0062371

VALIDATION REPORT

SAF NUMBER F03-006

SDG NUMBER H2242

_____ DRAFT

X FINAL

RECEIVED
AUG 10 2004
EDMC

ORP-114
(02/02)

ORP - REVIEW COMMENT RECORD (RCR)

H2242(WRT)

1. Date	2. Review No.
Dec 9, 2003	N/A
3. Project No. 200-PW-2 & 4	4. Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Data Package SDG H2242	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
Organization Manager (optional)	WC Thackaberry Reviewer/Point of Contact 1-28-04 Date Requester	WC Thackaberry Reviewer/Point of Contact 1-28-04 Date 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	ICP and Mercury Analysis - pgs 25-28, The validator failed to circle N/A in numerous places where it should have been circled.		N/A's circled	✓
2	ICP and Mercury Analysis, Pages 10-28, please discourage the validator from submitting reduced size data sheets.		Will be enlarged to fullsize	✓
3	ICP and Mercury Analysis, pages 10 & 11 not legible		" " " " "	✓
4	Inorganic Analysis - This package lacks the chain of custody sheets for samples B17116 & B17123		COCs added	✓
5	Inorganic Analysis - pages 9-33, please discourage the validator from submitting reduced size data sheets.		Will be enlarged	✓
6	Inorganic Analysis - 9-20 Can't read the Lionville data sheets.		" " "	✓
7	Inorganic Analysis - Pg 27-33, The validator failed to circle N/A in numerous places where it should have been circled.		N/A's circled	✓
8	General Organic Analysis - pgs 52-56, The validator failed to circle N/A in numerous places where it should have been circled.		N/A's circled	✓
9	General Organic Analysis - pgs 10-56, please discourage the validator from submitting reduced size data sheets.		Will be enlarged	✓
10	General Organic Analysis - pg 53, Accuracy section of of the checklist requires yes or no answers for several questions. The validator failed to answer them.		Checklist completed	✓

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ORP - REVIEW COMMENT RECORD (RCR) (continued)

1. Date	2. Review No.
Dec 9, 2003	N/A
3. Project No.	4. Page 2 of 2
200-PW-2 & 4	

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
11	Radio Chemistry - pgs 11-31, please discourage the validator from submitting reduced size data sheets.		Attachments will be enlarged	✓
12	Semivolatile Analysis - pg 33, validator failed to answer the checklist question "Results reported for all requested analysis?"		Checklist completed	✓
13	Semivolatile Analysis - pgs 30-33, The validator failed to circle N/A in numerous places where it should have been circled.		N/As circled	✓
14	Semivolatile Analysis - pgs 10-33, please discourage the validator from submitting reduced size data sheets.		Attachments will be enlarged	✓
15	Volatile Analysis - pgs 10-29, please discourage the validator from submitting reduced size data sheets.		" " " "	✓
16	Volatile Analysis - pgs 24 & 25, These pages appear to be duplicates.		Duplicate removed	✓
17	Volatile Analysis - pgs 26 & 27, These pages are the same checklist items however, they present conflicting answers. It appears that one may belong with different batch. Pg 26 appears to apply to a level D or E validation.		Accepted. Stray page removed.	✓
18	Volatile Analysis, pgs 24-28, validator failed to circle N/A in numerous places where it should have been circled.		N/As circled	✓
19	Volatile Analysis, page A-3 of the validation checklist (covering precision, system performance and hold times) is missing.		Checklist completed	✓

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ORP - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
January 9, 2004	N/A
3. Project No. 200-PW-2	4. Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Data Package H2242	Groundwater Protection Program/200-PW-2	Doris Ayres	EIS Sample Management	A0-21 373-5582

17. Comment Submittal Approval	10. Agreement with indicated comment disposition(s)	11. CLOSED
Organization Manager (optional)	Doris E. Ayres 1/28/04 Reviewer/Point of Contact; Date; Requestor	Doris E. Ayres 1/28/04 Reviewer/Point of Contact; Date; 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	Volatiles - In the "Field Duplicate" you indicate that no field duplicate samples were taken. However, in the Radiochemistry validation you say that there are field duplicates. I would assume that some sort of statement should be made in the Volatiles section that identifies the filed duplicate samples.		Accepted. Discussion of field duplicate sample B17123 will be added	✓
2	Semi-Volatiles - In the "Field Duplicate" you indicate that no field duplicate samples were taken. However, in the Radiochemistry validation you say that there are field duplicates. I would assume that some sort of statement should be made in the Semi-Volatiles section that identifies the filed duplicate samples.		Same as item 1	✓
3	General Organics - In the "Field Duplicate" you indicate that no field duplicate samples were taken. However, in the Radiochemistry validation you say that there are field duplicates. I would assume that some sort of statement should be made in the General Organics section that identifies the filed duplicate samples.		Same as item 1	✓
4	General Organics - Page 8 the sample listed for the GRO is not in agreement with page 10 in the annotated data section of the report.		Accepted. GRO results were not flagged	✓
5	Inorganics - In the "Field Duplicate" you indicate that no field duplicate samples were taken. However, in the Radiochemistry validation you say that there are field duplicates. I would assume that some sort of statement should be made in the Inorganics section that identifies the filed duplicate samples.		Same as item 1	✓

ORP-114 (02/02)

ORP - REVIEW COMMENT RECORD (RCR) (continued)

1. Date	2. Review No.
January 9, 2004	N/A
3. Project No. 200-PW-2	4. Page 2 of 2

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
6	Inorganics - Page 7; This page is inconsistent with other sections. Please correct this page to read: Appendix 2/Summary of Data Qualifiers. Create a page 7A that states that "No data was qualified"		Accepted	✓
7	Metals - In the "Field Duplicate" you indicate that no field duplicate samples were taken. However, in the Radiochemistry validation you say that there are field duplicates. I would assume that some sort of statement should be made in the Metals section that identifies the filed duplicate samples.		Accepted. Field duplicate sample B17123 will be discussed.	✓
8	Radiochemistry - Laboratory QC sheets need to be included.		Rejected. This will be addressed in future validation reports.	✓

JAN 2004
RECEIVED

Date: 11/18/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: Semi-volatile Analysis-Data Package SDG H2242

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2242 prepared by Lionville Laboratory, Inc. (LLI) for Semi Volatile (SVOA) analysis by Method 8270C. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B17115	5/20/03	Soil	C	8270C
B17116	5/27/03	Soil	C	8270C
B17123	5/27/03	Soil	C	8270C
B17124	5/20/03	Soil	C	8270C

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis BHI-01435 and Sampling and Analysis Plan, DOE/RL-2000-60, REV1, Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualifiers
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 the Client – not apply

DATA QUALITY OBJECTIVES

No Chain of custody seals were present of H2242 semi-volatile samples. Chain of custody forms were present.

- **Holding Times**

Analytical holding times for SVOAs is 14 days to extraction, 40 days to analysis.

All holding times were met except the extraction holding time for samples B17124 and B17115, which were extracted 15 days after collection. Validation criteria indicate that if hold times are less than or equal to two times the required time, samples are flagged with UJ and J.

- **Method Blanks**

  At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water was processed through each set of the sample preparation and analysis procedure. Laboratory blanks must be ≤ 3 times the DL.

  All method blanks fell within acceptable limits.

- **Field Blanks**

  No field blanks were submitted for analysis.

- **Accuracy**

  Surrogates

  Each sample is spiked with the appropriate surrogate compounds as listed in the table below:

Compound	Soil Recovery Limits
Nitrobenzene-d5	23-120%
2-Fluorobiphenyl	30-115%
Terphenyl-d14	18-137
Phenol-d6	24-113
2-Fluorophenol	25-121
2,4,6-Tribromophenol	19-122

  All surrogate recoveries were within required limit except for samples B17124 and B17123, where the surrogates were diluted out, so therefore these samples will be qualified with a "UJ" and "J".

- **Matrix Spikes**

  Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 50-150%. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no qualification is required.

  The matrix spikes for samples B17123 and B17116 did not meet there criteria. Therefore the samples must be qualified with a "UJ" for 4-chloro-3-methyl phenol and 4-nitrophenol.

- **Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)**

  LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 50-150%.

  All LCS/BSS met the acceptance criteria.

- **Precision**

  Matrix Spike/Spike Duplicate Samples

  Matrix spike duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq$ 35% for non-aqueous samples.

  MS/MSD RPDs for all except two spike compounds were diluted out. This is associated with samples B17124 and B17115. No flags were added based on the validation criteria.

  Field Duplicate Samples

  Sample B17123 was a duplicate of sample B17116. However, the laboratory decided that B17123 needed to be diluted to cope with high analyte levels; B17116 was not diluted. The results obtained for TBP on the two samples were 59,000 ug/kg and 180,000 ug/kg, yielding an RPD of 50.6%. This does not meet the 35% limit for soils. The field duplicate criteria were met for all other compounds. No flags were applied in connection with field duplicate criteria.

- **Analytical Detection Limits**

  Reported analytical detection limits were compared against the requirements of the sampling and analysis plan, DOE/RL-2000-60, Rev. 1. The plan requires that phenol and tributyl phosphate be analyzed with quantitation limits of 330 ug/kg and 3300 ug/kg, respectively, in soils. If high radiation or chemical interference is present, these requirements are relaxed to 3300 ug/kg and 5000 ug/kg, respectively.

  Tributyl phosphate was detected in all samples, so detection limits for it are not a concern. However, phenol was not detected, and detection limits exceeded the requirements. For samples B17115 and B17116, the limit was exceeded only moderately; these samples were reported as <380 ug/kg and <360 ug/kg, respectively.

The data package narrative says that "samples B17124 and B17123 required a 100-fold dilution due to high levels of target compounds." Phenol was reported in sample B17123 as <36,000 ug/kg and in B17124 as <38,000 ug/kg. These detection levels are well above the limit for samples with interferences.

In accordance with the data validation procedure, no flags were applied to the results for these exceedances.

- **Completeness**

The data package for SDG: H2242 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid. The completeness percentage was 100%

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

All holding times were met except the extraction holding time for samples B17124 and B17115, which were extracted 15 days after collection. Validation criteria indicate that if hold times are less than or equal to two times the required time, samples are flagged with "UJ" and "J".

All surrogate recoveries were within required limit except for samples B17124 and B17123, where the surrogates were diluted out, so therefore these samples will be qualified with "UJ" and "J".

The matrix spikes for samples B17123 and B17116 did not meet this criteria. Therefore the samples must be qualified with a "UJ" for 4-chloro-3-methyl phenol and 4-nitrophenol.

REFERENCES

BHI-01435, Rev 0, Validation Procedure for Chemical Analysis.

DOE-RL2000-60, Rev. 1, Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Pan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI 01435 and DOE/RL-2000-60.

U - Indicates the compound or analysis 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 concentration is an estimate, but the data was usable for decision making purposes.

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

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to 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 a major QC deficiency.

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

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

Appendix 2

Summary of Data Qualifiers

SDG: H2242	REVIEWER: KAB	DATE: 11/25/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B17124 and B17115	UJ and J	All	Holding time RPD
B17123 and B17116	UJ	4-chloro-3-methyl phenol 4-nitrophenol	Matrix spike
B17124 and B17123	UJ and J	All	Surrogates diluted out

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Report Date: 07/10/03 11:51

	Cust ID:	B17124	B17124	B17124	B17115	SBLKUV	SBLKUV BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	03LE0678-MB1	03LE0678-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	100	100	100	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	0 D %	0 D %	0 D %	67 %	73 %	79 %
	2-Fluorobiphenyl	0 D %	0 D %	0 D %	70 %	71 %	79 %
	Terphenyl-d14	0 D %	0 D %	0 D %	84 %	92 %	90 %
	Phenol-d5	0 D %	0 D %	77 %	60 %	73 %	79 %
	2-Fluorophenol	0 D %	0 D %	0 D %	53 %	64 %	72 %
	2,4,6-Tribromophenol	0 D %	0 D %	0 D %	78 %	64 %	83 %
		fl	fl	fl	fl	fl	fl
Phenol		38000 U UJ	75 %	80 %	380 U UJ	330 U	77 %
bis(2-Chloroethyl)ether		38000 U	38000 U	38000 U	380 U	330 U	330 U
2-Chlorophenol		38000 U	80 %	80 %	380 U	330 U	71 %
1,3-Dichlorobenzene		38000 U	38000 U	38000 U	380 U	330 U	330 U
1,4-Dichlorobenzene		38000 U	0 D %	0 D %	380 U	330 U	74 %
1,2-Dichlorobenzene		38000 U	38000 U	38000 U	380 U	330 U	330 U
2-Methylphenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		38000 U	38000 U	38000 U	380 U	330 U	330 U
3- and/or 4-Methylphenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
N-Nitroso-di-n-propylamine		38000 U	0 D %	0 D %	380 U	330 U	76 %
Hexachloroethane		38000 U	38000 U	38000 U	380 U	330 U	330 U
Nitrobenzene		38000 U	38000 U	38000 U	380 U	330 U	330 U
Isophorone		38000 U	38000 U	38000 U	380 U	330 U	330 U
2-Nitrophenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
2,4-Dimethylphenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
bis(2-Chloroethoxy)methane		38000 U	38000 U	38000 U	380 U	330 U	330 U
2,4-Dichlorophenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
1,2,4-Trichlorobenzene		38000 U	0 D %	0 D %	380 U	330 U	77 %
Naphthalene		38000 U	38000 U	38000 U	380 U	330 U	330 U
4-Chloroaniline		38000 U	38000 U	38000 U	380 U	330 U	330 U
Hexachlorobutadiene		38000 U	38000 U	38000 U	380 U	330 U	330 U
4-Chloro-3-methylphenol		38000 U	0 D %	0 D %	380 U	330 U	73 %
2-Methylnaphthalene		38000 U	38000 U	38000 U	380 U	330 U	330 U
Hexachlorocyclopentadiene		38000 U	38000 U	38000 U	380 U	330 U	330 U
2,4,6-Trichlorophenol		38000 U	38000 U	38000 U	380 U	330 U	330 U
2,4,5-Trichlorophenol		96000 U	96000 U	96000 U	940 U	840 U	840 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1b

Cust ID:	B17124	B17124	B17124	B17115	SBLKUV	SBLKUV BS
RFW#:	001	001 MS	001 MSD	002	03LE0678-MB1	03LE0678-MB1
2-Chloronaphthalene	38000 U UJ	38000 U	38000 U	380 U UJ	330 U	330 U
2-Nitroaniline	96000 U	96000 U	96000 U	940 U	840 U	840 U
Dimethylphthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
Acenaphthylene	38000 U	38000 U	38000 U	380 U	330 U	330 U
2,6-Dinitrotoluene	38000 U	38000 U	38000 U	380 U	330 U	330 U
3-Nitroaniline	96000 U	96000 U	96000 U	940 U	840 U	840 U
Acenaphthene	38000 U	0 D %	0 D %	380 U	330 U	76 %
2,4-Dinitrophenol	96000 U	96000 U	96000 U	940 U	840 U	840 U
4-Nitrophenol	96000 U	0 D %	0 D %	940 U	840 U	91 %
Dibenzofuran	38000 U	38000 U	38000 U	380 U	330 U	330 U
2,4-Dinitrotoluene	38000 U	0 D %	0 D %	380 U	330 U	89 %
Diethylphthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
4-Chlorophenyl-phenylether	38000 U	38000 U	38000 U	380 U	330 U	330 U
Fluorene	38000 U	38000 U	38000 U	380 U	330 U	330 U
4-Nitroaniline	96000 U	96000 U	96000 U	940 U	840 U	840 U
4,6-Dinitro-2-methylphenol	96000 U	96000 U	96000 U	940 U	840 U	840 U
N-Nitrosodiphenylamine (1)	38000 U	38000 U	38000 U	380 U	330 U	330 U
4-Bromophenyl-phenylether	38000 U	38000 U	38000 U	380 U	330 U	330 U
Hexachlorobenzene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Pentachlorophenol	96000 U	0 D %	0 D %	940 U	840 U	94 %
Phenanthrene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Anthracene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Carbazole	38000 U	38000 U	38000 U	380 U	330 U	330 U
Di-n-butylphthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
Fluoranthene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Pyrene	38000 U	0 D %	0 D %	380 U	330 U	84 %
Butylbenzylphthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
3,3'-Dichlorobenzidine	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzo(a)anthracene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Chrysene	38000 U	38000 U	38000 U	380 U	330 U	330 U
bis(2-Ethylhexyl)phthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
Di-n-octyl phthalate	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzo(b)fluoranthene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzo(k)fluoranthene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzo(a)pyrene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Indeno(1,2,3-cd)pyrene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Dibenz(a,h)anthracene	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzo(g,h,i)perylene	38000 U	38000 U	38000 U	380 U	330 U	330 U
2-Butoxyethanol	38000 U	38000 U	38000 U	380 U	330 U	330 U
Benzyl alcohol	38000 U	38000 U	38000 U	380 U	330 U	330 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1c

Cust ID:	B17124	B17124	B17124	B17115	SBLKUV	SBLKUV BS
RFW#:	001	001 MS	001 MSD	002	03LE0678-MB1	03LE0678-MB1
Tributylphosphate	290000 J	1700000 E	1600000 E	140 J	330 U	330 U

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

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Report Date: 07/10/03 11:51 Page: 2a

	Cust ID:	B17116	B17116	B17123	B17116	B17116
Sample Information	RFW#:	533-001	533-001 DL	533-002	533-001 MS	533-001 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	50.0	100	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	65 %	0 D %	0 D %	69 %	71 %
	2-Fluorobiphenyl	68 %	69 %	0 D %	71 %	78 %
	Terphenyl-d14	79 %	77 %	0 D %	86 %	95 %
	Phenol-d5	75 %	56 %	0 D %	83 %	87 %
	2-Fluorophenol	63 %	52 %	0 D %	65 %	68 %
	2,4,6-Tribromophenol	68 %	0 D %	0 D %	64 %	80 %
		fl	fl	fl	fl	fl fl
Phenol		360 U	18000 U	36000 U	81 %	85 %
bis(2-Chloroethyl)ether		360 U	18000 U	36000 U	360 U	360 U
2-Chlorophenol		360 U	18000 U	36000 U	66 %	68 %
1,3-Dichlorobenzene		360 U	18000 U	36000 U	360 U	360 U
1,4-Dichlorobenzene		360 U	18000 U	36000 U	66 %	66 %
1,2-Dichlorobenzene		360 U	18000 U	36000 U	360 U	360 U
2-Methylphenol		360 U	18000 U	36000 U	360 U	360 U
2,2'-oxybis(1-Chloropropane)		360 U	18000 U	36000 U	360 U	360 U
3- and/or 4-Methylphenol		360 U	18000 U	36000 U	360 U	360 U
N-Nitroso-di-n-propylamine		360 U	18000 U	36000 U	66 %	66 %
Hexachloroethane		360 U	18000 U	36000 U	360 U	360 U
Nitrobenzene		360 U	18000 U	36000 U	360 U	360 U
Isophorone		360 U	18000 U	36000 U	360 U	360 U
2-Nitrophenol		360 U	18000 U	36000 U	360 U	360 U
2,4-Dimethylphenol		360 U	18000 U	36000 U	360 U	360 U
bis(2-Chloroethoxy)methane		360 U	18000 U	36000 U	360 U	360 U
2,4-Dichlorophenol		360 U	18000 U	36000 U	360 U	360 U
1,2,4-Trichlorobenzene		360 U	18000 U	36000 U	69 %	69 %
Naphthalene		360 U	18000 U	36000 U	360 U	360 U
4-Chloroaniline		360 U	18000 U	36000 U	360 U	360 U
Hexachlorobutadiene		360 U	18000 U	36000 U	360 U	360 U
4-Chloro-3-methylphenol		360 U	18000 U	36000 U	10 * %	6 * %
2-Methylnaphthalene		360 U	18000 U	36000 U	190 J	110 J
Hexachlorocyclopentadiene		360 U	18000 U	36000 U	360 U	360 U
2,4,6-Trichlorophenol		360 U	18000 U	36000 U	360 U	360 U
2,4,5-Trichlorophenol		900 U	45000 U	90000 U	900 U	900 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 2b

Cust ID:	B17116		B17116		B17123		B17116		B17116	
RFW#:	533-001		533-001 DL		533-002		533-001 MS		533-001 MSD	
2-Chloronaphthalene	360	U	18000	U	36000	U J	360	U	360	U
2-Nitroaniline	900	U	45000	U	90000	U	900	U	900	U
Dimethylphthalate	360	U	18000	U	36000	U	360	U	360	U
Acenaphthylene	360	U	18000	U	36000	U	360	U	360	U
2,6-Dinitrotoluene	360	U	18000	U	36000	U	360	U	360	U
3-Nitroaniline	900	U	45000	U	90000	U	900	U	900	U
Acenaphthene	360	U	18000	U	36000	U	75	%	78	%
2,4-Dinitrophenol	900	U	45000	U	90000	U	900	U	900	U
4-Nitrophenol	900	U J	45000	U J	90000	U	3 *	%	0 *	%
Dibenzofuran	360	U	18000	U	36000	U	360	U	360	U
2,4-Dinitrotoluene	360	U	18000	U	36000	U	84	%	85	%
Diethylphthalate	360	U	18000	U	36000	U	360	U	360	U
4-Chlorophenyl-phenylether	360	U	18000	U	36000	U	360	U	360	U
Fluorene	360	U	18000	U	36000	U	360	U	360	U
4-Nitroaniline	900	U	45000	U	90000	U	900	U	900	U
4,6-Dinitro-2-methylphenol	900	U	45000	U	90000	U	900	U	900	U
N-Nitrosodiphenylamine (1)	360	U	18000	U	36000	U	360	U	360	U
4-Bromophenyl-phenylether	360	U	18000	U	36000	U	360	U	360	U
Hexachlorobenzene	360	U	18000	U	36000	U	360	U	360	U
Pentachlorophenol	20	J	45000	U	90000	U	89	%	94	%
Phenanthrene	360	U	18000	U	36000	U	360	U	360	U
Anthracene	360	U	18000	U	36000	U	360	U	360	U
Carbazole	360	U	18000	U	36000	U	360	U	360	U
Di-n-butylphthalate	360	U	18000	U	36000	U	360	U	360	U
Fluoranthene	360	U	18000	U	36000	U	360	U	360	U
Pyrene	360	U	18000	U	36000	U	78	%	81	%
Butylbenzylphthalate	360	U	18000	U	36000	U	360	U	360	U
3,3'-Dichlorobenzidine	360	U	18000	U	36000	U	360	U	360	U
Benzo(a)anthracene	360	U	18000	U	36000	U	360	U	360	U
Chrysene	360	U	18000	U	36000	U	360	U	360	U
bis(2-Ethylhexyl)phthalate	140	J	18000	U	36000	U	140	J	150	J
Di-n-octyl phthalate	360	U	18000	U	36000	U	360	U	360	U
Benzo(b)fluoranthene	360	U	18000	U	36000	U	360	U	360	U
Benzo(k)fluoranthene	360	U	18000	U	36000	U	360	U	360	U
Benzo(a)pyrene	360	U	18000	U	36000	U	360	U	360	U
Indeno(1,2,3-cd)pyrene	360	U	18000	U	36000	U	360	U	360	U
Dibenz(a,h)anthracene	360	U	18000	U	36000	U	360	U	360	U
Benzo(g,h,i)perylene	360	U	18000	U	36000	U	360	U	360	U
2-Butoxyethanol	26	J	18000	U	36000	U	360	U	360	U
Benzyl alcohol	360	U	18000	U	36000	U	360	U	360	U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 2c

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Cust ID:	B17116	B17116	B17123	B17116	B17116
RFW#:	533-001	533-001 DL	533-002	533-001 MS	533-001 MSD
Tributylphosphate	59000 E	90000 D	180000 J	65000 E	71000 E

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

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B17124

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: (soil/water) SOIL

Lab Sample ID: 0305L520-001

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D062718

Level: (low/med) LOW

Date Received: 05/29/03

% Moisture: 13 decanted: (Y/N) __

Date Extracted: 06/04/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 06/27/03

Injection Volume: 2.0(uL)

Dilution Factor: 100

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALKANE	9.792	20000	J
2.	ALKANE	11.355	90000	J
3.	ALKANE	12.830	400000	J
4.	ALKANE	14.192	300000	J
5.	ALKANE	15.467	20000	J

FORM 1 SV-TIC RFW (v3.3)

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1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B17115

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: (soil/water) SOIL

Lab Sample ID: 0305L520-002

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D061008

Level: (low/med) LOW

Date Received: 05/29/03

% Moisture: 11 decanted: (Y/N)__

Date Extracted: 06/04/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 06/10/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	2.984	600	JB
2.	ALDOL CONDENSATE	3.349	200	JAB
3.	ALDOL CONDENSATE	3.923	30000	JAB
4. 79-34-5	1,1,2,2-TETRACHLOROETHANE	5.079	80	JBN
5.	ALKANE	11.122	100	J
6.	ALKANE	12.478	100	J
7.	UNKNOWN	21.564	80	J
8.	ALKANE	22.929	80	J

FORM 1 SV-TIC RFW (v3.3)

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1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B17116

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: (soil/water) SOIL

Lab Sample ID: 0305L533-001

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D061009

Level: (low/med) LOW

Date Received: 05/30/03

% Moisture: 8 decanted: (Y/N) __

Date Extracted: 06/04/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 06/10/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: _____

Number TICs found: 10

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	3.923	30000	JA
2.	ALKANE	9.757	20000	J
3.	ALKANE	9.957	4000	J
4.	ALKANE	10.140	8000	J
5.	ALKANE	10.349	3000	J
6.	ALKANE	10.664	10000	J
7.	ALKANE	10.775	10000	J
8.	ALKANE	10.948	6000	J
9.	ALKANE	11.270	30000	J
10.	ALKANE	12.574	20000	J

FORM 1 SV-TIC RFW (v3.3)

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1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B17123

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: (soil/water) SOIL

Lab Sample ID: 0305L533-002

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D062720

Level: (low/med) LOW

Date Received: 05/30/03

% Moisture: 8 decanted: (Y/N)

Date Extracted: 06/04/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 06/27/03

Injection Volume: 2.0(uL)

Dilution Factor: 100

GPC Cleanup: (Y/N) N pH:

Number TICs found: 10

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.225	50000	JAB
2.	ALKANE	11.354	50000	J
3.	ALKANE	11.695	30000	J
4.	ALKANE	11.764	30000	J
5.	ALKANE	12.262	40000	J
6.	ALKANE	12.384	50000	J
7.	ALKANE	12.594	20000	J
8.	ALKANE	12.812	100000	J
9.	ALKANE	13.179	20000	J
10.	ALKANE	14.183	80000	J

FORM 1 SV-TIC RFW (v3.3)

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1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

SBLKUV

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: (soil/water) SOIL

Lab Sample ID: 03LE0678-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D060918

Level: (low/med) LOW

Date Received: 06/04/03

% Moisture: _____ decanted: (Y/N)__

Date Extracted: 06/04/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 06/09/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: _____

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	3.177	400	J
2.	ALDOL CONDENSATE	3.551	300	JA
3.	ALDOL CONDENSATE	4.125	20000	JA
4. 79-34-5	1,1,2,2-TETRACHLOROETHANE	5.290	70	JN

FORM 1 SV-TIC RFW (v3.3)

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD F03-006
LVL #: 0306L520 & 0306L533
SDG/SAF # H2242/ F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-29,30-2003

SEMIVOLATILE

Four (4) soil samples were collected on 05-20,27-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 06-04-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 06-09,10,27,30-2003.

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. Samples B17124 and B17123 required a 100-fold dilution due to high levels of target compounds.
5. All obtainable surrogate recoveries were within EPA QC limits.
6. Four (4) of twenty-six (26) obtainable matrix spike recoveries were outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
7. All blank spike recoveries were within EPA QC limits.
8. Internal standard area and retention time criteria were met.
9. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

07-10-03
Date

J. Michael Taylor
President
Lionville Laboratory Incorporated

som\group\data\hna\tnu-hanford-0305-520&533.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 6 pages.

03

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

(6) VOA BNA filed from ...

Lionville Laboratory Use Only: 0305L520

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI LIONVILLE LABORATORY, INC.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU Hanford F03-006

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: SPEC Del: STD TAT: 30 days

Date Rec'd: 5/29/03 Date Due: 6-28-03

		A	B	C	D	E	F	G
Refrigerator #		1	2	2	2	2	2	2
#/Type Container	Liquid							
	Solid	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL
Volume	Liquid							
	Solid	60	125	60	60	125	60	60
Preservatives								
ANALYSES REQUESTED	ORGANIC: VOA							
	ORGANIC: BNA							
	ORGANIC: Pest/PCB							
	ORGANIC: Herb							
	INORG: Metal							
	INORG: CN							
	Cr Hex							
	IC Anions							
	NO2/NO3							
	oil + Grease							
Lionville Laboratory Use Only		OGCSC 06244	06255 OPEO OPEO	MET ①		I.CR6	IAORG ①	ZNO2 ZNO3 ZO6GR

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	OGCSC 06244	06255 OPEO OPEO	MET ①	I.CR6	IAORG ①	ZNO2 ZNO3	ZO6GR
001	B17124	✓	✓	S	5/20/03	0945	1	1	1	1	1	1	1
002	B17115			⊥	⊥	0830	1		1	1		1	1

Special Instructions: SAF # F03-006
Run Matrix QC on -001
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO3, NO2, PO4, SO4
INH3N, IPH, I.CNTO

DATE/REVISIONS:
5-30-03 1. ~~Bottle~~ 06244 Add OGCSC
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/29/03	1000

Relinquished by	Received by	Date	Time

COMPOSITE WASTE

ORIGINAL REWRITTEN

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___
Airbill # 792256788451
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was: 1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 1.7 °C

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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-10 (C3247) ~~62.5-55 R~~ TMJ 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03 101	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/21/03	Offsite Property No.: A030240		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~N/A~~ TMJ 5-23-8 Radioactive TIR TO: B17131, B17132

Special Handling and/or Storage

N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix*	Sample Date	Sample Time										
~~B17115~~	~~SOIL~~	~~5/20/03~~	~~0830~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~N/A~~	52803
B17124	SOIL	5/20/03	0945	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: TMJohansen/[illegible] Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref Date/Time: 5/20/03 1317		
Relinquished By/Removed From: HO-64-427 Ref Date/Time: 5/22/03 1120	Received By/Stored In: TMJohansen [illegible] Date/Time: 5/22/03 1120		
Relinquished By/Removed From: TMJohansen [illegible] Date/Time: 5/22/03 1150	Received By/Stored In: REF 1A 3728 Date/Time: 5/22/03 1150		
Relinquished By/Removed From: REF 1A 3728 52803 0800	Received By/Stored In: SJGALE [illegible] Date/Time: 52803 0800		
Relinquished By/Removed From: SJGALE [illegible] Date/Time: 52803 0800	Received By/Stored In: FED EX Date/Time:		
Relinquished By/Removed From: FedEX Date/Time: 5/29/03 1000	Received By/Stored In: JPerry Date/Time: 5/29/03 1000		

SPECIAL INSTRUCTIONS 5/20/03

~~** The laboratory is to achieve a detection limit of 50.0 pCi/g for Carbon 44.~~ ** The laboratory is to report both *kerosene* and diesel range *compounds* from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Diethyl ether, Ethylene glycol, Methanol)
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (2-Butoxyethanol, Tributyl phosphate); TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel); Mercury - 7471 - (CV)
(4) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 = Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-~~

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

5/24/03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	Page 1 of 1
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom	Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code: 8N; Air Quality ☐
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) ~~53.5-55.8~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Data Turnaround: 45 Days
Ice Chest No.: ERC 02 010	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ ASL 5/20/03	Offsite Property No.: RSR 107187		Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ MJS 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1		1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions. N/A 52803	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions. N/A 52803	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions. ASL 52803	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17115	SOIL	5/20/03	0830	X	X	X	X	X	X	X			
~~B17124~~	~~SOIL~~	~~5/20/03~~	~~0945~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	ASL 52803		

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref	Date/Time: 5/20/03 1317
Relinquished By/Removed From: HO-64-427 Ref	Date/Time: 5/20/03 1120	Received By/Stored In: Johansen/Pope/Pfister	Date/Time: 5/20/03 1120
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1150	Received By/Stored In: REF 1A 3728	Date/Time: 5/20/03 1150
Relinquished By/Removed From: REF 1A 3728	Date/Time: 52803 0800	Received By/Stored In: SJGALE	Date/Time: 52803 0800
Relinquished By/Removed From: SJGALE	Date/Time: 52803 0800	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: Fed EX	Date/Time: 5-29-03 1000	Received By/Stored In: [signature]	Date/Time:

SPECIAL INSTRUCTIONS ASL 5/20/03
~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec. - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 = Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

Matrix *
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
ASL 5/20/03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-107	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-10 (C3247) 62.5-65 ft		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03-103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ TMJ 5-27-03 Beera	Offsite Property No.: 0030 226		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS: B17133; ~~B17134~~ TMJ 5-27-03 ~~N/A~~ Radiological Tie To: ~~B17136~~ TMJ 5-27-03 (B17116; B17123)

Special Handling and/or Storage: N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17116	SOIL	5-27-03	1030	X	X	X	X	X	X	X			
B17123	Soil	5-27-03	1030	X	X	X	X	X	X	X		TMJ 5-27-03	
~~B12 B17122~~ TMJ 5-27-03	~~Soil~~	~~5-27-03~~	~~1110~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		TMJ 5-27-03	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: FH [signature]	Date/Time: 5/27/03 1415	Received By/Stored In: ERC R.E. Cooper R.E. Hulstrom	Date/Time: 5-27-03 1415
Relinquished By/Removed From: R.E. Cooper R.E. Hulstrom	Date/Time: 1415 5-27-03	Received By/Stored In: IB 3728	Date/Time: 1415 5-27-03
Relinquished By/Removed From: R.E. Cooper R.E. Hulstrom	Date/Time: 1000 IB 5-27-03	Received By/Stored In: R.E. Cooper R.E. Hulstrom	Date/Time: 1000 5-27-03
Relinquished By/Removed From: ERC R.E. Cooper R.E. Hulstrom	Date/Time: 1000 5-27-03	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 5/30/03 0945	Received By/Stored In: JPCorry	Date/Time: 5/30/03 0945
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium~~
(6) ~~Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129~~ Nickel-63; Neptunium-237

Matrix *: S=Soil; SB=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

TMJ 5-27-03

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

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

Lionville Laboratory Use Only
0305L-533

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI Lionville Laboratory Inc.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU Hartford F03-006
Est. Final Proj. Sampling Date:
Project #: 11243-606-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: CJ
QC: SPEC Del: STD TAT: 30 days
Date Rec'd: 5/30/03 Date Due: 6-29-03

		A	B			C	D		E		F	G	H			
Refrigerator #		1	2			1	2		2		2	2	2			
#/Type Container	Liquid															
	Solid	AGL	AGL			AGL	AGL		AGL		AGL	AGL	AGL			
Volume	Liquid															
	Solid	60	125/60			60/125	60		60/125		60	125/60				
Preservatives																
ANALYSES REQUESTED		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	Metals (Cu, Ni, Zn)	Oil Grease		Metal	CN	Cr6	TC Anions	NO2/NO3			
		Lionville Laboratory Use Only														
		0624X	0625X 0D80 0520			OGCSC	IOGGR		MET ①		ICR6	INORG①	INNO2			

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	Metals	Oil Grease		Metal	CN	Cr6	TC Anions	NO2/NO3			
001	B17116			S	5/27/03	1030	1	1			1	1		1		1	1	1			
002	B17123			⊥	⊥	⊥	1	1			1	1		1		1	1	1			

Special Instructions: SAF # F03-006
Run Matrix QC
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO4, SO_4
INH_3N, IPH, ICNTO

DATE/REVISIONS:
002-C 1. Label says see special item (5). This is not a required item. No bottle was allocated for item (1) so this bottle was assigned for (1)
2.
002 B,C,E,G - Bottle size does not match size indicated on COC.
4.
5.
6.

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	5/30/03	0940

Relinquished by	Received by	Date	Time

ORIGINAL

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

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___
Airbill # See below
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

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

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FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-114	Page 2 of 2
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-10 (C3247) ~~318.5-321 ft~~ TMS 5-27-03 62.5-65'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03 103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ TMS 5-27-03 Necra	Offsite Property No.: 17030-276		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~N/A~~ Radioactive TieTO: See Below

Special Handling and/or Storage

N/A

Preservation	None	Cool 4C									
Type of Container	aG	aG									
No. of Container(s)		1									
Volume	~~mL~~	60 mL									
	Ultium - H3	See special instruction (7)									

SAMPLE ANALYSIS

TieTO:

Sample No.	Matrix *	Sample Date	Sample Time									
B17123	SOIL	5-27-03	1030		X		B17133					
B17126	Soil	5-27-03	1030		X		B17133					
~~B17122~~ 5.29.03	~~Soil~~	~~5-27-03~~	~~1110~~		~~X~~		B17134					

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	5-27-03 1415	ERC [signature]	5-27-03 1415
[signature]	5-27-03 1410	[signature]	5-27-03 1415
LB 7728	5-29-03 1000	[signature]	5-29-03 1000
ERC [signature]	5-29-03 1000	Fed Ex	
Fed Ex	5/30/03 0945	J Perry	5/30/03 0945

SPECIAL INSTRUCTIONS

** 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.

(7) VOA-8260A (TCL); VOA-8260A (Add-On) {2-Pentanone, Benzyl alcohol, n-Butylbenzene}

Matrix *

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

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

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

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

JENT: TNU Hanford

rchase Order/Project:

DATE: 5/09/03

AF# / SOW# / Release #: F03-006

aboratory SDG #: 03054520

OTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? As below	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
10. Shipment meets Lvl.1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-101 / TNR 7922 5678 8451 / 1.7°C (Sample 001)
ERC-03-100 / 839350745320 / 5.8°C (Sample 002)

Laboratory Sample Custodian: JPerry 5/09/03 1000

Laboratory Project Manager:

25

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

Purchase Order/Project:

DATE: 5/30/03

SAF# / SOW# / Release #: F03-006

Laboratory SDG #: 0305L533

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☐ Yes	☑ No	☐ N/A	☑ see Comment # 1
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? 7907 9459 8746	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☐ Yes	☑ No	☐ N/A	☑ see Comment # 2
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☐ Yes	☐ No	☑ N/A	☐ see Comment #
10. Shipment meets LvL1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-103 / 4°C

① No custody seals
② 002C Label says see item (5). This is not a requested item. No bottle was received for item (1), so this bottle was assigned to (1).
002B,C,E,G - Bottle size doesn't match client C (60 mL to a 125 mL or vice-versa)

Laboratory Sample Custodian: JKeny 5/30/03 0945

Laboratory Project Manager:

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Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: Area 200			DATA PACKAGE: H2242		
VALIDATOR: [illegible]		LAB: Leonville		DATE: 11/13/03	
CASE:			SDG: H2242		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
			X		
SAMPLES/MATRIX					
Soil					

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: _____

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: For MS and MSD recoveries for samples B17124 require qualification. However surrogates were diluted out so all data flagged with U.S. same for sample B17123 sample B17116 flagged for 4-chloro-3 methyl phenol, 4-nitrophenol due to poor MS recovery

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: TBP on B17116 was 59,000 ug/kg
TBP on B17123 was 180,000 ug/kg
yielding RPD = 50.6% 1/13/04

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: yes for All except B17124 & B17115 MM

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: _____

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: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):

JAN 2004
RECEIVED

Date: 12/12/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: Volatile Analysis, Method 8260B-Data Package SDG H2242

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2242 prepared by Lionville Laboratory, Inc. (LLI) for Volatile (VOA) analysis by Method 8260. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B17115	5/20/03	Soil	C	8260B
B17116	5/27/03	Soil	C	8260B
B17123	5/27/03	Soil	C	8260B
B17124	5/20/03	Soil	C	8260B

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis, BHI-01435, and Sampling and Analysis Plan, DOE/RL-2000-60, Rev. 1. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualifiers
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 the Client- not apply

DATA QUALITY OBJECTIVES

No chain of custody seals were used on SDG H2242 VOA samples.

- **Holding Times**

Analytical holding times for VOAs is 14 days.

All holding times were met.

- **Method Blanks**

  At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water and was processed through each set of the sample preparation and analysis procedure. Laboratory blanks must be ≤ 3 times the DL of ≤ 5 times the DL for common laboratory contaminants: methylene chloride, acetone, toluene, and 2-butanone.

  All method blanks fell within acceptable limits.

- **Field Blanks**

  No field blanks were submitted for analysis.

- **Accuracy**

  Surrogates

  Each sample is spiked with the appropriate surrogate compounds: Toluene-d8, 1,2-Dichloroethane-d4, and Bromofluorobenzene.

  All surrogate recoveries were within the laboratory required limit per the case narrative, except for sample B17123, which had high recovery limits for Bromofluorobenzene of 126% (sample) and 133% (MS). However, the MSD percent recovery for Bromofluorobenzene is within limits. The surrogate recovery is above the limit and the sample results for the nonpolar compounds are <RDL, therefore, no qualification is necessary.

  Matrix Spikes

  Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 50-150% which are the validation limits and within the laboratory limits.

  All MS and MSD % recoveries were within criteria.

  Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)

  LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 50-150% which are the validation limits and within the laboratory limits.

  All LCS/BSS met the acceptance criteria.

- **Precision**

  Matrix Spike Duplicate Samples

  Matrix Spike duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq$ 35% for non-aqueous samples per BHI-01435.

  All matrix spike duplicates met the acceptance criteria.

  Field Duplicate Samples

  Sample B17123 was a duplicate of sample B17116. Acetone was reported as 140 µg/kg in B17116 and as 35 µ/kg in B17123. Since one of these is less than 5 times the RDL of 20 ug/kg, the difference between results is compared to the RDL. The difference is more than two times the RDL, which fails the criteria for field duplicate. No flags were applied for field duplicate criteria.

- **Analytical Detection Limits**

  Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev. 1.

  The method blanks reporting limits met criteria. The sample reporting limits were slightly above those listed in the SAP (e.g. 6 ug/kg instead of 5 ug/kg). However, in all cases except carbon tetrachloride, the reporting limits were below the preliminary action levels, thus there is no impact on the usability of the data.

- **Completeness**

  The data package for SDG: H2242 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid.

  The completeness percentage was 100% for the analytes reported. Note that the SAP requested n-butanol which was analyzed by method 8015.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI-01435. Rev 0, Validation Procedure for Chemical Analysis

DOE-RL2000-60, Rev. 1, 4-24-03, Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Pan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI 01435 and DOE/RL-2000-60.

U - Indicates the compound or analysis 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 concentration is an estimate, but the data was usable for decision making purposes.

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

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to 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 a major QC deficiency.

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

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

Appendix 2

Summary of Data Qualifiers

No data was qualified.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List
Report Date: 06/20/03 12:09

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1a

	Cust ID:	B17124		B17124		B17124		B17115		VBLKTL		VBLKTL BS	
Sample Information	RFW#:	001		001 MS		001 MSD		002		03LVX166-MB1		03LVX166-MB1	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.14		1.02		1.04		1.11		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Toluene-d8	97	%	103	%	104	%	100	%	99	%	94	%
	Bromofluorobenzene	74	%	88	%	91	%	90	%	93	%	95	%
	1,2-Dichloroethane-d4	98	%	109	%	106	%	90	%	92	%	97	%
			fl		fl		fl		fl		fl		fl
Chloromethane		13	U	12	U	12	U	13	U	10	U	10	U
Bromomethane		13	U	12	U	12	U	13	U	10	U	10	U
Vinyl Chloride		13	U	12	U	12	U	13	U	10	U	10	U
Chloroethane		13	U	12	U	12	U	13	U	10	U	10	U
Methylene Chloride		23		38		27		20		5	U	4	J
Acetone		22		31		20		13	U	10	U	10	U
Carbon Disulfide		6	U	6	U	6	U	6	U	5	U	5	U
1,1-Dichloroethene		6	U	109	%	100	%	6	U	5	U	87	%
1,1-Dichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloroethene (total)		6	U	6	U	6	U	6	U	5	U	5	U
Chloroform		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
2-Butanone		13	U	12	U	12	U	13	U	10	U	10	U
1,1,1-Trichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Carbon Tetrachloride		6	U	6	U	6	U	6	U	5	U	5	U
Bromodichloromethane		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloropropane		6	U	6	U	6	U	6	U	5	U	5	U
cis-1,3-Dichloropropene		6	U	6	U	6	U	6	U	5	U	5	U
Trichloroethene		6	U	99	%	96	%	6	U	5	U	90	%
Dibromochloromethane		6	U	6	U	6	U	6	U	5	U	5	U
1,1,2-Trichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Benzene		6	U	105	%	102	%	6	U	5	U	89	%
Trans-1,3-Dichloropropene		6	U	6	U	6	U	6	U	5	U	5	U
Bromoform		6	U	6	U	6	U	6	U	5	U	5	U
4-Methyl-2-pentanone		13	U	12	U	12	U	13	U	10	U	10	U
2-Hexanone		13	U	12	U	12	U	13	U	10	U	10	U
Tetrachloroethene		6	U	6	U	6	U	6	U	5	U	5	U
1,1,2,2-Tetrachloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Toluene		2	J	110	%	105	%	6	U	5	U	90	%

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1b

Cust ID:	B17124	B17124	B17124	B17115	VBLKTL	VBLKTL BS
RFW#:	001	001 MS	001 MSD	002	03LVX166-MB1	03LVX166-MB1
Chlorobenzene	6 U	106 %	101 %	6 U	5 U	90 %
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	1 J	5 U
N-butylbenzene	NA	NA	NA	NA	NA	NA

*= Outside of EPA CLP QC limits.

Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1a

Report Date: 06/23/03 10:40

	Cust ID:	B17116		B17123		B17123		B17123		VBLKVW		VBLKVW BS	
Sample Information	RFW#:	001		002		002 MS		002 MSD		03LVG121-MB1		03LVG121-MB1	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00		1.02		1.06		1.02		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Toluene-d8	109	%	109	%	104	%	105	%	98	%	97	%
	Bromofluorobenzene	112	%	126 *	%	133 *	%	118	%	100	%	101	%
	1,2-Dichloroethane-d4	109	%	106	%	102	%	104	%	94	%	94	%
			fl		fl		fl		fl		fl		fl
Chloromethane		11	U	11	U	12	U	11	U	10	U	10	U
Bromomethane		11	U	11	U	12	U	11	U	10	U	10	U
Vinyl Chloride		11	U	11	U	12	U	11	U	10	U	10	U
Chloroethane		11	U	11	U	12	U	11	U	10	U	10	U
Methylene Chloride		29	B	27	B	22	B	25	B	1	J	4	JB
Acetone		140	B	35	B	34	B	42	B	2	J	10	U
Carbon Disulfide		6	U	6	U	6	U	6	U	5	U	5	U
1,1-Dichloroethene		6	U	6	U	82	%	84	%	5	U	82	%
1,1-Dichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloroethene (total)		6	U	6	U	6	U	6	U	5	U	5	U
Chloroform		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
2-Butanone		18		14		15		23		10	U	10	U
1,1,1-Trichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Carbon Tetrachloride		6	U	6	U	6	U	6	U	5	U	5	U
Bromodichloromethane		6	U	6	U	6	U	6	U	5	U	5	U
1,2-Dichloropropane		6	U	6	U	6	U	6	U	5	U	5	U
cis-1,3-Dichloropropene		6	U	6	U	6	U	6	U	5	U	5	U
Trichloroethene		6	U	6	U	94	%	94	%	5	U	95	%
Dibromochloromethane		6	U	6	U	6	U	6	U	5	U	5	U
1,1,2-Trichloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Benzene		6	U	6	U	92	%	92	% *	5	U	90	%
Trans-1,3-Dichloropropene		6	U	6	U	6	U	6	U	5	U	5	U
Bromoform		6	U	6	U	6	U	6	U	5	U	5	U
4-Methyl-2-pentanone		11	U	11	U	12	U	11	U	10	U	10	U
2-Hexanone		11	U	11	U	12	U	11	U	10	U	10	U
Tetrachloroethene		6	U	6	U	6	U	6	U	5	U	5	U
1,1,2,2-Tetrachloroethane		6	U	6	U	6	U	6	U	5	U	5	U
Toluene		1	J	2	J	98	%	102	%	5	U	93	%

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1b

Cust ID:	B17116	B17123	B17123	B17123	VBLKVW	VBLKVW BS
RFW#:	001	002	002 MS	002 MSD	03LVG121-MB1	03LVG121-MB1
Chlorobenzene	6 U	6 U	94 %	97 %	5 U	94 %
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.

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1E

VOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B17124

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2242

Matrix: SOIL

Lab Sample ID: 0305L520-001

Sample wt/vol: 4.40 (g/mL) G

Lab File ID: x053016

Level: (low/med) LOW

Date Received: 05/29/03

% Moisture: not dec. 13

Date Analyzed: 05/30/03

Column: (pack/cap) CAP

Dilution Factor: 1.14

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALKANE	17.823	1000	J
2.	ALKANE	18.955	20	J
3.	ALKANE	19.687	4000	J
4.	ALKANE	21.308	600	J
5.	ALKANE	22.771	200	J

FORM 1 VOA-TIC 12/88 Rev.

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD F03-006
LVL #: 0305L520 & 0305L533
SDG/SAF # H2242/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-29,30-2003

GC/MS VOLATILE

Four (4) soil samples were collected on 05-20,27-2003.

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 05-30-2003 and 06-06-2003.

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 with the exception of some discrepancies, which have been recorded on the Sample Receipt Checklist.
2. Samples were analyzed within holding time.
3. Non-target compounds were detected in the samples.
4. Two (2) of thirty-six (36) surrogate recoveries were outside EPA QC limits. The analysis of associated matrix spike samples fulfills the reanalysis requirement of sample B17123.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blank 03LVG121-MB1 contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than the CRQL. The method blank 03LVX166-MB1 contained the target compound Xylene (Total) at a level less than the CRQL.
8. Internal standard area criteria were not met for samples B17124 and B17123. The analysis of matrix spike samples fulfills their reanalysis requirement.
9. A spectral search was conducted for the compound 2-Pentanone and this compound was not identified in the samples for both batches.

   The instrument was not calibrated for the compound N-butylbenzene in LVL # 0305L520; however, a spectral search was conducted for the compound and the 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

06-26-03
Date

som\group\data\voa\tnu-hanford\0305-520&533.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 4 pages.

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

Lionville Laboratory Use Only
0305L520

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI Lionville Laboratory Inc.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNX Hanford F03-006
Est. Final Proj. Sampling Date:
Project #: 1134D-606-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: OS
QC: SPEC Del: STD TAT: 30 days

Date Rec'd: 5/29/03 Date Due: 6-28-03

		A	B	C	D	E	F	G
Refrigerator #		1	2	2	2	2	2	2
#/Type Container	Liquid	TAGL	TAGL	TAGL				
	Solid	IAGL	IAGL	IAGL	IAGL	IAGL	IAGL	IAGL
Volume	Liquid							
	Solid	60	125	60	60	125	60	60
Preservatives								
ANALYSES REQUESTED	ORGANIC: VOA	8260						
	ORGANIC: BNA		8270					
	ORGANIC: Pest/PCB		8081					
	ORGANIC: Herb		8151					
	INORG: Metal			MET ①		ICP	INORG ①	ZN3 N2
	INORG: CN							ZOG GR
	Cr Hex							
	TC Quant							
	NO2/NO3							
	oil + grease							

Lionville Laboratory Use Only: OGCSC 0624H; 0625X 0320 0680

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	OGCSC	0625X	MET ①	ICP	INORG ①	ZN3 N2	ZOG GR
001	B17124	✓	✓	S	5/20/03	0945	1	1	1	1	1	1	1
002	B17115			L	L	0830	1		1	1		1	1

Special Instructions: SAF # F03-006
Run Matrix QC on -001
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO_4, SO_4
TNH3N, ZPH, TCNTD

DATE/REVISIONS:
5-30-03 1. ~~Remove~~ 0624H Add OGCSC
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/29/03	1000

Relinquished by	Received by	Date	Time
COMPOSITE WASTE		ORIGINAL REWRITTEN	

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

Lionville Laboratory Use Only

Samples were: ✓
1) Shipped ____ or Hand Delivered ____
Airbill # 7932567884 51
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec'd (Y) or N
Cooler Temp. 1.7 °C

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FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	Page 1 of 1
Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ	Price Code 8N Air Quality ☐
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location TMJ 5-20-03 216-A-10 (C3247) ~~52.5-55 R~~ 52'-54'; 54'-56'		SAF No. F03-006	Data Turnaround 45 Days
Ice Chest No. ERC 03 101	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Federal Express	
Shipped To RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No. A030240		Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ TMJ 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
~~B17115~~	~~SOIL~~	~~5/20/03~~	~~0830~~	X	X	X	X	X	X	X			52803
B17124	SOIL	5/20/03	0945	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: TMJohansen/[illegible] Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref Date/Time: 5/20/03 1317	
Relinquished By/Removed From: HO-64-427 Ref Date/Time: 5/20/03 1120	Received By/Stored In: TMJohansen [illegible] Date/Time: 5/20/03 1120	
Relinquished By/Removed From: TMJohansen [illegible] Date/Time: 5/20/03 1150	Received By/Stored In: REF 1A 3728 Date/Time: 5/20/03 1150	
Relinquished By/Removed From: REF 1A 3728 Date/Time: 52803 0800	Received By/Stored In: SJGALE [illegible] Date/Time: 52803 0800	
Relinquished By/Removed From: SJGALE [illegible] Date/Time: 52803 0800	Received By/Stored In: FED EX Date/Time:	
Relinquished By/Removed From: FedEX Date/Time: 5/29/03 1000	Received By/Stored In: JPerry Date/Time: 5/29/03 1000	

SPECIAL INSTRUCTIONS 5/20/03
~~** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 = Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

Matrix *
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
5/24/03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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-10 (C3247) ~~52.5-55 ft~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 02 010	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No.: RSR 107187		Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~N/A~~ MJS 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage

N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1		1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17115	SOIL	5/20/03	0830	X	X	X	X	X	X	X			
~~B17124~~	~~SOIL~~	~~5/20/03~~	~~0945~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	5/20/03		

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: Johansen/Pope/Pfister Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref Date/Time: 5/20/03 1317	
Relinquished By/Removed From: HO-64-427 Ref Date/Time: 5/22/03 1120	Received By/Stored In: Johansen/Pope/Pfister Date/Time: 5/22/03 1120	
Relinquished By/Removed From: Johansen/Pope/Pfister Date/Time: 5/22/03 1150	Received By/Stored In: REF 1A 3728 Date/Time: 5/22/03 1150	
Relinquished By/Removed From: REF 1A 3728 52803 0800	Received By/Stored In: SJGALE 52803 0800	
Relinquished By/Removed From: SJGALE 52803 0800	Received By/Stored In: FED EX Date/Time:	
Relinquished By/Removed From: Fed EX 5-29-03 1000	Received By/Stored In: [signature] Date/Time:	

SPECIAL INSTRUCTIONS 5/20/03

~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec. - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium, Americium-241, Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-233}; Carbon-14; Iodine-~~

Matrix *: 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

5/20/03

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

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

Lionville Laboratory Use Only: 0305L533

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVL Lionville Laboratory Inc.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: INL Hanford F03-006
Est. Final Proj. Sampling Date:
Project #: 11343-606-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: QJ
QC: SPEC Del: STD TAT: 30 days

Date Rec'd: 5/30/03 Date Due: 6-29-03

		A	B			C	D		E		F	G	H			
Refrigerator #		1	2			1	2		2		2	2	2			
#/Type Container	Liquid															
	Solid	AGL	AGL			AGL	AGL		AGL		AGL	AGL	AGL			
Volume	Liquid															
	Solid	60	125/60			60/125	60		60/125		60	125/60	60			
Preservatives																
ANALYSES REQUESTED		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	VOA (Alt. Bottle)	Oil Grease		Metal	CN	Cr 6	Tot Cyanide	NO2/NO3			
		Lionville Laboratory Use Only														
		0624X	0625X ODBA 0680			0GC3C	1OGGR		MET O		1CR6	1NORG(1)	1N3N2			

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	0624X	0625X ODBA 0680			0GC3C	1OGGR		MET O		1CR6	1NORG(1)	1N3N2			
001	B17116			S	5/27/03	1030	1	1			1	1		1		1	1	1			
002	B17123			⊥	⊥	⊥	1	1			1	1		1		1	1	1			

Special Instructions: SAF # F03-006
Run Matrix QC

MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO_4, SO_4
INH_3N, IPH, ICNTO

DATE/REVISIONS:
002-C 1. Label says see special item (5). This is not a requested item. No bottle
2. was received for item (1) so this bottle
was assigned for (1).
002B,C,E,G Bottle size does not match size
indicated on COC.
4.
5.
6.

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered
Airbill # See below
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Samples Properly Preserved Y or N
5) Received Within Holding Time Y or N

Tamper Resistant Seal was: 1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec'd Y or N
Cooler Temp. 4 °C

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

Relinquished by	Received by	Date	Time
FedEx	J Perry	5/30/03	0945

Relinquished by	Received by	Date	Time
COMPOSITE MASTER			

ORIGINAL REWRITTEN

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-107	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-10 (C3247) 62.5-65 ft	SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03-103	Field Logbook No.: HNF-N-3361; COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ Reera	Offsite Property No.: 030 276	Bill of Lading/Air Bill No.: SEE OSR	

POSSIBLE SAMPLE HAZARDS/REMARKS: B17133; ~~B17134~~ Radiological Tie To: ~~B17116~~ (B17116; B17123)

Special Handling and/or Storage: N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3
Sample No. / Matrix * / Sample Date / Sample Time										
B17116 / SOIL / 5-27-03 / 1030	X	X	X	X	X	X	X			
B17123 / SOIL / 5-27-03 / 1030	X	X	X	X	X	X	X			
B12 ~~B17122~~ / SOIL / 5-27-03 / 1110	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: [illegible]	5/27/03 1415	Received By/Stored In: ERC [illegible]	5-27-03 1415
Relinquished By/Removed From: [illegible]	1415 5-27-03	Received By/Stored In: IB 3728	1415 5270
Relinquished By/Removed From: [illegible]	1000 IB 5-27-03	Received By/Stored In: [illegible]	1000 5-29-03
Relinquished By/Removed From: ERC [illegible]	1000 5-29-03	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: Fed Ex	5/30/03 0945	Received By/Stored In: JPMy	5/30/03 0945
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Diethyl ether, Ethylene glycol, Methanol)
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (2-Butoxyethanol, Tributyl phosphate); TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel); Mercury - 7471 - (CV)
(4) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec -- Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium~~
(6) ~~Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129~~ Nickel-63; Neptunium-237

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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-114	Page 2 of 2
Collector Johansen/Pope/Pfister	Company Contact LC Hulstrom	Telephone No. 373-3928	Project Coordinator TRENT, SJ	Price Code 8N Air Quality ☐
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location ~~TMD 5-27-03~~ 216-A-10 (C3247) ~~318.5-321 ft~~ 62.5-65'		SAF No. F03-006	Data Turnaround 45 Days
Ice Chest No. ERC 03 102	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Federal Express	
Shipped To ~~TMD 5-27-03~~ ~~EBERLINE SERVICES (Formerly TMA)~~ Necra	Offsite Property No. 17030-276		Bill of Lading/Air Bill No. SEE OSR	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~NH~~ Radioactive TILTO: See Below

Special Handling and/or Storage
N/A

Preservation	None	1004C									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	125 mL	40 mL									
SAMPLE ANALYSIS	Tritium - H3	See Special Instructions (7)									

Sample No.	Matrix *	Sample Date	Sample Time				TILTO:					
B17123	SOIL	5-27-03	1030		X		B7133					
B17126	Soil	5-27-03	1030		X		B7133					
~~B7122~~	~~Soil~~	~~5-27-03~~	~~1110~~		~~X~~		~~B7134~~					
Re 5-29-03												

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By/Removed From: [signature] Date/Time 5-27-03 1445	Received By/Stored In: ERC [signature] Date/Time 1445 5-27-03	* 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=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other
Relinquished By/Removed From: [signature] Date/Time 1415 5-27-03	Received By/Stored In: [signature] Date/Time 1415 5-27-03	(7) VOA-8260A (TCL); VOA-8260A (Add-On) {2-Pentanone, Benzyl alcohol, n-Butylbenzene}	
Relinquished By/Removed From: 1B 3728 5-29-03 Date/Time 1000	Received By/Stored In: [signature] Date/Time 1000 5-29-03		
Relinquished By/Removed From: ERC [signature] Date/Time 1000 5-29-03	Received By/Stored In: 1st col Ex Date/Time		
Relinquished By/Removed From: FedEx Date/Time 5/30/03 0945	Received By/Stored In: JPeny Date/Time 5/30/03 0945		
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

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

22

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

LIENT: TNU Hanford

rchase Order/Project:

DATE: 5/29/03

AF# / SOW# / Release #: F03-006

aboratory SDG #: C3054520

OTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? See below	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
10. Shipment meets LvL1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-101 / TRK# 7922 5678 8451 / 1.7°C (Sample 001)
ERC-03-100 / 839350745320 / 5.8°C (Sample 002)

Laboratory Sample Custodian: J Perry 5/29/03 1000

Laboratory Project Manager:

10

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

Purchase Order/Project:

DATE: 5/30/03

SAF# / SOW# / Release #: F03-006

Laboratory SDG #: 0305L533

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (1)
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? 790794598746	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (2)
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☐ Yes	☐ No	☑ N/A	☐ see Comment #
10. Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-103 / 4°C

(1) No custody seals
(2) 002C Label says see item (5). This is not a requested item. No bottle was received for item (1), so this bottle was assigned to (1)
002B,C,E,G - Bottle size doesn't match client (60 mL to a 125 mL or vice-versa)

Laboratory Sample Custodian: JKerry 5/30/03 0945

Laboratory Project Manager:

9

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: Area 200			DATA PACKAGE:		
VALIDATOR:		LAB: Livermore Lab		DATE: 11/12/03	
CASE:			SDG: H 2242		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
X					
SAMPLES/MATRIX					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: No chain of custody seals on Sample Containers for SAF# F03-106 Custody was present. OK. MM

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:

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: surrogate for sp. B17123 is outside of control limits dibromofluoromethane. However MSD recovery is okay, surrogate recovery >UCL and sample result is <RDL – no flag

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: B17116 acetone was 140 ug/kg
B17123 acetone was 35 ug/kg
yielding RPD=60% JMG 1/13/04

JMG 1/13/04

6. SYSTEM PERFORMANCE (Levels D and E)

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

Comments:

7. HOLDING TIMES (all levels)

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

Comments: _____

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: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):

JAN 2004
RECEIVED

Date: 11/20/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: General Organic Analysis, Method 8015B-Data Package SDG H2242

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2242 prepared by Lionville Laboratory, Inc. (LLI) for Method 8015. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B17115	5/20/03	Soil	C	8015B-alcohols, glycols and GRO 3540/8015B-DRO
B17116	5/27/03	Soil	C	8015B-alcohols, glycols and GRO 3540/8015B-DRO
B17123	5/27/03	Soil	C	8015B-alcohols, glycols and GRO 3540/8015B-DRO
B17124	5/20/03	Soil	C	8015B-alcohols, glycols and GRO 3540/8015B-DRO

GRO, DRO, glycol, and alcohol analysis were both performed by Method 8015B.

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis BHI-01435 and Sampling and Analysis Plan, DOE/RL-2000-60, REV1, Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualifiers
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 the Client- not apply

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for Method 8015B, Analysis of Nonhalogenated Organics is 14 days for soils for alcohols and GRO. For extraction of the DRO, the holding time to extraction is 14 days with analysis within 40 days per SW846. Table B-5 of the SAP nor BHI-01435 does not delineate between extraction and analysis holding times for DRO, thus, the SW846 holding times were used. DRO holding times failed by one day for extraction of sample B17115. Data that failed the extraction date of 14 days were flagged with a J.

  All other holding times were met.

  No chain of custody seals present on these samples. However, the chain of custody documentation was present.

- **Method Blanks**

  At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water was processed through each set of the sample preparation and analysis procedure.

  All blanks were acceptable and below the reporting limits.

- **Field Blanks**

  No field blanks were submitted for analysis.

- **Accuracy**

  Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least once per batch of samples, using the same procedures as samples and added as early in the sample preparation process as possible.

  Matrix spike recoveries must fall within the range of 50-150%.

  All matrix spike recoveries were acceptable. Note that the MSs for DRO for B17116 and B 17124 were diluted out due to the high sample. Also note that the GRO MS/MSDs were low for sample B17116. All surrogates from GRO were acceptable, thus no flags were added.

- **Surrogates**

  Surrogates are also used to assess the accuracy of the method. Surrogate limits for organic surrogates are: 50-150%.

  The surrogate results for samples B17116, B17123, and B17124 were diluted out for DRO due to high analyte concentrations in the samples. Therefore, results for these samples were qualified with a "J' where the analyte was detected and "UJ" where it was not.

- **Laboratory Control Samples (LCS)/Blank Spike Sample (BSS)**

  BSS/LCSs are also a measure of accuracy. Blank spikes or LCS recoveries must be within 50-150%.

  One blank spike in this SDG had a recovery of 45% for ethyl ether and the blank spike duplicate recovery in the same batch was 64% which the laboratory indicates is within limits. Its associated samples are B17124 and B17115 and were undetected. Given that one BS was within laboratory limits and the other was not, it is acceptable.

- **Precision**

  Matrix Spike Duplicate Samples

  Matrix Spike duplicate samples are used to measure laboratory precision and sample homogeneity. Results must be within a relative percent difference (RPD) of $\leq 35\%$ for non-aqueous samples that have a concentration of >5 times the RDL.

  All duplicate results met this criteria unless the recoveries noted in the matrix spike discussions were diluted out.

  Field Duplicate Samples

  Sample B17123 was a duplicate of sample B17116. All sample-to-sample RPD criteria were met.

- **Analytical Detection Limits**

  Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev 1.

  All required detection limits were met for the method blanks. The DRO samples B17116 and B17123 and B17124 were elevated due to the dilutions required to analyze the samples due to the higher concentrations reported.

Reporting limits for the methanol, ethyl ether and butanol in the method blanks were 25 mg/kg and the SAP requires 5 mg/kg. The preliminary action limit is 6.6 mg/kg. All the samples were nondetects at sample reporting limits from 25-29 mg/kg. The data are not flagged but this should be accounted for in the data quality assessment.

- **Completeness**

  The data package for SDG: H2242 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid. The completeness percentage was 100%

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

See discussions in holding times, surrogates, matrix spikes and blank spikes.

REFERENCES

BHI-01435. Rev 1, Validation Procedure for Chemical Analysis

DOE-RL2000-60, Rev. 1, 4-23-03, Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Pan-Includes 200-PW-2 and 200-PW-4 Operable Units,.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI 01435 and DOE/RL2000-60.

U - Indicates the compound or analysis 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 concentration is an estimate, but the data was usable for decision making purposes.

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

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to 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 a major QC deficiency.

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

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

Appendix 2

Summary of Data Qualifiers

DATA QUALIFICATION SUMMARY

SDG: H2242	REVIEWER: MSM	DATE: 11/18/03	PAGE 1 OF 1
SAMPLES AFFECTED	**QUALIFIER**	**COMPOUND**	**REASON**
B17115	J, UJ	DRO	Holding time
B17116 B17123 B17124	J, UJ	DRO	Surrogate

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.
GAS RANGE ORGANICS

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1 Report Date: 06/21/03 13:47

	Cust ID:	B17124	B17115	TBLKKF	TBLKKF BS	TBLKKG	TBLKKG BS
Sample Information	RFW#:	001	002	03LVJ602-MB1	03LVJ602-MB1	03LVJ603-MB1	03LVJ603-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
Fluorobenzene		80 %	98 %	97 %	100 %	100 %	106 %
Gasoline Range Organics (GRO)		33 U	63 U	30 U	105 %	30 U	100 %

	Cust ID:	TBLKKG BSD
Sample Information	RFW#:	03LVJ603-MB1
	Matrix:	SOIL
	D.F.:	1.00
	Units:	UG/KG
Fluorobenzene		108 %
Gasoline Range Organics (GRO)		103 %

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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Lionville Laboratory, Inc.

GAS RANGE ORGANICS

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1 Report Date: 06/24/03 11:07

	Cust ID:	B17116	B17116	B17116	B17123	TBLKKF	TBLKKF BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	03LVJ602-MB1	03LVJ602-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
	Fluorobenzene	90 %	65 %	86 %	89 %	97 %	100 %
Gasoline Range Organics (GRO)		1500	16 * %	41 %	75 U	30 U	105 %

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: 07/09/03 15:15

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1

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	Cust ID:	B17116	B17116	B17116	B17123	BLK	BLK BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	03LE0662-MB1	03LE0662-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	10.0	10.0	10.0	100	1.00	1.00
	Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
	p-Terphenyl	D %	D %	D %	D %	76 %	70 %
		fl	fl	fl	fl	fl	fl
Diesel Range Organics		131 U J	D % J	D % J	1300 U J	12.0 U	71 %
Kerosene		700 J	580 J	760 J	6000 J	12.0 U	12.0 U

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

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1

Report Date: 07/09/03 14:27

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	Cust ID:	B17124	B17124	B17124	B17115	B17115	B17115
Sample Information	RFW#:	001	001 MS	001 MSD	002	002 MS	002 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	100	100	100	1.00	1.00	1.00
	Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
p-Terphenyl		D %	D %	D %	75 %	80 %	107 %
Diesel Range Organics		10000 J	D % J	D % J	13.6 U J	88 % J	107 % J
Kerosene		1370 U J	1370 U J	1370 U J	13.6 U J	27.1 U J	27.1 U J

	Cust ID:	BLK	BLK BS	BLK	BLK BS
Sample Information	RFW#:	03LE0652-MB1	03LE0652-MB1	03LE0674-MB1	03LE0674-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
p-Terphenyl		65 %	63 %	89 %	69 %
Diesel Range Organics		12.0 U	58 %	12.0 U	69 %
Kerosene		12.0 U	12.0 U	12.0 U	12.0 U

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

KB 7/9/03

Lionville Laboratory, Inc.

GC SCAN

Report Date: 07/09/03 17:14

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1

	Cust ID:	B17116	B17123	BLK	BLK BS
Sample Information	RFW#:	001	002	03LE0715-MB1	03LE0715-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

Methanol	26	U	29	U	25	U	96	%
Ethyl Ether	26	U	29	U	25	U	54	%
1-Butanol	26	U	29	U	25	U	91	%

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.

GC SCAN

Report Date: 06/21/03 10:59

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1

	Cust ID:	B17124	B17124	B17124	B17115	BLK	BLK BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	03LE0655-MB1	03LE0655-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Methanol		28 U	93 %	99 %	28 U	25 U	114 %
Ethyl Ether		28 U	94 %	98 %	28 U	25 U	45 * %
1-Butanol		28 U	94 %	95 %	28 U	25 U	94 %

	Cust ID:	BLK BSD
Sample Information	RFW#:	03LE0655-MB1
	Matrix:	SOIL
	D.F.:	1.00
	Units:	mg/kg
Methanol		134 %
Ethyl Ether		64 %
1-Butanol		98 %

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: 07/08/03 09:37

RFW Batch Number: 0305L533 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1

	Cust ID:	B17116	B17123	BLK	BLK BS	BLK BSD
Sample Information	RFW#:	001	002	03LE0671-MB1	03LE0671-MB1	03LE0671-MB1
	Matrix:	SOIL	SOIL	SOIL	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
Ethylene Glycol		25.5 U	24.5 U	25.0 U	86 %	104 %

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

RFW Batch Number: 0305L520 Client: TNUHANFORD F03-006 H2242 Work Order: 11343606001 Page: 1 Report Date: 07/08/03 09:35

	Cust ID:	B17124	B17124	B17124	B17115	BLK	BLK BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	03LE0671-MB1	03LE0671-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
Ethylene Glycol		37	71 %	92 %	23.5 U	25.0 U	86 %

	Cust ID:	BLK BSD
Sample Information	RFW#:	03LE0671-MB1
	Matrix:	SOIL
	D.F.:	1.00
	Units:	ug/Kg
Ethylene Glycol		104 %

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

7/8/03

Appendix 4

Laboratory Narrative and Chain of Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD F03-006
LVL #: 0305L520
SDG/SAF#: H2242/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-29-03

GRO

The set of samples consisted of two (2) soil samples collected on 05-20-03.

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 06-02,03-03. 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 LVLI's sample acceptance policy.

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

3. All method blanks were below the reporting limits for all target compounds.

4. All surrogate recoveries were within acceptance criteria.

5. All blank spike recoveries were within acceptance criteria.

6. Matrix spike analyses are associated with Lionville batch# 0305L533. A copy of the Sample Discrepancy Report (SDR) associated with the matrix QC for that batch has been enclosed.

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

6/20/03
Date

pef\Rrgroup\data\gro\mu\05L-520.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 10 pages.

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

2

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD F03-006
LVL #: 0305L533
SDG/SAF#: H2242/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-30-03

GRO

The set of samples consisted of two (2) soil samples collected on 05-27-03.

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 06-02-03. 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. Please refer to the Sample Receipt Checklist for sample discrepancies in LvLI's sample acceptance policy.

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

3. All 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. One (1) of two (2) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

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

6/25/03
Date

pef\Rrgroup\data\gro\tnu\05L-533.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 12 pages.

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2

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L520
SDG/SAF #: H2242/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-29-03

DIESEL RANGE ORGANICS

The set of samples consisted of two (2) soil samples collected on 05-20-03.

The samples and their associated QC samples were extracted on 05-30-02 and 06-04-03 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 06-02,21-03 and 07-08-03. 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. All required holding times for extraction and analysis have been met.
3. All method blanks were below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All obtainable matrix spike recoveries were within acceptance criteria. The unobtainable matrix spike recoveries were to the dilution required for analysis.
7. Sample B17124 and its matrix QC required 100-fold instrument dilutions due to the high concentrations of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
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

7/15/03
Date

pefl:r:\group\data\dro\tnu hanford\05L-520.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 10 pages.

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2

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-006
LVL #: 0305L533
SDG/SAF #: H2242/F03-006

W.O. #: 11343-606-001-9999-00
Date Received: 05-30-03

DIESEL RANGE ORGANICS

The set of samples consisted of two (2) soil samples collected on 05-27-03.

The samples and their associated QC samples were extracted on 06-02-03 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 06-30-03 and 07-08-03. 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. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. Matrix spike recoveries were unobtainable due to the dilution required for analysis.
7. All samples and the matrix QC required instrument dilutions due to the high concentrations of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
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

7/10/03
Date

perl\r:\group\data\dro\tnu hanford\05L-533.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 9 pages.

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2

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD F03-006
LVL#: 0305L520
SDG/SAF#: H2242/F03-006

W.O.#: 11343-606-001-9999-00
Date Received: 05-29-03

GC SCAN

The set of samples consisted of two (2) soil samples collected on 05-20-03.

The samples and their associated QC samples were prepped on 05-30-03 and analyzed on 06-02-03 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures based on method 8015B 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. All required holding times for extraction and analysis have been met.

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

4. Surrogates are not currently employed in the methodology.

5. One (1) of six (6) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. All matrix spike recoveries were within acceptance criteria.

7. All initial calibrations 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

6/20/03
Date

r:\group\data\gcsc\05L-520.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 10 pages.

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

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD F03-006
LVL#: 0305L533
SDG/SAF#: H2242/F03-006

W.O.#: 11343-606-001-9999-00
Date Received: 05-30-03

GC SCAN

The set of samples consisted of two (2) soil samples collected on 05-27-03.

The samples and their associated QC samples were prepped and analyzed on 06-11-03 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures based on method 8015B 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. All required holding times for extraction and analysis have been met.
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. Matrix spike analyses are associated with Lionville batch# 0305L520.
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

7/10/03
Date

r:\group\data\gcsc\05L-533.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 9 pages.

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2

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD F03-006
LVL#: 0305L520/533
SDG/SAF#: H2242/F03-006

W.O.#: 11343-606-001-9999-00
Date Received: 05-29,30-03

GC SCAN

The set of samples consisted of four (4) soil samples collected on 05-20,27-03.

The samples and their associated QC samples were prepped and analyzed on 06-03-03 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures based on method 8015B 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 LvLI's sample acceptance policy.

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

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 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

7/10/03
Date

r:\group\data\gcsc\05L-520533.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 15 pages.

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3

Lionville Laboratory Use Only: 0305L520

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI LIONVILLE LABORATORY INC.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TMLL Hanford F03-006

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: Spec Del: STD TAT: 30 days

Date Rec'd: 5/29/03 Date Due: 6-28-03

		A	B	C	D	E	F	G
Refrigerator #		1	2	2	2	2	2	2
#/Type Container	Liquid	1AGL	1AGL	1AGL				
	Solid	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL
Volume	Liquid							
	Solid	60	125	60	60	125	60	60
Preservatives								
ANALYSES REQUESTED	ORGANIC: VOA	8260 + 8260 GCSC						
	ORGANIC: BNA	8625X						
	ORGANIC: Pest/PCB	8080						
	ORGANIC: Herb	8080						
	INORG: Metal	MET ①						
	INORG: CN	ICP 6						
	Cr Hex	INORG ①						
	IC Anions	IN3N2						
	NO2 NO3	IOGGR						
	Oil + Grease							

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	8260 GCSC	8625X 8080 8080	MET ①	ICP 6	INORG ①	IN3N2	IOGGR
001	B17124	✓	✓	S	5/20/03	0945	1	1	1	1	1	1	1
002	B17115			⊥	⊥	0830	1		1	1		1	1

Special Instructions: SAF # F03-006
Run Matrix QC on -001
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO3, NO2, PO4, SO4
I-NH3N, I-PH, I-CNTO

DATE/REVISIONS:
5-30-03 1. ~~Rec'd 8624HH~~ Add 8260 GCSC
2.
3.
4.
5.
6.

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___
Airbill # 792256788451
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was: 1) Present on Outer Package (Y) or N; 2) Unbroken on Outer Package (Y) or N; 3) Present on Sample (Y) or N; 4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 1.7 °C

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/29/03	1000

Relinquished by	Received by	Date	Time
COMPOSITE WASTE			

ORIGINAL REWRITTEN

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES:

Lionville Laboratory Use Only: 0305L533

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI Lionville Laboratories, Inc.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU Hanford F03-006

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: SPEX Del: STD TAT: 30 days

Date Rec'd: 5/30/03 Date Due: 6-29-03

		A	B			C	D		E		F	G	H			
Refrigerator #		1	2			1	2		2		2	2	2			
#/Type Container	Liquid															
	Solid	AGL	AGL			AGL	AGL		AGL		AGL	AGL	AGL			
Volume	Liquid															
	Solid	60	125 60			60 60	60		60 125		60	125 60	60			
Preservatives																
ANALYSES REQUESTED		ORGANIC: VOA	BNA	Pest/PCB	Herb	Oil & Grease			INORG: Metal	CN	Cl, F, Br, PO4, SO4	Nitrate Nitrite	NO2/NO3			
		Lionville Laboratory Use Only														
		0624X	0625X ODEA 0660			0GC5C	1GGR		MET 1		ICR4	INORG 1	IN02N3			

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	0624X	0625X ODEA 0660			0GC5C	1GGR		MET 1		ICR4	INORG 1	IN02N3			
001	B17116			S	5/27/03	1030	1	1			1	1		1		1	1	1			
002	B17123			L	L	L	1	1			1	1		1		1	1	1			

Special Instructions: SAF # F03-006
Run Matrix QC

MET 1 = RCRA + Sb, Be, Bi, B, Cu, Ni

INORG 1 = IC: Cl, F, NO_3, NO_2, PO_4, SO_4
INH_3N, IPH, ICNTO

DATE/REVISIONS:
002C 1. Label says see special item (5). This is not a requested item. No bottle was requested for item (1) so this bottle was assigned for (1)
002B,C,E,G Bottle size does not match size indicated on COC.
2.
4.
5.
6.

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___ Airbill # see below
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was: 1) Present on Outer Package Y or (N) 2) Unbroken on Outer Package Y or (N) 3) Present on Sample (Y) or N 4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 4 °C

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/30/03	0945

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-107	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-10 (C3247) 62.5-65 ft		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03-103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ TMJ 5-27-03 Beera	Offsite Property No.: 0030 276		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS: B17133; ~~B17134~~ TMJ 5-27-03 N/A

Radiological Tie To: ~~B17136~~ TMJ 5-27-03 (B17116; B17123)

Special Handling and/or Storage: N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17116	SOIL	5-27-03	1030	X	X	X	X	X	X	X			
B17123	Soil	5-27-03	1030	X	X	X	X	X	X	X		TMJ 5-27-03	
~~B12-B17122~~ 5-29-03	~~Soil~~	~~5-27-03~~	~~1110~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		TMJ 5-27-03	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: [signature] FH	Date/Time: 5/27/03 1415	Received By/Stored In: ERC R. Fellow R. Fellow	Date/Time: 5-27-03 1415
Relinquished By/Removed From: R. Fellow R. Fellow	Date/Time: 1415 5-27-03	Received By/Stored In: IB 3728	Date/Time: 5-27-03 1415
Relinquished By/Removed From: ~~R. Fellow~~ R. Fellow	Date/Time: 1000 IB 5-29-03	Received By/Stored In: R. Fellow R. Fellow	Date/Time: 1000 5-29-03
Relinquished By/Removed From: R. Fellow R. Fellow	Date/Time: 1000 5-29-03	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 5/30/03 0945	Received By/Stored In: JPerry	Date/Time: 5/30/03 0945
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129~~ Nickel-63; Neptunium-237

Matrix *: 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

TMJ 5-27-03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-114	Page 2 of 2
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-10 (C3247) ~~518.5-321 ft~~ TMD 5-27-03 62.5-65'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03 103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ TMD 5-27-03 Necra	Offsite Property No.: 17030-275		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ Radioactive Tie To: See Below

Special Handling and/or Storage
N/A

Preservation	None	Cool 4C									
Type of Container	aG	aG									
No. of Container(s)		1									
Volume	60mL	60 mL									
SAMPLE ANALYSIS	Tritium - H3	See special instruction (7)									
						Tie To:					
Sample No.	Matrix *	Sample Date	Sample Time								
B17123	SOIL	5-27-03	1030		X	B17133					
B17126	Soil	5-27-03	1030		X	B17133					
~~B17122~~ 5-29-03	~~Soil~~	~~5-27-03~~	~~1110~~		~~X~~	~~B17134~~					

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: [signature] Date/Time: 5-27-03 1415	Received By/Stored In: ERC Date/Time: 1415 [signature] 5-27-03	
Relinquished By/Removed From: [signature] Date/Time: 1410 5-27-03	Received By/Stored In: IB 3728 Date/Time: 1415 5-27-03	
Relinquished By/Removed From: IB 3728 Date/Time: 10:00 5-29-03	Received By/Stored In: [signature] Date/Time: 10:00 5-29-03	
Relinquished By/Removed From: ERC Date/Time: 10:00 [signature] 5-29-03	Received By/Stored In: Fed Ex Date/Time:	
Relinquished By/Removed From: Fed Ex Date/Time: 5/30/03 0945	Received By/Stored In: J Perry Date/Time: 5/30/03 0945	
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:	

SPECIAL INSTRUCTIONS
** 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.
(7) VOA-8260A (TCL); VOA-8260A (Add-On) {2-Pentanone, Benzyl alcohol, n-Butylbenzene}

Matrix *
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
N=Other

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-106	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-10 (C3247) ~~52.5-85-R~~ 52'-54'; 54'-56'	SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03 101	Field Logbook No.: HNF-N-3361; COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/21/03	Offsite Property No.: A030240	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive TLD: B17131, B17132

Special Handling and/or Storage: N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See Item (1) in Special Instructions. VOA 8260	See Item (2) in Special Instructions.	See Item (3) in Special Instructions.	Chromium Hex - 7196	See Item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See Item (5) in Special Instructions.	See Item (6) in Special Instructions.	Tritium - H3
Sample No. / Matrix * / Sample Date / Sample Time										
~~B17115 / SOIL / 5/20/03 / 0830~~	X	X	X	X	X	X	X	/		52803
B17124 / SOIL / 5/20/03 / 0945	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names
Relinquished By/Removed From: [signature] Date/Time: 5/20/03 1317	Received By/Stored In: HO-04-427 REF Date/Time: 5/20/03 1317
Relinquished By/Removed From: HO-04-427 REF Date/Time: 5/20/03 1120	Received By/Stored In: [signature] Date/Time: 5/20/03 1120
Relinquished By/Removed From: [signature] Date/Time: 5/20/03 1150	Received By/Stored In: REF 1A 3728 Date/Time: 5/20/03 1150
Relinquished By/Removed From: REF 1A 3728 52803 0800	Received By/Stored In: SJ GALE Date/Time: 52803 0800
Relinquished By/Removed From: SJ GALE 52803 0800	Received By/Stored In: FED EX Date/Time:
Relinquished By/Removed From: FedEX Date/Time: 5/29/03 1000	Received By/Stored In: JPerry Date/Time: 5/29/03 1000

SPECIAL INSTRUCTIONS: ~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Diethyl ether, Ethylene glycol, Methanol)
(2) Semi-VOA - 8270A (TCL); Semi-VOA + 8270A (Add-On) (2-Butoxyethanol, Tributyl phosphate); TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel); Mercury - 7471 - (CV)
(4) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
(6) ~~Technetium-99; Strontium-89,90 = Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-~~

[signature] 5/20/03

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

[signature] 5/20/03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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-10 (C3247) ~~62.5-55 R~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 02 010	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No.: RSR 107187		Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ MJS 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1		1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17115	SOIL	5/20/03	0830	X	X	X	X	X	X	X			
~~B17124~~	~~SOIL~~	~~5/20/03~~	~~0945~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	52803		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref	Date/Time: 5/20/03 1317
Relinquished By/Removed From: HO-64-427 Ref	Date/Time: 5/22/03 1120	Received By/Stored In: Johansen/Pope/Pfister	Date/Time: 5/22/03 1120
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/22/03 1150	Received By/Stored In: REF 1A 3728	Date/Time: 5/22/03 1150
Relinquished By/Removed From: REF 1A 3728	Date/Time: 52803 0800	Received By/Stored In: SJGALE	Date/Time: 52803 0800
Relinquished By/Removed From: SJGALE	Date/Time: 52803 0800	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: Fed EX	Date/Time: 5-29-03 1000	Received By/Stored In: [signature]	Date/Time:

SPECIAL INSTRUCTIONS 5/20/03
~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 = Total Sr, Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

Matrix *
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

5/20/03

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

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

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

LIENT: TNU Hanford

rchase Order/Project:

DATE: 5/09/03

AF# / SOW# / Release #: F03-000

aboratory SDG #: 03054520

OTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?.	☑ Yes	☐ No	☐ N/A	☐ see Comment #
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? See below	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
10. Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-101 / TRK# 7922 5678 8451 / 1.7°C (Sample 001)
ERC-03-100 / 5393507 45320 / 5.8°C (Sample 002)

Laboratory Sample Custodian: J Remy 5/09/03 1000

Laboratory Project Manager:

10

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

Purchase Order/Project:

DATE: 5/30/03

SAF# / SOW# / Release #: F03-006

Laboratory SDG #: 0305L533

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☐ Yes	☑ No	☐ N/A	☑ see Comment # 1
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? 790794598746	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☐ Yes	☑ No	☐ N/A	☑ see Comment # 2
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☐ Yes	☐ No	☑ N/A	☐ see Comment #
10. Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-103 / 4°C

1) No custody seals
2) 002C Label says see item (5). This is not a requested item. No bottle was recieved for item (1), so this bottle was assigned to (1).
002B,C,E,G - Bottle size doesnot match client c (60 mL to a 125 mL or vice-versa)

Laboratory Sample Custodian: JKeny 5/30/03 0945

Laboratory Project Manager:

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Appendix 5

Data Validation Supporting Documentation

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 Area			DATA PACKAGE: H2242		
VALIDATOR: MLH/MSM		LAB: Knoxville		DATE: 11/13/03 & 11/23/03	
CASE:			SDG: H2242		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
X		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: The chain of custody sheets COCs were present.

MM

2. INSTRUMENT TUNING AND CALIBRATION (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

Comments:

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

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

Surrogates/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 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: DRO - MAny surrogates Diluted out, Dul Dhigh
MS% on DRO Also Diluted out — Sgplecore.
MS out on GRO

MM

GENERAL ORGANIC 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:

1/13/04

6. HOLDING TIMES (all levels)

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

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

Comments: yes for all except NO for DRO – 1 sample extracted outside 14 day.

MM

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Comments: yes except AS noted for the Alcohols. MM

9. SAMPLE CLEANUP (Levels D and E)

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

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

Check recoveries acceptable? ..... Yes No (N/A)

Check materials traceable? ..... Yes No (N/A)

Check materials Expired? ..... Yes No (N/A)

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

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

Comments:

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

Comments:

JAN 2004
RECEIVED

Date: 12/16/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: Inorganic Analysis - Data Package SDG H2242

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2242 prepared by Lionville Laboratory, Inc. (LLI) for General Chemistry analysis for the analytes and methods shown in the table below: Also shown in the table is a list of the samples validated and their sampling date. Unless otherwise specified the methods are SW 846 Methods.

Sample ID	Sample Date	Media	Validation	Analysis & Method #
B17115	5/20/03	Soil	C	Ammonia- EPA 350.3 CR^{+6} 3060A/7196A, pH- 9045C, O&G 9071A/EPA 413.1, Solids-ASTMD2216-80 CN- 9010B/9014 NO_2NO_3-EPA 353.2 (mod) Method 300.0 (mod)-IC
B17116	5/27/03	Soil	C	Ammonia- EPA 350.3 CR^{+6} 3060A/7196A, pH- 9045C, O&G 9071A, Solids-ASTMD2216-80 CN- 9010B/9014 NO_2NO_3-EPA 353.2 (mod) Method 300.0 (mod)-IC
B17123	5/27/03	Soil	C	Ammonia- EPA 350.3 CR^{+6}-Method #3060A/7196A, pH-Method 9045C, O&G Method 9071A/EPA 413.1, Solids-ASTM2216-80[1] CN-Method 9010B/9014 NO_2NO_3-EPA 353.2 (mod) Method 300.0 (mod)-IC
B17124	5/20/03	Soil	C	Ammonia- EPA 350.3 CR^{+6}-Method #3060A/7196A, pH-Method 9045C, O&G Method 9071A/EPA 413.1, % Solids-ASTM D2216-80 CN-Method 9010B/9014 NO_2NO_3-EPA 353.2 (mod) Method 300.0 (mod)-IC

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis, BHI-01435, and Sampling and Analysis Plan, DOE/RL-2000-60, Rev. 1. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualifiers

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 the Client. – not applicable

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for cyanide is 14 days, oil and grease is 28 days, percent solids is not established, Chromium VI is 30 days, ammonia is 28 days, nitrate/nitrite 353.2 is 28 days and pH is 24 hours. By IC chloride, sulfate and fluoride holding times are 28 days. Per the SAP and the BHI-01435 the holding times by IC for nitrate/nitrite and phosphate are 48 hr.

  All holding times were met except for nitrate/nitrite & phosphate, which, by project agreement per email 11/24/03, are not evaluated.

- **Method Blanks**

  At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water and was processed through each of the sample preparation and analysis procedures.

  All method blanks fell within acceptable limits.

- **Field Blanks**

  No field blanks were submitted for analysis.

- **Accuracy**

  Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 75 to 125%. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no qualification is required.

  Matrix spikes were analyzed where applicable (i.e. no matrix spike can be analyzed for pH) and met acceptance criteria

- **Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)**

  LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 80-120% per the laboratory criteria as required by the SAP.

  All LCS/BSS met the acceptance criteria.

- **Precision**

  Duplicate Samples

  Laboratory duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq 20\%$ for non-aqueous samples based on laboratory criteria as stated in the SAP.

  All duplicate results met these criteria.

  Field Duplicate Samples

  Sample B17123 was a duplicate of sample B17116. All sample-to-sample RPD criteria were met.

- **Analytical Detection Limits**

  Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev 1. No reporting limits were stated for the specific nitrate/nitrite method used, but limits were stated for ion chromatography (IC) method and the limits reported per 353.2 were near those of IC method. No flags were applied for nitrate/nitrite. Ammonia as N was reported at reporting limits ranging from 4.4 to 6.5 mg/kg and those required in the SAP were .5 mg/kg. However, preliminary action limits are not set by the state at this time, thus the reporting limits are acceptable and are not flagged. Oil and grease reporting limits ranged from 725 to 763 mg/kg which is above the 200 mg/kg in the SAP; however, this reporting limit is below the preliminary action limits of 2000 mg/kg in the SAP. No flags were applied.

  All required detection limits were met.

- **Completeness**

The data package for SDG H2242 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid. The completeness percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI 01435. Rev 0,Validation Procedure for Chemical Analysis

DOE-RL2000-60, Rev. 1, Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Pan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI-01435 and DOE/RL-2000-60.

U - Indicates the compound or analysis 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 concentration is an estimate, but the data was usable for decision making purposes.

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

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to 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 a major QC deficiency.

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

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

Appendix 2

Summary of Data Qualifiers

No data was qualified.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B17124	% Solids	87.3	%	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	1.43 u	MG/KG	1.43	1.0
		Nitrate by IC	2.41	MG/KG	1.43	1.0
		Cyanide, Total	0.50 u	MG/KG	0.50	1.0
		Phosphate by IC	15.0	MG/KG	1.4	1.0
		Chromium VI	0.46 u	MG/KG	0.46	1.0
		Sulfate by IC	26.4	MG/KG	1.4	1.0
		Nitrate Nitrite	1.1	MG/KG	0.23	1.0
		Ammonia, as N	5.3 u	MG/KG	5.3	1.0
		Oil & Grease Gravimetri	3620	MG/KG	763	1.0
		pH	6.4	SOIL PH	0.01	1.0
-002	B17115	% Solids	88.5	%	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	1.41 u	MG/KG	1.41	1.0
		Nitrate by IC	119	MG/KG	7.06	5.0
		Cyanide, Total	0.53 u	MG/KG	0.53	1.0
		Phosphate by IC	26.9	MG/KG	1.4	1.0
		Chromium VI	0.45 u	MG/KG	0.45	1.0
		Sulfate by IC	21.6	MG/KG	1.4	1.0
		Nitrate Nitrite	25.8	MG/KG	1.1	5.0
		Ammonia, as N	6.5 u	MG/KG	6.5	1.0
		Oil & Grease Gravimetri	753 u	MG/KG	753	1.0
		pH	6.5	SOIL PH	0.01	1.0

NORL in SAP
.5 TO 8,000
8200

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LICB38-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	03LCA51-MB1	Cyanide, Total	0.50	u	MG/KG	0.50	1.0
BLANK10	03LVI047-MB1	Chromium VI	0.40	u	MG/KG	0.40	1.0
BLANK10	03LN3A30-MB1	Nitrate Nitrite	0.20	u	MG/KG	0.20	1.0
BLANK10	03LAMA15-MB1	Ammonia, as N	5.0	u	MG/KG	5.0	1.0
BLANK10	03LOG026-MB1	Oil & Grease Gravimetri	667	u	MG/KG	667	1.0
BLANK1	03LCC51-MB1	Cyanide, Total	0.50	u	MG/KG	0.50	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	E17124	Chloride by IC	30.1	1.2	28.6	100.8	1.0
		Fluoride by IC	29.3	0.17	28.6	101.9	1.0
		Nitrite by IC	28.8	1.43u	28.6	100.7	1.0
		Nitrate by IC	31.9	2.41	28.6	103.0	1.0
		Cyanide, Total	5.62	0.50u	5.70	98.7	1.0
		Phosphate by IC	45.8	15.0	28.6	107.7	1.0
		Soluble Chromium VI	4.5	0.45u	4.6	92.8	1.0
		Insoluble Chromium VI	1370	0.45u	1380	99.3	100
		Sulfate by IC	58.0	26.4	28.6	110.5	1.0
		Nitrate Nitrite	6.8	1.1	5.9	97.9	1.0
		Ammonia, as N	205	5.3 u	228	90.0	1.0
		Oil & Grease Gravimetr	13500	3620	9080	108.5	1.0
BLANK10	03LICB38-MB1	Chloride by IC	24.6	1.2 u	25.0	98.4	1.0
		Fluoride by IC	24.7	1.2 u	25.0	98.8	1.0
		Nitrite by IC	24.6	1.25u	25.0	98.5	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.0	1.0
		Phosphate by IC	25.1	1.2 u	25.0	100.3	1.0
		Sulfate by IC	25.0	1.2 u	25.0	100.1	1.0
BLANK10	03LVI047-MB1	Soluble Chromium VI	3.6	0.40u	4.0	91.2	1.0
		Insoluble Chromium VI	1290	0.40u	1370	94.1	100
BLANK10	03LN3A30-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.4	1.0
BLANK10	03LAMA15-MB1	Ammonia, as N	195	5.0 u	200	97.5	1.0
		Ammonia, as N MSD	208	5.0 u	200	104.2	1.0
BLANK10	03LOG026-MB1	Oil & Grease Gravimetr	7950	667 u	7930	100.2	1.0
		Oil & Grease - Grav M	7870	667 u	7930	99.2	1.0

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Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	03LAMA15-MB1	Ammonia, as N	97.5	104.2	6.7
BLANK10	03LOG026-MB1	Oil & Grease - Grav	100.2	99.2	1.0

IC?
Cl6
NO2/NO3
pH.
cN
Sequent Ps OK

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/27/03

CLIENT: TNUHANFORD P03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B17124	% Solids	87.3	87.4	0.13	1.0
		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	1.43u	1.43u	NC	1.0
		Nitrate by IC	2.41	2.46	2.1	1.0
		Cyanide, Total	0.50u	0.54u	NC	1.0
		Phosphate by IC	15.0	16.4	9.1	1.0
		Chromium VI	0.46u	0.46u	NC	1.0
		Sulfate by IC	26.4	26.8	1.5	1.0
		Nitrate Nitrite	1.1	1.1	1.2	1.0
		Ammonia, as N	5.3 u	6.9 u	NC	1.0
		Oil & Grease Gravimetri	3620	3470	4.2	1.0
		pH	6.4	6.4	0.0	1.0
-002REP	B17115	Cyanide, Total	0.53u	0.54u	NC	1.0

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/27/03

CLIENT: TMUHANFORD F03-006 H2242 LVL LOT #: 0305L520
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCSS1	03LCA51-LCS1	Cyanide, Total LCS	1.89	2.0	MG/KG	94.4
LCSS2	03LCA51-LCS2	Cyanide, Total LCS	9.96	10.0	MG/KG	99.6
LCSS1	03LCC51-LCS1	Cyanide, Total LCS	1.92	2.0	MG/KG	95.9
LCSS2	03LCC51-LCS2	Cyanide, Total LCS	9.96	10.0	MG/KG	99.6

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B17116	% Solids	91.8		%	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	1.36	u	MG/KG	1.36	1.0
		Cyanide, Total	0.53	u	MG/KG	0.53	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	35.6		MG/KG	1.4	1.0
		Nitrate Nitrite	0.18	u	MG/KG	0.18	1.0
		Ammonia, as N	4.4	u	MG/KG	4.4	1.0
		Oil & Grease Gravimetri	726	u	MG/KG	726	1.0
		pH	6.9		SOIL PH	0.01	1.0
-002	B17123	% Solids	92.0		%	0.01	1.0
		Chloride by IC	1.4	u	MG/KG	1.4	1.0
		Fluoride by IC	1.4		MG/KG	1.4	1.0
		Nitrite by IC	1.36	u	MG/KG	1.36	1.0
		Nitrate by IC	1.36	u	MG/KG	1.36	1.0
		Cyanide, Total	0.54	u	MG/KG	0.54	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	35.1		MG/KG	1.4	1.0
		Nitrate Nitrite	0.21	u	MG/KG	0.21	1.0
		Ammonia, as N	5.4	u	MG/KG	5.4	1.0
		Oil & Grease Gravimetri	725	u	MG/KG	725	1.0
		pH	7.2		SOIL PH	0.01	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LICB38-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
BLANK10	03LICA39-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	03LC053-MB1	Cyanide, Total	0.50	u	MG/KG	0.50	1.0
BLANK10	03LVI048-MB1	Chromium VI	0.40	u	MG/KG	0.40	1.0
BLANK10	03LN3A30-MB1	Nitrate Nitrite	0.20	u	MG/KG	0.20	1.0
BLANK10	03LAMA15-MB1	Ammonia, as N	5.0	u	MG/KG	5.0	1.0
BLANK10	03LOG026-MB1	Oil & Grease Gravimetri	667	u	MG/KG	667	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B17116	Chloride by IC	53.0	0.14	54.4	97.0	2.0
		Fluoride by IC	53.9	0.22	54.4	98.5	2.0
		Nitrite by IC	52.5	1.36u	54.4	96.4	2.0
		Nitrate by IC	52.5	1.36u	54.4	96.4	2.0
		Cyanide, Total	5.04	0.53u	5.11	98.7	1.0
		Phosphate by IC	52.1	1.4 u	54.4	95.7	2.0
		Soluble Chromium VI	4.2	0.44u	4.4	88.4	1.0
		Insoluble Chromium VI	1540	0.44u	1640	93.8	100
		Sulfate by IC	92.0	35.6	54.4	103.6	2.0
		Nitrate Nitrite	5.2	0.18u	5.4	96.2	1.0
		Ammonia, as N	207	4.4 u	216	96.0	1.0
-002	B17123	Oil & Grease Gravimetr	8790	725 u	8630	101.9	1.0
BLANK10	03LICB38-MB1	Chloride by IC	24.6	1.2 u	25.0	98.4	1.0
		Fluoride by IC	24.7	1.2 u	25.0	98.8	1.0
		Nitrite by IC	24.6	1.25u	25.0	98.5	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.0	1.0
		Phosphate by IC	25.1	1.2 u	25.0	100.3	1.0
		Sulfate by IC	25.0	1.2 u	25.0	100.1	1.0
BLANK10	03LICA39-MB1	Chloride by IC	23.9	1.2 u	25.0	95.8	1.0
		Fluoride by IC	24.2	1.2 u	25.0	97.0	1.0
		Nitrite by IC	23.5	1.25u	25.0	93.9	1.0
		Nitrate by IC	24.1	1.25u	25.0	96.4	1.0
		Phosphate by IC	24.4	1.2 u	25.0	97.4	1.0
		Sulfate by IC	24.4	1.2 u	25.0	97.8	1.0
BLANK10	03LVI048-MB1	Soluble Chromium VI	3.9	0.40u	4.0	98.6	1.0
		Insoluble Chromium VI	1120	0.40u	1180	95.1	100
BLANK10	03LNA30-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.4	1.0
BLANK10	03LAMA15-MB1	Ammonia, as N	195	5.0 u	200	97.5	1.0
		Ammonia, as N MSD	208	5.0 u	200	104.2	1.0
BLANK10	03LOG026-MB1	Oil & Grease Gravimetr	7950	667 u	7930	100.2	1.0
		Oil & Grease - Grav M	7870	667 u	7930	99.2	1.0

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Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	03LAMA15-MB1	Ammonia, as N	97.5	104.2	6.7
BLANK10	03LOG026-MB1	Oil & Grease - Grav	100.2	99.2	1.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B17116	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	1.36u	1.36u	NC	1.0
		Cyanide, Total	0.53u	0.50u	NC	1.0
		Phosphate by IC	1.4 u	1.4 u	NC	1.0
		Chromium VI	0.44u	0.44u	NC	1.0
		Sulfate by IC	35.6	35.8	0.44	1.0
		Nitrate Nitrite	0.18u	0.22u	NC	1.0
		Ammonia, as N	4.4 u	5.0 u	NC	1.0
		pH	6.9	6.9	0.1	1.0
-002REP	B17123	Oil & Grease Gravimetri	725 u	725 u	NC	1.0

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/27/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCSS1	03LC053-LCS1	Cyanide, Total LCS	1.93	2.0	MG/KG	96.5
LCSS2	03LC053-LCS2	Cyanide, Total LCS	10.2	10.0	MG/KG	101.7

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Appendix 4

Laboratory Narrative and Chain of Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-006 H2242
LVL#: 0305L520 and 0305L533

W.O.#: 11343-606-001-9999-00
Date Received: 05-29,30-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 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.

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, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia and Oil and Grease were within the 75-125% control limits.

8. The replicate analyses for Percent Solids, Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia, Oil and Grease and pH were within the 20% Relative Percent Difference (RPD) control limit.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

06-27-03
Date

njpl05-520,533

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 29 pages.

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

07

Lionville Laboratory Use Only
0305L520

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI 5

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: ~~TNLL Internal~~ F03-006
Est. Final Proj. Sampling Date:
Project #: 11342.006-001-9999.00
Project Contact/Phone #:
Lionville Laboratory Project Manager: 05
QC: SPEC Del: STD TAT: 30 days

Date Rec'd: 5/29/03 Date Due: 6-28-03

		A	B	C	D	E	F	G
Refrigerator #		1	2	2	2	2	2	2
#/Type Container	Liquid	1AGL	1AGL	1AGL				
	Solid	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL
Volume	Liquid							
	Solid	60	125	60	60	125	60	60
Preservatives								
ANALYSES REQUESTED	ORGANIC: VOA							
	ORGANIC: BNA							
	ORGANIC: Pest/PCB							
	ORGANIC: Herb							
	INORG: Metal							
	INORG: CN							
	Cr Hex							
	IC Anions							
	NO2/NO3							
	Oil + Grease							

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 (✓) MS	MSD	Matrix	Date Collected	Time Collected	OGCSC 0624+1	0625X ODEO OGMO						MET ①		ICP 6	INORG ①	IN3N 2	IOGGR
001	B17124	✓	✓	S	5/29/03	0945	1	1						1		1	1	1	1
002	B17115			L	L	0830	1	✓						1		1	✓	1	1

Special Instructions: SAF # F03-006
Run Matrix QC on -001
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO_4, SO_4
IN3N, IPH, ICNTO

DATE/REVISIONS:
5-30-03 1. ~~Rec'd~~ 0624+1 Add OGCSC
6-2-03 2. Add to -002 same analyses as in -001
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/29/03	1000

Relinquished by	Received by	Date	Time
COMPOSITE WASTE		ORIGINAL REWRITTEN	

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

Lionville Laboratory Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # 7922567884 51
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 1.7 °C

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	Page 1 of 1
Collector: Johansen/Pope/Pfister	Company Contact: LC Halstrom	Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code: 8N; Air Quality ☐; Data Turnaround: 45 Days
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) ~~52.5-55.R~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	
Ice Chest No.: ERC 03 101	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No.: A030240		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ MJS 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See Item (1) in Special Instructions. VOA 8260	See Item (2) in Special Instructions.	See Item (3) in Special Instructions.	Chromium Hex - 7196	See Item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See Item (5) in Special Instructions.	See Item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
~~B17115~~	~~SOIL~~	~~5/20/03~~	~~0830~~	X	X	X	X	X	X	X			52803
B17124	SOIL	5/20/03	0945	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 Ref	Date/Time: 5/20/03 1317
Relinquished By/Removed From: HO-64-427 Ref	Date/Time: 5/22/03 1120	Received By/Stored In: Johansen/Pope/Pfister	Date/Time: 5/22/03 1120
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/22/03 1150	Received By/Stored In: REF 1A 3728	Date/Time: 5/22/03 1150
Relinquished By/Removed From: REF 1A 3728	Date/Time: 52803 0800	Received By/Stored In: SJGALE	Date/Time: 52803 0800
Relinquished By/Removed From: SJGALE	Date/Time: 52803 0800	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FedEX	Date/Time: 5/29/03 1000	Received By/Stored In: JPerry	Date/Time: 5/29/03 1000

SPECIAL INSTRUCTIONS
~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G.
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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-10 (C3247) ~~52.5-55 R~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 02 010	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No.: RSR 107187		Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ MJS 5-23-03 Radioactive TIE TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1		1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17115	SOIL	5/20/03	0830	X	X	X	X	X	X	X			
~~B17124~~	~~SOIL~~	~~5/20/03~~	~~0945~~	X	X	X	X	X	X	X	52803		

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: Johansen/Pope/Pfister Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 REF Date/Time: 5/20/03 1317	
Relinquished By/Removed From: HO-64-427 REF Date/Time: 5/22/03 1120	Received By/Stored In: Johansen/Pope/Pfister Date/Time: 5/22/03 1120	
Relinquished By/Removed From: Johansen/Pope/Pfister Date/Time: 5/22/03 1150	Received By/Stored In: REF 1A 3728 Date/Time: 5/22/03 1150	
Relinquished By/Removed From: REF 1A 3728 52803 Date/Time: 0800	Received By/Stored In: SJGALE Date/Time: 52803 0800	
Relinquished By/Removed From: SJGALE 52803 Date/Time: 0800	Received By/Stored In: FED EX Date/Time:	
Relinquished By/Removed From: FED EX Date/Time: 5-29-03 1000	Received By/Stored In: [signature] Date/Time:	

SPECIAL INSTRUCTIONS 5/20/03
~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon-14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Diethyl ether, Ethylene glycol, Methanol)
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (2-Butoxyethanol, Tributyl phosphate); TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel); Mercury - 7471 - (CV)
(4) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-~~

Matrix *
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
5/20/03

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

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

Lionville Laboratory Use Only
0305L533

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI Hossner Laboratories

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: DSL Hartford F03-006
Est. Final Proj. Sampling Date:
Project #: 11243-006-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: CJ
QC: Spec Del: STD TAT: 30 days

Date Rec'd: 5/30/03 Date Due: 6-29-03

	A	B			C	D		E		F	G	H			
Refrigerator #	1	2			1	2		2		2	2	2			
#/Type Container – Liquid															
#/Type Container – Solid	ASL	ASL			ASL	ASL		ASL		ASL	ASL	ASL			
Volume – Liquid															
Volume – Solid	60	125/60			60/60	60		60/125		60	125/60				
Preservatives															
ANALYSES REQUESTED	ORGANIC: VOA	BNA	Pest/PCB	Herb				INORG: Metal	CN	Cr6	TC, Anions	NO2/NO3			

Lionville Laboratory Use Only

MATRIX CODES	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	0624H	0625X 0626 0620			0605C	0606A		MET ①		ICR6	INORG ①	IN3N2			
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	B17116			S	5/27/03	1030	1	1			1	1		1		1	1	1			
	002	B17123			↓	↓	↓	1	1			1	1		1		1	1	1			

Special Instructions: SAF # F03-006
Run Matrix QC

MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO_4, SO_4
INH_3N, IPH, ICNTO

DATE/REVISIONS:
002C 1. Label says see special item (5). This is not a required item. No bottle was received for item (1) so this bottle was assigned to (1).
2.
002B,C,E,G Bottle size does not match size indicated on COC.
4.
6-2-03 5. Change 0624X to 0624H
6.

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___
Airbill # See below
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

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

Relinquished by	Received by	Date	Time
FedEx	J Perry	5/30/03	0945

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

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

Airbill # 7907 9459 8746

27

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-107	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-10 (C3247) 62.5-65 ft	SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03-103	Field Logbook No.: HNF-N-3361 — COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ Berea	Offsite Property No.: 030 226	Bill of Lading/Air Bill No.: SFEOSR	

POSSIBLE SAMPLE HAZARDS/REMARKS: B17133; ~~B17134~~ mo 5-27-03 N/A
Radiological Tie To: ~~B17186~~ mo 5-27-03 (B17116; B17123)

Special Handling and/or Storage: N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL

SAMPLE ANALYSIS

Sample No.	Matrix*	Sample Date	Sample Time	See Item (1) in Special Instructions.	See Item (2) in Special Instructions.	See Item (3) in Special Instructions.	Chromium Hex - 7196	See Item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See Item (5) in Special Instructions.	See Item (6) in Special Instructions.	Tritium - H3
B17116	SOIL	5-27-03	1030	X	X	X	X	X	X	X			
B17123	Soil	5-27-03	1030	X	X	X	X	X	X	X		mo 5-27-03	
~~B17~~ B17122	Soil	5-27-03	1110	X	X	X	X	X	X	X		mo 5-27-03	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[illegible]	5/27/03 1415	ERC R. Gooch	5-27-03 1445
R. Gooch	5-27-03 1445	IB 3728	5-27-03 1415
IB	5-27-03 1000	R. Gooch	5-27-03 1000
R. Gooch	5-27-03 1000	Fed Ex	
Fed Ex	5/30/03 0945	[illegible]	5/30/03 0945

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Diethyl ether, Ethylene glycol, Methanol)
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (2-Butoxyethanol, Tributyl phosphate); TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel); Mercury - 7471 - (CV)
(4) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
(6) ~~Technetium-99; Strontium-89,90; Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129~~ ~~Nickel-63; Ni-Di Nickel-63~~

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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-114	Page 2 of 2
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom	Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code: 8N; Air Quality ☐; Data Turnaround: 45 Days
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) ~~318.5-321 ft~~ TMS 5-27-03 62.5-65'		SAF No.: F03-006	
Ice Chest No.: ERC 03 103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ TMS 5-27-03 Necra	Offsite Property No.: 17030-276		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~N/A~~ Radioactive Tie To: See Below

Special Handling and/or Storage

N/A

Preservation	None	Cool 4C										
Type of Container	aG	aG										
No. of Container(s)		1										
Volume	60mL	60 mL										
	Alum - H3	See special instruction (T)										

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time				Tie To:					
B17123	SOIL	5-27-03	1030		X		B17133					
B17116	Soil	5-27-03	1030		X		B17133					
~~B17122~~ 5.29.03	~~Soil~~	~~5-27-03~~	~~1110~~		~~X~~		~~B17134~~					

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[illegible]	5-27-03 1415	ERC [illegible]	5-27-03 1415
[illegible]	5-27-03 1410	[illegible]	5-27-03 1415
IB 3728	5-29-03 1000	[illegible]	5-29-03 1000
ERC [illegible]	5-29-03 1000	Fed Ex	
Fed Ex	5/30/03 0945	J Perry	5/30/03 0945

SPECIAL INSTRUCTIONS

** 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.

(T) VOA-8260A (TCL); VOA-8260A (Add-On) {2-Pentanone, Benzyl alcohol, n-Butylbenzene}

Matrix *

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

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

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

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

rchase Order/Project:

DATE: 5/29/03

F# / SOW# / Release #: F03-006

boratory SDG #: 03054520

OTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? See below	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
10. Shipment meets Lvl.1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-101 / TRK# 7922 5678 8451 / 1.7°C (Sample 001)
ERC-03-100 / 839350745320 / 5.8°C (Sample 002)

Laboratory Sample Custodian: J Perry 5/29/03 1000

Laboratory Project Manager:

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LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

Purchase Order/Project:

DATE: 5/30/03

SAF# / SOW# / Release #: F03-006

Laboratory SDG #: 0305L533

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (1)
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? 7907 9459 8746	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (2)
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☐ Yes	☐ No	☑ N/A	☐ see Comment #
10. Shipment meets LvL1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-103 / 4°C

(1) No custody seals
(2) 002C Label says see item (5). This is not a requested item. No bottle was recieved for item (1), so this bottle was assigned to (1).
002B,C,E,G - Bottle size doesn't match client C (60 mL to a 125 mL or vice-versa)

Laboratory Sample Custodian: JKerry 5/30/03 0945

Laboratory Project Manager:

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Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 Area Source Characte			DATA PACKAGE:		
VALIDATOR: MAN		LAB:		DATE: 11/15/03	
CASE:			SDG: H 2242		
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	% Solids	CN
SAMPLES/MATRIX					

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: _____

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: _____

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) JJ 1/13/04

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:

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: _____

JAN 2004
RECEIVED

Date: November 14, 2003
To: Fluor Hanford Inc.
From: EQM
Project: PW-2, 216-A-10 Borehole (C3247)
Subject: Radiochemistry-Data Package No. H2242

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2242 prepared by Eberline Services. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B17115	05/20/03	Soil	C	See note 1
B17116	05/27/03			
B17123	05/27/03			
B17124	05/20/03			

1- Gamma Spectroscopy, alpha spectroscopy (U-iso, Pu-iso, Th-iso), Am-241, Np-237, Total-U, Tc-99, Sr-89, 90 (Total), C-14, I-129, Ni-63, H-3.

Data validation was conducted in accordance with BHI validation procedure, *Data Validation Procedure for Radiochemical Analysis*, October 2000, BHI-01433, Rev. 0 and the *Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, DOE/RL-2000-60, Rev. 1. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client – not apply

DATA QUALITY PARAMETERS

- **Holding Times**

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

  All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

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

The Tc-99 blank results were greater than the MDA, the Tc-99 sample results were greater than the MDA but less than 5X the RDL. Therefore, all Tc-99 results were "J" flagged.

For Cs-137, the blank results did exceed the RDL, however, all Cs-137 sample results were greater than the MDA and greater than 5X the Cs-137 blank results, and therefore no qualifiers were necessary for Cs-137.

For Co-60, Eu-152, Eu-154, Eu-155, Ra-226 and Ra-228, the blank results were reported as "U", but the reported MDA's were greater than the RDL's. In those cases, the MDA's were used in the data evaluation criteria for the blanks. Based on the evaluation, "J" qualifiers were applied for the above listed isotopes except to Co-60 for sample B17123. For that sample, the MDA for Co-60 was 0.041 pCi/g, which is less than the RDL of 0.050 pCi/g. Therefore no qualifier was applied.

Field Blank

No field blanks were submitted for analysis.

- Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 65-135%. 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, or not qualified, depending on the activity of the individual sample. Results are rejected for

LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All LCS accuracy results were acceptable.

Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

- Laboratory Duplicates

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If a duplicate sample was not analyzed, qualify all associated sample results as estimated (J, UJ). If the sample and duplicate concentration are both >5xRDL and the RPD is >20% for water samples (>35% for soil samples), qualify all associated sample and duplicate results as estimated (J). If both sample and duplicate results are non-detect, no qualification is required. If either or both of the sample and duplicate sample concentrations are <5xRDL, the above RPD criteria do not apply and the range of the sample and duplicate concentrations must be evaluated as follows:

- If the range in concentration between the sample result(s) or quantitation limit(s) are ≤RDL unit for water samples (≤2xRDL units for soil samples), no qualification is required.
- If the range in concentration between the sample result of quantitation limit are >RDL unit for water samples (>2xRDL units for soil samples), then qualify all associated sample results as estimated (J). Non-detects are not qualified.

The Eu-152, Eu-154 and Eu-155 results were "J" flagged due to duplicate criteria not being met.

Field Duplicate

Samples B17116 and B17123 were field duplicates. The RPD's are calculated when both the sample results and the duplicate results are greater than 5X the analyte specific RDL. The RPD for Total Sr was 72%, for Ra-226 was 37%, and for Eu-152 was 41% all of which exceeded the required RPD of 35% for soils. In addition, if either the sample or duplicate is less than 5X the analyte specific RDL, the range of the sample and duplicate concentrations must be evaluated. The range for Eu-154 exceeded the criteria of 2X the RDL.

As per the data validation procedure, data qualifiers are not required for field duplicate RPD's. The information is provided to alert data users to uncertainties in the data set during decision making.

- Detection Levels

  The reported MDA's exceeded the RDL's for Pu-238, Pu-239/240, Co-60, Cs-137, Eu-152, Eu-154 and Eu-155 for some of the samples. However, for the Cs-137 the sample results were 300 times the RDL's. As per the data validation procedure, no qualifiers are required to be applied to the data.

- Completeness

  Data package No.H2242 was submitted for validation and verified for completeness. Completeness is based on the percentage of date determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

- Due to blank results exceeding the data validation criteria, "J" qualifiers were applied to Tc-99, Co-60, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226 and Ra-228 for some samples.

- The Eu-152, Eu-154 and Eu-155 results were "J" flagged due to duplicate criteria not being met.

- Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

REFERENCES

Data Validation Procedure for Radiochemical Analysis, October 2000, BHI-01433, Rev. 0

Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan, DOE/RL-2000-60, Rev. 1.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimated, 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 date are unusable.

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2242	REVIEWER: KAB	DATE: 11/12/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	**QUALIFIER**	**COMPOUND**	**REASON**
B17115	J	Co-60	Blank
	J	Ra-226	Blank
	J	Ra-228	Blank
	J	Tc-99	Blank
	J	Eu-152	Duplicate
	J	Eu-154	Duplicate
	J	Eu-155	Duplicate
	J	C-14	No matrix spike
B17116	J	Co-60	Blank
	J	Ra-226	Blank
	J	Ra-228	Blank
	J	Tc-99	Blank
	J	Eu-152	Duplicate
	J	Eu-154	Duplicate
	J	Eu-155	Duplicate
	J	C-14	No matrix spike
B17123	J	Ra-226	Blank
	J	Ra-228	Blank
	J	Tc-99	Blank
	J	Eu-152	Duplicate
	J	Eu-154	Duplicate
	J	Eu-155	Duplicate
	J	C-14	No matrix spike
B17124	J	Co-60	Blank
	J	Ra-226	Blank
	J	Ra-228	Blank
	J	Tc-99	Blank
	J	Eu-152	Duplicate
	J	Eu-154	Duplicate
	J	Eu-155	Duplicate
	J	C-14	No matrix spike

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2242

7528-001 B17124

DATA SHEET

SDG	7528	Client/Case no	Hanford SDG H2242
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305191-01	Client sample id	B17124
Dept sample id	7528-001	Location/Matrix	216-A-10 (C3247) SOLID
Received	05/29/03	Collected/Weight	05/20/03 09:45 185.0 g
% solids	87.2	Custody/SAF No	F03-006-106 F03-006

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	319	3.2	0.48	400		H
Carbon 14	14762-75-5	0.950	1.4	2.3	50	U J	C
Nickel 63	13981-37-8	-0.546	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	0.614	0.20	0.27	1.0		SR
Technetium 99	14133-76-7	0.796	0.22	0.56	15	B J	TC
Thorium 228	14274-82-9	0.484	0.14	0.094			TH
Thorium 230	14269-63-7	0.008	0.12	0.27	1.0	U	TH
Thorium 232	TH-232	0.526	0.14	0.065	1.0		TH
Total Uranium (ug/g)	7440-61-1	1.68	0.18	0.004	1.0		U_T
Uranium 233/234	U-233/234	1.01	0.33	0.10	1.0		U
Uranium 235	15117-96-1	0.227	0.17	0.22	1.0		U
Uranium 238	U-238	0.703	0.28	0.18	1.0		U
Neptunium 237	13994-20-2	0.032	0.064	0.096	1.0	U	NP
Plutonium 238	13981-16-3	132	42	26	1.0		PU
Plutonium 239/240	PU-239/240	3120	330	26	1.0		PU
Americium 241	14596-10-2	738	190	0.53	1.0		AM
Iodine 129	15046-84-1	10.3	0.90	1.7	2.0		I
Potassium 40	13966-00-2	19.6	3.4	2.1			GAM
Cobalt 60	10198-40-0	U		0.18	0.050	U J	GAM
Cesium 137	10045-97-3	488	3.1	0.93	0.10		GAM
Radium 226	13982-63-3	U		1.8		U J	GAM
Radium 228	15262-20-1	U		1.7		U J	GAM
Europium 152	14683-23-9	U		2.6	0.10	U J	GAM
Europium 154	15585-10-1	U		0.62	0.10	U J	GAM
Europium 155	14391-16-3	U		1.5	0.10	U J	GAM
Thorium 228	14274-82-9	U		1.0		U	GAM
Thorium 232	TH-232	U		1.7		U	GAM
Uranium 235	15117-96-1	U		2.3		U	GAM

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

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2242

7528-002 B17115

DATA SHEET

SDG	7528	Client/Case no	Hanford SDG H2242
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305191-02	Client sample id	B17115
Dept sample id	7528-002	Location/Matrix	216-A-10 (C3247) SOLID
Received	05/29/03	Collected/Weight	05/20/03 08:30 159.7 g
% Solids	88.1	Custody/SAF No	F03-006-106 F03-006

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	145	1.5	0.31	400		H
Carbon 14	14762-75-5	1.58	1.5	2.5	50	U J	C
Nickel 63	13981-37-8	-1.22	1.3	2.3	30	U	NI_L
Total Strontium	SR-RAD	0.637	0.20	0.27	1.0		SR
Technetium 99	14133-76-7	0.791	0.25	0.48	15	B J	TC
Thorium 228	14274-82-9	0.858	0.20	0.093			TH
Thorium 230	14269-63-7	0.702	0.20	0.21	1.0		TH
Thorium 232	TH-232	0.507	0.14	0.075	1.0		TH
Total Uranium (ug/g)	7440-61-1	1.04	0.12	0.004	1.0		U_T
Uranium 233/234	U-233/234	1.04	0.35	0.19	1.0		U
Uranium 235	15117-96-1	0.120	0.12	0.23	1.0	U	U
Uranium 238	U-238	0.666	0.25	0.19	1.0		U
Neptunium 237	13994-20-2	0.052	0.052	0.078	1.0	U	NP
Plutonium 238	13981-16-3	316	71	25	1.0		PU
Plutonium 239/240	PU-239/240	7110	650	25	1.0		PU
Americium 241	14596-10-2	1320	340	0.58	1.0		AM
Iodine 129	15046-84-1	3.41	0.83	1.8	2.0		I
Potassium 40	13966-00-2	27.2	3.4	2.1			GAM
Cobalt 60	10198-40-0	U		0.22	0.050	U J	GAM
Cesium 137	10045-97-3	1080	4.0	1.4	0.10		GAM
Radium 226	13982-63-3	U		1.7		U J	GAM
Radium 228	15262-20-1	U		1.3		U J	GAM
Europium 152	14683-23-9	U		3.2	0.10	U J	GAM
Europium 154	15585-10-1	U		0.63	0.10	U J	GAM
Europium 155	14391-16-3	U		1.9	0.10	U J	GAM
Thorium 228	14274-82-9	U		1.6		U	GAM
Thorium 232	TH-232	U		1.3		U	GAM
Uranium 235	15117-96-1	U		3.3		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2242

7528-003 B17116

DATA SHEET

SDG	7528	Client/Case no	Hanford SDG H2242
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305291-03	Client sample id	B17116
Dept sample id	7528-003	Location/Matrix	216-A-10 (C3247) SOLID
Received	05/30/03	Collected/Weight	05/27/03 10:30 209.3 g
% solids	90.9	Custody/SAF No	F03-006-107 F03-006

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	134	1.4	0.30	400		H
Carbon 14	14762-75-5	0.356	1.3	2.2	50	U J	C
Nickel 63	13981-37-8	-0.994	1.3	2.3	30	U	NI_L
Total Strontium	SR-RAD	11.1	0.59	0.24	1.0		SR
Technetium 99	14133-76-7	0.785	0.21	0.55	15	B J	TC
Thorium 228	14274-82-9	0.572	0.15	0.091			TH
Thorium 230	14269-63-7	0.581	0.17	0.22	1.0		TH
Thorium 232	TH-232	0.353	0.12	0.073	1.0		TH
Total Uranium (ug/g)	7440-61-1	2.78	0.32	0.004	1.0		U_T
Uranium 233/234	U-233/234	1.39	0.41	0.19	1.0		U
Uranium 235	15117-96-1	0.150	0.12	0.23	1.0	U	U
Uranium 238	U-238	1.22	0.36	0.19	1.0		U
Neptunium 237	13994-20-2	0.132	0.11	0.079	1.0		NP
Plutonium 238	13981-16-3	0.070	0.070	0.27	1.0	U	PU
Plutonium 239/240	PU-239/240	0.805	0.36	0.27	1.0		PU
Americium 241	14596-10-2	70.6	6.5	0.28	1.0		AM
Iodine 129	15046-84-1	4.40	0.84	1.7	2.0		I
Potassium 40	13966-00-2	22.8	1.4	0.61			GAM
Cobalt 60	10198-40-0	U		0.069	0.050	U J	GAM
Cesium 137	10045-97-3	294	1.0	0.25	0.10		GAM
Radium 226	13982-63-3	U		0.75		U J	GAM
Radium 228	15262-20-1	1.06	0.26	0.26		J	GAM
Europium 152	14683-23-9	U		0.85	0.10	U J	GAM
Europium 154	15585-10-1	U		0.41	0.10	U J	GAM
Europium 155	14391-16-3	U		0.49	0.10	U J	GAM
Thorium 228	14274-82-9	0.860	0.26	0.38			GAM
Thorium 232	TH-232	1.06	0.26	0.26			GAM
Uranium 235	15117-96-1	U		0.83		U	GAM

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SAMPLE DELIVERY GROUP H2242

7528-004

B17123

DATA SHEET

SDG	7528	Client/Case no	Hanford — SDG H2242
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305191-04	Client sample id	B17123
Dept sample id	7528-004	Location/Matrix	216-A-10 (C3247) — SOLID
Received	05/30/03	Collected/Weight	05/27/03 10:30 — 230.6 g
% solids	90.3	Custody/SAF No	F03-006-107 — F03-006

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	160	1.6	0.33	400		H
Carbon 14	14762-75-5	1.44	1.3	2.2	50	U J	C
Nickel 63	13981-37-8	0.299	1.3	2.3	30	U	NI_L
Total Strontium	SR-RAD	5.23	0.43	0.26	1.0		SR
Technetium 99	14133-76-7	1.03	0.23	0.54	15	B J	TC
Thorium 228	14274-82-9	0.454	0.22	0.20			TH
Thorium 230	14269-63-7	0.959	0.33	0.20	1.0		TH
Thorium 232	TH-232	0.479	0.22	0.20	1.0		TH
Total Uranium (ug/g)	7440-61-1	2.64	0.30	0.004	1.0		U T
Uranium 233/234	U-233/234	0.938	0.29	0.18	1.0		U
Uranium 235	15117-96-1	0.114	0.11	0.22	1.0	U	U
Uranium 238	U-238	0.891	0.29	0.18	1.0		U
Neptunium 237	13994-20-2	0.040	0.079	0.30	1.0	U	NP
Plutonium 238	13981-16-3	0	0.33	1.2	1.0	U	PU
Plutonium 239/240	PU-239/240	0.976	0.66	1.2	1.0	U	PU
Americium 241	14596-10-2	78.8	7.0	0.26	1.0		AM
Iodine 129	15046-84-1	5.17	0.68	1.4	2.0		I
Potassium 40	13966-00-2	21.1	0.82	0.38			GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	347	0.70	0.16	0.10		GAM
Radium 226	13982-63-3	0.516	0.19	0.25		J	GAM
Radium 228	15262-20-1	0.984	0.20	0.18		J	GAM
Europium 152	14683-23-9	U		0.56	0.10	U J	GAM
Europium 154	15585-10-1	0.200	0.12	0.14	0.10	J	GAM
Europium 155	14391-16-3	U		0.32	0.10	U J	GAM
Thorium 228	14274-82-9	0.633	0.19	0.27			GAM
Thorium 232	TH-232	0.984	0.20	0.18			GAM
Uranium 235	15117-96-1	U		0.54		U	GAM

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2242 was composed of four 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

There was contamination in the method blank (0.773 pCi/g). The activity was below the RDL for Tc-99 (15 pCi/g). The activity in the method blank is probably from a long-lived isotope in the tracer. No other 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

The Th-230 RPD between sample B17115 and its sample duplicate was 83%, greater than the 3σ limit of 75%. The difference between sample B17115 and its sample duplicate was less than the RDL (1.0 pCi/g) for Th-230. No other problems were encountered during the course of the analyses.

2.8 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.9 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.10 Neptunium-237 Analyses

The LCS percent recovery (74%) was below the laboratory protocol limits (80 to 120%), but was within the contract limits (70 to 130%). No other problems were encountered during the course of the analyses.

2.11 Isotopic Plutonium Analyses

The Pu samples were reanalyzed because samples B17124 and B17115 cross contaminated each other, and the other Pu samples. The data from the reanalysis of the Pu samples is reported herein. No problems were encountered during the course of the reanalyses.

2.12 Americium-241 Analyses

Due to Pu contamination in the Am-241 sample aliquots samples B17124, B17115, and the sample duplicate were reworked in chemistry to remove the contamination. The data from the rework of the samples are reported herein. No other problems were encountered during the course of the analyses.

2.13 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Melissa Mannion
Melissa C. Mannion
Program Manager

7/22/3
Date

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-106	Page 1 of 1

Collector Johansen/Pope/Pfister H2242 (7528)	**Company Contact** LC Hulstrom	**Telephone No.** 373-3928 H2242 (7528)	**Project Coordinator** TRENT, SJ
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	**Sampling Location** 216-A-10 (C3247) ~~52.5-55 ft~~ MJS 5-20-03 52-54'; 54'-56'		**SAF No.** F03-006
Ice Chest No. ERC 99 022	**Field Logbook No.** HNF-N-3361	**COA** 117504ES10	**Method of Shipment** Federal Express
Shipped To EBERLINE SERVICES (Formerly TMA)	**Offsite Property No.** A030268		**Bill of Lading/Air Bill No.** SEE OSPC

Price Code 8N **Data Turnaround** 45 Days

Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A MJS 5-22-03 Radioactive TieTO: B17131 B17132

Special Handling and/or Storage

N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196 5/21/03	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
~~B17115~~	~~SOIL~~	~~5-20-03~~	~~0830~~				52803				X	X	X
B17124	SOIL	5-20-03	0945								X	X	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Johansen/Johansen	5/20/03 1317	HO-64-427 ReF	5/20/03 1317
HO-64-427 ReF	5/22/03 1120	Tr Johansen/Johansen	5/22/03 1120
Johansen/Johansen FH	5/22/03 1150	REF 1A 52203	1150
REF 1A 52803	0800	SJGALE	52803 0800
SJGALE	52803 0800	FED EX	
FED EX		[signature]	5-28-03 1000

SPECIAL INSTRUCTIONS

** 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.~~ 5/20/03 [initials]

~~(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}~~
~~(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH Diesel Range - WTPH-D; TPH Gasoline Range - WTPH-G.~~
~~(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)~~
~~(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010~~
(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium
(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-129; Nickel-63; Neptunium-237

Matrix *

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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-106	Page 1 of 1

Collector: Johansen/Pope/Pfister H2242 (7528)	Company Contact: LC Hulstrom	Telephone No.: 373-3928 H2242 (7528)	Project Coordinator: TRENT, SJ
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) ~~52.5-55 ft~~ MJS-20-03 52-54'; 54'-56'		SAF No.: F03-006
Ice Chest No.: ERC 96 009	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express
Shipped To: EBERLINE SERVICES (Formerly TMA)	Offsite Property No.: RSR 107188		Bill of Lading/Air Bill No.: N/A

Price Code: 8N

Air Quality ☐

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

~~N/A~~ MJS 5-22-03 Radioachue TIETO: B17131 B17132

Special Handling and/or Storage

N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196 5/21/03	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17115	SOIL	5-20-03	0830								X	X	X
~~B17124~~	~~SOIL~~	~~5-20-03~~	~~0945~~								~~X~~	~~X~~	~~X~~
						52803							

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Johansen/Johansen	5/20/03 1317	HO-64-427 ReF	5/20/03 1317
HO-64-427 ReF	5/22/03 1120	Johansen/Johansen	5/22/03 1120
Johansen/Johansen FH	5/22/03 1150	REF 1A 52203	1150
REF 1A 52803	0800	SJGALE	52803 0800
SJGALE	52803 0800	FED EX	
FED EX		[signature]	5-29-03 1000

SPECIAL INSTRUCTIONS

** 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.~~ 5/20/03 [initials]

~~(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}~~
~~(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH Diesel Range - WTPH-D; TPH Gasoline Range - WTPH-G~~
~~(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)~~
~~(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010~~
(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium
(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-129; Nickel-63; Neptunium-237

Matrix *

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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-107	Page 1 of 1

Collector: Johansen/Pope/Pfister H2242 (7528)	Company Contact: LC Hulstrom	Telephone No.: 373-3928	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days	Air Quality ☐	
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) 62.5-65 ft H2242 (7528)	SAF No.: F03-006	
Ice Chest No.: ERC 99-508	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express
Shipped To: EBERLINE SERVICES (Formerly TMA)	Offsite Property No.: A030 269	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
TMS 5-27-03
N/A
Radiological Tie To: B17116 B17133; ~~B17134~~ RF 5-29-03

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

TMS 5-27-03

Sample No.	Matrix *	Sample Date	Sample Time									
B17116	SOIL	5-27-03	1030							X	X	X
B17123	Soil	5-27-03	1030							X	X	X
~~B17122 5-29-03 RF~~	~~Soil~~	~~5-27-03~~	~~1110~~							~~X~~	~~X~~	~~X~~

TMS 5-27-03

TMS 5-27-03

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: Mon Carlton Pfister	5-27-03 1415	Received By/Stored In: RFolle R. Fahlk	5-27-03 1415
Relinquished By/Removed From: R. Folle R. Fahlk	5-29-03 1415	Received By/Stored In: JB 3728	5-29-03 1415
Relinquished By/Removed From: JB 3728	5-29-03 1000	Received By/Stored In: R. Folle R. Fahlk	5-29-03 1000
Relinquished By/Removed From: ERC R. Folle R. Fahlk	5-29-03 1000	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: FED EX		Received By/Stored In:	5-30-03 1000
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, ~~Diethyl ether, Ethylene glycol, Methanol~~}
(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A ~~(Add-On) (2-Butoxyethanol, Tributyl phosphate)~~; ~~TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G~~
(3) ~~ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver)~~; ~~ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel)~~; Mercury - 7471 - (GV)
(4) ~~IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3, pH (Soil) - 9045, Total Cyanide - 9010~~
(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium
(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-129; Nickel-63; Neptunium-237

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

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

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

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 216-A-10 Borehole (C3247)			DATA PACKAGE: H2242		
VALIDATOR: K. Brammer		LAB: Eberline		DATE:	
CASE:			SDG: H2242		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90 total	Tritium-3H	Alpha Spectrometry	Gamma Spectrometry	
Total Uranium	Radium-22	(Tritium)	C-14	Ni-63	I-129
SAMPLES/MATRIX B17115, B17116, B17123, B17124					
soil					

1. Completeness ..... ☐ N/A

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

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

Method blank analyzed within required frequency? ..... (Yes) No N/A
Method blank results acceptable? ..... Yes (No) N/A
Analytes detected in method blank? ..... (Yes) No N/A
Field blank(s) analyzed? ..... Yes (No) N/A
Field blank results acceptable? ..... Yes (No) N/A
Analytes detected in field blank(s)? ..... Yes (No) N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No (N/A)

Comments: Tc-99 blank results > the MDA but < RDL. J
Co-60, Cs-137, Eu-152, -154 + 155 blank results reported a "U".
MDA's exceeded RDL's. Need to compare results
Also, MDA's exceed RDL's for Ra-226 + Ra-228
Several samples J qualified due to blank contamination.

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: 65%-135%. Results are within limits
No qualifiers

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

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

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

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

Comments: No tracer/carrier used for C-14, yet assumed to be 100% I C-14 results.

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: MS only performed for H-3 analysis
No qualifiers

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: Eu-152, Eu-154 and Eu-155 results "J" qualified due to duplicate criteria not being met.

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: The RPD for Sr total was 36%, which slightly exceeded the required 35% for soils. No qualifiers.

12. Holding Times (All levels)

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

Comments:

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:

JAN 2004
RECEIVED

Date: 11/25/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: ICP and Mercury Analysis-Data Package SDG H2242

INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2242 prepared by Lionville Laboratory, Inc. (LLI) for ICP analysis. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Method #
B17115	5/20/03	Soil	C	6010B for ICP & Method 7471A for mercury
B17116	5/27/03	Soil	C	6010B for ICP & Method 7471A for mercury
B17123	5/27/03	Soil	C	6010B for ICP & Method 7471A for mercury
B17124	5/20/03	Soil	C	6010B for ICP & Method 7471A for mercury

The analytes analyzed for were silver, arsenic, boron, barium, beryllium, bismuth, cadmium, chromium, copper, mercury, nickel, lead, antimony and selenium.

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis BHI-01435 and Sampling and Analysis Plan, DOE/RL-2000-60, REV1, Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualifiers
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 the Client – not applicable

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for metals is 180 days. Except for mercury that was 28 days.

All holding times were met.

- **Method Blanks**

At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water processed through each set of the sample preparation and analysis procedures.

All method blanks fell within acceptable limits.

- **Field Blanks**

No field blanks were submitted for analysis.

- **Accuracy**

Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 75 to 125%. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no qualification is required.

All matrix spike recoveries except for sample B17116 and B17124 for antimony and B17116 for mercury met the criteria. The spike recoveries for antimony in two different matrix spikes are below 75% and the samples were undetected, therefore the samples need to be qualified with a "UJ" for antimony only. For mercury one matrix spike recovery was acceptable and the one for B17116 was not, therefore the positive result in the sample is flagged J per validation criteria.

- **Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)**

LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 80-120%.

All LCS/BSS met the acceptance criteria.

- **Precision**

  Duplicate Samples

  Laboratory duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq 35\%$.

  Two analytes exceeded criteria. Beryllium in B17124 was 54% RPD however, the difference between both results were equal to the laboratory reporting limit and no flag is required per validation criteria.

  The mercury for sample B17116 exceeded RPD criteria at 200%. One result was at the reporting limit and the other result is more than two times the reporting limit, based on the validation criteria no flags are required.

  Field Duplicate Samples

  Sample B17123 was a duplicate of sample B17116. All sample-to-sample RPD criteria were met.

- **Analytical Detection Limits**

  Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev 1.

  All required detection limits were met.

- **Completeness**

  The data package for SDG: H2242 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid.

  The completeness percentage was 100%

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI-01435, Rev 1, Validation Procedure for Chemical Analysis.

DOE-RL2000-60, Rev. 1, Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Pan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI 01435 and DOE/RL-200-60.

U - Indicates the compound or analysis 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 concentration is an estimate, but the data was usable for decision making purposes.

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

BJ – Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R – Indicates the compound or analyte was analyzed for, detected and due to 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 a major QC deficiency.

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

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

Appendix 2

Summary of Data Qualifiers

SDG: H2242	REVIEWER: MM/AH	DATE: 11/25/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B17124 and B17116	UJ	antimony	Matrix spike
B17116	J	Mercury	Matrix spike

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/18/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L520

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR	VAL FIAG
-001	B17124	Silver, Total	0.13 u	MG/KG	0.13	1.0	
		Arsenic, Total	2.6	MG/KG	0.37	1.0	
		Boron, Total	0.71	MG/KG	0.21	1.0	
		Barium, Total	3.5	MG/KG	0.02	1.0	
		Beryllium, Total	0.03	MG/KG	0.01	1.0	
		Bismuth, Total	0.57 u	MG/KG	0.57	1.0	
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0	
		Chromium, Total	1.7	MG/KG	0.11	1.0	
		Copper, Total	1.3	MG/KG	0.07	1.0	
		Mercury, Total	0.1	MG/KG	0.02	1.0	
		Nickel, Total	0.99	MG/KG	0.14	1.0	
		Lead, Total	0.69	MG/KG	0.26	1.0	
		Antimony, Total	0.24 u	MG/KG	0.24	1.0	UJ
		Selenium, Total	0.47 u	MG/KG	0.47	1.0	
-002	B17115	Silver, Total	0.13 u	MG/KG	0.13	1.0	
		Arsenic, Total	3.1	MG/KG	0.36	1.0	
		Boron, Total	1.0	MG/KG	0.20	1.0	
		Barium, Total	5.6	MG/KG	0.02	1.0	
		Beryllium, Total	0.05	MG/KG	0.01	1.0	
		Bismuth, Total	0.55 u	MG/KG	0.55	1.0	
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0	
		Chromium, Total	2.7	MG/KG	0.11	1.0	
		Copper, Total	3.1	MG/KG	0.06	1.0	
		Mercury, Total	0.14	MG/KG	0.02	1.0	
		Nickel, Total	1.9	MG/KG	0.14	1.0	
		Lead, Total	1.1	MG/KG	0.25	1.0	
		Antimony, Total	0.30	MG/KG	0.24	1.0	
		Selenium, Total	0.45 u	MG/KG	0.45	1.0	

11

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/18/03

CLIENT: TNUHANFORD F03-006 H2242 LVL LOT #: 0305L533

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR	VAL FLAG
-001	B17116	Silver, Total	0.12 u	MG/KG	0.12	1.0	
		Arsenic, Total	4.2	MG/KG	0.34	1.0	
		Boron, Total	0.69	MG/KG	0.20	1.0	
		Barium, Total	31.8	MG/KG	0.02	1.0	
		Beryllium, Total	0.23	MG/KG	0.01	1.0	
		Bismuth, Total	0.52 u	MG/KG	0.52	1.0	
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0	
		Chromium, Total	9.9	MG/KG	0.10	1.0	
		Copper, Total	11.2	MG/KG	0.06	1.0	
		Mercury, Total	0.74	MG/KG	0.01	1.0	J
		Nickel, Total	11.4	MG/KG	0.13	1.0	
		Lead, Total	4.3	MG/KG	0.24	1.0	
		Antimony, Total	0.23 u	MG/KG	0.23	1.0	UJ
		Selenium, Total	0.43 u	MG/KG	0.43	1.0	
-002	B17123	Silver, Total	0.12 u	MG/KG	0.12	1.0	
		Arsenic, Total	3.2	MG/KG	0.34	1.0	
		Boron, Total	0.73	MG/KG	0.19	1.0	
		Barium, Total	35.5	MG/KG	0.02	1.0	
		Beryllium, Total	0.17	MG/KG	0.01	1.0	
		Bismuth, Total	0.52 u	MG/KG	0.52	1.0	
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0	
		Chromium, Total	10.1	MG/KG	0.10	1.0	
		Copper, Total	9.1	MG/KG	0.06	1.0	
		Mercury, Total	1.2	MG/KG	0.02	1.0	
		Nickel, Total	9.3	MG/KG	0.13	1.0	
		Lead, Total	4.0	MG/KG	0.23	1.0	
		Antimony, Total	0.22 u	MG/KG	0.22	1.0	~~UJ~~
		Selenium, Total	0.43 u	MG/KG	0.43	1.0	

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-006
LVL#: 0305L520\0305L533
SDG/SAF#: H2242/F03-006

W.O.#: 11343-606-001-9999-00
Dates Received: 05-29\05-30-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 4 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 (80-120% for Mercury).

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), 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) recoveries for 2 analytes were 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 26 pages.

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

C7

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B17124	Antimony	100	115.3
B17116	Antimony	100	110.1

12. The duplicate analyses for 3 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

06-23-03
Date

jjw/m05-520\533

C8

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-006 H2242

DATE RECEIVED: 05/30/03 LVL LOT # :0305L533

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
LEAD, TOTAL	001 MS	S	03L0324	05/27/03	06/09/03	06/13/03
ANTIMONY, TOTAL	001	S	03L0324	05/27/03	06/09/03	06/13/03
ANTIMONY, TOTAL	001 REP	S	03L0324	05/27/03	06/09/03	06/13/03
ANTIMONY, TOTAL	001 MS	S	03L0324	05/27/03	06/09/03	06/13/03
SELENIUM, TOTAL	001	S	03L0324	05/27/03	06/09/03	06/13/03
SELENIUM, TOTAL	001 REP	S	03L0324	05/27/03	06/09/03	06/13/03
SELENIUM, TOTAL	001 MS	S	03L0324	05/27/03	06/09/03	06/13/03
B17123						
SILVER, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
ARSENIC, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
BORON, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
BARIUM, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
BERYLLIUM, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
BISMUTH, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
CADMIUM, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
CHROMIUM, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
COPPER, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
MERCURY, TOTAL	002	S	03C0143	05/27/03	06/12/03	06/12/03
NICKEL, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
LEAD, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
ANTIMONY, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
SELENIUM, TOTAL	002	S	03L0324	05/27/03	06/09/03	06/13/03
LAB QC:						
SILVER LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
SILVER, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
ARSENIC LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
ARSENIC, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
BORON LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
BORON, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
BARIUM LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
BARIUM, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
BERYLLIUM LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
BERYLLIUM, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
BISMUTH, LCS	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03

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Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-006 H2242

DATE RECEIVED: 05/30/03 LVL LOT # :0305L533

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BISMUTH, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
CADMIUM LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
CADMIUM, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
CHROMIUM LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
CHROMIUM, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
COPPER LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
COPPER, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
MERCURY LABORATORY	LC1 BS	S	03C0143	N/A	06/12/03	06/12/03
MERCURY, TOTAL	MB1	S	03C0143	N/A	06/12/03	06/12/03
MERCURY LABORATORY	LC1 BS	S	03C0145	N/A	06/13/03	06/13/03
MERCURY, TOTAL	MB1	S	03C0145	N/A	06/13/03	06/13/03
NICKEL LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
NICKEL, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
LEAD LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
LEAD, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
ANTIMONY LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
ANTIMONY, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03
SELENIUM LABORATORY	LC1 BS	S	03L0324	N/A	06/09/03	06/10/03
SELENIUM, TOTAL	MB1	S	03L0324	N/A	06/09/03	06/10/03

C6

Lionville Laboratory Use Only: 0305L520

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI 5

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: [illegible] F03-006
Est. Final Prel. Sampling Date:
Project #: 113 [illegible] - 006 - 001 - 9999.00
Project Contact/Phone #:
Lionville Laboratory Project Manager: DS
QC: SPLC Del: STD TAT: 30 days

Date Rec'd: 5/29/03 Date Due: 6-28-03

	A	B	C	D	E	F	G
Refrigerator #	1	2	2	2	2	2	2
#/Type Container (Liquid)							
#/Type Container (Solid)	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL	1AGL
Volume (Liquid)							
Volume (Solid)	60	125	60	60	125	60	60
Preservatives							
ANALYSES REQUESTED (ORGANIC: VOA)	8260	8260					
ORGANIC: BNA							
ORGANIC: Pest/PCB							
ORGANIC: Herb							
INORG: Metal			MET ①				
INORG: CN							
Lionville Laboratory Use Only	OGCSC	0625X		ICR 6	INORG ①	IN3 N2	IOG GR
	8260	0625					

MATRIX CODES	Lab ID	Client ID/Description	Matrix	Date Collected	Time Collected	OGCSC 8260	0625X 0625	MET ①	ICR 6	INORG ①	IN3 N2	IOG GR
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	B17124 (MS ✓, MSD ✓)	S	5/29/03	0945	✓	✓	✓	✓	✓	✓	✓
	002	B17115	L	L	0830	✓	✓	✓	✓	✓	✓	✓

Special Instructions: SAF at F03-006
Run Matrix QC on -001
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO_3, NO_2, PO_4, SO_4
I-NH3N, I-PH, I-CNTO

DATE/REVISIONS:
5-30-03 1. ~~Remove~~ on phone 0624++ Add OGCSC
6-2-03 2. Add to -002 same analyses as in -001
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	JPerry	5/29/03	1000

Relinquished by	Received by	Date	Time
COMPOSITE WASTE			

ORIGINAL REWRITTEN

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ____
Airbill # 7922567884 51
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was: 1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 1.7 °C

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

Lionville Laboratory Use Only
0305L533

Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI Quality Laboratories Inc.

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: Trustar Ford F03-006
Est. Final Proj. Sampling Date:
Project #: 11343-006-001-9999.00
Project Contact/Phone #:
Lionville Laboratory Project Manager: CJ
QC: SPC Del: STD TAT: 30 days

Date Rec'd: 5/30/03 Date Due: 6-29-03

		A	B			C	D		E		F	G	H			
Refrigerator #		1	2			1	2		2		2	2	2			
#/Type Container	Liquid															
	Solid	AGL	AGL			AGL	AGL		AGL		AGL	AGL	AGL			
Volume	Liquid															
	Solid	60	125/60			60/60	60		60/125		60	125/60	60			
Preservatives																
ANALYSES REQUESTED		ORGANIC: VOA	BNA	Pest/PCB	Herb	Metals	Oil & Grease		INORG: Metal	CN	Cr6	Total Cyanide	NO2/NO3			
Lionville Laboratory Use Only		0624H	0625X 0D60			OGCSC	IOGGR		MET ①		ICR6	INORG ①	IN3N2			

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	0624H	0625X 0D60			OGCSC	IOGGR		MET ①		ICR6	INORG ①	IN3N2			
S - Soil, SE - Sediment, SQ - 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	BI7116			S	5/27/03	1030	1	1			1	1		1		1	1	1			
	002	BI7123			↓	↓	↓	1	1			1	1		1		1	1	1			

Special Instructions: SAF # F03-006
Run Matrix QC
MET ①: RCRA + Sb, Be, Bi, B, Cu, Ni
INORG ①: IC: Cl, F, NO3, NO2, PO4, SO4
IN H2N, IPH, ICNTO

DATE/REVISIONS:
002C 1. Label says see special item (5). This is not a required item. No bottle was received for item (1) so this bottle was assigned for (1)
2.
002B,C,E,G Bottle size does not match size indicated on COC.
4.
6-2-03 5. Change 0624X to 0624H
6.

Lionville Laboratory Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ____
Airbill # See below
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

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

Relinquished by	Received by	Date	Time
FedEx	J Perry	5/30/03	0945

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

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

TRK# 7907 9459 8746

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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-10 (C3247) ~~62.5-55 ft~~ MJS 5-20-03 52'-54'; 54'-56'		SAF No.: F03-006	Air Quality ☐
Ice Chest No.: ERC 03 101	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: RECRA ~~EBERLINE SERVICES (Formerly TMA)~~ 5/20/03	Offsite Property No.: A030240		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ MJS 5-23-03 Radioactive TIR TO: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
~~B17115~~	~~SOIL~~	~~5/20/03~~	~~0830~~	X	X	X	X	X	X	X			52803
B17124	SOIL	5/20/03	0945	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1317	Received By/Stored In: HO-64-427 REF	Date/Time: 5/20/03 1317
Relinquished By/Removed From: HO-64-427 REF	Date/Time: 5/20/03 1120	Received By/Stored In: Johansen/Pope/Pfister	Date/Time: 5/20/03 1120
Relinquished By/Removed From: Johansen/Pope/Pfister	Date/Time: 5/20/03 1150	Received By/Stored In: REF 1A 3728	Date/Time: 5/20/03 1150
Relinquished By/Removed From: REF 1A 3728	Date/Time: 52803 0800	Received By/Stored In: SJGALE	Date/Time: 52803 0800
Relinquished By/Removed From: SJGALE	Date/Time: 52803 0800	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FedEX	Date/Time: 5/29/03 1000	Received By/Stored In: JPerry	Date/Time: 5/29/03 1000

SPECIAL INSTRUCTIONS
~~** The laboratory is to achieve a detection limit of 30.0 pCi/g for Carbon 14.~~ ** The laboratory is to report both kerosene and diesel range compounds from WTPH-D analysis.

(1) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
~~(6) Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

Matrix *
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

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-106	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 TMS 5-20-03 216-A-10 (C3247) ~~52.5-55 ft~~ 52'-54'; 54'-56'		SAF No. F03-006	Air Quality ☐
Ice Chest No. ERC 02 010	Field Logbook No. HNF-N-3361	COA 117504ES10	Method of Shipment Federal Express	
Shipped To REZRA ~~ERRERLINS SERVICES (Formerly TMA)~~ 5/21/03	Offsite Property No. RSR 107187		Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
N/A TMS 5-23-03 Radioactive TLD: B17131, B17132

Special Handling and/or Storage
N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions. VOA 8260	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time									
B17115	SOIL	5/20/03	0830	X	X	X	X	X	X	X		
~~B17124~~	~~SOIL~~	~~5/20/03~~	~~0945~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~5/20/03~~	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	5/20/03 1317	HO-64-D7 REF	5/20/03 1317
HO-64-D7 REF	5/20/03 1120	[signature]	5/20/03 1120
[signature]	5/20/03 1150	REF 1A 3728	5/20/03 1150
REF 1A 3728	52803 0800	S. GALE	52803 0800
S. GALE	52803 0800	FED EX	
FED EX	5-29-03 1000	[signature]	

SPECIAL INSTRUCTIONS
~~** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
~~(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium, Americium-241; Isotopic Plutonium; Isotopic Uranium~~
(6) ~~Technetium-99; Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-~~

[signature] 5/20/03

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

[signature] 5/20/03

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

20

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-006-107	Page 1 of 1
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom	Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code: 8N; Air Quality ☐; Data Turnaround: 45 Days
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: 216-A-10 (C3247) 62.5-65 ft		SAF No.: F03-006	
Ice Chest No.: ERC 03-103	Field Logbook No.: HNF-N-3361	COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ Beera MJS 5-27-03	Offsite Property No.: 0030 276		Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS B17133; ~~B17134~~ MJS 5-27-03

~~N/A~~ Radiological Tie To: ~~B17136~~ MJS 5-27-03 (B17116; B17123)

Special Handling and/or Storage

N/A

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	125mL	60mL	60mL	125mL	60mL	60mL	60mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	See item (4) in Special Instructions.	NO2/NO3 - 353.2	Oil & Grease - 413.1	See item (5) in Special Instructions.	See item (6) in Special Instructions.	Tritium - H3

Sample No.	Matrix *	Sample Date	Sample Time										
B17116	SOIL	5-27-03	1030	X	X	X	X	X	X	X			
B17123	Soil	5-27-03	1030	X	X	X	X	X	X	X		MJS 5-27-03	
~~B12 B17122~~ 5-27-03	Soil	5-27-03	1110	X	X	X	X	X	X	X		MJS 5-27-03	

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature] LH	5/27/03 1415	R. Gooo R. Gohn ERC	5-27-03 1415
R. Gooo R. Gohn	5-27-03 1415	IB 3728	5-27-03 1415
R. Gooo R. Gohn	5-27-03 1000	R. Gooo R. Gohn	5-27-03 1000
R. Gooo R. Gohn	5-27-03 1000	Fed Ex	
Fed Ex	5/30/03 0945	[signature]	5/30/03 0945

SPECIAL INSTRUCTIONS

** 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) Alcohols, Glycols, & Ketones - 8015 {1-Butanol, Diethyl ether, Ethylene glycol, Methanol}
(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) {2-Butoxyethanol, Tributyl phosphate}; TPH-Diesel Range - WTPH-D; TPH-Gasoline Range - WTPH-G
(3) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Bismuth, Boron, Copper, Nickel}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; pH (Soil) - 9045; Total Cyanide - 9010
(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Cesium-134, Radium-226, Radium-228, Tin-126}; Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium
(6) Technetium-99, Strontium-89,90 - Total Sr; Isotopic Thorium {Thorium-232}; Carbon-14; Iodine-127; Nickel-63; Neptunium-237

Matrix *
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

MJS 5-27-03

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

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

FH-Central Plateau Project	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-006-114	Page 2 of 2
Collector: Johansen/Pope/Pfister	Company Contact: LC Hulstrom; Telephone No.: 373-3928	Project Coordinator: TRENT, SJ	Price Code: 8N; Data Turnaround: 45 Days; Air Quality ☐
Project Designation: 200-PW-2/200-PW-4 OU - Borehole Soil Sampling	Sampling Location: ~~TMA 5-27-03~~ 216-A-10 (C3247) ~~313.5-321 ft~~ 62.5-65'	SAF No.: F03-006	
Ice Chest No.: ERC 03 102	Field Logbook No.: HNF-N-3361; COA: 117504ES10	Method of Shipment: Federal Express	
Shipped To: ~~TMA 5-27-03~~ ~~EBERLINE SERVICES (Formerly TMA)~~ Hecra	Offsite Property No.: 17030-276	Bill of Lading/Air Bill No.: SEE OSR	

POSSIBLE SAMPLE HAZARDS/REMARKS
~~N/A~~ Radioactive TLTO: See Below

Special Handling and/or Storage
N/A

Preservation	None	Cool 4C									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	60 mL	60 mL									
SAMPLE ANALYSIS	Tritium - H3	See special instruction (1)			TLTO:						

Sample No.	Matrix *	Sample Date	Sample Time									
B17123	SOIL	5-27-03	1030		X		B17133					
B17126	Soil	5-27-03	1030		X		B17133					
~~B17122~~ 5-29-03	~~Soil~~	~~5-27-03~~	~~1110~~		X		B17134					

CHAIN OF POSSESSION	Sign/Print Names
Relinquished By/Removed From: [signature] Date/Time: 5-27-03 1415	Received By/Stored In: ERC [signature] Date/Time: 1415
Relinquished By/Removed From: [signature] Date/Time: 5-27-03 1415	Received By/Stored In: [signature] Date/Time: 1415 5-27-03
Relinquished By/Removed From: [signature] Date/Time: 5-29-03 1000	Received By/Stored In: [signature] Date/Time: 1000 5-29-03
Relinquished By/Removed From: ERC [signature] Date/Time: 5-29-03 1000	Received By/Stored In: 1st Col Ex Date/Time:
Relinquished By/Removed From: FedEx Date/Time: 5/30/03 0945	Received By/Stored In: JPerry Date/Time: 5/30/03 0945
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:

SPECIAL INSTRUCTIONS
** 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) VOA-8260A (TCL); VOA-8260A (add-on) {2-Pentanone, Benzyl alcohol, n-Butylbenzene}

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

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

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

LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

LIENT: TNU Hanford

rchase Order/Project:

DATE: 5/29/03

LF# / SOW# / Release #: F03-006

aboratory SDG #: 03054520

OTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1. Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
2. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3. Airbill # recorded? See below	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5. Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7. All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8. All sample label information matches coc?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
10. Shipment meets Lvl.1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11. Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12. coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13. coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-101 / TRK# 7922 5678 8451 / 1.7°C (Sample 001)
ERC-03-100 / 839350745320 / 5.8°C (Sample 002)

Laboratory Sample Custodian: J Perry 5/29/03 1000

Laboratory Project Manager:

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LIONVILLE LABORATORY INCORPORATED
SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford

Purchase Order/Project:

DATE: 5/30/03

SAF# / SOW# / Release #: F03-006

Laboratory SDG #: 0305L533

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

1.	Custody seals on coolers or shipping container intact, signed and dated?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (1)
2.	Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
3.	Airbill # recorded? 790794598746	☑ Yes	☐ No	☐ N/A	☐ see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
5.	Sample containers are intact?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
6.	Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
7.	All samples on coc received?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
8.	All sample label information matches coc?	☐ Yes	☑ No	☐ N/A	☑ see Comment # (2)
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	☐ Yes	☐ No	☑ N/A	☐ see Comment #
10.	Shipment meets LvLJ Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	☐ N/A	☐ see Comment #
11.	Where applicable, bar code labels are affixed to coc?	☐ Yes	☐ No	☑ N/A	☐ see Comment #
12.	coc signed and dated?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
13.	coc will be faxed or emailed to client?	☑ Yes	☐ No	☐ N/A	☐ see Comment #
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	☐ No	☑ N/A	☐ see Comment #

Cooler # / temp (°C) and Comments:

ERC-03-103 / 4°C

(1) No custody seals
(2) 002C Label says see item (5). This is not a requested item - No bottle was received for item (1), so this bottle was assigned to (1
002B,C,E,G - Bottle size doesn't match client (60 mL to a 125 mL or vice-versa)

Laboratory Sample Custodian: JKeny 5/30/03 0945

Laboratory Project Manager:

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Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 Area			DATA PACKAGE:		
VALIDATOR: MEN/MM		LAB: Knoxville		DATE: 2/13/03	
CASE:			SDG: H2242		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
X		X			
SAMPLES/MATRIX					

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: _____

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) JRJ 1/7/04

Comments: Sample B17124 and B17116 need to be qualified with "U,J" for antimony – poor MS recovery

Sample B17116 needs Hg flagged due to MS failure.

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

JMJ 11/13/04

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:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):