.6766E+000		-6.7489E-001
		1401.50	1.27	8.9618E+000		3.4381E+000
		1407.98	2.15	5.5599E+000		7.4482E-001
		1509.23	2.11	5.0400E+000		1.5973E+000
		1661.28	1.15	7.7111E+000		2.0352E+000
		1729.60	2.92	2.3548E+000		-2.4384E+000
		1764.49*	15.40	6.5560E-001		6.9568E-001
		1847.42	2.11	4.4804E+000		1.1100E+000
+	PB-214	74.81*	6.44	2.5401E+000	1.88E-001	2.0533E+000
		77.11	10.80	2.2118E+000		6.8118E-001
		87.30	4.84	4.2207E+000		4.6261E-001

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.8277E+000	1.88E-001	-7.0620E-001
		295.22*	19.30	3.3891E-001		1.9479E-001
		351.93*	37.60	1.8799E-001		2.1318E-001
		785.96	1.07	1.0892E+001		-1.0698E-001
	RA-226	186.21*	3.28	2.1580E+000	2.16E+000	7.8183E+000
	AC-228	93.35	0.32	8.4701E+001	5.85E-001	-1.8385E+000
		129.07	2.42	4.3390E+000		1.8224E+000
		209.25	3.89	2.6331E+000		4.9478E-001
		270.24	3.46	2.9852E+000		1.2077E+000
		338.32	11.27	9.1607E-001		5.8198E-001
		409.46	1.92	4.9317E+000		-3.3267E+000
		463.00	4.40	2.3141E+000		5.9486E-001
		794.95	4.25	2.7591E+000		3.9987E-001
		911.20	25.80	5.8455E-001		6.4784E-001
		964.77	4.99	3.0898E+000		1.0689E+000
		968.97	15.80	9.4448E-001		5.0654E-001
		1588.20	3.22	3.7010E+000		2.2303E+000
+	U-235	89.95	3.56	8.0497E+000	1.24E-001	-2.2715E+000
		93.35*	5.81	3.8112E+000		2.0171E+001
		105.00	2.69	4.4216E+000		-2.0631E+000
		109.16	1.54	8.6980E+000		-3.1766E+000
		143.76*	10.96	5.6962E-001		6.6289E-001
		163.33	5.08	2.0947E+000		1.7892E-001
		185.72*	57.20	1.2375E-001		4.4832E-001
		202.11	1.08	9.1751E+000		-1.8313E+000
		205.31	5.01	2.0462E+000		1.5754E+000
+	U-238	63.29*	4.80	5.6401E+000	3.95E+000	1.2508E+001
		92.60*	5.60	3.9541E+000		2.0928E+001
		1001.03*	0.84	9.8816E+000		3.4714E+001
	Am-241	59.54	35.90	9.2256E-001	9.23E-001	2.4583E-002

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************

Report Generated On                 :  8/18/01  2:54:21 PM

Sample Title                        : LC-3A-3 Outflow 3
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  7.446E+002 gram

Sample Taken On                     :
Acquisition Started                 :  7/12/01 10:52:20 AM

Live Time                           :      600.0 seconds
Real Time                           :      600.2 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-3 Outflow 3
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.985	1461.00*		10.67	7.23421E+000	1.49887E+000
TL-208	0.619	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.93380E-001	8.21920E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.451	74.81*	@	10.40	1.57156E+000	1.00757E+000
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	3.60781E-001	1.39280E-001
		300.09		3.28		
U-235	0.474	89.95	@	3.56		
		93.35*	@	5.81	1.55499E+001	2.95086E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	3.85725E-001	1.07570E-001
		202.11		1.08		
		205.31		5.01		
U-238	0.999	63.29*		4.80	1.17531E+001	3.88177E+000
		92.60*		5.60	1.61330E+001	3.06152E+000
		1001.03*		0.84	2.74409E+001	1.09315E+001

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.985	7.234214E+000	1.498866E+000
	TL-208	@	0.619	1.933800E-001	8.219204E-002
	PB-212	@	0.451	3.607807E-001	1.392804E-001
X	RA-226		0.953		
	U-235	@	0.474	3.868798E-001	1.067264E-001
	U-238		0.999	1.481637E+001	2.348656E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:54:20 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
6	295.17	2.7295E-002	104.31

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-3 Outflow 3
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.3841E+000	1.38E+000	7.2342E+000
	Co-60	1173.24	100.00	1.4123E-001	1.25E-001	-2.9008E-002
		1332.50	100.00	1.2537E-001		9.7363E-002
	CS-137	661.66	85.10	1.4484E-001	1.45E-001	-1.3233E-001
+	TL-208	277.36	6.31	1.6214E+000	1.10E-001	5.1989E-001
		510.77	22.60	6.9979E-001		9.4623E-001
		583.19*	84.50	1.0990E-001		1.9338E-001
		763.13	1.81	8.8006E+000		4.3059E+000
		860.56	12.42	1.2492E+000		8.5213E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	2.1267E+001	9.60E-001	-1.5620E+001
		351.06	12.91	9.6039E-001		6.9498E-001
	PB-211	404.85	3.78	2.8902E+000	2.89E+000	1.0019E+000
		427.09	1.76	6.1836E+000		4.5593E+000
		832.01	3.52	3.8194E+000		-5.7857E-001
	BI-212	727.33	6.58	1.8754E+000	1.88E+000	-1.0178E+000
		785.37	1.10	1.0881E+001		3.9194E-001
		1620.50	1.49	7.7884E+000		2.0495E+000
+	PB-212	74.81*	10.40	1.6018E+000	1.92E-001	1.5716E+000
		77.11	17.50	1.3793E+000		7.4579E-001
		87.30	7.81	2.6302E+000		1.7085E+000
		238.63*	43.30	1.9231E-001		3.6078E-001
		300.09	3.28	3.5549E+000		-9.1964E-001
	BI-214	609.31	46.10	3.5210E-001	3.52E-001	3.1076E-001
		768.36	4.94	3.4688E+000		4.1068E+000
		806.17	1.22	9.4726E+000		-5.2184E+000
		934.06	3.03	5.0737E+000		4.7294E+000
		1120.29	15.10	1.0835E+000		4.8639E-001
		1155.19	1.63	9.3016E+000		6.2757E+000
		1238.11	5.79	2.7580E+000		1.6776E+000
		1280.96	1.43	8.7971E+000		-2.3298E+000
		1377.67	4.00	2.6453E+000		-5.2538E-001
		1401.50	1.27	1.0905E+001		3.9768E+000
		1407.98	2.15	6.5993E+000		2.0223E+000
		1509.23	2.11	5.8543E+000		6.0027E-001
		1661.28	1.15	7.4010E+000		-5.7865E+000
		1729.60	2.92	3.9668E+000		5.4084E-001
		1764.49	15.40	7.9262E-001		4.8071E-001
		1847.42	2.11	5.9494E+000		-9.8404E-001
	PB-214	74.81	6.44	4.1185E+000	3.37E-001	6.9450E+000
		77.11	10.80	2.2350E+000		1.2085E+000
		87.30	4.84	4.2442E+000		2.7568E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
	PB-214	242.00	7.43	1.9500E+000	3.37E-001	-7.2600E-001
		295.22	19.30	6.1963E-001		3.9156E-002
		351.93	37.60	3.3747E-001		4.3246E-001
		785.96	1.07	1.1191E+001		-2.4186E+000
	RA-226	186.21*	3.28	2.2436E+000	2.24E+000	6.7267E+000
	AC-228	93.35	0.32	7.9478E+001	6.56E-001	2.7794E+002
		129.07	2.42	4.0817E+000		3.2604E+000
		209.25	3.89	2.6442E+000		-9.6569E-001
		270.24	3.46	3.2030E+000		2.7738E+000
		338.32	11.27	1.0335E+000		1.5509E-001
		409.46	1.92	6.0621E+000		2.6326E+000
		463.00	4.40	2.6648E+000		1.7487E+000
		794.95	4.25	2.7902E+000		2.9590E-001
		911.20	25.80	6.5607E-001		3.8953E-001
		964.77	4.99	3.0634E+000		9.5070E-001
		968.97	15.80	1.0249E+000		8.7152E-001
		1588.20	3.22	4.4081E+000		2.7467E+000
+	U-235	89.95	3.56	7.7458E+000	1.29E-001	-8.2632E+000
		93.35*	5.81	2.9710E+000		1.5550E+001
		105.00	2.69	4.3088E+000		-9.6938E-001
		109.16	1.54	8.0400E+000		3.4403E+000
		143.76	10.96	9.5576E-001		5.2942E-001
		163.33	5.08	1.9178E+000		1.7855E-001
		185.72*	57.20	1.2865E-001		3.8573E-001
		202.11	1.08	9.3703E+000		1.5755E+000
		205.31	5.01	2.1579E+000		2.1495E+000
+	U-238	63.29*	4.80	5.1975E+000	3.08E+000	1.1753E+001
		92.60*	5.60	3.0824E+000		1.6133E+001
		1001.03*	0.84	1.4121E+001		2.7441E+001
	Am-241	59.54	35.90	8.9589E-001	8.96E-001	2.2312E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:54:37 PM
Sample Title	:	LC-3A-4 Sump 04
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	9.055E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 12:18:05 PM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-4 Sump 04
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.986	1461.00*		10.67	6.35891E+000	1.31756E+000
TL-208	0.623	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.85785E-001	6.81326E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.776	74.81*	@	10.40	7.85000E-001	5.04113E-001
		77.11*	@	17.50	4.15510E-001	2.22265E-001
		87.30	@	7.81		
		238.63*		43.30	4.65099E-001	1.35743E-001
		300.09		3.28		
BI-214	0.327	609.31*		46.10	8.75070E-001	1.81376E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29		15.10		
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49*		15.40	1.43729E+000	5.23791E-001
		1847.42		2.11		
PB-214	0.735	74.81*	@	6.44	1.26770E+000	8.14096E-001
		77.11*	@	10.80	6.73279E-001	3.60152E-001
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	6.99811E-001	2.63810E-001
		351.93*		37.60	9.43172E-001	2.05544E-001
		785.96		1.07		
RA-226	0.990	186.21*		3.28	1.46814E+000	1.04355E+000
U-235	0.395	89.95	@	3.56		
		93.35	@	5.81		
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
U-235	0.395	185.72*	57.20	8.41871E-002	5.98906E-002
		202.11	1.08		
		205.31	5.01		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.986	6.358915E+000	1.317565E+000
	TL-208	@	0.623	1.857848E-001	6.813257E-002
X	BI-211		0.801		
	PB-212	@	0.776	4.650990E-001	1.357432E-001
	BI-214		0.327	9.352662E-001	1.713912E-001
	PB-214	@	0.735	8.512441E-001	1.621396E-001
?	RA-226		0.990	1.468140E+000	1.043553E+000
?	U-235	@	0.395	8.418707E-002	5.989059E-002

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:54:36 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
9	910.77	7.8662E-002	35.42

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-4 Sump 04
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.3056E+000	1.31E+000	6.3589E+000
	Co-60	1173.24	100.00	1.2572E-001	1.03E-001	5.3336E-002
		1332.50	100.00	1.0309E-001		6.7526E-003
	CS-137	661.66	85.10	1.3259E-001	1.33E-001	4.7763E-002
+	TL-208	277.36	6.31	1.5099E+000	8.46E-002	6.0795E-001
		510.77	22.60	6.2495E-001		6.5692E-001
		583.19*	84.50	8.4561E-002		1.8578E-001
		763.13	1.81	6.1970E+000		3.8282E+000
		860.56	12.42	7.9239E-001		-9.4223E-002
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.4121E+001	6.52E-001	-5.0667E+000
		351.06*	12.91	6.5158E-001		2.7470E+000
	PB-211	404.85	3.78	2.8549E+000	2.85E+000	-3.9922E-001
		427.09	1.76	5.2237E+000		1.7137E+000
		832.01	3.52	3.4508E+000		1.2149E-001
	BI-212	727.33	6.58	1.7886E+000	1.79E+000	2.7823E-001
		785.37	1.10	9.2214E+000		2.3110E+000
		1620.50	1.49	6.1509E+000		2.0877E+000
+	PB-212	74.81*	10.40	1.0889E+000	1.72E-001	7.8500E-001
		77.11*	17.50	5.3754E-001		4.1551E-001
		87.30	7.81	1.5911E+000		1.1739E+000
		238.63*	43.30	1.7230E-001		4.6510E-001
		300.09	3.28	3.4229E+000		-2.6394E+000
+	BI-214	609.31*	46.10	1.7094E-001	1.71E-001	8.7507E-001
		768.36	4.94	2.1719E+000		-1.8012E-002
		806.17	1.22	9.5776E+000		6.6900E+000
		934.06	3.03	3.6191E+000		2.4252E+000
		1120.29	15.10	9.6278E-001		1.5851E-001
		1155.19	1.63	6.9425E+000		8.6615E-001
		1238.11	5.79	2.4817E+000		1.3771E+000
		1280.96	1.43	8.0634E+000		-1.7725E+000
		1377.67	4.00	2.7568E+000		-7.6535E-001
		1401.50	1.27	8.3479E+000		-4.2034E+000
		1407.98	2.15	4.8144E+000		2.7331E+000
		1509.23	2.11	4.8141E+000		8.3978E-001
		1661.28	1.15	9.0439E+000		1.2320E+000
		1729.60	2.92	3.8811E+000		-4.6815E-002
		1764.49*	15.40	5.4563E-001		1.4373E+000
		1847.42	2.11	3.8040E+000		-2.9171E+000
+	PB-214	74.81*	6.44	1.7585E+000	2.24E-001	1.2677E+000
		77.11*	10.80	8.7101E-001		6.7328E-001
		87.30	4.84	2.5674E+000		1.8942E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.9082E+000	2.24E-001	1.9798E-001
		295.22*	19.30	3.5493E-001		6.9981E-001
		351.93*	37.60	2.2372E-001		9.4317E-001
		785.96	1.07	9.6212E+000		3.6461E+000
+	RA-226	186.21*	3.28	1.6287E+000	1.63E+000	1.4681E+000
	AC-228	93.35	0.32	3.2124E+001	6.44E-001	1.3119E+001
		129.07	2.42	3.5265E+000		3.3961E-001
		209.25	3.89	2.4303E+000		-3.9231E-001
		270.24	3.46	2.8636E+000		2.8140E-001
		338.32	11.27	9.5980E-001		1.0708E+000
		409.46	1.92	5.3859E+000		-1.2347E+000
		463.00	4.40	2.3211E+000		1.7845E+000
		794.95	4.25	1.9301E+000		-7.5568E-001
		911.20	25.80	6.4380E-001		8.5907E-001
		964.77	4.99	3.0490E+000		2.9030E+000
		968.97	15.80	9.0214E-001		6.9663E-001
		1588.20	3.22	3.9613E+000		1.7626E+000
+	U-235	89.95	3.56	3.2799E+000	9.34E-002	-1.7325E+000
		93.35	5.81	1.7693E+000		7.2258E-001
		105.00	2.69	3.2611E+000		-1.4374E-001
		109.16	1.54	5.3726E+000		-3.4059E+000
		143.76	10.96	7.5925E-001		1.0938E-002
		163.33	5.08	1.7479E+000		-9.3308E-001
		185.72*	57.20	9.3395E-002		8.4187E-002
		202.11	1.08	9.0879E+000		8.3902E+000
		205.31	5.01	1.9353E+000		7.1478E-001
	U-238	63.29	4.80	3.8135E+000	1.86E+000	1.0044E+000
		92.60	5.60	1.8624E+000		4.1056E-001
		1001.03	0.84	1.3387E+001		6.9576E+000
	Am-241	59.54	35.90	5.5757E-001	5.58E-001	-2.1441E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:54:51 PM
Sample Title	:	LC-3A-5 Left to 04
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	8.520E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/11/01 5:31:31 PM
Live Time	:	300.0 seconds
Real Time	:	300.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-5 Left to 04
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.991	1461.00*		10.67	7.77490E+000	1.97304E+000
PB-214	0.405	74.81	@	6.44		
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	4.81625E-001	2.84797E-001
		351.93*		37.60	4.24181E-001	2.62815E-001
		785.96		1.07		
U-235	0.476	89.95	@	3.56		
		93.35*	@	5.81	1.83025E+001	3.85631E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	3.97715E-001	1.58022E-001
		202.11		1.08		
		205.31		5.01		
U-238	0.997	63.29*		4.80	1.28381E+001	4.97792E+000
		92.60*		5.60	1.89888E+001	4.00092E+000
		1001.03*		0.84	3.51854E+001	1.29820E+001

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.991	7.774898E+000	1.973036E+000
X	BI-211		0.829		
	PB-214	@	0.405	4.506009E-001	1.931427E-001
X	RA-226		0.963		
	U-235	@	0.476	3.996788E-001	1.573771E-001
	U-238		0.997	1.735203E+001	3.033698E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:54:50 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
4	238.34	2.2522E-001	38.30
7	766.14	6.3510E-002	61.39

