START 9613503.0011 BOBFF7-TMA-719 TMA

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APR 1994 RECEIVED SDLA

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

GENERAL CHEMISTRY & ORGANICS
Case No. 03-011
(TMA/ARLI W.O. No. A4-03-011)

METALS & NITRATE/NITRITE
Case No. N4-03-002
(TMA/Skinner & Sherman W.O. Nos. S4-03-031 & S4-03-032)

April 21, 1994

TMA Master Work Order N4-03-002

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GENERAL CHEMISTRY RESULTS

CASE NO. 03-011

Sample #:

B0BFF7

CASE NARRATIVE

Sample B0BFF7 (A4-03-011-01H) yielded a 65% recovery for the Fluoride analysis. A post extraction (P.E.) spike was performed and analyzed for Fluoride. The low Fluoride recovery compared to our laboratory control sample and P.E. Spike indicated the presence of a matrix interference.

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

Maureen Parrish 4/20/94

Maureen Parrish

9613503.0013

TMA Inc. REPORT Work Order # A4-03-011

Received: 03/01/94

Results by Sample

SAMPLE ID B0BFF7 FRACTION 01G TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 02/22/94 Category

000009

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	4.1	mg/kg	1.0
Fluoride	300.0	<0.1	mg/kg	0.1
Sulfate	300.0	27	mg/kg	5

FORM I

9613503.0014

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CASE NO. 03-011

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DATA SUMMARY REPORT
ORGANICS

PREPARED BY:

TMA/ARLI
160 TAYLOR ST.
MONROVIA, CA 91016

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 03-011

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : March 01, 1994

1.0 DESCRIPTION OF CASE :

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

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B0BFF7	A4-03-011-01A	V	SOIL
B0BFF7 MS	A4-03-011-01B	V	SOIL
B0BFF7 MSD	A4-03-011-01C	V	SOIL
B0BFF7	A4-03-011-01D	SV	SOIL
B0BFF7 MS	A4-03-011-01E	SV	SOIL
B0BFF7 MSD	A4-03-011-01F	SV	SOIL
B0BFF7	A4-03-011-01J	K	SOIL
B0BFF7 MS	A4-03-011-01K	K	SOIL
B0BFF7 MSD	A4-03-011-01L	K	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

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

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

TUNES :

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

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS : 000072

LOW LEVEL SOIL :

The samples were extracted and analyzed within the contract required holding times.

In sample B0BFF7, small amounts of Di-n-butylphthalate and bis(2-Ethylhexyl)phthalate were detected below the CRQL. In sample B0BFF7MSD, Pentachlorophenol was detected at a concentration that exceeded the calibration range of the instrument, and was therefore "E" qualified.

The matrix spike recoveries for 2,4-Dinitrotoluene exceeded the QC limits in both the MS and MSD. In addition, the recovery for Pentachlorophenol was above the QC limits in sample B0BFF7MSD. These high recoveries were due to the efficiency of the extraction and analysis. In accordance with the protocol, no further action was required.

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

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 03/05/94 and was analyzed according to the SW-846 Method 8015M. The %RSD in the all of the initial calibrations and the %D in the continuing calibrations were below their 20% and 15% limits, respectively.

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

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the required holding times. Approximately 20 g of each sample were extracted and concentrated to 5 mL.

The surrogate o-Terphenyl was added to each sample, and the recoveries ranged from 79% to 86%. However, since the reporting forms could not accommodate the surrogate recovery results, the data was included in the "Additional Raw Data" poriton of the package.

The matrix spike and matrix spike duplicate recoveries for Kerosene were 72% and 80%, respectively. The LCS, KLCS0308A, was prepared at the same time and had a Kerosene spike

recovery of 79%. The LCS results were included in the "Additional Raw Data" portion of the package. No Kerosene was detected in any of the unspiked samples.

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

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

Nicole Roth

Nicole Roth 4/20/94
Program Manager

Maureen Parrish

Maureen Parrish 4/20/94
Program Manager

9613503.0018

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

000074

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 40304R07

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: not dec. 5 Date Analyzed: 03/04/94

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	2	BJ
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	11	U
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	11	U
67-66-3	Chloroform	11	U
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	2	BJ
56-23-5	Carbon Tetrachloride	11	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-Dichloropropene	11	U
79-01-6	Trichloroethene	11	U
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-Dichloropropene	11	U
75-25-2	Bromoform	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	11	U
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
1330-20-7	Xylene (total)	11	U

9613503.0019

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

000075

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 40304R07

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: not dec. 5 Date Analyzed: 03/04/94

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

9613503.0020

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

000076

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

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

9613503.0021

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

000077

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

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	290	BJ
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	36	J
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

9613503.0022

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

000078

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

Number TICs found: 16

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.12	100	BJ
2.	UNKNOWN HYDROCARBON	5.55	1300	BJ
3.	UNKNOWN KETONE	5.83	170	BJ
4.	UNKNOWN HYDROCARBON	6.08	730	BJ
5.	UNKNOWN HYDROCARBON	7.68	310	J
6.	UNKNOWN HYDROCARBON	7.77	140	J
7.	UNKNOWN HYDROCARBON	11.83	210	J
8.	UNKNOWN HYDROCARBON	13.23	240	J
9.	UNKNOWN ALKANE	14.03	140	J
10.	UNKNOWN ALKANE	14.57	140	J
11.	UNKNOWN HYDROCARBON	16.33	940	J
12.	UNKNOWN HYDROCARBON	17.67	69	J
13. 7704-34-9	SULFUR	21.23	140	JN
14.	UNKNOWN ACID	21.83	170	J
15.	HEXADECANOIC ACID ISOMER	22.08	69	BJ
16.	UNKNOWN HYDROCARBON	23.90	100	BJ

9613503.0023

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000324

CASE NO. 03-011

8015M EXTRACTABLE

9613503.0024

TMA Inc. REPORT Work Order # A4-03-011

Received: 03/02/94 Results by Sample

000327

SAMPLE ID B0BFF7 FRACTION 01J TEST CODE 8015MS NAME EPA 8015M EXTRACT.

Date & Time Collected 02/22/94 Category

MODIFIED 8015 - EXTRACTABLE FUEL HYDROCARBONS

Matrix: SOIL
Date Analyzed: 03/14/94
Dilution factor: 1.00
Concentration Units: mg/Kg

Compound	Sample Result	PQL
Kerosene Range	ND	10
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

9613503.0025

TMA

Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

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Report for

TMA/Norcal

WORK ORDER #S403032

Scientific Services Since 1922

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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

i Ar 7-25-94

9613503.0026

 *** T M A *** REPORT Work Order # S4-03-032

Received: 03/02/94 03/25/94 16:00:05

REPORT TMA/NORCAL
TO 2030 Wright Avenue
Richmond, CA 94804

ATTEN Dan Steurmer

CLIENT HANFORD NOR SAMPLES 2
COMPANY TMA/NORCAL Hanford
FACILITY Richmond, CA

PREPARED Thermo Analytical, Inc.
BY 300 Second Avenue
P.O. Box 521
Waltham, MA 02254
ATTEN Client Services
PHONE (617) 890-7200

CERTIFIED BY

CONTACT DP

WORK ID N4-03-002
TAKEN By Client
TRANS Fedex
TYPE 1 soil
P.O. # N4-03-002
INVOICE under separate cover

SAMPLE IDENTIFICATION

01 BOBFF7
01 BOBFF7D
01 BOBFF7S
02 LCSS

TEST CODES and NAMES used on this workorder

NITR S Nitrate/Nitrite in Soils

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories 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.

