

0053547

**ANALYTICAL REPORT**

**RECEIVED**  
AUG 17 2000

**EDMC**

PROJECT NO. ~~100-N-GRIB~~ Borehole Drilling at  
B00-048 116-H-1 Trench

Lot #: F0E060117  
SDG #: W03169

*Daynes*  
6/1/00

Bechtel Hanford, Inc.

Bechtel Hanford, Inc.  
3350 George Washington Way  
Richland, WA 99352



SEVERN TRENT LABORATORIES, INC.

*M. Ward*

MARTI WARD  
Project Manager

May 24, 2000



Quanterra Incorporated  
13715 Rider Trail North  
Earth City, Missouri 63045

314 298-8566 Telephone  
314 298-8757 Fax

**CASE NARRATIVE**

Bechtel Hanford Incorporated  
3350 George Washington Way  
Richland, Washington 99352

May 24, 2000

Attention: Joan Kessner

Project Number	:	36072
SAF	:	B00-048
SDG	:	W03169
Number of Samples	:	one (1)
Sample Matrix	:	Soil
Data Deliverable	:	Summary
Date SDG Closed	:	May 4, 2000



**II. Introduction**

On May 4, 2000, one (1) "soil" sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. The samples were received within temperature criteria. See the attached Sample Summary sheet for the client and lab ids for these samples.

**III. Analytical Results/ Methodology**

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested: ICP Metals – 6010 Trace Arsenic  
Mercury – 7471 - CV

Deviation from Request: There were no deviations.

**IV. Definitions**

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

- QCBLK- Quality Control Blank, Method Blank
- QCLCS- Quality Control Laboratory Control Sample, Blank Spike
- MS- Matrix Spike.
- DUP- Matrix Duplicate
- MSD- Matrix Spike Duplicate.



Bechtel Hanford Incorporated  
May 24, 2000  
Project Number: 36072  
SDG: W03169  
Page 2

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**V. Comments**

**General:**

The term "Detection Limit" used in the analytical data reports refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

Please refer to the attached cross-reference table for the standard preparation methods used at Quanterra, St. Louis.

**Metals:**

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

The Mercury matrix spike recovery was above the 125% control limit at 130%. The result was flagged with an "N" qualifier. LCS recoveries were within criteria.

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

Reviewed and approved:

A handwritten signature in black ink, appearing to read "Marti Ward", written over a horizontal line.

Marti Ward  
St. Louis Project Manager

## SAMPLE SUMMARY

FOE060117

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
DCVEW	001	BOY2B3	05/01/00	13:50

**NOTE(S) :**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint fiber test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**METHODS SUMMARY**

FOE060117

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Mercury in Solid Waste (Manual Cold-Vapor)	SW846 7471A	SW846 7471A
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3050B

**References:**

- MCAWW "Methods for Chemical Analysis of Water and Wastes",  
EPA-600/4-79-020, March 1983 and subsequent revisions.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical  
Methods", Third Edition, November 1986 and its updates.

CLIENT: 127642 BECHTEL HANFORD, INC.  
PROJECT MANAGER: MARTI WARD  
PROJECT #: 100-N CRIB  
REPORT TO: Bechtel Hanford, Inc.  
P.O. NUMBER: MRC-SBB-A-19981  
SITE: B00-032  
AMOUNT REC'D: 120G,250G  
STORAGE LOC: T9C  
LOT COMMENTS:  
MATRIX: SOLID  
SAMPLE ID: B0Y2B3  
QC PACKAGE: Special Report - see checklist  
SAMPLE COMMENTS:

QUOTE/SAR #: 36072  
LAB ID: F-0E060117-001  
WORK ORDER: DCVEW  
RECEIVING DATE: 5/04/00  
SAMPLING DATE: 5/01/00  
ANALYTICAL DUE DATE: 5/25/00N  
REPORT DUE DATE: 5/25/00  
PRIORITY: 21  
SAMPLING TIME: 13:50  
RECEIVING TIME: 11:45  
SDG# : W03169

Beginning Depth: .00 Ending Depth: .00

<u>***** ANALYSIS *****</u>				
	<u>WRK</u>	<u>REQUEST</u>	<u>EXTRACTION</u>	<u>ANALYSIS</u>
	<u>LOC</u>	<u>DATE</u>	<u>EXP DATE</u>	<u>EXP DATE</u>
Inductively Coupled Plasma (6010B Trace) METALS, TOTAL - Soils MT6010_S AS (A-46-QM-01) DCVEW Protocol: A QC Program: STANDARD TEST SET	06	5/06/00	0/00/00	10/28/00
Mercury (7471A, Cold Vapor) - Solids METALS, TOTAL (Method Exclusive) - Solids M7471_S HG (A-70-09-01) DCVEW Protocol: A QC Program: STANDARD TEST SET	06	5/06/00	0/00/00	5/29/00
Moisture, Percent (160.3) NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION (A-88-WM-01) DCVEW-1-07 Protocol: A QC Program: STANDARD TEST SET	06	5/06/00	0/00/00	8/08/00

CLIENT: 127642 BECHTEL HANFORD, INC.  
PROJECT MANAGER: MARTI WARD  
PROJECT #: 100-N CRIB  
REPORT TO: Bechtel Hanford, Inc.  
P.O. NUMBER: MRC-SBB-A-19981  
SITE: B00-032  
AMOUNT REC'D: 120G,250G  
STORAGE LOC: T9C  
LOT COMMENTS:  
MATRIX: SOLID  
SAMPLE ID: B0Y2B3  
QC PACKAGE: Special Report - see checklist  
SAMPLE COMMENTS:

QUOTE/SAR #: 36072  
LAB ID: F-0E060117-001-D  
WORK ORDER: DCVEW MSD  
RECEIVING DATE: 5/04/00  
SAMPLING DATE: 5/01/00  
ANALYTICAL DUE DATE: 5/25/00N  
REPORT DUE DATE: 5/25/00  
PRIORITY: 21  
SAMPLING TIME: 13:50  
RECEIVING TIME: 11:45  
SDG# : W03169

Beginning Depth: .00 Ending Depth: .00

\*\*\*\*\* ANALYSIS \*\*\*\*\*

WRK LOC	REQUEST DATE	EXTRACTION EXP DATE	ANALYSIS EXP DATE
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Inductively Coupled Plasma (6010B Trace) 06	5/06/00	0/00/00	10/28/00
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METALS, TOTAL - Soils

MT6010\_S AS

(A-46-QM-01) DCVEW Protocol: A QC Program: STANDARD TEST SET

Mercury (7471A, Cold Vapor) - Solids 06	5/06/00	0/00/00	5/29/00
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METALS, TOTAL (Method Exclusive) - Solids

M7471\_S HG

(A-70-09-01) DCVEW Protocol: A QC Program: STANDARD TEST SET

CLIENT: 127642 BECHTEL HANFORD, INC.  
PROJECT MANAGER: MARTI WARD  
PROJECT #: 100-N CRIB  
REPORT TO: Bechtel Hanford, Inc.  
P.O. NUMBER: MRC-SBB-A-19981  
SITE: B00-032  
AMOUNT REC'D: 120G,250G  
STORAGE LOC: T9C  
LOT COMMENTS:  
MATRIX: SOLID  
SAMPLE ID: B0Y2B3  
QC PACKAGE: Special Report - see checklist  
SAMPLE COMMENTS:

