

Date: 24 August 1999
 To: Bechtel Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: ERDF Leachate Delisting Analysis
 Subject: Wet Chemistry - Data Package No. H0389-RLN (SDG No. H0389)

RECEIVED
 APR 25 2000
 EDMC

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0389-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BOV926	4/20/99	Water	C	See note 1
BOV927	4/20/99	Water	C	See note 1

1 - IC Anions - 9056 (bromide, chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; total dissolved solids (TDS) - 160.1; total suspended solids (TSS) - 160.2; specific conductance - 9050A, pH - 9040A; sulphide - 9030A; oil & grease - 9070.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility Leachate Delisting Petition (DOE/RL-98-47 Draft B). 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 are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 28 days for ammonia, specific conductance, TOC, oil & grease, and IC anions (bromide, chloride, fluoride, and sulfate); 14 days for cyanide; 7

days for sulfide, TSS and TDS; 2 days for IC anion (phosphate, nitrate and nitrite); 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 holding time being exceeded by greater than two times the limit, all pH results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by less than two times the limit, the TSS result in sample BOV926 was qualified as an estimate and flagged "J".

Holding times were met for all other parameters and samples.

- **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 CRQL to be acceptable.

Due to laboratory blank contamination, all oil & grease results were qualified as estimates and flagged "J".

All other method blank results were acceptable.

- **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%. Samples with a spike recovery of less than 30% and a sample value below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike

recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to the matrix spike not being analyzed with the SDG, all TOC results were qualified as estimates and flagged "J".

All 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 RPD limits of plus or minus 35% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD of 58%, all bromide results were qualified as estimates and flagged "J".

Due to the matrix spike duplicate not being analyzed with the SDG, all TOC results were qualified as estimates and flagged "J".

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

Field Duplicate Samples

One pair of field duplicate samples (samples BOV926/BOV927) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for bromide was outside QC limits (61%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Environmental Restoration Disposal Facility Leachate Delisting Petition PQLs or the CRDL if no PQL was specified, to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above PQL/CRDL: Bromide in sample BOV927 and nitrite, cyanide, ammonia, and total suspended solids in all samples. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL/CRDL.

- **Completeness**

Data Package No. H0389-RLN (SDG No. H0389) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by greater than two times the limit, all pH results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than two times the limit, the TSS result in sample BOV926 was qualified as an estimate and flagged "J". Due to an RPD of 58%, all bromide results were qualified as estimates and flagged "J". Due to the matrix spike not being analyzed with the SDG, all TOC results were qualified as estimates and flagged "J". Due to laboratory blank contamination, all oil & grease results were qualified as estimates 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.

The following reported detection limits were above PQL/CRDL: Bromide in sample BOV927 and nitrate, cyanide, ammonia, and total suspended solids in all samples. 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-98-47, Draft B, *Environmental Restoration Disposal Facility Leachate Delisting Petition*, U.S. Department of Energy, October 1998.

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Appendix 1

Glossary of Data Reporting Qualifiers

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: H0389	REVIEWER: TLI	DATE: 8/24/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
pH	J	All	Holding time
Oil & Grease	J	All	Blank contamination
TOC	J	All	MS and MSD not run with the SDG
TSS	J	B0V926	Holding time
Bromide	J	All	RPD

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	BOV926	Bromide by IC	4.7 J	MG/L	2.5	10.0
		Chloride by IC	335	MG/L	25.0	100
		Fluoride by IC	2.0	MG/L	0.50	1.0
		Nitrite by IC	2.5 u	MG/L	2.5	10
		Nitrate by IC	150	MG/L	25	100
		Cyanide, Total	10 u	UG/L	10	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	336	MG/L	25.0	100
		Ammonia, as N	0.10 u	MG/L	0.10	1.0
		Total Organic Carbon	12.1 J	MG/L	0.50	1.0
		Oil & Grease Gravimetri	3.0	MG/L	1.0	1.0
		pH	7.6 J	PH UNITS	0.01	1.0
		Sulfide	1.0 u	MG/L	1.0	1.0
		Specific Conductance	2230	UMHOS/CM	1.0	1.0
		Total Dissolved Solids	1700	MG/L	5.0	1.0
		Total Suspended Solids	5.0 u J	MG/L	5.0	1.0
-003	BOV927	Bromide by IC	2.5 u J	MG/L	2.5	10.0
		Chloride by IC	362	MG/L	25.0	100
		Fluoride by IC	2.1	MG/L	0.50	1.0
		Nitrite by IC	2.5 u	MG/L	2.5	10
		Nitrate by IC	150	MG/L	25	100
		Cyanide, Total	5.0 u	UG/L	5.0	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	343	MG/L	25.0	100
		Ammonia, as N	0.10 u J	MG/L	0.10	1.0
		Total Organic Carbon	11.1 J	MG/L	0.50	1.0
		Oil & Grease Gravimetri	2.8	MG/L	1.0	1.0
		pH	7.8 J	PH UNITS	0.01	1.0
		Sulfide	1.0 u	MG/L	1.0	1.0
		Specific Conductance	2060	UMHOS/CM	1.0	1.0
		Total Dissolved Solids	1800	MG/L	5.0	1.0
		Total Suspended Solids	5.0 u	MG/L	5.0	1.0

ju
8/19/99

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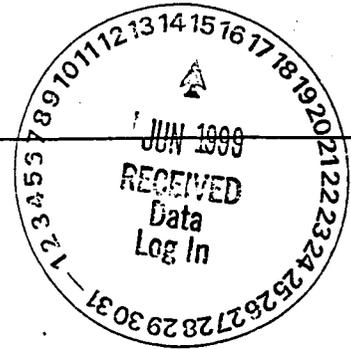
Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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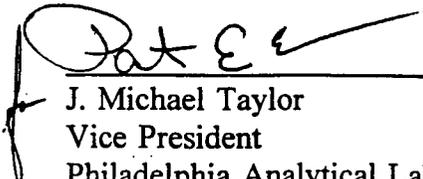
Recra LabNet Philadelphia Analytical Report

Client : TNU-HANFORD B99-037
RFW# : 9904L738
SDG# : H0389
SAF# : B99-037

W.O. # : 10985-001-001-9999-00
Date Received: 04-22-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary. For NPDES samples: Ammonia distillations for method 350.3 were not performed as specified in 40 CFR part 136.
3. Sample holding times as required by the method and/or contract were met with the exception of Total Suspended Solids, Total Organic Carbon replicate and spike samples which were analyzed past hold and pH which were received past hold.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blanks were within method criteria with the exception of 99LOG009-MB1 for Oil and Grease which was above the reporting limit.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.
7. The matrix spike recoveries were within the 75-125% control limits. The matrix spike duplicates were within the 20% RPD control limit.
8. The replicate analyses were within the 20% RPD control limit with the exception of Bromide.



J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

5-28-99
Date

njpv04-738

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Project Coordinator: WEISS, RL
 SAF No.: B99-037
 Method of Shipment: Fed Ex

Company Contact: Fred Rocco
 Telephone No.: 372-9086

Sampling Location: ERDF 200 west

Field Logbook No.: EL 1309-3

Offsite Property No.: A990116

Bill of Lading/Air Bill No.: 4235795Z 9916
 4235795Z 49ZT, 4235795Z 4905
 COA: TERDFY X117

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		HCL to pH <2 Cool 4C	HNO3 to pH <2 Cool 4C	Cool 4C	HCL Cool 4C	Special Handling and/or Storage
				Type of Container	No. of Container(s)					
B0V925	Water	4-20-99	0645	G	2	1000mL	P	3	40mL	
B0V926	Water	4-20-99	0915	G	2	1000mL	P	3	40mL	
B0V927	Water	4-20-99	0920	G	2	1000mL	P	3	40mL	

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By	Date/Time	Received By	Date/Time
SJOGALE AML 42099 0630	42099 1425	REF 1-C	42099 1425
Relinquished By	Date/Time	Received By	Date/Time
REF 1-C	42199 0630	SJOGALE AML	42199 0630
Relinquished By	Date/Time	Received By	Date/Time
SJOGALE AML	42199 0800	FED EX	
Relinquished By	Date/Time	Received By	Date/Time
Ref-ey			

LABORATORY SECTION Received By: *Ref-ey*

FINAL SAMPLE Disposal Method: *Ref-ey*

LABORATORY SECTION Received By: *Loegin* Title: *Unit Leader*

FINAL SAMPLE Disposal Method: *Ref-ey*

Date/Time: 4/22/99 0930

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits for GEA.

(1) Alcohols, Glycols, & Ketones - 8015M (1-Butanol, Diethyl ether, Methanol)
 (2) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) (1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isopropyl)

Matrix *
 Soil
 Water
 Vapor
 Other Solid
 Other Liquid

B99-037-05

Date Turnaround
45 Days

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

Collector: Gale, SJ/ Neilson RJ
 Telephone No. 372-9086
 Project Designation: ERDF Leachate Delisting Analysis
 Sampling Location: ERDF 200 west
 Field Logbook No. EL-1309-3
 Offsite Property No. A990116
 Bill of Lading/Air Bill No. 42357524927, 42357524925
 COA TCRDFY K117

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		HNO3 to pH <2 Cool 4C	ZnAc+NaOH to pH >9 Cool	HNO3 to pH <2	NaOH to pH >12 Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C
				Type of Container	No. of Container(s)								
BOV925	Water												
BOV926	Water	4-20-99	0915										
BOV927	Water	4-20-99	0920										

POSSIBLE SAMPLE HAZARDS/REMARKS

SAMPLE ANALYSIS

Item	Test	Result	Special Instructions
See item (1) in Special Instructions	Ammonia - 350 J		
See item (2) in Special Instructions	Sulfides - 9030		
See item (3) in Special Instructions	Total Cyanide - 9010		
See item (4) in Special Instructions	Chloro-Herbicides - EPA8151		
See item (5) in Special Instructions	Pesticides - 8081		

SPECIAL INSTRUCTIONS

** TMA is requested to report all analytes found above their detection limits for GEA.

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)
 (2) Gamma Spectroscopy (Water) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]
 (3) 8310 SVOA, HPLC (Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene)
 (4) Nitrosamines - 8070 (N-Nitroso-di-n-dipropylamine, N-Nitrosodimethylamine)
 (5) Semi-VOA - 8270A (App IX); Semi-VOA -- 8270A (App IX Add-On) (1,2-Diphenylhydrazine, 1,4-Dinitrobenzene, 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 2-Cyclohexyl-4,6-dinitrophenol)

CHAIN OF POSSESSION

Received By	Date/Time	Received By	Date/Time
SJ GALE	4/20/99 1425	REF 1-C	4/20/99 1425
REF 1-C	4/21/99 0630	SJ GALE	4/21/99 0630
SJ GALE	4/21/99 0800	FED EX	

LABORATORY SECTION
 Received By: Jordan
 Date/Time: 4/22/99 0930

FINAL SAMPLE SECTION
 Disposed By: Logyn Unit Leader
 Date/Time: 4/22/99 0930

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc. Page 1 of 2
 Project Designation: ERDF Delisting Analysis B99-037-05
 Date Turnaround: **45 Days**

Company Contact: Fred Rocco Telephone No. 372-9086
 Sampling Location: ERDF 200 west Project Coordinator WEISS, RL
 Field Logbook No. **EL-1309-3** SAF No. B99-037

Offsite Property No. **A990116**
 Method of Shipment: **27-2.30C, 16-2.19C, 05-2.44**
 Bill of Lading/Air Bill No. **423579524927**
423579524905, 423579524916
COA 7CRDF4A117

Collector: Calc. SJ/Neilson RJ
 Project Designation: ERDF Delisting Analysis
 Ice Chest No. **ERC 96-010, SNK 427**
42357954 ERC 7E 065
 Shipped to: **JMA/REORA**
440 42099

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	None	None	None	HCl or H2SO4 to pH < 2	Cool 4C							
BOV925	Water				P	100mL	250mL	aG	aG	500mL	500mL	500mL	500mL	500mL	500mL	500mL
BOV926	Water	4-20-99	0915		P	20mL										
BOV927	Water	4-20-99	0920		P	100mL										

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	None	None	None	HCl or H2SO4 to pH < 2	Cool 4C						
BOV925	Water				P	100mL	250mL	aG	aG	500mL	500mL	500mL	500mL	500mL	500mL
BOV926	Water	4-20-99	0915		P	20mL									
BOV927	Water	4-20-99	0920		P	100mL									

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	None	None	None	HCl or H2SO4 to pH < 2	Cool 4C						
BOV925	Water				P	100mL	250mL	aG	aG	500mL	500mL	500mL	500mL	500mL	500mL
BOV926	Water	4-20-99	0915		P	20mL									
BOV927	Water	4-20-99	0920		P	100mL									

Chain of Possession	Sign/Print Names	Date/Time	Date/Time
Relinquished By: SJONE/APBL	Received By: REF 1-C	42099 1425	42099 1425
Relinquished By: REF 1-C	Received By: SJONE/APBL	42199 0630	42199 0630
Relinquished By: SJONE/APBL	Received By: FED EX	42199 0800	42199 0800
Relinquished By: 1 Fedex	Received By:		

LABORATORY SECTION: **JMA/REORA** Received By: **JMA/REORA** Title: **Logan Unit Leachor** Date/Time: **4/22/99 0930**
 FINAL SAMPLE Disposal Method: **Disposed by** Date/Time: **4/22/99 0930**

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits for GEA.
 (1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)

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Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF DeIisFing		DATA PACKAGE:	H0389	
VALIDATOR:	TZ1	LAB:	Recpt	DATE:	8/1/99
CASE:			SDG:	H0389	
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Anions/IC	<input checked="" type="checkbox"/> TOC	<input type="checkbox"/> TOX	<input type="checkbox"/> TPH-418.1	<input checked="" type="checkbox"/> Oil and Grease	<input type="checkbox"/> Alkalinity
<input checked="" type="checkbox"/> Ammonia	<input type="checkbox"/> BOD/COD	<input type="checkbox"/> Chloride	<input type="checkbox"/> Chromium-VI	<input checked="" type="checkbox"/> pH	<input type="checkbox"/> NO ₂ /NO ₃
<input type="checkbox"/> Sulfate	<input checked="" type="checkbox"/> TDS	<input type="checkbox"/> TKN	<input type="checkbox"/> Phosphate	<input checked="" type="checkbox"/> TSS	<input checked="" type="checkbox"/> cyanide
<input checked="" type="checkbox"/> Conductance	<input checked="" type="checkbox"/> Sulphide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	B00924	B00927			water

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: ammonia ✓ phosphat SC ✓ TOC ✓
 TSS-10 days - J ph- 2 days - J
 X 926

check phosphat & sulphate ✓

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: oil + grease

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: MS TOC 27 days after sample J bottle

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

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/28/99

CLIENT: TNU-HANFORD B99-037

RECRA LOT #: 9904L738

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	99LIC046-MB1	Bromide by IC	0.25 u	MG/L	0.25	1.0
		Chloride by IC	0.25 u	MG/L	0.25	1.0
		Fluoride by IC	0.50 u	MG/L	0.50	1.0
		Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0
BLANK1	99LC055-MB1	Cyanide, Total	5.0 u	UG/L	5.0	1.0
BLANK10	99LAM021-MB1	Ammonia, as N	0.10 u	MG/L	0.10	1.0
BLANK10	99LTC017-MB1	Total Organic Carbon	0.50 u	MG/L	0.50	1.0
BLANK10	99LOG009-MB1	Oil & Grease Gravimetri	1.6	MG/L	1.0	1.0
BLANK10	99LSD024-MB1	Sulfide	1.0 u	MG/L	1.0	1.0
BLANK10	99LSP016-MB1	Specific Conductance	1.0 u	UMHOS/CM	1.0	1.0
BLANK10	99LSS037-MB1	Total Dissolved Solids	5.0 u	MG/L	5.0	1.0
BLANK10	99LSSA39-MB1	Total Suspended Solids	5.0 u	MG/L	5.0	1.0
BLANK10	99LTC021-MB1	Total Organic Carbon	0.50 u	MG/L	0.50	1.0

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Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/28/99

CLIENT: TNU-HANFORD B99-037
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	99LSSA37-MB1	Total Suspended Solids	5.0	u MG/L	5.0	1.0

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Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037

RECRA LOT #: 9904L738

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-002	BOV926	Bromide by IC	46.8	4.7	50.0	84.2	10.0
		Chloride by IC	840	335	500	101.2	100
		Fluoride by IC	12.2	2.0	10.0	101.6	1.0
		Nitrite by IC	510	2.5 u	500	102.7	100
		Nitrate by IC	650	150	500	98.9	100
		Cyanide, Total	77	10 u	100	77.2	1.0
		Phosphate by IC	42.6	0.25u	50.0	85.2	10.0
		Sulfate by IC	875	336	500	107.8	100
-003	BOV927	Ammonia, as N	0.94	0.10u	1.0	94.1	1.0
		Total Organic Carbon	20.9	11.1	10.0	98.0	2.0
		Total Organic Carbon	21.1	11.1	10.0	99.7	2.0
		Sulfide	39.3	0.00	40.0	98.2	1.0
		Sulfide MSD	39.3	0.00	40.0	98.2	1.0
BLANK10	99LIC046-MB1	Bromide by IC	4.9	0.25u	5.0	98.2	1.0
		Chloride by IC	4.7	0.25u	5.0	94.4	1.0
		Fluoride by IC	10.7	0.50u	10.0	106.7	1.0
		Nitrite by IC	4.9	0.25u	5.0	97.1	1.0
		Nitrate by IC	4.8	0.25u	5.0	95.5	1.0
		Phosphate by IC	5.0	0.25u	5.0	99.4	1.0
		Sulfate by IC	4.8	0.25u	5.0	96.0	1.0
BLANK10	99LAM021-MB1	Ammonia, as N	1.0	0.10u	1.0	105.0	1.0
		Ammonia, as N MSD	1.0	0.10u	1.0	99.9	1.0
BLANK10	99LTC017-MB1	Total Organic Carbon	4.8	0.50u	5.0	96.8	1.0
		Total Organic Carbon	4.8	0.50u	5.0	95.9	1.0
BLANK10	99LOG009-MB1	Oil & Grease Gravimetr	33.0	1.6	35.4	88.8	1.0
		Oil & Grease - Grav M	36.6	1.6	36.1	97.0	1.0
BLANK10	99LSD024-MB1	Sulfide	9.9	1.0 u	10.0	99.0	1.0
		Sulfide MSD	10.0	1.0 u	10.0	100	1.0
BLANK10	99LSP016-MB1	Specific Conductance	136	1.0 u	147	92.5	1.0
		Spec Conductance MSD	136	1.0 u	147	92.7	1.0
BLANK10	99LSS037-MB1	Total Dissolved Solids	100	5.0 u	100	102.0	1.0
		Total Dissolved Solids	100	5.0 u	100	101.0	1.0
BLANK10	99LSSA39-MB1	Total Suspended Solids	99	5.0 u	100	98.7	1.0
		Total Suspended Solids	97	5.0 u	100	97.1	1.0

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Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
BLANK10	99LTC021-MB1	Total Organic Carbon	5.1	0.50u	5.0	101.9	1.0
		Total Organic Carbon	5.1	0.50u	5.0	101.3	1.0
BLANK10	99LSSA37-MB1	Total Suspended Solids	99	5.0 u	100	99.0	1.0
		Total Suspended Solids	94	5.0 u	100	94.4	1.0

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008

Recra LabNet - Lionville

INORGANICS DUPLICATE SPIKE REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	SPIKE#1		SPIKE#2	
			%RECOV	%RECOV	%RECOV	%DIFF
-003	BOV927	Total Organic Carbon	98.0	99.7	1.7	
		Sulfide	98.2	98.2	0.00	
BLANK10	99LAM021-MB1	Ammonia, as N	105.0	99.9	5.0	
BLANK10	99LTC017-MB1	Total Organic Carbon	96.8	95.9	0.91	
BLANK10	99LOG009-MB1	Oil & Grease - Grav	88.8	97.0	8.9	
BLANK10	99LSD024-MB1	Sulfide	99.0	100	1.0	
BLANK10	99LSP016-MB1	Specific Conductance	92.5	92.7	0.15	
BLANK10	99LSS037-MB1	Total Dissolved Solids	102.0	101.0	0.99	
BLANK10	99LSSA39-MB1	Total Suspended Solids	98.7	97.1	1.6	
BLANK10	99LTC021-MB1	Total Organic Carbon	101.9	101.3	0.59	

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009

Recra LabNet - Lionville

INORGANICS DUPLICATE SPIKE REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	SPIKE#1	SPIKE#2	%DIFF
			%RECOV	%RECOV	
BLANK10	99LSSA37-MB1	Total Suspended Solids	99.0	94.4	4.8

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Recra LabNet - Lionville

INORGANICS PRECISION REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037

RECRA LOT #: 9904L738

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE RPD		
-002REP	BOV926	Bromide by IC	4.7	2.6	58.1	10.0
		Chloride by IC	335	325	3.0	100
		Fluoride by IC	2.0	2.1	3.4	1.0
		Nitrite by IC	2.5 u	2.5 u	NC	10
		Nitrate by IC	150	150	1.2	100
		Cyanide, Total	10 u	10 u	NC	1.0
		Phosphate by IC	0.25u	0.25u	NC	1.0
		Sulfate by IC	336	335	0.19	100
-003REP	BOV927	Ammonia, as N	0.10u	0.10u	NC	1.0
		Total Organic Carbon	11.1	11.3	2.1	1.0
		pH	7.8	7.9	0.3	1.0
		Sulfide	1.0 u	1.0 u	NC	1.0
		Total Dissolved Solids	1800	1700	3.8	1.0
		Total Suspended Solids	5.0 u	5.0 u	NC	1.0

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Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/28/99

CLIENT: TNU-HANFORD B99-037
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9904L738

SAMPLE	SITE ID	ANALYTE	SPIKED	SPIKED	UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	99LC055-LC1	Cyanide, Total LCS	18	20	UG/L	88.5
LCS2	99LC055-LC2	Cyanide, Total LCS	91	100	UG/L	90.9

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STZ

Date: 24 August 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: PCBs, Pesticides and Herbicides - Data Package No. H0389-RLN (SDG No. H0389)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0389-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0V926	4/20/99	Water	C	See note 1 & 2
B0V927	4/20/99	Water	C	See note 1 & 2

1 - Pesticides/PCBs by 8081 and herbicides by 8151.

2 - PCBs were not analysed by EPA method 8082 (as stated in the Environmental Restoration Disposal Facility Leachate Delisting Petition (DOE/RL-98-47 Draft B) but by an equivalent method (EPA 8081)

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility Leachate Delisting Petition (DOE/RL-98-47 Draft B). 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 by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

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

All method blank target compound results were acceptable.

- **Accuracy**

- Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 50% to 150%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike results were acceptable.

- Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target

compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. The RPD for liquid samples is $\leq 20\%$ and $\leq 35\%$ for soils. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD of 23%, all Dicamba results were qualified as estimates and flagged "J".

Due to an RPD of 22%, all Dichloroprop results were qualified as estimates and flagged "J".

Due to an RPD of 24%, all 2,4-D results were qualified as estimates and flagged "J".

Due to an RPD of 25%, all 2,4,5-TP (Silvex) results were qualified as estimates and flagged "J".

Due to an RPD of 24%, all 2,4,5-T results were qualified as estimates and flagged "J".

Due to an RPD of 24%, all 2,4-DB results were qualified as estimates and flagged "J".

Due to an RPD of 23%, all Dinoseb results were qualified as estimates and flagged "J".

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

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Field Duplicate Samples

One pair of field duplicate samples (samples B0V926/B0V927) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Environmental Restoration Disposal Facility Leachate Delisting Petition PQLs or the CRDL if no PQL was specified, to ensure that laboratory detection levels meet the required criteria. The following analytes had laboratory reported detection limits above the analyte specific PQLs/CRDLs:

alpha-BHC	beta-BHC	heptachlor
aldrin	toxaphene	dieldrin
4,4'-DDE	endrin	4,4'-DDD
4,4'-DDT	gamma-BHC (lindane)	heptachlor epoxide

Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL or CRDL.

- **Completeness**

Data Package No. H0389-RLN (SDG No. H0389) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD of 23%, all Dicamba results were qualified as estimates and flagged "J". Due to an RPD of 22%, all Dichloroprop results were qualified as estimates and flagged "J". Due to an RPD of 24%, all 2,4-D results were qualified as estimates and flagged "J". Due to an RPD of 25%, all 2,4,5-TP (Silvex) results were qualified as estimates and flagged "J". Due to an RPD of 24%, all 2,4,5-T results were qualified as estimates and flagged "J". Due to an RPD of 24%, all 2,4-DB results were qualified as estimates and flagged "J". Due to an RPD of

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23%, all Dinoseb 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 had laboratory reported detection limits above the analyte specific PQLs/CRDLs:

alpha-BHC	beta-BHC	heptachlor
aldrin	toxaphene	dieldrin
4,4'-DDE	endrin	4,4'-DDD
4,4'-DDT	gamma-BHC (lindane)	heptachlor epoxide

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-98-47, Draft B, *Environmental Restoration Disposal Facility Leachate Delisting Petition*, U.S. Department of Energy, October 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

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

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

000006

Appendix 2

Summary of Data Qualification

000007

DATA QUALIFICATION SUMMARY

SDG: H0389	REVIEWER: TLI	DATE: 8/24/99	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Dicamba	J	All	MS/MSD RPD
Dichloroprop	J	All	MS/MSD RPD
2,4-D	J	All	MS/MSD RPD
2,4,5-TP (Silvex)	J	All	MS/MSD RPD
2,4,5-T	J	All	MS/MSD RPD
2,4-DB	J	All	MS/MSD RPD
Dinoseb	J	All	MS/MSD RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: BECHTEL-HANFORD		SDG: H0389		B0V926		B0V927	
Laboratory: Rebra LabNet							
Sample Number	Location	Sample Date	CRDL	Q Result	Q Result	Q Result	Q Result
Alpha-BHC		04/20/99	0.006	0.050 U	0.050 U		
Beta-BHC			0.019	0.050 U	0.050 U		
Delta-BHC				0.050 U	0.050 U		
Gamma-BHC (Lindane)			0.009	0.050 U	0.050 U		
Heptachlor			0.011	0.050 U	0.050 U		
Aldrin			0.01	0.050 U	0.050 U		
Heptachlor Epoxide			0.005	0.050 U	0.050 U		
Endosulfan I				0.050 U	0.050 U		
Dieldrin			0.008	0.10 U	0.10 U		
4,4'-DDE			0.005	0.10 U	0.10 U		
Endrin			0.005	0.10 U	0.10 U		
Endosulfan II				0.10 U	0.10 U		
4,4'-DDD			0.007	0.10 U	0.10 U		
Endosulfan Sulfate				0.10 U	0.10 U		
4,4'-DDT			0.01	0.10 U	0.10 U		
Methoxychlor				0.50 U	0.50 U		
Endrin Ketone				0.10 U	0.10 U		
Endrin Aldehyde				0.10 U	0.10 U		
alpha-Chlordane				0.050 U	0.050 U		
gamma-Chlordane				0.050 U	0.050 U		
Toxaphene			0.14	5.0 U	5.0 U		
Aroclor-1016			2	1.0 U	1.0 U		
Aroclor-1221			2	2.0 U	2.0 U		
Aroclor-1232			2	1.0 U	1.0 U		
Aroclor-1242			2	1.0 U	1.0 U		
Aroclor-1248			2	1.0 U	1.0 U		
Aroclor-1254			2	1.0 U	1.0 U		
Aroclor-1260			2	1.0 U	1.0 U		
Herbicides by 8151							
Dalapon				5.0 U	5.0 U		
Dicamba				2.0 UJ	2.0 UJ		
Dichloroprop				5.0 UJ	5.0 UJ		
2,4-D			4	1.0 UJ	1.0 UJ		
2,4,5-TP (Silvex)				0.50 UJ	0.50 UJ		
2,4,5-T				0.50 UJ	0.50 UJ		
2,4-DB				5.0 UJ	5.0 UJ		
Dinoseb				0.50 UJ	0.50 UJ		

000010

RFW Batch Number: 9904L738

Cust ID: B0V926 B0V927 B0V927 B0V927 B0V927 PBLKIS BS
 RFW#: 002 003 003 MS 003 MSD 99LE0495-MB1 99LE0495-MB1
 Matrix: WATER WATER WATER WATER WATER WATER
 D.F.: 1.00 1.00 1.00 1.00 1.00 1.00
 Units: UG/L UG/L UG/L UG/L UG/L UG/L

Surrogate:	Decachlorobiphenyl	82 %	95 %	94 %	91 %	95 %	94 %
Tetrachloro-m-xylene	85 %	82 %	65 %	55 %	50 %	55 %	55 %
Alpha-BHC	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
Beta-BHC	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
Delta-BHC	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
gamma-BHC (Lindane)	0.050 U	0.050 U	95 %	95 %	95 %	0.050 U	100 %
Heptachlor	0.050 U	0.050 U	85 %	80 %	80 %	0.050 U	85 %
Aldrin	0.050 U	0.050 U	85 %	80 %	80 %	0.050 U	75 %
Heptachlor epoxide	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
Endosulfan I	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
Dieldrin	0.10 U	0.10 U	96 %	94 %	94 %	0.10 U	100 %
3,4'-DDE	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	122 %	116 %	116 %	0.10 U	124 %
Endosulfan II	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
3,4'-DDO	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
4,4'-DDT	0.10 U	0.10 U	94 %	94 %	94 %	0.10 U	104 %
Methoxychlor	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U
Endrin ketone	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
Endrin aldehyde	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.10 U	0.10 U
alpha-Chlordane	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
gamma-Chlordane	0.050 U	0.050 U	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U
Toxaphene	5.0 U	5.0 U	10 U	10 U	10 U	5.0 U	5.0 U
Aroclor-1016	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U
Aroclor-1221	2.0 U	2.0 U	4.0 U	4.0 U	4.0 U	2.0 U	2.0 U
Aroclor-1232	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U
Aroclor-1242	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U
Aroclor-1248	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U
Aroclor-1254	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
 % = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC
8/24/99
Quat 5/16/99

Client: TNU-HANFORD B99-037 Work Order: 10985001001 Page: 1

RFW Batch Number: 9904L738

Cust ID: B0V926 B0V926 B0V926 B0V926 B0V927 PBLKIT BS
 RFW#: 002 002 MS 002 MSD 003 99LE0501-MB1 99LE0501-MB1
 Matrix: WATER WATER WATER WATER WATER WATER
 D.F.: 1.00 1.00 1.00 1.00 1.00 1.00
 Units: ug/L ug/L ug/L ug/L ug/L ug/L

Surrogate:	DCAA	85	76	90	78	87	97
Dalapon	5.0 U	69 %	80 %	5.0 U	5.0 U	5.0 U	78 %
Dicamba	2.0 U	76 %	96 %	2.0 U	2.0 U	2.0 U	90 %
Dichloroprop	5.0 U	79 %	99 %	5.0 U	5.0 U	5.0 U	95 %
2,4-D	1.0 U	77 %	98 %	1.0 U	1.0 U	1.0 U	97 %
2,4,5-TP (Silvex)	0.50 U	78 %	100 %	0.50 U	0.50 U	0.50 U	89 %
2,4,5-T	0.50 U	88 %	112 %	0.50 U	0.50 U	0.50 U	109 %
2,4-DB	5.0 U	79 %	100 %	5.0 U	5.0 U	5.0 U	97 %
Dinoseb	0.50 U	68 %	86 %	0.50 U	0.50 U	0.50 U	81 %

Handwritten: 9904L738

000012

Handwritten: 8/24/89

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

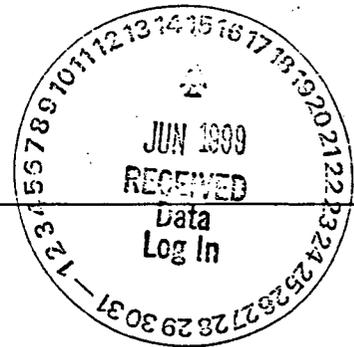
000013



**RECRA
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere



**Recra LabNet Philadelphia
Analytical Report**

Client: TNU-HANFORD B99-037
RFW#: 9904L738
SDG/SAF#: H0389/B99-037

W.O.#: 10985-001-001-9999-00
Date Received: 04-22-99

PESTICIDE/PCB

The set of samples consisted of two (2) water samples collected on 04-20-99.

The samples and their associated QC samples were extracted on 04-27-99 and analyzed based on SW846, 3rd Edition on 04-28,29-99. The extraction procedure was based on method 3520 and the extracts were analyzed based on method 8081.

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 has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

J. Michael Taylor

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

05-21-99

Date

pefr:\group\data\pest\04L-738.pes

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

000014

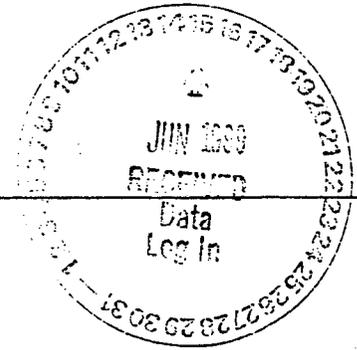
204



**RECRA
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere



**Recra LabNet Philadelphia
Analytical Report**

Client: TNU-HANFORD B99-037
RFW#: 9904L738
SDG/SAF#: H0389/B99-037

W.O.#: 10985-001-001-9999-00
Date Received: 04-22-99

HERBICIDE

The set of samples consisted of two (2) water samples collected on 04-20-99.

The samples and their associated QC samples were extracted on 04-27-99 and analyzed based on SW846, 3rd Edition on 04-28,29-99. The extraction and analysis procedure was based on method 8151.

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 has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

For J. Michael Taylor

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

pefr:\group\data\herb\04L-738.her

05-21-99
Date

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 8 pages.

000015

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.
Collector
Gale, S/ Neilson RJ
Project Designation
ERDF: Leachate Delisting Analysis
Company Contact
Fred Roeck
Telephone No.
372-9086
Project Coordinator
WEISS, RL
SAF No.
B99-037
Price Code
Method of Shipment
Fed Ex
Bill of Lading/Air Bill No. 423579524927
423579524905, 423579524916
COA TERDEF4K117

Shipped To
JMA/RECRA
423579524905
423579524916
Field Logbook No.
EL-1309-3
Offsite Property No.
A990116

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		None	None	HCl or H2SO4 to pH <2 Cool	Cool 4C	HNO3 to pH <2	Cool 4C						
				Type of Container	No. of Container(s)												
10V925	Water			P	aG	100mL	20mL	aG	500mL	G	500mL	500mL	500mL	500mL	500mL	500mL	500mL
10V926	Water	4-20-99	0915	P	aG	100mL	20mL	aG	500mL	G	500mL	500mL	500mL	500mL	500mL	500mL	500mL
10V927	Water	4-20-99	0920	P	aG	100mL	20mL	aG	500mL	G	500mL	500mL	500mL	500mL	500mL	500mL	500mL

SPECIAL INSTRUCTIONS
** TMA is requested to report all analytes found above their detection limits for GEA.
(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
SJGAL-APR 42099	425	REF 1-C	42099 1425
Relinquished By	Date/Time	Received By	Date/Time
REF 1-C	42199 0630	SJGAL-APR 42199	0630
Relinquished By	Date/Time	Received By	Date/Time
SJGAL-APR 42199	0820	FED EX	
Relinquished By	Date/Time	Received By	Date/Time
Deeley			

LABORATORY SECTION
Received By: JGaller
Disposal Method: Loggin Unit Leader
Title: Loggin Unit Leader
Date/Time: 4/22/99 0930

ANAL SAMPLE POSITION
Disposed By: [Signature]

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.
 Collector: Gale, SJ/ Neilson RJ
 Project Designation: ERDF Leachate Delisting Analysis
 Ice Chest No. 66-1309-3
 Shipped To: ERDF RECRA 421999

Company Contact: Fred Rocco
 Telephone No.: 372-9086
 Project Coordinator: WEISS, RL
 SAF No.: B99-037
 Method of Shipment: Fed Ex
 Bill of Lading/Air Bill No.: 423577524916
 #23579524927, 423579524925
 COA 7 ERDF4 K117

Field Logbook No. 66-1309-3
 Offsite Property No. A990116

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		HNO3 to pH <2 Cool 4C	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HNO3 to pH <2	NaOH to pH >= 12 Cool 4C	Cool 4C				
				Type of Container	No. of Container(s)										
SAMPLE ANALYSIS															
Special Handling and/or Storage															
B0V925	Water					500mL	500mL	500mL	500mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL
B0V926	Water	4-20-99	0915	X	X	500mL	500mL	500mL	500mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL
B0V927	Water	4-20-99	0920	X	X	500mL	500mL	500mL	500mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By	Date/Time	Received By	Date/Time
SJ GALE	MAR 42099 1425	REF 1-C	42099 1425
Relinquished By	Date/Time	Received By	Date/Time
REF 1-C	42199 0630	SJ GALE	MAR 42199 0630
Relinquished By	Date/Time	Received By	Date/Time
SJ GALE	MAR 42199 0800	FED EX	
Relinquished By	Date/Time	Received By	Date/Time
REF 1-C	42199 0800		

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits for GE. A.

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)
 (2) Gamma Spectroscopy (Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)
 (3) 8310 SVOA HPLC (Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene)
 (4) Nitrosamines - 8070 (N-Nitroso-di-n-dipropylamine, N-Nitrosodimethylamine)
 (5) Semi-VOC - 8270A (App IX); Semi-VOC - 8270A (App IX Add-On) (1,2-Diphenylhydrazine, 1,4-Dinitrobenzene, 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 2-Cyctohexyl-4,6-dinitrophenol)

Laboratory Section: Jorden
 Received By: Jorden
 Disposal Method:
 Title: Loggin Unit Leachler
 Date/Time: 4/22/99 0930
 Disposed By:
 Date/Time:
 Matrix *
 Soil
 Water
 Vapor
 Other Solid
 Other Liquid

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.
 Collector: Calc, SJ/ Neilson RJ
 Project Designation: ERDF Leachate Delisting Analysis
 Ice Chest No.: EL 1309-3
 Shipped To: TAMRECRA 4/20/99
 Bill of Lading/Air Bill No.: 4235795Z 1916,
 4235795Z 4927, 4235795Z 4905
 COA TERDFY K117

Company Contact: Fred Roock
 Telephone No.: 372-9086
 Project Coordinator: WEISS, RL
 Price Code: B99-037
 Method of Shipment: Fed Ex

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		HCL to pH <2 Cool 4C	HN03 to pH <2	Cool 4C	HCL Cool 4C	SPECIAL INSTRUCTIONS	Matrix *
				Type of Container	No. of Container(s)						
BOV925	Water	4-20-99	0645	G	2	P	1000mL	aGs*	3	See item (1) in Special Instructions.	Soil
BOV926	Water	4-20-99	0915	G	2	P	1000mL	aGs*	3	See item (1) in Special Instructions.	Water
BOV927	Water	4-20-99	0920	G	2	P	1000mL	aGs*	3	See item (1) in Special Instructions.	Vapor
											Other Solid
											Other Liquid

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits for GEA.
 (1) Alcohols, Glycols, & Ketones - 8015M (1-Butanol, Diethyl ether, Methanol)
 (2) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) (1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop

CHAIN OF POSSESSION

Relinquished By: S.J. CALC	Date/Time: 4/20/99 1425	Received By: REF 1-C	Date/Time: 4/20/99 1425
Relinquished By: REF 1-C	Date/Time: 4/21/99 0630	Received By: S.J. CALC	Date/Time: 4/21/99 0630
Relinquished By: S.J. CALC	Date/Time: 4/21/99 0800	Received By: FED EX	Date/Time:

LABORATORY SECTION
 Received By: Fed Ex
 Disposal Method: TMA
 Title: Logan Unit Leader
 Date/Time: 4/22/99 0930
 Disposed By:

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDL Delisting			DATA PACKAGE: H0387		
VALIDATOR: JLI		LAB: REKA ROCKA		DATE: 8/10/99	
CASE:			SDG: H0389		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP3/90	<input type="checkbox"/> SW-846 8080	<input checked="" type="checkbox"/> SW-846 8081	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX B0U926 B0U927					
water					

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: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

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

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

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

A-3 000020

PESTICIDE/PCB DATA VALIDATION CHECKLIST

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

Comments: _____

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

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

Comments: _____

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

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

Comments: _____

3.4 CALIBRATION VERIFICATION (3/90 SOW)

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

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMS, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMS acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments: _____

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: _____

5. ACCURACY

Were surrogates analyzed?	Yes	No	N/A
Are surrogate recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A
Were LCS samples analyzed?	Yes	No	N/A
Are LCS results acceptable?	Yes	No	N/A

Comments: MS - ENDRIU 122% - all undetected - no 7001

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? Yes No N/A

Are laboratory duplicate results acceptable? Yes No N/A

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

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

Comments: _____

7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? Yes No N/A

Are positive results resolved acceptably? Yes No N/A

Comments: _____

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? Yes No N/A

Is compound quantitation acceptable? Yes No N/A

Comments: _____

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? Yes No N/A

Are all results supported in the raw data? Yes No N/A

Do results meet the CRQLs? Yes No N/A

Comments: alpha BHC, beta BHC, Lindane (gamma BHC), Heptachlor, Aldrin
~~DE~~ Dieldrin, 44 DDE, Endrin, 44 DDD, 44 DDT Toxaphene Heptachlor epoxide
all over

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF delisting			DATA PACKAGE: H0389		
VALIDATOR: TLI		LAB: RCCRA		DATE: 8/16/99	
CASE:			SDG: H0389		
ANALYSES PERFORMED					
<input type="checkbox"/> 8010	<input type="checkbox"/> 8015	<input type="checkbox"/> 8020	<input type="checkbox"/> 8021	8140	8141
<input type="checkbox"/> 8150	<input checked="" 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: B00926 B00927					
water					

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: _____

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

A-12

GENERAL GC DATA VALIDATION CHECKLIST

Comments: Dalepan 6990 Dinoseb 6890 - J

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: dicamba 2390 dichloroprop 2290 24-D 2490
2,4,5-TP (silvex) 2590 2,45T - 2490 2,4B 2390
Dinoseb - 2390 - J

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: _____

AT

Date: 24 August 1999
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Radiochemistry - Data Package No. H0389-TNU (SDG No. H0389)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0389-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BOV926	4/20/99	Water	C	See note 1
BOV927	4/20/99	Water	C	See note 1

1 - Gamma spectroscopy; gross alpha and beta.

Data validation was conducted in accordance with the BHI validation statement of work and the the Environmental Restoration Disposal Facility Leachate Delisting Petition (DOE/RL-98-47 Draft B). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

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

All holding times were acceptable.

000001

- **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 RDL, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the 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 laboratory blank results were acceptable although the laboratory reported detection limits for gross alpha and beta exceeded their RDLs. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is either 70-130% or ± 3 sigma. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 20 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the

applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 25%, all gross alpha results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0V926/B0V927) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for gross alpha was outside QC limits (25%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the Environmental Restoration Disposal Facility Leachate Delisting Petition, (DOE/RL-98-47) PQLs (or against the CRDLs if no PQL was available) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL/CRDL.

- **Completeness**

Data Package No. H0389 (SDG No. H0389) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD of 25%, all gross alpha 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.

REFERENCES

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

DOE/RL-98-47 Draft B, *Environmental Restoration Disposal Facility Leachate Delisting Petition*

Appendix 1

Glossary of Data Reporting Qualifiers

000004

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

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

Appendix 2

Summary of Data Qualification

000006

DATA QUALIFICATION SUMMARY

SDG: H0389	REVIEWER: TLI	DATE: 8/24/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Gross alpha	J	All	RPD

000007

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000008

T M A / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 0 3 8 9

N904123-01

B0V926

D A T A S H E E T

SDG <u>7116</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0389</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N904123-01</u>	Client sample id <u>B0V926</u>	
Dept sample id <u>7116-001</u>	Location/Matrix <u>LIQUID</u>	
Received <u>04/22/99</u>	Collected <u>04/20/99 09:15</u>	
	Custody/SAF No <u>B99-037-05</u> <u>B99-037</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	38.4	7.0	<u>3.5</u>	3.0	J	80A
Gross Beta	12587-47-2	76.3	3.9	2.4	4.0		80B
Potassium 40	13966-00-2	U		180		U	GAM
Cobalt 60	10198-40-0	U		11	25	U	GAM
Cesium 137	10045-97-3	U		9.8	15	U	GAM
Europium 152	14683-23-9	U		28	50	U	GAM
Europium 154	15585-10-1	U		29	50	U	GAM
Europium 155	14391-16-3	U		26	50	U	GAM
Radium 226	13982-63-3	U		18		U	GAM
Radium 228	15262-20-1	U		44		U	GAM
Thorium 228	14274-82-9	U		16		U	GAM
Thorium 232	TH-232	U		44		U	GAM
Americium 241	14596-10-2	U		35		U	GAM
Uranium 238	U-238	U		1200		U	GAM
Uranium 235	15117-96-1	U		37		U	GAM

ERDF Leachate Delisting Analysis

rw
8/18/99

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 10

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>06/16/99</u>

000010

T M A / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 0 3 8 9

N904123-02

BOV927

D A T A S H E E T

SDG <u>7116</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0389</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N904123-02</u>	Client sample id <u>BOV927</u>	
Dept sample id <u>7116-002</u>	Location/Matrix <u>LIQUID</u>	
Received <u>04/22/99</u>	Collected <u>04/20/99 09:20</u>	
	Custody/SAF No <u>B99-037-05</u>	<u>B99-037</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	38.4	6.6	2.8	3.0	J	80A
Gross Beta	12587-47-2	65.8	3.7	2.7	4.0		80B
Potassium 40	13966-00-2	U		170		U	GAM
Cobalt 60	10198-40-0	U		18	25	U	GAM
Cesium 137	10045-97-3	U		14	15	U	GAM
Europium 152	14683-23-9	U		35	50	U	GAM
Europium 154	15585-10-1	U		47	50	U	GAM
Europium 155	14391-16-3	U		21	50	U	GAM
Radium 226	13982-63-3	U		25		U	GAM
Radium 228	15262-20-1	U		58		U	GAM
Thorium 228	14274-82-9	U		16		U	GAM
Thorium 232	TH-232	U		58		U	GAM
Americium 241	14596-10-2	U		10		U	GAM
Uranium 238	U-238	U		1700		U	GAM
Uranium 235	15117-96-1	U		35		U	GAM

ERDF Leachate Delisting Analysis

ms
8/1/98/99

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>06/16/99</u>

000011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

CCC012

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0389 is comprised of two water samples designated under SAF No. B99-037 with a Project Designation of: ERDF Leachate Delisting Analysis.

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

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses

No problems were encountered with the analyses.

2.2 Gross Alpha and Beta Analyses

No problems were encountered with the analyses.

B99-037-05

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

Collector: Gale, SJ/ Neilson RJ
 Telephone No. 372-9086
 Project Designation: ERDF Leachate Delisting Analysis
 Project Coordinator: WEISS, RL
 Price Code: Data Turnaround 45 Days
 SAF No. B99-037
 Method of Shipment: Fed Ex
 Field Logbook No. EL-1309-3
 Offsite Property No. A99015
 Bill of Lading/Air Bill No. 423579524880
 COA TERDFYK117

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	None	None	ICI or I12504 to pH < 2 Con	Conduct AC	INO3 to pH < 2	Conduct AC	Conduct AC	Conduct AC	Conduct AC
BOV925	Water				P	None	aG	aG	G	P	P	P	P
BOV926	Water	4-20-99	0915	X	P	100mL	250ml.	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.
BOV927	Water	4-20-99	0920	X	P	20mL	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	None	None	ICI or I12504 to pH < 2 Con	Conduct AC	INO3 to pH < 2	Conduct AC	Conduct AC	Conduct AC	Conduct AC
BOV925	Water				P	None	aG	aG	G	P	P	P	P
BOV926	Water	4-20-99	0915	X	P	100mL	250ml.	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.
BOV927	Water	4-20-99	0920	X	P	20mL	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.	500ml.

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
SJ GALE	4/20/99 1425	REF 1-C	4/20/99 1425
REF 1-C	4/21/99 0630	SJ GALE	4/21/99 0630
SJ GALE	4/21/99 0820	FED EX	4-21-99
FED EX	4-22-99 10:30	LABORATORY	4-22-99 10:30

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits (w/ C/A).
 (1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)

Matrix *
 Soil
 Water
 Vapor
 Other Solid
 Other Liquid

Disposal Method
 Disposed By: Title
 Disposal Method: Disposed By: Title

Collector Gale, S/ Neilson RJ	Company Contact Fred Rocco	Telephone No. 372-9086	Project Coordinator WEISS, RL	Price Code	Data Turnaround 45 Days
Project Designation ERDF Leachate Decontamination Analysis	Sampling Location ERDF 200 west		SAF No. B99-037		
Ice Chest No.	Field Logbook No. GL 1309-3		Method of Shipment Fed Ex		
Shipped To TMA/BERA	Offsite Property No. A990115		Bill of Lading/Air Bill No. 423579524880		

COA TERDEF4 K117

Preservation	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HNO3 to pH <2	NaOH to pH >=12 Cool 4C	Final 4C	Final 4C					
Type of Container	P	P	P	P	P	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1	1	1
Volume	500ml.	500ml.	500ml.	500ml.	500ml.	1000ml.	1000ml.	1000ml.	1000ml.	1000ml.	1000ml.	1000ml.

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Special Handling and/or Storage	See item (1) in Special Instructions	Total Cyanide - 9010	See item (2) in Special Instructions	See item (3) in Special Instructions	Chloro-Herbicides - EPABIS	See item (4) in Special Instructions	Pesticides - 8081	See item (5) in Special Instructions
B0V925	Water											
B0V926	Water	4-20-99	0915									
B0V927	Water	4-20-99	0920									

SPECIAL INSTRUCTIONS

** TMA is requested to report all analytes found above their detection limits for GLA

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) ; Arsenic, Lead, Selenium, Silicon, Thallium, Tin
 (2) Gamma Spectroscopy (Water) {Cesium-137, Cobalt-60, Francium-152, Francium-154, Europium-155}
 (3) 8310, SYDA, TPLC (Benzofluoranthracene, Benzofluoranthracene, Dibenzo(a,h)anthracene)
 (4) Nitrosamines - 8070 (N-Nitroso-di-n-propylamine, N-Nitrosodimethylamine)
 (5) Semi-VOA - 8270A (App IX); Semi-VOA - 8270A (App IX Add-On) [1,2-Diphenylhydrazine, 1,4-Dinitrobenzene, 1-Acetyl-2-thiourea, 3,5-Diaminotoluene, 2-Cylohexyl-4,6-dinitrophenol]

Relinquished By	Date/Time	Received By	Date/Time
S GALE, A/S	42099 1425	REF 1-C	42099 1425
REF 1-C	42199 0630	S JORALE	42199 0630
S JORALE	42199 0820	FED EX	4-21-99
FedEx	4-22-99 10:30	REF 1-C	4-22-99 10:30

LABORATORY SECTION

Received By: REF 1-C Date/Time: 4-22-99 10:30

Disposal Method

Disposed By

Date Time

000045

Collector Gale, SJ/ Neilson RJ	Company Contact Fred Roeck	Telephone No. 372-9086	Project Coordinator WEISS, RL	Price Code	Data Turnaround 45 Days
Project Designation ERDF Leachate Delisting Analysis	Sampling Location ERDF 200 west		SAF No. B99-037		
Ice Chest No.	Field Logbook No. EL1309-3		Method of Shipment Fed Ex		
Shipped To TIMARECKA 4142099	Offsite Property No. A990115		Bill of Lading/Air Bill No. 42357952 4880		
			COA TERDF4 K117		

Sample No.	Matrix *	Sample Date	Sample Time	Preservation		HNO ₃ to pH <2	Cool 4C	HCl Cool 4C	Special Handling and/or Storage
				Type of Container	No. of Container(s) • Volume				
B0V925	Water			G	2	P	1	aGs*	
B0V926	Water	4-20-99	0915		1000ml.	2	40mL	40mL	See item (2) in Special Instructions.
B0V927	Water	4-20-99	0920		oil & Grease - 9070	Gross Alpha, Gross Beta			

SAMPLE ANALYSIS

CHAIN OF POSSESSION		Sign/Print Names		Date/Time	
Relinquished By S. GALE	Received By REF	4-20-99	4-20-99	1425	1425
Relinquished By S. GALE	Received By S. GALE	4-21-99	4-21-99	0630	0630
Relinquished By Fed Ex	Received By FED EX	4-22-99	4-21-99	10:30	10:30
LABORATORY SECTION	Received By J. Leonard	4-22-99	4-22-99	10:30	10:30
FINAL SAMPLE DISPOSITION	Disposal Method	Title			

SPECIAL INSTRUCTIONS
 ** TMA is requested to report all analytes found above their detection limits for CFA.
 (1) Alcohols, Glycols, & Ketones - 8015M (1-Butanol, Diethyl ether, Methanol)
 (2) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) (1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Cyclohexane, Dichloropropane, Diethyl ether, Ethyl acetate, Isopropanol)

Appendix 5

Data Validation Supporting Documentation

000017

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF Delisting	DATA PACKAGE: H0389				
VALIDATOR: TLI	LAB: TWU		DATE: 8/1/99		
CASE:			SDG: H0389		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross (Alpha/Beta)	<input type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX	BOU926	BOU927		water	

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: _____

AA 000018

- 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: check gr A+B not - over not but 0
gr B absolute value of result exceeds TDY
Count time 38 min vs 210 for sample - JF

- 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: _____

- 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: IR - record

- 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: - all gamma completed -
grass alpha 2570 - J/J all

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: grass alpha 25%

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: check on MDA's - ok

AS

T M A / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 0 3 8 9

N904123-04

Method Blank

M E T H O D B L A N K

SDG <u>7116</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0389</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N904123-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7116-004</u>	Material/Matrix <u>LIQUID</u>	
	SAF No <u>B99-037</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	1.20	2.3	<u>4.0</u>	3.0	U	80A
Gross Beta	12587-47-2	-1.75	3.3	<u>5.8</u>	4.0	U	80B
Potassium 40	13966-00-2	U		160		U	GAM
Cobalt 60	10198-40-0	U		6.9	25	U	GAM
Cesium 137	10045-97-3	U		5.9	15	U	GAM
Europium 152	14683-23-9	U		16	50	U	GAM
Europium 154	15585-10-1	U		19	50	U	GAM
Europium 155	14391-16-3	U		15	50	U	GAM
Radium 226	13982-63-3	U		11		U	GAM
Radium 228	15262-20-1	U		26		U	GAM
Thorium 228	14274-82-9	U		10		U	GAM
Thorium 232	TH-232	U		26		U	GAM
Americium 241	14596-10-2	U		14		U	GAM
Uranium 238	U-238	U		810		U	GAM
Uranium 235	15117-96-1	U		23		U	GAM

ERDF Leachate Delisting Analysis

QC-BLANK 30591

000022

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0389

Lab Control Sample

N904123-03

LAB CONTROL SAMPLE

SDG 7116
Contact L.A. Johnson

Client/Case no Hanford SDG-H0389
Case no TRB-SBB-207925

Lab sample id N904123-03
Dept sample id 7116-003

Client sample id Lab Control Sample
Material/Matrix LIQUID
SAF No B99-037

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	51.0	4.5	3.1	3.0		80A	64.0	2.6	80	73-127	80-120
Gross Beta	55.2	3.2	1.9	4.0		80B	57.0	2.3	97	76-124	80-120
Potassium 40	U		230		U	GAM					
Cobalt 60	535	36	17	25		GAM	522	21	102	81-119	80-120
Cesium 137	550	31	23	15		GAM	518	21	106	81-119	80-120
Europium 152	U		48	50	U	GAM					
Europium 154	U		51	50	U	GAM					
Europium 155	U		40	50	U	GAM					
Radium 226	U		36		U	GAM					
Radium 228	U		95		U	GAM					
Thorium 228	U		25		U	GAM					
Thorium 232	U		98		U	GAM					
Americium 241	U		52		U	GAM					
Uranium 238	U		2800		U	GAM					
Uranium 235	U		60		U	GAM					

ERDF Leachate Delisting Analysis

QC-LCS 30590

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/04/99

000023

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0389

N904123-05

BOV926

DUPLICATE

<u>SDG 7116</u>	<u>Client/Case no Hanford</u>	<u>SDG-H0389</u>
<u>Contact L.A. Johnson</u>	<u>Case no TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N904123-05</u>	Lab sample id <u>N904123-01</u>	Client sample id <u>BOV926</u>
Dept sample id <u>7116-005</u>	Dept sample id <u>7116-001</u>	Location/Matrix <u>LIQUID</u>
	Received <u>04/22/99</u>	Collected <u>04/20/99 09:15</u>
		Custody/SAF No <u>B99-037-05</u> <u>B99-037</u>

ANALYTE	DUPLICATE		MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/L	2σ ERR (COUNT)					pCi/L	2σ ERR (COUNT)					
Gross Alpha	49.5	8.1	2.9	3.0		80A	38.4	7.0	<u>3.5</u>		25	56	
Gross Beta	67.1	3.8	2.8	4.0		80B	76.3	3.9	2.4		13	34	
Potassium 40	U		200		U	GAM	U		180	U	-		
Cobalt 60	U		7.5	25	U	GAM	U		11	U	-		
Cesium 137	U		6.9	15	U	GAM	U		9.8	U	-		
Europium 152	U		20	50	U	GAM	U		28	U	-		
Europium 154	U		21	50	U	GAM	U		29	U	-		
Europium 155	U		19	50	U	GAM	U		26	U	-		
Radium 226	U		13		U	GAM	U		18	U	-		
Radium 228	U		30		U	GAM	U		44	U	-		
Thorium 228	U		12		U	GAM	U		16	U	-		
Thorium 232	U		30		U	GAM	U		44	U	-		
Americium 241	U		17		U	GAM	U		35	U	-		
Uranium 238	U		890		U	GAM	U		1200	U	-		
Uranium 235	U		25		U	GAM	U		37	U	-		

ERDF Leachate Delisting Analysis

QC-DUP#1 30592

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>06/16/99</u>

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 9

000024

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 August 1999

Information Request

110389 - Herbicides

A number of the MS/MSD results are outside the 20% range but not flagged by the laboratory. I need to see the control limits the laboratory is using since they don't make a specific statment in the case narrative stating the MS/MSD precision results are within their acceptance criteria.

See attached sheet

R orders 8-24-99

Weiss, Richard L

From: Johnson, Orlette [johnsono@recralab.com]
Sent: Tuesday, August 24, 1999 2:10 PM
To: Rich Weiss
Subject: H0389

Herbicide control limits:
Dalapon 50 - 150
Dicamba 50 - 150
Dichloroprop 50 - 150
2,4-D 28 - 154
2,4,5-TP 30 - 150
2,4,5-T 54 - 134
2,4-DB 50 - 150
Dinoseb 50 - 150

1. Date 8/24/99	2. Review No. BHI/QA99016
3. Project Group 3 Overburden	4. Page Page 1 of 1

Reviewer Stacey	8. Organization/Group BHI/QA	9. Location/Phone H0-16/372-9208
--------------------	---------------------------------	-------------------------------------

Disposition(s) 11. CLOSED

Name of Contact _____ Date _____
Reviewer/Point of Contact _____

Author _____ Author/Organizer _____

4. Initial	15. Disposition (Provide justification if NOT accepted.)	16. Status

ERRORS

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

THE FOLLOWING FILE(S) ERASED

FILE FILE TYPE OPTION

004 MEMORY TX

TEL NO. 3755151

PAGE RESULT

02/02 OK

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 August 1999

Information Request

110389 - Herbicides

A number of the MS/MSD results are outside the 20% range but not flagged by the laboratory. I need to see the control limits the laboratory is using since they don't make a specific statement in the case narrative stating the MS/MSD precision results are within their acceptance criteria.

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

.....
facsimile transmittal

To: B. Christian Fax: 375-5667

From: _____ Date: 8-19-99

Re: _____ Pages: 3

cc: HO 387 IR

Quick Turn / Priority Data

Final Data Package

.....

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

- MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

RFW 21-21L-033/N-10/96

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 19 August 1999

Information Request

H0389 - inorganics - ~~Hot~~ Metals

Page 008 - accuracy report. Why has the laboratory assigned the asterisks (*) to three of the percent recoveries.

*Read the Case Narrative
See attached sheet*

R. Ward

8-19-99

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 19 August 1999

Information Request

H0389 - inorganics

Page 008 - accuracy report. Why has the laboratory assigned the asterisks (*) to three of the percent recoveries.

THE FOLLOWING FILE(S) ERASED

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

ERRORS

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

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

facsimile transmittal

To: B. Christian Fax: 375-5667
 From: _____ Date: 8-19-99
 Re: _____ Pages: 3
 CC: HO 387 IR

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Final Data Package

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 30 July 1999

Information Request

H0389 - Radiochemistry

Was a laboratory control sample analyzed for gross alpha?

Revised sheet attached
Rich Weist

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0389

N904123-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7116
Contact L.A. Johnson

Client/Case no Hanford SDG-H0389
Case no TRB-SBB-207925

Lab sample id N904123-03
Dept sample id 7116-003

Client sample id Lab Control Sample
Material/Matrix LIQUID
SAF No B99-037

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	51.0	4.5	1.1	3.0		80A	64.0	2.6	80	73-127	80-120
Gross Beta	55.2	3.2	1.9	4.0		80B	57.0	2.3	97	76-124	80-120
Potassium 40	U		230		U	GAM					
Cobalt 60	535	36	17	25		GAM	522	21	102	81-119	80-120
Cesium 137	550	31	23	15		GAM	518	21	106	81-119	80-120
Europium 152	U		48	50	U	GAM					
Europium 154	U		51	50	U	GAM					
Europium 155	U		40	50	U	GAM					
Radium 226	U		36		U	GAM					
Radium 228	U		95		U	GAM					
Thorium 228	U		25		U	GAM					
Thorium 232	U		95		U	GAM					
Americium 241	U		52		U	GAM					
Uranium 238	U		2800		U	GAM					
Uranium 235	U		60		U	GAM					

ERDF Leachate Delisting Analysis

QC-LCS 30590

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/04/99

THE FOLLOWING FILE(S) ERASED

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

ERRORS

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

BHI Sample Management
 Phone: (509) 372-9146
 FAX: (509) 372-9487

facsimile transmittal

To: B. Christian Fax: 375-5151
 From: R. Weiss Date: 8-5-99
 Re: A0387 IR Pages: 3

CC:

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See Attached sheets

.....
facsimile transmittal

To: B. Christian

Fax: 375-5151

From: R. Weiss

Date: 8-5-99

Re: A0389 IR

Pages: 3

CC:

Quick Turn / Priority Data

Final Data Package

See Attached sheets

Rich

you may already have this



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TECHLAW, INC.

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Information Request

H0389 - Radiochemistry

Was a laboratory control sample analyzed for gross alpha?