

REVIEW COMMENT RECORD (RCR)

1. Date: 1/14/04

2. Review No.

3. Project No.

4. Page 1 of 2

5. Document Number(s)/Title(s)
Data Validation Report for H2195

6. Program/Project/Building Number

7. Reviewer
G.S. Thomas

8. Organization/Group
WM/GPP

9. Location/Phone
E6-35/373-3907

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)

Reviewer/Point of Contract

Reviewer/Point of Contract

Date

Author/Originator

Date

Author/Originator

12. Item

13a. Comment(s)

13b. Basis

13c. Recommendation

14. Reviewer
Concurrence
Required

15. Disposition (Provide
Justification is NOT accepted)

16. Status

Data Validation Wet chemistry H2195

1 The data validation report on page 1 first sentence under Hold Times section the word metals should be deleted and the words anions and cations be added.

Car
ke

Data Validation Radiological H2195

1 The lab used a tracer for Tc-99 therefore no matrix spike was needed. The validation report should not report that Tc-99 needs to be flagged with a J qualifier in the Accuracy section.

Car
ke

ORP-114 (02/02)		ORP - REVIEW COMMENT RECORD (RCR)			1. Date	2. Review No.
					Jan 14, 2004	N/A
					3. Project No.	4. Page 1 of 1
					200-PW-2 & 4	
5. Document Number(s)/Title(s)		6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone	
Data Package SDG H2195		Groundwater Protection program/200-PW-2 & 4 OU	Bill Thackaberry	Env & Science Assurance (QA)	E6-35 372-0742	
17. Comment Submittal Approval		10. Agreement with indicated comment disposition(s)		11. CLOSED		
		<i>WR Thackaberry</i> Reviewer/Point of Contact		<i>WR Thackaberry</i> Reviewer/Point of Contact		
Organization Manager (optional)		1-19-04 Date		1-19-04 Date		
		Requester		Requester		
12. Item	13a. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted). Provide separate attachments if necessary.	16. Status		
1	Wet Chemistry - No Comment.					
2	Radiochemistry - No comment					
3	SemiVOA - pg 11B, Ethylene Glycol should be flagged UJ		<i>Carve k</i>		OK	
4	SemiVOA - pg 11B, Gasoline Range organics should be flagged UR not UJ.		<i>Carve k</i>		OK	
5	SemiVOA - pg 11B, Diesel range organics should not have the R flag.		<i>Carve k</i>		OK	
6	VOA - No Comment					
7	PCBs - No Comment					
8	Inorganics - No Comment					

REVIEW COMMENT RECORD (RCR)

1. Date 01/14/03

2. Review No.

3. Project No.

4. Page 1 of 1

200-PW-2/4

5. Document Number(s)/Title(s)
Validation Packages for SDG 2195

6. Program/Project/Building Number
200-PW-2/4 Waste Management

7. Reviewer
RL Weiss

8. Organization/Group
S&DM

9. Location/Phone
Sigma 1
372-9631

17. Comment Submittal Approval:

Organization Manager (Optional)

10. Agreement with indicated comment disposition(s)

Richard L. Weiss

Reviewer/Point of Contract

1-27-04

Date

Author/Originator

11.

Reviewer/Point of Contact

Date

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry, Pages 2, 3, 8, 10, 11, & 20; Tc-99 analysis performed using a tracer, matrix spike not required. Check of lab data package for info on tracer recoveries.	<i>OK RLW 1-27-04</i>	<i>Carve K</i>	
2	PCB, page 1; Appendices 1 through 6 are mentioned, only 5 appendices in package.	<i>OK RLW 1-27-04</i>	<i>Carve K</i>	
3	Volatiles, page 11; Need "U" qualifier applied to methylene chloride and acetone results.	<i>OK RLW 1-27-04</i>	<i>Carve K</i>	
4	Semivolatile, page 11B; Pentachlorophenol result incorrectly flagged "J". Ethylene glycol result should be flagged "J".	<i>OK RLW 1-27-04</i>	<i>Carve K</i>	
5	Wet Chme & Inorganics – no comments.			

Date: 12 January 2004
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Semivolatile - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2195 prepared by Lionville Laboratory Inc.. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16W84	4/30/03	Soil	C	See note 1

1-Semivolatiles by 8270B; ethylene glycol by 8015B; TPH-diesel and TPH-gasoline.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction for semivolatiles and analyzed within 14 days for ethylene glycol, diesel and gasoline range organics.

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

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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".

Due to the holding time being exceeded by greater than twice the limit, the gasoline range organic result was rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all ethylene glycol result was qualified as an estimate and flagged "J".

All other 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.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike sample analyses are used to assess the analytical accuracy of the reported data. Matrix spike/matrix duplicate results are used to assess 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

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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 and blank spike 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".

Due to the lack of a surrogate analysis, all ethylene glycol results were qualified as estimates and flagged "J".

All other 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 +/-35%. 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.

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All MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicate results were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits (TQL's) to ensure that laboratory detection levels meet the required criteria. Five results exceeded the TQL. Under the FHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2195 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 99%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, the gasoline range organic result was rejected and flagged "UR". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all ethylene glycol result was qualified as an estimate and flagged "J". Due to the lack of a surrogate analysis, all ethylene glycol results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI 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.

Five results exceeded the TQL. Under the FHI statement of work, no qualification is required

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REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

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Appendix 1

Glossary of Data Reporting Qualifiers

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Qualifiers which may be applied by data validators in compliance with the FHI 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).

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Appendix 2

Summary of Data Qualification

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SEMIVOLATILE DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Gasoline range organics	UR	All	Holding time
Ethylene glycol	J	All	Holding time
Ethylene glycol	J	All	No surrogate analysis

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: FLUOR-HANFORD									
Laboratory: LLI									
Case:		SDG: H2195							
Sample Number		B16W84							
Sample Date		4/30/03							
Semivolatiles (8270C)	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Phenol*	330	360	U						
bis(2-Chloroethyl)ether		360	U						
2-Chlorophenol		360	U						
1,3-Dichlorobenzene		360	U						
1,4-Dichlorobenzene		360	U						
1,2-Dichlorobenzene		360	U						
2-Methylphenol		360	U						
2,2'-oxybis(1-chloropropane)		360	U						
3 and/or 4-Methylphenol		360	U						
N-Nitroso-di-n-propylamine		360	U						
Hexachloroethane		360	U						
Nitrobenzene		360	U						
Isophorone		360	U						
2-Nitrophenol		360	U						
2,4-Dimethylphenol		360	U						
bis(2-Chloroethoxy)methane		360	U						
2,4-Dichlorophenol		360	U						
1,2,4-Trichlorobenzene		360	U						
Naphthalene		360	U						
4-Chloroaniline		360	U						
Hexachlorobutadiene		360	U						
4-Chloro-3-methylphenol		360	U						
2-Methylnaphthalene		360	U						
Hexachlorocyclopentadiene		360	U						
2,4,6-Trichlorophenol		360	U						
2,4,5-Trichlorophenol		910	U						
2-Chloronaphthalene		360	U						
2-Nitroaniline		910	U						
Dimethylphthalate		360	U						
Acenaphthylene		360	U						
2,6-Dinitrotoluene		360	U						
3-Nitroaniline		910	U						
Acenaphthene		360	U						
2,4-Dinitrophenol		910	U						
4-Nitrophenol		910	U						

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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.

Project: FLUOR-HANFORD									
Laboratory: LLI									
Case:		SDG: H2195							
Sample Number		B16W84							
Sample Date		4/30/03							
Semivolatile (8270C)	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Dibenzofuran		360	U						
2,4-Dinitrotoluene		360	U						
Diethylphthalate		360	U						
4-Chlorophenyl-phenyl ether		360	U						
Fluorene		360	U						
4-Nitroaniline		910	U						
4,6-Dinitro-2-methylphenol		910	U						
N-Nitrosodiphenylamine		360	U						
4-Bromophenyl-phenyl ether		360	U						
Hexachlorobenzene		360	U						
Pentachlorophenol		910	U						
Phenanthrene		360	U						
Anthracene		360	U						
Carbazole		360	U						
Di-n-butylphthalate		360	U						
Fluoranthene		360	U						
Pyrene		360	U						
Butylbenzylphthalate		360	U						
3,3'-Dichlorobenzidine		360	U						
Benzo(a)anthracene		360	U						
Chrysene		360	U						
bis(2-Ethylhexyl)phthalate		360	U						
Di-n-octylphthalate		360	U						
Benzo(b)fluoranthene		360	U						
Benzo(k)fluoranthene		360	U						
Benzo(a)pyrene		360	U						
Indeno(1,2,3-cd)pyrene		360	U						
Dibenz(a,h)anthracene		360	U						
Benzo(g,h,i)perylene		360	U						
2-Butoxyethanol		360	U						
Benzyl alcohol		360	U						
Tributyl phosphate*	330	360	U						
Ethylene Glycol*	5	27.5	UJ						
Gasoline range organics*	5	30	UR						
Diesel range organics		30	U						
Kerosene*	5	13.1	U						

* - TQL exceeded

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.

Cust ID: B16W84

~~B16W85~~
11/16/01

B16W85

B16W85

SBLKTK

SBLKTK BS

RFW#:

001

002

002 MS

002 MSD

03LE0575-MB1

03LE0575-MB1

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	001	002	002 MS	002 MSD	03LE0575-MB1	03LE0575-MB1
2-Chloronaphthalene	360 U	360 U	360 U	360 U	330 U	330 U
2-Nitroaniline	910 U	900 U	900 U	900 U	830 U	830 U
Dimethylphthalate	360 U	360 U	360 U	360 U	330 U	330 U
Acenaphthylene	360 U	360 U	360 U	360 U	330 U	330 U
2,6-Dinitrotoluene	360 U	360 U	360 U	360 U	330 U	330 U
3-Nitroaniline	910 U	900 U	900 U	900 U	830 U	830 U
Acenaphthene	360 U	360 U	62 %	72 %	330 U	68 %
2,4-Dinitrophenol	910 U	900 U	900 U	900 U	830 U	830 U
4-Nitrophenol	910 U	900 U	52 %	64 %	830 U	79 %
Dibenzofuran	360 U	360 U	360 U	360 U	330 U	330 U
2,4-Dinitrotoluene	360 U	360 U	70 %	83 %	330 U	83 %
Diethylphthalate	360 U	360 U	360 U	360 U	330 U	330 U
4-Chlorophenyl-phenylether	360 U	360 U	360 U	360 U	330 U	330 U
Fluorene	360 U	360 U	360 U	360 U	330 U	330 U
4-Nitroaniline	910 U	900 U	900 U	900 U	830 U	830 U
4,6-Dinitro-2-methylphenol	910 U	900 U	900 U	900 U	830 U	830 U
N-Nitrosodiphenylamine (1)	360 U	360 U	360 U	360 U	330 U	330 U
4-Bromophenyl-phenylether	360 U	360 U	360 U	360 U	330 U	330 U
Hexachlorobenzene	360 U	360 U	360 U	360 U	330 U	330 U
Pentachlorophenol	910 U	900 U	58 %	68 %	830 U	82 %
Phenanthrene	360 U	360 U	360 U	360 U	330 U	330 U
Anthracene	360 U	360 U	360 U	360 U	330 U	330 U
Carbazole	360 U	360 U	360 U	360 U	330 U	330 U
Di-n-butylphthalate	360 U	360 U	360 U	360 U	330 U	330 U
Fluoranthene	360 U	360 U	360 U	360 U	330 U	330 U
Pyrene	360 U	360 U	82 %	85 %	330 U	81 %
Butylbenzylphthalate	360 U	360 U	360 U	360 U	330 U	330 U
3,3'-Dichlorobenzidine	360 U	360 U	360 U	360 U	330 U	330 U
Benzo(a)anthracene	360 U	360 U	360 U	360 U	330 U	330 U
Chrysene	360 U	360 U	360 U	360 U	330 U	330 U
bis(2-Ethylhexyl)phthalate	360 U	360 U	33 J	54 J	330 U	51 J
Di-n-octyl phthalate	360 U	360 U	360 U	360 U	330 U	330 U
Benzo(b)fluoranthene	360 U	360 U	360 U	360 U	330 U	330 U
Benzo(k)fluoranthene	360 U	360 U	360 U	360 U	330 U	330 U
Benzo(a)pyrene	360 U	360 U	360 U	360 U	330 U	330 U
Indeno(1,2,3-cd)pyrene	360 U	360 U	360 U	360 U	330 U	330 U
Dibenz(a,h)anthracene	360 U	360 U	360 U	360 U	330 U	330 U
Benzo(g,h,i)perylene	360 U	360 U	360 U	360 U	330 U	330 U
2-Butoxyethanol	360 U	360 U	360 U	360 U	330 U	330 U
Benzyl alcohol	360 U	360 U	360 U	360 U	330 U	330 U

*= Outside of EPA CLP QC limits.

11/16/01

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Report Date: 06/18/03 10:34 ⁰⁰

RFW Batch Number: 0305L339

Client: TNUHANFORD F03-006 H2195 Work Order: 11343606001 Page: 1

	Cust ID:	B16W84	B16W85 1/10/04	BLK	BLK BS
Sample	RFW#:	001	002	03LE0577-MB1	03LE0577-MB1
Information	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg

	p-Terphenyl	99 %	82 %	106 %	91 %
=====fl=====fl=====fl=====fl=====fl					
Diesel Range Organics		13.1 U	12.9 U	12.0 U	74 %
Kerosene		13.1 U	12.9 U	12.0 U	12.0 U

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1/10/04

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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

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Report Date: 06/18/03 10:34

RFW Batch Number: 0305L366

Client: ~~TNUHANFORD F03-006 H2195~~ Work Order: 11343606001 Page: 1

10

Sample Information	Cust ID: B16W87 11/16/04	B16W87	B16W87	BLK	BLK BS
RFW#:	001	001 MS	001 MSD	03LE0577-MB1	03LE0577-MB1
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
<hr/>					
p-Terphenyl	82 %	73 %	69 %	106 %	91 %
=====fl=====fl=====fl=====fl=====fl=====fl					
Diesel Range Organics	12.3 U	61 %	55 %	12.0 U	74 %
Kerosene	12.3 U	12.3 U	12.3 U	12.0 U	12.0 U

0000016

K
11/16/04

TSC 6/18/03

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

Lionville Laboratory, Inc.

Nonhalogenated Volatiles by GC, Method 8015

Report Date: 06/19/03 15:47

RFW Batch Number: 0305L339

Client: TNUHANFORD F03-006 H2195 Work Order: 11343606001 Page: 1

0

Sample Information	Cust ID:	B16W84	B16W85	B16W85	B16W85	BLK	BLK BS
	RFW#:	001	002	002 MS	002 MSD	03LE0586-MB1	03LE0586-MB1
	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

	fl	fl	fl	fl	fl	fl	fl
Ethylene Glycol	27.5 U	23.5 U	79 %	89 %	25.0 U	108 %	

JK
11/10/04

Asacalata

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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

Lionville Laboratory, Inc.

GAS RANGE ORGANICS

Report Date: 06/18/03 12:40

RFW Batch Number: 0305L339

Client: TNUHANFORD F03-006 H2195 Work Order: 11343606001 Page: 1

Sample Information	Cust ID:	B16W84	B16W85 1/16/04	TBLKIY	TBLKIY BS
	RFW#:	001	002	03LVJ514-MB1	03LVJ514-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG

Fluorobenzene	77 %	83 %	98 %	109 %
Gasoline Range Organics (GRO)	30 U <i>R</i>	33 U	30 U	105 %

000018

1/16/04

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

ggc 6/18/03

Lionville Laboratory, Inc.

GAS RANGE ORGANICS

Report Date: 06/18/03 12:49

RFW Batch Number: 0305L372

Client: TNUHANFORD F03-006 H2195 Work Order: 11343606001 Page: 1

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Sample Information	Cust ID:	B16W88 11/10/04	B16W88	B16W88	TBLKIY	TBLKIY BS
	RFW#:	001	001 MS	001 MSD	03LVJ514-MB1	03LVJ514-MB1
	Matrix:	SOLID	SOLID	SOLID	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
	Fluorobenzene	86 %	92 %	87 %	98 %	109 %
	=====fl=====					
Gasoline Range Organics (GRO)		30 U	109 %	103 %	30 U	105 %

K
11/10/04

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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

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

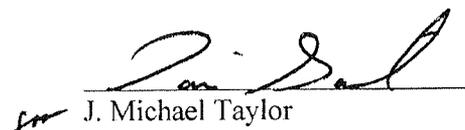
SEMIVOLATILE

Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 05-14-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 06-07,08,09-2003.

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. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. 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").
9. 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.


J. Michael Taylor
President
Lionville Laboratory Incorporated

6/29/03
Date

son\group\data\bna\tnu-hanford-0306-339,357,366,372.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 3 3 pages.

000021

05



Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

GRO

Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline Range Organics (GRO) on 06-14-2003. The analysis met the intent of method WTPH-G.

The following is a summary of the QC results accompanying these 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 LVL's sample acceptance policy.
2. The required holding time for analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. The matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. 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


Date

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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 24 pages.

000022

05



Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

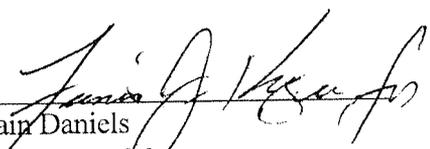
GC SCAN

Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were prepared according to method 3580A (waste dilution-1g into 5mL) on 05-15-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures based on method 8015B on 05-15,19,20-2003 for Ethylene Glycol.

The following is a summary of the QC results accompanying these 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 LVL's sample acceptance policy.
2. Samples associated with LVL # 0305L339 were extracted outside the holding time. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
3. Surrogates are not currently employed in the methodology.
4. The blank spike recovery was within acceptance criteria.
5. The matrix spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
8. 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


Date

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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 5 pages.

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Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

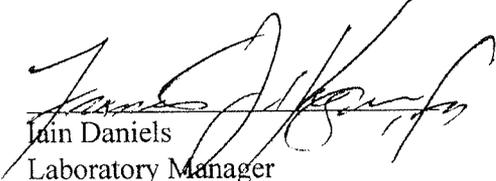
DIESEL RANGE ORGANICS

Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were extracted on 05-14-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 05-16,19-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B. The analysis met the intent of method WTPH-D.

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. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. The matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. 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.


John Daniels
Laboratory Manager

Lionville Laboratory Incorporated

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FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					Price Code 8N		Data Turnaround				
Collector Johansen/Pope/Pfister		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Air Quality <input type="checkbox"/>		45 Days			
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 216-A-37 (C4106); (72.5'-75')			SAF No. F03-006		Method of Shipment Federal Express						
Ice Chest No. ERC-01-038		Field Logbook No. HNF-N-3361		COA 117504ES10		Bill of Lading/Air Bill No. SEE OSA							
Shipped To REZNA EBERLINE SERVICES (Formerly TMA) Age 4/2/03		Offsite Property No. R030221			22								
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive TIE TO B16W80 Special Handling and/or Storage COB 14°C 000025				Preservation	Cool 4C	Cool 4C	Cool 4C	None	None				
				Type of Container	aG	aG	aG	aG	aG				
				No. of Container(s)	1	1	1	1	1				
				Volume	120mL	60mL	120mL	60mL	60mL				
					Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3				
SAMPLE ANALYSIS													
Sample No.	Matrix *	Sample Date	Sample Time										
B16W84	SOIL	4-30-03	0900	X	X	X					B16W80		
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis. (1) Technetium-99, Strontium-89,90, Total Sr, Isotopic Thorium (Thorium-232); Carbon-14; Indium-129; Nickel-63; Neptunium-237 98 4/22/03					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
LABORATORY SECTION		Received By				Title							
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By							

Lionville Laboratory Use Only

0305L339

Custody Transfer Record/Lab Work Request Page 1 of 1



FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client <u>TNU-Hamford</u> <u>F03-006</u>	Refrigerator #	
Est. Final Proj. Sampling Date	#/Type Container	Liquid
Project # <u>11343-606-001-9999-00</u>		Solid
Project Contact/Phone #	Volume	Liquid
Lionville Laboratory Project Manager <u>Orlette Johnson</u>		Solid
QC <u>SPEC</u> Del <u>STD</u> TAT <u>30 days</u>	Preservatives	
Date Rec'd <u>5-3-03</u> Date Due <u>6-16-03</u>	ANALYSES REQUESTED	ORGANIC
		INORG
		Metal CN
		Hex Chloride
		NO2
		NO3
		Oil + Grease
		VOA BNA Pes/PCB Herb

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	Lionville Laboratory Use Only		
			MS	MSD				ICR1	INJN2	IOGGR
S - Soil										
SE - Sediment										
SO - Solid										
SL - Sludge										
W - Water										
O - Oil										
A - Air										
DS - Drum Solids										
DL - Drum Liquids										
L - EP/TCLP Leachate										
WI - Wipe										
X - Other										
F - Fish										
	001	B16W84			S	4-30-03	0900			
	002	B16W85			L	L	1238	X	X	X

Special Instructions: SAF # F03-006
~~Run Matrix QC~~
 Batch QC for L339, 357, 366, 372

- DATE/REVISIONS: 5-14-03
- Per Chem Due Date: 6-16-03
 - ADD Ag, As, B, Ba, Be, Bi, Cd, Cr, Cu, Hg
 - Ni, Pb, Sb, Se / IC: Cl, F, I, NO₂, NO₃, PO₄, SO₄
 - INH3N, IPH, O624H, O625X, O6CSC, OPCS
 - ODRO, OGR0

Lionville Laboratory Use Only

Samples were: 1) Shipped or Hand Delivered
 Airbill # 790765893774
 2) Ambient or Chilled
 3) Received in Good Condition or N
 4) Samples Properly Preserved or N
 5) Received Within Holding Times or N

Tamper Resistant Seal was: 1) Present on Outer Package or N
 2) Unbroken on Outer Package or N
 3) Present on Sample or N
 4) Unbroken on Sample or N
 COC Record Present Upon Sample Rec't or N
 Cooler Temp. 0.6 °C

Discrepancies Between Samples Labels and COC Record? Y or N
 NOTES:

Relinquished by	Received by	Date	Time
<u>Deo Ex</u>	<u>D J Smith</u>	<u>5.3.03</u>	<u>11:00</u>

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 0360198

Initiator: John Lach
 Date: 6/15/03
 Client: TNU

Batch: 0305 L 325, 335, 357, 366³⁷²
 Samples: All 325, All
 Method: SW846/MCAWW/CLP/

Parameter: 06CSC EC
 Matrix: SO-1
 Prep Batch: 0320586

1. Reason for SDR

a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C
 Transcription Error Wrong Test Code Other _____

b. General Discrepancy

Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible
 Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold
 Improper Bottle Type Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

① SAMPLES 325, 1-6 extracted 2 days past hold.
 ② ~~There was a h.T. in the blank above the reporting limit.~~
 N/A for samples

2. Known or Probable Causes(s)

3. Discussion and Proposed Action

Other Description:

- Re-log
- Entire Batch
- Following Samples: _____
- Re-leach
- Re-extract
- Re-digest
- Revise EDD
- Change Test Code to _____
- Place On/Take Off Hold (circle)

② No h.T.s in samples.
 Blank was re-run on 6/15/03

[Signature] 6/16/03

4. Project Manager Instructions...signature/date: _____

- Concur with Proposed Action
- Disagree with Proposed Action; See Instruction
- Include in Case Narrative
- Client Contacted:
- Date/Person _____
- Add
- Cancel

5. Final Action...signature/date: John Lach 6/16/03

Other Explanation:

- Verified re-[log][leach][extract][digest][analysis] (circle)
- Included in Case Narrative
- Hard Copy COC Revised
- Electronic COC Revised
- EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
<input checked="" type="checkbox"/>	Initiator	<input type="checkbox"/>	Metals: Beegle
<input checked="" type="checkbox"/>	Lab General Manager: M. Taylor	<input type="checkbox"/>	Inorganic: Perrone
<input checked="" type="checkbox"/>	Project Mgr: Stone/Johnson/Haslett	<input type="checkbox"/>	GC/LC: Kiger
<input checked="" type="checkbox"/>	Technical Mgr: Wesson/Daniels	<input type="checkbox"/>	MS: Rychlak/Layman
<input checked="" type="checkbox"/>	QA (file)	<input type="checkbox"/>	Log-in: Melnic
<input type="checkbox"/>	Data Management: Feldman	<input type="checkbox"/>	Admin: Soos
<input type="checkbox"/>	Sample Prep: Beegle/Kiger	<input type="checkbox"/>	Other: _____

000027

Lionville Laboratory, Inc.
GRO ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-006 H2195

DATE RECEIVED: 05/03/03

LVL LOT # :0305L339

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B16W84	001	S	03LVJ514	04/30/03	N/A	06/14/03
B16W85	002	S	03LVJ514	04/30/03	N/A	06/14/03

LAB QC:

TBLKIY	MB1	S	03LVJ514	N/A	N/A	06/14/03
TBLKIY	MB1 BS	S	03LVJ514	N/A	N/A	06/14/03



DRO

File 1/2/03

000028

1

RECEIVED
2 days
1/10/03
JUN 2003

Lionville Laboratory, Inc.
8015 ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-006 H2195

DATE RECEIVED: 05/03/03

LVL LOT # :0305L339

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B16W84	001	S	03LE0586	04/30/03	05/15/03	05/19/03
B16W85	002	S	03LE0586	04/30/03	05/15/03	05/19/03
B16W85	002 MS	S	03LE0586	04/30/03	05/15/03	05/19/03
B16W85	002 MSD	S	03LE0586	04/30/03	05/15/03	05/19/03

LAB QC:

BLK	MB1	S	03LE0586	N/A	05/15/03	05/20/03
BLK	MB1 BS	S	03LE0586	N/A	05/15/03	05/15/03

EG

7/16/19/03

Appendix 5

Data Validation Supporting Documentation

000030

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-PW-24		DATA PACKAGE: H2195		
VALIDATOR:	TLI	LAB:	DATE: 1/8/03		
CASE:			SDG: H2195		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270	8015 B	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B16 W54					
Sail					

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: No FB

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: Ethylene glycol - No surrogate I all

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: _____

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: No - Gasolene Range organic - >2x I/UR
Etylethyl glycol <2x I N/A

GC/MS ORGANIC DATA VALIDATION CHECKLIST

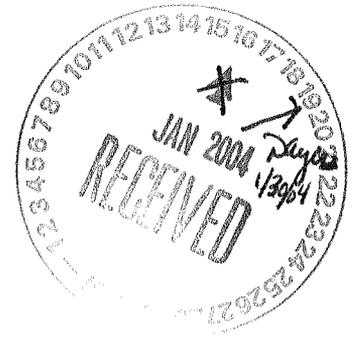
8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

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
Results 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: Scan 11/15

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? Yes No N/A
GPC check performed? Yes No N/A
GPC check recoveries acceptable? 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: _____

Date: 12 January 2003
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU Borehole Soil Sampling
Subject: Inorganics - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2195 prepared by Lionville Laboratory Inc.. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16W84	4/30/03	Soil	C	See note 1

1 - ICP metals by 6010B and mercury by 7471A.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). 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 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

000001

- **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.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample Analysis

Matrix spike (MS), matrix spike duplicate (MSD) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125% for matrix spike analysis. 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 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required. LCS recoveries must fall within limits specified by the laboratory.

Due to a matrix spike recovery outside QC limits (59.2%), all antimony results were

000002

qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike and 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 +/- 35%, 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.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Limits**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All results met the analyte specific TQL.

- **Completeness**

Data package No. H2195 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 96%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery outside QC limits (59.2%), all antimony results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All

000003

other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with FHI 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).

000006

Appendix 2
Summary of Data Qualification

000007

METALS DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR HANFORD															
Laboratory: LLI															
Case		SDG: H2195													
Sample Number		B16W84													
Remarks															
Sample Date		4/30/03													
Inorganics	TQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.5	0.13	U												
Arsenic	1	2.0													
Boron		0.57													
Barium	20	108													
Beryllium	0.5	0.38													
Bismuth		0.54	U												
Cadmium	0.5	0.04	U												
Chromium	1	6.3													
Copper	2.5	17.2													
Mercury	0.2	0.02													
Nickel	4	8.4													
Lead	1	3.7													
Antimony	1	0.23	UJ												
Selenium	10	0.45	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.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/04/03

CLIENT: TNUHANFORD P03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B16W84	Silver, Total	0.13	u MG/KG	0.13	1.0
		Arsenic, Total	2.0	MG/KG	0.35	1.0
		Boron, Total	0.57	MG/KG	0.20	1.0
		Barium, Total	108	MG/KG	0.02	1.0
		Beryllium, Total	0.38	MG/KG	0.01	1.0
		Bismuth, Total	0.54	u MG/KG	0.54	1.0
		Cadmium, Total	0.04	u MG/KG	0.04	1.0
		Chromium, Total	6.3	MG/KG	0.11	1.0
		Copper, Total	17.2	MG/KG	0.06	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Nickel, Total	8.4	MG/KG	0.14	1.0
		Lead, Total	3.7	MG/KG	0.24	1.0
		Antimony, Total	0.23	u MG/KG	0.23	1.0
		Selenium, Total	0.45	u MG/KG	0.45	1.0

Yes
 1/10/04

000011

14

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000012



Analytical Report

Client: TNU-HANFORD F03-006
LVL#: 0305L339, 357, 366, 372
SDG/SAF#: H2195/F03-006

W.O.#: 11343-606-001-9999-00
Date Received: 05-03, 07, 08, 09-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 5 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.
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. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration level for the following analytes:

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 **35** pages.

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<u>Sample ID</u>	<u>Element</u>	<u>PDS</u> <u>Concentration (ppb)</u>	<u>PDS</u> <u>% Recovery</u>
B16W84	Antimony	100	97.3

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
13. 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.
14. 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
 gmb/m05-339, 357, 366, 372

06-05-03
 Date



000014

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Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ	Price Code 8N	Data Turnaround 45 Days
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location 216-A-37 (C4106); (72.5'-75')	SAF No. F03-006	Air Quality <input type="checkbox"/>		
Ice Chest No. ERC-01-038	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Federal Express		
Shipped To RETRA EBERLINE SERVICES (Formerly TMA) <i>9/24/03</i>	Offsite Property No. R030221	Bill of Lading/Air Bill No. SEE OSA			

POSSIBLE SAMPLE HAZARDS/REMARKS <i>Radioactive</i> <i>Tie To B16W80</i> <i>Special Handling and/or Storage</i> <i>COB 140L</i>	Preservation	Cool 4C	Cool 4C	Cool 4C	None	None						
	Type of Container	aG	aG	aG	aG	aG						
	No. of Container(s)	1	1	1	1	1						
	Volume	120mL	60mL	120mL	60mL	60mL						

SAMPLE ANALYSIS				Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3					
				<i>7/28/03 4/22/03</i>									

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3					
B16W84	SOIL	4-30-03	0900	X	X	X							<i>Tie To:</i> <i>B16W80</i>

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.				S=Soil SE=Sediment SO=Solid SL=Sludge W = Water O=Oil A= Air DS=Dram Solids DL=Dram Liquids T=Tissue W= Wipe L=Liquid V=Vegetation X=Other
<i>R. G. Hill</i>	4-30-03 1430	<i>R. G. Hill</i>	4-30-03 1430	(1) Technetium-99, Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237				
<i>R. G. Hill</i>	4-30-03 1430	<i>R. G. Hill</i>	4-30-03 1430					
<i>R. G. Hill</i>	4-30-03 1000	<i>R. G. Hill</i>	4-30-03 1000	<i>9/24/03 4/22/03</i>				
<i>R. G. Hill</i>	5-2-03 1000	<i>R. G. Hill</i>	5-2-03 1000					
<i>R. G. Hill</i>	5-3-03 11:00	<i>R. G. Hill</i>	5-3-03 11:00					

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

000015

Appendix 5

Data Validation Supporting Documentation

000017

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-PW-244		DATA PACKAGE: H2195		
VALIDATOR:	TLI	LAB:	LLI	DATE: 11/8/97 1/8/04	
CASE:			SDG:	H2195	
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
B16 W84					
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: NO FB

Antimony 59.290 - Tall 1/8/01

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

Antimony 59.290 Tall

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: _____

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
- Results 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: _____

Appendix 6

Additional Documentation Requested by Client

000023

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/04/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339, 357, 366, 372

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	03L0284-MB1	Silver, Total	0.12 u	MG/KG	0.12	1.0
		Arsenic, Total	0.33 u	MG/KG	0.33	1.0
		Boron, Total	0.19 u	MG/KG	0.19	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Beryllium, Total	0.02	MG/KG	0.01	1.0
		Bismuth, Total	0.51 u	MG/KG	0.51	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.10 u	MG/KG	0.10	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.23 u	MG/KG	0.23	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.42 u	MG/KG	0.42	1.0
BLANK1	03C0122-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/04/03

CLIENT: TNUHANFORD P03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
=====	=====	=====	=====	=====	=====	=====	=====
-001	B16W84	Silver, Total	4.9	0.13u	5.3	92.5	1.0
		Arsenic, Total	192	2.0	210	90.6	1.0
		Boron, Total	93.0	0.57	105	88.0	1.0
		Barium, Total	332	108	210	106.8	1.0
		Beryllium, Total	5.1	0.38	5.3	89.1	1.0
		Bismuth, Total	488	0.54u	525	92.9	1.0
		Cadmium, Total	4.8	0.04u	5.3	90.6	1.0
		Chromium, Total	26.3	6.3	21.0	95.2	1.0
		Copper, Total	42.5	17.2	26.3	96.2	1.0
		Mercury, Total	0.19	0.02	0.18	94.9	1.0
		Nickel, Total	56.8	8.4	52.5	92.2	1.0
		Lead, Total	51.5	3.7	52.5	91.0	1.0
		Antimony, Total	31.1	0.23u	52.5	59.2	1.0
		Selenium, Total	182	0.45u	210	86.8	1.0

000025

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/04/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION
			RESULT	REPLICATE	RPD	
-001REP	B16W84	Silver, Total	0.13u	0.13u	NC	1.0
		Arsenic, Total	2.0	2.4	18.2	1.0
		Boron, Total	0.57	0.26	75.2	1.0
		Barium, Total	108	130	18.8	1.0
		Beryllium, Total	0.38	0.36	4.6	1.0
		Bismuth, Total	0.54u	0.54u	NC	1.0
		Cadmium, Total	0.04u	0.04u	NC	1.0
		Chromium, Total	6.3	5.3	17.2	1.0
		Copper, Total	17.2	16.2	6.0	1.0
		Mercury, Total	0.02	0.02u	NC 2.00	1.0
		Nickel, Total	8.4	8.8	4.7	1.0
		Lead, Total	3.7	3.8	2.7	1.0
		Antimony, Total	0.23u	0.23u	NC	1.0
		Selenium, Total	0.45u	0.45u	NC	1.0

Handwritten note: 1.00/1.7

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/04/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339, 357, 366, 372

SAMPLE	SITE ID	ANALYTE	SPIKED		UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	03L0284-LC1	Silver, LCS	49.1	50.0	MG/KG	98.2
		Arsenic, LCS	931	1000	MG/KG	93.1
		Boron, LCS	471	500	MG/KG	94.2
		Barium, LCS	505	500	MG/KG	100.9
		Beryllium, LCS	24.2	25.0	MG/KG	96.8
		Bismuth, LCS	491	500	MG/KG	98.2
		Cadmium, LCS	24.6	25.0	MG/KG	98.4
		Chromium, LCS	50.6	50.0	MG/KG	101.2
		Copper, LCS	127	125	MG/KG	101.8
		Nickel, LCS	200	200	MG/KG	99.9
		Lead, LCS	243	250	MG/KG	97.4
		Antimony, LCS	291	300	MG/KG	97.0
		Selenium, LCS	890	1000	MG/KG	89.0
LCS1	03C0122-LC1	Mercury, LCS	6.8	6.2	MG/KG	109.8

000027

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Date: 12 January 2004
 To: Fluor Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 200-PW-2/200-PW-4 OU Borehole Soil Sampling
 Subject: PCBs - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2195 prepared by Lionville Laboratory Inc.. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16W84	4/30/03	Soil	C	PCBs by 8082

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev.1, December 2000). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

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 practical quantitation limit (PQL). 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 PQL, the result is qualified as undetected and elevated to the PQL.

All method blank target compound results were acceptable.

Field Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Blank Spike

Matrix spike and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations and is done in duplicate. Matrix spike and blank spike analyses 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 accuracy 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

000002

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.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits to ensure that laboratory detection levels meet the required criteria. All results met the analyte specific TQL.

- **Completeness**

Data Package No. H2195 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.

000003

MINOR DEFICIENCIES

None found

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

000004

Appendix 1

Glossary of Data Reporting Qualifiers

000005

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).

000006

Appendix 2

Summary of Data Qualification

000007

PESTICIDE DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD							
Laboratory: LLI							
Case:		SDG: H2195					
Sample Number		B16W84					
Remarks							
Sample Date		4/30/03					
Analysis Date		5/21/03					
PCB	RDL	Result	Q	Result	Q	Result	Q
Aroclor-1016	16.5	16	U				
Aroclor-1221	16.5	16	U				
Aroclor-1232	16.5	16	U				
Aroclor-1242	16.5	16	U				
Aroclor-1248	16.5	16	U				
Aroclor-1254	16.5	16	U				
Aroclor-1260	16.5	16	U				
Aroclor-1262	16.5	16	U				
Aroclor-1268	16.5	16	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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013



Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

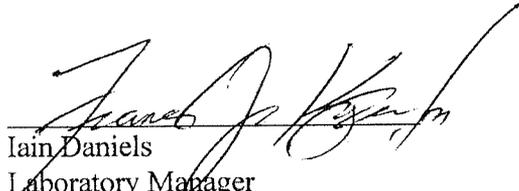
PCB

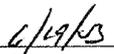
Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were extracted on 05-14-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 05-21,22-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

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 was met.
3. Samples and their associated QC samples received a Sulfuric Acid and Sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The 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


Date

son:\r:\group\data\pest\tnu_hanford\0305-339,357,366,372.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 2 4 pages.

000014

05

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-000-01	
Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ		Price Code 8N	Data Turnaround 45 Days	
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location 216-A-37 (C4106); (72.5'-75')		SAF No. F03-006		Air Quality <input type="checkbox"/>		
Ice Chest No. ERC-01-038	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Federal Express		Bill of Lading/Air Bill No. SEE OSA		
Shipped To FEDEX SERVICES (Formerly TMA) <i>Age 4/12/03</i>	Offsite Property No. R030221						
POSSIBLE SAMPLE HAZARDS/REMARKS <i>Radioactive</i> <i>Tie To B16W80</i> <i>COB 140L</i>	Preservation	Cool 4C	Cool 4C	Cool 4C	None	None	
	Type of Container	aG	aG	aG	aG	aG	
	No. of Container(s)	1	1	1	1	1	
	Volume	120mL	60mL	120mL	60mL	60mL	
SAMPLE ANALYSIS	Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3		
	<i>Tie To!</i>						
Sample No.	Matrix *	Sample Date	Sample Time				
B16W84	SOIL	4-30-03	0900	X	X	X	<i>B16W80</i>
CHAIN OF POSSESSION			Sign/Print Names		SPECIAL INSTRUCTIONS		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.			
<i>R. G. Hill</i>	4-30-03 1430	<i>R. G. Hill</i>	4-30-03 1430	(1) Technetium-99, Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	<i>Age 4/12/03</i>			
<i>R. G. Hill</i>	4-30-03 1430	<i>R. G. Hill</i>	4-30-03 1430				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	<i>Age 4/12/03</i>			
<i>R. G. Hill</i>	5-2-03 1000	<i>R. G. Hill</i>	5-2-03 1000				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
<i>R. G. Hill</i>	5-2-03 1000	<i>FedEx</i>					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
<i>R. G. Hill</i>	5-3-03 11:00	<i>R. G. Hill</i>	5-3-03 11:00				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
LABORATORY SECTION	Received By	Title		Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By		Date/Time			

Appendix 5

Data Validation Supporting Documentation

000017

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-PW-224		DATA PACKAGE: H2195		
VALIDATOR:	TLI	LAB:	LLI	DATE: 1/8/03	
CASE:			SDG: H2195		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
B16W84					
Sail					

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:	NO FB		

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
Results 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: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluorocil ® (or other absorbant) cleanup performed? Yes No N/A
Lot check performed? Yes No N/A
Check recoveries acceptable? Yes No N/A
GPC cleanup performed? Yes No N/A
GPC check performed? Yes No N/A
GPC check recoveries acceptable? 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: _____

Date: 12 January 2004
 To: Fluor Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
 Subject: Volatiles - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2195 prepared by Lionville Laboratories Inc. (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	Media	Validation	Analysis
B16W84	4/30/03	Soil	C	See note 1

1 - Volatiles by EPA 8260A and alcohols by 8015B

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). Appendices 1 through 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 Preservation**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Samples must be analyzed within 14 days of the date of sample collection for VOAs and alcohols. If holding times are exceeded, but not by greater than twice 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 twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all volatile organic results were qualified as estimates and flagged "J".