QUOTE/SAR #: 36072  
LAB ID: F-0E060117-001-S  
WORK ORDER: DCVEW MS  
RECEIVING DATE: 5/04/00  
SAMPLING DATE: 5/01/00  
ANALYTICAL DUE DATE: 5/25/00N  
REPORT DUE DATE: 5/25/00  
PRIORITY: 21  
SAMPLING TIME: 13:50  
RECEIVING TIME: 11:45  
SDG# : W03169

Beginning Depth: .00 Ending Depth: .00

\*\*\*\*\* ANALYSIS \*\*\*\*\*

	WRK LOC	REQUEST DATE	EXTRACTION EXP DATE	ANALYSIS EXP DATE
Inductively Coupled Plasma (6010B Trace) METALS, TOTAL - Soils MT6010_S AS (A-46-QM-01) DCVEW Protocol: A QC Program: STANDARD TEST SET	06	5/06/00	0/00/00	10/28/00
Mercury (7471A, Cold Vapor) - Solids METALS, TOTAL (Method Exclusive) - Solids M7471_S HG (A-70-09-01) DCVEW Protocol: A QC Program: STANDARD TEST SET	06	5/06/00	0/00/00	5/29/00

Q. 27038

AIRBORNE 401268841 JP

CUR#500

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				Page 1 of 1	
Collector R. Nielson/M. Stankovich	Company Contact M. Stankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ	Price Code 8L	Date Turnaround 21 Days		
Project Designation Borehole Drilling at 116-H-1 Trench - SOIL	Sampling Location 116-H-1		SAF No. B00-048	Air Quality <input type="checkbox"/>			
Ice Chest No. ERC 99-010	Field Logbook No. EL-1500-1	CDA R116H12000	Mixed of Shipment Head deliver - Govt. Vehicle	Bill of Lading/Air Bill No. N/A			
Shipped To Sovern Trent Incorporated	Offsite Property No. N/A						
<p><b>POSSIBLE SAMPLE HAZARDS/REMARKS</b></p> <p>* SDG Due 5-25-00. W03169 JDE040248</p> <p>SAMPLE ANALYSIS</p>							
Special Handling and/or Storage	Name	Mass	Mass	Mass	Mass	Mass	Mass
	P	g	g	g	g	g	g
Type of Container	Preservation	Volume	No. of Containers (6)	Type of Container	No. of Containers (6)	Volume	No. of Containers (6)
		20mL	1		1	20mL	1
Activity Area	Activity Area	Activity Area	Activity Area	Activity Area	Activity Area	Activity Area	Activity Area
Sample No.	Matrix *	Sample Date	Sample Time	Sample No.	Matrix *	Sample Date	Sample Time
B07283	Soil	5-1-00	1350				
STL - ST LOUIS RECEIVED 1x250g 1x120g (SOIL) 10076 Fall							
<p><b>CHAIN OF POSSESSION</b></p> <p>Received By: R. Nielson Date/Time: 5-2-00 1015</p> <p>Received By: DWShea Date/Time: 5-2-00 1625</p> <p>Received By: R. F. E. Date/Time: 5-4-00 1145</p> <p>Received By: R. F. E. Date/Time: 5-4-00 1315</p> <p>Received By: R. F. E. Date/Time: 5-4-00 1625</p> <p>Received By: R. F. E. Date/Time: 5-4-00 1625</p> <p>Received By: R. F. E. Date/Time: 5-4-00 1625</p>							
<p><b>SPECIAL INSTRUCTIONS</b></p> <p>(1) Gamma Spectroscopy (Cobalt-137, Cobalt-60, Europium-152, Europium-154, Europium-155)</p> <p>COLLECTOR UNAVAILABLE TO SIGN COC.</p> <p>coll</p>							
LABORATORY SECTION		Disposited By		Date/Time		Date/Time	
FINAL SAMPLE DISPOSITION		Disposited By		Date/Time		Date/Time	
STL		STL SMARE CONTRY SUPERVISOR		05-05-00		0930	



Condition Upon Receipt Variance Report  
St. Louis Laboratory

Lot No. F0E060117  
F0E060117  
W03169

Client: BECHTEL HANFORD  
Quote No: 34072  
Shipper/No: AIRBORNE

Date: 05-05-00 Time: 0930  
Initiated by: WSP  
RFA/COC Numbers: B00-048-01

Condition/Variance (Check all that apply):

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Sample received broken/leaking.   | 8. <input type="checkbox"/> Sample ID on container does not match sample ID on paperwork. Explain: _____   |
| 2. <input type="checkbox"/> Sample received without proper preservative.<br><input type="checkbox"/> Cooler temperature not within 4°C ± 2°C<br>Record temperature: _____<br><input type="checkbox"/> pH _____<br><input type="checkbox"/> other: _____ | 9. <input type="checkbox"/> All coolers on airbill not received with shipment.   |
| 3. <input type="checkbox"/> Sample received in improper container.  | 10. <input type="checkbox"/> Sample volume insufficient for analysis   |
| 4. <input type="checkbox"/> Sample received without proper paperwork. Explain: _____  | 11. <input checked="" type="checkbox"/> Other (explain below)<br><u>COC DOES NOT EASILY IDENTIFY SAMPLES SENT TO STL - ST LOUIS; SAMPLES RECEIVED WERE NOTED</u> |
| 5. <input type="checkbox"/> Paperwork received without sample.  |  |
| 6. <input type="checkbox"/> No sample ID on sample container.   |  |
| 7. <input type="checkbox"/> Custody tape disturbed/broken/missing/not tamper evident type (circle all that apply).  |  |

- No variances were noted during sample receipt.
- Cooler Temperature Upon Receipt in °C: 2°

Temperature Variance Does Not Affect the Following Analyses: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Corrective Action:

- Client's Name: \_\_\_\_\_ Informed verbally on: \_\_\_\_\_ By: \_\_\_\_\_
- Client's Name: \_\_\_\_\_ Informed in writing on: \_\_\_\_\_ By: \_\_\_\_\_
- Sample(s) processed "as is". \_\_\_\_\_
- Sample(s) on hold until: \_\_\_\_\_ If released, notify: \_\_\_\_\_

Sample Control Supervisor Review: [Signature] Date: 05-05-00  
Project Management Review: [Signature] Date: 5.8.00

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

# METALS

BECHTEL HANFORD, INC.

Client Sample ID: BOY2B3

TOTAL Metals

Lot-Sample #...: FOE060117-001

Matrix.....: SOLID

Date Sampled...: 05/01/00

Date Received...: 05/04/00

% Moisture.....: 2.3

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0131211						
Mercury	0.020 B	0.034	mg/kg	SW846 7471A	05/11-05/12/00	DCVEW101
		Dilution Factor: 1		MDL.....: 0.0072		
Prep Batch #...: 0132298						
Arsenic	2.3	1.0	mg/kg	SW846 6010B	05/11-05/18/00	DCVEW104
		Dilution Factor: 1		MDL.....: 0.20		

NOTE(S):

B Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

## MATRIX SPIKE SAMPLE DATA REPORT

## TOTAL Metals

Client Lot #...: F0E060117  
 Date Sampled...: 05/01/00

Date Received...: 05/04/00

Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASURED AMOUNT	UNITS	PERCENT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: F0E060117-001 Prep Batch #...: 0131211									
Mercury									
	0.020	0.171	0.243	N mg/kg	130		SW846 7471A	05/11-05/12/00	DCVEW102
	0.020	0.171	0.222	mg/kg	118	8.8	SW846 7471A	05/11-05/12/00	DCVEW103
Dilution Factor: 1									

MS Lot-Sample #: F0E060117-001 Prep Batch #...: 0132298									
Arsenic									
	2.3	205	200	mg/kg	97		SW846 6010B	05/11-05/18/00	DCVEW105
	2.3	205	208	mg/kg	100	3.6	SW846 6010B	05/11-05/18/00	DCVEW106
Dilution Factor: 1									

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Results and reporting limits have been adjusted for dry weight.  
 N Spiked analyte recovery is outside stated control limits.

