

AMENDED DATA

Analytical Data Package Prepared For  
**US Nuclear Reg Comm**

Requested Recount

Radiochemical Analysis By

**TAL Richland**

**2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.**

Assigned Laboratory Code: STLRL

Data Package Contains 23 Pages

Report No.: 37616

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
36647		128	J7K130136-1	KA41T2AA	9KA41T20	7318245
		131	J7K130136-2	KA4102AA	9KA41020	7318245
		457	J7K130136-3	KA4142AA	9KA41420	7318245
		466	J7K130136-4	KA4192AA	9KA41920	7318245
		467	J7K130136-5	KA42C2AA	9KA42C20	7318245
		468	J7K130136-6	KA42E2AA	9KA42E20	7318245
		469	J7K130136-7	KA42H2AA	9KA42H20	7318245
		470	J7K130136-8	KA42L2AA	9KA42L20	7318245

138087

NMSS/RCN1 MATERIALS-002

TAL Richland  
rptSTLRehTitle v3.73

TAL RICHLAND

REC'D IN LAT JAN 24 2008

ML



## Certificate of Analysis

November 30, 2007

January 11, 2008

US Nuclear Regulatory Commission  
Region 1  
475 Allendale Road  
King of Prussia, PA 19406-1415

Attention: Steve Hammann

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Date Received at Lab	:	November 7, 2007
Project Name	:	DNSC Hammond Depot, Hammond, IN
Project Number	:	H-07-1
Sample Type	:	Eight (8) Soil Samples
SDG Number	:	36647

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### CASE NARRATIVE

*This data report has been amended to include recount results as requested by the client. All amendments in the case narrative are bold and underlined.*

#### I. Introduction

On November 7, 2007, eight soil samples were received at the TestAmerica Laboratory Richland (TALR) laboratory for radiochemical analysis. Upon receipt, the samples were assigned TALR identification numbers as described on the cover page of the Analytical Data Package report form. The samples were assigned to Lot Number J7K130136.

#### II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

#### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analysis requested was:

**Gamma**  
Gamma by method STL RICH-RC-5013/5017

US Nuclear Regulatory Commission  
November 30, 2007  
January 11, 2008

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**IV. Quality Control**

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

**V. Comments**

**Gamma**

Gamma by method STL RICH-RC-5013/5017:

The LCS, batch blank, sample and sample duplicate results are within analytical requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

  
Erika Jordan  
Manager, Project Management

## Sample Results Summary

Date: 11-Jan-08

## TAL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 37616

SDG No: 36647

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty ( 2s)	Qual	Units	Tracer Yield	MDC or MDA	CRDL	RER2
7318245	RICHRC5017								
128									
	KA41T2AA	CS-137	1.91E-01 +- 2.55E-02	J	pCi/g		7.42E-03	2.00E-01	
		TH-232	7.09E-01 +- 9.78E-02		pCi/g		4.53E-02		
		U-238DHP	1.71E+00 +- 3.21E-01		pCi/g		2.80E-01		
128 DUP									
	KA41T2AC	CS-137	2.04E-01 +- 2.61E-02		pCi/g		7.21E-03	2.00E-01	
		TH-232	7.39E-01 +- 1.04E-01		pCi/g		4.56E-02		
		U-238DHP	1.88E+00 +- 5.22E-01		pCi/g		4.15E-01		
131									
	KA4102AA	CS-137	2.48E-02 +- 7.45E-03	J	pCi/g		6.63E-03	2.00E-01	
		TH-232	6.53E-01 +- 9.20E-02		pCi/g		3.83E-02		
		U-238DHP	1.61E+00 +- 4.29E-01		pCi/g		3.64E-01		
457									
	KA4142AA	CS-137	4.79E-01 +- 6.04E-02		pCi/g		9.03E-03	2.00E-01	
		TH-232	7.32E-01 +- 1.03E-01		pCi/g		5.11E-02		
		U-238DHP	1.52E+00 +- 3.41E-01		pCi/g		2.64E-01		
466									
	KA4192AA	CS-137	1.95E-02 +- 5.84E-03	U	pCi/g		8.16E-03	2.00E-01	
		TH-232	7.19E-01 +- 9.69E-02		pCi/g		4.43E-02		
		U-238DHP	1.94E+00 +- 2.77E-01		pCi/g		1.54E-01		
467									
	KA42C2AA	CS-137	3.46E-01 +- 4.55E-02		pCi/g		7.72E-03	2.00E-01	
		TH-232	7.32E-01 +- 9.98E-02		pCi/g		4.63E-02		
		U-238DHP	1.78E+00 +- 2.60E-01		pCi/g		1.60E-01		
468									
	KA42E2AA	CS-137	3.81E-01 +- 4.98E-02		pCi/g		8.09E-03	2.00E-01	
		TH-232	9.36E-01 +- 1.25E-01		pCi/g		5.01E-02		
		U-238DHP	1.64E+00 +- 2.49E-01		pCi/g		1.69E-01		
469									
	KA42H2AA	CS-137	8.36E-01 +- 1.03E-01		pCi/g		6.92E-03	2.00E-01	
		TH-232	5.56E-01 +- 8.06E-02		pCi/g		4.19E-02		
		U-238DHP	8.77E-01 +- 2.42E-01		pCi/g		2.19E-01		
470									
	KA42L2AA	CS-137	3.86E-01 +- 4.96E-02		pCi/g		8.88E-03	2.00E-01	
		TH-232	1.95E+00 +- 2.41E-01		pCi/g		4.96E-02		
		U-238DHP	1.55E+00 +- 3.21E-01		pCi/g		3.02E-01		
No. of Results: 27									

