9453549D
~~9452475D~~
ATTACHMENT 22
Page 1 of 23

GENERAL GC DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09325.GC)

9413225.1590

MEMORANDUM

MAR 1994 RECEIVED TQO

TO: 200-UP-2 Project QA Record March 4, 1994

FR: Susan Winter, Golder Associates Inc.

RE: GENERAL GC DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, Filename B09325.GC)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332 B09333 B09336	09/09/93 09/10/93 09/10/93	SOIL SOIL SOIL	SEE NOTE 1
Note 1. All samples were analyzed for kerosene according to the 8015 Modified method.			

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

MAR 1994

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met. However, the control limits for the matrix spike and matrix spike duplicate percent recoveries (MS/MSD %R) are not currently available and have been requested. The MS/MSD %R were 35% and 93%, respectively, therefore, no qualification was required since the recoveries were considered acceptable.

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 three samples were validated in this data package with a total of 3 determinations reported, all of

001

which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

No minor deficiencies were identified during data validation which required qualification of data.

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.

9413225.592

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9W7225.1593

GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. 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 quantitation 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 reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.

NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of 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 has been qualified as unusable due to a major 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 has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

94K225.1595

DATA QUALIFICATION SUMMARY

SDG: B09332-TMA-611	VALIDATOR: [illegible] DATE: March 3, 1994		PAGE 1 OF 1
COMMENTS: GENERAL GC FOR KEROSENE			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO QUALIFICATIONS REQUIRED			

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9413225.1597

Validated Data Summary, Data Package: B09332-IMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
KEROSENE	MG/KG	5.000	U	5.000	U	5.000	U

Verified

3/03/94

TMA Inc. REPORT Work Order # A3-09-028

Received: 09/14/93 Results by Sample

SAMPLE ID B09332 FRACTION 01G TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/09/93 Category

299-W19-95

60-62.5'

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL

Date Analyzed: 09/24/93

Dilution factor: 1.00

Concentration Units: mg/Kg

Compound	Sample Result	PQL
Kerosene Range	ND	5
C10 - C16 Jet Fuel Range	NA	NA
C9 - C22 Diesel Range	NA	NA
Hydraulic Range	NA	NA

ND = Not detected at the specified limits

Form I

Verified

[signature] 3/23/94

9413225.1599

TMA Inc. REPORT Work Order # A3-09-028

Received: 09/14/93

Results by Sample

SAMPLE ID 809333 FRACTION 02G TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/10/93 Category

299-W19-97
50-52.5'

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 09/24/93
Dilution factor: 1.00
Concentration Units: mg/Kg

Compound	Sample Result	PQL
Kerosene Range	ND	5
C10 - C16 Jet Fuel Range	NA	NA
C9 - C22 Diesel Range	NA	NA
Hydraulic Range	NA	NA

ND = Not detected at the specified limits

Form I

Verified
[signature]
3/03/94

9413225.1600

TMA Inc. REPORT Work Order # A3-09-028

Received: 09/14/93 Results by Sample

SAMPLE ID B09336 FRACTION 03D TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/10/93 Category

299-W19-95
74.8-77.3

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 09/24/93
Dilution factor: 1.00
Concentration Units: mg/Kg

Compound	Sample Result	PQL
Kerosene Range	ND	5
C10 - C16 Jet Fuel Range	NA	NA
C9 - C22 Diesel Range	NA	NA
Hydraulic Range	NA	NA

ND = Not detected at the specified limits

Form I

Verified
3/03/94

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.1602

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-028

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 14, 1993

1.0 DESCRIPTION OF CASE :

Four soil samples were analyzed for TCL Organics- Volatiles and Semivolatiles according to the USEPA Contract Laboratory Program (CLP) Statement of Work for Organic Analysis, Revision OLM01.8. The Extractable Hydrocarbons in the Kerosene Range (K) were analyzed according to the SW-846 Method 8015M.

9413225.1603

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09332	A3-09-028-01A	V	SOIL
B09332 MS	A3-09-028-01B	V	SOIL
B09332 MSD	A3-09-028-01C	V	SOIL
B09332	A3-09-028-01D	SV	SOIL
B09332	A3-09-028-01G	K	SOIL
B09333	A3-09-028-02A	V	SOIL
B09333	A3-09-028-02B	SV	SOIL
B09333 MS	A3-09-028-02C	SV	SOIL
B09333 MSD	A3-09-028-02D	SV	SOIL
B09333	A3-09-028-02G	K	SOIL
B09336	A3-09-028-03A	V	SOIL
B09336	A3-09-028-03B	SV	SOIL
B09336	A3-09-028-03D	K	SOIL
B09336 MS	A3-09-028-03E	K	SOIL
B09336 MSD	A3-09-028-03F	K	SOIL
B09335	A3-09-028-04A	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were analyzed by heated purge within the CLP SOW holding times.

All of the QC results were within the limits specified by the EPA CLP SOW.

TUNES :

All BFB tunes were injected directly into the GC/MS instrument.

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Phenol was detected in sample B09336 at a concentration that was below the CRQL.

The matrix spike recovery of 2,4-Dinitrotoluene in sample B09333MS was slightly above the QC limits. In accordance with the protocol, no further action was required.

All of the other QC results were within the limits specified by the EPA CLP SOW.

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 09/16/93 and was analyzed according to the SW-846 Method 8015M. The initial calibration consisted of 5 different levels of the Kerosene standard that ranged from 200ppm to 2000ppm. The continuing calibration at the 1000ppm level was injected amongst a series of samples, in order to verify the instrument stability. The %RSD in the initial calibration and the %D in the continuing calibration were below their 20% and 15% limits, respectively.

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed for extractable hydrocarbons in the Kerosene range within the required holding times. Approximately 20 g of each sample was extracted and concentrated to 5 mL.

There were no hydrocarbons detected in any of the samples. Sample B09336 was spiked with Kerosene and the matrix spike recoveries were 85% and 93%. A blank spike was prepared at the same time, and had an 79% recovery.

All of the QC results were within the limits specified by the SW-846 Method 8015M.

We certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data in this hardcopy data package and in the computer-readable data submitted on diskette is authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Nicole Roth 11/29/93
Nicole Roth
CLP Program Manager

Maureen Parrish 11/29/93
Maureen Parrish
Project Manager

9413225.605

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: 9-9-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

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

~~B09334~~ B09335

~~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~~

9-10-93

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:	Received by:	Date/Time:
1040 L E Rogers 9-10-93	Rcvd. Sample Ron Taylor	1040 9-10-93
Relinquished by: Rcvd Sample Ron Taylor 1054 9-10-93	Received by: H. Narciso	Date/Time: 9-11-93 10:50
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

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: 9-10-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09333

- 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

B09336

- 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

9-10-93

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: 1040 9-10-93	Received by:	Date/Time: 9-10-93 1040
Relinquished by: 1054 9-10-93	Received by:	Date/Time: 9-10-93 10:50
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

9413225.1608

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B-9332-TMA-611
VALIDATOR: [illegible]	LAB: TMA	DATE: 03/03/94
CASE:		SDG: B-9332-TMA-611

ANALYSES PERFORMED

☐ 8010	☒ 8015 (Mod)	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX: Soils

B-9332
B-9333
B-9336

9413225.1609

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

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

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

Comments: _____

3.2 CONTINUING CALIBRATION

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

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

Comments: _____

4. BLANKS

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

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

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

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

Comments: _____

5. ACCURACY

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

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

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

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

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

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

9413225.1610

020

GENERAL GC DATA VALIDATION CHECKLIST

Comments: Control limits for the MS/MSD analysis have been requested and were not available at the time of validation. No qualification of the data was required. MS%R = 85% and MSD%R = 93%.

6. PRECISION

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

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

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

Comments:

7. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

Comments:

WHC-SD-EN-SPP-002, Rev. 2

9413225.1612

HOLDING TIME SUMMARY

B09332-TMA-611

SDG:	VALIDATOR: [signature]	DATE: 3/3/94	PAGE 1 OF 1

COMMENTS: General GC for Kerosene (Method 8015 Modified)

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09332	8015Mod	09/09/93	9/20/93	9/24/93	11	4	None
B09333	↓	09/~~09~~ 10/93	↓	↓	10	4	↓
B09336	↓	09/10/93	↓	↓	10	4	↓
		[initials] 3/5/94					

METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09332.MET)

9413225.1613

MEMORANDUM

MAR 1994 RECEIVED TCO

TO: 200-UP-2 Project QA Record

March 2, 1994

FR: Susan Winter, Golder Associates Inc.

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, Filename B09332.MET)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332	09/09/93	SOIL	SEE NOTE 1
B09333	09/10/93	SOIL	
B09336	09/10/93	SOIL	
Note 1. All samples were analyzed for CLP TAL metals, titanium and cyanide.			

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

RECEIVED MAR 7 1994 VALIDATION DOCUMENT SOLA

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of the deficiencies identified below.

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 three samples were validated in this data package with a total of 75 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives 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 as estimated.

Laboratory Blanks

- Beryllium, copper and antimony were detected in the laboratory blanks at concentrations greater than the IDL but less than the CRDL. Attachments 2 and 5 provide a summary of the samples affected, data qualification applied and supporting documentation.

Matrix Spike

- The matrix spike percent recovery (MS %R) for antimony and manganese were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

Laboratory Duplicate

- The laboratory duplicate relative percent difference (RPD) for barium and manganese were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

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.

9413225.1615

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9413225.1616

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.

94/9225.617

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9112225.1618

DATA QUALIFICATION SUMMARY

SDG: B09332-TMA-611	VALIDATOR:	DATE: March 2, 1994	PAGE 1 OF 1
COMMENTS: METALS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
BERYLLIUM	U	B09332 B09333 B09336	PRESENT IN PREP. BLANK
COPPER	U	B09332 B09336	PRESENT IN ICB, CCB, AND PREP. BLANK
ANTIMONY	UJ	B09332 B09333 B09336	MS SPIKE %R <75% BUT >30%
MANGANESE	J	B09332 B09333 B09336	MS SPIKE %R >125%
BARIUM	J	B09332 B09333 B09336	DUPLICATE SAMPLE RESULT GREATER THAN ±2xCRQL AND RESULTS <5xCRQL
MANGANESE	J	B09332 B09333 B09336	LABORATORY DUPLICATE RPD OUT OF CONTROL LIMITS

9413225.1619

006

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9413225.1620

Validated Data Summary, Data Package: B09332-IMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
ALUMINUM	MG/KG	4920.000		7710.000		4880.000	
ANTIMONY	MG/KG	2.600	UJ	2.700	UJ	2.600	UJ
ARSENIC	MG/KG	2.700		3.900		3.300	
BARIUM	MG/KG	45.900	J	84.800	J	42.000	J
BERYLLIUM	MG/KG	0.330	U	0.380	U	0.210	U
CADMIUM	MG/KG	0.260	U	0.270	U	0.260	U
CALCIUM	MG/KG	7440.000		9330.000		7960.000	
CHROMIUM	MG/KG	10.100		10.300		7.200	
COBALT	MG/KG	5.700	B	8.900	B	5.700	B
COPPER	MG/KG	12.400	U	12.800		11.100	U
IRON	MG/KG	11400.000		17000.000		12500.000	
LEAD	MG/KG	2.800		4.800		2.400	
MAGNESIUM	MG/KG	4150.000		5260.000		3990.000	
MANGANESE	MG/KG	186.000	J	341.000	J	184.000	J
MERCURY	MG/KG	0.050	U	0.050	U	0.050	U
NICKEL	MG/KG	9.600		9.500		5.800	B
POTASSIUM	MG/KG	855.000	B	1530.000		729.000	B
SELENIUM	MG/KG	0.460	U	0.480	U	0.460	U
SILVER	MG/KG	0.800	B	0.540	U	0.520	U
SODIUM	MG/KG	179.000	B	146.000	B	172.000	B
THALLIUM	MG/KG	0.440	U	0.460	U	0.440	U
VANADIUM	MG/KG	24.500		35.700		26.700	
ZINC	MG/KG	26.600		37.500		26.100	
CYANIDE	MG/KG	0.510	U	0.520	U	0.470	U
TITANIUM	MG/KG	754.000		1040.000		831.000	

Verified

3/2/94

WESTINGHOUSE/HANFORD
1

299-W19-95
60-62.5'

SAMPLE NUMBER:

B09332

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-01 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 97.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4920			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	UJ
7440-38-2	Arsenic	2.7			P	
7440-39-3	Barium	45.9	—	*	P	J
7440-41-7	Beryllium	0.33	~~B~~		P	U
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	7440			P	
7440-47-3	Chromium	10.1			P	
7440-48-4	Cobalt	5.7	B		P	
7440-50-8	Copper	12.4	—		P	U
7439-89-6	Iron	11400			P	
7439-92-1	Lead	2.3			P	
7439-95-4	Magnesium	4150			P	
7439-96-5	Manganese	136	—	N*	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.5			P	
7440-09-7	Potassium	355	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	0.30	B		P	
7440-23-5	Sodium	179	B		P	
7440-28-0	Thallium	0.44	U		P	
7440-62-2	Vanadium	24.3			P	
7440-66-6	Zinc	26.5			P	
	Cyanide	0.31	U		CA	
7440-32-6	Titanium	754			P	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified
[signature] 3/22/94

009

2

FORM I - IN ILM02.1

9413225.1622

299-W19-9-
50-52.5'

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

B09333

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-02 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 92.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7710			P	
7440-36-0	Antimony	2.7	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.9			P	
7440-39-3	Barium	84.8		*	P	J
7440-41-7	Beryllium	0.38	~~B~~		P	U
7440-43-9	Cadmium	0.27	U		P	
7440-70-2	Calcium	9330			P	
7440-47-3	Chromium	10.3			P	
7440-48-4	Cobalt	8.9	B		P	
7440-50-8	Copper	12.8			P	
7439-89-6	Iron	17000			P	
7439-92-1	Lead	4.8			P	
7439-95-4	Magnesium	5260			P	
7439-96-5	Manganese	341		N*	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.5			P	
7440-09-7	Potassium	1530			P	
7782-49-2	Selenium	0.48	U		P	
7440-22-4	Silver	0.54	U		P	
7440-23-5	Sodium	146	B		P	
7440-28-0	Thallium	0.46	U		P	
7440-62-2	Vanadium	35.7			P	
7440-66-6	Zinc	37.5			P	
	Cyanide	0.52	U		CA	
7440-32-6	Titanium	1040			P	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified
[signature] 3/22/94

3

FORM I - IN ILM02.1

010

9413225.1623

WESTINGHOUSE/HANFORD

1

299-W19-95
74.8-77.3'

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09336

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-03 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 96.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4880			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.3			P	
7440-39-3	Barium	42.0		*	P	J
7440-41-7	Beryllium	0.21	~~B~~		P	U
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	7960			P	
7440-47-3	Chromium	7.2			P	
7440-48-4	Cobalt	5.7	B		P	
7440-50-8	Copper	11.1			P	U
7439-89-6	Iron	12500			P	
7439-92-1	Lead	2.4			P	
7439-95-4	Magnesium	3990			P	
7439-96-5	Manganese	134		W*	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	5.3	B		P	
7440-09-7	Potassium	729	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	0.52	U		P	
7440-23-5	Sodium	172	B		P	
7440-28-0	Thallium	0.44	U		P	
7440-62-2	Vanadium	26.7			P	
7440-66-6	Zinc	26.1			P	
	Cyanide	0.47	U		CA	
7440-32-6	Titanium	331			P	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified
3/22/94

4

FORM I - IN ILM02.1

011

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.1625

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

DEC 1993
RECEIVED
SDLA

RECORD COPY

October 21, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
Three (3) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 15, 1993 from TMA/Norcal. The samples were analyzed for the USEPA CLP Target Analyte List metals, titanium, and cyanide. The analyses were performed under TMA/Skinner and Sherman work order S309104.

Methodology
The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02.

Discussion
All quality control requirements were met for the samples with the following exceptions;

The digestion spike recovery for antimony and manganese exceeded control limit requirements.

The laboratory duplicate for barium and manganese exceeded control limit requirements.

Please feel free to call if there are any questions concerning this package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

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: 9-9-93

Ice Chest No.: SML 366 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

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

1,120ml
9-10-93

2) ~~B09334~~ B09335

~~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~~

1,120ml
9-10-93

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:	Received by:	Date/Time:
1040 [signature] 9-10-93	[signature]	1040 9-10-93
[signature] 1054 9-10-93	[signature] / H. NARCISO	9-14-93 10:50

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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: 9-10-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09333

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) B09336

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

9-10-93

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:	Received by:	Date/Time:
1040 9-10-93		9-10-93 1040
Relinquished by: 1054 9-10-93	Received by: T. Harris	Date/Time: 9-14-93 10:50
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

015

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.1629

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B09332-TMA-611	
VALIDATOR: [illegible]	LAB: TMA		DATE: 03/02/94
CASE:		SDG: B09332-TMA-611	

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☒ CLP/Hg	☒ CLP/Cyanide	☒ Titanium by ICP	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX Soils

B09332

B09333

B09336

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:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

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

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

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

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

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A

Are ICB and CCB results acceptable? . . . . . ~~Yes~~ No N/A 3/2/9

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

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

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

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

Comments:

~~Qualify beryllium and copper in all three.~~

See attached lab blank form for details.

5. ACCURACY

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

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

Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A

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

Comments:

See attached lab spike form for details.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

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

Were ICP serial dilution samples analyzed? . . . . . Yes No N/A

Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A

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

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

Comments: Qualify results for Iodium & Manganese as estimated (J).

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A

Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A

Were analytical spikes performed as required? . . . . . Yes No N/A

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

Was MSA performed as required? . . . . . Yes No N/A

Are MSA results acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:

9413225.1633

HOLDING TIME SUMMARY

B-9332-TMA-611

SDG:	VALIDATOR:	DATE: 3/2/94	PAGE 1 OF 1
COMMENTS: Metals			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B-9332	ICP	9/9/93	10/11/93	10/15/93		36	None
B-9333	↓	9/10/93	↓	↓		35	↓
B-9336	↓	9/10/93	↓	↓		35	↓
B-9332	As, Pb, Se, Tl	9/9/93	10/11/93	10/12/93		33	None
B-9333	↓	9/10/93	↓	↓	3/2/94	~~34~~ 32	↓
B-9336	↓	9/10/93	↓	↓	3/2/94	~~34~~ 32	↓
B-9332	Hg	9/9/93	9/30/93	10/04/93		25	None
B-9333	↓	9/10/93	↓	↓		24	↓
B-9336	↓	↓	↓	↓		24	↓
B-9332	CN	9/9/93	9/20/93	9/22/93		12	None
B-9333	↓	9/10/93	↓	↓		11	↓
B-9336	↓	↓	↓	↓		11	↓

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M	
Aluminum	10.6	U	20.1	B	10.6	U	26.0	B	2.120	U	P	
Antimony	12.9	U	12.9	U	-13.0	B	12.9	U	2.580	U	P	
Arsenic	1.7	U	1.7	U	1.7	U	1.7	U	0.340	U	P	
Barium	1.2	U	1.2	U	1.2	U	1.2	U	0.240	U	P	
Beryllium	0.2	B	0.2	B	0.3	B	0.3	B	0.078	B	P	xS= 0.39
Cadmium	1.3	U	1.3	U	1.3	U	1.3	U	0.260	U	P	
Calcium	59.0	U	59.0	U	59.0	U	59.0	U	11.800	U	P	
Chromium	2.2	B	2.1	U	2.1	U	2.1	U	0.558	B	P	
Cobalt	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	P	
Copper	62.5 12.5	B	52 10.4	B	5.4	B	8.6	B	2.156	B	P	xS=10.78
Iron	5.3	U	7.4	B	12.5	B	10.6	B	-2.758	B	P	
Lead	1.1	U	1.1	U	1.1	U	1.1	U	0.220	U	P	
Magnesium	22.9	U	22.9	U	22.9	U	38.9	B	4.580	U	P	
Manganese	0.3	U	1.0	B	1.2	B	1.2	B	0.160	U	P	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV	
Nickel	3.4	U	3.4	U	3.4	U	3.4	U	0.680	U	P	
Potassium	68.5	U	68.5	U	68.5	U	68.5	U	13.700	U	P	
Selenium	2.3	U	2.3	U	2.3	U	2.3	U	0.460	U	P	
Silver	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	P	
Sodium	114.4	U	114.4	U	114.4	U	114.4	U	22.880	U	P	
Thallium	2.2	U	2.2	U	2.3	B	2.2	U	0.440	U	P	
Vanadium	5.5	U	5.5	U	5.5	U	5.5	U	1.100	U	P	
Zinc	6.0	B	4.4	U	4.9	B	4.4	U	0.880	U	P	
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA	
Titanium	1.1	U	1.2	B	1.1	U	1.6	B	0.220	U	P	

Assoc w/
B09332
B09333
B09336

3/2/94

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5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER:

B09336S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 96.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M	
Aluminum									NR	
Antimony	75-125	72.0992		2.5850	U	97.36	74.1	N	P	J
Arsenic	75-125	371.4781		3.3010		389.43	94.5		P	
Barium	75-125	413.5950		42.0331		389.43	95.4		P	
Beryllium	75-125	9.0406		0.2124	B	9.74	90.6		P	
Cadmium	75-125	8.0495		0.2605	U	9.74	82.6		P	
Calcium									NR	
Chromium	75-125	42.0196		7.1558		38.94	89.5		P	
Cobalt	75-125	92.4859		5.7371	B	97.36	89.1		P	
Copper	75-125	54.0141		11.1235		48.68	88.1		P	
Iron									NR	
Lead	75-125	93.1752		2.4345		97.36	93.2		P	
Magnesium									NR	
Manganese	75-125	771.3651		183.7226		97.36	603.6	N	P	J
Mercury	75-125	0.5434		0.0469	U	0.49	110.9		CV	
Nickel	75-125	94.0690		5.8232	B	97.36	90.6		P	
Potassium									NR	
Selenium	75-125	364.5852		0.4609	U	389.43	93.6		P	
Silver	75-125	9.5800		0.5210	U	9.74	98.4		P	
Sodium									NR	
Thallium	75-125	359.0747		0.4409	U	389.43	92.2		P	
Vanadium	75-125	110.5380		26.7356		97.36	86.1		P	
Zinc	75-125	110.6431		26.1124		97.36	86.8		P	
Cyanide	75-125	25.6329		0.4734	U	25.29	101.4		CA	
Titanium		784.3332		830.5830		97.36	-47.5		P	

Comments: - No qualifier is necessary for titanium since the sample result is greater than 4x spiked amount.
- Qualify all antimony results as estimated (J/UJ).
- Qualify all manganese positive sample results as estimated (J).

