Date: 14 April 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 105-F/DR Phase III Below-grade Areas Sampling and Analysis - Concrete
Subject: Inorganics - Data Package No. W03090-QES (SDG No. W03090)

INTRODUCTION

This memo presents the results of data validation on Data Package No. W03090-QES prepared by Quanterra Environmental Services (QES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0XMY0	2/22/00	Solid	C	See note 1
B0XMY1	2/22/00	Solid	C	See note 1
B0XMY2	2/22/00	Solid	C	See note 1
B0XMY3	2/22/00	Solid	C	See note 1
B0XMY4	2/22/00	Solid	C	See note 1
B0XMY5	2/22/00	Solid	C	See note 1
B0XMY6	2/22/00	Solid	C	See note 1
B0XMY7	2/22/00	Solid	C	See note 1
B0XMY8	2/22/00	Solid	C	See note 1
B0XMY9	2/22/00	Solid	C	See note 1
B0XN00	2/22/00	Solid	C	See note 1
B0XN01	2/22/00	Solid	C	See note 1
B0XN02	2/22/00	Solid	C	See note 1
B0XN03	2/22/00	Solid	C	See note 1
B0XN04	2/22/00	Solid	C	See note 1

1- ICP metals - 6010 Supertrace (lead and chromium); mercury by 7471

Data validation was conducted in accordance with the BHI validation statement of work and "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils" (DOE/RL-99-35). Appendices 1 through 5 provide the following information as indicated below:

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Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within six (6) months for ICP metals and 28 days for mercury.

Due to the holding time being exceeded by less than two times the limit, all mercury results were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike duplicate recovery of 138%, all detected mercury results were qualified as estimates and flagged "J".

All other matrix spike results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30%. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicates

One pair of field duplicate samples (B0XN02/B0XN04) were submitted for analysis. The samples were compared using the same criteria as laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific CRDL.

- **Completeness**

Data package No. W03090-QES (SDG No. W03090) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than two times the limit, all mercury results were qualified as estimates and flagged "J". Due to a matrix spike duplicate recovery of 138%, all detected mercury results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W03090	REVIEWER: TLI	DATE: 4/14/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Mercury	J	All	Holding time
Mercury	J	All	MSD recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																			
Laboratory: Quanterra																			
Case	SDG: W03090																		
Sample Number		B0XMY0		B0XMY1		B0XMY2		B0XMY3		B0XMY4		B0XMY5		B0XMY6		B0XMY7			
Location		1		2		3		4		5		6		7		8			
Remarks																			
Sample Date		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00			
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Mercury	0.2	0.078	J	0.26	J	0.036	J	0.036	J	0.028	J	0.051	J	0.064	J	0.048	J		
Lead	3	10.9		41.6		10		12.3		12.3		11.7		21.6		12.0			
Chromium	10	18.6		20.0		11.1		14.2		12.6		14.8		14.7		30.8			
		B0XMY8		B0XMY9		B0XN00		B0XN01		B0XN02		B0XN03		B0XN04					
		9		10		11		12		13		14		15					
														Duplicate					
		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00					
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Mercury	0.2	0.05	J	0.038	J	0.057	J	0.044	J	0.048	J	0.038	J	0.048	J				
Lead	3	10.0		25.7		17.0		10.9		9.9		17.3		10.3					
Chromium	10	15.2		12.3		15.2		16.7		15.4		11.3		15.7					

000010

BECHTEL HANFORD, INC.

Client Sample ID: B0XMY0

TOTAL Metals

Lot-Sample #...: F0B240142-001 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	18.6	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XJQ10C
		Dilution Factor: 1		MDL.....: 0.30		
Lead	10.9	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XJQ101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.078 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XJQ204
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY1

TOTAL Metals

Lot-Sample #...: F0B240142-002 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	20.0	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XK3103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	41.6	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XK3101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.26 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XK3202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY2

TOTAL Metals

Lot-Sample #...: F0B240142-003 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	11.1	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XK5103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	10	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XK5101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.036 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XK5202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY3

TOTAL Metals

Lot-Sample #...: F0B240142-004 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	14.2	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XK7103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	12.3	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XK7101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.036 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XK7202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY4

TOTAL Metals

Lot-Sample #...: F0B240142-005 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	12.6	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XK9103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	12.3	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XK9101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.028 ~~B~~ J	0.033	mg/kg	SW846 7471A	03/26/00	D8XK9202
		Dilution Factor: 1		MDL.....: 0.0070		

NOTE(S):

B Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY5

TOTAL Metals

Lot-Sample #...: F0B240142-006 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	14.8	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKA103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	11.7	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKA101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.051 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKA202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY6

TOTAL Metals

Lot-Sample #...: F0B240142-007 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	14.7	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKC103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	21.6	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKC101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.064 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKC202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY7

TOTAL Metals

Lot-Sample #...: F0B240142-008 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	30.8	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKF103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	12.0	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKF101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.048 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKF202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY8

TOTAL Metals

Lot-Sample #...: F0B240142-009 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	15.2	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKG103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	10.0	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKG101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.050 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKG202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XMY9

TOTAL Metals

Lot-Sample #...: F0B240142-010 Matrix.:.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0082202						
Chromium	12.3	1.0	mg/kg	SW846 6010B	03/22-03/23/00	D8XKJ103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	25.7	0.30	mg/kg	SW846 6010B	03/22-03/23/00	D8XKJ101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.038 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKJ202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XN00

TOTAL Metals

Lot-Sample #...: F0B240142-011 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	15.2	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKL103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	17.0	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKL101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.057 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKL202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XN01

TOTAL Metals

Lot-Sample #...: F0B240142-012 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	16.7	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKP103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	10.9	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKP101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.044 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKP202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XN02

TOTAL Metals

Lot-Sample #...: F0B240142-013 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	15.4	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKQ103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	9.9	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKQ101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.048 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKQ202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XN03

TOTAL Metals

Lot-Sample #...: F0B240142-014 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	11.3	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKR103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	17.3	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKR101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.038 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKR202
		Dilution Factor: 1		MDL.....: 0.0070		

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BECHTEL HANFORD, INC.

Client Sample ID: B0XN04

TOTAL Metals

Lot-Sample #...: F0B240142-015 Matrix.....: SOLID
Date Sampled...: 02/22/00 Date Received..: 02/23/00
% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0070179						
Chromium	15.7	1.0	mg/kg	SW846 6010B	03/10-03/16/00	D8XKT103
		Dilution Factor: 1		MDL.....: 0.30		
Lead	10.3	0.30	mg/kg	SW846 6010B	03/10-03/16/00	D8XKT101
		Dilution Factor: 1		MDL.....: 0.15		
Prep Batch #...: 0088360						
Mercury	0.048 J	0.033	mg/kg	SW846 7471A	03/26/00	D8XKT202
		Dilution Factor: 1		MDL.....: 0.0070		

4/13/00

Data is Incomplete without Case Narrative

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Quanterra
Environmental Services

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

March 30, 2000

Attention: Joan Kessner

APR 2000
RECEIVED
Data
Log In

Quote Number	:	33811
SDG	:	W03090
Number of Samples	:	fifteen (20)
Sample Matrix	:	Solid
Data Deliverable	:	Summary
Date SDG Closed	:	February 23, 2000

II. Introduction

On February 23, 2000, fifteen (15) "solid" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. The samples were received at the St. Louis lab within the temperature criteria. See the attached Sample Summary for a listing of Client Ids and their associated Lab numbers.

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 Super Trace - Lead, Chromium
Mercury - 7471 - CV

Deviation from Request: None

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

Bechtel Hanford Incorporated
March 30, 2000
Quote Number: 33811
SDG: W03090
Page 2

MS- Matrix Spike.
MSD- Matrix Spike Duplicate.

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.

Samples were originally extracted and analyzed for Mercury on March 14 and March 15. The laboratory Standard Operating Procedures recommends sample extracts be analyzed within 24 hours of sample preparation. The hold time between sample extraction and analysis was exceeded. The samples were re-extracted and reanalyzed. The second extraction was beyond the recommended hold time from time of sampling to the time of analysis. The second analysis is reported.

I certify that this Summary 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:

Marti Ward
St. Louis Project Manager

W-211034 AIRBORNE 4012631416 30

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B00-013-191	Page 1 of 1
Collector: Faulberg	Company Contact: J Adler	Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 91, Air Quality
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F		SAF No.: B00-013	Date Turnaround: 21 Days
Ice Chest No.: ERC-96-059	Field Logbook No.: FI 1424	COA: R105F22B0C	Method of Shipment: Fed EX	
Shipped To: Quantera Incorporated	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS: SRC Due 3-1-05

W03090 JOB230234

Preservation	None	None
Type of Container	all	all
No. of Container(s)	1	1
Volume	60ml.	120ml.
	RCP Metals - 6010A (Supernatant) (Lead) Mercury - 7471 - (CV)	See item (1) on Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time			
B0XN02 D8WVK	Other Solid	2-22-00	1232	X	X	B0XN07
B0XN03 D8WVW	Other Solid	2-22-00	1240	X	X	B0XN07
B0XN04 D8WW0	Other Solid	2-22-00	1232	X	X	B0XN07

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date Time	Received By	Date Time
R. Fulle / R. Fahlsen	2-22-00 1500	R. Thoren	2-22-00 1500
R. Thoren	2-23-00 1330	R. Kuehling	2-23-00 1330
R. Kuehling	2-23-00 1600	Marissa Hace	02-24-00 20

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium, Strontium-89/90 -- Total Sr, Technetium-99, Americium-241, Nickel-63, Carbon-14

Matrix *

LABORATORY SECTION	Received By	Title	Date Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date Time

BHI-EE-011 (10/99)