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-5 Left to 04
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.7529E+000	1.75E+000	7.7749E+000
	Co-60	1173.24	100.00	1.6940E-001	1.50E-001	-1.2372E-002
		1332.50	100.00	1.5032E-001		-3.5037E-002
	CS-137	661.66	85.10	2.1683E-001	2.17E-001	2.6388E-003
	TL-208	277.36	6.31	2.2886E+000	2.70E-001	-8.1083E-001
		510.77	22.60	1.0011E+000		1.0205E+000
		583.19	84.50	2.6959E-001		1.2553E-001
		763.13	1.81	1.2393E+001		6.0905E+000
		860.56	12.42	1.5312E+000		-5.4621E-002
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	3.0112E+001	1.16E+000	3.8020E+001
		351.06*	12.91	1.1637E+000		1.2354E+000
	PB-211	404.85	3.78	4.3994E+000	4.40E+000	2.2163E+000
		427.09	1.76	9.0567E+000		-1.5297E+000
		832.01	3.52	4.9566E+000		-1.6369E+000
	BI-212	727.33	6.58	3.0500E+000	3.05E+000	-1.7427E-001
		785.37	1.10	1.5377E+001		-1.1646E+001
		1620.50	1.49	1.2508E+001		1.0320E+000
	PB-212	74.81	10.40	3.6735E+000	5.19E-001	7.1982E+000
		77.11	17.50	1.9505E+000		-3.0707E-002
		87.30	7.81	3.4406E+000		1.5330E+000
		238.63	43.30	5.1866E-001		8.0185E-001
		300.09	3.28	4.5659E+000		4.1050E-002
	BI-214	609.31	46.10	4.7747E-001	4.77E-001	2.0721E-001
		768.36	4.94	4.7318E+000		4.4082E+000
		806.17	1.22	1.4061E+001		4.9966E+000
		934.06	3.03	5.1367E+000		-4.6780E+000
		1120.29	15.10	1.5947E+000		3.8688E-001
		1155.19	1.63	1.3062E+001		-5.1697E-001
		1238.11	5.79	4.0738E+000		1.7363E-001
		1280.96	1.43	1.3346E+001		-3.1749E+000
		1377.67	4.00	4.6237E+000		-2.8968E-002
		1401.50	1.27	1.5792E+001		6.9682E+000
		1407.98	2.15	9.0365E+000		2.6403E+000
		1509.23	2.11	7.6388E+000		-2.0348E+000
		1661.28	1.15	1.0622E+001		2.8780E-001
		1729.60	2.92	6.6330E+000		3.5823E+000
		1764.49	15.40	1.2729E+000		6.8745E-001
		1847.42	2.11	5.3240E+000		1.1467E+000
+	PB-214	74.81	6.44	5.9323E+000	3.89E-001	1.1624E+001
		77.11	10.80	3.1606E+000		-4.9757E-002
		87.30	4.84	5.5519E+000		2.4736E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	3.0158E+000	3.89E-001	-7.8206E-001
		295.22*	19.30	3.8864E-001		4.8162E-001
		351.93*	37.60	3.9957E-001		4.2418E-001
		785.96	1.07	1.6196E+001		-6.9026E+000
	RA-226	186.21*	3.28	3.7868E+000	3.79E+000	6.9358E+000
	AC-228	93.35	0.32	1.0612E+002	9.69E-001	2.7872E+002
		129.07	2.42	5.8457E+000		-2.3675E+000
		209.25	3.89	3.5928E+000		2.1063E-001
		270.24	3.46	4.1511E+000		-1.1009E+000
		338.32	11.27	1.6587E+000		1.0082E+000
		409.46	1.92	7.4156E+000		1.2600E+000
		463.00	4.40	3.5896E+000		1.8959E-001
		794.95	4.25	4.3778E+000		1.3165E+000
		911.20	25.80	9.6852E-001		6.7322E-001
		964.77	4.99	5.2913E+000		4.6163E+000
		968.97	15.80	1.7343E+000		1.7313E+000
		1588.20	3.22	4.8410E+000		-1.5447E+000
+	U-235	89.95	3.56	1.0156E+001	2.17E-001	-1.4168E+000
		93.35*	5.81	4.0970E+000		1.8302E+001
		105.00	2.69	5.5906E+000		-1.4794E+000
		109.16	1.54	1.0886E+001		-6.9509E-001
		143.76	10.96	1.4295E+000		6.6661E-001
		163.33	5.08	2.9419E+000		-4.7961E-001
		185.72*	57.20	2.1715E-001		3.9772E-001
		202.11	1.08	1.2636E+001		8.5956E+000
		205.31	5.01	2.7438E+000		-4.5619E-001
+	U-238	63.29*	4.80	6.8544E+000	4.25E+000	1.2838E+001
		92.60*	5.60	4.2506E+000		1.8989E+001
		1001.03*	0.84	1.1471E+001		3.5185E+001
	Am-241	59.54	35.90	1.2838E+000	1.28E+000	-3.7884E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:55:02 PM
Sample Title	:	LC-3A-6 Sump 03
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.962E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 3:15:04 PM
Live Time	:	600.0 seconds
Real Time	:	600.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-6 Sump 03
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.977	1461.00*	10.67	7.66231E+000	1.47714E+000
TL-208	0.622	277.36	6.31		
		510.77 @	22.60		
		583.19*	84.50	1.77096E-001	8.20237E-002
		763.13	1.81		
		860.56	12.42		
		2614.53	99.16		
PB-212	0.779	74.81* @	10.40	1.28318E+000	5.90403E-001
		77.11* @	17.50	7.02967E-001	2.64975E-001
		87.30 @	7.81		
		238.63*	43.30	6.65261E-001	1.35900E-001
		300.09	3.28		
BI-214	0.342	609.31*	46.10	4.85214E-001	1.77697E-001
		768.36	4.94		
		806.17	1.22		
		934.06	3.03		
		1120.29*	15.10	4.29458E-001	4.49207E-001
		1155.19	1.63		
		1238.11	5.79		
		1280.96	1.43		
		1377.67	4.00		
		1401.50	1.27		
		1407.98	2.15		
		1509.23	2.11		
		1661.28	1.15		
		1729.60	2.92		
		1764.49	15.40		
		1847.42	2.11		
PB-214	0.880	74.81* @	6.44	2.07222E+000	9.53446E-001
		77.11* @	10.80	1.13907E+000	4.29357E-001
		87.30 @	4.84		
		242.00*	7.43	9.11583E-001	4.26322E-001
		295.22*	19.30	4.15548E-001	2.40782E-001
		351.93*	37.60	3.82488E-001	1.33309E-001
		785.96	1.07		
AC-228	0.366	93.35 @	0.32		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		338.32*	11.27	3.32924E-001	3.50785E-001
		409.46	1.92		
		463.00	4.40		

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
AC-228	0.366	794.95	4.25		
		911.20*	25.80	6.45922E-001	2.39920E-001
		964.77	4.99		
		968.97*	15.80	6.30949E-001	3.69826E-001
		1588.20	3.22		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.977	7.662306E+000	1.477144E+000
	TL-208	@	0.622	1.770959E-001	8.202375E-002
X	BI-211		0.797		
	PB-212	@	0.779	6.652605E-001	1.358996E-001
	BI-214		0.342	4.776699E-001	1.652379E-001
	PB-214	@	0.880	4.265439E-001	1.124937E-001
	AC-228	@	0.366	5.650610E-001	1.745784E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:55:01 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty

All peaks were identified.

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-6 Sump 03
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2955E+000	1.30E+000	7.6623E+000
	Co-60	1173.24	100.00	1.3434E-001	8.93E-002	-8.1489E-002
		1332.50	100.00	8.9255E-002		-9.9533E-002
	CS-137	661.66	85.10	1.2526E-001	1.25E-001	3.6413E-002
+	TL-208	277.36	6.31	1.5349E+000	1.15E-001	-1.3281E-001
		510.77	22.60	7.3566E-001		9.1409E-001
		583.19*	84.50	1.1544E-001		1.7710E-001
		763.13	1.81	6.8010E+000		-8.6886E-001
		860.56	12.42	8.1924E-001		-8.9275E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.6137E+001	4.61E-001	-1.2984E+001
		351.06*	12.91	4.6059E-001		1.1140E+000
	PB-211	404.85	3.78	3.0702E+000	3.07E+000	9.4699E-001
		427.09	1.76	5.3947E+000		2.7025E+000
		832.01	3.52	3.3307E+000		5.2098E-001
	BI-212	727.33	6.58	1.9733E+000	1.97E+000	7.6169E-001
		785.37	1.10	1.0176E+001		-7.8183E-001
		1620.50	1.49	6.6921E+000		2.0135E+000
+	PB-212	74.81*	10.40	1.1187E+000	1.47E-001	1.2832E+000
		77.11*	17.50	5.0216E-001		7.0297E-001
		87.30	7.81	1.8486E+000		1.3764E+000
		238.63*	43.30	1.4660E-001		6.6526E-001
		300.09	3.28	3.4094E+000		-1.0953E+000
+	BI-214	609.31*	46.10	2.3780E-001	2.38E-001	4.8521E-001
		768.36	4.94	2.6504E+000		1.0947E+000
		806.17	1.22	9.5897E+000		3.2420E+000
		934.06	3.03	3.9897E+000		-1.6686E-001
		1120.29*	15.10	7.3326E-001		4.2946E-001
		1155.19	1.63	8.0357E+000		1.7039E-001
		1238.11	5.79	2.6155E+000		1.3349E+000
		1280.96	1.43	7.8132E+000		-3.7139E+000
		1377.67	4.00	2.9075E+000		-9.2279E-001
		1401.50	1.27	1.0198E+001		3.5835E+000
		1407.98	2.15	5.9043E+000		1.2201E+000
		1509.23	2.11	5.6412E+000		4.0827E+000
		1661.28	1.15	6.9214E+000		1.1351E+000
		1729.60	2.92	2.7919E+000		2.4491E-001
		1764.49	15.40	1.1168E+000		9.7920E-001
		1847.42	2.11	4.6063E+000		8.8132E-001
+	PB-214	74.81*	6.44	1.8066E+000	1.58E-001	2.0722E+000
		77.11*	10.80	8.1368E-001		1.1391E+000
		87.30	4.84	2.9830E+000		2.2210E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00*	7.43	8.2979E-001	1.58E-001	9.1158E-001
		295.22*	19.30	3.5818E-001		4.1555E-001
		351.93*	37.60	1.5814E-001		3.8249E-001
		785.96	1.07	1.0786E+001		2.3417E+000
	RA-226	186.21	3.28	3.3369E+000	3.34E+000	1.4806E+000
+	AC-228	93.35	0.32	3.9269E+001	2.48E-001	3.5418E+001
		129.07	2.42	3.6872E+000		6.7427E-001
		209.25	3.89	2.7540E+000		1.8835E+000
		270.24	3.46	3.1434E+000		2.5624E+000
		338.32*	11.27	5.7469E-001		3.3292E-001
		409.46	1.92	5.7550E+000		1.7819E+000
		463.00	4.40	2.5565E+000		2.1064E+000
		794.95	4.25	2.7321E+000		2.8647E-001
		911.20*	25.80	2.4804E-001		6.4592E-001
		964.77	4.99	3.3564E+000		1.2628E+000
		968.97*	15.80	5.1030E-001		6.3095E-001
		1588.20	3.22	4.2218E+000		2.6172E+000
	U-235	89.95	3.56	3.9435E+000	1.93E-001	1.9588E+000
		93.35	5.81	2.1629E+000		1.9507E+000
		105.00	2.69	3.4408E+000		-1.0311E+000
		109.16	1.54	6.3379E+000		2.9342E+000
		143.76	10.96	7.8903E-001		-3.0244E-001
		163.33	5.08	1.8082E+000		6.1469E-001
		185.72	57.20	1.9290E-001		1.4123E-001
		202.11	1.08	8.5248E+000		-8.0342E-001
		205.31	5.01	1.9940E+000		-5.0324E-001
	U-238	63.29	4.80	3.7291E+000	2.28E+000	-3.9942E+000
		92.60	5.60	2.2796E+000		1.0569E+000
		1001.03	0.84	1.6794E+001		-2.1240E+000
	Am-241	59.54	35.90	5.4726E-001	5.47E-001	-4.1429E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************

Report Generated On                 :  8/18/01  2:55:17 PM

Sample Title                        : LC-3A-7 Left to 03
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  8.006E+002 gram

Sample Taken On                     :
Acquisition Started                 :  7/12/01  2:11:27 PM

Live Time                           :      600.0 seconds
Real Time                           :      600.1 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-7 Left to 03
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.975	1461.00*	10.67	6.44272E+000	1.46051E+000
TL-208	0.821	277.36	6.31		
		510.77* @	22.60	4.58783E-001	3.73006E-001
		583.19*	84.50	2.17478E-001	7.73100E-002
		763.13	1.81		
		860.56	12.42		
		2614.53	99.16		
BI-214	0.339	609.31*	46.10	3.71933E-001	1.47445E-001
		768.36	4.94		
		806.17	1.22		
		934.06	3.03		
		1120.29*	15.10	5.21663E-001	3.66851E-001
		1155.19	1.63		
		1238.11	5.79		
		1280.96	1.43		
		1377.67	4.00		
		1401.50	1.27		
		1407.98	2.15		
		1509.23	2.11		
		1661.28	1.15		
		1729.60	2.92		
		1764.49	15.40		
		1847.42	2.11		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	0.975	6.442719E+000	1.460513E+000
TL-208 @	0.821	2.174780E-001	7.724415E-002
BI-214	0.339	3.927569E-001	1.368082E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:55:15 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	238.54	2.3394E-001	21.91
2	294.97	8.7130E-002	39.63
3	327.37	3.1667E-002	69.55
4	337.83	4.6704E-002	57.14
8	910.88	6.1190E-002	39.66

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-7 Left to 03
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.5693E+000	1.57E+000	6.4427E+000
	Co-60	1173.24	100.00	1.2906E-001	1.10E-001	6.1597E-002
		1332.50	100.00	1.1040E-001		3.0495E-002
	CS-137	661.66	85.10	1.2975E-001	1.30E-001	4.8314E-002
+	TL-208	277.36	6.31	1.5717E+000	9.42E-002	6.9788E-001
		510.77*	22.60	6.0371E-001		4.5878E-001
		583.19*	84.50	9.4214E-002		2.1748E-001
		763.13	1.81	6.6796E+000		2.9274E+000
		860.56	12.42	9.2658E-001		1.2681E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.5709E+001	1.08E+000	1.5902E+001
		351.06	12.91	1.0800E+000		1.5241E+000
	PB-211	404.85	3.78	2.5456E+000	2.55E+000	-6.8400E-001
		427.09	1.76	5.8563E+000		-2.6236E+000
		832.01	3.52	3.3124E+000		-3.1613E-001
	BI-212	727.33	6.58	1.7442E+000	1.74E+000	6.3298E-001
		785.37	1.10	1.0729E+001		6.9970E+000
		1620.50	1.49	6.3365E+000		-7.7004E+000
	PB-212	74.81	10.40	1.9576E+000	3.66E-001	4.0824E+000
		77.11	17.50	1.0660E+000		7.7155E-001
		87.30	7.81	1.8500E+000		2.1492E+000
		238.63	43.30	3.6622E-001		8.4388E-001
		300.09	3.28	3.2544E+000		-2.2550E+000
+	BI-214	609.31*	46.10	1.9287E-001	1.93E-001	3.7193E-001
		768.36	4.94	2.8297E+000		3.1189E+000
		806.17	1.22	1.0207E+001		1.4907E+000
		934.06	3.03	4.0311E+000		1.5922E+000
		1120.29*	15.10	5.2958E-001		5.2166E-001
		1155.19	1.63	7.1096E+000		-3.8659E+000
		1238.11	5.79	2.4533E+000		-5.8546E-001
		1280.96	1.43	8.7583E+000		2.4843E+000
		1377.67	4.00	2.8114E+000		-3.7754E-001
		1401.50	1.27	1.0142E+001		-1.7145E+000
		1407.98	2.15	7.0915E+000		7.4078E+000
		1509.23	2.11	5.6102E+000		5.9551E-001
		1661.28	1.15	6.8834E+000		-1.9427E+000
		1729.60	2.92	4.3897E+000		2.3403E+000
		1764.49	15.40	1.0169E+000		7.6494E-001
		1847.42	2.11	5.0838E+000		6.1014E-001
	PB-214	74.81	6.44	3.1613E+000	3.63E-001	6.5926E+000
		77.11	10.80	1.7274E+000		1.2502E+000
		87.30	4.84	2.9852E+000		3.4680E+000