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1-800-4 LAB TEST FAX (617) 890-3883

9613503.0027

 *** T M A *** REPORT Work Order # S4-03-032

Received: 03/02/94 Results by Sample

SAMPLE ID BOBFF7 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 37.1
mg N/kg

SAMPLE ID BOBFF7D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 41.5
mg N/kg

SAMPLE ID BOBFF7S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 74.1
mg N/kg

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

NITR_S 2.05
mg N/L

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

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1-800-4 LAB TEST FAX (617) 890-3883

9613503.0028

 *** T M A *** REPORT Work Order # S4-03-032

Received: 03/02/94 03/25/94 16:00:05

TMA/NORCAL Hanford

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

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S403032-01	37.1 mg/kg	40.3 mg/kg	74.1 mg/kg	91.8

DUPLICATE

Sample ID	Sample result	Duplicate Result	Relative % Difference
S403032-01	37.1 mg/kg	41.5 mg/kg	11.2

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	Percent Recovery
LCS	2.00 mg/L	2.05 mg/L	102.5
Prep blank	--	<0.25 mg/L	--

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

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

9613503.0029

Received: 03/02/94

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)

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories 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.

300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
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9613503.0030

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

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March 31, 1994

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

Quality Control Narrative

Scope
One (1) soil sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on March 2, 1994 from TMA/Norcal. The sample was analyzed for the USEPA CLP Target Analyte List metals, titanium and cyanide. The analysis were performed under TMA/Skinner and Sherman work order S403031.

Methodology
The sample was 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 sample with the following exceptions:

The matrix spike recovery for antimony exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

9613503.0031

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B08FF7

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D2-0039

Lab Code: SKINER Case No.: N4-03-002SAS No.: SDG No.: B08FF7

Matrix (soil/water): SOIL Lab Sample ID: 03031-01S

Level (low/med): LOW Date Received: 03/02/94

% Solids: 90.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4030			P
7440-36-0	Antimony	2.6	U	N	P
7440-38-2	Arsenic	5.9			P
7440-39-3	Barium	36.2	B		P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	0.46	B		P
7440-70-2	Calcium	1860			P
7440-47-3	Chromium	8.3			P
7440-48-4	Cobalt	8.8	B		P
7440-50-8	Copper	7.7			P
7439-89-6	Iron	21000			P
7439-92-1	Lead	4.1			P
7439-95-4	Magnesium	2720			P
7439-96-5	Manganese	179			P
7439-97-6	Mercury	0.90			CV
7440-02-0	Nickel	5.4	B		P
7440-09-7	Potassium	733	B		P
7782-49-2	Selenium	0.61	U		P
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	510	B		P
7440-28-0	Thallium	0.80	U		P
7440-62-2	Vanadium	63.7			P
7440-66-6	Zinc	37.1			P
	Cyanide	0.54	U		CA
7440-32-6	Titanium	2240			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

002

9613503.0032

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No. (510) 235-0438

RECORD COPY

MAY 1994
RECEIVED
SDLA

May 4, 1994

Ref: TMA/Norcal N4-03-008-7340

Ms. Briana Colley
Westinghouse Hanford Company
345 Hills Street
Richland, WA 99352

Dear Ms. Colley:

Enclosed is the data report for the one soil sample designated as SAF #93-263, received March 1, 1994. Results are given for gross alpha, gross beta, selenium-79, strontium-90, technetium-99, iodine-129, isotopic uranium, total uranium, isotopic plutonium, americium-241, curium-244, and gamma scan analyses.

The data package is paginated 1 through 422.

Please call if you have any questions concerning this data.

Sincerely,

Julie D. Wose
Manager, Nuclear Programs
TMA/Norcal

JDW/ss

Enclosure: Data Package

TMA/Norcal

Report N4-03-008-7340
Sample Delivery Group 7340

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

Case Narrative

May 4, 1994

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7340 is comprised of one soil sample designated as SAF #93-263, delivered under the following Chain-of-Custody document 006479.

One 1000 mL poly bottle containing the sample was received for analyses.

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses

No problems were encountered by the laboratory in the analyses.

2.2 Gross Beta Analyses

The relative percent difference in the results for sample B0BFF7 and its duplicate is 34% which just barely exceeds than the 3σ limit of 33%. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.3 Selenium-79 Analyses

The relative percent difference in the results for sample B0BFF7 and its duplicate is 200% which is greater than the 3σ limit of 176%. Both results are less than the RDL. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.4 Strontium-90 Analyses

No problems were encountered by the laboratory in the analyses.

2.5 Technetium-99 Analyses

The chemical yields for the original analysis of sample B0BFF7 and its duplicate were 7% and 18%, well below the 20-105% protocol limits. Both the sample and duplicate were reanalyzed and satisfactory yields of 42% and 40% were obtained. No cause could be determined for the poor initial yields.

2.6 Iodine-129 Analyses

No problems were encountered by the laboratory in the analyses.

2.7 Neptunium-237 Analyses

Reagent blank 7340-003 shows activity at 0.085 pCi/g which is above the 0.01 pCi/g MDA. Both the result and MDA are well below the RDL so there is no adverse impact on the data.

The relative percent difference in the results for sample B0BFF7 and its duplicate is 119% which is greater than the 3σ limit of 65%. Both results are less than the RDL. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.8 Uranium-233/234, 235 and 238 Analyses

The relative percent difference in the uranium-233/234, uranium-235, and uranium-238 results exceed the 3σ protocol limits. The high RPD's are likely the result of an inhomogeneity of the sample matrix.

2.9 Total Uranium Analyses

The MDA for sample B0BFF7 is 0.2 μg/g which is higher than the RDL of 0.1 μg/g because of extra dilutions required to eliminate matrix interferences. The result of the analysis is 85 times the MDA and therefore there is no adverse impact on the data.

2.10 Plutonium-238 and 239/240 Analyses

The relative percent difference in the plutonium-239/240 results for sample B0BFF7 and its duplicate is 43% which is greater than the 3σ limit of 23%. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.11 Americium-241/Curium-244 Analyses

No problems were encountered by the laboratory in the analyses.

2.12 Gamma Scan Analyses

Aliquot sizes for sample B0BFF7 and its duplicate were 135 and 144 grams which is smaller than the nominal 750 grams normally used for soil analyses. Several MDA's exceeded the RDL's as a result. The iron-59 MDA for laboratory control sample 7340-002 is higher than the RDL due to the short half-life of iron-59.