Data is Incomplete without Case Narrative

000029

Severn Trent - St. Louis

CLN 000216

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-187	Page 1 of 1
Collector: Fahlberg	Company Contact: J Adler — Telephone No.: 373-1316	Project Coordinator: TRENT, SJ	Price Code: 9L — Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F	SAF No.: B00-013	Air Quality
Ice Chest No.: ERC 96 059	Field Logbook No.: FL-1424 — COA: B105F22B0C	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

Preservation				None	None								
Type of Container				aG	aG								
No. of Container(s)				1	1								
Volume				60mL	120mL								
SAMPLE ANALYSIS				RP Metals - 6010A (Supernate) (Lead). Mercury - 7471 - (CV)	See item (1) in Special Instructions								
Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY0 D8WW2	Other Solid	2.22.00	0842	X	X							Box	N07
B0XMY1 D8WW3	Other Solid	2.22.00	0853	X	X							Box	N07
B0XMY2 D8WW4	Other Solid	2.22.00	0905	X	X							Box	N07

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: R. Fahlberg / R Fahlberg	Received By: R Thoren	2.22.00 1200 / 1500
Relinquished By: R Thoren / R Thoren	Received By: K Schlenker	2.23.00 / 1330
Relinquished By: K Schlenker	Received By: Melissa Rice	02/24/00 0800
Relinquished By:	Received By: [illegible]	2-24-00 0800 / 2-24-00
Relinquished By:	Received By:	
Relinquished By:	Received By:	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotope Plutonium, Strontium-89/90 – Total Sr, Technetium-99, Americium-241, Nickel-63, Carbon-14

Matrix *: S - Soil; SD - Sediment; SO - Solid; S - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; T - Tissue; WI - Wipe; O - Other; V - Vegetation; X - Other

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

BH-EE-011 (10/99)

000030

Data is Incomplete without Case Narrative

Severn Trent - St. Louis

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

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Collector: Fahlberg	Company Contact: J Adler	Telephone No.: 373-4316	Project Coordinator: TRENT, SJ
Price Code: 9L	Data Turnaround: 21 Days	Air Quality	
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F		SAF No.: B00-013
Ice Chest No.: ERL 96 059	Field Logbook No.: FI 1421	COA: R105F2280C	Method of Shipment: Fed EX
Shipped To: Quanterra Incorporated	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

			Preservation	None	None								
			Type of Container	G	G								
			No. of Container(s)	1	1								
			Volume	60ml.	60ml.								
			ICP Metals - 6010A (Supervace) Lead, Mercury - 7471 - (CV)	See item (...) on Special Instructions									
Sample No	Matrix *	Sample Date	Sample Time										
BOXMY3 DSWW5	Other Solid	2-22-00	0914	X	X								BOX NO7
BOXMY4 DSWW6	Other Solid	2-22-00	0927	X	X								BOX NO7
BOXMY5 DSWW8	Other Solid	2-22-00	0940	X	X								BOX NO7

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	2-22-00 1500	R. Thoren	2-22-00/1500
R. Thoren	2-23-00/1330	R. Schlinsing	2-23-00 1330
R. Schlinsing	2-23-00 1600	Marsha Stone	2-24-00 0830
		2-24-00	

SPECIAL INSTRUCTIONS

(1) Gamma Spectrum (w/ (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155), Gamma Spec - Add-on (Barium-133), Isotopic Plutonium, Strontium-89/90 -- Total Sr, Technetium-99, Americium-241, Nickel-63, Carbon-14

Matrix *

LABORATORY SECTION: Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method — Disposed By — Date/Time

BHI-EE-011 (10/99)

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Data is Incomplete without Case Narrative

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-189 | Page 1 of 1

Collector: Fahlberg	Company Contact: J Adler	Telephone No.: 373-4316	Project Coordinator: TRENT, SJ
Price Code: 9L	Data Turnaround: 21 Days		
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F		SAF No.: B00-013
Air Quality			
Ice Chest No.: ERC 96 059	Field Logbook No.: EJ 1424	COA: B105F2280C	Method of Shipment: Fed EX
Shipped To: Quanterra Incorporated	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

			Preservation	None	None								
			Type of Container	aG	aG								
			No. of Container(s)	1	1								
			Volume	60ml.	120ml.								
				RCP Metals - 6010B (Supernatant Lead), Mercury - 7471 - (CV)	See item (1) in Special Instructions								
Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY6 D8WWA	Other Solid	2.22.00	0950	X	X								Box No 07
B0XMY7 D8WWC	Other Solid	2.22.00	1000	X	X								Box No 07
B0XMY8 D8WWD	Other Solid	2.22.00	1010	X	X								Box No 07

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: R. Fahlberg		2.22.00 1500
Received By: R. Thoren		2.22.00 1500
Relinquished By: R. Thoren		2.22.00 1330
Received By: K. Allbaugh		2.23.00 1330
Relinquished By: K. Allbaugh		2.23.00 1600
Received By: Marcia Moss		2.23.00 0820
Relinquished By		
Received By		
Relinquished By		
Received By		
Relinquished By		
Received By		

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155). Gamma Spec - Add-on (Barium-133), Isotopic Plutonium, Strontium-89/90 -- Total Sr, Technetium-99, Americium-241; Nickel-63; Carbon-14

Matrix *
S - Soil
SD - Sediment
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
T - Tissue
WI - Wipe
L - Liquid
V - Vegetation
X - Other

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

BHI-EE-011 (10/99)

000032

Data is Incomplete without Case Narrative

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Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B00-013-190	Page 1 of 1
Collector: Fahlberg	Company Contact: J Adler	Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 9L; Air Quality	Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F		SAF No.: B00-013	
Ice Chest No.: ERC 96 059	Field Logbook No.: H-1-123	COA: B305F22B0'	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None										
Type of Container	aG	aG										
No. of Container(s)	1	1										
Volume	60ml	120ml										
SAMPLE ANALYSIS	RP Metals - 6010A (Supernate) [Lead] Mercury - 7471 - (CV)	See item 15 on Special Instructions										
Sample No.	Matrix *	Sample Date	Sample Time									
B0XMY9 D8WWE	Other Solid	2-22-00	1017	X	X							B0XN07
B0XN00 D8WWF	Other Solid	2-22-00	1212	X	X							B0XN07
B0XN01 D8WWG	Other Solid	2-22-00	1221	X	X							B0XN07

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R Fahlberg / R Fahlberg	Date/Time: 2-22-00 1500	Received By: R. Thoren	Date/Time: 2 2 00/1500
Relinquished By: R. Thoren	Date/Time: 2-23-00/1330	Received By: K Schlinsing	Date/Time: 2-23-00 1370
Relinquished By: K Schlinsing	Date/Time: 2 23 00 1600	Received By: Marsha Sias	Date/Time: 022400 0820
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155). Gamma Spec - Add-on (Barium-133). Isotopic Plutonium, Strontium-89,90 -- Total Sr, Technetium-99, Americium-241; Nickel-63; Carbon-14

Matrix *

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

BHI-EE-011 (10/99)

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Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 105/DR Concrete			DATA PACKAGE: W03090		
VALIDATOR: TL		LAB: QES		DATE: 4/4/00	
CASE:			SDG: W03090		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX BOXN00 BOXN01 BOXN02 BOXN03 BOXN04
BOXM40 BOXM41 BOXM42 BOXM43 BOXM44 BOXM45
BOXM46 BOXM47 BOXM48 BOXM49

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No) N/A

Comments: Full Hg 33 days

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are ICP interference checks acceptable? . . . . . Yes No N/A
Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A
Are ICV and CCV checks acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments: NO3 EB – all detected
~IR (says error in USR) – Not on EB

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A

Comments: IR when is MS (pg 33)
Hg 13870 J – all detected

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No N/A
Are laboratory duplicate samples RPD values acceptable? . . . . Yes No N/A
Were ICP serial dilution samples analyzed? . . . . . Yes No N/A
Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: IR – no MSD (pg 33)

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A
Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A
Were analytical spikes performed as required? . . . . . Yes No N/A
Are analytical spike recoveries acceptable? . . . . . Yes No N/A
Was MSA performed as required? . . . . . Yes No N/A
Are MSA results acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Are results calculated properly? . . . . . Yes No N/A
Do results meet the CRDLs? . . . . . Yes No N/A

Comments: ~~C060 48 NOT 2~~
~~152 – 40 42 44, 47, 48, N01, N02, N03~~
~~154 45 N04~~
~~155 – 45~~

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: F0B240142 **Matrix.....:** SOLID
Date Sampled...: 02/22/00 **Date Received..:** 02/23/00

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: F0B240142-001 **Prep Batch #...:** 0070179									
Chromium									
	18.6	20.0	38.7	mg/kg	101		SW846 6010B	03/10-03/16/00	D8XJQ10D
	18.6	20.0	36.6	mg/kg	90	5.6	SW846 6010B	03/10-03/16/00	D8XJQ10E
			Dilution Factor: 1						
Chromium									
		20.0	38.7	mg/kg	101		SW846 6010B	03/10-03/16/00	D8XJQ10G
		20.0	36.6	mg/kg	90	5.6	SW846 6010B	03/10-03/16/00	D8XJQ10H
			Dilution Factor: 1						
Lead									
	10.9	50.0	59.0	mg/kg	96		SW846 6010B	03/10-03/16/00	D8XJQ107
	10.9	50.0	55.7	mg/kg	90	5.8	SW846 6010B	03/10-03/16/00	D8XJQ108
			Dilution Factor: 1						
MS Lot-Sample #: F0B240142-001 **Prep Batch #...:** 0088360									
Mercury									
		0.167	0.240	mg/kg	109		SW846 7471A	03/26/00	D8XJQ105
		0.167	0.288 N	mg/kg	138	18	SW846 7471A	03/26/00	D8XJQ106
			Dilution Factor: 1						

mw 3.20.00

NOTE(S):

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

N Spiked analyte recovery is outside stated control limits.