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
PB-214	242.00	7.43	2.1029E+000	3.63E-001	-7.8279E-001
	295.22	19.30	6.4917E-001		7.5212E-001
	351.93	37.60	3.6294E-001		4.1263E-001
	785.96	1.07	1.1185E+001		4.7477E+000
RA-226	186.21	3.28	3.1288E+000	3.13E+000	2.4808E+000
AC-228	93.35	0.32	4.0012E+001	6.67E-001	5.8240E+001
	129.07	2.42	3.4867E+000		-7.1372E-001
	209.25	3.89	2.4037E+000		1.2336E-001
	270.24	3.46	2.7752E+000		-7.4090E-001
	338.32	11.27	9.7836E-001		4.9378E-001
	409.46	1.92	5.3278E+000		-2.0697E+000
	463.00	4.40	2.3901E+000		2.9937E-001
	794.95	4.25	3.0862E+000		1.1929E+000
	911.20	25.80	6.6704E-001		8.1497E-001
	964.77	4.99	2.9151E+000		1.9365E+000
	968.97	15.80	9.1242E-001		7.3686E-001
	1588.20	3.22	3.5584E+000		1.8195E+000
U-235	89.95	3.56	4.0674E+000	1.75E-001	4.7176E+000
	93.35	5.81	2.2038E+000		3.2077E+000
	105.00	2.69	3.4218E+000		6.9431E-001
	109.16	1.54	5.6445E+000		2.8919E+000
	143.76	10.96	8.2740E-001		5.1895E-001
	163.33	5.08	1.8340E+000		2.6720E-001
	185.72	57.20	1.7480E-001		4.4360E-002
	202.11	1.08	8.7537E+000		2.7983E+000
	205.31	5.01	1.9587E+000		-4.2325E-001
U-238	63.29	4.80	3.5691E+000	2.31E+000	-8.0631E-001
	92.60	5.60	2.3108E+000		8.1589E-001
	1001.03	0.84	1.7323E+001		9.7871E+000
Am-241	59.54	35.90	5.5554E-001	5.56E-001	-1.8656E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:55:28 PM
Sample Title	:	LC-3A-8 Right to 02
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.874E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 3:03:00 PM
Live Time	:	600.0 seconds
Real Time	:	600.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-8 Right to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.965	1461.00*		10.67	6.97799E+000	1.41331E+000
TL-208	0.623	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.46143E-001	6.34989E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.451	74.81*	@	10.40	6.81250E-001	8.06104E-001
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	5.17532E-001	1.55237E-001
		300.09		3.28		
BI-214	0.313	609.31*		46.10	5.00872E-001	1.59041E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29		15.10		
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49*		15.40	8.86064E-001	5.12991E-001
		1847.42		2.11		
PB-214	0.537	74.81*	@	6.44	1.10016E+000	1.30178E+000
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	6.49013E-001	2.42132E-001
		351.93*		37.60	6.40629E-001	1.71829E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.965	6.977985E+000	1.413312E+000
	TL-208	@	0.623	1.461433E-001	6.349887E-002
X	BI-211		0.787		
	PB-212	@	0.451	5.175324E-001	1.552366E-001
	BI-214		0.313	5.346491E-001	1.519081E-001
	PB-214	@	0.537	6.434370E-001	1.401298E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:55:27 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
7	910.82	8.0952E-002	35.31

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-8 Right to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2536E+000	1.25E+000	6.9780E+000
	Co-60	1173.24	100.00	1.3123E-001	1.31E-001	-1.8826E-002
		1332.50	100.00	1.3810E-001		1.1238E-001
	CS-137	661.66	85.10	1.4649E-001	1.46E-001	-1.3091E-002
+	TL-208	277.36	6.31	1.6160E+000	7.96E-002	1.2724E+000
		510.77	22.60	7.3454E-001		1.3052E+000
		583.19*	84.50	7.9599E-002		1.4614E-001
		763.13	1.81	6.9613E+000		-2.2695E+000
		860.56	12.42	1.1204E+000		5.2916E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.6239E+001	5.48E-001	2.3881E+000
		351.06*	12.91	5.4756E-001		1.8658E+000
	PB-211	404.85	3.78	3.0840E+000	3.08E+000	1.9527E+000
		427.09	1.76	6.4610E+000		-1.0401E+000
		832.01	3.52	3.5645E+000		1.3865E+000
	BI-212	727.33	6.58	1.9953E+000	2.00E+000	7.9972E-001
		785.37	1.10	1.0290E+001		-8.3074E-001
		1620.50	1.49	7.0734E+000		1.4618E+000
+	PB-212	74.81*	10.40	1.3447E+000	2.00E-001	6.8125E-001
		77.11	17.50	1.0927E+000		1.1502E+000
		87.30	7.81	1.8575E+000		1.7615E+000
		238.63*	43.30	1.9966E-001		5.1753E-001
		300.09	3.28	3.4134E+000		-2.2861E+000
+	BI-214	609.31*	46.10	1.8699E-001	1.87E-001	5.0087E-001
		768.36	4.94	2.4976E+000		1.2234E+000
		806.17	1.22	9.4089E+000		5.0253E-001
		934.06	3.03	3.5474E+000		-1.8590E+000
		1120.29	15.10	1.0726E+000		6.0157E-001
		1155.19	1.63	8.2644E+000		3.4695E+000
		1238.11	5.79	2.7861E+000		4.2741E-001
		1280.96	1.43	9.9632E+000		-3.2944E-001
		1377.67	4.00	3.4507E+000		6.9709E-001
		1401.50	1.27	1.0312E+001		5.6464E+000
		1407.98	2.15	6.1071E+000		1.4934E+000
		1509.23	2.11	5.3618E+000		6.2719E-001
		1661.28	1.15	8.4701E+000		-3.7203E+000
		1729.60	2.92	4.1953E+000		2.7995E+000
		1764.49*	15.40	6.9514E-001		8.8606E-001
		1847.42	2.11	5.8388E+000		1.2235E+000
+	PB-214	74.81*	6.44	2.1716E+000	1.88E-001	1.1002E+000
		77.11	10.80	1.7706E+000		1.8638E+000
		87.30	4.84	2.9973E+000		2.8424E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.0970E+000	1.88E-001	-2.7441E+000
		295.22*	19.30	3.0080E-001		6.4901E-001
		351.93*	37.60	1.8800E-001		6.4063E-001
		785.96	1.07	1.0746E+001		2.1655E+000
	RA-226	186.21	3.28	3.2251E+000	3.23E+000	8.3474E-001
	AC-228	93.35	0.32	3.6728E+001	7.54E-001	1.5140E+001
		129.07	2.42	3.6074E+000		1.2488E+000
		209.25	3.89	2.5337E+000		7.4927E-001
		270.24	3.46	2.9980E+000		1.3156E+000
		338.32	11.27	1.0062E+000		5.7370E-001
		409.46	1.92	5.4172E+000		1.1342E+000
		463.00	4.40	2.4755E+000		2.3279E-001
		794.95	4.25	2.7627E+000		6.5944E-001
		911.20	25.80	7.5393E-001		6.6025E-001
		964.77	4.99	3.3362E+000		2.8507E+000
		968.97	15.80	1.0744E+000		8.7664E-001
		1588.20	3.22	4.9924E+000		3.5982E+000
	U-235	89.95	3.56	3.8248E+000	1.85E-001	2.5077E+000
		93.35	5.81	2.0229E+000		8.3386E-001
		105.00	2.69	3.5073E+000		1.6921E+000
		109.16	1.54	6.0116E+000		-2.1879E+000
		143.76	10.96	7.9440E-001		1.4777E-001
		163.33	5.08	1.8862E+000		6.1349E-001
		185.72	57.20	1.8474E-001		5.8328E-002
		202.11	1.08	8.8609E+000		7.5287E+000
		205.31	5.01	1.8451E+000		-5.5633E-001
	U-238	63.29	4.80	3.8396E+000	2.10E+000	7.3021E-001
		92.60	5.60	2.0988E+000		-8.0462E-001
		1001.03	0.84	1.5395E+001		2.1007E+000
	Am-241	59.54	35.90	5.6938E-001	5.69E-001	-5.3478E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:55:41 PM
Sample Title	:	LC-3A-8 Right to 02
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.874E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 3:03:00 PM
Live Time	:	600.0 seconds
Real Time	:	600.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-8 Right to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.965	1461.00*		10.67	6.97799E+000	1.41331E+000
TL-208	0.623	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.46143E-001	6.34989E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.451	74.81*	@	10.40	6.81250E-001	8.06104E-001
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	5.17532E-001	1.55237E-001
		300.09		3.28		
BI-214	0.313	609.31*		46.10	5.00872E-001	1.59041E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29		15.10		
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49*		15.40	8.86064E-001	5.12991E-001
		1847.42		2.11		
PB-214	0.537	74.81*	@	6.44	1.10016E+000	1.30178E+000
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	6.49013E-001	2.42132E-001
		351.93*		37.60	6.40629E-001	1.71829E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.965	6.977985E+000	1.413312E+000
	TL-208	@	0.623	1.461433E-001	6.349887E-002
X	BI-211		0.787		
	PB-212	@	0.451	5.175324E-001	1.552366E-001
	BI-214		0.313	5.346491E-001	1.519081E-001
	PB-214	@	0.537	6.434370E-001	1.401298E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:55:40 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
7	910.82	8.0952E-002	35.31

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-8 Right to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2536E+000	1.25E+000	6.9780E+000
	Co-60	1173.24	100.00	1.3123E-001	1.31E-001	-1.8826E-002
		1332.50	100.00	1.3810E-001		1.1238E-001
	CS-137	661.66	85.10	1.4649E-001	1.46E-001	-1.3091E-002
+	TL-208	277.36	6.31	1.6160E+000	7.96E-002	1.2724E+000
		510.77	22.60	7.3454E-001		1.3052E+000
		583.19*	84.50	7.9599E-002		1.4614E-001
		763.13	1.81	6.9613E+000		-2.2695E+000
		860.56	12.42	1.1204E+000		5.2916E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.6239E+001	5.48E-001	2.3881E+000
		351.06*	12.91	5.4756E-001		1.8658E+000
	PB-211	404.85	3.78	3.0840E+000	3.08E+000	1.9527E+000
		427.09	1.76	6.4610E+000		-1.0401E+000
		832.01	3.52	3.5645E+000		1.3865E+000
	BI-212	727.33	6.58	1.9953E+000	2.00E+000	7.9972E-001
		785.37	1.10	1.0290E+001		-8.3074E-001
		1620.50	1.49	7.0734E+000		1.4618E+000
+	PB-212	74.81*	10.40	1.3447E+000	2.00E-001	6.8125E-001
		77.11	17.50	1.0927E+000		1.1502E+000
		87.30	7.81	1.8575E+000		1.7615E+000
		238.63*	43.30	1.9966E-001		5.1753E-001
		300.09	3.28	3.4134E+000		-2.2861E+000
+	BI-214	609.31*	46.10	1.8699E-001	1.87E-001	5.0087E-001
		768.36	4.94	2.4976E+000		1.2234E+000
		806.17	1.22	9.4089E+000		5.0253E-001
		934.06	3.03	3.5474E+000		-1.8590E+000
		1120.29	15.10	1.0726E+000		6.0157E-001
		1155.19	1.63	8.2644E+000		3.4695E+000
		1238.11	5.79	2.7861E+000		4.2741E-001
		1280.96	1.43	9.9632E+000		-3.2944E-001
		1377.67	4.00	3.4507E+000		6.9709E-001
		1401.50	1.27	1.0312E+001		5.6464E+000
		1407.98	2.15	6.1071E+000		1.4934E+000
		1509.23	2.11	5.3618E+000		6.2719E-001
		1661.28	1.15	8.4701E+000		-3.7203E+000
		1729.60	2.92	4.1953E+000		2.7995E+000
		1764.49*	15.40	6.9514E-001		8.8606E-001
		1847.42	2.11	5.8388E+000		1.2235E+000
+	PB-214	74.81*	6.44	2.1716E+000	1.88E-001	1.1002E+000
		77.11	10.80	1.7706E+000		1.8638E+000
		87.30	4.84	2.9973E+000		2.8424E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.0970E+000	1.88E-001	-2.7441E+000
		295.22*	19.30	3.0080E-001		6.4901E-001
		351.93*	37.60	1.8800E-001		6.4063E-001
		785.96	1.07	1.0746E+001		2.1655E+000
	RA-226	186.21	3.28	3.2251E+000	3.23E+000	8.3474E-001
	AC-228	93.35	0.32	3.6728E+001	7.54E-001	1.5140E+001
		129.07	2.42	3.6074E+000		1.2488E+000
		209.25	3.89	2.5337E+000		7.4927E-001
		270.24	3.46	2.9980E+000		1.3156E+000
		338.32	11.27	1.0062E+000		5.7370E-001
		409.46	1.92	5.4172E+000		1.1342E+000
		463.00	4.40	2.4755E+000		2.3279E-001
		794.95	4.25	2.7627E+000		6.5944E-001
		911.20	25.80	7.5393E-001		6.6025E-001
		964.77	4.99	3.3362E+000		2.8507E+000
		968.97	15.80	1.0744E+000		8.7664E-001
		1588.20	3.22	4.9924E+000		3.5982E+000
	U-235	89.95	3.56	3.8248E+000	1.85E-001	2.5077E+000
		93.35	5.81	2.0229E+000		8.3386E-001
		105.00	2.69	3.5073E+000		1.6921E+000
		109.16	1.54	6.0116E+000		-2.1879E+000
		143.76	10.96	7.9440E-001		1.4777E-001
		163.33	5.08	1.8862E+000		6.1349E-001
		185.72	57.20	1.8474E-001		5.8328E-002
		202.11	1.08	8.8609E+000		7.5287E+000
		205.31	5.01	1.8451E+000		-5.5633E-001
	U-238	63.29	4.80	3.8396E+000	2.10E+000	7.3021E-001
		92.60	5.60	2.0988E+000		-8.0462E-001
		1001.03	0.84	1.5395E+001		2.1007E+000
	Am-241	59.54	35.90	5.6938E-001	5.69E-001	-5.3478E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:55:56 PM
Sample Title	:	LC-3A-9 Sump 02
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.237E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 12:06:56 PM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-9 Sump 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.985	1461.00*		10.67	2.97933E+000	1.23536E+000
BI-211	0.796	72.87	@	1.27		
		351.06*		12.91	1.40587E+000	4.64012E-001
PB-212	0.452	74.81*	@	10.40	9.89144E-001	8.45220E-001
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	2.73020E-001	1.61400E-001
		300.09		3.28		
U-235	0.473	89.95	@	3.56		
		93.35*	@	5.81	9.31700E+000	2.15708E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	2.90442E-001	1.08869E-001
		202.11		1.08		
		205.31		5.01		
U-238	0.992	63.29*		4.80	5.64420E+000	2.65723E+000
		92.60*		5.60	9.66638E+000	2.23797E+000
		1001.03*		0.84	1.44594E+001	6.94039E+000

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.985	2.979332E+000	1.235356E+000
	BI-211	@	0.796	1.405868E+000	4.640121E-001
	PB-212	@	0.452	2.730204E-001	1.614001E-001
X	RA-226		0.947		
	U-235	@	0.473	2.932714E-001	1.083517E-001
	U-238		0.992	8.200027E+000	1.663105E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:55:55 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
7	608.80	1.3276E-001	27.38
8	910.79	2.5000E-002	77.43