TAL Richland RER2 - Replicate Error Ratio =  $(S-D)/[\sqrt{sq(TPU_s)+sq(TPU_d)}]$  as defined by ICPT BOA.

rptSTLRchSaSum J Qual - No U|&lt; qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

mary2 V5.1.5 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by  
A2002 gamma scan software.

# AMENDED DATA

## QC Results Summary

Date: 11-Jan-08

TAL Richland STLRL

Ordered by Method, Batch No, QC Type,.

Report No. : 37616

SDG No.: 36647

Batch	Work Order	Parameter	Result +- Uncertainty ( 2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDC MDA
RICHRC5017									
7318245 BLANK QC,									
	KA74X2AA	CS-137	-2.09E-03 +- 1.59E-03	U	pCi/g				2.49E-03
		TH-232	4.12E-02 +- 1.57E-02		pCi/g				1.55E-02
		U-238DHP	1.16E-01 +- 6.19E-02		pCi/g				4.76E-02
7318245 LCS,									
	KA74X2AC	CS-137	2.38E-01 +- 3.17E-02		pCi/g		93%	-0.1	1.26E-02
No. of Results: 4									

TAL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.  
 rptSTLRchQcSummary V5.1.5 A2002 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM I  
SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/2/2007

Lot-Sample No.: J7K130136-1

Report No.: 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 128

COC No.:

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA41T2AA		Report DB ID: 9KA41T20					
CS-137	1.91E-01	J	2.5E-02	2.5E-02	7.42E-03	pCi/g		(25.7)	12/25/07 10:00 a		823.5	GER7\$1
							2.00E-01	(15.)			g	
TH-232	7.09E-01		9.8E-02	9.8E-02	4.53E-02	pCi/g		(15.7)	12/25/07 10:00 a		823.5	GER7\$1
								(14.5)			g	
U-238DHP	1.71E+00		3.2E-01	3.2E-01	2.80E-01	pCi/g		(6.1)	12/25/07 10:00 a		823.5	GER7\$1
								(10.6)			g	

No. of Results: 3

Comments:

# FORM I SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/2/2007

Lot-Sample No.: J7K130136-2

Report No. : 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 131

COC No. :

