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Date: 29 February 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. W02980A-QES & W02980B-QES  
 (SDG No. W02980)

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 MAY 10 2000

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package Nos. W02980A-QES and W02980B-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
BOX5M4	12/16/99	Solid	C	See note 1
BOX5M5	12/16/99	Solid	C	See note 1
BOX5M6	12/16/99	Solid	C	See note 1
BOX5M7	12/16/99	Solid	C	See note 1
BOX5M8	12/16/99	Solid	C	See note 1
BOX5M9	12/16/99	Solid	C	See note 1
BOX5N0	12/16/99	Solid	C	See note 1
BOX5N1	12/16/99	Solid	C	See note 1
BOX5N2	12/16/99	Solid	C	See note 1
BOX5N3	12/16/99	Solid	C	See note 1
BOX5N4	12/16/99	Solid	C	See note 1
BOX5N5	12/16/99	Solid	C	See note 1
BOX5Y7	12/17/99	Solid	C	See note 2
BOX5Y8	12/17/99	Solid	C	See note 2
BOX5Y9	12/17/99	Solid	C	See note 2

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

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

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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, the strontium-90 results in samples BOX5Y7 and BOX5Y9 were qualified as estimates and flagged "J".

Due to laboratory blank contamination, the americium-241 results in samples BOX5M4 and BOX5N2 were qualified as estimates and flagged "J".

All other laboratory blank results were acceptable.

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## Field Blanks

One equipment blank (BOX5N0) was submitted for analysis. Uranium-234, uranium-238, nickel-63 and technetium-99 were detected in the equipment blank. Under the BHI statement of work, no qualification is required. All other field duplicate 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 an LCS analysis, all carbon-14 results in samples BOW5M4, BOW5M5, BOW5M6, BOW5M7, BOW5M8, BOW5M9, BOW5N0, BOW5N1, BOW5N2, BOW5N3, BOW5N4, and BOW5N5 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".

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 than 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.

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Due to the lack of a duplicate analysis, all carbon-14 results in samples BOW5M4, BOW5M5, BOW5M6, BOW5M7, BOW5M8, BOW5M9, BOW5N0, BOW5N1, BOW5N2, BOW5N3, BOW5N4, and BOW5N5 were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

#### Field Duplicate Samples

One pair of field duplicate samples (samples BOX5M6/BOW5M7) were submitted to QES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the 105DR PQLs to ensure that laboratory detection levels meet the required criteria. The PQL was exceeded for the following: Europium-154 in samples BOX5M4, BOX5M6, and BOX5N1; and europium-155 in samples BOX5M4, BOX5M5, BOX5M6, BOX5N1, BOX5N5, BOX5Y7 and BOX5Y8. 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. W02980A & W02980B (SDG No. W02980) was submitted for validation and verified for completeness. The completion rate was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

The following minor deficiencies were noted:

- Due to laboratory blank contamination, the strontium-90 results in samples BOX5Y7 and BOX5Y9 were qualified as estimates and flagged "J".
- Due to laboratory blank contamination, the americium-241 results in samples BOX5M4 and BOX5N2 were qualified as estimates and flagged "J".

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- Due to the lack of an LCS analysis, all carbon-14 results in samples BOW5M4, BOW5M5, BOW5M6, BOW5M7, BOW5M8, BOW5M9, BOW5N0, BOW5N1, BOW5N2, BOW5N3, BOW5N4, and BOW5N5 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 a duplicate analysis, all carbon-14 results in samples BOW5M4, BOW5M5, BOW5M6, BOW5M7, BOW5M8, BOW5M9, BOW5N0, BOW5N1, BOW5N2, BOW5N3, BOW5N4, and BOW5N5 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**

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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.

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**Appendix 2**  
**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: W02980	REVIEWER: TLI	DATE: 2/29/00	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Strontium-90	J	BOX5Y7, BOX5Y9	Blank contamination
Americium-241	J	BOX5M4, BOX5N2	Blank contamination
Carbon-14	J	BOW5M4, BOW5M5, BOW5M6, BOW5M7, BOW5M8, BOW5M9, BOW5N0, BOW5N1, BOW5N2, BOW5N3, BOW5N4, BOW5N5	No LCS or blank analysis
Carbon-14	J	All	No MS analysis

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HFC10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5M4      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	2.37E-02	J	2.1E-02	2.2E-02	1.29E-02	pCi/g	87.64%	RICHRC5080
PU-238	9.63E-03	U	1.2E-02	1.2E-02	1.74E-02	pCi/g	89.64%	RICHRC5010
PU239/40	2.65E-03	U	7.0E-03	7.1E-03	1.74E-02	pCi/g	89.64%	RICHRC5010
U-234	2.64E-01	J	7.6E-02	8.9E-02	2.18E-02	pCi/g	79.28%	RICHRC5079
U-235	9.08E-03	U	1.5E-02	1.5E-02	2.89E-02	pCi/g	79.28%	RICHRC5079
U-238	2.10E-01	J	6.8E-02	7.7E-02	2.47E-02	pCi/g	79.28%	RICHRC5079
BA-133	4.06E-02	U	4.5E-02	4.5E-02	6.59E-02	pCi/g		RICHRC5017
CO-60	2.83E-02	U	3.9E-02	3.9E-02	6.92E-02	pCi/g		RICHRC5017
CS-137	2.84E-01		6.2E-02	6.2E-02	6.33E-02	pCi/g		RICHRC5017
EU-152	5.83E-01	U	1.4E-01	1.4E-01	1.84E-01	pCi/g		RICHRC5017
EU-154	5.92E-02	U	1.2E-01	1.2E-01	2.04E-01	pCi/g		RICHRC5017
EU-155	6.47E-02	U	7.3E-02	7.3E-02	1.25E-01	pCi/g		RICHRC5017
STRONTIUM	9.92E-02	U	6.2E-02	6.8E-02	1.20E-01	pCi/g	87.20%	RICHRC5006
C-14	-1.05E-01	J	7.8E-03	5.1E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	5.39E+00	J	2.6E-01	1.2E+00	1.51E+00	pCi/g	78.85%	RICHRC5069
TC-99	-2.07E-01	U	1.1E-02	7.0E-01	7.75E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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2/25/00

*not*

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HFK10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5M5      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	0.00E+00	U	0.0E+00	1.1E-02	1.21E-02	pCi/g	89.58%	RICHRC5080
PU-238	8.00E-03	U	1.1E-02	1.1E-02	1.08E-02	pCi/g	77.05%	RICHRC5010
PU239/40	0.00E+00	U	0.0E+00	9.8E-03	1.08E-02	pCi/g	77.05%	RICHRC5010
U-234	1.24E-01	U	5.0E-02	5.5E-02	3.48E-02	pCi/g	85.99%	RICHRC5079
U-235	1.81E-02	U	2.0E-02	2.0E-02	2.63E-02	pCi/g	85.99%	RICHRC5079
U-238	1.51E-01	U	5.5E-02	6.1E-02	2.78E-02	pCi/g	85.99%	RICHRC5079
BA-133	9.85E-03	U	3.2E-02	3.2E-02	4.86E-02	pCi/g		RICHRC5017
CO-60	-1.37E-02	U	3.1E-02	3.1E-02	5.22E-02	pCi/g		RICHRC5017
CS-137	9.49E-02	U	3.7E-02	3.7E-02	4.51E-02	pCi/g		RICHRC5017
EU-152	5.83E-02	U	7.3E-02	7.3E-02	1.13E-01	pCi/g		RICHRC5017
EU-154	-3.29E-02	U	9.0E-02	9.0E-02	1.51E-01	pCi/g		RICHRC5017
EU-155	6.20E-02	U	6.5E-02	6.5E-02	1.09E-01	pCi/g		RICHRC5017
STRONTIUM	4.03E-02	U	4.3E-02	4.4E-02	9.03E-02	pCi/g	100.00%	RICHRC5006
C-14	2.49E-01	U J	1.8E-02	5.3E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	3.67E-01	U	2.2E-02	8.4E-01	1.40E+00	pCi/g	88.94%	RICHRC5069
TC-99	-2.88E-01	U	1.5E-02	6.9E-01	7.68E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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Quanterra Analytical Services, Inc  
rptChemRadSample; v3.41

*DOH*

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B / 9682  
**LAB SAMPLE ID:** 9D6HFR10      **MATRIX:** OTHER  
**CLIENT ID:** B0X5M6      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	9.74E-03	U	1.4E-02	1.4E-02	1.32E-02	pCi/g	81.51%	RICHRC5080
PU-238	3.84E-03	U	7.7E-03	7.7E-03	1.04E-02	pCi/g	81.55%	RICHRC5010
PU239/40	3.84E-03	U	7.7E-03	7.7E-03	1.04E-02	pCi/g	81.55%	RICHRC5010
U-234	2.27E-01	✓	6.7E-02	7.7E-02	3.41E-02	pCi/g	95.77%	RICHRC5079
U-235	1.81E-02	U	1.9E-02	2.0E-02	2.40E-02	pCi/g	95.77%	RICHRC5079
U-238	1.91E-01	✓	6.2E-02	7.0E-02	3.84E-02	pCi/g	95.77%	RICHRC5079
BA-133	-3.42E-03	U	4.1E-02	4.1E-02	5.75E-02	pCi/g		RICHRC5017
CO-60	5.60E-02	U	4.1E-02	4.1E-02	7.57E-02	pCi/g		RICHRC5017
CS-137	2.29E-01		6.3E-02	6.3E-02	6.09E-02	pCi/g		RICHRC5017
EU-152	4.67E-01	U	1.5E-01	1.5E-01	1.78E-01	pCi/g		RICHRC5017
EU-154	-1.00E-02	U	1.2E-01	1.2E-01	2.03E-01	pCi/g		RICHRC5017
EU-155	6.83E-02	U	6.9E-02	6.9E-02	1.19E-01	pCi/g		RICHRC5017
STRONTIUM	1.36E-01	✓	6.0E-02	7.1E-02	1.07E-01	pCi/g	89.00%	RICHRC5008
C-14	-8.16E-02	U J	6.0E-03	5.1E-01	8.05E-01	pCi/g	100.00%	RICHRC5022
NI-63	2.87E+00	✓	1.5E-01	9.8E-01	1.40E+00	pCi/g	88.53%	RICHRC5069
TC-99	1.68E-01	U	8.7E-03	7.3E-01	7.79E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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*2/25/00*

*DATE*

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HFT10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5M7      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	4.84E-03	U	9.7E-03	9.7E-03	1.31E-02	pCi/g	82.34%	RICHRC5080
PU-238	8.24E-03	U	1.2E-02	1.2E-02	1.12E-02	pCi/g	75.35%	RICHRC5010
PU239/40	4.12E-03	U	8.2E-03	8.3E-03	1.12E-02	pCi/g	75.35%	RICHRC5010
U-234	1.90E-01	U	6.0E-02	6.9E-02	3.54E-02	pCi/g	83.73%	RICHRC5079
U-235	2.71E-02	U	2.3E-02	2.3E-02	2.12E-02	pCi/g	83.73%	RICHRC5079
U-238	2.72E-01	U	7.1E-02	8.5E-02	2.76E-02	pCi/g	83.73%	RICHRC5079
BA-133	4.46E-03	U	4.0E-02	4.0E-02	5.80E-02	pCi/g		RICHRC5017
CO-60	4.19E-02	U	3.5E-02	3.5E-02	6.38E-02	pCi/g		RICHRC5017
CS-137	1.81E-01		5.5E-02	5.5E-02	5.60E-02	pCi/g		RICHRC5017
EU-152	5.94E-01	U	1.4E-01	1.4E-01	1.71E-01	pCi/g		RICHRC5017
EU-154	4.48E-02	U	1.1E-01	1.1E-01	1.85E-01	pCi/g		RICHRC5017
EU-155	3.94E-02	U	5.5E-02	5.5E-02	9.41E-02	pCi/g		RICHRC5017
STRONTIUM	8.79E-02	U	4.8E-02	5.4E-02	8.96E-02	pCi/g	98.40%	RICHRC5006
C-14	1.64E-01	U J	1.2E-02	5.3E-01	8.06E-01	pCi/g	100.00%	RICHRC5022
NI-63	2.33E+00	U	1.3E-01	9.3E-01	1.43E+00	pCi/g	88.82%	RICHRC5069
TC-99	1.01E+00	U	4.9E-02	7.9E-01	7.78E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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*2/25/00*

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HFV10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5M8      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	-3.71E-04	U	7.4E-04	7.4E-04	1.87E-02	pCi/g	90.70%	RICHRC5080
PU-238	6.84E-03	U	9.7E-03	9.7E-03	9.27E-03	pCi/g	90.36%	RICHRC5010
PU239/40	3.42E-03	U	6.8E-03	6.9E-03	9.26E-03	pCi/g	90.36%	RICHRC5010
U-234	2.68E-01	U	7.3E-02	8.7E-02	2.82E-02	pCi/g	85.03%	RICHRC5079
U-235	7.99E-03	U	1.4E-02	1.4E-02	2.82E-02	pCi/g	85.03%	RICHRC5079
U-238	2.18E-01	U	6.6E-02	7.6E-02	2.82E-02	pCi/g	85.03%	RICHRC5079
BA-133	2.17E-02	U	3.4E-02	3.4E-02	5.01E-02	pCi/g		RICHRC5017
CO-60	1.39E-02	U	3.1E-02	3.1E-02	5.56E-02	pCi/g		RICHRC5017
CS-137	8.83E-02	U	4.5E-02	4.5E-02	5.03E-02	pCi/g		RICHRC5017
EU-152	8.25E-02	U	6.5E-02	6.5E-02	1.14E-01	pCi/g		RICHRC5017
EU-154	-2.73E-02	U	9.8E-02	9.8E-02	1.64E-01	pCi/g		RICHRC5017
EU-155	5.18E-02	U	4.9E-02	4.9E-02	8.53E-02	pCi/g		RICHRC5017
STRONTIUM	4.30E-02	U	5.1E-02	5.3E-02	1.10E-01	pCi/g	81.80%	RICHRC5006
C-14	-2.27E-01	U	1.7E-02	5.0E-01	8.04E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.09E+00	U	6.3E-02	9.7E-01	1.56E+00	pCi/g	78.89%	RICHRC5069
TC-99	-2.43E-01	U	1.3E-02	6.9E-01	7.66E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

