GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09904-TMA-644 (923-E418 TMA644W.UP2)

9413225.0639

MEMORANDUM

TO: 200-UP-2 Project QA Record

March 18, 1994

FR: Christina Jensen, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE B09904-TMA-644 (923-E418 TMA644W.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09904-TMA-644 prepared by the Thermo Analytical laboratory. The samples validated along with the analyses reported and the methods of analysis are provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09DP0	11/05/93	SOIL	SEE NOTE 1
B09904	10/29/93	SOIL	SEE NOTE 2
B09905	11/01/93	SOIL	SEE NOTE 2
B09906	11/01/93	SOIL	SEE NOTE 2
B09907	11/02/93	SOIL	SEE NOTE 2
B09908	11/02/93	SOIL	SEE NOTE 2

Notes:

1. The sample was analyzed for nitrate+nitrite and anions (chloride, fluoride and sulfate).

2. The samples were analyzed for nitrate+nitrite only.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993a) and validation procedures (WHC 1993b). Attachments 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the deficiencies identified below.

Sample Result Verification. All sample results were supported in the raw data.

Detection Limits. Detection limit goals were met for all sample results as specified in the reference analytical method.

Completeness. The data package was complete for all requested analyses. A total of six samples were validated in this data package with a total of 9 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives of 90 percent. Two sets of nitrate/nitrite data were submitted in this data package and were validated together (see telecon in Attachment 5).

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

Matrix Spike Recovery

- The matrix spike recovery was unacceptable for nitrate+nitrite associated with sample B09DP0. Attachment 2 provides a summary of the data qualification applied.

Correlation Coefficient

- The correlation coefficient (r) for the initial calibration of nitrate+nitrite associated with sample B09DP0 was unacceptable. Attachment 2 provides a summary of the data qualification applied.

REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

WHC 1993b, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2., 1993. Westinghouse Hanford Company, Richland, Washington.

9413225.0641

Attachment 1

Glossary of Data Reporting Qualifiers

91 3225 0642

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

9114225.0643

Attachment 2

Summary of Data Qualifications

91/022.0644

DATA QUALIFICATION SUMMARY

SDG:	VALIDATOR: [illegible]	DATE: 3/14/94	PAGE 1 OF 1
COMMENTS: [illegible] B09914-TMA-644			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO_2/NO_3	J	B09DP0, B09DP0dup	r < .995
NO_2/NO_3	J	B09DP0, B09DP0dup	Spike < 75% R

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006

Attachment 3

Qualified Data Summary and Annotated Laboratory Reports

91/3275.0646

Validated Data Summary, Data Package: B09904-TMA-644

	Samp#	B09904		B09905		B09906		B09907		B09908		B09DP0	
	Date	10-29-93		11-1-93		11-1-93		11-2-93		11-2-93		11-5-93	
	Location	---		---		---		---		---		---	
	Depth	---		---		---		---		---		---	
	Type	---		---		---		---		---		---	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/KG	---		---		---		---		---		9.500	
FLUORIDE	MG/KG	---		---		---		---		---		1.900	
SULFATE	MG/KG	---		---		---		---		---		14.000	
NITRATE+NITRITE	MG-N/K	68.700		106.000		197.000		15.300		12.100		11.400	J

Received: 11/11/93

Results by Sample

SAMPLE ID B09DP0 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 11/05/93 Category SOIL

NITR_S 11.4 J
mg N/kg

SAMPLE ID B09DP00 SAMPLE # 01 FRACTIONS: B
Date & Time Collected 11/05/93 Category SOIL

NITR_S 7.79 J
mg N/kg

SAMPLE ID B09DP0S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 11/05/93 Category SOIL

NITR_S 25.4 J 3/14/94
mg N/kg

SAMPLE ID LCSS SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category SOIL

NITR_S 2.06 J 3/14/94
mg N/L

3/14/94

-009

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc. 300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-41 LAB TEST FAX (617) 890-3883

Received: 11/09/93

Results by Sample

SAMPLE ID B09904 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 10/29/93 Category SOIL

NITR_S 68.7
mg N/kg

SAMPLE ID B09904 Dup. SAMPLE # 01 FRACTIONS: B
Date & Time Collected 10/29/93 Category SOIL

NITR_S 65.9
mg N/kg

SAMPLE ID B09904 Spike SAMPLE # 01 FRACTIONS: C
Date & Time Collected 10/29/93 Category SOIL

NITR_S 88.0
mg N/kg

SAMPLE ID B09905 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 11/01/93 Category SOIL

NITR_S 106
mg N/kg

SAMPLE ID B09906 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 11/01/93 Category SOIL

NITR_S 197
mg N/kg

SAMPLE ID B09907 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 11/02/93 Category SOIL

NITR_S 15.3
mg N/kg

SAMPLE ID B09908 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 11/02/93 Category SOIL

NITR_S 12.1
mg N/kg

-010

3/17/94

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4LAB TEST FAX (617) 890-3883

TMA Inc. REPORT Work Order # A3-11-043

Received: 11/10/93

Results by Sample

SAMPLE ID B09DP0 FRACTION 01G TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 11/05/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	9.5	mg/kg	2.0
Fluoride	300.0	1.9	mg/kg	1.0
Sulfate	300.0	14	mg/kg	10

FORM I

9413225.0650

3/14/94

Attachment 4

Laboratory Narrative and Chain-of-Custody Documentation

0413275.0651

9413225.0652

GENERAL CHEMISTRY RESULTS

CASE NO. 11-043

Soil Sample #

B09DP0

CASE NARRATIVE

Sample B09DP0 (A3-11-043-01G, 01I Dup) did not exhibit homogeneity. Therefore, the Relative Percent Difference for Chloride was 33.3% and 30.3% for Sulfate. The sample, duplicate, and matrix spike was reanalyzed within holding time. The second analysis also exhibited the same inhomogeneity. The second analysis has been included only to demonstrate the matrix effects on the analytes concentration.

No other problems were encountered during sample analysis. All QC results were acceptable.

Maureen Parrish 11/12/94

Maureen Parrish

Received: 11/09/93 Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

The sample was extracted with deionized water and analyzed in accordance with Method for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1979, Method 353.2 (modified)

91 7225 0653

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc. 300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4LAB TEST FAX (617) 890-3893

Received: 11/11/93 Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

The sample was extracted with deionized water and analyzed in accordance with Method for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1979, Method 353.2 (modified)

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-ALAB TEST FAX (617) 890-3883

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator L E ROGERS

Company Contact L E ROGERS

Telephone 376-7690

Project Designation/Sampling Locations 200-UP-2

Collection Date 10-29-93

Ice Chest No. SML-353

Field Logbook No. EFL-1091

Bill of Lading/Airbill No. 2519010351

Offsite Property No. ~~W944-0-00009-41~~

Method of Shipment ~~OVERNIGHT~~ AIR SERVICE

Shipped to TMA

Possible Sample Hazards/Remarks Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09904

~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~

~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

~~2)~~

~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~

~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

~~3)~~

~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~

~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 11-9-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

~~024A~~

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS — Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2 — Collection Date: 11-1-93

Ice Chest No.: SML-353 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 2519010351 — Offsite Property No.: W94-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE JER 11-9-93

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09905
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

~~2)~~
~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~
~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604).~~

3)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

JER 11-1-93

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Clarence E. Vogels 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

9413225.0656

~~024~~

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS — Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2 — Collection Date: 11-1-93

Ice Chest No.: JML-353 — Field Logbook No.: EFL-1091

~~Bill of Lading/Airbill No.~~ HER 11-8-93 2519010351 — Offsite Property No. W94-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09906

~~1~~,125ml P/G:Anions NO2,NO3 (EPA 353.2)
~~1~~,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

2) HER 11-1-93

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

3)

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Lorene E. Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

~~024E~~

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-2-93

Ice Chest No.: SML-353

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 2519010351

Offsite Property No.: W94-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09907
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

2) B09908
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

~~3)~~
~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~ 11-2-93
~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Loren E. Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

~~S24G~~

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

000002A

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS / JG HOGAN

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-5-93

Ice Chest No.: SML 55A

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: HMSR 17891

Offsite Property No.:

Method of Shipment: AIR

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) RADIOACTIVE

Sample Identification

1) B09DP0

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

[] Field transfer of Custody

Chain of Possession (Sign and Print Names)		
Relinquished by: JG HOGAN	Received by: W.U. SETZER	Date/Time: 11-9-93 1115
Relinquished by: W.U. Setzer	Received by: H. NARCISO	Date/Time: 11-10-93 10:22
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Attachment 5

Data Validation Supporting Documentation

0990 4224 0660

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200 UP2		DATA PACKAGE: B09904-TMA-644	
VALIDATOR: C Jensen	LAB: TMA		DATE: 3/14/94
CASE: 11-043		SDG:	

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 ~~Aqueous~~ 3/14/94 B29DP0 / Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

022

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: The r for NO_2/NO_3 was .993, results for sample B09DP0 qualified J, also B09DP0 duplicate

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: Information not available at the time of validation to determine whether sample is a QC sample. Information will be requested and ~~see~~ evaluated in the final summary.

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: The MS analyzed for NO_2/NO_3 was 70.7% R. Results qualified as J for sample B09DP0

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)

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: ~~NO-NO3 duplicate RPD range for sample B0F000 is~~ 5 3/4/43. Duplicate results are acceptable for all analytes.

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

Are results calculated properly? . . . . . Yes No N/A

Do results meet the CRDLs? . . . . . Yes No N/A

Comments:

9413225.0663

9413225.0664

HOLDING TIME SUMMARY

SDG:	VALIDATOR: C. Jensen	DATE: 3/4/93	PAGE 1 OF 1
COMMENTS: Ecochem pkg B09904-TW17-1044			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09DP0	Anions	11/5/93	—	12/1/93	—	26	none
	NO_2/NO_3	11/5/93	—	12/2/93	—	27	none
B09904	NO_2/NO_3	10/29/93		11/12/93		14	none
B09905		11/1/93				11	
B09906		11/1/93				11	
B09907		11/2/93				10	
B09908		11/2/93				10	

Received: 11/11/93 12/22/93 14:53:05

TMA/NORCAL Hanford

Q U A L I T Y - C O N T R O L

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S311126-01	11.4 mg/kg	19.8 mg/kg	25.4 mg/kg	70.7

DUPLICATE

Sample ID	Sample result	Duplicate Result	Relative % Difference
S311126-01	11.4 mg/kg	7.79 mg/kg	37.6

range sk- no qual results <2x CRDL

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	Percent Recovery
LCS	2.00 mg/L	2.06 mg/L	103.0
Prep blank	--	<0.25 mg/L	--

Associated with Sample 01-4DPB only

MS below 75-125

all results qualified J 3/17/94

-02

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4LAB TEST FAX (617) 890-3883

Golder Associates

Telecon/Contact Memorandum

☐ Personal Visit
☒ Telephone ☐ Incoming ☒ Outgoing

Company Name: WHC HASM
Address:

Person: Jeanette Duncan
Telephone: 1-509-372-3395
Job/subject: pkg B09904-TMA-644 DV

ROUTE TO:
Files ☒ Project
☐ Business Development
☐ Mailing List

Job No. 923-E418
Date: 3/15/94
Time: 300

Remarks:

Jeanette instructed GA to validate both sets of NO_2/NO_3 data in one memo. The two sets are: B09090 in one package
B09904, B09905, -06, -07, and -08 in the 2nd package.

Action/Next Contact:
Include a copy of this telecon in DV pkg

BY: C. Jensen

RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09904-TMA-644 (923-E418 644RAD.UP2)

9413225.0667

MEMORANDUM

APR 1994
RECEIVED
TQD

TO: 200 UP-2 Project QA Record

April 5, 1994

FR: Thomas Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE B09904-TMA-644 (923-E418 644RAD.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09904-TMA-644 prepared by the TMA/Norcal laboratory under contract to Westinghouse/Hanford using WHC approved methods. Information concerning the samples validated along with the analyses reported and the methods of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09904	10/29/93	SOIL	SEE NOTE 1.
B09905	11/01/93	SOIL	SEE NOTE 1.
B09906	11/01/93	SOIL	SEE NOTE 1.
B09907	11/02/93	SOIL	SEE NOTE 1.
B09908	11/02/93	SOIL	SEE NOTE 1.
B09DP0	11/05/93	SOIL	SEE NOTE 2.

NOTES:

1. Indicates the samples were analyzed for gross alpha/beta, technetium-99 (beta counting), isotopic uranium, (alpha spectroscopy), and total uranium (laser fluorometry),

2. Indicates the sample was analyzed for gross alpha/beta, strontium-90, technetium-99 (beta counting), selenium-79 (liquid scintillation), isotopic plutonium, uranium, curium-244, americium-241, and neptunium-237 (alpha spectroscopy), total uranium (laser fluorometry), and selected radioisotopes by gamma spectroscopy.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993a) and validation procedures (WHC 1993b). Attachments 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

Precision. Goals for precision were met with the exception of the relative percent difference (RPD) as indicated below.

Accuracy. Goals for accuracy were met.

9417225.0668
001

Sample Result Verification. All sample results were supported in the raw data.

Detection Limits. Detection limit goals were acceptable for all sample results except for minimum detectable activities (MDAs) which exceeded the required detection limits as follows:

Sample ID	Isotope	MDA	RDL
B09DP0	IRON-59	0.1	0.05
B09DP0	COBALT-58	0.06	0.05
B09DP0	EUROPIUM-152	0.6	0.1
B09DP0	EUROPIUM-154	0.4	0.1
B09DP0	EUROPIUM-155	0.8	0.1

Completeness. The data package was complete for all requested analyses. A total of six samples were validated in this data package with a total of 70 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the work plan objective of 90%.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

Laboratory Precision

- The RPD for cesium-137 and thorium-228 was unacceptable, therefore sample results have been qualified as estimated (J). Attachments 2 and 5 provide a summary of the samples affected, data qualification applied and supporting documentation.

Results Verification

- The gross alpha result for sample B09DP0 has been changed on the laboratory result form due to a calculation error. Attachment 5 provides supporting documentation.

002

DATA REPORTING

- Laboratory results reported below the MDA have been elevated to the MDA and reported with a U as shown in Attachment 3.

REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

WHC 1993b, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

9413225.0670

-003

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9413225.0671

GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

9413225.0672

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9414225.0673

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B09904-TMA-644	REVIEWER: T. STAPP	DATE: 3-29-94	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
CESIUM-137, THORIUM-228	J	B09DP0	DUPLICATE RELATIVE PERCENT DIFFERENCE EXCEEDED THE 35% LIMIT

9413225.0674

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

9413225.0675

9411225.0676

Validated Data Summary, Data Package: B09904-TMA-644

	Samp#	B09904		B09905		B09906		B09907		B09908		B09DP0	
	Date	10-29-93		11-1-93		11-1-93		11-2-93		11-2-93		11-5-93	
	Location	299-W22-78		299-W22-78		299-W22-78		299-W22-78		299-W22-78		299-W19-96	
	Depth	194.00 - 196.50		198.50 - 200.00		209.50 - 212.00		222.00 - 224.50		230.00 - 232.50		4.00 - 6.00	
	Type	---		---		---		---		---		---	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	5.600		6.300		9.800		8.500		6.800		9.200	
GROSS BETA	pCi/g	13.000		17.000		28.000		19.000		19.000		360.000	
SELENIUM-79	pCi/g	---		---		---		---		---		2.000	U
STRONTIUM-90	pCi/g	---		---		---		---		---		42.000	
TECHNETIUM-99	pCi/g	0.400	U	0.590		1.000		0.300	U	0.300	U	0.400	U
IODINE-129	pCi/g	---		---		---		---		---		1.000	U
URANIUM-233/234	pCi/g	1.100		0.530		0.790		0.570		0.390		0.690	
URANIUM-235	pCi/g	0.067		0.090	U	0.057		0.090	U	0.100	U	0.100	U
URANIUM-238	pCi/g	1.100		0.500		0.760		0.580		0.400		0.640	
TOTAL URANIUM	UG/G	3.000		1.400		2.900		1.700		1.200		2.000	
NEPTUNIUM-237	pCi/g	---		---		---		---		---		0.007	
PLUTONIUM-238	pCi/g	---		---		---		---		---		0.040	U
PLUTONIUM-239/240	pCi/g	---		---		---		---		---		0.020	U
AMERICIUM-241	pCi/g	---		---		---		---		---		0.050	U
CURIUM-244	pCi/g	---		---		---		---		---		0.050	U
SODIUM-22	pCi/g	---		---		---		---		---		0.050	U
POTASSIUM-40	pCi/g	---		---		---		---		---		12.000	
MANGANESE-54	pCi/g	---		---		---		---		---		0.050	U
IRON-59	pCi/g	---		---		---		---		---		0.100	U
COBALT-58	pCi/g	---		---		---		---		---		0.060	U
COBALT-60	pCi/g	---		---		---		---		---		0.040	U
NIOBIUM-94	pCi/g	---		---		---		---		---		0.040	U
RUTHENIUM-103	pCi/g	---		---		---		---		---		0.500	U
RUTHENIUM-106	pCi/g	---		---		---		---		---		2.000	U
TIN-113	pCi/g	---		---		---		---		---		0.500	U
CESIUM-134	pCi/g	---		---		---		---		---		0.060	U
CESIUM-137	pCi/g	---		---		---		---		---		320.000	J
CERIUM-144	pCi/g	---		---		---		---		---		1.000	U
EUROPIUM-152	pCi/g	---		---		---		---		---		0.600	U
EUROPIUM-154	pCi/g	---		---		---		---		---		0.400	U
EUROPIUM-155	pCi/g	---		---		---		---		---		0.800	U
RADIUM-226	pCi/g	---		---		---		---		---		0.690	
RADIUM-228	pCi/g	---		---		---		---		---		0.750	
THORIUM-228	pCi/g	---		---		---		---		---		1.000	J
THORIUM-232	pCi/g	---		---		---		---		---		0.750	

Verified 4-4-94

600-

N311062-01

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09904

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-01	Client sample id	B09904
Dept sample id	7296-001	Location/Matrix	200-UP-2 SOLID
Received	11/09/93	Collected	10/29/93
% moisture	15.4	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	5.6	3.7	4	10	~~J~~	80A
Gross Beta	Beta	13	3.9	5	10		80B
Technetium 99	14133-76-7	~~0.36~~	~~0.16~~	0.4	0.5	U	TC
Uranium 233/234		1.1	0.19	0.08	0.3		U
Uranium 235	15117-96-1	0.067	0.045	0.06	0.3	~~J~~	U
Uranium 238		1.1	0.18	0.06	0.3		U
Total Uranium (ug/g)	7440-61-1	3.0	0.53	0.03	0.1		U_T

Verified RS 4-4-94

RS 4/4/94

~~25~~

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 17

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

N311062-02

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09905

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-02	Client sample id	B09905
Dept sample id	7296-002	Location/Matrix	200-UP-2 SOLID
Received	11/09/93	Collected	11/01/93
% moisture	12.7	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	6.3	4.4	5	10	~~J~~	80A
Gross Beta	Beta	17	4.1	5	10		80B
Technetium 99	14133-76-7	0.59	0.16	0.4	0.5		TC
Uranium 233/234		0.53	0.16	0.1	0.3		U
Uranium 235	15117-96-1	~~0~~	~~0.022~~	0.09	0.3	U	U
Uranium 238		0.50	0.14	0.07	0.3		U
Total Uranium (ug/g)	7440-61-1	1.4	0.25	0.03	0.1		U_T

Verified 4-4-94

9413225.0678

DATA SHEETS
Page 2
SUMMARY DATA SECTION
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4-4-94

~~26~~

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

N311062-03

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09906

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-03	Client sample id	B09906
Dept sample id	7296-003	Location/Matrix	200-UP-2 SOLID
Received	11/09/93	Collected	11/01/93
% moisture	18.3	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	9.8	4.3	4	10	~~J~~	80A
Gross Beta	Beta	28	4.6	5	10		80B
Technetium 99	14133-76-7	1.0	0.20	0.4	0.5		TC
Uranium 233/234		0.79	0.12	0.05	0.3		U
Uranium 235	15117-96-1	0.057	0.035	0.03	0.3	~~J~~	U
Uranium 238		0.76	0.12	0.03	0.3		U
Total Uranium (ug/g)	7440-61-1	2.9	0.51	0.03	0.1		U_T

9413225.0679

Verified FS 4-4-94

FS 4-4-94

DATA SHEETS
Page 3
SUMMARY DATA SECTION
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Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

N311062-04

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09907

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-04	Client sample id	B09907
Dept sample id	7296-004	Location/Matrix	200-UP-2 SOLID
Received	11/09/93	Collected	11/02/93
% moisture	14.4	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.5	4.0	4	10	~~J~~	80A
Gross Beta	Beta	19	4.2	5	10		80B
Technetium 99	14133-76-7	~~0.11~~	~~0.091~~	0.3	0.5	U	TC
Uranium 233/234		0.57	0.16	0.09	0.3		U
Uranium 235	15117-96-1	~~0.023~~	~~0.046~~	0.09	0.3	U	U
Uranium 238		0.58	0.16	0.07	0.3		U
Total Uranium (ug/g)	7440-61-1	1.7	0.29	0.03	0.1		U_T

9413227.0680

Verified RS 4-4-94

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SUMMARY DATA SECTION
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RS 4-4-94

~~28~~

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

N311062-05

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09908

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-05	Client sample id	B09908
Dept sample id	7296-005	Location/Matrix	200-UP-2 SOLID
Received	11/09/93	Collected	11/02/93
% moisture	16.3	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	6.8	3.4	3	10	~~J~~	80A
Gross Beta	Beta	19	4.3	5	10		80B
Technetium 99	14133-76-7	~~0.099~~	~~0.13~~	0.3	0.5	U	TC
Uranium 233/234		0.39	0.14	0.1	0.3		U
Uranium 235	15117-96-1	~~0.014~~	~~0.027~~	0.1	0.3	U	U
Uranium 238		0.40	0.14	0.09	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.21	0.03	0.1		U_T

Verified FC 4-4-94

FC 4-4-94

~~29~~

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

N311062-06

TMA NORCAL
REPORTING GROUP 7296

DATA SHEET

B09DPO

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-06	Client sample id	B09DPO
Dept sample id	7296-006	Location/Matrix	200-UP-2 SOLID
Received	11/10/93	Collected	11/05/93
% moisture	3.9	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	~~9.0~~ 9.2	5.5	4	10	~~J~~	80A
Gross Beta	Beta	360	13	6	10		80B
Selenium 79	15758-45-9	~~0.028~~	~~0.96~~	2	10	U	SE
Strontium 90	10098-97-2	42	1.6	0.8	1		Y
Technetium 99	14133-76-7	~~0.18~~	~~0.14~~	0.4	0.5	U	TC
Iodine 129	15046-84-1	~~0.078~~	~~0.56~~	1	2	U	I
Uranium 233/234		0.69	0.18	0.08	0.3		U
Uranium 235	15117-96-1	~~0.038~~	~~0.050~~	0.1	0.3	U	U
Uranium 238		0.64	0.18	0.08	0.3		U
Total Uranium (ug/g)	7440-61-1	2.0	0.35	0.03	0.1		U_T
Neptunium 237	13994-20-2	0.007	0.010	0	0.2	~~J~~	NP
Plutonium 238	13981-16-3	~~0.006~~	~~0.016~~	0.04	0.05	U	PU
Plutonium 239/240		~~0.008~~	~~0.012~~	0.02	0.05	U	PU
Americium 241	14596-10-2	~~0.007~~	~~0.014~~	0.05	0.05	U	TP
Curium 244	13981-15-2	~~0~~	~~0.014~~	0.05	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	12	0.83				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.06	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.5		U	GAM
Ruthenium 106	13967-48-1	U		2		U	GAM
Tin 113	13966-06-8	U		0.5		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	320	1.0		0.05	J	GAM

4-1-94

Verified 4-4-94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

TMA NORCAL
REPORTING GROUP 7296

N311062-06

DATA SHEET, cont

B09DP0

SDG	7296	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N311062-06	Client sample id	B09DP0
Dept sample id	7296-006	Location/Matrix	200-UP-2 SOLID
Received	11/10/93	Collected	11/05/93
% moisture	3.9	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		1		U	GAM
Europium 152	14683-23-9	U		0.6	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Europium 155	14391-16-3	U		0.8	0.1	U	GAM
Radium 226	13982-63-3	0.69	0.25				GAM
Radium 228	15262-20-1	0.75	0.18				GAM
Thorium 228	14274-82-9	1.0	0.32			J	GAM
Thorium 232	7440-29-1	0.75	0.18				GAM

9413275.0683

RS Verified 4-4-94

DATA SHEETS
Page 7
SUMMARY DATA SECTION
Page 23

RS 4-4-94

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Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/20/94

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9417225.0684

TMA/Norcal
Report N3-11-062-7296
Sample Delivery Group 7296

Westinghouse Hanford Company
P.O. MBH-SVV-069262

Case Narrative

January 20, 1994

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7296 is comprised of the six soil samples from location 200-UP-2, delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

One 1000 mL plastic bottle containing each sample was received for analysis. Inadequate volumes were received to meet gamma scan RDL's for the duplicate of sample BO9DP0.

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses

No problems were encountered by the laboratory in the analyses.

2.2 Gross Beta Analyses

The relative percent difference (RPD) between sample BO9DP0 and its duplicate is slightly above the 3 σ contractual limit of 33%. The samples were recounted and the results did not improve. The sample inhomogeneity is suspected.

2.3 Selenium-79 Analyses

No problems were encountered by the laboratory in the analyses.

Standardization solutions of selenium-79 are not available commercially for calibration of this analysis. LSC instrument efficiency must be determined using carbon-14, which has a decay scheme and beta energy spectrum very similar to those of selenium-79.

The analysis begins with the addition of stable selenium carrier to the sample and proceeds with appropriate separation and purification chemistry to isolate the selenium. The chemical recovery is gravimetrically determined by weighing the recovered carrier. The selenium is then prepared for LSC counting by combining it with a fluor in a scintillation vial. Instrument background is determined by preparing and counting a matched vial with carrier but no activity.

After the initial sample count, the vial is opened and spiked with a known amount of traceable carbon-14 activity and recounted. The counting efficiency is then determined from the combined data from both counts.

Since selenium-79 activity is not available and carbon-14 surrogate activity will not follow through the selenium purification chemistry, it is not possible to process a laboratory control sample. The QC samples will therefore consist of blanks and duplicates only.

4 4-4-94

TMA/Norcal
Report N3-11-062-7296
Sample Delivery Group 7296

Westinghouse Hanford Company
P.O. MBH-SVV-069262

Case Narrative

January 20, 1994

2.0 ANALYSIS NOTES (con't.)

2.4 **Strontium-90 Analyses**
No problems were encountered by the laboratory in the analyses.

2.5 **Technetium-99 Analyses**
No problems were encountered by the laboratory in the analyses.

2.6 **Iodine-129 Analyses**
The recovery of iodine-129 in the laboratory control sample is 124% which is outside both the 3 σ protocol limits and the contractual limits of (80-120)%. No cause could be determined for the low recovery.

2.7 **Neptunium-237 Analyses**
Low recoveries were observed during the initial analysis and the sample was reanalyzed QC samples 7296-012 and 7296-013. The sample and the QC associated with the sample were counted for less than the nominal count time of 100 minutes. MDA's met the RDL despite the reduced count time.

2.8 **Total Uranium Analyses**
No problems were encountered by the laboratory in the analyses.

2.9 **Isotopic Uranium Analyses**
The count time for sample BO9DP0, the blank, and the laboratory control sample were less than the nominal count time of 150 minutes. The MDA's meet the RDL despite this.

2.10 **Isotopic Plutonium Analyses**
The plutonium-238 MDA in the duplicate of sample BO9DP0 is higher than the RDL due to higher detector background in the region of interest.

2.11 **Americium-241/Curium-244 Analyses**
No problems were encountered by the laboratory in the analyses.

4-4-94

9413225.0686

TMA/Norcal
Report N3-11-062-7296
Sample Delivery Group 7296

Westinghouse Hanford Company
P.O. MBH-SVV-069262

Case Narrative

January 20, 1994

2.12 Gamma Scan Analyses

The MDA's of several gamma nuclides for the duplicate analyses of sample B09DP0 are higher than the RDL's due to the smaller than nominal aliquot available for analysis. The MDA's of iron-59, cobalt-58, europium-152, 154, and 155 in the original of sample BO9DP0 are higher than the RDL's due to the shorter half-lives of the nuclides and, in some cases, due to higher background of the detector in the region of interest. The relative percent difference of cesium-137 in the sample and its duplicate is above the contractual limit of 33%. The sample inhomogeneity is suspected.

9413225.0682

4-4-94

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS / JG HOGAN

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-5-93

Ice Chest No.: SML 55A

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: HMSR 17891

Offsite Property No.:

Method of Shipment: AIR

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) RADIOACTIVE

Sample Identification

1) B09DP0

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

SER 11-5-93

[] Field Transfer of Custody — Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
JG Hogan	W.U. Setzer	11-9-93 1115
W.U. Setzer	H. Narciso / H. Narciso	11-10-93 10:22

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~80~~ 4-4-94

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 10-29-93

Ice Chest No.: SML-353

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 2519010351 LER 11-8-93

Offsite Property No.: ~~WHH-0-0009-41~~

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09904
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

~~2)~~
~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~
~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

~~3)~~ ~~LER 10-29-93~~
~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~
~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Loren E Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

~~72~~ 4-4-94

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-1-93

Ice Chest No.: 3ML-353

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 2519010351

Offsite Property No.: W94-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09905

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

2) ~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~
1,1000ml P/G:Gross beta (EP-10), ~~Total Uranium~~ (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

3) 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

11-1-93

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Clarence E. Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

4-4-94

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A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-1-93

Ice Chest No.: JML-353

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: HER 11-8-93 2519010351

Offsite Property No.: W94-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09906

~~1~~ 125ml P/G:Anions NO2,NO3 (EPA 353.2)
~~1~~ 1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

~~2)~~ HER 11-1-93

~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~
~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

3)

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1045 Lorene E. Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

4-4-94

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A-6000-407 (12/90) (EF) WEF061
Chain of Custody

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 11-2-93

Ice Chest No.: SML-353

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 2519010351

Offsite Property No.: 094-0-0009-41

Method of Shipment: ~~OVERNIGHT~~ AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09907

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)

1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

2) B09908

1,125ml P/G:Anions NO2,NO3 (EPA 353.2)

1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)

3) ~~1,125ml P/G:Anions NO2,NO3 (EPA 353.2)~~ 11-2-93

~~1,1000ml P/G:Gross beta (EP-10), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5),Tc-99 (RC-24, RC-604)~~

[] Field Transfer of Custody

Relinquished by:	Received by:	Date/Time:
1045 Loren E. Rogers 11-8-93	K. Blum Kermit Blum	11-9-93 1145
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Chain of Possession (Sign and Print Names)

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

~~78~~ 11-4-94

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9411225.0693

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . NOTE ① . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments: ① Current detector control charts were not available for the month in which sample analysis was performed. Calibration check results were compared to the previous most recent checks and results were acceptable, therefore no qualification was applied for technetium-99 analysis on detectors LGB-10, -11, -12, and -15.

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? . . . NOTE ① . . . . . 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: ① Field QC is not identified with this sample set, but it has been requested. Field QC will be evaluated with the final data summary.

5. Matrix Spikes . . . . . SEE NOTE ① . . . . . ☐ 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: ① Matrix Spike analysis is not required since LCS data is present.

9413225.0694

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . NOTE ① . . . . . Yes No N/A
RPD Values Acceptable? . . NOTE ② . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ① Duplicate analysis for Gamma Spect. analytes was performed on different geometry (Jar) than other QC and Samples (Marinelli). No qualification applied.
② RPD of Cs-137 and Th-228 exceed the 35% limit for Soils as indicated with qualification on form B-5.

9417225.0695

9. Field QC Samples . . . SEE NOTE ① . . . . . ☐ 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: ① Field QC samples have not been identified with this sample set but the information has been requested. Field QC will be evaluated in the final data summary.

10. Holding Times

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

Comments: SEE HOLD TIME Summary page B-1.

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? . . . SEE NOTE ④ on page A-5. . . . . Yes No N/A
Transcription/Calculation errors? . NOTE ① . . . . . Yes No N/A
MDA's meet required detection limits? . NOTE ② . . . . . Yes No N/A
Transcription/calculation errors? . . NOTE ③ . . . . . Yes No N/A

Comments: ① Gross α amount for B09DP0 has been changed on the Lab report form. ② MDAs for Fe-59 Co-58, and Eu-152-154-155 were reported above the RDL for Sample B09DP0 as indicated in the laboratory narrative. ③ MDA values were not verified by recalculation for samples with associated results as follows: Se-79, Sr-90, Isotopic Uranium, plutonium, curium ~~and~~ neptunium and Iodine. Differences may be attributable to statistical treatment at the laboratory and was not available at the time of data verification. No qualification of data is required.

4-25-94

(Revised 4-25-94

9413225.0696

Comments:

Continuation of Item # 11 : (page A-4)

Note (4) Laboratory applied qualifiers as seen on laboratory report forms (Attachment 3), have been crossed out during validation since they do not apply to normal validation procedures as outlined by WHC. Where appropriate, new qualifiers have been applied or, the qualification column has been left blank (ie, no qualifiers).

TC 4-25-94

9414225.0697

4-25-94
Revised TC
030A

HOLDING TIME SUMMARY

SDG: B09904-TMA-644 | VALIDATOR: T. Stapp | DATE: 3-29-94 | PAGE 1 OF 2

COMMENTS: RADIOCHEMISTRY

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09904	Grs α β	10-29-93	N/A	12-14-93	N/A	≤180	NONE
	Tc-99			12-23-93			
	U isotopic			12-28-93			
	Total U			12-21-93			
B09905	Grs α β	11-1-93		12-14-93			
	Tc-99			12-23			
	U isotopic			12-28			
	Total U			12-21			
B09906	Grs α β	11-1-93		12-14-93			
	Tc-99			12-23-93			
	U isotopic			12-13-94			
	Total U			12-21-93			
B09907	Grs α β	11-2-93		12-14-93			
	Tc-99			12-21-93			
	U isotopic			12-28-93			
	Total U			12-21-93			

4-25-94

HOLDING TIME SUMMARY

SDG: B09904-TMA-644 VALIDATOR: T. Staff DATE: 3-29-94 PAGE 2 OF 2

COMMENTS: RADIOCHEMISTRY

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09908	Grs α, β	11-2-93	N/A	12-14-93	N/A	≤ 180	NONE
	Tc-99			12-14-93			
	U isotopic			12-28-93			
	Total U			12-21-93			
B09DPO	Grs α, β	11-5-93		1-17-94			
	Gamma			12-09-93			
	I-129			12-14-93			
	Np			1-07-94			
	Am, Cm			12-17-93			
	U isotopic			1-07-94			
	Total U			12-21-93			
	Sr-90			12-11-93			
	Tc-99			12-23-93			
	Se			1-06-94			
	Pu isotopic			12-18-93			
N/A							
N/A							

4-25-94

3-29-92

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PRECISION DATA SUMMARY

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COMMENTS:

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Cesium-137	B09DP0	Duplicate	46	B09DP0	J/~~UJ~~ 4-4-94
Thorium-228	"	"	61	"	J/~~UJ~~ 4-4-94

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Gross Alpha/Beta

Sample ID	B09904	B09905	B09906	B09907	B09908	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	109	111	113	115	116	106	109	110	115
Aliquot	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Count time	100	100	100	100	100	100	100	100	100
Alpha cpm	0.22	0.31	0.40	0.43	0.32	0.53	5.68	0.05	0.79
Alpha, Bkgd	0.06	0.11	0.07	0.11	0.06	0.07	0.057	0.038	0.116
Alpha, Xtalk	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff	0.127	0.134	0.144	0.164	0.163	0.127	0.115	0.114	0.135
Alpha Result Calc.	5.56	6.31	9.83	8.55	6.83	9.22	215.06	0.45	12.97
Alpha Result Rptd.	5.60	6.30	9.80	8.50	6.80	9.00	220	0.46	13
Alpha MDA Calc.	3.91	5.27	3.86	4.21	3.21	4.34	4.36	3.59	5.30
Alpha MDA Rptd.	4	5	4	4	3	4	4	4	5
Beta cpm	2.29	2.66	3.68	2.86	3.01	35.17	24.69	1.39	49.2
Bkgd	1.05	1.05	1.00	0.98	1.12	1.61	1.052	1.266	1.552
Xtalk	0.274	0.270	0.264	0.254	0.255	0.275	0.281	0.281	0.269
Eff	0.42	0.42	0.42	0.42	0.42	0.42	0.416	0.416	0.42
Beta Result Calc.	12.91	16.66	27.78	19.17	19.41	360.34	238.82	1.31	509.08
Beta Result Rptd	13	17	28	19	19	360	240	1.3	510
Beta MDA Calc	5.14	5.13	4.98	4.91	5.25	6.36	5.18	5.68	6.23
Beta MDA rptd	5	5	5	5	5	6	5	6	6

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Selenium 79

Sample ID	B09DP0	QC-BLANK	B09DP0-DUP
Detector	4	4	4
Gross Counts	1675	1725	1736
Count Time	150	150	150
Sample Amount	0.52	1	0.53
Bkgd cpm	11.14	11.02	11.16
Decay Factor	1	1	1
Detector Eff.	0.728	0.727	0.768
Yield	0.6739	0.7259	0.7957
Result Calc.	0.047	0.41	0.57
Result Rptd	0.028	0.39	0.57
MDA Calc.	2.24	1.08	1.77
MDA Rptd.	2.00	2.00	2.00

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Technetium 99

Sample ID		B09904	B09905	B09906	B09907	B09908	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
	Detector	LBG 10	LBG 11	LBG 12	LBG 11	LBG 12	LBG 15	LBG 16	LBG 13	LBG 11
	Aliquot	2.030	2.030	2.060	2.040	2.050	2.020	2	2	2.06
	P-Factor	2.340	2.340	2.340	2.340	2.340	2.340	2.340	2.340	2.340
	Yield	0.397	0.426	0.382	0.539	0.478	0.473	0.4209	0.6113	0.4239
	Days	55.616	52.574	52.574	51.574	56.421	48.574	0	0	53.498
	Lambda	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09
	Decay	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	Net, cpm	0.270	0.480	0.740	0.120	0.090	0.170	18.200	0.160	0.200
	Count, time	132.200	132.200	132.200	132.200	105.100	118.100	132.200	176.800	134.800
	Bkg., cpm	0.540	0.500	0.570	0.470	0.590	0.575	0.52	0.47	0.52
	Result, calc.	0.354	0.585	0.993	0.115	0.097	0.187	22.789	0.138	0.241
	Result, rptd.	0.360	0.590	1.000	0.110	0.099	0.180	23	0.13	0.24
	MDA, calc.	0.390	0.349	0.410	0.266	0.375	0.358	0.366	0.207	0.349
	MDA, rptd.	0.400	0.400	0.400	0.300	0.300	0.400	0.4	0.2	0.3

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Total Uranium	Standard	Intensity			Calc	UG/L	Prep/Dsvl	Final	Rptd
			Sample ID	Intens.	Result		Volume	Rslt	Rslt
	0.049	402	B09904	27992	3.5	37.9	0.08	3.0	3.0
	0.156	1182	B09905	13039	1.6	17.6	0.08	1.4	1.4
	0.521	4187	B09906	26293	3.3	35.9	0.08	2.9	2.9
	0.976	7921	B09907	15628	2.0	21	0.08	1.7	1.7
	2.603	20934	B09908	11193	1.4	14.8	0.08	1.2	1.2
	4.881	38734	B09DP0	18497	2.3	25.1	0.08	2.0	2.0
	16.27	121703	QC-LCS	26429	3.3	32.5	0.08	2.6	2.6
			QC-BLANK	-483	-0.1	0	0.08	0.0	0.0
			B09DP0-DU	22667	2.9	31.1	0.08	2.5	2.5
Slope:	1.3E-04								

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Uranium 233/4/5/8

Sample ID	B09904	B09905	B09906	B09907	B09908	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	25	26	23	25	26	28	29	30	24
Sample count time	400.02	400.02	527.93	201.48	201.48	149.05	149.05	149.05	313.7
Corr. tracer dpm	10.47	10.47	10.46	10.47	10.47	10.46	10.46	10.46	10.47
Bkgd count time	6481.67	6481.67	790.67	6481.67	6481.67	6227.63	6227.63	6227.63	1132.27
Net tracer counts	765	510	1298	494	416	454	475	362	729
Detector eff.	0.3135	0.2822	0.3001	0.3135	0.2822	0.3894	0.3868	0.3674	0.3157
Yield	0.5826	0.4315	0.7833	0.7470	0.6938	0.7478	0.7877	0.6320	0.7031
Aliquot	1	1	1	1	1	1	1	1	1
U-238, gross counts	176	55	212	62	35	62	545	1	125
U-238, bkgd counts	2	1	2	1	0	0	33	0	2
U-235, gross counts	10	1	15	3	1	3	331	1	14
U-235, bkgd counts	1	1	1	1	0	0	0	0	1
U-235, branch ratio	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts	189	62	226	63	37	67	502	1	127
U-233/4, bkgd counts	5	4	6	2	2	0	36	0	5
U-238, result calc.	1.073	0.499	0.762	0.582	0.397	0.643	5.079	0.013	0.80
U-238, result rptd	1.100	0.500	0.760	0.580	0.400	0.640	5.100	0.013	0.80
U-238 MDA calc.	0.047	0.071	0.028	0.073	0.087	0.080	0.266	0.100	0.05
U-238, MDA rptd.	0.060	0.070	0.030	0.070	0.090	0.080	0.300	0.100	0.06
U-235, result calc.	0.067	0.000	0.062	0.023	0.014	0.038	3.975	0.016	0.10
U-235, result rptd.	0.067	0.000	0.057	0.023	0.014	0.038	4.000	0.016	0.10
U-235, MDA calc.	0.057	0.086	0.034	0.089	0.105	0.096	0.092	0.121	0.06
U-235, MDA rptd.	0.060	0.090	0.030	0.090	0.100	0.100	0.090	0.100	0.06
U-233/4, result calc.	1.134	0.536	0.799	0.582	0.397	0.695	4.622	0.013	0.79
U-233/4, result rptd.	1.100	0.530	0.790	0.570	0.390	0.690	4.600	0.000	0.78
U-233/4, MDA calc.	0.064	0.086	0.041	0.073	0.087	0.080	0.277	0.100	0.07
U-233/4, MDA rptd.	0.080	0.100	0.050	0.090	0.100	0.080	0.300	0.100	0.09

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Plutonium 238/239

Sample ID	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	40	41	42	43
Count time	1277.3	1277.3	1277.3	1275.5
Corr, tracer dpm	4.86	4.86	4.86	4.86
Bkgd, count time	2375.67	2375.67	2375.67	2382.02
Net, tracer counts	1072	1387	1163	625
Detector Eff	0.4138	0.4063	0.3937	0.3688
Yield	0.417	0.550	0.476	0.273
Aliquot	1	1	1	1
Pu239, gross counts	7	664	4	8
Pu239, bkgd counts	3	2	3	2
Pu239 decay	1	1	1	1
Pu238, gross counts	0	20	23	17
Pu238, bkgd counts	11	11	14	12
Pu238 decay	0.999	1	1	1
Pu239, Result calc.	0.008	1.045	0.002	0.021
Pu239, Result rptd	0.008	1.000	0.002	0.021
Pu239, MDA calc.	0.016	0.012	0.015	0.027
Pu239, MDA rptd.	0.020	0.020	0.020	0.030
Pu238, Result calc.	-0.022	0.014	0.017	0.018
Pu238, Result rptd.	-0.006	0.014	0.017	0.018
Pu238, MDA calc.	0.032	0.024	0.033	0.057
Pu238, MDA rptd	0.040	0.030	0.040	0.070

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Americium/Curium

Sample ID	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	63	64	65	66
Count Time	731.52	731.52	731.52	731.52
Tracer dpm	4.95	4.95	4.95	4.95
Bkgd count time	2380.13	2380.13	2380.13	2380.13
Net tracer counts	326	694	1086	613
Detector eff.	0.4006	0.4031	0.409	0.4068
Yield	0.225	0.475	0.733	0.416
Aliquot	1	1	1	1
Am241 gross counts	1	353	2	6
Am241 bkgd. counts	1	0	1	2
Am241 decay	0.9998	1	1	0.9998
Cm244 gross counts	0	231	1	1
Cm244 bkgd counts	0	1	1	2
Cm244 decay	0.9955	1	1	0.9955
Am241 result calc.	0.000	1.134	0.002	0.015
Am241 result rptd.	-0.007	1.132	-0.002	0.011
Am241 MDA calc.	0.052	0.025	0.016	0.028
Am241 MDA rptd	0.050	0.020	0.020	0.030
Cm244 result calc.	0.000	0.739	0.000	-0.004
Cm244 result rptd	0.000	0.740	-0.002	-0.004
Cm244 MDA calc.	0.053	0.025	0.016	0.028
Cm244 MDA rptd.	0.050	0.020	0.020	0.040

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Neptunium

Sample ID	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	28	30	54	29
Np239 cpm	35.24	38.55	21.52	33.78
Inst. eff.	0.721	0.721	0.721	0.721
Am243 added	99.08	99.08	99.08	99.08
Yield	0.4933	0.5396	0.3012	0.4729
Aliquot	1.000	1.000	1.000	1.000
Count time	976.87	976.87	1015.03	976.87
Np237 gross counts	4	1602	2	2
Np237 bkgd counts	1	1	0	1
Np237 aspec. eff	0.389	0.367	0.37	0.387
Np237 result calc.	0.007	3.728	0.008	0.003
Np237 result rptd.	0.007	3.700	0.008	0.003
Np237 MDA calc.	0.018	0.018	0.031	0.019
Np237 MDA rptd.	0.000	0.000	0.010	0.000

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09904-TMA-644

Iodine-129

Sample ID	B09DP0	QC-LCS	QC-BLANK	B09DP0-DUP
Detector	XSPEC14	XSPEC14	XSPEC14	XSPEC14
Count Time	684.45	238.67	409.35	555.6
Gross cpm	0.558	22.831	0.507	0.418
Bkg cpm	0.616	0.824	0.627	0.487
Blank cpm	-0.088	-0.117	-0.088	-0.088
Net cpm	0.03	22.124	-0.036	0.081
Lambda	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days	39.91	0.00	0.00	43.00
Decay	1	1	1	1
Yield	0.7539	0.8763	0.864	0.6334
Aliquot	1.04	1	1	1.04
PPT. Corr.	1	1	1	1
Product	7.84E-01	8.76E-01	8.64E-01	6.59E-01
P-factor	4.57	4.57	4.57	4.57
Result Calc.	0.079	51.973	-0.086	0.253
Result Rptd.	0.078	52.000	-0.085	0.250
MDA Calc.	0.367	0.643	0.435	0.431
MDA Rptd.	1.000	2.000	1.000	2.000