The cobalt-60 and cesium-137 recoveries of laboratory control sample 7340-002 are 76% and 74% which are slightly below the 3σ protocol limits of 79-121%. No cause could be determined for the low recoveries.

9613503.0035

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-01

DATA SHEET

B0BFF7

SDG 7340 Client Westinghouse Hanford
Contact N. Joseph Verville Contract MBH-SVV-069262

Lab sample id N403008-01 Client sample id B0BFF7
Dept sample id 7340-001 Location/Matrix 216-U-8 Crib SOLID
Received 03/01/94 Collected 02/22/94
% moisture 5.3 Chain of custody id 006479

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	14	4.1	3	10		80A
Gross Beta	Beta	2400	32	5	10		80B
Selenium 79	15758-45-9	-0.37	2.2	4	10	U	SE_L
Strontium 90	10098-97-2	7.9	1.5	0.5	1		Y
Technetium 99	14133-76-7	1.5	0.11	0.2	0.5		TC
Iodine 129	15046-84-1	0.14	0.96	2	2	U	I
Uranium 233/234		5.6	0.43	0.08	0.3		U
Uranium 235	15117-96-1	0.54	0.10	0.03	0.3		U
Uranium 238		5.3	0.41	0.07	0.3		U
Total Uranium (ug/g)	7440-61-1	17	3.4	0.2	0.1		U_T
Neptunium 237	13994-20-2	0.038	0.015	0.004	0.2	BJ	NP
Plutonium 238	13981-16-3	0.023	0.024	0.04	0.05	U	PU
Plutonium 239/240		0.97	0.096	0.02	0.05		PU
Americium 241	14596-10-2	0.042	0.018	0.01	0.05	J	TP
Curium 244	13981-15-2	0.005	0.006	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.2		U	GAM
Potassium 40	13966-00-2	11	2.4				GAM
Manganese 54	13966-31-9	U		0.3		U	GAM
Iron 59	14596-12-4	U		0.4	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.3	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM
Niobium 94	14681-63-1	U		0.3		U	GAM
Ruthenium 103	13968-53-1	U		3		U	GAM
Ruthenium 106	13967-48-1	U		10		U	GAM
Tin 113	13966-06-8	U		3		U	GAM
Cesium 134	13967-70-9	U		0.3		U	GAM
Cesium 137	10045-97-3	2600	7.0		0.05		GAM

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.30
Report date 05/03/94

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-01

DATA SHEET, cont

B0BFF7

SDG	7340	Client	Westinghouse Hanford
Contact	N. Joseph Verville	Contract	MBH-SVV-069262
Lab sample id	N403008-01	Client sample id	B0BFF7
Dept sample id	7340-001	Location/Matrix	216-U-8 Crib SOLID
Received	03/01/94	Collected	02/22/94
% moisture	5.3	Chain of custody id	006479

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		7		U	GAM
Europium 152	14683-23-9	U		3	0.1	U	GAM
Europium 154	15585-10-1	U		2	0.1	U	GAM
Europium 155	14391-16-3	U		3	0.1	U	GAM
Radium 226	13982-63-3	U		2		U	GAM
Radium 228	15262-20-1	1.2	0.84				GAM
Thorium 228	14274-82-9	U		3		U	GAM
Thorium 232	7440-29-1	1.2	0.84				GAM

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.30
Report date	05/03/94

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST N4-02-65 008	Page 1 of 1
		006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. SML-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR # 19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
SPECIAL INSTRUCTIONS
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required		Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA ✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA ✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury ✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4 ✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3 ✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide ✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene ✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific ✓		

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.A. Edwards
D.A. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

***Matrix**

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

9415503.0067

65

9613503.0038

VALIDATION SUMMARY

9613503.0039

Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

Golder Associates

May 10, 1994

Our ref: 923-E418
S/O/3066

Westinghouse Hanford Company
Hanford Analytical Services
P.O. Box 1970
Richland, Washington 99352

ATTENTION: Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGES, 200-UP-2 DATA VALIDATION PROJECT, TASK ORDER S94-18, CONTRACT MJK-SVV-073750

Dear Ms. Duncan:

Enclosed are data validation packages for the 200-UP-2 data validation project. The following provides a summary of the data validation packages included in this shipment:

- B0BFG0-TMA-722
- B0BFF7-TMA-719

Please call us at (206)883-0777 if there are any questions concerning the above.

Sincerely,

GOLDER ASSOCIATES INC.

Christina Jensen
Task Manager

Kent M. Angelos
Project Manager

RECEIVED
MAY 11 1994

cc: P.K. Brockman, SAIC

9613503.0040

Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

Golder Associates

June 10, 1994

Our ref: 923-E418
S/O/3147

Westinghouse Hanford Company
Hanford Analytical Services Management
345 Hills, MSIN H4-29
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGES, 200-UP-2 DATA VALIDATION PROJECT, TASK ORDER S94-18, CONTRACT MJK-SVV-M073750

Dear Ms. Duncan:

Enclosed are data validation packages for the 200-UP-2 data validation project. The following provides a summary of the data validation packages included in this shipment:

- B0BFF7-TMA-719
- B0BFF9-TMA-726

Please call us if you have questions concerning the above.

Sincerely,

GOLDER ASSOCIATES INC.

Christina I. Jensen
Task Manager

Kent M. Angelos
Project Manager

RECEIVED
JUN 13 1994
VALIDATION DOCUMENTATION
SDLA

CJ\KMA\ah

cc: P.K. Brockman, SAIC

9613503.0041

MEMORANDUM

MAY 1994 RECEIVED TOO

TO: 200-UP-2 Project QA Record

May 10, 1994

FR: Susan Winter, Golder Associates Inc

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B0BFF7-TMA-719 (923-E418, Filename B0BFF7CH.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B0BFF7-TMA-719 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
B0BFF7	02/22/94	SOIL	SEE NOTE 1

Note 1. All samples were analyzed for anions (chloride, fluoride, and sulfate) and nitrate+nitrite-N.