## METHOD BLANK REPORT

## TOTAL Metals

Client Lot #....: FOE060117

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
MB Lot-Sample #: FOE100000-211 Prep Batch #....: 0131211						
Mercury	0.0073 B	0.033	mg/kg	SW846 7471A	05/11-05/12/00	DD0V6101
Dilution Factor: 1						

MB Lot-Sample #: FOE110000-298 Prep Batch #....: 0132298						
Arsenic	ND	1.0	mg/kg	SW846 6010B	05/11-05/17/00	DD31F101
Dilution Factor: 1						

NOTE (B):

Calculations are performed before rounding to avoid round-off errors in calculated results.

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Lot-Sample #...: FOE060117

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Mercury	3.13	3.35	mg/kg	107		SW846 7471A	05/10-05/12/00	0131211
	3.13	3.29	mg/kg	105	1.8	SW846 7471A	05/10-05/12/00	0131211
Dilution Factor: 1								
Arsenic	53.2	56.1	mg/kg	106		SW846 6010B	05/11-05/17/00	0132298
	53.2	47.8	mg/kg	90	16	SW846 6010B	05/11-05/17/00	0132298
Dilution Factor: 1								

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# Bechtel Hanford

Analysis By

**Severn Trent Laboratories Richland**

*2800 G.W. Way, Richland, Wa 99352, (509) 375-3131*

Report Nbr: 10542

SDG No.	SAF No.	CLIENT ID No.	STL ID No.
W03169	B00-048	B0Y2B3	9DCQX710



Comments:

0001

Quanterra  
2800 George Washington Way  
Richland, Washington 99352-1613

509 375-3131 Telephone  
509 375-5590 Fax

## CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc.  
3350 George Washington Way  
Richland, WA 99352

May 26, 2000

Attention: Joan Kessner

SAF Number : B00-048  
Date SDG Closed : May 4, 2000  
Number of Samples : One (1)  
Sample Type : Soil  
SDG Number : W03169  
Data Deliverable : 21-Day / Summary



### I. Introduction

On May 4, 2000, one soil sample was received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

<u>STLR ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9DCQX710	B0Y2B3	SOIL	5/4/00

### II. 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 errors.

The requested analyses were:

**Gamma Spectroscopy**

Gamma Scan by method RICH-RC-5017

**Gas Proportional Counting**

Total Strontium by method RICH-RC-5006

**Alpha Spectroscopy**

Plutonium-238, -239/40 by method RICH-RC-5010

Uranium-234, -235, -238 by method RICH-RC-5079

**Liquid Scintillation Counting**  
Carbon-14 by method RICH-RC-5022  
**Chemical Analyses**  
Chromium Hex by EPA method 7196

III. Quality Control

The analytical results for each analysis performed under SDG W03169 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

IV. Comments

**Gamma Spectroscopy**

Gamma Scan by method RICH-RC-5017:

The LCS, batch blank, sample and sample duplicate (B0Y2B3) results are within contractual requirements.

**Gas Proportional Counting**

Total Strontium by method RICH-RC-5006:

The LCS, batch blank, sample and sample duplicate (B0Y2B3) results are within contractual requirements.

**Alpha Spectroscopy**

Plutonium-238, -239/40 by method RICH-RC-5010:

The LCS, batch blank, sample and sample duplicate (B0Y2B3) results are within contractual requirements.

Uranium-234, -235, -238 by method RICH-RC-5079:

The LCS, batch blank, sample and sample duplicate (B0Y2B3) results are within contractual requirements.

**Liquid Scintillation Counting**

Carbon-14 by method RICH-RC-5022:

For solid matrices, the laboratory control and batch blank samples are direct count analyses. The LCS, batch blank, sample and sample duplicate (B0Y2B3) results are within contractual requirements.

Bechtel Hanford, Inc.  
May 26, 2000  
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**Chemical Analyses**

Chromium Hex by EPA method 7196:

The LCS, batch blank, sample, sample duplicate (B0Y2B3) and sample matrix spike (B0Y2B3) results are within contractual 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. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:



Jackie Waddell  
Project Manager





### DUPLICATE RESULTS

LAB NAME: STL Richland SDG: /RPT GRP: W03169 / 10542  
LOT,RPT DB ID: J0E040248-1 DCQX71CR MATRIX: SOIL  
CLIENT ID: B0Y2B3 DUP DATE RECEIVED: 5/4/2000 1:15:00 P  
ORIG LAB ID: 9DCQX710

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
C-14	-5.16E-02	U	4.0E-03	5.0E-01	7.46E-01	pCi/g	100.00%	RICHRC5022	2.68E-01	295.29%

Number of Results:

### DUPLICATE RESULTS

LAB NAME: STL Richland SDG: /RPT GRP: W03169 / 10542  
LOT,RPT DB ID: J0E040248-1 DCQX71DR MATRIX: SOIL  
CLIENT ID: B0Y2B3 DUP DATE RECEIVED: 5/4/2000 1:15:00 P  
ORIG LAB ID: 9DCQX710

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
PU-238	2.43E-02	U	3.6E-02	3.6E-02	5.09E-02	pCi/g	32.55%	RICHRC5010	1.13E-02	72.89%
PU239/40	4.80E-01	J	1.6E-01	1.9E-01	3.42E-02	pCi/g	32.55%	RICHRC5010	4.53E-01	5.71%

Number of Results:

### DUPLICATE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03169 / 10542
LOT,RPT DB ID:	J0E040248-1 DCQX71ER	MATRIX:	SOIL
CLIENT ID:	B0Y2B3 DUP	DATE RECEIVED:	5/4/2000 1:15:00 P
ORIG LAB ID:	9DCQX710		

ANALYTE	DUP RESULT	Q	COUNTING ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
U-234	4.52E-01	J	9.0E-02	1.2E-01	2.38E-02	pCi/g	97.90%	RICHRC5079	4.78E-01	5.41%
U-235	8.19E-03	U	1.3E-02	1.3E-02	2.03E-02	pCi/g	97.90%	RICHRC5079	1.44E-02	54.77%
U-238	4.26E-01	J	8.7E-02	1.1E-01	2.22E-02	pCi/g	97.90%	RICHRC5079	5.43E-01	24.20%

Number of Results:

### DUPLICATE RESULTS

**LAB NAME:** STL Richland **SDG: /RPT GRP:** W03169 / 10542  
**LOT,RPT DB ID:** J0E040248-1 DCQX71FR **MATRIX:** SOIL  
**CLIENT ID:** B0Y2B3 DUP **DATE RECEIVED:** 5/4/2000 1:15:00 P  
**ORIG LAB ID:** 9DCQX710