HOLDING TIME SUMMARY

SDG: W03090	VALIDATOR: TU	DATE: 4/13/00	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
All	Hg	2/22/00	3/26/00	3/26/00	33	0	J/UJ

Date: 14 April 2000
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 105-F/DR Phase III Below-grade Areas Sampling and Analysis - Concrete
Subject: Radiochemistry - Data Package No. W03090-QES (SDG No. W03090)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package Nos. W03090-QES which were prepared by Quanterra Environmental Services. A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0XMY0	2/22/00	Solid	C	See note 1
B0XMY1	2/22/00	Solid	C	See note 1
B0XMY2	2/22/00	Solid	C	See note 1
B0XMY3	2/22/00	Solid	C	See note 1
B0XMY4	2/22/00	Solid	C	See note 1
B0XMY5	2/22/00	Solid	C	See note 1
B0XMY6	2/22/00	Solid	C	See note 1
B0XMY7	2/22/00	Solid	C	See note 1
B0XMY8	2/22/00	Solid	C	See note 1
B0XMY9	2/22/00	Solid	C	See note 1
B0XN00	2/22/00	Solid	C	See note 1
B0XN01	2/22/00	Solid	C	See note 1
B0XN02	2/22/00	Solid	C	See note 1
B0XN03	2/22/00	Solid	C	See note 1
B0XN04	2/22/00	Solid	C	See note 1

1- Gamma spectroscopy; alpha spectroscopy (isotopic plutonium and americium-241); total strontium; nickel-63; carbon-14; technetium-99.

Data validation was conducted in accordance with the BHI validation statement of work and the "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils" (DOE/RL-99-35). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months with liquid scintillation requiring analysis within 7 days of distillation.

All holding times were acceptable.

- **Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to laboratory blank contamination, all nickel-63 results were qualified as estimates and flagged "J".

All laboratory blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery is 70-130% (80-120% for gamma spectroscopy). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer

recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J".

Due to the lack of an LCS analysis, all cobalt-60 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 30 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

One pair of field duplicate samples (B0XN02/B0XN04) were submitted for analysis. The samples were compared using the same criteria as laboratory duplicates. The RPDs for cesium-137 (49%) and nickel-63 (34.6%) were outside QC limits. Under the BHI statement of work, no qualification is required.

- **Detection Levels**

Reported analytical detection levels are compared against the 105DR PQLs to ensure that laboratory detection levels meet the required criteria. The following analytes were reported above the PQL: Europium-155 in samples B0XN01, B0XN02, B0XN03, B0XN04, B0XMY0, B0XMY1, B0XMY5, B0XMY6, and B0XMY8; europium-154 in samples B0XN04, B0XMY6 and B0XMY8; and

europium-152 in sample B0XN02. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific PQL.

- **Completeness**

  Data Package No. W03090-QES (SDG No. W03090) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, all nickel-63 results were qualified as estimates and flagged "J". Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J". Due to the lack of an LCS analysis, all cobalt-60 results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes were reported above the PQL: Europium-155 in samples B0XN01, B0XN02, B0XN03, B0XN04, B0XMY0, B0XMY1, B0XMY5, B0XMY6, and B0XMY8; europium-154 in samples B0XN04, B0XMY6 and B0XMY8; and europium-152 in sample B0XN02. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W03090	REVIEWER: TLI	DATE: 4/14/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel-63	J	All	Blank contamination
Carbon-14	J	All	No matrix spike
Cobalt-60	J	All	No LCS analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOLID MATRIX, (PCi/G)

Project: BECHTEL-HANFORD
Laboratory: Quanterra
Case: SDG: W03090

Sample Number		B0XMY0		B0XMY1		B0XMY2		B0XMY3		B0XMY4		B0XMY5		B0XMY6		B0XMY7			
Location		1		2		3		4		5		6		7		8			
Remarks																			
Sample Date		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00			
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Plutonium-238	1	0.0425	U	0.0241		0.00291	U	0.00486	U	0.0251		0.0120	U	0.0176	U	0.00349	U		
Plutonium-239/240	1	-0.000414	U	-0.00244	U	0.00	U	0.00	U	-0.000742	U	0.00	U	-0.000272	U	0.00	U		
Americium-241	1	0.0879		0.129		0.00563	U	0.0350		0.0232		0.138		0.0646		-0.000346	U		
Barium-133		0.0118	U	0.117	U	0.0187	U	0.0851	U	-0.00696	U	0.181	U	0.285	U	0.0100	U		
Cobalt-60	0.1	0.413	J	0.547	J	0.0370	UJ	0.160	J	0.0774	UJ	0.229	J	0.174	J	0.0459	UJ		
Cesium 137	0.1	5.69		20.9		1.78		3.30		2.89		8.80		10.7		2.01			
Europium-152	0.2	0.587	U	3.42		0.332	U	0.459		0.273	U	3.55		1.80		0.343	U		
Europium-154	0.2	0.0115	U	0.449		-0.0873	U	-0.0107	U	0.00983	U	0.371	U	0.196	U	-0.0154	U		
Europium-155	0.1	0.0409	U	0.0672	U	0.0263	U	0.0214	U	0.0439	U	0.105	U	0.0383	U	-0.0133	U		
Strontium	1	3.35		2.65		0.571		0.884		0.551		2.77		2.60		0.326			
Carbon-14	50	101	J	44.2	J	5.56	J	32.5	J	5.37	J	36.8	J	82.2	J	8.39	J		
Nickel-63	30	7.90	J	17.5	J	7.51	J	9.44	J	7.62	J	9.43	J	11.6	J	7.18	J		
Technetium-99	15	0.659	U	0.103	U	0.422	U	-0.104	U	-0.451	U	0.0511	U	0.0239	U	0.214	U		

000010

RADIOCHEMISTRY ANALYSIS, SOLID MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																			
Laboratory: Quanterra																			
Case	SDG: W03090																		
Sample Number		B0XMY8		B0XMY9		B0XN00		B0XN01		B0XN02		B0XN03		B0XN04					
Location		9		10		11		12		13		14		15					
Remarks														Duplicate					
Sample Date		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00		2/22/00					
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Plutonium-238	1	0.00424	U	0.00343	U	0.0213	U	-0.000344	U	0.0102	U	0.00	U	0.00	U				
Plutonium-239/240	1	0.00376	U	-0.000451	U	0.00330	U	0.00	U	0.00	U	-0.000312	U	-0.000834	U				
Americium-241	1	0.0828		0.0614		0.0902		0.0197		0.0491		0.0230		0.125					
Barium-133		0.00315	U	-0.0131	U	0.0701	U	0.103	U	0.0704	U	0.0250	U	0.194	U				
Cobalt-60	0.1	0.105	UJ	0.148	J	0.407	J	0.189	UJ	0.100	UJ	0.0471	UJ	0.270	J				
Cesium 137	0.1	4.01		3.81		8.27		5.25		5.81		2.15		9.70					
Europium-152	0.2	0.582	U	1.03		1.28		0.700	U	0.619	U	0.268	U	3.27					
Europium-154	0.2	0.125	U	0.0518	U	0.0871	U	0.0277	U	0.00933	U	0.00325	U	0.391	U				
Europium-155	0.1	0.0558	U	0.0614	U	0.00807	U	0.0381	U	-0.0627	U	0.0194	U	0.0199	U				
Strontium	1	1.77		1.50		2.12		1.68		2.05		0.381		2.10					
Carbon-14	50	63.4	J	20.4	J	82.8	J	77.6	J	71.0	J	8.87	J	56.7	J				
Nickel-63	30	20.3	J	9.29	J	9.48	J	7.55	J	8.10	J	10.3	J	5.71	J				
Technetium-99	15	0.243	U	0.0982	U	0.286	U	0.149	U	0.0526	U	0.0285	U	-0.152	U				

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Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-14 9D8WWF10	MATRIX:	OTHER
CLIENT ID:	B0XN00	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	2.13E-02	U	2.0E-02	2.0E-02	2.23E-02	pCi/g	91.05%	RICHRC5080	D8WW	0060179
PU-238	3.30E-03	U	7.9E-03	7.9E-03	1.79E-02	pCi/g	79.31%	RICHRC5010	D8WW	0060177
PU239/40	9.02E-02	~~U~~	3.8E-02	4.1E-02	1.06E-02	pCi/g	79.31%	RICHRC5010	D8WW	0060177
BA-133	7.01E-02	U	4.5E-02	4.5E-02	6.68E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	4.07E-01	J	6.6E-02	6.6E-02	4.59E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	8.27E+00		8.4E-01	8.4E-01	4.80E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	1.28E+00		2.3E-01	2.3E-01	1.41E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	8.71E-02	U	8.6E-02	8.6E-02	1.56E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	8.07E-03	U	5.5E-02	5.5E-02	9.09E-02	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	2.12E+00		1.4E-01	6.2E-01	7.67E-02	pCi/g	92.00%	RICHRC5006	D8WW	0060181
C-14	8.28E+01	J	1.4E+00	3.8E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	9.48E+00	~~U~~ J	5.2E-01	3.2E+00	4.79E+00	pCi/g	97.89%	RICHRC5069	D8WW	0060174
TC-99	2.86E-01	U	1.5E-02	7.1E-01	7.68E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

4/13/00

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SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-15 9D8WWG10	MATRIX:	OTHER
CLIENT ID:	B0XN01	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	-3.44E-04	U	6.9E-04	6.9E-04	1.73E-02	pCi/g	94.23%	RICHRC5080	D8WW	0060179
PU-238	0.00E+00	U	0.0E+00	9.7E-03	1.07E-02	pCi/g	79.28%	RICHRC5010	D8WW	0060177
PU239/40	1.97E-02		1.8E-02	1.8E-02	1.07E-02	pCi/g	79.28%	RICHRC5010	D8WW	0060177
BA-133	1.03E-01	U	4.8E-02	4.8E-02	7.11E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	1.69E-01	U J	4.6E-02	4.6E-02	8.19E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	5.25E+00		5.4E-01	5.4E-01	5.79E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	7.00E-01	U	1.8E-01	1.8E-01	1.87E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	2.77E-02	U	1.0E-01	1.0E-01	1.80E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	3.81E-02	U	7.1E-02	7.1E-02	1.18E-01	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	1.68E+00		1.3E-01	4.9E-01	7.78E-02	pCi/g	96.20%	RICHRC5006	D8WW	0060181
C-14	7.76E+01	J	1.3E+00	3.6E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	7.55E+00	J	4.2E-01	3.3E+00	5.01E+00	pCi/g	91.32%	RICHRC5069	D8WW	0060174
TC-99	1.49E-01	U	7.9E-03	7.0E-01	7.71E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

4/12/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-1	9D8WVK10	MATRIX:	OTHER
CLIENT ID:	B0XN02		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	1.02E-02	U	1.6E-02	1.6E-02	2.53E-02	pCi/g	93.00%	RICHRC5080	D8WVK	0060179
PU-238	0.00E+00	U	0.0E+00	9.3E-03	1.02E-02	pCi/g	82.02%	RICHRC5010	D8WVK	0060177
PU239/40	4.91E-02		2.7E-02	2.8E-02	1.02E-02	pCi/g	82.02%	RICHRC5010	D8WVK	0060177
BA-133	7.04E-02	U	5.3E-02	5.3E-02	7.81E-02	pCi/g		RICHRC5017	D8WVK	0060180
CO-60	1.00E-01	U J	4.4E-02	4.4E-02	8.05E-02	pCi/g		RICHRC5017	D8WVK	0060180
CS-137	5.81E+00		6.0E-01	6.0E-01	6.75E-02	pCi/g		RICHRC5017	D8WVK	0060180
EU-152	6.19E-01	U	1.6E-01	1.6E-01	2.01E-01	pCi/g		RICHRC5017	D8WVK	0060180
EU-154	9.33E-03	U	1.1E-01	1.1E-01	1.92E-01	pCi/g		RICHRC5017	D8WVK	0060180
EU-155	-6.27E-02	U	7.6E-02	7.6E-02	1.24E-01	pCi/g		RICHRC5017	D8WVK	0060180
STRONTIUM	2.05E+00		1.4E-01	6.0E-01	8.61E-02	pCi/g	88.90%	RICHRC5006	D8WVK	0060181
C-14	7.10E+01	J	1.3E+00	3.4E+00	8.02E-01	pCi/g	100.00%	RICHRC5022	D8WVK	0060171
NI-63	8.10E+00	J	4.5E-01	3.3E+00	5.00E+00	pCi/g	94.92%	RICHRC5069	D8WVK	0060174
TC-99	5.26E-02	U	2.9E-03	7.0E-01	7.81E-01	pCi/g	100.00%	RICHRC5078	D8WVK	0060176

Number of Results: 13

4/13/00

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Severn Trent Laboratories Richland
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-2	9D8WVW10	MATRIX:	OTHER
CLIENT ID:	B0XN03		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	0.00E+00	U	0.0E+00	1.0E-02	1.11E-02	pCi/g	94.25%	RICHRC5080	D8WV	0060179
PU-238	-3.12E-04	U	6.2E-04	6.3E-04	1.57E-02	pCi/g	80.06%	RICHRC5010	D8WV	0060177
PU239/40	2.30E-02		1.9E-02	1.9E-02	1.57E-02	pCi/g	80.06%	RICHRC5010	D8WV	0060177
BA-133	2.50E-02	U	3.6E-02	3.6E-02	5.46E-02	pCi/g		RICHRC5017	D8WV	0060180
CO-60	4.71E-02	U J	3.3E-02	3.3E-02	6.04E-02	pCi/g		RICHRC5017	D8WV	0060180
CS-137	2.15E+00		2.3E-01	2.3E-01	4.82E-02	pCi/g		RICHRC5017	D8WV	0060180
EU-152	2.68E-01	U	9.7E-02	9.7E-02	1.42E-01	pCi/g		RICHRC5017	D8WV	0060180
EU-154	3.25E-03	U	9.0E-02	9.0E-02	1.54E-01	pCi/g		RICHRC5017	D8WV	0060180
EU-155	1.94E-02	U	6.7E-02	6.7E-02	1.16E-01	pCi/g		RICHRC5017	D8WV	0060180
STRONTIUM	3.81E-01		7.0E-02	1.3E-01	8.84E-02	pCi/g	87.50%	RICHRC5006	D8WV	0060181
C-14	8.87E+00	J	3.8E-01	9.5E-01	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WV	0060171
NI-63	1.03E+01	J	5.6E-01	3.6E+00	5.33E+00	pCi/g	92.83%	RICHRC5069	D8WV	0060174
TC-99	2.85E-02	U	1.5E-03	6.9E-01	7.80E-01	pCi/g	100.00%	RICHRC5078	D8WV	0060176

Number of Results: 13

4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-3	9D8WW010	MATRIX:	OTHER
CLIENT ID:	B0XN04		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	0.00E+00	U	0.0E+00	3.4E-02	3.75E-02	pCi/g	28.45%	RICHRC5080	D8WW0	0060179
PU-238	-8.34E-04	U	1.2E-03	1.2E-03	2.38E-02	pCi/g	61.44%	RICHRC5010	D8WW0	0060177
PU239/40	1.25E-01		5.1E-02	5.5E-02	1.41E-02	pCi/g	61.44%	RICHRC5010	D8WW0	0060177
BA-133	1.94E-01	U	7.0E-02	7.0E-02	9.17E-02	pCi/g		RICHRC5017	D8WW0	0060180
CO-60	2.70E-01	J	8.9E-02	8.9E-02	6.37E-02	pCi/g		RICHRC5017	D8WW0	0060180
CS-137	9.70E+00		9.9E-01	9.9E-01	6.59E-02	pCi/g		RICHRC5017	D8WW0	0060180
EU-152	3.27E+00		3.8E-01	3.8E-01	1.87E-01	pCi/g		RICHRC5017	D8WW0	0060180
EU-154	3.91E-01	U	1.7E-01	1.7E-01	2.36E-01	pCi/g		RICHRC5017	D8WW0	0060180
EU-155	1.99E-02	U	1.0E-01	1.0E-01	1.77E-01	pCi/g		RICHRC5017	D8WW0	0060180
STRONTIUM	2.10E+00		1.4E-01	6.1E-01	7.82E-02	pCi/g	98.10%	RICHRC5006	D8WW0	0060181
C-14	5.67E+01	J	1.1E+00	2.8E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW0	0060171
NI-63	5.71E+00	J	3.3E-01	3.3E+00	5.41E+00	pCi/g	89.66%	RICHRC5069	D8WW0	0060174
TC-99	-1.52E-01	U	8.3E-03	6.8E-01	7.67E-01	pCi/g	100.00%	RICHRC5078	D8WW0	0060176

Number of Results: 13

4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-4	9D8WW210	MATRIX:	OTHER
CLIENT ID:	B0XMY0		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	4.25E-02	U	5.2E-02	5.3E-02	6.85E-02	pCi/g	26.64%	RICHRC5080	D8WW2	0060179
PU-238	-4.14E-04	U	8.3E-04	8.3E-04	2.08E-02	pCi/g	57.79%	RICHRC5010	D8WW2	0060177
PU239/40	8.79E-02		4.3E-02	4.5E-02	1.40E-02	pCi/g	57.79%	RICHRC5010	D8WW2	0060177
BA-133	1.18E-02	U	4.3E-02	4.3E-02	6.20E-02	pCi/g		RICHRC5017	D8WW2	0060180
CO-60	4.13E-01	J	8.4E-02	8.4E-02	5.45E-02	pCi/g		RICHRC5017	D8WW2	0060180
CS-137	5.69E+00		5.9E-01	5.9E-01	5.33E-02	pCi/g		RICHRC5017	D8WW2	0060180
EU-152	5.87E-01	U	1.4E-01	1.4E-01	1.80E-01	pCi/g		RICHRC5017	D8WW2	0060180
EU-154	1.15E-02	U	1.0E-01	1.0E-01	1.82E-01	pCi/g		RICHRC5017	D8WW2	0060180
EU-155	4.09E-02	U	6.1E-02	6.1E-02	1.04E-01	pCi/g		RICHRC5017	D8WW2	0060180
STRONTIUM	3.35E+00		1.8E-01	9.7E-01	8.85E-02	pCi/g	87.10%	RICHRC5006	D8WW2	0060181
C-14	1.01E+02	J	1.5E+00	4.5E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW2	0060171
NI-63	7.90E+00	J	4.4E-01	3.0E+00	4.61E+00	pCi/g	96.78%	RICHRC5069	D8WW2	0060174
TC-99	6.59E-01	U	3.4E-02	7.4E-01	7.85E-01	pCi/g	100.00%	RICHRC5078	D8WW2	0060176

Number of Results: 13

4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-5	9D8WW310	MATRIX:	OTHER
CLIENT ID:	B0XMY1		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	2.41E-02		2.0E-02	2.0E-02	1.09E-02	pCi/g	103.01%	RICHRC5080	D8WW3	0060179
PU-238	-2.44E-03	U	2.4E-03	2.5E-03	4.08E-02	pCi/g	42.97%	RICHRC5010	D8WW3	0060177
PU239/40	1.29E-01		6.3E-02	6.7E-02	3.49E-02	pCi/g	42.97%	RICHRC5010	D8WW3	0060177
BA-133	1.17E-01	U	6.3E-02	6.3E-02	9.27E-02	pCi/g		RICHRC5017	D8WW3	0060180
CO-60	5.47E-01	J	8.4E-02	8.4E-02	4.53E-02	pCi/g		RICHRC5017	D8WW3	0060180
CS-137	2.09E+01		2.1E+00	2.1E+00	5.72E-02	pCi/g		RICHRC5017	D8WW3	0060180
EU-152	3.42E+00		4.1E-01	4.1E-01	1.95E-01	pCi/g		RICHRC5017	D8WW3	0060180
EU-154	4.49E-01		1.6E-01	1.6E-01	1.46E-01	pCi/g		RICHRC5017	D8WW3	0060180
EU-155	6.72E-02	U	7.8E-02	7.8E-02	1.29E-01	pCi/g		RICHRC5017	D8WW3	0060180
STRONTIUM	2.65E+00		1.6E-01	7.7E-01	7.69E-02	pCi/g	93.90%	RICHRC5006	D8WW3	0060181
C-14	4.42E+01	J	9.9E-01	2.4E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW3	0060171
NI-63	1.75E+01	J	8.7E-01	3.8E+00	4.90E+00	pCi/g	93.30%	RICHRC5069	D8WW3	0060174
TC-99	1.03E-01	U	5.5E-03	7.0E-01	7.57E-01	pCi/g	100.00%	RICHRC5078	D8WW3	0060176

Number of Results: 13

RW
4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-6	9D8WW410	MATRIX:	OTHER
CLIENT ID:	B0XMY2		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	2.91E-03	U	8.7E-03	8.7E-03	2.29E-02	pCi/g	101.18%	RICHRC5080	D8WW4	0060179
PU-238	0.00E+00	U	0.0E+00	1.4E-02	1.53E-02	pCi/g	58.90%	RICHRC5010	D8WW4	0060177
PU239/40	5.63E-03	U	1.1E-02	1.1E-02	1.53E-02	pCi/g	58.90%	RICHRC5010	D8WW4	0060177
BA-133	1.87E-02	U	3.4E-02	3.4E-02	4.94E-02	pCi/g		RICHRC5017	D8WW4	0060180
CO-60	3.70E-02	U J	3.3E-02	3.3E-02	6.01E-02	pCi/g		RICHRC5017	D8WW4	0060180
CS-137	1.78E+00		2.0E-01	2.0E-01	4.65E-02	pCi/g		RICHRC5017	D8WW4	0060180
EU-152	3.32E-01	U	1.1E-01	1.1E-01	1.33E-01	pCi/g		RICHRC5017	D8WW4	0060180
EU-154	-8.73E-02	U	8.9E-02	8.9E-02	1.45E-01	pCi/g		RICHRC5017	D8WW4	0060180
EU-155	2.63E-02	U	4.5E-02	4.5E-02	7.55E-02	pCi/g		RICHRC5017	D8WW4	0060180
STRONTIUM	5.71E-01		7.9E-02	1.8E-01	7.94E-02	pCi/g	92.10%	RICHRC5006	D8WW4	0060181
C-14	5.56E+00	J	2.7E-01	8.1E-01	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW4	0060171
NI-63	7.51E+00	J	4.4E-01	3.7E+00	6.07E+00	pCi/g	90.77%	RICHRC5069	D8WW4	0060174
TC-99	4.22E-01	U	2.2E-02	7.3E-01	7.97E-01	pCi/g	100.00%	RICHRC5078	D8WW4	0060176

Number of Results: 13

pr
4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-7	9D8WW510	MATRIX:	OTHER
CLIENT ID:	B0XMY3		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	4.86E-03	U	9.7E-03	9.8E-03	1.32E-02	pCi/g	86.62%	RICHRC5080	D8WW5	0060179
PU-238	0.00E+00	U	0.0E+00	1.4E-02	1.58E-02	pCi/g	59.68%	RICHRC5010	D8WW5	0060177
PU239/40	3.50E-02		2.9E-02	2.9E-02	1.58E-02	pCi/g	59.68%	RICHRC5010	D8WW5	0060177
BA-133	8.51E-02	U	4.0E-02	4.0E-02	5.70E-02	pCi/g		RICHRC5017	D8WW5	0060180
CO-60	1.60E-01	J	4.8E-02	4.8E-02	4.96E-02	pCi/g		RICHRC5017	D8WW5	0060180
CS-137	3.30E+00		3.5E-01	3.5E-01	4.30E-02	pCi/g		RICHRC5017	D8WW5	0060180
EU-152	4.59E-01		1.5E-01	1.5E-01	1.12E-01	pCi/g		RICHRC5017	D8WW5	0060180
EU-154	-1.07E-02	U	8.6E-02	8.6E-02	1.46E-01	pCi/g		RICHRC5017	D8WW5	0060180
EU-155	2.14E-02	U	4.9E-02	4.9E-02	8.20E-02	pCi/g		RICHRC5017	D8WW5	0060180
STRONTIUM	8.84E-01		9.3E-02	2.7E-01	7.85E-02	pCi/g	96.50%	RICHRC5006	D8WW5	0060181
C-14	3.25E+01	J	8.3E-01	1.9E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW5	0060171
NI-63	9.44E+00	J	5.5E-01	3.4E+00	5.52E+00	pCi/g	92.55%	RICHRC5069	D8WW5	0060174
TC-99	-1.04E-01	U	5.6E-03	6.8E-01	7.66E-01	pCi/g	100.00%	RICHRC5078	D8WW5	0060176

Number of Results: 13

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4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-8	9D8WW610	MATRIX:	OTHER
CLIENT ID:	B0XMY4		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	2.51E-02	J	2.0E-02	2.1E-02	1.13E-02	pCi/g	100.97%	RICHRC5080	D8WW6	0060179
PU-238	-7.42E-04	U	1.0E-03	1.1E-03	2.12E-02	pCi/g	68.78%	RICHRC5010	D8WW6	0060177
PU239/40	2.32E-02	J	2.1E-02	2.1E-02	1.26E-02	pCi/g	68.78%	RICHRC5010	D8WW6	0060177
BA-133	-6.96E-03	U	3.3E-02	3.3E-02	4.59E-02	pCi/g		RICHRC5017	D8WW6	0060180
CO-60	7.74E-02	U J	4.2E-02	4.2E-02	5.35E-02	pCi/g		RICHRC5017	D8WW6	0060180
CS-137	2.89E+00		3.0E-01	3.0E-01	3.72E-02	pCi/g		RICHRC5017	D8WW6	0060180
EU-152	2.73E-01	U	9.2E-02	9.2E-02	1.26E-01	pCi/g		RICHRC5017	D8WW6	0060180
EU-154	9.83E-03	U	6.6E-02	6.6E-02	1.17E-01	pCi/g		RICHRC5017	D8WW6	0060180
EU-155	4.39E-02	U	4.1E-02	4.1E-02	6.87E-02	pCi/g		RICHRC5017	D8WW6	0060180
STRONTIUM	5.51E-01	J	7.8E-02	1.7E-01	7.89E-02	pCi/g	89.50%	RICHRC5006	D8WW6	0060181
C-14	5.37E+00	J J	2.7E-01	8.0E-01	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW6	0060171
NI-63	7.62E+00	J J	4.6E-01	3.2E+00	5.59E+00	pCi/g	92.22%	RICHRC5069	D8WW6	0060174
TC-99	-4.51E-01	U	2.5E-02	6.5E-01	7.61E-01	pCi/g	100.00%	RICHRC5078	D8WW6	0060176

Number of Results: 13

pw
4/13/00

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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rptChemRadSample; v3.41

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SAMPLE RESULTS

LAB NAME:	STL Richland		SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-9	9D8WW810	MATRIX:	OTHER
CLIENT ID:	B0XMY5		DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	1.20E-02	U	1.5E-02	1.5E-02	2.18E-02	pCi/g	95.18%	RICHRC5080	D8WW8	0060179
PU-238	0.00E+00	U	0.0E+00	1.5E-02	1.70E-02	pCi/g	49.43%	RICHRC5010	D8WW8	0060177
PU239/40	1.38E-01	J	5.9E-02	6.4E-02	1.70E-02	pCi/g	49.43%	RICHRC5010	D8WW8	0060177
BA-133	1.81E-01	U	8.0E-02	8.0E-02	7.56E-02	pCi/g		RICHRC5017	D8WW8	0060180
CO-60	2.29E-01	J	5.4E-02	5.4E-02	4.34E-02	pCi/g		RICHRC5017	D8WW8	0060180
CS-137	8.80E+00		8.9E-01	8.9E-01	4.77E-02	pCi/g		RICHRC5017	D8WW8	0060180
EU-152	3.55E+00		4.2E-01	4.2E-01	1.45E-01	pCi/g		RICHRC5017	D8WW8	0060180
EU-154	3.71E-01	U	1.3E-01	1.3E-01	1.88E-01	pCi/g		RICHRC5017	D8WW8	0060180
EU-155	1.05E-01	U	6.0E-02	6.0E-02	1.01E-01	pCi/g		RICHRC5017	D8WW8	0060180
STRONTIUM	2.77E+00		1.6E-01	8.0E-01	7.54E-02	pCi/g	99.00%	RICHRC5006	D8WW8	0060181
C-14	3.68E+01	J	8.9E-01	2.1E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW8	0060171
NI-63	9.43E+00	J	5.2E-01	3.1E+00	4.68E+00	pCi/g	98.68%	RICHRC5069	D8WW8	0060174
TC-99	5.11E-02	U	2.7E-03	6.9E-01	7.61E-01	pCi/g	100.00%	RICHRC5078	D8WW8	0060176

Number of Results: 13

4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-10 9D8WWA10	MATRIX:	OTHER
CLIENT ID:	B0XMY6	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	1.76E-02	U	1.8E-02	1.8E-02	1.80E-02	pCi/g	83.93%	RICHRC5080	D8WW	0060179
PU-238	-2.72E-04	U	5.4E-04	5.5E-04	1.37E-02	pCi/g	90.50%	RICHRC5010	D8WW	0060177
PU239/40	6.46E-02		3.0E-02	3.1E-02	9.21E-03	pCi/g	90.50%	RICHRC5010	D8WW	0060177
BA-133	2.85E-01	U	7.9E-02	7.9E-02	8.67E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	1.74E-01	J	6.8E-02	6.8E-02	5.49E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	1.07E+01		1.1E+00	1.1E+00	6.00E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	1.80E+00		2.5E-01	2.5E-01	1.58E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	1.96E-01	U	1.1E-01	1.1E-01	2.09E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	3.83E-02	U	7.4E-02	7.4E-02	1.25E-01	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	2.60E+00		1.6E-01	7.6E-01	7.95E-02	pCi/g	91.30%	RICHRC5006	D8WW	0060181
C-14	8.22E+01	J	1.4E+00	3.8E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	1.16E+01	J	6.2E-01	3.5E+00	5.08E+00	pCi/g	97.50%	RICHRC5069	D8WW	0060174
TC-99	2.39E-02	U	1.3E-03	6.9E-01	7.74E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

4/13/00

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-11 9D8WWC10	MATRIX:	OTHER
CLIENT ID:	B0XMY7	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	3.49E-03	U	7.6E-03	7.6E-03	1.53E-02	pCi/g	102.02%	RICHRC5080	D8WW	0060179
PU-238	0.00E+00	U	0.0E+00	1.1E-02	1.17E-02	pCi/g	73.88%	RICHRC5010	D8WW	0060177
PU239/40	-3.46E-04	U	6.9E-04	7.0E-04	1.74E-02	pCi/g	73.88%	RICHRC5010	D8WW	0060177
BA-133	1.00E-02	U	3.4E-02	3.4E-02	4.90E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	4.59E-02	U J	2.8E-02	2.8E-02	5.23E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	2.01E+00		2.2E-01	2.2E-01	4.24E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	3.43E-01	U	1.1E-01	1.1E-01	1.30E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	-1.54E-02	U	7.4E-02	7.4E-02	1.26E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	-1.33E-02	U	4.3E-02	4.3E-02	7.29E-02	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	3.26E-01		6.4E-02	1.1E-01	8.09E-02	pCi/g	91.00%	RICHRC5006	D8WW	0060181
C-14	8.39E+00	J	3.7E-01	9.3E-01	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	7.18E+00	J	4.1E-01	3.3E+00	5.07E+00	pCi/g	93.87%	RICHRC5069	D8WW	0060174
TC-99	2.14E-01	U	1.1E-02	7.1E-01	7.76E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

4/13/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-12 9D8WWD10	MATRIX:	OTHER
CLIENT ID:	B0XMY8	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	4.24E-03	U	8.5E-03	8.5E-03	1.15E-02	pCi/g	93.97%	RICHRC5080	D8WW	0060179
PU-238	3.76E-03	U	1.1E-02	1.1E-02	2.95E-02	pCi/g	75.28%	RICHRC5010	D8WW	0060177
PU239/40	8.28E-02		4.3E-02	4.5E-02	1.50E-02	pCi/g	75.28%	RICHRC5010	D8WW	0060177
BA-133	3.15E-03	U	5.1E-02	5.1E-02	7.23E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	1.05E-01	U J	4.6E-02	4.6E-02	8.71E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	4.01E+00		4.2E-01	4.2E-01	6.21E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	5.82E-01	U	1.6E-01	1.6E-01	1.96E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	1.25E-01	U	1.2E-01	1.2E-01	2.19E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	5.58E-02	U	6.5E-02	6.5E-02	1.09E-01	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	1.77E+00		1.3E-01	5.2E-01	8.37E-02	pCi/g	89.10%	RICHRC5006	D8WW	0060181
C-14	6.34E+01	J	1.2E+00	3.1E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	2.03E+01	J	9.8E-01	4.0E+00	4.80E+00	pCi/g	91.81%	RICHRC5069	D8WW	0060174
TC-99	2.43E-01	U	1.3E-02	7.1E-01	7.64E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

pr
3/14/00

Quanterra

SAMPLE RESULTS

LAB NAME:	STL Richland	SDG: /RPT GRP:	W03090 / 10165
LOT,RPT DB ID:	J0B230234-13 9D8WWE10	MATRIX:	OTHER
CLIENT ID:	B0XMY9	DATE RECEIVED:	2/23/2000 1:30:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
AM-241	3.43E-03	U	9.1E-03	9.1E-03	2.25E-02	pCi/g	94.69%	RICHRC5080	D8WW	0060179
PU-238	-4.51E-04	U	9.0E-04	9.0E-04	2.27E-02	pCi/g	75.20%	RICHRC5010	D8WW	0060177
PU239/40	6.14E-02		3.7E-02	3.9E-02	2.26E-02	pCi/g	75.20%	RICHRC5010	D8WW	0060177
BA-133	-1.31E-02	U	3.9E-02	3.9E-02	5.93E-02	pCi/g		RICHRC5017	D8WW	0060180
CO-60	1.48E-01	J	4.8E-02	4.8E-02	5.63E-02	pCi/g		RICHRC5017	D8WW	0060180
CS-137	3.81E+00		4.0E-01	4.0E-01	5.48E-02	pCi/g		RICHRC5017	D8WW	0060180
EU-152	1.03E+00		1.9E-01	1.9E-01	1.36E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-154	5.18E-02	U	1.0E-01	1.0E-01	1.81E-01	pCi/g		RICHRC5017	D8WW	0060180
EU-155	6.14E-02	U	5.6E-02	5.6E-02	9.53E-02	pCi/g		RICHRC5017	D8WW	0060180
STRONTIUM	1.50E+00		1.3E-01	4.4E-01	8.89E-02	pCi/g	84.00%	RICHRC5006	D8WW	0060181
C-14	2.04E+01	J	6.4E-01	1.4E+00	8.03E-01	pCi/g	100.00%	RICHRC5022	D8WW	0060171
NI-63	9.29E+00	J	5.1E-01	3.5E+00	5.22E+00	pCi/g	90.98%	RICHRC5069	D8WW	0060174
TC-99	9.82E-02	U	5.3E-03	7.0E-01	7.78E-01	pCi/g	100.00%	RICHRC5078	D8WW	0060176

Number of Results: 13

4/13/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Quanterra

Quanterra
2800 George Washington Way
Richland, Washington 99352-1613

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS
Amended 4/4/00

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

April 4, 2000

Attention: Joan Kessner

SAF Number	:	B00-013
Date SDG Closed	:	February 23, 2000
Number of Samples	:	Fifteen (15)
Sample Type	:	Other
SDG Number	:	W03090
Data Deliverable	:	21-Day / Summary

I. Introduction

On February 23, 2000, fifteen other (matrix: solid) samples were received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

STLR ID#	BHI ID#	MATRIX	DATE OF RECEIPT
9D8WVK10	B0XN02	OTHER	2/23/00
9D8WVW10	B0XN03	OTHER	2/23/00
9D8WW010	B0XN04	OTHER	2/23/00
9D8WW210	B0XMY0	OTHER	2/23/00
9D8WW310	B0XMY1	OTHER	2/23/00
9D8WW410	B0XMY2	OTHER	2/23/00
9D8WW510	B0XMY3	OTHER	2/23/00
9D8WW610	B0XMY4	OTHER	2/23/00
9D8WW810	B0XMY5	OTHER	2/23/00
9D8WWA10	B0XMY6	OTHER	2/23/00
9D8WWC10	B0XMY7	OTHER	2/23/00
9D8WWD10	B0XMY8	OTHER	2/23/00
9D8WWE10	B0XMY9	OTHER	2/23/00
9D8WWF10	B0XN00	OTHER	2/23/00
9D8WWG10	B0XN01	OTHER	2/23/00

Quanterra

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
Americium-241 by method RICH-RC-5080
Liquid Scintillation Counting
Technetium-99 by method RICH-RC-5078
Nickel-63 by method RICH-RC-5069
Carbon-14 by method RICH-RC-5022

III. Quality Control

The analytical results for each analysis performed under SDG W03090 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 achieved Co-60 MDAs for samples B0XN02, B0XN03, B0XN04, B0XMY2, B0XMY8, B0XMY9, B0XN01 and B0XMY1 duplicate do not meet the CRDL due to insufficient sample volumes. The data are accepted for reporting with the MDAs achieved. Except as noted, the LCS, batch blank, samples and sample duplicate (B0XMY1) results are within contractual requirements.

Gas Proportional Counting
Total Strontium by method RICH-RC-5006:
The LCS, batch blank, samples and sample duplicate (B0XMY2) results are within contractual requirements.

0003

Alpha Spectroscopy

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

The LCS, batch blank, samples and sample duplicate (B0XMY0) results are within contractual requirements.

Americium-241 by method RICH-RC-5080:

The LCS and batch blank samples were switched during analysis due to a technician error. The sample identifications were corrected for calculation. Since all sample results are significantly less than the CRDL, the data are accepted for reporting. Except as noted, the LCS, batch blank, samples and sample duplicate (B0XMY0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method RICH-RC-5078:

The LCS, batch blank, samples, sample duplicate (B0XN04) and sample matrix spike (B0XN04) results are within contractual requirements.

Nickel-63 by method RICH-RC-5069:

The LCS, batch blank, samples, sample duplicate (B0XN03) and sample matrix spike (B0XN03) results are within contractual requirements.

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, samples and sample duplicate (B0XN02) 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

Jackie Waddell
Project Manager

0004

W-2-10-00

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-191	Page 1 of 1

Collector: Fahlberg	Company Contact: J Adler — Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 9L — Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F	SAF No.: B00-013	Air Quality [ ]
Ice Chest No.: ERC-96-059	Field Logbook No.: EL 1424 — COA: R105F2280C	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

8DX Due 3-1-05

SAMPLE ANALYSIS

W03090 JOB230234

			Preservation	None	None									
			Type of Container	aG	aG									
			No. of Container(s)	1	1									
			Volume 2/22/00	60mL	120mL									
				ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.									
Sample No.	Matrix *	Sample Date	Sample Time											
B0XN02 D8WVK	Other Solid	2-22-00	1232	X	X								B0XN07	
B0XN03 D8WVW	Other Solid	2-22-00	1240	X	X								B0XN07	
B0XN04 D8WN0	Other Solid	2-22-00	1232	X	X								B0XN07	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	1500 2-22-00	R. Thoren	2-22-00/1500
R. Thoren	2-23-00/1330	[illegible]	2-23-00 1330

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Barium-133}; Isotopic Plutonium; Strontium-89,90 – Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-187	Page 1 of 1

Collector: Fahlberg	Company Contact: J Adler — Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 9L — Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F	SAF No.: B00-013	Air Quality:
Ice Chest No.: ERC 96-059	Field Logbook No.: EL 1424 — COA: R105F2280C	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS													
			Preservation	None	None								
			Type of Container	sG	sG								
			No. of Container(s)	1	1								
			Volume	60mL	120mL								
				ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.								
Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY0 D8WW2	Other Solid	2.22.00	0842	X	X							Box	No7
B0XMY1 D8WW3	Other Solid	2.22.00	0853	X	X							Box	No7
B0XMY2 D8WW4	Other Solid	2.22.00	0905	X	X							Box	No7

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fell / R Fahlberg	2.22.00 1500	R. Thoren	2.22.00/1500
R. Thoren	2.23.00/1330	R. Ashley (signature)	2-23-00 1330

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 -- Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-188	Page 1 of 1
Collector: Fahlberg	Company Contact: J Adler; Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 9L; Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F	SAF No.: B00-013	Air Quality
Ice Chest No.: ERC 96059	Field Logbook No.: EL 1424; COA: R105F2280C	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	60mL	120mL									
SAMPLE ANALYSIS	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY3 D8WW5	Other Solid	2.22.00	0914	X	X								BOX NO7
B0XMY4 D8WW6	Other Solid	2.22.00	0927	X	X								BOX NO7
B0XMY5 D8WW8	Other Solid	2.22.00	0940	X	X								BOX NO7

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	1500 2-22-00	R. Thoren	2-22-00/1500
R. Thoren	2-23-00/1330	K. Adlerburg	1330 2-23-00

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 -- Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

Matrix *
S=Soil
SE=Sediment
SO=Solid
S =Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-189	Page 1 of 1

Collector Fahlberg	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ
Project Designation 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location 105F		SAF No. B00-013
Ice Chest No. ERC 96 059	Field Logbook No. EL 1424	COA R105F2280C	Method of Shipment Fed EX
Shipped To Quanterra Incorporated	Offsite Property No. NA		Bill of Lading/Air Bill No. NA

Price Code 9L

Air Quality ☐

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS													
			Preservation	None	None								
			Type of Container	aG	aG								
			No. of Container(s)	1	1								
			Volume	60mL	120mL								
				ICP Metals - 6010A (Supertrace) (Lead), Mercury - 7471 - (CV)	See item (1) in Special Instructions.								
Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY6 D8WWA	Other Solid	2.22.00	0950	X	X							BOXN07	
B0XMY7 D8WWC	Other Solid	2.22.00	1000	X	X							BOXN07	
B0XMY8 D8WWD	Other Solid	2.22.00	1010	X	X							BOXN07	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time 1500	Received By R. Thoren	Date/Time
R. Fell/R. Fahlberg	2.22.00	R. Thoren	2.22.00/1500
Relinquished By R. Thoren	Date/Time 2.23.00/1330	Received By K. Schlinsky	Date/Time 1330 2-23-00
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 -- Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

Matrix *

S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-013-190	Page 1 of 1
Collector: Fahlberg	Company Contact: J Adler; Telephone No.: 373-4316	Project Coordinator: TRENT, SJ	Price Code: 9L; Data Turnaround: 21 Days
Project Designation: 105-F/DR Phase III Below-grade Areas Sampling and Analy	Sampling Location: 105F	SAF No.: B00-013	Air Quality [ ]
Ice Chest No.: ERC 96 059	Field Logbook No.: EL 1424; COA: R105F2280C	Method of Shipment: Fed EX	
Shipped To: Quanterra Incorporated	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	60mL	120mL									
SAMPLE ANALYSIS	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
B0XMY9 D8WWE	Other Solid	2.22.00	1017	X	X							BOXN07	
B0XN00 D8WWF	Other Solid	2.22.00	1212	X	X							BOXN07	
B0XN01 D8WWG	Other Solid	2.22.00	1221	X	X							BOXN07	

B00-013

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	2.22.00 1500	R. Thoren	2.22.00/1500
R. Thoren	2.23.00/1330	Lidvenn / R. Schinkey	2-23-00 1370

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 -- Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

Matrix *
S=Soil
SE=Sediment
SO=Solid
S =Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 105 PR/F - concrete			DATA PACKAGE: ~~W6390~~ W03070		
VALIDATOR: TLI		LAB: QES		DATE:	
CASE:			SDG: W03090		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☑ Strontium-90	☑ Technetium-99	☑ Alpha Spectroscopy	☑ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ C14	X Ni-63	

SAMPLES/MATRIX BOXN02	BOXN03	BOXN04	BOXM40	
BOXM41	BOXM42	BOXM43	BOXM44	BOXM45
BOXM46	BOXM47	BOXM48	BOXM49	BOXN00
BOXN01				
				Solid

1. Completeness . . . . . ☒ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments:

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments:

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: C14 (=267) +99, DU, Am241, gamma, Sr90

Ni-63 (41.3) N02, N03, N04, Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y8, Y9, 00, 01 – J.

~~N03-FB~~ ~~PU239/40~~ CS137 SR C14 Ni-63

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed? . . . . . Yes No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . Yes No N/A
Spike source expired? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: No C14 MS - J all

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: C14✓ Ni✓ tcr✓ pu✓ Am✓ cs✓ Sr✓ — NO CO-60 LCS
IR LJ COLO

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . Yes No N/A
Chemical carrier traceable? . . . . . Yes No N/A
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: C14 Ni tcr pu✓ Am✓ Sam (check 154) Sr✓
(w/in ROL)

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . . . . Yes No N/A
Field duplicate RPD values acceptable? . . . . . Yes No N/A
Field split sample(s) analyzed? . . . . . Yes No N/A
Field split RPD values acceptable? . . . . . Yes No N/A
Performance audit sample(s) analyzed? . . . . . Yes No N/A
Performance audit sample results acceptable? . . . . . Yes No N/A

Comments: N02 / N04. CS137 (49%) Ni-63 (34.6%) 3.81
7.75
14.3
65.85
2.39/4.9

10. Holding Times

Are sample holding times acceptable? . . . . . Yes No N/A

Comments: IR on LCS

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments: ~~C060 152 154 155~~ 152 – N02
~~60 – Y4 N04~~ 154 – Y8, Y6, N04
~~152, 40 42 44, 47, 48, N01, N02, N03~~ 15 01, 02, 03, 04
~~154 – Y5, N04~~ 40 41 45 46 48
~~155 – Y5~~

Quanterra

BLANK RESULTS

LAB NAME: STL Richland SDG /RPT GRP: W03090 / 10165

LOT,RPT DB ID: J0B290000-174 D948E11B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	RPT UNIT	YIELD	METHOD NUMBER	WORK ORDE	BAT-CH
NI-63	8.27E+00	J	4.8E-01	3.3E+00	5.33E+00	pCi/g	100.34%	RICHRC5069	D948E1	0060174

Number of Results: 1

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

Severn Trent Laboratories Richland
rptChemRadBlank; v3.41

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 April 2000

Information Request #3

W03090 - Metals

No matrix spike data is present.

Matrix spike data is on pg 33 of metals data package (not with rest of QC results). If you don't have pg 33 let us know

RZW 4-6-00

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 April 2000

Information Request #1

W03090 - Rad

No LCS data is present for cobalt-60. Was one analyzed??

LCS material used by the lab does not contain Co-60
Proceed with validation

RZW 4-6-00

facsimile transmittal

To: B. Christian Fax: 375-5151

From: R. Weiss Date: 4-6-00

Re: WO3090 TRs Pages: 3

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

See attached

Rich

TRANSMISSION RESULT REPORT (APR 06 '00 08:18AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
097	MEMORY TX		3755151	03/03	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

[redacted]

To: B. Christian Fax: 375-5151

From: R. Weiss Date: 4-6-00

Re: 1103070 TBs Pages: 3

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

See attached

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 April 2000

Information Request #2

W03090 - Rad

LSC JMD 4/6/00

I need the preparation and analysis dates for the ~~LCS~~ analytes.

See attached pages. This should close this IR...

Liquid Scintillation Counting Sheet

QC BATCH Number: 0060176 5078 3-14-00

Position	WorkOrder No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value
1	D8WVK 105	2g		
2	D8WVW105			
3	D8WWA 105			
4	D8WWC 105			
5	D8WWD 105			
6	D8WWE 105			
7	D8WWF 105			
8	D8WWG 105			
9	D8WW0108X (NA)			
10	D8WW0105			
11	D8WW0109S			TCSG0152 PR.2/18/00 EX.2/18/01
12	D948F104B	5ml		
13	D8WW2 105	2g		
14	D8WW3105			
15	D8WW4105			
16	D8WW5105			
17	D8WW6105			
18	D8WW8105			
19	D948F101B	100 ml		
20	D948F102C	100 ml		TCSE0423 PR.2/18/00 EX.2/18/01
21	D948F103B	5ml		
22				
23				
24				

Preparation Information

Analysis: TC99
Matrix: Solid
Client: BHI
Date Cocktail Added: 3-9-00
Total Count Time 60 min
Volume Counted: 5 mLs
Tray No(s): 24-67
Initials: MH

Counting Information

Tower No: 5
LSC#: 4
CR Initials: [illegible]

Comments

Counted 3/10/00

JW 4/6/00

RC-114, Rev.1, 4/99

Liquid Scintillation Counting Sheet

QC BATCH Number: 0060174 3-14-00

Position	WorkOrder No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value
1	D948E103B	5		
2	D8WVK102			
3	D8KVW10AX			
4	D8KVW102			
5	D8KVW109S			
6	D8WWA102			
7	D8WWC102			
8	D8WWD102			
9	D8WWE102			
10	D8WWF102			
11	D8WWG102			
12	D8WWO102			
13	D948E104B	5		
14	D8WW2102			
15	D8WW3102			
16	D8WW4102			
17	D8WW5102			
18	D8WW6102			
19	D8WW8102			
20	D948E101B			
21	D948E102C			
22				
23				
24				

Preparation Information

Analysis: NI63
Matrix: Solid
Client: BHI
Date Cocktail Added: 3/23/00
Total Count Time 100 min
Volume Counted: 5 mLs
Tray No(s): 3, 18
Initials: PB

Counting Information

Tower No: 4
LSC#: 5
CR Initials: G

Comments

Counted 3/27/00

JW 4/6/00

RC-114, Rev.1, 4/99

Liquid Scintillation Counting Sheet

QC BATCH Number: 0060171

Position	WorkOrder No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value
1	D948A-1-01BN	5		
2	D948A-1-03BN	2		
3	D948A-1-02 C	↓		CSE0068 20.403 PR.3/3/00 EX.3/3/00
4	D8WVK-1-07	↓		
5	D8WVK-1-09X	↓		
6	D8WVW-1-07	↓		
7	D8WWA-1-07	↓		
8	D8WWC-1-07	↓		
9	D8WWD-1-07	↓		
10	D8WWE-1-07	↓		
11	D8WWF-1-07	↓		
12	D8WWG-1-07	↓		
13	D8WWO-1-07	↓		
14	D8WW2-1-07	↓		
15	D8WW3-1-07	↓		
16	D8WW4-1-07	↓		
17	D8WW5-1-07	↓		
18	D8WW6-1-07	↓		
19	D8WW8-1-07	↓		
20				
21				
22				
23				
24				

Preparation Information

Analysis: C-14

Matrix: Concrete

Client: BHI

Date Cocktail Added: 3-3-00

Total Count Time 40 min

Volume Counted: 5 mLs

Tray No(s): 8, 13

Initials: DM

Counting Information

Tower No: 11

LSC#: 3/3/00 4S

CR Initials: CM

Comments

Counted 3/4/00

JW 4/6/00

RC-114, Rev.1, 4/99

TRANSMISSION RESULT REPORT (APR 06 '00 07:49AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
096	MEMORY TX		3755151	04/04	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

Apr-05-00 03:59P APR 05 '00 03:15PM

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 April 2000

Information Request #2

W03090 - Rad

4/6/00

TRANSMISSION RESULT REPORT (APR 24 '00 01:51PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
077	MEMORY TX		3755151	03/03	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

Data Package Review - RLW

H0766 Inorganics: Pg. 2, Preparation Blanks, Last paragraph; typo ("an" not "and"). The parenthetical clause here is not clear. Should the "no action" comment belong in the equipment blank section?

Volatiles: No comments

Radiochemistry: No comments.

W03090 Inorganics: No comments.

Radiochemistry: Need to reevaluate and revise detection level sections. The evaluations appear to have been made against the reported "results" not MDA values. For example most Eu-155 MDAs do not meet the criteria. Also please note that Quanterra routinely reports non-detect results greater than the reported MDA (most Eu-152 issues noted in this report fall into this category). This is an artifact of Quanterra's antiquated gamma spec software (two different subroutines are used for the "result" and "MDA" calcs). Please identify those cases where the MDA was technically met but that reported non-detect values are above the CRDL.

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 April 2000

Information Request #4

W03090 - Metals

In the validation service request sample summary, page 17, it states that sample B0XN03 is an equipment blank, and then says 'Error'. Is this sample an EB??

Good catch – this is <u>not</u> an equipment blank.

Jeanette

HOLIDAY INN KNOXVILLE CENTRAL @ PAPERMILL

FACSIMILE TRANSMITTAL SHEET

TO: J. Duncan	FROM: Claude Stacey
COMPANY: ERC/CHI	DATE: 04/24/00
FAX NUMBER: (509) 372-9487	TOTAL NO. OF PAGES INCLUDING COVER: 3
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
RE:	YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Validation Report Comments

Sorry these are late.

Claude

1315 KIRBY ROAD
KNOXVILLE TN 37909

Data Package Review - RLW

H0766 Inorganics: Pg. 2, Preparation Blanks, Last paragraph; typo ("an" not "and"). The parenthetical clause here is not clear. Should the "no action" comment belong in the equipment blank section?

Volatiles: No comments

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W03090 Inorganics: No comments.

Radiochemistry: Need to reevaluate and revise detection level sections. The evaluations appear to have been made against the reported "results" not MDA values. For example most Eu-155 MDAs do not meet the criteria. Also please note that Quanterra routinely reports non-detect results greater than the reported MDA (most Eu-152 issues noted in this report fall into this category). This is an artifact of Quanterra's antiquated gamma spec software (two different subroutines are used for the "result" and "MDA" calcs). Please identify those cases where the MDA was technically met but that reported non-detect values are above the CRDL.

APR-24-00 04:15 PM HOLIDAY INN 850 588 6728 APR 24 '00 12:15PM P.02

Review Comment Record (RCR)

1. Date	2. Review No.
04/18/00	QA-0024
3. Project	**4. Page**
105-F/DR	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. W03090	105-F/DR Phase III Below grade Sampling and Analysis	Claude Stacey	Quality Program	372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry: Page 10, sample B0XMY6, C-14 has the result as 0.822; were as the lab report sheet shows the result as 82.2.			
2	Inorganic: Page 2, Holding Times, first paragraph, last line should include meeting Cr-6 holding time.			
3	Inorganic: Page 10 the title has the matrix as water and units as UG/L. The matrix is soil and the units are MG/KG.			

Review Comment Record (RCR)

1. Date	2. Review No.
04/18/00	QA-0025
3. Project	**4. Page**
100-D	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0766	100-D Full Protocol	Claude Stacey	Quality Program	372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____ Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry: Page 10, sample B0XP52, Sr-Total has the result as –0.077 were as the lab report sheet shows the result as 0.007.			
2	Inorganic: OK			
3	Volatiles: OK			

CH2M HILL
Hanford, Inc.

MEMORANDUM

To: J Dawson / B Christian (OFFICE)

(OFFICE)

(OFFICE)

(OFFICE)

(OFFICE)

(OFFICE)

From: Rich Weiss (OFFICE)

Date: Project No:

Re: SDS 3090 Rad Val

Detection Limit sections (pg 3+4) still incorrect

Correct as follows

Analytes above the PQL

Eu-155
BOXNO1, BOXNO2, BOXNO3, BOXNO4, BOXMY0, BOXMY1, BOXMY5, BOXMY6, BOXMY8

Eu-154
BOXMY8, BOXMY6, BOXNO4 (not BOXNO2)

Eu-152
BOXNO2

Other Corrections OK

Rich Weiss

372-5487

TRANSMISSION RESULT REPORT (APR 25 '00 10:37AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
083	MEMORY TX		3755151	01/01	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

Apr-25-2000 02:29pm From-STL KNOXVILLE 8655844315 T-352 P.001/001 F-796 APR 25 '00 10:28AM

CH2M HILL
Hanford, Inc.

MEMORANDUM

To: J Dawson / B Christian (OFFICE)

From: Rich Weiss (OFFICE)

Date: Project No:

Re: SDG 3090 Red Val

Detection limit sections (pg 3+4) still incorrect

Correct as follows

Analytes above the PQL

Ec-155

facsimile transmittal

To: Rich Weiss/ Fax: (865) 584-4315

From: Claude Stacey Jeanette Duncan Date: 4/25/00

Re: Validation W03090 + H0766 Pages: ~~8~~ 14

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Rich/Claude -

Please review validators disposition of your comments on W03090 ~~- Bill Sand~~ + H0766. I believe I have attached all pages that you need. I need to get W03090 to Jason tomorrow totally complete. HELP!

Jeanette

TRANSMISSION RESULT REPORT (APR 25 '00 09:56AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
081	MEMORY TX		18655844315	14/14	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

[redacted]

To: Rich Weiss/ Fax: (865) 584-4315

From: Claude Stacey / Jeanette Duncan Date: 4/25/00

Re: Validation WP3090 + HD766 Pages: ~~8~~ 14

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Rich / Claude –

Data Package Review - RLW

H0766 Inorganics: Pg. 2, Preparation Blanks, Last paragraph; typo ("an" not "and"). The parenthetical clause here is not clear. Should the "no action" comment belong in the equipment blank section?

4/24/00

Volatiles: No comments

Radiochemistry: No comments.

W03090 Inorganics: No comments.

Radiochemistry: Need to reevaluate and revise detection level sections. The evaluations appear to have been made against the reported "results" not MDA values. For example most Eu-155 MDAs do not meet the criteria. Also please note that Quanterra routinely reports non-detect results greater than the reported MDA (most Eu-152 issues noted in this report fall into this category). This is an artifact of Quanterra's antiquated gamma spec software (two different subroutines are used for the "result" and "MDA" calcs). Please identify those cases where the MDA was technically met but that reported non-detect values are above the CRDL.

Review Comment Record (RCR)

1. Date	2. Review No.
04/18/00	QA-0024
3. Project	**4. Page**
105-F/DR	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. W03090	105-F/DR Phase III Below grade Sampling and Analysis	Claude Stacey	Quality Program	372-9208

17. Comment Submittal Approval:

Organization Manager (Optional)

Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact

Author/Originator

11. CLOSED

5/03/00
Date

Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry: Page 10, sample B0XMY6, C-14 has the result as 0.822; were as the lab report sheet shows the result as 82.2.		Correct [illegible]	
2	Inorganic: Page 2, Holding Times, first paragraph, last line should include meeting Cr-6 holding time.		Correct [illegible]	
3	Inorganic: Page 10 the title has the matrix as water and units as UG/L. The matrix is soil and the units are MG/KG.		Correct [illegible]	

4/24/00

APR-24-00 01:30PM BHI S&D MANAGEMENT 509 372 9287
APR 24 '00 7:26PM