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-9 Sump 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.6933E+000	1.69E+000	2.9793E+000
	Co-60	1173.24	100.00	1.5499E-001	1.29E-001	3.9742E-002
		1332.50	100.00	1.2899E-001		1.6725E-002
	CS-137	661.66	85.10	1.3385E-001	1.34E-001	-8.2614E-002
	TL-208	277.36	6.31	1.6370E+000	1.89E-001	5.2974E-001
		510.77	22.60	6.3461E-001		3.5491E-001
		583.19	84.50	1.8923E-001		1.9903E-001
		763.13	1.81	8.8266E+000		-3.5968E-001
		860.56	12.42	1.1774E+000		4.7284E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
+	BI-211	72.87	1.27	1.7320E+001	5.52E-001	1.5568E+001
		351.06*	12.91	5.5151E-001		1.4059E+000
	PB-211	404.85	3.78	2.8696E+000	2.87E+000	7.4415E-001
		427.09	1.76	5.8714E+000		-1.2267E+000
		832.01	3.52	3.3146E+000		-1.6016E-001
	BI-212	727.33	6.58	2.0053E+000	2.01E+000	8.7043E-001
		785.37	1.10	1.1195E+001		5.6059E+000
		1620.50	1.49	6.6343E+000		1.4517E+000
+	PB-212	74.81*	10.40	1.3753E+000	2.51E-001	9.8914E-001
		77.11	17.50	1.1697E+000		9.3019E-001
		87.30	7.81	2.1736E+000		1.0037E+000
		238.63*	43.30	2.5136E-001		2.7302E-001
		300.09	3.28	3.6764E+000		-4.7125E-001
	BI-214	609.31	46.10	4.1993E-001	4.20E-001	5.8648E-001
		768.36	4.94	3.3574E+000		1.8155E+000
		806.17	1.22	8.6706E+000		-6.8350E+000
		934.06	3.03	3.7770E+000		8.7200E-001
		1120.29	15.10	1.0876E+000		8.6607E-001
		1155.19	1.63	8.5294E+000		-1.5450E+000
		1238.11	5.79	2.6714E+000		1.0330E+000
		1280.96	1.43	9.0512E+000		-1.5234E+000
		1377.67	4.00	3.0184E+000		-3.3227E-001
		1401.50	1.27	9.5981E+000		-1.1929E-001
		1407.98	2.15	5.8569E+000		-3.8149E+000
		1509.23	2.11	4.7510E+000		-6.6440E-001
		1661.28	1.15	9.6793E+000		-1.0810E+000
		1729.60	2.92	4.5646E+000		4.3255E-001
		1764.49	15.40	1.2482E+000		1.3039E+000
		1847.42	2.11	5.6240E+000		1.7499E+000
	PB-214	74.81	6.44	3.4764E+000	4.02E-001	6.4725E+000
		77.11	10.80	1.8953E+000		1.5072E+000
		87.30	4.84	3.5074E+000		1.6196E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
	PB-214	242.00	7.43	1.9379E+000	4.02E-001	2.7813E-001
		295.22	19.30	6.7622E-001		4.0112E-001
		351.93	37.60	4.0150E-001		6.1314E-001
		785.96	1.07	1.1149E+001		2.1461E+000
	RA-226	186.21*	3.28	2.6353E+000	2.64E+000	5.0650E+000
	AC-228	93.35	0.32	6.3343E+001	6.12E-001	1.7948E+002
		129.07	2.42	3.8057E+000		2.0081E+000
		209.25	3.89	2.3259E+000		-7.7522E-001
		270.24	3.46	2.7658E+000		1.3469E+000
		338.32	11.27	9.5513E-001		-1.2374E-001
		409.46	1.92	5.7919E+000		-4.2598E-001
		463.00	4.40	2.4085E+000		-7.3175E-001
		794.95	4.25	2.6789E+000		-9.5677E-002
		911.20	25.80	6.1175E-001		3.5069E-001
		964.77	4.99	3.0000E+000		1.1669E+000
		968.97	15.80	1.0434E+000		6.7156E-001
		1588.20	3.22	2.8496E+000		-5.8934E-002
+	U-235	89.95	3.56	6.1650E+000	1.51E-001	-9.0127E-001
		93.35*	5.81	2.5001E+000		9.3170E+000
		105.00	2.69	3.7701E+000		6.2813E-001
		109.16	1.54	6.3266E+000		-2.3578E+000
		143.76	10.96	9.1532E-001		2.3654E-001
		163.33	5.08	1.8219E+000		-1.6987E-001
		185.72*	57.20	1.5112E-001		2.9044E-001
		202.11	1.08	9.6409E+000		4.8595E-001
		205.31	5.01	1.9878E+000		2.4053E-001
+	U-238	63.29*	4.80	3.8706E+000	2.59E+000	5.6442E+000
		92.60*	5.60	2.5938E+000		9.6664E+000
		1001.03*	0.84	7.9424E+000		1.4459E+001
	Am-241	59.54	35.90	6.6663E-001	6.67E-001	-2.9547E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:56:08 PM
Sample Title	:	LC-3A-10 Left to 02
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.443E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 11:55:24 AM
Live Time	:	600.0 seconds
Real Time	:	600.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

```
*********************************************************************
*****  N U C L I D E   I D E N T I F I C A T I O N   R E P O R T  *****
*********************************************************************
```

Sample Title: LC-3A-10 Left to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.995	1461.00*		10.67	7.21336E+000	1.55868E+000
TL-208	0.625	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	2.67011E-001	8.72861E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-214	0.414	74.81	@	6.44		
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	4.66385E-001	2.40486E-001
		351.93*		37.60	3.66882E-001	1.39839E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.995	7.213363E+000	1.558683E+000
	TL-208	@	0.625	2.670114E-001	8.728608E-002
X	BI-211		0.806		
	PB-214	@	0.414	3.920251E-001	1.208870E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:56:07 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	238.53	1.5598E-001	34.31
5	608.94	9.5710E-002	32.00
6	910.81	7.1336E-002	37.85

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-10 Left to 02
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.5827E+000	1.58E+000	7.2134E+000
	Co-60	1173.24	100.00	1.1702E-001	1.17E-001	-6.4418E-002
		1332.50	100.00	1.2542E-001		1.9506E-002
	CS-137	661.66	85.10	1.3957E-001	1.40E-001	7.0303E-002
+	TL-208	277.36	6.31	1.6905E+000	1.03E-001	-7.7199E-001
		510.77	22.60	7.2551E-001		9.3651E-001
		583.19*	84.50	1.0292E-001		2.6701E-001
		763.13	1.81	7.3644E+000		3.3545E+000
		860.56	12.42	1.0736E+000		2.5863E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.6583E+001	5.09E-001	6.9941E+000
		351.06*	12.91	5.0871E-001		1.0685E+000
	PB-211	404.85	3.78	2.8664E+000	2.87E+000	1.0591E+000
		427.09	1.76	6.7836E+000		2.8704E+000
		832.01	3.52	3.1002E+000		-2.2816E+000
	BI-212	727.33	6.58	2.0662E+000	2.07E+000	7.4837E-001
		785.37	1.10	1.0363E+001		-1.5141E+001
		1620.50	1.49	7.7915E+000		-1.8257E+000
	PB-212	74.81	10.40	2.0646E+000	3.79E-001	3.8133E+000
		77.11	17.50	1.1429E+000		1.0710E+000
		87.30	7.81	1.8086E+000		2.3897E+000
		238.63	43.30	3.7928E-001		9.1516E-001
		300.09	3.28	3.5747E+000		-1.9558E+000
	BI-214	609.31	46.10	3.9121E-001	3.91E-001	5.7676E-001
		768.36	4.94	2.8660E+000		2.7921E+000
		806.17	1.22	9.9537E+000		3.5854E-001
		934.06	3.03	3.7528E+000		-1.8190E+000
		1120.29	15.10	8.9683E-001		-1.1031E-001
		1155.19	1.63	8.7430E+000		-5.6063E+000
		1238.11	5.79	2.3783E+000		8.9838E-001
		1280.96	1.43	9.2193E+000		-5.1216E+000
		1377.67	4.00	3.6505E+000		1.1998E+000
		1401.50	1.27	9.3325E+000		6.7936E-001
		1407.98	2.15	5.6948E+000		-8.1513E-001
		1509.23	2.11	5.8567E+000		3.0702E+000
		1661.28	1.15	7.9648E+000		1.0825E+000
		1729.60	2.92	4.2883E+000		2.7338E+000
		1764.49	15.40	1.1753E+000		6.6792E-001
		1847.42	2.11	4.3020E+000		7.5109E-001
+	PB-214	74.81	6.44	3.3341E+000	1.75E-001	6.1581E+000
		77.11	10.80	1.8520E+000		1.7355E+000
		87.30	4.84	2.9183E+000		3.8561E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.1513E+000	1.75E-001	-1.8716E-001
		295.22*	19.30	3.4139E-001		4.6639E-001
		351.93*	37.60	1.7467E-001		3.6688E-001
		785.96	1.07	1.1019E+001		-7.7051E+000
	RA-226	186.21	3.28	3.1474E+000	3.15E+000	1.7440E+000
	AC-228	93.35	0.32	3.7937E+001	7.69E-001	4.0627E+001
		129.07	2.42	3.8487E+000		1.9156E+000
		209.25	3.89	2.5734E+000		6.2618E-001
		270.24	3.46	3.1880E+000		-1.5500E+000
		338.32	11.27	1.0765E+000		5.3854E-001
		409.46	1.92	5.7798E+000		4.1268E+000
		463.00	4.40	2.7573E+000		1.9064E+000
		794.95	4.25	2.7913E+000		-7.1504E-001
		911.20	25.80	7.6860E-001		8.5834E-001
		964.77	4.99	3.6800E+000		4.0798E+000
		968.97	15.80	1.1649E+000		1.1668E+000
		1588.20	3.22	5.0099E+000		3.8117E+000
	U-235	89.95	3.56	3.8074E+000	1.82E-001	2.0147E+000
		93.35	5.81	2.0895E+000		2.2376E+000
		105.00	2.69	3.4331E+000		-1.0229E+000
		109.16	1.54	6.1249E+000		9.2831E-001
		143.76	10.96	8.5846E-001		2.3184E-001
		163.33	5.08	1.8466E+000		4.4907E-001
		185.72	57.20	1.8243E-001		7.7574E-002
		202.11	1.08	9.5809E+000		-4.8659E-001
		205.31	5.01	2.0264E+000		0.0000E+000
	U-238	63.29	4.80	3.8083E+000	2.20E+000	-2.5336E+000
		92.60	5.60	2.2006E+000		4.3702E-001
		1001.03	0.84	1.4390E+001		8.3806E-002
	Am-241	59.54	35.90	5.6795E-001	5.68E-001	-2.7971E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:56:22 PM
Sample Title	:	LC-3A-11 04 Left 1
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	9.338E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 2:22:41 PM
Live Time	:	600.0 seconds
Real Time	:	600.1 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-11 04 Left 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.986	1461.00*		10.67	6.36304E+000	1.26077E+000
TL-208	0.612	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.18233E-001	6.10287E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
BI-214	0.316	609.31*		46.10	4.20236E-001	1.39604E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29		15.10		
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49*		15.40	5.84748E-001	4.21382E-001
		1847.42		2.11		
PB-214	0.410	74.81	@	6.44		
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	4.10253E-001	1.98386E-001
		351.93*		37.60	4.72113E-001	1.44371E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.986	6.363035E+000	1.260771E+000
	TL-208	@	0.612	1.182327E-001	6.102872E-002
X	BI-211		0.825		
	BI-214		0.316	4.365065E-001	1.325207E-001
	PB-214	@	0.410	4.506950E-001	1.167330E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:56:20 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	238.42	1.9908E-001	26.55
6	910.84	6.7789E-002	31.89

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-11 04 Left 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.1583E+000	1.16E+000	6.3630E+000
	Co-60	1173.24	100.00	1.0452E-001	9.74E-002	-8.4913E-002
		1332.50	100.00	9.7351E-002		1.2844E-003
	CS-137	661.66	85.10	1.2608E-001	1.26E-001	9.5565E-002
+	TL-208	277.36	6.31	1.3244E+000	8.65E-002	7.2595E-001
		510.77	22.60	5.4605E-001		2.1258E-001
		583.19*	84.50	8.6495E-002		1.1823E-001
		763.13	1.81	6.4714E+000		4.2865E+000
		860.56	12.42	9.1248E-001		2.5749E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.4087E+001	5.10E-001	9.7600E+000
		351.06*	12.91	5.0999E-001		1.3750E+000
	PB-211	404.85	3.78	2.5300E+000	2.53E+000	5.8044E-001
		427.09	1.76	4.2406E+000		-2.4978E+000
		832.01	3.52	3.2370E+000		1.4582E+000
	BI-212	727.33	6.58	1.7846E+000	1.78E+000	-5.2268E-001
		785.37	1.10	8.5402E+000		2.1877E+000
		1620.50	1.49	5.9645E+000		3.4241E+000
	PB-212	74.81	10.40	1.7419E+000	3.07E-001	3.6537E+000
		77.11	17.50	9.5471E-001		9.0834E-001
		87.30	7.81	1.6597E+000		2.4260E+000
		238.63	43.30	3.0703E-001		5.9412E-001
		300.09	3.28	3.0464E+000		-2.8920E+000
+	BI-214	609.31*	46.10	1.7259E-001	1.73E-001	4.2024E-001
		768.36	4.94	2.3087E+000		2.0990E-001
		806.17	1.22	8.0562E+000		1.1976E-001
		934.06	3.03	3.4561E+000		1.3142E+000
		1120.29	15.10	1.0156E+000		9.4839E-001
		1155.19	1.63	8.2338E+000		3.3567E+000
		1238.11	5.79	2.2301E+000		1.5294E+000
		1280.96	1.43	7.1837E+000		2.3254E+000
		1377.67	4.00	2.6733E+000		2.4483E-001
		1401.50	1.27	8.0949E+000		2.9747E+000
		1407.98	2.15	5.1496E+000		1.1224E+000
		1509.23	2.11	3.2729E+000		1.3924E+000
		1661.28	1.15	6.7596E+000		1.8971E+000
		1729.60	2.92	3.1631E+000		4.0856E-002
		1764.49*	15.40	6.2120E-001		5.8475E-001
		1847.42	2.11	5.0956E+000		6.9972E-001
+	PB-214	74.81	6.44	2.8131E+000	1.75E-001	5.9003E+000
		77.11	10.80	1.5470E+000		1.4719E+000
		87.30	4.84	2.6782E+000		3.9147E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.7891E+000	1.75E-001	-2.8609E-001
		295.22*	19.30	2.7718E-001		4.1025E-001
		351.93*	37.60	1.7510E-001		4.7211E-001
		785.96	1.07	8.6406E+000		-4.9659E-001
	RA-226	186.21	3.28	2.5484E+000	2.55E+000	1.4876E+000
	AC-228	93.35	0.32	3.4788E+001	5.14E-001	2.6053E+001
		129.07	2.42	3.0677E+000		-7.5990E-001
		209.25	3.89	2.3058E+000		1.5505E+000
		270.24	3.46	2.5149E+000		8.5894E-001
		338.32	11.27	8.9968E-001		8.2037E-001
		409.46	1.92	4.5679E+000		-2.6205E+000
		463.00	4.40	2.0492E+000		-2.7465E-002
		794.95	4.25	2.1888E+000		7.4312E-001
		911.20	25.80	5.1374E-001		9.0694E-002
		964.77	4.99	2.6872E+000		1.2937E+000
		968.97	15.80	8.5064E-001		6.2051E-001
		1588.20	3.22	3.2456E+000		8.0908E-001
	U-235	89.95	3.56	3.5278E+000	1.47E-001	9.1025E-001
		93.35	5.81	1.9161E+000		1.4349E+000
		105.00	2.69	2.8245E+000		-1.4752E-002
		109.16	1.54	5.3465E+000		3.7502E-002
		143.76	10.96	7.0663E-001		3.0043E-001
		163.33	5.08	1.4977E+000		-9.5093E-001
		185.72	57.20	1.4654E-001		1.2693E-001
		202.11	1.08	7.4047E+000		3.4325E-001
		205.31	5.01	1.7001E+000		-3.2880E-002
	U-238	63.29	4.80	3.4490E+000	2.00E+000	-1.4017E+000
		92.60	5.60	1.9997E+000		4.4707E-001
		1001.03	0.84	1.1699E+001		-1.1095E+000
	Am-241	59.54	35.90	5.0777E-001	5.08E-001	-6.7799E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:56:32 PM
Sample Title	:	LC-3A-12 04 Left 2
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	8.891E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 2:51:35 PM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-12 04 Left 2
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.974	1461.00*		10.67	6.72406E+000	1.32932E+000
PB-212	0.608	74.81*	@	10.40	8.41786E-001	5.06306E-001
		77.11	@	17.50		
		87.30*	@	7.81	6.49213E-001	6.00142E-001
		238.63*		43.30	5.12170E-001	1.46243E-001
		300.09		3.28		
PB-214	0.634	74.81*	@	6.44	1.35941E+000	8.17637E-001
		77.11	@	10.80		
		87.30*	@	4.84	1.04759E+000	9.68410E-001
		242.00		7.43		
		295.22*		19.30	3.04686E-001	1.98600E-001
		351.93*		37.60	4.55068E-001	1.29347E-001
		785.96		1.07		
U-235	0.477	89.95	@	3.56		
		93.35*	@	5.81	1.61385E+000	1.12117E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	1.42084E-001	9.34684E-002
		202.11		1.08		
		205.31		5.01		
U-238	0.311	63.29		4.80		
		92.60*		5.60	1.67437E+000	1.16322E+000
		1001.03		0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.974	6.724058E+000	1.329319E+000
X	BI-211		0.928		
	PB-212	@	0.608	5.121698E-001	1.462434E-001
	PB-214	@	0.634	4.102779E-001	1.083863E-001
X	RA-226		0.967		
	U-235	@	0.477	1.420840E-001	9.334146E-002
	U-238		0.311	1.526959E+000	1.167242E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:56:30 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

	Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M	1	72.59	3.6049E-002	69.22
	9	608.97	7.5307E-002	44.22
	10	911.09	6.0124E-002	45.47