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA4102AA		Report DB ID: 9KA41020					
CS-137	<b>2.48E-02</b>	J	7.5E-03	7.5E-03	6.63E-03	pCi/g		(3.7)	12/25/07 10:01 a		959.5	GER4\$1
							2.00E-01	(6.7)			g	
TH-232	<b>6.53E-01</b>		9.2E-02	9.2E-02	3.83E-02	pCi/g		(17.)	12/25/07 10:01 a		959.5	GER4\$1
								(14.2)			g	
U-238DHP	<b>1.61E+00</b>		4.3E-01	4.3E-01	3.64E-01	pCi/g		(4.4)	12/25/07 10:01 a		959.5	GER4\$1
								(7.5)			g	

No. of Results: 3

Comments:

TAL Richland  
rptSTLRchSample  
V5.1.5 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.  
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.  
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

AMENDED DATA

# FORM I SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-3

Report No. : 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 457

COC No. :

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA4142AA		Report DB ID: 9KA41420					
CS-137	<b>4.79E-01</b>		6.0E-02	6.0E-02	9.03E-03	pCi/g		(53.1)	12/25/07 10:02 a		778.3	GER6\$1
							2.00E-01	(15.9)			g	
TH-232	<b>7.32E-01</b>		1.0E-01	1.0E-01	5.11E-02	pCi/g		(14.3)	12/25/07 10:02 a		778.3	GER6\$1
								(14.2)			g	
U-238DHP	<b>1.52E+00</b>		3.4E-01	3.4E-01	2.64E-01	pCi/g		(5.7)	12/25/07 10:02 a		778.3	GER6\$1
								(8.9)			g	

No. of Results: 3

Comments:



# FORM I SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-4

Report No. : 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 466

COC No. :

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA4192AA		Report DB ID: 9KA41920					
CS-137	<b>1.95E-02</b>	U	5.8E-03	5.8E-03	8.16E-03	pCi/g		(2.4)	12/25/07 10:03 a		911.6	GER8\$1
							2.00E-01	(6.7)			g	
TH-232	<b>7.19E-01</b>		9.7E-02	9.7E-02	4.43E-02	pCi/g		(16.2)	12/25/07 10:03 a		911.6	GER8\$1
								(14.8)			g	
U-238DHP	<b>1.94E+00</b>		2.8E-01	2.8E-01	1.54E-01	pCi/g		(12.6)	12/25/07 10:03 a		911.6	GER8\$1
								(14.)			g	

No. of Results: 3

Comments:

FORM I  
SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-5

Report No.: 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 467

COC No.:

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA42C2AA		Report DB ID: 9KA42C20					
CS-137	3.46E-01		4.5E-02	4.5E-02	7.72E-03	pCi/g		(44.8)	12/25/07 10:05 a		740.5	GER5\$1
							2.00E-01	(15.2)			g	
TH-232	7.32E-01		1.0E-01	1.0E-01	4.63E-02	pCi/g		(15.8)	12/25/07 10:05 a		740.5	GER5\$1
								(14.7)			g	
U-238DHP	1.78E+00		2.6E-01	2.6E-01	1.60E-01	pCi/g		(11.2)	12/25/07 10:05 a		740.5	GER5\$1
								(13.7)			g	

No. of Results: 3

Comments:

FORM I  
SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-6

Report No.: 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 468

COC No.:

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA42E2AA		Report DB ID: 9KA42E20					
CS-137	<b>3.81E-01</b>		5.0E-02	5.0E-02	8.09E-03	pCi/g		(47.1)	12/26/07 08:37 a		680.6	GER5\$1
							2.00E-01	(15.3)			g	
TH-232	<b>9.36E-01</b>		1.2E-01	1.2E-01	5.01E-02	pCi/g		(18.7)	12/26/07 08:37 a		680.6	GER5\$1
								(15.)			g	
U-238DHP	<b>1.64E+00</b>		2.5E-01	2.5E-01	1.69E-01	pCi/g		(9.7)	12/26/07 08:37 a		680.6	GER5\$1
								(13.1)			g	

No. of Results: 3

Comments:

# FORM I SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-7

Report No.: 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 469

COC No.:

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA42H2AA		Report DB ID: 9KA42H20					
CS-137	<b>8.36E-01</b>		1.0E-01	1.0E-01	6.92E-03	pCi/g		(120.9)	12/26/07 08:38 a		958.6	GER6\$1
							2.00E-01	(16.2)			g	
TH-232	<b>5.56E-01</b>		8.1E-02	8.1E-02	4.19E-02	pCi/g		(13.3)	12/26/07 08:38 a		958.6	GER6\$1
								(13.8)			g	
U-238DHP	<b>8.77E-01</b>		2.4E-01	2.4E-01	2.19E-01	pCi/g		(4.)	12/26/07 08:38 a		958.6	GER6\$1
								(7.3)			g	

No. of Results: 3

Comments:

FORM I  
SAMPLE RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Collection Date: 10/3/2007

Lot-Sample No.: J7K130136-8

Report No. : 37616

Received Date: 11/7/2007 10:00:00 AM

Client Sample ID: 470

COC No. :

Matrix: SOIL

Requested Recount

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA42L2AA		Report DB ID: 9KA42L20					
CS-137	<b>3.86E-01</b>		5.0E-02	5.0E-02	8.88E-03	pCi/g		(43.5)	12/26/07 08:39 a		876.8	GER7\$1
							2.00E-01	(15.6)			g	
TH-232	<b>1.95E+00</b>		2.4E-01	2.4E-01	4.96E-02	pCi/g		(39.2)	12/26/07 08:39 a		876.8	GER7\$1
								(16.1)			g	
U-238DHP	<b>1.55E+00</b>		3.2E-01	3.2E-01	3.02E-01	pCi/g		(5.1)	12/26/07 08:39 a		876.8	GER7\$1
								(9.6)			g	

No. of Results: 3

Comments:

## FORM II

Date: 11-Jan-08

## DUPLICATE RESULTS

Lab Name: TA Richland  
 Lot-Sample No.: J7K130136-1  
 Client Sample ID: 128 DUP

SDG: 36647  
 Report No.: 37616  
 COC No.:

Collection Date: 10/2/2007  
 Received Date: 11/7/2007 10:00:00 AM  
 Matrix: SOIL

Parameter	Result, Orig Rst	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA41T2AC			Report DB ID: KA41T2CR	Orig Sa DB ID: 9KA41T10			
CS-137	2.04E-01		2.6E-02	2.6E-02	7.21E-03	pCi/g		(28.3)	12/26/07 08:35 a		823.5	GER4\$1
	2.07E-01		RER2 0.1			2.00E-01		(15.7)			g	
CS-137	2.04E-01		2.6E-02	2.6E-02	7.21E-03	pCi/g		(28.3)	12/26/07 08:35 a		823.5	GER4\$1
	1.91E-01	J	RER2 0.7			2.00E-01		(15.7)			g	
TH-232	7.39E-01		1.0E-01	1.0E-01	4.56E-02	pCi/g		(16.2)	12/26/07 08:35 a		823.5	GER4\$1
	8.46E-01		RER2 1.0					(14.3)			g	
TH-232	7.39E-01		1.0E-01	1.0E-01	4.56E-02	pCi/g		(16.2)	12/26/07 08:35 a		823.5	GER4\$1
	7.09E-01		RER2 0.4					(14.3)			g	
U-238DHP	1.88E+00		5.2E-01	5.2E-01	4.15E-01	pCi/g		(4.5)	12/26/07 08:35 a		823.5	GER4\$1
	1.71E+00		RER2 0.6					(7.2)			g	
U-238DHP	1.88E+00		5.2E-01	5.2E-01	4.15E-01	pCi/g		(4.5)	12/26/07 08:35 a		823.5	GER4\$1
	1.61E+00		RER2 0.4					(7.2)			g	

No. of Results: 6      Comments:

TAL Richland      RER2 - Replicate Error Ratio =  $(S-D)/[\sqrt{sq(TPUs)+sq(TPUd)}]$  as defined by ICPT BOA.  
 rptSTLRchDupV5.1      MDC|MDA,Le - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.  
 .5 A2002      J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