ANALYTE	DUP RESULT	COUNTING Q ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
CO-60	5.39E-01	6.9E-02	6.9E-02	2.47E-02	pCi/g		RICHRC5017	4.56E-01	16.63%
CS-137	3.04E+01	3.0E+00	3.0E+00	4.98E-02	pCi/g		RICHRC5017	2.74E+01	10.16%
EU-152	6.01E+00	6.3E-01	6.3E-01	1.70E-01	pCi/g		RICHRC5017	5.00E+00	18.38%
EU-154	4.91E-01	1.1E-01	1.1E-01	9.30E-02	pCi/g		RICHRC5017	3.88E-01	23.42%
EU-155	-6.21E-02 U	1.1E-01	1.1E-01	1.87E-01	pCi/g		RICHRC5017	7.86E-02	1703.85%

Number of Results: 5





**BLANK RESULTS**

LAB NAME: STL Richland

SDG /RPT GRP: W03169 / 10542

LOT,RPT DB ID: JOE080000-388 DCWM711B

MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT- CH
PU-238	-5.92E-03	U	4.5E-03	4.6E-03	6.54E-02	pCi/g	39.95%	RICHRC5010	DCWM	0129388
PU239/40	1.77E-02	U	3.0E-02	3.0E-02	5.64E-02	pCi/g	39.95%	RICHRC5010	DCWM	0129388

Number of Results:





**BLANK RESULTS**

LAB NAME: STL Richland

SDG /RPT GRP: W03169 / 10542

LOT,RPT DB ID: JOE080000-392 DCWMD11B

MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT- CH
STRONTIUM	-3.79E-02	U	4.0E-02	4.1E-02	1.10E-01	pCi/g	94.20%	RICHRC5006	DCWM	0129392

Number of Results:





LABORATORY CONTROL SAMPLE

LAB NAME: STL Richland SDG: /RPT GRP: W03169 / 10542  
LAB SAMPLE ID: DCWM712S MATRIX: SOIL

---

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
PU239/40	3.31E+00		2.8E-01	6.5E-01	2.36E-02	pCi/g	70.76%	3.40E+00	97.33%

---

Number of Results:



**LABORATORY CONTROL SAMPLE**

**LAB NAME:** STL Richland                      **SDG: /RPT GRP:** W03169 / 10542  
**LAB SAMPLE ID:** DCWMC12S                      **MATRIX:** SOIL

---

<b>ANALYTE</b>	<b>RESULT</b>	<b>COUNTING Q ERROR (2 s)</b>	<b>TOTAL ERROR (2 s)</b>	<b>MDA/ IDL</b>	<b>REPORT UNIT</b>	<b>YIELD</b>	<b>EXPECTED</b>	<b>RECOVERY</b>
CS-137	3.27E-01	5.5E-02	5.5E-02	3.40E-02	pCi/g		3.05E-01	107.11%

---

**Number of Results:**



**LABORATORY CONTROL SAMPLE**

**LAB NAME:** STL Richland                      **SDG: /RPT GRP:** W03169 / 10542  
**LAB SAMPLE ID:** DWC9F12S                      **MATRIX:** SOIL

---

<b>ANALYTE</b>	<b>RESULT</b>	<b>COUNTING Q ERROR (2 s)</b>	<b>TOTAL ERROR (2 s)</b>	<b>MDA/ IDL</b>	<b>REPORT UNIT</b>	<b>YIELD</b>	<b>EXPECTED</b>	<b>RECOVERY</b>
HEXCHROME	9.55E-01	N/A	N/A	2.00E-03	mg/L	N/A	1.00E+00	95.50%

---

**Number of Results:**





STL RICHLAND  
Data Review Checklist  
RADIOCHEMISTRY

Priority

Lot Number: <u>JOE040248</u>					
Client ID: <u>BHL</u>					
Due Date: <u>5-24-00</u>					
QC Batch Number: <u>0129388</u>			SDG Number: <u>3164</u>		
Method Test Parameter: <u>Puzso</u>					
Matrix: <u>Soil</u>					
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)	
<b>A. Calibration</b>					
1. Is the calibration documentation included where applicable?			✓	✓	
<b>B. Sample Analysis</b>					
1. Are the sample yields within acceptance criteria?	/			↓	
2. Were all sample holding times met?	/				
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	/				
<b>C. QC Samples</b>					
1. Is the blank yield within acceptance criteria?	/				
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	/				
3. Does the blank result meet the Contract criteria?	/				
4. Is the blank result < the Contract Detection Limit?	/				
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			/		
6. Is the LCS result within acceptance criteria?	/				
7. Is the LCS yield within acceptance criteria?	/				
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	/				
9. Do the MS/MSD results and yields meet acceptance criteria?			/		
10. Do the duplicate sample results and yields meet acceptance criteria?	/				
<b>D. Other</b>					
1. Are all Nonconformances included and noted?			/		
2. Are all required forms filled out?	/				
3. Was the correct methodology used?	/				
4. Was transcription checked?	/				
5. Were all calculations checked at a minimum frequency?	/				
6. Were units checked?	/			↓	

Comments on any "No" response: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

First Level Review: Pam Kunitz Date: 5-19-00

Second Level Review: Jacqui Weddell Date: 5/25/00

STL RICHLAND  
Data Review Checklist  
RADIOCHEMISTRY

Priority

Lot Number: JOE040248				
Client ID: BNI				
Due Date: 5-19-00				
QC Batch Number: 0129389			SDG Number: W03169	
Method Test Parameter: WISO				
Matrix: Soil				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_  
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 \_\_\_\_\_  
 \_\_\_\_\_

First Level Review: Pam Kanitz Date: 5-19-00  
 Second Level Review: Judith Weddell Date: 5/25/00

STL RICHLAND  
Data Review Checklist  
RADIOCHEMISTRY

*Priority*

Lot Number: <u>JOE 040248</u>					
Client ID: <u>BHI</u>					
Due Date: <u>5-24-00</u>					
QC Batch Number: <u>0129391</u>		SDG Number: <u>W03169</u>			
Method Test Parameter: <u>gamma</u>					
Matrix: <u>soil</u>					
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)	
<b>A. Calibration</b>					
1. Is the calibration documentation included where applicable?			/	✓	
<b>B. Sample Analysis</b>					
1. Are the sample yields within acceptance criteria?			/	↓	
2. Were all sample holding times met?	/				
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	/				
<b>C. QC Samples</b>					
1. Is the blank yield within acceptance criteria?			/		
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	/				
3. Does the blank result meet the Contract criteria?	/				
4. Is the blank result < the Contract Detection Limit?	/				
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			/		
6. Is the LCS result within acceptance criteria?	/				
7. Is the LCS yield within acceptance criteria?			/		
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	/				
9. Do the MS/MSD results and yields meet acceptance criteria?			/		
10. Do the duplicate sample results and yields meet acceptance criteria?			/		
<b>D. Other</b>					
1. Are all Nonconformances included and noted?	/				
2. Are all required forms filled out?	/				
3. Was the correct methodology used?	/				
4. Was transcription checked?	/				
5. Were all calculations checked at a minimum frequency?	/				
6. Were units checked?	/				

Comments on any "No" response: \_\_\_\_\_  
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First Level Review: Pam Kunitz  
 Second Level Review: Jillie Waddell