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-12 04 Left 2
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2227E+000	1.22E+000	6.7241E+000
	Co-60	1173.24	100.00	1.0977E-001	9.65E-002	2.7897E-002
		1332.50	100.00	9.6480E-002		-5.5544E-002
	CS-137	661.66	85.10	1.1684E-001	1.17E-001	2.9592E-002
	TL-208	277.36	6.31	1.4232E+000	1.60E-001	2.7909E-001
		510.77	22.60	6.0735E-001		9.7215E-001
		583.19	84.50	1.5984E-001		1.2750E-001
		763.13	1.81	6.5935E+000		4.1783E+000
		860.56	12.42	9.4676E-001		1.4842E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87*	1.27	6.8956E+000	3.89E-001	3.7690E+000
		351.06*	12.91	3.8925E-001		1.3254E+000
	PB-211	404.85	3.78	2.4819E+000	2.48E+000	7.8990E-001
		427.09	1.76	5.1786E+000		2.3028E+000
		832.01	3.52	2.8443E+000		-9.1305E-001
	BI-212	727.33	6.58	1.7107E+000	1.71E+000	9.2808E-001
		785.37	1.10	1.0426E+001		3.7201E+000
		1620.50	1.49	5.9928E+000		-4.2255E+000
+	PB-212	74.81*	10.40	1.0717E+000	1.87E-001	8.4179E-001
		77.11	17.50	1.0072E+000		-1.4043E-001
		87.30*	7.81	9.7711E-001		6.4921E-001
		238.63*	43.30	1.8653E-001		5.1217E-001
		300.09	3.28	3.0532E+000		1.3803E+000
	BI-214	609.31	46.10	3.3394E-001	3.34E-001	3.9266E-001
		768.36	4.94	2.4499E+000		1.4419E+000
		806.17	1.22	6.8995E+000		1.2570E+000
		934.06	3.03	3.7409E+000		6.3928E-001
		1120.29	15.10	8.8528E-001		3.2030E-001
		1155.19	1.63	8.3374E+000		4.4513E+000
		1238.11	5.79	2.4368E+000		1.9954E+000
		1280.96	1.43	8.5240E+000		-4.6345E+000
		1377.67	4.00	3.2283E+000		1.7840E+000
		1401.50	1.27	7.5666E+000		-4.8549E-001
		1407.98	2.15	4.4811E+000		4.1580E-001
		1509.23	2.11	4.5881E+000		5.9412E-001
		1661.28	1.15	8.5752E+000		5.2007E+000
		1729.60	2.92	3.8362E+000		-7.9861E-001
		1764.49	15.40	1.0160E+000		9.0012E-001
		1847.42	2.11	3.6014E+000		-5.3293E+000
+	PB-214	74.81*	6.44	1.7306E+000	1.34E-001	1.3594E+000
		77.11	10.80	1.6320E+000		-2.2754E-001
		87.30*	4.84	1.5767E+000		1.0476E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.8972E+000	1.34E-001	-1.1326E+000
		295.22*	19.30	3.0101E-001		3.0469E-001
		351.93*	37.60	1.3365E-001		4.5507E-001
		785.96	1.07	1.0596E+001		-1.2260E+000
	RA-226	186.21*	3.28	2.5808E+000	2.58E+000	2.4778E+000
	AC-228	93.35	0.32	4.1483E+001	6.01E-001	6.6505E+001
		129.07	2.42	3.3282E+000		-2.1234E-001
		209.25	3.89	2.3299E+000		8.7512E-001
		270.24	3.46	2.7229E+000		1.4364E+000
		338.32	11.27	9.6368E-001		7.6700E-001
		409.46	1.92	4.6297E+000		1.6531E+000
		463.00	4.40	2.5570E+000		2.2090E+000
		794.95	4.25	2.6516E+000		5.6194E-001
		911.20	25.80	6.0064E-001		3.1456E-001
		964.77	4.99	3.0057E+000		1.6692E+000
		968.97	15.80	9.9834E-001		4.2725E-001
		1588.20	3.22	4.1940E+000		3.2286E+000
+	U-235	89.95	3.56	4.0874E+000	1.48E-001	-4.3084E-001
		93.35*	5.81	1.7883E+000		1.6139E+000
		105.00	2.69	3.3443E+000		8.8170E-001
		109.16	1.54	5.8141E+000		8.8746E-001
		143.76	10.96	7.3635E-001		-9.8890E-002
		163.33	5.08	1.7323E+000		-5.2018E-001
		185.72*	57.20	1.4799E-001		1.4208E-001
		202.11	1.08	7.8823E+000		-2.6345E+000
		205.31	5.01	1.7490E+000		8.3663E-001
+	U-238	63.29	4.80	3.6895E+000	1.86E+000	4.0577E-001
		92.60*	5.60	1.8554E+000		1.6744E+000
		1001.03	0.84	1.3202E+001		-5.0929E-001
	Am-241	59.54	35.90	5.4262E-001	5.43E-001	-3.4111E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************

Report Generated On                 :  8/18/01  2:56:42 PM

Sample Title                        : LC-3A-13 Below 04 Left 1
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  9.197E+002 gram

Sample Taken On                     :
Acquisition Started                 :  7/12/01 12:40:29 PM

Live Time                           :      600.0 seconds
Real Time                           :      600.1 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-13 Below 04 Left 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.989	1461.00*		10.67	6.46638E+000	1.30218E+000
TL-208	0.623	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.24302E-001	5.57997E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
BI-211	0.836	72.87	@	1.27		
		351.06*		12.91	1.14324E+000	3.95767E-001
BI-214	0.351	609.31*		46.10	3.06565E-001	1.10445E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29*		15.10	5.48332E-001	3.24775E-001
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49		15.40		
		1847.42		2.11		
U-235	0.472	89.95	@	3.56		
		93.35*	@	5.81	1.68743E+000	9.35925E-001
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	1.14965E-001	6.14225E-002
		202.11		1.08		
		205.31		5.01		
U-238	0.314	63.29		4.80		
		92.60*		5.60	1.75071E+000	9.71022E-001
		1001.03		0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.989	6.466385E+000	1.302181E+000
	TL-208	@	0.623	1.243019E-001	5.579965E-002
	BI-211	@	0.836	1.143240E+000	3.957671E-001
	BI-214		0.351	3.316264E-001	1.045642E-001
X	RA-226		0.934		
	U-235	@	0.472	1.149649E-001	6.129602E-002
	U-238		0.314	1.631433E+000	9.731023E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:56:41 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
3	238.48	1.3623E-001	30.89

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-13 Below 04 Left 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2483E+000	1.25E+000	6.4664E+000
	Co-60	1173.24	100.00	1.0824E-001	1.01E-001	-7.0455E-002
		1332.50	100.00	1.0150E-001		1.2922E-002
	CS-137	661.66	85.10	1.0844E-001	1.08E-001	4.2031E-003
+	TL-208	277.36	6.31	1.3758E+000	7.21E-002	5.0594E-001
		510.77	22.60	6.0700E-001		7.9634E-001
		583.19*	84.50	7.2093E-002		1.2430E-001
		763.13	1.81	5.1045E+000		-1.2478E+000
		860.56	12.42	7.8015E-001		1.2229E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
+	BI-211	72.87	1.27	1.4412E+001	5.02E-001	1.4084E+001
		351.06*	12.91	5.0212E-001		1.1432E+000
	PB-211	404.85	3.78	2.3797E+000	2.38E+000	-5.3830E-001
		427.09	1.76	5.2760E+000		4.8625E+000
		832.01	3.52	3.0923E+000		-9.1638E-001
	BI-212	727.33	6.58	1.6903E+000	1.69E+000	1.1101E+000
		785.37	1.10	9.0790E+000		-7.4987E+000
		1620.50	1.49	7.2055E+000		3.6301E+000
	PB-212	74.81	10.40	1.8000E+000	2.84E-001	3.6812E+000
		77.11	17.50	9.6355E-001		1.0421E+000
		87.30	7.81	1.5665E+000		1.2178E+000
		238.63	43.30	2.8434E-001		4.2166E-001
		300.09	3.28	2.8481E+000		-2.1785E+000
+	BI-214	609.31*	46.10	1.2636E-001	1.26E-001	3.0657E-001
		768.36	4.94	2.2179E+000		3.4096E-001
		806.17	1.22	8.3019E+000		-5.6026E-001
		934.06	3.03	3.5091E+000		-4.9812E-002
		1120.29*	15.10	4.3508E-001		5.4833E-001
		1155.19	1.63	7.4198E+000		7.9713E-001
		1238.11	5.79	2.5000E+000		9.4447E-001
		1280.96	1.43	7.7833E+000		-1.9796E+000
		1377.67	4.00	2.3004E+000		6.9371E-001
		1401.50	1.27	7.7821E+000		-4.2991E+000
		1407.98	2.15	4.7401E+000		3.8913E-001
		1509.23	2.11	4.1045E+000		3.5345E-001
		1661.28	1.15	7.6165E+000		-1.9107E+000
		1729.60	2.92	2.7685E+000		-1.1523E-001
		1764.49	15.40	8.3193E-001		7.0761E-001
		1847.42	2.11	4.2135E+000		1.3610E+000
	PB-214	74.81	6.44	2.9069E+000	3.07E-001	5.9449E+000
		77.11	10.80	1.5613E+000		1.6886E+000
		87.30	4.84	2.5278E+000		1.9650E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
	PB-214	242.00	7.43	1.6504E+000	3.07E-001	-1.6940E+000
		295.22	19.30	5.3663E-001		4.0049E-001
		351.93	37.60	3.0713E-001		3.5193E-001
		785.96	1.07	9.4726E+000		-5.0234E+000
	RA-226	186.21*	3.28	1.5729E+000	1.57E+000	2.0049E+000
	AC-228	93.35	0.32	3.5886E+001	5.22E-001	6.2774E+001
		129.07	2.42	3.0218E+000		-3.3436E-001
		209.25	3.89	2.2158E+000		1.3837E+000
		270.24	3.46	2.5668E+000		-8.6492E-001
		338.32	11.27	9.0888E-001		2.6999E-001
		409.46	1.92	4.8325E+000		2.9802E+000
		463.00	4.40	2.2675E+000		9.7952E-001
		794.95	4.25	2.5315E+000		-2.2963E-001
		911.20	25.80	5.2162E-001		1.4922E-001
		964.77	4.99	2.8312E+000		2.8538E+000
		968.97	15.80	8.8011E-001		9.3336E-001
		1588.20	3.22	3.2954E+000		1.1726E+000
+	U-235	89.95	3.56	3.5682E+000	9.02E-002	-7.9733E-001
		93.35*	5.81	1.4300E+000		1.6874E+000
		105.00	2.69	2.8298E+000		4.7918E-001
		109.16	1.54	4.9135E+000		2.3745E+000
		143.76	10.96	6.9762E-001		-2.2666E-001
		163.33	5.08	1.5010E+000		-8.0859E-001
		185.72*	57.20	9.0196E-002		1.1496E-001
		202.11	1.08	7.5182E+000		-4.2664E-002
		205.31	5.01	1.6176E+000		-8.8037E-001
+	U-238	63.29	4.80	3.7950E+000	1.48E+000	1.0449E+000
		92.60*	5.60	1.4837E+000		1.7507E+000
		1001.03	0.84	1.3384E+001		4.4809E+000
	Am-241	59.54	35.90	5.4383E-001	5.44E-001	-3.9974E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:56:53 PM
Sample Title	:	LC-3A-14 Sump 02 Right
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	9.410E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 12:29:26 PM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-14 Sump 02 Right
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.964	1461.00*		10.67	6.88434E+000	1.28289E+000
TL-208	0.633	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.07091E-001	5.78947E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.779	74.81*	@	10.40	5.76574E-001	4.13497E-001
		77.11*	@	17.50	4.19089E-001	1.83773E-001
		87.30	@	7.81		
		238.63*		43.30	3.85190E-001	1.13401E-001
		300.09		3.28		
PB-214	0.740	74.81*	@	6.44	9.31114E-001	6.67759E-001
		77.11*	@	10.80	6.79080E-001	2.97780E-001
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	5.23671E-001	2.06729E-001
		351.93*		37.60	2.93926E-001	1.17332E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.964	6.884342E+000	1.282885E+000
	TL-208	@	0.633	1.070910E-001	5.789475E-002
X	BI-211		0.741		
	PB-212	@	0.779	3.851903E-001	1.134013E-001
	PB-214	@	0.740	3.499021E-001	1.020420E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:56:52 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
5	338.16	2.5681E-002	84.57
8	609.01	1.1354E-001	30.02
9	968.55	4.4632E-002	46.98

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-14 Sump 02 Right
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.0971E+000	1.10E+000	6.8843E+000
	Co-60	1173.24	100.00	9.9423E-002	9.12E-002	-1.4497E-002
		1332.50	100.00	9.1159E-002		-4.3093E-002
	CS-137	661.66	85.10	1.1999E-001	1.20E-001	4.3992E-002
+	TL-208	277.36	6.31	1.2830E+000	8.26E-002	6.4829E-001
		510.77	22.60	6.0405E-001		9.6669E-001
		583.19*	84.50	8.2554E-002		1.0709E-001
		763.13	1.81	6.1643E+000		4.2536E+000
		860.56	12.42	8.8343E-001		6.1544E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.2768E+001	4.48E-001	8.8947E-002
		351.06*	12.91	4.4753E-001		8.5605E-001
	PB-211	404.85	3.78	2.3065E+000	2.31E+000	-1.3223E-001
		427.09	1.76	4.9380E+000		1.6787E+000
		832.01	3.52	3.2123E+000		2.8652E+000
	BI-212	727.33	6.58	1.7379E+000	1.74E+000	8.6107E-001
		785.37	1.10	9.6166E+000		7.3379E+000
		1620.50	1.49	6.6196E+000		3.2770E+000
+	PB-212	74.81*	10.40	9.0787E-001	1.38E-001	5.7657E-001
		77.11*	17.50	3.9075E-001		4.1909E-001
		87.30	7.81	1.3604E+000		7.0021E-001
		238.63*	43.30	1.3773E-001		3.8519E-001
		300.09	3.28	2.8848E+000		-1.3303E+000
	BI-214	609.31	46.10	3.2588E-001	3.26E-001	4.6636E-001
		768.36	4.94	2.2669E+000		5.4598E-001
		806.17	1.22	9.0076E+000		3.9661E+000
		934.06	3.03	3.4826E+000		-1.6260E+000
		1120.29	15.10	9.6354E-001		-1.6389E-001
		1155.19	1.63	6.6806E+000		-4.1600E+000
		1238.11	5.79	2.1195E+000		1.4818E+000
		1280.96	1.43	9.0016E+000		2.1248E+000
		1377.67	4.00	2.6528E+000		5.4818E-001
		1401.50	1.27	8.6289E+000		2.7431E+000
		1407.98	2.15	4.9957E+000		4.4467E-001
		1509.23	2.11	4.3350E+000		1.0076E+000
		1661.28	1.15	7.0875E+000		-4.2577E+000
		1729.60	2.92	2.8590E+000		6.0534E-001
		1764.49	15.40	9.2959E-001		8.0542E-001
		1847.42	2.11	3.8975E+000		-9.2286E-001
+	PB-214	74.81*	6.44	1.4661E+000	1.54E-001	9.3111E-001
		77.11*	10.80	6.3316E-001		6.7908E-001
		87.30	4.84	2.1953E+000		1.1299E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.5667E+000	1.54E-001	-6.1991E-001
		295.22*	19.30	2.6741E-001		5.2367E-001
		351.93*	37.60	1.5366E-001		2.9393E-001
		785.96	1.07	9.7674E+000		6.0096E+000
	RA-226	186.21	3.28	2.4695E+000	2.47E+000	-2.1611E-001
	AC-228	93.35	0.32	3.1089E+001	5.72E-001	2.7217E+001
		129.07	2.42	2.9926E+000		-8.4836E-001
		209.25	3.89	2.1201E+000		1.0142E+000
		270.24	3.46	2.3887E+000		1.0265E-001
		338.32	11.27	7.8767E-001		3.7663E-001
		409.46	1.92	4.7231E+000		1.7245E+000
		463.00	4.40	2.0526E+000		-3.1821E-001
		794.95	4.25	2.5360E+000		7.3385E-001
		911.20	25.80	5.7170E-001		5.4690E-001
		964.77	4.99	2.7174E+000		2.5052E+000
		968.97	15.80	8.6019E-001		6.9328E-001
		1588.20	3.22	2.9252E+000		6.7987E-001
	U-235	89.95	3.56	2.9001E+000	1.43E-001	-6.8453E-001
		93.35	5.81	1.7123E+000		1.4990E+000
		105.00	2.69	2.7155E+000		-1.3425E+000
		109.16	1.54	4.9487E+000		1.9620E+000
		143.76	10.96	6.9021E-001		3.7136E-001
		163.33	5.08	1.3944E+000		1.9076E-001
		185.72	57.20	1.4317E-001		5.8682E-002
		202.11	1.08	7.2809E+000		-4.3952E-001
		205.31	5.01	1.6172E+000		-5.2476E-001
	U-238	63.29	4.80	3.2243E+000	1.77E+000	4.5176E-001
		92.60	5.60	1.7717E+000		4.9114E-002
		1001.03	0.84	1.1610E+001		-1.4151E+000
	Am-241	59.54	35.90	4.6110E-001	4.61E-001	-2.6435E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************

Report Generated On                 :  8/18/01  2:57:06 PM

Sample Title                        : LC-3A-15 Sump 02 Right 1
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  8.992E+002 gram

Sample Taken On                     :
Acquisition Started                 :  7/12/01  2:37:38 PM

Live Time                           :      600.0 seconds
Real Time                           :      600.2 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-15 Sump 02 Right 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.980	1461.00*		10.67	7.66738E+000	1.39948E+000
TL-208	0.633	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	9.87092E-002	5.65217E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
BI-211	0.808	72.87	@	1.27		
		351.06*		12.91	1.13465E+000	3.71357E-001
U-238	0.314	63.29		4.80		
		92.60*		5.60	1.87039E+000	1.13155E+000
		1001.03		0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40		0.980	7.667379E+000	1.399480E+000
TL-208	@	0.633	9.870920E-002	5.652174E-002
BI-211	@	0.808	1.134649E+000	3.713570E-001
U-238		0.314	1.870395E+000	1.131546E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:57:05 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
2	238.53	1.3227E-001	36.97
5	609.00	1.1500E-001	28.56

