ORP-114
(02/02)

ORP - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
May 25, 2004	N/A
3. Project No. 216-B-26	4. Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H2469	Groundwater Remediation proj	Bill Thackaberry	Env & Science Assurance (QA)	E6-35/2-0742

17. Comment Submittal Approval	10. Agreement with indicated comment disposition(s)	11. CLOSED
Organization Manager (optional)	8/26/04 Date; WC Thackaberry Reviewer/Point of Contact; Requester	8/26/04 Date; WC Thackaberry Reviewer/Point of Contact; Requester

12. Item	13a. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted). Provide separate attachments if necessary.	16. Status
1	Radiochemistry, pg 16, Completeness on validation checklist has been marked N/A.	accepted Dayes 8/25/04	the completeness section in the checklist refers only to a technical verification step that no longer occurs. *	C
2	Wet Chemistry, pg 10, table is erroneously marked SDG H1969.		carried	C
3	Wet Chemistry, pg 16, Completeness on validation checklist has been marked N/A.	accepted Dayes 8/25/04	~~See Item #1 above~~	C
			*- the completeness on the checklist refers to the completeness of the data package, not the data itself.	

WC 6/27/04

REVIEW COMMENT RECORD (RCR)

1. Date 6/10/04	2. Review No.
3. Project No. 216-B-26	4. Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Validation Packages for SDG H2469	216-B-26	RL Weiss	S&DM	Sigma 1 372-9631

17. Comment Submittal Approval:	10. Agreement with indicated comment disposition(s)	11.
Organization Manager (Optional)	Reviewer/Point of Contract Date Author/Originator	Reviewer/Point of Contact 8-27-05 Date Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Wet chemistry – No Comments			
2	Radiochemistry – pg. 2, Accuracy: Strike "other' from the last sentence in this section.			OK RLW

Date: 18 May 2004
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-B-26 Characterization Sampling - Soil Sampling
Subject: Wet Chemistry - Data Package No. H2469-LLI (SDG No. H2469)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2469-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B183M9	12/14/03	Soil	C	See note 1

1 - Nitrate/nitrite - 353.2; total organic carbon - 9060; and chromium VI - 7196A.

Data validation was conducted in accordance with the FHI validation statement of work and the BC Cribs and Trenches 200-TW-1 Operable Unit Borehole Sampling and Analysis Plan (DOE/RL-2003-44, Rev. 0). 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

RECEIVED
JUN 29 2004

DATA QUALITY PARAMETERS

- **Holding Times/Sample Preservation**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 30 days for chromium VI, 28 days for nitrate/nitrite and 14 days for total organic carbon.

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 less than twice the limit, all total organic carbon results were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and laboratory Control Sample

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

All matrix spike and LCS recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in

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

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 200-TW-1 target required quanitiation limits (TRQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the TRQL.

- **Completeness**

Data package No. H2469-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 holding time being exceeded by less than twice the limit, all total organic carbon results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

DOE/RL-2003-44, Rev. 0, *BC Cribs and Trenches 200-TW-1 Operable Unit Borehole Sampling and Analysis Plan*, November 2003.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

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

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY

SDG: H2469	REVIEWER: TLI	DATE: 5/18/04	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Total Organic Carbon	J	All	Holding time

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

WET CHEMISTRY ANALYSIS, SOIL MATRIX, MG/KG

Project: FLUOR-HANFORD									
Laboratory: LLI									
Case	SDG: H2469								
Sample Number		B183M9							
Remarks									
Sample Date		12/14/04							
Wet Chemistry	TRQL	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.21	U						
Nitrate/Nitrite		56.3							
Total organic carbon	100	38.2	J						

000010

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 01/09/04

CLIENT: TNUHANFORD F03-020 H2469 LVL LOT #: 0312L422

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B183M9	% Solids	96.6	%	0.01	1.0
		Chromium VI	0.21 u	MG/KG	0.21	1.0
		Nitrate Nitrite	56.3	MG/KG	2.0	10.0
		Total Organic Carbon	38.2 J	MG/KG	15.0	1.0
-002	B183M4	% Solids	91.0	%	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0
		Nitrate Nitrite	5.9	MG/KG	0.21	1.0
		Total Organic Carbon	275	MG/KG	15.6	1.0
-003	B183M7	% Solids	85.9	%	0.01	1.0
		Chromium VI	0.21 u	MG/KG	0.21	1.0
		Nitrate Nitrite	3.8	MG/KG	0.20	1.0
		Total Organic Carbon	111	MG/KG	21.5	1.0

4/25/04

4/25/04

~~000002~~

06

000011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-020 H2469
LVL#: 0312L422

W.O.#: 11343-606-001-9999-0
Date Received: 12-19-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.

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

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

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

5. The method blanks were within the method criteria.

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

7. The matrix spike recoveries for Chromium VI, Nitrate Nitrite and Total Organic Carbon (TOC) were within the 75-125% control limits.

8. The replicate analyses for Percent Solids, Chromium VI and Nitrate Nitrite were within the 20% Relative Percent Difference (RPD) control limit, however replicate analysis for TOC was outside the control limit that may be attributed to sample inhomogeneity and minute sample sized analyzed (sample size range from ~5 mg to 100 mg).

9. Results for Chromium VI and Nitrate Nitrite 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
Laboratory Manager
Lionville Laboratory Incorporated

01-14-04
Date

njp\i12-422

0000019

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.

03

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

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-020-017	Page 1 of 1

Collector Pope/Hughes/Pfister	Company Contact Steve Trent	Telephone No. 373-5869	Project Coordinator TRENT, SJ	Price Code ~~ON~~ ① 8H	Data Turnaround ① 45 Days 30
Project Designation 216-B-26 Characterization Sampling - Soil Sampling	Sampling Location C3245 (52.5-55 ft)		SAF No. F03-020	Air Quality ☐	① MAB 12/19/03
Ice Chest No. SEE OSPC	Field Logbook No. HNF-N- 3560-1	COA 119142ES10	Method of Shipment Federal Express		
Shipped To RP 12-8-3 ~~EBERLINE SERVICES (Formerly TMA)~~ RECRA	Offsite Property No. A040065		Bill of Lading/Air Bill No. SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS
Rad fue to B18529

Special Handling and/or Storage

Preservation	Cool 4C	None										
Type of Container	G	G/P										
No. of Container(s)	1	1										
Volume	250mL	250mL										
SAMPLE ANALYSIS	Chromium Hex - 7196; NO2/NO3 - 353.2	See item (1) in Special Instructions. RP 12-8-3										

Sample No.	Matrix *	Sample Date	Sample Time										
B183M9	SOIL	12/14/03	1020	X									

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
JS Dale/[illegible]	12/14/03 1430	MO-026 [illegible]	12/14/03 1430
MO-026 [illegible]	12/18/03 0900	[illegible]	12/18/03 0900
[illegible]	12/18/03 0900	[illegible]	
[illegible]	12-19-03 1315	[illegible]	12-19-03 1315
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

~~(1) Isotopic Thorium (Thorium-232); Strontium-89,90; Total Sr; Nickel-63; Technetium-99; Carbon-14; Tritium - H3; Gamma Spec - Radium (Radium-226; Radium-228)~~ RP 12-8-3

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

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

A-6003-618(03/03)

000014

000001

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: H2469		
VALIDATOR: TLI		LAB: LLR		DATE: 4/25/04	
CASE:			SDG: H2469		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MATRIX					
D183M9					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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

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

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

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

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

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

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

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

Comments: NO FB

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

Spike samples analyzed? ..... Yes No N/A

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

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

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

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

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

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

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

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

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

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

Comments: NO PAS

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments: TOC over 14 day T alp

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/09/04

CLIENT: TNUHANFORD F03-020 H2469 LVL LOT #: 0312L422
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LVI089-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	03LN3074-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0
BLANK10	04LTZ001-MB1	Total Organic Carbon	4.7 u	MG/KG	4.7	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 01/09/04

CLIENT: TNUHANFORD F03-020 H2469 LVL LOT #: 0312L422

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B183M9	Soluble Chromium VI	4.2	0.21u	4.1	103.6	1.0
		Insoluble Chromium VI	1320	0.21u	1210	108.6	100
		Nitrate Nitrite	191	56.3	128	105.1	20.0
-003	B183M7	Total Organic Carbon	1530	0.0	1460	105.0	1.0
BLANK10	03LVI089-MB1	Soluble Chromium VI	3.8	0.20u	4.0	95.3	1.0
		Insoluble Chromium VI	1170	0.20u	1180	99.1	100
BLANK10	03LN3074-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.2	1.0
BLANK10	04LTZ001-MB1	Total Organic Carbon	364	4.7 u	400	90.9	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 01/09/04

CLIENT: TNUHANFORD F03-020 H2469 LVL LOT #: 0312L422

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B183M9	Chromium VI	0.21u	0.21u	NC	1.0
		Nitrate Nitrite	56.3	49.3	13.2	10.0
-002REP	B183M4	% Solids	91.0	91.5	0.48	1.0
-003REP	B183M7	Total Organic Carbon	111	68.1	47.7	0.0

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Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-020 H2469

DATE RECEIVED: 12/19/03 LVL LOT # :0312L422

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B183M9						
% SOLIDS	001	S	03L%S198	12/14/03	12/23/03	12/24/03
CHROMIUM VI	001	S	03LVI089	12/14/03	12/31/03	12/31/03
CHROMIUM VI	001 REP	S	03LVI089	12/14/03	12/31/03	12/31/03
CHROMIUM VI	001 MS	S	03LVI089	12/14/03	12/31/03	12/31/03
CHROMIUM VI	001 MSD	S	03LVI089	12/14/03	12/31/03	12/31/03
NITRATE NITRITE	001	S	03LN3074	12/14/03	12/29/03	12/31/03
NITRATE NITRITE	001 REP	S	03LN3074	12/14/03	12/29/03	12/31/03
NITRATE NITRITE	001 MS	S	03LN3074	12/14/03	12/29/03	12/31/03
TOTAL ORGANIC CARBON	001	S	04LTZ001	12/14/03	01/07/04	01/07/04
B183M4						
% SOLIDS	002	S	03L%S198	12/13/03	12/23/03	12/24/03
% SOLIDS	002 REP	S	03L%S198	12/13/03	12/23/03	12/24/03
CHROMIUM VI	002	S	03LVI089	12/13/03	12/31/03	12/31/03
NITRATE NITRITE	002	S	03LN3074	12/13/03	12/29/03	12/31/03
TOTAL ORGANIC CARBON	002	S	04LTZ001	12/13/03	01/07/04	01/07/04
B183M7						
% SOLIDS	003	S	03L%S198	12/13/03	12/23/03	12/24/03
CHROMIUM VI	003	S	03LVI089	12/13/03	12/31/03	12/31/03
NITRATE NITRITE	003	S	03LN3074	12/13/03	12/29/03	12/31/03
TOTAL ORGANIC CARBON	003	S	04LTZ001	12/13/03	01/07/04	01/07/04
TOTAL ORGANIC CARBON	003 REP	S	04LTZ001	12/13/03	01/07/04	01/07/04
TOTAL ORGANIC CARBON	003 MS	S	04LTZ001	12/13/03	01/07/04	01/07/04

LAB QC:

CHROMIUM VI	MB1	S	03LVI089	N/A	12/31/03	12/31/03
CHROMIUM VI	MB1 BS	S	03LVI089	N/A	12/31/03	12/31/03
CHROMIUM VI	MB1 BSD	S	03LVI089	N/A	12/31/03	12/31/03
NITRATE NITRITE	MB1	S	03LN3074	N/A	12/31/03	12/31/03
NITRATE NITRITE	MB1 BS	S	03LN3074	N/A	12/31/03	12/31/03
TOTAL ORGANIC CARBON	MB1	S	04LTZ001	N/A	01/07/04	01/07/04

~~000001~~ 01

Date: 18 May 2004
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-B-26 Characterization Sampling - Soil Sampling
Subject: Radiochemistry - Data Package No. H2469 (SDG No. H2469)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2469 which was prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B183M9	12/14/03	Soil	C	See note 1

1 - Gamma spectroscopy; isotopic thorium; tritium; carbon-14; nickel-63; technetium-99; and total strontium.

Data validation was conducted in accordance with the FHI validation statement of work and the BC Cribs and Trenches 200-TW-1 Operable Unit Borehole Sampling and Analysis Plan (DOE/RL-2003-44, Rev. 0). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
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Appendix 6. Additional Documentation Requested by Client

RECEIVED
JUN 29 2004

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.

- **Laboratory (Method) Blanks**

Laboratory Blanks

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

All laboratory blank results were acceptable.

Field Blanks

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

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is either 65-135% or 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, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

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

equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (37%), the cesium-137 result was qualified as an estimate and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

No field duplicate results were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the 200-TW-1 target required quanitiation limits (TRQLs) to ensure that laboratory detection levels meet the required criteria. Four analytes exceeded the TRQL. Under the FHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TRQL.

- **Completeness**

Data package SDG No. H2469 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD outside QC limits, the cesium-137 result was qualified as an estimate and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

DOE/RL-2003-44, Rev. 0, *BC Cribs and Trenches 200-TW-1 Operable Unit Borehole Sampling and Analysis Plan*, November 2003.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY

SDG: H2469	REVIEWER: TLI	DATE: 5/18/04	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cesium-137	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: FLUOR-HANFORD											
Laboratory: EB											
Case	SDG: H2469										
Sample Number		B183M9									
Remarks											
Sample Date		12/14/03									
Radiochemistry	TRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	7.04									
Carbon-14	50	-1.04	U								
Nickel-63	30	0.736	U								
Total Strontium	1	0.067	U								
Technetium-99	15	5.03									
Thorium-228		0.586									
Thorium-230		0.351									
Thorium-232	1	1.05									
Potassium-40		21.7									
Cobalt 60*	0.05	U	U								
Cesium 137	0.1	U	UJ								
Radium-226	0.1	0.623									
Radium-228	0.2	0.974									
Europium 152*	0.1	U	U								
Europium 154*	0.1	U	U								
Europium 155*	0.1	U	U								
Thorium-228		0.791									
Thorium-232		0.974									
Uranium-235		U	U								
Uranium-238		U	U								
Americium-241		U	U								

000010

* - TRQL exceeded

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

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2469

7669-006 B183M9

DATA SHEET

SDG	7669	Client/Case no	Hanford	SDG H2469	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R312133-06	Client sample id	B183M9		
Dept sample id	7669-006	Location/Matrix	C3245 (52.5-55 ft)	SOLID	
Received	12/19/03	Collected/Weight	12/14/03 10:20	259.5 g	
% solids	96.2	Custody/SAF No	F03-020-017	F03-020	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	7.04	0.33	0.27	400	B	H
Carbon 14	14762-75-5	-1.04	1.7	2.9	50	U	C
Nickel 63	13981-37-8	0.736	1.5	2.5	30	U	NI_L
Total Strontium	SR-RAD	0.067	0.17	0.33	1.0	U	SR
Technetium 99	14133-76-7	5.03	0.70	0.62	15		TC
Thorium 228	14274-82-9	0.586	0.32	0.30			TH
Thorium 230	14269-63-7	0.351	0.31	0.30	1.0		TH
Thorium 232	TH-232	1.05	0.40	0.30	1.0		TH
Potassium 40	13966-00-2	21.7	1.5	0.77			GAM
Cobalt 60	10198-40-0	U		0.089	0.050	U	GAM
Cesium 137	10045-97-3	U		0.074	0.10	U J	GAM
Radium 226	13982-63-3	0.623	0.16	0.16	0.10		GAM
Radium 228	15262-20-1	0.974	0.41	0.37	0.20		GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.791	0.080	0.074			GAM
Thorium 232	TH-232	0.974	0.41	0.37			GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		9.8		U	GAM
Americium 241	14596-10-2	U		0.18		U	GAM

216-B-26 Characterization/Soil Samp.

5/15/04

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/24/04

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2469 was composed of six soil samples designated under SAF No. F03-020 with a Project Designation of: 216-B-26 Characterization Sampling – 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

There was contamination in the H-3 method blank (0.386 pCi/g). The activity was significantly below the RDL for H-3 (400 pCi/L). 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 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.7 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
Senior Program Manager

1/24/4
Date

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-020-017	Page 1 of 1
Collector Pope/Hughes/Pfister	Company Contact Steve Trent	Telephone No. 373-5869	Project Coordinator TRENT, SJ	Price Code ~~BN~~ 8U (1) / Data Turnaround
Project Designation 216-B-26 Characterization Sampling - Soil Sampling	Sampling Location C3245 (52.5-55 ft)		SAF No. F03-020	Air Quality ☐ / ~~45~~ 30 Days
Ice Chest No. SEE OSPC	Field Logbook No. HNF-N- 356-1	COA 119142ES10	Method of Shipment Federal Express	(1) MAB 12/18/03
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No. A040086		Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

RADTIE to: B18529 (WSCF)

Special Handling and/or Storage

Preservation	Cool 4C	None									
Type of Container	G	G/P									
No. of Container(s)	1	1									
Volume	250mL	250mL									
SAMPLE ANALYSIS	Chromium Hex - 7196; NO2/NO3 - 353.2	See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
B183M9	SOIL	12/14/03	1020		X								

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
OSPOLLAGE	12/14/03 1450	OSPOLLAGE	12/14/03 1450
NO-026 KH2	12/18/03 0900	M.H. Dwinter M.H. Dwinter	12/18/03 0900
M.H. Dwinter M.H. Dwinter	12/18/03 0900	HLX	
Jel		Ayamamoto	12/19/03 10:30

SPECIAL INSTRUCTIONS

(1) Isotopic Thorium {Thorium-232}; Strontium-89,90 – Total Sr; Nickel-63; Technetium-99; Carbon-14; Tritium - H3; Gamma Spec - Radium {Radium-226, Radium-228}

Matrix *

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

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

A-6003-618(03/03)

000014

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: H2469		
VALIDATOR: TLF		LAB: EB		DATE: 4/25/04	
CASE:			SDG: H2469		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	C14 Ni-63	Tc-99	
SAMPLES/MATRIX					
~~B18318 B18319 B18341 B18344 B18347~~ 4/22/04					
B18349					
					Soil

1. Completeness ..... ☒ N/A

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

Comments: _____

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

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

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

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

Appendix A – Radiochemical Data Validation Checklist

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

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

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

Comments: _____

NOTB

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

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: CS-137 - 37.6% - J all

11. Field QC Samples (Levels C, D E) ..... ☒ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

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

Field split sample(s) analyzed? ..... Yes No N/A

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

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

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

Comments:

12. Holding Times (All levels)

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

Comments:

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

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

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

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

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

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

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

Comments: CO-60 Eu-152/154/155 mm

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2469

7669-008

Method Blank

METHOD BLANK

SDG	7669	Client/Case no	Hanford SDG H2469
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R312133-08	Client sample id	Method Blank
Dept sample id	7669-008	Material/Matrix	SOLID
		SAF No	F03-020

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.386	0.18	0.29	400		H
Carbon 14	14762-75-5	-0.497	2.1	3.5	50	U	C
Nickel 63	13981-37-8	-1.07	1.5	2.5	30	U	NI_L
Total Strontium	SR-RAD	-0.027	0.18	0.37	1.0	U	SR
Technetium 99	14133-76-7	0.092	0.27	0.50	15	U	TC
Thorium 228	14274-82-9	0.040	0.081	0.31		U	TH
Thorium 230	14269-63-7	0.040	0.16	0.31	1.0	U	TH
Thorium 232	TH-232	-0.040	0.080	0.31	1.0	U	TH
Potassium 40	13966-00-2	U		6.2		U	GAM
Cobalt 60	10198-40-0	U		0.57	0.050	U	GAM
Cesium 137	10045-97-3	U		0.41	0.10	U	GAM
Radium 226	13982-63-3	U		0.70	0.10	U	GAM
Radium 228	15262-20-1	U		1.6	0.20	U	GAM
Europium 152	14683-23-9	U		0.92	0.10	U	GAM
Europium 154	15585-10-1	U		1.2	0.10	U	GAM
Europium 155	14391-16-3	U		0.88	0.10	U	GAM
Thorium 228	14274-82-9	U		0.51		U	GAM
Thorium 232	TH-232	U		1.6		U	GAM
Uranium 235	15117-96-1	U		1.3		U	GAM
Uranium 238	U-238	U		47		U	GAM
Americium 241	14596-10-2	U		0.99		U	GAM

216-B-26 Characterization/Soil Samp.

QC-BLANK #46477

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/24/04

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2469

7669-007

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7669
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2469
Contract No. 630

Lab sample id R312133-07
Dept sample id 7669-007

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No F03-020

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	12.3	0.43	0.29	400	B	H	12.8	0.51	96	84-116	80-120
Carbon 14	2110	43	11	50		C	2130	85	99	84-116	80-120
Nickel 63	277	5.9	2.9	30		NI_L	272	11	102	83-117	80-120
Total Strontium	12.6	0.70	0.28	1.0		SR	11.4	0.46	110	80-120	80-120
Technetium 99	119	5.6	0.56	15		TC	120	4.8	99	82-118	80-120
Thorium 230	42.2	4.4	0.36	1.0		TH	46.4	1.9	91	83-117	80-120
Cobalt 60	37.4	1.6	0.94	0.050		GAM	35.1	1.4	107	74-126	80-120
Cesium 137	35.5	1.3	0.89	0.10		GAM	31.4	1.3	113	73-127	80-120

216-B-26 Characterization/Soil Samp.

QC-LCS #46476

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/24/04

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2469

7669-009 B183L8

DUPLICATE

SDG	7669			Client/Case no	Hanford SDG H2469
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R312133-09	Lab sample id	R312133-01	Client sample id	B183L8
Dept sample id	7669-009	Dept sample id	7669-001	Location/Matrix	C3245 (22.5-25 ft) SOLID
		Received	12/18/03	Collected/Weight	12/12/03 11:43 71.71 g
% solids	93.3	% solids	93.3	Custody/SAF No	F03-020-008 F03-020

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	0.058	0.18	0.30	400	U	H	0.078	0.19	0.32	U	-		
Carbon 14	0.075	1.7	2.9	50	U	C	-1.08	1.9	3.2	U	-		
Nickel 63	2.77	1.5	2.4	30		NI_L	2.29	1.5	2.4	U	19	128	
Total Strontium	1.92	0.30	0.29	1.0		SR	1.79	0.28	0.27		7	39	
Technetium 99	0.401	0.21	0.57	15	U	TC	0.750	0.21	0.57		61	81	
Thorium 228	0.782	0.42	0.31			TH	0.823	0.40	0.30		5	109	
Thorium 230	0.411	0.33	0.31	1.0		TH	0.587	0.32	0.30		35	139	
Thorium 232	0.494	0.33	0.31	1.0		TH	0.822	0.40	0.30		50	119	
Potassium 40	15.4	1.6	0.95			GAM	13.7	4.1	3.4		12	55	
Cobalt 60	U		0.11	0.050	U	GAM	U		0.29	U	-		
Cesium 137	1.23	0.11	0.096	0.10		GAM	0.840	0.30	0.30		38	57	
Radium 226	0.417	0.15	0.17	0.10		GAM	0.443	0.40	0.47	U	6	152	
Radium 228	0.538	0.37	0.37	0.20		GAM	0.729	0.72	0.78	U	30	194	
Europium 152	U		0.20	0.10	U	GAM	U		0.57	U	-		
Europium 154	U		0.31	0.10	U	GAM	U		0.81	U	-		
Europium 155	U		0.16	0.10	U	GAM	U		0.48	U	-		
Thorium 228	0.691	0.093	0.085			GAM	0.747	0.36	0.40		8	84	
Thorium 232	0.538	0.37	0.37			GAM	0.729	0.72	0.78	U	30	194	
Uranium 235	U		0.51		U	GAM	U		0.77	U	-		
Uranium 238	U		14		U	GAM	U		34	U	-		
Americium 241	U		0.22		U	GAM	U		0.60	U	-		

216-B-26 Characterization/Soil Samp.

QC-DUP#1 46478

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/24/04

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2469

7669-010 B183L9

MATRIX SPIKE

SDG	7669			Client/Case no	Hanford SDG H2469
Contact	Melissa C. Mannion			Contract	No. 630
	MATRIX SPIKE		ORIGINAL		
Lab sample id	R312133-10	Lab sample id	R312133-02	Client sample id	B183L9
Dept sample id	7669-010	Dept sample id	7669-002	Location/Matrix	C3245 (17.5-20 ft) SOLID
		Received	12/18/03	Collected/Weight	12/11/03 11:42 35.33 g
% solids	92.1	% solids	92.1	Custody/SAF No	F03-020-008 F03-020

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 LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	116	1.8	0.65	400	BX	H	131	5.2	0.881	0.43	88	85-115	60-140

216-B-26 Characterization/Soil Samp.

QC-MS#2 46479

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-MS
Version	3.06
Report date	01/24/04

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: H2469		
VALIDATOR: TLF		LAB: EB		DATE: 4/25/04	
CASE:			SDG: H2469		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	C-14 Ni-63	Tc-99	
SAMPLES/MATRIX					
~~B18318 B18319 B18314 B18314 B18317~~					
B18319					
					Soil

1. Completeness ..... ~~Yes~~ N/A

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

Comments: _____

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

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

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

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: H2465		
VALIDATOR: TLI		LAB: LLI		DATE: 4/25/04	
CASE:			SDG: H2465		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MATRIX					
D183M9					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: WSCF20031684		
VALIDATOR: TCI		LAB: WSCF		DATE: 5/11/05	
CASE:			SDG: 31684		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
B183N2					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

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

Comments:

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: WSCF20031684		
VALIDATOR: TLP		LAB:		DATE: 5/14/04	
CASE:			SDG: 31684		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide	
SAMPLES/MATRIX					
B183N2					
NO2 NO3 phosphate - not validated or reported					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: WSCF20031684		
VALIDATOR: TLT		LAB: WSCF		DATE: 5/12/04	
CASE:			SDG: 31684		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX B183N2					
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

Comments:

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-B-26			DATA PACKAGE: WSCF 20031684		
VALIDATOR: TCI		LAB: WSCF		DATE: 5/13/04	
CASE:			SDG: 1684		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
B183N2					
					Soil

1. Completeness ..... ~~Yes~~ No N/A

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

Comments: _____

2. Initial Calibration (Levels D, E) ..... ~~Yes~~ No N/A

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

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

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