Date: 5-22-00  
 Date: 5/25/00

STL RICHLAND  
Data Review Checklist  
RADIOCHEMISTRY

Priority

Lot Number: JOEC40248				
Client ID: BHI				
Due Date: 5-19-00				
QC Batch Number: 0129392			SDG Number: W03169	
Method Test Parameter: TOT. SR (TH)				
Matrix: Soil				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			↓
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_  
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First Level Review: Pam Kewitzer Date: 5/19/00  
 Second Level Review: Jacqui Weddell Date: 5/25/00

STL RICHLAND  
Data Review Checklist  
RADIOCHEMISTRY

*Priority*

Lot Number: <u>JOE040248</u>				
Client ID: <u>BNI</u>				
Due Date: <u>5-24-00</u>				
QC Batch Number: <u>0129387</u>			SDG Number: <u>W03169</u>	
Method Test Parameter: <u>C-14</u>				
Matrix: <u>Soil</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample yields within acceptance criteria?			/	
2. Were all sample holding times met?	/			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	/			
<b>C. QC Samples</b>				
1. Is the blank yield within acceptance criteria?			/	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	/			
3. Does the blank result meet the Contract criteria?	/			
4. Is the blank result < the Contract Detection Limit?	/			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			/	
6. Is the LCS result within acceptance criteria?	/			
7. Is the LCS yield within acceptance criteria?			/	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	/			
9. Do the MS/MSD results and yields meet acceptance criteria?			/	
10. Do the duplicate sample results and yields meet acceptance criteria?	/			
<b>D. Other</b>				
1. Are all Nonconformances included and noted?			/	
2. Are all required forms filled out?	/			
3. Was the correct methodology used?	/			
4. Was transcription checked?	/			
5. Were all calculations checked at a minimum frequency?	/			
6. Were units checked?	/			✓

Comments on any "No" response: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

First Level Review: *Paula Kesitgeni*

Date: 5-18-00

Second Level Review: *Jacqui Waddell*

Date: 5/25/00

LS-038, Rev.6, 5/00



Richland Laboratory  
Data Review Check List  
METALS

<u>Work Order Number(s):</u> DCQX7      BATCH # 0129248      LOT# JOE040248-001				
<u>Lab Sample Numbers or SDG:</u> W03169				
<u>Method/Test/Parameter:</u> CR16 IN SOIL      RICHWC 5005 R.4				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Initial Calibration</b>				
1. Performed at required frequency with required number of levels?	✓			✓
2. Correlation coefficient within QC limits?	✓			✓
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within QC limits?	✓			✓
4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters $\leq$ reporting limit?	✓			✓
<b>B. Continuing Calibration</b>				
1. CCV analyzed at required frequency and all parameters within QC limits?	✓			✓
2. CCB analyzed at required frequency and all results $\leq$ reporting limit?	✓			✓
<b>C. Sample Analysis</b>				
1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed?	✓			✓
2. Were all sample holding times met?	✓			✓
<b>D. QC Samples</b>				
1. All results for the preparation blank below limits?	✓			✓
2. MS or MS/MSD recoveries within QC limits and %RPD (for MSD) acceptable?	✓			✓
3. LCS percent recovery within QC limits and %RPD (for LCSD) acceptable?	✓			✓
4. Analytical spikes within QC limits where applicable?			✓	✓
5. ICP only: One serial dilution performed per SDG?			✓	✓
6. ICP only: CRDL standard (CR1 or CRA) analyzed at required frequency?			✓	✓
7. ICP only: Interference check samples (ICSA, ICSAB) and HICAL analyzed at the required frequencies and within QC limits?			✓	✓

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>E. Other</b>				
1. Are all nonconformances included and noted?			✓	✓
2. Is the correct date and time of analysis shown?	✓			✓
3. Did the analyst sign and date the front page of the analytical run?	✓			✓
4. Correct methodology used?	✓			✓
5. Transcriptions checked?	✓			✓
6. Calculations checked at minimum frequency?	✓			✓
7. Units checked?	✓			✓

Comments on any "No" response:

C1- PbCrO4 spike of DCQX7101 required x20 dilution.

Analyst: M. Jahn

Date: 5/11/00

Second-Level Review: Roxie Ross

Date: 5/11/00

# CHAIN OF CUSTODY

U-21000

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				<b>B00-048-01</b>		Page <u>1</u> of <u>1</u>	
Collector R. Nielson/M. Stankovich		Company Contact M. Stankovich		Telephone No. 531-7620		Project Coordinator TRENT, SJ		Price Code <b>8L</b>	
Project Designation Borehole Drilling at 116-H-1 Trench - SOIL		Sampling Location 116-H-1		SAF No. B00-048		Air Quality <b>11</b>		Data Turnaround <b>21 Days</b>	
Ice Chest No. <b>ERC 99-010</b>		Field Logbook No. EL-1500-1		COA <b>R116H12000</b>		Method of Shipment Hand deliver - Govt. Vehicle			
Shipped To Severn Trent Incorporated		Offsite Property No. <b>N/A</b>				Bill of Lading/Air Bill No. <b>N/A</b>			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	None	None	None	Cool 4C	None	None		
	Type of Container	P	aG	aG	aG	aG	aG	aG	aG		
	No. of Container(s)	1	1	1	1	1	1	1	1		
	Special Handling and/or Storage	Volume	20mL	60mL	60mL	60mL	60mL	120mL	120mL	1000mL	

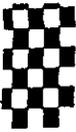
* SDG W03169	Time 5-25-00 SAMPLE ANALYSIS JOE040248	Activity Scan	Carbon-14	ICP Metals - 6010A (Supertrace) (Arsenic)	Isotopic Plutonium; Isotopic Uranium	Strontium-89,90 - Total Sr	Chromium Hex - 7196	Mercury - 7471 - (CV)	See item (1) in Special Instructions		
		*	*		*	*	✓		✓		

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Carbon-14	ICP Metals - 6010A (Supertrace) (Arsenic)	Isotopic Plutonium; Isotopic Uranium	Strontium-89,90 - Total Sr	Chromium Hex - 7196	Mercury - 7471 - (CV)	See item (1) in Special Instructions
B0Y2B3	Soil	5-1-00	1350	X	X	X	X	X	X	X	X

<b>CHAIN OF POSSESSION</b>				<b>Sign/Print Names</b>				<b>SPECIAL INSTRUCTIONS</b>				<b>Matrix *</b>
Relinquished By <i>R. Nielson</i>	Date/Time 1015	Received By <i>DWSHEA</i>	Date/Time 5/2/00 1015	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) COLLECTOR UNAVAILABLE TO SIGN COC, coll								S=Soil SE=Soilment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drawn Solids DL=Drawn Liquids T=Time WJ=Wipe L=Liquid V=Vegetation X=Other
Relinquished By <i>DWSHEA</i>	Date/Time 5/2/00 1625	Received By <i>DWSHEA for Fritz IB</i>	Date/Time 5/2/00 1625									
Relinquished By <i>REF IB</i>	Date/Time 5:40 11:45	Received By <i>R. G. H. H.</i>	Date/Time 5:40 11:45									
Relinquished By <i>R. F. H. H.</i>	Date/Time 5:40 1315	Received By <i>Keith Whitwell</i>	Date/Time 5:40 1315									
Relinquished By <i>[Signature]</i>	Date/Time	Received By <i>21004</i>	Date/Time									
Relinquished By	Date/Time	Received By	Date/Time									