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

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

RECEIVED
MAY 11 1994
VALIDATION DOCUMENTATION
SDLA

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

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

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

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

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 4 determinations reported, all of

0001

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

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Matrix Spike

- The matrix spike percent recovery (MS %R) for fluoride was unacceptable. Attachments 2 and 5 provide a summary of the qualification applied and supporting documentation.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

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

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

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

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

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

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY

SDG: B0BFF7-TMA-719	VALIDATOR:	DATE: May 10, 1994	PAGE 1 OF 1
COMMENTS: GENERAL CHEMISTRY			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
FLUORIDE	UJ	B0BFF7	MS %R < 75% BUT > 30%

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B0BFF7-TMA-719

	Samp#	B0BFF7	
	Date	2-22-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
Parameter	Units	Result	Q
CHLORIDE	MG/KG	4.100	
FLUORIDE	MG/KG	0.100	UJ
SULFATE	MG/KG	27.000	
NITRATE+NITRITE	MG-N/KG	37.100	

Verified

5/10/94

9615050.0048

9613503.0049

TMA Inc. REPORT Work Order # A4-03-011

Received: 03/01/94 Results by Sample

SAMPLE ID B0BFF7 FRACTION 01G TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 02/22/94 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	4.1	mg/kg	1.0
Fluoride	300.0	<0.1	mg/kg	0.1
Sulfate	300.0	27	mg/kg	5

Q ~~000009~~

FORM I

Verified
5/10/94

9613503.0050

 *** T M A *** REPORT Work Order # S4-03-032

Received: 03/02/94 Results by Sample

SAMPLE ID B0BFF7 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 37.1
mg N/kg

SAMPLE ID B0BFF7D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 41.5
mg N/kg

SAMPLE ID B0BFF7S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 02/22/94 14:10:00 Category SOIL

NITR_S 74.1
mg N/kg

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

NITR_S 2.05
mg N/L

Verified
[illegible] 5/10/94

0010

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

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

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

GENERAL CHEMISTRY RESULTS

CASE NO. 03-011

Sample #:

B0BFF7

CASE NARRATIVE

Sample B0BFF7 (A4-03-011-01H) yielded a 65% recovery for the Fluoride analysis. A post extraction (P.E.) spike was performed and analyzed for Fluoride. The low Fluoride recovery compared to our laboratory control sample and P.E. Spike indicated the presence of a matrix interference.

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

Maureen Parrish 4/20/94

Maureen Parrish

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. SRL-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR # 19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
SPECIAL INSTRUCTIONS
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required		Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA ✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA ✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury ✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4 ✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3 ✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide ✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene ✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific ✓		

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.K. Edwards
D.K. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

9412507.0959

4014

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2	DATA PACKAGE: B0BFF7-TMA-719	
VALIDATOR: [illegible]	LAB: TMA	DATE: 05/10/94
CASE:	SDG: B0BFF7-TMA-719	

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 Soil

B0BFF7

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:

016

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 5/24/94

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: Lab blank results are acceptable. No qualification is required for blank adjustment. 5/24/94

5. ACCURACY

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

Are spike recoveries acceptable? . . . . . Yes No N/A 5/24/94

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

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

Comments: Fluoride MS%R is 65%. Qualify associated result as estimated (UJ).

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

Revised 5/24/94

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: Sample locations are currently not available. Field QC will be evaluated in the Final Summary report.

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:

HOLDING TIME SUMMARY

BoBFF7-TMA-719

SDG:	VALIDATOR: [illegible]	DATE: 5/10/94	PAGE 1 OF 1
COMMENTS: General Chemistry			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BoBFF7	NO_2/NO_3	2/22/94	2/28/94	3/09/94	6	9	None
BoBFF7	Anions	2/22/94	3/22/94	3/22/94	28	Ø	None

9613503.0059

TMA Inc. REPORT Work Order # A4-03-011

Received: 03/01/94 Results by Sample

SAMPLE ID B0BFF7 MS FRACTION 01H TEST CODE WCQCS NAME Quality Control Summary

Date & Time Collected 02/22/94 Category

~~000012~~

SPIKE QC SUMMARY

ANALYSIS	SAMPLE ID	SAMPLE RESULT	SPIKE RESULT	AMOUNT ADDED	% R
Chloride	B0BFF7 MS	4.1	30.5	23.4	113
Fluoride	B0BFF7 MS	<0.1	15.3	23.4	65
Sulfate	B0BFF7 MS	27	128	93.7	108

FORM V

Qualify fluoride result ~~in~~ 5/10/94 in sample B0BFF7 as estimated (UJ).

5/10/94

9613503.0060

MEMORANDUM

MAY 1994 RECEIVED

TO: 200-UP-2 Project QA Record May 9, 1994

FR: Susan Winter, Golder Associates Inc.

RE: VOLATILE ORGANICS DATA VALIDATION SUMMARY FOR DATA PACKAGE: B0BFF7-TMA-719 (923-E418, Filename B0BFF7V.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B0BFF7-TMA-719 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
B0BFF7	02/22/94	SOIL	SEE NOTE 1

Note 1. All samples were analyzed for CLP TCL volatile organics.

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

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

RECEIVED MAY 11 1994 VALIDATION DOCUMENT SDLA

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

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

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 33 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

001

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Blanks

- Methylene chloride, 1,1,1-trichloroethane, and toluene were detected in the associated laboratory blank. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

REFERENCES

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

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

9613503.0062

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.

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

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

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

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

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

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

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

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

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

9613503.0064

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY

SDG: B0BFF7-TMA-719	VALIDATOR: DATE: May 9, 1994		PAGE 1 OF 1
COMMENTS: VOLATILE ORGANICS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
METHYLENE CHLORIDE	U	B0BFF7	PRESENT IN ASSOCIATED BLANK
1,1,1-TRICHLOROETHANE	U	B0BFF7	PRESENT IN ASSOCIATED BLANK
TOLUENE	U	B0BFF7	PRESENT IN ASSOCIATED BLANK

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B0BFF7-TMA-719

	Samp#	B0BFF7	
	Date	2-22-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
Parameter	Units	Result	Q
CHLOROMETHANE	UG/KG	11.000	U
BROMOMETHANE	UG/KG	11.000	U
VINYL CHLORIDE	UG/KG	11.000	U
CHLOROETHANE	UG/KG	11.000	U
METHYLENE CHLORIDE	UG/KG	11.000	U
ACETONE	UG/KG	11.000	U
CARBON DISULFIDE	UG/KG	11.000	U
1,1-DICHLOROETHENE	UG/KG	11.000	U
1,1-DICHLOROETHANE	UG/KG	11.000	U
1,2-DICHLOROETHENE (TOTAL)	UG/KG	11.000	U
CHLOROFORM	UG/KG	11.000	U
1,2-DICHLOROETHANE	UG/KG	11.000	U
2-BUTANONE	UG/KG	11.000	U
1,1,1-TRICHLOROETHANE	UG/KG	11.000	U
CARBON TETRACHLORIDE	UG/KG	11.000	U
BROMODICHLOROMETHANE	UG/KG	11.000	U
1,2-DICHLOROPROPANE	UG/KG	11.000	U
CIS-1,3-DICHLOROPROPENE	UG/KG	11.000	U
TRICHLOROETHENE	UG/KG	11.000	U
DIBROMOCHLOROMETHANE	UG/KG	11.000	U
1,1,2-TRICHLOROETHANE	UG/KG	11.000	U
BENZENE	UG/KG	11.000	U
TRANS-1,3-DICHLOROPROPENE	UG/KG	11.000	U
BROMOFORM	UG/KG	11.000	U
4-METHYL-2-PENTANONE	UG/KG	11.000	U
2-HEXANONE	UG/KG	11.000	U
TETRACHLOROETHENE	UG/KG	11.000	U
1,1,2,2-TETRACHLOROETHANE	UG/KG	11.000	U
TOLUENE	UG/KG	11.000	U
CHLOROBENZENE	UG/KG	11.000	U
ETHYLBENZENE	UG/KG	11.000	U
STYRENE	UG/KG	11.000	U
XYLENES (TOTAL)	UG/KG	11.000	U