All other holding times were met.

- **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 of a given matrix. 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 project quantitation limit (MDL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the MDL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, all methylene chloride and acetone results were qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field duplicate samples were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". 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.

000002

All MS/MSD and blank spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

Due to the lack of a surrogate analysis, all alcohol results were qualified as estimates and flagged "J".

All other surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Sample results must be within RPD limits of +/- 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

000003

- **Detection Limits**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. Thirteen analytes exceeded the analyte specific TQL. Under the FHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2195 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 laboratory blank contamination, all methylene chloride and acetone results were qualified as undetected and flagged "U". Due to the holding time being exceeded by less than twice the limit, all volatile organic results were qualified as estimates and flagged "J". Due to the lack of a surrogate analysis, all alcohol results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI 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.

Thirteen analytes exceeded the analyte specific TQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

000004

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validator 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 sample quantitation limit corrected for 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).

000006

Appendix 2

Summary of Data Qualification

000007

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methanol Ethyl ether 1-Butanol	J	All	No surrogate analysis
Volatile organics	J	All	Holding time exceeded
Methylene chloride Acetone	U	All	Blank contamination

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD									
Laboratory: LLI									
Case:		SDG: H2195							
Sample Number		B16W84							
Sample Date		4/30/03							
VOA/Alcohols	PQL	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane		11	UJ						
Bromomethane		11	UJ						
Vinyl Chloride		11	UJ						
Chloroethane		11	UJ						
Methylene Chloride	5	6	UJ						
Acetone		9	UJ						
Carbon Disulfide		6	UJ						
1,1-Dichloroethene	5	6	UJ						
1,1-Dichloroethane	10	6	UJ						
1,2-Dichloroethene (total)		6	UJ						
Chloroform	5	6	UJ						
1,2-Dichloroethane		6	UJ						
2-Butanone	10	11	UJ						
1,1,1-Trichloroethane	5	6	UJ						
Carbon Tetrachloride	5	6	UJ						
Vinyl Acetate		6	UJ						
Bromodichloromethane		6	UJ						
1,2-Dichloropropane		6	UJ						
cis-1,3-Dichloropropene		6	UJ						
Trichloroethene		6	UJ						
Dibromochloromethane		6	UJ						
1,1,2-Trichloroethane		6	UJ						
Benzene	5	6	UJ						
trans-1,3-Dichloropropene		6	UJ						
Bromoform		6	UJ						
4-Methyl-2-pentanone		11	UJ						
2-Hexanone		11	UJ						
Tetrachloroethene		6	UJ						
1,1,2,2-Tetrachloroethane		6	UJ						
Toluene	5	6	UJ						
Chlorobenzene	5	6	UJ						
Ethylbenzene	5	6	UJ						
Styrene		6	UJ						
Xylenes (total)	5	6	UJ						
n-Butylbenzene		6	UJ						
Methanol*	5	24	UJ						
Ethyl ether*		24	UJ						
Ethanol*		24	UJ						
* - Units are MG/KG									

010010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation. * - Units are MG/KG. All other qualifiers shown were applied during validation.

Cust ID: B16W84 B16W85 B16W85 B16W85 VBLKRT VBLKRT BS

RFW#: 001 002 002 MS 002 MSD 03LVJ056-MB1 03LVJ056-MB1

	001	002	002 MS	002 MSD	03LVJ056-MB1	03LVJ056-MB1
Chlorobenzene	6 U	6 U	103 %	108 %	5 U	104 %
Ethylbenzene	6 U	6 U	6 U	6 U	5 U	5 U
Styrene	6 U	6 U	6 U	6 U	5 U	5 U
Xylene (total)	6 U	6 U	6 U	6 U	5 U	5 U
N-butylbenzene	6 U	6 U	6 U	6 U	5 U	5 U

*= Outside of EPA CLP QC limits.

[Handwritten signature]
1/10/04

000012

Lionville Laboratory, Inc.

GC SCAN

Report Date: 06/15/03 12:56

RFW Batch Number: 0305L339

Client: TNUHANFORD F03-006 H2195 Work Order: 11343606001 Page: 1

	Cust ID:	B16W84	B16W85 1/10/04	BLK	BLK BS
Sample Information	RFW#:	001	002	03LE0578-MB1	03LE0578-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg

	fl	fl	fl	fl	fl
Methanol	24 U J	24 U	25 U	101 %	
Ethyl Ether	24 U J	24 U	25 U	86 %	
1-Butanol	24 U J	24 U	25 U	94 %	

K
1/10/04

7/21/03

000013

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000015



Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372
SDG/SAF # H2195/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003

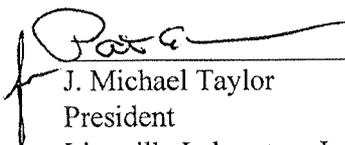
GC/MS VOLATILE

Five (5) soil samples were collected on 04-30-2003 and 05-05,06,07-2003

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCL volatile target compounds on 05-16,17-2003.

The following is a summary of the QC results accompanying these 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 samples were analyzed within holding time with the exception of samples associated with LVL # 0305L339. However, this volatile analysis was added later and performed at client request.
3. A non-target compound was detected in sample B16W84.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks 03LVJ056-MB1 and 03LVJ055-MB1 contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than the CRQL.
8. Internal standard area and retention time criteria were met.
9. A spectral search was conducted for the compound 2-Pentanone; however, this compound was not identified in the samples.
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."



J. Michael Taylor
President
Lionville Laboratory Incorporated

06-09-03

Date

son\group\data\voa\tnu-hanford\0305-336,357,366,372.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 3 2 pages.



Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L339, 0305L357,
0305L366, 0305L372

W.O. #: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-2003
SDG/SAF # H2195/F03-006

GC SCAN

Five (5) soil/solid samples were collected on 04-30-2003 and 05-05,06,07-2003.

The samples and their associated QC samples were prepared according to method 3580A (waste dilution-1g into 5mL) on 05-14-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedure, method 8015B on 05-14-2003 for Methanol, Ethyl Ether and 1-Butanol.

The following is a summary of the QC results accompanying these 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. The method blank was below the reporting limits for all target compounds.
4. Surrogates are not currently employed in the methodology.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. 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

6/19/03
Date

r:\group\data\gcscit\tnu\0305w339x,357x,366x,372x.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 24 pages.

05

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					F03-006-67		Page 1 of 1			
Collector Johansen/Pope/Pfister		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Price Code 8N		Data Turnaround 45 Days		
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 216-A-37 (C4106); (72.5'-75')			SAF No. F03-006		Air Quality <input type="checkbox"/>					
Ice Chest No. ERC-01-038		Field Logbook No. HNF-N-3361		COA 117504ES10		Method of Shipment Federal Express						
Shipped To REIRA EBERLINE SERVICES (Formerly TMA) <i>Age 4/12/03</i>		Offsite Property No. A030221			Bill of Lading/Air Bill No. SEE OSA							
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive TIC TO B16W80 Special Handling and/or Storage COB 140L 000018				Preservation	Cool 4C	Cool 4C	Cool 4C	None	None			
				Type of Container	aG	aG	aG	aG	aG			
				No. of Container(s)	1	1	1	1	1			
				Volume	120mL	60mL	120mL	60mL	60mL			
SAMPLE ANALYSIS				Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3				
Sample No.	Matrix *	Sample Date	Sample Time									
B16W84	SOIL	4-30-03	0900	X	X	X				B16W80		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.</p> <p>(1) Technetium-99; Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237</p> <p><i>Age 4/22/03</i></p>				
<i>R. Hill</i>		4-30-03 1430		<i>ERC</i>		4-30-03 1430						
<i>R. Hill</i>		4-30-03 1430		<i>R. Hill</i>		4-30-03 1430						
<i>R. Hill</i>		4-30-03 1000		<i>R. Hill</i>		4-30-03 1000						
<i>R. Hill</i>		5-2-03 1000		<i>R. Hill</i>		5-2-03 1000						
<i>R. Hill</i>		5-2-03 1000		<i>R. Hill</i>		5-2-03 1000						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p><i>Age 4/22/03</i></p>				
<i>R. Hill</i>		5-2-03 11:00		<i>FedEx</i>								
<i>R. Hill</i>		5-3-03 11:00		<i>M. Hill</i>		5-3-03 11:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		Matrix *				
								<p>S=Soil SE=Sediment SO=Solid Sl=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue Wl=Wipe L=Liquid V=Vegetation X=Other</p>				
LABORATORY SECTION		Received By		Title				Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time				

Appendix 5

Data Validation Supporting Documentation

000020

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-PW-204		DATA PACKAGE: H2195		
VALIDATOR:	LAB: LLI		DATE: 1/6/03		
CASE:			SDG: H2195		
ANALYSES PERFORMED					
SW-846 8260	8015 B	SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B16 W94					
501					

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:

LB - methylene chloride, acetone in blanks - U all
NO FR

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
alcohols - NO Surrogate - J all

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: _____

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: < 2X the limit on U.S. is - I all

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
Results 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: 13 over

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? Yes No N/A
GPC check performed? Yes No N/A
GPC check recoveries acceptable? 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: _____

Date: 12 January 2004
 To: Fluor Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
 Subject: Wet Chemistry - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2195 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 Levelnnnnn	Analysis
B16W84	4/30/03	Soil	C	See note 1 & 2

1 - Ammonia - 350.3; pH - 9045C; IC anions - 300.0; chromium VI by 7196A; cyanide - 9010B; oil & grease by 9071A; nitrate/nitrite by 353.2;

2 - Phosphate, nitrate and nitrite not validated per FHI request.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev.1, December 2000). 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/Sample Preservation**

Analytical holding times 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; 28 days for nitrate/nitrite, oil & grease, ammonia, chloride, fluoride and sulfate; 14 days for cyanide; and immediate (24 hours) for pH.

If holding times are exceeded, but not by greater than two times the limit, all

000001 *Days 3/29/04*

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".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

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

All other holding times were acceptable.

- **Method Blanks**

- Method Blanks

- Method blank analyses are performed 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. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

- All method blank results were acceptable.

- Field (Equipment) Blank

- No equipment blanks were submitted for analysis.

- **Accuracy**

- Matrix Spike and Laboratory Control Sample

- Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike and LCS recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

000002 *Dayes* 3/29/04

All matrix spike and LCS 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 35%, 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 laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. The ammonia result exceeded the TQL. Under the BHI statement of work, no qualification is required. All other results met the TQL.

- **Completeness**

Data package No. H2195 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.

000003 *Daynes*
3/29/04

MINOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than twice the limit, all cyanide results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The ammonia result exceeded the TQL. Under the BHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

000004 DAgnes 3/29/04

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with FHI 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).

000006

Appendix 2

Summary of Data Qualification

000007

WET CHEMISTRY DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cyanide pH	J	All	Holding time

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD							
Laboratory: LLI							
Case		SDG: H2195					
Sample Number		B16W84					
Remarks							
Location							
Sample Date		4/30/03					
Wet Chemistry	TQL	Result	Q	Result	Q	Result	Q
Chloride	2	1.4	U				
Fluoride	5	1.4	U				
Nitrite*	2.5	1.36	U				
Nitrate*	2.5	113					
Cyanide	0.5	0.48	UJ				
Phosphate*	5	1.4	U				
Chromium VI	0.5	0.44	U				
Sulfate	5	2.3					
Nitrate/nitrite		24.1					
Ammonia	0.5	4.8	U				
Oil & Grease		727	U				
pH**		8.4	J				
** - Units are pH units							

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.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/27/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B16W84	% Solids	91.6	%	0.01	1.0
		Chloride by IC	1.4	u MG/KG	1.4	1.0
		Fluoride by IC	1.4	u MG/KG	1.4	1.0
		Nitrite by IC	1.36	u MG/KG	1.36	1.0
		Nitrate by IC	113	MG/KG	13.6	10.0
		Cyanide, Total	0.48	u MG/KG	0.48	1.0
		Phosphate by IC	1.4	u MG/KG	1.4	1.0
		Chromium VI	0.44	u MG/KG	0.44	1.0
		Sulfate by IC	2.3	MG/KG	1.4	1.0
		Nitrate Nitrite	24.1	MG/KG	1.1	5.0
		Ammonia, as N	4.8	u MG/KG	4.8	1.0
		Oil & Grease Gravimetri	727	u MG/KG	727	1.0
		pH	8.4	SOIL PH	0.01	1.0
-002	B16W85	% Solids	93.1	%	0.01	1.0
		Chloride by IC	1.3	u MG/KG	1.3	1.0
		Fluoride by IC	1.3	u MG/KG	1.3	1.0
		Nitrite by IC	1.34	u MG/KG	1.34	1.0
		Nitrate by IC	23.3	MG/KG	1.34	1.0
		Cyanide, Total	0.40	u MG/KG	0.40	1.0
		Phosphate by IC	1.3	u MG/KG	1.3	1.0
		Chromium VI	0.43	u MG/KG	0.43	1.0
		Sulfate by IC	1.3	u MG/KG	1.3	1.0
		Nitrate Nitrite	5.6	MG/KG	0.22	1.0
		Ammonia, as N	5.3	u MG/KG	5.3	1.0
		Oil & Grease Gravimetri	716	u MG/KG	716	1.0
		pH	8.6	SOIL PH	0.01	1.0

[Handwritten signature]
 1/16/04

[Handwritten signature]
 1/16/04

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000012



Analytical Report

Client: TNU-HANFORD F03-006 H2195
LVL#: 0305L339, 0305L357, 0305L366 and 0305L372

W.O.#: 11343-606-001-9999-00
Date Received: 05-03,07,08,09-03

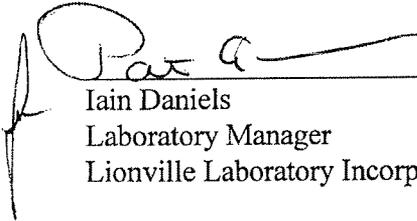
INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 solid sample and 4 soil samples.
2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. The sample holding times as required by the method and/or contract were met with the exception of Total Cyanide samples B16W84 and B16W85.
4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia and Oil and Grease were within the 20% Relative Percent Difference (RPD) control limit.
7. The matrix spike recoveries for Chloride, Fluoride, Nitrite, Nitrate, Phosphate, Sulfate, Nitrate Nitrite and Oil and Grease sample B16W84, Chromium VI and Ammonia sample B16W85 and Total Cyanide sample B16W87 were within the 75-125% control limits.
8. The replicate analyses for Percent Solids, Chloride, Fluoride, Nitrite, Nitrate, Phosphate, Sulfate, Nitrate Nitrite, Oil and Grease, pH, Chromium VI, Ammonia and Total Cyanide were within the 20% Relative Percent Difference (RPD) control limit.

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 50 pages.

10

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

06-06-03
Date

njpl05-339,357,366,372



000014

~~11~~

FH-Central Plateau Project				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						F03-006-67		Page 1 of 1				
Collector Johansen/Pope/Pfister				Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Price Code 8N		Data Turnaround 45 Days				
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling				Sampling Location 216-A-37 (C4106); (72.5'-75')				SAF No. F03-006		Air Quality <input type="checkbox"/>						
Ice Chest No. ERC-01-038				Field Logbook No. HNF-N-3361		COA 117504ES10		Method of Shipment Federal Express								
Shipped To RECLA EBERLINE SERVICES (Formerly TMA) 7/24/03				Offsite Property No. A030221				Bill of Lading/Air Bill No. SEE OSA								
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive Tie To B16W80 Special Handling and/or Storage COB 14°L 000015				Preservation		Cool 4C	Cool 4C	Cool 4C	None	None						
				Type of Container		aG	aG	aG	aG	aG						
				No. of Container(s)		1	1	1	1	1						
				Volume		120mL	60mL	120mL	60mL	60mL						
SAMPLE ANALYSIS				Chromium Hex - 7196		NO2/NO3 - 353.2		Oil & Grease - 413.1		See item (1) in Special Instructions.		Tritium - H3				
										7/24/03 4/22/03		TIED!				
Sample No.		Matrix *	Sample Date		Sample Time											
B16W84		SOIL	4-30-03		1400		X X X				B16W80					
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis. (1) Technetium-99; Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237 7/24/03 4/22/03				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				
R. Seiler		4-30-03 1430		R. Seiler		4-30-03 1430										
R. Seiler		4-30-03 1430		R. Seiler		4-30-03 1430										
R. Seiler		4-30-03 1000		R. Seiler		4-30-03 1000										
R. Seiler		5-2-03 1000		R. Seiler		5-2-03 1000										
R. Seiler		5-2-03 1000		R. Seiler		5-2-03 1000										
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time										
R. Seiler		5-3-03 11:00		FedEx		5-3-03 11:00										
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time										
R. Seiler		5-3-03 11:00		R. Seiler		5-3-03 11:00										
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time										
R. Seiler		5-3-03 11:00		R. Seiler		5-3-03 11:00										
LABORATORY SECTION		Received By		Title				Date/Time								
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time								



Custody Transfer Record/Lab Work Request Page 1 of 1

Lionville Laboratory Use Only
0305L339

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client <u>TNU-Hamford</u> <u>F03-006</u>		Refrigerator #		2										
Est. Final Proj. Sampling Date		#/Type Container	Liquid											
Project # <u>11343-606-001-9999-00</u>			Solid		10g	10g								
Project Contact/Phone #		Volume	Liquid											
Lionville Laboratory Project Manager <u>Orlette Johnson</u>			Solid		120	60								
QC <u>SPEC</u> Del <u>STD</u> TAT <u>30 days</u>		Preservatives												
Date Rec'd <u>5-3-03</u> Date Due <u>6-16-03</u>		ANALYSES REQUESTED		Lionville Laboratory Use Only										
MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)	Matrix	Date Collected	Time Collected	Lionville Laboratory Use Only							
							MS	MSD	ICR	IN3NL	IOGGR			
	001	B16W84	✓	S	4-30-03	0900			X	X	X			
	002	B16W85		L	L	1238			X	X	X			

Special Instructions: SAF # F03-006
~~From Matrix QC~~
Batch QC for L339, 357, 366, 372

- DATE/REVISIONS:
5-14-03
- Per Client Due Date: 6-16-03
 - Add Ag, As, B, Ba, Be, Bi, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se / IC: Cl, F, I, NO₃, NO₂, PO₄, SO₄
 - INH3N, IPH, 0624H, 0625X, OFCSC, OPFB
 - ODRO, OGRO, CNTD

Lionville Laboratory Use Only

Samples were:
1) Shipped or Hand Delivered _____
Airbill # 7907 6589 3774
2) Ambient or Chilled
3) Received in Good Condition or N
4) Samples Property Preserved or N
5) Received Within Holding Times or N

Tamper Resistant Seal was:
1) Present on Outer Package or N
2) Unbroken on Outer Package or N
3) Present on Sample or N
4) Unbroken on Sample or N
COC Record Present Upon Sample Rec't or N
Cooler Temp. 0.6 °C

Relinquished by	Received by	Date	Time
<u>Deed &</u>	<u>DJ Smith</u>	<u>5-3-03</u>	<u>11:00</u>

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Appendix 5

Data Validation Supporting Documentation

000017

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-pw-244		DATA PACKAGE: H2195		
VALIDATOR:	TLF	LAB:	LTI	DATE: 1/8/04	
CASE:				SDG: H2195	
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium VI	pH	NO ₃ /NO ₂
Sulfate	TDS	TKN	Phosphate	Cyanide	
SAMPLES/MATRIX					
B16 W84					
nitrate, nitrite (phosphate not validated) 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**

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: _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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: NO FB

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

Spike samples analyzed? Yes No N/A
Spike recoveries acceptable? Yes No N/A
Spike standards NIST traceable? (Levels D, E) Yes No N/A
Spike 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

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A
Comments: _____

pH 52X Tall
cyanide 52X Tall

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? Yes No N/A
Results 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: Ammonia cur

Appendix 6

Additional Documentation Requested by Client

000022

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/27/03

CLIENT: TNUHANFORD P03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LIC032-MB1	Chloride by IC	1.2	u MG/KG	1.2	1.0
		Fluoride by IC	1.2	u MG/KG	1.2	1.0
		Nitrite by IC	1.25	u MG/KG	1.25	1.0
		Nitrate by IC	1.25	u MG/KG	1.25	1.0
		Phosphate by IC	1.2	u MG/KG	1.2	1.0
		Sulfate by IC	1.2	u MG/KG	1.2	1.0
BLANK1	03LCA45-MB1	Cyanide, Total	0.50	u MG/KG	0.50	1.0
BLANK10	03LVI041-MB1	Chromium VI	0.40	u MG/KG	0.40	1.0
BLANK10	03LN3B26-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
BLANK10	03LAMA14-MB1	Ammonia, as N	5.0	u MG/KG	5.0	1.0
BLANK10	03LOG020-MB1	Oil & Grease Gravimetri	667	u MG/KG	667	1.0

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000023

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/27/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B16W84	Chloride by IC	26.9	0.40	27.3	97.0	1.0
		Fluoride by IC	27.5	0.66	27.3	98.3	1.0
		Nitrite by IC	26.6	1.36u	27.3	97.7	1.0
		Nitrate by IC	399	113	273	105.0	10.0
		Phosphate by IC	25.1	1.4 u	27.3	91.9	1.0
		Sulfate by IC	30.8	2.3	27.3	104.4	1.0
		Nitrate Nitrite	30.3	24.1	5.5	112.6*	5.0
		Oil & Grease Gravimetr	6820	727 u	7900	86.3	1.0
-002	B16W85	Soluble Chromium VI	3.7	0.43u	4.3	80.1	1.0
		Insoluble Chromium VI	1190	0.43u	1200	99.0	100
		Ammonia, as N	192	5.3 u	199	96.5	1.0
BLANK10	03LIC032-MB1	Chloride by IC	24.2	1.2 u	25.0	96.7	1.0
		Fluoride by IC	24.7	1.2 u	25.0	98.9	1.0
		Nitrite by IC	24.5	1.25u	25.0	98.1	1.0
		Nitrate by IC	24.3	1.25u	25.0	97.2	1.0
		Phosphate by IC	23.4	1.2 u	25.0	93.7	1.0
		Sulfate by IC	24.5	1.2 u	25.0	97.8	1.0
BLANK10	03LVI041-MB1	Soluble Chromium VI	3.9	0.40u	4.0	96.6	1.0
		Insoluble Chromium VI	1220	0.40u	1250	97.8	100
BLANK10	03LN3E26-MB1	Nitrate Nitrite	5.1	0.20u	5.0	102.4	1.0
BLANK10	03LAMA14-MB1	Ammonia, as N	196	5.0 u	200	98.0	1.0
		Ammonia, as N MSD	192	5.0 u	200	96.0	1.0
BLANK10	03LOG020-MB1	Oil & Grease Gravimetr	6470	667 u	7240	89.3	1.0
		Oil & Grease - Grav M	7120	667 u	7240	98.3	1.0

000024

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Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 05/27/03

CLIENT: TNUHANFORD F03-006 H2195
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	SPIKE#1	SPIKE#2	%DIFF
			%RBCOV	%RBCOV	
BLANK10	03LAMA14-MB1	Ammonia, as N	98.0	96.0	2.1
BLANK10	03LOG020-MB1	Oil & Grease - Grav	89.3	98.3	9.6

000025

17

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/27/03

CLIENT: TNUHANFORD F03-006 H2195
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REF)
			RESULT	REPLICATE RPD		
-001REP	B16W84	Chloride by IC	1.4 u	1.4 u	NC	1.0
		Fluoride by IC	1.4 u	1.4 u	NC	1.0
		Nitrite by IC	1.36u	1.36u	NC	1.0
		Nitrate by IC	113	104	7.9	10.0
		Phosphate by IC	1.4 u	1.4 u	NC	1.0
		Sulfate by IC	2.3	2.1	11.1	1.0
		Nitrate Nitrite	24.1	24.0	0.44	5.0
		Oil & Grease Gravimetri	727 u	727 u	NC	1.0
		pH	8.4	8.4	0.5	1.0
-002REP	B16W85	% Solids	93.1	92.6	0.51	1.0
		Chromium VI	0.43u	0.43u	NC	1.0
		Ammonia, as N	5.3 u	5.1 u	NC	1.0

000026

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/27/03

CLIENT: TNUHANFORD F03-006 H2195
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L339

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCSS1	03LCA45-LCS1	Cyanide, Total LCS	1.87	2.0	MG/KG	93.6
LCSS2	03LCA45-LCS2	Cyanide, Total LCS	9.66	10.0	MG/KG	96.6

10

000027



Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-006 H2195

DATE RECEIVED: 05/03/03

LVL LOT # :0305L339

CLIENT ID /ANALYSIS LVL # MTX PREP # COLLECTION EXTR/PREP ANALYSIS

B16W84

% SOLIDS	001	S	03L%S062	04/30/03	05/06/03	05/07/03
CHLORIDE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
CHLORIDE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
CHLORIDE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
FLUORIDE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
FLUORIDE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
FLUORIDE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRITE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRITE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRITE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRATE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRATE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRATE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
TOTAL CYANIDE	001	S	03LCA45	04/30/03	05/19/03	05/19/03
PHOSPHATE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
PHOSPHATE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
PHOSPHATE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
CHROMIUM VI	001	S	03LVI041	04/30/03	05/07/03	05/07/03
SULFATE BY IC	001	S	03LIC032	04/30/03	05/21/03	05/21/03
SULFATE BY IC	001 REP	S	03LIC032	04/30/03	05/21/03	05/21/03
SULFATE BY IC	001 MS	S	03LIC032	04/30/03	05/21/03	05/21/03
NITRATE NITRITE	001	S	03LN3B26	04/30/03	05/19/03	05/19/03
NITRATE NITRITE	001 REP	S	03LN3B26	04/30/03	05/19/03	05/19/03
NITRATE NITRITE	001 MS	S	03LN3B26	04/30/03	05/19/03	05/19/03
AMMONIA	001	S	03LAMA14	04/30/03	05/24/03	05/26/03
OIL & GREASE BY GRAV	001	S	03LOG020	04/30/03	05/21/03	05/22/03
OIL AND GREASE BY GR	001 REP	S	03LOG020	04/30/03	05/21/03	05/22/03
OIL AND GREASE BY GR	001 MS	S	03LOG020	04/30/03	05/21/03	05/22/03
PH	001	S	03LPH035	04/30/03	05/20/03	05/20/03
PH	001 REP	S	03LPH035	04/30/03	05/20/03	05/20/03

B16W85

% SOLIDS	002	S	03L%S062	04/30/03	05/06/03	05/07/03
% SOLIDS	002 REP	S	03L%S062	04/30/03	05/06/03	05/07/03

00 *OK*

000028

Date: 12 January 2004
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling
Subject: Radiochemistry - Data Package No. H2195



INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2195 which was prepared by Eberline Services Inc. (EB). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B16W84	4/30/03	Soil	C	See note 1

1 - Alpha spectroscopy; tritium; carbon-14; nickel-63; total strontium; technetium-99; Iodine-129; and neptunium-237.

Data validation was conducted in accordance with the FHI validation statement of work and the 200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-2000-60, Rev. 1, December 2000). 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 OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

000001

- **Laboratory (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 required detection limit (RDL), 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 minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to method blank contamination, all thorium-230 and thorium-228 results were qualified as estimates and flagged "J".

All other laboratory blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 80-120%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 and nickel-63 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

000002

- **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than +/- 35 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

No field duplicate results were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the target quantitation limits (TQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TQL.

- **Completeness**

Data package SDG No. H2195 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 method blank contamination, all thorium-230 and thorium-228 results were qualified as estimates and flagged "J". Due to the lack of a matrix spike analysis, all carbon-14 and nickel-63 results were qualified as estimates and

000003

flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2000-60, Rev. 1, *200-PW-2 Uranium-Rich Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, December 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with the FHI 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

000007

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY

SDG: H2195	REVIEWER: TLI	DATE: 1/12/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14 Nickel-63	J	All	No matrix spike
Thorium-228 Thorium-230	J	All	Blank contamination

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: FLUOR-HANFORD									
Laboratory: EB									
Case		SDG: H2195							
Sample Number		B16W84							
Remarks									
Location									
Sample Date		4/30/03							
Radiochemistry	TQL	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	175							
Carbon-14	50	-0.040	UJ						
Nickel-63	30	-0.227	UJ						
Total strontium	1	0.073	U						
Technetium-99	15	0.307	U						
Thorium-228		0.476	J						
Thorium-230		0.804	J						
Thorium-232	1	0.219	U						
Neptunium-237	1	0	U						
Iodine-129	2	-0.084	U						

000010

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.

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2195

7508-001

B16W84

DATA SHEET

SDG <u>7508</u>	Client/Case no <u>Hanford</u>	SDG <u>H2195</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R305021-01</u>	Client sample id <u>B16W84</u>	
Dept sample id <u>7508-001</u>	Location/Matrix <u>216-A-37 (C4106)</u>	<u>SOLID</u>
Received <u>05/05/03</u>	Collected/Weight <u>04/30/03 09:00</u>	<u>132.3 g</u>
% solids <u>91.0</u>	Custody/SAF No <u>F03-006-67</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	175	1.8	0.26	400		H
Carbon 14	14762-75-5	-0.040	J 1.7	2.9	50	U	C
Nickel 63	13981-37-8	-0.227	J 1.5	2.5	30	U	NI_L
Total Strontium	SR-RAD	0.073	0.17	0.33	1.0	U	SR
Technetium 99	14133-76-7	0.307	0.35	0.64	15	U	TC
Thorium 228	14274-82-9	0.476	J 0.30	0.35		B	TH
Thorium 230	14269-63-7	0.804	J 0.37	0.28	1.0	B	TH
Thorium 232	TH-232	0.219	0.15	0.28	1.0	U	TH
Neptunium 237	13994-20-2	0	0.066	0.099	1.0	U	NP
Iodine 129	15046-84-1	-0.084	0.56	1.3	2.0	U	I

200-PW-2/200-PW-4 OU-Borehole Soil

Handwritten signature
1/15/04

000011

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/25/03</u>

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2195 was composed of five solid (soil) samples designated under SAF No. F03-006 with a Project Designations of: 200-PW-2/200-PW-4 OU – Borehole Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.6 Iodine-129 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Thorium Analyses

There was Th-228 and Th-230 activity in the method blank. The Th-230 (1.05 pCi/g) activity was slightly above the RDL (1.0 pCi/g) and the Th-228 (0.672 pCi/g) activity was below the RDL (1.0 pCi/g) for thorium. The method blank is currently being recounted. There is Th activity in the client samples. No other problems were encountered during the course of the analyses.

2.8 Neptunium-237 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

6/25/13
Date

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					F03-006-67		Page 1 of 1			
Collector Johansen/Pope/Pfister		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Price Code 8N		Data Turnaround 45 Days		
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 216-A-37 (C4106); (72.5'-75') SDA H2195(7508)			SAF No. F03-006		Air Quality <input type="checkbox"/>					
Ice Chest No. ERC 99-010		Field Logbook No. HNF-N-3361		COA 117504ES10		Method of Shipment Federal Express						
Shipped To EBERLINE SERVICES (Formerly TMA)		Offsite Property No. R030 249			Bill of Lading/Air Bill No. SFEOSR							
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive Tie To B16W84 Special Handling and/or Storage None				Preservation		Cool 4C	Cool 4C	Cool 4C	None	None		
				Type of Container		aG	aG	aG	aG	aG		
				No. of Container(s)		1	1	1	1	1		
				Volume		120mL	60mL	120mL	60mL	60mL		
SAMPLE ANALYSIS				Chromium Hex - 7196	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (1) in Special Instructions.	Tritium - H3				
Sample No.	Matrix *	Sample Date	Sample Time									
B16W84	SOIL	4-30-03	0900				X	X		Tie To: B16W84		
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon-14. ** The laboratory is to report both kerosene and diesel range compounds from WTPHD analysis. ASL</p> <p>(1) Technetium-99; Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237</p>				
Monahan		4-30-03 1430		R. Feiler		4-30-03 1430						
R. Feiler		4-30-03 1000		I-B		4-30-03 3728						
I-B		4-30-03 1000		R. Feiler		5-2-03 3728						
R. Feiler		5-2-03 1000		Fed Ex		5-2-03 3728						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>S=Soil SE=Sediment SO=Solid SI=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other</p>				
Fed Ex		5-2-03 1000		Trent		5-5-03 1000						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time						
LABORATORY SECTION		Received By		Title				Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time				

000015

Appendix 5

Data Validation Supporting Documentation

APPENDIX A
RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-PW-214		DATA PACKAGE:	H2195	
VALIDATOR:	TLF	LAB:	EB	DATE:	1/8/05
CASE:			SDG:	H2195	
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	I-129
Total Uranium	Radium-22	Thorium	C-14	Ni-63	
SAMPLES/MATRIX					
B16W84					
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

Appendix A – Radiochemical Data Validation Checklist

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: _____ No FB

Thorium - 228 + 230 - in EB J all

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

Appendix A – Radiochemical Data Validation Checklist

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: NO 24 MS - J all
IC 9/11/12/13
NIC

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: _____

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: _____

Appendix 6

Additional Documentation Requested by Client

000023

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2195

7508-007

Method Blank

METHOD BLANK

SDG <u>7508</u>	Client/Case no <u>Hanford</u>	SDG <u>H2195</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R305021-07</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7508-007</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-006</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.077	0.17	0.28	400	U	H
Carbon 14	14762-75-5	1.37	1.9	3.1	50	U	C
Nickel 63	13981-37-8	-0.966	1.3	2.2	30	U	NI_L
Total Strontium	SR-RAD	-0.091	0.15	0.33	1.0	U	SR
Technetium 99	14133-76-7	0.108	0.30	0.58	15	U	TC
Thorium 228	14274-82-9	<u>0.672</u>	0.39	0.37			TH
Thorium 230	14269-63-7	<u>1.05</u>	0.49	0.37	1.0		TH
Thorium 232	TH-232	0	0.096	0.37	1.0	U	TH
Neptunium 237	13994-20-2	0	0.080	0.12	1.0	U	NP
Iodine 129	15046-84-1	0.164	0.26	0.58	2.0	U	I

200-PW-2/200-PW-4 OU-Borehole Soil

QC-BLANK #44725

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/25/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2195

7508-006

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7508</u>	Client/Case no <u>Hanford</u>	<u>SDG H2195</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R305021-06</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7508-006</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-006</u>	

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
Tritium	13.3	0.43	0.27	400		H	13.8	0.55	96	84-116	80-120
Carbon 14	1830	19	4.5	50		C	1980	79	92	85-115	80-120
Nickel 63	257	4.5	2.1	30		NI_L	274	11	94	84-116	80-120
Total Strontium	23.2	1.1	0.35	1.0		SR	22.1	0.88	105	82-118	80-120
Technetium 99	131	2.7	0.65	15		TC	120	4.8	109	82-118	80-120
Thorium 230	43.4	4.5	0.30	1.0	B	TH	44.8	1.8	97	82-118	80-120
Neptunium 237	18.6	1.8	0.11	1.0		NP	21.8	0.87	85	85-115	80-120
Iodine 129	138	0.92	1.0	2.0		I	127	5.1	109	83-117	80-120

200-PW-2/200-PW-4 OU-Borehole Soil

QC-LCS #44724

LAB CONTROL SAMPLES

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SUMMARY DATA SECTION

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>06/25/03</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2195

7508-008

B16W87

DUPLICATE

SDG <u>7508</u>	Client/Case no <u>Hanford</u>	<u>SDG H2195</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R305021-08</u>	Lab sample id <u>R305021-04</u>	Client sample id <u>B16W87</u>
Dept sample id <u>7508-008</u>	Dept sample id <u>7508-004</u>	Location/Matrix <u>216-A-37 (C4106)</u>
	Received <u>05/08/03</u>	<u>SOLID</u>
% solids <u>97.6</u>	% solids <u>97.6</u>	Collected/Weight <u>05/06/03 09:45 178.8 g</u>
		Custody/SAF No <u>F03-006-70</u> <u>F03-006</u>

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 PROT TOT LIMIT
Tritium	86.7	0.88	0.18	400		H	79.6	0.80	0.17		9	21
Carbon 14	1.00	1.8	3.0	50	U	C	0.420	1.7	2.9	U	-	
Nickel 63	-0.501	1.4	2.4	30	U	NI_L	-0.472	1.5	2.6	U	-	
Total Strontium	0.050	0.20	0.39	1.0	U	SR	0.091	0.16	0.31	U	-	
Technetium 99	0.042	0.19	0.52	15	U	TC	0.135	0.32	0.60	U	-	
Thorium 228	0.609	0.35	0.33		B	TH	0.701	0.37	0.28	B	14	117
Thorium 230	0.869	0.44	0.33	1.0	B	TH	1.33	0.46	0.35	B	42	88
Thorium 232	0.652	0.35	0.33	1.0	U	TH	0.442	0.22	0.28		38	114
Neptunium 237	0	0.089	0.13	1.0	U	NP	0	0.075	0.11	U	-	
Iodine 129	0.022	0.62	1.4	2.0	U	I	-0.355	0.75	1.7	U	-	

200-PW-2/200-PW-4 OU-Borehole Soil

QC-DUP#4 44726

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>06/25/03</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2195

7508-009

B16W87

MATRIX SPIKE

SDG <u>7508</u>	Client/Case no <u>Hanford</u>	<u>SDG H2195</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R305021-09</u>	Lab sample id <u>R305021-04</u>	Client sample id <u>B16W87</u>
Dept sample id <u>7508-009</u>	Dept sample id <u>7508-004</u>	Location/Matrix <u>216-A-37 (C4106)</u>
	Received <u>05/08/03</u>	<u>SOLID</u>
% solids <u>97.6</u>	% solids <u>97.6</u>	Collected/Weight <u>05/06/03 09:45 178.8 g</u>
		Custody/SAF No <u>F03-006-70</u> <u>F03-006</u>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS	PROTOCOL LIMITS
Tritium	125	1.3	0.25	400	X	H	54.1	2.2	79.6	0.80	84	58-142	60-140

200-PW-2/200-PW-4 OU-Borehole Soil

QC-MS#4 44727

MATRIX SPIKES

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SUMMARY DATA SECTION

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>06/25/03</u>

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