<b>LABORATORY SECTION</b>	Received By	Title	Date/Time
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method	Disposed By	Date/Time

BH-EE-011 (10/99)  
034



# ERC Radiological Counting Facility Analysis Report

RCF Number RCF7761

Sample Date & Time 5/1/00 1131

Project ID: 116-H-1

SAF Number: B00-048

Date Analyzed 5/3/00 8:01:49

Sample ID: B0Y271

**Gamma Energy Analysis**

Nuclide	Activity (pCi/g)	Error (pCi/g)	MDC (pCi/g)
K-40	< 1.7E+02		1.7E+02
Co-60	2.1E+01 +/-	1.1E+01	1.2E+01
Cs-137	4.1E+01 +/-	1.7E+01	2.4E+01
Eu-152	1.1E+02 +/-	5.1E+01	6.2E+01
Eu-154	< 6.3E+01		6.3E+01
Eu-155	< 9.6E+01		9.6E+01
Th-232D	< 4.6E+01		4.6E+01
Th-234	< 3.6E+02		3.6E+02
U-235	< 1.8E+02		1.8E+02
Am-241	< 5.0E+01		5.0E+01

*Handwritten notes:*  
 \* 6.9 \* 1627.7 = 1.12 x 10<sup>4</sup> pCi/g  
 B 99 \* 1627.7 = 1.61 x 10<sup>5</sup> pCi/g  
 Cat II  
 1627.7 gms Total Sample In house

Total GEA (pCi/g) 1.7E+02 +/- 7.8E+01

	Activity (pCi/g)	Error (pCi/g)
Gross Alpha**	6.9E+00 +/-	1.3E+00
Gross Beta	9.9E+01 +/-	4.4E+00

Alpha MDC (pCi/g)	2.6E+00
Beta MDC (pCi/g)	5.1E+01

**Definitions:**

All errors reported at 2 standard deviations.  
 N/R = no result or analysis not requested. <MDC = Less than detection limit.  
 All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.  
 Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

**For soils and natural samples, the following applies:**

The analysis of U-238 is based on the activity of Pa-234m.  
 The analysis of Np-237 is based on the activity of Pa-233.  
 U-238da is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.  
 Th-232da is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.  
 Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.  
 \*\*The gross alpha results are not corrected for mass absorption  
 # No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst T. J. Snider 5/3/00

Report To  
 Mike Stankovich

Fax  
 373-1396  
 372-9487  
 0035

**St John, David A**

---

**From:** Nielson, Renee J  
**Sent:** Thursday, May 04, 2000 8:15 AM  
**To:** Gale, Stuart J (Jeff); Thoren, Rikki A  
**Cc:** St John, David A; Stankovich, Michael T; Nielson, Renee J; Ayres, Doris E; Duncan, Jeanette M  
**Subject:** Samples collected from 116-H-1 Drilling

Rikki and Jeff,

I forgot to write the RCF HEIS numbers on the Chains of Custody that go to Quanterra and to TMA/RECRA. We usually do this so the shipper knows what total activity goes with what sample. Here they are...

**Samples collected on 5/1/00**

B0Y270 (TMA)	B0Y271 (RCF)	500 cpm
B0Y272 (TMA)	B0Y273 (RCF)	Background + $\approx$ 10-50 cpm
B0Y2B2 (TMA)	B0Y273 (RCF)	Background
B0Y2B3 (QTL)	B0Y273 (RCF)	Background
B0Y2B4 (TMA)	No TA needed (equipment blank for B0Y270)	

**Samples collected on 5/2/00**

B0Y274 (TMA)	B0Y275 (RCF)	Background
B0Y276 (TMA)	B0Y277 (RCF)	Background
B0Y278 (TMA)	B0Y279 (RCF)	Background
B0Y280 (TMA)	B0Y281 (RCF)	Background

**Samples collected on 5/3/00**

B0Y282 (TMA)	B0Y283 (RCF)	Background
B0Y284 (TMA)	B0Y285 (RCF)	Background.

**Water samples collected on 5/3/00**

B0Y3V6 (TMA)	B0Y3V7 (QTL)	B0Y3W0 (RCF)	} down gradient and cross gradient < 2,000 pCi/g
B0Y3V8 (TMA)	B0Y3V9 (QTL)	B0Y3W0 (RCF)	

If you have any questions, please call me at 521-2090.

Thanks,  
Renee

*Per Mike Stankovich  
and Renee Nielson  
Telecon 5/4/00  
@ 08:30  
DAS*

Figure 1. Sample Check-in List

Date/Time Received: 1315 5/4/00 SDG#: W03169  
 Work Order Number: JOE040248 SAF#: B00-048  
 Shipping Container ID: ERC 99-010 Chain of Custody #: B00-048-01

1. Outermost shipping container damaged? Yes  No
2. Custody Seals on shipping container intact? Yes  No
3. Custody Seals dated and signed? Yes  No
4. Chain-of-Custody record present? Yes  No
5. Chain-of-Custody includes the following information:
  - Client name Yes  No
  - Project name or number Yes  No
  - Sample date/time for each sample Yes  No
  - Container types, sizes and number of containers Yes  No
  - Short description of sample, i.e., matrix Yes  No
  - Analyses requested Yes  No
  - Preservation used or "none" or N/A if not applicable Yes  No
  - Date and time of relinquish and receipt Yes  No
  - Signatures of those persons relinquishing and receiving Yes  No
6. Sample numbers on chain of custody match those on sample containers? Yes  No  8
7. Collection date and date of laboratory receipt are within project specific holding time requirements? Yes  No
8. Cooler temperature: 4°C
9. Vermiculite/packing materials is: Wet  Dry

10. Samples have: / tape        hazard labels  
/ custody seals / appropriate sample labels

11. Samples are: / in good condition        leaking  
       broken        have air bubbles

12. Were any anomalies identified in sample receipt? Yes  No
13. Description of anomalies (include sample numbers): \_\_\_\_\_

Sample Custodian/Laboratory: Niall Sabulull Date: 1315 5/4/00  
 Telephone/Fax/E-mailed to: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_

RQC053

Severn Trent Laboratories, Inc.  
Information Sheet Rad Prep

Run Date: 5/11/00  
Time: 10:05:44

Parent Batch:  
Associated Batches:

:  
:  
:  
:

\*\*\*\*\*  
\* QC BATCH: 0129388 \*  
\*  
\*\*\*\*\*

**PRIORITY**

*21 day*

Page: 1

SO: Plutonium-238,239/40 by Alpha Spec  
6A: Pu PrpRC5013/RC5019, SepRC5010(5039)  
5I: CLIENT: HANFORD

Analytical Due Date: 5/24/00

Project Manager: JW2

*W03169*

Lot# Work Order	Analyst Client	Due Date Matrix	Client Name Aliquot	Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
J0E040248-001 X DCQX7-1-0D SOIL Comments: SOIL		5/24/00	Bechtel Hanford, .0000		.000		5/01/00 13:50		1	pCi/g	**NYS 54-05/00	**NYS	JW2
J0E040248-001 DCQX7-1-05 SOIL Comments: SOIL		5/24/00	Bechtel Hanford, .0000		.000		5/01/00 13:50		1	pCi/g	**NYS 54-05/00	**NYS	JW2
J0E080000-388 B DCWM7-1-01 SOLID Comments:		5/24/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2
J0E080000-388 C DCWM7-1-02 SOLID Comments:		5/24/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2
J0E080000-388 B DCWM7-1-03 SOLID Comments:		5/24/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2
J0E080000-388 C DCWM7-1-04 SOLID Comments:		5/24/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00006

**Batch Information:**

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

**BLANK CRDL**

Plutonium 238 1  
Plutonium 239/4 1

**Tracer Yield**

Plutonium 242 (020-105)

**Type**

RPD  
RPD

**QC Control Limits**

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

\*\* Indicates that Batch Information has changed for this sample. Print worksheet for details.