Verified
[illegible] 5/10/94

9330 0087

9615503.0068

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

~~000104~~

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 40304R07

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: not dec. 5 Date Analyzed: 03/04/94

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Q
74-87-3	Chloromethane	11	U	
74-83-9	Bromomethane	11	U	
75-01-4	Vinyl Chloride	11	U	
75-00-3	Chloroethane	11	U	
75-09-2	Methylene Chloride	11 ~~2~~	~~BJ~~	u
67-64-1	Acetone	11	U	
75-15-0	Carbon Disulfide	11	U	
75-35-4	1,1-Dichloroethene	11	U	
75-34-3	1,1-Dichloroethane	11	U	
540-59-0	1,2-Dichloroethene (total)	11	U	
67-66-3	Chloroform	11	U	
107-06-2	1,2-Dichloroethane	11	U	
78-93-3	2-Butanone	11	U	
71-55-6	1,1,1-Trichloroethane	11 ~~2~~	~~BJ~~	u
56-23-5	Carbon Tetrachloride	11	U	
75-27-4	Bromodichloromethane	11	U	
78-87-5	1,2-Dichloropropane	11	U	
10061-01-5	cis-1,3-Dichloropropene	11	U	
79-01-6	Trichloroethene	11	U	
124-48-1	Dibromochloromethane	11	U	
79-00-5	1,1,2-Trichloroethane	11	U	
71-43-2	Benzene	11	U	
10061-02-6	trans-1,3-Dichloropropene	11	U	
75-25-2	Bromoform	11	U	
108-10-1	4-Methyl-2-Pentanone	11	U	
591-78-6	2-Hexanone	11	U	
127-18-4	Tetrachloroethene	11	U	
79-34-5	1,1,2,2-Tetrachloroethane	11	U	
108-88-3	Toluene	11 ~~1~~	~~J~~	u
108-90-7	Chlorobenzene	11	U	
100-41-4	Ethylbenzene	11	U	
100-42-5	Styrene	11	U	
1330-20-7	Xylene (total)	11	U	

6009

Verified 5/09/94

9613503.0069

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS ~~000105~~

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 40304R07

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: not dec. 5 Date Analyzed: 03/04/94

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

U010

Verified

FORM I VOA-TIC 3/90

9613503.0070

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 03-011

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : March 01, 1994

1.0 DESCRIPTION OF CASE :

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

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B0BFF7	A4-03-011-01A	V	SOIL
B0BFF7 MS	A4-03-011-01B	V	SOIL
B0BFF7 MSD	A4-03-011-01C	V	SOIL
B0BFF7	A4-03-011-01D	SV	SOIL
B0BFF7 MS	A4-03-011-01E	SV	SOIL
B0BFF7 MSD	A4-03-011-01F	SV	SOIL
B0BFF7	A4-03-011-01J	K	SOIL
B0BFF7 MS	A4-03-011-01K	K	SOIL
B0BFF7 MSD	A4-03-011-01L	K	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

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

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

TUNES :

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

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS : ~~000072~~

LOW LEVEL SOIL :

The samples were extracted and analyzed within the contract required holding times.

In sample B0BFF7, small amounts of Di-n-butylphthalate and bis(2-Ethylhexyl)phthalate were detected below the CRQL. In sample B0BFF7MSD, Pentachlorophenol was detected at a concentration that exceeded the calibration range of the instrument, and was therefore "E" qualified.

The matrix spike recoveries for 2,4-Dinitrotoluene exceeded the QC limits in both the MS and MSD. In addition, the recovery for Pentachlorophenol was above the QC limits in sample B0BFF7MSD. These high recoveries were due to the efficiency of the extraction and analysis. In accordance with the protocol, no further action was required.

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

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 03/05/94 and was analyzed according to the SW-846 Method 8015M. The %RSD in the all of the initial calibrations and the %D in the continuing calibrations were below their 20% and 15% limits, respectively.

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

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the required holding times. Approximately 20 g of each sample were extracted and concentrated to 5 mL.

The surrogate o-Terphenyl was added to each sample, and the recoveries ranged from 79% to 86%. However, since the reporting forms could not accommodate the surrogate recovery results, the data was included in the "Additional Raw Data" poriton of the package.

The matrix spike and matrix spike duplicate recoveries for Kerosene were 72% and 80%, respectively. The LCS, KLCS0308A, was prepared at the same time and had a Kerosene spike

recovery of 79%. The LCS results were included in the "Additional Raw Data" portion of the package. No Kerosene was detected in any of the unspiked samples.

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

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

Nicole Roth

Nicole Roth 4/20/94
Program Manager

Maureen Parrish

Maureen Parrish 4/20/94
Program Manager

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. SML-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR #19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

SPECIAL INSTRUCTIONS

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required		Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA ✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA ✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury ✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4 ✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3 ✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide ✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene ✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific ✓		

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.L. Edwards
D.L. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B0BFF7-TMA-719
VALIDATOR: [illegible]	LAB: TMA	DATE: 05/09/94
CASE:		SDG: B0BFF7-TMA-719

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 Soil

B0BFF7

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:

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

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: See attached lab report form for compounds present in assoc. blank. Toluene was present in the blank but was not reported by the lab since the conc. is less than 1 ug/kg. The quant. form is also attached.

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:

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: Sample locations are currently not available. Field QC will be evaluated in the Final Summary report.

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: TICs were not detected in either the blank or the sample. No qualification was required.

HOLDING TIME SUMMARY

B0BFF7-TMA-719

SDG:	VALIDATOR: [illegible]	DATE: 5/9/94	PAGE 1 OF 1

COMMENTS: Volatile Organics

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0BFF7	VOA	2/22/94	—	3/04/94	—	10	None

