

**John Hickman - Rancho Seco**

---

**From:** "Robert E. Jones" <RJones2@smud.org>  
**To:** <jbh@nrc.gov>  
**Date:** 04/17/2007 12:51 PM  
**Subject:** Rancho Seco

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John,

Follow up e-mail

<<GEL Case Narrative.pdf>>

Bob Jones

**Mail Envelope Properties** (4624FB14.84B : 18 : 38987)

**Subject:** Rancho Seco  
**Creation Date** 04/17/2007 12:50:10 PM  
**From:** "Robert E. Jones" <[RJones2@smud.org](mailto:RJones2@smud.org)>

**Created By:** [RJones2@smud.org](mailto:RJones2@smud.org)

**Recipients**

nrc.gov

OWGWPO04.HQGWDO01  
JBH (John Hickman)

**Post Office**

OWGWPO04.HQGWDO01

**Route**

nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	66	04/17/2007 12:50:10 PM
TEXT.htm	632	
GEL Case Narrative.pdf	3523111	
Mime.822	4824256	

**Options**

**Expiration Date:** None  
**Priority:** Standard  
**ReplyRequested:** No  
**Return Notification:** None

**Concealed Subject:** No  
**Security:** Standard

**Junk Mail Handling Evaluation Results**

Message is eligible for Junk Mail handling  
This message was not classified as Junk Mail

**Junk Mail settings when this message was delivered**

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# GENERAL NARRATIVE

**CASE NARRATIVE**  
**for**  
**Rancho Seco Nuclear Generating Station**  
**Work Order 124326**

**November 22, 2004**

**Laboratory Identification:**

General Engineering Laboratories, LLC

**Mailing Address:**

P.O. Box 30712  
Charleston, South Carolina 29417

**Express Mail Delivery and Shipping Address:**

2040 Savage Road  
Charleston, South Carolina 29407

**Telephone Number:**

(843) 556-8171

**Summary:**

Samples from Rancho Seco Nuclear Generating Station arrived at General Engineering Laboratories, LLC, (GEL) Charleston, South Carolina May 28, 2004 for Radiochemistry analyses.

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
124326001	#1 RELOG 113907001
124326002	#2 RELOG 113907002
124326003	#3 RELOG 113907003
124326004	#5 RELOG 113907005
124326005	#6 RELOG 113907006
124326006	#8 RELOG 113907008
124326007	#9 RELOG 113907009
124326009	#2 RELOG 113907002
124326010	#7 RELOG 113907007

**Case Narrative:**

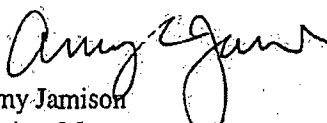
Sample analyses were conducted using methodology as outlined in General Engineering Laboratories Standard Operating Procedures. Any technical or administrative problems during analysis, data review and reductions are listed within this narrative.

**Internal Chain of Custody:**

Custody was maintained for these samples.

**Data Package:**

The enclosed data package contains Case Narrative and Radiochemistry data. The results are reanalyses of samples originally analyzed in work order 113907.

  
Amy Jamison  
Project Manager

# **RADIOLOGICAL ANALYSIS**

**Radiochemistry Case Narrative  
Rancho Seco Nuclear Generating Station (SMUD)  
Work Order 124326**

**Method/Analysis Information**

Product:	Liquid Scint Pu241, Solid High Rad
Analytical Method:	DOE EML HASL-300, Pu-11-RC Modified
Prep Method:	Ash Soil Prep
Dry Soil Prep GL-RAD-A-021 Method:	Dry Soil Prep
Analytical Batch Number:	376856
Prep Batch Number:	376855
Dry Soil Prep GL-RAD-A-021 Batch Number:	376852

Sample ID	Client ID
124326001	#1 RELOG 113907001
124326002	#2 RELOG 113907002
124326003	#3 RELOG 113907003
124326004	#5 RELOG 113907005
124326005	#6 RELOG 113907006
124326006	#8 RELOG 113907008
124326007	#9 RELOG 113907009
1200729731	Method Blank (MB)
1200729734	Laboratory Control Sample (LCS)
1200729732	124326001(#1 RELOG 113907001) Sample Duplicate (DUP)
1200729733	124326001(#1 RELOG 113907001) Matrix Spike (MS)

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-035 REV# 5.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 124326001 (#1 RELOG 113907001).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**



**Holding Time**

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

**Preparation Information**

All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**

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

**Miscellaneous Information:****NCR Documentation**

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

**Manual Integration**

Manual integration of alpha spectroscopy spectra 124326002 (#2 RELOG 113907002) was performed to fully separate counts in Regions of Interest which would have been biased.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information****Product:**

**Liquid Scint Tc99, Solid High Rad**

**Analytical Method:**

DOE EML HASL-300, Tc-02-RC Modified

**Analytical Batch Number:**

376858

**Sample ID****Client ID**

124326009

#2 RELOG 113907002

1200729739

Method Blank (MB)

1200729742

Laboratory Control Sample (LCS)

1200729740

124326009(#2 RELOG 113907002) Sample Duplicate (DUP)

1200729741

124326009(#2 RELOG 113907002) Matrix Spike (MS)

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-005 REV# 11.

**Calibration Information:****Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

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

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

**Designated QC**

The following sample was used for QC: 124326009 (#2 RELOG 113907002).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

**Preparation Information**

All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**

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

**Miscellaneous Information:**

**NCR Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**

**Liquid Scint Tc99, Solid High Rad**

**Analytical Method:**

DOE EML HASL-300, Tc-02-RC Modified

**Analytical Batch Number:**

381079

**Sample ID**

**Client ID**

124326005

#6 RELOG 113907006

124326010

#7 RELOG 113907007

1200739977

Method Blank (MB)

1200739980

Laboratory Control Sample (LCS)

1200739978

124326005(#6 RELOG 113907006) Sample Duplicate (DUP)

1200739979

124326005(#6 RELOG 113907006) Matrix Spike (MS)

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-005 REV# 11.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

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

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

**Designated QC**

The following sample was used for QC: 124326005 (#6 RELOG 113907006).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:****Holding Time**

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

**Preparation Information**

All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**

Sample 1200739979 (#6 RELOG 113907006) was recounted due to the quench number being out of calibration range.

**Miscellaneous Information:****NCR Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

**Review Validation:**

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

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

*Arlene G. Cichowicz 11/22/04*

Reviewer: \_\_\_\_\_

# **SAMPLE DATA SUMMARY**

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis Report for

SMUD001-Rancho Seco Nuclear Generating Station

Client SDG: 124326 GEL Work Order: 124326

### Sample(s) Contained within this report:

Lab Sample ID	Client Sample ID	Sample Description	Collected
124326001	#1 RELOG 113907001	N/A	08/12/2003 13:40
124326002	#2 RELOG 113907002	N/A	04/28/2003 14:00
124326003	#3 RELOG 113907003	N/A	03/08/2004 14:55
124326004	#5 RELOG 113907005	N/A	11/19/2003 13:15
124326005	#6 RELOG 113907006	N/A	11/19/2003 10:20
124326006	#8 RELOG 113907008	N/A	02/11/2004 13:30
124326007	#9 RELOG 113907009	N/A	12/08/2003 14:00
124326009	#2 RELOG 113907002	N/A	04/28/2003 14:00
124326010	#7 RELOG 113907007	N/A	01/12/2004 08:25

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

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

*A. E. G. Jamison*

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326001

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #1 RELOG 113907001

Collect Date: August 12, 2003

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	U	-3.90E+00	6.12E+00	1.07E+01	1.50E+01	6.13E+00	5.24E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326002 Client: Rancho Seco Nuclear Generating Station  
Client Sample ID: #2 RELOG 113907002 Collect Date: April 28, 2003  
Matrix: Misc Solid Receive Date: October 27, 2004  
Amount of Sample Received: Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	U	4.69E-01	7.51E+00	1.29E+01	1.50E+01	7.51E+00	6.29E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326003

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #3 RELOG 113907003

Collect Date: March 08, 2004

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	U	1.11E-01	7.66E+00	1.32E+01	1.50E+01	7.66E+00	6.42E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.



# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326004

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #5 RELOG 113907005

Collect Date: November 19, 2003

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	3	4.72E+01	8.85E+00	1.29E+01	1.50E+01	9.78E+00	6.30E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326005 Client: Rancho Seco Nuclear Generating Station  
Client Sample ID: #6 RELOG 113907006 Collect Date: November 19, 2003  
Matrix: Misc Solid Receive Date: October 27, 2004  
Amount of Sample Received: Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Tc-99	11/16/04	3	2.36E+00	1.06E+00	1.69E+00	5.00E+00	1.06E+00	8.21E-01	pCi/g
Pu-241	11/03/04	3	1.74E+01	6.85E+00	1.09E+01	1.50E+01	7.02E+00	5.32E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326006

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #8 RELOG 113907008

Collect Date: February 11, 2004

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	U	1.00E+00	6.97E+00	1.20E+01	1.50E+01	6.97E+00	5.82E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326007

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #9 RELOG 113907009

Collect Date: December 08, 2003

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Pu-241	11/03/04	3	1.75E+01	7.99E+00	1.29E+01	1.50E+01	8.13E+00	6.27E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326009

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #2 RELOG 113907002

Collect Date: April 28, 2003

Matrix: Misc Solid

Receive Date: October 27, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Tc-99	11/02/04	U	5.37E-01	2.40E+00	4.12E+00	5.00E+00	2.40E+00	2.00E+00	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# GENERAL ENGINEERING LABORATORIES, LLC

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

## 10 CFR Part 50/61 Certificate of Analysis

GEL Sample ID: 124326010

Client: Rancho Seco Nuclear Generating Station

Client Sample ID: #7 RELOG 113907007

Collect Date: January 12, 2004

Matrix: Misc Solid

Receive Date: November 12, 2004

Amount of Sample Received:

Report Date: November 22, 2004

Analyte	Run Date	Qualifier	Activity <sup>2</sup>	Uncertainty	MDA <sup>1</sup>	RL	TPU	Critical Level	Units
Tc-99	11/16/04	3	2.70E+00	1.16E+00	1.83E+00	5.00E+00	1.16E+00	8.89E-01	pCi/g

Note(s): 1. Calculated MDAs are a-posteriori values.

2. Activity concentration net +/- 2 sigma overall on reference date.

3. Results are statistically positive at the 99.9% confidence level (activity is greater than three times the uncertainty)

U Indicates the target analyte was analyzed for but not detected above the detection limit.

# QUALITY CONTROL DATA

# GENERAL ENGINEERING LABORATORIES, LLC

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

## QC Summary

Client : Rancho Seco Nuclear Generating  
Station  
14440 Twin Cities Road

Report Date: November 22, 2004

Page 1 of 2

Contact: Herald, California  
Mr. John Newey

Workorder: 124326

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
High Rad Testing Batch 376856										
QC1200729732 124326001 DUP Plutonium-241	U	-3.9	U	-1.61	pCi/g	N/A		(0% - 100%) AAK		11/03/04 05:29
	Uncert:	+/-6.12		+/-7.06						
	TPU:	+/-6.13		+/-7.06						
QC1200729734 LCS Plutonium-241	113			88.3	pCi/g		78	(75%-125%)		11/03/04 06:32
	Uncert:			+/-8.33						
	TPU:			+/-11.1						
QC1200729731 MB Plutonium-241	U		U	1.08	pCi/g					11/03/04 04:58
	Uncert:			+/-6.24						
	TPU:			+/-6.24						
QC1200729733 124326001 MS Plutonium-241	306 U	-3.9		242	pCi/g		79	(75%-125%)		11/03/04 06:01
	Uncert:	+/-6.12		+/-21.4						
	TPU:	+/-6.13		+/-29.1						
Batch 376858										
QC1200729740 124326009 DUP Technetium-99	U	0.537	U	0.988	pCi/g	0		(0% - 100%) NXLI		11/02/04 16:11
	Uncert:	+/-2.40		+/-1.79						
	TPU:	+/-2.40		+/-1.79						
QC1200729742 LCS Technetium-99	107			112	pCi/g		105	(75%-125%)		11/02/04 17:18
	Uncert:			+/-3.36						
	TPU:			+/-4.49						
QC1200729739 MB Technetium-99	U		U	0.00	pCi/g					11/02/04 15:38
	Uncert:			+/-1.17						
	TPU:			+/-1.17						
QC1200729741 124326009 MS Technetium-99	200 U	0.537		197	pCi/g		98	(75%-125%)		11/02/04 16:44
	Uncert:	+/-2.40		+/-7.97						
	TPU:	+/-2.40		+/-9.41						
Batch 381079										
QC1200739978 124326005 DUP Technetium-99		2.36		2.72	pCi/g	14		(0% - 100%) ADD		11/16/04 19:44
	Uncert:	+/-1.06		+/-1.11						
	TPU:	+/-1.06		+/-1.11						
QC1200739980 LCS Technetium-99	88.9			101	pCi/g		113	(75%-125%)		11/16/04 20:49
	Uncert:			+/-2.80						
	TPU:			+/-3.84						
QC1200739977 MB										



# GENERAL ENGINEERING LABORATORIES, LLC

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

## QC Summary

Workorder: 124326

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing											
Batch	381079										
Technetium-99				U	-0.109	pCi/g					
		Uncert:			+/-0.927						
		TPU:			+/-0.927						
QC1200739979 124326005 MS											
Technetium-99	103	2.36		114	pCi/g		108 (75%-125%)			11/17/04	18:50
		Uncert:	+/-1.06		+/-3.18						
		TPU:	+/-1.06		+/-4.37						

### Notes:

The Qualifiers in this report are defined as follows:

- \* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- \*\* Indicates the analyte is a surrogate compound.
- B Target analyte was detected in the sample as well as the associated blank.
- BD Flag for results below the MDC or a flag for low tracer recovery.
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- U Indicates the target analyte was analyzed for but not detected above the detection limit.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- h Sample preparation or preservation holding time exceeded.

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

\*\* Indicates analyte is a surrogate compound.

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

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

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