0038

COC Signature Page

W03169

Lot or Batch #: 0129388 Initials/Date Procedure #

Released By	<u>BWK 5-9-00</u>	<u>RICHRC0009</u>
Received	<u>K 5-9-00</u>	<u>MICHAEL SOIB</u>
Released By	<u>K 5-10-00</u>	<u>n/a</u>
Received	<u>SK 5/10/00</u>	<u>RC5079</u>
Released By	<u>SK 5/16/00</u>	<u>n/a</u>
Received	<u>FW 05-16-00</u>	<u>RC 5010</u>
Released By	<u>FW 05-17-00</u>	<u>n/a</u>
Received	<u>SD 5/17/00</u>	<u>RC5039-2</u>
Released By	<u>SD 5/18/00</u>	<u>n/a</u>
Received	<u>CP 5/18/00</u>	<u>RICHARD W. S. RC</u>
Released By	<u>ML 5/22/00</u>	<u>n/a</u>
Received	<u>JM 5-19-00</u>	<u>Radical V2.8.2.1</u>
Released By	<u>JM 5-19-00</u>	<u>n/a</u>
Received	<u>PK 5-19-00</u> <u>PF 5-19-00</u>	<u>RICHRC0002</u>

RQC053

Severn Trent Laboratories, Inc.  
Information Sheet Rad Prep

Run Date: 5/08/00  
Time: 15:26:17

Parent Batch:  
Associated Batches:

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\*  
\* QC BATCH: 0129389 \*  
\*  
\*\*\*\*\*

**PRIORITY**

*2 day*

Page: 1

SR: Uranium-234,235,238 by Alpha Spec  
7S: UIso PrpRC5013/RC5019, SepRC5079(5039)  
SI: CLIENT: HANFORD

Analytical Due Date: 5/19/00

Project Manager: JW2

*W03169*

Lot# Work Order	Client	Analyt Due Matrix	Client Name Aliquot Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
J0E040248-001 X DCQX7-1-0E SOIL Comments: SOIL		5/19/00	Bechtel Hanford, .0000	.000		5/01/00 13:50			pCi/g	**NYS 54-05/00	**NYS	JW2
++ J0E040248-001 DCQX7-1-02 SOIL Comments: SOIL		5/19/00	Bechtel Hanford, .0000	.000		5/01/00 13:50			pCi/g	**NYS 54-05/00	**NYS	JW2
J0E080000-389 B DCWM8-1-01 SOLID Comments:		5/19/00	Bechtel Hanford,			5/01/00 13:50			pCi/g	**NA	**NA	JW2
J0E080000-389 C DCWM8-1-02 SOLID Comments:		5/19/00	Bechtel Hanford,			5/01/00 13:50			pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Uranium 234 1  
Uranium 235 1  
Uranium 238 1

Tracer Yield

(020-105)

Type  
RPD  
RPD  
RPD

QC Control Limits

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0040

COC Signature Page

W03169

Lot or Batch #: 0129389

Initials/Date

Procedure #

Released By	<u>PNOK 5-9-00</u>	<u>RICHRC00009</u>
Received	<u>W 5-9-00</u>	<u>R.M.R.C 5013</u>
Released By	<u>W 5-10-00</u>	<u>n/a</u>
Received	<u>SK 5/10/00</u>	<u>RC5019</u>
Released By	<u>SK 5/16/00</u>	<u>n/a</u>
Received	<u>PK 05-16-00</u>	<u>RC 5079</u>
Released By	<u>PK 05-17-00</u>	<u>n/a</u>
Received	<u>SD 5/17/00</u>	<u>RC5039-2</u>
Released By	<u>SD 5/19/00</u>	<u>n/a</u>
Received	<u>CS 5/19/00</u>	<u>RICHRC00009</u>
Released By	<u>CS 5/19/00</u>	<u>n/a</u>
Received	<u>SM 5-19-00</u>	<u>PK 05-19-00-8-2-1</u>
Released By	<u>JM 5-19-00</u>	<u>n/a</u>
Received	<u>PK 5-19-00</u> <u>PK 5-19-00</u>	<u>RICH RC000</u>

RQC053

Severn Trent Laboratories, Inc.  
Information Sheet Rad Prep

Run Date: 5/08/00  
Time: 15:26:55

Parent Batch:  
Associated Batches:

\*\*\*\*\*  
\* QC BATCH: 0129391 \*  
\*\*\*\*\*

**PRIORITY**  
*2 day*

Page: 1

*W03169*  
T9: Gamma by HPGE 10 day ingrowth  
AW: Gamma PrpRC5017  
SI: CLIENT: HANFORD

Analytical Due Date: 5/24/00

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot	Client Name Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
J0E040248-001 X DCQX7-1-0F SOIL Comments: SOIL	5/24/00	Bechtel Hanford, .0000		.000	5/01/00 13:50			5.00E-02	pCi/g	**NYS 54-05/00	**NYS	JW2
J0E040248-001 DCQX7-1-06 SOIL Comments: SOIL	5/24/00	Bechtel Hanford, .0000		.000	5/01/00 13:50			5.00E-02	pCi/g	**NYS 54-05/00	**NYS	JW2
J0E080000-391 B DCWMC-1-01 SOLID Comments:	5/24/00	Bechtel Hanford,			5/01/00 13:50			1.00E-01	pCi/g	**NA	**NA	JW2
J0E080000-391 C DCWMC-1-02 SOLID Comments:	5/24/00	Bechtel Hanford,			5/01/00 13:50			0.1	pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Radium, 226	1.00E-01
Radium 228	2.00E-01
Cobalt 60	5.00E-02
Cesium 137	1.00E-01
Europium 152	1.00E-01
Europium 154	1.00E-01
Europium 155	1.00E-01

Tracer Yield

Type
RPD

QC Control Limits

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0042

COC Signature Page

W03109

Lot or Batch #: 0129391

Initials/Date

Procedure #

Released By	Initials/Date	Procedure #
Released By	<u>BWK 5-9-00</u>	<u>RICHRCONDEN</u>
Received	<u># 5-9-00</u>	<u>B.L.H.R.C. 5013/5017</u>
Released By	<u># 5-10-00</u>	<u>n/a</u>
Received	<u>OK 5/10/2000</u>	<u>RICHRD0007REW2</u>
Released By	<u>OK 5/22/2000</u>	<u>n/a</u>
Received	<u>PK 5-22-00</u>	<u>RICHRCONDEN</u>
Released By	<u>ACS-2200</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC053

Parent Batch:  
Associated Batches:

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Severn Trent Laboratories, Inc.  
Information Sheet Rad Prep

**PRIORITY**

*2 day*

Run Date: 5/08/00  
Time: 15:27:20

Page: 1

\*\*\*\*\*  
\* QC BATCH: 0129392 \*  
\* \*\*\*\*\*

*W03169*

TH: Total Strontium by GPC  
CH: Sr-Total PrpRC5013, SepRC5006  
SI: CLIENT: HANFORD