9613503.0079

9613503.0080

VBLK0304R

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	128	180	7:30	1	1.000	A BB	28694.	50.000 PPB	15.56
2	114	381	15:52	2	1.000	A BB	115361	50.000 PPB	15.56
3	117	479	19:57	3	1.000	A BB	101680.	50.000 PPB	15.56
4	65	234	9:45	1	1.300	A BB	35114.	49.206 PPB	15.31
5	98	454	18:55	3	0.948	A BB	90094.	49.783 PPB	15.49
6	95	560	23:20	3	1.169	A BB	69790.	51.871 PPB	16.14
7	NOT FOUND								
8	NOT FOUND								
9	NOT FOUND								
10	NOT FOUND								
11	84	112	4:40	1	0.622	A BB	2315.	3.124 PPB	0.97
12	43	124	5:10	1	0.689	A BB	3254.	8.530 PPB	2.65
13	NOT FOUND								
14	NOT FOUND								
15	NOT FOUND								
16	NOT FOUND								
~~17~~	~~83~~	~~221~~	~~9:12~~	~~1~~	~~1.220~~	~~A BB~~	~~589.~~	~~0.370 PPB~~	~~0.12~~
~~18~~	~~43~~	~~235~~	~~9:47~~	~~1~~	~~1.306~~	~~A VV~~	~~2505.~~	~~3.995 PPB~~	~~1.24~~
19	NOT FOUND								
20	97	260	10:50	2	0.682	A BB	1287.	1.107 PPB	0.34
21	NOT FOUND								
~~22~~	~~43~~	~~235~~	~~9:47~~	~~2~~	~~0.617~~	~~A VV~~	~~2505.~~	~~1.027 PPB~~	~~0.32~~
~~23~~	~~83~~	~~280~~	~~11:40~~	~~2~~	~~0.735~~	~~A BB~~	~~900.~~	~~0.578 PPB~~	~~0.18~~
24	NOT FOUND								
25	NOT FOUND								
26	NOT FOUND								
27	NOT FOUND								
28	NOT FOUND								
29	NOT FOUND								
30	NOT FOUND								
31	NOT FOUND								
32	NOT FOUND								
~~33~~	~~43~~	~~395~~	~~16:27~~	~~3~~	~~0.825~~	~~A BB~~	~~529.~~	~~0.337 PPB~~	~~0.10~~
34	NOT FOUND								
35	NOT FOUND								
36	NOT FOUND								
~~37~~	~~91~~	~~458~~	~~19:05~~	~~3~~	~~0.956~~	~~A BB~~	~~1492.~~	~~0.691 PPB~~	~~0.21~~
38	NOT FOUND								
39	NOT FOUND								
40	NOT FOUND								
41	NOT FOUND								
42	NOT FOUND								

Toluene

$\frac{ug}{Kg}$ toluene $= \frac{(1492)(50)}{(35114)(1.062)} = 0.691 \frac{ug}{Kg} \times 5 = 3.45$ ug/kg

std (101680)

3-7-94

No	Ret(L)	Ratio	RRT(L)	Ratio	Amnt	Amnt(L)	R.Fac	R.Fac(L)	Ratio
1	7:22	1.02	1.000	1.00	50.00	50.00	1.000	1.000	1.00
2	15:52	1.00	1.000	1.00	50.00	50.00	1.000	1.000	1.00
3	19:57	1.00	1.000	1.00	50.00	50.00	1.000	1.000	1.00
4	9:42	1.00	1.316	0.99	49.21	50.00	1.224	1.243	0.98
5	18:55	1.00	0.948	1.00	49.78	50.00	0.886	0.890	1.00
6	23:22	1.00	1.171	1.00	51.87	50.00	0.686	0.662	1.04
7	0:50		0.113						
8	1:30		0.203						
9	1:55		0.260						
10	2:37		0.356						
11	4:20	1.08	0.588	1.06	3.12	50.00	0.081	1.291	0.06
12	4:55	1.05	0.667	1.03	8.53	50.00	0.113	0.665	0.17

5/09/94

U022

03/14/94

9613503.0081

MEMORANDUM

MAY 1994 RECEIVED 100

TO: 200-UP-2 Project QA Record May 9, 1994

FR: Susan Winter, Golder Associates Inc.

RE: SEMIVOLATILE ORGANICS DATA VALIDATION SUMMARY FOR DATA PACKAGE: B0BFF7-TMA-719 (923-E418, Filename B0BFF7SV.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B0BFF7-TMA-719 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
B0BFF7	02/22/94	SOIL	SEE NOTE 1

Note 1. All samples were analyzed for CLP TCL semivolatile organics.

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

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

RECEIVED MAY 11 1994 VALIDATION DOCUMENTATION SDLA

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

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

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 64 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

001

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Blanks

- Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the associated laboratory blank. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

TENTATIVELY IDENTIFIED COMPOUND EVALUATION

Tentatively identified compounds (TICs) reported by the laboratory were evaluated during validation and qualified as follows:

- TICs were detected in the samples and associated laboratory blank and were common laboratory contaminants, resulting in qualification of the TICs as unusable (UR) as shown in Attachment 3.

- TICs were detected in the samples and associated laboratory blank and have been qualified due to associated blank contamination and have been determined to be presumptive and valid (UJN).

- TICs were detected in the samples and determined to be valid, resulting in qualification of the results as presumptive and valid (JN).

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.

9613503.0083

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.

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

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

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

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

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

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

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

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

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

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY

SDG: B0BFF7-TMA-719	VALIDATOR:	DATE: May 9, 1994	PAGE 1 OF 1
COMMENTS: SEMIVOLATILE ORGANICS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
DI-N-BUTYLPHTHALATE	U	B0BFF7	PRESENT IN ASSOCIATED BLANK
BIS(2-ETHYLHEXYL)PHTHALATE	U	B0BFF7	PRESENT IN ASSOCIATED BLANK

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B0BFF7-TMA-719

	Samp#	B0BFF7	
	Date	2-22-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
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
ACENAPHTHENE	UG/KG	340.000	U

Verified
[illegible] 5/10/94

9615053.0088

Validated Data Summary, Data Package: BOBFF7-TMA-719

	Samp#	BOBFF7	
	Date	2-22-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
Parameter	Units	Result	Q
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	340.000	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
[illegible] 5/10/94

96 2503 0089

9613503.0090

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

~~000186~~

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

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

U010

Verified 5/09/94

9613503.0091

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

~~000187~~

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

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	340 ~~290~~	~~BJ~~	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 ~~36~~	~~J~~	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	

0011

(1) - Cannot be separated from Diphenylamine

Verified 5/09/94

FORM I SV-2

3/90

9613503.0092

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

~~000188~~

EPA SAMPLE NO.