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-15 Sump 02 Right 1
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2209E+000	1.22E+000	7.6674E+000
	Co-60	1173.24	100.00	1.1283E-001	1.01E-001	5.0965E-002
		1332.50	100.00	1.0110E-001		-4.0571E-002
	CS-137	661.66	85.10	1.3093E-001	1.31E-001	6.2026E-003
+	TL-208	277.36	6.31	1.3753E+000	8.10E-002	-8.4054E-001
		510.77	22.60	5.8253E-001		3.2554E-001
		583.19*	84.50	8.1001E-002		9.8709E-002
		763.13	1.81	5.6371E+000		1.8615E+000
		860.56	12.42	9.0075E-001		2.8922E-002
>		2614.53	99.16	0.0000E+000		0.0000E+000
+	BI-211	72.87	1.27	1.3436E+001	4.37E-001	1.2734E+001
		351.06*	12.91	4.3739E-001		1.1346E+000
	PB-211	404.85	3.78	2.5132E+000	2.51E+000	4.3243E-001
		427.09	1.76	4.8275E+000		-2.6441E+000
		832.01	3.52	2.8588E+000		-8.7322E-001
	BI-212	727.33	6.58	1.6337E+000	1.63E+000	5.2636E-002
		785.37	1.10	9.1493E+000		4.5747E-001
		1620.50	1.49	6.6933E+000		2.4224E+000
	PB-212	74.81	10.40	1.6470E+000	2.79E-001	2.2626E+000
		77.11	17.50	8.8341E-001		2.8352E-001
		87.30	7.81	1.5632E+000		1.0293E+000
		238.63	43.30	2.7851E-001		4.8649E-001
		300.09	3.28	2.9740E+000		-1.3735E+000
	BI-214	609.31	46.10	3.2702E-001	3.27E-001	4.7564E-001
		768.36	4.94	2.2146E+000		5.8570E-001
		806.17	1.22	8.6142E+000		3.7150E+000
		934.06	3.03	3.6444E+000		-9.9853E-001
		1120.29	15.10	8.6418E-001		1.1714E-001
		1155.19	1.63	6.9912E+000		-2.7997E+000
		1238.11	5.79	2.4397E+000		1.2294E+000
		1280.96	1.43	7.7979E+000		-5.8765E+000
		1377.67	4.00	2.5031E+000		-2.9991E-001
		1401.50	1.27	7.9595E+000		4.5860E+000
		1407.98	2.15	4.2811E+000		-2.1322E+000
		1509.23	2.11	2.8948E+000		-6.8234E+000
		1661.28	1.15	7.0197E+000		1.6779E+000
		1729.60	2.92	3.1424E+000		4.1381E-001
		1764.49	15.40	9.5644E-001		8.0255E-001
		1847.42	2.11	5.2916E+000		6.0592E-001
	PB-214	74.81	6.44	2.6597E+000	3.27E-001	3.6540E+000
		77.11	10.80	1.4315E+000		4.5941E-001
		87.30	4.84	2.5224E+000		1.6610E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
	PB-214	242.00	7.43	1.5980E+000	3.27E-001	-2.5017E-001
		295.22	19.30	5.5116E-001		2.5291E-001
		351.93	37.60	3.2692E-001		3.3306E-001
		785.96	1.07	9.5502E+000		8.7370E-001
	RA-226	186.21	3.28	2.8715E+000	2.87E+000	3.4445E-001
	AC-228	93.35	0.32	3.6704E+001	5.43E-001	4.5700E+001
		129.07	2.42	3.1723E+000		4.1876E-001
		209.25	3.89	2.2090E+000		6.9175E-001
		270.24	3.46	2.6657E+000		1.7272E+000
		338.32	11.27	9.3898E-001		8.9984E-001
		409.46	1.92	5.3883E+000		-5.3569E-001
		463.00	4.40	2.0251E+000		1.4158E+000
		794.95	4.25	2.6539E+000		2.0420E+000
		911.20	25.80	5.4327E-001		6.2528E-001
		964.77	4.99	2.7906E+000		2.3035E+000
		968.97	15.80	9.0846E-001		6.8310E-001
		1588.20	3.22	4.2982E+000		1.2173E+000
	U-235	89.95	3.56	3.6355E+000	1.68E-001	6.7276E-001
		93.35	5.81	2.0216E+000		2.5171E+000
		105.00	2.69	3.0590E+000		1.6972E+000
		109.16	1.54	4.7272E+000		-2.6697E+000
		143.76	10.96	7.3096E-001		3.3825E-001
		163.33	5.08	1.5946E+000		-2.6963E-001
		185.72	57.20	1.6820E-001		1.1003E-001
		202.11	1.08	7.9305E+000		4.2155E+000
		205.31	5.01	1.7073E+000		1.5699E-002
+	U-238	63.29	4.80	3.6150E+000	1.77E+000	9.9809E-001
		92.60*	5.60	1.7702E+000		1.8704E+000
		1001.03	0.84	1.3481E+001		5.2243E+000
	Am-241	59.54	35.90	4.9661E-001	4.97E-001	-3.8741E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Report Generated On	:	8/18/01 2:57:19 PM
Sample Title	:	LC-3A-16 01-01-011 Under
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	8.706E+002 gram
Sample Taken On	:	
Acquisition Started	:	7/12/01 11:03:50 AM
Live Time	:	600.0 seconds
Real Time	:	600.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: LC-3A-16 01-01-011 Under
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.989	1461.00*		10.67	9.32084E+000	1.58022E+000
TL-208	0.618	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	1.08580E-001	5.99385E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
PB-212	0.449	74.81*	@	10.40	2.18038E+000	1.25333E+000
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	4.23092E-001	1.54857E-001
		300.09		3.28		
BI-214	0.336	609.31*		46.10	4.33718E-001	1.46759E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29*		15.10	5.41763E-001	3.79936E-001
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49		15.40		
		1847.42		2.11		
PB-214	0.526	74.81*	@	6.44	3.52111E+000	2.02402E+000
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	4.09015E-001	2.88266E-001
		351.93*		37.60	4.72845E-001	1.37307E-001
		785.96		1.07		
U-235	0.475	89.95	@	3.56		
		93.35*	@	5.81	9.42685E+000	1.96587E+000
		105.00		2.69		
		109.16		1.54		
		143.76		10.96		
		163.33		5.08		
		185.72*		57.20	2.38253E-001	8.81665E-002

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
U-235	0.475	202.11	1.08		
		205.31	5.01		
U-238	0.912	63.29*	4.80	5.11994E+000	2.28517E+000
		92.60*	5.60	9.78036E+000	2.03959E+000
		1001.03	0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.989	9.320844E+000	1.580217E+000
	TL-208	@	0.618	1.085801E-001	5.993849E-002
X	BI-211		0.799		
	PB-212	@	0.449	4.230918E-001	1.548571E-001
	BI-214		0.336	4.477456E-001	1.369005E-001
	PB-214	@	0.526	4.610408E-001	1.239631E-001
X	RA-226		0.967		
	U-235	@	0.475	2.420107E-001	8.774893E-002
	U-238		0.912	7.574187E+000	1.522494E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:57:18 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty

All peaks were identified.

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: LC-3A-16 01-01-011 Under
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.3608E+000	1.36E+000	9.3208E+000
	Co-60	1173.24	100.00	1.2286E-001	1.15E-001	1.3783E-002
		1332.50	100.00	1.1518E-001		4.6044E-002
	CS-137	661.66	85.10	1.4053E-001	1.41E-001	-4.9598E-003
+	TL-208	277.36	6.31	1.5248E+000	8.53E-002	6.1536E-001
		510.77	22.60	6.7836E-001		8.5835E-001
		583.19*	84.50	8.5295E-002		1.0858E-001
		763.13	1.81	8.2389E+000		9.0687E+000
		860.56	12.42	8.0979E-001		-2.4126E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.9193E+001	4.35E-001	5.9765E+000
		351.06*	12.91	4.3542E-001		1.3771E+000
	PB-211	404.85	3.78	2.6554E+000	2.66E+000	2.8659E-001
		427.09	1.76	5.2886E+000		-7.2484E-001
		832.01	3.52	3.6649E+000		-7.3270E-001
	BI-212	727.33	6.58	1.6462E+000	1.65E+000	-5.9604E-001
		785.37	1.10	1.1825E+001		6.0378E+000
		1620.50	1.49	6.1202E+000		-4.0195E+000
+	PB-212	74.81*	10.40	1.9969E+000	2.20E-001	2.1804E+000
		77.11	17.50	1.2148E+000		-8.9020E-002
		87.30	7.81	2.2679E+000		3.1750E+000
		238.63*	43.30	2.2048E-001		4.2309E-001
		300.09	3.28	3.3539E+000		1.4238E+000
+	BI-214	609.31*	46.10	1.8180E-001	1.82E-001	4.3372E-001
		768.36	4.94	3.1119E+000		2.9788E+000
		806.17	1.22	9.3866E+000		3.6053E+000
		934.06	3.03	3.9839E+000		1.1294E+000
		1120.29*	15.10	5.6107E-001		5.4176E-001
		1155.19	1.63	7.4746E+000		-4.3443E+000
		1238.11	5.79	2.6410E+000		8.4387E-001
		1280.96	1.43	8.3867E+000		5.8296E-002
		1377.67	4.00	3.1209E+000		7.3013E-001
		1401.50	1.27	9.1177E+000		5.7670E-001
		1407.98	2.15	5.3997E+000		9.6897E-001
		1509.23	2.11	5.7219E+000		9.3345E-001
		1661.28	1.15	8.0461E+000		-8.8519E-001
		1729.60	2.92	2.9246E+000		-1.1755E+000
		1764.49	15.40	1.0536E+000		6.7744E-001
		1847.42	2.11	4.2126E+000		0.0000E+000
+	PB-214	74.81*	6.44	3.2249E+000	1.50E-001	3.5211E+000
		77.11	10.80	1.9684E+000		-1.4425E-001
		87.30	4.84	3.6596E+000		5.1232E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.8662E+000	1.50E-001	-2.9225E-001
		295.22*	19.30	4.5665E-001		4.0901E-001
		351.93*	37.60	1.4950E-001		4.7284E-001
		785.96	1.07	1.2161E+001		7.6720E+000
	RA-226	186.21*	3.28	2.1127E+000	2.11E+000	4.1549E+000
	AC-228	93.35	0.32	6.4165E+001	6.00E-001	1.9611E+002
		129.07	2.42	3.6678E+000		1.5408E+000
		209.25	3.89	2.6673E+000		3.1153E+000
		270.24	3.46	2.8215E+000		4.0912E-001
		338.32	11.27	8.6780E-001		-1.3199E-001
		409.46	1.92	5.1050E+000		2.5114E+000
		463.00	4.40	2.4513E+000		8.9944E-001
		794.95	4.25	2.6402E+000		-2.2021E+000
		911.20	25.80	5.9963E-001		5.3458E-001
		964.77	4.99	3.0696E+000		1.9330E+000
		968.97	15.80	9.6345E-001		7.6492E-001
		1588.20	3.22	2.9258E+000		1.1380E+000
+	U-235	89.95	3.56	6.2098E+000	1.21E-001	-7.0171E-001
		93.35*	5.81	2.0891E+000		9.4269E+000
		105.00	2.69	4.0648E+000		-8.6985E-002
		109.16	1.54	7.2909E+000		3.7677E-001
		143.76	10.96	8.7017E-001		5.2277E-002
		163.33	5.08	1.9003E+000		-6.6436E-003
		185.72*	57.20	1.2115E-001		2.3825E-001
		202.11	1.08	8.5665E+000		5.2438E-002
		205.31	5.01	1.9101E+000		4.2787E-001
+	U-238	63.29*	4.80	3.2875E+000	2.17E+000	5.1199E+000
		92.60*	5.60	2.1675E+000		9.7804E+000
		1001.03	0.84	2.0600E+001		1.9488E+001
	Am-241	59.54	35.90	7.4714E-001	7.47E-001	-8.9132E-002

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Report Generated On	:	8/18/01 2:57:36 PM
Sample Title	:	S Pipe Top
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	6.636E+002 gram
Sample Taken On	:	
Acquisition Started	:	6/29/01 12:00:44 PM
Live Time	:	900.0 seconds
Real Time	:	900.3 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: S Pipe Top
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.978	1461.00*	10.67	9.72436E+000	1.55576E+000
TL-208	0.623	277.36	6.31		
		510.77 @	22.60		
		583.19*	84.50	6.13905E-001	1.20322E-001
		763.13	1.81		
		860.56	12.42		
		2614.53	99.16		
PB-212	0.936	74.81* @	10.40	3.87309E+000	8.41177E-001
		77.11* @	17.50	1.17517E+000	3.30426E-001
		87.30* @	7.81	9.98572E-001	4.96226E-001
		238.63*	43.30	1.69152E+000	2.56704E-001
		300.09	3.28		
BI-214	0.349	609.31*	46.10	1.07092E+000	2.08412E-001
		768.36	4.94		
		806.17	1.22		
		934.06	3.03		
		1120.29*	15.10	1.05347E+000	5.01301E-001
		1155.19	1.63		
		1238.11	5.79		
		1280.96	1.43		
		1377.67	4.00		
		1401.50	1.27		
		1407.98	2.15		
		1509.23	2.11		
		1661.28	1.15		
		1729.60	2.92		
		1764.49	15.40		
		1847.42	2.11		
PB-214	0.833	74.81* @	6.44	6.25468E+000	1.35842E+000
		77.11* @	10.80	1.90420E+000	5.35412E-001
		87.30* @	4.84	1.61133E+000	8.00728E-001
		242.00	7.43		
		295.22*	19.30	9.77066E-001	3.27297E-001
		351.93*	37.60	1.01611E+000	2.06994E-001
		785.96	1.07		
RA-226	0.995	186.21*	3.28	2.14091E+000	1.36029E+000
AC-228	0.667	93.35* @	0.32	3.24632E+001	2.24220E+001
		129.07	2.42		
		209.25*	3.89	1.49326E+000	1.31790E+000
		270.24	3.46		
		338.32*	11.27	1.80273E+000	5.15988E-001
		409.46	1.92		

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
AC-228	0.667	463.00*	4.40	1.82121E+000	9.28192E-001
		794.95	4.25		
		911.20*	25.80	1.62739E+000	3.58051E-001
		964.77*	4.99	2.13749E+000	9.73305E-001
		968.97*	15.80	1.33967E+000	4.05419E-001
		1588.20	3.22		
U-238	0.314	63.29	4.80		
		92.60*	5.60	1.85504E+000	1.28125E+000
		1001.03	0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.978	9.724360E+000	1.555761E+000
	TL-208	@	0.623	6.139054E-001	1.203223E-001
X	BI-211		0.949		
	PB-212	@	0.936	1.691516E+000	2.567043E-001
	BI-214		0.349	1.068352E+000	1.924436E-001
	PB-214	@	0.833	1.004952E+000	1.749433E-001
	RA-226		0.995	2.140912E+000	1.360288E+000
	AC-228	@	0.667	1.607533E+000	2.212284E-001
X	U-235		0.466		
	U-238		0.314	1.763181E+000	1.281317E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:57:35 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

	Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M	1	72.89	9.6148E-002	30.09
M	4	84.69	4.2803E-002	73.73