JFC  
 2/25/00

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
 J = No U qualifier and result <

Quanterra Analytical Services, Inc  
 rptChemRadSample; v3.41

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HD910      **MATRIX:** OTHER  
**CLIENT ID:** BOX5M9      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	5.42E-03	U	1.1E-02	1.1E-02	1.47E-02	pCi/g	74.39%	RICHRC5080
PU-238	1.46E-02	U	1.5E-02	1.5E-02	1.74E-02	pCi/g	86.46%	RICHRC5010
PU239/40	3.50E-03	U	7.6E-03	7.7E-03	1.53E-02	pCi/g	86.46%	RICHRC5010
U-234	3.17E-01	<i>U</i>	7.8E-02	9.5E-02	3.07E-02	pCi/g	84.56%	RICHRC5079
U-235	6.49E-03	U	1.4E-02	1.4E-02	3.07E-02	pCi/g	84.56%	RICHRC5079
U-238	2.46E-01	<i>U</i>	7.0E-02	8.2E-02	3.96E-02	pCi/g	84.56%	RICHRC5079
BA-133	6.96E-03	U	3.5E-02	3.5E-02	5.11E-02	pCi/g		RICHRC5017
CO-60	1.45E-02	U	3.3E-02	3.3E-02	5.87E-02	pCi/g		RICHRC5017
CS-137	2.15E-01		5.7E-02	5.7E-02	5.03E-02	pCi/g		RICHRC5017
EU-152	2.68E-01	U	1.1E-01	1.1E-01	1.45E-01	pCi/g		RICHRC5017
EU-154	4.05E-02	U	9.5E-02	9.5E-02	1.71E-01	pCi/g		RICHRC5017
EU-155	-4.05E-02	U	5.0E-02	5.0E-02	8.44E-02	pCi/g		RICHRC5017
STRONTIUM	5.90E-02	U	4.5E-02	4.8E-02	9.02E-02	pCi/g	97.60%	RICHRC5006
C-14	3.45E-01	<i>U J</i>	2.4E-02	5.4E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	2.92E+00	<i>U</i>	1.6E-01	1.0E+00	1.49E+00	pCi/g	81.38%	RICHRC5069
TC-99	4.37E-01	U	2.2E-02	7.5E-01	7.68E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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 2/25/00

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HDC10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5N0      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	-7.64E-04	U	1.1E-03	1.1E-03	2.18E-02	pCi/g	82.78%	RICHRC5080
PU-238	8.11E-03	U	1.1E-02	1.2E-02	1.10E-02	pCi/g	84.38%	RICHRC5010
PU239/40	0.00E+00	U	0.0E+00	9.9E-03	1.10E-02	pCi/g	84.38%	RICHRC5010
U-234	2.36E-01	U	6.4E-02	7.6E-02	3.03E-02	pCi/g	101.67%	RICHRC5079
U-235	2.91E-03	U	8.7E-03	8.7E-03	2.29E-02	pCi/g	101.67%	RICHRC5079
U-238	2.47E-01	U	6.5E-02	7.8E-02	2.42E-02	pCi/g	101.67%	RICHRC5079
BA-133	1.25E-03	U	3.0E-02	3.0E-02	4.32E-02	pCi/g		RICHRC5017
CO-60	1.67E-02	U	2.9E-02	2.9E-02	5.26E-02	pCi/g		RICHRC5017
CS-137	3.37E-02	U	2.9E-02	2.9E-02	5.17E-02	pCi/g		RICHRC5017
EU-152	-2.42E-02	U	6.2E-02	6.2E-02	1.02E-01	pCi/g		RICHRC5017
EU-154	5.86E-02	U	9.3E-02	9.3E-02	1.66E-01	pCi/g		RICHRC5017
EU-155	3.12E-02	U	5.2E-02	5.2E-02	8.79E-02	pCi/g		RICHRC5017
STRONTIUM	1.35E-02	U	4.3E-02	4.3E-02	9.84E-02	pCi/g	92.50%	RICHRC5006
C-14	3.56E-01	U J	2.5E-02	5.4E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.55E+00	U	8.7E-02	8.8E-01	1.36E+00	pCi/g	88.35%	RICHRC5069
TC-99	1.36E+00	U	6.5E-02	8.2E-01	7.78E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16,

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2/25/00

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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*ADDT*

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HDD10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5N1      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	4.13E-01	#	9.0E-02	1.2E-01	1.33E-02	pCi/g	78.81%	RICHRC5080
PU-238	1.18E-01	#	4.8E-02	5.2E-02	1.33E-02	pCi/g	82.83%	RICHRC5010
PU239/40	2.85E-01	#	7.5E-02	9.0E-02	1.33E-02	pCi/g	82.83%	RICHRC5010
U-234	1.00E-01	#	4.6E-02	4.9E-02	3.75E-02	pCi/g	91.09%	RICHRC5079
U-235	9.26E-03	U	1.4E-02	1.4E-02	2.30E-02	pCi/g	91.09%	RICHRC5079
U-238	1.32E-01	#	5.2E-02	5.7E-02	3.35E-02	pCi/g	91.09%	RICHRC5079
BA-133	8.66E-03	U	5.2E-02	5.2E-02	7.52E-02	pCi/g		RICHRC5017
CO-60	5.37E-01		9.2E-02	9.2E-02	6.10E-02	pCi/g		RICHRC5017
CS-137	2.72E+00		2.9E-01	2.9E-01	7.40E-02	pCi/g		RICHRC5017
EU-152	4.26E+00		4.8E-01	4.8E-01	1.71E-01	pCi/g		RICHRC5017
EU-154	7.57E-01	U	2.1E-01	2.1E-01	2.93E-01	pCi/g		RICHRC5017
EU-155	-1.42E-02	U	9.2E-02	9.2E-02	1.52E-01	pCi/g		RICHRC5017
STRONTIUM	3.09E-01	#	6.8E-02	1.1E-01	9.03E-02	pCi/g	100.00%	RICHRC5006
C-14	5.43E-01	U J	3.8E-02	5.5E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.39E+01	#	5.3E-01	1.7E+00	1.35E+00	pCi/g	87.16%	RICHRC5069
TC-99	-8.61E-02	U	4.5E-03	7.1E-01	7.76E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

  
 2/25/00



### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HDG10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5N2      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	4.87E-02	<del>U</del> J	2.9E-02	3.1E-02	1.20E-02	pCi/g	91.51%	RICHRC5080
PU-238	2.41E-02	U	2.3E-02	2.3E-02	2.52E-02	pCi/g	79.49%	RICHRC5010
PU239/40	4.01E-02	<del>U</del>	2.9E-02	2.9E-02	2.04E-02	pCi/g	79.49%	RICHRC5010
U-234	1.98E-01	<del>U</del>	6.3E-02	7.2E-02	3.49E-02	pCi/g	82.77%	RICHRC5079
U-235	-7.90E-04	U	1.1E-03	1.1E-03	2.26E-02	pCi/g	82.77%	RICHRC5079
U-238	2.25E-01	<del>U</del>	6.7E-02	7.7E-02	2.93E-02	pCi/g	82.77%	RICHRC5079
BA-133	-2.47E-02	U	7.8E-02	7.8E-02	1.10E-01	pCi/g		RICHRC5017
CO-60	4.33E+00		4.6E-01	4.6E-01	7.41E-02	pCi/g		RICHRC5017
CS-137	1.17E+01		1.2E+00	1.2E+00	1.21E-01	pCi/g		RICHRC5017
EU-152	3.90E+01		3.9E+00	3.9E+00	2.53E-01	pCi/g		RICHRC5017
EU-154	7.18E+00		8.2E-01	8.2E-01	2.54E-01	pCi/g		RICHRC5017
EU-155	3.62E-01		1.8E-01	1.8E-01	2.25E-01	pCi/g		RICHRC5017
STRONTIUM	1.09E+00		1.1E-01	3.3E-01	9.49E-02	pCi/g	100.00%	RICHRC5006
C-14	5.85E-01	U J	4.0E-02	5.5E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.55E+02		2.3E+00	1.1E+01	1.46E+00	pCi/g	84.70%	RICHRC5069
TC-99	5.92E-01	U	3.0E-02	7.6E-01	8.01E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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DATE

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HDX10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5N3      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	4.22E-03	U	8.4E-03	8.5E-03	1.14E-02	pCi/g	90.07%	RICHRC5080
PU-238	-2.73E-04	U	5.5E-04	5.5E-04	1.38E-02	pCi/g	89.70%	RICHRC5010
PU239/40	3.41E-03	U	6.8E-03	6.9E-03	9.25E-03	pCi/g	89.70%	RICHRC5010
U-234	2.58E-01	U	7.1E-02	8.4E-02	2.72E-02	pCi/g	85.79%	RICHRC5079
U-235	1.25E-02	U	1.7E-02	1.7E-02	2.72E-02	pCi/g	85.79%	RICHRC5079
U-238	3.88E-01	U	8.7E-02	1.1E-01	2.40E-02	pCi/g	85.79%	RICHRC5079
BA-133	3.04E-02	U	3.9E-02	3.9E-02	5.75E-02	pCi/g		RICHRC5017
CO-60	2.14E-02	U	2.9E-02	2.9E-02	5.47E-02	pCi/g		RICHRC5017
CS-137	1.01E-01		3.7E-02	3.7E-02	4.99E-02	pCi/g		RICHRC5017
EU-152	-4.25E-02	U	7.6E-02	7.6E-02	1.22E-01	pCi/g		RICHRC5017
EU-154	-8.08E-03	U	8.7E-02	8.7E-02	1.52E-01	pCi/g		RICHRC5017
EU-155	3.40E-02	U	4.9E-02	4.9E-02	8.31E-02	pCi/g		RICHRC5017
STRONTIUM	1.66E-02	U	4.0E-02	4.0E-02	9.02E-02	pCi/g	97.90%	RICHRC5006
C-14	2.47E-01	U	1.8E-02	5.3E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.24E+00	U	7.1E-02	9.1E-01	1.44E+00	pCi/g	86.60%	RICHRC5069
TC-99	4.36E-02	U	2.3E-03	7.2E-01	7.72E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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*2/25/00*

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6GL910      **MATRIX:** OTHER  
**CLIENT ID:** B0X5N4      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	-1.33E-03	U	1.5E-03	1.6E-03	2.76E-02	pCi/g	71.83%	RICHRC5080
PU-238	0.00E+00	U	0.0E+00	1.5E-02	1.67E-02	pCi/g	63.74%	RICHRC5010
PU239/40	-1.48E-03	U	1.7E-03	1.7E-03	3.08E-02	pCi/g	63.74%	RICHRC5010
U-234	1.79E-01	U	6.0E-02	6.7E-02	2.00E-02	pCi/g	85.62%	RICHRC5079
U-235	1.33E-02	U	1.7E-02	1.7E-02	2.66E-02	pCi/g	85.62%	RICHRC5079
U-238	2.13E-01	U	6.5E-02	7.5E-02	2.48E-02	pCi/g	85.62%	RICHRC5079
BA-133	4.81E-03	U	3.9E-02	3.9E-02	5.65E-02	pCi/g		RICHRC5017
CO-60	2.08E-02	U	3.3E-02	3.3E-02	5.97E-02	pCi/g		RICHRC5017
CS-137	1.43E-01		4.5E-02	4.5E-02	5.18E-02	pCi/g		RICHRC5017
EU-152	7.33E-03	U	7.7E-02	7.7E-02	1.30E-01	pCi/g		RICHRC5017
EU-154	6.54E-03	U	9.2E-02	9.2E-02	1.60E-01	pCi/g		RICHRC5017
EU-155	4.27E-02	U	5.4E-02	5.4E-02	9.22E-02	pCi/g		RICHRC5017
STRONTIUM	8.76E-02	U	5.0E-02	5.6E-02	9.60E-02	pCi/g	95.40%	RICHRC5006
C-14	1.54E-01	U <sup>J</sup>	1.1E-02	5.3E-01	8.03E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.26E+00	U	7.1E-02	8.2E-01	1.28E+00	pCi/g	94.43%	RICHRC5069
TC-99	2.66E-01	U	1.4E-02	7.3E-01	7.74E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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2/25/00

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980B/ 9682  
**LAB SAMPLE ID:** 9D6HD710      **MATRIX:** OTHER  
**CLIENT ID:** BOX5N5      **DATE RECEIVED:** 12/17/99 9:41:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	5.00E-03	U	1.0E-02	1.0E-02	1.35E-02	pCi/g	83.19%	RICHRC5080
PU-238	3.84E-03	U	1.0E-02	1.0E-02	2.52E-02	pCi/g	81.89%	RICHRC5010
PU239/40	4.65E-03	U	1.0E-02	1.0E-02	2.03E-02	pCi/g	81.89%	RICHRC5010
U-234	3.76E-01	<del>U</del>	8.3E-02	1.1E-01	2.93E-02	pCi/g	89.18%	RICHRC5079
U-235	4.20E-03	U	9.2E-03	9.2E-03	1.84E-02	pCi/g	89.18%	RICHRC5079
U-238	3.36E-01	<del>U</del>	7.9E-02	9.7E-02	2.58E-02	pCi/g	89.18%	RICHRC5079
BA-133	3.40E-02	U	3.4E-02	3.4E-02	5.21E-02	pCi/g		RICHRC5017
CO-60	-2.26E-02	U	3.3E-02	3.3E-02	5.30E-02	pCi/g		RICHRC5017
CS-137	6.90E-02	<del>U</del>	4.1E-02	4.1E-02	4.88E-02	pCi/g		RICHRC5017
EU-152	1.51E-01	U	7.8E-02	7.8E-02	1.23E-01	pCi/g		RICHRC5017
EU-154	2.78E-02	U	1.0E-01	1.0E-01	1.76E-01	pCi/g		RICHRC5017
EU-155	8.83E-04	U	6.7E-02	6.7E-02	1.16E-01	pCi/g		RICHRC5017
STRONTIUM	6.16E-02	U	4.6E-02	4.9E-02	9.22E-02	pCi/g	98.70%	RICHRC5006
C-14	2.71E-01	U <i>J</i>	1.9E-02	5.3E-01	8.04E-01	pCi/g	100.00%	RICHRC5022
NI-63	2.01E+00	<del>U</del>	1.1E-01	8.9E-01	1.33E+00	pCi/g	89.03%	RICHRC5069
TC-99	-1.01E-01	U	5.3E-03	7.1E-01	7.68E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 16

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*2/25/00*

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980A/ 9680  
**LAB SAMPLE ID:** 9D6LCN10      **MATRIX:** OTHER  
**CLIENT ID:** BOX5Y7      **DATE RECEIVED:** 12/20/99 8:40:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	-5.38E-04	U	1.1E-03	1.1E-03	2.70E-02	pCi/g	77.79%	RICHRC5080
PU-238	0.00E+00	U	0.0E+00	1.0E-02	1.13E-02	pCi/g	76.46%	RICHRC5010
PU239/40	7.65E-03	U	1.2E-02	1.2E-02	1.90E-02	pCi/g	76.46%	RICHRC5010
BA-133	3.10E-02	U	4.2E-02	4.2E-02	6.12E-02	pCi/g		RICHRC5017
CO-60	4.07E-02	U	3.7E-02	3.7E-02	6.70E-02	pCi/g		RICHRC5017
CS-137	2.96E-02	U	3.6E-02	3.6E-02	6.18E-02	pCi/g		RICHRC5017
EU-152	7.44E-02	U	9.3E-02	9.3E-02	1.38E-01	pCi/g		RICHRC5017
EU-154	-1.70E-02	U	1.0E-01	1.0E-01	1.77E-01	pCi/g		RICHRC5017
EU-155	3.04E-02	U	6.6E-02	6.6E-02	1.12E-01	pCi/g		RICHRC5017
STRONTIUM	1.62E-01	J	6.4E-02	7.7E-02	9.74E-02	pCi/g	93.70%	RICHRC5006
C-14	5.36E-01	J	3.7E-02	5.8E-01	8.12E-01	pCi/g	100.00%	RICHRC5022
NI-63	6.76E-01	U	4.3E-02	8.5E-01	1.53E+00	pCi/g	91.38%	RICHRC5069
TC-99	4.46E-02	U	2.2E-03	8.0E-01	7.96E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 13

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2/25/00

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980A/ 9680  
**LAB SAMPLE ID:** 9D6LCP10      **MATRIX:** OTHER  
**CLIENT ID:** 80X5Y8      **DATE RECEIVED:** 12/20/99 8:40:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	4.12E-03	U	9.9E-03	9.9E-03	2.24E-02	pCi/g	81.97%	RICHRC5080
PU-238	0.00E+00	U	0.0E+00	1.1E-02	1.27E-02	pCi/g	76.23%	RICHRC5010
PU239/40	2.80E-02	J	2.3E-02	2.3E-02	1.26E-02	pCi/g	76.23%	RICHRC5010
BA-133	2.35E-02	U	3.1E-02	3.1E-02	4.83E-02	pCi/g		RICHRC5017
CO-60	-2.88E-03	U	3.2E-02	3.2E-02	5.39E-02	pCi/g		RICHRC5017
CS-137	8.30E-02	J	3.8E-02	3.8E-02	4.54E-02	pCi/g		RICHRC5017
EU-152	-4.63E-02	U	9.7E-02	9.7E-02	1.09E-01	pCi/g		RICHRC5017
EU-154	-5.15E-02	U	9.0E-02	9.0E-02	1.48E-01	pCi/g		RICHRC5017
EU-155	2.65E-03	U	6.3E-02	6.3E-02	1.09E-01	pCi/g		RICHRC5017
STRONTIUM	8.74E-02	U	6.0E-02	6.4E-02	1.12E-01	pCi/g	87.80%	RICHRC5006
C-14	3.21E-01	U J	2.3E-02	5.7E-01	8.11E-01	pCi/g	100.00%	RICHRC5022
NI-63	1.16E+00	U	7.0E-02	9.4E-01	1.58E+00	pCi/g	90.91%	RICHRC5069
TC-99	5.58E-01	U	2.7E-02	8.4E-01	7.93E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 13

*Handwritten signature*  
2/25/00

### SAMPLE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W02980A/ 9680  
**LAB SAMPLE ID:** 9D6LCQ10      **MATRIX:** OTHER  
**CLIENT ID:** B0X5Y9      **DATE RECEIVED:** 12/20/99 8:40:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	-1.13E-03	U	1.6E-03	1.6E-03	3.21E-02	pCi/g	53.83%	RICHRC5080
PU-238	4.80E-03	U	1.3E-02	1.3E-02	3.15E-02	pCi/g	64.85%	RICHRC5010
PU239/40	5.81E-03	U	1.3E-02	1.3E-02	2.54E-02	pCi/g	64.85%	RICHRC5010
BA-133	1.27E-02	U	3.2E-02	3.2E-02	4.75E-02	pCi/g		RICHRC5017
CO-60	2.06E-02	U	3.2E-02	3.2E-02	5.82E-02	pCi/g		RICHRC5017
CS-137	5.33E-02	U	3.2E-02	3.2E-02	5.67E-02	pCi/g		RICHRC5017
EU-152	-1.74E-02	U	6.5E-02	6.5E-02	1.07E-01	pCi/g		RICHRC5017
EU-154	-1.04E-02	U	9.7E-02	9.7E-02	1.68E-01	pCi/g		RICHRC5017
EU-155	3.43E-02	U	5.4E-02	5.4E-02	9.12E-02	pCi/g		RICHRC5017
STRONTIUM	1.41E-01	U J	6.3E-02	7.3E-02	1.03E-01	pCi/g	100.00%	RICHRC5006
C-14	7.26E-01	U J	4.9E-02	5.9E-01	8.11E-01	pCi/g	100.00%	RICHRC5022
NI-63	2.91E-01	U	1.8E-02	8.4E-01	1.49E+00	pCi/g	91.14%	RICHRC5069
TC-99	-1.71E-01	U	8.9E-03	7.9E-01	8.16E-01	pCi/g	100.00%	RICHRC5078

Number of Results: 13

  
 2/25/00

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

000028

Quanterra  
2800 George Washington Way  
Richland, Washington 99352-1613

509 375-3131 Telephone  
509 375-5590 Fax

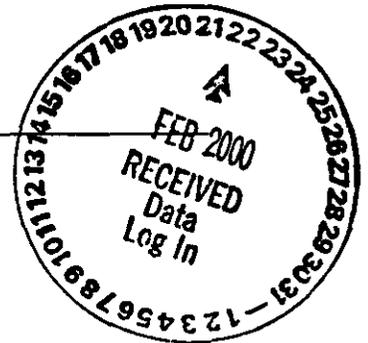
## CERTIFICATE OF ANALYSIS

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

February 16, 2000

Attention: Joan Kessner

SAF Number : B00-014  
Date SDG Closed : December 21, 1999  
Number of Samples : Three (3)  
Sample Type : Other  
SDG Number : W02980A  
Data Deliverable : 21-Day / Summary



### I. Introduction

On December 16, 1999, three other (matrix: solid) samples were received at the Quanterra Richland Laboratory (QRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

<u>QRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9D6LCN10	B0X5Y7	OTHER	12/20/99
9D6LCP10	B0X5Y8	OTHER	12/20/99
9D6LCQ10	B0X5Y9	OTHER	12/20/99

### 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

Bechtel Hanford, Inc.  
February 16, 2000  
Page 2

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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 W02980A 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 Co-60 MDAs achieved for samples B0X5Y7, B0X5Y9 and B0X5Y9 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 (B0X5Y9) results are within contractual requirements.

#### **Gas Proportional Counting**

##### Total Strontium by method RICH-RC-5006:

The LCS, batch blank, samples and sample duplicate (B0X5Y7) results are within contractual requirements.

#### **Alpha Spectroscopy**

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

The LCS, batch blank, samples and sample duplicate (B0X5Y8) results are within contractual requirements.

##### Americium-241 by method RICH-RC-5080:

The LCS, batch blank, samples and sample duplicate (B0X5Y8) results are within contractual requirements.

Bechtel Hanford, Inc.  
February 16, 2000  
Page 3

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**Liquid Scintillation Counting**

Technetium-99 by method RICH-RC-5078:

The sample and sample matrix spike were switched during analysis due to a technician error. The data 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, sample duplicate (B0X5Y7) and sample matrix spike (B0X5Y7) results are within contractual requirements.

Nickel-63 by method RICH-RC-5069:

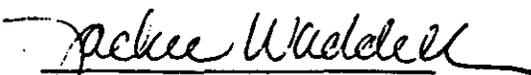
The LCS, batch blank, samples, sample duplicate (B0X5Y7) and sample matrix spike (B0X5Y9) results are within contractual requirements.

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 (B0X5Y7) results are within contractual requirements.

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

Reviewed and approved:       "



Jackie Waddell  
Project Manager

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*Waddell*

Quanterra  
2800 George Washington Way  
Richland, Washington 99352-1613

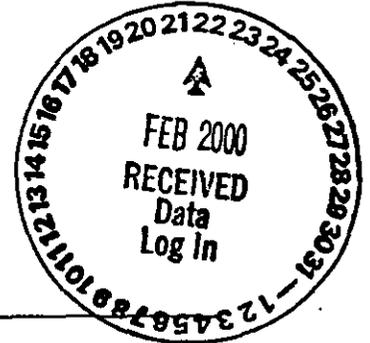
509 375-3131 Telephone  
509 375-5590 Fax

## CERTIFICATE OF ANALYSIS

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

February 3, 2000

Attention: Joan Kessner



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SAF Number	:	B00-013
Date SDG Closed	:	December 20, 1999
Number of Samples	:	Twelve (12)
Sample Type	:	Other (Solid)
SDG Number	:	W02980B
Data Deliverable	:	21-Day / Summary

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### I. Introduction

On December 17, 1999, twelve other (matrix: solid) samples were received at the Quanterra Richland Laboratory (QRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

<u>QRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9D6GL910	B0X5N4	OTHER	12/17/99
9D6HD710	B0X5N5	OTHER	12/17/99
9D6HD910	B0X5M9	OTHER	12/17/99
9D6HDC10	B0X5N0	OTHER	12/17/99
9D6HDD10	B0X5N1	OTHER	12/17/99
9D6HDG10	B0X5N2	OTHER	12/17/99
9D6HDX10	B0X5N3	OTHER	12/17/99
9D6HFC10	B0X5M4	OTHER	12/17/99
9D6HFK10	B0X5M5	OTHER	12/17/99
9D6HFR10	B0X5M6	OTHER	12/17/99
9D6HFT10	B0X5M7	OTHER	12/17/99
9D6HFV10	B0X5M8	OTHER	12/17/99

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Bechtel Hanford, Inc.  
February 10, 2000  
Page 2

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## 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

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

### **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 W02980B 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 Co-60 MDAs achieved for samples B0X5N4, B0X5M9, B0X5M6, B0X5M8, B0X5M4, B0X5M7, B0X5N1, B0X5N1 Duplicate and B0X5N2 do not meet the CRDL due to insufficient sample volumes. In addition, notable levels of Cs-137 detected in many of these samples increased the sample background. The data are accepted for reporting with the MDAs achieved. Except as noted, the LCS, batch blank, samples and sample duplicate (B0X5N1) results are within contractual requirements.

Bechtel Hanford, Inc.  
February 10, 2000  
Page 3

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**Gas Proportional Counting**

Total Strontium by method RICH-RC-5006:

The LCS, batch blank, samples and sample duplicate (BOX5N0) results are within contractual requirements.

**Alpha Spectroscopy**

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

The LCS, batch blank, samples and sample duplicate (BOX5M9) results are within contractual requirements.

Americium-241 by method RICH-RC-5080:

The LCS, batch blank, samples and sample duplicate (BOX5M9) results are within contractual requirements.

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

The LCS, batch blank, samples and sample duplicate (BOX5N4) results are within contractual requirements.

**Liquid Scintillation Counting**

Technetium-99 by method RICH-RC-5078:

The LCS, batch blank, samples, sample duplicate (BOX5N4) and sample matrix spike (BOX5N4) results are within contractual requirements.

Nickel-63 by method RICH-RC-5069:

The LCS, batch blank, samples, sample duplicate (BOX5N5) and sample matrix spike (BOX5N0) results are within contractual requirements.

Carbon-14 by method RICH-RC-5022:

A duplicate sample analysis result is not reported for this analytical batch due to a laboratory clerical error. For solid matrices, the laboratory control and batch blank samples are direct count analyses. The LCS, batch blank and samples results are within contractual requirements.

Bechtel Hanford, Inc.  
February 10, 2000  
Page 4

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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:

A handwritten signature in cursive script that reads "Jackie Waddell".

Jackie Waddell  
Project Manager

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<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B00-013-17	Page 1 of 1
Collector R. Fahlberg/R. Nielson	Company Contact Jason 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 105-FR	SAF No. B00-013	Air Quality <input type="checkbox"/>				
Ice Chest No. ERC-96087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express				
Shipped To RF 12-16-99 TMA/REGRA Quateira	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None						
	Type of Container	aG	aG	aG	aG						
	No. of Container(s)	0	0	1	1						
	Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL					

SAMPLE ANALYSIS				PCBs - 8082	Isotopic Uranium	See item (1) in Special Instructions.	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)						
506 402980B	J9L170163												
Sample No.	Matrix *	Sample Date	Sample Time										
BOX5N4	Other Solid	12-16-99	1323	X	X	X	X	D6G L9				Box	4N6
BOX5NE	Other Solid	12-16-99	1340	X	X	X	X	D6H D7				Box	4N6

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By R. Fahlberg	Date/Time 12-16-99 1600	Received By Ref 1-C	Date/Time 12-16-99 1600	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14  out of ICP metals analyze PCBs out of Gamma Spec analyze Isotopic Uranium				S=Soil SE=Soil/Screen 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
Relinquished By Ref 1-C	Date/Time 12-17-99/0730	Received By K. Thoren	Date/Time 12-17-99/0730					
Relinquished By K. Thoren	Date/Time 12-17-99/0941	Received By K. Schenkling	Date/Time 12-17-99/0941					
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					

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

Collector R. Fahberg/R. Nielson	Company Contact Jason 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 105-DR	SAF No. B00-013	Air Quality <input type="checkbox"/>		

Ice Chest No. ERC-96087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express		
Shipped To RF 12-16-99 FMAREGRA Quasterra	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None						
	Type of Container	aG	aG	aG	aG						
	No. of Container(s)	0	0	1	1						
	Volume	60mL	60mL	60mL	60mL						

SPECIAL HANDLING AND/OR STORAGE				PCBs - 8082	Isotopic Uranium	See item (1) in Special Instructions.	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)					
SAMPLE ANALYSIS												
506 402980 B J9L170163												

Sample No.	Matrix *	Sample Date	Sample Time								
BOX5M9	Other Solid	12-16-99	1005	X	X	X	X	- D6H D9			Box 4 N6
BOX5 N0	Other Solid	12-16-99	1223	X	X	X	X	- D6H DC			
BOX5 N1	Other Solid	12-16-99	1247	X	X	X	X	- D6H DD			
BOX5 N2	Other Solid	12-16-99	1300	X	X	X	X	- D6H DG			
BOX5 N3	Other Solid	12-16-99	1312	X	X	X	X	- D6H DX			↓

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS								Matrix *
Relinquished By R. Fahberg	Date/Time 12-16-99	Received By Ref I-C	Date/Time 12-16-99	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14 out of ICP metals, analyze PCBs out of Gamma Spec, analyze Iso Uranium								S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drawn Solids DL=Drawn Liquids T=Trace W=Wipe L=Liquid V=Vegetation X=Other
Relinquished By R. Thoren	Date/Time 12-17-99/0730	Received By R. Thoren	Date/Time 12-17-99/0730									
Relinquished By R. Thoren	Date/Time 12-17-99/0941	Received By K. Schindler	Date/Time 12-17-99/0941									
Relinquished By	Date/Time	Received By	Date/Time									
Relinquished By	Date/Time	Received By	Date/Time									

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

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B00-013-07	Page 1 of 1
Collector R. Fahlberg/R. Nielson	Company Contact Jason 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 105-DR	SAF No. B00-013	Air Quality <input type="checkbox"/>				
Ice Chest No. ERC 94-087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express				
Shipped To TMA/RECRE Quatern	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None						
	Type of Container	aG	aG	aG	aG						
	No. of Container(s)	0	0	1	1						
	Volume	60mL	60mL	60mL	60mL						
Special Handling and/or Storage											

SAMPLE ANALYSIS				PCBs - 8082	Isotopic Uranium	See item (1) in Special Instructions.	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)					
526 W01980 B				J9L170163								

Sample No.	Matrix *	Sample Date	Sample Time								
BOX5M4	Other Solid	12-16-99	0830	X	X	X	X	DG H F C			Box 4 N6
Box 5m5	other solid	12-16-99	0858	X	X	X	X	DG H F K			Box 4 N6
Box 5m6	other solid	12-16-99	0915	X	X	X	X	DG H F R			Box 4 N6
Box 5m7	other solid	12-16-99	0915	X	X	X	X	DG H F T			Box 4 N6
Box 5m8	other solid	12-16-99	0947	X	X	X	X	DG H F V			Box 4 N6

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By R. Fahlberg	Date/Time 12-16-99 1600	Received By Ref 1-C	Date/Time 12-16-99 1600
Relinquished By R. Thoren	Date/Time 12-17-99 0730	Received By K. Thoren	Date/Time 12-17-99 0730
Relinquished By R. Thoren	Date/Time 12-17-99 0941	Received By K. Thoren	Date/Time 12-17-99 0941
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

<b>SPECIAL INSTRUCTIONS</b> (1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14 out of ICP metals, analyze for PCBs out of Gamma spec. analyze Iso Uranium	<b>Matrix *</b> S-Soil SE-Sediment SL-Solid S-Sludge W-Water O-Oil A-Air DS-Drum Solids DL-Drum Liquids T-Tissue WJ-Wipe L-Liquid V-Vegetation X-Other
--	--

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

Collector: R. Fahlgberg  
 Company Contact: Jason 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: 105-DR  
 SAF No.: B00-013  
 Air Quality: [Blank]

Ice Chest No.: ERC 99.003  
 Field Logbook No.: EL-1424  
 COA: R105D2280C  
 Method of Shipment: Federal Express

Shipped To: ~~FMARECRA~~ QUANTERRA Rich  
 Office Property No.: N/A  
 Bill of Lading/Air Bill No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None										
	Type of Container	aG	aG										
	No. of Container(s)	1	1										
	Volume	60mL	120mL										

SDG SAMPLE ANALYSIS Due 1-11-00  
 W02980A J9L200121  
 ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)  
 See item (1) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
BOX57 D6LCN	Other Solid	12-17-99	1322	X	X								Box 4NS
Box 58 D6LCP	Other Solid	12-17-99	1334	X	X								Box 4NS
Box 59 D6LCA	Other Solid	12-17-99	1346	X	X								Box 4NS

CHAIN OF POSSESSION			Sign/Print Names			SPECIAL INSTRUCTIONS						Matrix *
Relinquished By	Date/Time	Received By	Date/Time			(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Platinum; Strontium-89,90 -- Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14  X- Pu/Am ✓ TOT SR ✓ TC ✓  N163 ✓ C14 ✓						S - Soil SF - Sediment SL - Solid W - Water L - Liquid V - Vegetation X - Other
R. Fahlgberg	12-17-99 1515	Ref 1-C	12-17-99 1815									
Relinquished By	Date/Time	Received By	Date/Time									
R. Thoren	12-20-99 10730	R. Thoren	12-20-99 10730									
Relinquished By	Date/Time	Received By	Date/Time									
R. Thoren	12-20-99 10840	[Signature]	12-20-99 0840									
Relinquished By	Date/Time	Received By	Date/Time									
Relinquished By	Date/Time	Received By	Date/Time									
Relinquished By	Date/Time	Received By	Date/Time									

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

**Appendix 5**  
**Data Validation Supporting Documentation**

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RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT: LOS F/DR			DATA PACKAGE: W02890 A+B		
VALIDATOR: TLI		LAB: QES		DATE: 2/24/00	
CASE:			SDG: W02890 A+B		
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha/Beta	<input type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX <u>BOX5M4 BOX5M5 BOX5M6 BOX5M7</u>					
<u>BOX5M8 BOX5M9 BOX5N0 BOX5N1 BOX5N2</u>					
<u>BOX5N3 BOX5N4 BOX5N5 BOX5Y7 BOX5Y8</u>					
<u>BOX5Y9</u>					
<u>Solid</u>					

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: Amzel - J M4 + N2  
SR-90 - J 47 + 49 Blank cont  
F. Blank U-234, U-238, U-143 + + C-99 in B  
 \_\_\_\_\_  
 \_\_\_\_\_

- 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: IR - C14  
all ok but C14 missing - IR - both Ash  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- 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 IR - in B - Jell  
others in B ok

- 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: no dup for C14 B  
all other ok

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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Holding Times

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

Comments: IR \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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: 152-M4, M6, M7, M8 } over MDA  
754-N1  
155-47, 48  
154 M4, M6, N1  
155 M4, M5, M6, N1, N5, 47, 48

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### BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02980B / 9682  
LAB SAMPLE ID: D6M1W11B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	1.68E-02	J	1.9E-02	2.0E-02	1.52E-02	pCi/g	73.21%	RICHRC5080

Number of Results: 1

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL

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Quanterra Analytical Services, Inc  
rptChemRadBlank; v3.41

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Date: 29 February 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. W02980-QES (SDG No. W02980)

**INTRODUCTION**

This memo presents the results of data validation on Data Package No. W02980-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
BOX5M4	12/16/99	Solid	C	See note 1
BOX5M5	12/16/99	Solid	C	See note 1
BOX5M6	12/16/99	Solid	C	See note 1
BOX5M7	12/16/99	Solid	C	See note 1
BOX5M8	12/16/99	Solid	C	See note 1
BOX5M9	12/16/99	Solid	C	See note 1
BOX5N0	12/16/99	Solid	C	See note 1
BOX5N1	12/16/99	Solid	C	See note 1
BOX5N2	12/16/99	Solid	C	See note 1
BOX5N3	12/16/99	Solid	C	See note 1
BOX5N4	12/16/99	Solid	C	See note 1
BOX5N5	12/16/99	Solid	C	See note 1
BOX5Y7	12/17/99	Solid	C	See note 1
BOX5Y8	12/17/99	Solid	C	See note 1
BOX5Y9	12/17/99	Solid	C	See note 1

1 - ICP metals by 6010B (lead); mercury by 7471A.

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:

- 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 lead and 28 days for mercury.

All 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.

### Field Blanks

One equipment blank (BOX5N0) was submitted for analysis. Lead and mercury were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **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 the lack of a matrix spike analysis, the lead results in samples BOX5Y7, BOX5Y8 and BOX5Y9 were qualified as estimates and flagged "J".

All 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% for solid samples. 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 two times 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 Duplicate Samples

One pair of field duplicate samples (samples BOX5M6/BOW5M7) were submitted to QES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its

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duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 105DR PQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. W02980-QES (SDG No. W02980) was submitted for validation and verified for completeness. The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to the lack of a matrix spike analysis, the lead results in samples BOX5Y7, BOX5Y8 and BOX5Y9 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**

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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).

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**Appendix 2**  
**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: W02980	REVIEWER: TLI	DATE: 2/29/00	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	BOX5Y7, BOX5Y8, BOX5Y9	No MS analysis

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

**000009**



BECHTEL HANFORD, INC.

Client Sample ID: BOX5M4

TOTAL Metals

Lot-Sample #...: F9L200157-001  
Date Sampled...: 12/16/99

Date Received...: 12/17/99

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0010413 Mercury	0.040	0.033	mg/kg	SW846 7471A	01/10/00	D6LQ3105
		Dilution Factor: 1				
Prep Batch #...: 0011206 Lead	4.6	0.30	mg/kg	SW846 6010B	01/11/00	D6LQ3102
		Dilution Factor: 1				

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2/25/00

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BECHTEL HANFORD, INC.

Client Sample ID: B0X5M5

TOTAL Metals

Lot-Sample #...: F9L200157-002

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.10	0.033	mg/kg	SW846 7471A	01/10/00	D6LQK103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	12.7	0.30	mg/kg	SW846 6010B	01/11/00	D6LQK102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5M6

TOTAL Metals

Lot-Sample #...: F9L200157-003

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0010413 Mercury	0.077	0.033	mg/kg	SW846 7471A	01/10/00	D6LQL103
Prep Batch #...: 0011206 Lead	17.5	0.30	mg/kg	SW846 6010B	01/11/00	D6LQL102

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BECHTEL HANFORD, INC.

Client Sample ID: B0X5M7

TOTAL Metals

Lot-Sample #...: F9L200157-004

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.094	0.033	mg/kg	SW846 7471A	01/10/00	D6LQM103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	21.5	0.30	mg/kg	SW846 6010B	01/11/00	D6LQM102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: B0X5M8

TOTAL Metals

Lot-Sample #...: F9L200157-005

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 0010413						
Mercury	ND	0.033	mg/kg	SW846 7471A	01/10/00	D6LQN103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	19.0	0.30	mg/kg	SW846 6010B	01/11/00	D6LQN102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5M9

TOTAL Metals

Lot-Sample #...: F9L200157-006

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.019 B	0.033	mg/kg	SW846 7471A	01/10/00	D6LQP103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	2.3	0.30	mg/kg	SW846 6010B	01/11/00	D6LQP102
		Dilution Factor: 1				

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: BOX5N0

TOTAL Metals

Lot-Sample #...: F9L200157-007

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 0010413						
Mercury	5.9	0.33	mg/kg	SW846 7471A	01/10/00	D6LQV103
		Dilution Factor: 10				
Prep Batch #...: 0011206						
Lead	7.5	0.30	mg/kg	SW846 6010B	01/11/00	D6LQV102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5N1

TOTAL Metals

Lot-Sample #...: F9L200157-008

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.32	0.033	mg/kg	SW846 7471A	01/10/00	D6LQW103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	134	0.30	mg/kg	SW846 6010B	01/11/00	D6LQW102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5N2

TOTAL Metals

Lot-Sample #....: F9L200157-009

Matrix.....: SOLID

Date Sampled....: 12/16/99

Date Received..: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #....: 0010413						
Mercury	15.4	0.33	mg/kg	SW846 7471A	01/10/00	D6LQX103
		Dilution Factor: 10				
Prep Batch #....: 0011206						
Lead	218	0.30	mg/kg	SW846 6010B	01/11/00	D6LQX102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: B0X5N3

TOTAL Metals

Lot-Sample #...: F9L200157-010

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.52	0.033	mg/kg	SW846 7471A	01/10/00	D6LR0103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	4.0	0.30	mg/kg	SW846 6010B	01/11/00	D6LR0102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5N4

TOTAL Metals

Lot-Sample #....: F9L200157-011  
Date Sampled....: 12/16/99

Date Received...: 12/17/99

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 0010413						
Mercury	0.078	0.033	mg/kg	SW846 7471A	01/10/00	D6LR1103
		Dilution Factor: 1				
Prep Batch #....: 0011206						
Lead	6.3	0.30	mg/kg	SW846 6010B	01/11/00	D6LR1102
		Dilution Factor: 1				

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BECHTEL HANFORD, INC.

Client Sample ID: BOX5N5

TOTAL Metals

Lot-Sample #...: F9L200157-012

Matrix.....: SOLID

Date Sampled...: 12/16/99

Date Received...: 12/17/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 0010413						
Mercury	0.96	0.033	mg/kg	SW846 7471A	01/10/00	D6LR2103
		Dilution Factor: 1				
Prep Batch #...: 0011206						
Lead	6.0	0.30	mg/kg	SW846 6010B	01/11/00	D6LR2102
		Dilution Factor: 1				

*ju*  
2/25/00

000022

~~000008~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5Y7

TOTAL Metals

Lot-Sample #...: F9L230207-001  
Date Sampled...: 12/17/99

Date Received...: 12/20/99

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 0007336						
Lead	6.4 J	0.30	mg/kg	SW846 6010B	01/07-01/10/00	D6TCG101
		Dilution Factor: 1				
Prep Batch #...: 0010413						
Mercury	0.11	0.033	mg/kg	SW846 7471A	01/10/00	D6TCG102
		Dilution Factor: 1				

*ju*  
2/25/00

000023

~~000004~~

BECHTEL HANFORD, INC.

Client Sample ID: B0X5Y8

TOTAL Metals

Lot-Sample #....: F9L230207-002

Matrix.....: SOLID

Date Sampled....: 12/17/99

Date Received...: 12/20/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #....: 0007336						
Lead	4.5 <i>J</i>	0.30	mg/kg	SW846 6010B	01/07-01/10/00	D6TD3101
		Dilution Factor: 1				
Prep Batch #....: 0010413						
Mercury	0.17	0.033	mg/kg	SW846 7471A	01/10/00	D6TD3102
		Dilution Factor: 1				

*Y*  
2/25/00

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BECHTEL HANFORD, INC.

Client Sample ID: B0X5Y9

TOTAL Metals

Lot-Sample #....: F9L230207-003

Matrix.....: SOLID

Date Sampled....: 12/17/99

Date Received...: 12/20/99

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #....: 0007336						
Lead	11.6	0.30	mg/kg	SW846 6010B	01/07-01/10/00	D6TDP101
		Dilution Factor: 1				
Prep Batch #....: 0010413						
Mercury	0.40	0.033	mg/kg	SW846 7471A	01/10/00	D6TDP102
		Dilution Factor: 1				

*Handwritten signature*  
2/24/00

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

000026

Quanterra Incorporated  
13715 Rider Trail North  
Earth City, Missouri 63045

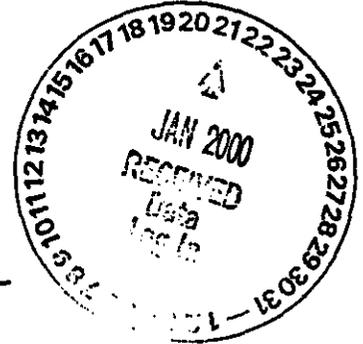
314 298-8566 Telephone  
314 298-8757 Fax

## CASE NARRATIVE

Bechtel Hanford Incorporated  
3350 George Washington Way  
Richland, Washington 99352

January 17, 2000

Attention: Joan Kessner



---

Quote Number	:	33811
SDG	:	W02980
Number of Samples	:	Fifteen (15)
Sample Matrix	:	Solid
Data Deliverable	:	Summary
Date SDG Closed	:	December 20, 1999

---

### II. Introduction

Between December 17, 1999, and December 20, 1999, 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 on 12/18/99 at 8 degrees C (COC #s B00-013-07; -12; -17), and 12/20/99 (COC # B00-013-52) at 4 degrees C. 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  
Mercury - 7471 - CV  
PCBs - 8082

Deviation from Request: None

000027

*Handwritten signature/initials*

Bechtel Hanford Incorporated

January 17, 2000

Quote Number: 33811

SDG: W02980

Page 2

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#### IV. Definitions

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

QCBLK- Quality Control Blank, Method Blank

QCLCS- Quality Control Laboratory Control Sample, Blank Spike

MS- Matrix Spike.

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.

There were no non-conformances or comments associated with the metals data for this SDG.

##### PCB:

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

Method 3545 (ASE) was used as the extraction method. The RPD for Aroclor 1016 in the MS/MSD is outside of control limits. Aroclor 1260 in the MS/MSD is slightly over the calibration range due to a hit in the sample for this Aroclor.

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Bechtel Hanford Incorporated

January 17, 2000

Quote Number: 33811

SDG: W02980

Page 3

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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

~~000004~~

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-52

Page 1 of 1

Collector R. Fahberg	Company Contact Jason 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 105-DR	SAF No. B00-013	Air Quality <input type="checkbox"/>		
Ice Chest No. ERC 99.003	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express		
Shipped To TMA/REGRA QUANTERRA Rich	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None								
	Type of Container	gG	gG								
	No. of Container(s)	1	1								
	Special Handling and/or Storage	Volume	60mL	120mL							

SDG W02980  
 SAMPLE ANALYSIS  
 J9L200121  
 ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)  
 Special Analysis

Sample No.	Matrix *	Sample Date	Sample Time	ICP Metals	Mercury	Volume	Special	Box	Notes
BOX57 D6LCN	Other Solid	12.17.99	1332	X	X	1 x 60mL	✓	Box	4NS
BOX58 D6LCP	Other Solid	12.17.99	1334	X	X	1 x 60mL	✓	Box	4NS
BOX59 D6LCA	Other Solid	12.17.99	1346	X	X	1 x 60mL	✓	Box	4NS

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *
Relinquished By R. Fahberg	Date/Time 12.17.99	Received By R. Thoman	Date/Time 12.17.99	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Phosphorus; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14  Pu/AM ✓ TOT SR ✓ TC ✓ N163 ✓ C14 ✓		S - Soil
Relinquished By R. Thoman	Date/Time 12.20.99	Received By R. Thoman	Date/Time 12.20.99			SE - Sediment
Relinquished By R. Thoman	Date/Time 12.20.99	Received By R. Thoman	Date/Time 12.20.99			SO - Solid
Relinquished By Heidelberg	Date/Time 12.20.99	Received By Jennifer Smith	Date/Time 12.22.99			S - Sludge
Relinquished By	Date/Time	Received By	Date/Time			W - Water

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

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-07

Page 1 of 1

Collector R. Fahlberg/R. Nielson

Company Contact Jason 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 105-DR

SAF No. B00-013 Air Quality

Ice Chest No. ERC 96-087

Field Logbook No. EL-1424

COA R105D2280C

Method of Shipment Federal Express

Shipped To TMA/RECRA RC 12-16-99 Quantern

Offsite Property No. N/A

Bill of Lading/Air Bill No. N/A

POSSIBLE SAMPLE HAZARDS/REMARKS

Table with columns: Preservation, Cool #C, None, None, None. Rows: Type of Container, No. of Container(s), Volume.

Special Handling and/or Storage

SAMPLE ANALYSIS

506 W01980

J92170163

Handwritten notes: PCBs - 8082, Isotopic Uranium, See item (1) in Special Instruction, HCP Metals - 2010A (Supertrace) (Lead); Mercury - 2471 (CV)

Table with columns: Sample No., Matrix, Sample Date, Sample Time, PCBs, Uranium, Special Instruction, HCP Metals. Rows: BOX5M4, BOX5M5, BOX5M6, BOX5M7, BOX5M8.

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CHAIN OF POSSESSION

Sign/Print Names

SPECIAL INSTRUCTIONS

Table with columns: Relinquished By, Date/Time, Received By, Date/Time. Rows: R. Fahlberg, R. Thoren, K. Schindler.

(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14. out of ICP metals, analyze for PCBs out of Gamma Spec, analyze Igo Uranium

Matrix \* S=Soil SE=Soilmat 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

Table with columns: LABORATORY SECTION, Received By, Title, Date/Time, ANAL SAMPLE DISPOSITION, Disposal Method, Disposed By, Date/Time.

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-12

Page 1 of 1

Collector R. Fahberg/R. Nielson

Company Contact Jason Adler Telephone No. 373-4316

Project Coordinator TRENT, SJ

Price Code 9L

Data Turnaround

Project Designation 105-F/DR Phase III Below-grade Arcas Sampling and Analy

Sampling Location 105-DR

SAF No. B00-013

Air Quality

21 Days

Ice Chest No. ERC-96087

Field Logbook No. EL-1424

COA R105D2280C

Method of Shipment Federal Express

Shipped To RF 12-16-99 FMA/REGRA-Quaserra

Offsite Property No. N/A

Bill of Lading/Air Bill No. N/A

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None
	Type of Container	gG	gG	gG	gG
	No. of Container(s)	0	0	1	1
	Volume	60mL	60mL	60mL	60mL

SPECIAL HANDLING AND/OR STORAGE	PCBs - 8062	Isotopic Uranium	See item (1) in Special Instructions	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)
	SOP 402980 J9L170163	100%	100%	100%

Sample No.	Matrix *	Sample Date	Sample Time	PCBs - 8062	Isotopic Uranium	See item (1) in Special Instructions	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)
BOX5M9	Other Solid	12-16-99	1005	X	X	X	X
BOX5N0	Other Solid	12-16-99	1223	X	X	X	X
BOX5N1	Other Solid	12-16-99	1247	X	X	X	X
BOX5N2	Other Solid	12-16-99	1300	X	X	X	X
BOX5N3	Other Solid	12-16-99	1312	X	X	X	X

Box 4146

000032

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By	Date/Time	Received By	Date/Time
R. Fahberg	12-16-99	RF 1-C	12-16-99
Relinquished By	Date/Time	Received By	Date/Time
K. Thoren	12-17-99/0730	K. Thoren	12-17-99/0730
Relinquished By	Date/Time	Received By	Date/Time
K. Thoren	12-17-99/0941	K. Thoren	12-17-99/0941
Relinquished By	Date/Time	Received By	Date/Time
K. Thoren	12-17-99/1600	RF 1-C	12-18-99/0945
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS	Matrix *
(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14	S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue W=Wipe L=Liquid V=Vegetation X=Other
out of ICP metals, analyze PCBs out of Gamma Spec, Analyze Isotopic Uranium	

000032

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

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>			B00-013-17	Page 1 of 1
Collector R. Fahlgberg/R. Nielson	Company Contact Jason 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 105-DR	SAF No. D00-013	Air Quality <input type="checkbox"/>			
Ice Chest No. ERC-96087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express			
Shipped To <i>RF 12-16-99</i> TMA/REGRA <i>Quatera</i>	Offsite Property No. <i>N/A</i>	Bill of Lading/Air Bill No. <i>N/A</i>				

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None					
	Type of Container	aG	aG	aG	aG					
	No. of Container(s)	0	0	1	1					
	Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL				

SAMPLE ANALYSIS				PCBs - 8082	Isotopic Uranium	See Item (1) in Special Instructions.	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7431 - (CH)						
<i>506</i>	<i>W02980</i>	<i>J9 L170163</i>											
Sample No.	Matrix *	Sample Date	Sample Time	100%	100%	100%	100%						
BOX5N4	Other Solid	12-16-99	1323	X	X	X	X					Box	4N6
BOX5N5	Other Solid	12-16-99	1340	X	X	X	X					Box	4N6

000033

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By <i>R. Fahlgberg</i>	Date/Time <i>12-16-99</i>	Received By <i>Ref 1-C</i>	Date/Time <i>12-16-99</i>	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14  <i>out of ICP metals analyze PCBs</i> <i>out of Gamma Spec analyze Isotopic Uranium</i>				S=Soil SE=Soil/Est SO=Solid S=Sheld W=Water O=Oil A=Air DS=Drym Solids DL=Drym Liquids T=Tissue W=Wipe L=Liquid V=Vegetation X=Other
Relinquished By <i>Ref 1-C</i>	Date/Time <i>12-17-99</i>	Received By <i>R. Thoren</i>	Date/Time <i>12-17-99</i>					
Relinquished By <i>R. Thoren</i>	Date/Time <i>12-17-99</i>	Received By <i>K. Schlenker</i>	Date/Time <i>12-17-99</i>					
Relinquished By <i>K. Schlenker</i>	Date/Time <i>12-17-99</i>	Received By <i>R. Schlenker</i>	Date/Time <i>12-17-99</i>					
Relinquished By	Date/Time	Received By	Date/Time					

LABORATORY SECTION	Received By <i>[Signature]</i>	Date/Time <i>12/15/99</i>	Title	Disposed By	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method				

**Appendix 5**  
**Data Validation Supporting Documentation**

000024

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	105DR		DATA PACKAGE: W02980		
VALIDATOR:	TLI	LAB: QES	DATE:		
CASE:			SDG:	W02980	
ANALYSES PERFORMED					
<input type="checkbox"/> CLP/CP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> SW-846/CP	<input type="checkbox"/> SW-846/GFAA	<input checked="" type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	Solid - Hg				
BOX5M4	BOX5M5	BOX5M6	BOX5M7	BOX5M8	
BOX5M9	BOX5N0	BOX5N1	BOX5N2	BOX5N3	
BOX5N4	BOX5N5	BOX5Y7	BOX5N8	BOX5Y9	
					Solid

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: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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: lead in both gb - ok  
pb + Hg in 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: MS - prep batch 336 - NO MS  
send in IR  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Date: 29 February 2000  
 To: Bechtel Hanford Inc. (technical representative)  
 From: TechLaw, Inc.  
 Project: 105-F/DR Phase III Below-grade Areas Sampling and Analysis - Concrete  
 Subject: PCB - Data Package No. W02980-QES (SDG No. W02980)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02980-QES prepared by Quanterra Environmental Services (QES). A list of the 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
BOX5M4	12/16/99	Solid	C	PCBs by EPA 8082
BOX5M5	12/16/99	Solid	C	PCBs by EPA 8082
BOX5M6	12/16/99	Solid	C	PCBs by EPA 8082
BOX5M7	12/16/99	Solid	C	PCBs by EPA 8082
BOX5M8	12/16/99	Solid	C	PCBs by EPA 8082
BOX5M9	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N0	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N1	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N2	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N3	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N4	12/16/99	Solid	C	PCBs by EPA 8082
BOX5N5	12/16/99	Solid	C	PCBs by EPA 8082

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:

000001

- 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**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Solid samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

Holding times were met for all samples.

- **Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable.

### Field Blanks

One equipment blank (BOX5N0) was submitted for analysis. Aroclor-1260 was detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **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 analyses are performed in duplicate and must be within 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For solid samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits (35%), all PCB results except aroclor-1016 were qualified as estimates and flagged "J".

#### Field Duplicate Samples

One pair of field duplicate samples (samples BOX5M6/BOW5M7) were submitted to QES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for aroclor-1260 was outside QC limits (99%). Under the BHI statement of work, no qualification is required.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 105DR PQLs to ensure that laboratory detection levels meet the required criteria. All undetected results in samples BOX5M5 and BOX5M6 were reported above the PQL. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data Package No. W02980-QES (SDG No. W02980) was submitted for validation and verified for completeness. The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

Due to an RPD outside QC limits (35%), all PCB results except aroclor-1016 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**

000006

Qualifiers which may be applied by data validators in compliance with the procedures herein 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. 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.
- 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).

000007

**Appendix 2**

**Summary of Data Qualification**

000008

DATA QUALIFICATION SUMMARY

SDG: W02980	REVIEWER: TLI	DATE: 2/29/00	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All except aroclor-1016	J	All	RPD

000009

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

Project: BECHTEL-HANFORD																			
Laboratory: Quanterra																			
Case		SDG: W02980																	
Sample Number		BOX5M4		BOX5M5		BOX5M6		BOX5M7		BOX5M8		BOX5M9		BOX5N0		BOX5N1		BOX5N2	
Location		#6		#7		#8		#8		#9		#10		#11		#12		#13	
Remarks		Duplicate																	
Sample Date		12/16/99		12/16/99		12/16/99		12/16/99		12/16/99		12/16/99		12/16/99		12/16/99		12/16/99	
PCB	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Aroclor-1221	100	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
Aroclor-1232	100	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
Aroclor-1242	100	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
Aroclor-1248	100	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
Aroclor-1254	100	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
Aroclor-1260	100	510	J	970	J	830	J	280	J	350	J	230	J	290	J	240	J	280	J
Sample Number		BOX5N3		BOX5N4		BOX5N5													
Location		#14		#15		#16													
Remarks																			
Sample Date		12/16/99		12/16/99		12/16/99													
PCB	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	ND	U	ND	U	ND	U												
Aroclor-1221	100	ND	UJ	ND	UJ	ND	UJ												
Aroclor-1232	100	ND	UJ	ND	UJ	ND	UJ												
Aroclor-1242	100	ND	UJ	ND	UJ	ND	UJ												
Aroclor-1248	100	ND	UJ	ND	UJ	ND	UJ												
Aroclor-1254	100	ND	UJ	ND	UJ	ND	UJ												
Aroclor-1260	100	130	J	260	J	590	J												

00001

BECHTEL HANFORD, INC.

Client Sample ID: BOX5M4

~~GC Semivolatiles~~ PCBs *Daynes* 1/24/2000

Lot-Sample #....: F9L200157-001 Work Order #....: D6LQ3108 Matrix.....: SOLID  
Date Sampled....: 12/16/99 Date Received...: 12/17/99  
Prep Date.....: 12/29/99 Analysis Date...: 12/30/99  
Prep Batch #....: 9364258  
Dilution Factor: 1 Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND <i>UJ</i>	33	ug/kg
Aroclor 1260	510 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Tetrachloro-m-xylene	54	(15 - 168)
Decachlorobiphenyl	103	(10 - 207)

*2/25/00*

~~0000302~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5M5

~~GC Semivolatiles~~ PCBs *Dayes* 1/24/2000

Lot-Sample #...: F9L200157-002    Work Order #...: D6LQK104    Matrix.....: SOLID  
Date Sampled...: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 01/03/00  
Prep Batch #...: 9364258  
Dilution Factor: 5    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	160	ug/kg
Aroclor 1221	ND UJ	160	ug/kg
Aroclor 1232	ND ↓	160	ug/kg
Aroclor 1242	ND ↓	160	ug/kg
Aroclor 1248	ND ↓	160	ug/kg
Aroclor 1254	ND ↓	160	ug/kg
Aroclor 1260	970 J	160	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Tetrachloro-m-xylene	105	(15 - 168)
Decachlorobiphenyl	73	(10 - 207)

*Dayes*  
1/25/00

000013

~~000037~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5M6

GC Semivolatiles PCBs *Daynes 1/24/2000*

Lot-Sample #....: F9L200157-003    Work Order #....: D6LQL104    Matrix.....: SOLID  
Date Sampled....: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 01/03/00  
Prep Batch #....: 9364258  
Dilution Factor: 5    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	160	ug/kg
Aroclor 1221	ND <i>UJ</i>	160	ug/kg
Aroclor 1232	ND	160	ug/kg
Aroclor 1242	ND	160	ug/kg
Aroclor 1248	ND	160	ug/kg
Aroclor 1254	ND	160	ug/kg
Aroclor 1260	830 <i>J</i>	160	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	80	(15 - 168)
Decachlorobiphenyl	82	(10 - 207)

*Daynes*  
*2/25/00*

BECHTEL HANFORD, INC.

Client Sample ID: BOX5M7

~~GC Semivolatiles~~ PCBs *Dayes 1/24/2000*

Lot-Sample #...: F9L200157-004    Work Order #...: D6LQM104    Matrix.....: SOLID  
 Date Sampled...: 12/16/99    Date Received...: 12/17/99  
 Prep Date.....: 12/29/99    Analysis Date...: 01/03/00  
 Prep Batch #...: 9364258  
 Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND UJ	33	ug/kg
Aroclor 1232	ND ↓	33	ug/kg
Aroclor 1242	ND ↓	33	ug/kg
Aroclor 1248	ND ↓	33	ug/kg
Aroclor 1254	ND ↓	33	ug/kg
Aroclor 1260	280 J	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	24	(15 - 168)
Decachlorobiphenyl	61	(10 - 207)

*mw*  
*2/25/00*

BECHTEL HANFORD, INC.

Client Sample ID: B0X5M8

~~GC Semivolatiles~~ PCBs *Dayes 1/24/2000*

Lot-Sample #...: F9L200157-005    Work Order #...: D6LQN104    Matrix.....: SOLID  
Date Sampled...: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 12/30/99  
Prep Batch #...: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	350 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	76	(15 - 168)
Decachlorobiphenyl	206	(10 - 207)

*ms*  
*2/25/00*

BECHTEL HANFORD, INC.

Client Sample ID: BOX5M9

~~GC Semivolatiles~~ PCBs *Daye* 1/24/2000

Lot-Sample #...: F9L200157-006    Work Order #...: D6LQP104    Matrix.....: SOLID  
Date Sampled...: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 12/30/99  
Prep Batch #...: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND UJ	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	230 J	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	65	(15 - 168)
Decachlorobiphenyl	144	(10 - 207)

*Daye*  
2/25/00

BECHTEL HANFORD, INC.

Client Sample ID: BOX5N0

~~GC-Semivolatiles~~ PCBs *Dayes* 1/24/2000

Lot-Sample #...: F9L200157-007    Work Order #...: D6LQV104    Matrix.....: SOLID  
Date Sampled...: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 12/30/99  
Prep Batch #...: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	290 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	79	(15 - 168)
Decachlorobiphenyl	60	(10 - 207)

*1/24/00*

BECHTEL HANFORD, INC.

Client Sample ID: B0X5N1

~~GC Semivolatiles~~ PCBs *Dayes 1/24/2000*

Lot-Sample #...: F9L200157-008    Work Order #...: D6LQW104    Matrix.....: SOLID  
 Date Sampled...: 12/16/99    Date Received...: 12/17/99  
 Prep Date.....: 12/29/99    Analysis Date...: 12/30/99  
 Prep Batch #...: 9364258  
 Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND UJ	33	ug/kg
Aroclor 1232	ND ↓	33	ug/kg
Aroclor 1242	ND ↓	33	ug/kg
Aroclor 1248	ND ↓	33	ug/kg
Aroclor 1254	ND ↓	33	ug/kg
Aroclor 1260	240 J	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	68	(15 - 168)
Decachlorobiphenyl	65	(10 - 207)

*YR*  
*2/25/00*

000019

~~000043~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5N2

~~GC Semivolatiles PCBs~~ *Daynes* 1/24/2000

Lot-Sample #....: F9L200157-009    Work Order #....: D6LQX104    Matrix.....: SOLID  
Date Sampled....: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 12/30/99  
Prep Batch #....: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND UJ	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	280 J	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	44	(15 - 168)
Decachlorobiphenyl	25	(10 - 207)

*pu*  
*2/25/00*

BECHTEL HANFORD, INC.

Client Sample ID: BOX5N3

~~GC Semivolatiles~~ PCBs *Dayes 1/24/2000*

Lot-Sample #...: F9L200157-010    Work Order #...: D6LR0104    Matrix.....: SOLID  
Date Sampled...: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 01/03/00  
Prep Batch #...: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	130 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	79	(15 - 168)
Decachlorobiphenyl	46	(10 - 207)

*pc*  
*2/25/00*

000021

~~000015~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5N4

~~GC Semivolatiles~~ PCBs *Dayes 1/24/2000*

Lot-Sample #...: F9L200157-011 Work Order #...: D6LR1104 Matrix.....: SOLID  
Date Sampled...: 12/16/99 Date Received...: 12/17/99  
Prep Date.....: 12/29/99 Analysis Date...: 01/03/00  
Prep Batch #...: 9364258  
Dilution Factor: 1 Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	260 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	91	(15 - 168)
Decachlorobiphenyl	64	(10 - 207)

*JW*  
*2/25/00*

000022

~~000048~~

BECHTEL HANFORD, INC.

Client Sample ID: BOX5N5

~~GC Semivolatiles~~ PCBs *Dayes* 1/24/2000

Lot-Sample #....: F9L200157-012    Work Order #....: D6LR2104    Matrix.....: SOLID  
Date Sampled....: 12/16/99    Date Received...: 12/17/99  
Prep Date.....: 12/29/99    Analysis Date...: 01/03/00  
Prep Batch #....: 9364258  
Dilution Factor: 1    Method.....: SW846 8082

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Aroclor 1016	ND	33	ug/kg
Aroclor 1221	ND <i>UJ</i>	33	ug/kg
Aroclor 1232	ND	33	ug/kg
Aroclor 1242	ND	33	ug/kg
Aroclor 1248	ND	33	ug/kg
Aroclor 1254	ND	33	ug/kg
Aroclor 1260	590 <i>J</i>	33	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Tetrachloro-m-xylene	100	(15 - 168)
Decachlorobiphenyl	79	(10 - 207)

*pc*  
*2/25/00*

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000024**

Quanterra Incorporated  
13715 Rider Trail North  
Earth City, Missouri 63045

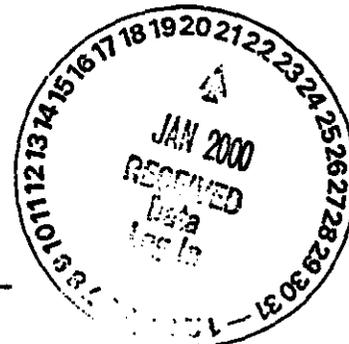
314 298-8566 Telephone  
314 298-8757 Fax

## CASE NARRATIVE

Bechtel Hanford Incorporated  
3350 George Washington Way  
Richland, Washington 99352

January 17, 2000

Attention: Joan Kessner



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Quote Number	:	33811
SDG	:	W02980
Number of Samples	:	Fifteen (15)
Sample Matrix	:	Solid
Data Deliverable	:	Summary
Date SDG Closed	:	December 20, 1999

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### II. Introduction

Between December 17, 1999, and December 20, 1999, 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 on 12/18/99 at 8 degrees C (COC #s B00-013-07; -12; -17), and 12/20/99 (COC # B00-013-52) at 4 degrees C. 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  
   Mercury - 7471 - CV  
   PCBs - 8082

Deviation from Request:    None

000025

~~000025~~

Bechtel Hanford Incorporated  
January 17, 2000  
Quote Number: 33811  
SDG: W02980  
Page 2

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#### IV. Definitions

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

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

There were no non-conformances or comments associated with the metals data for this SDG.

##### PCB:

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

Method 3545 (ASE) was used as the extraction method. The RPD for Aroclor 1016 in the MS/MSD is outside of control limits. Aroclor 1260 in the MS/MSD is slightly over the calibration range due to a hit in the sample for this Aroclor.

Bechtel Hanford Incorporated

January 17, 2000

Quote Number: 33811

SDG: W02980

Page 3

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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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: R. Fahlgberg  
 Company Contact: Jason 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: 105-DR  
 SAF No.: B00-013  
 Air Quality:   
 Ice Chest No.: ERC 99-003  
 Field Logbook No.: EL-1424  
 COA: R105D2280C  
 Method of Shipment: Federal Express  
 Shipped To: FMA/REGRA QUANTERRA Rich  
 Offsite Property No.: N/A  
 Bill of Lading/Air Bill No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None											
	Type of Container	uG	uG											
	No. of Container(s)	1	1											
	Volume	60mL	120mL											

SDG W02980  
 SAMPLE ANALYSIS  
 J9L200121  
 Date 1-11-00  
 ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (CV)

Sample No.	Matrix *	Sample Date	Sample Time											
BOX57 D6LCN	Other Solid	12-17-99	1332	X				1 x 60mL	↓	45%	Box	4NS		
Box 58 D6LCP	Other Solid	12-17-99	1334	X				1 x 60mL	↓	full	Box	4NS		
Box 59 D6LCA	Other Solid	12-17-99	1346	X				1 x 60mL	↓	full	Box	4NS		

000028

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Sign/Print Names		Date/Time						
Relinquished By: R. Fahlgberg	Date/Time: 12-17-99	Received By: R. Thoren	Date/Time: 12-17-99	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Phosphorus; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14 Pu/Am ✓ TOT SR ✓ TC ✓ N163 ✓ C14 ✓				S=Soil
Relinquished By: R. Thoren	Date/Time: 12-20-99/0730	Received By: R. Thoren	Date/Time: 12-20-99/0730					SE=Seafloor
Relinquished By: Heindelberg	Date/Time: 12-20-99/1600	Received By: L. Smith	Date/Time: 12-22-99/0700					SC=Solid
Relinquished By:	Date/Time:	Received By:	Date/Time:					S=Sludge
Relinquished By:	Date/Time:	Received By:	Date/Time:					W=Water

LABORATORY SECTION Received By: \_\_\_\_\_ Title: \_\_\_\_\_ Date/Time: \_\_\_\_\_

FINAL SAMPLE DISPOSITION Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-07

Page 1 of 1

Collector  
R. Fahlberg/R. Nielson

Company Contact  
Jason Adler

Telephone No.  
373-4316

Project Coordinator  
TRENT, SJ

Price Code 9L

Data Turnaround

Project Designation  
105-F/DR Phase III Below-grade Areas Sampling and Analy

Sampling Location  
105-DR

SAF No.  
B00-013

Air Quality

21 Days

Ice Chest No.  
ERC 96-087

Field Logbook No.  
EL-1424

COA  
R105D2280C

Method of Shipment  
Federal Express

Shipped To  
TMA/REGRA  
RC 12-16-99  
Quantum

Offsite Property No.  
N/A

Bill of Lading/Air Bill No.  
N/A

POSSIBLE SAMPLE HAZARDS/REMARKS

Preservation

Cool 4C

None

None

None

Type of Container

aG

aG

aG

aG

No. of Container(s)

0

0

1

1

Special Handling and/or Storage

Volume

60mL

60mL

60mL

60mL

SAMPLE ANALYSIS

PCBs - 2002

Isotopic Uranium

See item (1) in Special Instruction

ICP Metals - 2010A (Supertrace) (Lead); Mercury - 7471 (CV)

SDG  
W02980

J9L170163

100%

100%

100%

100%

Sample No.

Matrix \*

Sample Date

Sample Time

BOX5M4

Other Solid

12-16-99

0830

X

X

X

X

Box 4 N6

Box 5m5

other solid

12-16-99

0858

X

X

X

X

Box 4 N6

Box 5m6

other solid

12-16-99

0915

X

X

X

X

Box 4 N6

Box 5m7

other solid

12-16-99

0915

X

X

X

X

Box 4 N6

Box 5m8

other solid

12-16-99

0947

X

X

X

X

Box 4 N6

CHAIN OF POSSESSION

Sign/Print Names

SPECIAL INSTRUCTIONS

Relinquished By

Date/Time 1600

Received By

Date/Time 1600

R. Fahlberg

R. Fahlberg 12-16-99

Ref 1-C

12-16-99

Relinquished By

12-17-99

Received By

Date/Time

Ref 1-C

12-17-99 0730

R. Thoren

12-17-99 0730

Relinquished By

RAT 12-16-99

Received By

Date/Time

R. Thoren

12-17-99 0941

R. Thoren

12-17-99 0941

Relinquished By

12-17-99

Received By

Date/Time

R. Thoren

12-17-99 0941

R. Thoren

12-17-99 0941

Relinquished By

Date/Time

Received By

Date/Time

LABORATORY SECTION

Received By

Title

Date/Time

FINAL SAMPLE DISPOSITION

Disposal Method

Disposed By

Date/Time

000059

(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Phosphorus; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14

out of ICP metals, analyze for PCBs

out of Gamma Spec, analyze I-130 Uranium

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

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>			B00-013-12	Page 1 of 1
Collector R. Fahllberg/R. Nielson	Company Contact Jason 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 105-DR	SAF No. B00-013	Air Quality <input type="checkbox"/>			
Ice Chest No. ERC-96087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express			
Shipped To R&F 12-16-99 TMA/REGRA-Quasiteca	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A				

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None					
	Type of Container	aG	aG	aG	aG					
	No. of Container(s)	0	0	1	1					
	Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL				

SAMPLE ANALYSIS				PCBs - 0003	Isotopic Uranium	See item (1) in Special Instructions.	ICP Metals - 6010A (Supertec) (Lead); Mercury - 7471-ICV					
506 W02980 J9L170163				100%	100%	100%	100%					
Sample No.	Matrix *	Sample Date	Sample Time									
BOX5M9	Other Solid	12-16-99	1005	X	X	X	X					Box 416
BOX5N0	Other Solid	12-16-99	1223	X	X	X	X					
BOX5N1	Other Solid	12-16-99	1247	X	X	X	X					
BOX5N2	Other Solid	12-16-99	1300	X	X	X	X					
BOX5N3	Other Solid	12-16-99	1312	X	X	X	X					

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By R. Fahllberg/R. Nielson	Date/Time 12-16-99	Received By Ref 1-C	Date/Time 12-16-99	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14				S-Soil
Relinquished By Kup 1-C	Date/Time 12-17-99/0730	Received By R. Thoren	Date/Time 12-16-99/0730	out of ICP metals, analyze PCBs				SE-Sediment
Relinquished By R. Thoren	Date/Time 12-17-99/0941	Received By K. Sellmeyer	Date/Time 12-17-99/0941	out of Gamma Spec, Analyze To Uranium				SO-Solid
Relinquished By K. Sellmeyer	Date/Time 12-17-99/1600	Received By Ref 1-C	Date/Time 12-18-99/0945					S-Slug
Relinquished By	Date/Time	Received By	Date/Time					W-Water
Relinquished By	Date/Time	Received By	Date/Time					O-Oil
Relinquished By	Date/Time	Received By	Date/Time					A-Air

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

000030

000028

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B00-013-17

Page 1 of 1

Collector R. Falberg/R. Nielson	Company Contact Jason 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 105-DR	SAF No. B00-013	Air Quality <input type="checkbox"/>		
Ice Chest No. ERC-96087	Field Logbook No. EL-1424	COA R105D2280C	Method of Shipment Federal Express		
Shipped To Ref 12-16-99 TMA/REGRA Quatecca	Offsite Property No. N/A	Bill of Lading/Air BHI No. N/A			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None	None
	Type of Container	aG	aG	aG	aG
	No. of Container(s)	0	0	1	1
	Special Handling and/or Storage	Volume	60mL	60mL	60mL

SAMPLE ANALYSIS				PCBs - 6082	Isotopic Uranium	See item (1) in Special Instructions.	ICP Metals - 6010A (Supertrace) (Lead); Mercury - 7471 - (C)
506	W02980	J9 L170163					
Sample No.	Matrix *	Sample Date	Sample Time				
BOX5N4	Other Solid	12-16-99	1323	X	X	X	X
BOX5N5	Other Solid	12-16-99	1340	X	X	X	X

000031

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *
Relinquished By R. Falberg 12-16-99	Date/Time 1600	Received By Ref 1-C 12-16-99	Date/Time 1600	(1) Gamma Spectroscopy (Cobalt-60); Gamma Spec - Add-on (Barium-133); Isotopic Phosphorus; Strontium-89,90 - Total Sr; Technetium-99; Americium-241; Nickel-63; Carbon-14  out of ICP metals analyze PCBs out of Gamma Spec analyze Isotopic Uranium		S=Soil SE=Soil/enum SO=Solid S=Sheds W=Water O=Oil A=Air OS=Drum Solids OL=Drum Liquids T=Traces W=Wipe L=Liquid V=Vegetation X=Other
Relinquished By Ref 1-C 12-17-99	Date/Time 0730	Received By K. Thoren 12-17-99	Date/Time 0730			
Relinquished By K. Thoren 12-17-99	Date/Time 0941	Received By K. Thoren 12-17-99	Date/Time 0941			
Relinquished By K. Thoren 12-17-99	Date/Time 1600	Received By K. Thoren 12-17-99	Date/Time 0945			
Relinquished By	Date/Time	Received By	Date/Time			

LABORATORY SECTION	Received By K. Thoren 12/15/99	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

**Appendix 5**  
**Data Validation Supporting Documentation**

000032

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT: 105 DR			DATA PACKAGE: W02980		
VALIDATOR: FLI	LAB: OES		DATE: 2/23/00		
CASE:	SDG: W02980				
ANALYSES PERFORMED					
<input type="checkbox"/> CLP3/90	<input type="checkbox"/> SW-846 8080	<input type="checkbox"/> SW-846 8081	<input checked="" type="checkbox"/> 8082	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX					
BOX5M4	BOX5M5	BOX5M6	BOX5M7	BOX5M8	
BOX5M9	BOX5N0	BOX5U1	BOX5U2	BOX5U3	
BOX5U4	BOX5U5	BOX5Y7	BOX5Y8	BOX5Y9	
					Solid

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: \_\_\_\_\_

? M5, M6, M7, U3, U4, U5 - ok own holding times  
run 4 day after etc

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No **N/A**

Are calibration standard retention times acceptable? . . . . . Yes No **N/A**

Are DDT and endrin breakdowns acceptable? . . . . . Yes No **N/A**

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . .	Yes	No	N/A
Is the GC/MS tuning/performance check acceptable? . . . . .	Yes	No	N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? . . . . .	Yes	No	N/A
Are quantitation column calibration factor %RSD values acceptable? . . . . .	Yes	No	N/A
Were the analytical sequence requirements met? . . . . .	Yes	No	N/A
Are continuing calibration %D values acceptable? . . . . .	Yes	No	N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . .	Yes	No	N/A
Was the resolution acceptable in the resolution check mix? . . . . .	Yes	No	N/A
Is resolution acceptable in the PEM, INDA and INDB? . . . . .	Yes	No	N/A
Are DDT and Endrin breakdowns acceptable? . . . . .	Yes	No	N/A
Are retention times in PEMs and calibration mixes acceptable? . . . . .	Yes	No	N/A
Are RPD values in the PEMs acceptable? . . . . .	Yes	No	N/A
Are %RSD values acceptable? . . . . .	Yes	No	N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . .	Yes	No	N/A
Is resolution acceptable in the PEMs? . . . . .	Yes	No	N/A
Are initial calibrations acceptable? . . . . .	Yes	No	N/A

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMS, INDA and INDB mixes? . . . . . Yes No N/A

Are RPD values in the PEMS acceptable? . . . . . Yes No N/A

Are the DDT and endrin breakdowns acceptable? . . . . . Yes No N/A

Was GPC cleanup performed? . . . . . Yes No N/A

Is the GPC calibration check acceptable? . . . . . Yes No N/A

Was Florisil cleanup performed? . . . . . Yes No N/A

Is the Florisil performance check acceptable? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory 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: Aroclor 1260 - 290 ug/kg

\_\_\_\_\_

\_\_\_\_\_

5. ACCURACY

Were surrogates analyzed? . . . . . Yes No N/A

Are surrogate recoveries acceptable? . . . . . Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD results acceptable? . . . . . Yes No N/A

Were LCS samples analyzed? . . . . . Yes No N/A

Are LCS results acceptable? . . . . . Yes No N/A

Comments: MS An 1260 1109% - fall but 10/11

OK

\_\_\_\_\_

\_\_\_\_\_

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

- Are MS/MSD RPD values acceptable? . . . . . Yes  No  N/A
- Are laboratory duplicate results 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: 1014 = 3390 RPD 1260 3570 RPP 1000  
31/23 1105 28 LJ  
42/119

FD - 99%

7. SYSTEM PERFORMANCE

- Is chromatographic performance acceptable? . . . . . Yes  No  N/A
- Are positive results resolved acceptably? . . . . . Yes  No  N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

8. COMPOUND IDENTIFICATION AND QUANTITATION

- Is compound identification acceptable? . . . . . Yes  No  N/A
- Is compound quantitation acceptable? . . . . . Yes  No  N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

Comments: MS, MU - all undetected above CRQL  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

MATRIX SPIKE SAMPLE EVALUATION REPORT

~~GC-Semivolatiles~~ PCBs *Dayes* 1/24/2000

Client Lot #...: W02980      Work Order #...: D6LQ310C-MS      Matrix.....: SOLID  
 MS Lot-Sample #: F9L200157-001      D6LQ310D-MSD  
 Date Sampled...: 12/16/99      Date Received...: 12/17/99  
 Prep Date.....: 12/29/99      Analysis Date...: 01/03/00  
 Prep Batch #...: 9364258  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Aroclor 1016	126	(10 - 174)			SW846 8082
	95 p	(10 - 174)	28	(0-20)	SW846 8082
Aroclor 1260	140	(10 - 222)			SW846 8082
	98	(10 - 222)	9 <del>28</del> 35%	(0-20)	SW846 8082
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>		<u>RECOVERY LIMITS</u>	
Tetrachloro-m-xylene		105		(15 - 168)	
		72		(15 - 168)	
Decachlorobiphenyl		205		(10 - 207)	
		142		(10 - 207)	

NOTE(S):

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

Bold print denotes control parameters

p Relative percent difference (RPD) is outside stated control limits.

000027

~~000050~~

**Duncan, Jeanette M**

---

**From:** Weiss, Richard L  
**Sent:** Thursday, March 02, 2000 4:39 PM  
**To:** Duncan, Jeanette M  
**Subject:** Validatio Review of W02980

Jeanette,

My review of the validation packages for W02980 found only the following:

The validator incorrectly used radionuclide result values not provided MDAs for comparison against the project MDA requirements.

The provided replacement package has been corrected.