B0BFF7

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 40324I10

Level: (low/med) LOW Date Received: 03/01/94

% Moisture: 5 decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.6

Number TICs found: 16

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	Q
1.	UNKNOWN HYDROCARBON	5.12	100	~~BJ~~	~~BJ~~
2.	UNKNOWN HYDROCARBON	5.55	1300	~~BJ~~	~~BJ~~
3.	UNKNOWN KETONE	5.83	170	~~BJ~~	~~BJ~~
4.	UNKNOWN HYDROCARBON	6.08	730	~~BJ~~	~~BJ~~
5.	UNKNOWN HYDROCARBON	7.68	310	~~J~~	~~J~~
6.	UNKNOWN HYDROCARBON	7.77	140	~~J~~	~~J~~
7.	UNKNOWN HYDROCARBON	11.83	210	~~J~~	~~J~~
8.	UNKNOWN HYDROCARBON	13.23	240	~~J~~	~~J~~
9.	UNKNOWN ALKANE	14.03	140	~~J~~	~~J~~
10.	UNKNOWN ALKANE	14.57	140	~~J~~	~~J~~
11.	UNKNOWN HYDROCARBON	16.33	940	~~J~~	~~J~~
12.	UNKNOWN HYDROCARBON	17.67	69	~~J~~	~~J~~
13. 7704-34-9	SULFUR	21.23	140	~~JN~~	~~JN~~
14.	UNKNOWN ACID	21.83	170	~~J~~	~~J~~
15.	HEXADECANOIC ACID ISOMER	22.08	69	~~BJ~~	~~BJ~~
16.	UNKNOWN HYDROCARBON	23.90	100	~~BJ~~	~~BJ~~

Verified
5/09/94

0012

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 03-011

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : March 01, 1994

1.0 DESCRIPTION OF CASE :

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

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B0BFF7	A4-03-011-01A	V	SOIL
B0BFF7 MS	A4-03-011-01B	V	SOIL
B0BFF7 MSD	A4-03-011-01C	V	SOIL
B0BFF7	A4-03-011-01D	SV	SOIL
B0BFF7 MS	A4-03-011-01E	SV	SOIL
B0BFF7 MSD	A4-03-011-01F	SV	SOIL
B0BFF7	A4-03-011-01J	K	SOIL
B0BFF7 MS	A4-03-011-01K	K	SOIL
B0BFF7 MSD	A4-03-011-01L	K	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received intact and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

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

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

TUNES :

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

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS : ~~000072~~

LOW LEVEL SOIL :

The samples were extracted and analyzed within the contract required holding times.

In sample B0BFF7, small amounts of Di-n-butylphthalate and bis(2-Ethylhexyl)phthalate were detected below the CRQL. In sample B0BFF7MSD, Pentachlorophenol was detected at a concentration that exceeded the calibration range of the instrument, and was therefore "E" qualified.

The matrix spike recoveries for 2,4-Dinitrotoluene exceeded the QC limits in both the MS and MSD. In addition, the recovery for Pentachlorophenol was above the QC limits in sample B0BFF7MSD. These high recoveries were due to the efficiency of the extraction and analysis. In accordance with the protocol, no further action was required.

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

3.2.3 EXTRACTABLE HYDROCARBONS "KEROSENE RANGE" COMMENTS :

SEQUENCE NOTES :

The sequence was started on 03/05/94 and was analyzed according to the SW-846 Method 8015M. The %RSD in the all of the initial calibrations and the %D in the continuing calibrations were below their 20% and 15% limits, respectively.

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

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the required holding times. Approximately 20 g of each sample were extracted and concentrated to 5 mL.

The surrogate o-Terphenyl was added to each sample, and the recoveries ranged from 79% to 86%. However, since the reporting forms could not accommodate the surrogate recovery results, the data was included in the "Additional Raw Data" poriton of the package.

The matrix spike and matrix spike duplicate recoveries for Kerosene were 72% and 80%, respectively. The LCS, KLCS0308A, was prepared at the same time and had a Kerosene spike

recovery of 79%. The LCS results were included in the "Additional Raw Data" portion of the package. No Kerosene was detected in any of the unspiked samples.

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

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

Nicole Roth

Nicole Roth 4/20/94
Program Manager

Maureen Parrish

Maureen Parrish 4/20/94
Program Manager

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. SML-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR # 19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
SPECIAL INSTRUCTIONS
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required		Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA ✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA ✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury ✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4 ✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3 ✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide ✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene ✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific ✓		

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.K. Edwards
D.K. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

000024

U017

9603 2057 0007

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B0BFF7-TMA-719
VALIDATOR: [illegible]	LAB: TMA	DATE: 05/09/94
CASE:		SDG: B0BFF7-TMA-719

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 Soil

B0BFF7

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:

U019

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3. INSTRU

Is the GC/

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Comments:

4. BLANK

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Are labo

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Comments:

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RGANIC DATA VALIDATION CHECKLIST

table? . . . . . Yes No N/A
lues acceptable? . . . . . Yes No N/A
acceptable? . . . . . Yes No N/A
ed and are not currently
ever, field QC will be
the final summary report.

nalyzed? . . . . . Yes No N/A
s acceptable? . . . . . Yes No N/A
ention times acceptable? . . . . . Yes No N/A

ON AND QUANTITATION
n acceptable? . . . . . Yes No N/A
acceptable? . . . . . Yes No N/A

QUANTITATION LIMITS
all requested analyses? . . . . . Yes No N/A
in the raw data? . . . . . Yes No N/A
s? . . . . . Yes No N/A
rly identified and coded all TIC? . . . Yes No N/A

U021

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HOLDING TIME SUMMARY

BoBFF7-TMA-719

SDG:	VALIDATOR: [illegible]	DATE: 5/9/94	PAGE 1 OF 1
COMMENTS: Semivolatile Organics			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BoBFF7	SVOA	02/22/94	3/04/94	03/24/94	10	20	None

9613503.0103

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

~~000276~~

SBLK0304S1

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-BLK

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 40324I09

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	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	270	J
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	26 ~~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

RD=2700

J 110-260

(1) - Cannot be separated from Diphenylamine

5/09/94

FORM I SV-2

3/90

023

9613503.0104

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS ~~000277~~

EPA SAMPLE NO.

SBLK0304S1

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03011 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A403011-BLK

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 40324I09

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 03/04/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

Number TICs found: 7

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	Q
1.	UNKNOWN HYDROCARBON	5.10	98	J	NJ
2.	UNKNOWN HYDROCARBON	5.55	1000	J	RJ
3.	UNKNOWN KETONE	5.83	98	J	RJ
4.	UNKNOWN HYDROCARBON	6.07	260	J	RJ
5.	UNKNOWN HYDROCARBON	20.03	66	J	NJ
6.	HEXADECANOIC ACID ISOMER	22.08	98	J	NJ
7.	UNKNOWN HYDROCARBON	23.90	130	J	NJ

5/09/94

U024

9613503.0105

SBLK 030451

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
64	NOT FOUND								
65	NOT FOUND								~~000286~~
66	149	1564	19:51	4	1.094	A BB	47544.	8.341 NG/UL	1.65
67	~~202~~	~~1671~~	~~21:12~~	~~4~~	~~1.169~~	~~A BB~~	~~50.~~	~~0.011 NG/UL~~	~~0.00~~
68	~~202~~	~~1714~~	~~21:45~~	~~5~~	~~0.876~~	~~A BB~~	~~384~~	~~0.087 NG/UL~~	~~0.02~~
69	~~149~~	~~1860~~	~~23:36~~	~~5~~	~~0.950~~	~~A BB~~	~~812.~~	~~0.360 NG/UL~~	~~0.07~~
70	NOT FOUND								
71	~~228~~	~~1956~~	~~24:49~~	~~5~~	~~0.999~~	~~A BB~~	~~138.~~	~~0.038 NG/UL~~	~~0.01~~
72	NOT FOUND								
73	~~149~~	~~1980~~	~~25:07~~	~~5~~	~~1.012~~	~~A BB~~	~~2676.~~	~~0.807 NG/UL~~	~~0.16~~
74	~~149~~	~~2106~~	~~26:43~~	~~6~~	~~0.945~~	~~A BB~~	~~364.~~	~~0.071 NG/UL~~	~~0.01~~
75	NOT FOUND								
76	NOT FOUND								
77	NOT FOUND								
78	NOT FOUND								
79	NOT FOUND								
80	NOT FOUND								

