

Date: 10 December 2001  
 To: Bechtel Hanford Inc. (technical representative)  
 From: TechLaw, Inc.  
 Project: 200-TW-1&2 - Soil Sampling  
 Subject: Inorganics - Data Package No. H1409-LLI (SDG No. H1409)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1- ICP metals by 6010B; mercury by 7470A.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is six (6) months for ICP metals and 28 days for mercury.

All holding times were acceptable.

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- **Blanks**

Preparation (Method) Blanks

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

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

All preparation blank results were acceptable.

Field Blanks

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

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130-70% for TOC) and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

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Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

- Laboratory Duplicate Samples

- Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35% for soil samples. If RPD values are out of specification and the sample concentration is greater than five times the TRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus 2 times the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

- Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J".

- All other laboratory duplicate results were acceptable.

- Field Duplicate Samples

- No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

- Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TRQL.

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- **Completeness**

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J". Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### **REFERENCES**

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

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

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**Appendix 1**

**Glossary of Data Reporting Qualifiers**

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

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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**Appendix 2**

**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel	J	B125Y4	RPD
Calcium Mercury Bismuth	J	B125X2	Matrix spike recovery

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125Y4	Silver, Total	0.29 u	MG/KG	0.29	1.0
		Aluminum, Total	5900	MG/KG	1.7	1.0
		Bismuth, Total	8.2	MG/KG	5.7	1.0
		Calcium, Total	7980	MG/KG	2.7	1.0
		Cadmium, Total	0.44 u	MG/KG	0.44	1.0
		Chromium, Total	8.9	MG/KG	0.40	1.0
		Copper, Total	12.9	MG/KG	0.25	1.0
		Iron, Total	20200	MG/KG	1.1	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	771	MG/KG	44.6	1.0
		Magnesium, Total	4080	MG/KG	2.7	1.0
		Manganese, Total	272	MG/KG	0.19	1.0
		Molybdenum, Total	10.3 u	MG/KG	10.3	1.0
		Sodium, Total	832	MG/KG	2.0	1.0
		Nickel, Total	8.7	MG/KG	1.2	1.0
		Lead, Total	5.0	MG/KG	3.2	1.0
		Vanadium, Total	52.3	MG/KG	0.44	1.0
		Zinc, Total	38.4	MG/KG	0.30	1.0

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L231

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125X2	Silver, Total	0.30 u	MG/KG	0.30	1.0
		Aluminum, Total	9540	MG/KG	1.8	1.0
		Bismuth, Total	198	MG/KG	5.9	1.0
		Calcium, Total	8130	MG/KG	2.8	1.0
		Cadmium, Total	0.46 u	MG/KG	0.46	1.0
		Chromium, Total	27.3	MG/KG	0.41	1.0
		Copper, Total	11.9	MG/KG	0.25	1.0
		Iron, Total	19200	MG/KG	1.1	1.0
		Mercury, Total	0.18	MG/KG	0.02	1.0
		Potassium, Total	1720	MG/KG	46.0	1.0
		Magnesium, Total	5460	MG/KG	2.7	1.0
		Manganese, Total	318	MG/KG	0.19	1.0
		Molybdenum, Total	10.6 u	MG/KG	10.6	1.0
		Sodium, Total	1510	MG/KG	2.1	1.0
		Nickel, Total	38.0	MG/KG	1.2	1.0
		Lead, Total	11.6	MG/KG	3.3	1.0
		Vanadium, Total	39.8	MG/KG	0.46	1.0
		Zinc, Total	39.9	MG/KG	0.31	1.0

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**Appendix 4**

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

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## Analytical Report

**Client:** TNU-HANFORD B01-058  
**LVL#:** 0107L228, 231  
**SDG/SAF#:** H1409/B01-058

**W.O.#:** 11343-606-001-9999-00  
**Date Received:** 07-05-01

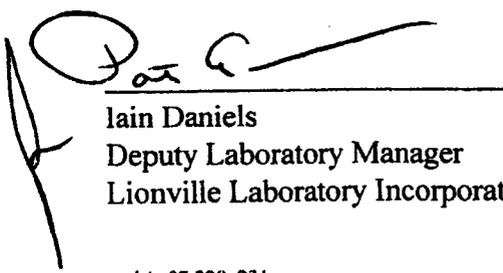
### METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 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. The cooler temperatures have been recorded on the Chain of Custodies.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), 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 7 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 PDS was prepared at meaningful concentration levels 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 24 pages.

<u>Sample ID</u>	<u>Element</u>	<u>PDS Concentration (ppb)</u>	<u>PDS % Recovery</u>
B125Y4	Aluminum	20,000	106.1
	Iron	20,000	89.0
B125X2	Aluminum	20,000	91.5
	Bismuth	5,000	87.1
	Calcium	20,000	93.7
	Iron	20,000	61.0

12. The duplicate analyses for 10 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  
 Deputy Laboratory Manager  
 Lionville Laboratory Incorporated

07-31-01  
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 Date

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 TNUHANFORD B01-058 H1409



DATE RECEIVED: 07/05/01

LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
SILVER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

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 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
BISMUTH, LCS	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	S	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	N/A	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ZINC, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
SILVER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

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Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
BISMUTH, LCS	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	S	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	N/A	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ZINC, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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

**000024**

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	200-TW-142		DATA PACKAGE: H1409		
VALIDATOR:	FLI	LAB: LLT	DATE: 2 Dec 01		
CASE:			SDG: H1409		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP/ICP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input checked="" type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	B125X2		<del>B12544</del>	B12544	sof

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

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

\_\_\_\_\_

\_\_\_\_\_

2. HOLDING TIMES

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

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

A-19

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INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

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

4. BLANKS

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

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

5. ACCURACY

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

Comments: ✓ 4 - al (411.5) Fe (1956) OK  
X 2 al (32.7) calcium (353.7) Iron (2995) Hg (24.3)  
Bismuth (129.1)

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

Comments: Y4 Ni (6470) pb (1570)  
pb (1570)

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7. FURNACE AA QUALITY CONTROL

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

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

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8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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**Appendix 6**

**Additional Documentation Requested by Client**

**000028**

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	01L0426-MB1	Silver, Total	0.28	u MG/KG	0.28	1.0
		Aluminum, Total	1.7	u MG/KG	1.7	1.0
		Bismuth, Total	5.6	u MG/KG	5.6	1.0
		Calcium, Total	2.6	u MG/KG	2.6	1.0
		Cadmium, Total	0.43	u MG/KG	0.43	1.0
		Chromium, Total	0.39	u MG/KG	0.39	1.0
		Copper, Total	0.24	u MG/KG	0.24	1.0
		Iron, Total	1.1	u MG/KG	1.1	1.0
		Potassium, Total	43.4	u MG/KG	43.4	1.0
		Magnesium, Total	2.6	u MG/KG	2.6	1.0
		Manganese, Total	0.18	u MG/KG	0.18	1.0
		Molybdenum, Total	10.0	u MG/KG	10.0	1.0
		Sodium, Total	3.3	MG/KG	1.9	1.0
		Nickel, Total	1.1	u MG/KG	1.1	1.0
		Lead, Total	3.1	u MG/KG	3.1	1.0
		Vanadium, Total	0.43	u MG/KG	0.43	1.0
		Zinc, Total	0.89	MG/KG	0.29	1.0
BLANK1	01C0228-MB1	Mercury, Total	0.02	u MG/KG	0.02	1.0

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L231

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	01L0426-MB1	Silver, Total	0.28 u	MG/KG	0.28	1.0
		Aluminum, Total	1.7 u	MG/KG	1.7	1.0
		Bismuth, Total	5.6 u	MG/KG	5.6	1.0
		Calcium, Total	2.6 u	MG/KG	2.6	1.0
		Cadmium, Total	0.43 u	MG/KG	0.43	1.0
		Chromium, Total	0.39 u	MG/KG	0.39	1.0
		Copper, Total	0.24 u	MG/KG	0.24	1.0
		Iron, Total	1.1 u	MG/KG	1.1	1.0
		Potassium, Total	43.4 u	MG/KG	43.4	1.0
		Magnesium, Total	2.6 u	MG/KG	2.6	1.0
		Manganese, Total	0.18 u	MG/KG	0.18	1.0
		Molybdenum, Total	10.0 u	MG/KG	10.0	1.0
		Sodium, Total	3.3	MG/KG	1.9	1.0
		Nickel, Total	1.1 u	MG/KG	1.1	1.0
		Lead, Total	3.1 u	MG/KG	3.1	1.0
		Vanadium, Total	0.43 u	MG/KG	0.43	1.0
		Zinc, Total	0.89	MG/KG	0.29	1.0
BLANK1	01C0228-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L231

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B125X2	Silver, Total	4.9	0.30u	5.3	92.5	1.0
		Aluminum, Total	10700	9540	212	536.7*	1.0
		Bismuth, Total	882	198	530	129.1	1.0
		Calcium, Total	17500	8130	2650	353.9	1.0
		Cadmium, Total	4.7	0.46u	5.3	88.7	1.0
		Chromium, Total	48.3	27.3	21.2	99.1	1.0
		Copper, Total	36.5	11.9	26.5	92.8	1.0
		Iron, Total	21300	19200	106	2045 *	1.0
		Mercury, Total	0.31	0.18	0.17	74.3	1.0
		Potassium, Total	4460	1720	2650	103.3	1.0
		Magnesium, Total	8360	5460	2650	109.2	1.0
		Manganese, Total	384	318	53.0	124.7*	1.0
		Molybdenum, Total	97.5	10.6 u	106	92.0	1.0
		Sodium, Total	4320	1510	2650	106.1	1.0
		Nickel, Total	98.7	38.0	53.0	114.5	1.0
		Lead, Total	55.6	11.6	53.0	83.0	1.0
		Vanadium, Total	98.6	39.8	53.0	110.9	1.0
		Zinc, Total	93.8	39.9	53.0	101.7	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409

LVL LOT #: 0107L228

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B125Y4	Silver, Total	4.9	0.29u	5.1	96.1	1.0
		Aluminum, Total	6750	5900	206	411.5*	1.0
		Bismuth, Total	489	8.2	514	93.6	1.0
		Calcium, Total	10100	7980	2570	82.3	1.0
		Cadmium, Total	4.9	0.44u	5.1	96.1	1.0
		Chromium, Total	30.2	8.9	20.6	103.4	1.0
		Copper, Total	36.7	12.9	25.7	92.6	1.0
		Iron, Total	22200	20200	103	1956 *	1.0
		Mercury, Total	0.16	0.02u	0.16	100	1.0
		Potassium, Total	3150	771	2570	92.6	1.0
		Magnesium, Total	6660	4080	2570	100.6	1.0
		Manganese, Total	325	272	51.4	102.7*	1.0
		Molybdenum, Total	95.7	10.3 u	103	93.1	1.0
		Sodium, Total	3290	832	2570	95.8	1.0
		Nickel, Total	62.1	8.7	51.4	103.9	1.0
		Lead, Total	52.9	5.0	51.4	93.2	1.0
		Vanadium, Total	105	52.3	51.4	102.3	1.0
		Zinc, Total	89.2	38.4	51.4	98.8	1.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L231

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION
			RESULT	REPLICATE RPD		
-001REP	B125X2	Silver, Total	0.30u	0.30u	NC	1.0
		Aluminum, Total	9540	9860	3.3	1.0
		Bismuth, Total	198	260	27.1	1.0
		Calcium, Total	8130	9530	15.8	1.0
		Cadmium, Total	0.46u	0.46u	NC	1.0
		Chromium, Total	27.3	26.9	1.5	1.0
		Copper, Total	11.9	11.6	2.6	1.0
		Iron, Total	19200	21200	10.2	1.0
		Mercury, Total	0.18	0.18	0.54	1.0
		Potassium, Total	1720	1660	3.7	1.0
		Magnesium, Total	5460	5540	1.3	1.0
		Manganese, Total	318	358	11.8	1.0
		Molybdenum, Total	10.6 u	10.6 u	NC	1.0
		Sodium, Total	1510	1590	5.7	1.0
		Nickel, Total	38.0	38.9	2.3	1.0
		Lead, Total	11.6	10.6	9.0	1.0
		Vanadium, Total	39.8	46.9	16.4	1.0
		Zinc, Total	39.9	42.6	6.5	1.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	B125Y4	Silver, Total	0.29u	0.45	NC Z O O	1.0
		Aluminum, Total	5900	6750	13.4	1.0
		Bismuth, Total	8.2	5.7 u	NC Z C O	1.0
		Calcium, Total	7980	8380	4.9	1.0
		Cadmium, Total	0.44u	0.44u	NC	1.0
		Chromium, Total	8.9	11.9	28.8	1.0
		Copper, Total	12.9	15.2	16.4	1.0
		Iron, Total	20200	26300	26.4	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Potassium, Total	771	860	10.9	1.0
		Magnesium, Total	4080	4910	18.6	1.0
		Manganese, Total	272	368	30.1	1.0
		Molybdenum, Total	10.3 u	10.3 u	NC	1.0
		Sodium, Total	832	960	14.3	1.0
		Nickel, Total	8.7	17.0	64.6	1.0
		Lead, Total	5.0	7.9	45.0	1.0
		Vanadium, Total	52.3	68.7	27.1	1.0
		Zinc, Total	38.4	47.8	21.8	1.0

*yfs 7/30/01*

000034

Date: 10 December 2001  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-TW-1&2 - Soil Sampling  
Subject: Diesel Range Organics - Data Package No. H1409-LLI (SDG No. H1409)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	Diesel Range Organics
B125Y4	6/27/01	Soil	C	Diesel Range Organics
B125X2RE*	6/27/01	Soil	C	Diesel Range Organics
B125Y4RE*	6/27/01	Soil	C	Diesel Range Organics

\* - Both samples were re-extracted and re-analyzed.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

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

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Analytical holding times for diesel range organics is assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is 14 days to extraction and 40 days for analysis.

The re-extraction took place outside QC limits and the associated results

**000001**

(B125X2RE and B125Y4RE) were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Blanks**

Preparation (Method) Blanks

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

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

All preparation blank results were acceptable.

Field Blanks

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

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

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

0000C2

Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

#### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If surrogate recoveries are out of control limits (50-100%) or outside laboratory control limits, all associated sample results greater than the target required quantitation limit (TRQL) are qualified as estimates and flagged "J". Sample results less than the TRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the TRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R".

Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". The MS recovery was also outside QC limits (undetected).

All other surrogate recovery results were acceptable.

- **Precision**

#### Matrix Spike/Matrix Spike Duplicate Samples

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

000003

Due to low MSD recoveries (0% and 37%) and prior qualification, no RPD was calculated for sample B125X2.

All other MS/MSD results were acceptable.

#### Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQL to ensure that laboratory detection levels meet the required criteria. All undetected diesel range organics results exceeded the TRQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 75%.

#### MAJOR DEFICIENCIES

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R". Rejected data is unusable and should not be reported.

#### MINOR DEFICIENCIES

The re-extraction took place outside QC limits and the associated results (B125X2RE and B125Y4RE) were qualified as estimates and flagged "J". Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected diesel range organics results exceeded the TRQL. Under the BHI

000004

statement of work, no qualification is required.

**REFERENCES**

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

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

**000006**

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

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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**Appendix 2**

**Summary of Data Qualification**

**000008**

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Diesel range organics	J	B125X2RE, B125Y4RE	Holding time
Diesel range organics	J	B125X2	Matrix spike recovery
Diesel range organics	J	B125X2	Surrogate recovery
Diesel range organics	R	B125Y4	Surrogate recovery

000009

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

**000010**



RFW Batch Number: 0107L231

Sample Information	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2
Cust ID:	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2
RFW#:	001	001	001 MS	001 MS	001 MS	001 MS	001 MSD	001 MSD
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	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	mg/kg	mg/kg
	REPREP	REPREP	REPREP	REPREP	REPREP	REPREP	REPREP	REPREP
p-Terphenyl	10 * %	78 %	0 * %	0 * %	86 %	4 * %	88 %	88 %
Diesel Range Organics	13 J	12.8 U J	U * %	U * %	72 %	37 %	69 %	69 %

Sample Information	BLK BS							
Cust ID:	BLK BS							
RFW#:	01LE0801-MB1							
Matrix:	SOIL							
D.F.:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Units:	mg/kg							
p-Terphenyl	12 * %	0 * %	89 %	108 %	87 %	87 %	87 %	87 %
Diesel Range Organics	12.0 U	59 %	12.0 U	87 %	87 %	87 %	87 %	87 %

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

*Handwritten:* 12/4/01

*Handwritten:* 7/27/01

RFW Batch Number: 0107L228

Sample Information	Cust ID:	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4
RFW#:	001	001	001 MS	001 MS	001 MS	001 MS	001 MSD	001 MSD	001 MSD
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	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	mg/kg	mg/kg	mg/kg
		REPREP	REPREP	REPREP	REPREP	REPREP	REPREP	REPREP	REPREP
	0 * %	89 %	1 * %	87 %	11 * %	87 %	87 %	87 %	99 %
p-Terphenyl	12.4 U R	12.7 U J	72 %	66 %	87 %	66 %	87 %	87 %	76 %

Diesel Range Organics

Sample Information	Cust ID:	BLK	BLK BS	BLK	BLK BS
RFW#:	01LE0801-MB1	01LE0801-MB1	01LE0801-MB1	01LE0871-MB1	01LE0871-MB1
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	12 * %	0 * %	89 %	108 %	108 %
p-Terphenyl	12.0 U	59 %	12.0 U	87 %	87 %

Diesel Range Organics

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

12/4/01

*[Handwritten signature]*

**Appendix 4**

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

**000014**



**Analytical Report**

Client : TNU HANFORD B01-058  
LVL# : 0107L231  
SDG/SAF#: H1405/B01-058

W.O #: 11343-606-001-9999-00  
Date Received: 07-05-01

**DIESEL RANGE ORGANICS**

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25, 26-01. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. One (1) of four (4) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Deputy Laboratory Manager  
Lionville Laboratory Incorporated

7/31/01  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

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## Analytical Report

Client : TNU HANFORD B01-058  
LVL# : 0107L228  
SDG/SAF#: H1409/B01-058

W.O #: 11343-606-001-9999-00  
Date Received: 07-05-01

### DIESEL RANGE ORGANICS

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25,26-01. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for the analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels

Deputy Laboratory Manager  
Lionville Laboratory Incorporated

7/31/01  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

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Lionville Laboratory, Inc.  
 DRO ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



RFW LOT # : 01075228

CLIENT ID	RFW #	MTX	PREP #	COLLECTN DATE	REC	EXT/PREP	ANALYSIS
B125Y4	001		S 01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001	R1	S 01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125Y4	001	MS	S 01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001	MS R1	S 01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125Y4	001	MSD	S 01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001	MSD R1	S 01LE0871	06/27/01	07/05/01	07/20/01	07/26/01

LAB QC:

BLK	MB1		S 01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1 BS		S 01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1		S 01LE0871	N/A	N/A	07/20/01	07/25/01
BLK	MB1 BS		S 01LE0871	N/A	N/A	07/20/01	07/25/01

*Handwritten signature and date: 7/30/01*

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Lionville Laboratory, Inc.  
 DRO ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



RFW LOT # : 0107

CLIENT ID	RFW #	MTX	PREP #	COLLECTN DATE	REC	EXT/PREP	ANALYSIS
B125X2	001	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125X2	001 MS	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 MS R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125X2	001 MSD	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 MSD R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01

LAB QC:

BLK	MB1	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1 BS	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1	S	01LE0871	N/A	N/A	07/20/01	07/25/01
BLK	MB1 BS	S	01LE0871	N/A	N/A	07/20/01	07/25/01

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Initiator: L. Kaufman Batch: 0107L228, 231 Parameter: ODRO  
 Date: 7-19-01 Samples: All Matrix: SOIL  
 Client: TNU Hanford Method: SW846/MCAWW/CLPI Prep Batch: 01LE801

**1. Reason for SDR**

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

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

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

c. Problem (Include all relevant specific results; attach data if necessary)  
*Very low recoveries for surrogates in all samples and QC (0-12%).*

**2. Known or Probable Causes(s)**

**3. Discussion and Proposed Action** Other Description: \_\_\_\_\_

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

**4. Project Manager Instructions...signature/date:** [Signature]

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

**5. Final Action...signature/date:** [Signature] Other Explanation: \_\_\_\_\_

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

*01LE0871*  
*Samples extracted past hold time 7/20/01*

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

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

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

**000022**

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-TW-142		DATA PACKAGE: H1409		
VALIDATOR:	JL	LAB: LLI	DATE: 2 Dec 01		
CASE:			SDG: H1409		
ANALYSES PERFORMED					
<input type="checkbox"/> 8010	<input checked="" type="checkbox"/> 8015	<input type="checkbox"/> 8020	<input type="checkbox"/> 8021	8140	8141
<input type="checkbox"/> 8150	<input type="checkbox"/> 8151	<input type="checkbox"/> WTPH-HCID	<input type="checkbox"/> WTPH-G	<input type="checkbox"/> WTPH-D	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX:	B12544	B125X2	Soil		
	B12544 RE	B125X2 RE			

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

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

\_\_\_\_\_

\_\_\_\_\_

2. HOLDING TIMES

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

Comments: Samples were re-extracted and analyzed

holding times - all RE

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No  N/A

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No  N/A

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

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No  N/A

Are %D values for calibration or response factors acceptable? . Yes No  N/A

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

4. BLANKS

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

Are laboratory blank results acceptable? . . . . .  Yes No N/A

Were field/trip blanks analyzed? . . . . . Yes  No N/A

Are field/trip blank results acceptable? . . . . . Yes No  N/A

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

5. ACCURACY

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

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

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

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

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

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

GENERAL GC DATA VALIDATION CHECKLIST

Comments: 0% surr 544 - ~~OR~~  
10% surr 5X2 - ~~J~~  
MS 5X2 - 0 rec J  
.44 - ok

6. PRECISION

Are MS/MSD sample RPD values acceptable? . . . . . Yes  No  N/A  
Are field duplicate RPD values acceptable? . . . . . Yes  No  N/A  
Are field split RPD values acceptable? . . . . . Yes  No  N/A

Comments: ~~X2~~ X2 - already J'd

7. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments: all undetect over

Date: 10 December 2001  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-TW-1&2 - Soil Sampling  
Subject: Semivolatile - Data Package No. H1409-LLI (SDG No. H1409)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	Semivolatiles by 8270C
B125Y4	6/27/01	Soil	C	Semivolatiles by 8270C

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

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

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

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If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J".

All other holding times were met.

- **Method Blanks**

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

All method blank results were acceptable.

#### Field Blanks

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

- **Accuracy**

#### Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control

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limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

#### Surrogate Recovery

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

All surrogate results were acceptable.

- **Precision**

#### Matrix Spike/Matrix Spike Duplicate Samples

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

Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J".

#### Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan TRQLs to ensure that laboratory detection levels meet the required criteria. All analytes met their TRQL.

- **Completeness**

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J". Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J". Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

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## REFERENCES

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

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

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

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

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

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DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	B125Y4	Sample preservation
1,2,4-Trichlorobenzene Hexachlorobenzene	J	B125X2	MSD recovery
All	J	B125X2	RPD

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

**000010**

Project: BECHTEL-HANFORD		SDG: H1409		B125X2		B125Y4	
Laboratory: Lionville Laboratory Inc.							
Case:	Sample Number	CRQL	Result	Q	Result	Q	Result
Remarks	6/27/01						
Sample Date	7/6/01						
Extraction Date	7/12/01						
Analysis Date							
Semivolatiles (8270C)	340 UJ			350 UJ			
Phenol	340 UJ			350 UJ			
bis(2-Chloroethyl)ether	340 UJ			350 UJ			
2-Chlorophenol	340 UJ			350 UJ			
1,3-Dichlorobenzene	340 UJ			350 UJ			
1,4-Dichlorobenzene	340 UJ			350 UJ			
1,2-Dichlorobenzene	340 UJ			350 UJ			
2-Methylphenol	340 UJ			350 UJ			
bis(2-Chloroisopropyl)ether	340 UJ			350 UJ			
4-Methylphenol	340 UJ			350 UJ			
N-Nitroso-di-n-propylamine	340 UJ			350 UJ			
Hexachloroethane	340 UJ			350 UJ			
Nitrobenzene	340 UJ			350 UJ			
Isophorone	340 UJ			350 UJ			
2-Nitrophenol	340 UJ			350 UJ			
2,4-Dimethylphenol	340 UJ			350 UJ			
bis(2-Chloroethoxy)methane	340 UJ			350 UJ			
2,4-Dichlorophenol	340 UJ			350 UJ			
1,2,4-Trichlorobenzene	340 UJ			350 UJ			
Naphthalene	340 UJ			350 UJ			
4-Chloroaniline	340 UJ			350 UJ			
Hexachlorobutadiene	340 UJ			350 UJ			
4-Chloro-3-methylphenol	340 UJ			350 UJ			
2-Methylnaphthalene	340 UJ			350 UJ			
Hexachlorocyclopentadiene	340 UJ			350 UJ			
2,4,6-Trichlorophenol	860 UJ			860 UJ			
2,4,5-Trichlorophenol	340 UJ			350 UJ			
2-Chloronaphthalene	860 UJ			860 UJ			
2-Nitroaniline	340 UJ			350 UJ			
Dimethylphthalate	340 UJ			350 UJ			
Acenaphthylene	340 UJ			350 UJ			
2,6-Dinitrotoluene	860 UJ			860 UJ			
3-Nitroaniline	340 UJ			350 UJ			
Acenaphthene	340 UJ			350 UJ			

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

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD		SDG: H1409		B125X2		B125Y4	
Laboratory: Lionville Laboratory Inc.							
Sample Number	CRQL	Result	Q	Result	Q	Result	Q
Remarks							
Sample Date			6/27/01		6/27/01		
Extraction Date			7/6/01		7/6/01		
Analysis Date			7/12/01		7/12/01		
Semivolatiles (8270C)				Result	Q	Result	Q
2,4-Dinitrophenol			860 UJ	860 UJ			
4-Nitrophenol			860 UJ	860 UJ			
Dibenzofuran			340 UJ	350 UJ			
2,4-Dinitrotoluene			340 UJ	350 UJ			
Diethylphthalate			340 UJ	350 UJ			
4-Chlorophenyl-phenyl ether			340 UJ	350 UJ			
Fluorene			860 UJ	860 UJ			
4-Nitroaniline			860 UJ	860 UJ			
4,6-Dinitro-2-methylphenol			340 UJ	350 UJ			
N-Nitrosodiphenylamine			340 UJ	350 UJ			
4-Bromophenyl-phenyl ether			340 UJ	350 UJ			
Hexachlorobenzene			860 UJ	860 UJ			
Pentachlorophenol			340 UJ	350 UJ			
Phenanthrene			340 UJ	350 UJ			
Carbazole			340 UJ	350 UJ			
Di-n-butylphthalate			340 UJ	350 UJ			
Fluoranthene			340 UJ	350 UJ			
Pyrene			340 UJ	350 UJ			
Butylbenzylphthalate			340 UJ	350 UJ			
3,3'-Dichlorobenzidine			340 UJ	350 UJ			
Benzo(a)anthracene			340 UJ	350 UJ			
Chrysene			340 UJ	350 UJ			
bis(2-Ethylhexyl)phthalate			340 UJ	350 UJ			
Di-n-octylphthalate			340 UJ	350 UJ			
Benzo(b)fluoranthene			340 UJ	350 UJ			
Benzo(k)fluoranthene			340 UJ	350 UJ			
Benzo(a)pyrene			340 UJ	350 UJ			
Indeno(1,2,3-cd)pyrene			340 UJ	350 UJ			
Dibenz(a,h)anthracene			340 UJ	350 UJ			
Benzo(g,h,i)perylene			340 UJ	350 UJ			
Tributylphosphate	3300		340 UJ	350 UJ			

000012

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

Sample Information	B125Y4 001 SOIL 1.00 ug/Kg	B125Y4 001 MS SOIL 1.00 ug/Kg	B125Y4 001 MSD SOIL 1.00 ug/Kg	B125Y4 SOIL 1.00 ug/Kg	SBLKBP BS
Nitrobenzene-d5	67 %	65 %	60 %	64 %	84 %
2-Fluorobiphenyl	69 %	67 %	68 %	69 %	86 %
p-Terphenyl-d14	105 %	80 %	92 %	93 %	113 %
Phenol-d5	78 %	74 %	74 %	78 %	93 %
2-Fluorophenol	73 %	66 %	67 %	70 %	85 %
2,4,6-Tribromophenol	75 %	71 %	73 %	81 %	105 %
Phenol	350 U	69 %	71 %	330 U	87 %
bis(2-Chloroethyl) ether	350 U	350 U	350 U	330 U	330 U
2-Chlorophenol	350 U	64 %	67 %	330 U	83 %
1,3-Dichlorobenzene	350 U	350 U	350 U	330 U	330 U
1,4-Dichlorobenzene	350 U	51 %	57 %	330 U	72 %
1,2-Dichlorobenzene	350 U	350 U	350 U	330 U	330 U
2-Methylphenol	350 U	350 U	350 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)	350 U	350 U	350 U	330 U	330 U
4-Methylphenol	350 U	77 %	77 %	330 U	109 %
N-Nitroso-Di-n-propylamine	350 U	350 U	350 U	330 U	330 U
Hexachloroethane	350 U	350 U	350 U	330 U	330 U
Nitrobenzene	350 U	350 U	350 U	330 U	330 U
Isophorone	350 U	350 U	350 U	330 U	330 U
2-Nitrophenol	350 U	350 U	350 U	330 U	330 U
2,4-Dimethylphenol	350 U	350 U	350 U	330 U	330 U
bis(2-Chloroethoxy)methane	350 U	350 U	350 U	330 U	330 U
2,4-Dichlorophenol	350 U	58 %	62 %	330 U	80 %
1,2,4-Trichlorobenzene	350 U	350 U	350 U	330 U	330 U
Naphthalene	350 U	350 U	350 U	330 U	330 U
4-Chloroaniline	350 U	350 U	350 U	330 U	330 U
Hexachlorobutadiene	350 U	70 %	71 %	330 U	96 %
4-Chloro-3-methylphenol	350 U	350 U	350 U	330 U	330 U
2-Methylnaphthalene	350 U	350 U	350 U	330 U	330 U
Hexachlorocyclopentadiene	350 U	350 U	350 U	330 U	330 U
2,4,6-Trichlorophenol	350 U	350 U	350 U	330 U	330 U
2,4,5-Trichlorophenol	860 U	870 U	870 U	830 U	830 U

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 12/4/01

\* = Outside of EPA CLP QC limits.

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Client: TNUHANFORD B01-058 H1409 Work Order: 11343606001

RFW Batch Number: 0107L228 Cust ID: B125Y4

SBLKBP BS SBLKBP B125Y4 B125Y4 001 MSD 01LE0800-MB1 01LE0800-MB1

RFW#:	001	001 MS	001 MSD	01LE0800-MB1	01LE0800-MB1
2-Chloronaphthalene	350 U	350 U	350 U	330 U	330 U
2-Nitroaniline	860 U	870 U	870 U	830 U	830 U
Dimethylphthalate	350 U	350 U	350 U	330 U	330 U
Acenaphthylene	350 U	350 U	350 U	330 U	330 U
2,6-Dinitrotoluene	350 U	350 U	350 U	330 U	330 U
3-Nitroaniline	860 U	870 U	870 U	830 U	830 U
Acenaphthene	350 U	66 %	69 %	330 U	86 %
2,4-Dinitrophenol	860 U	870 U	870 U	830 U	830 U
4-Nitrophenol	860 U	52 %	53 %	830 U	72 %
Dibenzofuran	350 U	350 U	350 U	330 U	330 U
2,4-Dinitrotoluene	350 U	65 %	69 %	330 U	89 %
Diethylphthalate	350 U	350 U	350 U	330 U	330 U
4-Chlorophenyl-phenylether	350 U	350 U	350 U	330 U	330 U
Fluorene	860 U	870 U	870 U	830 U	830 U
4-Nitroaniline	860 U	870 U	870 U	830 U	830 U
4,6-Dinitro-2-methylphenol	350 U	350 U	350 U	330 U	330 U
N-Nitrosodiphenylamine (1)	350 U	350 U	350 U	330 U	330 U
4-Bromophenyl-phenylether	350 U	350 U	350 U	330 U	330 U
Hexachlorobenzene	350 U	73 %	76 %	830 U	100 %
Pentachlorophenol	860 U	350 U	350 U	330 U	330 U
Phenanthrene	350 U	350 U	350 U	330 U	330 U
Anthracene	350 U	350 U	350 U	330 U	330 U
Carbazole	350 U	350 U	350 U	330 U	330 U
Di-n-Butylphthalate	350 U	350 U	350 U	330 U	330 U
Fluoranthene	350 U	76 %	86 %	330 U	105 %
Pyrene	350 U	350 U	350 U	330 U	330 U
Butylbenzylphthalate	350 U	350 U	350 U	330 U	330 U
3,3'-Dichlorobenzidine	350 U	350 U	350 U	330 U	330 U
Benzo(a)anthracene	350 U	350 U	350 U	330 U	330 U
Chrysene	350 U	350 U	93 J	330 U	330 U
bis(2-Ethylhexyl)phthalate	350 U	350 U	350 U	330 U	330 U
Di-n-Octyl phthalate	350 U	350 U	350 U	330 U	330 U
Benzo(b)fluoranthene	350 U	350 U	350 U	330 U	330 U
Benzo(k)fluoranthene	350 U	350 U	350 U	330 U	330 U
Benzo(a)pyrene	350 U	350 U	350 U	330 U	330 U
Indeno(1,2,3-cd)pyrene	350 U	350 U	350 U	330 U	330 U
Dibenzo(a,h)anthracene	350 U	350 U	350 U	330 U	330 U
Benzo(g,h,i)perylene	350 U	350 U	350 U	330 U	330 U
Tributylphosphate	350 U	350 U	350 U	330 U	330 U

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

Sample Information	Cust ID:	B125X2	B125X2	B125X2	B125X2	B125X2	SBLKBP	SBLKBP BS
		001	001 MS	001 MSD	001 MS	001 MSD	SOIL	SOIL
		SOIL	SOIL	SOIL	SOIL	SOIL	1.00	1.00
		1.00	1.00	1.00	1.00	1.00	ug/Kg	ug/Kg
Units:		ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg		
Nitrobenzene-d5		63	64	38	64	38	%	84
2-Fluorobiphenyl		69	66	39	69	39	%	86
p-Terphenyl-d14		93	87	54	93	54	%	113
Phenol-d5		77	72	43	78	43	%	93
2-Fluorophenol		69	65	38	70	38	%	85
2,4,6-Tribromophenol		88	74	44	81	44	%	105
Phenol		340	71	41	330	41	%	87
bis(2-Chloroethyl) ether		340	350	360	330	360	U	330
2-Chlorophenol		340	66	38	330	38	%	83
1,3-Dichlorobenzene		340	350	360	330	360	U	330
1,4-Dichlorobenzene		340	58	32	330	32	%	72
1,2-Dichlorobenzene		340	350	360	330	360	U	330
2-Methylphenol		340	350	360	330	360	U	330
2,2'-oxybis(1-Chloropropane)		340	350	360	330	360	U	330
4-Methylphenol		340	86	49	330	49	%	109
N-Nitroso-Di-n-propylamine		340	350	360	330	360	U	330
Hexachloroethane		340	350	360	330	360	U	330
Nitrobenzene		340	350	360	330	360	U	330
Isophorone		340	350	360	330	360	U	330
2-Nitrophenol		340	350	360	330	360	U	330
2,4-Dimethylphenol		340	350	360	330	360	U	330
bis(2-Chloroethoxy)methane		340	350	360	330	360	U	330
2,4-Dichlorophenol		340	65	37	330	37	%	80
1,2,4-Trichlorobenzene		340	350	360	330	360	U	330
Naphthalene		340	350	360	330	360	U	330
4-Chloroaniline		340	350	360	330	360	U	330
Hexachlorobutadiene		340	73	43	330	43	%	96
4-Chloro-3-methylphenol		340	350	360	330	360	U	330
2-Methylnaphthalene		340	350	360	330	360	U	330
Hexachlorocyclopentadiene		340	350	360	330	360	U	330
2,4,6-Trichlorophenol		340	350	360	330	360	U	330
2,4,5-Trichlorophenol		860	880	890	830	890	U	830

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 12/4/01

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\* = Outside of EPA CLP QC limits.



**Appendix 4**

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

**000017**



Client: TNU-HANFORD B01-058  
RFW #: 0107L228  
SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00  
Date Received: 07-05-2001

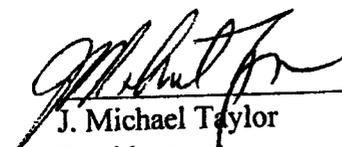
### SEMIVOLATILE

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-12,16-2001.

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

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The sample was extracted and analyzed within required holding times.
3. A non-target compound was detected in the sample.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. "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

8/6/01  
\_\_\_\_\_  
Date

som\group\data\bna\tnu-hanford-0107-228.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 11 pages. 000018



Client: TNU-HANFORD B01-058  
LVL #: 0107L231  
SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00  
Date Received: 07-05-2001

## SEMIVOLATILE

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-16-2001.

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

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The sample was extracted and analyzed within required holding times.
3. A non-target compound was detected in the sample.
4. All surrogate recoveries were within EPA QC limits.
5. One (1) of twenty-two (22) matrix spike recoveries was outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

08-3-01  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 2 pages.

Lionville Laboratory, Inc.  
 BNA ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



DATE RECEIVED: 07/05/01

LVL LOT # : 0107L228

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4	001	S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001 MS	S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001 MSD	S	01LE0800	06/27/01	07/06/01	07/12/01

LAB QC:

SBLKBP	MB1	S	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1 BS	S	01LE0800	N/A	07/06/01	07/16/01

000020

Lionville Laboratory, Inc.  
 BNA ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2	001	S	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MS	S	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MSD	S	01LE0800	06/27/01	07/06/01	07/16/01

LAB QC:

SBLKBP	MB1	S	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1 BS	S	01LE0800	N/A	07/06/01	07/16/01

000021

Initiator: John W. Smith Batch: 0107031 Parameter: 025 X  
 Date: 7/17/01 Samples: 001 T Matrix: Soil  
 Client: Two Hundred 801-058 Method: SW846/MCAWW/CLP/ Prep Batch: 01LE0800  
H1409

**1. Reason for SDR**

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

**b. General Discrepancy**

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

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

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

1,2,4-Trichlorobenzene fails low in 001 T. All other spikes and surrogates meet criteria.

**2. Known or Probable Causes(s)**

**3. Discussion and Proposed Action**

Other Description:

Report & Narrate

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

*[Handwritten Signature]*

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

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

**5. Final Action...signature/date:** 01T 8/2/01

Other Explanation:

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

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

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

*[Handwritten mark]*







**Appendix 5**

**Data Validation Supporting Documentation**

000025

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-TW-1+2		DATA PACKAGE: H1409		
VALIDATOR:	TLI	LAB:	LLI	DATE: 2Dec01	
CASE:			SDG: H1409		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP Volatiles	<input type="checkbox"/> SW-846 8240 (cap column)	<input type="checkbox"/> SW-846 8260 (packed column)	<input type="checkbox"/> CLP Semivolatiles	<input checked="" type="checkbox"/> SW-846 8270 (cap column)	<input type="checkbox"/> SW-846 (packed column)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	B125X2	B125Y4	Soil		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

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

\_\_\_\_\_

\_\_\_\_\_

2. HOLDING TIMES

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

Comments: cooler temp 17° - July 94

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

Are initial calibrations acceptable? . . . . . Yes No **N/A**

Are continuing calibrations acceptable? . . . . . Yes No **N/A**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. BLANKS

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

Are laboratory blank results acceptable? . . . . . **Yes** No N/A

Were field/trip blanks analyzed? . . . . . Yes **No** N/A

Are field/trip blank results acceptable? . . . . . Yes No **N/A**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . **Yes** No N/A

Are surrogate/System Monitoring Compound recoveries acceptable? **Yes** No N/A

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

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

Comments: 124 trichloro benzene 37% - X3

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

- Are MS/MSD RPD values acceptable? . . . . . Yes  No  N/A
- Are field duplicate RPD values acceptable? . . . . . Yes  No  N/A
- Are field split RPD values acceptable? . . . . . Yes  No  N/A

Comments: all 1/2 out

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7. SYSTEM PERFORMANCE

- Were internal standards analyzed? . . . . . Yes  No  N/A
- Are internal standard areas acceptable? . . . . . Yes  No  N/A
- Are internal standard retention times acceptable? . . . . . Yes  No  N/A

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

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8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

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9. REPORTED RESULTS AND QUANTITATION LIMITS

- Are results reported for all requested analyses? . . . . .  Yes  No  N/A
- Are all results supported in the raw data? . . . . .  Yes  No  N/A
- Do results meet the CRQLs? . . . . .  Yes  No  N/A
- Has the laboratory properly identified and coded all TIC? . . . . . Yes  No  N/A

Comments: FSP - out

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Date: 10 December 2001  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-TW-1&2 - Soil Sampling  
Subject: Radiochemistry - Data Package No. H1409-ES (SDG No. H1409)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H1409-ES prepared by Eberline Services (ES). 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
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1- Tritium; carbon-14; nickel-63; total strontium; americium-241; technetium-99; isotopic uranium, plutonium and thorium; neptunium-237; gamma spectroscopy; total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

## **DATA QUALITY PARAMETERS**

- **Holding Times**

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

All holding times were acceptable.

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- **Method Blanks**

#### Laboratory Blanks

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

All blank results were acceptable although the target required quantitation limits (TRQLs) were exceeded for 17 of the 29 analytes.

#### Field Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS and matrix spike (MS) recovery range is 70-130%. 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.

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

All other accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using

000002

unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the TRQL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the TRQL, the RPD control limit is less than or equal to two times the TRQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

#### Field Duplicate

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQLs to ensure that laboratory detection levels meet the required criteria. The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TRQL.

- **Completeness**

Data package No. H1409-ES (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

000003

## MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J". Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required.

## REFERENCES

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

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

**Appendix 1**

**Glossary of Data Reporting Qualifiers**

**000005**

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

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

000006

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

**000007**

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14 Total uranium	J	All	No matrix spike
Plutonium-238	J	All	RPD

000008

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

**000009**

Project: BECHTEL-HANFORD		Laboratory: Eberline Services		Case	SDG: H1409	B125X2	B125Y4	06/27/01		06/27/01	
Sample Number	Remarks	CRDL	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium		400	U	0.466	U	0.028	U				
Carbon-14		50	UJ	-0.955	UJ	1.23	UJ				
Nickel-63		30	U	-1.80	U	0.487	U				
Total Strontium		1	U	491.00	U	0.026	U				
Americium-241		1	U	227	U	-0.005	U				
Technetium-99		15	U	0.909	U	-0.007	U				
Thorium-228			U	4.09	U	0.447	U				
Thorium-230			U	0.582	U	0.284	U				
Thorium-232		1	U	1.74	U	0.365	U				
Total Uranium (ug/g)		1	J	61.1	J	1.72	J				
Uranium-233		1	U	18.1	U	0.355	U				
Uranium-235		1	U	1.22	U	0.061	U				
Uranium-238		1	U	21.1	U	0.659	U				
Neptunium-237		1	U	2.17	U	0.033	U				
Plutonium-238		1	J	35.2	J	0	UJ				
Plutonium-239/240		1	U	6320	U	0.086	U				
Potassium-40			U	17.0	U	4.98	U				
Cobalt 60		0.05	U		U		U				
Cesium 137		0.1	U	21200	U	0.540	U				
Radium-226		0.1	U		U	0.203	U				
Radium-228		0.2	U		U	0.246	U				
Europium 152		0.1	U		U		U				
Europium 154		0.1	U	61.9	U		U				
Europium 155		0.1	U	85.1	U		U				
Thorium-228(gea)			U		U	0.349	U				
Thorium-232(gea)			U		U	0.246	U				
Uranium-238(gea)			U		U		U				
Uranium-235(gea)			U		U		U				
Americium-241 (gea)			U		U		U				

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

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H1409**

R107019-01

B125X2

**DATA SHEET**

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	SDG <u>H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>	
Dept sample id <u>7027-001</u>	Location/Matrix <u>T-26/200 W</u>	<u>SOLID</u>
Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 11:15</u>	<u>401.4 g</u>
% solids <u>92.9</u>	Custody/SAF No <u>B01-058-2</u>	<u>B01-058</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.466	0.94	1.6	400	U	H
Carbon 14	14762-75-5	-0.955	2.7	4.6	50	U J	C
Nickel 63	13981-37-8	-1.80	31	<u>52</u>	30	U	NI_L
Total Strontium	SR-RAD	49100	230	<u>11</u>	1.0		SR
Americium 241	14596-10-2	227	19	<u>4.1</u>	1.0		AM
Technetium 99	14133-76-7	0.909	1.3	3.8	15	U	TC
Thorium 228	14274-82-9	4.09	4.7	6.5		U	TH
Thorium 230	14269-63-7	0.582	3.5	<u>4.5</u>	1.0	U	TH
Thorium 232	TH-232	1.74	2.3	<u>4.5</u>	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	61.1	7.1	<u>0.12</u>	0.10	J	U_T
Uranium 233	U-233/234	18.1	6.1	<u>3.8</u>	1.0		U
Uranium 235	15117-96-1	1.22	1.2	<u>4.7</u>	1.0	U	U
Uranium 238	U-238	21.1	6.2	<u>3.8</u>	1.0		U
Neptunium 237	13994-20-2	2.17	4.3	<u>8.3</u>	1.0	U	NP
Plutonium 238	13981-16-3	35.2	15	<u>18</u>	1.0	J	PU
Plutonium 239/240	PU-239/240	6320	540	<u>7.8</u>	1.0		PU
Potassium 40	13966-00-2	17.0	5.2	4.5			GAM
Cobalt 60	10198-40-0	U		<u>0.85</u>	0.050	U	GAM
Cesium 137	10045-97-3	21200	20	<u>6.9</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>9.1</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>11</u>	0.20	U	GAM
Europium 152	14683-23-9	U		<u>20</u>	0.10	U	GAM
Europium 154	15585-10-1	61.9	4.6	<u>3.4</u>	0.10		GAM
Europium 155	14391-16-3	85.1	8.0	<u>12</u>	0.10		GAM
Thorium 228	14274-82-9	U		8.2		U	GAM
Thorium 232	TH-232	U		11		U	GAM
Uranium 235	15117-96-1	U		19		U	GAM
Uranium 238	U-238	U		310		U	GAM

200-TW-1 & 2 - Soil Sampling

*per* 12/4/01

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

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EBERLINE SERVICES / RICHMOND  
 SAMPLE DELIVERY GROUP H1409

R107019-01

B125X2

DATA SHEET, cont

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	<u>SDG H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>	
Dept sample id <u>7027-001</u>	Location/Matrix <u>T-26/200 W</u>	<u>SOLID</u>
Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 11:15</u>	<u>401.4 g</u>
% solids <u>92.9</u>	Custody/SAF No <u>B01-058-2</u>	<u>B01-058</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Americium 241	14596-10-2	U		300		U	GAM

200-TW-1 & 2 - Soil Sampling

DATA SHEETS

Page 2

SUMMARY DATA SECTION

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

000012

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H1409**

R107019-02

B125Y4

**DATA SHEET**

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	SDG <u>H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R107019-02</u>	Client sample id <u>B125Y4</u>	
Dept sample id <u>7027-002</u>	Location/Matrix <u>T-26/200 W</u>	<u>SOLID</u>
Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 04:30</u>	<u>1890 g</u>
% solids <u>90.2</u>	Custody/SAF No <u>B01-058-14</u>	<u>B01-058</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.028	0.055	0.092	400	U	H
Carbon 14	14762-75-5	1.23	2.6	4.2	50	U J	C
Nickel 63	13981-37-8	0.487	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	0.026	0.16	0.33	1.0	U	SR
Americium 241	14596-10-2	-0.005	0.050	0.092	1.0	U	AM
Technetium 99	14133-76-7	-0.007	0.17	0.58	15	U	TC
Thorium 228	14274-82-9	0.447	0.33	0.50		U	TH
Thorium 230	14269-63-7	0.284	0.32	0.39	1.0	U	TH
Thorium 232	TH-232	0.365	0.24	0.31	1.0	J	TH
Total Uranium (ug/g)	7440-61-1	1.72	0.20	0.024	0.10	J	U_T
Uranium 233	U-233/234	0.355	0.20	0.19	1.0	J	U
Uranium 235	15117-96-1	0.061	0.062	0.23	1.0	U	U
Uranium 238	U-238	0.659	0.26	0.19	1.0	J	U
Neptunium 237	13994-20-2	0.033	0.067	0.10	1.0	U	NP
Plutonium 238	13981-16-3	0	0.057	0.22	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.086	0.11	0.22	1.0	U	PU
Potassium 40	13966-00-2	4.98	2.6	0.43			GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	0.540	0.049	0.046	0.10		GAM
Radium 226	13982-63-3	0.203	0.11	0.080	0.10		GAM
Radium 228	15262-20-1	0.246	0.19	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.097	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Thorium 228	14274-82-9	0.349	0.073	0.046			GAM
Thorium 232	TH-232	0.246	0.19	0.17			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		4.7		U	GAM

200-TW-1 & 2 - Soil Sampling

*Handwritten:* 12/1/01

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 17

000013

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1409

R107019-02

B125Y4

DATA SHEET, cont

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	SDG <u>H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R107019-02</u>	Client sample id <u>B125Y4</u>	
Dept sample id <u>7027-002</u>	Location/Matrix <u>T-26/200 W</u>	<u>SOLID</u>
Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 04:30</u>	<u>1890 g</u>
% solids <u>90.2</u>	Custody/SAF No <u>B01-058-14</u>	<u>B01-058</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Americium 241	14596-10-2	U		0.038		U	GAM

200-TW-1 & 2 - Soil Sampling

*Per*  
12/4/01

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

000014

**Appendix 4**

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

**000015**

Case Narrative

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**1.0 GENERAL**

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1409 was composed of three solid (soil) samples designated under SAF No. B01-058 with a Project Designation of: 200-TW-1 & 2 – 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**

The matrix spike percent recovery (84%) was slightly below the  $3\sigma$  limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). No other 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 Technetium-99 Analyses**

No problems were encountered during the course of the analyses.

**2.5 Total Strontium Analyses**

No problems were encountered during the course of the analyses.

**2.6 Isotopic Thorium Analyses**

No problems were encountered during the course of the analyses.

**2.7 Isotopic Uranium Analyses**

No problems were encountered during the course of the analyses.

**2.8 Total Uranium Analyses**

No problems were encountered during the course of the analyses.

**2.9 Neptunium-237 Analyses**

No problems were encountered during the course of the analyses.

**2.10 Isotopic Plutonium Analyses**

No problems were encountered during the course of the analyses.

**2.11 Americium-241 Analyses**

No problems were encountered during the course of the analyses.

Case Narrative

**2.12 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

8/16/01  
Date





**Appendix 5**

**Data Validation Supporting Documentation**

**000020**

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	200-TW-142		DATA PACKAGE: H-1409		
VALIDATOR:	TLI	LAB: EB	DATE: 2 Dec 01		
CASE:			SDG: H-1409		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input checked="" type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input checked="" type="checkbox"/> Tritium	CI4	NI-63	
SAMPLES/MATRIX	B125X2	B125Y4	soil		

1. Completeness . . . . .  N/A

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

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

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

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

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

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

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

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

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

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

Comments: no CH MS - J all

for UR -

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. Laboratory Control Samples . . . . .  N/A  
LCS analyzed? . . . . .  Yes No N/A  
LCS recoveries acceptable? . . . . .  Yes No N/A  
LCS traceable? . . . . . Yes No  N/A  
Transcription/Calculation Errors? . . . . . Yes No  N/A

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

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

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

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

Comments: 80283 - 4576 - all  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

AH

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

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

- 10. Holding Times
- Are sample holding times acceptable? . . . . .  Yes  No  N/A

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

- 11. Results and Detection Limits (Levels D & E) . . . . .  N/A
- Results reported for all required sample analyses? . . . . .  Yes  No  N/A
- Results supported in raw data? . . . . . Yes  No  N/A
- Results Acceptable? . . . . .  Yes  No  N/A
- Transcription/Calculation errors? . . . . . Yes  No  N/A
- MDA's meet required detection limits? . . . . . Yes  No  N/A
- Transcription/calculation errors? . . . . . Yes  No  N/A

Comments: ~~U 235~~ U235 (gen) UP 237 Ra 226/228 Fu152 X2  
~~U 235~~ U1-63 ~~U 235~~ Th 232/230/232 C060 ~~U 235~~

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

**000025**

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H1409**

R107019-04

Method Blank

**METHOD BLANK**

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	<u>SDG H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R107019-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7027-004</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B01-058</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	1.50	3.3	5.5	400	U	H
Carbon 14	14762-75-5	-0.368	2.7	4.5	50	U	C
Nickel 63	13981-37-8	-0.882	30	<u>51</u>	30	U	NI_L
Total Strontium	SR-RAD	1.05	9.5	<u>19</u>	1.0	U	SR
Americium 241	14596-10-2	1.42	2.8	<u>5.4</u>	1.0	U	AM
Technetium 99	14133-76-7	-0.556	1.0	3.6	15	U	TC
Thorium 228	14274-82-9	-0.790	1.1	2.2		U	TH
Thorium 230	14269-63-7	-1.23	1.8	<u>3.6</u>	1.0	U	TH
Thorium 232	TH-232	0.175	0.53	0.67	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0	0.005	0.012	0.10	U	U_T
Uranium 233	U-233/234	1.07	2.1	<u>4.1</u>	1.0	U	U
Uranium 235	15117-96-1	0	1.3	<u>4.9</u>	1.0	U	U
Uranium 238	U-238	0	1.1	<u>4.1</u>	1.0	U	U
Neptunium 237	13994-20-2	1.03	2.1	<u>2.8</u>	1.0	U	NP
Plutonium 238	13981-16-3	-0.612	2.4	<u>5.9</u>	1.0	U	PU
Plutonium 239/240	PU-239/240	1.84	2.5	<u>4.7</u>	1.0	U	PU
Potassium 40	13966-00-2	U		3.6		U	GAM
Cobalt 60	10198-40-0	U		<u>0.31</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		<u>0.32</u>	0.10	U	GAM
Radium 226	13982-63-3	U		<u>0.61</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>1.2</u>	0.20	U	GAM
Europium 152	14683-23-9	U		<u>0.73</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.86</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.52</u>	0.10	U	GAM
Thorium 228	14274-82-9	U		0.39		U	GAM
Thorium 232	TH-232	U		1.2		U	GAM
Uranium 235	15117-96-1	U		0.92		U	GAM
Uranium 238	U-238	U		37		U	GAM
Americium 241	14596-10-2	U		0.64		U	GAM

200-TW-1 & 2 - Soil Sampling

**METHOD BLANKS**

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1409

R107019-04

Method Blank

BLANK, cont.

SDG <u>7027</u>	Client/Case no <u>Hanford</u>	SDG <u>H1409</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R107019-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7027-004</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B01-058</u>	

QC-BLANK 39162

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

000027

**EBERLINE SERVICES/RICHMOND**  
SAMPLE DELIVERY GROUP H1409

R107019-03

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7027</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> SDG <u>H1409</u> Case no <u>No. 630</u>
Lab sample id <u>R107019-03</u> Dept sample id <u>7027-003</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>801-058</u>

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	485	11	5.4	400		H	479	19	101	83-117	80-120
Carbon 14	10200	100	13	50		C	11300	450	90	85-115	80-120
Nickel 63	5920	130	<u>62</u>	30		NI_L	5800	230	102	83-117	80-120
Total Strontium	1200	34	<u>9.9</u>	1.0		SR	1100	44	109	82-118	80-120
Americium 241	458	19	<u>1.6</u>	1.0		AM	478	19	96	89-111	80-120
Technetium 99	809	23	<u>3.7</u>	15		TC	787	31	103	83-117	80-120
Thorium 230	534	19	<u>3.7</u>	1.0		TH	510	20	105	89-111	80-120
Total Uranium (ug/g)	71.5	8.3	<u>0.12</u>	0.10		U_T	72.0	2.9	99	77-123	80-120
Uranium 233	468	44	<u>21</u>	1.0		U	464	19	101	83-117	80-120
Uranium 235	374	39	<u>4.7</u>	1.0		U	378	15	99	82-118	80-120
Uranium 238	520	47	<u>20</u>	1.0		U	505	20	103	83-117	80-120
Neptunium 237	483	51	<u>3.1</u>	1.0		NP	530	21	91	83-117	80-120
Plutonium 238	632	62	<u>5.1</u>	1.0		PU	620	25	102	82-118	80-120
Plutonium 239/240	690	66	<u>5.1</u>	1.0		PU	660	26	104	82-118	80-120
Cobalt 60	19.9	1.3	<u>0.65</u>	0.050		GAM	19.8	0.79	100	75-125	80-120
Cesium 137	20.9	1.1	<u>0.85</u>	0.10		GAM	20.5	0.82	102	75-125	80-120

200-TW-1 & 2 - Soil Sampling

QC-LCS 39161

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-LCS  
 Version 3.06  
 Report date 08/15/01

000028

**EBERLINE SERVICES/RICHMOND**  
SAMPLE DELIVERY GROUP H1409

R107019-05

B125X2

**DUPLICATE**

SDG <u>7027</u> Contact <u>Melissa C. Mannion</u> DUPLICATE Lab sample id <u>R107019-05</u> Dept sample id <u>7027-005</u> % solids <u>92.9</u>	Client/Case no <u>Hanford</u> SDG <u>H1409</u> Case no <u>No. 630</u> ORIGINAL Lab sample id <u>R107019-01</u> Dept sample id <u>7027-001</u> Received <u>07/03/01</u> % solids <u>92.9</u>
Client sample id <u>B125X2</u> Location/Matrix <u>T-26/200 W</u> <u>SOLID</u> Collected/Weight <u>06/27/01 11:15</u> <u>401.4 g</u> Custody/SAF No <u>B01-058-2</u> <u>B01-058</u>	

ANALYTE	DUPLICATE		MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/g	2σ ERR (COUNT)					pCi/g	2σ ERR (COUNT)					
Tritium	0.250	0.93	1.6	400	U	H	0.466	0.94	1.6	U	-		
Carbon 14	0.257	2.6	4.3	50	U	C	-0.955	2.7	4.6	U	-		
Nickel 63	0.885	30	51	30	U	NI_L	-1.80	31	52	U	-		
Total Strontium	51000	230	9.7	1.0		SR	49100	230	11		4	21	
Americium 241	204	33	7.6	1.0		AM	227	19	4.1		11	29	
Technetium 99	2.08	1.1	3.2	15	U	TC	0.909	1.3	3.8	U	-		
Thorium 228	0.749	0.95	1.6		U	TH	4.09	4.7	6.5	U	-		
Thorium 230	-2.25	1.6	3.7	1.0	U	TH	0.582	3.5	4.5	U	-		
Thorium 232	0.749	0.55	0.65	1.0	J	TH	1.74	2.3	4.5	U	80	285	
Total Uranium (ug/g)	61.5	7.1	0.12	0.10		U_T	61.1	7.1	0.12		1	31	
Uranium 233	19.9	6.1	3.8	1.0		U	18.1	6.1	3.8		9	69	
Uranium 235	1.80	2.4	4.6	1.0	U	U	1.22	1.2	4.7	U	-		
Uranium 238	24.4	7.1	3.8	1.0		U	21.1	6.2	3.8		15	63	
Neptunium 237	1.88	1.9	2.8	1.0	U	NP	2.17	4.3	8.3	U	-		
Plutonium 238	22.3	13	19	1.0		PU	35.2	15	18		45	104	
Plutonium 239/240	6380	680	20	1.0		PU	6320	540	7.8		1	23	
Ruthenium 106	U		43		U	GAM	U				0	214	
Antimony 125	U		25		U	GAM	U				0	214	
Potassium 40	13.3	6.3	5.5			GAM	17.0	5.2	4.5		24	87	
Cobalt 60	U		0.76	0.050	U	GAM	U		0.85	U	-		
Barium 133	U		8.2		U	GAM	U				0	215	
Cesium 137	21100	20	6.8	0.10		GAM	21200	20	6.9		0	32	
Radium 226	U		8.9	0.10	U	GAM	U		9.1	U	-		
Radium 228	U		9.8	0.20	U	GAM	U		11	U	-		
Europium 152	U		20	0.10	U	GAM	U		20	U	-		
Europium 154	57.3	4.6	3.7	0.10		GAM	61.9	4.6	3.4		8	36	
Europium 155	81.8	7.8	11	0.10		GAM	85.1	8.0	12		4	38	
Thorium 228	U		8.1		U	GAM	U		8.2	U	-		

200-TW-1 & 2 - Soil Sampling

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

000029

**EBERLINE SERVICES/RICHMOND**  
**SAMPLE DELIVERY GROUP H1409**

R107019-05

B125X2

**DUPLICATE, cont.**

SDG <u>7027</u> Contact <u>Melissa C. Marnion</u> Duplicates Lab sample id <u>R107019-05</u> Dept sample id <u>7027-005</u> % solids <u>92.9</u>	ORIGINAL Lab sample id <u>R107019-01</u> Dept sample id <u>7027-001</u> Received <u>07/03/01</u> % solids <u>92.9</u>	Client/Case no <u>Hanford</u> SDG <u>H1409</u> Case no <u>No. 630</u> Client sample id <u>B125X2</u> Location/Matrix <u>T-26/200 W</u> <u>SOLID</u> Collected/Weight <u>06/27/01 11:15</u> <u>401.4 g</u> Custody/SAF No <u>B01-058-2</u> <u>B01-058</u>
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ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ PROT TOT LIMIT
Thorium 232	U		9.8		U	GAM	U		11	U	-	
Uranium 235	U		18		U	GAM	U		19	U	-	
Uranium 238	U		300		U	GAM	U		310	U	-	
Americium 241	U		290		U	GAM	U		300	U	-	

200-TW-1 & 2 - Soil Sampling

QC-DUP#1 39163

000030

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H1409

R107019-06

B125X2

**MATRIX SPIKE**

SDG <u>7027</u>		Client/Case no <u>Hanford</u> <span style="float:right">SDG <u>H1409</u></span>
Contact <u>Melissa C. Mannion</u>		Case no <u>No. 630</u>
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R107019-06</u>	Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>
Dept sample id <u>7027-006</u>	Dept sample id <u>7027-001</u>	Location/Matrix <u>T-26/200 W</u> <span style="float:right">SOLID</span>
	Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 11:15</u> <u>401.4 g</u>
% solids <u>92.9</u>	% solids <u>92.9</u>	Custody/SAF No <u>B01-058-2</u> <span style="float:right"><u>B01-058</u></span>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS LIMITS	PROTOCOL LIMITS
Tritium	720	7.3	1.6	400	X H	857	34	0.466	0.94	<u>84</u>	86-114	60-140

200-TW-1 & 2 - Soil Sampling

QC-MS#1 39164

MATRIX SPIKES

Page 1

SUMMARY DATA SECTION

Page 14

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>08/15/01</u>

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Date: 10 December 2001  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 200-TW-1&2 - Soil Sampling  
Subject: Wet Chemistry - Data Package No. H1409-LLI (SDG No. H1409)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1 - IC Anions - 300.0 (chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; pH - 9045C; nitrate/nitrite 353.2; chromium VI - 7196A.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001*. Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, sulphate, fluoride); 14 days for cyanide and total

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organic carbon (TOC); 2 days for IC anions (nitrate, nitrite, phosphate); and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the samples being received at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J".

Holding times were met for all other parameters and samples.

- **Method Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the target required quantitation limit (TRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

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

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (30-69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130% and 70% for

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TOC) and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

- Laboratory Duplicate Samples

- Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35%. If RPD values are out of specification and the sample concentration is greater than five times the target required quantitation limit (TRQL), all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

- All laboratory duplicate results were within the required control limits.

- Field Duplicate Samples

- No field duplicates were submitted for analysis.

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- **Analytical Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TRQL.

- **Completeness**

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to the samples being recieved at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J". Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

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

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

**Appendix 1**

**Glossary of Data Reporting Qualifiers**

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Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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**Appendix 2**

**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
TOC Ammonia Chromium VI Cyanide	J	B125Y4	Sample preservation
Phosphate Chromium VI	J	B125Y4	Matrix spike recovery
Chromium VI Nitrate/nitrite	J	B125X2	Matrix spike recovery

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

**000010**

GENERAL CHEMISTRY ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD		Case: B125X2		SDG: H1409		Sample Number: B125Y4	
Laboratory: Lionville Laboratory Inc.							
Sample Date	TRQL	Result	Q	Result	Q	Result	Q
General Chemistry							
Chloride	2	3.6		2.6			
Fluoride	5	1.68		9.5			
Nitrite	2.5	1.34	U	1.32	U		
Nitrate	2.5	12.1		33.4			
Cyanide, total	0.5	0.43	U	0.41	UJ		
Phosphate	5	13.1		2.5	J		
Chromium VI	0.5	4.2	J	0.87	J		
Sulfate	5	11.2		22.0			
Nitrate/Nitrite		3.4	J	6.7			
Ammonia, as N	0.5	5.3	U	5.3	UJ		
Total Organic Carbon		132	U	188	J		
pH		8.8		9.9			

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/27/01

LVL LOT #: 0107L231

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125X2	% Solids	93.4	%	0.01	1.0
		Chloride by IC	3.6	MG/KG	1.3	1.0
		Fluoride by IC	168	MG/KG	26.8	10.0
		Nitrite by IC	1.34	u MG/KG	1.34	1.0
		Nitrate by IC	12.1	MG/KG	1.34	1.0
		Cyanide, Total	0.43	u MG/KG	0.43	1.0
		Phosphate by IC	13.1	MG/KG	1.3	1.0
		Chromium VI	4.2	J MG/KG	0.43	1.0
		Sulfate by IC	11.2	MG/KG	1.3	1.0
		Nitrate Nitrite	3.4	J MG/KG	0.22	1.0
		Ammonia, as N	5.3	u MG/KG	5.3	1.0
		Total Organic Carbon	132	u MG/KG	132	1.0
		pH	8.8	SOIL PH	0.01	1.0

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 12/4/01

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*Handwritten signature/initials*

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/27/01

LVL LOT #: 0107L228

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125Y4	% Solids	94.4	%	0.01	1.0
		Chloride by IC	2.6	MG/KG	1.3	1.0
		Fluoride by IC	9.5	MG/KG	2.6	1.0
		Nitrite by IC	1.32	u MG/KG	1.32	1.0
		Nitrate by IC	33.4	MG/KG	1.32	1.0
		Cyanide, Total	0.41	u MG/KG	0.41	1.0
		Phosphate by IC	2.5	MG/KG	1.3	1.0
		Chromium VI	0.87	MG/KG	0.42	1.0
		Sulfate by IC	22.0	MG/KG	1.3	1.0
		Nitrate Nitrite	6.7	MG/KG	0.21	1.0
		Ammonia, as N	5.3	u MG/KG	5.3	1.0
		Total Organic Carbon	188	MG/KG	129	1.0
		pH	9.9	SOIL PH	0.01	1.0

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**Appendix 4**

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

**000014**



## Analytical Report

Client: TNU-HANFORD B01-058 H1409  
LVL#: 0107L231

W.O.#: 11343-606-001-9999-00  
Date Received: 07-05-01

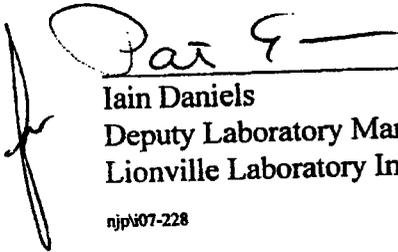
### INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.
2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain of custody.
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 was within the 20% Relative Percent Difference (RPD) control limit.
7. The matrix spike (MS) recoveries were within the 75-125% control limits with the exception of Nitrate Nitrite that was below the control limits that may be attributed to sample inhomogeneity and Soluble Chromium VI MS recovery that was below the control limits that may be attributed to matrix interference to the potassium dichromate spiking solution.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Nitrate, Sulfate and Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.

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 15 pages.

000015

9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.
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  
Deputy Laboratory Manager  
Lionville Laboratory Incorporated

07-30-01  
Date

njp07-228



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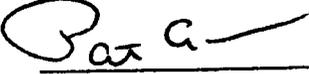
## Analytical Report

Client: TNU-HANFORD B01-058 H1409  
LVL#: 0107L228

W.O.#: 11343-606-001-9999-00  
Date Received: 07-05-01

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.
2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain of custody.
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 was within the 20% Relative Percent Difference (RPD) control limit.
7. The matrix spike recoveries were within the 75-125% control limits with the exception of Insoluble Chromium VI that was above the control limits and Soluble Chromium VI and Phosphate that were below the control limits; poor matrix spike recoveries may be attributed to sample inhomogeneity.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.
9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.
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  
Deputy Laboratory Manager  
Lionville Laboratory Incorporated

07-30-01  
Date

njp07-228

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 14 pages. 000017

Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

LVL LOT # :0107L231

DATE RECEIVED: 07/05/01

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001 MS	S	01LTZ019	06/27/01	07/18/01	07/20/01
PH	001	S	01LPH050	06/27/01	07/19/01	07/19/01
PH	001 REP	S	01LPH050	06/27/01	07/19/01	07/19/01
QC:						
CHLORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
CHLORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	MB1	S	01LCA67	N/A	07/09/01	07/09/01
PHOSPHATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
PHOSPHATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
CHROMIUM VI	MB1	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BS	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BSD	S	01LVIA61	N/A	07/20/01	07/20/01
SULFATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
SULFATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE NITRITE	MB1	S	01LN3F39	N/A	07/18/01	07/18/01
NITRATE NITRITE	MB1 BS	S	01LN3F39	N/A	07/18/01	07/18/01
AMMONIA	MB1	S	01LAM035	N/A	07/10/01	07/11/01
AMMONIA	MB1 BS	S	01LAM035	N/A	07/10/01	07/11/01
AMMONIA	MB1 BSD	S	01LAM035	N/A	07/10/01	07/11/01
TOTAL ORGANIC CARBON	MB1	S	01LTZ019	N/A	07/18/01	07/20/01
TOTAL ORGANIC CARBON	MB1 BS	S	01LTZ019	N/A	07/18/01	07/20/01

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Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



LVL LOT # : 0107L231

DATE RECEIVED: 07/05/01

CLIENT ID / ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
% SOLIDS	001	S	01L&S083	06/27/01	07/06/01	07/07/01
% SOLIDS	001 REP	S	01L&S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 REP	S	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 MS	S	01LCA67	06/27/01	07/09/01	07/09/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 REP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 REP	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 MS	S	01LAM035	06/27/01	07/10/01	07/11/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001 MS	S	01LTZ019	06/27/01	07/18/01	07/20/01
PH	001	S	01LPH050	06/27/01	07/19/01	07/19/01
PH	001 REP	S	01LPH050	06/27/01	07/19/01	07/19/01
QC:						
CHLORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
CHLORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
TOTAL CYANIDE	LCS L	S	01LC068	N/A	07/11/01	07/11/01
TOTAL CYANIDE	LCS L	S	01LC068	N/A	07/11/01	07/11/01
TOTAL CYANIDE	MB1	S	01LC068	N/A	07/11/01	07/11/01
PHOSPHATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
PHOSPHATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
CHROMIUM VI	MB1	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BS	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BSD	S	01LVIA61	N/A	07/20/01	07/20/01
SULFATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
SULFATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE NITRITE	MB1	S	01LN3F39	N/A	07/18/01	07/18/01
NITRATE NITRITE	MB1 BS	S	01LN3F39	N/A	07/18/01	07/18/01
AMMONIA	MB1	S	01LAM036	N/A	07/18/01	07/19/01
AMMONIA	MB1 BS	S	01LAM036	N/A	07/18/01	07/19/01
AMMONIA	MB1 BSD	S	01LAM036	N/A	07/18/01	07/19/01
TOTAL ORGANIC CARBON	MB1	S	01LTZ019	N/A	07/18/01	07/20/01
TOTAL ORGANIC CARBON	MB1 BS	S	01LTZ019	N/A	07/18/01	07/20/01

000020

Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD B01-058 H1409



DATE RECEIVED: 07/05/01

LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
% SOLIDS	001	S	01L&S083	06/27/01	07/06/01	07/07/01
% SOLIDS	001 REP	S	01L&S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 REP	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 MS	S	01LC068	06/27/01	07/11/01	07/11/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 REP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	S	01LAM036	06/27/01	07/18/01	07/19/01
AMMONIA	001 REP	S	01LAM036	06/27/01	07/18/01	07/19/01
AMMONIA	001 MS	S	01LAM036	06/27/01	07/18/01	07/19/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

000021





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

000024

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-tw-1+2	DATA PACKAGE: #1409				
VALIDATOR: TLI	LAB: LIF		DATE: 2 Dec 01		
CASE:	SDG: #1409				
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Anions/IC	<input checked="" type="checkbox"/> TOC	<input type="checkbox"/> TOX	<input type="checkbox"/> TPH-418.1	Oil and Grease	Alkalinity
<input checked="" type="checkbox"/> Ammonia	<input type="checkbox"/> BOD/COD	<input type="checkbox"/> Chloride	<input checked="" type="checkbox"/> Chromium-VI	<input checked="" type="checkbox"/> pH	<input checked="" type="checkbox"/> NO <sub>3</sub> /NO <sub>2</sub>
<input type="checkbox"/> Sulfate	<input type="checkbox"/> TDS	<input type="checkbox"/> TKN	<input type="checkbox"/> Phosphate	<input checked="" type="checkbox"/> Cyanide	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	B125X2	B125Y4	Soil		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No N/A  
 Is a case narrative present? . . . . . Yes No N/A

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

2. HOLDING TIMES

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

Comments: \_\_\_\_\_  
preservator - cooler 17°  
TOC, ammonia, hex chrome, cyanide - all J 544  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

*A-25/er*

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses? Yes No N/A

Are initial calibration results acceptable? . . . . . Yes No N/A

Was a calibration check performed for all applicable analyses? Yes No N/A

Are calibration check results acceptable? . . . . . Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

4. BLANKS

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

Are laboratory blank results acceptable? . . . . . Yes No N/A

Were field/trip blanks analyzed? . . . . . Yes No N/A

Are field/trip blank results acceptable? . . . . . Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . . . Yes No N/A

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

Were LCS analyses performed at the required frequency? . . . . . Yes No N/A

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

Comments: phosphate (73.3) + CRVL (74.8) - Jall 544

nitrate/nitrite (73.4) + COT (0) - Jall

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency? . . . . . Yes No N/A

Are laboratory duplicate sample RPD values acceptable? . . . . . Yes No N/A

Are field duplicate RPD values acceptable? . . . . . Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

A-247



**Appendix 6**

**Additional Documentation Requested by Client**

000028

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/27/01

LVL LOT #: 0107L231

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION
			RESULT	REPLICATE RPD		
-----	-----	-----	-----	-----	-----	-----
-001REP	B125X2	% Solids	93.4	94.4	1.1	1.0
		Chloride by IC	3.6	3.6	0.90	1.0
		Fluoride by IC	168	196	15.6	10.0
		Nitrite by IC	1.34u	1.34u	NC	1.0
		Nitrate by IC	12.1	15.6	25.2	1.0
		Cyanide, Total	0.43u	0.44u	NC	1.0
		Phosphate by IC	13.1	12.6	3.4	1.0
		Chromium VI	4.2	4.0	3.9	1.0
		Sulfate by IC	11.2	14.0	22.1	1.0
		Nitrate Nitrite	3.4	3.3	1.9	1.0
		Ammonia, as N	5.3 u	5.3 u	NC	1.0
		Total Organic Carbon	132 u	163	32.5	1.0
		pH	8.76	8.7	0.2	1.0

000029

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 07/27/01

LVL LOT #: 0107L231

CLIENT: TNUHANFORD B01-058 H1409  
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1	SPIKE#2	%DIFF
			%RECOV	%RECOV	
BLANK10	01LAM035-MB1	Ammonia, as N	98.0	99.5	1.5

000030

*20*

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/27/01

LVL LOT #: 0107L231

CLIENT: TNUHANFORD B01-058 H1409

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B125X2	Chloride by IC	53.4	3.6	53.6	93.1	2.0
		Fluoride by IC	731	168	536	105.2	10.0
		Nitrite by IC	47.1	1.34u	53.6	88.0	2.0
		Nitrate by IC	66.1	12.1	53.6	100.9	2.0
		Cyanide, Total	3.78	0.43u	3.92	96.6	1.0
		Phosphate by IC	61.1	13.1	53.6	89.6	2.0
		Soluble Chromium VI	2.1	4.2	4.3	0.0	1.0
		Insoluble Chromium VI	1610	4.2	1310	122.3	100
		Sulfate by IC	63.1	11.2	53.6	96.8	2.0
		Nitrate Nitrite	7.3	3.4	5.3	73.4	1.0
		Ammonia, as N	210	5.3 u	206	101.8	1.0
		Total Organic Carbon	2570	117	2670	92.1	1.0
BLANK10	01LICA45-MB1	Chloride by IC	23.5	1.2 u	25.0	93.9	1.0
		Fluoride by IC	54.6	2.5 u	50.0	109.2	1.0
		Nitrite by IC	23.6	1.25u	25.0	94.4	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.1	1.0
		Phosphate by IC	25.4	1.2 u	25.0	101.8	1.0
		Sulfate by IC	23.1	1.2 u	25.0	92.4	1.0
BLANK10	01LVIA61-MB1	Soluble Chromium VI	3.6	0.40u	4.0	90.7	1.0
		Insoluble Chromium VI	1790	0.40u	1740	103.1	100
BLANK10	01LN3F39-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.0	1.0
BLANK10	01LAM035-MB1	Ammonia, as N	98.0	5.0 u	100	98.0	1.0
		Ammonia, as N MSD	99.5	5.0 u	100	99.5	1.0
BLANK10	01LT2019-MB1	Total Organic Carbon	395	20.0 u	400	98.8	1.0

000031

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

LVL LOT #: 0107L231

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK10	01LICA45-MB1	Chloride by IC	1.2	u MG/KG	1.2	1.0
		Fluoride by IC	2.5	u MG/KG	2.5	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	01LCA67-MB1	Cyanide, Total	0.50	u MG/KG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0.40	u MG/KG	0.40	1.0
BLANK10	01LN3F39-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
ANK10	01LAM035-MB1	Ammonia, as N	5.0	u MG/KG	5.0	1.0
BLANK10	01LT2019-MB1	Total Organic Carbon	20.0	u MG/KG	20.0	1.0

000032

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

LVL LOT #: 0107L228

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	01LICA45-MB1	Chloride by IC	1.2	u MG/KG	1.2	1.0
		Fluoride by IC	2.5	u MG/KG	2.5	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	01LC068-MB1	Cyanide, Total	0.50	u MG/KG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0.40	u MG/KG	0.40	1.0
BLANK10	01LN3F39-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
ANK10	01LAM036-MB1	Ammonia, as N	5.0	u MG/KG	5.0	1.0
BLANK10	01LT2019-MB1	Total Organic Carbon	20.0	u MG/KG	20.0	1.0

000033

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/27/01

LVL LOT #: 0107L228

CLIENT: TNUHANFORD B01-058 H1409

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B125Y4	Chloride by IC	50.3	2.6	53.0	90.1	2.0
		Fluoride by IC	118	9.5	106	102.0	2.0
		Nitrite by IC	49.3	1.32u	53.0	93.0	2.0
		Nitrate by IC	83.0	33.4	53.0	93.7	2.0
		Cyanide, Total	4.55	0.41u	4.99	91.2	1.0
		Phosphate by IC	41.4	2.5	53.0	73.3	2.0
		Soluble Chromium VI	4.0	0.87	4.2	74.8	1.0
		Insoluble Chromium VI	1590	0.87	1230	129.0	100
		Sulfate by IC	69.4	22.0	53.0	89.6	2.0
		Nitrate Nitrite	11.3	6.7	5.3	87.8	2.0
		Ammonia, as N	210	5.3 u	210	100	1.0
		Total Organic Carbon	2650	188	2650	93.1	1.0
BLANK10	01LICA45-MB1	Chloride by IC	23.5	1.2 u	25.0	93.9	1.0
		Fluoride by IC	54.6	2.5 u	50.0	109.2	1.0
		Nitrite by IC	23.6	1.25u	25.0	94.4	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.1	1.0
		Phosphate by IC	25.4	1.2 u	25.0	101.8	1.0
		Sulfate by IC	23.1	1.2 u	25.0	92.4	1.0
BLANK10	01LVIA61-MB1	Soluble Chromium VI	3.6	0.40u	4.0	90.7	1.0
		Insoluble Chromium VI	1790	0.40u	1740	103.1	100
BLANK10	01LN3F39-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.0	1.0
BLANK10	01LAM036-MB1	Ammonia, as N	96.0	5.0 u	100	96.0	1.0
		Ammonia, as N MSD	96.0	5.0 u	100	96.0	1.0
BLANK10	01LT2019-MB1	Total Organic Carbon	395	20.0 u	400	98.8	1.0

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Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 07/27/01

CLIENT: TNUHANFORD B01-058 H1409  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	SPIKE#1		SPIKE#2	
			%RECOV	%RECOV	%RECOV	%DIFF
BLANK10	01LAM036-MB1	Ammonia, as N	96.0	96.0	0.00	

000025

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/27/01

CLIENT: TNUHANFORD B01-058 H1409  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	INITIAL	REPLICATE RPD		DILUTION
			RESULT			FACTOR (REP)
-001REP	B125Y4	% Solids	94.4	95.6	1.3	1.0
		Chloride by IC	2.6	2.5	4.2	1.0
		Fluoride by IC	9.5	8.6	10.4	1.0
		Nitrite by IC	1.32u	1.32u	NC	1.0
		Nitrate by IC	33.4	31.6	5.6	1.0
		Cyanide, Total	0.41u	0.51u	NC	1.0
		Phosphate by IC	2.5	2.5	0.20	1.0
		Chromium VI	0.87	0.85	2.8	1.0
		Sulfate by IC	22.0	20.8	5.3	1.0
		Nitrate Nitrite	6.7	5.7	15.9	1.0
		Ammonia, as N	5.3 u	5.2 u	NC	1.0
		Total Organic Carbon	188	137	31.5	1.0
		pH	9.88	9.9	0.1	1.0

000026

1/19