FORM II  
BLANK RESULTS

Date: 11-Jan-08

Lab Name: TA Richland  
Matrix: SOILSDG: 36647  
Report No. : 37616

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA ,	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017				Work Order: KA74X2AA	Report DB ID: KA74X2AB						
CS-137	-2.09E-03	U	1.6E-03	1.6E-03	2.49E-03	pCi/g		-0.84	12/26/07 08:40 a		857.27	GER8\$1
						2.00E-01		-(2.6)			g	
TH-232	4.12E-02		1.6E-02	1.6E-02	1.55E-02	pCi/g		(2.7)	12/26/07 08:40 a		857.27	GER8\$1
								(5.3)			g	
U-238DHP	1.16E-01		6.2E-02	6.2E-02	4.76E-02	pCi/g		(2.4)	12/26/07 08:40 a		857.27	GER8\$1
								(3.8)			g	
No. of Results: 3			Comments:									

FORM II  
LCS RESULTS

Date: 11-Jan-08

Lab Name: TA Richland

SDG: 36647

Matrix: SOIL

Report No. : 37616

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 7318245	RICHRC5017												
CS-137	2.38E-01		3.2E-02	3.2E-02	1.26E-02	pCi/g		2.56E-01	1.15E-02	93%	12/27/07 09:07 a	457.78	GER4\$1
							Rec Limits:	70	130	-0.1		g	
No. of Results: 1	Comments:												



### Drinking Water Method Cross References

DRINKING WATER ASTM METHOD CROSS REFERENCES		
Referenced Method	Isotope(s)	STL Richland's SOP number
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 00-02	Gross Alpha (Coprecipitation)	RICH-RC-5021
EPA 903.0	Total Alpha Radium (Ra-226)	RICH-RC-5027
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr-89/90	RICH-RC-5006
ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007

### Uncertainty Estimation

Test America Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship,  $R = \text{constants} * f(x, y, z, \dots)$ . The components (x, y, z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ( $u_i$ ) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ( $u_c$ ) multiplied by the coverage factor (1, 2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value ( $S/\sqrt{n}$ ), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

<b>Action Lev</b>	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
<b>Batch</b>	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
<b>Bias</b>	Defined by the equation $(\text{Result}/\text{Expected}) - 1$ as defined by ANSI N13.30.
<b>COC No</b>	Chain of Custody Number assigned by the Client or STL Richland.
<b>Count Error (#s)</b>	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
<b>Total Uncert (#s) <math>u_c</math> - Combined Uncertainty.</b>	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, $u_c$ the combined uncertainty. The uncertainty is absolute and in the same units as the result.
<b>(#s), Coverage Factor</b>	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
<b>CRDL (RL)</b>	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
<b>Lc</b>	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. $Lc = (1.645 * \sqrt{2 * (\text{BkgrndCnt}/\text{BkgrndCntMin}) / \text{SCntMin}}) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
<b>Lot-Sample No</b>	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
<b>MDC MDA</b>	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. $MDC = (4.65 * \sqrt{((\text{BkgrndCnt}/\text{BkgrndCntMin}) / \text{SCntMin}) + 2.71 / \text{SCntMin}}) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . For LSC methods the batch blank is used as a measure of the background variability.
<b>Primary Detector</b>	The instrument identifier associated with the analysis of the sample aliquot.
<b>Ratio U-234/U-238</b>	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
<b>Rst/MDC</b>	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
<b>Rst/TotUcert</b>	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
<b>Report DB No</b>	Sample Identifier used by the report system. The number is based upon the first five digits of the <b>Work Order</b> Number.
<b>RER</b>	The equation Replicate Error Ratio = $(S - D) / [\sqrt{(\text{TPUs}^2 + \text{TPUd}^2)}]$ as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
<b>SDG</b>	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
<b>Sum Rpt Alpha Spec Rst(s)</b>	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
<b>Work Order</b>	The LIMS software assign test specific identifier.
<b>Yield</b>	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

NRC FORM 303 (1-2007)				U.S. NUCLEAR REGULATORY COMMISSION				LABORATORY USE ONLY				
<b>REQUEST FOR ANALYSIS AND CHAIN OF CUSTODY</b> LABORATORY - <input type="checkbox"/> ORISE <input checked="" type="checkbox"/> OTHER <u>TestAmerica</u> (Specify)								CONTROL NUMBER				
								H-07-1				
SAMPLE LOCATION (LICENSEE)				INSPECTION NO.				LICENSE NO.		DOCKET NO.		
DNSC Hammond Denot. Hammond, IN				04000341/2007-002				STC-133		040-00341		
SAMPLE SUBMITTED								DATE SAMPLES SUBMITTED		PRIORITY		
# TOTAL	TYPE	VOLUME	WEIGHT					11/05/2007		<input checked="" type="checkbox"/> ROUTINE <input type="checkbox"/> URGENT		
8	Soil		@ 1 kg/ea.									
								SAMPLE COLLECTION INTERVAL				
								START	MONTH	DAY	YEAR	TIME
									10	2	2007	
INSPECTOR RESPONSIBLE								STOP	10	3	2007	
Gene Bonano								TELEPHONE NUMBER				
630-829-9826												
ANALYSIS TO BE PERFORMED				LIST DESIRED LLD (Optional)		OTHER TYPE OF ANALYSIS (Specify)			LIST DESIRED LLD (Optional)			
<input type="checkbox"/> GROSS ALPHA (GA)						<input checked="" type="checkbox"/> Thorium-232			0.34 pCi/g			
<input type="checkbox"/> GROSS BETA (GB)						<input checked="" type="checkbox"/> Uranium-238			0.28 pCi/g			
<input type="checkbox"/> GAMMA SPEC (GS)						<input type="checkbox"/>						
<input type="checkbox"/> TRITIUM (H3)						<input type="checkbox"/>						
<input type="checkbox"/> CARBON-14 (C14)						<input type="checkbox"/>						
<input type="checkbox"/> IODINE-125 (I125)						<input type="checkbox"/>						
RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY								
NRC RIII	Fedex	10/09/2007	5:00pm	Shipped to DNSC								
Fedex	DNSC Hammond	10/10/2007	7:00am	To store samples								
DNSC Hammond	Fedex	11/05/2007	5:00pm	Shipped to TestAmeri								
Fedex	TestAmerica	11-7-07	1000	Analyze samples								
FEE RECOVERABLE <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TAC NUMBER (If Assigned)												
REMARKS												
for Region I, POC: Betsy Ullrich, 610-337-5040												
NOTE: SAMPLES WILL BE DISCARDED AFTER ANALYSIS UNLESS REASONS ARE NOTED IN REMARKS ABOVE.												



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# AMENDED DATA





# Sample Check-in List

DUE 12-5-07

Date/Time Received: 11/10-7-07 1000

Client: USNRC SDG #: 36647 NA [ ] SAF #:                      NA [ ]

Work Order Number: J7K130136 Chain of Custody #                     

Shipping Container ID:                      Air Bill #                     

1. Custody Seals on shipping container intact? NA ☒ Yes [ ] No [ ]
2. Custody Seals dated and signed? NA ☒ Yes [ ] No [ ]
3. Chain of Custody record present? NA [ ] Yes ☒ No [ ]
4. Cooler Temperature:                      NA ☒ 5. Vermiculite/packing materials is NA ☒ Wet [ ] Dry [ ]
6. Number of samples in shipping container: 8
7. Sample holding times exceeded? NA ☒ Yes [ ] No [ ]
8. Samples have:
 

Tape  
           Custody Seals

Hazard Lables  
           Appropriate Sample Lables
9. Samples are:
 

☒   In Good Condition  
           Broken

Leaking  
           Have Air Bubbles  
 (Only for samples requiring no head space.)
10. Sample pH taken? SOIL NA ☒ pH<2 [ ] pH>2 [ ] pH>9 [ ]
11. Sample Location, Sample Collector Listed? \*  
\*For documentation only. No corrective action needed.
12. Were any anomalies identified in sample receipt? Yes ☒ No [ ]
13. Description of anomalies (include sample numbers): NO CDC. NOTHING ON SAMPLES EXCEPT DATE OF COLLECTION. DETERMINED CLIENT FROM RETURN ADDRESS ON SHIPPING LABEL.

Sample Custodian: [Signature] Date: 11/10-7-07

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on                      by                      Person Contacted                     

[ ] No action necessary; process as is.

Project Manager                      Date