FORM V (Part 1) - IN

3/02/94

CILM02.1

~~15~~

022

9413225.1635

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6

DUPLICATES

SAMPLE NUMBER:

B09336D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 96.9 % Solids for Duplicate: 97.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		4878.4153		5046.7402		3.4		P
Antimony		2.5850	U	2.5850	U			P
Arsenic	2.0	3.3010		2.7395		18.6		P
Barium	40.1	42.0331		153.9812		114.2	*	P
Beryllium		0.2124	B	0.2425	B	13.2		P
Cadmium		0.2605	U	0.2605	U			P
Calcium		7963.3693		7499.6744		6.0		P
Chromium	2.0	7.1558		8.8511		21.2		P
Cobalt		5.7371	B	7.2680	B	23.5		P
Copper	5.0	11.1235		12.5843		12.3		P
Iron		12478.8842		12188.7242		2.4		P
Lead	0.6	2.4345		2.6072		6.9		P
Magnesium	1001.9	3988.6982		4372.2384		9.2		P
Manganese		183.7226		555.3127		100.6	*	P
Mercury		0.0469	U	0.0491	U			CV
Nickel	3.0	5.3232	B	8.2960		35.0		P
Potassium		728.8467	B	796.4572	B	8.9		P
Selenium		0.4609	U	0.4712	B	200.0		P
Silver		0.5210	U	0.5210	U			P
Sodium		172.1723	B	210.7868	B	20.2		P
Thallium		0.4409	U	0.4409	U			P
Vanadium	10.0	26.7356		25.3990		5.1		P
Zinc		26.1124		26.5292		1.6		P
Cyanide		0.4734	U	0.5109	U			CA
Titanium		830.5830		681.5153		19.7		P

Qualifying positive results for barium and manganese as estimated (J).

3/22/94

17

FORM VI - IN ILM02.1

9413225.1636

METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09332.MET)

9413225.1637

COPY

MEMORANDUM

TO: 200-UP-2 Project QA Record

April 20, 1994

FR: Susan Winter, Golder Associates Inc.

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, Filename B09332.MET)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332	09/09/93	SOIL	SEE NOTE 1
B09333	09/10/93	SOIL	
B09336	09/10/93	SOIL	
Note 1. All samples were analyzed for CLP TAL metals, titanium and cyanide.			

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 deficiencies identified below.

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.

Revised 4/30/94

001

Completeness. The data package was complete for all requested analyses. A total of three samples were validated in this data package with a total of 75 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives 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 as estimated.

Laboratory Blanks

- Beryllium, copper and antimony were detected in the laboratory blanks at concentrations greater than the IDL but less than the CRDL. Attachments 2 and 5 provide a summary of the samples affected, data qualification applied and supporting documentation.

Matrix Spike

- The matrix spike percent recovery (MS %R) for antimony and manganese were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

Laboratory Duplicate

- The laboratory duplicate relative percent difference (RPD) for barium and manganese were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

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.

Revised 4/20/94

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

94/3225.1640

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.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.1642

DATA QUALIFICATION SUMMARY

SDG: B09332-TMA-611	VALIDATOR: [illegible]	DATE: March 2, 1994	PAGE 1 OF 1
COMMENTS: METALS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
BERYLLIUM	U	B09332 B09333 B09336	PRESENT IN PREP. BLANK
COPPER	U	B09332 B09336	PRESENT IN ICB, CCB, AND PREP. BLANK
ANTIMONY	UJ	B09332 B09333 B09336	MS SPIKE %R <75% BUT >30%
MANGANESE	J	B09332 B09333 B09336	MS SPIKE %R >125%
BARIUM	J	B09332 B09333 B09336	DUPLICATE SAMPLE RESULT GREATER THAN ±2xCRQL AND RESULTS <5xCRQL
MANGANESE	J	B09332 B09333 B09336	LABORATORY DUPLICATE RPD OUT OF CONTROL LIMITS

9413275.1643

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9415225.1644

Validated Data Summary, Data Package: B09332-TMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
ALUMINUM	MG/KG	4920.000		7710.000		4880.000	
ANTIMONY	MG/KG	2.600	UJ	2.700	UJ	2.600	UJ
ARSENIC	MG/KG	2.700		3.900		3.300	
BARIUM	MG/KG	45.900	J	84.800	J	42.000	J
BERYLLIUM	MG/KG	0.330	U	0.380	U	0.210	U
CADMIUM	MG/KG	0.260	U	0.270	U	0.260	U
CALCIUM	MG/KG	7440.000		9330.000		7960.000	
CHROMIUM	MG/KG	10.100		10.300		7.200	
COBALT	MG/KG	5.700	B	8.900	B	5.700	B
COPPER	MG/KG	12.400	U	12.800		11.100	U
IRON	MG/KG	11400.000		17000.000		12500.000	
LEAD	MG/KG	2.800		4.800		2.400	
MAGNESIUM	MG/KG	4150.000		5260.000		3990.000	
MANGANESE	MG/KG	186.000	J	341.000	J	184.000	J
MERCURY	MG/KG	0.050	U	0.050	U	0.050	U
NICKEL	MG/KG	9.600		9.500		5.800	B
POTASSIUM	MG/KG	855.000	B	1530.000		729.000	B
SELENIUM	MG/KG	0.460	U	0.480	U	0.460	U
SILVER	MG/KG	0.800	B	0.540	U	0.520	U
SODIUM	MG/KG	179.000	B	146.000	B	172.000	B
THALLIUM	MG/KG	0.440	U	0.460	U	0.440	U
VANADIUM	MG/KG	24.500		35.700		26.700	
ZINC	MG/KG	26.600		37.500		26.100	
CYANIDE	MG/KG	0.510	U	0.520	U	0.470	U
TITANIUM	MG/KG	754.000		1040.000		831.000	

Verified

3/2/94

WESTINGHOUSE/HANFORD

1

299-W19-95
60-62.5'

SAMPLE NUMBER:

B09332

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-01 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 97.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4920			P
7440-36-0	Antimony	2.6	~~U~~	N	P
7440-38-2	Arsenic	2.7			P
7440-39-3	Barium	45.9	—	*	P
7440-41-7	Beryllium	0.33	~~B~~		P
7440-43-9	Cadmium	0.26	U		P
7440-70-2	Calcium	7440			P
7440-47-3	Chromium	10.1			P
7440-48-4	Cobalt	5.7	B		P
7440-50-8	Copper	12.4	—		P
7439-89-6	Iron	11400			P
7439-92-1	Lead	2.8			P
7439-95-4	Magnesium	4150			P
7439-96-5	Manganese	186	—	N*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	9.6			P
7440-09-7	Potassium	855	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	0.80	B		P
7440-23-5	Sodium	179	B		P
7440-28-0	Thallium	0.44	U		P
7440-62-2	Vanadium	24.5			P
7440-66-6	Zinc	26.6			P
	Cyanide	0.51	U		CA
7440-32-6	Titanium	754			P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified
3/22/94

009

2

FORM I - IN ILM02.1

299-W19-97
50-52.5'

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

B09333

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-02 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 92.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7710			P	
7440-36-0	Antimony	2.7	~~U~~	N	P	W
7440-38-2	Arsenic	3.9			P	
7440-39-3	Barium	84.8		*	P	J
7440-41-7	Beryllium	0.38	~~B~~		P	J
7440-43-9	Cadmium	0.27	U		P	
7440-70-2	Calcium	9330			P	
7440-47-3	Chromium	10.3			P	
7440-48-4	Cobalt	8.9	B		P	
7440-50-8	Copper	12.8			P	
7439-89-6	Iron	17000			P	
7439-92-1	Lead	4.8			P	
7439-95-4	Magnesium	5260			P	
7439-96-5	Manganese	341		N*	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.5			P	
7440-09-7	Potassium	1530			P	
7782-49-2	Selenium	0.48	U		P	
7440-22-4	Silver	0.54	U		P	
7440-23-5	Sodium	146	B		P	
7440-28-0	Thallium	0.46	U		P	
7440-62-2	Vanadium	35.7			P	
7440-66-6	Zinc	37.5			P	
	Cyanide	0.52	U		CA	
7440-32-6	Titanium	1040			P	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
. STONES

Verified
3/22/94

3

FORM I - IN ILM02.1

010

9413225.1647

WESTINGHOUSE/HANFORD

1

299-W19-95
74.8-77.3'

SAMPLE NUMBER:

B09336

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Lab Sample ID: S309104-03 S

Level (low/med): LOW Date Received: 09/15/93

% Solids: 96.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4880			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	UJ
7440-38-2	Arsenic	3.3			P	
7440-39-3	Barium	42.0	—	*	P	J
7440-41-7	Beryllium	0.21	~~B~~		P	U
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	7960			P	
7440-47-3	Chromium	7.2			P	
7440-48-4	Cobalt	5.7	B		P	
7440-50-8	Copper	11.1	—		P	U
7439-89-6	Iron	12500			P	
7439-92-1	Lead	2.4			P	
7439-95-4	Magnesium	3990			P	
7439-96-5	Manganese	184	—	N*	P	J
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	5.8	B		P	
7440-09-7	Potassium	729	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	0.52	U		P	
7440-23-5	Sodium	172	B		P	
7440-28-0	Thallium	0.44	U		P	
7440-62-2	Vanadium	26.7			P	
7440-66-6	Zinc	26.1			P	
	Cyanide	0.47	U		CA	
7440-32-6	Titanium	831			P	

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified
3/22/94

4

FORM I - IN ILM02.1

011

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9107225.1649

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890 3883

DEC 1993
RECEIVED
SDLA

RECORD COPY

October 21, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

9413225.1650

Scope

Three (3) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 15, 1993 from TMA/Norcal. The samples were analyzed for the USEPA CLP Target Analyte List metals, titanium, and cyanide. The analyses were performed under TMA/Skinner and Sherman work order S309104.

Methodology

The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02.

Discussion

All quality control requirements were met for the samples with the following exceptions;

The digestion spike recovery for antimony and manganese exceeded control limit requirements.

The laboratory duplicate for barium and manganese exceeded control limit requirements.

Please feel free to call if there are any questions concerning this package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

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: 9-9-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

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

1,120ml
9-10-93

2) ~~B09334~~ B09335

~~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~~

2,120ml
9-10-93

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:	Received by:	Date/Time:
1040 Loren E. Rogers 9-10-93	Roy T. Siddle	1040 9-10-93
Roy T. Siddle 1054 9-10-93	H. Narciso	9-14-93 10:50

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

014

~~000002C~~

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: 9-10-93

Ice Chest No.: SML 366 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1)

B09333

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

B09336

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

1,000ml
HR
9-10-93

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

HR 9-10-93

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

Relinquished by:	Received by:	Date/Time:
1040 L E Rogers 9-10-93	Roy T Sickle	9-10-93 1040
Relinquished by: Roy T Sickle 1054 9-10-93	Received by: H. Harris	Date/Time: 9-14-93 10:50
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) (ET) WEF061
Chain of Custody

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.1653

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B09332-TMA-611
VALIDATOR: [illegible]	LAB: TMA	DATE: 03/02/94
CASE:		SDG: B09332-TMA-611

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☒ CLP/Hg	☒ CLP/Cyanide	☒ Titanium by ICP	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX Soils

B09332
B09333
B09336

9413225.1654

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:

-017

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A 3/2/94
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments:
~~Qualify beryllium and copper in all three.~~
See attached lab blank form for details.

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments:
See attached lab spike form for details.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

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

Were ICP serial dilution samples analyzed? . . . . . Yes No N/A

Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A

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

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

Comments:

Qualify results for barium & Manganese as estimated (J).

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A

Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A

Were analytical spikes performed as required? . . . . . Yes No N/A

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

Was MSA performed as required? . . . . . Yes No N/A

Are MSA results acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:

9413225.1656

019

HOLDING TIME SUMMARY

B09332-TMA-611

SDG:	VALIDATOR:	DATE: 3/2/94	PAGE 1 OF 1
COMMENTS: Metals			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09332	ICP	9/09/93	10/11/93	10/15/93		36	None
B09333	↓	9/10/93	↓	↓		35	↓
B09336	↓	9/10/93	↓	↓		35	↓
B09332	As, Pb Se, Tl	9/09/93	10/11/93	10/12/93		33	None
B09333	↓	9/10/93	↓	↓	3/2/94	~~34~~ 32	↓
B09336	↓	9/10/93	↓	↓	3/2/94	~~34~~ 32	↓
B09332	Hg	9/9/93	9/30/93	10/04/93		25	None
B09333	↓	9/10/93	↓	↓		24	↓
B09336	↓	↓	↓	↓		24	↓
B09332	CN	9/9/93	9/20/93	9/21/93		12	None
B09333	↓	9/10/93	↓	↓		11	↓
B09336	↓	↓	↓	↓		11	↓

WESTINGHOUSE/HANFORD

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M	
Aluminum	10.6	U	20.1	B	10.6	U	26.0	B	2.120	U	P	
Antimony	12.9	U	12.9	U	-13.0	B	12.9	U	2.580	U	P	
Arsenic	1.7	U	1.7	U	1.7	U	1.7	U	0.340	U	P	
Barium	1.2	U	1.2	U	1.2	U	1.2	U	0.240	U	P	
Beryllium	0.2	B	0.2	B	0.3	B	0.3	B	0.078	B	P	xS= 0.39
Cadmium	1.3	U	1.3	U	1.3	U	1.3	U	0.260	U	P	
Calcium	59.0	U	59.0	U	59.0	U	59.0	U	11.800	U	P	
Chromium	2.2	B	2.1	U	2.1	U	2.1	U	0.558	B	P	
Cobalt	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	P	
Copper	62.5 12.5	B	52 10.4	B	5.4	B	8.6	B	2.156	B	P	xS=~~3~~10.78
Iron	5.3	U	7.4	B	12.5	B	10.6	B	-2.758	B	P	
Lead	1.1	U	1.1	U	1.1	U	1.1	U	0.220	U	P	
Magnesium	22.9	U	22.9	U	22.9	U	38.9	B	4.580	U	P	
Manganese	0.8	U	1.0	B	1.2	B	1.2	B	0.160	U	P	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV	
Nickel	3.4	U	3.4	U	3.4	U	3.4	U	0.680	U	P	
Potassium	68.5	U	68.5	U	68.5	U	68.5	U	13.700	U	P	
Selenium	2.3	U	2.3	U	2.3	U	2.3	U	0.460	U	P	
Silver	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	P	
Sodium	114.4	U	114.4	U	114.4	U	114.4	U	22.880	U	P	
Thallium	2.2	U	2.2	U	2.3	B	2.2	U	0.440	U	P	
Vanadium	5.5	U	5.5	U	5.5	U	5.5	U	1.100	U	P	
Zinc	6.0	B	4.4	U	4.9	B	4.4	U	0.880	U	P	
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA	
Titanium	1.1	U	1.2	B	1.1	U	1.6	B	0.220	U	P	

Assoc w/
B09332
B09333
B09336

3/2/94

WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER:

B09336S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 96.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M	
Aluminum									NR	
Antimony	75-125	72.0992		2.5850	U	97.36	74.1	N	P	UJ
Arsenic	75-125	371.4781		3.3010		389.43	94.5		P	
Barium	75-125	413.5950		42.0331		389.43	95.4		P	
Beryllium	75-125	9.0406		0.2124	B	9.74	90.6		P	
Cadmium	75-125	8.0495		0.2605	U	9.74	82.6		P	
Calcium									NR	
Chromium	75-125	42.0196		7.1558		38.94	89.5		P	
Cobalt	75-125	92.4859		5.7371	B	97.36	89.1		P	
Copper	75-125	54.0141		11.1235		48.68	88.1		P	
Iron									NR	
Lead	75-125	93.1752		2.4345		97.36	93.2		P	
Magnesium									NR	
Manganese	75-125	771.3651		183.7226		97.36	603.6	N	P	J
Mercury	75-125	0.5434		0.0469	U	0.49	110.9		CV	
Nickel	75-125	94.0690		5.8232	B	97.36	90.6		P	
Potassium									NR	
Selenium	75-125	364.5852		0.4609	U	389.43	93.6		P	
Silver	75-125	9.5800		0.5210	U	9.74	98.4		P	
Sodium									NR	
Thallium	75-125	359.0747		0.4409	U	389.43	92.2		P	
Vanadium	75-125	110.5380		26.7356		97.36	86.1		P	
Zinc	75-125	110.6431		26.1124		97.36	86.8		P	
Cyanide	75-125	25.6329		0.4734	U	25.29	101.4		CA	
Titanium		784.3332		830.5830		97.36	-47.5		P	

Comments: - No qualifier is necessary for titanium since the sample result is greater than 4x spiked amount.
- Qualify all antimony results as estimated (J/UJ).
- Qualify all manganese positive sample results as estimated (J).

3/2/94

FORM V (Part 1) - IN ILM02.1

~~15~~

022

94/3225.1659

WESTINGHOUSE/HANFORD

6

DUPLICATES

SAMPLE NUMBER:

B09336D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-046SAS No.: SDG No.: B09332

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 96.9 % Solids for Duplicate: 97.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		4878.4153		5046.7402		3.4		P
Antimony		2.5850	U	2.5850	U			P
Arsenic	2.0	3.3010		2.7395		18.6		P
Barium	40.1	42.0331		153.9812		114.2	*	P
Beryllium		0.2124	B	0.2425	B	13.2		P
Cadmium		0.2605	U	0.2605	U			P
Calcium		7963.3693		7499.6744		6.0		P
Chromium	2.0	7.1558		8.8511		21.2		P
Cobalt		5.7371	B	7.2680	B	23.5		P
Copper	5.0	11.1235		12.5843		12.3		P
Iron		12478.8842		12188.7242		2.4		P
Lead	0.6	2.4345		2.6072		6.9		P
Magnesium	1001.9	3988.6982		4372.2384		9.2		P
Manganese		183.7226		555.8127		100.6	*	P
Mercury		0.0469	U	0.0491	U			CV
Nickel	8.0	5.8232	B	8.2960		35.0		P
Potassium		728.8467	B	796.4572	B	8.9		P
Selenium		0.4609	U	0.4712	B	200.0		P
Silver		0.5210	U	0.5210	U			P
Sodium		172.1723	B	210.7868	B	20.2		P
Thallium		0.4409	U	0.4409	U			P
Vanadium	10.0	26.7356		25.3990		5.1		P
Zinc		26.1124		26.5292		1.6		P
Cyanide		0.4734	U	0.5109	U			CA
Titanium		830.5830		681.5153		19.7		P

Qualify positive results for barium and manganese as estimated (J).

3/22/94

17

FORM VI - IN ILM02.1

SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09332.BNA)

9447225.1661

MEMORANDUM

MAR 1994
RECEIVED
TCC

TO: 200-UP-2 Project QA Record

March 3, 1994

FR: Susan Winter, Golder Associates Inc.

RE: SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, Filename B09332.BNA)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332 B09333 B09336	09/09/93 09/10/93 09/10/93	SOIL SOIL SOIL	SEE NOTE 1
Note 1. All samples were analyzed for CLP TCL Semivolatile Organic Constituents.			

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.

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 three samples were validated in this data package with a total of 192 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

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MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable.

- The tentatively identified compound (TIC) identified as 4-hydroxy-4-methyl-2-pentanone has been qualified as unusable (UR) since it is an aldol condensation product, a suspected laboratory contaminant. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation. However, these qualifications do not affect the percent completeness since the TICs are not TCL compounds.

MINOR DEFICIENCIES

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

Laboratory Blanks

- Di-n-butylphthalate, bis(2-ethylhexyl)phthalate, pyrene, and two TICs, as listed in Attachment 2, were detected in the associated laboratory blank. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

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.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. 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 quantitation 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 reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.

NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.

UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.