Rich Weiss

THE FOLLOWING FILE(S) ERASED

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

ERRORS

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

1. Date 3/01/00		2. Review No. BHI/QA0016	
3. Project 105-F/DR		4. Page Page 1 of 1	
Reviewer Stacey	8. Organization/Group BHI/QA		9. Location/Phone HO-16/372-9208
	11. CLOSED		
12. Contact	Date	13. Reviewer/Point of Contact	14. Author/Originator
15. Disposition (Provide justification if NOT accepted.)	16. Status		

<b>Review Comment Record (RCR)</b>	1. Date 3/01/00	2. Review No. BHI/QA0016
	3. Project 105-F/DR	4. Page Page 1 of 1

5. Document Number(s)/Title(s)  SDG No. W02980	6. Program/Project/ Building Number  105-F/DR Phase II Below-grade Areas Sampling and Analysis - Concrete	7. Reviewer  Claude Stacey	8. Organization/Group  BHI/QA	9. Location/Phone  H0-16/372-9208
--	---	----------------------------------	-------------------------------------	---

17. Comment Submittal Approval: \_\_\_\_\_ 10. Agreement with indicated comment disposition(s) \_\_\_\_\_ 11. CLOSED

\_\_\_\_\_  
Organization Manager (Optional)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Reviewer/Point of Contact

\_\_\_\_\_  
Date

\_\_\_\_\_  
Reviewer/Point of Contact

\_\_\_\_\_  
Author/Originator

\_\_\_\_\_  
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	PCB: Page 09 under compound the aroclor-1216 is indicated. This should be aroclor-1016.			
2	PCB: Page 11, sample B0X5N2 the result for the Aroclor-1260 shows 260; whereas, the laboratory result sheet, page 20, shows 280.			
3	Inorganics: There is no page 12 in the package.			
4	Radiochemistry: Page 04, Detection Limits, indicates that the sample B0X5M8 exceeded the detection limit for Eu-152. This should be sample B0X5M9.			
5	Radiochemistry: Page 11, sample B0X5M9 has the value for Eu-154 as 0.405; whereas, the laboratory result sheet shows the value as 0.0405.			

THE FOLLOWING FILE(S) ERASED

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

ERRORS

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

BHI Sample Management  
 Phone: (509) 372-9346  
 FAX: (509) 372-9487

To: B. Christian

Fax: 375-5151

From: R. Weiss

Date: 2-28-00

Re: W2580 IR

Pages: 3

CC:

Quick Turn / Priority Data

Final Data Package

One to 5d

BHI Sample Management  
Phone: (509) 372-9346  
FAX: (509) 372-9487

facsimile transmittal

To: B. Christian

Fax: 375-5151

From: R. Weiss

Date: 2-28-00

Re: W2580 IR

Pages: 3

CC:

Quick Turn / Priority Data

Final Data Package

One to go  
-Rick

# FAX

## TECHLAW, INC.

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

To: Jeannette Duncan

From: Bruce Christian

Pages: 1

Date: 24 February 2000

Information Request

W02980 - Inorganics

Three of the lead samples (BOX5Y7, BOX5Y8, BOX5Y9) were prepared and analyzed separately from the other 12 samples. A blank and LCS are reported for this separate group but no matrix spike. Is there an associated matrix spike??

*See item 2 on attached sheet.*

*R. Wilson*

*2-28-00*

**Kessner, Joan H**

---

**From:** WaddellJ@quanterra.com  
**Sent:** Monday, February 28, 2000 11:55 AM  
**To:** JHKessne@mail.bhi-erc.com  
**Subject:** FW: SDG W02980

Answers from St. Louis for Rich's questions.

---

**From:** Ward, Marti  
**Sent:** Monday, February 28, 2000 9:16 AM  
**To:** Waddell, Jackie  
**Subject:** RE: SDG W02980

---

**From:** Waddell, Jackie  
**Sent:** Monday, February 28, 2000 10:57 AM  
**To:** Ward, Marti  
**Subject:** SDG W02980  
**Importance:** High

Marti,  
questions on the package....

1. Where do you find the PCB extraction date?

Top of the form has a line item labeled "Prep Date". That is the extraction date.

2. Three metal samples (B0X5X7, B0X5X8 and B0X5X9) were prepped and analyzed separate from the other samples. Did we run an MS for that batch?

A MS/MSD was analyzed in the second batch, but it was not on a sample in this SDG. We only report one set of QC per twenty samples (or per SDG if it contains less than 20 samples).

3. For the main metals package, two matrix spikes are listed. Please verify that the second is actually the MSD.

Yes, the top number is the MS and the second value is the MSD. This is the way Quantims reports these.

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
019	MEMORY TX		3755151	10/10	OK

ERRORS

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

BHI Sample Management  
 Phone: (509) 372-9346  
 FAX: (509) 372-9487



To: B. Christian Fax: 375-5751  
 From: R. Owens Date: 2-28-00  
 Re: 602780 TR Pages: 10  
 CC:

Quick Turn / Priority Data  Final Data Package

*still working on the last 2*

BHI Sample Management  
Phone: (509) 372-9346  
FAX: (509) 372-9487

.....

facsimile transmittal

To: B. Christian

Fax: 375-5751

From: R. Weiss

Date: 2-28-00

Re: W02780 IRs

Pages: 10

CC:

Quick Turn / Priority Data

Final Data Package

still working on the last 2

Rich

.....

# 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: 24 February 2000

Information Request

W02980 - PCBs

The RPD for aroclor-1260 on page 50 is given by the lab at 9.9%. I calculate 35%.

*Lab calculated results are incorrect.  
Use your calculation for RPD determinations*

*R. Wood 2-28-00*

# 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: 24 February 2000

Information Request

W02980 - Metals

No lab duplicates are identified but the lab ran two matrix spikes. Is one spike meant to be the matrix spike duplicate?

*Use 2nd "spike" as an MSD*

*R. M. W.*

*2-28-00*



# 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: 24 February 2000

Information Request

W02980 - Rad

I need the distillation and analysis dates for carbon-14, 3H and TC-99

*NI-63*

*Re-Send w/ corrected  
Attached sheets should provide necessary  
info  
P. Klein 2-28-00*

Liquid Scintillation Counting Sheet

2980A

QC BATCH Number: 9355296

1110100

Position	WorkOrder No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value	Preparation Information
1	D6LCN10AY	2			Analysis: <u>TC99</u> Matrix: <u>SOIL</u> Client: <u>BHI</u> Date Cocktail Added: <u>1/7/00</u> Total Count Time <u>60</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>24</u> Vials: <u>AB</u>
2	D6LCN105	↓			
3	D6LCN109S			TCSG094 PR. 3/31/99 EX. 3/31/00	
4	D6LCP105				
5	D6LCA105				
6	D6MXK101B				
7	D6MXK102C			TCSG096 PR. 3/31/99 EX. 3/31/00	
8	D6MXK103B		5		
9					Counting Information Tower No: <u>45</u> LSC#: <u>49</u> CR initials: <u>[Signature]</u> Comments Counted 1/9/00 [Signature] 1/28/00
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

Liquid Scintillation Counting Sheet

2980A

1/10/00

QC BATCH Number: 9255293

Position	WorkOrder No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value	Preparation information
1	D6LCN102				Analysis: <u>NIG3</u> Matrix: <u>Solid</u> Client: <u>BWT</u> Date Cocktail Added: <u>1-19-00</u> Total Count Time <u>100</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>30</u> Initials: <u>RB</u>
2	D6LCN108X				
3	D6LCP102				
4	D6LCQ102				
5	D6LCQ1095				
6	D6MXC101B				
7	D6MXC102C				
8	D6MXC103B	B			
9					Counting information Tower No: <u>4</u> LSC#: <u>5</u> CF initials: <u>16/30 1/19/00</u>
10					
11					
12					
13					Comments D6MXC101B D6MXC102C lost their PA after putting on CT may have lost some sample  Counted 1/23/00 RB
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

Liquid Scintillation Counting Sheet

2980A

QC BATCH Number: 9355292

Position	Work Order No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value	Preparation Information
1	DGMXG-1-01BN				Analysis: <u>C-14</u> Matrix: <u>Solid</u> Client: <u>BHI</u> Date Cocktail Added: <u>1-3-00</u> Total Count Time <u>40</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>7</u> Initials: <u>bm</u> Counting Information Tower No. <u>15</u> LSC# <u>5</u> CR Initials: _____ Comments Counted 1/4/00 [Signature] 2/28/00
2	DGMXG-1-03BN				
3	DGMXG-1-02C			CSE040	
4	DGLCN-1-07	0.07			
5	DGLCN-1-0EX				
6	DGLCP-1-07				
7	DGLCQ-1-07				
8					
9					
10					
11					
12					
13					
14					
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23					
24					

Liquid Scintillation Counting Sheet

2980B

GC BATCH Number: 9354407

116100

Position	WorkOrder No.	Volume Analyzed (g/mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value	Preparation Information
1	D6MIK103B	5.2			Analysis: <u>TC99</u> Matrix: <u>Other</u> Client: <u>BLI</u> Date Cocktail Added: <u>11/7/00</u> Total Count Time <u>100</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>23+16</u> initials: <u>RB</u>
2	D6GL910AY	2			
3	D6GL9106				
4	D6GL9109S			TCSG095 PR. 3/31/99 31.3/31/00	
5	D6HDC106				
6	D6HDD106				
7	D6HDG106				
8	D6HDX106				
9	D6HDT106				
10	D6HDA9106				
11	D6HFC106				
12	D6HFK106	↓			
13	D6MIK104B	5			
14	D6HFR106	2			
15	D6HFT106				
16	D6HFV106				
17	D6MIK101B				
18	D6MIK102C	↓		TCSG097 PR. 3/31/99 31.3/31/00	
19					
20					
21					
22					
23					
24					

Counted  
1/8/00  
RB

Liquid Scintillation Counting Sheet

2980B

QC BATCH Number: 9354403

1-6-99

Position	Work Order No.	Volume Analyzed (g mL L Hr)	Total Sample Volume (g mL L) OR Multiplier	Vial Label or Spike Value	Preparation Information
1	D6MIC103B	5			Analysis: <u>NF63</u> Matrix: <u>Solid</u> Client: <u>BHI</u> Date Cocktail Added: <u>11/7/00</u> Total Count Time: <u>100</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>126, 32</u> Initials: <u>RS</u>
2	D6GL9 102				
3	D6HAC 10AS				
4	D6HAC 102				
5	D6HDD 102				
6	D6HDDG 102				
7	D6HDX 102				
8	D6HDT 109X				
9	D6HDT 102				
10	D6HDT 102				
11	D6HFC 102				
12	D6HFK 102				
13	D6MIC104B	5			
14	D6HFR 102				
15	D6HFT 102				
16	D6HFR 102				
17	D6MIC101B				
18	D6MIC102G				
19					
20					
21					
22					
23					
24					

Liquid Scintillation Counting Sheet

2980B

QC BATCH Number: 9354399

Position	WorkOrder No.	Volume Analyzed (µ mL, L, H)	Total Sample Volume (µ mL, L) OR Multiplier	Vial Label or Spike Value	Preparation Information
1	DGM11-1-01BN				Analysis: <u>C-14</u> Matrix: <u>Solid</u> Client: <u>BHT</u> Date Cocktail Added: <u>12-29-99</u> Total Count Time: <u>90</u> min Volume Counted: <u>5</u> mLs Tray No(s): <u>26, 7</u> Initials: <u>DK</u>
2	DGM11-1-03BN				
3	DGM11-1-04BN				
4	DGM11-1-02C				
5	DGLG-1-08				
6	DGHDC-1-08				
7	DGHDD-1-08				
8	DGHDE-1-08				
9	DGHDX-1-08				
10	DGHDT-1-08				
11	DGHDT9-1-08				
12	DGHFC-1-08				
13	DGHFK-1-08				
14	DGHFR-1-08				
15	DGHFT-1-08				
16	DGHFV-1-08				
17					Counting Information Tower No. <u>15</u> LSC# <u>5</u> CR Initials: <u>CR 12/29/99 1530</u>
18					
19					
20					
21					
22					
23					
24					

Counted  
12/29/99  
DK

# 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: 24 February 2000

Information Request

W02980B - Rad

No I.C.S is present for carbon-14

*2 to Jack  
2/24*

# 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: 24 February 2000

Information Request

W02980 - Rad

I need the distillation and analysis dates for carbon-14, 3H and TC-99

*01-63*

*Re-Send w/e correction*

*discussed  
w/ Jackie  
2/24*

**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: 24 February 2000

Information Request

W02980 - PCBs

The RPD for aroclor-1260 on page 50 is given by the lab at 9.9%. I calculate 35%.

*2  
to Jackie  
2/24*

# 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: 24 February 2000

Information Request

W02980B - Rad

No matrix spike is present for 3H

*C-14*

*Re-send w/ corrected*

*Lab doesn't do .....*

# 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: 24 February 2000

Information Request

W02980 - Metals

No lab duplicates are identified but the lab ran two matrix spikes. Is one spike meant to be the matrix spike duplicate?

*Sent to lab*

# 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: 24 February 2000

Information Request

W02980 - Inorganics

Three of the lead samples (BOX5Y7, BOX5Y8, BOX5Y9) were prepared and analyzed separately from the other 12 samples. A blank and LCS are reported for this separate group but no matrix spike. Is there an associated matrix spike??

*Sent to lab*

**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: 24 February 2000

Information Request

W02980B - Rad

No matrix spike is present for 3H

*C-14*

*Re-sent w/ correction*

*Laboratory does not perform MS  
for this analysis*

*RLW-2-25-00*

# 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: 24 February 2000

Information Request

W02980A - Rad

No MS is present for carbon-14

*L Lab doesn't  
do.....*

*Laboratory does not perform AMS for  
this analysis*

*RLW 2-25-00*

**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: 24 February 2000

Information Request

W02980 **B** - Rad

Noduplicate is present for carbon-14

*check case  
narrative*

*No duplicate was performed for this  
analysis -*

*RZW 2-25-00*

# 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: 24 February 2000

Information Request

W02980 - PCBs

I need the extraction dates for the PCB analysis.

*Withdrawn 2-25-00*

THE FOLLOWING FILE(S) ERASED

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

ERRORS

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

BHI Sample Management  
 Phone: (509) 372-9346  
 FAX: (509) 372-9487



To: B Christian Fax: 375-3151  
 From: R Weiss Date: 2-25-00  
 Re: I.R. Response Pages: 4  
 CC:

Quick Turn / Priority Data  Final Data Package

More soon I hope  
 n-1

BHI Sample Management  
Phone: (509) 372-9346  
FAX: (509) 372-9487

facsimile transmittal

To: B Christian Fax: 375-5151  
From: R Weiss Date: 2-25-00  
Re: IR Responses Pages: 4  
CC:

- Quick Turn / Priority Data  Final Data Package

more soon I hope  
- Rich