Analytical Due Date: 5/19/00

Project Manager: JW2

Lot# Work Order	Client Matrix	Analyt Due	Client Name Aliquot	Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Alpha	Info - (Ci) Beta	PM Bin
J0E040248-001 X DCQX7-1-0G SOIL Comments: SOIL		5/19/00	Bechtel Hanford, .0000				.000 5/01/00 13:50		1	pCi/g	**NYS 54-05/00	**NYS	JW2
++ J0E040248-001 DCQX7-1-03 SOIL Comments: SOIL		5/19/00	Bechtel Hanford, .0000				.000 5/01/00 13:50		1	pCi/g	**NYS 54-05/00	**NYS	JW2
J0E080000-392 B DCWMD-1-01 SOLID Comments:		5/19/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2
J0E080000-392 C DCWMD-1-02 SOLID Comments:		5/19/00	Bechtel Hanford,				5/01/00 13:50		1	pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt: Decay Correct: Y Blank Sub: None Call In:

Uncert: Both Sigma: 1.960 ODR: Target List + Other Detected

BLANK CRDL  
Strontium 90 1

Tracer Yield  
Strontium Trace (020-105) RPD

QC Control Limits

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0044

COC Signature Page

W03169

Lot or Batch #: 0129378      Initials/Date      Procedure #

Released By	<u>PNK 5-9-00</u>	<u>RICHRC0009</u>
Received	<u>NA 5-9-00</u>	<u>RICHRC5013</u>
Released By	<u>N 5-10-00</u>	<u>na</u>
Received	<u>SK 5/10/00</u>	<u>RC5019</u>
Released By	<u>SIC 5/15/00</u>	<u>na</u>
Received	<u>RTM 5/15/00</u>	<u>RICHRC5006</u>
Released By	<u>RTM 5/18/00</u>	<u>na</u>
Received	<u>EPS 5/18/00</u>	<u>RICHARD 0003.2</u>
Released By	<u>d 5/19/00</u>	<u>na</u>
Received	<u>JMS 19-00</u>	<u>RADICAL V2.8.2.1</u>
Released By	<u>JMS 19-00</u>	<u>na</u>
Received	<u>PKS-19-00</u>	<u>RICHRC0002</u>
Released By	<u>PKS-19-00</u>	<u>na</u>
Received	<u>_____</u>	<u>_____</u>

RQC053

Severn Trent Laboratories, Inc.  
Information Sheet Rad Prep

Run Date: 5/08/00  
Time: 15:25:00

Parent Batch:  
Associated Batches:  
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\*\*\*\*\*  
\* QC BATCH: 0129387 \*  
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**PRIORITY**  
*2 day*

Page: 1

S3: Carbon-14 by Liquid Scint  
5S: C-14 Prp/SepRC5022  
5I: CLIENT: HANFORD

Analytical Due Date: 5/24/00

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot	Client Name Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
JOE040248-001 X DCQX7-1-0C SOIL Comments: SOIL	5/24/00	Bechtel Hanford, .0000		.000		5/01/00 13:50		50	pCi/g	**NYS 54-05/00	**NYS	JW2
JOE040248-001 DCQX7-1-07 SOIL Comments: SOIL	5/24/00	Bechtel Hanford, .0000		.000		5/01/00 13:50		50	pCi/g	**NYS 54-05/00	**NYS	JW2
JOE080000-387 B DCWMS-1-01 SOLID Comments:	5/24/00	Bechtel Hanford,				5/01/00 13:50		50	pCi/g	**NA	**NA	JW2
JOE080000-387 C DCWMS-1-02 SOLID Comments:	5/24/00	Bechtel Hanford,				5/01/00 13:50		50	pCi/g	**NA	**NA	JW2
JOE080000-387 B DCWMS-1-03 SOLID Comments:	5/24/00	Bechtel Hanford,				5/01/00 13:50		50	pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00005

Batch Information:

Dry Wt:                      Decay Correct: Y                      Blank Sub: None                      Call In:                     

Uncert: Both                      Sigma: 1.960                      ODR: Target List + Other Detected

BLANK CRDL                      Tracer Yield                      Type                      QC Control Limits  
Carbon 14                      50                      RPD

\*\* NYS = Not Yet Screened  
 \*\* NA = Not Applicable  
 \*\* Other = Other than Gross Alpha or Gross Beta  
 ++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0046

COC Signature Page

W03169

Lot or Batch #: 0129387

Initials/Date

Procedure #

Released By	<u>PNWK 5-9-00</u>	<u>RICHR00009</u>
Received	<u>W 5-9-00</u>	<u>RICHR 5013</u>
Released By	<u>W 5-9-00</u>	<u>n/a</u>
Received	<u>pm 5-9-00</u>	<u>RICHR 5032</u>
Released By	<u>pm 5-15-00</u> <sup>17 am 5-17-00</sup>	<u>n/a</u>
Received	<u>M 5/17/00</u>	<u>RICHR00001</u>
Released By	<u>M 5/18/00</u>	<u>n/a</u>
Received	<u>JMS-18-0</u>	<u>Radcalc 1/2.8.2.1</u>
Released By	<u>jm 5-18-00</u>	<u>n/a</u>
Received	<u>PKS-18-00</u>	<u>RICHR00002</u>
Released By	<u>PKS-18-00</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC050

Severn Trent Laboratories, Inc.  
WET CHEM BATCHSHEET

Run Date: 5/08/00  
Time: 11:08:55

PRODUCTION FIGURES - WET CHEM

TOTAL NUMBER	SAMPLE NUMBER	QC	RE-RUN MATRIX	RE-RUN OTHER	MISC NUMBER	TOTAL HOURS	EXPANDED DELIVERABLE
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METHOD:	EA Chromium, Hexavalent (7196A)			INITIALS:	DATA ENTRY:		
QC BATCH #:	0129248			PREP		INITIALS	
PREP DATE:	5/04/00			ANAL		DATE	
USER:	ROSSR						

Work Order	Lab Number	Structured Analysis	Exp. Del.	Analysis Date	Sample ID:
DCQX7-1-01	J-0E040248-001	XX A DW EA 5I			BOY2B3
DCQX7-1-08	J-0E040248-001-S	XX A DW EA 5I			BOY2B3
DCQX7-1-0A	J-0E040248-001-S	XX A DW EA 5I			BOY2B3
DCQX7-1-09	J-0E040248-001-X	XX A DW EA 5I			BOY2B3 DUP
DCW9F-1-01	J-0E080000-248-B	XX A DW EA 5I			INTRA-LAB BLANK
DCW9F-1-02	J-0E080000-248-C	XX A DW EA 5I			INTRA-LAB CHECK

Control Limits

(75-125)

(75-125)

(80-120)

0048

COC Signature Page

Lot or Batch #:	Initials/Date	Procedure #
Released By	_____	_____
Received	<u>M. J. 5/3/00</u>	<u>RICHWC 5005 R.4</u>
Released By	<u>M. J. 5/11/00</u>	n/a
Received	_____	_____
Released By	_____	n/a
Received	_____	_____
Released By	_____	n/a
Received	_____	_____
Released By	_____	n/a
Received	_____	_____
Released By	_____	n/a
Received	_____	_____
Released By	_____	n/a
Received	_____	_____