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: S Pipe Top
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.4053E+000	1.41E+000	9.7244E+000
	Co-60	1173.24	100.00	1.4748E-001	1.26E-001	1.0497E-001
		1332.50	100.00	1.2610E-001		-1.6455E-002
	CS-137	661.66	85.10	1.4936E-001	1.49E-001	6.0031E-002
+	TL-208	277.36	6.31	1.8305E+000	1.35E-001	-3.3846E-001
		510.77	22.60	7.7323E-001		8.0703E-001
		583.19*	84.50	1.3500E-001		6.1391E-001
		763.13	1.81	7.4967E+000		2.4541E+000
		860.56	12.42	1.1654E+000		1.3162E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87*	1.27	8.6427E+000	6.51E-001	1.3382E+001
		351.06*	12.91	6.5058E-001		2.9594E+000
	PB-211	404.85	3.78	3.2067E+000	3.21E+000	-3.2227E-001
		427.09	1.76	6.5156E+000		2.8580E+000
		832.01	3.52	3.8549E+000		-1.4750E+000
	BI-212	727.33	6.58	2.3902E+000	2.39E+000	2.2134E+000
		785.37	1.10	1.1791E+001		5.7278E+000
		1620.50	1.49	8.1909E+000		2.7571E+000
+	PB-212	74.81*	10.40	1.2534E+000	2.30E-001	3.8731E+000
		77.11*	17.50	6.4380E-001		1.1752E+000
		87.30*	7.81	1.2104E+000		9.9857E-001
		238.63*	43.30	2.3017E-001		1.6915E+000
		300.09	3.28	4.0410E+000		1.4117E+000
+	BI-214	609.31*	46.10	2.2361E-001	2.24E-001	1.0709E+000
		768.36	4.94	3.0066E+000		2.8959E+000
		806.17	1.22	9.9763E+000		7.0248E+000
		934.06	3.03	4.5599E+000		1.1375E+000
		1120.29*	15.10	7.0688E-001		1.0535E+000
		1155.19	1.63	8.1635E+000		-1.0265E-002
		1238.11	5.79	2.8993E+000		2.0184E+000
		1280.96	1.43	9.0907E+000		1.3332E+000
		1377.67	4.00	3.4244E+000		1.4779E+000
		1401.50	1.27	1.0623E+001		-6.6348E+000
		1407.98	2.15	6.6017E+000		-3.9646E+000
		1509.23	2.11	6.2291E+000		2.0279E+000
		1661.28	1.15	7.6594E+000		-4.9428E-001
		1729.60	2.92	4.4239E+000		2.7460E+000
		1764.49	15.40	1.2861E+000		1.6256E+000
		1847.42	2.11	5.5076E+000		-1.0875E+000
+	PB-214	74.81*	6.44	2.0241E+000	2.23E-001	6.2547E+000
		77.11*	10.80	1.0432E+000		1.9042E+000
		87.30*	4.84	1.9531E+000		1.6113E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.8840E+000	2.23E-001	-2.3761E+000
		295.22*	19.30	4.5154E-001		9.7707E-001
		351.93*	37.60	2.2338E-001		1.0161E+000
		785.96	1.07	1.2385E+001		7.7853E+000
+	RA-226	186.21*	3.28	2.1376E+000	2.14E+000	2.1409E+000
+	AC-228	93.35*	0.32	3.6000E+001	3.59E-001	3.2463E+001
		129.07	2.42	4.4443E+000		-3.8766E-001
		209.25*	3.89	2.1569E+000		1.4933E+000
		270.24	3.46	3.5960E+000		1.2737E+000
		338.32*	11.27	6.3719E-001		1.8027E+000
		409.46	1.92	6.0839E+000		1.7431E+000
		463.00*	4.40	1.2948E+000		1.8212E+000
		794.95	4.25	3.1372E+000		1.9346E+000
		911.20*	25.80	3.5871E-001		1.6274E+000
		964.77*	4.99	1.7463E+000		2.1375E+000
		968.97*	15.80	5.5340E-001		1.3397E+000
		1588.20	3.22	4.6110E+000		3.3421E+000
	U-235	89.95	3.56	4.7639E+000	1.23E-001	1.0030E+000
		93.35*	5.81	1.9828E+000		1.7880E+000
		105.00	2.69	4.3917E+000		3.2191E+000
		109.16	1.54	7.5222E+000		-5.1745E-001
		143.76	10.96	1.0024E+000		1.0905E-001
		163.33	5.08	2.2033E+000		2.1653E-001
		185.72*	57.20	1.2257E-001		1.2277E-001
		202.11	1.08	1.0885E+001		-2.6973E+000
		205.31	5.01	2.4806E+000		-7.8843E-001
+	U-238	63.29	4.80	4.6630E+000	2.06E+000	2.5593E+000
		92.60*	5.60	2.0571E+000		1.8550E+000
		1001.03	0.84	1.6460E+001		5.3892E+000
	Am-241	59.54	35.90	6.7368E-001	6.74E-001	-2.5954E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Report Generated On	:	8/18/01 2:57:53 PM
Sample Title	:	S Pipe Bottom
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	7.959E+002 gram
Sample Taken On	:	
Acquisition Started	:	6/29/01 11:43:47 AM
Live Time	:	900.0 seconds
Real Time	:	900.4 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: S Pipe Bottom
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.990	1461.00*	10.67	6.84099E+000	1.24596E+000
TL-208	0.908	277.36	6.31		
		510.77* @	22.60	3.93328E-001	3.43310E-001
		583.19*	84.50	4.44113E-001	9.27835E-002
		763.13	1.81		
		860.56*	12.42	6.53575E-001	3.52130E-001
		2614.53	99.16		
BI-212	0.542	727.33*	6.58	2.32199E+000	8.88774E-001
		785.37	1.10		
		1620.50	1.49		
PB-212	0.934	74.81* @	10.40	2.26641E+000	6.45068E-001
		77.11* @	17.50	1.43921E+000	3.36043E-001
		87.30* @	7.81	1.61034E+000	5.08453E-001
		238.63*	43.30	1.52972E+000	2.26694E-001
		300.09	3.28		
BI-214	0.528	609.31*	46.10	1.18102E+000	1.84404E-001
		768.36	4.94		
		806.17	1.22		
		934.06	3.03		
		1120.29*	15.10	1.30767E+000	4.15684E-001
		1155.19	1.63		
		1238.11	5.79		
		1280.96	1.43		
		1377.67	4.00		
		1401.50	1.27		
		1407.98	2.15		
		1509.23	2.11		
		1661.28	1.15		
		1729.60	2.92		
		1764.49*	15.40	1.34157E+000	4.96938E-001
		1847.42	2.11		
PB-214	0.832	74.81* @	6.44	3.66005E+000	1.04173E+000
		77.11* @	10.80	2.33205E+000	5.44514E-001
		87.30* @	4.84	2.59850E+000	8.20458E-001
		242.00	7.43		
		295.22*	19.30	8.55468E-001	2.69486E-001
		351.93*	37.60	1.11184E+000	1.99227E-001
		785.96	1.07		
AC-228	0.556	93.35* @	0.32	3.44730E+001	1.15077E+001
		129.07	2.42		
		209.25	3.89		
		270.24*	3.46	1.22080E+000	1.37663E+000

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
AC-228	0.556	338.32*	11.27	1.51225E+000	5.53682E-001
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20*	25.80	1.81475E+000	3.44806E-001
		964.77*	4.99	1.12914E+000	6.50478E-001
		968.97*	15.80	1.78131E+000	3.98049E-001
		1588.20	3.22		
U-235	0.533	89.95* @	3.56	1.70286E+000	8.78023E-001
		93.35* @	5.81	1.89868E+000	6.33813E-001
		105.00	2.69		
		109.16	1.54		
		143.76	10.96		
		163.33	5.08		
		185.72*	57.20	8.61385E-002	6.02282E-002
		202.11	1.08		
		205.31	5.01		
U-238	0.314	63.29	4.80		
		92.60*	5.60	1.96989E+000	6.57581E-001
		1001.03	0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.990	6.840986E+000	1.245960E+000
	TL-208	@	0.908	4.571468E-001	8.962865E-002
X	BI-211		0.797		
	BI-212		0.542	2.321991E+000	8.887738E-001
	PB-212	@	0.934	1.529718E+000	2.266943E-001
	BI-214		0.528	1.216265E+000	1.596292E-001
	PB-214	@	0.832	1.021237E+000	1.602016E-001
X	RA-226		0.972		
	AC-228	@	0.556	1.664737E+000	2.188677E-001
	U-235	@	0.533	8.613856E-002	6.015581E-002
	U-238		0.314	1.785389E+000	6.606549E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:57:51 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

	Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M	3	84.50	1.0842E-001	34.11

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: S Pipe Bottom
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.2853E+000	1.29E+000	6.8410E+000
	Co-60	1173.24	100.00	1.1645E-001	1.09E-001	2.6722E-002
		1332.50	100.00	1.0939E-001		-7.5013E-002
	CS-137	661.66	85.10	1.2063E-001	1.21E-001	-6.7562E-002
+	TL-208	277.36	6.31	1.6050E+000	1.05E-001	8.9363E-001
		510.77*	22.60	5.6428E-001		3.9333E-001
		583.19*	84.50	1.0493E-001		4.4411E-001
		763.13	1.81	7.0642E+000		2.9255E-001
		860.56*	12.42	4.9183E-001		6.5357E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.7069E+001	5.91E-001	-1.5265E+001
		351.06*	12.91	5.9142E-001		3.2382E+000
	PB-211	404.85	3.78	2.9347E+000	2.93E+000	3.0513E+000
		427.09	1.76	5.6266E+000		1.3792E+000
		832.01	3.52	3.4718E+000		-1.3011E+000
+	BI-212	727.33*	6.58	1.2024E+000	1.20E+000	2.3220E+000
		785.37	1.10	1.0835E+001		-1.3899E+000
		1620.50	1.49	7.0787E+000		-1.2721E+000
+	PB-212	74.81*	10.40	1.1447E+000	2.01E-001	2.2664E+000
		77.11*	17.50	5.7802E-001		1.4392E+000
		87.30*	7.81	1.0736E+000		1.6103E+000
		238.63*	43.30	2.0062E-001		1.5297E+000
		300.09	3.28	3.6050E+000		-1.6254E+000
+	BI-214	609.31*	46.10	1.5545E-001	1.55E-001	1.1810E+000
		768.36	4.94	2.7706E+000		3.0785E+000
		806.17	1.22	9.3683E+000		8.1757E+000
		934.06	3.03	3.8020E+000		2.0022E-001
		1120.29*	15.10	4.7062E-001		1.3077E+000
		1155.19	1.63	8.2708E+000		4.8970E+000
		1238.11	5.79	2.4004E+000		-7.2798E-001
		1280.96	1.43	8.1194E+000		2.0088E+000
		1377.67	4.00	2.8892E+000		-6.4112E-001
		1401.50	1.27	9.0789E+000		1.8116E+000
		1407.98	2.15	5.4409E+000		-8.6419E-001
		1509.23	2.11	5.1936E+000		6.9827E-001
		1661.28	1.15	7.0825E+000		2.2006E+000
		1729.60	2.92	3.9430E+000		3.0359E+000
		1764.49*	15.40	6.1117E-001		1.3416E+000
		1847.42	2.11	5.3130E+000		2.5068E+000
+	PB-214	74.81*	6.44	1.8487E+000	2.03E-001	3.6600E+000
		77.11*	10.80	9.3660E-001		2.3321E+000
		87.30*	4.84	1.7324E+000		2.5985E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.5754E+000	2.03E-001	-3.2755E+000
		295.22*	19.30	3.6194E-001		8.5547E-001
		351.93*	37.60	2.0307E-001		1.1118E+000
		785.96	1.07	1.1011E+001		-8.7265E+000
	RA-226	186.21*	3.28	1.6637E+000	1.66E+000	1.5022E+000
+	AC-228	93.35*	0.32	2.4244E+001	3.30E-001	3.4473E+001
		129.07	2.42	4.1568E+000		7.8194E-001
		209.25	3.89	2.7274E+000		7.7711E-001
		270.24*	3.46	2.2934E+000		1.2208E+000
		338.32*	11.27	8.0261E-001		1.5123E+000
		409.46	1.92	5.4188E+000		-1.1125E+000
		463.00	4.40	2.4484E+000		1.3117E+000
		794.95	4.25	2.8880E+000		1.9776E+000
		911.20*	25.80	3.2984E-001		1.8148E+000
		964.77*	4.99	1.1551E+000		1.1291E+000
		968.97*	15.80	3.9024E-001		1.7813E+000
		1588.20	3.22	3.6545E+000		-1.4410E-001
+	U-235	89.95*	3.56	2.2664E+000	9.54E-002	1.7029E+000
		93.35*	5.81	1.3353E+000		1.8987E+000
		105.00	2.69	3.6958E+000		-1.4468E-001
		109.16	1.54	6.7932E+000		2.9307E+000
		143.76	10.96	9.2834E-001		1.5618E-001
		163.33	5.08	1.9754E+000		3.9331E-001
		185.72*	57.20	9.5404E-002		8.6139E-002
		202.11	1.08	9.3511E+000		4.4558E+000
		205.31	5.01	2.0478E+000		-1.7947E+000
+	U-238	63.29	4.80	4.3389E+000	1.39E+000	3.5748E+000
		92.60*	5.60	1.3853E+000		1.9699E+000
		1001.03	0.84	1.3261E+001		5.6429E+000
	Am-241	59.54	35.90	6.4510E-001	6.45E-001	-5.7240E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************


Report Generated On                 :  8/18/01  2:58:26 PM

Sample Title                        :  West Pipe
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  9.593E+002 gram

Sample Taken On                     :
Acquisition Started                 :  6/29/01 12:17:06 PM

Live Time                           :      900.0 seconds
Real Time                           :      900.2 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: West Pipe
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.998	1461.00*		10.67	3.72727E+000	8.56145E-001
PB-212	0.448	74.81*	@	10.40	6.88389E-001	3.43546E-001
		77.11	@	17.50		
		87.30	@	7.81		
		238.63*		43.30	1.16273E-001	7.12387E-002
		300.09		3.28		
BI-214	0.351	609.31*		46.10	3.85189E-001	9.96579E-002
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29*		15.10	3.39767E-001	2.00952E-001
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49		15.40		
		1847.42		2.11		
PB-214	0.533	74.81*	@	6.44	1.11168E+000	5.54794E-001
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	3.02490E-001	1.29384E-001
		351.93*		37.60	2.98288E-001	1.07957E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.998	3.727270E+000	8.561445E-001
X	BI-211		0.955		
	PB-212	@	0.448	1.162732E-001	7.123869E-002
	BI-214		0.351	3.762229E-001	8.928170E-002
	PB-214	@	0.533	3.000124E-001	8.289196E-002

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:58:25 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

	Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M	1	72.97	4.6714E-002	42.78

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: West Pipe
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	9.6351E-001	9.64E-001	3.7273E+000
	Co-60	1173.24	100.00	7.6764E-002	7.12E-002	-4.7524E-002
		1332.50	100.00	7.1208E-002		-1.4130E-002
	CS-137	661.66	85.10	7.0286E-002	7.03E-002	-2.9957E-002
	TL-208	277.36	6.31	8.1803E-001	9.64E-002	-1.8098E-001
		510.77	22.60	4.1543E-001		4.8659E-001
		583.19	84.50	9.6384E-002		1.0186E-001
		763.13	1.81	3.8547E+000		2.2885E+000
		860.56	12.42	5.8498E-001		-5.7399E-002
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87*	1.27	4.2954E+000	4.33E-001	4.4904E+000
		351.06*	12.91	4.3338E-001		8.6875E-001
	PB-211	404.85	3.78	1.6988E+000	1.70E+000	8.0772E-001
		427.09	1.76	3.6400E+000		5.5145E-002
		832.01	3.52	2.1946E+000		2.3051E-001
	BI-212	727.33	6.58	1.2205E+000	1.22E+000	-7.0518E-001
		785.37	1.10	5.8869E+000		-4.4836E+000
		1620.50	1.49	4.3289E+000		-1.3033E+000
+	PB-212	74.81*	10.40	6.3375E-001	1.11E-001	6.8839E-001
		77.11	17.50	5.1986E-001		-1.1120E-002
		87.30	7.81	9.3313E-001		9.8841E-001
		238.63*	43.30	1.1050E-001		1.1627E-001
		300.09	3.28	1.9503E+000		-3.6198E+000
+	BI-214	609.31*	46.10	1.0770E-001	1.08E-001	3.8519E-001
		768.36	4.94	1.4504E+000		1.1663E-001
		806.17	1.22	6.2902E+000		1.3865E+000
		934.06	3.03	2.9030E+000		2.3544E+000
		1120.29*	15.10	2.6575E-001		3.3977E-001
		1155.19	1.63	4.4463E+000		-1.2312E+000
		1238.11	5.79	1.6156E+000		4.7573E-001
		1280.96	1.43	5.0741E+000		-1.7569E+000
		1377.67	4.00	1.9245E+000		1.5526E+000
		1401.50	1.27	5.2532E+000		-7.2700E-001
		1407.98	2.15	2.9456E+000		-1.9186E+000
		1509.23	2.11	3.6186E+000		8.6597E-001
		1661.28	1.15	6.5571E+000		3.9599E+000
		1729.60	2.92	2.2181E+000		5.1554E-001
		1764.49	15.40	7.0978E-001		6.8123E-001
		1847.42	2.11	2.6930E+000		1.6973E-001
+	PB-214	74.81*	6.44	1.0234E+000	1.49E-001	1.1117E+000
		77.11	10.80	8.4237E-001		-1.8018E-002
		87.30	4.84	1.5057E+000		1.5949E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	9.7733E-001	1.49E-001	1.5946E-001
		295.22*	19.30	1.7182E-001		3.0249E-001
		351.93*	37.60	1.4880E-001		2.9829E-001
		785.96	1.07	6.2234E+000		-2.5784E+000
	RA-226	186.21	3.28	1.7225E+000	1.72E+000	4.6236E-001
	AC-228	93.35	0.32	1.8762E+001	3.74E-001	-2.0648E+000
		129.07	2.42	2.0483E+000		-7.3176E-001
		209.25	3.89	1.4044E+000		5.6776E-001
		270.24	3.46	1.5975E+000		1.0793E+000
		338.32	11.27	5.5061E-001		-1.3681E-001
		409.46	1.92	3.2311E+000		-1.1474E-001
		463.00	4.40	1.3172E+000		-1.2540E-001
		794.95	4.25	1.6978E+000		7.2745E-001
		911.20	25.80	3.7386E-001		3.2638E-001
		964.77	4.99	1.7934E+000		9.7719E-001
		968.97	15.80	5.8291E-001		2.7760E-001
		1588.20	3.22	2.3360E+000		-8.0229E-002
	U-235	89.95	3.56	1.9694E+000	9.87E-002	1.7739E+000
		93.35	5.81	1.0334E+000		-1.1373E-001
		105.00	2.69	1.9269E+000		4.4814E-001
		109.16	1.54	3.3680E+000		1.8733E+000
		143.76	10.96	4.4033E-001		-3.5935E-002
		163.33	5.08	1.0085E+000		9.6139E-002
		185.72	57.20	9.8669E-002		6.7052E-002
		202.11	1.08	5.1830E+000		-1.3587E+000
		205.31	5.01	1.1078E+000		-4.2172E-001
	U-238	63.29	4.80	2.0481E+000	1.10E+000	-2.2001E-001
		92.60	5.60	1.0999E+000		9.5988E-002
		1001.03	0.84	7.8804E+000		-6.9601E+000
	Am-241	59.54	35.90	3.0534E-001	3.05E-001	-3.0866E-002

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Report Generated On	:	8/18/01 2:58:40 PM
Sample Title	:	Bottom
Spectrum Description	:	
Sample Identification	:	Cabrera
Sample Type	:	ISOCS 7078
Sample Geometry	:	
Peak Locate Threshold	:	3.00
Peak Locate Range (in channels)	:	100 - 8192
Peak Area Range (in channels)	:	100 - 8192
Identification Energy Tolerance	:	1.000 keV
Sample Size	:	5.410E+002 gram
Sample Taken On	:	
Acquisition Started	:	6/29/01 12:49:22 PM
Live Time	:	900.0 seconds
Real Time	:	900.2 seconds

Energy Calibration Used Done On	:	6/26/01
Efficiency Calibration Used Done On	:	6/26/01

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: Bottom
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)		Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.993	1461.00*		10.67	1.80899E+000	1.12236E+000
TL-208	0.642	277.36		6.31		
		510.77	@	22.60		
		583.19*		84.50	3.09165E-002	4.26120E-002
		763.13		1.81		
		860.56		12.42		
		2614.53		99.16		
BI-214	0.348	609.31*		46.10	4.03038E-001	1.27810E-001
		768.36		4.94		
		806.17		1.22		
		934.06		3.03		
		1120.29*		15.10	6.53382E-001	3.53865E-001
		1155.19		1.63		
		1238.11		5.79		
		1280.96		1.43		
		1377.67		4.00		
		1401.50		1.27		
		1407.98		2.15		
		1509.23		2.11		
		1661.28		1.15		
		1729.60		2.92		
		1764.49		15.40		
		1847.42		2.11		
PB-214	0.419	74.81	@	6.44		
		77.11	@	10.80		
		87.30	@	4.84		
		242.00		7.43		
		295.22*		19.30	3.71489E-001	2.18299E-001
		351.93*		37.60	2.55683E-001	1.23538E-001
		785.96		1.07		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.993	1.808985E+000	1.122358E+000
	TL-208	@	0.642	3.091654E-002	4.261196E-002
X	BI-211		0.765		
	BI-214		0.348	4.319269E-001	1.202092E-001
	PB-214	@	0.419	2.837737E-001	1.075153E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:58:39 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	238.50	2.5753E-002	79.35

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

****
***** N U C L I D E M D A R E P O R T *****
****

Detector Name: 7078DIG
Sample Geometry:
Sample Title: Bottom
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.7245E+000	1.72E+000	1.8090E+000
	Co-60	1173.24	100.00	1.4028E-001	1.24E-001	8.0753E-002
		1332.50	100.00	1.2357E-001		8.5362E-002
	CS-137	661.66	85.10	1.3913E-001	1.39E-001	9.7959E-002
+	TL-208	277.36	6.31	1.3323E+000	7.22E-002	7.9083E-001
		510.77	22.60	6.1070E-001		6.9319E-001
		583.19*	84.50	7.2218E-002		3.0917E-002
		763.13	1.81	6.5059E+000		7.9667E-001
		860.56	12.42	1.0244E+000		1.1071E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87	1.27	1.1752E+001	4.99E-001	6.7711E+000
		351.06*	12.91	4.9883E-001		7.4467E-001
	PB-211	404.85	3.78	2.3874E+000	2.39E+000	1.4375E-001
		427.09	1.76	5.5141E+000		1.8178E+000
		832.01	3.52	3.4121E+000		-7.4270E-001
	BI-212	727.33	6.58	1.5504E+000	1.55E+000	1.5898E-001
		785.37	1.10	7.8722E+000		-7.5129E+000
		1620.50	1.49	8.3991E+000		2.9551E-001
	PB-212	74.81	10.40	1.4467E+000	2.49E-001	1.7766E+000
		77.11	17.50	7.8107E-001		-6.0268E-002
		87.30	7.81	1.3234E+000		1.0449E+000
		238.63	43.30	2.4915E-001		2.3544E-001
		300.09	3.28	2.9030E+000		-2.8415E+000
+	BI-214	609.31*	46.10	1.3064E-001	1.31E-001	4.0304E-001
		768.36	4.94	2.4234E+000		1.7411E+000
		806.17	1.22	9.5452E+000		-5.8488E+000
		934.06	3.03	4.1580E+000		-6.3440E-001
		1120.29*	15.10	4.4041E-001		6.5338E-001
		1155.19	1.63	7.0141E+000		9.0768E-001
		1238.11	5.79	2.3043E+000		-2.1796E-001
		1280.96	1.43	9.1701E+000		-2.9949E+000
		1377.67	4.00	2.6919E+000		-6.6075E-001
		1401.50	1.27	8.2902E+000		-1.4321E-001
		1407.98	2.15	4.9096E+000		-1.2382E+000
		1509.23	2.11	5.2026E+000		-5.5721E-001
		1661.28	1.15	9.7506E+000		2.2662E+000
		1729.60	2.92	4.6901E+000		2.1708E+000
		1764.49	15.40	1.1639E+000		8.0760E-001
		1847.42	2.11	6.5883E+000		3.9658E+000
+	PB-214	74.81	6.44	2.3363E+000	1.71E-001	2.8691E+000
		77.11	10.80	1.2656E+000		-9.7657E-002
		87.30	4.84	2.1355E+000		1.6860E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	1.4048E+000	1.71E-001	-7.1405E-001
		295.22*	19.30	3.2226E-001		3.7149E-001
		351.93*	37.60	1.7127E-001		2.5568E-001
		785.96	1.07	8.3019E+000		-6.2877E+000
	RA-226	186.21	3.28	2.2779E+000	2.28E+000	6.9971E-001
	AC-228	93.35	0.32	2.8300E+001	5.08E-001	2.0344E+001
		129.07	2.42	2.7409E+000		-6.9801E-001
		209.25	3.89	2.1618E+000		1.2944E+000
		270.24	3.46	2.4485E+000		-1.2200E+000
		338.32	11.27	8.3236E-001		8.0366E-002
		409.46	1.92	4.6297E+000		-2.4676E+000
		463.00	4.40	2.3801E+000		7.9947E-001
		794.95	4.25	2.3891E+000		-3.5970E-001
		911.20	25.80	5.0843E-001		-1.5417E-002
		964.77	4.99	2.3790E+000		4.5512E-001
		968.97	15.80	7.5308E-001		2.4753E-001
		1588.20	3.22	3.3920E+000		9.0099E-001
	U-235	89.95	3.56	2.8849E+000	1.30E-001	1.2195E+000
		93.35	5.81	1.5587E+000		1.1205E+000
		105.00	2.69	2.4472E+000		6.4843E-001
		109.16	1.54	4.1781E+000		-3.1549E+000
		143.76	10.96	6.0882E-001		-1.0130E-001
		163.33	5.08	1.3871E+000		9.3288E-001
		185.72	57.20	1.2963E-001		-4.5742E-003
		202.11	1.08	7.2132E+000		-3.0044E+000
		205.31	5.01	1.6541E+000		9.4041E-001
	U-238	63.29	4.80	3.1808E+000	1.63E+000	2.9618E+000
		92.60	5.60	1.6343E+000		2.2730E-002
		1001.03	0.84	1.3974E+001		8.5783E-001
	Am-241	59.54	35.90	4.2566E-001	4.26E-001	-1.3340E-001

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************


Report Generated On                 :  8/18/01  2:58:54 PM

Sample Title                        : Center
Spectrum Description                :
Sample Identification               : Cabrera
Sample Type                         : ISOCS 7078
Sample Geometry                     :

Peak Locate Threshold               :  3.00
Peak Locate Range (in channels)     :   100 -  8192
Peak Area Range (in channels)       :   100 -  8192
Identification Energy Tolerance     :    1.000 keV

Sample Size                         :  7.496E+002 gram

Sample Taken On                     :
Acquisition Started                 :  6/29/01 12:33:18 PM

Live Time                           :      900.0 seconds
Real Time                           :      900.3 seconds


          Energy Calibration Used Done On       :  6/26/01
          Efficiency Calibration Used Done On   :  6/26/01
```

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: Center
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.987	1461.00*	10.67	5.93805E+000	1.22281E+000
TL-208	0.817	277.36	6.31		
		510.77* @	22.60	4.24142E-001	3.38720E-001
		583.19*	84.50	2.93950E-001	7.64563E-002
		763.13	1.81		
		860.56	12.42		
		2614.53	99.16		
PB-212	0.779	74.81* @	10.40	2.27308E+000	6.18769E-001
		77.11* @	17.50	7.25820E-001	2.44022E-001
		87.30 @	7.81		
		238.63*	43.30	7.19691E-001	1.61043E-001
		300.09	3.28		
BI-214	0.426	609.31*	46.10	6.95288E-001	1.52897E-001
		768.36	4.94		
		806.17	1.22		
		934.06	3.03		
		1120.29*	15.10	7.65703E-001	3.81295E-001
		1155.19	1.63		
		1238.11*	5.79	1.14657E+000	7.00411E-001
		1280.96	1.43		
		1377.67	4.00		
		1401.50	1.27		
		1407.98	2.15		
		1509.23	2.11		
		1661.28	1.15		
		1729.60	2.92		
		1764.49	15.40		
		1847.42	2.11		
PB-214	0.735	74.81* @	6.44	3.67082E+000	9.99254E-001
		77.11* @	10.80	1.17610E+000	3.95406E-001
		87.30 @	4.84		
		242.00	7.43		
		295.22*	19.30	6.26377E-001	2.62214E-001
		351.93*	37.60	6.96145E-001	1.61979E-001
		785.96	1.07		
AC-228	0.386	93.35* @	0.32	1.54686E+001	1.43473E+001
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		338.32*	11.27	1.09057E+000	4.01267E-001
		409.46	1.92		
		463.00	4.40		

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
AC-228	0.386	794.95	4.25		
		911.20*	25.80	8.16089E-001	2.58600E-001
		964.77	4.99		
		968.97*	15.80	9.30508E-001	4.35741E-001
		1588.20	3.22		
U-238	0.308	63.29	4.80		
		92.60*	5.60	8.83920E-001	8.19848E-001
		1001.03	0.84		

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
	K-40		0.987	5.938054E+000	1.222809E+000
	TL-208	@	0.817	2.939503E-001	7.633456E-002
X	BI-211		0.952		
	PB-212	@	0.779	7.196905E-001	1.610428E-001
	BI-214		0.426	7.224530E-001	1.390868E-001
	PB-214	@	0.735	6.768754E-001	1.378059E-001
	AC-228	@	0.386	9.033836E-001	1.945110E-001
	U-238		0.308	8.322976E-001	8.199236E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 8/18/01 2:58:52 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M 1	72.73	9.8564E-002	29.50

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

```
*************************************************************************
*****              N U C L I D E   M D A   R E P O R T              *****
*************************************************************************
```

Detector Name: 7078DIG
Sample Geometry:
Sample Title: Center
Nuclide Library Used: C:\GENIE2K\CAMFILES\Lake City.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40	1461.00*	10.67	1.3444E+000	1.34E+000	5.9381E+000
	Co-60	1173.24	100.00	1.2830E-001	7.86E-002	-1.0616E-002
		1332.50	100.00	7.8607E-002		-4.9083E-002
	CS-137	661.66	85.10	1.1748E-001	1.17E-001	-3.5169E-002
+	TL-208	277.36	6.31	1.3987E+000	8.89E-002	-1.8192E-001
		510.77*	22.60	5.5185E-001		4.2414E-001
		583.19*	84.50	8.8893E-002		2.9395E-001
		763.13	1.81	6.2013E+000		3.6450E+000
		860.56	12.42	9.0596E-001		1.1000E-001
>		2614.53	99.16	0.0000E+000		0.0000E+000
	BI-211	72.87*	1.27	7.5936E+000	5.38E-001	1.2186E+001
		351.06*	12.91	5.3838E-001		2.0275E+000
	PB-211	404.85	3.78	2.4553E+000	2.46E+000	9.7205E-001
		427.09	1.76	4.8516E+000		8.7745E-001
		832.01	3.52	3.0603E+000		2.4535E-001
	BI-212	727.33	6.58	1.8449E+000	1.84E+000	9.5349E-001
		785.37	1.10	9.2416E+000		-1.8332E+000
		1620.50	1.49	4.7387E+000		-6.1810E+000
+	PB-212	74.81*	10.40	1.0535E+000	1.95E-001	2.2731E+000
		77.11*	17.50	5.2550E-001		7.2582E-001
		87.30	7.81	1.6794E+000		2.7946E+000
		238.63*	43.30	1.9549E-001		7.1969E-001
		300.09	3.28	3.2645E+000		1.0188E+000
+	BI-214	609.31*	46.10	1.6141E-001	1.61E-001	6.9529E-001
		768.36	4.94	2.2971E+000		1.5925E+000
		806.17	1.22	7.7987E+000		3.9887E+000
		934.06	3.03	3.4706E+000		-6.3107E-002
		1120.29*	15.10	5.2664E-001		7.6570E-001
		1155.19	1.63	7.1510E+000		1.5885E+000
		1238.11*	5.79	9.3994E-001		1.1466E+000
		1280.96	1.43	7.4258E+000		1.6943E+000
		1377.67	4.00	2.5082E+000		-1.4202E+000
		1401.50	1.27	7.6840E+000		1.6558E+000
		1407.98	2.15	4.3702E+000		4.3305E-002
		1509.23	2.11	4.2189E+000		8.4321E-001
		1661.28	1.15	7.5200E+000		8.0110E-002
		1729.60	2.92	2.8387E+000		8.5455E-001
		1764.49	15.40	1.1126E+000		1.6023E+000
		1847.42	2.11	4.3694E+000		-2.3222E+000
+	PB-214	74.81*	6.44	1.7014E+000	1.85E-001	3.6708E+000
		77.11*	10.80	8.5150E-001		1.1761E+000
		87.30	4.84	2.7100E+000		4.5095E+000

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	PB-214	242.00	7.43	2.0027E+000	1.85E-001	-1.2867E+000
		295.22*	19.30	3.8120E-001		6.2638E-001
		351.93*	37.60	1.8485E-001		6.9615E-001
		785.96	1.07	9.5045E+000		-3.1445E+000
	RA-226	186.21	3.28	3.0122E+000	3.01E+000	1.4361E+000
+	AC-228	93.35*	0.32	2.3488E+001	3.11E-001	1.5469E+001
		129.07	2.42	3.4949E+000		-9.8835E-002
		209.25	3.89	2.4431E+000		1.5584E-001
		270.24	3.46	2.7363E+000		2.1574E+000
		338.32*	11.27	5.4018E-001		1.0906E+000
		409.46	1.92	4.3934E+000		-1.0948E+000
		463.00	4.40	2.3413E+000		1.3857E+000
		794.95	4.25	2.6199E+000		4.4241E-001
		911.20*	25.80	3.1134E-001		8.1609E-001
		964.77	4.99	3.3596E+000		5.1774E-001
		968.97*	15.80	6.2489E-001		9.3051E-001
		1588.20	3.22	3.4961E+000		1.2355E+000
	U-235	89.95	3.56	3.6126E+000	1.73E-001	6.8802E-001
		93.35	5.81	1.9662E+000		2.7401E+000
		105.00	2.69	3.3520E+000		-4.4169E-002
		109.16	1.54	5.7439E+000		3.3089E+000
		143.76	10.96	7.8813E-001		6.3183E-001
		163.33	5.08	1.6552E+000		-9.2873E-002
		185.72	57.20	1.7287E-001		2.7611E-002
		202.11	1.08	7.9855E+000		-3.6783E+000
		205.31	5.01	1.8629E+000		2.1657E-003
+	U-238	63.29	4.80	3.8361E+000	1.34E+000	1.1223E+000
		92.60*	5.60	1.3422E+000		8.8392E-001
		1001.03	0.84	1.1586E+001		4.2390E+000
	Am-241	59.54	35.90	5.6331E-001	5.63E-001	3.2301E-002

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction