0059800

SAF-B01-054

100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol

FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jill Thomson — JT 5/20
INITIAL/DATE

Jeanette Duncan — JT 5/20
INITIAL/DATE

SDG: H2166 **SAF-B01-054**

Waste Site/Sample Location: 1607-B9

RECEIVED
JUL 14 2003
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Date: 12 May 2003
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B9
Subject: Semivolatile - Data Package No. H2166-LLI (SDG No. H2166)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2166-LLI prepared by Lionville Laboratory Incorporated (LLI). 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
J00LW2	4/16/03	Soil	C	See note 1
J00LW3	4/16/03	Soil	C	See note 1
J00LW4	4/16/03	Soil	C	See note 1
J00LW5	4/16/03	Soil	C	See note 1
J00LW6	4/16/03	Soil	C	See note 1
J00LW7	4/16/03	Soil	C	See note 1
J00LW8	4/16/03	Soil	C	See note 1
J00LW9	4/16/03	Soil	C	See note 1
J00LX0	4/16/03	Soil	C	See note 1
J00LX1	4/16/03	Soil	C	See note 1

1-Semivolatiles by 8270C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 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 were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater 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 detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

<u>Field Blanks</u>

One equipment blank (J00LX1) was submitted for analysis. Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the equipment blank. Under the BHI statement of work, no qualification is required. All other field blank results were acceptable.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate 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/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected 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/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-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 of 40%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results were qualified as estimates and flagged "J".

Field Duplicate Samples

One set of field duplicate samples (J00LW7/J00LW8) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target detection limits (TDL's) to ensure that laboratory detection levels meet the required criteria. Sixty-six sample results exceeded the TDL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2166-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD of 40%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Sixty-six sample results exceeded the TDL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the 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 same 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 minor 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 minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major 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 major 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 usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2166	REVIEWER: TLI	DATE: 5/12/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
4-Nitrophenol 2-Nitrophenol 2,4-Dinitrophenol	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD																	
Laboratory: LLI																	
Case:	SDG: H2166																
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9	
Remarks														Duplicate			
Sample Date		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03	
Extraction Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03	
Analysis Date		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03	
Semivolatile (8270C)	TDL	Result	Q	Result	Q	Result	Q	Result	U	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
bis(2-Chloroethyl)ether	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2-Chlorophenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
1,3-Dichlorobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
1,4-Dichlorobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
1,2-Dichlorobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2-Methylphenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,2'-oxybis(1-chloropropane)	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
3 and/or 4-Methylphenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
N-Nitroso-di-n-propylamine	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Hexachloroethane	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Nitrobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Isophorone	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2-Nitrophenol	660	360	UJ	360	UJ	360	UJ	350	UJ	360	UJ	360	UJ	360	UJ	360	UJ
2,4-Dimethylphenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
bis(2-Chloroethoxy)methane	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,4-Dichlorophenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
1,2,4-Trichlorobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Naphthalene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
4-Chloroaniline	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Hexachlorobutadiene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
4-Chloro-3-methylphenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2-Methylnaphthalene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Hexachlorocyclopentadiene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,4,6-Trichlorophenol	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,4,5-Trichlorophenol	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
2-Chloronaphthalene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2-Nitroaniline	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
Dimethylphthalate	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Acenaphthylene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,6-Dinitrotoluene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD																	
Laboratory: LLI																	
Case:	SDG: H2166																
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9	
Remarks														Duplicate			
Sample Date		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03	
Extraction Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03	
Analysis Date		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03	
Semivolatile (8270C)	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
Acenaphthene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,4-Dinitrophenol	660	910	UJ	900	UJ	900	UJ	880	UJ	890	UJ	890	UJ	900	UJ	890	UJ
4-Nitrophenol	660	910	UJ	900	UJ	900	UJ	880	UJ	890	UJ	890	UJ	900	UJ	890	U
Dibenzofuran	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
2,4-Dinitrotoluene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Diethylphthalate	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
4-Chlorophenyl-phenyl ether	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Fluorene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
4-Nitroaniline	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
4,6-Dinitro-2-methylphenol	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
N-Nitrosodiphenylamine	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
4-Bromophenyl-phenyl ether	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Hexachlorobenzene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Pentachlorophenol	660	910	U	900	U	900	U	880	U	890	U	890	U	900	U	890	U
Phenanthrene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Anthracene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Carbazole	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Di-n-butylphthalate	660	360	U	96		360	U	36		360	U	360	U	360	U	360	U
Fluoranthene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Pyrene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Butylbenzylphthalate	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
3,3'-Dichlorobenzidine	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Benzo(a)anthracene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Chrysene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
bis(2-Ethylhexyl)phthalate	660	360	U	30		24		19		20		18		20		66	
Di-n-octylphthalate	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Benzo(b)fluoranthene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Benzo(k)fluoranthene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Benzo(a)pyrene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Indeno(1,2,3-cd)pyrene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Dibenz(a,h)anthracene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U
Benzo(g,h,i)perylene	660	360	U	360	U	360	U	350	U	360	U	360	U	360	U	360	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

000012

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD
Laboratory: LLI
Case: SDG: H2166

Sample Number		J00LX0		J00LX1													
Remarks				E. Blank													
Sample Date		4/16/03		4/16/03													
Extraction Date		4/21/03		4/21/03													
Analysis Date		4/24/03		4/24/03													
Semivolatile (8270C)	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	660	360	U	330	U												
bis(2-Chloroethyl)ether	660	360	U	330	U												
2-Chlorophenol	660	360	U	330	U												
1,3-Dichlorobenzene	660	360	U	330	U												
1,4-Dichlorobenzene	660	360	U	330	U												
1,2-Dichlorobenzene	660	360	U	330	U												
2-Methylphenol	660	360	U	330	U												
2,2'-oxybis(1-chloropropane)	660	360	U	330	U												
3 and/or 4-Methylphenol	660	360	U	330	U												
N-Nitroso-di-n-propylamine	660	360	U	330	U												
Hexachloroethane	660	360	U	330	U												
Nitrobenzene	660	360	U	330	U												
Isophorone	660	360	U	330	U												
2-Nitrophenol	660	360	UJ	330	UJ												
2,4-Dimethylphenol	660	360	U	330	U												
bis(2-Chloroethoxy)methane	660	360	U	330	U												
2,4-Dichlorophenol	660	360	U	330	U												
1,2,4-Trichlorobenzene	660	360	U	330	U												
Naphthalene	660	360	U	330	U												
4-Chloroaniline	660	360	U	330	U												
Hexachlorobutadiene	660	360	U	330	U												
4-Chloro-3-methylphenol	660	360	U	330	U												
2-Methylnaphthalene	660	360	U	330	U												
Hexachlorocyclopentadiene	660	360	U	330	U												
2,4,6-Trichlorophenol	660	360	U	330	U												
2,4,5-Trichlorophenol	660	900	U	830	U												
2-Chloronaphthalene	660	360	U	330	U												
2-Nitroaniline	660	900	U	830	U												
Dimethylphthalate	660	360	U	330	U												
Acenaphthylene	660	360	U	330	U												
2,6-Dinitrotoluene	660	360	U	330	U												

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD
Laboratory: LLI
Case: SDG: H2166

Sample Number		J00LX0		J00LX1													
Remarks				E. Blank													
Sample Date		4/16/03		4/16/03													
Extraction Date		4/21/03		4/21/03													
Analysis Date		4/24/03		4/24/03													
Semivolatile (8270C)	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	660	900	U	830	U												
Acenaphthene	660	360	U	330	U												
2,4-Dinitrophenol	660	900	UJ	830	UJ												
4-Nitrophenol	660	900	UJ	830	UJ												
Dibenzofuran	660	360	U	330	U												
2,4-Dinitrotoluene	660	360	U	330	U												
Diethylphthalate	660	360	U	330	U												
4-Chlorophenyl-phenyl ether	660	360	U	330	U												
Fluorene	660	360	U	330	U												
4-Nitroaniline	660	900	U	830	U												
4,6-Dinitro-2-methylphenol	660	900	U	830	U												
N-Nitrosodiphenylamine	660	360	U	330	U												
4-Bromophenyl-phenyl ether	660	360	U	330	U												
Hexachlorobenzene	660	360	U	330	U												
Pentachlorophenol	660	900	U	830	U												
Phenanthrene	660	360	U	330	U												
Anthracene	660	26		330	U												
Carbazole	660	45		330	U												
Di-n-butylphthalate	660	360	U	230													
Fluoranthene	660	650		330	U												
Pyrene	660	610		330	U												
Butylbenzylphthalate	660	360	U	330	U												
3,3'-Dichlorobenzidine	660	360	U	330	U												
Benzo(a)anthracene	660	360		330	U												
Chrysene	660	500		330	U												
bis(2-Ethylhexyl)phthalate	660	21		30													
Di-n-octylphthalate	660	360	U	330	U												
Benzo(b)fluoranthene	660	290		330	U												
Benzo(k)fluoranthene	660	220		330	U												
Benzo(a)pyrene	660	180		330	U												
Indeno(1,2,3-cd)pyrene	660	90		330	U												
Dibenz(a,h)anthracene	660	48		330	U												
Benzo(g,h,i)perylene	660	91		330	U												

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

Report Date: 04/25/03 10:31

RFW Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 1a

	Cust ID:	J00LW2	J00LW2	J00LW2	J00LW3	J00LW4	J00LW5
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	84 %	78 %	89 %	74 %	96 %	87 %
	2-Fluorobiphenyl	79 %	81 %	86 %	74 %	83 %	92 %
	Terphenyl-d14	114 %	102 %	112 %	98 %	125 %	117 %
	Phenol-d5	86 %	111 %	98 %	77 %	97 %	98 %
	2-Fluorophenol	82 %	110 %	91 %	75 %	79 %	89 %
	2,4,6-Tribromophenol	88 %	93 %	105 %	82 %	96 %	97 %
		fl	fl	fl	fl	fl	fl
Phenol		360 U	96 * %	98 * %	360 U	360 U	350 U
bis(2-Chloroethyl)ether		360 U	360 U	360 U	360 U	360 U	350 U
2-Chlorophenol		360 U	82 %	91 %	360 U	360 U	350 U
1,3-Dichlorobenzene		360 U	360 U	360 U	360 U	360 U	350 U
1,4-Dichlorobenzene		360 U	71 %	81 %	360 U	360 U	350 U
1,2-Dichlorobenzene		360 U	360 U	360 U	360 U	360 U	350 U
2-Methylphenol		360 U	360 U	360 U	360 U	360 U	350 U
2,2'-oxybis(1-Chloropropane)		360 U	360 U	360 U	360 U	360 U	350 U
3- and/or 4-Methylphenol		360 U	360 U	360 U	360 U	360 U	350 U
N-Nitroso-di-n-propylamine		360 U	82 %	90 %	360 U	360 U	350 U
Hexachloroethane		360 U	360 U	360 U	360 U	360 U	350 U
Nitrobenzene		360 U	360 U	360 U	360 U	360 U	350 U
Isophorone		360 U	360 U	360 U	360 U	360 U	350 U
2-Nitrophenol		360 U J	360 U	360 U	360 U J	360 U J	350 U J
2,4-Dimethylphenol		360 U	360 U	360 U	360 U	360 U	350 U
bis(2-Chloroethoxy)methane		360 U	360 U	360 U	360 U	360 U	350 U
2,4-Dichlorophenol		360 U	360 U	360 U	360 U	360 U	350 U
1,2,4-Trichlorobenzene		360 U	71 %	80 %	360 U	360 U	350 U
Naphthalene		360 U	360 U	360 U	360 U	360 U	350 U
4-Chloroaniline		360 U	360 U	360 U	360 U	360 U	350 U
Hexachlorobutadiene		360 U	360 U	360 U	360 U	360 U	350 U
4-Chloro-3-methylphenol		360 U	79 %	90 %	360 U	360 U	350 U
2-Methylnaphthalene		360 U	360 U	360 U	360 U	360 U	350 U
Hexachlorocyclopentadiene		360 U	360 U	360 U	360 U	360 U	350 U
2,4,6-Trichlorophenol		360 U	360 U	360 U	360 U	360 U	350 U
2,4,5-Trichlorophenol		910 U	910 U	910 U	900 U	900 U	880 U

*= Outside of EPA CLP QC limits.

000015

5/10/03

Cust ID:	J00LW2		J00LW2		J00LW2		J00LW3		J00LW4		J00LW5	
RFW#:	001		001 MS		001 MSD		002		003		004	
2-Chloronaphthalene	360	U	360	U	360	U	360	U	360	U	350	U
2-Nitroaniline	910	U	910	U	910	U	900	U	900	U	880	U
Dimethylphthalate	360	U	360	U	360	U	360	U	360	U	350	U
Acenaphthylene	360	U	360	U	360	U	360	U	360	U	350	U
2,6-Dinitrotoluene	360	U	360	U	360	U	360	U	360	U	350	U
3-Nitroaniline	910	U	910	U	910	U	900	U	900	U	880	U
Acenaphthene	360	U	75	%	82	%	360	U	360	U	350	U
2,4-Dinitrophenol	910	U J	910	U	910	U	900	U J	900	U J	880	U J
4-Nitrophenol	910	U J	56	%	84	%	900	U J	900	U J	880	U J
Dibenzofuran	360	U	360	U	360	U	360	U	360	U	350	U
2,4-Dinitrotoluene	360	U	72	%	85	%	360	U	360	U	350	U
Diethylphthalate	360	U	360	U	360	U	360	U	360	U	350	U
4-Chlorophenyl-phenylether	360	U	360	U	360	U	360	U	360	U	350	U
Fluorene	360	U	360	U	360	U	360	U	360	U	350	U
4-Nitroaniline	910	U	910	U	910	U	900	U	900	U	880	U
4,6-Dinitro-2-methylphenol	910	U	910	U	910	U	900	U	900	U	880	U
N-Nitrosodiphenylamine (1)	360	U	360	U	360	U	360	U	360	U	350	U
4-Bromophenyl-phenylether	360	U	360	U	360	U	360	U	360	U	350	U
Hexachlorobenzene	360	U	360	U	360	U	360	U	360	U	350	U
Pentachlorophenol	910	U	72	%	91	%	900	U	900	U	880	U
Phenanthrene	360	U	360	U	360	U	360	U	360	U	350	U
Anthracene	360	U	360	U	360	U	360	U	360	U	350	U
Carbazole	360	U	360	U	360	U	360	U	360	U	350	U
Di-n-butylphthalate	360	U	360	U	360	U	96	J	360	U	36	J
Fluoranthene	360	U	360	U	360	U	360	U	360	U	350	U
Pyrene	360	U	98	%	106	%	360	U	360	U	350	U
Butylbenzylphthalate	360	U	360	U	360	U	360	U	360	U	350	U
3,3'-Dichlorobenzidine	360	U	360	U	360	U	360	U	360	U	350	U
Benzo(a)anthracene	360	U	360	U	360	U	360	U	360	U	350	U
Chrysene	360	U	360	U	360	U	360	U	360	U	350	U
bis(2-Ethylhexyl)phthalate	360	U	360	U	37	J	30	J	24	J	19	J
Di-n-octyl phthalate	360	U	360	U	360	U	360	U	360	U	350	U
Benzo(b)fluoranthene	360	U	360	U	360	U	360	U	360	U	350	U
Benzo(k)fluoranthene	360	U	360	U	360	U	360	U	360	U	350	U
Benzo(a)pyrene	360	U	360	U	360	U	360	U	360	U	350	U
Indeno(1,2,3-cd)pyrene	360	U	360	U	360	U	360	U	360	U	350	U
Dibenz(a,h)anthracene	360	U	360	U	360	U	360	U	360	U	350	U
Benzo(g,h,i)perylene	360	U	360	U	360	U	360	U	360	U	350	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

000016

JW 5/13/03

Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Report Date: 04/25/03 10:31 Page: 2a

	Cust ID:	J00LW6		J00LW7		J00LW8		J00LW9		J00LX0		J00LX1	
Sample Information	RFW#:	005		006		007		008		009		010	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Nitrobenzene-d5	86	%	72	%	68	%	87	%	104	%	105	%
	2-Fluorobiphenyl	88	%	75	%	75	%	95	%	108	%	106	%
	Terphenyl-d14	122	%	108	%	122	%	124	%	120	%	156 *	%
	Phenol-d5	84	%	81	%	78	%	95	%	108	%	108	%
	2-Fluorophenol	84	%	77	%	75	%	89	%	101	%	103	%
	2,4,6-Tribromophenol	97	%	89	%	103	%	100	%	109	%	113	%
			fl		fl		fl		fl		fl		fl
Phenol		360	U	360	U	360	U	360	U	360	U	330	U
bis(2-Chloroethyl)ether		360	U	360	U	360	U	360	U	360	U	330	U
2-Chlorophenol		360	U	360	U	360	U	360	U	360	U	330	U
1,3-Dichlorobenzene		360	U	360	U	360	U	360	U	360	U	330	U
1,4-Dichlorobenzene		360	U	360	U	360	U	360	U	360	U	330	U
1,2-Dichlorobenzene		360	U	360	U	360	U	360	U	360	U	330	U
2-Methylphenol		360	U	360	U	360	U	360	U	360	U	330	U
2,2'-oxybis(1-Chloropropane)		360	U	360	U	360	U	360	U	360	U	330	U
3- and/or 4-Methylphenol		360	U	360	U	360	U	360	U	360	U	330	U
N-Nitroso-di-n-propylamine		360	U	360	U	360	U	360	U	360	U	330	U
Hexachloroethane		360	U	360	U	360	U	360	U	360	U	330	U
Nitrobenzene		360	U	360	U	360	U	360	U	360	U	330	U
Isophorone		360	U	360	U	360	U	360	U	360	U	330	U
2-Nitrophenol		360	U J	360	U J	360	U J	360	U J	360	U J	330	U J
2,4-Dimethylphenol		360	U	360	U	360	U	360	U	360	U	330	U
bis(2-Chloroethoxy)methane		360	U	360	U	360	U	360	U	360	U	330	U
2,4-Dichlorophenol		360	U	360	U	360	U	360	U	360	U	330	U
1,2,4-Trichlorobenzene		360	U	360	U	360	U	360	U	360	U	330	U
Naphthalene		360	U	360	U	360	U	360	U	360	U	330	U
4-Chloroaniline		360	U	360	U	360	U	360	U	360	U	330	U
Hexachlorobutadiene		360	U	360	U	360	U	360	U	360	U	330	U
4-Chloro-3-methylphenol		360	U	360	U	360	U	360	U	360	U	330	U
2-Methylnaphthalene		360	U	360	U	360	U	360	U	360	U	330	U
Hexachlorocyclopentadiene		360	U	360	U	360	U	360	U	360	U	330	U
2,4,6-Trichlorophenol		360	U	360	U	360	U	360	U	360	U	330	U
2,4,5-Trichlorophenol		890	U	890	U	900	U	890	U	900	U	830	U

*= Outside of EPA CLP QC limits.

000047

8

5/19/03

Cust ID:	J00LW6		J00LW7		J00LW8		J00LW9		J00LX0		J00LX1	
RFW#:	005		006		007		008		009		010	
2-Chloronaphthalene	360	U	360	U	360	U	360	U	360	U	330	U
2-Nitroaniline	890	U	890	U	900	U	890	U	900	U	830	U
Dimethylphthalate	360	U	360	U	360	U	360	U	360	U	330	U
Acenaphthylene	360	U	360	U	360	U	360	U	360	U	330	U
2,6-Dinitrotoluene	360	U	360	U	360	U	360	U	360	U	330	U
3-Nitroaniline	890	U	890	U	900	U	890	U	900	U	830	U
Acenaphthene	360	U	360	U	360	U	360	U	360	U	330	U
2,4-Dinitrophenol	890	U J	890	U J	900	U J	890	U J	900	U J	830	U J
4-Nitrophenol	890	U J	890	U J	900	U J	890	U J	900	U J	830	U J
Dibenzofuran	360	U	360	U	360	U	360	U	360	U	330	U
2,4-Dinitrotoluene	360	U	360	U	360	U	360	U	360	U	330	U
Diethylphthalate	360	U	360	U	360	U	360	U	360	U	330	U
4-Chlorophenyl-phenylether	360	U	360	U	360	U	360	U	360	U	330	U
Fluorene	360	U	360	U	360	U	360	U	360	U	330	U
4-Nitroaniline	890	U	890	U	900	U	890	U	900	U	830	U
4,6-Dinitro-2-methylphenol	890	U	890	U	900	U	890	U	900	U	830	U
N-Nitrosodiphenylamine (1)	360	U	360	U	360	U	360	U	360	U	330	U
4-Bromophenyl-phenylether	360	U	360	U	360	U	360	U	360	U	330	U
Hexachlorobenzene	360	U	360	U	360	U	360	U	360	U	330	U
Pentachlorophenol	890	U	890	U	900	U	890	U	900	U	830	U
Phenanthrene	360	U	360	U	360	U	360	U	310	J	330	U
Anthracene	360	U	360	U	360	U	360	U	26	J	330	U
Carbazole	360	U	360	U	360	U	360	U	45	J	330	U
Di-n-butylphthalate	360	U	360	U	360	U	360	U	360	U	230	J
Fluoranthene	360	U	360	U	360	U	360	U	650		330	U
Pyrene	360	U	360	U	360	U	360	U	610		330	U
Butylbenzylphthalate	360	U	360	U	360	U	360	U	360	U	330	U
3,3'-Dichlorobenzidine	360	U	360	U	360	U	360	U	360	U	330	U
Benzo(a)anthracene	360	U	360	U	360	U	360	U	360		330	U
Chrysene	360	U	360	U	360	U	360	U	500		330	U
bis(2-Ethylhexyl)phthalate	20	J	18	J	20	J	66	J	21	J	30	J
Di-n-octyl phthalate	360	U	360	U	360	U	360	U	360	U	330	U
Benzo(b)fluoranthene	360	U	360	U	360	U	360	U	290	J	330	U
Benzo(k)fluoranthene	360	U	360	U	360	U	360	U	220	J	330	U
Benzo(a)pyrene	360	U	360	U	360	U	360	U	180	J	330	U
Indeno(1,2,3-cd)pyrene	360	U	360	U	360	U	360	U	90	J	330	U
Dibenz(a,h)anthracene	360	U	360	U	360	U	360	U	48	J	330	U
Benzo(g,h,i)perylene	360	U	360	U	360	U	360	U	91	J	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Report Date: 04/25/03 10:31 Page: 3a

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	Cust ID:	SBLKRS		SBLKRS BS	
Sample Information	RFW#:	03LE0468-MB1		03LE0468-MB1	
	Matrix:	SOIL		SOIL	
	D.F.:	1.00		1.00	
	Units:	ug/Kg		ug/Kg	
Surrogate Recovery	Nitrobenzene-d5	70	%	95	%
	2-Fluorobiphenyl	73	%	90	%
	Terphenyl-d14	108	%	117	%
	Phenol-d5	78	%	100	%
	2-Fluorophenol	69	%	92	%
	2,4,6-Tribromophenol	86	%	107	%
Phenol		330	U	98 *	%
bis(2-Chloroethyl)ether		330	U	330	U
2-Chlorophenol		330	U	92	%
1,3-Dichlorobenzene		330	U	330	U
1,4-Dichlorobenzene		330	U	82	%
1,2-Dichlorobenzene		330	U	330	U
2-Methylphenol		330	U	330	U
2,2'-oxybis(1-Chloropropane)		330	U	330	U
3- and/or 4-Methylphenol		330	U	330	U
N-Nitroso-di-n-propylamine		330	U	89	%
Hexachloroethane		330	U	330	U
Nitrobenzene		330	U	330	U
Isophorone		330	U	330	U
2-Nitrophenol		330	U	330	U
2,4-Dimethylphenol		330	U	330	U
bis(2-Chloroethoxy)methane		330	U	330	U
2,4-Dichlorophenol		330	U	330	U
1,2,4-Trichlorobenzene		330	U	85	%
Naphthalene		330	U	330	U
4-Chloroaniline		330	U	330	U
Hexachlorobutadiene		330	U	330	U
4-Chloro-3-methylphenol		330	U	99	%
2-Methylnaphthalene		330	U	330	U
Hexachlorocyclopentadiene		330	U	330	U
2,4,6-Trichlorophenol		330	U	330	U
2,4,5-Trichlorophenol		830	U	830	U

*= Outside of EPA CLP QC limits.

000019

	Cust ID: SBLKRS		SBLKRS BS	
	RFW#: 03LE0468-MB1		03LE0468-MB1	
2-Chloronaphthalene	330	U	330	U
2-Nitroaniline	830	U	830	U
Dimethylphthalate	330	U	330	U
Acenaphthylene	330	U	330	U
2,6-Dinitrotoluene	330	U	330	U
3-Nitroaniline	830	U	830	U
Acenaphthene	330	U	87	%
2,4-Dinitrophenol	830	U	830	U
4-Nitrophenol	830	U	93	%
Dibenzofuran	330	U	330	U
2,4-Dinitrotoluene	330	U	94 *	%
Diethylphthalate	27	J	32	JB
4-Chlorophenyl-phenylether	330	U	330	U
Fluorene	330	U	330	U
4-Nitroaniline	830	U	830	U
4,6-Dinitro-2-methylphenol	830	U	830	U
N-Nitrosodiphenylamine (1)	330	U	330	U
4-Bromophenyl-phenylether	330	U	330	U
Hexachlorobenzene	330	U	330	U
Pentachlorophenol	830	U	90	%
Phenanthrene	330	U	330	U
Anthracene	330	U	330	U
Carbazole	330	U	330	U
Di-n-butylphthalate	330	U	330	U
Fluoranthene	330	U	330	U
Pyrene	330	U	102	%
Butylbenzylphthalate	330	U	330	U
3,3'-Dichlorobenzidine	330	U	330	U
Benzo(a)anthracene	330	U	330	U
Chrysene	330	U	330	U
bis(2-Ethylhexyl)phthalate	330	U	330	U
Di-n-octyl phthalate	330	U	330	U
Benzo(b)fluoranthene	330	U	330	U
Benzo(k)fluoranthene	330	U	330	U
Benzo(a)pyrene	330	U	330	U
Indeno(1,2,3-cd)pyrene	330	U	330	U
Dibenz(a,h)anthracene	330	U	330	U
Benzo(g,h,i)perylene	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

5/10/05

000020

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD B01-054
LVL #: 0304L231
SDG/SAF # H2166/B01-054

W.O. #: 11343-606-001-9999-00
Date Received: 04-18-2003

SEMIVOLATILE

Ten (10) soil samples were collected on 04-16-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 04-21-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 04-23,24-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. Samples were extracted and analyzed within required holding time.

3. Non-target compounds were detected in the samples.

4. One (1) of eighty-four (84) surrogate recoveries was outside EPA QC limits. However, EPA CLP surrogate recovery criteria were met (i.e., no more than one outlier per fraction {acid and base neutral} and no recoveries less than 10%).

5. Two (2) of twenty-two (22) matrix spike recoveries were outside EPA QC limits.

6. Two (2) of eleven (11) blank spike recoveries were outside EPA QC limits.

7. The method blank contained the common laboratory contaminant Diethylphthalate at a level less than the CRQL.

8. Internal standard area and retention time criteria were met.

9. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, 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.

for J. Michael Taylor
President
Lionville Laboratory Incorporated

4/25/03
Date

som\gorup\data\bna\tnu-hanford-0304-231.doc
The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 6 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-054-020

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: ~~21~~ 7 Days DWS 4/15/03		
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system		SAF No.: B01-054
Air Quality: ☐			
Ice Chest No.: ERC 02 403	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A030212		Bill of Lading/Air Bill No.: 8EE 03PC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

C000023

Preservation			Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container			G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)			1	~~1~~ 0	1	1	1	1	1	1		
Volume			120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS			See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		
Sample No.	Matrix *	Sample Date	Sample Time									
J00LW2	SOIL	4/16/03	0833	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW3	SOIL		0851	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW4	SOIL		0911	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW5	SOIL		0933	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW6	SOIL		0952	✓	✓	✓	✓	✓	✓	✓	✓	

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWSHEA DWSHEA	4/16/03 1618	Fridge 3B	4/16/02 1618
REF 3B	41703 1000	SJOALE	41703 1000
SJOALE	41703 1000	FED EX	
Fed Ex	4/18/03 0900		4/18/03 0900

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Selenium, Silver}
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, ~~Silver-108-metastable~~, Uranium-238}

DWS 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

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

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

BHI-EE-011 (03/01/2002)

Bechtel Hanford Inc. | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | B01-054-026 | Page 2 of 2

Collector: D.Shea	Company Contact: D.Shea — Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L — Data Turnaround: ~~21~~ 7 Days DWS 4/15/03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system	SAF No.: B01-054	Air Quality: ☐
Ice Chest No.: ERC 02 403	Field Logbook No.: EL-1573 — COA: R607B92F00	Method of Shipment: FED EX	
Shipped ~~To~~: TMA/RECRA	Offsite Property No.: A03021R	Bill of Lading/Air Bill No.: SEE 037C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

C00023

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)	1	1 0 DWS 4/15/03	1	1	1	1	1	1		
Volume	120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		
Sample No. / Matrix * / Sample Date / Sample Time										
J00LW7 / SOIL / 4/16/03 / 1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW8 / SOIL / ↓ / 1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW9 / SOIL / ↓ / 1217	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX0 / SOIL / ↓ / 1236	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX1 / SOIL / ↓ / 0812	✓	✓	✓	✓	✓	✓	✓	✓		

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: DWShea DWShea	4/16/03 1618	Received By/Stored In: Fridge 3B	4/16/03 1618
Relinquished By/Removed From: REF 1B	41703 1000	Received By/Stored In: SJOALS Moale	41703 1000
Relinquished By/Removed From: SJOALS Moale	41703 1000	Received By/Stored In: FED EX	
Relinquished By/Removed From: Fed Ex	4.18.03 0900	Received By/Stored In: [illegible]	4.19.03 0900
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Selenium, Silver}
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, ~~Silver-108 metastable~~, Uranium-238}

DWS 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

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

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

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-KSP			DATA PACKAGE: H2166		
VALIDATOR: TCI		LAB: LLI		DATE: 5/8/03	
CASE:			SDG: H2166		

ANALYSES PERFORMED

SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)

SAMPLES/MATRIX

J00LW2 J00LW3 J00LW4 J00LW5 J00LW6 ~~J00LW7~~
J00LW7 J00LW8 J00LW9 J00LX0 J00LX1

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

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

Continuing calibrations acceptable? ..... Yes No N/A

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

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

Calculation check acceptable? ..... Yes No N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: di-n-butylphthalate + bis 2-(ethylhexyl) phthalate in EB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A
Surrogates traceable? (Levels D, E) ..... Yes No N/A
Surrogates expired? (Levels D, E) ..... Yes No N/A
MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: No PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD RPD values acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
Field duplicate RPD values acceptable? ..... Yes No N/A
Field split RPD values acceptable? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: 40% RPD 4-nitrophenol, 2-nitrophenol, 2,4-dinitrophenol } J

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A
Internal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A
Sample holding times acceptable? ..... Yes No N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: Cleaver ..... Yes No N/A

9. SAMPLE CLEANUP (Levels D and E)

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

GPC check performed? ..... Yes No N/A

GPC check recoveries aceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments: ..... Yes No N/A

Date: 12 May 2003
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B9
Subject: Radiochemistry - Data Package No. H2166-EB (SDG No. H2166)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2166-EB which was prepared by Eberline Services (EB). 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
J00LW2	4/16/03	Soil	C	See note 1
J00LW3	4/16/03	Soil	C	See note 1
J00LW4	4/16/03	Soil	C	See note 1
J00LW5	4/16/03	Soil	C	See note 1
J00LW6	4/16/03	Soil	C	See note 1
J00LW7	4/16/03	Soil	C	See note 1
J00LW8	4/16/03	Soil	C	See note 1
J00LW9	4/16/03	Soil	C	See note 1
J00LX0	4/16/03	Soil	C	See note 1
J00LX1	4/16/03	Soil	C	See note 1

1- Gamma spectroscopy, gross alpha & beta.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 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
Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

- **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.

All holding times were acceptable.

- **Preparation (Method) 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 minimum detectable activity (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.

All blank results were acceptable.

Field (Equipment) Blank

One equipment blank (J00LX1) was submitted for analysis. Potassium-40, radium-226 and thorium-228 were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is either 70-130% or ±3 sigma. 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. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% or ±3 sigma.

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30% (35% for gross alpha and gross beta), no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples (J00LW7/J00LW8) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. Fifty-nine analytes were reported above their TDL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific TDL.

- **Completeness**

Data package No. H2166 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Fifty-nine analytes were reported above their TDL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incoroprated, March 2003.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor 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 minor 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 major 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 major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2166	REVIEWER: TLI	DATE: 5/12/03	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																			
Laboratory: EB																			
Case	SDG: H2166																		
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9			
Remarks														Duplicate					
Location		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9			
Sample Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03			
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Gross alpha		7.65		7.95		4.88		2.06	U	1.26	U	2.76	U	5.91		7.83			
Gross beta		22.1		33.7		14.0		20.8		22.4		25.3		20.6		18.7			
Potassium-40		9.18		9.08		9.47		11.5		11.6		11.0		9.93		9.87			
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*		
Cesium 137	0.05	U	U*	U	U*	U	U*	U	U	U	U*	U	U*	U	U*	U	U*		
Radium-226		0.500		0.313		0.332		0.318		0.449		0.349		0.393		0.393			
Radium-228		0.699		U	U	0.550		0.815		0.872		0.670		0.569		0.627			
Europium 152	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*		
Europium 154	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*		
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*		
Thorium-228		0.749		0.560		0.561		0.566		0.630		0.556		0.454		0.412			
Thorium-232		0.699		U	U	0.550		0.815		0.872		0.670		0.569		0.627			
Uranium-235	1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Uranium-238	1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*		
Americium-241	1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		

000070

* - TDL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

NA = Not analyzed

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																	
Laboratory: EB																	
Case	SDG: H2166																
Sample Number		J00LX0		J00LX1													
Remarks				E. Blank													
		1607-B9		1607-B9													
Sample Date		4/21/03		4/21/03													
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross alpha		14.0		2.57	U												
Gross beta		20.8		2.13	U												
Potassium-40		9.76		3.28													
Cobalt 60	0.05	U	U*	U	U*												
Cesium 137	0.05	U	U*	U	U*												
Radium-226		0.451		0.114													
Radium-228		0.502		U	U												
Europium 152	0.1	U	U*	U	U*												
Europium 154	0.1	U	U*	U	U*												
Europium 155	0.1	U	U*	U	U*												
Thorium-228		0.666		0.120													
Thorium-232		0.502		U	U												
Uranium-235	1	U	U	U	U												
Uranium-238	1	U	U*	U	U*												
Americium-241	1	U	U	U	U												

000011

* - TDL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

NA = Not analyzed

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-001 J00LW2

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R304116-01	Client sample id	J00LW2		
Dept sample id	7490-001	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID	
Received	04/18/03	Collected/Weight	04/16/03 08:33	830.1 g	
% solids	91.6	Custody/SAF No	B01-054-026	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	7.65	4.0	4.3	10		93A
Gross Beta	12587-47-2	22.1	5.7	8.1	15		93B
Potassium 40	13966-00-2	9.18	3.7	0.97			GAM
Cobalt 60	10198-40-0	U		0.16	0.050	U	GAM
Cesium 137	10045-97-3	U		0.17	0.10	U	GAM
Radium 226	13982-63-3	0.500	0.21	0.17			GAM
Radium 228	15262-20-1	0.699	0.49	0.45			GAM
Europium 152	14683-23-9	U		0.23	0.10	U	GAM
Europium 154	15585-10-1	U		0.29	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	0.749	0.15	0.17			GAM
Thorium 232	TH-232	0.699	0.49	0.45			GAM
Uranium 235	15117-96-1	U		0.34		U	GAM
Uranium 238	U-238	U		11		U	GAM
Americium 241	14596-10-2	U		0.093		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-002 J00LW3

DATA SHEET

SDG	7490	Client/Case no	Hanford SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R304116-02	Client sample id	J00LW3
Dept sample id	7490-002	Location/Matrix	100 BC, 1607-B-09 Septic SOLID
Received	04/18/03	Collected/Weight	04/16/03 08:51 959.5 g
% solids	93.9	Custody/SAF No	B01-054-026 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	7.95	4.1	4.7	10		93A
Gross Beta	12587-47-2	33.7	5.5	6.6	15		93B
Potassium 40	13966-00-2	9.08	2.9	0.80			GAM
Cobalt 60	10198-40-0	U		0.081	0.050	U	GAM
Cesium 137	10045-97-3	U		0.072	0.10	U	GAM
Radium 226	13982-63-3	0.313	0.15	0.14			GAM
Radium 228	15262-20-1	U		0.43		U	GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.23	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.560	0.10	0.12			GAM
Thorium 232	TH-232	U		0.43		U	GAM
Uranium 235	15117-96-1	U		0.26		U	GAM
Uranium 238	U-238	U		8.9		U	GAM
Americium 241	14596-10-2	U		0.072		U	GAM

100 B/C Area Effluent & Proximity

PR 5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-003 J00LW4

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R304116-03	Client sample id	J00LW4	
Dept sample id	7490-003	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID
Received	04/18/03	Collected/Weight	04/16/03 09:11	799.2 g
% solids	93.8	Custody/SAF No	B01-054-026	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	4.88	3.4	4.2	10		93A
Gross Beta	12587-47-2	14.0	5.4	8.1	15		93B
Potassium 40	13966-00-2	9.47	3.2	0.65			GAM
Cobalt 60	10198-40-0	U		0.14	0.050	U	GAM
Cesium 137	10045-97-3	U		0.075	0.10	U	GAM
Radium 226	13982-63-3	0.332	0.16	0.15			GAM
Radium 228	15262-20-1	0.550	0.37	0.38			GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.25	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	0.561	0.12	0.13			GAM
Thorium 232	TH-232	0.550	0.37	0.38			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		9.8		U	GAM
Americium 241	14596-10-2	U		0.076		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-004 J00LW5

DATA SHEET

SDG	7490	Client/Case no	Hanford SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R304116-04	Client sample id	J00LW5
Dept sample id	7490-004	Location/Matrix	100 BC, 1607-B-09 Septic SOLID
Received	04/18/03	Collected/Weight	04/16/03 09:33 878.4 g
% solids	93.2	Custody/SAF No	B01-054-026 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.06	2.9	3.9	10	U	93A
Gross Beta	12587-47-2	20.8	5.1	6.8	15		93B
Potassium 40	13966-00-2	11.5	1.0	0.50			GAM
Cobalt 60	10198-40-0	U		0.052	0.050	U	GAM
Cesium 137	10045-97-3	U		0.050	0.10	U	GAM
Radium 226	13982-63-3	0.318	0.094	0.10			GAM
Radium 228	15262-20-1	0.815	0.24	0.23			GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.566	0.060	0.058			GAM
Thorium 232	TH-232	0.815	0.24	0.23			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		5.7		U	GAM
Americium 241	14596-10-2	U		0.11		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-005 J00LW6

DATA SHEET

SDG	7490	Client/Case no	Hanford SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R304116-05	Client sample id	J00LW6
Dept sample id	7490-005	Location/Matrix	100 BC, 1607-B-09 Septic SOLID
Received	04/18/03	Collected/Weight	04/16/03 09:52 874.9 g
% solids	93.0	Custody/SAF No	B01-054-026 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	1.26	2.8	4.3	10	U	93A
Gross Beta	12587-47-2	22.4	4.6	5.9	15		93B
Potassium 40	13966-00-2	11.6	1.5	0.70			GAM
Cobalt 60	10198-40-0	U		0.086	0.050	U	GAM
Cesium 137	10045-97-3	U		0.085	0.10	U	GAM
Radium 226	13982-63-3	0.449	0.16	0.17			GAM
Radium 228	15262-20-1	0.872	0.37	0.36			GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.24	0.10	U	GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	0.630	0.082	0.080			GAM
Thorium 232	TH-232	0.872	0.37	0.36			GAM
Uranium 235	15117-96-1	U		0.33		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.42		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-006 J00LW7

DATA SHEET

SDG	7490	Client/Case no	Hanford SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R304116-06	Client sample id	J00LW7
Dept sample id	7490-006	Location/Matrix	100 BC, 1607-B-09 Septic SOLID
Received	04/18/03	Collected/Weight	04/16/03 11:30 900.0 g
% solids	94.1	Custody/SAF No	B01-054-026 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.76	3.3	5.0	10	U	93A
Gross Beta	12587-47-2	25.3	5.2	6.6	15		93B
Potassium 40	13966-00-2	11.0	2.8	0.70			GAM
Cobalt 60	10198-40-0	U		0.091	0.050	U	GAM
Cesium 137	10045-97-3	U		0.073	0.10	U	GAM
Radium 226	13982-63-3	0.349	0.21	0.14			GAM
Radium 228	15262-20-1	0.670	0.35	0.37			GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.22	0.10	U	GAM
Europium 155	14391-16-3	U		0.20	0.10	U	GAM
Thorium 228	14274-82-9	0.556	0.14	0.13			GAM
Thorium 232	TH-232	0.670	0.35	0.37			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		8.6		U	GAM
Americium 241	14596-10-2	U		0.30		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-007

J00LW8

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R304116-07	Client sample id	J00LW8		
Dept sample id	7490-007	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID	
Received	04/18/03	Collected/Weight	04/16/03 11:30	904.2 g	
% solids	94.1	Custody/SAF No	B01-054-026	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	5.91	3.5	4.1	10		93A
Gross Beta	12587-47-2	20.6	5.6	8.0	15		93B
Potassium 40	13966-00-2	9.93	1.0	0.40			GAM
Cobalt 60	10198-40-0	U		0.058	0.050	U	GAM
Cesium 137	10045-97-3	U		0.057	0.10	U	GAM
Radium 226	13982-63-3	0.393	0.091	0.084			GAM
Radium 228	15262-20-1	0.569	0.24	0.26			GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.454	0.058	0.058			GAM
Thorium 232	TH-232	0.569	0.24	0.26			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		6.4		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-008 J00LW9

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R304116-08	Client sample id	J00LW9	
Dept sample id	7490-008	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID
Received	04/18/03	Collected/Weight	04/16/03 12:17	988.0 g
% solids	94.2	Custody/SAF No	B01-054-026	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	7.83	4.0	4.4	10		93A
Gross Beta	12587-47-2	18.7	5.6	8.1	15		93B
Potassium 40	13966-00-2	9.87	2.4	0.57			GAM
Cobalt 60	10198-40-0	U		0.076	0.050	U	GAM
Cesium 137	10045-97-3	U		0.062	0.10	U	GAM
Radium 226	13982-63-3	0.393	0.17	0.10			GAM
Radium 228	15262-20-1	0.627	0.24	0.25			GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	0.412	0.081	0.072			GAM
Thorium 232	TH-232	0.627	0.24	0.25			GAM
Uranium 235	15117-96-1	U		0.27		U	GAM
Uranium 238	U-238	U		7.4		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-009

J00LX0

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R304116-09	Client sample id	J00LX0	
Dept sample id	7490-009	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID
Received	04/18/03	Collected/Weight	04/16/03 12:36	810.5 g
% solids	87.6	Custody/SAF No	B01-054-026	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	14.0	5.2	5.2	10		93A
Gross Beta	12587-47-2	20.8	5.0	6.6	15		93B
Potassium 40	13966-00-2	9.76	3.3	0.91			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	U		0.12	0.10	U	GAM
Radium 226	13982-63-3	0.451	0.18	0.16			GAM
Radium 228	15262-20-1	0.502	0.33	0.36			GAM
Europium 152	14683-23-9	U		0.21	0.10	U	GAM
Europium 154	15585-10-1	U		0.25	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	0.666	0.13	0.14			GAM
Thorium 232	TH-232	0.502	0.33	0.36			GAM
Uranium 235	15117-96-1	U		0.30		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.082		U	GAM

100 B/C Area Effluent & Proximity

5/10/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-010

J00LX1

DATA SHEET

SDG	7490	Client/Case no	Hanford	SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R304116-10	Client sample id	J00LX1	
Dept sample id	7490-010	Location/Matrix	100 BC, 1607-B-09 Septic	SOLID
Received	04/18/03	Collected/Weight	04/16/03 08:12	840.1 g
% solids	100.0	Custody/SAF No	B01-054-026	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.57	2.3	2.8	10	U	93A
Gross Beta	12587-47-2	2.13	3.9	6.4	15	U	93B
Potassium 40	13966-00-2	3.28	0.89	0.62			GAM
Cobalt 60	10198-40-0	U		0.064	0.050	U	GAM
Cesium 137	10045-97-3	U		0.052	0.10	U	GAM
Radium 226	13982-63-3	0.114	0.086	0.099			GAM
Radium 228	15262-20-1	U		0.27		U	GAM
Europium 152	14683-23-9	U		0.13	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.120	0.049	0.065			GAM
Thorium 232	TH-232	U		0.27		U	GAM
Uranium 235	15117-96-1	U		0.22		U	GAM
Uranium 238	U-238	U		6.7		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM

100 B/C Area Effluent & Proximity

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2166 was composed of ten solid (soil) samples designated under SAF No. B01-054 with a Project Designation of: 100 B/C Area Effluent Pipeline & Proximity Site Remediation, 100 BC, 1607-B-09 Septic System.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on April 25, 2003. The electronic data deliverable (EDD) was transmitted to BHI via e-mail on April 25, 2003.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

The gross beta RPD between sample J00LW8 and its sample duplicate was 69%. No other problems were encountered during the course of the analyses.

2.2 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Melissa Mannion

Melissa C. Mannion
Program Manager

4/30/03

Date

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-054-026

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: ~~21~~ 7 Days DWS 4/15/03	Air Quality ☐	
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system SDG ~~H2085~~ (7490) H2166 KG 4-18	SAF No.: B01-054	
Ice Chest No.: ERC02 504	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A030200		Bill of Lading/Air Bill No.: 8EE03PC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000024

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		

Sample No.	Matrix *	Sample Date	Sample Time										
J00LW2	SOIL	4/16/03	0833	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW3	SOIL		0851	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW4	SOIL		0911	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW5	SOIL		0933	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW6	SOIL		0952	✓	✓	✓	✓	✓	✓	✓	✓		

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWSHEA DWSHEA	4/16/03 1618	Fridge 3B	4/16/02 1618
REF 3B	41703 1000	SJOHLER	41703 1000
SJOHLER	41703 1000	FED EX	
FED EX		Rai CR	1000 4-18-03

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)
(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)

DWS 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

Matrix: S=Soil, SE=Sediment, SO=Solid, Sl=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solid, DL=Drum Liquid, T=Tissue, Wi=Wipe, L=Liquid, V=Vegetation, X=Other

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

BHI-EE-011 (03/01/2002)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

B01-054-026 | Page 2 of 2

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: 7 ~~21~~ Days TMB 4/15/03	Air Quality ☐	
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system SDGH 2166 (7490)	SAF No.: B01-054	
Ice Chest No.: ERC 02 504	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A030 200		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000025

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)	1	1 TMB 4/15/03	1	1	1	1	1	1		
Volume	120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		

DAD 41703

Sample No.	Matrix *	Sample Date	Sample Time										
J00LW7	SOIL	4/16/03	1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW8	SOIL	↓	1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW9	SOIL		1217	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX0	SOIL		1236	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX1	SOIL		0812	✓	✓	✓	✓	✓	✓	✓	✓		

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWSheaDWShea	4/16/03 1615	Fridge 3B	4/16/03 1615
REF 1B	41703 1000	SJOALS Moale	41703 1000
SJOALS Moale	41703 1000	FED EX	
FED EX		[illegible] 1000	4.18.03

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)
(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
TMB 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

Matrix *: S=Soil, SE=Sediment, SO=Solid, Sl=Sludge, W=Water, O=Oil, A=Air, DS=Drum S, DL=Drum L, T=Tissue, Wi=Wipe, L=Liquid, V=Vegetatio, X=Other

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

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-B9			DATA PACKAGE: H2166		
VALIDATOR: TLI		LAB: EB		DATE: 5/9/03	
CASE:			SDG: H2166		

ANALYSES PERFORMED

Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			

SAMPLES/MATRIX

J00LW2	J00LW3	J00LW4	J00LW5	J00LW6
J00LW7	J00LW8	J00LW9	J00LX0	J00LX1
				Soil

1. Completeness ..... ☒ N/A

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

Comments: _____

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

Calculation check acceptable? ..... Yes No N/A

Comments: _____

3. Continuing Calibration (Levels D, E) ..... ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... 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? (Levels D, E) ..... Yes No N/A

Comments: K-40 Ra224 Th228 in FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A

LCS/BSS recoveries acceptable? ..... Yes No N/A

LCS/BSS traceable? (Levels D,E) ..... Yes No N/A

LCS/BSS expired? (Levels D,E) ..... Yes No N/A

LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☒ N/A

Chemical carrier added? ..... Yes No N/A

Chemical recovery acceptable? ..... Yes No N/A

Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) ..... ☒ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E) ..... ☒ N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E) ..... ☐ 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: NO PAS/FS

12. Holding Times (All levels)

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

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data?(Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: 59 avg MDL

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2166

7490-012 Method Blank

METHOD BLANK

SDG	7490	Client/Case no	Hanford	SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R304116-12	Client sample id	Method Blank	
Dept sample id	7490-012	Material/Matrix		SOLID
		SAF No	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	0.147	1.7	3.1	10	U	93A
Gross Beta	12587-47-2	-0.576	3.3	5.7	15	U	93B
Potassium 40	13966-00-2	U		2.7		U	GAM
Cobalt 60	10198-40-0	U		0.12	0.050	U	GAM
Cesium 137	10045-97-3	U		0.096	0.10	U	GAM
Radium 226	13982-63-3	U		0.19		U	GAM
Radium 228	15262-20-1	U		0.45		U	GAM
Europium 152	14683-23-9	U		0.23	0.10	U	GAM
Europium 154	15585-10-1	U		0.28	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	U		0.11		U	GAM
Thorium 232	TH-232	U		0.45		U	GAM
Uranium 235	15117-96-1	U		0.33		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.077		U	GAM

100 B/C Area Effluent & Proximity

QC-BLANK #44477

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-011 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7490
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2166
Contract No. 630

Lab sample id R304116-11
Dept sample id 7490-011

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-054

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	182	15	2.8	10		93A	200	8.0	91	70-130	70-130
Gross Beta	212	11	6.7	15		93B	211	8.4	100	75-125	70-130
Cobalt 60	5.74	0.27	0.073	0.050		GAM	6.09	0.24	94	77-123	80-120
Cesium 137	5.62	0.23	0.14	0.10		GAM	5.89	0.24	95	77-123	80-120

100 B/C Area Effluent & Proximity

QC-LCS #44476

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 04/25/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2166

7490-013

J00LW8

DUPLICATE

SDG	7490	Client/Case no	Hanford SDG H2166
Contact	Melissa C. Mannion	Contract	No. 630
DUPLICATE		ORIGINAL	
Lab sample id	R304116-13	Lab sample id	R304116-07
Dept sample id	7490-013	Dept sample id	7490-007
		Received	04/18/03
% solids	94.1	% solids	94.1
Client sample id	J00LW8		
Location/Matrix	100 BC, 1607-B-09 Septic SOLID		
Collected/Weight	04/16/03 11:30 904.2 g		
Custody/SAF No	B01-054-026 B01-054		

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	3.17	2.9	3.2	10	U	93A	5.91	3.5	4.1		60	157	
Gross Beta	42.5	5.8	6.6	15		93B	20.6	5.6	8.0		69	51	
Potassium 40	10.5	1.5	0.80			GAM	9.93	1.0	0.40		6	41	
Cobalt 60	U		0.082	0.050	U	GAM	U		0.058	U	-		
Cesium 137	U		0.079	0.10	U	GAM	U		0.057	U	-		
Radium 226	0.436	0.16	0.17			GAM	0.393	0.091	0.084		10	74	
Radium 228	0.502	0.33	0.38			GAM	0.569	0.24	0.26		13	119	
Europium 152	U		0.19	0.10	U	GAM	U		0.12	U	-		
Europium 154	U		0.30	0.10	U	GAM	U		0.17	U	-		
Europium 155	U		0.21	0.10	U	GAM	U		0.11	U	-		
Thorium 228	0.586	0.086	0.088			GAM	0.454	0.058	0.058		25	44	
Thorium 232	0.502	0.33	0.38			GAM	0.569	0.24	0.26		13	119	
Uranium 235	U		0.31		U	GAM	U		0.17	U	-		
Uranium 238	U		10		U	GAM	U		6.4	U	-		
Americium 241	U		0.43		U	GAM	U		0.12	U	-		

100 B/C Area Effluent & Proximity

QC-DUP#7 44533

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	04/25/03

Date: 12 May 2003
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B9
Subject: Inorganics - Data Package No. H2166-LLI (SDG No. H2166)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2166-LLI prepared by Lionville Laboratory Inc. (LLI). 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
J00LW2	4/16/03	Soil	C	See note 1
J00LW3	4/16/03	Soil	C	See note 1
J00LW4	4/16/03	Soil	C	See note 1
J00LW5	4/16/03	Soil	C	See note 1
J00LW6	4/16/03	Soil	C	See note 1
J00LW7	4/16/03	Soil	C	See note 1
J00LW8	4/16/03	Soil	C	See note 1
J00LW9	4/16/03	Soil	C	See note 1
J00LX0	4/16/03	Soil	C	See note 1
J00LX1	4/16/03	Soil	C	See note 1

1 - Chromium VI by 7196A; ICP metals by 6010B; mercury by 7471A.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 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

Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **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 30 days for chromium VI, 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

- **Preparation (Method) 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 instrument detection limit (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.

Due to preparation blank contamination, the silver and chromium(total) results in samples J00LX1 were qualified as undetected and flagged "U".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One equipment blank (J00LX1) was submitted for analysis. Silver, barium, lead and chromium(total) were detected in the equipment blank. Under the BHI

statement of work, no qualification is required.

- **Accuracy**

Matrix Spike

Matrix spike (MS) 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.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (58.6%), all lead results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples (J00LW7/J00LW8) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. All chromium VI results exceeded the analyte specific TDL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2166-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD outside QC limits (58.6%), all lead results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Due to preparation blank contamination, the silver and chromium(total) results in samples J00LX1 were qualified as undetected and flagged "U".

All chromium VI results exceeded the analyte specific TDL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor 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 minor 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 major 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 major QC deficiency.

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

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2166	REVIEWER: TLI	DATE: 5/12/03	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Silver Chromium(total)	U	JOOLX1	Blank contamination
Lead	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																					
Laboratory: LLI																					
Case	SDG: H2166																				
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9					
Remarks														Duplicate							
Location		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9		1607-B9					
Sample Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03					
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.2	0.09	U	0.09	U	0.08	U	0.08	U	0.08	U	0.08	U	0.09	U	0.08	U				
Arsenic	1	3.6		2.5		2.6		3.4		3.8		3.1		3.2		3.6					
Barium	20	73.9		56.6		59.6		55.1		56.1		52.1		54.4		55.9					
Cadmium	0.2	0.37		0.43		0.43		0.49		0.44		0.50		0.52		0.48					
Chromium(total)	1	14.8		11.2		11.0		9.1		10.2		8.9		9.5		9.0					
Mercury	0.2	0.02	U	0.12		0.02	U	0.03		0.02	U	0.02	U	0.02	U	0.02	U				
Lead	5	13.9	J	5.7	J	4.6	J	5.5	J	6.8	J	5.5	J	5.8	J	5.6	J				
Selenium	1	0.39	U	0.38	U	0.38	U	0.40		0.43		0.37	U	0.41		0.45					
Chromium VI	0.1	0.44	U	0.43	U	0.43	U	0.42	U	0.43	U	0.43	U	0.43	U	0.43	U				
Sample Number		J00LX0		J00LX1																	
Remarks				E. Blank																	
Location		1607-B9		1607-B9																	
Sample Date		4/21/03		4/21/03																	
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q										
Silver	0.2	0.08	U	0.10	U																
Arsenic	1	2.4		0.33	U																
Barium	20	59.1		0.94																	
Cadmium	0.2	0.45		0.04	U																
Chromium(total)	1	10.4		0.28	U																
Mercury	0.2	0.02	U	0.01	U																
Lead	5	15.3	J	0.33	J																
Selenium	1	0.35	U	0.34	U																
Chromium VI	0.1	0.43	U	0.40	U																

000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation. NA = Not analyzed

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/24/03

CLIENT: TNUHANFORD B01-054 H2166

WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L231

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00LW2	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.6	MG/KG	0.38	1.0
		Barium, Total	73.9	MG/KG	0.01	1.0
		Cadmium, Total	0.37	MG/KG	0.04	1.0
		Chromium, Total	14.8	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	13.9 J	MG/KG	0.28	1.0
		Selenium, Total	0.39 u	MG/KG	0.39	1.0
-002	J00LW3	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.5	MG/KG	0.37	1.0
		Barium, Total	56.6	MG/KG	0.01	1.0
		Cadmium, Total	0.43	MG/KG	0.04	1.0
		Chromium, Total	11.2	MG/KG	0.06	1.0
		Mercury, Total	0.12	MG/KG	0.02	1.0
		Lead, Total	5.7 J	MG/KG	0.28	1.0
		Selenium, Total	0.38 u	MG/KG	0.38	1.0
-003	J00LW4	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.6	MG/KG	0.37	1.0
		Barium, Total	59.6	MG/KG	0.01	1.0
		Cadmium, Total	0.43	MG/KG	0.04	1.0
		Chromium, Total	11.0	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.6 J	MG/KG	0.28	1.0
		Selenium, Total	0.38 u	MG/KG	0.38	1.0
-004	J00LW5	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.4	MG/KG	0.36	1.0
		Barium, Total	55.1	MG/KG	0.01	1.0
		Cadmium, Total	0.49	MG/KG	0.04	1.0
		Chromium, Total	9.1	MG/KG	0.06	1.0
		Mercury, Total	0.03	MG/KG	0.02	1.0
		Lead, Total	5.5 J	MG/KG	0.27	1.0
		Selenium, Total	0.40	MG/KG	0.37	1.0

5/10/03

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/24/03

CLIENT: TNUHANFORD B01-054 H2166 LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J00LW6	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.8	MG/KG	0.37	1.0
		Barium, Total	56.1	MG/KG	0.01	1.0
		Cadmium, Total	0.44	MG/KG	0.04	1.0
		Chromium, Total	10.2	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	6.8 J	MG/KG	0.28	1.0
		Selenium, Total	0.43	MG/KG	0.38	1.0
-006	J00LW7	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.1	MG/KG	0.36	1.0
		Barium, Total	52.1	MG/KG	0.01	1.0
		Cadmium, Total	0.50	MG/KG	0.04	1.0
		Chromium, Total	8.9	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.5 J	MG/KG	0.27	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
-007	J00LW8	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.2	MG/KG	0.37	1.0
		Barium, Total	54.4	MG/KG	0.01	1.0
		Cadmium, Total	0.52	MG/KG	0.04	1.0
		Chromium, Total	9.5	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.8 J	MG/KG	0.28	1.0
		Selenium, Total	0.41	MG/KG	0.38	1.0
-008	J00LW9	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.6	MG/KG	0.34	1.0
		Barium, Total	55.9	MG/KG	0.01	1.0
		Cadmium, Total	0.48	MG/KG	0.04	1.0
		Chromium, Total	9.0	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.6 J	MG/KG	0.25	1.0
		Selenium, Total	0.45	MG/KG	0.35	1.0

pr 5/10/03

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/24/03

CLIENT: TNUHANFORD B01-054 H2166

LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-009	J00LX0	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.4	MG/KG	0.34	1.0
		Barium, Total	59.1	MG/KG	0.01	1.0
		Cadmium, Total	0.45	MG/KG	0.04	1.0
		Chromium, Total	10.4	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	15.3 J	MG/KG	0.25	1.0
		Selenium, Total	0.35 u	MG/KG	0.35	1.0
-010	J00LX1	Silver, Total	0.10 U	MG/KG	0.07	1.0
		Arsenic, Total	0.33 u	MG/KG	0.33	1.0
		Barium, Total	0.94	MG/KG	0.009	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.28 U	MG/KG	0.06	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	0.33 J	MG/KG	0.24	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0

5/10/07

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/22/03

CLIENT: TNU-HANFORD B01-054 H2166 LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00LW2	% Solids	91.8	%	0.01	1.0
		Chromium VI	0.44 u	MG/KG	0.44	1.0
-002	J00LW3	% Solids	92.8	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-003	J00LW4	% Solids	92.3	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-004	J00LW5	% Solids	95.0	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-005	J00LW6	% Solids	93.4	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-006	J00LW7	% Solids	93.3	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-007	J00LW8	% Solids	92.8	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-008	J00LW9	% Solids	93.9	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-009	J00LX0	% Solids	92.6	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-010	J00LX1	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0

5/10/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054
LVL#: 0304L231
SDG/SAF#: H2166/B01-054

W.O.#: 11343-606-001-9999-00
Date Received: 04-18-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 10 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits with the exception of the final CCV for Arsenic. All samples were surrounded by CCVs in control.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 19 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, 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.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

04-24-03
Date

gmb/m04-231

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054 H2166
LVL#: 0304L231

W.O.#: 11343-606-001-9999-00
Date Received: 04-18-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 10 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. The method blank for Chromium VI was within the method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.

8. The replicate analyses for Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

04-24-03
Date

njp\i04- 231

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: 7 ~~21~~ Days DWS 4/15/03	Air Quality:	SAF No.: B01-054
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system		
Ice Chest No.: ERC 02 403	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A0302R		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)	1	1 0 DWS 4/15/03	1	1	1	1	1	1		
Volume	120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		

Sample No.	Matrix *	Sample Date	Sample Time									
J00LW7	SOIL	4/16/03	1130	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW8	SOIL	↓	1130	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW9	SOIL		1217	✓	✓	✓	✓	✓	✓	✓	✓	
J00LX0	SOIL		1236	✓	✓	✓	✓	✓	✓	✓	✓	
J00LX1	SOIL		0812	✓	✓	✓	✓	✓	✓	✓	✓	

000019

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWSheaDWShea	4/16/03 1615	Fridge 3B	4/16/03 1615
REF 1B	41703 1000	SJOALS Mode	41703 1000
SJOALS Mode	41703 1000	FED EX	
Fed Ex	4.18.03/0900	W. Smith	4.18.03/0900

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)
(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Silver-108 metastable, Uranium-238)
DWS 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

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

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

Title

Date/Time

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

Collector: D.Shea

Company Contact: D.Shea — Telephone No.: 521-6014

Project Coordinator: KESSNER, JH

Price Code: 8L — Data Turnaround: ~~21~~ 7 Days DWS 4/15/03

Air Quality: ☐

SAF No.: B01-054

Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio

Sampling Location: 100 BC, 1607-B-09 Septic system

Ice Chest No.: ERC 02 403

Field Logbook No.: EL-1573 — COA: R607B92F00

Method of Shipment: FED EX

Shipped To: TMA/RECRA

Offsite Property No.: A030212

Bill of Lading/Air Bill No.: 8EE 05PC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000020

Preservation			Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	
Type of Container			G/P	G/P	G/P	sG	sG	sG	G/P	G/P	
No. of Container(s)			1	1	1	1	1	1	1	1	
Volume			120mL	120mL	60mL	250g	120g	60mL	500mL	60mL	
SAMPLE ANALYSIS			See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta	
Sample No.	Matrix *	Sample Date	Sample Time								
J00LW2	SOIL	4/16/03	0833	✓	✓	✓	✓	✓	✓	✓	✓
J00LW3	SOIL		0851	✓	✓	✓	✓	✓	✓	✓	✓
J00LW4	SOIL		0911	✓	✓	✓	✓	✓	✓	✓	✓
J00LW5	SOIL		0933	✓	✓	✓	✓	✓	✓	✓	✓
J00LW6	SOIL		0752	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	4/16/03 1618	Fridge 3B	4/16/02 1618
REF 3B	41703 1000	[signature]	41703 1000
[signature]	41703 1000	FED EX	
Fed Ex	4/18/03 0900	[signature]	4/18/03 0900

Title

Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)
(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108-metastable~~, Uranium-238)

DWS 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

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

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

(02/01/2002)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E

PROJECT: 1607-B9		DATA PACKAGE: H2166	
VALIDATOR: TLI	LAB: LLI	DATE: 5/7/03	
CASE:		SDG: H2166	

ANALYSES PERFORMED

SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	CRUT	

SAMPLES/MATRIX

J00LW2 J00LW3 J00LW4 J00LW5
J00LW6 J00LW7 J00LW8 J00LW9
J00LX0 J00LX1

soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

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

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

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

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

Calculation check acceptable? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: Silver + CR (total) U X1

EB – Silver Barium Chromium (total) + lead ~~in~~ in EB

4. ACCURACY (Levels C, D, and E)

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

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

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

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

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

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: NO PAS

A-17

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A
Duplicate results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
Field duplicate RPD values acceptable? ..... Yes No N/A
Field split RPD values acceptable? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: lead RPD 58.6 – J all

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes No N/A
ICP serial dilution %D values acceptable? ..... Yes No N/A
ICP post digestion spike required? ..... Yes No N/A
ICP post digestion spike values acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

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

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

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: all CRQL ova

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/24/03

CLIENT: TNUHANFORD B01-054 H2166 LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	03L0218-MB1	Silver, Total	0.08	MG/KG	0.08	1.0
		Arsenic, Total	0.35 u	MG/KG	0.35	1.0
		Barium, Total	0.02	MG/KG	0.01	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.08	MG/KG	0.06	1.0
		Lead, Total	0.26 u	MG/KG	0.26	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
BLANK1	03C0092-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/24/03

CLIENT: TNUHANFORD B01-054 H2166 LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J00LW2	Silver, Total	4.9	0.09u	5.1	96.1	1.0
		Arsenic, Total	184	3.6	204	88.6	1.0
		Barium, Total	265	73.9	204	94.1	1.0
		Cadmium, Total	4.9	0.37	5.1	88.8	1.0
		Chromium, Total	34.2	14.8	20.4	95.1	1.0
		Mercury, Total	0.20	0.02u	0.18	111.4	1.0
		Lead, Total	52.2	13.9	50.9	75.2	1.0
		Selenium, Total	180	0.39u	204	88.4	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/24/03

CLIENT: TNUHANFORD B01-054 H2166

LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J00LW2	Silver, Total	0.09u	0.08u	NC	1.0
		Arsenic, Total	3.6	3.5	2.8	1.0
		Barium, Total	73.9	69.5	6.1	1.0
		Cadmium, Total	0.37	0.37	1.1	1.0
		Chromium, Total	14.8	12.9	13.7	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	13.9	7.6	58.6	1.0
		Selenium, Total	0.39u	0.37u	NC	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/22/03

CLIENT: TNU-HANFORD B01-054 H2166

LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LVI025-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/22/03

CLIENT: TNU-HANFORD B01-054 H2166

LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-010	J00LX1	Soluble Chromium VI	4.1	0.40u	4.0	104.1	1.0
		Insoluble Chromium VI	1220	0.40u	1150	106.2	100
BLANK10	03LVI025-MB1	Chromium VI	3.9	0.40u	4.0	97.8	1.0
		Insoluble Chromium VI	1100	0.40u	1040	105.0	100

08

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/22/03

CLIENT: TNU-HANFORD B01-054 H2166 LVL LOT #: 0304L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-005REP	J00LW6	% Solids	93.4	89.4	4.4	1.0
-010REP	J00LX1	Chromium VI	0.40u	0.40u	NC	1.0

Date: 12 May 2003
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B9
Subject: PCB/Pesticide - Data Package No. H2166-LLI (SDG No. H2166)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2166-LLI prepared by Lionville Laboratory Incorporated (LLI). 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
J00LW2	4/16/03	Soil	C	See note 1
J00LW3	4/16/03	Soil	C	See note 1
J00LW4	4/16/03	Soil	C	See note 1
J00LW5	4/16/03	Soil	C	See note 1
J00LW6	4/16/03	Soil	C	See note 1
J00LW7	4/16/03	Soil	C	See note 1
J00LW8	4/16/03	Soil	C	See note 1
J00LW9	4/16/03	Soil	C	See note 1
J00LX0	4/16/03	Soil	C	See note 1
J00LX1	4/16/03	Soil	C	See note 1

1 - PCBs by 8082; pesticides by 8081A.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). Appendices 1 through 6 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**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil 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 non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

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 target detection limit (TDL). 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 TDL, the result is qualified as undetected and elevated to the TDL.

All method blank target compound results were acceptable.

<u>Field Blanks</u>

One equipment blank (J00LX1) was submitted for analysis. No analytes were detected in the equipment blank.

- **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 control limits of 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". Non-detected 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". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate 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 relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil 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.

All matrix spike/matrix spike duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicate samples J00LW7/J00LW8 were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

  Reported analytical detection levels are compared against the Target Detection Limits TDLs to ensure that laboratory detection levels meet the required criteria. All reported PCB, toxaphene and methoxychlor results exceeded the TDL. Under the BHI statement of work, no qualification is required.

- **Completeness**

  Data Package No. H2166-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

All reported PCB, toxaphene and methoxychlor results exceeded the TDL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incoroprated, March 2003.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

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 minor 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 minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

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

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

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2166	REVIEWER: TLI	DATE: 5/12/03	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: Lionville Laboratory Inc.																	
Case:	SDG: H2166																
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9	
Remarks														Duplicate			
Sample Date		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03	
Extraction Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03	
Analysis Date		4/23/03		4/23/03		4/23/03		4/23/03		4/23/03		4/23/03		4/23/03		4/23/03	
PCB	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	20	36	UJ	36	U	36	U	35	U	36	U	36	U	36	U	36	U
Aroclor-1221	20	73	UJ	72	U	72	U	70	U	71	U	71	U	72	U	71	U
Aroclor-1232	20	36	UJ	36	U	36	U	35	U	36	U	35	U	36	U	36	U
Aroclor-1242	20	36	UJ	36	U	36	U	35	U	36	U	35	U	36	U	36	U
Aroclor-1248	20	36	UJ	36	U	36	U	35	U	36	U	35	U	36	U	36	U
Aroclor-1254	20	36	UJ	36	U	36	U	35	U	36	U	35	U	36	U	36	U
Aroclor-1260	20	36	UJ	36	U	36	U	35	U	36	U	35	U	36	U	36	U
Sample Number		J00LW2		J00LW3		J00LW4		J00LW5		J00LW6		J00LW7		J00LW8		J00LW9	
Remarks														Duplicate			
Sample Date		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03		4/16/03	
Extraction Date		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03		4/21/03	
Analysis Date		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03		4/24/03	
Pesticide	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Beta-BHC	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Delta-BHC	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Gamma-BHC (Lindane)	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Heptachlor	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Aldrin	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Heptachlor Epoxide	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Endosulfan I	5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Dieldrin	5	3.6	U	4.3		3.6	U	4.6		3.6	U	3.6	U	3.6	U	3.6	U
4,4'-DDE	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
Endrin	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
Endosulfan II	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
4,4'-DDD	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
Endosulfan Sulfate	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
4,4'-DDT	5	3.6	U	3.6	U	3.6	U	3.5		3.6	U	3.6	U	3.6	U	3.6	U
Methoxychlor	5	18	U	18	U	18	U	18	U	18	U	18	U	18	U	18	U
Endrin Ketone	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
Endrin Aldehyde	5	3.6	U	3.6	U	3.6	U	3.5	U	3.6	U	3.6	U	3.6	U	3.6	U
alpha-Chlordane	16.5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
gamma-Chlordane	16.5	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Toxaphene	5	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

000011

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: Lionville Laboratory Inc.																	
Case:	SDG: H2166																
Sample Number		J00LX0		J00LX1													
Remarks				E.Blank													
Sample Date		4/16/03		4/16/03													
Extraction Date		4/21/03		4/21/03													
Analysis Date		4/23/03		4/23/03													
PCB	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	20	36	U	33	U												
Aroclor-1221	20	72	U	67	U												
Aroclor-1232	20	36	U	33	U												
Aroclor-1242	20	36	U	33	U												
Aroclor-1248	20	36	U	33	U												
Aroclor-1254	20	36	U	33	U												
Aroclor-1260	20	36	U	33	U												
Sample Number		J00KX0		J00KX1													
Remarks				E. Blank													
Sample Date		4/16/03		4/16/03													
Extraction Date		4/21/03		4/21/03													
Analysis Date		4/24/03		4/24/03													
Pesticide	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.8	U	1.7	U												
Beta-BHC	5	1.8	U	1.7	U												
Delta-BHC	5	1.8	U	1.7	U												
Gamma-BHC (Lindane)	5	1.8	U	1.7	U												
Heptachlor	5	1.8	U	1.7	U												
Aldrin	5	1.8	U	1.7	U												
Heptachlor Epoxide	5	1.8	U	1.7	U												
Endosulfan I	5	1.8	U	1.7	U												
Dieldrin	5	3.6	U	3.5	U												
4,4'-DDE	5	3.6	U	3.5	U												
Endrin	5	3.6	U	3.5	U												
Endosulfan II	5	3.6	U	3.5	U												
4,4'-DDD	5	3.6	U	3.5	U												
Endosulfan Sulfate	5	3.6	U	3.5	U												
4,4'-DDT	5	3.6	U	3.5	U												
Methoxychlor	5	18	U	17	U												
Endrin Ketone	5	3.6	U	3.5	U												
Endrin Aldehyde	5	3.6	U	3.5	U												
alpha-Chlordane	16.5	1.8	U	1.7	U												
gamma-Chlordane	16.5	1.8	U	1.7	U												
Toxaphene	5	180	U	170	U												

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

Pesticide/PCBs by GC, CLP List

'W Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 1 Report Date: 04/25/03 08:44

	Cust ID:	J00LW2	J00LW2	J00LW2	J00LW3	J00LW4	J00LW5
ample information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
rrogate: Tetrachloro-m-xylene		95 %	95 %	95 %	90 %	95 %	95 %
Decachlorobiphenyl		115 %	115 %	120 %	115 %	125 * %	120 %
pha-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
ta-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
lta-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
mma-BHC (Lindane)		1.8 U	72 %	84 %	1.8 U	1.8 U	1.8 U
ptachlor		1.8 U	82 %	78 %	1.8 U	1.8 U	1.8 U
drin		1.8 U	80 %	84 %	1.8 U	1.8 U	1.8 U
ptachlor epoxide		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
dosulfan I		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
eldrin		3.6 U	96 %	103 %	4.3	3.6 U	4.6
4'-DDE		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
drin		3.6 U	112 %	119 %	3.6 U	3.6 U	3.5 U
dosulfan II		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
4'-DDD		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
dosulfan sulfate		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
4'-DDT		3.6 U	88 %	111 %	3.6 U	3.6 U	3.5 U
thoxychlor		18 U	18 U	18 U	18 U	18 U	18 U
drin ketone		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
drin aldehyde		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U
pha-Chlordane		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
mma-Chlordane		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
xaphene		180 U	180 U	180 U	180 U	180 U	180 U

Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000013

Lionville Laboratory, Inc.

Pesticide/PCBs by GC, CLP List

Report Date: 04/25/03 08:44

RFW Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 2

	Cust ID:	J00LW6	J00LW7	J00LW8	J00LW9	J00LX0	J00LX1
Sample Information	RFW#:	005	006	007	008	009	010
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	95 %	95 %	95 %	90 %	105 %	100 %
	Decachlorobiphenyl	120 %	120 %	120 %	110 %	125 * %	135 * %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Beta-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Delta-BHC		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
gamma-BHC (Lindane)		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Heptachlor		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Aldrin		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Heptachlor epoxide		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Endosulfan I		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Dieldrin		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
4,4'-DDE		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
Endrin		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
Endosulfan II		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
4,4'-DDD		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
Endosulfan sulfate		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
4,4'-DDT		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
Methoxychlor		18 U	18 U	18 U	18 U	18 U	17 U
Endrin ketone		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
Endrin aldehyde		3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.3 U
alpha-Chlordane		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
gamma-Chlordane		1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
Toxaphene		180 U	180 U	180 U	180 U	180 U	170 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000014

5/10/03

4/25/03

Lionville Laboratory, Inc.

Pesticide/PCBs by GC, CLP List

Report Date: 04/25/03 08:44

I Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 3

	Cust ID:	PBLKRK	PBLKRK BS
mple formation	RFW#:	03LE0465-MB1	03LE0465-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	UG/KG	UG/KG

rogate:	Tetrachloro-m-xylene	100 %	95 %	
	Decachlorobiphenyl	115 %	120 %	
		fl	fl	fl fl fl fl fl
pha-BHC		1.7 U	1.7 U	
ta-BHC		1.7 U	1.7 U	
lta-BHC		1.7 U	1.7 U	
mma-BHC (Lindane)		1.7 U	84 %	
ptachlor		1.7 U	80 %	
drin		1.7 U	74 %	
ptachlor epoxide		1.7 U	1.7 U	
dosulfan I		1.7 U	1.7 U	
eldrin		3.3 U	98 %	
4'-DDE		3.3 U	3.3 U	
drin		3.3 U	111 %	
dosulfan II		3.3 U	3.3 U	
4'-DDD		3.3 U	3.3 U	
dosulfan sulfate		3.3 U	3.3 U	
4'-DDT		3.3 U	100 %	
thoxychlor		17 U	17 U	
drin ketone		3.3 U	3.3 U	
drin aldehyde		3.3 U	3.3 U	
pha-Chlordane		1.7 U	1.7 U	
mma-Chlordane		1.7 U	1.7 U	
xaphene		170 U	170 U	

Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000015

5/10/03

4/28/03

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 04/23/03 17:57

RFW Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 1

	Cust ID:	J00LW2	J00LW3	J00LW3	J00LW3	J00LW4	J00LW5
Sample Information	RFW#:	001	002	002 MS	002 MSD	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	85 %	85 %	85 %	80 %	80 %	115 %
	Decachlorobiphenyl	95 %	100 %	105 %	95 %	95 %	130 * %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		36 U	36 U	94 %	90 %	36 U	35 U
Aroclor-1221		73 U	72 U	72 U	72 U	72 U	70 U
Aroclor-1232		36 U	36 U	36 U	36 U	36 U	35 U
Aroclor-1242		36 U	36 U	36 U	36 U	36 U	35 U
Aroclor-1248		36 U	36 U	36 U	36 U	36 U	35 U
Aroclor-1254		36 U	36 U	36 U	36 U	36 U	35 U
Aroclor-1260		36 U	36 U	96 %	94 %	36 U	35 U

	Cust ID:	J00LW6	J00LW7	J00LW8	J00LW9	J00LX0	J00LX1
Sample Information	RFW#:	005	006	007	008	009	010
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	90 %	85 %	85 %	75 %	90 %	85 %
	Decachlorobiphenyl	105 %	100 %	100 %	95 %	95 %	100 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		36 U	36 U	36 U	36 U	36 U	33 U
Aroclor-1221		71 U	71 U	72 U	71 U	72 U	67 U
Aroclor-1232		36 U	36 U	36 U	36 U	36 U	33 U
Aroclor-1242		36 U	36 U	36 U	36 U	36 U	33 U
Aroclor-1248		36 U	36 U	36 U	36 U	36 U	33 U
Aroclor-1254		36 U	36 U	36 U	36 U	36 U	33 U
Aroclor-1260		36 U	36 U	36 U	36 U	36 U	33 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000016

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 04/23/03 17:57

Batch Number: 0304L231 Client: TNUHANFORD B01-054 H2166 Work Order: 11343606001 Page: 2

	Cust ID:	PBLKRK	PBLKRK BS
›le	RFW#:	03LE0465-MB1	03LE0465-MB1
›rmation	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	UG/KG	UG/KG

:ogate:	Tetrachloro-m-xylene	80	%	80	%
	Decachlorobiphenyl	95	%	95	%

fl fl fl fl fl fl fl

:lor-1016	33	U	92	%
:lor-1221	67	U	67	U
:lor-1232	33	U	33	U
:lor-1242	33	U	33	U
:lor-1248	33	U	33	U
:lor-1254	33	U	33	U
:lor-1260	33	U	87	%

000017

5/10/03

7/Jan 4/24/03

Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054
LVL #: 0304L231
SDG/SAF #: H2166/B01-054

W.O. #: 11343-606-001-9999-00
Date Received: 04-18-03

PCB

The set of samples consisted of ten (10) soil samples collected on 04-16-03.

The samples and their associated QC samples were extracted on 04-21-03 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 04-23-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. All required holding times for extraction and analysis have been met.

3. All samples and their associated QC samples received Sulfuric Acid and Sulfur cleanups.

4. The method blank was below the reporting limits for all target compounds.

5. One (1) of twenty-eight (28) surrogate recoveries was outside QC limits; however, the surrogate recovery acceptance criteria were met (i.e., no more than one outlier per sample).

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. All initial calibrations associated with this data set were within acceptance criteria.

9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, 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.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/24/03
Date

pef\r:\group\data\pest\tnu hanford\04L-231.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054
LVL #: 0304L231
SDG/SAF # H2166/B01-054

W.O. #: 11343-606-001-9999-00
Date Received: 04-18-2003

PESTICIDE

Ten (10) soil samples were collected on 04-16-2003.

The samples and their associated QC samples were extracted on 04-21-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 04-24-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8081A.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The samples and their associated QC samples received a Sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. Three (3) of twenty-eight (28) surrogate recoveries were outside acceptance criteria. However, EPA CLP surrogate recovery criteria were met (i.e., no more than one outlier per sample).
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, 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.

Jain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/25/03
Date

som\r:\group\data\pest\tnu hanford\0304-231.pes

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 1 pages. 000020

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: ~~21~~ 7 Days DWS 4/15/03	Air Quality: ☐	
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system	SAF No.: B01-054	
Ice Chest No.: ERC 02 403	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A030212		Bill of Lading/Air Bill No.: 8EF 0DPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000021

SAMPLE ANALYSIS												
Preservation				Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	
Type of Container				G/P	G/P MWS 4/15/03	G/P	aG	aG	aG	G/P	G/P	
No. of Container(s)				1	10	1	1	1	1	1	1	
Volume				120mL	120mL	60mL	250g	120g	60mL	500mL	60mL	
				See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta	
Sample No.	Matrix *	Sample Date	Sample Time									
J00LW2	SOIL	4/16/03	0833	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW3	SOIL	↓	0851	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW4	SOIL		0911	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW5	SOIL		0933	✓	✓	✓	✓	✓	✓	✓	✓	
J00LW6	SOIL		0952	✓	✓	✓	✓	✓	✓	✓	✓	

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	D.Shea D.Shea	4/16/03 1618	Fridge 3B	4/16/02 1618
Relinquished By/Removed From	REF 3B	41703 1000	S.Jones	41703 1000
Relinquished By/Removed From	S.Jones	41703 1000	FED EX	
Relinquished By/Removed From	Fed Ex	4/18/03 0900	[illegible]	4/18/03 0900
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)
(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
DWS 4/15/03

Personnel not available to relinquish samples from the 3728
Ref # 33 on 4/17/03

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

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

BHI-EE-011 (03/01/2002)

Bechtel Hanford Inc.

CHAIN OF CUSTODY RECORD

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: 7 ~~21~~ Days DWB 4/15/03	Air Quality:	
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC, 1607-B-09 Septic system	SAF No.: B01-054	
Ice Chest No.: ERC 02 403	Field Logbook No.: EL-1573	COA: R607B92F00	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A03022		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	G/P	G/P	G/P	aG	aG	aG	G/P	G/P		
No. of Container(s)	1	1 ~~0~~ DWB 4/15/03	1	1	1	1	1	1		
Volume	120mL	120mL	60mL	250g	120g	60mL	500mL	60mL		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha; Gross Beta		

Sample No.	Matrix *	Sample Date	Sample Time										
J00LW7	SOIL	4/16/03	1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW8	SOIL	↓	1130	✓	✓	✓	✓	✓	✓	✓	✓		
J00LW9	SOIL		1217	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX0	SOIL		1236	✓	✓	✓	✓	✓	✓	✓	✓		
J00LX1	SOIL		0812	✓	✓	✓	✓	✓	✓	✓	✓		

000022

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWShea DWShea	4/16/03 1615	Fridge 3B	4/16/03 1615
REF 1B	41703 1000	SJOALS Moale	41703 1000
SJOALS Moale	41703 1000	FED EX	
Fed Ex	4.18.03 0900	[illegible]	4.19.03 0900

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) {Arsenic, Barium, Cadmium, Selenium, Silver}
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, ~~Silver-108 metastable~~, Uranium-238}

DWB 4/15/03

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/17/03

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

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

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	1607-B9		DATA PACKAGE:	H2166	
VALIDATOR:	TLI	LAB:	LLI	DATE:	5/8/03
CASE:			SDG:	H2166	
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J00LW2	J00LW3	J00LW4	J00LW5		
J00LW6	J00LW7	J00WL8	J00LW9		
J00LX0	J00LX1				

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

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

Continuing calibrations acceptable? ..... Yes No N/A

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

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

Calculation check acceptable? ..... Yes No N/A

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

Comments:

PESTICIDE/PCB DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? ..... Yes No N/A

Surrogate recoveries acceptable? ..... Yes No N/A

Surrogates traceable? (Levels D, E) ..... Yes No N/A

Surrogates expired? (Levels D, E) ..... Yes No N/A

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

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

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

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

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

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: NO PAS

PESTICIDE/PCB DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No N/A

Positive results resolved acceptably? ..... Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: _____

PESTICIDE/PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: all PCB's methoxychlor + toxaphene are

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other aborbant) cleanup performed? ..... Yes No N/A

Lot check performed? ..... Yes No N/A

Check recoveries aceptable? ..... Yes No N/A

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

GPC check performed? ..... Yes No N/A

GPC check recoveries aceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments: