GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418)

9413225.2404

MEMORANDUM

FEB 1994
RECEIVED
TCO

TO: 200-UP-2 Project QA Record

February 15, 1994

FR: Michael Higgins, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418)

INTRODUCTION

This memorandum presents the results of data validation on data package B09355-TMA-615 prepared by Thermo Analytical Inc. (TMA). 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Notes: 1 All samples were analyzed for IC ions (Cl, F, SO4), and nitrate/nitrite.

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 referenced analytical method.

9413225.2405

referenced analytical method.

Completeness. The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 28 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives.

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.

9413225.2406

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9413225.2407

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.

94/3225.2408

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.2409

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	VALIDATOR: MCH	DATE: 940215	PAGE 1 OF 1
COMMENTS: B09355-TMA-615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
	NONE		

9413225.2410

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

GW3225.241

Validated Data Summary, Data Package: B09355-TMA-615

	Sample#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/KG	7.900		5.600		5.700		6.600		6.200		8.900	
FLUORIDE	MG/KG	2.100		1.400		1.300		0.600		1.700		3.500	
SULFATE	MG/KG	19.000		12.000		14.000		8.000		8.000		47.000	
NITRATE+NITRITE	MG-N/KG	3.490		2.450	U	2.460	U	2.480	U	2.460	U	3.050	

Validated Report

9413225.2413

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
CHLORIDE	MG/KG	8.200	
FLUORIDE	MG/KG	4.700	
SULFATE	MG/KG	47.000	
NITRATE+NITRITE	MG-N/KG	6.800	

Initial 9/16/93

009

Received: 09/28/93 Results by Sample

SAMPLE ID 809355 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 3.49
mg N/kg

SAMPLE ID 809356 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.45
mg N/kg

SAMPLE ID 809357 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.46
mg N/kg

SAMPLE ID 809359 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.48
mg N/kg

SAMPLE ID 809360 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.46
mg N/kg

SAMPLE ID 809361 SAMPLE # 06 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 3.05
mg N/kg

SAMPLE ID 809362 SAMPLE # 07 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 6.30
mg N/kg

Verified 940211 MLH.

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

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

94L3225.2414

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09355 FRACTION 01E TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	7.9	mg/kg	1.0
Fluoride	300.0	2.1	mg/kg	0.5
Sulfate	300.0	19	mg/kg	5

FORM I

9411322.2415

Verified 940211 [illegible]

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93 Results by Sample

SAMPLE ID 809356 FRACTION 02E TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	5.6	mg/kg	1.0
Fluoride	300.0	1.4	mg/kg	0.5
Sulfate	300.0	12	mg/kg	5

FORM 1

9402225.2416

Verified 9402112

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93 Results by Sample

SAMPLE ID B09357 FRACTION 04C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	5.7	mg/kg	1.0
Fluoride	300.0	1.3	mg/kg	0.5
Sulfate	300.0	14	mg/kg	5

FORM I

AW3225 2417

Verified 9/30/93 MMK

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93 Results by Sample

SAMPLE ID B09362 FRACTION 05C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/21/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	8.2	mg/kg	1.0
Fluoride	300.0	4.7	mg/kg	0.5
Sulfate	300.0	47	mg/kg	5

FORM I

Verified 940211 MMh.

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID 809359 FRACTION 06C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	6.6	mg/kg	1.0
Fluoride	300.0	0.6	mg/kg	0.5
Sulfate	300.0	8	mg/kg	5

FORM I

94/3225.249

Verified 94024 [illegible]

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID 809360 FRACTION 07C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	6.2	mg/kg	1.0
Fluoride	300.0	1.7	mg/kg	0.5
Sulfate	300.0	8	mg/kg	5

FORM I

FW3225.2420

Verified 9/10/11 MMh

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09361 FRACTION 08C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	8.9	mg/kg	1.0
Fluoride	300.0	3.5	mg/kg	0.5
Sulfate	300.0	47	mg/kg	5

FORM I

94/3225.2421

Verified 9/30/93 MMR

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.2422

9413225.2423

GENERAL CHEMISTRY RESULTS

CASE NO. 09-078

Solid Sample #:

B09355	B09356
B09357	B09359
B09360	B09361
B09362	

CASE NARRATIVE

Sample B09355 (A3-09-078-01F) yielded a 76.0% recovery for the Fluoride analysis. The low Fluoride recovery compared to our laboratory control sample indicated the presence of a matrix interference.

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

Maureen Parrish 12/3/93

Maureen Parrish

Received: 09/28/93

Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

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

9413225.2424

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

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

U3-09-132

Westinghouse Hanford Company

CHAIN OF CUSTODY

0000024

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0704-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

- 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

9413225.2425

B09356

- 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

LER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
Lorene E. Rogers 9-23-93 1440	Kermit Blum K. Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Sealed on 9-25-93 · opened 9-27-93 KB

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

0000020

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Leone Rogers 1440	K. Blum Kismit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Nexus 9-25-93 ; opened 9-27-93 - KB

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

9413225.2426

000002F

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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

9413225.2427

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

KER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
Karen S. Rogers 9-23-93 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Norcal on 9-25-93; opened 9-27-93 KB

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

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.2428

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

G 2/14/94

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B093555-TMA-615
VALIDATOR: M. HIGGINS	LAB: TMA	DATE: FEB. 11, 1994
CASE: NA		SDG: NA

ANALYSES PERFORMED

☒ Anions/IC	☐ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☐ Ammonia	☐ BOD/COD	☐ Chloride	☐ Chromium-VI	☐ pH	☒ NO_2/NO_3
☐ Sulfate	☐ TDS	☐ TKN	☐ Phosphate	☐	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX	7 / SOILS
B09355	B09361
B09356	B09362
B09357	
B09359	
B09360	

9413225.2429

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:

025

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

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

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

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

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

Comments:

4. BLANKS

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

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

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

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

Comments:

5. ACCURACY

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

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

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

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

Comments:

6. PRECISION

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

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

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

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

9413225.2430

026

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:

7. ANALYTE QUANTITATION

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:

9413225.2431

027

HOLDING TIME SUMMARY

SDG: B093555	VALIDATOR: M. HIGGINS	DATE: 9402 11	PAGE 1 OF 1
COMMENTS: B093555. TMA. 615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	IC IONS	9/20/93	NA	10/15/93	NA	≤ 28 days	NONE
B09356	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B093600	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓
ALL	NO2/NO3	9/20/93	10/18/93 ~~NA~~	10/19/93	≤28 days	≤28 days	NONE

GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418)

9413225.2433

MEMORANDUM

FEB 1994
RECEIVED
TQO

TO: 200-UP-2 Project QA Record

February 15, 1994

FR: Michael Higgins, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418)

INTRODUCTION

This memorandum presents the results of data validation on data package B09355-TMA-615 prepared by Thermo Analytical Inc. (TMA). 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Notes: 1 All samples were analyzed for IC ions (Cl, F, SO4), and nitrate/nitrite.

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 referenced analytical method.

9413225.2434

referenced analytical method.

Completeness. The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 28 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives.

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.

9413225.2435

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9413225.2436

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.

9413225.2437

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.2438

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	VALIDATOR: MCH	DATE: 940215	PAGE 1 OF 1
COMMENTS: B09355-TMA-615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
	NONE		

9413225.2439

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9413225.2440

9413225.2441

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/KG	7.900		5.600		5.700		6.600		6.200		8.900	
FLUORIDE	MG/KG	2.100		1.400		1.300		0.600		1.700		3.500	
SULFATE	MG/KG	19.000		12.000		14.000		8.000		8.000		47.000	
NITRATE+NITRITE	MG-N/KG	3.490		2.450	U	2.460	U	2.480	U	2.460	U	3.050	

Verified Draft

008

9413225.2442

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
CHLORIDE	MG/KG	8.200	
FLUORIDE	MG/KG	4.700	
SULFATE	MG/KG	47.000	
NITRATE+NITRITE	MG-N/KG	6.800	

Verified 9/16/93

009

Received: 09/28/93

Results by Sample

SAMPLE ID B09355 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 3.49
mg N/kg

SAMPLE ID B09356 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.45
mg N/kg

SAMPLE ID B09357 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.46
mg N/kg

SAMPLE ID B09359 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.48
mg N/kg

SAMPLE ID B09360 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S <2.46
mg N/kg

SAMPLE ID B09361 SAMPLE # 06 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 3.05
mg N/kg

SAMPLE ID B09362 SAMPLE # 07 FRACTIONS: A
Date & Time Collected 09/20/93 Category SOIL

NITR_S 6.80
mg N/kg

Verified 940211 MLH

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

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

9413225 2443

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09355 FRACTION 01E TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	7.9	mg/kg	1.0
Fluoride	300.0	2.1	mg/kg	0.5
Sulfate	300.0	19	mg/kg	5

FORM I

OM3225.2444

Verified 940211 MMh

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09356 FRACTION 02E TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	5.6	mg/kg	1.0
Fluoride	300.0	1.4	mg/kg	0.5
Sulfate	300.0	12	mg/kg	5

FORM I

9413225.2445

Verified 9402112

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09357 FRACTION 04C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	5.7	mg/kg	1.0
Fluoride	300.0	1.3	mg/kg	0.5
Sulfate	300.0	14	mg/kg	5

FORM I

9413225.2446

Verified 9/30/94 MM

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09362 FRACTION 05C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/21/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	8.2	mg/kg	1.0
Fluoride	300.0	4.7	mg/kg	0.5
Sulfate	300.0	47	mg/kg	5

FORM I

9413225.2447

Verified 940211 MMh.

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09359 FRACTION 06C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	6.6	mg/kg	1.0
Fluoride	300.0	0.6	mg/kg	0.5
Sulfate	300.0	8	mg/kg	5

FORM I

9413225.2448

Verified 9/30/94

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09360 FRACTION 07C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	6.2	mg/kg	1.0
Fluoride	300.0	1.7	mg/kg	0.5
Sulfate	300.0	8	mg/kg	5

FORM I

9413225.2449

Verified 9/30/11

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09361 FRACTION 08C TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 09/20/93 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	8.9	mg/kg	1.0
Fluoride	300.0	3.5	mg/kg	0.5
Sulfate	300.0	47	mg/kg	5

FORM I

914 3225-2450

Verified 9/02/11 MM

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

944 3225.2451

9413225.2452

GENERAL CHEMISTRY RESULTS

CASE NO. 09-078

Solid Sample #:

B09355	B09356
B09357	B09359
B09360	B09361
B09362	

CASE NARRATIVE

Sample B09355 (A3-09-078-01F) yielded a 76.0% recovery for the Fluoride analysis. The low Fluoride recovery compared to our laboratory control sample indicated the presence of a matrix interference.

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

Maureen Parrish 12/3/93

Maureen Parrish

Received: 09/28/93 Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

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

9413225.2453

TMA
Thermo Analytical Inc.

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

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

US-09-132

Westinghouse Hanford Company

CHAIN OF CUSTODY

0000021

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

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) B09356

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

9413225.2454

3)

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

SER 9-21-93

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-23-93 Karen E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Local on 9-25-93 opened 9-27-93 KB

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: 093-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Lorene Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Norcal 9-25-93 ; opened 9-27-93 - KB

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

9413225.2455

000002

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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

9413225.2456

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

LER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
Leon E. Rogers 9-23-93 1440	Kermit Blum K. Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Normal on 9-25-93 ; opened 9-27-93 KB

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

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9W3225.2457

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

cj 2/14/94

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B093555-TMA-615
VALIDATOR: M. HIGGINS	LAB: TMA	DATE: FEB. 11, 1994
CASE: NA		SDG: NA

ANALYSES PERFORMED

☒ Anions/IC	☐ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☐ Ammonia	☐ BOD/COD	☐ Chloride	☐ Chromium-VI	☐ pH	☒ NO_3/NO_2
☐ Sulfate	☐ TDS	☐ TKN	☐ Phosphate	☐	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX 7 / SOILS	
B09355	B09361
B09356	B09362
B09357	
B09359	
B09360	

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:

9413225.2458

025

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

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

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

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

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

Comments:

4. BLANKS

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

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

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

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

Comments:

5. ACCURACY

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

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

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

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

Comments:

6. PRECISION

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

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

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

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

9413225.2459

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:

7. ANALYTE QUANTITATION

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:

9413225.2460

027

HOLDING TIME SUMMARY

SDG: B093555	VALIDATOR: M. HIGGINS	DATE: 9402 11	PAGE 1 OF 1
COMMENTS: B093555. TMA. 615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	IC IONS	9/20/93	NA	10/15/93	NA	≤ 28 days	NONE
B09356	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B093600	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓
ALL	NO2/NO3	9/20/93	10/18/93 ~~BA~~ MA	10/19/93	≤28 days	≤28 days	NONE

GENERAL GC DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418)

9413225.2462

COPY

MEMORANDUM

FEB 1994 RECEIVED TQO

TO: 200-UP-2 Project QA Record

February 16, 1994

FR: Michael Higgins, Golder Associates Inc.

RE: GENERAL GC DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418)

9413225.2463

INTRODUCTION

This memorandum presents the results of data validation on data package B09355-TMA-615 prepared by Thermo Analytical Inc. (TMA). 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Notes: 1 All samples were analyzed for extractable fuel hydrocarbons (kerosene range).

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 referenced analytical method.

Completeness. The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 7 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives.

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.

9413225.2464

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9W3225.2465

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.

9413225.2466

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.2467

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	VALIDATOR: MCH	DATE: 940215	PAGE 1 OF 1
COMMENTS: B09355-TMA-615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
	NONE		

9413225.2468

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

94W3225.2469

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
KEROSENE	MG/KG	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U

9413225.2471

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
KEROSENE	MG/KG	5.000	U

Verified
9-30-93

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09355 FRACTION 01G TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/10/93
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 940210 [illegible]

9114225.2472

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID 809356 FRACTION 02G TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/10/93
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 940210

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09357 FRACTION 04D TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/10/93
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 9/10/10

TMA Inc. REPORT Work Order # A3-09-078 000521

Received: 09/27/93

Results by Sample

SAMPLE ID B09359 FRACTION 06D TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/10/93
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 941021 KLL

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID 809360 FRACTION 07D TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/11/93
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

9473225.2476

Verified 9/10/10

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID B09361 FRACTION 08B TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/20/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/11/93
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 9402 10 MW

TMA Inc. REPORT Work Order # A3-09-078

Received: 09/27/93

Results by Sample

SAMPLE ID 809362 FRACTION 05D TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 09/21/93 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 10/10/93
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 GHOZIO

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9413225.2479

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-078

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 27, 1993

1.0 DESCRIPTION OF CASE :

Eight 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 Total Petroleum Hydrocarbons in the Kerosene range (K) were analyzed according to the SW-846 Method 8015M.

9413225.2480

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09355	A3-09-078-01A	V	SOIL
B09355	A3-09-078-01B	SV	SOIL
B09355 MS	A3-09-078-01C	SV	SOIL
B09355 MSD	A3-09-078-01D	SV	SOIL
B09355	A3-09-078-01G	K	SOIL
B09356	A3-09-078-02A	V	SOIL
B09356 MS	A3-09-078-02B	V	SOIL
B09356 MSD	A3-09-078-02C	V	SOIL
B09356	A3-09-078-02D	SV	SOIL
B09356	A3-09-078-02G	K	SOIL
B098Y6	A3-09-078-03A	V	SOIL
B09357	A3-09-078-04A	V	SOIL
B09357	A3-09-078-04B	SV	SOIL
B09357	A3-09-078-04D	K	SOIL
B09357 MS	A3-09-078-04E	K	SOIL
B09357 MSD	A3-09-078-04F	K	SOIL
B09362	A3-09-078-05A	V	SOIL
B09362	A3-09-078-05B	SV	SOIL
B09362	A3-09-078-05D	K	SOIL
B09359	A3-09-078-06A	V	SOIL
B09359	A3-09-078-06B	SV	SOIL
B09359	A3-09-078-06D	K	SOIL
B09360	A3-09-078-07A	V	SOIL
B09360	A3-09-078-07B	SV	SOIL
B09360	A3-09-078-07D	K	SOIL
B09361	A3-09-078-08B	SV,K	SOIL
B09361	A3-09-078-08D	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

A 250 mL Volatile container for sample B09361 was broken at TMA/ARLI. As per WHC ROD-93-0215, TMA/ARLI was instructed to use the Kerosene aliquot of that sample for the Volatile analysis. Both Kerosene and Semivolatiles will be analyzed for by utilizing the 250 mL bottle designated for the Semivolatiles analysis.

All of the other sample containers 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 contract required holding times.

No TCL analytes were detected in the samples, with the exception of trace amounts of Di-n-butylphthalate ranging from 290 to 410 ppb.

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

3.2.3 TOTAL PETROLEUM HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 10/05/93 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 within the SW-846 holding time. Approximately 20g of each sample was extracted and concentrated to a final volume of 5 mL. The samples were then analyzed by GC/FID for total petroleum hydrocarbons in the Kerosene range by Method 8015M. There were no total petroleum hydrocarbons detected in the samples.

Sample B09357 was spiked with approximately 245 ug/Kg of Kerosene. The spike recoveries were between 90% and 92%, whereas the blank spike had a recovery of 82%.

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

94/3225.2482

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 12/2/93
Nicole Roth
CLP Program Manager

for Wida Ang 12/2/93
Wida Ang
Organics Supervisor

N3-09-137

Westinghouse Hanford Company

CHAIN OF CUSTODY

0000021

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

- 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

B09356

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

3)

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

SER 9-21-93

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-23-93 Lorene E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Hazcal on 9-25-93 opened 9-27-93 KB

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

9413295.2483

0000026

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: 9-20-93

Ice Chest No.: 161 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836 — Offsite Property No.: 4993-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1)

B09359

- 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

B09360

- 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)

B09361

- 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: 9-25-93 Tom Rasche TMA	Received by: K Blum Kimie Blum	Date/Time: 9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA Nexus 9-25-93; Opened 9-27-93 - KB

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

022

9413235.2484

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 997332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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~~

FOR 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 1410	K. Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Normal on 9-25-93 ; opened 9-27-93 KB

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

9413225.2485

023

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.2486

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

9413225.2487

GENERAL GC DATA VALIDATION CHECKLIST

Comments: Surrogate should be analyzed using this method. HOWEVER qualification per Section 6.6.1 was not performed and data was not qualified because ① LCS was performed and acceptable ② Matrix Spike (in Duplicate) was performed and acceptable (although criteria was not provided by the laboratory

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: RPD was on order 1%, However no criteria (control limits) was provided by the laboratory for evaluation. 2/14/94 No qualification of the data was made.

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:

9413225.2488

027

HOLDING TIME SUMMARY

SDG: NA	VALIDATOR: M. HIGGINS	DATE 940210	PAGE 1 OF 1
COMMENTS: B09355-TMA Ø615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	8015M	09/20/93	10/02/93	10/10/93	≤ 14 DAYS	≤ 40 DAYS	NONE
B09356	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B09360	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓

028

9413225.2489

METALS AND CYANIDE DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-F418)

9413225.2490

FEB 1994
RECEIVED
TQO

MEMORANDUM

TO: 200-UP-2 Project QA Record

February 17, 1994

FR: Michael Higgins, Golder Associates Inc.

RE: METALS AND CYANIDE DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418)

9413225.2491

INTRODUCTION

This memorandum presents the results of data validation on data package B09355-TMA-615 prepared by Thermo Analytical Inc. (TMA). 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Notes: 1 All samples were analyzed for Target Analyte List (TAL) metals and cyanide, and titanium.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

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

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

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

Completeness. The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 105 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory blanks

Positive Blanks. Positive analytes were detected in the calibration blanks. Attachment 2 provides a summary of the samples and data qualification applied.

Negative Blanks. No negative results were reported for the calibration or preparation blanks.

Spike Sample Recovery

- Spike sample recoveries was unacceptable for antimony. Attachment 2 provides a summary of the samples and data qualifications applied.

REFERENCES

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

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

9413225.2492

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GW3225.2493

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.

PHI 3225-2494

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9M3225.2495

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	VALIDATOR: MCH	DATE: 940217	PAGE 1 OF 1
COMMENTS: B09355-TMA-0615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
ANTIMONY	J/BJ/UJ	ALL	ICP SPIKE RECOVERY < 75 BUT ≥ 30%
BERYLLIUM	U	B09355, B09356, B09357 B09359, B09361, B09362	PRESENT IN CALIBRATION BLANK
CADMIUM	U	B09355	PRESENT IN CALIBRATION BLANK
CALCIUM	U	B09359	PRESENT IN CALIBRATION BLANK
CHROMIUM	U	B09359, B09360	PRESENT IN CALIBRATION BLANK
COPPER	U	B09356, B09357, B09359, B09360	PRESENT IN CALIBRATION BLANK
MAGNESIUM	U	B09359, B09360	PRESENT IN CALIBRATION BLANK
MANGANESE	U	B09359, B09360	PRESENT IN CALIBRATION BLANK
POTASSIUM	U	B09359, B09360	PRESENT IN CALIBRATION BLANK
SILVER	U	309356, 309357, 309361 309362	PRESENT IN CALIBRATION BLANK
SODIUM	U	309359, 309360	PRESENT IN CALIBRATION BLANK
ZINC	U	309359, 309360	PRESENT IN CALIBRATION BLANK
TITANIUM	U	309359, 309360	PRESENT IN CALIBRATION BLANK
ARSENIC	U	ALL	PRESENT IN CALIBRATION BLANK

9413225.2496

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9H13225.2497

Validated Data Summary, Data Package: B09355-THA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	MG/KG	6900.000		5880.000		5570.000		51.800		53.700		6150.000	
ANTIMONY	MG/KG	3.000	BJ	2.600	UJ	2.400	UJ	2.500	UJ	2.500	UJ	2.600	UJ
ARSENIC	MG/KG	6.700	U	5.100	U	5.100	U	0.500	U	0.710	U	1.900	U
BARIUM	MG/KG	107.000		53.700		50.600		0.390	B	0.340	B	133.000	
BERYLLIUM	MG/KG	0.360	U	0.260	U	0.260	U	0.050	U	0.040	U	0.290	U
CADMIUM	MG/KG	0.360	U	0.260	U	0.240	U	0.250	U	0.250	U	0.260	U
CALCIUM	MG/KG	117000.000		9230.000		9930.000		16.800	U	11.200	U	9330.000	
CHROMIUM	MG/KG	10.000		8.000		7.700		0.850	U	0.780	U	11.600	
COBALT	MG/KG	8.000	B	6.000	B	5.800	B	0.510	U	0.500	U	9.000	B
COPPER	MG/KG	22.000		10.700	U	11.400	U	0.830	U	1.300	U	17.600	
IRON	MG/KG	11600.000		12700.000		12500.000		140.000		205.000		16400.000	
LEAD	MG/KG	3.700		4.500		4.300		0.560	U	0.550	U	3.500	
MAGNESIUM	MG/KG	7360.000		5040.000		4750.000		12.400	U	7.900	U	3930.000	
MANGANESE	MG/KG	433.000		294.000		270.000		0.660	U	0.430	U	227.000	
MERCURY	MG/KG	0.060	U	0.050	U	0.050	U	0.040	U	0.050	U	0.050	U
NICKEL	MG/KG	11.900		8.400		8.000		0.660	U	0.650	U	9.200	
POTASSIUM	MG/KG	970.000	B	753.000	B	713.000	B	18.400	U	18.700	U	1240.000	
SELENIUM	MG/KG	0.600	U	0.560	U	0.530	U	0.540	U	0.530	U	0.560	U
SILVER	MG/KG	0.560	U	1.300	U	0.940	U	0.510	U	0.500	U	1.600	U
SODIUM	MG/KG	190.000	B	134.000	B	122.000	B	27.800	U	30.700	U	486.000	B
THALLIUM	MG/KG	0.340	U	0.320	U	0.300	U	0.310	U	0.320	B	0.320	U
VANADIUM	MG/KG	41.800		25.100		23.900		1.100	U	1.000	U	42.900	
ZINC	MG/KG	25.400		30.500		29.300		0.920	U	0.890	U	38.100	
CYANIDE	MG/KG	0.580	U	0.490	U	0.490	U	0.470	U	0.500	U	0.510	U
TITANIUM	MG/KG	794.000		555.000		514.000		2.100	U	1.500	U	1510.000	

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
ALUMINUM	MG/KG	8460.000	
ANTIMONY	MG/KG	3.700	BJ
ARSENIC	MG/KG	3.300	U
BARIUM	MG/KG	153.000	
BERYLLIUM	MG/KG	0.430	U
CADMIUM	MG/KG	0.260	U
CALCIUM	MG/KG	7940.000	
CHROMIUM	MG/KG	15.000	
COBALT	MG/KG	11.900	
COPPER	MG/KG	18.100	
IRON	MG/KG	21200.000	
LEAD	MG/KG	3.800	
MAGNESIUM	MG/KG	5140.000	
MANGANESE	MG/KG	330.000	
MERCURY	MG/KG	0.050	U
NICKEL	MG/KG	11.200	
POTASSIUM	MG/KG	1470.000	
SELENIUM	MG/KG	0.560	U
SILVER	MG/KG	2.100	U
SODIUM	MG/KG	643.000	B
THALLIUM	MG/KG	0.320	U
VANADIUM	MG/KG	61.900	
ZINC	MG/KG	42.900	
CYANIDE	MG/KG	0.510	U
TITANIUM	MG/KG	2070.000	

Verified 9/30/94

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09355

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-01S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 86.0

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

9413225.2500

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6900			P	
7440-36-0	Antimony	3.0	~~B~~	N	P	BJ
7440-38-2	Arsenic	6.7			P	
7440-39-3	Barium	107			P	
7440-41-7	Beryllium	0.36	~~B~~		P	U
7440-43-9	Cadmium	0.36	~~B~~		P	U
7440-70-2	Calcium	117000			P	
7440-47-3	Chromium	10.0			P	
7440-48-4	Cobalt	8.0	B		P	
7440-50-8	Copper	22.0			P	
7439-89-6	Iron	11600			P	
7439-92-1	Lead	3.7		*	P	
7439-95-4	Magnesium	7360			P	
7439-96-5	Manganese	433			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	11.9			P	
7440-09-7	Potassium	970	B		P	
7782-49-2	Selenium	0.60	U		P	
7440-22-4	Silver	0.56	U		P	
7440-23-5	Sodium	190	B		P	
7440-28-0	Thallium	0.34	U		P	
7440-62-2	Vanadium	41.3			P	
7440-66-6	Zinc	25.4			P	
	Cyanide	0.88	U		CA	
7440-32-6	Titanium	794			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Verified 4/02/94 JWH

Comments:
STONES

2

010

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B09356

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-02S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 97.3

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5880			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	UJ u ij 2/15/94
7440-38-2	Arsenic	5.1	—		P	
7440-39-3	Barium	53.7			P	
7440-41-7	Beryllium	0.26	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	9230			P	
7440-47-3	Chromium	8.0			P	
7440-48-4	Cobalt	6.0	B		P	
7440-50-8	Copper	10.7	—		P	u ij 2/15/94
7439-89-6	Iron	12700			P	
7439-92-1	Lead	4.5			P	
7439-95-4	Magnesium	5040			P	
7439-96-5	Manganese	294			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	3.4			P	
7440-09-7	Potassium	753	B		P	
7782-49-2	Selenium	0.56	U		P	
7440-22-4	Silver	1.3	~~B~~		P	u
7440-23-5	Sodium	134	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	25.1			P	
7440-66-6	Zinc	30.3			P	
	Cyanide	0.49	U		CA	
7440-32-6	Titanium	555			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Verified 9/2/94

Comments:

3

011

FORM I - IN ILM02.1

9413225.2501

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09357

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-03S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5570			P	
7440-36-0	Antimony	2.4	~~U~~	N	P	UJ
7440-38-2	Arsenic	5.1	—		P	U
7440-39-3	Barium	50.6			P	
7440-41-7	Beryllium	0.26	~~B~~		P	U
7440-43-9	Cadmium	0.24	U		P	
7440-70-2	Calcium	9930			P	
7440-47-3	Chromium	7.7			P	
7440-48-4	Cobalt	5.8	B		P	
7440-50-8	Copper	11.4	—		P	U gj 2/15/94
7439-89-6	Iron	12500			P	
7439-92-1	Lead	4.3		*	P	
7439-95-4	Magnesium	4750			P	
7439-96-5	Manganese	270			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	8.0			P	
7440-09-7	Potassium	713	B		P	
7782-49-2	Selenium	0.33	U		P	
7440-22-4	Silver	0.34	~~B~~		P	U
7440-23-5	Sodium	122	B		P	
7440-28-0	Thallium	0.30	U		P	
7440-62-2	Vanadium	13.9			P	
7440-66-6	Zinc	29.3			P	
	Cyanide	0.49	U		CA	
7440-32-6	Titanium	516			P	

Verified 9402/14

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

FORM I - IN ILM02.1

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B09359

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-04S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 99.9

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

9413225.2503

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	51.8			P	
7440-36-0	Antimony	2.5	~~U~~	N	P	UJ
7440-38-2	Arsenic	0.50	~~B~~		P	U
7440-39-3	Barium	0.39	B		P	
7440-41-7	Beryllium	0.05	~~B~~		P	U
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	16.8	~~B~~		P	U
7440-47-3	Chromium	0.85	~~B~~		P	U
7440-48-4	Cobalt	0.51	U		P	
7440-50-8	Copper	0.83	~~B~~		P	U
7439-89-6	Iron	140			P	
7439-92-1	Lead	0.56	U	*	P	
7439-95-4	Magnesium	12.4	~~B~~		P	U
7439-96-5	Manganese	0.66	~~B~~		P	U
7439-97-6	Mercury	0.04	U		CV	
7440-02-0	Nickel	0.66	U		P	
7440-09-7	Potassium	18.4	~~B~~		P	U
7782-49-2	Selenium	0.34	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	27.3	~~B~~		P	U
7440-28-0	Thallium	0.31	U		P	
7440-62-2	Vanadium	1.1	U		P	
7440-66-6	Zinc	0.92	~~B~~		P	U
	Cyanide	0.47	U		CA	
7440-32-6	Titanium	2.1	B		P	

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts:

Comments:

Verified 940214

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013

FORM I - IN ILM02.1

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09360

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-05S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 99.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	53.7			P	
7440-36-0	Antimony	2.5	~~U~~	N	P	uJ
7440-38-2	Arsenic	0.71	~~B~~		P	u
7440-39-3	Barium	0.34	B		P	
7440-41-7	Beryllium	0.04	U		P	
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	11.2	U		P	
7440-47-3	Chromium	0.78	~~B~~		P	u
7440-48-4	Cobalt	0.50	U		P	
7440-50-8	Copper	1.3	~~B~~		P	u
7439-89-6	Iron	205			P	
7439-92-1	Lead	0.55	U	*	P	
7439-95-4	Magnesium	7.9	~~B~~		P	u
7439-96-5	Manganese	0.13	~~B~~		P	u
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	0.55	U		P	
7440-09-7	Potassium	18.7	~~B~~		P	u
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.50	U		P	
7440-23-5	Sodium	30.7	~~B~~		P	u
7440-28-0	Thallium	0.32	~~B~~		P	~~u~~ B 9-21-94
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	0.39	~~B~~		P	u
	Cyanide	0.50	U		CA	
7440-32-6	Titanium	1.5	~~B~~		P	u

Verified 940214

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts:

Comments:

9413225.2504

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09361

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-06S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 98.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6150			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	uJ
7440-38-2	Arsenic	1.9	~~B~~		P	u
7440-39-3	Barium	133			P	
7440-41-7	Beryllium	0.29	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	9330			P	
7440-47-3	Chromium	11.6			P	
7440-48-4	Cobalt	9.0	B		P	
7440-50-8	Copper	17.6			P	
7439-89-6	Iron	16400			P	
7439-92-1	Lead	3.5		*	P	
7439-95-4	Magnesium	3930			P	
7439-96-5	Manganese	227			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.2			P	
7440-09-7	Potassium	1260			P	
7782-49-2	Selenium	0.56	U		P	
7440-22-4	Silver	1.6	~~B~~		P	u
7440-23-5	Sodium	186	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	12.9			P	
7440-66-6	Zinc	38.1			P	
	Cyanide	0.51	U		CA	
7440-32-6	Titanium	1510			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified 9/02/94

7

015

FORM I - IN ILM02.1

9413225.2505

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09362

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-07S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 95.8

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	8460			P	
7440-36-0	Antimony	3.7	~~B~~	N	P	BJ
7440-38-2	Arsenic	3.3	—		P	u 2/17/94
7440-39-3	Barium	153			P	
7440-41-7	Beryllium	0.43	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	7940			P	
7440-47-3	Chromium	15.0			P	
7440-48-4	Cobalt	11.9			P	
7440-50-8	Copper	18.1			P	
7439-89-6	Iron	21200			P	
7439-92-1	Lead	3.8		*	P	
7439-95-4	Magnesium	3140			P	
7439-96-5	Manganese	330			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	11.2			P	
7440-09-7	Potassium	1470			P	
7782-49-2	Selenium	0.36	U		P	
7440-22-4	Silver	2.[illegible]	—		P	u
7440-23-5	Sodium	340	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	[illegible]			P	
7440-66-6	Zinc	[illegible]			P	
	Cyanide	0.31	U		CA	
7440-32-6	Titanium	2070			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified 940214

8

016

FORM I - IN ILM02.1

9413225.2506

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

94113225.2507

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

RECORD COPY

DEC 1993
RECEIVED
SDLA

November 4, 1993

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

941 3225.2508

Quality Control Narrative

Scope
Seven (7) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 28, 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 S309245.

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 exceeded control limit requirements.

The laboratory duplicate exceeded control limit requirements for lead.

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

U3-09-137

Westinghouse Hanford Company

CHAIN OF CUSTODY

000002A

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

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) B09356

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

9413225.2509

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

SPR 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 Loren E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received in TMA Hood on 9-25-93 opened 9-27-93 KB

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

0000026

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Lorne E Rogers 1440	K. Blum Kamil Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NSL 9-25-93; opened 9-27-93 - KB

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

9413225.2510

000002

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 997332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

- 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) B09362

- 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

LER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 1440 Leon E. Rogers	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Noted on 9-25-93 ; opened 9-27-93 KB

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

9413225.2511

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GH#3225.2512

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: BØ9355-TMA-Ø615	
VALIDATOR: M. HIGGINS	LAB: TMA		DATE: FEB. 11, 1994
CASE: N3-09-137-SAS		SDG: BØ9355	

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☒ CLP/Hg	☒ CLP/Cyanide	☒ titanium	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX 7/SOIL	
BØ9355	BØ9361
BØ9356	BØ9362
BØ9357	
BØ9359	
BØ9360	

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: Preparation log (form XIII) indicated Hg was prepared 10/18/93, Run log (form XIV) indicated Hg was analyzed on 10/16/93. INCONSISTENT BUT NOT QUALIFIED. Bench showed original prep @ 10/18/93 changed to 10/16/93 at latter date. Believe that form XIV date was taken from original bench and incorrect date.

023

9413225.2513

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

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

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

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

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

Comments:

4. BLANKS

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

Are ICB and CCB results acceptable? . . . . . Yes (No) N/A

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

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

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

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

Comments: Minor qualifications (B→U) for blank contamination.

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? . . . . . 5/21/94 Yes (No) N/A

Comments: SPIKE Recovery for Antimony = 47.5%, POST DIGEST = 99%.
~~LCS RECOVERY FOR ANTIMONY = 76.6%~~ → no qual. for SBs based on DW procedure 5/21/94
~~SPIKE RECOVERY FOR~~ SPICE RECOVERY for TITANIUM WAS ~~5x~~ ~~[illegible]~~ 90%, but SAMPLE WAS > ~~5x~~ 4x SPIKE LEVEL.
5/21/94

024

9413225.2514

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: LEAD RESULT WAS FLAGGED OUTSIDE CRITERIA BY THE LABORATORY, HOWEVER THE RESULTS WERE < 5CRQL + < 2X CRQL RPD LIMIT, NO QUALIFICATION.

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:

9413225.2515

025

HOLDING TIME SUMMARY

SDG: B09355 | VALIDATOR: M. HIGGINS | DATE: 940211 | PAGE 1 OF 1

COMMENTS: B09355.TMA.0615

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	METALS	09/20/93	10/25/93	10/29/93	≤180 days	≤180 days	NONE
B09356	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B09360	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓
AS ABOVE	CN	09/20/93	9/30/93	10/04/93	≤14 days	≤14 days	NONE
AS ABOVE	HG	09/20/93	NA	10/16/93	NA	≤28 days	NONE

BLANK AND SAMPLE DATA SUMMARY

SDG: B09355 | VALIDATOR: M Higgins | DATE: 940214 | PAGE 1 OF 1

COMMENTS: B09355-TMA-0615

SAMPLE ID	COMPOUND	RESULT RAW	Q	RT	UNITS (ppm)	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
ICB	Be	.00026				.0013		B09357, B09359, B09356	U
CCB1	Be	.00069				.00345		B09355, ~~B09356~~, B09361 gj 2/15/94	
CCB2/3	Be	.00052				.0026		B09362	
CCB1/2	Cd	.00190				0095		B09355	
CCB1	Ca	.08571				.4285		B09359	
CCB1	Cr	.00405				.02025		B09359, B09360	
ICB	Cu	.01312				.0656	gj 2/15/94	B09359, B09360, B09356, B09357	
CCB1	Mg	.07422				.3711		B09359, B09360	
CCB2	Mn	.00231				.01155		B09359, B09360	
CCB2	K	.09505				0.47525		B09359, B09360	
CCB2	Ag	.00404				.0202		B09356, B09357, B09361, B09362	gj 2/15/94
CCB2	Na	0.1329				0.6445		B09359, B09360	
CCB2	Zn	.00580				0.0290		B09359, B09360	
CCB2	Ti	.00556				.02780		B09359, B09360	
ICB	As	.00505				.02525	all	~~B09359, B09360~~, ~~B09361~~, ~~B09355~~	
~~C~~	~~Tl~~ gj 2/15/94							~~B09356~~ B09362	gj 2/15/94

gj 2/17/94 ICB/CCB

WESTINGHOUSE/HANFORD

3
BLANKS

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

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	40.4	B	29.9	B	26.6	B	2.646	B	P
Antimony	12.9	U	12.9	U	12.9	U	12.9	U	2.580	U	P
Arsenic	5.1	B	2.1	U	4.2	B	3.6	B	0.938	B	P
Barium	1.3	B	3.0	B	3.5	B	2.8	B	0.240	U	P
Beryllium	0.3	B	0.7	B	0.5	B	0.5	B	0.052	B	P
Cadmium	1.3	U	1.9	B	1.9	B	1.7	B	0.260	U	P
Calcium	59.0	U	85.7	B	59.0	U	59.8	B	11.800	U	P
Chromium	2.1	U	4.0	B	3.1	B	2.8	B	0.808	B	P
Cobalt	2.6	U	2.8	B	2.8	B	2.6	U	0.520	U	P
Copper	13.1	B	11.5	B	8.7	B	5.7	B	2.814	B	P
Iron	5.3	U	15.3	B	24.8	B	17.8	B	13.708	B	P
Lead	2.9	U	2.9	U	2.9	U	2.9	U	0.580	U	P
Magnesium	25.5	B	74.2	B	46.5	B	41.2	B	4.580	U	P
Manganese	0.8	U	2.1	B	2.3	B	2.1	B	0.226	B	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	3.4	U	3.6	B	3.4	U	3.4	U	0.680	U	P
Potassium	70.2	B	92.8	B	95.0	B	102.2	B	15.380	B	P
Selenium	2.8	U	2.8	U	2.8	U	2.8	U	0.560	U	P
Silver	3.8	B	4.0	B	3.6	B	2.8	B	0.798	B	P
Sodium	114.4	U	125.0	B	128.9	B	149.4	B	22.880	U	P
Thallium	1.6	U	1.6	U	1.6	U	1.6	U	0.320	U	P
Vanadium	5.5	U	5.5	U	5.5	U	5.5	U	1.100	U	P
Zinc	5.6	B	5.4	B	5.3	B	4.9	B	0.380	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA
Titanium	2.4	B	4.0	B	5.6	B	4.1	B	0.596	B	P

B09355 62S
56 62L
57 62A
59 62
60
61

WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: 309362S

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

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

% Solids for Sample: 95.8

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	50.9713		3.7257	B	99.41	47.5	N	P
Arsenic	75-125	400.6959		3.3092		397.65	99.9		P
Barium	75-125	544.3285		152.5434		397.65	98.5		P
Beryllium	75-125	9.6014		0.4336	B	9.94	92.2		P
Cadmium	75-125	9.2872		0.2610	U	9.94	93.4		P
Calcium									NR
Chromium	75-125	51.1085		15.0273		39.77	90.7		P
Cobalt	75-125	103.5570		11.9118		99.41	92.2		P
Copper	75-125	67.2274		18.0926		49.71	98.8		P
Iron									NR
Lead	75-125	95.2600		3.8024		99.41	92.0		P
Magnesium									NR
Manganese	75-125	412.3273		329.7133		99.44	83.1		P
Mercury	75-125	0.6128		0.0522	U	0.52	117.8		CV
Nickel	75-125	102.3024		11.2113		99.41	91.6		P
Potassium									NR
Selenium	75-125	374.9677		0.5621	U	397.65	94.3		P
Silver	75-125	11.8541		2.1439		9.94	97.7		P
Sodium									NR
Thallium	75-125	371.0906		0.3212	U	397.65	93.3		P
Vanadium	75-125	151.6791		61.3837		99.41	90.3		P
Zinc	75-125	135.1208		42.8698		99.41	92.8		P
Cyanide	75-125	23.3736		~~0.5117~~	U	~~25.34~~	~~92.2~~		CA
Titanium		2051.2973		2071.0214		99.41	-19.8		P

cj 2/17/94

Comments:

Sample result >4x spike added

Spike recovery J Antimony 940222

FORM V (Part 1) - IN ILM02.1

METALS AND CYANIDE DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418)

9413225.2520

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MEMORANDUM

TO: 200-UP-2 Project QA Record

February 17, 1994

FR: Michael Higgins, Golder Associates Inc.

RE: METALS AND CYANIDE DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418)

9413225.2521

INTRODUCTION

This memorandum presents the results of data validation on data package B09355-TMA-615 prepared by Thermo Analytical Inc. (TMA). 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Notes: 1 All samples were analyzed for Target Analyte List (TAL) metals and cyanide, and titanium.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

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

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

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

Completeness. The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 105 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets normal work plan objectives.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory blanks

Positive Blanks. Positive analytes were detected in the calibration blanks. Attachment 2 provides a summary of the samples and data qualification applied.

Negative Blanks. No negative results were reported for the calibration or preparation blanks.

Spike Sample Recovery

- Spike sample recoveries was unacceptable for antimony. Attachment 2 provides a summary of the samples and data qualifications applied.

REFERENCES

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

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

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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.

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.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

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9413225.2527

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	MG/KG	6900.000		5880.000		5570.000		51.800		53.700		6150.000	
ANTIMONY	MG/KG	3.000	BJ	2.600	UJ	2.400	UJ	2.500	UJ	2.500	UJ	2.600	UJ
ARSENIC	MG/KG	6.700	U	5.100	U	5.100	U	0.500	U	0.710	U	1.900	U
BARIUM	MG/KG	107.000		53.700		50.600		0.390	B	0.340	B	133.000	
BERYLLIUM	MG/KG	0.360	U	0.260	U	0.260	U	0.050	U	0.040	U	0.290	U
CADMIUM	MG/KG	0.360	U	0.260	U	0.240	U	0.250	U	0.250	U	0.260	U
CALCIUM	MG/KG	117000.000		9230.000		9930.000		16.800	U	11.200	U	9330.000	
CHROMIUM	MG/KG	10.000		8.000		7.700		0.850	U	0.780	U	11.600	
COBALT	MG/KG	8.000	B	6.000	B	5.800	B	0.510	U	0.500	U	9.000	B
COPPER	MG/KG	22.000		10.700	U	11.400	U	0.830	U	1.300	U	17.600	
IRON	MG/KG	11600.000		12700.000		12500.000		140.000		205.000		16400.000	
LEAD	MG/KG	3.700		4.500		4.300		0.560	U	0.550	U	3.500	
MAGNESIUM	MG/KG	7360.000		5040.000		4750.000		12.400	U	7.900	U	3930.000	
MANGANESE	MG/KG	433.000		294.000		270.000		0.660	U	0.430	U	227.000	
MERCURY	MG/KG	0.060	U	0.050	U	0.050	U	0.040	U	0.050	U	0.050	U
NICKEL	MG/KG	11.900		8.400		8.000		0.660	U	0.650	U	9.200	
POTASSIUM	MG/KG	970.000	B	753.000	B	713.000	B	18.400	U	18.700	U	1240.000	
SELENIUM	MG/KG	0.600	U	0.560	U	0.530	U	0.540	U	0.530	U	0.560	U
SILVER	MG/KG	0.560	U	1.300	U	0.940	U	0.510	U	0.500	U	1.600	U
SODIUM	MG/KG	190.000	B	134.000	B	122.000	B	27.800	U	30.700	U	486.000	B
THALLIUM	MG/KG	0.340	U	0.320	U	0.300	U	0.310	U	0.320	B	0.320	U
VANADIUM	MG/KG	41.800		25.100		23.900		1.100	U	1.000	U	42.900	
ZINC	MG/KG	25.400		30.500		29.300		0.920	U	0.890	U	38.100	
CYANIDE	MG/KG	0.580	U	0.490	U	0.490	U	0.470	U	0.500	U	0.510	U
TITANIUM	MG/KG	794.000		555.000		514.000		2.100	U	1.500	U	1510.000	

Verified 9/29/93

008

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09355

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-01S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 86.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6900			P	
7440-36-0	Antimony	3.0	~~B~~	N	P	BJ
7440-38-2	Arsenic	6.7			P	U
7440-39-3	Barium	107			P	
7440-41-7	Beryllium	0.36	~~B~~		P	U
7440-43-9	Cadmium	0.36	~~B~~		P	U
7440-70-2	Calcium	117000			P	
7440-47-3	Chromium	10.0			P	
7440-48-4	Cobalt	8.0	B		P	
7440-50-8	Copper	22.0			P	
7439-89-6	Iron	11600			P	
7439-92-1	Lead	3.7		*	P	
7439-95-4	Magnesium	7360			P	
7439-96-5	Manganese	433			P	
7439-97-6	Mercury	0.06	U		CV	
7440-02-0	Nickel	11.9			P	
7440-09-7	Potassium	970	B		P	
7782-49-2	Selenium	0.60	U		P	
7440-22-4	Silver	0.56	U		P	
7440-23-5	Sodium	190	B		P	
7440-28-0	Thallium	0.34	U		P	
7440-62-2	Vanadium	41.8			P	
7440-66-6	Zinc	25.4			P	
	Cyanide	0.33	U		CA	
7440-32-6	Titanium	794			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified 9/02/94 MMH

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09356

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-02S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 97.3

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5880			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	UJ u ij 2/15/94
7440-38-2	Arsenic	5.1	—		P	
7440-39-3	Barium	53.7			P	
7440-41-7	Beryllium	0.26	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	9230			P	
7440-47-3	Chromium	8.0			P	
7440-48-4	Cobalt	6.0	B		P	
7440-50-8	Copper	10.7	—		P	u ij 2/15/94
7439-89-6	Iron	12700			P	
7439-92-1	Lead	4.5		*	P	
7439-95-4	Magnesium	5040			P	
7439-96-5	Manganese	294			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	8.4			P	
7440-09-7	Potassium	753	B		P	
7782-49-2	Selenium	0.56	U		P	
7440-22-4	Silver	1.3	~~B~~		P	u
7440-23-5	Sodium	134	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	25.1			P	
7440-66-6	Zinc	30.5			P	
	Cyanide	0.49	U		CA	
7440-32-6	Titanium	555			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Verified 9/4/214

Comments:

3

011

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B09357

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-03S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5570			P	
7440-36-0	Antimony	2.4	~~U~~	N	P	UJ
7440-38-2	Arsenic	5.1	—		P	U
7440-39-3	Barium	50.6			P	
7440-41-7	Beryllium	0.26	~~B~~		P	U
7440-43-9	Cadmium	0.24	U		P	
7440-70-2	Calcium	9930			P	
7440-47-3	Chromium	7.7			P	
7440-48-4	Cobalt	5.8	B		P	
7440-50-8	Copper	11.4	—		P	U gj 2/15/94
7439-89-6	Iron	12500			P	
7439-92-1	Lead	4.3		*	P	
7439-95-4	Magnesium	4750			P	
7439-96-5	Manganese	270			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	8.0			P	
7440-09-7	Potassium	713	B		P	
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.94	~~B~~		P	U
7440-23-5	Sodium	122	B		P	
7440-28-0	Thallium	0.30	U		P	
7440-62-2	Vanadium	23.9			P	
7440-66-6	Zinc	29.3			P	
	Cyanide	0.49	U		CA	
7440-32-6	Titanium	314			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

Verified 9/02/14

4

012

FORM I - IN ILM02.1

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WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09359

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: 809355

Matrix (soil/water): SOIL Lab Sample ID: 09245-04S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 99.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	51.8			P	
7440-36-0	Antimony	2.5	~~U~~	N	P	UJ
7440-38-2	Arsenic	0.50	~~B~~		P	U
7440-39-3	Barium	0.39	B		P	
7440-41-7	Beryllium	0.05	~~B~~		P	U
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	16.8	~~B~~		P	U
7440-47-3	Chromium	0.85	~~B~~		P	U
7440-48-4	Cobalt	0.51	U		P	
7440-50-8	Copper	0.83	~~B~~		P	U
7439-89-6	Iron	140			P	
7439-92-1	Lead	0.56	U	*	P	
7439-95-4	Magnesium	12.4	~~B~~		P	U
7439-96-5	Manganese	0.66	~~B~~		P	U
7439-97-6	Mercury	0.04	U		CV	
7440-02-0	Nickel	0.66	U		P	
7440-09-7	Potassium	18.4	~~B~~		P	U
7782-49-2	Selenium	0.54	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	27.8	~~B~~		P	U
7440-28-0	Thallium	0.31	U		P	
7440-62-2	Vanadium	1.1	U		P	
7440-66-6	Zinc	0.92	~~B~~		P	U
	Cyanide	0.47	U		CA	
7440-32-6	Titanium	2.1	B		P	

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts:

Comments:

Verified 940214

5

013

FORM I - IN ILM02.1

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WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09360

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-05S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 99.9

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

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CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	53.7			P	
7440-36-0	Antimony	2.5	~~U~~	N	P	u J
7440-38-2	Arsenic	0.71	~~B~~		P	u
7440-39-3	Barium	0.34	B		P	
7440-41-7	Beryllium	0.04	U		P	
7440-43-9	Cadmium	0.25	U		P	
7440-70-2	Calcium	11.2	U		P	
7440-47-3	Chromium	0.78	~~B~~		P	u
7440-48-4	Cobalt	0.50	U		P	
7440-50-8	Copper	1.3	~~B~~		P	u
7439-89-6	Iron	205			P	
7439-92-1	Lead	0.55	U	*	P	
7439-95-4	Magnesium	7.9	~~B~~		P	u
7439-96-5	Manganese	0.43	~~B~~		P	u
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	0.65	U		P	
7440-09-7	Potassium	18.7	~~B~~		P	u
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.50	U		P	
7440-23-5	Sodium	30.7	~~B~~		P	u
7440-28-0	Thallium	0.32	~~B~~		P	~~u~~ B 9 2/15/94
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	0.89	~~B~~		P	u
	Cyanide	0.50	U		CA	
7440-32-6	Titanium	1.5	~~B~~		P	u

Verified 940214

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09361

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-06S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 98.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6150			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	uJ
7440-38-2	Arsenic	1.9	~~B~~		P	u
7440-39-3	Barium	133			P	
7440-41-7	Beryllium	0.29	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	9330			P	
7440-47-3	Chromium	11.6			P	
7440-48-4	Cobalt	9.0	B		P	
7440-50-8	Copper	17.6			P	
7439-89-6	Iron	16400			P	
7439-92-1	Lead	3.5		*	P	
7439-95-4	Magnesium	3930			P	
7439-96-5	Manganese	227			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	9.2			P	
7440-09-7	Potassium	1240			P	
7782-49-2	Selenium	0.56	U		P	
7440-22-4	Silver	1.6	~~B~~		P	u
7440-23-5	Sodium	486	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	42.9			P	
7440-66-6	Zinc	38.1			P	
	Cyanide	0.31	U		CA	
7440-32-6	Titanium	1510			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified 940214

7

015

FORM I - IN ILM02.1

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09362

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

Matrix (soil/water): SOIL Lab Sample ID: 09245-07S

Level (low/med): LOW Date Received: 09/28/93

% Solids: 95.8

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	8460			P	
7440-36-0	Antimony	3.7	~~B~~	N	P	BJ
7440-38-2	Arsenic	3.3	—		P	u 2/17/94
7440-39-3	Barium	153			P	
7440-41-7	Beryllium	0.43	~~B~~		P	u
7440-43-9	Cadmium	0.26	U		P	
7440-70-2	Calcium	7940			P	
7440-47-3	Chromium	15.0			P	
7440-48-4	Cobalt	11.9			P	
7440-50-8	Copper	18.1			P	
7439-89-6	Iron	21200			P	
7439-92-1	Lead	3.8		*	P	
7439-95-4	Magnesium	5140			P	
7439-96-5	Manganese	330			P	
7439-97-6	Mercury	0.05	U		CV	
7440-02-0	Nickel	11.2			P	
7440-09-7	Potassium	1470			P	
7782-49-2	Selenium	0.56	U		P	
7440-22-4	Silver	2.1	—		P	u
7440-23-5	Sodium	643	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	61.9			P	
7440-66-6	Zinc	22.9			P	
	Cyanide	0.51	U		CA	
7440-32-6	Titanium	1070			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

Verified 940214

8

016

FORM I - IN ILM02.1

9413275.2534

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9W3225.2535

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

RECORD COPY

DEC 1993
RECEIVED
SDLA

November 4, 1993

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

9413225.2536

Quality Control Narrative

Scope
Seven (7) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 28, 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 S309245.

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 exceeded control limit requirements.

The laboratory duplicate exceeded control limit requirements for lead.

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

N3-09-137

Westinghouse Hanford Company

CHAIN OF CUSTODY

0000024

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

- 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

B09356

- 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

9413225.2537

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

LER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 Loren E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Local on 9-25-93 opened 9-27-93 KB

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

0000020

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Laurie E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Nexia 9-25-93 ; opened 9-27-93 - KB

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

000002F

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1)

B09357

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

B09362

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

9413225.2539

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

KER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 1440 Jerry S. Rogers	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Norcal on 9-25-93; opened 9-27-93 KB

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

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9143225.2540

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	(E)

PROJECT: 200-UP-2		DATA PACKAGE: BØ9355-TMA-Ø615	
VALIDATOR: M. HIGGINS	LAB: TMA		DATE: FEB. 11, 1994
CASE: N3.09.137SAS		SDG: BØ9355	

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☒ CLP/Hg	☒ CLP/Cyanide	☒ titanium	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX 7/SOIL	
BØ9355	BØ9361
BØ9356	BØ9362
BØ9357	
BØ9359	
BØ9360	

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: Preparation log (form XIII) indicated Hg was prepared 10/18/93, Run log (form XIV) indicated Hg was analyzed on 10/16/93. INCONSISTENT BUT NOT QUALIFIED. Bench showed original prep @ 10/18/93 changed to 10/16/93 at latter date, believe that form XIV date ~~is~~ was taken from original bench and incorrect date.

9413225.2541

023

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? (Yes) No N/A
Are ICB and CCB results acceptable? . . . . . Yes (No) N/A
Were preparation blanks analyzed? . . . . . (Yes) No N/A
Are preparation blank results acceptable? . . . . . Yes (No) N/A
Were field/trip blanks analyzed? . . . . . Yes No (N/A)
Are field/trip blank results acceptable? . . . . . Yes No (N/A)
Comments: Minor qualifications (B->U) for blank contamination.

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? . . . . . 5/27/94 (Yes) (No) N/A
Comments: SPIKE Recovery for Antimony = 47.5%, POST DIGEST = 99%. ~~LCS RECOVERY FOR ANTIMONY = 76.6%~~ no qual. for Sb based on DV procedure 5/27/94
~~SPIKE RECOVERY FOR~~ SPIKE RECOVERY for TITANIUM WAS ~~[illegible]~~ ~ 76.8%, but SAMPLE WAS > ~~5X~~ 4X SPIKE LEVEL.
5/27/94

024

9413225.2542

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: LEAD RESULT WAS FLAGGED OUTSIDE CRITERIA BY THE LABORATORY, HOWEVER THE RESULTS WERE < 5CRQL + < 2X CRQL RPD LIMIT, NO QUALIFICATION.

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:

9413225.2543

HOLDING TIME SUMMARY

SDG: B09355	VALIDATOR: M. HIGGINS	DATE: 940211	PAGE 1 OF 1
COMMENTS: B09355·TMA·0615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	METALS	09/20/93	10/25/93	10/29/93	≤180 days	≤180 days	NONE
B09356	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B09360	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓
AS ABOVE	CN	09/20/93	9/30/93	10/04/93	≤14 days	≤14 days	NONE
AS ABOVE	HG	09/20/93	NA	10/16/93	NA	≤28 days	NONE

BLANK AND SAMPLE DATA SUMMARY

SDG: B09355 | VALIDATOR: M. HIGGINS | DATE: 940214 | PAGE 1 OF 1

COMMENTS: B09355-TMA-0615

SAMPLE ID	COMPOUND	RESULT RAW	Q	RT	UNITS (ppm)	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
ICB	Be	.00026				.0013		B09357, B09359, B09356	U
CCB1	Be	.00069				.00345		B09355, ~~B09356~~, B09361 cj 2/15/94	
CCB2/3	Be	.00052				.0026		B09362	
CCB1/2	Cd	.00190				.0095		B09355	
CCB1	Ca	.08571				.4285		B09359	
CCB1	Cr	.00405				.02025		B09359, B09360	
ICB	Cu	.01312				.0656	cj 2/15/94	B09359, B09360, B09356, B09357	
CCB1	Mg	.07422				.3711		B09359, B09360	
CCB2	Mn	.00231				.01155		B09359, B09360	
CCB2	K	.09505				0.47525		B09359, B09360	
CCB2	Ag	.00404				.0202		B09356, B09357, B09361, B09362	cj 2/15/94
CCB2	Na	0.1329				0.6445		B09359, B09360	
CCB2	Zn	.00580				0.0290		B09359, B09360	
CCB2	Ti	.00556				.02780		B09359, B09360	
ICB	As	.00505				.02525	UU	~~B09359, B09360~~, B09361, B09355	
~~C~~	~~Tl~~ cj 2/15/94							~~B09359~~ B09362	cj 2/15/94

cj 2/17/94 ICB1 ICB

WESTINGHOUSE/HANFORD

3
BLANKS

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

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	40.4	B	29.9	B	26.6	B	2.646	B	P
Antimony	12.9	U	12.9	U	12.9	U	12.9	U	2.580	U	P
Arsenic	5.1	B	2.1	U	4.2	B	3.6	B	0.938	B	P
Barium	1.3	B	3.0	B	3.5	B	2.8	B	0.240	U	P
Beryllium	0.3	B	0.7	B	0.5	B	0.5	B	0.052	B	P
Cadmium	1.3	U	1.9	B	1.9	B	1.7	B	0.260	U	P
Calcium	59.0	U	85.7	B	59.0	U	59.8	B	11.800	U	P
Chromium	2.1	U	4.0	B	3.1	B	2.8	B	0.808	B	P
Cobalt	2.6	U	2.8	B	2.8	B	2.6	U	0.520	U	P
Copper	13.1	B	11.5	B	8.7	B	5.7	B	2.814	B	P
Iron	5.3	U	15.3	B	24.8	B	17.8	B	13.708	B	P
Lead	2.9	U	2.9	U	2.9	U	2.9	U	0.580	U	P
Magnesium	25.5	B	74.2	B	46.5	B	41.2	B	4.580	U	P
Manganese	0.8	U	2.1	B	2.3	B	2.1	B	0.226	B	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	3.4	U	3.6	B	3.4	U	3.4	U	0.680	U	P
Potassium	70.2	B	92.8	B	95.0	B	102.2	B	15.380	B	P
Selenium	2.8	U	2.8	U	2.8	U	2.8	U	0.560	U	P
Silver	3.8	B	4.0	B	3.6	B	2.8	B	0.798	B	P
Sodium	114.4	U	125.0	B	128.9	B	149.4	B	22.880	U	P
Thallium	1.6	U	1.6	U	1.6	U	1.6	U	0.320	U	P
Vanadium	5.5	U	5.5	U	5.5	U	5.5	U	1.100	U	P
Zinc	5.6	B	5.4	B	5.8	B	4.9	B	0.880	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA
Titanium	2.4	B	4.0	B	5.6	B	4.1	B	0.596	B	P

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FORM III - IN ILM02.1

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028

WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: B09362S

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

Lab Code: SKINER Case No.: N3-09-137SAS No.: SDG No.: B09355

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

% Solids for Sample: 95.8

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	50.9713		3.7257	B	99.41	47.5	N	P
Arsenic	75-125	400.6959		3.3092		397.65	99.9		P
Barium	75-125	544.3285		152.5434		397.65	98.5		P
Beryllium	75-125	9.6014		0.4336	B	9.94	92.2		P
Cadmium	75-125	9.2872		0.2610	U	9.94	93.4		P
Calcium									NR
Chromium	75-125	51.1085		15.0273		39.77	90.7		P
Cobalt	75-125	103.5570		11.9118		99.41	92.2		P
Copper	75-125	67.2274		18.0926		49.71	98.8		P
Iron									NR
Lead	75-125	95.2600		3.8024		99.41	92.0		P
Magnesium									NR
Manganese	75-125	412.3273		329.7133		99.41	83.1		P
Mercury	75-125	0.6128		0.0522	U	0.52	117.8		CV
Nickel	75-125	102.3024		11.2113		99.41	91.6		P
Potassium									NR
Selenium	75-125	374.9677		0.5621	U	397.65	94.3		P
Silver	75-125	11.8541		2.1439		9.94	97.7		P
Sodium									NR
Thallium	75-125	371.0906		0.3212	U	397.65	93.3		P
Vanadium	75-125	151.6791		61.8837		99.41	90.3		P
Zinc	75-125	135.1208		42.8698		99.41	92.8		P
Cyanide	75-125	23.3736		0.5117	U	25.34	92.2		CA
Titanium		2051.2973		2071.0214		99.41	-19.8		P

OK cj 2/17/94

Comments:

Sample result >4x spike added

Spike recovery J Antimony 5/40222

FORM V (Part 1) - IN ILM02.1

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SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418/615SVOA.UP2)

9413225.2548

COPY

MEMORANDUM

FEB 1994 RECEIVED TQO

TO: 200-UP-2 Project QA Record February 11, 1994

FR: Kenney Louie, Golder Associates Inc. Kenney Louie

RE: SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418/615SVOA.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09355-TMA-615 prepared by TMA/ARLI laboratory. A list of samples validated along with the analyses reported and the method(s) of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09355	9/20/93	SOIL	SEE NOTE 1
B09356	9/20/93	SOIL	
B09357	9/20/93	SOIL	
B09359	9/20/93	SOIL	
B09360	9/20/93	SOIL	
B09361	9/20/93	SOIL	
B09362	9/20/93	SOIL	

Notes:

1. All samples were analyzed for Semivolatile Organic Analysis only.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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.

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Completeness. The data package was complete for all requested analyses. A total of seven samples were validated in this data package with a total of 448 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.

Laboratory Blanks

- Di-n-butylphthalate was detected in the laboratory blank. Attachment 2 provides a summary of the samples and data qualification applied.
- Three tentatively identified compounds (TIC's) were detected in the laboratory blank. Attachment 2 provides a summary of the samples and data qualification applied.

REFERENCES

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

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

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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.

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.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	REVIEWER: K. LOUIE	DATE: 940217	PAGE 1 OF 1
COMMENTS: SVOA B093555-TMA-0615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
Di-n-butylphthalate	U	ALL	TCL PRESENT IN BLANK
UNKNOWN HYDROCARBON	U	ALL	TIC PRESENT IN BLANK @ RT = 5.92 BASE PEAK = M/Z 43
UNKNOWN CARBOXYLIC ACID ESTER	U	B09355	TIC PRESENT IN BLANK @ RT = 19.45
HEXANEDIOIC ACID ISOMER	U	B09355, B09360, B09361	TIC PRESENT IN BLANK @ RT = 24.58
UNKNOWN HYDROCARBON	JN	B09355, B09356, B09359 B09360, B09361, B09362	TIC @ RT = 5.37
UNKNOWN ALKANE	JN	B09355, B09361, B09362	TIC @ RT = 27.17
UNKNOWN ALKANE	JN	B09355	TIC @ RT = 28.85
UNKNOWN ALKANE	JN	B09357	TIC @ RT = 5.90 BASE PEAK = M/Z 59
UNKNOWN HYDROCARBON	JN	B09359, B09360, B09361	TIC @ RT = 22.30
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 7.90
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 11.67
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 22.70
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.60
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.72
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.98
UNKNOWN HYDROCARBON	JN	B09361, B09362	TIC @ RT = 27.13
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 27.38
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 27.92

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND

ANNOTATED LABORATORY RESULTS

9W3225.2555

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
PHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-CHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,3-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,4-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,2-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROETHANE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
NITROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ISOPHORONE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-NITROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DIMETHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DICHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
NAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLOROANILINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROBUTADIENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-METHYLNAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
2-CHLORONAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
DIMETHYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ACENAPHTHYLENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
3-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U

Verified 12/20/93

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ACENAPHTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DINITROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
4-NITROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
DIBENZOFURAN	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DINITROTOLUENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,6-DINITROTOLUENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DIETHYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
FLUORENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
N-NITROSODIPHENYLAMINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
PENTACHLOROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	330.000	U
PHENANTHRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
CARBAZOLE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DI-N-BUTYLPHTHALATE	UG/KG	410.000	U	340.000	U	360.000	U	320.000	U	330.000	U	340.000	U
FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BUTYLBENZYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(A)ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
CHRYSENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DI-N-OCTYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(B)FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(K)FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(A)PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(G,H,I)PERYLENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
PHENOL	UG/KG	340.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	340.000	U
2-CHLOROPHENOL	UG/KG	340.000	U
1,3-DICHLOROBENZENE	UG/KG	340.000	U
1,4-DICHLOROBENZENE	UG/KG	340.000	U
1,2-DICHLOROBENZENE	UG/KG	340.000	U
2-METHYLPHENOL	UG/KG	340.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	340.000	U
4-METHYLPHENOL	UG/KG	340.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	340.000	U
HEXACHLOROETHANE	UG/KG	340.000	U
NITROBENZENE	UG/KG	340.000	U
ISOPHORONE	UG/KG	340.000	U
2-NITROPHENOL	UG/KG	340.000	U
2,4-DIMETHYLPHENOL	UG/KG	340.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	340.000	U
2,4-DICHLOROPHENOL	UG/KG	340.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	340.000	U
NAPHTHALENE	UG/KG	340.000	U
4-CHLOROANILINE	UG/KG	340.000	U
HEXACHLOROBUTADIENE	UG/KG	340.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	340.000	U
2-METHYLNAPHTHALENE	UG/KG	340.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	340.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	340.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	830.000	U
2-CHLORONAPHTHALENE	UG/KG	340.000	U
2-NITROANILINE	UG/KG	830.000	U
DIMETHYLPHTHALATE	UG/KG	340.000	U
ACENAPHTHYLENE	UG/KG	340.000	U
3-NITROANILINE	UG/KG	830.000	U

Verified 9/20/94 -010

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
ACENAPHTHENE	UG/KG	340.000	U
2,4-DINITROPHENOL	UG/KG	830.000	U
4-NITROPHENOL	UG/KG	830.000	U
DIBENZOFURAN	UG/KG	340.000	U
2,4-DINITROTOLUENE	UG/KG	340.000	U
2,6-DINITROTOLUENE	UG/KG	340.000	U
DIETHYLPHTHALATE	UG/KG	340.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	340.000	U
FLUORENE	UG/KG	340.000	U
4-NITROANILINE	UG/KG	830.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	830.000	U
N-NITROSODIPHENYLAMINE	UG/KG	340.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	340.000	U
HEXACHLOROBENZENE	UG/KG	340.000	U
PENTACHLOROPHENOL	UG/KG	830.000	U
PHENANTHRENE	UG/KG	340.000	U
ANTHRACENE	UG/KG	340.000	U
CARBAZOLE	UG/KG	340.000	U
DI-N-BUTYLPHTHALATE	UG/KG	350.000	U
FLUORANTHENE	UG/KG	340.000	U
PYRENE	UG/KG	340.000	U
BUTYLBENZYLPHTHALATE	UG/KG	340.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	340.000	U
BENZO(A)ANTHRACENE	UG/KG	340.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	340.000	U
CHRYSENE	UG/KG	340.000	U
DI-N-OCTYLPHTHALATE	UG/KG	340.000	U
BENZO(B)FLUORANTHENE	UG/KG	340.000	U
BENZO(K)FLUORANTHENE	UG/KG	340.000	U
BENZO(A)PYRENE	UG/KG	340.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	340.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	340.000	U
BENZO(G,H,I)PERYLENE	UG/KG	340.000	U

Verified
10/12/93

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

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

CAS NO.	COMPOUND	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

9413225.2580

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

9413225.2501

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	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	410	~~B~~ 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	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

FORM I SV-2

Verified Klowe 2-9-94

000269 SF
~~000269~~ 12/21

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.37	79	JN
2.	UNKNOWN HYDROCARBON	5.92	1100	~~BJ~~ U
3.	UNKNOWN CARBOXYLIC ACID ESTE	19.43	120	~~BJ~~ U
4.	HEXANEDIOIC ACID ISOMER	24.58	120	~~BJ~~ U
5.	UNKNOWN ALKANE	27.17	79	JN
6.	UNKNOWN ALKANE	28.85	240	JN

Verified 940216 [illegible]

94/3225.2562

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09356

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

9413225.2563

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)Ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-Propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)Methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-Methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	810	U

Klaus verified 3/95 2-11-94

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09356

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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	UG/KG	Q
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-Butylphthalate	340 ~~290~~	~~B~~ U
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)Anthracene	340	U
117-81-7	bis(2-Ethylhexyl)Phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-Octyl Phthalate	340	U
205-99-2	Benzo(b)Fluoranthene	340	U
207-08-9	Benzo(k)Fluoranthene	340	U
50-32-8	Benzo(a)Pyrene	340	U
193-39-5	Indeno(1,2,3-cd)Pyrene	340	U
53-70-3	Dibenz(a,h)Anthracene	340	U
191-24-2	Benzo(g,h,i)Perylene	340	U

(1) - Cannot be separated from Diphenylamine

Verified Klaus 3-11-94

FORM I SV-2

EPA SAMPLE NO.

B09356

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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.	UNKNOWN HYDROCARBON	5.35	100	JN
2.	UNKNOWN HYDROCARBON	5.90	1300	~~BJ~~ U

Verified 9/10/96

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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	UG/KG	Q
108-95-2	Phenol	360	U
111-44-4	bis(2-Chloroethyl)Ether	360	U
95-57-8	2-Chlorophenol	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
95-50-1	1,2-Dichlorobenzene	360	U
95-48-7	2-Methylphenol	360	U
108-60-1	2,2'-oxybis(1-Chloropropane)	360	U
106-44-5	4-Methylphenol	360	U
621-64-7	N-Nitroso-Di-n-Propylamine	360	U
67-72-1	Hexachloroethane	360	U
98-95-3	Nitrobenzene	360	U
78-59-1	Isophorone	360	U
88-75-5	2-Nitrophenol	360	U
105-67-9	2,4-Dimethylphenol	360	U
111-91-1	bis(2-Chloroethoxy)Methane	360	U
120-83-2	2,4-Dichlorophenol	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
91-20-3	Naphthalene	360	U
106-47-8	4-Chloroaniline	360	U
87-68-3	Hexachlorobutadiene	360	U
59-50-7	4-Chloro-3-Methylphenol	360	U
91-57-6	2-Methylnaphthalene	360	U
77-47-4	Hexachlorocyclopentadiene	360	U
88-06-2	2,4,6-Trichlorophenol	360	U
95-95-4	2,4,5-Trichlorophenol	870	U
91-58-7	2-Chloronaphthalene	360	U
88-74-4	2-Nitroaniline	870	U
131-11-3	Dimethylphthalate	360	U
208-96-8	Acenaphthylene	360	U
99-09-2	3-Nitroaniline	870	U
83-32-9	Acenaphthene	360	U
51-28-5	2,4-Dinitrophenol	870	U

Klaine 3/90 7-11-94 Verified

9413225.2586

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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
100-02-7	4-Nitrophenol	870	U
132-64-9	Dibenzofuran	360	U
121-14-2	2,4-Dinitrotoluene	360	U
606-20-2	2,6-Dinitrotoluene	360	U
84-66-2	Diethylphthalate	360	U
7005-72-3	4-Chlorophenyl-phenylether	360	U
86-73-7	Fluorene	360	U
100-01-6	4-Nitroaniline	870	U
534-52-1	4,6-Dinitro-2-methylphenol	870	U
86-30-6	N-Nitrosodiphenylamine (1)	360	U
101-55-3	4-Bromophenyl-phenylether	360	U
118-74-1	Hexachlorobenzene	360	U
87-86-5	Pentachlorophenol	870	U
85-01-8	Phenanthrene	360	U
120-12-7	Anthracene	360	U
86-74-8	Carbazole	360	U
84-74-2	Di-n-Butylphthalate	360 ~~320~~	~~BJ~~ U
206-44-0	Fluoranthene	360	U
129-00-0	Pyrene	360	U
85-68-7	Butylbenzylphthalate	360	U
91-94-1	3,3'-Dichlorobenzidine	360	U
56-55-3	Benzo(a)Anthracene	360	U
117-81-7	bis(2-Ethylhexyl)Phthalate	360	U
218-01-9	Chrysene	360	U
117-84-0	Di-n-Octyl Phthalate	360	U
205-99-2	Benzo(b)Fluoranthene	360	U
207-08-9	Benzo(k)Fluoranthene	360	U
50-32-8	Benzo(a)Pyrene	360	U
193-39-5	Indeno(1,2,3-cd)Pyrene	360	U
53-70-3	Dibenz(a,h)Anthracene	360	U
191-24-2	Benzo(g,h,i)Perylene	360	U

(1) - Cannot be separated from Diphenylamine

Verified 2-11-94 KL Cain 3/90

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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.	UNKNOWN HYDROCARBON	5.90	110	JN
2.	UNKNOWN HYDROCARBON	5.98	1300	~~BJ~~ U

Verified 940216

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09359

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	320	U
111-44-4	bis(2-Chloroethyl)Ether	320	U
95-57-8	2-Chlorophenol	320	U
541-73-1	1,3-Dichlorobenzene	320	U
106-46-7	1,4-Dichlorobenzene	320	U
95-50-1	1,2-Dichlorobenzene	320	U
95-48-7	2-Methylphenol	320	U
108-60-1	2,2'-oxybis(1-Chloropropane)	320	U
106-44-5	4-Methylphenol	320	U
621-64-7	N-Nitroso-Di-n-Propylamine	320	U
67-72-1	Hexachloroethane	320	U
98-95-3	Nitrobenzene	320	U
78-59-1	Isophorone	320	U
88-75-5	2-Nitrophenol	320	U
105-67-9	2,4-Dimethylphenol	320	U
111-91-1	bis(2-Chloroethoxy)Methane	320	U
120-83-2	2,4-Dichlorophenol	320	U
120-82-1	1,2,4-Trichlorobenzene	320	U
91-20-3	Naphthalene	320	U
106-47-8	4-Chloroaniline	320	U
87-68-3	Hexachlorobutadiene	320	U
59-50-7	4-Chloro-3-Methylphenol	320	U
91-57-6	2-Methylnaphthalene	320	U
77-47-4	Hexachlorocyclopentadiene	320	U
88-06-2	2,4,6-Trichlorophenol	320	U
95-95-4	2,4,5-Trichlorophenol	790	U
91-58-7	2-Chloronaphthalene	320	U
88-74-4	2-Nitroaniline	790	U
131-11-3	Dimethylphthalate	320	U
208-96-8	Acenaphthylene	320	U
99-09-2	3-Nitroaniline	790	U
83-32-9	Acenaphthene	320	U
51-28-5	2,4-Dinitrophenol	790	U

FORM I SV-1

Verified 2-11-94 3/90 Clair

9413225.2969

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09359

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

9413225.2500

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	320	U
121-14-2	2,4-Dinitrotoluene	320	U
606-20-2	2,6-Dinitrotoluene	320	U
84-66-2	Diethylphthalate	320	U
7005-72-3	4-Chlorophenyl-phenylether	320	U
86-73-7	Fluorene	320	U
100-01-6	4-Nitroaniline	790	U
534-52-1	4,6-Dinitro-2-methylphenol	790	U
86-30-6	N-Nitrosodiphenylamine (1)	320	U
101-55-3	4-Bromophenyl-phenylether	320	U
118-74-1	Hexachlorobenzene	320	U
87-86-5	Pentachlorophenol	790	U
85-01-8	Phenanthrene	320	U
120-12-7	Anthracene	320	U
86-74-8	Carbazole	320	U
84-74-2	Di-n-Butylphthalate	320 ~~310~~	~~B~~ n
206-44-0	Fluoranthene	320	U
129-00-0	Pyrene	320	U
85-68-7	Butylbenzylphthalate	320	U
91-94-1	3,3'-Dichlorobenzidine	320	U
56-55-3	Benzo(a)Anthracene	320	U
117-81-7	bis(2-Ethylhexyl)Phthalate	320	U
218-01-9	Chrysene	320	U
117-84-0	Di-n-Octyl Phthalate	320	U
205-99-2	Benzo(b)Fluoranthene	320	U
207-08-9	Benzo(k)Fluoranthene	320	U
50-32-8	Benzo(a)Pyrene	320	U
193-39-5	Indeno(1,2,3-cd)Pyrene	320	U
53-70-3	Dibenz(a,h)Anthracene	320	U
191-24-2	Benzo(g,h,i)Perylene	320	U

(1) - Cannot be separated from Diphenylamine

Verified 2-11-94 Klein

FORM I SV-2

EPA SAMPLE NO.

B09359

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.35	66	JN
2.	UNKNOWN HYDROCARBON	5.90	950	~~BJ~~ JN
3.	UNKNOWN HYDROCARBON	22.30	720	JN

Verified 5/02/10

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09360

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

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

CAS NO.	COMPOUND	UG/KG	Q
108-95-2	Phenol	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

Klein Verified 3/90 2-1-94

000345

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09360

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

9413225.2593

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	330 ~~300~~	~~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	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 2-1-94 Klein 3/96

FORM I SV-2

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B09360

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 4

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.35	130	J N
2.	UNKNOWN HYDROCARBON	5.88	1500	~~BJ~~ U
3.	UNKNOWN HYDROCARBON	22.27	890	J N
4.	HEXANEDIOIC ACID ISOMER	24.53	99	~~BJ~~ U

5/21/94

Verified 9410216

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

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

CAS NO.	COMPOUND		Q
108-95-2	Phenol	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	810	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	810	U

Verified 2-14-94 Klein

9413225.2595

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

9413225.2996

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	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	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	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	810	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	340	~~B~~ 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	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

028

Verified 2-14-94 Klowe

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

Number TICs found: 12

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.33	100	JN
2.	UNKNOWN HYDROCARBON	5.88	1300	~~BJ~~U
3.	UNKNOWN HYDROCARBON	7.90	170	JN
4.	UNKNOWN HYDROCARBON	11.67	100	JN
5.	UNKNOWN HYDROCARBON	22.70	67	JN
6.	HEXANEDIOIC ACID ISOMER	24.53	130	~~BJ~~U
7.	UNKNOWN HYDROCARBON	26.60	240	JN
8.	UNKNOWN HYDROCARBON	26.72	67	JN
9.	UNKNOWN HYDROCARBON	26.98	540	JN
10.	UNKNOWN HYDROCARBON	27.13	540	JN
11.	UNKNOWN HYDROCARBON	27.38	130	JN
12.	UNKNOWN HYDROCARBON	27.92	100	JN

Verified 940216

000393

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

94/3225.258

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)Ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-Propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)Methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-Methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	830	U

030

Verified 3-11-94 [illegible]

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

944 3225.2599

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-Butylphthalate	350	~~B~~ U
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)Anthracene	340	U
117-81-7	bis(2-Ethylhexyl)Phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-Octyl Phthalate	340	U
205-99-2	Benzo(b)Fluoranthene	340	U
207-08-9	Benzo(k)Fluoranthene	340	U
50-32-8	Benzo(a)Pyrene	340	U
193-39-5	Indeno(1,2,3-cd)Pyrene	340	U
53-70-3	Dibenz(a,h)Anthracene	340	U
191-24-2	Benzo(g,h,i)Perylene	340	U

(1) - Cannot be separated from Diphenylamine

-031

Klonie verified 10-19-93/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.37	100	JN
2.	UNKNOWN HYDROCARBON	5.92	1500	~~BJ~~ U
3.	UNKNOWN HYDROCARBON	27.17	69	JN

Verified 9/10/16

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9W3225.2581

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-078

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 27, 1993

1.0 DESCRIPTION OF CASE :

Eight 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 Total Petroleum Hydrocarbons in the Kerosene range (K) were analyzed according to the SW-846 Method 8015M.

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2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09355	A3-09-078-01A	V	SOIL
B09355	A3-09-078-01B	SV	SOIL
B09355 MS	A3-09-078-01C	SV	SOIL
B09355 MSD	A3-09-078-01D	SV	SOIL
B09355	A3-09-078-01G	K	SOIL
B09356	A3-09-078-02A	V	SOIL
B09356 MS	A3-09-078-02B	V	SOIL
B09356 MSD	A3-09-078-02C	V	SOIL
B09356	A3-09-078-02D	SV	SOIL
B09356	A3-09-078-02G	K	SOIL
B098Y6	A3-09-078-03A	V	SOIL
B09357	A3-09-078-04A	V	SOIL
B09357	A3-09-078-04B	SV	SOIL
B09357	A3-09-078-04D	K	SOIL
B09357 MS	A3-09-078-04E	K	SOIL
B09357 MSD	A3-09-078-04F	K	SOIL
B09362	A3-09-078-05A	V	SOIL
B09362	A3-09-078-05B	SV	SOIL
B09362	A3-09-078-05D	K	SOIL
B09359	A3-09-078-06A	V	SOIL
B09359	A3-09-078-06B	SV	SOIL
B09359	A3-09-078-06D	K	SOIL
B09360	A3-09-078-07A	V	SOIL
B09360	A3-09-078-07B	SV	SOIL
B09360	A3-09-078-07D	K	SOIL
B09361	A3-09-078-08B	SV,K	SOIL
B09361	A3-09-078-08D	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

A 250 mL Volatile container for sample B09361 was broken at TMA/ARLI. As per WHC ROD-93-0215, TMA/ARLI was instructed to use the Kerosene aliquot of that sample for the Volatile analysis. Both Kerosene and Semivolatiles will be analyzed for by utilizing the 250 mL bottle designated for the Semivolatiles analysis.

All of the other sample containers 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 contract required holding times.

No TCL analytes were detected in the samples, with the exception of trace amounts of Di-n-butylphthalate ranging from 290 to 410 ppb.

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

3.2.3 TOTAL PETROLEUM HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 10/05/93 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

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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 within the SW-846 holding time. Approximately 20g of each sample was extracted and concentrated to a final volume of 5 mL. The samples were then analyzed by GC/FID for total petroleum hydrocarbons in the Kerosene range by Method 8015M. There were no total petroleum hydrocarbons detected in the samples.

Sample B09357 was spiked with approximately 245 ug/Kg of Kerosene. The spike recoveries were between 90% and 92%, whereas the blank spike had a recovery of 82%.

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

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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 12/2/93
CLP Program Manager

for Wida Ang 12/2/93
Organics Supervisor

0000020

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: 4993-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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

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2) B09360

- 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) B09361

- 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:
9-23-93 Loren E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCO 9-25-93; opened 9-27-93 - KB

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

000002

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

- 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) B09362

- 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

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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 9-21-93

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

Relinquished by:	Received by:	Date/Time:
Jacob S. Rogers 9-23-93 1440	Kermit K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL on 9-25-93; opened 9-27-93 KB

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

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

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

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

Comments:

4. BLANKS

gj 2/14/94

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

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

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

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

Comments:

5. ACCURACY

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

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

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

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

Comments:

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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:

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HOLDING TIME SUMMARY

SDG: B09355-TMA-615	VALIDATOR: K. Louie	DATE: 2-11-94	PAGE 1 OF 1
COMMENTS: SVOA B09355-TMA-615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	CLP	9-20-93	10-02-93	10-13-93	12	11	None
B09356	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09358	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B09360	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓

BLANK AND SAMPLE DATA SUMMARY

SDG: B09355	VALIDATOR: K. LOUIES	DATE: 2-11-94	PAGE 1 OF 1
COMMENTS: SVOA B09355-TMA-615			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
SBLK1002S	Di-n-butylphthalate	290	J		ug/kg		2900	ALL	u
SBLK1002S	UNKNOWN HC	860	J	5.92		4300		ALL	u
SBLK1002S	UNKNOWN CARBOXYLIC								
	ACID ESTER	99	J	19.45		495	~~495~~ et mt	B09355	u
SBLK1002S	HEXANEDIOIC ACID								
	ESTER	66	J	24.58		330	~~330~~ et mt	B09355, B09360 B09361,	u

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1002S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-BLK

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I03

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

PM 3225.2592

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	290	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	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

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FORM I SV-2 3/90

Blank Contamination.

EPA SAMPLE NO.

SBLK1002S

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-BLK

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I03

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.92	860	J
2.	UNKNOWN CARBOXYLIC ACID ESTE	19.45	99	J
3.	HEXANEDIOIC ACID ISOMER	24.58	66	J

Blank Contamination

.047

SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418/615SVOA.UP2)

9413225.2594

MEMORANDUM

FEB 1994
RECEIVED
TQO

TO: 200-UP-2 Project QA Record February 11, 1994

FR: Kenney Louie, Golder Associates Inc. Kenney Louie

RE: SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE B09355-TMA-615 (923-E418/615SVOA.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B09355-TMA-615 prepared by TMA/ARLI laboratory. A list of samples validated along with the analyses reported and the method(s) of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09355	9/20/93	SOIL	SEE NOTE 1
B09356	9/20/93	SOIL	
B09357	9/20/93	SOIL	
B09359	9/20/93	SOIL	
B09360	9/20/93	SOIL	
B09361	9/20/93	SOIL	
B09362	9/20/93	SOIL	

Notes:

1. All samples were analyzed for Semivolatile Organic Analysis only.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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.

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Completeness. The data package was complete for all requested analyses. A total of seven samples were validated in this data package with a total of 448 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.

Laboratory Blanks

- Di-n-butylphthalate was detected in the laboratory blank. Attachment 2 provides a summary of the samples and data qualification applied.
- Three tentatively identified compounds (TIC's) were detected in the laboratory blank. Attachment 2 provides a summary of the samples and data qualification applied.

REFERENCES

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

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

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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.

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.

9413225.2597

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.2598

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: NA	REVIEWER: K. LOUIE	DATE: 940217	PAGE 1 OF 1
COMMENTS: SVOA B093555-TMA-0615			
PARAMETER	QUALIFIER	SAMPLES AFFECTED	REASON
Di-n-butylphthalate	U	ALL	TCL PRESENT IN BLANK
UNKNOWN HYDROCARBON	U	ALL	TIC PRESENT IN BLANK @ RT = 5.92 BASE PEAK = M/Z 43
UNKNOWN CARBOXYLIC ACID ESTER	U	B09355	TIC PRESENT IN BLANK @ RT = 19.45
HEXANEDIOIC ACID ISOMER	U	B09355, B09360, B09361	TIC PRESENT IN BLANK @ RT = 24.58
UNKNOWN HYDROCARBON	JN	B09355, B09356, B09359 B09360, B09361, B09362	TIC @ RT = 5.37
UNKNOWN ALKANE	JN	B09355, B09361, B09362	TIC @ RT = 27.17
UNKNOWN ALKANE	JN	B09355	TIC @ RT = 28.85
UNKNOWN ALKANE	JN	B09357	TIC @ RT = 5.90 BASE PEAK = M/Z 59
UNKNOWN HYDROCARBON	JN	B09359, B09360, B09361	TIC @ RT = 22.30
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 7.90
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 11.67
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 22.70
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.60
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.72
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 26.98
UNKNOWN HYDROCARBON	JN	B09361, B09362	TIC @ RT = 27.13
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 27.38
UNKNOWN HYDROCARBON	JN	B09361	TIC @ RT = 27.92

9413225.2599

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND

ANNOTATED LABORATORY RESULTS

9W3225.2600

Validated Data Summary, Data Package: B09355-THA-615

	Sample#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
PHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-CHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,3-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,4-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,2-DICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROETHANE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
NITROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ISOPHORONE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-NITROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DIMETHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DICHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
NAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLOROANILINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROBUTADIENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-METHYLNAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
2-CHLORONAPHTHALENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
DIMETHYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ACENAPHTHYLENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
3-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U

Validated Data Summary, Data Package: B09355-TMA-615

	Sample	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.5 - 170		169 - 171.5		169 - 171.5		---		---		181 - 182	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ACENAPHTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DINITROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
4-NITROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
DIBENZOFURAN	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,4-DINITROTOLUENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
2,6-DINITROTOLUENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DIETHYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
FLUORENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-NITROANILINE	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	810.000	U
N-NITROSODIPHENYLAMINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
HEXACHLOROBENZENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
PENTACHLOROPHENOL	UG/KG	940.000	U	810.000	U	870.000	U	790.000	U	790.000	U	330.000	U
PHENANTHRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
CARBAZOLE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DI-N-BUTYLPHTHALATE	UG/KG	410.000	U	340.000	U	360.000	U	320.000	U	330.000	U	340.000	U
FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BUTYLBENZYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(A)ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
CHRYSENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DI-N-OCTYLPHTHALATE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(B)FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(K)FLUORANTHENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(A)PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U
BENZO(G,H,I)PERYLENE	UG/KG	390.000	U	340.000	U	360.000	U	320.000	U	330.000	U	330.000	U

Validated Data Summary, Data Package: B09355-IMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
PHENOL	UG/KG	340.000	U
BIS(2-CHLOROETHYL)ETHER	UG/KG	340.000	U
2-CHLOROPHENOL	UG/KG	340.000	U
1,3-DICHLOROBENZENE	UG/KG	340.000	U
1,4-DICHLOROBENZENE	UG/KG	340.000	U
1,2-DICHLOROBENZENE	UG/KG	340.000	U
2-METHYLPHENOL	UG/KG	340.000	U
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	340.000	U
4-METHYLPHENOL	UG/KG	340.000	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	340.000	U
HEXACHLOROETHANE	UG/KG	340.000	U
NITROBENZENE	UG/KG	340.000	U
ISOPHORONE	UG/KG	340.000	U
2-NITROPHENOL	UG/KG	340.000	U
2,4-DIMETHYLPHENOL	UG/KG	340.000	U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	340.000	U
2,4-DICHLOROPHENOL	UG/KG	340.000	U
1,2,4-TRICHLOROBENZENE	UG/KG	340.000	U
NAPHTHALENE	UG/KG	340.000	U
4-CHLOROANILINE	UG/KG	340.000	U
HEXACHLOROBUTADIENE	UG/KG	340.000	U
4-CHLORO-3-METHYLPHENOL	UG/KG	340.000	U
2-METHYLNAPHTHALENE	UG/KG	340.000	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	340.000	U
2,4,6-TRICHLOROPHENOL	UG/KG	340.000	U
2,4,5-TRICHLOROPHENOL	UG/KG	830.000	U
2-CHLORONAPHTHALENE	UG/KG	340.000	U
2-NITROANILINE	UG/KG	830.000	U
DIMETHYLPHTHALATE	UG/KG	340.000	U
ACENAPHTHYLENE	UG/KG	340.000	U
3-NITROANILINE	UG/KG	830.000	U

Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-21-93	
	Location	219-W19-97	
	Depth	175.7 - 177	
	Type	---	
Parameter	Units	Result	Q
ACENAPHTHENE	UG/KG	340.000	U
2,4-DINITROPHENOL	UG/KG	830.000	U
4-NITROPHENOL	UG/KG	830.000	U
DIBENZOFURAN	UG/KG	340.000	U
2,4-DINITROTOLUENE	UG/KG	340.000	U
2,6-DINITROTOLUENE	UG/KG	340.000	U
DIETHYLPHTHALATE	UG/KG	340.000	U
4-CHLOROPHENYL-PHENYLETHER	UG/KG	340.000	U
FLUORENE	UG/KG	340.000	U
4-NITROANILINE	UG/KG	830.000	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	830.000	U
N-NITROSODIPHENYLAMINE	UG/KG	340.000	U
4-BROMOPHENYL-PHENYLETHER	UG/KG	340.000	U
HEXACHLOROBENZENE	UG/KG	340.000	U
PENTACHLOROPHENOL	UG/KG	830.000	U
PHENANTHRENE	UG/KG	340.000	U
ANTHRACENE	UG/KG	340.000	U
CARBAZOLE	UG/KG	340.000	U
DI-N-BUTYLPHTHALATE	UG/KG	350.000	U
FLUORANTHENE	UG/KG	340.000	U
PYRENE	UG/KG	340.000	U
BUTYLBENZYLPHTHALATE	UG/KG	340.000	U
3,3'-DICHLOROBENZIDINE	UG/KG	340.000	U
BENZO(A)ANTHRACENE	UG/KG	340.000	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	340.000	U
CHRYSENE	UG/KG	340.000	U
DI-N-OCTYLPHTHALATE	UG/KG	340.000	U
BENZO(B)FLUORANTHENE	UG/KG	340.000	U
BENZO(K)FLUORANTHENE	UG/KG	340.000	U
BENZO(A)PYRENE	UG/KG	340.000	U
INDENO(1,2,3-CD)PYRENE	UG/KG	340.000	U
DIBENZ(A,H)ANTHRACENE	UG/KG	340.000	U
BENZO(G,H,I)PERYLENE	UG/KG	340.000	U

Validated
10/20/93

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

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

9413225.2665

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

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

CAS NO.	COMPOUND		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	410	~~B~~ 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	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

FORM I SV-2

Verified KLowe 2-9-94

000269 SF
~~000269~~ 12/2/

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B09355

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-01B

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 31013I04

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 17 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.37	79	JN
2.	UNKNOWN HYDROCARBON	5.92	1100	~~BJ~~ U
3.	UNKNOWN CARBOXYLIC ACID ESTE	19.43	120	~~BJ~~ U
4.	HEXANEDIOIC ACID ISOMER	24.58	120	~~BJ~~ U
5.	UNKNOWN ALKANE	27.17	79	JN
6.	UNKNOWN ALKANE	28.35	240	JN

Verified 3/02/96

9413325.2607

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09356

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)Ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-Propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)Methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-Methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	810	U

FORM I SV-1

Klaus verified 3-11-94

9413225.2608

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09356

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

9413225.2209

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-Butylphthalate	3-0 ~~290~~	~~37~~ U
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)Anthracene	340	U
117-81-7	bis(2-Ethylhexyl)Phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-Octyl Phthalate	340	U
205-99-2	Benzo(b)Fluoranthene	340	U
207-08-9	Benzo(k)Fluoranthene	340	U
50-32-8	Benzo(a)Pyrene	340	U
193-39-5	Indeno(1,2,3-cd)Pyrene	340	U
53-70-3	Dibenz(a,h)Anthracene	340	U
191-24-2	Benzo(g,h,i)Perylene	340	U

(1) - Cannot be separated from Diphenylamine

Verified KLowe 3-1-94

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09356

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-02D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I07

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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.	UNKNOWN HYDROCARBON	5.35	100	JN
2.	UNKNOWN HYDROCARBON	5.90	1300	~~BJ~~ N

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

9413225.2611

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	360	U
111-44-4	bis(2-Chloroethyl)Ether	360	U
95-57-8	2-Chlorophenol	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
95-50-1	1,2-Dichlorobenzene	360	U
95-48-7	2-Methylphenol	360	U
108-60-1	2,2'-oxybis(1-Chloropropane)	360	U
106-44-5	4-Methylphenol	360	U
621-64-7	N-Nitroso-Di-n-Propylamine	360	U
67-72-1	Hexachloroethane	360	U
98-95-3	Nitrobenzene	360	U
78-59-1	Isophorone	360	U
88-75-5	2-Nitrophenol	360	U
105-67-9	2,4-Dimethylphenol	360	U
111-91-1	bis(2-Chloroethoxy)Methane	360	U
120-83-2	2,4-Dichlorophenol	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
91-20-3	Naphthalene	360	U
106-47-8	4-Chloroaniline	360	U
87-68-3	Hexachlorobutadiene	360	U
59-50-7	4-Chloro-3-Methylphenol	360	U
91-57-6	2-Methylnaphthalene	360	U
77-47-4	Hexachlorocyclopentadiene	360	U
88-06-2	2,4,6-Trichlorophenol	360	U
95-95-4	2,4,5-Trichlorophenol	370	U
91-58-7	2-Chloronaphthalene	360	U
88-74-4	2-Nitroaniline	870	U
131-11-3	Dimethylphthalate	360	U
208-96-8	Acenaphthylene	360	U
99-09-2	3-Nitroaniline	870	U
83-32-9	Acenaphthene	360	U
51-28-5	2,4-Dinitrophenol	870	U

FORM I SV-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

9413225.2612

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	870	U
132-64-9	Dibenzofuran	360	U
121-14-2	2,4-Dinitrotoluene	360	U
606-20-2	2,6-Dinitrotoluene	360	U
84-66-2	Diethylphthalate	360	U
7005-72-3	4-Chlorophenyl-phenylether	360	U
86-73-7	Fluorene	360	U
100-01-6	4-Nitroaniline	870	U
534-52-1	4,6-Dinitro-2-methylphenol	870	U
86-30-6	N-Nitrosodiphenylamine (1)	360	U
101-55-3	4-Bromophenyl-phenylether	360	U
118-74-1	Hexachlorobenzene	360	U
87-86-5	Pentachlorophenol	870	U
85-01-8	Phenanthrene	360	U
120-12-7	Anthracene	360	U
86-74-8	Carbazole	360	U
84-74-2	Di-n-Butylphthalate	~~360~~ 320	~~U~~ J
206-44-0	Fluoranthene	360	U
129-00-0	Pyrene	360	U
85-68-7	Butylbenzylphthalate	360	U
91-94-1	3,3'-Dichlorobenzidine	360	U
56-55-3	Benzo(a)Anthracene	360	U
117-81-7	bis(2-Ethylhexyl)Phthalate	360	U
218-01-9	Chrysene	360	U
117-84-0	Di-n-Octyl Phthalate	360	U
205-99-2	Benzo(b)Fluoranthene	360	U
207-08-9	Benzo(k)Fluoranthene	360	U
50-32-8	Benzo(a)Pyrene	360	U
193-39-5	Indeno(1,2,3-cd)Pyrene	360	U
53-70-3	Dibenz(a,h)Anthracene	360	U
191-24-2	Benzo(g,h,i)Perylene	360	U

(1) - Cannot be separated from Diphenylamine

Verified 2-11-94 KL 3/90

FORM I SV-2

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09357

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-04B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I08

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

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.	UNKNOWN HYDROCARBON	5.90	110	JN
2.	UNKNOWN HYDROCARBON	5.98	1300	~~BJ~~ U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09359

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

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

CAS NO.	COMPOUND	UG/KG	Q
108-95-2	Phenol	320	U
111-44-4	bis(2-Chloroethyl)Ether	320	U
95-57-8	2-Chlorophenol	320	U
541-73-1	1,3-Dichlorobenzene	320	U
106-46-7	1,4-Dichlorobenzene	320	U
95-50-1	1,2-Dichlorobenzene	320	U
95-48-7	2-Methylphenol	320	U
108-60-1	2,2'-oxybis(1-Chloropropane)	320	U
106-44-5	4-Methylphenol	320	U
621-64-7	N-Nitroso-Di-n-Propylamine	320	U
67-72-1	Hexachloroethane	320	U
98-95-3	Nitrobenzene	320	U
78-59-1	Isophorone	320	U
88-75-5	2-Nitrophenol	320	U
105-67-9	2,4-Dimethylphenol	320	U
111-91-1	bis(2-Chloroethoxy)Methane	320	U
120-83-2	2,4-Dichlorophenol	320	U
120-82-1	1,2,4-Trichlorobenzene	320	U
91-20-3	Naphthalene	320	U
106-47-8	4-Chloroaniline	320	U
87-68-3	Hexachlorobutadiene	320	U
59-50-7	4-Chloro-3-Methylphenol	320	U
91-57-6	2-Methylnaphthalene	320	U
77-47-4	Hexachlorocyclopentadiene	320	U
88-06-2	2,4,6-Trichlorophenol	320	U
95-95-4	2,4,5-Trichlorophenol	790	U
91-58-7	2-Chloronaphthalene	320	U
88-74-4	2-Nitroaniline	790	U
131-11-3	Dimethylphthalate	320	U
208-96-8	Acenaphthylene	320	U
99-09-2	3-Nitroaniline	790	U
83-32-9	Acenaphthene	320	U
51-28-5	2,4-Dinitrophenol	790	U

FORM I SV-1

Verified 2-11-94 3/90 Clem

9413225.261

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09359

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

9413225.2665

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	320	U
121-14-2	2,4-Dinitrotoluene	320	U
606-20-2	2,6-Dinitrotoluene	320	U
84-66-2	Diethylphthalate	320	U
7005-72-3	4-Chlorophenyl-phenylether	320	U
86-73-7	Fluorene	320	U
100-01-6	4-Nitroaniline	790	U
534-52-1	4,6-Dinitro-2-methylphenol	790	U
86-30-6	N-Nitrosodiphenylamine (1)	320	U
101-55-3	4-Bromophenyl-phenylether	320	U
118-74-1	Hexachlorobenzene	320	U
87-86-5	Pentachlorophenol	790	U
85-01-8	Phenanthrene	320	U
120-12-7	Anthracene	320	U
86-74-8	Carbazole	320	U
84-74-2	Di-n-Butylphthalate	320 ~~310~~	~~J~~ 1
206-44-0	Fluoranthene	320	U
129-00-0	Pyrene	320	U
85-68-7	Butylbenzylphthalate	320	U
91-94-1	3,3'-Dichlorobenzidine	320	U
56-55-3	Benzo(a)Anthracene	320	U
117-81-7	bis(2-Ethylhexyl)Phthalate	320	U
218-01-9	Chrysene	320	U
117-84-0	Di-n-Octyl Phthalate	320	U
205-99-2	Benzo(b)Fluoranthene	320	U
207-08-9	Benzo(k)Fluoranthene	320	U
50-32-8	Benzo(a)Pyrene	320	U
193-39-5	Indeno(1,2,3-cd)Pyrene	320	U
53-70-3	Dibenz(a,h)Anthracene	320	U
191-24-2	Benzo(g,h,i)Perylene	320	U

(1) - Cannot be separated from Diphenylamine

Verified 2-11-94

FORM I SV-2

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09359

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-06B

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 31013I10

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.6

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.35	66	JN
2.	UNKNOWN HYDROCARBON	5.90	950	~~BJ~~ JN
3.	UNKNOWN HYDROCARBON	22.30	720	JN

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09360

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

9413225.2607

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	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

Klaus Verified 3/96

EPA SAMPLE NO.

B09360

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

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

CAS NO.	COMPOUND	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	~~300~~ 330	~~30~~ 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	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 2-11-94 Klaus 3/96

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09360

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-07B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I11

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 4

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.35	130	J N
2.	UNKNOWN HYDROCARBON	5.88	1500	~~BJ~~ U
3.	UNKNOWN HYDROCARBON	22.27	890	J N
4.	HEXANEDIOIC ACID ISOMER	24.53	99	~~BJ~~ U

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

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

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	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	810	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	810	U

Verified 2-14-94 Klein

9413225.2630

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	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	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	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	810	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	340	~~B~~
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	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

028

Verified 2-1-94

FORM I SV-2 3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09361

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-08B

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I12

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 2 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

Number TICs found: 12

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.33	100	JN
2.	UNKNOWN HYDROCARBON	5.88	1300	~~BJ~~ U
3.	UNKNOWN HYDROCARBON	7.90	170	JN
4.	UNKNOWN HYDROCARBON	11.67	100	JN
5.	UNKNOWN HYDROCARBON	22.70	67	JN
6.	HEXANEDIOIC ACID ISOMER	24.53	130	~~BJ~~ U
7.	UNKNOWN HYDROCARBON	26.60	240	JN
8.	UNKNOWN HYDROCARBON	26.72	67	JN
9.	UNKNOWN HYDROCARBON	26.98	540	JN
10.	UNKNOWN HYDROCARBON	27.13	540	JN
11.	UNKNOWN HYDROCARBON	27.38	130	JN
12.	UNKNOWN HYDROCARBON	27.92	100	JN

Verified 940216

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)Ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-Propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)Methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-Methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	830	U

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Verified 2-11-94

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

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

CAS NO.	COMPOUND	UG/KG	Q
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-Butylphthalate	350	~~B~~
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)Anthracene	340	U
117-81-7	bis(2-Ethylhexyl)Phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-Octyl Phthalate	340	U
205-99-2	Benzo(b)Fluoranthene	340	U
207-08-9	Benzo(k)Fluoranthene	340	U
50-32-8	Benzo(a)Pyrene	340	U
193-39-5	Indeno(1,2,3-cd)Pyrene	340	U
53-70-3	Dibenz(a,h)Anthracene	340	U
191-24-2	Benzo(g,h,i)Perylene	340	U

(1) - Cannot be separated from Diphenylamine

-031

Klaus verified 3/90 10-14-93

FORM I SV-2

9413225.2629

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B09362

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-05B

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 31013I09

Level: (low/med) LOW Date Received: 09/27/93

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.3

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.37	100	JN
2.	UNKNOWN HYDROCARBON	5.92	1500	~~BJ~~ N
3.	UNKNOWN HYDROCARBON	27.17	69	JN

-032

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9419225.2626

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 09-078

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : September 27, 1993

1.0 DESCRIPTION OF CASE :

Eight 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 Total Petroleum Hydrocarbons in the Kerosene range (K) were analyzed according to the SW-846 Method 8015M.

9413225.2627

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B09355	A3-09-078-01A	V	SOIL
B09355	A3-09-078-01B	SV	SOIL
B09355 MS	A3-09-078-01C	SV	SOIL
B09355 MSD	A3-09-078-01D	SV	SOIL
B09355	A3-09-078-01G	K	SOIL
B09356	A3-09-078-02A	V	SOIL
B09356 MS	A3-09-078-02B	V	SOIL
B09356 MSD	A3-09-078-02C	V	SOIL
B09356	A3-09-078-02D	SV	SOIL
B09356	A3-09-078-02G	K	SOIL
B098Y6	A3-09-078-03A	V	SOIL
B09357	A3-09-078-04A	V	SOIL
B09357	A3-09-078-04B	SV	SOIL
B09357	A3-09-078-04D	K	SOIL
B09357 MS	A3-09-078-04E	K	SOIL
B09357 MSD	A3-09-078-04F	K	SOIL
B09362	A3-09-078-05A	V	SOIL
B09362	A3-09-078-05B	SV	SOIL
B09362	A3-09-078-05D	K	SOIL
B09359	A3-09-078-06A	V	SOIL
B09359	A3-09-078-06B	SV	SOIL
B09359	A3-09-078-06D	K	SOIL
B09360	A3-09-078-07A	V	SOIL
B09360	A3-09-078-07B	SV	SOIL
B09360	A3-09-078-07D	K	SOIL
B09361	A3-09-078-08B	SV,K	SOIL
B09361	A3-09-078-08D	V	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

A 250 mL Volatile container for sample B09361 was broken at TMA/ARLI. As per WHC ROD-93-0215, TMA/ARLI was instructed to use the Kerosene aliquot of that sample for the Volatile analysis. Both Kerosene and Semivolatiles will be analyzed for by utilizing the 250 mL bottle designated for the Semivolatiles analysis.

All of the other sample containers 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 contract required holding times.

No TCL analytes were detected in the samples, with the exception of trace amounts of Di-n-butylphthalate ranging from 290 to 410 ppb.

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

3.2.3 TOTAL PETROLEUM HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 10/05/93 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

9413225.2628

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 within the SW-846 holding time. Approximately 20g of each sample was extracted and concentrated to a final volume of 5 mL. The samples were then analyzed by GC/FID for total petroleum hydrocarbons in the Kerosene range by Method 8015M. There were no total petroleum hydrocarbons detected in the samples.

Sample B09357 was spiked with approximately 245 ug/Kg of Kerosene. The spike recoveries were between 90% and 92%, whereas the blank spike had a recovery of 82%.

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

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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 12.2.93
CLP Program Manager

for Nida Ang 12/2/93
Organics Supervisor

N3-09-137

Westinghouse Hanford Company

CHAIN OF CUSTODY

000002A

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-5764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

- 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) B09356

- 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

9-22-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 Jerome E. Rogers LMC	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received at TMA [illegible] on 9-25-93 opened 9-27-93 KB

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

9413225.2630

037

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Karen Rogers 1440	K Blum Kimmit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / Nexus 9-25-93, opened 9-27-93 - KB

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

9413225.2631

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 997332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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

JER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
Leon S. Rogers 9-23-93 1440	Kermit K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL on 9-25-93; opened 9-27-93 KB

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

9413275.2632

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

PW3225.2633

GC/MS ORGANIC DATA VALIDATION CHECKLIST

~~2/11/94~~ 2/14/94

VALIDATION LEVEL:	A	B	C	~~D~~	E

PROJECT: 200 UP2	DATA PACKAGE: B09355-TMA-615	
VALIDATOR: Klosie	LAB: TMA/ARLI	DATE: 2-11-94
CASE:	SDG: B09355-TMA-615	

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 B09355, B09356, B09357, B09358
B09359, B09360, B09361, B09362
Soils All

9413225.2634

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:

-041

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

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

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

Comments:

4. BLANKS

gj 2/14/94

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

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

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

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

Comments:

5. ACCURACY

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

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

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

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

Comments:

9413225.2635

042

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:

9413225.2636

HOLDING TIME SUMMARY

SDG: B09355-TMA-615	VALIDATOR: K. Louie	DATE: 2-11-94	PAGE 1 OF 1
COMMENTS: SVOA B09355-TMA-615			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09355	CLP	9-20-93	10-02-93	10-13-93	12	11	None
B09356	↓	↓	↓	↓	↓	↓	↓
B09357	↓	↓	↓	↓	↓	↓	↓
B09358	↓	↓	↓	↓	↓	↓	↓
B09359	↓	↓	↓	↓	↓	↓	↓
B09360	↓	↓	↓	↓	↓	↓	↓
B09361	↓	↓	↓	↓	↓	↓	↓
B09362	↓	↓	↓	↓	↓	↓	↓

BLANK AND SAMPLE DATA SUMMARY

SDG: B09355 | VALIDATOR: K. LOUIES | DATE: 2-11-94 | PAGE 1 OF 1

COMMENTS: SVOA B09355-TMA-615

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
SBLK10025	Di-n-butylphthalate	290	J		ug/kg		2900	ALL	u
SBLK10025	UNKNOWN HC	860	J	5.92		4300		ALL	u
SBLK10025	UNKNOWN CARBOXYLIC								
	ACID ESTER	99	J	19.45		495	495 est	B09355	u
SBLK10025	HEXANEDIOIC ACID								
	ESTER	66	J	24.58		330	330 est	B09355, B09360 B09361,	u

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1002S

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-BLK

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I03

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

9413225.2670

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	290	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	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

046

FORM I SV-2 3/90

Blank Contamination.

EPA SAMPLE NO.

SBLK1002S

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 09078 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A309078-BLK

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 31013I03

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 10/02/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 10/13/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.92	860	J
2.	UNKNOWN CARBOXYLIC ACID ESTE	19.45	99	J
3.	HEXANEDIOIC ACID ISOMER	24.58	66	J

Blank contamination

.047

RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418, Filename B09355.RAD)

9473225.2641

MEMORANDUM

MAR 1994
RECEIVED
TQO

TO: 200-UP-2 Project QA Record

March 25, 1994

FR: Susan Winter, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09355-TMA-615 (923-E418, Filename B09355.RAD)

INTRODUCTION

This memo presents the results of data validation on data package B09355-TMA-615 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.

9413225.2642

RECEIVED
MAR 28 1994
VALIDATION DOCUMENTATION
SDLA

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Note 1. All samples were analyzed for gross alpha, gross beta, selenium-79, strontium-90, technetium-99, iodine-129, isotopic uranium, total uranium, neptunium-237, plutonium-238, plutonium-239/140, americium-241, curium-244, and gamma spectroscopy.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

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

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

Detection Limits. Detection limit goals were met for all sample results with the exception the following:

SAMPLE ID	ANALYTE	MDA (pCi/g)	RDL (pCi/g)
B09355	IRON-59	0.1	0.05
B09356	IRON-59	0.1	0.05
B09357	IRON-59	0.1	0.05
B09360	IRON-59	0.06	0.05
B09361	IRON-59	0.1	0.05
B09362	IRON-59	0.1	0.05
LCS	URANIUM-233/234	0.4	0.3
LCS	URANIUM-238	0.4	0.3
B09355 DUPLICATE	IRON-59	0.2	0.05
B09355 DUPLICATE	COBALT-58	0.08	0.05
B09355 DUPLICATE	COBALT-60	0.09	0.05
B09355 DUPLICATE	CESIUM-137	0.07	0.05

Completeness. The data package was complete for all requested analyses. A total of seven samples were validated in this data package with a total of 245 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

Sample B09359 was identified as a field blank and contains low levels of total uranium, radium-226, radium-228, thorium-228, and thorium-232. Sample B09360 was identified as an equipment blank and contains low levels of uranium-233/234, total uranium, potassium-40, radium-226, radium-228, thorium-228, and thorium-232. Attachments 3 and 5 provide the data summaries listing the specific sample activity levels for the positive results.

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.

Chemical Yield

- Neptunium-237 chemical yield for sample B09357 was unacceptable. Attachments 2 and 5 provide a summary of data qualification applied and supporting documentation.

-002

9413225.2643

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-SFP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

9413225.2644

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9443225.2645

GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

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

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

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

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

944 3225.2646

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9413225.2647

DATA QUALIFICATION SUMMARY

SDG: B09355-TMA-615	VALIDATOR:	DATE: March 25, 1994	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NEPTUNIUM-237	UJ - NONDETECTS	B09357	CHEMICAL YIELD < 30% BUT > 10%

9413225.2648

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

9413225.2649

Validated Data Summary, Data Package: B09355-TMA-615

	Sample#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.50 - 170.00		169.00 - 171.50		169.00 - 171.50		---		---		181.00 - 182.00	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	12.000		14.000		14.000		4.000	U	5.000	U	9.300	
GROSS BETA	pCi/g	13.000		24.000		23.000		5.000	U	5.000	U	14.000	
SELENIUM-79	pCi/g	0.020	U	0.010	U	0.010	U	0.020	U	0.010	U	0.020	U
STRONTIUM-90	pCi/g	0.600	U	0.700	U	0.700	U	0.700	U	0.700	U	0.700	U
TECHNETIUM-99	pCi/g	0.300	U	0.400	U	0.400	U	0.300	U	0.500	U	0.200	U
IODINE-129	pCi/g	2.000	U	1.000	U	1.000	U	2.000	U	2.000	U	2.000	U
URANIUM-233/234	pCi/g	1.300		0.820		0.720		0.100	U	0.120		0.400	
URANIUM-235	pCi/g	0.060	U	0.090	U	0.100	U	0.100	U	0.100	U	0.100	U
URANIUM-238	pCi/g	1.300		0.880		0.580		0.100	U	0.100	U	0.470	
TOTAL URANIUM	UG/G	3.600		2.500		2.000		0.190		0.200		1.400	
NEPTUNIUM-237	pCi/g	0.030	U	0.010	U	0.050	UJ	0.040	U	0.020	U	0.010	U
PLUTONIUM-238	pCi/g	0.030	U	0.020	U	0.020	U	0.020	U	0.030	U	0.020	U
PLUTONIUM-239/240	pCi/g	0.030	U	0.020	U	0.020	U	0.030	U	0.040	U	0.020	U
AMERICIUM-241	pCi/g	0.040	U	0.040	U	0.030	U	0.030	U	0.020	U	0.030	U
CURIUM-244	pCi/g	0.040	U	0.040	U	0.030	U	0.030	U	0.020	U	0.020	U
SODIUM-22	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.040	U
POTASSIUM-40	pCi/g	6.100		17.000		17.000		0.400	U	0.330		15.000	
MANGANESE-54	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.030	U
IRON-59	pCi/g	0.100	U	0.100	U	0.100	U	0.050	U	0.060	U	0.100	U
COBALT-58	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.050	U
COBALT-60	pCi/g	0.040	U	0.040	U	0.050	U	0.020	U	0.020	U	0.040	U
NIOBIUM-94	pCi/g	0.040	U	0.040	U	0.040	U	0.020	U	0.020	U	0.030	U
RUTHENIUM-103	pCi/g	0.060	U	0.060	U	0.050	U	0.030	U	0.030	U	0.050	U
RUTHENIUM-106	pCi/g	0.400	U	0.400	U	0.300	U	0.200	U	0.200	U	0.300	U
TIN-113	pCi/g	0.060	U	0.060	U	0.050	U	0.020	U	0.020	U	0.040	U
CESIUM-134	pCi/g	0.050	U	0.060	U	0.050	U	0.020	U	0.020	U	0.050	U
CESIUM-137	pCi/g	0.040	U	0.050	U	0.040	U	0.020	U	0.020	U	0.040	U
CERIUM-144	pCi/g	0.200	U	0.200	U	0.200	U	0.100	U	0.100	U	0.200	U
EUROPIUM-152	pCi/g	0.090	U	0.100	U	0.090	U	0.040	U	0.040	U	0.070	U
EUROPIUM-154	pCi/g	0.060	U	0.070	U	0.060	U	0.030	U	0.030	U	0.050	U
EUROPIUM-155	pCi/g	0.100	U	0.100	U	0.100	U	0.060	U	0.050	U	0.100	U
RADIUM-226	pCi/g	1.000		0.750		0.700		0.120		0.084		0.500	
RADIUM-228	pCi/g	0.820		1.100		1.100		0.095		0.160		0.660	
THORIUM-228	pCi/g	0.630		1.300		1.000		0.110		0.150		0.740	
THORIUM-232	pCi/g	0.820		1.100		1.100		0.095		0.160		0.660	

Verified
3/25/94

9413225.2651

Validated Data Summary, Data Package: B09355-1HA-615

	Sample	B09362	
	Date	9-20-93	
	Location	219-W19-97	
	Depth	175.70 - 177.00	
	Type	---	
	Comments	---	
Parameter	Units	Result	Q
GROSS ALPHA	µCi/g	7.000	U
GROSS BETA	µCi/g	16.000	
SELENIUM-79	µCi/g	0.010	
STRONTIUM-90	µCi/g	0.700	U
TECHNETIUM-99	µCi/g	0.300	U
IODINE-129	µCi/g	2.000	U
URANIUM-233/234	µCi/g	0.410	
URANIUM-235	µCi/g	0.200	U
URANIUM-238	µCi/g	0.720	
TOTAL URANIUM	UG/G	1.400	
NEPTUNIUM-237	µCi/g	0.030	U
PLUTONIUM-238	µCi/g	0.020	U
PLUTONIUM-239/240	µCi/g	0.020	U
AMERICIUM-241	µCi/g	0.030	U
CURIUM-244	µCi/g	0.030	U
SODIUM-22	µCi/g	0.040	U
POTASSIUM-40	µCi/g	12.000	
MANGANESE-54	µCi/g	0.030	U
IRON-59	µCi/g	0.100	U
COBALT-58	µCi/g	0.030	U
COBALT-60	µCi/g	0.030	U
NIOBIUM-94	µCi/g	0.030	U
RUTHENIUM-103	µCi/g	0.040	U
RUTHENIUM-106	µCi/g	0.300	U
TIN-113	µCi/g	0.040	U
CESIUM-134	µCi/g	0.040	U
CESIUM-137	µCi/g	0.030	U
CERIUM-144	µCi/g	0.200	U
EUROPIUM-152	µCi/g	0.070	U
EUROPIUM-154	µCi/g	0.040	U
EUROPIUM-155	µCi/g	0.090	U
RADIUM-226	µCi/g	0.450	
RADIUM-228	µCi/g	0.720	
THORIUM-228	µCi/g	0.800	
THORIUM-232	µCi/g	0.720	

Verified [illegible] 3/25/94

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299-W19-97

N309139-01

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09355
167.5-170
~~Solid Rip Blank~~

3/24/94

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-01	Client sample id	B09355
Dept sample id	7266-001	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2652

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	12	5.1	5	10		80A
Gross Beta	Beta	13	4.1	5	10		80B
Selenium 79	15758-45-9	0.012	0.009	0.02	10	U	SE
Strontium 90	10098-97-2	0.052	0.16	0.6	1	U	Y
Technetium 99	14133-76-7	0.086	0.14	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.63	0.76	2	2	U	I
Uranium 233/234		1.3	0.21	0.07	0.3		U
Uranium 235	15117-96-1	0.057	0.049	0.06	0.3	U	U
Uranium 238		1.3	0.21	0.06	0.3		U
Total Uranium (ug/g)	7440-61-1	3.6	0.63	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.011	0.015	0.03	0.2	U ~~U~~ ~~UE~~	NP
Plutonium 238	13981-16-3	0.010	0.014	0.03	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	0.010	0.024	0.04	0.05	U	TP
Curium 244	13981-15-2	-0.005	0.020	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	6.1	0.78				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	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		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.1		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

5/24/94

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

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N309139-01

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09355
167.5-170

3/24/94 ~~Solid Trip Blank~~

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-01	Client sample id	B09355
Dept sample id	7266-001	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	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	1.0	0.10				GAM
Radium 228	15262-20-1	0.32	0.20				GAM
Thorium 228	14274-82-9	0.63	0.050				GAM
Thorium 232	7440-29-1	0.82	0.20				GAM

9413225.2653

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-02

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09356

169-171.5'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-02	Client sample id	B09356
Dept sample id	7266-002	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	14	5.0	4	10		80A
Gross Beta	Beta	24	4.6	5	10		80B
Selenium 79	15758-45-9	-0.007	0.008	0.01	10	U	SE
Strontium 90	10098-97-2	0.071	0.18	0.7	1	U	Y
Technetium 99	14133-76-7	0.31	0.16	0.4	0.5	U	TC
Iodine 129	15046-84-1	0.079	0.65	1	2	U	I
Uranium 233/234		0.32	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.068	0.046	0.09	0.3	U	U
Uranium 238		0.38	0.20	0.07	0.3		U
Total Uranium (ug/g)	7440-61-1	2.5	0.44	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.008	0.008	0.01	0.2	U ~~U~~ ~~U~~	NP
Plutonium 238	13981-16-3	-0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.010	0.02	0.05	U	PU
Americium 241	14596-10-2	0.009	0.023	0.04	0.05	U	TP
Curium 244	13981-15-2	0	0.024	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	17	0.99				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	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		0.06		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		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

3/25/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

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013

9413225.2654

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N309139-02

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09356

169-171.5'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-02	Client sample id	B09356
Dept sample id	7266-002	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		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		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.75	0.11				GAM
Radium 228	15262-20-1	1.1	0.21				GAM
Thorium 228	14274-82-9	1.3	0.073				GAM
Thorium 232	7440-29-1	1.1	0.21				GAM

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3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

N309139-03

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

299-W19-95

B09357
159-171.5

Field Duplicate

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-03	Client sample id	B09357
Dept sample id	7266-003	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2656

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	14	5.0	4	10		80A
Gross Beta	Beta	23	4.5	5	10		80B
Selenium 79	15758-45-9	0.002	0.009	0.01	10	U	SE
Strontium 90	10098-97-2	0.013	0.40	0.7	1	U	Y
Technetium 99	14133-76-7	0.10	0.13	0.4	0.5	U	TC
Iodine 129	15046-84-1	-0.27	0.50	1	2	U	I
Uranium 233/234		0.72	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.065	0.052	0.1	0.3	U	U
Uranium 238		0.58	0.16	0.08	0.3		U
Total Uranium (ug/g)	7440-61-1	2.0	0.35	0.04	0.1		U_T
Neptunium 237	13994-20-2	0	0.021	0.05	0.2	~~U~~ US	NP
Plutonium 238	13981-16-3	-0.002	0.010	0.02	0.05	U	PU
Plutonium 239/240		-0.005	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.006	0.016	0.03	0.05	U	TP
Curium 244	13981-15-2	0	0.016	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	17	0.96				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	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		0.05		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

2/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

TMA NORCAL
REPORTING GROUP 7266

N309139-03

DATA SHEET, cont

299-W19-95

B09357
169-171.5'
Field Duplicate

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-03	Client sample id	B09357
Dept sample id	7266-003	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS a	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	0.70	0.081				GAM
Radium 228	15262-20-1	1.1	0.16				GAM
Thorium 228	14274-82-9	1.0	0.056				GAM
Thorium 232	7440-29-1	1.1	0.16				GAM

9413225.2657

Verified [illegible] 3/24/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/11/94

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N309139-04

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09359

Field Blank

SDG 7266
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N309139-04
Dept sample id 7266-004
Received 09/27/93
Client sample id B09359
Location/Matrix 200-UP-2 SOLID
Collected 09/20/93
Chain of custody id NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	0.47	2.6	4	10	U	80A
Gross Beta	Beta	0.080	3.2	5	10	U	80B
Selenium 79	15758-45-9	0.013	0.010	0.02	10	U	SE
Strontium 90	10098-97-2	0.022	0.16	0.7	1	U	Y
Technetium 99	14133-76-7	0.065	0.10	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.22	0.86	2	2	U	I
Uranium 233/234		0.025	0.076	0.1	0.3	U	U
Uranium 235	15117-96-1	-0.015	0.031	0.1	0.3	U	U
Uranium 238		0.050	0.051	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.19	0.033	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.008	0.015	0.04	0.2	U	NP
Plutonium 238	13981-16-3	0.003	0.011	0.02	0.05	U	PU
Plutonium 239/240		-0.006	0.006	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.015	0.03	0.05	U	TP
Curium 244	13981-15-2	0.008	0.015	0.03	0.05	U	TP
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		0.05	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	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		0.03		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

3/24/94

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/11/94

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N309139-04

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09359

Field Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-04	Client sample id	B09359
Dept sample id	7266-004	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.06	0.1	U	GAM
Radium 226	13982-63-3	0.12	0.040				GAM
Radium 228	15262-20-1	0.095	0.072				GAM
Thorium 228	14274-82-9	0.11	0.023				GAM
Thorium 232	7440-29-1	0.095	0.072				GAM

9413225.2659

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

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N309139-05

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09360

Equipment Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-05	Client sample id	B09360
Dept sample id	7266-005	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2660

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	2.3	3.3	5	10	U	80A
Gross Beta	Beta	-1.2	3.0	5	10	U	80B
Selenium 79	15758-45-9	0.008	0.008	0.01	10	U	SE
Strontium 90	10098-97-2	0.022	0.17	0.7	1	U	Y
Technetium 99	14133-76-7	-0.067	0.19	0.5	0.5	U	TC
Iodine 129	15046-84-1	0.051	0.72	2	2	U	I
Uranium 233/234		0.12	0.091	0.1	0.3	~~U~~	U
Uranium 235	15117-96-1	0.018	0.036	0.1	0.3	U	U
Uranium 238		0.015	0.030	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.20	0.035	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.006	0.011	0.02	0.2	U	NP
Plutonium 238	13981-16-3	-0.003	0.013	0.03	0.05	U	PU
Plutonium 239/240		0	0.019	0.04	0.05	U	PU
Americium 241	14596-10-2	0	0.011	0.02	0.05	U	TP
Curium 244	13981-15-2	0.007	0.014	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.33	0.15				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.06	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	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		0.03		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

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
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Version	2.28
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N309139-05

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09360

Equipment Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-05	Client sample id	B09360
Dept sample id	7266-005	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.05	0.1	U	GAM
Radium 226	13982-63-3	0.084	0.029				GAM
Radium 228	15262-20-1	0.16	0.076				GAM
Thorium 228	14274-82-9	0.15	0.032				GAM
Thorium 232	7440-29-1	0.16	0.076				GAM

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Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
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Report date 01/11/94

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N309139-06

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09361

181-182'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-06	Client sample id	B09361
Dept sample id	7266-006	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2662

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	9.3	4.5	4	10	~~J~~	80A
Gross Beta	Beta	14	4.0	5	10		80B
Selenium 79	15758-45-9	0	0.009	0.02	10	U	SE
Strontium 90	10098-97-2	0.17	0.21	0.7	1	U	Y
Technetium 99	14133-76-7	0.17	0.099	0.2	0.5	U	TC
Iodine 129	15046-84-1	-0.33	0.80	2	2	U	I
Uranium 233/234		0.40	0.17	0.1	0.3		U
Uranium 235	15117-96-1	0.017	0.034	0.1	0.3	U	U
Uranium 238		0.47	0.17	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.4	0.25	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.007	0.007	0.01	0.2	4 ~~U~~ ~~J~~	NP
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.015	0.03	0.05	U	TP
Curium 244	13981-15-2	-0.004	0.012	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	15	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		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		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

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Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
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N309139-06

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09361

181-182'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-06	Client sample id	B09361
Dept sample id	7266-006	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2663

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.07	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	0.50	0.070				GAM
Radium 228	15262-20-1	0.66	0.15				GAM
Thorium 228	14274-82-9	0.74	0.044				GAM
Thorium 232	7440-29-1	0.66	0.15				GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
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N309139-07

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09362

175.7 - 177'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-07	Client sample id	B09362
Dept sample id	7266-007	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	5.1	5.2	7	10	U	80A
Gross Beta	Beta	16	4.2	5	10		80B
Selenium 79	15758-45-9	0.010	0.008	0.01	10		SE
Strontium 90	10098-97-2	0.038	0.18	0.7	1	U	Y
Technetium 99	14133-76-7	0.15	0.11	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.31	0.84	2	2	U	I
Uranium 233/234		0.41	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.045	0.045	0.2	0.3	U	U
Uranium 238		0.72	0.24	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.4	0.25	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.004	0.014	0.03	0.2	U	NP
Plutonium 238	13981-16-3	-0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.002	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.009	0.009	0.03	0.05	U	TP
Curium 244	13981-15-2	0.004	0.013	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	12	0.67				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		0.03	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		0.03	0.05	U	GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
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N309139-07

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09362

175.7-177'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-07	Client sample id	B09362
Dept sample id	7266-007	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2665

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.07	0.1	U	GAM
Europium 154	15585-10-1	U		0.04	0.1	U	GAM
Europium 155	14391-16-3	U		0.09	0.1	U	GAM
Radium 226	13982-63-3	0.45	0.064				GAM
Radium 228	15262-20-1	0.72	0.14				GAM
Thorium 228	14274-82-9	0.80	0.068				GAM
Thorium 232	7440-29-1	0.72	0.14				GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

94/3225.2666

TMA/Norcal
Report N3-09-139-7266
Sample Delivery Group 7266

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

Case Narrative **January 12, 1994**

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7266 is comprised of the seven soil samples from location 200-UP-2, delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

One 100 mL plastic bottle containing each sample was received for the analyses. This was not an adequate volume to obtain the required detection limit for gamma scan for the duplicate analysis.

9413225.2667

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses
No problems were encountered by the laboratory in the analyses

2.2 Gross Beta Analyses
No problems were encountered by the laboratory in the analyses.

2.3 Selenium-79 Analyses
No problems were encountered by the laboratory in the analyses.

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

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

2.6 Iodine-129 Analyses
No problems were encountered by the laboratory in the analyses.

2.7 Neptunium-237 Analyses
No problems were encountered by the laboratory in the analyses.

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

TMA/Norcal
Report N3-09-139-7266
Sample Delivery Group 7266

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

Case Narrative **January 12, 1994**

2.0 ANALYSIS NOTES (cont.)

2.9 Isotopic Uranium Analyses
The uranium-233/234 and uranium-238 MDA's for the LCS are higher than the RDL's due to interferencefrom uranium-235. Sample B09362, the blank, the LCS, and the duplicate were counted for less than the nominal count time of 150 minutes.

3.0 Isotopic Plutonium Analyses
No problems were encountered by the laboratory in the analyses.

3.1 Americium-241/Curium-244 Analyses
No problems were encountered by the laboratory in the analyses. Samples B09359, B09360, B09361, B09362, and the duplicate of B09355 were counted for less than the nominal count time of 700 minutes.

3.2 Gamma Scan Analyses
The MDA's of several gamma nuclides for the duplicate analyses of sample B09355 are higher than the RDL's due to the smaller than nominal aliquot available for analysis. The MDA of iron-59 for all the samples is higher than the RDL due to the short half-life of iron-59.

9413225.2668

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 9-20-93

Ice Chest No. 580

Field Logbook No. EFL-1091

Bill of Lading/Airbill No. 9973332836

Offsite Property No. W93-0-0764-23

Method of Shipment OVERNIGHT AIR SERVICE

Shipped to TMA

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

Sample Identification

1) B09355

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) B09356

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

SBR 9-21-93

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-23-93 Gene E. Rogers 1440	K Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/Norcal on 9-25-93; opened 9-27-93. KB

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

9413225.2669

~~64~~ 028

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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

KJR 9-21-93

[ ] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-23-93 1440	K. Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA / NORCAL on 9-25-93 ; opened 9-27-93 KB

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

9413225.2670

67

-029

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Jerome Rogers 1440	K. Blum Kimmie Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL 9-25-93; opened 9-27-93 . KB

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

9413225.2671

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.2672

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B09355-TMA-615	
VALIDATOR: [illegible]	LAB: TMA		DATE: 03/10/94
CASE:		SDG: B09355-TMA-615	

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☒ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	Se-79
☒ Total Uranium	☐ Radium-22	☐ Tritium	☒ I-129	Np-237	

SAMPLES/MATRIX Soils

B09355	B09361
B09356	B09362
B09357	
B09359	
B09360	

1. Completeness . . . . . ☐ N/A

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

Comments: _____

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

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

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

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

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

Comments: The gamma spec (SPEC) detectors and detectors used for gross alpha/beta were calibrated initially more than 1 yr prior to sample analysis. However, since the ICV and CCV are acceptable, no qualification is required.

9413225.2673

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: The calibration control limits for the ~~GFAA, GR~~ LBG detectors were obtained from SOG B-9325-TMA-620. All blank & SP checks are within the control limits.

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: See last page of checklist for comments.

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed? . . . . . Yes No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . ~~Yes~~ No N/A 5/22/94
Spike source expired? . . . . . Yes ~~No~~ N/A 5/22/94
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

9413225.2674

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: ~~All chemical and tracer recoveries are acceptable with the exception of sample B09357 chemical recoveries for neptunium-237. The affected samples and qualifications are listed on the last page of this checklist.~~

3/25/94

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:

9413225.2675

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: The Uranium-238 field duplicate result (for sample R09357) is acceptable since the sample results are less than 5xRDL and the difference between the two results is within the range of 1.5xRDL.

9413225.2676 3/22/94

10. Holding Times

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

Comments:

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

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

Comments: See last page of checklist for comments.

Comments: Comments to Item 4:

- Sample B09359 is identified as a field blank. All results are nondetects with the exception of the following:

B09359 - Field Blank of 299-W19-951

Analyte	Result
Total Uranium	0.19 ug/g
Radium-226	0.12 pCi/g
Radium-228	0.095 pCi/g
Thorium-228	0.11 pCi/g
Thorium-232	0.095 pCi/g

- Sample B09360 is identified as an equipment blank. All results are undetected with the exception of the following:

B09360 - Equipment Blank

Analyte	Result
Uranium-233/234	0.12 pCi/g
Total Uranium	0.20 ~~pCi/g~~ ug/g 3/22/94
Potassium-40	0.33 pCi/g
Radium-226	0.084 pCi/g
Radium-228	0.15 pCi/g
Thorium-228	0.15 pCi/g
Thorium-232	0.16 pCi/g

- ~~Sample B09355 is identified as a field trip blank. All results are nondetects with the exception of the following:~~

~~B09355 - Field Trip Blank~~

~~Analyte~~	~~Result~~
~~Gross Alpha~~	~~12 pCi/g~~
~~Gross Beta~~	~~13 pCi/g~~
~~Uranium-233/234~~	~~1.3 pCi/g~~
~~Uranium-238~~	~~1.3 pCi/g~~
~~Total Uranium~~	~~[illegible] ug/g~~
~~Potassium-40~~	~~[illegible] pCi/g~~
~~Radium-226~~	~~1.0 pCi/g~~
~~Radium-228~~	~~0.32 pCi/g~~
~~Thorium-228~~	~~0.03 pCi/g~~
~~Thorium-232~~	~~0.02 pCi/g~~

3/22/94

3/22/94

9413225.2677

036

Comments: Comment to Item 7:

- The neptunium-237 chemical yields for the following samples were unacceptable. Therefore the assoc. result has been qualified as estimated (J/UJ)

Sample ID	Chemical yield	Qualifier	
~~B09355~~	~~26%~~	~~UJ~~	Alpha Spec
~~B09356~~	~~27%~~	~~UJ~~	control
B09357	~~20%~~ 19.6%	UJ	limit is
3/22/94 ~~B09359~~	~~23%~~	~~UJ~~	20%-105%
~~B09361~~	~~20%~~	~~UJ~~	
~~LCS (7366-008)~~	~~29%~~	~~J~~	3/24/94
~~B09355 Duplicate~~	~~27%~~	~~UJ~~	

Comments to Item 11:

- All MDAs meet the RDLs w/ the exception of:

Sample ID	Analyte	MDA	RDL	Units
B09355	Iron-59	0.1	0.05	pCi/g
B09356	Iron-59	0.1	0.05	pCi/g
B09357	Iron-59	0.1	0.05	pCi/g
B09360	Iron-59	0.06	0.05	pCi/g
B09361	Iron-59	0.1	0.05	pCi/g
B09362	Iron-59	0.1	0.05	pCi/g
LCS (7366-008)	U-233/234	0.4	0.3	pCi/g
↓	U-238	0.4	0.3	pCi/g
B09355 Dup	Iron-59	0.2	0.05	pCi/g
↓	Cobalt-58	0.08	0.05	pCi/g
	Cobalt-60	0.09	0.05	pCi/g
	Cesium-137	0.07	0.05	pCi/g

No qualification is required.

- The raw data for Iodine-129, sample B09355 Duplicate, was not included in the data pkg. However, since the raw data for all other samples was included the package will be completely validated. No qualification is required.

3/22/94

9413225.2678

Comments:

Continued comments to Item 11.

The MDA value of 0.1 for total uranium, for the laboratory control sample and blank, cannot be verified against the raw data. No qualification is required.

Comment to Item 2:

The initial calibration certificate for the Xspec detectors used to perform the ~~radium~~ iodine analysis was not included in this data package but was obtained from package B0R31-TMA-580.

9413225.2679

3/24/94

TMA NORCAL

REPORTING GROUP 7266

SDG 7266
Contact Dinkar Kharkar

WORK SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

Holding Time Summary

Pg 1 of 3

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED BY	METHOD
B09355		N309139-01	7266-001	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-001	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-001	GAM		10/20/93	30	Gamma Scan
			7266-001	I		11/29/93	70	Iodine 129 in Soil
			7266-001	NP				Neptunium in Soil
			7266-001	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-001	SE		12/15/93	86	Selenium 79 in Soil
			7266-001	TC		10/26/93	36	Technetium 99 in Soil
			7266-001	TP	A2	12/29/93	100	Americium 241/Curium in Solids
			7266-001	U		11/09/93	50	Uranium, Isotopic in Soil
			7266-001	U_T		11/06/93	47	Uranium, Total in Soil
			7266-001	Y		10/28/93	38	Strontium 90 in Soil
B09356		N309139-02	7266-002	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-002	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-002	GAM		10/20/93	30	Gamma Scan
			7266-002	I		11/30/93	71	Iodine 129 in Soil
			7266-002	NP				Neptunium in Soil
			7266-002	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-002	SE		12/16/93	87	Selenium 79 in Soil
			7266-002	TC		10/26/93	36	Technetium 99 in Soil
			7266-002	TP	A2	12/29/93	100	Americium 241/Curium in Solids
			7266-002	U		11/09/93	50	Uranium, Isotopic in Soil
			7266-002	U_T		11/06/93	47	Uranium, Total in Soil
			7266-002	Y		10/28/93	38	Strontium 90 in Soil
B09357		N309139-03	7266-003	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-003	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-003	GAM		10/20/93	30	Gamma Scan
			7266-003	I		11/30/93	71	Iodine 129 in Soil
			7266-003	NP				Neptunium in Soil
			7266-003	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-003	SE		12/16/93	37	Selenium 79 in Soil
			7266-003	TC		10/26/93	36	Technetium 99 in Soil
			7266-003	TP	A2R1	01/05/94	107	Americium 241/Curium in Solids
			7266-003	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-003	U_T		11/06/93	47	Uranium, Total in Soil
			7266-003	Y		10/28/93	38	Strontium 90 in Soil

3/22/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.28
Report date 01/11/94

9413225.2680

TMA NORCAL
REPORTING GROUP 7266

SDG 7266
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

Holding Time Summary Pg. 3 of 3

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED BY	METHOD
B09362		N309139-07	7266-007	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-007	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-007	GAM		10/20/93	30	Gamma Scan
			7266-007	I		11/27/93	68	Iodine 129 in Soil
			7266-007	NP				Neptunium in Soil
			7266-007	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-007	SE		12/16/93	87	Selenium 79 in Soil
			7266-007	TC		10/26/93	36	Technetium 99 in Soil
			7266-007	TP	A2	12/23/93	94	Americium 241/Curium in Solids
			7266-007	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-007	U_T		11/06/93	47	Uranium, Total in Soil
			7266-007	Y		10/28/93	38	Strontium 90 in Soil
Reagent Blank		N309139-09	7266-009	80A/80		11/04/93	45	Gross Alpha in Soil
	SOLID		7266-009	80B/80		11/04/93	45	Gross Beta in Soil
			7266-009	GAM		10/20/93	30	Gamma Scan
			7266-009	I		12/02/93	73	Iodine 129 in Soil
			7266-009	NP				Neptunium in Soil
			7266-009	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-009	SE		12/16/93	87	Selenium 79 in Soil
			7266-009	TC		10/26/93	36	Technetium 99 in Soil
			7266-009	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-009	U_T		11/06/93	47	Uranium, Total in Soil
			7266-009	Y		10/28/93	38	Strontium 90 in Soil
Reagent Blank	SOLID	N309139-18	7266-018	TP		12/29/93		Americium 241/Curium in Solids
Lab Control Sample	SOLID	N309139-08	7266-008	80A/80		11/04/93		Gross Alpha in Soil
			7266-008	80B/80		11/04/93		Gross Beta in Soil
			7266-008	GAM		10/20/93		Gamma Scan
			7266-008	I		12/01/93		Iodine 129 in Soil
			7266-008	NP				Neptunium in Soil
			7266-008	PU		11/10/93		Plutonium, Isotopic in Soil
			7266-008	TC		10/26/93		Technetium 99 in Soil
			7266-008	U		11/10/93		Uranium, Isotopic in Soil
			7266-008	U_T		11/06/93		Uranium, Total in Soil
			7266-008	Y		10/28/93		Strontium 90 in Soil

3/22/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.28
Report date 01/11/94

9413325.2681

FIELD DUPLICATE PRECISION CALCULATION WORKSHEET 22-Mar-94 SDG B09355-TMA-615

FILENAME: B09355FD.WK1

SDG NO.: B09355-TMA-615

SAMPLE ID: B09356
DUPLICATE SAMPLE ID: B09357

SAMPLE LOCATION: 299-W19-95 169'-171.5'

PARAMETER	RDL	SAMPLE RESULT	DUPLICATE RESULT	RPD
GROSS ALPHA	10	14	14	0
GROSS BETA	10	24	23	4
URANIUM-233/23	0.3	0.82	0.72	13
URANIUM-238	0.3	0.88	0.58	41
TOTAL URANIUM	0.1	2.5	2	22
POTASSIUM-40	not specified	17	17	0
RADIUM-226	not specified	0.75	0.7	7
RADIUM-228	not specified	1.1	1.1	0
THORIUM-228	not specified	1.3	1	26
THORIUM-232	not specified	1.1	1.1	0

Certificate of Calibration		TMA/Norcal
Calibration: ^{129}I	Instrument: XSPEC 11, XSPEC 14 XSPEC 15, INGE 1	Type: Germanium gamma spec., NaI(Tl) x-ray spectrometer
Calibration Standard: ^{129}I - SRM 4949B-54 from NBS		
Status	Date	Reference Document
Original Calibration:	October, 1988	TLW 6240
Verification:		
Summary of Results		

Det	Eff	P-Factor
XSPEC 11	0.1980	3.10
XSPEC 14	0.2107	4.57
XSPEC 15	0.2053	4.97
INGE 1	0.0127	78.78

Initial Calibration Certificate for X-Spec detectors used to perform Iodine analysis. Since this certificate was not provided in this data package, it was obtained from data package B09313-TMA-580.

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3/25/94

9413225.2683

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Gross Alpha/Beta

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Aliquot:	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Detector:	102	103	104	113	115	116	101	102	103	104
Count time:	100	100	100	106.03	106.03	106.03	100	100	100	100
Alpha Counts:	41	55	49	12	21	36	24	692	5	35
Alpha cpm:	0.41	0.55	0.49	0.11	0.20	0.34	0.24	6.92	0.05	0.35
Alpha, Bkgd:	0.074	0.089	0.066	0.097	0.122	0.073	0.114	0.074	0.089	0.066
Alpha, Xtalk:	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff:	0.122	0.143	0.134	0.152	0.151	0.126	0.103	0.129	0.126	0.124
Alpha Result Calc.:	12.14	14.10	13.82	0.48	2.29	9.26	5.13	229.97	-1.37	10.12
Alpha Result Rptd.:	12.10	14.10	13.80	0.47	2.30	9.26	5.15	230.00	-1.40	10.10
Alpha MDA Calc.:	4.68	4.38	4.02	4.30	4.86	4.50	6.88	4.43	4.97	4.35
Alpha MDA Rptd.:	4.68	4.39	4.01	4.19	4.72	4.36	6.88	4.40	5.00	4.33
Beta Counts:	250	353	329	124	108	267	259	4634	107	203
Beta cpm:	2.50	3.53	3.29	1.17	1.02	2.52	2.59	46.34	1.07	2.03
Bkgd:	1.187	1.179	1.045	1.158	1.108	1.179	1.102	1.187	1.179	1.045
Xtalk:	0.277	0.264	0.269	0.259	0.26	0.275	0.298	0.273	0.275	0.276
Eff:	0.417	0.421	0.42	0.422	0.422	0.418	0.412	0.419	0.418	0.418
Beta Result Calc.:	13.18	23.85	22.85	0.08	-1.17	13.64	15.86	465.30	-1.06	9.77
Beta Result Rptd:	13.20	23.90	22.90	0.08	-1.16	13.70	15.90	466.00	-1.10	9.79
Beta MDA Calc:	5.48	5.41	5.11	5.20	5.08	5.30	5.35	5.46	5.45	5.13
Beta MDA rptd:	5.48	5.41	5.11	5.20	5.08	5.29	5.34	5.50	5.50	5.13

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Strontium 90

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	GRB 205	GRB 208	GRB 209	GRB 210	GRB 212	GRB 213	GRB 214	GRB 215	GRB 209	GRB 205
Bkg:	0.3729	0.4651	0.4746	0.4266	0.4632	0.4729	0.4875	0.3997	0.4722	0.3729
Count Time:	33	33	33	33	33	33	33	33	33	33
Y90 cpm:	0.057	0.078	0.014	0.022	0.024	0.169	0.04	15.539	0.21	0.036
Elapsed Time, days:	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974
Yield:	0.9133	0.916	0.916	0.8333	0.8985	0.8495	0.8898	0.8817	0.8246	0.875
PPT. corr.:	1	1	1	1	1	1	1	1	1	1
Aliquot:	1	1	1	1	1	1	1	1	1	1
Product:	0.9110	0.9137	0.9137	0.8312	0.8962	0.8473	0.8875	0.8794	0.8225	0.8728
C zero:	0.0828	0.0854	0.0153	0.0265	0.0268	0.1995	0.0451	17.6692	0.2553	0.0412
P- Factor:	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859
Result, calc.:	0.05	0.07	0.01	0.02	0.02	0.17	0.04	14.80	0.21	0.03
Result, rptd.:	0.05	0.07	0.01	0.02	0.02	0.17	0.04	14.76	0.21	0.04
MDA, calc.:	0.84	0.94	0.95	0.82	0.92	0.88	0.93	0.84	0.85	0.80
MDA, rptd.:	0.62	0.68	0.68	0.72	0.69	0.74	0.71	0.66	0.88	0.65

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Technetium 99

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	LBG 12	LBG 13	LBG 14	LBG 13	LBG 16	LBG 9	LBG 10	LBG 11	LBG 12	LBG 13
Net, cpm:	0.08	0.22	0.08	0.07	-0.04	0.17	0.13	24.01	0.08	0.15
Days:	36.59	36.59	36.59	36.59	36.59	36.692	36.692	0	0	36.692
Lambda:	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09
Decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Yield:	0.4976	0.3726	0.4044	0.5567	0.3102	0.5426	0.4463	0.4967	0.5212	0.4997
Aliquot:	2.02	2.03	2.08	2.01	2.02	2.02	2.06	2	2	2.01
P-Factor:	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
Count, time:	135.2	135.2	135.2	135.2	135.2	232.6	232.6	232.6	232.6	232.6
Bkg., cpm:	0.53	0.45	0.5	0.66	0.53	0.55	0.54	0.48	0.53	0.45
Result, calc.:	0.08	0.31	0.10	0.07	-0.07	0.16	0.15	25.48	0.08	0.16
Result, rptd.:	0.09	0.31	0.10	0.07	-0.07	0.17	0.15	25.48	0.08	0.15
MDA, calc.:	0.31	0.37	0.36	0.31	0.49	0.22	0.26	0.22	0.22	0.22
MDA, rptd.:	0.32	0.41	0.39	0.32	0.54	0.23	0.28	0.24	0.23	0.23

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Neptunium

Sample ID	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	SS-61	SS-62	SS-63	SS-64	SS-65	SS-66	SS-49	SS-50	SS-64	SS-65
Np239 cpm:	18.69	19.09	14.03	16.72	22.34	18.32	24.68	20.52	21.83	19.06
Inst. eff.:	0.721	0.721	0.721	0.721	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	99.08	99.08	99.08	99.08
Yield:	0.2616	0.2672	0.1964	0.2341	0.3127	0.2565	0.3455	0.2872	0.3056	0.2668
Aliquot:	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Count time:	1098.05	1098.05	1098.05	1229.65	1229.65	1229.65	1000.38	1000.38	1098.05	1098.05
Np237 gross counts:	4	2	2	4	3	2	2	1100	4	2
Np237 bkgd counts:	1	0	2	2	1	0	1	4	1	3
Np237 aspec. eff:	0.42	0.387	0.396	0.404	0.413	0.408	0.368	0.365	0.405	0.41
Np237 result calc.:	0.01	0.01	0.00	0.01	0.01	0.01	0.00	4.71	0.01	-0.00
Np237 result rptd.:	0.01	0.01	0.00	0.01	0.01	0.01	0.00	4.71	0.01	-0.00
Np237 MDA calc.:	0.03	0.03	0.04	0.03	0.02	0.03	0.03	0.04	0.03	0.03
Np237 MDA rptd.:	0.03	0.01	0.05	0.04	0.02	0.01	0.03	0.05	0.03	0.04

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Iodine-129

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS
Detector:	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14
Count Time:	465.77	401.67	691.58	354.52	414.43	400.77	426.6	464.53	384.77
Gross cpm:	0.615	0.591	0.557	0.566	0.576	0.629	0.621	14.247	0.533
Bkg cpm:	0.863	0.561	0.658	0.635	0.557	0.747	0.722	0.761	0.718
Blank cpm:	-0.004	-0.027	-0.155	-0.101	-0.155	-0.053			
Net cpm:	-0.248	0.03	-0.101	-0.069	0.019	-0.118	-0.101	13.486	-0.185
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	70.467	71.508	71.79	72.79	65.399	65.689	68.412	0	0
Decay:	1	1	1	1	1	1	1	1	1
Yield:	0.8131	0.7934	0.7685	0.6593	0.7468	0.7416	0.6791	0.6558	0.8403
Aliquot:	1	1	1	1	1	1	1	1	1
PPT. Corr.:	1	1	1	1	1	1	1	1	1
Product:	8.13E-01	7.93E-01	7.68E-01	6.59E-01	7.47E-01	7.42E-01	6.79E-01	6.56E-01	8.40E-01
P-factor:	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Result Calc.:	-0.63	0.08	-0.27	-0.22	0.05	-0.33	-0.31	42.33	-0.45
Result Rptd.:	-0.63	0.08	-0.27	-0.22	0.05	-0.33	-0.31	42.33	-0.45
MDA Calc.:	0.51	0.45	0.32	0.62	0.47	0.56	0.58	0.59	0.49
MDA Rptd.:	1.74	1.46	1.14	1.95	1.64	1.81	1.91	2.02	1.65

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Plutonium 238/239

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS	B09355 DUP
Detector:	SS-64	SS-65	SS-66	SS-52	SS-53	SS-54	SS-57	SS-58	SS-60	SS-61
Count time:	721.23	721.23	721.23	731.03	731.03	731.03	731.03	731.03	731.03	731.03
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	4.86	4.86	4.86	4.86
Bkgd, count time:	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47
Net, tracer counts:	627	876	922	786	691	900	892	637	652	851
Detector Eff:	0.4109	0.4114	0.4133	0.3802	0.3856	0.3741	0.3575	0.3732	0.3801	0.4155
Yield:	0.4353	0.6075	0.6364	0.5819	0.5044	0.6771	0.7023	0.4804	0.4828	0.5765
Pu239, gross counts:	1	2	0	0	4	0	1	285	0	2
Pu239, bkgd counts:	1	2	2	2	4	0	0	3	1	2
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08	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	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	4	0	1	2	1	1	0	0	1	3
Pu238, bkgd counts:	1	1	2	1	2	0	1	3	0	2
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05	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	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1	1	1	1	1
Pu239, Result calc.:	0.000	0.000	-0.005	-0.006	0.000	0.000	0.002	0.969	-0.003	0.000
Pu239, Result rptd:	0.000	0.000	-0.005	-0.006	0.000	0.000	0.002	0.968	-0.003	0.000
Pu239, MDA calc.:	0.027	0.019	0.018	0.021	0.030	0.019	0.019	0.028	0.028	0.020
Pu239, MDA rptd.:	0.027	0.024	0.023	0.027	0.039	0.019	0.019	0.038	0.028	0.025
Pu238, Result calc.:	0.010	-0.003	-0.002	0.003	-0.003	0.002	-0.002	-0.010	0.003	0.003
Pu238, Result rptd.:	0.010	-0.003	-0.002	0.003	-0.003	0.002	-0.002	0.010	0.003	0.003
Pu238, MDA calc.:	0.027	0.019	0.018	0.021	0.024	0.019	0.019	0.028	0.028	0.020
Pu238, MDA rptd:	0.027	0.019	0.023	0.021	0.030	0.019	0.019	0.038	0.028	0.025

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Uranium 233/4/5/8

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS	B09355 DUP
Detector:	SS-25	SS-26	SS-23	SS-24	SS-25	SS-26	SS-3	SS-20	SS-23	SS-24
Sample count time:	246.12	246.12	150.25	150.25	150.25	150.25	121.17	121.17	121.17	121.17
GMT count:										
Zero time:										
Corr. tracer dpm:	10.49	10.49	10.49	10.48	10.49	10.49	10.49	10.49	10.49	10.49
Bkgd count time:	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98
Net tracer counts:	703	507	441	374	316	340	256	255	317	297
Detector eff.:	0.3058	0.2822	0.3121	0.3178	0.3078	0.2812	0.2768	0.2675	0.3121	0.3178
Yield:	0.8913	0.8985	0.8975	0.7475	0.6521	0.7679	0.7284	0.7507	0.8	0.7361
U-238, gross counts:	191	96	55	4	1	34	39	316	1	95
U-238, bkgd counts:	2	1	1	0	0	0	0	18	0	0
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13	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	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	8	6	5	0	1	1	2	184	0	3
U-235, bkgd counts:	1	0	0	1	0	0	0	0	0	1
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12	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	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts:	200	92	70	5	9	31	23	291	5	94
U-233/4, bkgd counts:	4	4	3	3	1	2	1	21	1	2
U-233/4, Lambda:	1.17E-08	1.17E-08	1.17E-08	1.17E-08	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	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1	1	1	1	1
U-238, result calc.:	1.27	0.88	0.58	0.05	0.01	0.47	0.72	5.52	0.01	1.51
U-238, result rptd:	1.27	0.88	0.58	0.05	0.01	0.47	0.72	5.52	0.01	1.51
U-238 MDA calc.:	0.05	0.07	0.08	0.10	0.11	0.11	0.14	0.37	0.11	0.12
U-238, MDA rptd.:	0.06	0.07	0.08	0.10	0.11	0.11	0.14	0.42	0.11	0.12
U-235, result calc.:	0.06	0.07	0.06	-0.02	0.02	0.02	0.04	4.12	0.00	0.04
U-235, result rptd.:	0.06	0.07	0.06	-0.02	0.02	0.02	0.04	4.12	0.00	0.04
U-235, MDA calc.:	0.06	0.09	0.10	0.12	0.14	0.13	0.17	0.17	0.14	0.15
U-235, MDA rptd.:	0.06	0.09	0.10	0.12	0.14	0.13	0.17	0.17	0.14	0.15
U-233/4, result calc.:	1.32	0.82	0.72	0.03	0.12	0.40	0.41	5.00	0.06	1.46
U-233/4, result rptd.:	1.32	0.82	0.72	0.03	0.12	0.40	0.41	5.00	0.06	0.15
U-233/4, MDA calc.:	0.06	0.09	0.09	0.10	0.11	0.11	0.14	0.40	0.11	0.12
U-233/4, MDA rptd.:	0.07	0.10	0.10	0.12	0.11	0.11	0.14	0.45	0.11	0.15

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Total Uranium

Standard	Intensity	ample ID	Intens.	ug/L Calc.	ug/L Rptd	Amount of Smpl	Prep. Volume	Dilution	Calc Result	Rptd Rslt
0.049	550	B09355	37470	3.931	4.44476	0.25	0.02	10	3.56	3.56
0.156	1616	B09356	27261	2.860	3.14757	0.25	0.02	10	2.52	2.52
0.521	4752	B09357	21735	2.280	2.50633	0.25	0.02	10	2.01	2.01
0.976	9299	B09359	19855	2.083	2.37714	0.25	0.02	1	0.19	0.19
2.603	24306	B09360	21769	2.284	2.54315	0.25	0.02	1	0.20	0.20
4.881	44539	B09361	14699	1.542	1.79617	0.25	0.02	10	1.44	1.44
16.27	138416	B09362	14585	1.530	1.76953	0.25	0.02	10	1.42	1.42
		LCS	31473	3.302	3.36178	0.25	0.02	10	2.69	2.69
Slope:	1.0E-04	BLANK	-387	-0.041	0.036	0.25	0.02	1	0.003	0.01
		B09355 D	39473	4.142	4.82402	0.25	0.02	10	3.86	3.86

RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09355-TMA-615 (923-E418, Filename B09355.RAD)

9HN 4225.2692

MEMORANDUM

MAR 1994
RECEIVED
TQO

TO: 200-UP-2 Project QA Record

March 25, 1994

FR: Susan Winter, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09355-TMA-615 (923-E418, Filename B09355.RAD)

INTRODUCTION

This memo presents the results of data validation on data package B09355-TMA-615 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
B09355	09/20/93	SOIL	SEE NOTE 1
B09356	09/20/93	SOIL	
B09357	09/20/93	SOIL	
B09359	09/20/93	SOIL	
B09360	09/20/93	SOIL	
B09361	09/20/93	SOIL	
B09362	09/20/93	SOIL	

Note 1. All samples were analyzed for gross alpha, gross beta, selenium-79, strontium-90, technetium-99,iodine-129, isotopic uranium, total uranium, neptunium-237, plutonium-238, plutonium-239/140, americium-241, curium-244, and gamma spectroscopy.

MAR 29 1994

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

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

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

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001

Detection Limits. Detection limit goals were met for all sample results with the exception the following:

SAMPLE ID	ANALYTE	MDA (pCi/g)	RDL (pCi/g)
B09355	IRON-59	0.1	0.05
B09356	IRON-59	0.1	0.05
B09357	IRON-59	0.1	0.05
B09360	IRON-59	0.06	0.05
B09361	IRON-59	0.1	0.05
B09362	IRON-59	0.1	0.05
LCS	URANIUM-233/234	0.4	0.3
LCS	URANIUM-238	0.4	0.3
B09355 DUPLICATE	IRON-59	0.2	0.05
B09355 DUPLICATE	COBALT-58	0.08	0.05
B09355 DUPLICATE	COBALT-60	0.09	0.05
B09355 DUPLICATE	CESIUM-137	0.07	0.05

Completeness. The data package was complete for all requested analyses. A total of seven samples were validated in this data package with a total of 245 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

Sample B09359 was identified as a field blank and contains low levels of total uranium, radium-226, radium-228, thorium-228, and thorium-232. Sample B09360 was identified as an equipment blank and contains low levels of uranium-233/234, total uranium, potassium-40, radium-226, radium-228, thorium-228, and thorium-232. Attachments 3 and 5 provide the data summaries listing the specific sample activity levels for the positive results.

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.

Chemical Yield

- Neptunium-237 chemical yield for sample B09357 was unacceptable. Attachments 2 and 5 provide a summary of data qualification applied and supporting documentation.

-002

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REFERENCES

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

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

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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DATA QUALIFICATION SUMMARY

SDG: B09355-TMA-615	VALIDATOR:	DATE: March 25, 1994	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NEPTUNIUM-237	UJ - NONDETECTS	B09357	CHEMICAL YIELD < 30% BUT > 10%

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09355		B09356		B09357		B09359		B09360		B09361	
	Date	9-20-93		9-20-93		9-20-93		9-20-93		9-20-93		9-20-93	
	Location	219-W19-97		219-W19-95		219-W19-95		219-W19-95		219-W19-95		219-W19-95	
	Depth	167.50 - 170.00		169.00 - 171.50		169.00 - 171.50		---		---		181.00 - 182.00	
	Type	---		---		DUPLICATE		FLD BLANK		EQ BLANK		---	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	12.000		14.000		14.000		4.000	U	5.000	U	9.300	
GROSS BETA	pCi/g	13.000		24.000		23.000		5.000	U	5.000	U	14.000	
SELENIUM-79	pCi/g	0.020	U	0.010	U	0.010	U	0.020	U	0.010	U	0.020	U
STRONTIUM-90	pCi/g	0.600	U	0.700	U	0.700	U	0.700	U	0.700	U	0.700	U
TECHNETIUM-99	pCi/g	0.300	U	0.400	U	0.400	U	0.300	U	0.500	U	0.200	U
IODINE-129	pCi/g	2.000	U	1.000	U	1.000	U	2.000	U	2.000	U	2.000	U
URANIUM-233/234	pCi/g	1.300		0.820		0.720		0.100	U	0.120		0.400	
URANIUM-235	pCi/g	0.060	U	0.090	U	0.100	U	0.100	U	0.100	U	0.100	U
URANIUM-238	pCi/g	1.300		0.880		0.580		0.100	U	0.100	U	0.470	
TOTAL URANIUM	UG/G	3.600		2.500		2.000		0.190		0.200		1.400	
NEPTUNIUM-237	pCi/g	0.030	U	0.010	U	0.050	UJ	0.040	U	0.020	U	0.010	U
PLUTONIUM-238	pCi/g	0.030	U	0.020	U	0.020	U	0.020	U	0.030	U	0.020	U
PLUTONIUM-239/240	pCi/g	0.030	U	0.020	U	0.020	U	0.030	U	0.040	U	0.020	U
AMERICIUM-241	pCi/g	0.040	U	0.040	U	0.030	U	0.030	U	0.020	U	0.030	U
CURIUM-244	pCi/g	0.040	U	0.040	U	0.030	U	0.030	U	0.020	U	0.020	U
SODIUM-22	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.040	U
POTASSIUM-40	pCi/g	6.100		17.000		17.000		0.400	U	0.330		15.000	
MANGANESE-54	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.030	U
IRON-59	pCi/g	0.100	U	0.100	U	0.100	U	0.050	U	0.060	U	0.100	U
COBALT-58	pCi/g	0.050	U	0.050	U	0.050	U	0.020	U	0.020	U	0.050	U
COBALT-60	pCi/g	0.040	U	0.040	U	0.050	U	0.020	U	0.020	U	0.040	U
NIOBIUM-94	pCi/g	0.040	U	0.040	U	0.040	U	0.020	U	0.020	U	0.030	U
RUTHENIUM-103	pCi/g	0.060	U	0.060	U	0.050	U	0.030	U	0.030	U	0.050	U
RUTHENIUM-106	pCi/g	0.400	U	0.400	U	0.300	U	0.200	U	0.200	U	0.300	U
TIN-113	pCi/g	0.060	U	0.060	U	0.050	U	0.020	U	0.020	U	0.040	U
CESIUM-134	pCi/g	0.050	U	0.060	U	0.050	U	0.020	U	0.020	U	0.050	U
CESIUM-137	pCi/g	0.040	U	0.050	U	0.040	U	0.020	U	0.020	U	0.040	U
CERIUM-144	pCi/g	0.200	U	0.200	U	0.200	U	0.100	U	0.100	U	0.200	U
EUROPIUM-152	pCi/g	0.090	U	0.100	U	0.090	U	0.040	U	0.040	U	0.070	U
EUROPIUM-154	pCi/g	0.060	U	0.070	U	0.060	U	0.030	U	0.030	U	0.050	U
EUROPIUM-155	pCi/g	0.100	U	0.100	U	0.100	U	0.060	U	0.050	U	0.100	U
RADIUM-226	pCi/g	1.000		0.750		0.700		0.120		0.084		0.500	
RADIUM-228	pCi/g	0.820		1.100		1.100		0.095		0.160		0.660	
THORIUM-228	pCi/g	0.630		1.300		1.000		0.110		0.150		0.740	
THORIUM-232	pCi/g	0.820		1.100		1.100		0.095		0.160		0.660	

Verified
[signature]
3/25/94

009

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Validated Data Summary, Data Package: B09355-TMA-615

	Samp#	B09362	
	Date	9-20-93	
	Location	219-W19-97	
	Depth	175.70 - 177.00	
	Type	---	
	Comments	---	
Parameter	Units	Result	Q
GROSS ALPHA	pCi/g	7.000	U
GROSS BETA	pCi/g	16.000	
SELENIUM-79	pCi/g	0.010	
STRONTIUM-90	pCi/g	0.700	U
TECHNETIUM-99	pCi/g	0.300	U
IODINE-129	pCi/g	2.000	U
URANIUM-233/234	pCi/g	0.410	
URANIUM-235	pCi/g	0.200	U
URANIUM-238	pCi/g	0.720	
TOTAL URANIUM	UG/G	1.400	
NEPTUNIUM-237	pCi/g	0.030	U
PLUTONIUM-238	pCi/g	0.020	U
PLUTONIUM-239/240	pCi/g	0.020	U
AMERICIUM-241	pCi/g	0.030	U
CURIUM-244	pCi/g	0.030	U
SODIUM-22	pCi/g	0.040	U
POTASSIUM-40	pCi/g	12.000	
MANGANESE-54	pCi/g	0.030	U
IRON-59	pCi/g	0.100	U
COBALT-58	pCi/g	0.030	U
COBALT-60	pCi/g	0.030	U
NIOBIUM-94	pCi/g	0.030	U
RUTHENIUM-103	pCi/g	0.040	U
RUTHENIUM-106	pCi/g	0.300	U
TIN-113	pCi/g	0.040	U
CESIUM-134	pCi/g	0.040	U
CESIUM-137	pCi/g	0.030	U
CERIUM-144	pCi/g	0.200	U
EUROPIUM-152	pCi/g	0.070	U
EUROPIUM-154	pCi/g	0.040	U
EUROPIUM-155	pCi/g	0.090	U
RADIUM-226	pCi/g	0.450	
RADIUM-228	pCi/g	0.720	
THORIUM-228	pCi/g	0.800	
THORIUM-232	pCi/g	0.720	

Verified [illegible] 3/25/94

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N309139-01

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

299-W19-97

B09355
167.5-170.

3/24/94 ~~Solid Rip Blank~~

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-01	Client sample id	B09355
Dept sample id	7266-001	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2703

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	12	5.1	5	10		80A
Gross Beta	Beta	13	4.1	5	10		80B
Selenium 79	15758-45-9	0.012	0.009	0.02	10	U	SE
Strontium 90	10098-97-2	0.052	0.16	0.6	1	U	Y
Technetium 99	14133-76-7	0.086	0.14	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.63	0.76	2	2	U	I
Uranium 233/234		1.3	0.21	0.07	0.3		U
Uranium 235	15117-96-1	0.057	0.049	0.06	0.3	U	U
Uranium 238		1.3	0.21	0.06	0.3		U
Total Uranium (ug/g)	7440-61-1	3.6	0.63	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.011	0.015	0.03	0.2	U ~~U~~ ~~UG~~	NP
Plutonium 238	13981-16-3	0.010	0.014	0.03	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	0.010	0.024	0.04	0.05	U	TP
Curium 244	13981-15-2	-0.005	0.020	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	6.1	0.78				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	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		0.06		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		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

3/24/94

Verified

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-97

N309139-01

TMA NORCAL
REPORTING GROUP 7266

B09355
167.5-170

DATA SHEET, cont

3/24/94 ~~Solid Trip Blank~~

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-01	Client sample id	B09355
Dept sample id	7266-001	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	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	1.0	0.10				GAM
Radium 228	15262-20-1	0.82	0.20				GAM
Thorium 228	14274-82-9	0.63	0.050				GAM
Thorium 232	7440-29-1	0.82	0.20				GAM

9413225.2704

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-02

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09356

169-171.5'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-02	Client sample id	B09356
Dept sample id	7266-002	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2705

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	14	5.0	4	10		80A
Gross Beta	Beta	24	4.6	5	10		80B
Selenium 79	15758-45-9	-0.007	0.008	0.01	10	U	SE
Strontium 90	10098-97-2	0.071	0.18	0.7	1	U	Y
Technetium 99	14133-76-7	0.31	0.16	0.4	0.5	U	TC
Iodine 129	15046-84-1	0.079	0.65	1	2	U	I
Uranium 233/234		0.82	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.068	0.046	0.09	0.3	U	U
Uranium 238		0.88	0.20	0.07	0.3		U
Total Uranium (ug/g)	7440-61-1	2.5	0.44	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.008	0.008	0.01	0.2	U ~~U~~ ~~UJ~~	NP
Plutonium 238	13981-16-3	-0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.010	0.02	0.05	U	PU
Americium 241	14596-10-2	0.009	0.023	0.04	0.05	U	TP
Curium 244	13981-15-2	0	0.024	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	17	0.99				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	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		0.06		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		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

3/24/94

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-02

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09356

169-171.5'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-02	Client sample id	B09356
Dept sample id	7266-002	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2706

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		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		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.75	0.11				GAM
Radium 228	15262-20-1	1.1	0.21				GAM
Thorium 228	14274-82-9	1.3	0.073				GAM
Thorium 232	7440-29-1	1.1	0.21				GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

N309139-03

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

299-W19-95

B09357
169-171.5

Field Duplicate

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-03	Client sample id	B09357
Dept sample id	7266-003	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	14	5.0	4	10		80A
Gross Beta	Beta	23	4.5	5	10		80B
Selenium 79	15758-45-9	0.002	0.009	0.01	10	U	SE
Strontium 90	10098-97-2	0.013	0.40	0.7	1	U	Y
Technetium 99	14133-76-7	0.10	0.13	0.4	0.5	U	TC
Iodine 129	15046-84-1	-0.27	0.50	1	2	U	I
Uranium 233/234		0.72	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.065	0.052	0.1	0.3	U	U
Uranium 238		0.58	0.16	0.08	0.3		U
Total Uranium (ug/g)	7440-61-1	2.0	0.35	0.04	0.1		U_T
Neptunium 237	13994-20-2	0	0.021	0.05	0.2	~~U~~ US	NP
Plutonium 238	13981-16-3	-0.002	0.010	0.02	0.05	U	PU
Plutonium 239/240		-0.005	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.006	0.016	0.03	0.05	U	TP
Curium 244	13981-15-2	0	0.016	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	17	0.96				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	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		0.05		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Verified 3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

9413225.2707

N309139-03

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

299-W19-95

B09357
169-171.5'
Field Duplicate

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-03	Client sample id	B09357
Dept sample id	7266-003	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	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	0.70	0.081				GAM
Radium 228	15262-20-1	1.1	0.16				GAM
Thorium 228	14274-82-9	1.0	0.056				GAM
Thorium 232	7440-29-1	1.1	0.16				GAM

9413225.2708

Verified [illegible] 3/24/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/11/94

N309139-04

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

299-W19-95

B09359

Field Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-04	Client sample id	B09359
Dept sample id	7266-004	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2709

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	0.47	2.6	4	10	U	80A
Gross Beta	Beta	0.080	3.2	5	10	U	80B
Selenium 79	15758-45-9	0.013	0.010	0.02	10	U	SE
Strontium 90	10098-97-2	0.022	0.16	0.7	1	U	Y
Technetium 99	14133-76-7	0.065	0.10	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.22	0.86	2	2	U	I
Uranium 233/234		0.025	0.076	0.1	0.3	U	U
Uranium 235	15117-96-1	-0.015	0.031	0.1	0.3	U	U
Uranium 238		0.050	0.051	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.19	0.033	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.008	0.015	0.04	0.2	U ~~U~~	NP
Plutonium 238	13981-16-3	0.003	0.011	0.02	0.05	U	PU
Plutonium 239/240		-0.006	0.006	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.015	0.03	0.05	U	TP
Curium 244	13981-15-2	0.008	0.015	0.03	0.05	U	TP
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		0.05	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	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		0.03		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

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-04

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09359

Field Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-04	Client sample id	B09359
Dept sample id	7266-004	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.06	0.1	U	GAM
Radium 226	13982-63-3	0.12	0.040				GAM
Radium 228	15262-20-1	0.095	0.072				GAM
Thorium 228	14274-82-9	0.11	0.023				GAM
Thorium 232	7440-29-1	0.095	0.072				GAM

9413225.2710

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-05

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09360

Equipment Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-05	Client sample id	B09360
Dept sample id	7266-005	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2711

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	2.3	3.3	5	10	U	80A
Gross Beta	Beta	-1.2	3.0	5	10	U	80B
Selenium 79	15758-45-9	0.008	0.008	0.01	10	U	SE
Strontium 90	10098-97-2	0.022	0.17	0.7	1	U	Y
Technetium 99	14133-76-7	-0.067	0.19	0.5	0.5	U	TC
Iodine 129	15046-84-1	0.051	0.72	2	2	U	I
Uranium 233/234		0.12	0.091	0.1	0.3	~~U~~	U
Uranium 235	15117-96-1	0.018	0.036	0.1	0.3	U	U
Uranium 238		0.015	0.030	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.20	0.035	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.006	0.011	0.02	0.2	U	NP
Plutonium 238	13981-16-3	-0.003	0.013	0.03	0.05	U	PU
Plutonium 239/240		0	0.019	0.04	0.05	U	PU
Americium 241	14596-10-2	0	0.011	0.02	0.05	U	TP
Curium 244	13981-15-2	0.007	0.014	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.33	0.15				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.06	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	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		0.03		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

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-05

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09360

Equipment Blank

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-05	Client sample id	B09360
Dept sample id	7266-005	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2712

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.05	0.1	U	GAM
Radium 226	13982-63-3	0.084	0.029				GAM
Radium 228	15262-20-1	0.16	0.076				GAM
Thorium 228	14274-82-9	0.15	0.032				GAM
Thorium 232	7440-29-1	0.16	0.076				GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

N309139-06

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

299-W19-95

B09361

181-182'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-06	Client sample id	B09361
Dept sample id	7266-006	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2713

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	9.3	4.5	4	10	~~J~~	80A
Gross Beta	Beta	14	4.0	5	10		80B
Selenium 79	15758-45-9	0	0.009	0.02	10	U	SE
Strontium 90	10098-97-2	0.17	0.21	0.7	1	U	Y
Technetium 99	14133-76-7	0.17	0.099	0.2	0.5	U	TC
Iodine 129	15046-84-1	-0.33	0.80	2	2	U	I
Uranium 233/234		0.40	0.17	0.1	0.3		U
Uranium 235	15117-96-1	0.017	0.034	0.1	0.3	U	U
Uranium 238		0.47	0.17	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.4	0.25	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.007	0.007	0.01	0.2	4 ~~U~~ ~~UJ~~	NP
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.015	0.03	0.05	U	TP
Curium 244	13981-15-2	-0.004	0.012	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	15	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		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		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

3/24/14

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-95

N309139-06

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09361

181-182'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-06	Client sample id	B09361
Dept sample id	7266-006	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.07	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	0.50	0.070				GAM
Radium 228	15262-20-1	0.66	0.15				GAM
Thorium 228	14274-82-9	0.74	0.044				GAM
Thorium 232	7440-29-1	0.66	0.15				GAM

9413225.2714

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-97

N309139-07

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET

B09362

175.7-177'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-07	Client sample id	B09362
Dept sample id	7266-007	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2715

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Gross Alpha	Alpha	5.1	5.2	7	10	U	80A
Gross Beta	Beta	16	4.2	5	10		80B
Selenium 79	15758-45-9	0.010	0.008	0.01	10		SE
Strontium 90	10098-97-2	0.038	0.18	0.7	1	U	Y
Technetium 99	14133-76-7	0.15	0.11	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.31	0.84	2	2	U	I
Uranium 233/234		0.41	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.045	0.045	0.2	0.3	U	U
Uranium 238		0.72	0.24	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.4	0.25	0.04	0.1		U_T
Neptunium 237	13994-20-2	0.004	0.014	0.03	0.2	U	NP
Plutonium 238	13981-16-3	-0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.002	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.009	0.009	0.03	0.05	U	TP
Curium 244	13981-15-2	0.004	0.013	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	12	0.67				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		0.03	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		0.03	0.05	U	GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

299-W19-97

N309139-07

TMA NORCAL
REPORTING GROUP 7266

DATA SHEET, cont

B09362

175.7-177'

SDG	7266	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309139-07	Client sample id	B09362
Dept sample id	7266-007	Location/Matrix	200-UP-2 SOLID
Received	09/27/93	Collected	09/20/93
		Chain of custody id	NONE

9413225.2716

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS Q	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.07	0.1	U	GAM
Europium 154	15585-10-1	U		0.04	0.1	U	GAM
Europium 155	14391-16-3	U		0.09	0.1	U	GAM
Radium 226	13982-63-3	0.45	0.064				GAM
Radium 228	15262-20-1	0.72	0.14				GAM
Thorium 228	14274-82-9	0.80	0.068				GAM
Thorium 232	7440-29-1	0.72	0.14				GAM

Verified

3/24/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/11/94

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

94A3225.2717

TMA/Norcal

Report N3-09-139-7266
Sample Delivery Group 7266

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

Case Narrative

January 12, 1994

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7266 is comprised of the seven soil samples from location 200-UP-2, delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

One 100 mL plastic bottle containing each sample was received for the analyses. This was not an adequate volume to obtain the required detection limit for gamma scan for the duplicate analysis.

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses

No problems were encountered by the laboratory in the analyses

2.2 Gross Beta Analyses

No problems were encountered by the laboratory in the analyses.

2.3 Selenium-79 Analyses

No problems were encountered by the laboratory in the analyses.

2.4 Strontium-90 Analyses

No problems were encountered by the laboratory in the analyses.

2.5 Technetium-99 Analyses

No problems were encountered by the laboratory in the analyses.

2.6 Iodine-129 Analyses

No problems were encountered by the laboratory in the analyses.

2.7 Neptunium-237 Analyses

No problems were encountered by the laboratory in the analyses.

2.8 Total Uranium Analyses

No problems were encountered by the laboratory in the analyses.

TMA/Norcal
Report N3-09-139-7266
Sample Delivery Group 7266

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

Case Narrative

January 12, 1994

2.0 ANALYSIS NOTES (cont.)

2.9 Isotopic Uranium Analyses
The uranium-233/234 and uranium-238 MDA's for the LCS are higher than the RDL's due to interferencefrom uranium-235. Sample B09362, the blank, the LCS, and the duplicate were counted for less than the nominal count time of 150 minutes.

3.0 Isotopic Plutonium Analyses
No problems were encountered by the laboratory in the analyses.

3.1 Americium-241/Curium-244 Analyses
No problems were encountered by the laboratory in the analyses. Samples B09359, B09360, B09361, B09362, and the duplicate of B09355 were counted for less than the nominal count time of 700 minutes.

3.2 Gamma Scan Analyses
The MDA's of several gamma nuclides for the duplicate analyses of sample B09355 are higher than the RDL's due to the smaller than nominal aliquot available for analysis. The MDA of iron-59 for all the samples is higher than the RDL due to the short half-life of iron-59.

9413225.2719

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: 9-20-93

Ice Chest No.: 580

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973328836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09355

- 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) B09356

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

3)

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

SER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 Irene E. Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL on 9-25-93; opened 9-27-93. KB

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

9413225.2720

~~64~~

028

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: 9-20-93

Ice Chest No.: 630

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09357

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) B09362

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

JER 9-21-93

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

Relinquished by:	Received by:	Date/Time:
9-23-93 1440 Leon S. Rogers	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL on 9-25-93; opened 9-27-93 KB

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

9413225.2721

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: 9-20-93

Ice Chest No.: 161

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 9973332836

Offsite Property No.: W93-0-0764-23

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

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

Sample Identification

1) B09359

- 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) B09360

- 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) B09361

- 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:
9-23-93 Loren E Rogers 1440	K. Blum Kermit Blum	9-27-93 *
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

* Received @ TMA/NORCAL 9-25-93; opened 9-27-93 . KB

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

9413225.2722

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

94 3225.2723

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	(E)
PROJECT: 200-UP-2			DATA PACKAGE: B09355-TMA-615		
VALIDATOR: [signature]		LAB: TMA		DATE: 03/10/94	
CASE:			SDG: B09355-TMA-615		

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☒ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	Se-79
☒ Total Uranium	☐ Radium-22	☐ Tritium	☒ I-129	Np-237	

SAMPLES/MATRIX Soils	
B09355	B09361
B09356	B09362
B09357	
B09359	
B09360	

1. Completeness . . . . . ☐ N/A

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

Comments: _____

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

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

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

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

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

Comments: The gamma spec xspec and detectors used for gross alpha/beta were calibrated initially more than 1 yr prior to sample analysis. However, since the ~~cal~~ FCU and CCU are acceptable, no qualification is required.

9413225.2724

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: The calibration control limits for the ~~GFAA, CE~~ LBG detectors were obtained from SOP BC-9325-TMA-620. All blank & CP checks are within the control limits.

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: See last page of checklist for comments.

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed? . . . . . Yes No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . ~~Yes~~ No N/A 3/22/94
Spike source expired? . . . . . Yes ~~No~~ N/A 3/22/94
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

9413225.2725

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: ~~All chemical and tracer recoveries are acceptable with the exception of sample BC9357 chemical recoveries for neptunium-237. The affected samples and qualifications are listed on the last page of this checklist.~~

3/25/94

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:

9413225.2726

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: The Uranium-238 field duplicate result (for sample B09357) is acceptable since the sample results are less than 5xRDL and the difference between the two results is within the range of 1.5xRDL. ~~range~~

9413225.2723 3/22/94

10. Holding Times

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

Comments:

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

Results reported for all required sample analyses? . . . . . (Yes) No N/A
Results supported in raw data? ~~Sec~~ . . . . . (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: See last page of checklist for comments.
The laboratory reported "J" qualifiers for samples B09360, B09361 and B09362. These "J" qualifiers have been crossed off the laboratory results forms for clarification purposes and are not considered appropriate for radiochemistry validation.

Revised page
CJ 4/18/94

Comments: Comments to Item 4:

- Sample B09359 is identified as a field blank. All results are nondetects with the exception of the following:

B09359 - Field Blank of 299-W19-95

Analyte	Result
Total Uranium	0.19 ug/g
Radium-226	0.12 pCi/g
Radium-228	0.095 pCi/g
Thorium-228	0.11 pCi/g
Thorium-232	0.095 pCi/g

- Sample B09360 is identified as an equipment blank. All results are undetected with the exception of the following:

B09360 - Equipment Blank

Analyte	Result
Uranium-233/234	0.12 pCi/g
Total Uranium	0.20 ~~pCi/g~~ ug/g 3/22/94
Potassium-40	0.33 pCi/g
Radium-226	0.084 pCi/g
Radium-228	0.16 pCi/g
Thorium-228	0.15 pCi/g
Thorium-232	0.16 pCi/g

- ~~Sample B09355 is identified as a field trip blank. All results are nondetects with the exception of the following~~

~~B09355 - Field Trip Blank~~

~~Analyte~~	~~Result~~
~~Gross Alpha~~	~~12 pCi/g~~
~~Gross Beta~~	~~13 pCi/g~~
~~Uranium-233/234~~	~~1.3 pCi/g~~
~~Uranium-238~~	~~1.3 pCi/g~~
~~Total Uranium~~	~~3.5 ug/g~~
~~Potassium-40~~	~~6.1 pCi/g~~
~~Radium-226~~	~~1.0 pCi/g~~
~~Radium-228~~	~~0.82 pCi/g~~
~~Thorium-228~~	~~0.63 pCi/g~~
~~Thorium-232~~	~~0.82 pCi/g~~

3/24/94

3/22/94

9413225.2728

036

Comments: Comment to Item 7:

- The neptunium-237 chemical yields for the following samples were unacceptable. Therefore the assoc. result has been qualified as estimated (J/UJ)

Sample ID	Chemical yield	Qualifier
~~B09355~~	~~26%~~	~~UJ~~
~~B09356~~	~~27%~~	~~UJ~~
B09357	~~20%~~ 19.6%	UJ
3/22/94 ~~B09359~~	~~23%~~	~~UJ~~
~~B09361~~	~~26%~~	~~UJ~~
~~LCS (7266-008)~~	~~29%~~	~~J~~
~~B09355 Duplicate~~	~~27%~~	~~UJ~~

Alpha Spec control limit is 20%-105%

[illegible] 3/24/94

Comments to Item 11:

- All MDAs meet the RDLs w/ the exception of:

Sample ID	Analyte	MDA	RDL	Units
B09355	Iron-59	0.1	0.05	pCi/g
B09356	Iron-59	0.1	0.05	pCi/g
B09357	Iron-59	0.1	0.05	pCi/g
B09360	Iron-59	0.06	0.05	pCi/g
B09361	Iron-59	0.1	0.05	pCi/g
B09362	Iron-59	0.1	0.05	pCi/g
LCS (7266-008)	U-233/234	0.4	0.3	pCi/g
↓	U-238	0.4	0.3	pCi/g
B09355 Dup	Iron-59	0.2	0.05	pCi/g
↓	Cobalt-58	0.08	0.05	pCi/g
↓	Cobalt-60	0.09	0.05	pCi/g
↓	Cesium-137	0.07	0.05	pCi/g

No qualification is required

- The raw data for Iodine-129, sample B09355 Duplicate, was not included in the data pkg. However, since the raw data for all other samples was included the package could be completely validated. No qualification is required.

[illegible] 3/22/94

9413225.2729

Comments:

Continued comments to Item 11.

The MDA value of 0.1 for total uranium, for the laboratory control sample and blank cannot be verified against the raw data. No qualification is required.

Comment to Item 2:

The initial calibration certificate for the Xspec detectors used to perform the iodine analysis was not included in this data package but was obtained from package B0F31-TMA-580.

9413225.2730

3/24/94

TMA NORCAL

REPORTING GROUP 7266

SDG 7266
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

WORK SUMMARY

Holding Time Summary

Pg 1 of 3

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUFFIX	ANALYZED	REVIEWED BY	METHOD
B09355		N309139-01	7266-001	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-001	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-001	GAM		10/20/93	30	Gamma Scan
			7266-001	I		11/29/93	70	Iodine 129 in Soil
			7266-001	NP				Neptunium in Soil
			7266-001	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-001	SE		12/15/93	86	Selenium 79 in Soil
			7266-001	TC		10/26/93	36	Technetium 99 in Soil
			7266-001	TP	A2	12/29/93	100	Americium 241/Curium in Solids
			7266-001	U		11/09/93	50	Uranium, Isotopic in Soil
			7266-001	U_T		11/06/93	47	Uranium, Total in Soil
			7266-001	Y		10/28/93	38	Strontium 90 in Soil
B09356		N309139-02	7266-002	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-002	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-002	GAM		10/20/93	30	Gamma Scan
			7266-002	I		11/30/93	71	Iodine 129 in Soil
			7266-002	NP				Neptunium in Soil
			7266-002	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-002	SE		12/16/93	87	Selenium 79 in Soil
			7266-002	TC		10/26/93	36	Technetium 99 in Soil
			7266-002	TP	A2	12/29/93	100	Americium 241/Curium in Solids
			7266-002	U		11/09/93	50	Uranium, Isotopic in Soil
			7266-002	U_T		11/06/93	47	Uranium, Total in Soil
			7266-002	Y		10/28/93	38	Strontium 90 in Soil
B09357		N309139-03	7266-003	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-003	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-003	GAM		10/20/93	30	Gamma Scan
			7266-003	I		11/30/93	71	Iodine 129 in Soil
			7266-003	NP				Neptunium in Soil
			7266-003	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-003	SE		12/16/93	87	Selenium 79 in Soil
			7266-003	TC		10/26/93	36	Technetium 99 in Soil
			7266-003	TP	A2R1	01/05/94	107	Americium 241/Curium in Solids
			7266-003	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-003	U_T		11/06/93	47	Uranium, Total in Soil
			7266-003	Y		10/28/93	38	Strontium 90 in Soil

3/22/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.28
Report date 01/11/94

TMA NORCAL
REPORTING GROUP 7266

SDG 7266
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

WORK SUMMARY, cont.

Holding Time Summary Pg. 3 of 3

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED BY	METHOD
B09362		N309139-07	7266-007	80A/80		11/04/93	45	Gross Alpha in Soil
200-UP-2	SOLID	09/20/93	7266-007	80B/80		11/04/93	45	Gross Beta in Soil
NONE		09/27/93	7266-007	GAM		10/20/93	30	Gamma Scan
			7266-007	I		11/27/93	68	Iodine 129 in Soil
			7266-007	NP				Neptunium in Soil
			7266-007	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-007	SE		12/16/93	87	Selenium 79 in Soil
			7266-007	TC		10/26/93	36	Technetium 99 in Soil
			7266-007	TP	A2	12/23/93	94	Americium 241/Curium in Solids
			7266-007	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-007	U_T		11/06/93	47	Uranium, Total in Soil
			7266-007	Y		10/28/93	38	Strontium 90 in Soil
Reagent Blank		N309139-09	7266-009	80A/80		11/04/93	45	Gross Alpha in Soil
	SOLID		7266-009	80B/80		11/04/93	45 (30)	Gross Beta in Soil
			7266-009	GAM		10/20/93	30	Gamma Scan
			7266-009	I		12/02/93	73 3/22/94	Iodine 129 in Soil
			7266-009	NP				Neptunium in Soil
			7266-009	PU		11/10/93	51	Plutonium, Isotopic in Soil
			7266-009	SE		12/16/93	87	Selenium 79 in Soil
			7266-009	TC		10/26/93	36	Technetium 99 in Soil
			7266-009	U		11/10/93	51	Uranium, Isotopic in Soil
			7266-009	U_T		11/06/93	47	Uranium, Total in Soil
			7266-009	Y		10/28/93	38	Strontium 90 in Soil
Reagent Blank	SOLID	N309139-18	7266-018	TP		12/29/93		Americium 241/Curium in Solids
Lab Control Sample	SOLID	N309139-08	7266-008	80A/80		11/04/93		Gross Alpha in Soil
			7266-008	80B/80		11/04/93		Gross Beta in Soil
			7266-008	GAM		10/20/93		Gamma Scan
			7266-008	I		12/01/93		Iodine 129 in Soil
			7266-008	NP				Neptunium in Soil
			7266-008	PU		11/10/93		Plutonium, Isotopic in Soil
			7266-008	TC		10/26/93		Technetium 99 in Soil
			7266-008	U		11/10/93		Uranium, Isotopic in Soil
			7266-008	U_T		11/06/93		Uranium, Total in Soil
			7266-008	Y		10/28/93		Strontium 90 in Soil

3/22/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.28
Report date 01/11/94

9413225.2732

FIELD DUPLICATE PRECISION CALCULATION WORKSHEET 22-Mar-94 SDG B09355-TMA-615

FILENAME: B09355FD.WK1

SDG NO.: B09355-TMA-615

SAMPLE ID: B09356
DUPLICATE SAMPLE ID: B09357

SAMPLE LOCATION: 299-W19-95 169'-171.5'

PARAMETER	RDL	SAMPLE RESULT	DUPLICATE RESULT	RPD
GROSS ALPHA	10	14	14	0
GROSS BETA	10	24	23	4
URANIUM-233/23	0.3	0.82	0.72	13
URANIUM-238	0.3	0.88	0.58	41
TOTAL URANIUM	0.1	2.5	2	22
POTASSIUM-40	not specified	17	17	0
RADIUM-226	not specified	0.75	0.7	7
RADIUM-228	not specified	1.1	1.1	0
THORIUM-228	not specified	1.3	1	26
THORIUM-232	not specified	1.1	1.1	0

Certificate of Calibration		TMA/Norcal
Calibration: ^{129}I	Instrument: XSPEC 11, XSPEC 14 XSPEC 15, INGE 1	Type: Germanium gamma spec., NaI(Tl) x-ray spectrometer
Calibration Standard: ^{129}I	SRM 49498-54 from NBS	

Status	Date	Reference Document
Original Calibration:	October, 1988	TLW 6240
Verification:		

Summary of Results

Det	Eff	P-Factor
XSPEC 11	0.1980	3.10
XSPEC 14	0.2107	4.57
XSPEC 15	0.2053	4.97
INGE 1	0.0127	78.78

Initial Calibration Certificate for X-Spec detectors used to perform Iodine analysis. Since this certificate was not provided in this data package, it was obtained from data package 809313-TMA-580.

~~273-A~~

3/25/94

9413225.2734

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Gross Alpha/Beta

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Aliquot:	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Detector:	102	103	104	113	115	116	101	102	103	104
Count time:	100	100	100	106.03	106.03	106.03	100	100	100	100
Alpha Counts:	41	55	49	12	21	36	24	692	5	35
Alpha cpm:	0.41	0.55	0.49	0.11	0.20	0.34	0.24	6.92	0.05	0.35
Alpha, Bkgd:	0.074	0.089	0.066	0.097	0.122	0.073	0.114	0.074	0.089	0.066
Alpha, Xtalk:	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff:	0.122	0.143	0.134	0.152	0.151	0.128	0.103	0.129	0.126	0.124
Alpha Result Calc.:	12.14	14.10	13.82	0.48	2.29	9.26	5.13	229.97	-1.37	10.12
Alpha Result Rptd.:	12.10	14.10	13.80	0.47	2.30	9.26	5.15	230.00	-1.40	10.10
Alpha MDA Calc.:	4.68	4.38	4.02	4.30	4.86	4.50	6.88	4.43	4.97	4.35
Alpha MDA Rptd.:	4.66	4.39	4.01	4.19	4.72	4.36	6.88	4.40	5.00	4.33
Beta Counts:	250	353	329	124	108	267	259	4634	107	203
Beta cpm:	2.50	3.53	3.29	1.17	1.02	2.52	2.59	46.34	1.07	2.03
Bkgd:	1.187	1.179	1.045	1.158	1.108	1.179	1.102	1.187	1.179	1.045
Xtalk:	0.277	0.264	0.269	0.259	0.26	0.275	0.298	0.273	0.275	0.276
Eff:	0.417	0.421	0.42	0.422	0.422	0.418	0.412	0.419	0.418	0.418
Beta Result Calc.:	13.18	23.85	22.85	0.08	-1.17	13.64	15.86	465.30	-1.06	9.77
Beta Result Rptd:	13.20	23.90	22.90	0.08	-1.16	13.70	15.90	466.00	-1.10	9.79
Beta MDA Calc:	5.48	5.41	5.11	5.20	5.08	5.30	5.35	5.46	5.45	5.13
Beta MDA rptd:	5.48	5.41	5.11	5.20	5.08	5.29	5.34	5.50	5.50	5.13

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Strontium 90

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	GRB 205	GRB 206	GRB 209	GRB 210	GRB 212	GRB 213	GRB 214	GRB 215	GRB 209	GRB 205
Bkg:	0.3729	0.4651	0.4746	0.4266	0.4632	0.4729	0.4875	0.3997	0.4722	0.3729
Count Time:	33	33	33	33	33	33	33	33	33	33
Y90 cpm:	0.057	0.078	0.014	0.022	0.024	0.169	0.04	15.539	0.21	0.036
Elapsed Time, days:	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419	37.419
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974	0.9974
Yield:	0.9133	0.916	0.916	0.8333	0.8985	0.8495	0.8898	0.8817	0.8246	0.875
PPT. corr.:	1	1	1	1	1	1	1	1	1	1
Aliquot:	1	1	1	1	1	1	1	1	1	1
Product:	0.9110	0.9137	0.9137	0.8312	0.8962	0.8473	0.8875	0.8794	0.8225	0.8728
C-zero:	0.0626	0.0854	0.0153	0.0265	0.0268	0.1995	0.0451	17.6692	0.2553	0.0412
P-Factor:	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859
Result, calc.:	0.05	0.07	0.01	0.02	0.02	0.17	0.04	14.80	0.21	0.03
Result, rptd.:	0.05	0.07	0.01	0.02	0.02	0.17	0.04	14.76	0.21	0.04
MDA, calc.:	0.84	0.94	0.95	0.82	0.92	0.88	0.93	0.84	0.85	0.80
MDA, rptd.:	0.62	0.68	0.68	0.72	0.69	0.74	0.71	0.66	0.88	0.65

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Technetium 99

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	LBG 12	LBG 13	LBG 14	LBG 13	LBG 16	LBG 9	LBG 10	LBG 11	LBG 12	LBG 13
Net, cpm:	0.08	0.22	0.08	0.07	-0.04	0.17	0.13	24.01	0.08	0.15
Days:	36.59	36.59	36.59	36.59	36.59	36.692	36.692	0	0	36.692
Lambda:	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09
Decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Yield:	0.4976	0.3726	0.4044	0.5567	0.3102	0.5426	0.4463	0.4967	0.5212	0.4997
Aliquot:	2.02	2.03	2.08	2.01	2.02	2.02	2.08	2	2	2.01
P-Factor:	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
Count, time:	135.2	135.2	135.2	135.2	135.2	232.6	232.6	232.6	232.6	232.6
Bkg., cpm:	0.53	0.45	0.5	0.66	0.53	0.55	0.54	0.48	0.53	0.45
Result, calc.:	0.08	0.31	0.10	0.07	-0.07	0.16	0.15	25.48	0.08	0.16
Result, rptd.:	0.09	0.31	0.10	0.07	-0.07	0.17	0.15	25.48	0.08	0.15
MDA, calc.:	0.31	0.37	0.36	0.31	0.49	0.22	0.26	0.22	0.22	0.22
MDA, rptd.:	0.32	0.41	0.39	0.32	0.54	0.23	0.28	0.24	0.23	0.23

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Selenium 79

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	B09355 D	B09337
Detector, LSC:	4	4	4	4	4	4	4	4	4	4
Count time:	150	150	150	150	150	150	150	150	150	150
Detector Eff:	77.6556	92.34	91.186	87.2	89.621	90.049	90.904	93.749	81.018	0.522
Sample Counts:	1739	1494	1619	1740	1697	1590	1730	1641	1772	1913
Sample cpm:	11.59	9.96	10.79	11.60	11.31	10.60	11.53	10.94	11.81	12.75
Bkgd cpm:	10.59	10.59	10.59	10.59	10.59	10.59	10.59	10.59	10.59	12.35
Yield:	0.9234	0.889	0.8497	0.7957	0.9381	0.7851	0.9185	0.7122	0.8055	0.7908
Decay Corr:	1	1	1	1	1	1	1	1	1	1
Aliquot:	0.52	0.53	0.5	0.51	0.5	0.51	0.5	0.5	0.51	0.5
Result calc:	0.01	-0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.02	0.88
Result rptd:	0.01	-0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.02	0.87
MDA calc:	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	2.92
MDA rptd:	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	2.96

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Neptunium

Sample ID	B09355	B09356	B09357	B09359	B09360	B09361	B09362	LCS	BLANK	B09355 DUP
Detector:	SS-61	SS-62	SS-63	SS-64	SS-65	SS-66	SS-49	SS-50	SS-64	SS-65
Np239 cpm:	18.69	19.09	14.03	16.72	22.34	18.32	24.68	20.52	21.83	19.06
Inst. eff.:	0.721	0.721	0.721	0.721	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	99.08	99.08	99.08	99.08
Yield:	0.2616	0.2672	0.1964	0.2341	0.3127	0.2565	0.3455	0.2872	0.3056	0.2668
Aliquot:	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Count time:	1098.05	1098.05	1098.05	1229.65	1229.65	1229.65	1000.38	1000.38	1098.05	1098.05
Np237 gross counts:	4	2	2	4	3	2	2	1100	4	2
Np237 bkgd counts:	1	0	2	2	1	0	1	4	1	3
Np237 aspec. eff:	0.42	0.387	0.396	0.404	0.413	0.408	0.368	0.365	0.405	0.41
Np237 result calc.:	0.01	0.01	0.00	0.01	0.01	0.01	0.00	4.71	0.01	-0.00
Np237 result rptd.:	0.01	0.01	0.00	0.01	0.01	0.01	0.00	4.71	0.01	-0.00
Np237 MDA calc.:	0.03	0.03	0.04	0.03	0.02	0.03	0.03	0.04	0.03	0.03
Np237 MDA rptd.:	0.03	0.01	0.05	0.04	0.02	0.01	0.03	0.05	0.03	0.04

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Iodine-129

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS
Detector:	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14
Count Time:	465.77	401.67	991.58	354.52	414.43	400.77	426.6	464.53	384.77
Gross cpm:	0.615	0.591	0.557	0.566	0.576	0.629	0.621	14.247	0.533
Bkg cpm:	0.863	0.561	0.658	0.635	0.557	0.747	0.722	0.761	0.718
Blank cpm:	-0.004	-0.027	-0.155	-0.101	-0.155	-0.053			
Net cpm:	-0.248	0.03	-0.101	-0.069	0.019	-0.118	-0.101	13.486	-0.185
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	70.467	71.508	71.79	72.79	65.399	65.689	68.412	0	0
Decay:	1	1	1	1	1	1	1	1	1
Yield:	0.8131	0.7934	0.7685	0.6593	0.7468	0.7416	0.6791	0.6558	0.8403
Aliquot:	1	1	1	1	1	1	1	1	1
PPT. Corr.:	1	1	1	1	1	1	1	1	1
Product:	8.13E-01	7.93E-01	7.68E-01	6.59E-01	7.47E-01	7.42E-01	6.79E-01	6.56E-01	8.40E-01
P-factor:	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Result Calc.:	-0.63	0.08	-0.27	-0.22	0.05	-0.33	-0.31	42.33	-0.45
Result Rptd.:	-0.63	0.08	-0.27	-0.22	0.05	-0.33	-0.31	42.33	-0.45
MDA Calc.:	0.51	0.45	0.32	0.62	0.47	0.56	0.58	0.59	0.49
MDA Rptd.:	1.74	1.46	1.14	1.95	1.64	1.81	1.91	2.02	1.65

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Plutonium 238/239

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS	B09355 DUP
Detector:	SS-64	SS-65	SS-66	SS-52	SS-53	SS-54	SS-57	SS-58	SS-60	SS-61
Count time:	721.23	721.23	721.23	731.03	731.03	731.03	731.03	731.03	731.03	731.03
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	4.86	4.86	4.86	4.86
Bkgd, count time:	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47
Net, tracer counts:	627	876	922	786	691	900	892	637	652	851
Detector Eff:	0.4109	0.4114	0.4133	0.3802	0.3856	0.3741	0.3575	0.3732	0.3801	0.4155
Yield:	0.4353	0.6075	0.6364	0.5819	0.6044	0.6771	0.7023	0.4804	0.4828	0.5765
Pu239, gross counts:	1	2	0	0	4	0	1	285	0	2
Pu239, bkgd counts:	1	2	2	2	4	0	0	3	1	2
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08	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	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	4	0	1	2	1	1	0	0	1	3
Pu238, bkgd counts:	1	1	2	1	2	0	1	3	0	2
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05	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	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1	1	1	1	1
Pu239, Result calc.:	0.000	0.000	-0.005	-0.006	0.000	0.000	0.002	0.969	-0.003	0.000
Pu239, Result rptd:	0.000	0.000	-0.005	-0.006	0.000	0.000	0.002	0.968	-0.003	0.000
Pu239, MDA calc.:	0.027	0.019	0.018	0.021	0.030	0.019	0.019	0.028	0.026	0.020
Pu239, MDA rptd.:	0.027	0.024	0.023	0.027	0.039	0.019	0.019	0.038	0.026	0.025
Pu238, Result calc.:	0.010	-0.003	-0.002	0.003	-0.003	0.002	-0.002	-0.010	0.003	0.003
Pu238, Result rptd.:	0.010	-0.003	-0.002	0.003	-0.003	0.002	-0.002	0.010	0.003	0.003
Pu238, MDA calc.:	0.027	0.019	0.018	0.021	0.024	0.019	0.019	0.028	0.026	0.020
Pu238, MDA rptd:	0.027	0.019	0.023	0.021	0.030	0.019	0.019	0.038	0.026	0.025

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Uranium 233/4/5/8

Sample ID:	B09355	B09356	B09357	B09359	B09360	B09361	B09362	BLANK	LCS	B09355 DUP
Detector:	SS-25	SS-26	SS-23	SS-24	SS-25	SS-26	SS-3	SS-20	SS-23	SS-24
Sample count time:	246.12	246.12	150.25	150.25	150.25	150.25	121.17	121.17	121.17	121.17
GMT count:										
Zero time:										
Corr. tracer dpm:	10.49	10.49	10.49	10.48	10.49	10.49	10.49	10.49	10.49	10.49
Bkgd count time:	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98
Net tracer counts:	703	507	441	374	316	340	256	255	317	297
Detector eff.:	0.3058	0.2822	0.3121	0.3178	0.3078	0.2812	0.2768	0.2675	0.3121	0.3178
Yield:	0.8913	0.6965	0.8975	0.7475	0.6521	0.7679	0.7284	0.7507	0.8	0.7361
U-238, gross counts:	191	96	55	4	1	34	39	316	1	95
U-238, bkgd counts:	2	1	1	0	0	0	0	18	0	0
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13	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	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	8	6	5	0	1	1	2	184	0	3
U-235, bkgd counts:	1	0	0	1	0	0	0	0	0	1
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12	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	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts:	200	92	70	5	9	31	23	291	5	94
U-233/4, bkgd counts:	4	4	3	3	1	2	1	21	1	2
U-233/4, Lambda:	1.17E-08	1.17E-08	1.17E-08	1.17E-08	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	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1	1	1	1	1
U-238, result calc.:	1.27	0.88	0.58	0.05	0.01	0.47	0.72	5.52	0.01	1.51
U-238, result rptd:	1.27	0.88	0.58	0.05	0.01	0.47	0.72	5.52	0.01	1.51
U-238 MDA calc.:	0.05	0.07	0.08	0.10	0.11	0.11	0.14	0.37	0.11	0.12
U-238, MDA rptd.:	0.06	0.07	0.08	0.10	0.11	0.11	0.14	0.42	0.11	0.12
U-235, result calc.:	0.06	0.07	0.06	-0.02	0.02	0.02	0.04	4.12	0.00	0.04
U-235, result rptd.:	0.06	0.07	0.06	-0.02	0.02	0.02	0.04	4.12	0.00	0.04
U-235, MDA calc.:	0.06	0.09	0.10	0.12	0.14	0.13	0.17	0.17	0.14	0.15
U-235, MDA rptd.:	0.06	0.09	0.10	0.12	0.14	0.13	0.17	0.17	0.14	0.15
U-233/4, result calc.:	1.32	0.82	0.72	0.03	0.12	0.40	0.41	5.00	0.06	1.46
U-233/4, result rptd.:	1.32	0.82	0.72	0.03	0.12	0.40	0.41	5.00	0.06	0.15
U-233/4, MDA calc.:	0.06	0.09	0.09	0.10	0.11	0.11	0.14	0.40	0.11	0.12
U-233/4, MDA rptd.:	0.07	0.10	0.10	0.12	0.11	0.11	0.14	0.45	0.11	0.15

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09355-TMA-615
Total Uranium

Standard	Intensity	ample ID	Intens.	ug/L Calc.	ug/L Rptd	Amount of Smpl	Prep. Volume	Dilution	Calc Result	Rptd Rslt
0.049	550	B09355	37470	3.931	4.44476	0.25	0.02	10	3.56	3.56
0.156	1616	B09356	27261	2.860	3.14757	0.25	0.02	10	2.52	2.52
0.521	4752	B09357	21735	2.280	2.50633	0.25	0.02	10	2.01	2.01
0.976	9299	B09359	19855	2.083	2.37714	0.25	0.02	1	0.19	0.19
2.603	24306	B09360	21769	2.284	2.54315	0.25	0.02	1	0.20	0.20
4.881	44539	B09361	14699	1.542	1.79617	0.25	0.02	10	1.44	1.44
16.27	138416	B09362	14585	1.530	1.76953	0.25	0.02	10	1.42	1.42
Slope:	1.0E-04	LCS	31473	3.302	3.36178	0.25	0.02	10	2.69	2.69
		BLANK	-387	-0.041	0.036	0.25	0.02	1	0.003	0.01
		B09355 D	39473	4.142	4.82402	0.25	0.02	10	3.86	3.86