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

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9417225.1666

DATA QUALIFICATION SUMMARY

SDG: B09332-TMA-611	VALIDATOR: [illegible]	DATE: March 24, 1994	PAGE 1 OF 1
COMMENTS: SEMIVOLATILE ORGANICS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
DI-N-BUTYLPHTHALATE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
BIS(2-ETHYLHEXYL)PHTHALATE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
PHENOL	U	B09336	PRESENT IN LABORATORY BLANK
4-HYDROXY-4-METHYL-2-PENTANONE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
4-HYDROXY-4-METHYL-2-PENTANONE	UR	B09332 B09333 B09336	SUSPECTED LABORATORY CONTAMINANT (ALDOL CONDENSATE)
UNKNOWN HYDROCARBON @ RT 6.85 MINUTES	UJN	B09332 B09333	PRESENT IN BLANK
UNKNOWN HYDROCARBON @ RT 6.87 MINUTES	UJN	B09336	PRESENT IN BLANK
UNKNOWN HYDROCARBONS @ RT 7.42 AND 8.73 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
PROPANOIC ACID ESTER ISOMER @ RT 18.1 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
HEXANEDIOIC ACID ESTER ISOMER @ RT 26.22 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
UNKNOWN HYDROCARBON @ RT 7.45 MINUTES	JN	B09336	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
HEXANEDIOIC ACID ESTER ISOMER @ RT 26.23 MINUTES	JN	B09336	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9918225.1668

Validated Data Summary, Data Package: B09332-IMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
PHENOL	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	350.000	U	390.000	U	330.000	U
2-CHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
1,3-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
1,4-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
1,2-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
2-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	350.000	U	390.000	U	330.000	U
4-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROETHANE	UG/KG	350.000	U	390.000	U	330.000	U
NITROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
ISOPHORONE	UG/KG	350.000	U	390.000	U	330.000	U
2-NITROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DIMETHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DICHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
NAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLOROANILINE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROBUTADIENE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2-METHYLNAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	350.000	U	390.000	U	330.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
2-CHLORONAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
2-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
DIMETHYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
ACENAPHTHYLENE	UG/KG	350.000	U	390.000	U	330.000	U
3-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
ACENAPHTHENE	UG/KG	350.000	U	390.000	U	330.000	U

Verified
3/03/94

Validated Data Summary, Data Package: B09332-THA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
2,4-DINITROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
4-NITROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
DIBENZOFURAN	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DINITROTOLUENE	UG/KG	350.000	U	390.000	U	330.000	U
2,6-DINITROTOLUENE	UG/KG	350.000	U	390.000	U	330.000	U
DIETHYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	350.000	U	390.000	U	330.000	U
FLUORENE	UG/KG	350.000	U	390.000	U	330.000	U
4-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
N-NITROSODIPHENYLAMINE	UG/KG	350.000	U	390.000	U	330.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
PENTACHLOROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
PHENANTHRENE	UG/KG	350.000	U	390.000	U	330.000	U
ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
CARBAZOLE	UG/KG	350.000	U	390.000	U	330.000	U
DI-N-BUTYLPHTHALATE	UG/KG	420.000	U	390.000	U	330.000	U
FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
BUTYLBENZYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(A)ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
CHRYSENE	UG/KG	350.000	U	390.000	U	330.000	U
DI-N-OCTYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(B)FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(K)FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(A)PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(G,H,I)PERYLENE	UG/KG	350.000	U	390.000	U	330.000	U

Verified
[illegible] 3/03/94

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W19-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	350	U
111-44-4	bis(2-Chloroethyl)Ether	350	U
95-57-8	2-Chlorophenol	350	U
541-73-1	1,3-Dichlorobenzene	350	U
106-46-7	1,4-Dichlorobenzene	350	U
95-50-1	1,2-Dichlorobenzene	350	U
95-48-7	2-Methylphenol	350	U
108-60-1	2,2'-oxybis(1-Chloropropane)	350	U
106-44-5	4-Methylphenol	350	U
621-64-7	N-Nitroso-Di-n-Propylamine	350	U
67-72-1	Hexachloroethane	350	U
98-95-3	Nitrobenzene	350	U
78-59-1	Isophorone	350	U
88-75-5	2-Nitrophenol	350	U
105-67-9	2,4-Dimethylphenol	350	U
111-91-1	bis(2-Chloroethoxy)Methane	350	U
120-83-2	2,4-Dichlorophenol	350	U
120-82-1	1,2,4-Trichlorobenzene	350	U
91-20-3	Naphthalene	350	U
106-47-8	4-Chloroaniline	350	U
87-68-3	Hexachlorobutadiene	350	U
59-50-7	4-Chloro-3-Methylphenol	350	U
91-57-6	2-Methylnaphthalene	350	U
77-47-4	Hexachlorocyclopentadiene	350	U
88-06-2	2,4,6-Trichlorophenol	350	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	350	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	350	U
208-96-8	Acenaphthylene	350	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	350	U
51-28-5	2,4-Dinitrophenol	840	U

FORM I SV-1

Verified 3/3/94

010

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W19-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

9413225.1672

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
100-02-7	4-Nitrophenol	840	U	
132-64-9	Dibenzofuran	350	U	
121-14-2	2,4-Dinitrotoluene	350	U	
606-20-2	2,6-Dinitrotoluene	350	U	
84-66-2	Diethylphthalate	350	U	
7005-72-3	4-Chlorophenyl-phenylether	350	U	
86-73-7	Fluorene	350	U	
100-01-6	4-Nitroaniline	840	U	
534-52-1	4,6-Dinitro-2-methylphenol	840	U	
86-30-6	N-Nitrosodiphenylamine (1)	350	U	
101-55-3	4-Bromophenyl-phenylether	350	U	
118-74-1	Hexachlorobenzene	350	U	
87-86-5	Pentachlorophenol	840	U	
85-01-8	Phenanthrene	350	U	
120-12-7	Anthracene	350	U	
86-74-8	Carbazole	350	U	
84-74-2	Di-n-Butylphthalate	420	~~B~~	U
206-44-0	Fluoranthene	350	U	
129-00-0	Pyrene	350	U	
85-68-7	Butylbenzylphthalate	350	U	
91-94-1	3,3'-Dichlorobenzidine	350	U	
56-55-3	Benzo(a)Anthracene	350	U	
117-81-7	bis(2-Ethylhexyl)Phthalate	350 ~~55~~	~~B~~	U
218-01-9	Chrysene	350	U	
117-84-0	Di-n-Octyl Phthalate	350	U	
205-99-2	Benzo(b)Fluoranthene	350	U	
207-08-9	Benzo(k)Fluoranthene	350	U	
50-32-8	Benzo(a)Pyrene	350	U	
193-39-5	Indeno(1,2,3-cd)Pyrene	350	U	
53-70-3	Dibenz(a,h)Anthracene	350	U	
191-24-2	Benzo(g,h,i)Perylene	350	U	

(1) - Cannot be separated from Diphenylamine

Verified

3/3/94

01

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W19-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.28~~	~~30000~~	~~BAJ~~
2.	UNKNOWN HYDROCARBON	6.85	70	~~BJ~~

FORM I SV-TIC

012

3/90

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W-19-97
B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

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

CAS NO.	COMPOUND		Q
108-95-2	Phenol	390	U
111-44-4	bis(2-Chloroethyl)Ether	390	U
95-57-8	2-Chlorophenol	390	U
541-73-1	1,3-Dichlorobenzene	390	U
106-46-7	1,4-Dichlorobenzene	390	U
95-50-1	1,2-Dichlorobenzene	390	U
95-48-7	2-Methylphenol	390	U
108-60-1	2,2'-oxybis(1-Chloropropane)	390	U
106-44-5	4-Methylphenol	390	U
621-64-7	N-Nitroso-Di-n-Propylamine	390	U
67-72-1	Hexachloroethane	390	U
98-95-3	Nitrobenzene	390	U
78-59-1	Isophorone	390	U
88-75-5	2-Nitrophenol	390	U
105-67-9	2,4-Dimethylphenol	390	U
111-91-1	bis(2-Chloroethoxy)Methane	390	U
120-83-2	2,4-Dichlorophenol	390	U
120-82-1	1,2,4-Trichlorobenzene	390	U
91-20-3	Naphthalene	390	U
106-47-8	4-Chloroaniline	390	U
87-68-3	Hexachlorobutadiene	390	U
59-50-7	4-Chloro-3-Methylphenol	390	U
91-57-6	2-Methylnaphthalene	390	U
77-47-4	Hexachlorocyclopentadiene	390	U
88-06-2	2,4,6-Trichlorophenol	390	U
95-95-4	2,4,5-Trichlorophenol	940	U
91-58-7	2-Chloronaphthalene	390	U
88-74-4	2-Nitroaniline	940	U
131-11-3	Dimethylphthalate	390	U
208-96-8	Acenaphthylene	390	U
99-09-2	3-Nitroaniline	940	U
83-32-9	Acenaphthene	390	U
51-28-5	2,4-Dinitrophenol	940	U

FORM I SV-1

Verified 3/3/94

94A325.674

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W19-97
B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
100-02-7	4-Nitrophenol	940	U	
132-64-9	Dibenzofuran	390	U	
121-14-2	2,4-Dinitrotoluene	390	U	
606-20-2	2,6-Dinitrotoluene	390	U	
84-66-2	Diethylphthalate	390	U	
7005-72-3	4-Chlorophenyl-phenylether	390	U	
86-73-7	Fluorene	390	U	
100-01-6	4-Nitroaniline	940	U	
534-52-1	4,6-Dinitro-2-methylphenol	940	U	
86-30-6	N-Nitrosodiphenylamine (1)	390	U	
101-55-3	4-Bromophenyl-phenylether	390	U	
118-74-1	Hexachlorobenzene	390	U	
87-86-5	Pentachlorophenol	940	U	
85-01-8	Phenanthrene	390	U	
120-12-7	Anthracene	390	U	
86-74-8	Carbazole	390	U	
84-74-2	Di-n-Butylphthalate	390 ~~290~~	~~J~~	J
206-44-0	Fluoranthene	390	U	
129-00-0	Pyrene	390	U	
85-68-7	Butylbenzylphthalate	390	U	
91-94-1	3,3'-Dichlorobenzidine	390	U	
56-55-3	Benzo(a)Anthracene	390	U	
117-81-7	bis(2-Ethylhexyl)Phthalate	390 ~~34~~	~~J~~	J
218-01-9	Chrysene	390	U	
117-84-0	Di-n-Octyl Phthalate	390	U	
205-99-2	Benzo(b)Fluoranthene	390	U	
207-08-9	Benzo(k)Fluoranthene	390	U	
50-32-8	Benzo(a)Pyrene	390	U	
193-39-5	Indeno(1,2,3-cd)Pyrene	390	U	
53-70-3	Dibenz(a,h)Anthracene	390	U	
191-24-2	Benzo(g,h,i)Perylene	390	U	

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

3/3/94 3/90

-014

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W19-97

B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.28~~	~~32000~~	~~BAJ~~	UR
2.	UNKNOWN HYDROCARBON	6.35	79	~~BJ~~	UJ
3.	UNKNOWN HYDROCARBON	7.42	1300	~~J~~	JN
4.	UNKNOWN HYDROCARBON	8.73	120	~~J~~	JN
5.	PROPANOIC ACID ESTER ISOMER	18.10	350	~~J~~	JN
6.	HEXANEDIOIC ACID ESTER ISOME	26.22	270	~~J~~	JN

9413225.1676

Verified

015

FORM I SV-TIC 3/90

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W19-95

B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

9413225.1677

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
108-95-2	Phenol	330 ~~50~~	~~J~~	U
111-44-4	bis(2-Chloroethyl)Ether	330	U	
95-57-8	2-Chlorophenol	330	U	
541-73-1	1,3-Dichlorobenzene	330	U	
106-46-7	1,4-Dichlorobenzene	330	U	
95-50-1	1,2-Dichlorobenzene	330	U	
95-48-7	2-Methylphenol	330	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U	
106-44-5	4-Methylphenol	330	U	
621-64-7	N-Nitroso-Di-n-Propylamine	330	U	
67-72-1	Hexachloroethane	330	U	
98-95-3	Nitrobenzene	330	U	
78-59-1	Isophorone	330	U	
88-75-5	2-Nitrophenol	330	U	
105-67-9	2,4-Dimethylphenol	330	U	
111-91-1	bis(2-Chloroethoxy)Methane	330	U	
120-83-2	2,4-Dichlorophenol	330	U	
120-82-1	1,2,4-Trichlorobenzene	330	U	
91-20-3	Naphthalene	330	U	
106-47-8	4-Chloroaniline	330	U	
87-68-3	Hexachlorobutadiene	330	U	
59-50-7	4-Chloro-3-Methylphenol	330	U	
91-57-6	2-Methylnaphthalene	330	U	
77-47-4	Hexachlorocyclopentadiene	330	U	
88-06-2	2,4,6-Trichlorophenol	330	U	
95-95-4	2,4,5-Trichlorophenol	800	U	
91-58-7	2-Chloronaphthalene	330	U	
88-74-4	2-Nitroaniline	800	U	
131-11-3	Dimethylphthalate	330	U	
208-96-8	Acenaphthylene	330	U	
99-09-2	3-Nitroaniline	800	U	
83-32-9	Acenaphthene	330	U	
51-28-5	2,4-Dinitrophenol	800	U	

016

FORM I SV-1 Verified 3/90

3/3/94

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-619-915
B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	800	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	800	U
534-52-1	4,6-Dinitro-2-methylphenol	800	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	800	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	330 ~~260~~	~~J~~
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330 ~~130~~	~~BJ~~
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

verified

FORM I SV-2

3/3/94

3/90

017

911225.178

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W19-95

B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 4

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.32~~	~~78000~~	~~BAJ~~
2.	UNKNOWN HYDROCARBON	6.87	67	~~BJ~~
3.	UNKNOWN HYDROCARBON	7.45	1100	~~J~~
4.	HEXANEDIOIC ACID ESTER ISOME	26.23	340	~~J~~

94/3225.1679

018

FORM I SV-TIC 3/90

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.1680

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-028

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 14, 1993

1.0 DESCRIPTION OF CASE :

Four soil samples were analyzed for TCL Organics- Volatiles and Semivolatiles according to the USEPA Contract Laboratory Program (CLP) Statement of Work for Organic Analysis, Revision OLM01.8. The Extractable Hydrocarbons in the Kerosene Range (K) were analyzed according to the SW-846 Method 8015M.

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09332	A3-09-028-01A	V	SOIL
B09332 MS	A3-09-028-01B	V	SOIL
B09332 MSD	A3-09-028-01C	V	SOIL
B09332	A3-09-028-01D	SV	SOIL
B09332	A3-09-028-01G	K	SOIL
B09333	A3-09-028-02A	V	SOIL
B09333	A3-09-028-02B	SV	SOIL
B09333 MS	A3-09-028-02C	SV	SOIL
B09333 MSD	A3-09-028-02D	SV	SOIL
B09333	A3-09-028-02G	K	SOIL
B09336	A3-09-028-03A	V	SOIL
B09336	A3-09-028-03B	SV	SOIL
B09336	A3-09-028-03D	K	SOIL
B09336 MS	A3-09-028-03E	K	SOIL
B09336 MSD	A3-09-028-03F	K	SOIL
B09335	A3-09-028-04A	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were analyzed by heated purge within the CLP SOW holding times.

All of the QC results were within the limits specified by the EPA CLP SOW.

TUNES :

All BFB tunes were injected directly into the GC/MS instrument.

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Phenol was detected in sample B09336 at a concentration that was below the CRQL.

The matrix spike recovery of 2,4-Dinitrotoluene in sample B09333MS was slightly above the QC limits. In accordance with the protocol, no further action was required.

All of the other QC results were within the limits specified by the EPA CLP SOW.

9413225.1682

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 09/16/93 and was analyzed according to the SW-846 Method 8015M. The initial calibration consisted of 5 different levels of the Kerosene standard that ranged from 200ppm to 2000ppm. The continuing calibration at the 1000ppm level was injected amongst a series of samples, in order to verify the instrument stability. The %RSD in the initial calibration and the %D in the continuing calibration were below their 20% and 15% limits, respectively.

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed for extractable hydrocarbons in the Kerosene range within the required holding times. Approximately 20 g of each sample was extracted and concentrated to 5 mL.

There were no hydrocarbons detected in any of the samples. Sample B09336 was spiked with Kerosene and the matrix spike recoveries were 85% and 93%. A blank spike was prepared at the same time, and had an 79% recovery.

All of the QC results were within the limits specified by the SW-846 Method 8015M.

We certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data in this hardcopy data package and in the computer-readable data submitted on diskette is authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Nicole Roth 11/29/93
Nicole Roth
CLP Program Manager

Maureen Parrish 11/29/93
Maureen Parrish
Project Manager

94/4225.1683

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: 9-9-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

1,250ml P:CLP;TAL Metals,Hg,Ti
~~1,250ml~~ Gs:VOA CLP
1,250ml nG: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

120ml 9-10-93

2) ~~B09334~~ B09335

~~1,250ml P:CLP;TAL Metals,Hg,Ti~~
~~1,250ml~~ Gs:VOA CLP
~~1,250ml nG: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~~

120ml 9-10-93

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
~~1,250ml Gs:VOA CLP~~
1,250ml nG: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:	Received by:	Date/Time:
1040 [signature] 9-10-93	[signature]	1040 9-10-93
Relinquished by: [signature] 1054 9-10-93	Received by: [signature] H. NARCISO	Date/Time: 9-10-93 10:50
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

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: 9-10-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09333

- 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) B09336

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- ~~1,250ml~~ 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

9-10-93

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:	Received by:	Date/Time:
1040 9-10-93	Paul Sichale	9-10-93 1040
Paul Sichale 1054 9-10-93	L. Rogers	9-10-93 10:50

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

94/322E.1686

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-UP-2			DATA PACKAGE: B09332-TMA-611		
VALIDATOR: [illegible]		LAB: TMA		DATE: 03/03/94	
CASE:			SDG: B09332-TMA-611		

ANALYSES PERFORMED					
☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☑ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX Soils
B09332
B09333
B09336

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: _____

026

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

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

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

Comments: See comments 1 and 2 on last page of checklist

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: Di-n-butyphthalate, bis(2-ethylhexyl)phthalate, and phenol are present in the laboratory blank. See attachments for blank concentration. Phenol was present, the calculation for phenol conc. is included on the attached quant form.

5. ACCURACY

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

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

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

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

Comments: The MS%R for 2,4-Dinitrotoluene is 93%, the control limits are 28 to 89%, however no qualification is required since all surrogates are within limits and the 2,4-dinitrotoluene MS%R is close to 100%, which is ideal.

9413225.1688

027

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

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

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

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

Comments:

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

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

Has the laboratory properly identified and coded all TIC? . . Yes No N/A

Comments:

9413225.1689

-028

GC/MS ORGANIC DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):

(1) The minimum RRF for surrogate 1,2-dichlorobenzene-d4 is 0.400 according to the SOW, the laboratory has recorded 0.800 on the calibration. No qualification is required.

(2) The laboratory used 20 ug/ml of internal standard instead of the specified amount of 40 ug/ml. No qualification is required, however, a factor of 2 is included in the result calculations.

9413225.1691

HOLDING TIME SUMMARY

B09332 IMA-611

SDG:	VALIDATOR: [signature]	DATE: 2/3/94	PAGE 1 OF 1
COMMENTS: Semivolatile Organics			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09332	BNF	9/09/93	9/16/93	9/28/93	7	12	None
B09333	↓	9/10/93	↓	9/28/93	6	12	↓
B09336	↓	9/10/93	↓	9/28/93	6	12	↓

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

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

CAS NO.	COMPOUND		Q
108-95-2	Phenol	15 ~~330~~	~~U~~
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	790	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	790	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
99-09-2	3-Nitroaniline	790	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	790	U

FORM I SV-1

3/3/94

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	790	U
534-52-1	4,6-Dinitro-2-methylphenol	790	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	790	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	260	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	420	
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

-032 3/90 3/3/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.32~~	~~75000~~	~~AJ~~ R
2.	UNKNOWN HYDROCARBON	6.35	66	J x5=33

9413225.1694

3/3/94

FORM I SV-TIC 3/90

033

Lab. Blank

~~000325~~

Quantitation Report File: 30928S02

SBLK0916S

Data: 30928S02.TI
09/28/93 11:32:00
Sample: CLP,09028,,SBLK0916S,L,S,A309028-BLK,BNA,BLANK
Conds.: CAP/.25,30928S01,3DFT0928S01
Formula: 30920SAVG90 Instrument: SHERMA Weight: 0.000
Submitted by: 30G:0.5M Analyst: FH#33S Acct. No.: CALTAB

AMOUNT=AREA * REF AMNT/(REF AREA * RESP FACT)
Resp. fac. from Library Entry

No	Name	
1	CI30	*IS1* 1,4-DICHLOROBENZENE-D4
2	CI40	*IS2* NAPHTHALENE-D8
3	CI50	*IS3* ACENAPHTHENE-D10
4	CI60	*IS4* PHENANTHRENE-D10
5	CI70	*IS5* CHRYSENE-D12
6	CI75	*IS6* PERYLENE-D12
7	CS50	*SU1* 2-FLUOROPHENOL
8	CS45	*SU2* PHENOL-D5
9	CS55	*SU3* 2,4,6,-TRIBROMOPHENOL
10	CS20	*SU4* NITROBENZENE-D5
11	CS25	*SU5* 2-FLUOROBIPHENYL
12	CS30	*SU6* TERPHENYL-D14
13	CS70	2-CHLOROPHENOL-D4
14	CS75	1,2-DICHLOROBENZENE-D4
15	C315	PHENOL
16	C325	BIS(2-CHLOROETHYL)ETHER
17	C330	2-CHLOROPHENOL
18	C335	1,3-DICHLOROBENZENE
19	C340	1,4-DICHLOROBENZENE
20	C345	BENZYL ALCOHOL
21	C350	1,2-DICHLOROBENZENE
22	C355	2-METHYLPHENOL
23	C360	BIS(2-CHLOROISOPROPYL)ETHER
24	C365	4-METHYLPHENOL
25	C370	N-NITROSO-DI-N-PROPYLAMINE
26	C375	HEXACHLOROETHANE
27	C410	NITROBENZENE
28	C415	ISOPHORONE
29	C420	2-NITROPHENOL
30	C425	2,4-DIMETHYLPHENOL
31	C435	BIS(2-CHLOROETHOXY)METHANE
32	C430	BENZOIC ACID
33	C440	2,4-DICHLOROPHENOL
34	C445	1,2,4-TRICHLOROBENZENE
35	C450	NAPHTHALENE
36	C455	4-CHLOROANILINE
37	C460	HEXACHLOROBUTADIENE
38	C465	4-CHLORO-3-METHYLPHENOL
39	C470	2-METHYLNAPHTHALENE
40	C510	HEXACHLOROCYCLOPENTADIENE
41	C515	2,4,6-TRICHLOROPHENOL
42	C520	2,4,5-TRICHLOROPHENOL
43	C525	2-CHLORONAPHTHALENE
44	C530	2-NITROANILINE
45	C535	DIMETHYL PHTHALATE
46	C540	ACENAPHTHYLENE
47	C545	3-NITROANILINE

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034

3/3/94

Lab. Blank

SBLK09165

~~000326~~

No	Name	
48	C550	ACENAPHTHENE
49	C555	2,4-DINITROPHENOL
50	C560	4-NITROPHENOL

F.H. 9/28/9

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount		%Tot
1	152	739	9:20	1	1.000	A BB	31902.	20.000	NG/UL	3.20
2	136	982	12:24	2	1.000	A BB	118660.	20.000	NG/UL	3.20
3	164	1343	16:57	3	1.000	A BB	64368.	20.000	NG/UL	3.20
4	188	1648	20:48	4	1.000	A BV	89210.	20.000	NG/UL	3.20
5	240	2177	27:29	5	1.000	A BB	59878.	20.000	NG/UL	3.20
6	264	2595	32:46	6	1.000	A BB	33815.	20.000	NG/UL	3.20
7	112	526	6:38	1	0.712	A BB	138638.	73.271	NG/UL	11.72
8	99	674	8:31	1	0.912	A BB	176198.	71.451	NG/UL	11.43
9	330	1506	19:01	3	1.121	A BB	30518.	64.871	NG/UL	10.38
10	82	843	10:39	2	0.858	A BB	119966.	46.995	NG/UL	7.52
11	172	1204	15:12	3	0.897	A BB	163804.	48.219	NG/UL	7.71
12	244	1967	24:50	5	0.904	A BB	147059.	53.202	NG/UL	8.51
13	132	699	8:49	1	0.946	A BB	136248.	72.544	NG/UL	11.60
14	152	767	9:41	1	1.038	A BB	61326.	47.666	NG/UL	7.62
15	~~94~~	~~676~~	~~8:32~~	~~1~~	~~0.915~~	~~A BB~~	~~1110.~~	~~0.450~~	~~NG/UL~~	~~0.07~~
16	NOT FOUND									
17	NOT FOUND									
18	NOT FOUND									
19	NOT FOUND									
20	~~108~~	~~767~~	~~9:41~~	~~1~~	~~1.038~~	~~A BB~~	~~658.~~	~~0.541~~	~~NG/UL~~	~~0.09~~
21	NOT FOUND									
22	NOT FOUND									
23	NOT FOUND									
24	NOT FOUND									
25	NOT FOUND									
26	NOT FOUND									
27	NOT FOUND									
28	NOT FOUND									
29	NOT FOUND									
30	NOT FOUND									
31	NOT FOUND									
32	NOT FOUND									
33	NOT FOUND									
34	NOT FOUND									
35	~~128~~	~~986~~	~~12:27~~	~~2~~	~~1.004~~	~~A BB~~	~~592.~~	~~0.112~~	~~NG/UL~~	~~0.02~~
36	NOT FOUND									
37	NOT FOUND									
38	NOT FOUND									
39	NOT FOUND									
40	NOT FOUND									
41	NOT FOUND									
42	NOT FOUND									
43	NOT FOUND									
44	NOT FOUND									
45	NOT FOUND									
46	NOT FOUND									
47	NOT FOUND									
48	NOT FOUND									
49	NOT FOUND									
50	NOT FOUND									

9413225.1696

for CPC — for internal std. dil'n

$$\text{ug/kg phenol} = \frac{(1110)(20)(500)(2)(2)}{(31902)(1.548)(30.4)(2)}$$

ug/kg phenol = 14.8 = 15 ug/kg in Blank

15 ug/kg × 5 = 75 ug/kg — upper limit

09/29/93

035

3/3/94

SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09332.BNA)

9413225.1697

COPY

MEMORANDUM

RECORD COPY

TO: 200-UP-2 Project QA Record April 20, 1994

FR: Susan Winter, Golder Associates Inc.

RE: SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, Filename B09332.BNA)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332 B09333 B09336	09/09/93 09/10/93 09/10/93	SOIL SOIL SOIL	SEE NOTE 1
Note 1. All samples were analyzed for CLP TCL Semivolatile Organic Constituents.			

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.

Accuracy. Goals for accuracy were met.

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 three samples were validated in this data package with a total of 192 determinations reported, all of

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-001

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which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable.

- The tentatively identified compound (TIC) identified as 4-hydroxy-4-methyl-2-pentanone has been qualified as unusable (UR) since it is an aldol condensation product, a suspected laboratory contaminant. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation. However, these qualifications do not affect the percent completeness since the TICs are not TCL compounds.

MINOR DEFICIENCIES

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

Laboratory Blanks

- Di-n-butylphthalate, bis(2-ethylhexyl)phthalate, pyrene, and two TICs, as listed in Attachment 2, were detected in the associated laboratory blank. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

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.

Revised 4/20/94

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9413225.1700

GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. 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 quantitation 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 reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.

NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.

UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.

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

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413275.1702

DATA QUALIFICATION SUMMARY

SDG: B09332-TMA-611	VALIDATOR: [illegible]	DATE: March 24, 1994	PAGE 1 OF 1
COMMENTS: SEMIVOLATILE ORGANICS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
DI-N-BUTYLPHTHALATE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
BIS(2-ETHYLHEXYL)PHTHALATE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
PHENOL	U	B09336	PRESENT IN LABORATORY BLANK
4-HYDROXY-4-METHYL-2-PENTANONE	U	B09332 B09333 B09336	PRESENT IN LABORATORY BLANK
4-HYDROXY-4-METHYL-2-PENTANONE	UR	B09332 B09333 B09336	SUSPECTED LABORATORY CONTAMINANT (ALDOL CONDENSATE)
UNKNOWN HYDROCARBON @ RT 6.85 MINUTES	UJN	B09332 B09333	PRESENT IN BLANK
UNKNOWN HYDROCARBON @ RT 6.87 MINUTES	UJN	B09336	PRESENT IN BLANK
UNKNOWN HYDROCARBONS @ RT 7.42 AND 8.73 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
PROPANOIC ACID ESTER ISOMER @ RT 18.1 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
HEXANEDIOIC ACID ESTER ISOMER @ RT 26.22 MINUTES	JN	B09333	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
UNKNOWN HYDROCARBON @ RT 7.45 MINUTES	JN	B09336	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES
HEXANEDIOIC ACID ESTER ISOMER @ RT 26.23 MINUTES	JN	B09336	IDENTIFIED AS A VALID RESULT USING DATA VALIDATION PROCEDURES

9413225.1703

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

94/9225.1704

Validated Data Summary, Data Package: B09332-TMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
PHENOL	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	350.000	U	390.000	U	330.000	U
2-CHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
1,3-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
1,4-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
1,2-DICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
2-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	350.000	U	390.000	U	330.000	U
4-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROETHANE	UG/KG	350.000	U	390.000	U	330.000	U
NITROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
ISOPHORONE	UG/KG	350.000	U	390.000	U	330.000	U
2-NITROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DIMETHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DICHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
NAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLOROANILINE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROBUTADIENE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2-METHYLNAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	350.000	U	390.000	U	330.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	350.000	U	390.000	U	330.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
2-CHLORONAPHTHALENE	UG/KG	350.000	U	390.000	U	330.000	U
2-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
DIMETHYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
ACENAPHTHYLENE	UG/KG	350.000	U	390.000	U	330.000	U
3-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
ACENAPHTHENE	UG/KG	350.000	U	390.000	U	330.000	U

Verified
[illegible] 3/03/94

Validated Data Summary, Data Package: B09332-TMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
2,4-DINITROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
4-NITROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
DIBENZOFURAN	UG/KG	350.000	U	390.000	U	330.000	U
2,4-DINITROTOLUENE	UG/KG	350.000	U	390.000	U	330.000	U
2,6-DINITROTOLUENE	UG/KG	350.000	U	390.000	U	330.000	U
DIETHYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	350.000	U	390.000	U	330.000	U
FLUORENE	UG/KG	350.000	U	390.000	U	330.000	U
4-NITROANILINE	UG/KG	840.000	U	940.000	U	800.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
N-NITROSODIPHENYLAMINE	UG/KG	350.000	U	390.000	U	330.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	350.000	U	390.000	U	330.000	U
HEXACHLOROBENZENE	UG/KG	350.000	U	390.000	U	330.000	U
PENTACHLOROPHENOL	UG/KG	840.000	U	940.000	U	800.000	U
PHENANTHRENE	UG/KG	350.000	U	390.000	U	330.000	U
ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
CARBAZOLE	UG/KG	350.000	U	390.000	U	330.000	U
DI-N-BUTYLPHTHALATE	UG/KG	420.000	U	390.000	U	330.000	U
FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
BUTYLBENZYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(A)ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
CHRYSENE	UG/KG	350.000	U	390.000	U	330.000	U
DI-N-OCTYLPHTHALATE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(B)FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(K)FLUORANTHENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(A)PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	350.000	U	390.000	U	330.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	350.000	U	390.000	U	330.000	U
BENZO(G,H,I)PERYLENE	UG/KG	350.000	U	390.000	U	330.000	U

Verified
3/03/94

~~566196~~

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-[illegible]-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

9413225.1707

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	350	U
111-44-4	bis(2-Chloroethyl)Ether	350	U
95-57-8	2-Chlorophenol	350	U
541-73-1	1,3-Dichlorobenzene	350	U
106-46-7	1,4-Dichlorobenzene	350	U
95-50-1	1,2-Dichlorobenzene	350	U
95-48-7	2-Methylphenol	350	U
108-60-1	2,2'-oxybis(1-Chloropropane)	350	U
106-44-5	4-Methylphenol	350	U
621-64-7	N-Nitroso-Di-n-Propylamine	350	U
67-72-1	Hexachloroethane	350	U
98-95-3	Nitrobenzene	350	U
78-59-1	Isophorone	350	U
88-75-5	2-Nitrophenol	350	U
105-67-9	2,4-Dimethylphenol	350	U
111-91-1	bis(2-Chloroethoxy)Methane	350	U
120-83-2	2,4-Dichlorophenol	350	U
120-82-1	1,2,4-Trichlorobenzene	350	U
91-20-3	Naphthalene	350	U
106-47-8	4-Chloroaniline	350	U
87-68-3	Hexachlorobutadiene	350	U
59-50-7	4-Chloro-3-Methylphenol	350	U
91-57-6	2-Methylnaphthalene	350	U
77-47-4	Hexachlorocyclopentadiene	350	U
88-06-2	2,4,6-Trichlorophenol	350	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	350	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	350	U
208-96-8	Acenaphthylene	350	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	350	U
51-28-5	2,4-Dinitrophenol	840	U

010

FORM I SV-1

Verified 3/3/94

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-[illegible]-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

9413225.1708

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
100-02-7	4-Nitrophenol	840	U	
132-64-9	Dibenzofuran	350	U	
121-14-2	2,4-Dinitrotoluene	350	U	
606-20-2	2,6-Dinitrotoluene	350	U	
84-66-2	Diethylphthalate	350	U	
7005-72-3	4-Chlorophenyl-phenylether	350	U	
86-73-7	Fluorene	350	U	
100-01-6	4-Nitroaniline	840	U	
534-52-1	4,6-Dinitro-2-methylphenol	840	U	
86-30-6	N-Nitrosodiphenylamine (1)	350	U	
101-55-3	4-Bromophenyl-phenylether	350	U	
118-74-1	Hexachlorobenzene	350	U	
87-86-5	Pentachlorophenol	840	U	
85-01-8	Phenanthrene	350	U	
120-12-7	Anthracene	350	U	
86-74-8	Carbazole	350	U	
84-74-2	Di-n-Butylphthalate	420	~~B~~	U
206-44-0	Fluoranthene	350	U	
129-00-0	Pyrene	350	U	
85-68-7	Butylbenzylphthalate	350	U	
91-94-1	3,3'-Dichlorobenzidine	350	U	
56-55-3	Benzo(a)Anthracene	350	U	
117-81-7	bis(2-Ethylhexyl)Phthalate	350 ~~56~~	~~BJ~~	U
218-01-9	Chrysene	350	U	
117-84-0	Di-n-Octyl Phthalate	350	U	
205-99-2	Benzo(b)Fluoranthene	350	U	
207-08-9	Benzo(k)Fluoranthene	350	U	
50-32-8	Benzo(a)Pyrene	350	U	
193-39-5	Indeno(1,2,3-cd)Pyrene	350	U	
53-70-3	Dibenz(a,h)Anthracene	350	U	
191-24-2	Benzo(g,h,i)Perylene	350	U	

(1) - Cannot be separated from Diphenylamine

Verified

3/3/94

01

FORM I SV-2

3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W.9-95

B09332
60-62.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S03

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.28~~	~~80000~~	~~BAJ~~
2.	UNKNOWN HYDROCARBON	6.85	70	~~BJ~~

9413225.1709

verified

3/3/94

FORM I SV-TIC

012

3/90

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 299-W19-97

B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDC No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

9413225.1710

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	390	U
111-44-4	bis(2-Chloroethyl)Ether	390	U
95-57-8	2-Chlorophenol	390	U
541-73-1	1,3-Dichlorobenzene	390	U
106-46-7	1,4-Dichlorobenzene	390	U
95-50-1	1,2-Dichlorobenzene	390	U
95-48-7	2-Methylphenol	390	U
108-60-1	2,2'-oxybis(1-Chloropropane)	390	U
106-44-5	4-Methylphenol	390	U
621-64-7	N-Nitroso-Di-n-Propylamine	390	U
67-72-1	Hexachloroethane	390	U
98-95-3	Nitrobenzene	390	U
78-59-1	Isophorone	390	U
88-75-5	2-Nitrophenol	390	U
105-67-9	2,4-Dimethylphenol	390	U
111-91-1	bis(2-Chloroethoxy)Methane	390	U
120-83-2	2,4-Dichlorophenol	390	U
120-82-1	1,2,4-Trichlorobenzene	390	U
91-20-3	Naphthalene	390	U
106-47-8	4-Chloroaniline	390	U
87-68-3	Hexachlorobutadiene	390	U
59-50-7	4-Chloro-3-Methylphenol	390	U
91-57-6	2-Methylnaphthalene	390	U
77-47-4	Hexachlorocyclopentadiene	390	U
88-06-2	2,4,6-Trichlorophenol	390	U
95-95-4	2,4,5-Trichlorophenol	940	U
91-58-7	2-Chloronaphthalene	390	U
88-74-4	2-Nitroaniline	940	U
131-11-3	Dimethylphthalate	390	U
208-96-8	Acenaphthylene	390	U
99-09-2	3-Nitroaniline	940	U
83-32-9	Acenaphthene	390	U
51-28-5	2,4-Dinitrophenol	940	U

verified 3/30
3/3/94

~~600217~~

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-6019-97

B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

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

CAS NO.	COMPOUND	UG/KG	Q	Q
100-02-7	4-Nitrophenol	940	U	
132-64-9	Dibenzofuran	390	U	
121-14-2	2,4-Dinitrotoluene	390	U	
606-20-2	2,6-Dinitrotoluene	390	U	
84-66-2	Diethylphthalate	390	U	
7005-72-3	4-Chlorophenyl-phenylether	390	U	
86-73-7	Fluorene	390	U	
100-01-6	4-Nitroaniline	940	U	
534-52-1	4,6-Dinitro-2-methylphenol	940	U	
86-30-6	N-Nitrosodiphenylamine (1)	390	U	
101-55-3	4-Bromophenyl-phenylether	390	U	
118-74-1	Hexachlorobenzene	390	U	
87-86-5	Pentachlorophenol	940	U	
85-01-8	Phenanthrene	390	U	
120-12-7	Anthracene	390	U	
86-74-8	Carbazole	390	U	
84-74-2	Di-n-Butylphthalate	390 ~~290~~	~~BJ~~	u
206-44-0	Fluoranthene	390	U	
129-00-0	Pyrene	390	U	
85-68-7	Butylbenzylphthalate	390	U	
91-94-1	3,3'-Dichlorobenzidine	390	U	
56-55-3	Benzo(a)Anthracene	390	U	
117-81-7	bis(2-Ethylhexyl)Phthalate	390 ~~84~~	~~BJ~~	u
218-01-9	Chrysene	390	U	
117-84-0	Di-n-Octyl Phthalate	390	U	
205-99-2	Benzo(b)Fluoranthene	390	U	
207-08-9	Benzo(k)Fluoranthene	390	U	
50-32-8	Benzo(a)Pyrene	390	U	
193-39-5	Indeno(1,2,3-cd)Pyrene	390	U	
53-70-3	Dibenz(a,h)Anthracene	390	U	
191-24-2	Benzo(g,h,i)Perylene	390	U	

(1) - Cannot be separated from Diphenylamine

014

FORM I SV-2

3/3/94 3/90

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W9-97
B09333
50-52.5'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-02B

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 30928S04

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.9

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.28~~	~~82000~~	~~BAJ~~
2.	UNKNOWN HYDROCARBON	6.85	79	~~BJ~~
3.	UNKNOWN HYDROCARBON	7.42	1300	~~J~~ JN
4.	UNKNOWN HYDROCARBON	8.73	120	~~J~~
5.	PROPANOIC ACID ESTER ISOMER	18.10	350	~~J~~
6.	HEXANEDIOIC ACID ESTER ISOME	26.22	270	~~J~~

UR
UJ
JN
JN
JN
JN

Verified

015

FORM I SV-TIC

3/90

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-619-945
B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

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

CAS NO.	COMPOUND		Q	Q
108-95-2	Phenol	330 ~~50~~	~~J~~	U
111-44-4	bis(2-Chloroethyl)Ether	330	U	
95-57-8	2-Chlorophenol	330	U	
541-73-1	1,3-Dichlorobenzene	330	U	
106-46-7	1,4-Dichlorobenzene	330	U	
95-50-1	1,2-Dichlorobenzene	330	U	
95-48-7	2-Methylphenol	330	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U	
106-44-5	4-Methylphenol	330	U	
621-64-7	N-Nitroso-Di-n-Propylamine	330	U	
67-72-1	Hexachloroethane	330	U	
98-95-3	Nitrobenzene	330	U	
78-59-1	Isophorone	330	U	
88-75-5	2-Nitrophenol	330	U	
105-67-9	2,4-Dimethylphenol	330	U	
111-91-1	bis(2-Chloroethoxy)Methane	330	U	
120-83-2	2,4-Dichlorophenol	330	U	
120-82-1	1,2,4-Trichlorobenzene	330	U	
91-20-3	Naphthalene	330	U	
106-47-8	4-Chloroaniline	330	U	
87-68-3	Hexachlorobutadiene	330	U	
59-50-7	4-Chloro-3-Methylphenol	330	U	
91-57-6	2-Methylnaphthalene	330	U	
77-47-4	Hexachlorocyclopentadiene	330	U	
88-06-2	2,4,6-Trichlorophenol	330	U	
95-95-4	2,4,5-Trichlorophenol	800	U	
91-58-7	2-Chloronaphthalene	330	U	
88-74-4	2-Nitroaniline	800	U	
131-11-3	Dimethylphthalate	330	U	
208-96-8	Acenaphthylene	330	U	
99-09-2	3-Nitroaniline	800	U	
83-32-9	Acenaphthene	330	U	
51-28-5	2,4-Dinitrophenol	800	U	

FORM I SV-1 3/90

Verified 3/3/94

016

~~000241~~

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
299-W19-95

B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

9413225.1714

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
100-02-7	4-Nitrophenol	800	U	
132-64-9	Dibenzofuran	330	U	
121-14-2	2,4-Dinitrotoluene	330	U	
606-20-2	2,6-Dinitrotoluene	330	U	
84-66-2	Diethylphthalate	330	U	
7005-72-3	4-Chlorophenyl-phenylether	330	U	
86-73-7	Fluorene	330	U	
100-01-6	4-Nitroaniline	800	U	
534-52-1	4,6-Dinitro-2-methylphenol	800	U	
86-30-6	N-Nitrosodiphenylamine (1)	330	U	
101-55-3	4-Bromophenyl-phenylether	330	U	
118-74-1	Hexachlorobenzene	330	U	
87-86-5	Pentachlorophenol	800	U	
85-01-8	Phenanthrene	330	U	
120-12-7	Anthracene	330	U	
86-74-8	Carbazole	330	U	
84-74-2	Di-n-Butylphthalate	330 ~~260~~	~~BJ~~	u
206-44-0	Fluoranthene	330	U	
129-00-0	Pyrene	330	U	
85-68-7	Butylbenzylphthalate	330	U	
91-94-1	3,3'-Dichlorobenzidine	330	U	
56-55-3	Benzo(a)Anthracene	330	U	
117-81-7	bis(2-Ethylhexyl)Phthalate	330 ~~100~~	~~BJ~~	u
218-01-9	Chrysene	330	U	
117-84-0	Di-n-Octyl Phthalate	330	U	
205-99-2	Benzo(b)Fluoranthene	330	U	
207-08-9	Benzo(k)Fluoranthene	330	U	
50-32-8	Benzo(a)Pyrene	330	U	
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U	
53-70-3	Dibenz(a,h)Anthracene	330	U	
191-24-2	Benzo(g,h,i)Perylene	330	U	

(1) - Cannot be separated from Diphenylamine

verified

3/3/94

017

FORM I SV-2 3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
299-W19-95

B09336
74.8-77.3'

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-03B

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 30928S07

Level: (low/med) LOW Date Received: 09/14/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 4

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.32~~	~~78000~~	~~BAJ~~
2.	UNKNOWN HYDROCARBON	6.87	67	~~BJ~~
3.	UNKNOWN HYDROCARBON	7.45	1100	~~J~~
4.	HEXANEDIOIC ACID ESTER ISOME	26.23	340	~~J~~

FORM I SV-TIC 3/90

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.1716

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-028

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 14, 1993

1.0 DESCRIPTION OF CASE :

Four soil samples were analyzed for TCL Organics- Volatiles and Semivolatiles according to the USEPA Contract Laboratory Program (CLP) Statement of Work for Organic Analysis, Revision OLM01.8. The Extractable Hydrocarbons in the Kerosene Range (K) were analyzed according to the SW-846 Method 8015M.

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09332	A3-09-028-01A	V	SOIL
B09332 MS	A3-09-028-01B	V	SOIL
B09332 MSD	A3-09-028-01C	V	SOIL
B09332	A3-09-028-01D	SV	SOIL
B09332	A3-09-028-01G	K	SOIL
B09333	A3-09-028-02A	V	SOIL
B09333	A3-09-028-02B	SV	SOIL
B09333 MS	A3-09-028-02C	SV	SOIL
B09333 MSD	A3-09-028-02D	SV	SOIL
B09333	A3-09-028-02G	K	SOIL
B09336	A3-09-028-03A	V	SOIL
B09336	A3-09-028-03B	SV	SOIL
B09336	A3-09-028-03D	K	SOIL
B09336 MS	A3-09-028-03E	K	SOIL
B09336 MSD	A3-09-028-03F	K	SOIL
B09335	A3-09-028-04A	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were analyzed by heated purge within the CLP SOW holding times.

All of the QC results were within the limits specified by the EPA CLP SOW.

TUNES :

All BFB tunes were injected directly into the GC/MS instrument.

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Phenol was detected in sample B09336 at a concentration that was below the CRQL.

The matrix spike recovery of 2,4-Dinitrotoluene in sample B09333MS was slightly above the QC limits. In accordance with the protocol, no further action was required.

All of the other QC results were within the limits specified by the EPA CLP SOW.

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 09/16/93 and was analyzed according to the SW-846 Method 8015M. The initial calibration consisted of 5 different levels of the Kerosene standard that ranged from 200ppm to 2000ppm. The continuing calibration at the 1000ppm level was injected amongst a series of samples, in order to verify the instrument stability. The %RSD in the initial calibration and the %D in the continuing calibration were below their 20% and 15% limits, respectively.

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed for extractable hydrocarbons in the Kerosene range within the required holding times. Approximately 20 g of each sample was extracted and concentrated to 5 mL.

There were no hydrocarbons detected in any of the samples. Sample B09336 was spiked with Kerosene and the matrix spike recoveries were 85% and 93%. A blank spike was prepared at the same time, and had an 79% recovery.

All of the QC results were within the limits specified by the SW-846 Method 8015M.

We certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data in this hardcopy data package and in the computer-readable data submitted on diskette is authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Nicole Roth 11/29/93
Nicole Roth
CLP Program Manager

Maureen Parrish 11/29/93
Maureen Parrish
Project Manager

9413225.1719

~~0000027~~

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 9-9-93

Ice Chest No. SML 366 — Field Logbook No. EFL-1091

Bill of Lading/Airbill No. — Offsite Property No.

Method of Shipment OVERNIGHT AIR SERVICE

Shipped to TMA

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

Sample Identification

1) B09332

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

120ml 9-10-93

2) ~~B09334~~ B09335 9-10-93

~~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~~

120ml 9-10-93

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:	Received by:	Date/Time:
1040 Loren E. Rogers 9-10-93	Roy T. Sickle	1040 9-10-93
Relinquished by: Roy T. Sickle 1054 9-10-93	Received by: H. Narciso	Date/Time: 9-14-93 10:50
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

~~000002C~~

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 9-10-93

Ice Chest No. SML 366

Field Logbook No. EFL-1091

Bill of Lading/Airbill No.

Offsite Property No.

Method of Shipment OVERNIGHT AIR SERVICE

Shipped to TMA

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

Sample Identification

1)

B09333

- 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)

B09336

- 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

1,250ml
JER
9-10-93

3)

JER 9-10-93

- 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:	Received by:	Date/Time:
1040 Loren E. Rogers 9-10-93	Roy T Sickle [signature]	9-10-93 1040
Relinquished by: Roy T Sickle 1054 9-10-93 [signature]	Received by: H. Harris [signature]	Date/Time: 9-14-93 10:50
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

L024

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.1722

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B09332-TMA-611
VALIDATOR: [illegible]	LAB: TMA	DATE: 03/03/94
CASE:		SDG: B09332-TMA-611

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☑ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX Soils
B09332
B09333
B09336

9413225.1723

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:

026

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

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

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

Comments: See comments 1 and 2 on last page of checklist

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: Di-n-butylphthalate, bis(2-ethylhexyl) phthalate, and phenol are present in the laboratory blank. See attachments for blank concentrations. Phenol was present, the calculation for phenol conc. is included on the attached quant form.

5. ACCURACY

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

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

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

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

Comments: The MS%R for 2,4-Dinitrotoluene is 93%, the control limits are 28 to 89%. However, no qualification is required since all surrogates are within limits and the 2,4-dinitrotoluene MS%R is closer to 100%, which is ideal.

GC/MS ORGANIC DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):

(1) The minimum RRF for surrogate 1,2-dichlorobenzene-d4 is 0.400 according to the SOW, the laboratory has recorded 0.800 on the CCV form. No qualification is required.

(2) The laboratory used 20 ng/uL of internal standard instead of the specified amount of 40 ng/uL. No qualification is required, however, a factor of 2 is included in the result calculations.

9413225.1725

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

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

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

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

Comments:

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

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

Has the laboratory properly identified and coded all TIC? . . Yes No N/A

Comments:

HOLDING TIME SUMMARY

B09332 TMA-611

SDG:	VALIDATOR:	DATE: 2/3/94	PAGE 1 OF 1
COMMENTS: Semivolatile Organics			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09332	BNA	9/09/93	9/16/93	9/28/93	7	12	None
B09333	↓	9/10/93	↓	9/28/93	6	12	↓
B09336	↓	9/10/93	↓	9/28/93	6	12	↓

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

~~000318~~
EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

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

CAS NO.	COMPOUND		Q	
108-95-2	Phenol	15 ~~330~~	~~U~~	J
111-44-4	bis(2-Chloroethyl)Ether	330	U	
95-57-8	2-Chlorophenol	330	U	
541-73-1	1,3-Dichlorobenzene	330	U	
106-46-7	1,4-Dichlorobenzene	330	U	
95-50-1	1,2-Dichlorobenzene	330	U	
95-48-7	2-Methylphenol	330	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U	
106-44-5	4-Methylphenol	330	U	
621-64-7	N-Nitroso-Di-n-Propylamine	330	U	
67-72-1	Hexachloroethane	330	U	
98-95-3	Nitrobenzene	330	U	
78-59-1	Isophorone	330	U	
88-75-5	2-Nitrophenol	330	U	
105-67-9	2,4-Dimethylphenol	330	U	
111-91-1	bis(2-Chloroethoxy)Methane	330	U	
120-83-2	2,4-Dichlorophenol	330	U	
120-82-1	1,2,4-Trichlorobenzene	330	U	
91-20-3	Naphthalene	330	U	
106-47-8	4-Chloroaniline	330	U	
87-68-3	Hexachlorobutadiene	330	U	
59-50-7	4-Chloro-3-Methylphenol	330	U	
91-57-6	2-Methylnaphthalene	330	U	
77-47-4	Hexachlorocyclopentadiene	330	U	
88-06-2	2,4,6-Trichlorophenol	330	U	
95-95-4	2,4,5-Trichlorophenol	790	U	
91-58-7	2-Chloronaphthalene	330	U	
88-74-4	2-Nitroaniline	790	U	
131-11-3	Dimethylphthalate	330	U	
208-96-8	Acenaphthylene	330	U	
99-09-2	3-Nitroaniline	790	U	
83-32-9	Acenaphthene	330	U	
51-28-5	2,4-Dinitrophenol	790	U	

FORM I SV-1

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	790	U
534-52-1	4,6-Dinitro-2-methylphenol	790	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	790	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	260	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	420	
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

-032 3/90 3/3/94

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK0916S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09028 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309028-BLK

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30928S02

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/16/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/28/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1. 123-42-2~~	~~4-HYDROXY-4-METHYL-2-PENTANO~~	~~6.32~~	~~75000~~	~~AJ~~ R
2.	UNKNOWN HYDROCARBON	6.85	66	J XS=33C

FORM I SV-TIC

3/90

Lab. Blank

SBLK0916S

~~000325~~

Quantitation Report File: 30928S02

Data: 30928S02.TI
09/28/93 11:32:00
Sample: CLP,09028,,SBLK0916S,L,S,A309028-BLK,BNA,BLANK
Conds.: CAP/.25,30928S01,3DFT0928S01
Formula: 30920SAVG90 Instrument: SHERMA Weight: 0.000
Submitted by: 30G:0.5M Analyst: FH#33S Acct. No.: CALTAB

AMOUNT=AREA * REF AMNT/(REF AREA * RESP FACT)
Resp. fac. from Library Entry

No	Name	
1	CI30	*IS1* 1,4-DICHLOROBENZENE-D4
2	CI40	*IS2* NAPHTHALENE-D8
3	CI50	*IS3* ACENAPHTHENE-D10
4	CI60	*IS4* PHENANTHRENE-D10
5	CI70	*IS5* CHRYSENE-D12
6	CI75	*IS6* PERYLENE-D12
7	CS50	*SU1* 2-FLUOROPHENOL
8	CS45	*SU2* PHENOL-D5
9	CS55	*SU3* 2,4,6,-TRIBROMOPHENOL
10	CS20	*SU4* NITROBENZENE-D5
11	CS25	*SU5* 2-FLUOROBIPHENYL
12	CS30	*SU6* TERPHENYL-D14
13	CS70	2-CHLOROPHENOL-D4
14	CS75	1,2-DICHLOROBENZENE-D4
15	C315	PHENOL
16	C325	BIS(2-CHLOROETHYL)ETHER
17	C330	2-CHLOROPHENOL
18	C335	1,3-DICHLOROBENZENE
19	C340	1,4-DICHLOROBENZENE
20	C345	BENZYL ALCOHOL
21	C350	1,2-DICHLOROBENZENE
22	C355	2-METHYLPHENOL
23	C360	BIS(2-CHLOROISOPROPYL)ETHER
24	C365	4-METHYLPHENOL
25	C370	N-NITROSO-DI-N-PROPYLAMINE
26	C375	HEXACHLOROETHANE
27	C410	NITROBENZENE
28	C415	ISOPHORONE
29	C420	2-NITROPHENOL
30	C425	2,4-DIMETHYLPHENOL
31	C435	BIS(2-CHLOROETHOXY)METHANE
32	C430	BENZOIC ACID
33	C440	2,4-DICHLOROPHENOL
34	C445	1,2,4-TRICHLOROBENZENE
35	C450	NAPHTHALENE
36	C455	4-CHLOROANILINE
37	C460	HEXACHLOROBUTADIENE
38	C465	4-CHLORO-3-METHYLPHENOL
39	C470	2-METHYLNAPHTHALENE
40	C510	HEXACHLOROCYCLOPENTADIENE
41	C515	2,4,6-TRICHLOROPHENOL
42	C520	2,4,5-TRICHLOROPHENOL
43	C525	2-CHLORONAPHTHALENE
44	C530	2-NITROANILINE
45	C535	DIMETHYL PHTHALATE
46	C540	ACENAPHTHYLENE
47	C545	3-NITROANILINE

SW3225.174

034

3/3/94

Lab. Blank
SBLK09165

~~000326~~

No	Name
48	C550 ACENAPHTHENE
49	C555 2,4-DINITROPHENOL
50	C560 4-NITROPHENOL

F.H. 9/28/9

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	152	739	9:20	1	1.000	A BB	31902.	20.000 NG/UL	3.20
2	136	982	12:24	2	1.000	A BB	118660.	20.000 NG/UL	3.20
3	164	1343	16:57	3	1.000	A BB	64368.	20.000 NG/UL	3.20
4	188	1648	20:48	4	1.000	A BV	89210.	20.000 NG/UL	3.20
5	240	2177	27:29	5	1.000	A BB	59878.	20.000 NG/UL	3.20
6	264	2595	32:46	6	1.000	A BB	33815.	20.000 NG/UL	3.20
7	112	526	6:38	1	0.712	A BB	138638.	73.271 NG/UL	11.72
8	99	674	8:31	1	0.912	A BB	176198.	71.451 NG/UL	11.43
9	330	1506	19:01	3	1.121	A BB	30518.	64.871 NG/UL	10.38
10	82	843	10:39	2	0.858	A BB	119966.	46.995 NG/UL	7.52
11	172	1204	15:12	3	0.897	A BB	163804.	48.219 NG/UL	7.71
12	244	1967	24:50	5	0.904	A BB	147059.	53.202 NG/UL	8.51
13	132	699	8:49	1	0.946	A BB	136248.	72.544 NG/UL	11.60
14	152	767	9:41	1	1.038	A BB	61326.	47.666 NG/UL	7.62
~~15~~	~~94~~	~~676~~	~~8:32~~	~~1~~	~~0.715~~	~~A BB~~	~~1110.~~	~~0.450 NG/UL~~	~~0.07~~
16	NOT FOUND								
17	NOT FOUND								
18	NOT FOUND								
19	NOT FOUND								
~~20~~	~~108~~	~~767~~	~~9:41~~	~~1~~	~~1.038~~	~~A BB~~	~~656.~~	~~0.541 NG/UL~~	~~0.09~~
21	NOT FOUND								
22	NOT FOUND								
23	NOT FOUND								
24	NOT FOUND								
25	NOT FOUND								
26	NOT FOUND								
27	NOT FOUND								
28	NOT FOUND								
29	NOT FOUND								
30	NOT FOUND								
31	NOT FOUND								
32	NOT FOUND								
33	NOT FOUND								
34	NOT FOUND								
~~35~~	~~128~~	~~986~~	~~12:27~~	~~2~~	~~1.004~~	~~A BB~~	~~592.~~	~~0.112 NG/UL~~	~~0.02~~
36	NOT FOUND								
37	NOT FOUND								
38	NOT FOUND								
39	NOT FOUND								
40	NOT FOUND								
41	NOT FOUND								
42	NOT FOUND								
43	NOT FOUND								
44	NOT FOUND								
45	NOT FOUND								
46	NOT FOUND								
47	NOT FOUND								
48	NOT FOUND								
49	NOT FOUND								
50	NOT FOUND								

See CPC — See internal std. dil'n

$$\text{ug/kg phenol} = \frac{(1110)(20)(500)(2)(2)}{(31902)(1.548)(30.4)(2)}$$

ug/kg phenol = 14.8 = 15 ug/kg in Blank

15 ug/kg × 5 = 75 ug/kg — upper limit

07/29/93

3/3/94

RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, B09332R.UP2)

9413225.1733

MEMORANDUM

TO: 200-UP-2 Project QA Record April 27, 1994

FR: Kent Angelos, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, B09332R.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the TMA/Norcal laboratory. A list of samples validated along with the analyses reported and methods of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332	09/09/93	SOIL	SEE NOTES
B09333	09/10/93	SOIL	
B09336	09/10/93	SOIL	

Notes:

1. Samples were analyzed for gross alpha, gross beta, selenium 79, strontium 90, technetium 99, iodine 129, isotopic uranium, isotopic plutonium, total uranium, neptunium 237, americium 241, curium 244 and selected isotopes by gamma spectroscopy.

2. All samples were 100% validated.

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.

Accuracy. Goals for accuracy were met.

Sample Result Verification. All sample results were supported in the raw data. However, sample results for total uranium and minimum detectable activities for neptunium-237 and iodine-129 could not be verified accurately by recalculation. No qualification was applied since the sample results were supported in the raw data.

Revised 4/27/94

Detection Limits. Detection limit goals were met for all sample results as specified in the laboratory statement of work, with the following exceptions due to matrix effects and insufficient sample volume. Attachment 4 provides supporting documentation.

SAMPLE ID	ANALYTE	MINIMUM DETECTABLE ACTIVITY REPORTED (pCi/g)	REQUIRED DETECTION LIMIT (pCi/g)
B09332	Iron 59	0.1	0.05
B09333	Selenium 79	20	10
	Iron 59	0.2	0.05
	Cobalt 58	0.06	0.05
	Cobalt 60	0.06	0.05
	Europium 155	0.2	0.1
B09336	Selenium 79	40	10
	Iron 59	0.1	0.05

Completeness. The data package was complete for all requested analyses. Three samples were validated in this data package with a total of 105 determinations reported, of which all were deemed valid. This results in a completeness of 100 percent, which meets the work plan data quality objectives of 90%.

MAJOR DEFICIENCIES

No major deficiencies were identified which required qualification of results as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified which required qualification of results as estimated.

Laboratory Blanks

- Gross beta was reported in the reagent blank therefore all sample results have been qualified as estimated (J).
- The reagent blank for gross alpha and gross beta analyses was performed several days after the associated samples. Therefore, all gross alpha and gross beta sample results have been qualified as estimated (J).

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. December 1993. Westinghouse Hanford Company, Richland, Washington.

Revised
4/27/94

ATTACHMENT 1

GLOSSARY OF 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.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.1737

DATA QUALIFICATION SUMMARY - FORM B7

SDG: B09332-TMA-611	Validator: K. Angelos	Date: April 27, 1994	Page 1 OF 1
Comments: Radiochemistry			
Compound/Analyte	Qualifier	Samples Affected	Reason
Gross Beta	J	All	Detected in reagent blank
Gross Beta	J	All	Associated reagent blank was analyzed several days after samples
Gross Alpha	J	All	Associated reagent blank was analyzed several days after samples

Revised 4/27/94

005

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND
ANNOTATED LABORATORY REPORTS

9413225.1739

94/5225.1740

Validated Data Summary, Data Package: B09332-TMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	4.500	J	3.600	J	4.000	J
GROSS BETA	pCi/g	14.000	J	12.000	J	16.000	J
SELENIUM-79	pCi/g	5.000	U	20.000	U	40.000	U
STRONTIUM-90	pCi/g	0.700	U	0.800	U	0.800	U
TECHNETIUM-99	pCi/g	0.120		0.210		0.140	
IODINE-129	pCi/g	0.300	U	1.000	U	2.000	U
URANIUM-233/234	pCi/g	0.370		0.230		0.430	
URANIUM-235	pCi/g	0.100	U	0.100	U	0.100	U
URANIUM-238	pCi/g	0.230		0.340		0.590	
TOTAL URANIUM	pCi/g	1.100		1.100		1.200	
NEPTUNIUM-237	pCi/g	0.040	U	0.030	U	0.011	
PLUTONIUM-238	pCi/g	0.010	U	0.030	U	0.040	U
PLUTONIUM-239/240	pCi/g	0.020	U	0.030	U	0.030	U
AMERICIUM-241	pCi/g	0.020	U	0.010	U	0.010	U
CURIUM-244	pCi/g	0.010	U	0.020	U	0.010	U
SODIUM-22	pCi/g	0.050	U	0.070	U	0.050	U
POTASSIUM-40	pCi/g	13.000		14.000		12.000	
MANGANESE-54	pCi/g	0.040	U	0.060	U	0.030	U
IRON-59	pCi/g	0.100	U	0.200	U	0.100	U
COBALT-58	pCi/g	0.040	U	0.060	U	0.040	U
COBALT-60	pCi/g	0.040	U	0.060	U	0.030	U
NIOBIUM-94	pCi/g	0.040	U	0.040	U	0.030	U
RUTHENIUM-103	pCi/g	0.050	U	0.060	U	0.040	U
RUTHENIUM-106	pCi/g	0.300	U	0.400	U	0.300	U
TIN-113	pCi/g	0.040	U	0.060	U	0.040	U
CESIUM-134	pCi/g	0.050	U	0.070	U	0.040	U
CESIUM-137	pCi/g	0.040	U	0.050	U	0.040	U
CERIUM-144	pCi/g	0.200	U	0.300	U	0.200	U
EUROPIUM-152	pCi/g	0.090	U	0.100	U	0.080	U
EUROPIUM-154	pCi/g	0.060	U	0.070	U	0.050	U
EUROPIUM-155	pCi/g	0.100	U	0.200	U	0.100	U
RADIUM-226	pCi/g	0.380		0.530		0.430	
RADIUM-228	pCi/g	0.700		0.840		0.560	
THORIUM-228	pCi/g	0.640		0.940		0.730	
THORIUM-232	pCi/g	0.700		0.840		0.560	

Revised [illegible] 4/27/94

Verified [illegible] 4/27/94

007

N309048-01

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09332

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-01	Client sample id	B09332
Dept sample id	7241-001	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/09/93
% moisture	2.1	Chain of custody id	EFL-1091

Q 5/4/27/94

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	4.5	3.7	4	10	~~J~~ J	80A
Gross Beta	Beta	14	4.1	5	10	~~B~~ J	80B
Selenium 79	15758-45-9	1.8	2.1	5	10	U	SE
Strontium 90	10098-97-2	-0.058	0.89	0.7	1	U	Y
Technetium 99	14133-76-7	0.12	0.053	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.20	0.14	0.3	2	U	I
Uranium 233/234		0.37	0.14	0.1	0.3		U
Uranium 235	15117-96-1	0.016	0.033	0.1	0.3	U	U
Uranium 238		0.23	0.11	0.1	0.3	~~J~~	U
Total Uranium (ug/g)	7440-61-1	1.1	0.20	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.034	0.030	0.04	0.2	U	NP
Plutonium 238	13981-16-3	-0.002	0.004	0.01	0.05	U	PU
Plutonium 239/240		-0.002	0.008	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.010	0.02	0.05	U	TP
Curium 244	13981-15-2	0	0.007	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	13	0.93				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	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		0.05		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Revised 4/27/94

Verified 3/14/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

N309048-01

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET, cont

B09332

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-01	Client sample id	B09332
Dept sample id	7241-001	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/09/93
% moisture	2.1	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		0.2		U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.38	0.084				GAM
Radium 228	15262-20-1	0.70	0.15				GAM
Thorium 228	14274-82-9	0.64	0.053				GAM
Thorium 232	7440-29-1	0.70	0.15				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-01	80A/80	7241-001		0.100 g	10/13/93	10/15/93	DPK
N309048-01	80B/80	7241-001		0.100 g	10/13/93	10/15/93	DPK
N309048-01	SE	7241-001		0.540 g	11/10/93	11/17/93	DPK
N309048-01	Y	7241-001		1.00 g	10/13/93	10/18/93	DPK
N309048-01	TC	7241-001		2.02 g	10/08/93	10/12/93	DPK
N309048-01	I	7241-001		1.00 g	11/29/93	12/01/93	DPK
N309048-01	U	7241-001		1.00 g	10/20/93	10/22/93	DPK
N309048-01	U_T	7241-001		0.250 g	10/07/93	11/30/93	DPK
N309048-01	NP	7241-001		1.00 g	10/21/93	10/27/93	DPK
N309048-01	PU	7241-001		1.00 g	10/18/93	10/20/93	DPK
N309048-01	TP	7241-001	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-01	GAM	7241-001		880 g	09/29/93	09/30/93	DPK

Verified 3/14/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

N309048-02

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09333

SDG 7241 | Client Westinghouse Hanford
Contact Dinkar Kharkar | Contract MBH-SVV-069262

Lab sample id N309048-02 | Client sample id B09333
Dept sample id 7241-002 | Location/Matrix 200-UP-2 SOLID
Received 09/14/93 | Collected 09/10/93
% moisture 19.5 | 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	3.6	2.9	3	10	~~J~~ J	80A
Gross Beta	Beta	12	3.8	5	10	~~B~~ J	80B
Selenium 79	15758-45-9	-9.0	11	20	10	U	SE
Strontium 90	10098-97-2	0.11	0.24	0.8	1	U	Y
Technetium 99	14133-76-7	0.21	0.078	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.070	0.65	1	2	U	I
Uranium 233/234		0.23	0.13	0.1	0.3	~~J~~	U
Uranium 235	15117-96-1	0.046	0.062	0.1	0.3	U	U
Uranium 238		0.34	0.13	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.1	0.20	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	-0.003	0.013	0.03	0.2	U	NP
Plutonium 238	13981-16-3	0.004	0.009	0.03	0.05	U	PU
Plutonium 239/240		-0.004	0.009	0.03	0.05	U	PU
Americium 241	14596-10-2	0.003	0.009	0.01	0.05	U	TP
Curium 244	13981-15-2	0.001	0.009	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.07		U	GAM
Potassium 40	13966-00-2	14	1.1				GAM
Manganese 54	13966-31-9	U		0.06		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.06	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Revised 4/27/94

Verified 3/19/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-02

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET, cont

B09333

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-02 Client sample id B09333
Dept sample id 7241-002 Location/Matrix 200-UP-2 SOLID
Received 09/14/93 Collected 09/10/93
% moisture 19.5 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		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Europium 155	14391-16-3	U		0.2	0.1	U	GAM
Radium 226	13982-63-3	0.53	0.11				GAM
Radium 228	15262-20-1	0.84	0.25				GAM
Thorium 228	14274-82-9	0.94	0.068				GAM
Thorium 232	7440-29-1	0.84	0.25				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-02	80A/80	7241-002		0.100 g	10/13/93	10/15/93	DPK
N309048-02	80B/80	7241-002		0.100 g	10/13/93	10/15/93	DPK
N309048-02	SE	7241-002		0.530 g	11/10/93	11/17/93	DPK
N309048-02	Y	7241-002		1.00 g	10/13/93	10/18/93	DPK
N309048-02	TC	7241-002		2.00 g	10/08/93	10/13/93	DPK
N309048-02	I	7241-002		1.00 g	10/29/93	11/02/93	DPK
N309048-02	U	7241-002		1.00 g	10/20/93	10/22/93	DPK
N309048-02	U_T	7241-002		0.250 g	10/07/93	11/30/93	DPK
N309048-02	NP	7241-002		1.00 g	10/21/93	10/28/93	DPK
N309048-02	PU	7241-002		1.00 g	10/14/93	10/18/93	DPK
N309048-02	TP	7241-002	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-02	GAM	7241-002		658 g	09/29/93	09/30/93	DPK

Verified 3/14/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-03

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09336

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-03	Client sample id	B09336
Dept sample id	7241-003	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/10/93
% moisture	3.0	Chain of custody id	EFI-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	4.0	3.2	3	10	~~J~~ S	80A
Gross Beta	Beta	16	4.1	5	10	~~B~~ J	80B
Selenium 79	15758-45-9	-28	22	40	10	U	SE
Strontium 90	10098-97-2	-0.042	0.74	0.8	1	U	Y
Technetium 99	14133-76-7	0.14	0.063	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.075	0.93	2	2	U	I
Uranium 233/234		0.43	0.17	0.1	0.3		U
Uranium 235	15117-96-1	0	0.034	0.1	0.3	U	U
Uranium 238		0.59	0.18	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.21	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.011	0.015	0.01	0.2	~~J~~	NP
Plutonium 238	13981-16-3	-0.008	0.008	0.04	0.05	U	PU
Plutonium 239/240		0.008	0.016	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.001	0.006	0.01	0.05	U	TP
Curium 244	13981-15-2	0.004	0.006	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	12	0.79				GAM
Manganese 54	13966-31-9	U		0.03		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.03	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Verified 3/14/94

Revised 4/27/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

DATA SHEETS
Page 5
SUMMARY DATA SECTION
Page 23

N309048-03

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET, cont

B09336

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-03	Client sample id	B09336
Dept sample id	7241-003	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/10/93
% moisture	3.0	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		0.2		U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.43	0.087				GAM
Radium 228	15262-20-1	0.56	0.19				GAM
Thorium 228	14274-82-9	0.73	0.067				GAM
Thorium 232	7440-29-1	0.56	0.19				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-03	80A/80	7241-003		0.100 g	10/13/93	10/15/93	DPK
N309048-03	80B/80	7241-003		0.100 g	10/13/93	10/15/93	DPK
N309048-03	SE	7241-003		0.550 g	11/10/93	11/17/93	DPK
N309048-03	Y	7241-003		1.00 g	10/13/93	10/18/93	DPK
N309048-03	TC	7241-003		2.03 g	10/09/93	10/13/93	DPK
N309048-03	I	7241-003		1.00 g	11/01/93	11/02/93	DPK
N309048-03	U	7241-003		1.00 g	10/20/93	10/22/93	DPK
N309048-03	U_T	7241-003		0.250 g	10/07/93	11/30/93	DPK
N309048-03	NP	7241-003		1.00 g	10/21/93	10/27/93	DPK
N309048-03	PU	7241-003		1.00 g	10/14/93	10/18/93	DPK
N309048-03	TP	7241-003	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-03	GAM	7241-003		1020 g	09/29/93	09/30/93	DPK

Verified [illegible] 9/14/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

ATTACHMENT 4

LABORATORY NARRATIVE AND
CHAIN-OF-CUSTODY DOCUMENTATION

9413225.1747

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL

REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7241 is comprised of the samples listed on the chain-of-custody documents below. This sample group was processed under the Westinghouse Hanford Company Statement of Work P.O. MBH-SVV-069262.

1.1 Chains-of-Custody

This report includes data for the three soil samples from location 200-UP-2, SAF #93-263 delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

1.2 Sample Volume

One thousand mL plastic bottles containing the samples were received for the analyses. These were not adequate volumes to obtain the required detection limits for the gamma scan analysis.

1.3 Missing Samples

All samples listed under Field Log Book #EFL-1091 were received.

1.4 Holding Times

The samples were collected on September 9 and 10, 1993 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control sample, a blank, and a replicate. All original analyses were performed with QC samples 7241-04 through 7241-06. Americium-241 and curium-244 analyses were performed with QC samples 7241-09 through 7241-11.

The QC samples were prepared by the Quality Control Department. Copies of the QC notebook pages are included in this data package.

2.1 Laboratory Control Samples

The LCS recovery for neptunium-237 which was 81%, which was below the 3 σ total limits of (87 - 113)%, but within the protocol limits of (80-120)%. The LCS recoveries for all other nuclides were acceptable. The MDA's of the results for all analyses met the RDL's except for iodine-129 which was above the RDL due to the higher background of the detector in the region of interest.

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

2.0 QUALITY CONTROL (cont'd)

2.2 Reagent Blanks
The MDA's of the results for all analyses met the RDL's. The gross beta result for the blank with a nominal aliquot of 0.1 g, was 11 pCi/g this was slightly higher than the RDL.

2.3 Duplicates
Results were satisfactory for all duplicate analyses. The MDA's of gamma nuclides for the duplicate of sample BO9332 were higher than the RDL's due to the smaller than nominal aliquots available for analysis. The MDA of iron-59 for the original of sample BO9332 was higher than the RDL due to the short half-life of iron-59.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses
The average MDA for gross alpha was (4 ± 2) pCi/g. Gross alpha activity above the RDL was not found in any of the samples.

3.2 Gross Beta Analyses
The average MDA for gross beta was (5 ± 0.8) pCi/g. Gross beta activity above the RDL was found in all of the samples.

3.3 Selenium-79 Analyses
The average yield for five analyses was (82 ± 16)%. The lowest yield was 76% and the highest was 93%. The average MDA was (20 ± 30) pCi/g. Selenium-79 activity above the RDL was not found in any of the samples. The MDA's for samples BO9333 and BO9336 were higher than the RDL due to quenching, resulting in lower scintillation efficiency.

3.4 Strontium-90 Analyses
The average yield for six analyses was (84 ± 5)%. The lowest yield was 81% and the highest was 86%. The average MDA was (0.8 ± 0.1) pCi/g. Strontium-90 activity above the RDL was not found in any of the samples.

3.5 Technetium-99 Analyses
The average yield for six analyses was (63 ± 11)%. The lowest yield was 55% and the highest was 68%. The average MDA was (0.2 ± 0.2) pCi/g. Technetium-99 activity above the RDL was not found in any of the samples.

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

3.0 ANALYSIS NOTES (cont'd)

3.6 Iodine-129 Analyses

The average yield for nine analyses was (72 ± 17)%. The lowest yield was 68% and the highest was 76%. The average MDA was (2 ± 2) pCi/g. Iodine-129 activity above the RDL was not found in any of the samples.

3.7 Isotopic Uranium Analyses

The average yield for six analyses was (68 ± 11)%. The lowest yield was 59% and the highest was 75%. The average MDA was (0.1 ± 0) pCi/g. Uranium-233/234 activity above the RDL was found in samples BO9332 and BO9336. Uranium-238 activity above the RDL was found in samples BO9333 and BO9336.

3.8 Total Uranium Analyses

The average MDA was (0.3 ± 0.3) μg/g. Uranium concentrations ranging from (1.1 to 1.2) μg/g were found in the samples.

3.9 Isotopic Plutonium Analyses

The average yield for six analyses was (41 ± 25)%. The lowest yield was 28% and the highest was 60%. The average MDA was (0.03 ± 0.02) pCi/g. Plutonium-238 and plutonium-239/240 activity above the RDL was not found in any of the samples.

3.10 Neptunium-237 Analyses

The average yield for six analyses was (38 ± 15)%. The lowest yield was 31% and the highest yield was 52%. The average MDA was (0.02 ± 0.02) pCi/g. Neptunium-237 activity above the RDL was not found in any of the samples.

3.11 Americium-241/Curium-244 Analyses

The average yield for six analyses was (83 ± 13)%. The lowest yield was 74% and the highest yield was 93%. The average MDA was (0.01 ± 0.01) pCi/g. Americium-241 and curium-244 activity above the RDL was not found in any of the samples.

3.12 Gamma Scan Analyses

A gamma scan analysis found only natural potassium-40, radium-226, radium-228, thorium-228, and thorium-232 activities in the samples. The MDA of iron-59 in all samples was lower than the RDL due to the short half-life of iron-59. The MDA of cobalt-60 in sample BO9333 was higher than the RDL due to the small sample aliquot available for analyses.

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: 9-9-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

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

120ml 9-10-93

2) ~~B09334~~ B09335 9-10-93

~~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~~

120ml 10-93

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:	Received by:	Date/Time:
1040 Joan E. Rogers 9-10-93	Roy T. Sickle [signature]	1040 9-10-93
Relinquished by: Roy T. Sickle 1054 [signature] 9-10-93	Received by: [signature] / H. Narciso	Date/Time: 9-14-93 10:50
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

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 9-10-93

Ice Chest No. SML 366

Field Logbook No. EFL-1091

Bill of Lading/Airbill No.

Offsite Property No.

Method of Shipment OVERNIGHT AIR SERVICE

Shipped to TMA

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

Sample Identification

1) B09333

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) B09336

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:	Received by:	Date/Time:
1040 Loren E. Rogers 9-10-93	Roy T Sickle [signature]	9-10-93 1040
Relinquished by: Roy T Sickle 1054 9-10-93 [signature]	Received by: H. Narciso [signature]	Date/Time: 9-14-93 10:50
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

74

019

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.1753

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B09332-TMA-611
VALIDATOR: R. Anadon	LAB: TMA/Wardell	DATE: 3/14/94
CASE:		SDG: #241

ANALYSES PERFORMED

☑ Gross Alpha/Beta	☑ Strontium-90	☐ Technetium-99	☑ Alpha Spectroscopy U, Pu, Am 241, Cu 244	☑ Gamma Spectroscopy	
☑ Total Uranium	☐ Radium-22	☐ Tritium	☑ I-129	Na-25 F	

SAMPLES/MATRIX B09332, B09336, B09333

1. Completeness . . . . . ☐ N/A

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

Comments: Technical verification completed by WHC

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

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

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

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

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

Comments: Certificates of Initial Calibration provided along with certificates for standards.

9413225.1754

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

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

Comments: Control limits not provided for LBG used limits of 90 - 110

4. Blanks . . . . . ☐ N/A

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

Comments: Gross beta reported in reagent blank at 11 pCi/g, all sample results qualified as estimated (J).

4/27/94 Reagent blank for gross alpha & gross beta was analyzed several days after samples. Associated results have been qualified as estimated.

5. Matrix Spikes . . . . . ☑ N/A

Matrix spike analyzed? . . . . . Yes No (N/A)
Spike recoveries acceptable? . . . . . Yes No (N/A)
Spike source traceable? . . . . . Yes No (N/A)
Spike source expired? . . . . . Yes No (N/A)
Transcription/Calculation Errors? . . . . . Yes No (N/A)

Comments: LCS evaluated in lieu of matrix spike

~~A2~~ Revised 4/27/94

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

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

Comments: _____

7. Chemical Recovery . . . . . ☐ N/A

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

Comments: _____

8. Duplicates . . . . . ☐ N/A

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

Comments: _____

9. Field QC Samples . . . . . ☐ N/A

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

Comments:

9413225.1757

10. Holding Times

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

Comments: All samples analyzed w/i 180 days of collection.

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments: MDA's exceeded RDLs as follows:

Sample	Analyte	MDA	RDL	
B09332	IRON-59	0.1	0.05	
B09333	Se79	20	10	No qualification necessary
	Fe59	0.2	0.05	
	Co58	0.06	0.05	
	Co60	0.06	0.05	
	Eu155	0.2	0.1	
B09336	Se79	40	10	
	Fe59	0.1	0.05	

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Comments:

The laboratory reported "J", "B", and "X" qualifiers for samples B-9332, B-9333, and B-9334. These qualifiers have been crossed by the laboratory result flags for classification purposes and are not considered appropriate for radiochemistry validation.

[signature] 4/20/94

9413225.1258

Additional Page [signature] 4/20/94

-024A

N309048-05

TMA NORCAL
REPORTING GROUP 7241

REAGENT BLANK

Reagent Blank

SDG 7241
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MDH-SVV-069262

Lab sample id N309048-05
Dept sample id 7241-005
Client sample id Reagent Blank
Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	0.27	3.3	5	10	U	ROA
Gross Beta	Beta	11	4.1	6	10		ROB
Selenium 79	15758-45-9	-0.27	2.0	3	10	U	SE
Strontium 90	10098-97-2	0.003	0.85	0.8	1	U	Y
Technetium 99	14133-76-7	0.052	0.000	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.24	1.1	2	2	U	I
Uranium 233/234		0.015	0.060	0.1	0.3	U	U
Uranium 235	15117-96-1	0	0.036	0.1	0.3	U	U
Uranium 238		0	0.030	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	U		0.003	0.1	U	U_T
Neptunium 237	13994-20-2	0.005	0.014	0.01	0.2	U	NP
Plutonium 238	13981-16-3	0.005	0.011	0.04	0.05	U	PU
Plutonium 239/240		0.005	0.011	0.04	0.05	U	PU
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	U		0.4		U	GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.04	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.01	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.02		U	GAM
Cesium 134	13967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM
Cerium 144	14762-78-8	U		0.09		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.02	0.1	U	GAM
Europium 155	14391-16-3	U		0.06	0.1	U	GAM

Qualify beta as J

Revised

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

Verified 3/21/94

4/29/94

REAGENT BLANKS
Page 1
SUMMARY DATA SECTION
Page 9

N309048-05

TMA NORCAL
REPORTING GROUP 7241

BLANK, cont.

Reagent Blank

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-05 Client sample id Reagent Blank
Dept sample id 7241-005 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Radium 226	13982-63-3	U		0.04		U	GAM
Radium 228	15262-20-1	U		0.1		U	GAM
Thorium 228	14274-82-9	U		0.02		U	GAM
Thorium 232	7440-29-1	U		0.1		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-05	80A/80	7241-005		0.100 g	12/03/93	~~10/15/93~~ 12/06/93	DPK
N309048-05	80B/80	7241-005		0.100 g	12/03/93	~~10/15/93~~ 12/06/93	DPK
N309048-05	SE	7241-005		0.500 g	11/10/93	11/17/93	DPK
N309048-05	Y	7241-005		1.00 g	10/13/93	10/18/93	DPK
N309048-05	TC	7241-005		2.00 g	10/09/93	10/13/93	DPK
N309048-05	I	7241-005		1.00 g	11/03/93	11/05/93	DPK
N309048-05	U	7241-005		1.00 g	10/20/93	10/22/93	DPK
N309048-05	U_T	7241-005		0.250 g	10/07/93	11/30/93	DPK
N309048-05	NP	7241-005		1.00 g	10/21/93	10/27/93	DPK
N309048-05	PU	7241-005		1.00 g	10/14/93	10/18/93	DPK
N309048-05	GAM	7241-005		750 g	09/29/93	09/30/93	DPK

4/27/94

QC 15455 - 15464

Verified 3/21/94

Revised 4/27/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-11

TMA NORCAL
REPORTING GROUP 7241

REAGENT BLANK

Reagent Blank

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-11 Client sample id Reagent Blank
Dept sample id 7241-011 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	0.003	0.008	0.01	0.05	U	TP
Curium 244	13981-15-2	0	0.005	0.01	0.05	U	TP

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-11	TP	7241-011		1.00 g	12/15/93	12/16/93	DPK

QC-16710

Verified MMA 3/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

B09332-TMA-611
Gross Alpha/Beta

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Aliquot:	0.10	0.10	0.10	0.10	0.10	0.10
Detector:	102	104	109	112	110	115
Count time:	100	100	100	100	100	100
Alpha cpm:	0.23	0.17	0.16	4.88	0.08	0.31
Alpha, Bkgd:	0.09	0.05	0.04	0.05	0.07	0.09
Alpha, Xtalk:	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff:	0.137	0.146	0.127	0.103	0.106	0.132
Alpha Result Calc.:	4.50	3.59	3.97	206.01	0.30	7.15
Alpha Result Rptd.:	4.49	3.58	3.99	206.00	0.27	7.11
Alpha MDA Calc.:	4.47	3.12	3.26	4.65	5.13	4.82
Alpha MDA Rptd.:	4.49	3.11	3.25	4.65	5.16	4.81
Beta cpm:	2.50	2.14	2.58	22.06	2.25	2.48
Bkgd:	1.13	1.02	1.04	1.10	1.25	0.99
Xtalk:	0.268	0.262	0.275	0.296	0.293	0.271
Eff:	0.42	0.42	0.42	0.41	0.41	0.42
Beta Result Calc.:	14.27	11.63	16.29	213.47	10.92	15.36
Beta Result Rptd:	14.30	11.70	16.30	214.00	10.90	15.40
Beta MDA Calc:	5.32	5.02	5.11	5.35	5.67	4.99
Beta MDA rptd:	5.31	5.02	5.11	5.35	5.67	4.98

Aliquot for QC-LCS and QC-BLANK have been corrected from 1.0 to 0.1 as according to the laboratory data.

4/27/94

Revised 4/27/94

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Selenium 79

Sample ID:	B09332	B09333	B09336	QC-BLANK	B09332-DUP
Detector, LSC:	5	5	5	5	5
Count time:	150	150	150	150	150
Detector Eff:	0.226	0.076	0.037	0.382	0.112
Sample cpm:	11.19	10.16	9.8	10.67	10.52
Bkgd cpm:	10.73	10.77	10.77	10.77	10.73
Yield:	0.9312	0.7711	0.7603	0.8718	0.7593
Decay Corr:	1	1	1	1	1
Aliquot:	0.54	0.53	0.55	0.5	0.54
Result calc:	1.82	-8.85	-28.24	-0.27	-2.06
Result rptd:	1.80	-8.95	-28.40	-0.27	-2.06
MDA calc:	4.94	18.11	36.35	3.38	12.23
MDA rptd:	4.99	18.40	36.97	3.42	12.36

9413225.1763

Aliquot for QC-BLANK has been corrected from 1.0 to 0.5 as according to the laboratory data.

[signature] 4/27/94

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Revised [signature] 4/27/94

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Strontium 90

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	205	206	207	208	209	210
Bkg:	0.3632	0.4500	0.4020	0.5485	0.4631	0.4201
Count Time:	33.000	33.000	33.000	33.000	33.000	33.000
Y90 cpm:	-0.059	0.117	-0.041	9.887	0.003	-0.298
Elapsed Time, days:	33.441	32.441	32.441	0.000	0.000	33.441
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9977	0.9978	0.9978	1.0000	1.0000	0.9977
Yield:	0.8555	0.8555	0.8038	0.8138	0.8609	0.8138
PPT. corr.:	1	1	1	1	1	1
Aliquot:	1	1	1	1	1	1
Product:	0.8535	0.8536	0.8020	0.8138	0.8609	0.8119
C-zero:	-0.0691	0.1371	-0.0511	12.1492	0.0035	-0.3670
P-Factor:	1.859	1.859	1.859	1.859	1.859	1.859
Result, calc.:	-0.058	0.115	-0.043	10.174	0.003	-0.307
Result, rptd.:	-0.058	0.114	-0.042	10.173	0.003	-0.259
MDA, calc.:	0.776	0.864	0.767	0.909	0.883	0.794
MDA, rptd.:	0.746	0.817	0.811	0.933	0.820	0.829

94/3225.1764

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Technetium 99

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	13	14	11	12	15	11
Net, cpm:	0.150	0.280	0.180	14.760	0.060	0.070
Days:	29.985	28.985	29.003	0.000	0.000	30.618
Lambda:	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
Yield:	0.629	0.676	0.680	0.569	0.651	0.553
Aliquot:	2.020	2.000	2.000	2.000	2.000	2.040
P-Factor:	2.340	2.340	2.340	2.340	2.340	2.340
Count, time:	583.300	583.300	556.700	556.700	123.800	123.800
Bkg., cpm:	0.470	0.480	0.650	0.500	0.550	0.480
Result, calc.:	0.125	0.218	0.140	13.674	0.049	0.065
Result, rptd.:	0.125	0.215	0.139	13.671	0.052	0.064
MDA, calc.:	0.110	0.104	0.123	0.129	0.252	0.271
MDA, rptd.:	0.114	0.109	0.130	0.138	0.275	0.291

Aliquot has been corrected from 1.0 to 2.0 for QC-LCS and QC-BLANK as according to laboratory data.

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Revised [illegible] 4/27/94

U031

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Total Uranium

Standard	Intensity			ug/L	ug/L		Amount	Prep.	Calc	Rptd
0.049	574	Sample ID	Intens.	Calc.	Rptd	Dilution	of Smpl	Volume	Result	Rslt
0.156	1564	B09332	13357	1.305	1.407	10	0.25	0.02	1.13	1.13
0.521	5160	B09333	13132	1.283	1.364	10	0.25	0.02	1.09	1.09
0.976	10437	B09336	13631	1.332	1.447	10	0.25	0.02	1.16	1.16
2.603	26611	QC-LCS	16046	1.568	1.506	10	0.25	0.02	1.20	1.20
4.881	49546	QC-BLANK	-680	-0.066	0.037	1	0.25	0.02	0.003	0.003
16.27	150595	B09332-DUP	11930	1.166	1.335	10	0.25	0.02	1.07	0.07

Slope: 9.8E-05

Calculation worksheet has been extended to include final calculated and reported result.

4/27/94

-032

Revised 4/27/94

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Uranium 233/4/5/8

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	23	24	25	26	27	28
Sample count time:	152	152	152	933.93	193.28	193.28
GMT count:	293.790	293.790	293.790	293.790	293.790	293.790
Zero time:	252.292	252.292	252.292	252.292	252.292	252.292
Corr. tracer dpm:	10.49	10.49	10.49	10.48	10.49	10.49
Bkgd count time:	2610.45	2610.45	2610.45	2610.45	2610.82	2610.45
Net tracer counts:	348	372	337	2262	314	358
Detector eff.:	0.3112	0.3124	0.3097	0.3195	0.2625	0.267
Yield:	0.7016	0.7468	0.6824	0.7233	0.5900	0.6613
U-238, gross counts:	17	28	42	1847	0	37
U-238, bkgd counts:	0	1	0	119	0	0
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13
U-238, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	1	4	0	1146	0	5
U-235, bkgd counts:	0	1	0	5	0	1
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12
U-235, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts:	29	21	32	1963	2	33
U-233/4, bkgd counts:	2	3	1	141	1	2
U-233/4, Lambda:	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08
U-233/4, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1
U-238, result calc.:	0.231	0.343	0.589	3.606	0.000	0.488
U-238, result rptd:	0.230	0.340	0.590	3.600	0.000	0.490
U-238 MDA calc.:	0.104	0.097	0.108	0.106	0.115	0.101
U-238, MDA rptd.:	0.100	0.100	0.100	0.100	0.100	0.100
U-235, result calc.:	0.016	0.046	0.000	2.883	0.000	0.064
U-235, result rptd.:	0.016	0.046	0.000	2.900	0.000	0.064
U-235, MDA calc.:	0.126	0.118	0.130	0.026	0.140	0.123
U-235, MDA rptd.:	0.100	0.100	0.100	0.030	0.100	0.100
U-233/4, result calc.:	0.366	0.229	0.435	3.802	0.015	0.409
U-233/4, result rptd.:	0.370	0.230	0.430	3.800	0.015	0.410
U-233/4, MDA calc.:	0.104	0.103	0.108	0.115	0.115	0.101
U-233/4, MDA rptd.:	0.100	0.100	0.100	0.100	0.100	0.100

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Plutonium 238/239

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	54	63	64	65	66	57
Count time:	1046.02	725.87	725.87	725.87	725.87	1046.02
GMT, count:	292.091	288.237	288.237	288.237	288.237	292.091
Zero time:	252.292	253.292	253.292	288.237	288.237	252.292
Corr, tracer dpm:	4.86	4.86	4.86	4.86	4.86	4.86
Bkgd, count time:	2739.25	2390.63	2390.63	2390.63	2390.63	2739.25
Net, tracer counts:	1145	494	554	461	407	962
Detector Eff:	0.3779	0.398	0.4048	0.4159	0.4137	0.3612
Yield:	0.5960	0.3518	0.3879	0.3142	0.2789	0.5239
Pu239, gross counts:	1	0	3	161	1	3
Pu239, bkgd counts:	2	1	1	1	0	0
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08
Pu239 decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	0	1	0	0	1	2
Pu238, bkgd counts:	1	0	2	0	0	2
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
Pu238 decay:	0.9991	0.9992	0.9992	1.0000	1.0000	0.9991
Aliquot:	1	1	1	1	1	1
Pu239, Result calc.:	-0.002	-0.004	0.008	0.760	0.005	0.007
Pu239, Result rptd:	-0.002	-0.004	0.008	0.760	0.005	0.007
Pu239, MDA calc.:	0.015	0.034	0.030	0.036	0.041	0.017
Pu239, MDA rptd.:	0.020	0.030	0.030	0.040	0.040	0.020
Pu238, Result calc.:	-0.002	0.004	-0.008	0.000	0.005	0.000
Pu238, Result rptd.:	-0.002	0.004	-0.008	0.000	0.005	0.000
Pu238, MDA calc.:	0.015	0.034	0.030	0.036	0.041	0.017
Pu238, MDA rptd:	0.010	0.030	0.030	0.040	0.040	0.020

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Americium/Curium

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	52	53	54	58	61	57
Count Time:	973.58	973.58	973.58	973.58	973.58	973.58
GMT, count:	350.100	350.100	350.100	350.100	350.100	350.100
Zero time:	252.292	252.292	252.292	350.100	350.100	252.292
Tracer dpm:	4.95	4.95	4.95	4.95	4.95	4.95
Bkgd count time:	2380.13	2380.13	2380.13	2380.13	2380.13	2380.13
Net tracer counts:	1376	1570	1533	1663	1711	1477
Detector eff.:	0.3835	0.3877	0.3782	0.3712	0.4181	0.3553
Yield:	0.7445	0.8403	0.8411	0.9296	0.8492	0.8626
Aliquot:	1	1	1	1	1	1
Am241 gross counts:	6	7	4	918	7	3
Am241 bkgd. counts:	5	5	5	5	5	4
Am-241, Lambda:	4.03E-06	4.03E-06	4.03E-06	4.03E-06	4.03E-06	4.03E-06
Am241 decay:	0.9996	0.9996	0.9996	1.0000	1.0000	0.9996
Cm244 gross counts:	2	6	5	546	3	0
Cm244 bkgd counts:	2	5	2	2	3	2
Cm-244, Lambda:	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
Cm244 decay:	0.9897	0.9897	0.9897	1.0000	1.0000	0.9897
Am241 result calc.:	0.002	0.003	-0.001	1.224	0.003	-0.002
Am241 result rptd.:	0.002	0.003	-0.001	1.225	0.003	-0.002
Am241 MDA calc.:	0.017	0.015	0.015	0.014	0.014	0.014
Am241 MDA rptd:	0.016	0.014	0.014	0.013	0.013	0.012
Cm244 result calc.:	0.000	0.001	0.004	0.729	0.000	-0.003
Cm244 result rptd:	0.000	0.001	0.004	0.729	0.000	-0.003
Cm244 MDA calc.:	0.013	0.015	0.011	0.010	0.011	0.012
Cm244 MDA rptd.:	0.013	0.018	0.011	0.010	0.013	0.012

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Neptunium						
Sample ID	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DU
Detector:	53	54	57	66	49	50
Np239 cpm:	21.92	26.39	24.83	23.18	36.98	27.58
Inst. eff.:	0.721	0.721	0.721	0.721	0.721	0.721
Am243 added:	99.08	99.08	99.08	99.08	99.08	99.08
Yield:	0.3068	0.3694	0.3476	0.3245	0.5177	0.3861
Aliquot:	1.000	1.000	1.000	1.000	1.000	1.000
Count time:	1020.87	1010.87	964.33	1054.18	993.1	993.1
Np237 gross counts:	12	1	3	789	5	5
Np237 bkgd counts:	3	2	0	0	3	1
Np237 aspec. eff:	0.386	0.378	0.367	0.413	0.364	0.355
Np237 result calc.:	0.034	-0.003	0.011	2.516	0.005	0.013
Np237 result rptd.:	0.034	-0.003	0.011	2.500	0.005	0.013
Np237 MDA calc.:	0.041	0.031	0.011	0.010	0.027	0.025
Np237 MDA rptd.:	0.040	0.030	0.011	0.010	0.027	0.025

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Revised 4/29/94

-036

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Iodine-129						
Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	INGE1	XSPEC14	XSPEC14	XSPEC15	XSPEC14	XSPEC14
Count Time:	203.9	465.33	899.68	401.85	788.93	1329.93
Gross cpm:	0.687	0.507	0.65	15.307	0.577	0.527
Bkg cpm:	0.787	0.508	0.779	0.909	0.806	0.59
Std. Dev. for Bkg % Error:	10.08	19.83	11	15.31	11.62	10.29
Blank cpm:	-0.004	-0.027	-0.155	-0.101	-0.155	-0.053
Std. Dev. for Blank % Error:	791.59	215.68	86.72	144.21	86.72	114.19
Net cpm:	-0.096	0.026	0.026	14.499	-0.074	-0.010
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	91.47	49.01	52.82	0.00	0.00	54.46
Decay:	1	1	1	1	1	1
Yield:	0.6924	0.7646	0.7613	0.6957	0.6834	0.7322
Aliquot:	1	1	1	1	1	1
PPT. Corr.:	1	1	1	1	1	1
Product:	6.92E-01	7.65E-01	7.61E-01	6.96E-01	6.83E-01	7.32E-01
P-factor:	1.00	4.57	4.87	4.87	4.87	4.57
Result Calc.:	-0.062	0.070	0.075	45.719	-0.238	-0.028
Result Rptd.:	-0.063	0.070	0.075	45.700	-0.237	-0.028
MDA Calc.:	0.267	1.472	2.145	2.975	2.456	1.126
MDA Rptd.:	0.268	1.475	2.147	2.977	2.457	1.122

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037

Revised [illegible] 5/02/94

RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09332-TMA-611 (923-E418, Filename B09332R.UP2)

94N322E.1772

MEMORANDUM

MAR 1994 RECEIVED TQD

TO: 200-UP-2 Project QA Record

March 23, 1994

FR: Kent Angelos, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09332-TMA-611 (923-E418, B09332R.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09332-TMA-611 prepared by the TMA/Norcal laboratory. A list of samples validated along with the analyses reported and methods of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09332	9/9/93	SOIL	see Notes
B09333	9/10/93	SOIL	
B09336	9/10/93	SOIL	

Notes:

1. Samples were analyzed for gross alpha, gross beta, selenium 79, strontium 90, technetium 99, iodine 129, isotopic uranium, isotopic plutonium, total uranium, neptunium 237, americium 241, curium 244 and selected isotopes by gamma spectroscopy.

2. All samples were 100% validated.

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.

Sample Result Verification. All sample results were supported in the raw data. However, sample results for total uranium and minimum detectable activities for neptunium-237 and iodine-129 could not be verified accurately by recalculation. No qualification was applied since the sample results were supported in the raw data.

Detection Limits. Detection limit goals were met for all sample results as specified in the laboratory statement of work, with the following exceptions:

SAMPLE ID	ANALYTE	MINIMUM DETECTABLE ACTIVITY REPORTED	REQUIRED DETECTION LIMIT
B09332	Iron 59	0.1	0.05
	Selenium 79	20	10
B09333	Iron 59	0.2	0.05
	Cobalt 58	0.06	0.05
	Cobalt 60	0.06	0.05
	Europium 155	0.2	0.1
B09336	Selenium 79	40	10
	Iron 59	0.1	0.05

Completeness. The data package was complete for all requested analyses. Three samples were validated in this data package with a total of 105 determinations reported, of which all were deemed valid. This results in a completeness of 100 percent, which meets the work plan data quality objectives of 90%.

MAJOR DEFICIENCIES

No major deficiencies were identified which required qualification of results as unusable.

MINOR DEFICIENCIES

Laboratory Blanks

- Gross beta was reported in the reagent blank therefore all sample results have been qualified as estimated (J).

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. December 1993. Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF 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.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.1776

DATA QUALIFICATION SUMMARY - FORM B7

SDG: B09332-TMA-611	Validator: K. Angelos	Date: March 15, 1994	Page 1 OF 1
Comments: Radiochemistry			
Compound/Analyte	Qualifier	Samples Affected	Reason
Gross Beta	J	All	Detected in reagent blank

9413225.1777

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND
ANNOTATED LABORATORY REPORTS

94132225.1778

Validated Data Summary, Data Package: B09332-IMA-611

	Samp#	B09332		B09333		B09336	
	Date	9-9-93		9-10-93		9-10-93	
	Location	299-W19-95		299-W19-97		299-W19-95	
	Depth	60.00 - 62.50		50.00 - 52.50		74.80 - 77.30	
	Type	---		---		---	
	Comments	---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q
GROSS ALPHA	µCi/g	4.500		3.600		4.000	
GROSS BETA	µCi/g	14.000	J	12.000	J	16.000	J
SELENIUM-79	µCi/g	5.000	U	20.000	U	40.000	U
STRONTIUM-90	µCi/g	0.700	U	0.800	U	0.800	U
TECHNETIUM-99	µCi/g	0.120		0.210		0.140	
IODINE-129	µCi/g	0.300	U	1.000	U	2.000	U
URANIUM-233/234	µCi/g	0.370		0.230		0.430	
URANIUM-235	µCi/g	0.100	U	0.100	U	0.100	U
URANIUM-238	µCi/g	0.230		0.340		0.590	
TOTAL URANIUM	µCi/g	1.100		1.100		1.200	
NEPTUNIUM-237	µCi/g	0.040	U	0.030	U	0.011	
PLUTONIUM-238	µCi/g	0.010	U	0.030	U	0.040	U
PLUTONIUM-239/240	µCi/g	0.020	U	0.030	U	0.030	U
AMERICIUM-241	µCi/g	0.020	U	0.010	U	0.010	U
CURIUM-244	µCi/g	0.010	U	0.020	U	0.010	U
SODIUM-22	µCi/g	0.050	U	0.070	U	0.050	U
POTASSIUM-40	µCi/g	13.000		14.000		12.000	
MANGANESE-54	µCi/g	0.040	U	0.060	U	0.030	U
IRON-59	µCi/g	0.100	U	0.200	U	0.100	U
COBALT-58	µCi/g	0.040	U	0.060	U	0.040	U
COBALT-60	µCi/g	0.040	U	0.060	U	0.030	U
NIOBIUM-94	µCi/g	0.040	U	0.040	U	0.030	U
RUTHENIUM-103	pCi/g	0.050	U	0.060	U	0.040	U
RUTHENIUM-106	µCi/g	0.300	U	0.400	U	0.300	U
TIN-113	µCi/g	0.040	U	0.060	U	0.040	U
CESIUM-134	µCi/g	0.050	U	0.070	U	0.040	U
CESIUM-137	µCi/g	0.040	U	0.050	U	0.040	U
CERIUM-144	µCi/g	0.200	U	0.300	U	0.200	U
EUROPIUM-152	µCi/g	0.090	U	0.100	U	0.080	U
EUROPIUM-154	µCi/g	0.060	U	0.070	U	0.050	U
EUROPIUM-155	pCi/g	0.100	U	0.200	U	0.100	U
RADIUM-226	µCi/g	0.380		0.530		0.430	
RADIUM-228	µCi/g	0.700		0.840		0.560	
THORIUM-228	µCi/g	0.640		0.940		0.730	
THORIUM-232	µCi/g	0.700		0.840		0.560	

N309048-01

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09332

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-01	Client sample id	B09332
Dept sample id	7241-001	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/09/93
% moisture	2.1	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	4.5	3.7	4	10	~~J~~	80A
Gross Beta	Beta	14	4.1	5	10	~~J~~	80B
Selenium 79	15758-45-9	1.8	2.1	5	10	U	SE
Strontium 90	10098-97-2	-0.058	0.89	0.7	1	U	Y
Technetium 99	14133-76-7	0.12	0.053	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.20	0.14	0.3	2	U	I
Uranium 233/234		0.37	0.14	0.1	0.3		U
Uranium 235	15117-96-1	0.016	0.033	0.1	0.3	U	U
Uranium 238		0.23	0.11	0.1	0.3	~~J~~	U
Total Uranium (ug/g)	7440-61-1	1.1	0.20	0.03	0.1	~~K~~	U_T
Neptunium 237	13994-20-2	0.034	0.030	0.04	0.2	U	NP
Plutonium 238	13981-16-3	-0.002	0.004	0.01	0.05	U	PU
Plutonium 239/240		-0.002	0.008	0.02	0.05	U	PU
Americium 241	14596-10-2	0.002	0.010	0.02	0.05	U	TP
Curium 244	13981-15-2	0	0.007	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	13	0.93				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	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		0.05		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 19

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-01

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET, cont

B09332

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-01	Client sample id	B09332
Dept sample id	7241-001	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/09/93
% moisture	2.1	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		0.2		U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.38	0.084				GAM
Radium 228	15262-20-1	0.70	0.15				GAM
Thorium 228	14274-82-9	0.64	0.053				GAM
Thorium 232	7440-29-1	0.70	0.15				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-01	80A/80	7241-001		0.100 g	10/13/93	10/15/93	DPK
N309048-01	80B/80	7241-001		0.100 g	10/13/93	10/15/93	DPK
N309048-01	SE	7241-001		0.540 g	11/10/93	11/17/93	DPK
N309048-01	Y	7241-001		1.00 g	10/13/93	10/18/93	DPK
N309048-01	TC	7241-001		2.02 g	10/08/93	10/12/93	DPK
N309048-01	I	7241-001		1.00 g	11/29/93	12/01/93	DPK
N309048-01	U	7241-001		1.00 g	10/20/93	10/22/93	DPK
N309048-01	U_T	7241-001		0.250 g	10/07/93	11/30/93	DPK
N309048-01	NP	7241-001		1.00 g	10/21/93	10/27/93	DPK
N309048-01	PU	7241-001		1.00 g	10/18/93	10/20/93	DPK
N309048-01	TP	7241-001	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-01	GAM	7241-001		880 g	09/29/93	09/30/93	DPK

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

N309048-02

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09333

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-02	Client sample id	B09333
Dept sample id	7241-002	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/10/93
% moisture	19.5	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	3.6	2.9	3	10	~~J~~	80A
Gross Beta	Beta	12	3.8	5	10	~~B~~ J	80B
Selenium 79	15758-45-9	-9.0	11	20	10	U	SE
Strontium 90	10098-97-2	0.11	0.24	0.8	1	U	Y
Technetium 99	14133-76-7	0.21	0.078	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.070	0.65	1	2	U	I
Uranium 233/234		0.23	0.13	0.1	0.3	~~J~~	U
Uranium 235	15117-96-1	0.046	0.062	0.1	0.3	U	U
Uranium 238		0.34	0.13	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.1	0.20	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	-0.003	0.013	0.03	0.2	U	NP
Plutonium 238	13981-16-3	0.004	0.009	0.03	0.05	U	PU
Plutonium 239/240		-0.004	0.009	0.03	0.05	U	PU
Americium 241	14596-10-2	0.003	0.009	0.01	0.05	U	TP
Curium 244	13981-15-2	0.001	0.009	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.07		U	GAM
Potassium 40	13966-00-2	14	1.1				GAM
Manganese 54	13966-31-9	U		0.06		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.06	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified 3/14/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

TMA NORCAL
REPORTING GROUP 7241

N309048-02

B09333

DATA SHEET, cont

SDG 7241
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N309048-02
Dept sample id 7241-002
Received 09/14/93
% moisture 19.5

Client sample id B09333
Location/Matrix 200-UP-2 SOLID
Collected 09/10/93
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		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Europium 155	14391-16-3	U		0.2	0.1	U	GAM
Radium 226	13982-63-3	0.53	0.11				GAM
Radium 228	15262-20-1	0.84	0.25				GAM
Thorium 228	14274-82-9	0.94	0.068				GAM
Thorium 232	7440-29-1	0.84	0.25				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-02	80A/80	7241-002		0.100 g	10/13/93	10/15/93	DPK
N309048-02	80B/80	7241-002		0.100 g	10/13/93	10/15/93	DPK
N309048-02	SE	7241-002		0.530 g	11/10/93	11/17/93	DPK
N309048-02	Y	7241-002		1.00 g	10/13/93	10/18/93	DPK
N309048-02	TC	7241-002		2.00 g	10/08/93	10/13/93	DPK
N309048-02	I	7241-002		1.00 g	10/29/93	11/02/93	DPK
N309048-02	U	7241-002		1.00 g	10/20/93	10/22/93	DPK
N309048-02	U_T	7241-002		0.250 g	10/07/93	11/30/93	DPK
N309048-02	NP	7241-002		1.00 g	10/21/93	10/28/93	DPK
N309048-02	PU	7241-002		1.00 g	10/14/93	10/18/93	DPK
N309048-02	TP	7241-002	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-02	GAM	7241-002		558 g	09/29/93	09/30/93	DPK

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-03

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET

B09336

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-03	Client sample id	B09336
Dept sample id	7241-003	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/10/93
% moisture	3.0	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	4.0	3.2	3	10	~~J~~	80A
Gross Beta	Beta	16	4.1	5	10	~~B~~ ~~J~~	80B
Selenium 79	15758-45-9	-28	22	40	10	U	SE
Strontium 90	10098-97-2	-0.042	0.74	0.8	1	U	Y
Technetium 99	14133-76-7	0.14	0.063	0.1	0.5	~~J~~	TC
Iodine 129	15046-84-1	0.075	0.93	2	2	U	I
Uranium 233/234		0.43	0.17	0.1	0.3		U
Uranium 235	15117-96-1	0	0.034	0.1	0.3	U	U
Uranium 238		0.59	0.18	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.21	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.011	0.015	0.01	0.2	~~J~~	NP
Plutonium 238	13981-16-3	-0.008	0.008	0.04	0.05	U	PU
Plutonium 239/240		0.008	0.016	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.001	0.006	0.01	0.05	U	TP
Curium 244	13981-15-2	0.004	0.006	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	12	0.79				GAM
Manganese 54	13966-31-9	U		0.03		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.03	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

N309048-03

TMA NORCAL
REPORTING GROUP 7241

DATA SHEET, cont

B09336

SDG	7241	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309048-03	Client sample id	B09336
Dept sample id	7241-003	Location/Matrix	200-UP-2 SOLID
Received	09/14/93	Collected	09/10/93
% moisture	3.0	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		0.2		U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.43	0.087				GAM
Radium 228	15262-20-1	0.56	0.19				GAM
Thorium 228	14274-82-9	0.73	0.067				GAM
Thorium 232	7440-29-1	0.56	0.19				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-03	80A/80	7241-003		0.100 g	10/13/93	10/15/93	DPK
N309048-03	80B/80	7241-003		0.100 g	10/13/93	10/15/93	DPK
N309048-03	SE	7241-003		0.550 g	11/10/93	11/17/93	DPK
N309048-03	Y	7241-003		1.00 g	10/13/93	10/18/93	DPK
N309048-03	TC	7241-003		2.03 g	10/09/93	10/13/93	DPK
N309048-03	I	7241-003		1.00 g	11/01/93	11/02/93	DPK
N309048-03	U	7241-003		1.00 g	10/20/93	10/22/93	DPK
N309048-03	U_T	7241-003		0.250 g	10/07/93	11/30/93	DPK
N309048-03	NP	7241-003		1.00 g	10/21/93	10/27/93	DPK
N309048-03	PU	7241-003		1.00 g	10/14/93	10/18/93	DPK
N309048-03	TP	7241-003	A2	1.00 g	12/15/93	12/16/93	DPK
N309048-03	GAM	7241-003		1020 g	09/29/93	09/30/93	DPK

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/21/93

ATTACHMENT 4

LABORATORY NARRATIVE AND
CHAIN-OF-CUSTODY DOCUMENTATION

9417225.1786

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7241 is comprised of the samples listed on the chain-of-custody documents below. This sample group was processed under the Westinghouse Hanford Company Statement of Work P.O. MBH-SVV-069262.

1.1 Chains-of-Custody

This report includes data for the three soil samples from location 200-UP-2, SAF #93-263 delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

1.2 Sample Volume

One thousand mL plastic bottles containing the samples were received for the analyses. These were not adequate volumes to obtain the required detection limits for the gamma scan analysis.

1.3 Missing Samples

All samples listed under Field Log Book #EFL-1091 were received.

1.4 Holding Times

The samples were collected on September 9 and 10, 1993 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control sample, a blank, and a replicate. All original analyses were performed with QC samples 7241-04 through 7241-06. Americium-241 and curium-244 analyses were performed with QC samples 7241-09 through 7241-11.

The QC samples were prepared by the Quality Control Department. Copies of the QC notebook pages are included in this data package.

2.1 Laboratory Control Samples

The LCS recovery for neptunium-237 which was 81%, which was below the 3 σ total limits of (87 - 113)%, but within the protocol limits of (80-120)%. The LCS recoveries for all other nuclides were acceptable. The MDA's of the results for all analyses met the RDL's except for iodine-129 which was above the RDL due to the higher background of the detector in the region of interest.

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

2.0 QUALITY CONTROL (cont'd)

2.2 Reagent Blanks

The MDA's of the results for all analyses met the RDL's. The gross beta result for the blank with a nominal aliquot of 0.1 g, was 11 pCi/g this was slightly higher than the RDL.

2.3 Duplicates

Results were satisfactory for all duplicate analyses. The MDA's of gamma nuclides for the duplicate of sample BO9332 were higher than the RDL's due to the smaller than nominal aliquots available for analysis. The MDA of iron-59 for the original of sample BO9332 was higher than the RDL due to the short half-life of iron-59.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses

The average MDA for gross alpha was (4 ± 2) pCi/g. Gross alpha activity above the RDL was not found in any of the samples.

3.2 Gross Beta Analyses

The average MDA for gross beta was (5 ± 0.8) pCi/g. Gross beta activity above the RDL was found in all of the samples.

3.3 Selenium-79 Analyses

The average yield for five analyses was (82 ± 16)%. The lowest yield was 76% and the highest was 93%. The average MDA was (20 ± 30) pCi/g. Selenium-79 activity above the RDL was not found in any of the samples. The MDA's for samples BO9333 and BO9336 were higher than the RDL due to quenching, resulting in lower scintillation efficiency.

3.4 Strontium-90 Analyses

The average yield for six analyses was (84 ± 5)%. The lowest yield was 81% and the highest was 86%. The average MDA was (0.8 ± 0.1) pCi/g. Strontium-90 activity above the RDL was not found in any of the samples.

3.5 Technetium-99 Analyses

The average yield for six analyses was (63 ± 11)%. The lowest yield was 55% and the highest was 68%. The average MDA was (0.2 ± 0.2) pCi/g. Technetium-99 activity above the RDL was not found in any of the samples.

SDG: 7241
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7241

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

3.0 ANALYSIS NOTES (cont'd)

3.6 Iodine-129 Analyses

The average yield for nine analyses was (72 ± 17)%. The lowest yield was 68% and the highest was 76%. The average MDA was (2 ± 2) pCi/g. Iodine-129 activity above the RDL was not found in any of the samples.

3.7 Isotopic Uranium Analyses

The average yield for six analyses was (68 ± 11)%. The lowest yield was 59% and the highest was 75%. The average MDA was (0.1 ± 0) pCi/g. Uranium-233/234 activity above the RDL was found in samples BO9332 and BO9336. Uranium-238 activity above the RDL was found in samples BO9333 and BO9336.

3.8 Total Uranium Analyses

The average MDA was (0.3 ± 0.3) μg/g. Uranium concentrations ranging from (1.1 to 1.2) μg/g were found in the samples.

3.9 Isotopic Plutonium Analyses

The average yield for six analyses was (41 ± 25)%. The lowest yield was 28% and the highest was 60%. The average MDA was (0.03 ± 0.02) pCi/g. Plutonium-238 and plutonium-239/240 activity above the RDL was not found in any of the samples.

3.10 Neptunium-237 Analyses

The average yield for six analyses was (38 ± 15)%. The lowest yield was 31% and the highest yield was 52%. The average MDA was (0.02 ± 0.02) pCi/g. Neptunium-237 activity above the RDL was not found in any of the samples.

3.11 Americium-241/Curium-244 Analyses

The average yield for six analyses was (83 ± 13)%. The lowest yield was 74% and the highest yield was 93%. The average MDA was (0.01 ± 0.01) pCi/g. Americium-241 and curium-244 activity above the RDL was not found in any of the samples.

3.12 Gamma Scan Analyses

A gamma scan analysis found only natural potassium-40, radium-226, radium-228, thorium-228, and thorium-232 activities in the samples. The MDA of iron-59 in all samples was lower than the RDL due to the short half-life of iron-59. The MDA of cobalt-60 in sample BO9333 was higher than the RDL due to the small sample aliquot available for analyses.

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: 9-9-93

Ice Chest No.: SML 366 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09332

1,250ml P:CLP;TAL Metals,Hg,Ti
~~1,250ml~~ 2,120ml 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) ~~B09334~~ B09335

~~1,250ml P:CLP;TAL Metals,Hg,Ti~~
~~1,250ml~~ 2,120ml 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~~

9-10-93

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:	Received by:	Date/Time:
1040 Jerene E. Rogers 9-10-93	Roy T. Sichle	1040 9-10-93
Relinquished by: Roy T. Sichle 1054 9-10-93	Received by: Louise H. Narciso	Date/Time: 9-10-93 10:50
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

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: 9-10-93

Ice Chest No.: SML 366

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09333

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) B09336

1,250ml P:CLP;TAL Metals,Hg,Ti
~~1,250ml~~ 2,120ml 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

JER 9-10-93

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

JER 9-10-93

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

Relinquished by:	Received by:	Date/Time:
1040 9-10-93		9-10-93 1040
Relinquished by: Roy T Sichile 1054 9-10-93	Received by: A. MARCUS	Date/Time: 9-14-93 10:50
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

9413225.1792

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-UP-2			DATA PACKAGE: B09332-TMA-611		
VALIDATOR: K. Angelos		LAB: TMA/NovCal		DATE: 3/14/94	
CASE:			SDG: =241		
ANALYSES PERFORMED					
☑ Gross Alpha/Beta	☑ Strontium-90	☑ Technetium-99	☑ Alpha Spectroscopy U, Pu, Am 241, Cu 244	☑ Gamma Spectroscopy	
☑ Total Uranium	☐ Radium-22	☐ Tritium	☑ I-129	Np-237	
SAMPLES/MATRIX B09332, B09336, B09333					

1. Completeness . . . . . ☐ N/A

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

Comments: Technical verification completed by WHC

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

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

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

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

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

Comments: Certificates of Initial Calibration provided along with certificates for standards.

9413225.1793

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

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

Comments: Control limits not provided for LBG used limits of 90 - 110

4. Blanks . . . . . ☐ N/A

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

Comments: Gross beta reported in reagent blank at 11 pCi/g all sample results qualified as estimated (J)

5. Matrix Spikes . . . . . ☒ N/A

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

Comments: LCS evaluated in lieu of matrix spike

9413225.1794

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

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

Comments: _____

7. Chemical Recovery . . . . . ☐ N/A

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

Comments: _____

8. Duplicates . . . . . ☐ N/A

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

Comments: _____

9. Field QC Samples . . . . . ☒ N/A

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

Comments:

9413225.1796

10. Holding Times

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

Comments: All samples analyzed w/i 180 days of collection.

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments: MDA's exceeded RDLs as follows

Sample	Analyte	MDA	RDL	
B09332	TRCN-59	0.1	0.05	
B09333	Se79	20	10	No analysis
	Fe59	0.2	0.05	[illegible]
	Co58	0.06	0.05	
	Co60	0.06	0.05	
	Eu155	0.2	0.1	
B09316	Se79	40	10	
	Fe59	0.1	0.05	

N309048-05

TMA NORCAL
REPORTING GROUP 7241

REAGENT BLANK

Reagent Blank

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-05 Client sample id Reagent Blank
Dept sample id 7241-005 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.27	3.3	5	10	U	80A
Gross Beta	Beta	11	4.1	6	10		80B
Selenium 79	15758-45-9	-0.27	2.0	3	10	U	SE
Strontium 90	10098-97-2	0.003	0.85	0.8	1	U	Y
Technetium 99	14133-76-7	0.052	0.088	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.24	1.1	2	2	U	I
Uranium 233/234		0.015	0.060	0.1	0.3	U	U
Uranium 235	15117-96-1	0	0.036	0.1	0.3	U	U
Uranium 238		0	0.030	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	U		0.003	0.1	UX	U_T
Neptunium 237	13994-20-2	0.005	0.014	0.03	0.2	U	NP
Plutonium 238	13981-16-3	0.005	0.011	0.04	0.05	U	PU
Plutonium 239/240		0.005	0.011	0.04	0.05	U	PU
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	U		0.4		U	GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.04	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.01	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.02		U	GAM
Cesium 134	13967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM
Cerium 144	14762-78-8	U		0.09		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.02	0.1	U	GAM
Europium 155	14391-16-3	U		0.06	0.1	U	GAM

Quality data as T

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

REAGENT BLANKS
Page 1
SUMMARY DATA SECTION
Page 9

Verified MWT 3/21/94

~~U 17~~

N309048-05

TMA NORCAL
REPORTING GROUP 7241

BLANK, cont.

Reagent Blank

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-05 Client sample id Reagent Blank
Dept sample id 7241-005 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Radium 226	13982-63-3	U		0.04		U	GAM
Radium 228	15262-20-1	U		0.1		U	GAM
Thorium 228	14274-82-9	U		0.02		U	GAM
Thorium 232	7440-29-1	U		0.1		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-05	80A/80	7241-005		0.100 g	12/03/93	10/15/93	DPK
N309048-05	80B/80	7241-005		0.100 g	12/03/93	10/15/93	DPK
N309048-05	SE	7241-005		0.500 g	11/10/93	11/17/93	DPK
N309048-05	Y	7241-005		1.00 g	10/13/93	10/18/93	DPK
N309048-05	TC	7241-005		2.00 g	10/09/93	10/13/93	DPK
N309048-05	I	7241-005		1.00 g	11/03/93	11/05/93	DPK
N309048-05	U	7241-005		1.00 g	10/20/93	10/22/93	DPK
N309048-05	U_T	7241-005		0.250 g	10/07/93	11/30/93	DPK
N309048-05	NP	7241-005		1.00 g	10/21/93	10/27/93	DPK
N309048-05	PU	7241-005		1.00 g	10/14/93	10/18/93	DPK
N309048-05	GAM	7241-005		750 g	09/29/93	09/30/93	DPK

QC 15455 - 15464

Verified MW 3/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

N309048-11

TMA NORCAL
REPORTING GROUP 7241

REAGENT BLANK

Reagent Blank

SDG 7241 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309048-11 Client sample id Reagent Blank
Dept sample id 7241-011 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	0.003	0.008	0.01	0.05	U	TP
Curium 244	13981-15-2	0	0.005	0.01	0.05	U	TP

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309048-11	TP	7241-011		1.00 g	12/15/93	12/16/93	DPK

QC-16710

Verified
3/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/21/93

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

B09332-TMA-611
Gross Alpha/Beta

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Aliquot:	0.10	0.10	0.10	1.00	1.00	0.10
Detector:	102	104	109	112	110	115
Count time:	100	100	100	100	100	100
Alpha cpm:	0.23	0.17	0.16	4.88	0.08	0.31
Alpha, Bkgd:	0.09	0.05	0.04	0.05	0.07	0.09
Alpha, Xtalk:	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff:	0.137	0.146	0.127	0.103	0.106	0.132
Alpha Result Calc.:	4.50	3.59	3.97	20.60	0.02	7.15
Alpha Result Rptd.:	4.49	3.58	3.99	20.60	0.03	7.11
Alpha MDA Calc.:	4.47	3.12	3.26	0.46	0.52	4.82
Alpha MDA Rptd.:	4.49	3.11	3.25	0.47	0.52	4.81
Beta cpm:	2.50	2.14	2.58	22.06	2.25	2.48
Bkgd:	1.13	1.02	1.04	1.10	1.25	0.99
Xtalk:	0.268	0.262	0.275	0.296	0.293	0.271
Eff:	0.42	0.42	0.42	0.41	0.41	0.42
Beta Result Calc.:	14.27	11.63	16.29	21.35	1.09	15.36
Beta Result Rptd:	14.30	11.70	16.30	21.40	1.09	15.40
Beta MDA Calc:	5.32	5.02	5.11	0.54	0.57	4.99
Beta MDA rptd:	5.31	5.02	5.11	0.54	0.57	4.98

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Selenium 79

Sample ID:	B09332	B09333	B09336	QC-BLANK	B09332-DUP
Detector, LSC:	5	5	5	5	5
Count time:	150	150	150	150	150
Detector Eff:	0.226	0.076	0.037	0.382	0.112
Sample cpm:	11.19	10.16	9.8	10.67	10.52
Bkgd cpm:	10.73	10.77	10.77	10.77	10.73
Yield:	0.9312	0.7711	0.7603	0.8718	0.7593
Decay Corr:	1	1	1	1	1
Aliquot:	0.54	0.53	0.55	1	0.54
Result calc:	1.82	-8.85	-28.24	-0.14	-2.06
Result rptd:	1.80	-8.95	-28.40	-0.14	-2.06
MDA calc:	4.94	18.11	36.35	1.69	12.23
MDA rptd:	4.99	18.40	36.97	1.71	12.36

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Strontium 90

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	205	206	207	208	209	210
Bkg:	0.3632	0.4500	0.4020	0.5485	0.4631	0.4201
Count Time:	33.000	33.000	33.000	33.000	33.000	33.000
Y90 cpm:	-0.059	0.117	-0.041	9.887	0.003	-0.298
Elapsed Time, days:	33.441	32.441	32.441	0.000	0.000	33.441
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9977	0.9978	0.9978	1.0000	1.0000	0.9977
Yield:	0.8555	0.8555	0.8038	0.8138	0.8609	0.8138
PPT. corr.:	1	1	1	1	1	1
Aliquot:	1	1	1	1	1	1
Product:	0.8535	0.8536	0.8020	0.8138	0.8609	0.8119
C-zero:	-0.0691	0.1371	-0.0511	12.1492	0.0035	-0.3670
P-Factor:	1.859	1.859	1.859	1.859	1.859	1.859
Result, calc.:	-0.058	0.115	-0.043	10.174	0.003	-0.307
Result, rptd.:	-0.058	0.114	-0.042	10.173	0.003	-0.259
MDA, calc.:	0.776	0.864	0.767	0.909	0.883	0.794
MDA, rptd.:	0.746	0.817	0.811	0.933	0.820	0.829

9413225.1802

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Technetium 99

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	13	14	11	12	15	11
Net, cpm:	0.150	0.280	0.180	14.760	0.060	0.070
Days:	29.985	28.985	29.003	0.000	0.000	30.618
Lambda:	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
Yield:	0.629	0.676	0.680	0.569	0.651	0.553
Aliquot:	2.020	2.000	2.000	1.000	1.000	2.040
P-Factor:	2.340	2.340	2.340	2.340	2.340	2.340
Count, time:	583.300	583.300	556.700	556.700	123.800	123.800
Bkg., cpm:	0.470	0.480	0.650	0.500	0.550	0.480
Result, calc.:	0.125	0.218	0.140	27.347	0.097	0.065
Result, rptd.:	0.125	0.215	0.139	27.341	0.104	0.064
MDA, calc.:	0.110	0.104	0.123	0.259	0.503	0.271
MDA, rptd.:	0.114	0.109	0.130	0.275	0.550	0.291

9413225.1803

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Total Uranium

Standard	Intensity			Calc	Rptd
0.049	574	Sample ID	Intens.	Result	Rslt
0.156	1564	B09332	13132	1.283	1.407
0.521	5160	B09333	14870	1.453	1.363
0.976	10437	B09336	13631	1.332	1.364
2.603	26611	QC-LCS	16046	1.568	1.447
4.881	49546	QC-BLANK	-680	-0.066	0.037
16.27	150595	B09332-DU	11930	1.166	1.335

Slope: 9.8E-05

9413225.1804

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Uranium 233/4/5/8

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	23	24	25	26	27	28
Sample count time:	152	152	152	933.93	193.28	193.28
GMT count:	293.790	293.790	293.790	293.790	293.790	293.790
Zero time:	252.292	252.292	252.292	252.292	252.292	252.292
Corr. tracer dpm:	10.49	10.49	10.49	10.48	10.49	10.49
Bkgd count time:	2610.45	2610.45	2610.45	2610.45	2610.82	2610.45
Net tracer counts:	348	372	337	2262	314	358
Detector eff.:	0.3112	0.3124	0.3097	0.3195	0.2625	0.267
Yield:	0.7016	0.7468	0.6824	0.7233	0.5900	0.6613
U-238, gross counts:	17	28	42	1847	0	37
U-238, bkgd counts:	0	1	0	119	0	0
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13
U-238, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	1	4	0	1146	0	5
U-235, bkgd counts:	0	1	0	5	0	1
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12
U-235, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts:	29	21	32	1963	2	33
U-233/4, bkgd counts:	2	3	1	141	1	2
U-233/4, Lambda:	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08
U-233/4, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1
U-238, result calc.:	0.231	0.343	0.589	3.606	0.000	0.488
U-238, result rptd:	0.230	0.340	0.590	3.600	0.000	0.490
U-238 MDA calc.:	0.104	0.097	0.108	0.106	0.115	0.101
U-238, MDA rptd.:	0.100	0.100	0.100	0.100	0.100	0.100
U-235, result calc.:	0.016	0.046	0.000	2.883	0.000	0.064
U-235, result rptd.:	0.016	0.046	0.000	2.900	0.000	0.064
U-235, MDA calc.:	0.126	0.118	0.130	0.026	0.140	0.123
U-235, MDA rptd.:	0.100	0.100	0.100	0.030	0.100	0.100
U-233/4, result calc.:	0.366	0.229	0.435	3.802	0.015	0.409
U-233/4, result rptd.:	0.370	0.230	0.430	3.800	0.015	0.410
U-233/4, MDA calc.:	0.104	0.103	0.108	0.115	0.115	0.101
U-233/4, MDA rptd.:	0.100	0.100	0.100	0.100	0.100	0.100

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Plutonium 238/239

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	54	63	64	65	66	57
Count time:	1046.02	725.87	725.87	725.87	725.87	1046.02
GMT, count:	292.091	288.237	288.237	288.237	288.237	292.091
Zero time:	252.292	253.292	253.292	288.237	288.237	252.292
Corr, tracer dpm:	4.86	4.86	4.86	4.86	4.86	4.86
Bkgd, count time:	2739.25	2390.63	2390.63	2390.63	2390.63	2739.25
Net, tracer counts:	1145	494	554	461	407	962
Detector Eff:	0.3779	0.398	0.4048	0.4159	0.4137	0.3612
Yield:	0.5960	0.3518	0.3879	0.3142	0.2789	0.5239
Pu239, gross counts:	1	0	3	161	1	3
Pu239, bkgd counts:	2	1	1	1	0	0
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08
Pu239 decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	0	1	0	0	1	2
Pu238, bkgd counts:	1	0	2	0	0	2
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
Pu238 decay:	0.9991	0.9992	0.9992	1.0000	1.0000	0.9991
Aliquot:	1	1	1	1	1	1
Pu239, Result calc.:	-0.002	-0.004	0.008	0.760	0.005	0.007
Pu239, Result rptd:	-0.002	-0.004	0.008	0.760	0.005	0.007
Pu239, MDA calc.:	0.015	0.034	0.030	0.036	0.041	0.017
Pu239, MDA rptd.:	0.020	0.030	0.030	0.040	0.040	0.020
Pu238, Result calc.:	-0.002	0.004	-0.008	0.000	0.005	0.000
Pu238, Result rptd.:	-0.002	0.004	-0.008	0.000	0.005	0.000
Pu238, MDA calc.:	0.015	0.034	0.030	0.036	0.041	0.017
Pu238, MDA rptd:	0.010	0.030	0.030	0.040	0.040	0.020

SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Americium/Curium

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DUP
Detector:	52	53	54	58	61	57
Count Time:	973.58	973.58	973.58	973.58	973.58	973.58
GMT, count:	350.100	350.100	350.100	350.100	350.100	350.100
Zero time:	252.292	252.292	252.292	350.100	350.100	252.292
Tracer dpm:	4.95	4.95	4.95	4.95	4.95	4.95
Bkgd count time:	2380.13	2380.13	2380.13	2380.13	2380.13	2380.13
Net tracer counts:	1376	1570	1533	1663	1711	1477
Detector eff.:	0.3835	0.3877	0.3782	0.3712	0.4181	0.3553
Yield:	0.7445	0.8403	0.8411	0.9296	0.8492	0.8626
Aliquot:	1	1	1	1	1	1
Am241 gross counts:	6	7	4	918	7	3
Am241 bkgd. counts:	5	5	5	5	5	4
Am-241, Lambda:	4.03E-06	4.03E-06	4.03E-06	4.03E-06	4.03E-06	4.03E-06
Am241 decay:	0.9996	0.9996	0.9996	1.0000	1.0000	0.9996
Cm244 gross counts:	2	6	5	546	3	0
Cm244 bkgd counts:	2	5	2	2	3	2
Cm-244, Lambda:	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
Cm244 decay:	0.9897	0.9897	0.9897	1.0000	1.0000	0.9897
Am241 result calc.:	0.002	0.003	-0.001	1.224	0.003	-0.002
Am241 result rptd.:	0.002	0.003	-0.001	1.225	0.003	-0.002
Am241 MDA calc.:	0.017	0.015	0.015	0.014	0.014	0.014
Am241 MDA rptd:	0.016	0.014	0.014	0.013	0.013	0.012
Cm244 result calc.:	0.000	0.001	0.004	0.729	0.000	-0.003
Cm244 result rptd:	0.000	0.001	0.004	0.729	0.000	-0.003
Cm244 MDA calc.:	0.013	0.015	0.011	0.010	0.011	0.012
Cm244 MDA rptd.:	0.013	0.018	0.011	0.010	0.013	0.012

Neptunium

Sample ID	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DU
Detector:	53	54	57	66	49	50
Np239 cpm:	21.92	26.39	24.83	23.18	36.98	27.58
Inst. eff.:	0.721	0.721	0.721	0.721	0.721	0.721
Am243 added:	99.08	99.08	99.08	99.08	99.08	99.08
Yield:	0.3068	0.3694	0.3476	0.3245	0.5177	0.3861
Aliquot:	1.000	1.000	1.000	1.000	1.000	1.000
Count time:	1020.87	1010.87	964.33	1054.18	993.1	993.1
Np237 gross counts:	12	1	3	789	5	5
Np237 bkgd counts:	3	2	0	0	3	1
Np237 aspec. eff:	0.386	0.378	0.367	0.413	0.364	0.355
Np237 result calc.:	0.034	-0.003	0.011	2.516	0.005	0.013
Np237 result rptd.:	0.034	-0.003	0.011	2.500	0.005	0.013
Np237 MDA calc.:	0.030	0.024	0.028	0.024	0.019	0.025
Np237 MDA rptd.:	0.040	0.030	0.011	0.010	0.027	0.025

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SAMPLE RESULT VERIFICATION, DATA PACKAGE: B09332-TMA-611

Iodine-129

Sample ID:	B09332	B09333	B09336	QC-LCS	QC-BLANK	B09332-DU
Detector:	INGE1	XSPEC14	XSPEC14	XSPEC15	XSPEC14	XSPEC14
Count Time:	203.9	465.33	899.68	401.85	788.93	1329.93
Gross cpm:	0.687	0.507	0.65	15.307	0.533	0.527
Bkg cpm:	0.787	0.508	0.779	0.909	0.496	0.59
Blank cpm:	-0.004	-0.027	-0.155	-0.101	-0.155	-0.053
Net cpm:	-0.096	0.026	0.026	14.499	-0.074	-0.010
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	91.37	49.01	52.82	0.00	0.00	54.46
Decay:	1	1	1	1	1	1
Yield:	0.6924	0.7646	0.7613	0.6957	0.6834	0.7322
Aliquot:	1	1	1	1	1	1
PPT. Corr.:	1	1	1	1	1	1
Product:	6.92E-01	7.65E-01	7.61E-01	6.96E-01	6.83E-01	7.32E-01
P-factor:	1.00	4.57	4.87	4.87	4.87	4.57
Result Calc.:	-0.062	0.070	0.075	45.719	-0.238	-0.028
Result Rptd.:	-0.063	0.070	0.075	45.700	-0.237	-0.028
MDA Calc.:	0.188	0.415	0.395	0.699	0.375	0.276
MDA Rptd.:	0.268	1.475	2.147	2.977	2.457	1.122