Bis(2-ethyl hexyl) phthalate

$\frac{ug}{kg}$ bis(2-ethylhexyl)phthalate $= \frac{(2676)(20)(2)(2)(500)}{(65546)(1.012)(30.5)(2)} = 26$ ug/kg

No	Ret(L)	Ratio	RRT(L)	Ratio	Amnt	Amnt(L)	R. Fac	R. Fac(L)	Ratio
51	14:59		1.036						
52	14:04		0.972						
53	15:45	1.00	1.089	1.00	0.32	25.00	0.020	1.576	0.01
54	15:03		1.040						
55	15:51		1.096						
56	15:55		1.100						
57	15:58		1.104						
58	16:02		0.883						
59	16:14		0.893						
60	17:08		0.943						
61	17:12		0.946						
62	17:43		0.975						
63	18:14	1.00	1.003	1.00	0.02	25.00	0.001	1.078	0.00
64	18:22		1.010						
65	18:49		1.036						
66	19:52	1.00	1.094	1.00	8.34	25.00	0.518	1.554	0.33
67	21:13	1.00	1.168	1.00	0.01	25.00	0.001	1.235	0.00
68	21:46	1.00	0.876	1.00	0.09	25.00	0.005	1.339	0.00
69	23:38	1.00	0.950	1.00	0.36	25.00	0.010	0.688	0.01
70	24:51		0.999						
71	24:50	1.00	0.999	1.00	0.04	25.00	0.002	1.101	0.00
72	24:55		1.003						
73	25:09	1.00	1.012	1.00	0.81	25.00	0.033	1.012	0.03
74	26:44	1.00	0.944	1.00	0.07	25.00	0.005	1.809	0.00
75	27:24		0.968						
76	27:27		0.970						
77	28:10		0.995						
78	31:33		1.114						
79	31:39		1.118						
80	32:30		1.148						

-025

5/09/94

03/30/94

9613503.0106

MAY 1994 RECEIVED TQO

MEMORANDUM

TO: 200-UP-2 Project QA Record May 10, 1994

FR: Susan Winter, Golder Associates Inc.

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: B0BFF7-TMA-719 (923-E418, Filename B0BFF7M.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B0BFF7-TMA-719 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
B0BFF7	02/22/94	SOIL	SEE NOTE 1

Note 1. Sample B0BFF7 was analyzed for CLP TAL metals, 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

RECEIVED MAY 11 1994 VALIDATION DOCUMENTATION

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

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

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

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

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 25 determinations reported, all of

001

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

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Blanks

- Silver, sodium, beryllium, and copper were detected at positive concentrations in the associated calibration and/or preparation blanks. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

Matrix Spike

- Matrix spike percent recovery (MS %R) for antimony was unacceptable. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

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

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

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

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

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

9613503.0110

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY

SDG: B0BFF7-TMA-719	VALIDATOR:	DATE: May 10, 1994	PAGE 1 OF 1
COMMENTS: METALS			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
BERYLLIUM	U	B0BFF7	PRESENT IN CCB AT A POSITIVE CONCENTRATION
COPPER	U	B0BFF7	PRESENT IN ICB, CCB, AND PREP. BLANK AT POSITIVE CONCENTRATIONS
SILVER	U	B0BFF7	PRESENT IN CCB AND PREP. BLANK AT POSITIVE CONCENTRATIONS
SODIUM	U	B0BFF7	PRESENT IN CCB AND PREP. BLANK AT POSITIVE CONCENTRATIONS
ANTIMONY	UJ	B0BFF7	MS %R < 75% BUT > 30%

9613503.0112

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B0BFF7-TMA-719

	Samp#	B0BFF7	
	Date	2-22-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
Parameter	Units	Result	Q
ALUMINUM	MG/KG	4030.000	
ANTIMONY	MG/KG	2.600	UJ
ARSENIC	MG/KG	5.900	
BARIUM	MG/KG	36.200	B
BERYLLIUM	MG/KG	0.360	U
CADMIUM	MG/KG	0.460	B
CALCIUM	MG/KG	1860.000	
CHROMIUM	MG/KG	8.300	
COBALT	MG/KG	8.800	B
COPPER	MG/KG	7.700	U
IRON	MG/KG	21000.000	
LEAD	MG/KG	4.100	
MAGNESIUM	MG/KG	2720.000	
MANGANESE	MG/KG	179.000	
MERCURY	MG/KG	0.900	
NICKEL	MG/KG	5.400	B
POTASSIUM	MG/KG	733.000	B
SELENIUM	MG/KG	0.610	U
SILVER	MG/KG	1.100	U
SODIUM	MG/KG	510.000	U
THALLIUM	MG/KG	0.800	U
VANADIUM	MG/KG	63.700	
ZINC	MG/KG	37.100	
CYANIDE	MG/KG	0.540	U
TITANIUM	MG/KG	2240.000	

Verified

5/10/94

96150601.3

9613503.0114

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

80BFF7

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D2-0039

Lab Code: SKINER Case No.: N4-03-002SAS No.: SDG No.: 80BFF7

Matrix (soil/water): SOIL Lab Sample ID: 03031-01S

Level (low/med): LOW Date Received: 03/02/94

% Solids: 90.4

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4030			P	
7440-36-0	Antimony	2.6	~~U~~	N	P	U
7440-38-2	Arsenic	5.9			P	
7440-39-3	Barium	36.2	B		P	
7440-41-7	Beryllium	0.36	~~B~~		P	U
7440-43-9	Cadmium	0.46	B		P	
7440-70-2	Calcium	1860			P	
7440-47-3	Chromium	8.3			P	
7440-48-4	Cobalt	8.8	B		P	
7440-50-8	Copper	7.7	—		P	U
7439-89-6	Iron	21000			P	
7439-92-1	Lead	4.1			P	
7439-95-4	Magnesium	2720			P	
7439-96-5	Manganese	179			P	
7439-97-6	Mercury	0.90			CV	
7440-02-0	Nickel	5.4	B		P	
7440-09-7	Potassium	733	B		P	
7782-49-2	Selenium	0.61	U		P	
7440-22-4	Silver	1.1	~~B~~		P	U
7440-23-5	Sodium	510	~~B~~		P	U
7440-28-0	Thallium	0.80	U		P	
7440-62-2	Vanadium	63.7			P	
7440-66-6	Zinc	37.1			P	
	Cyanide	0.54	U		CA	
7440-32-6	Titanium	2240			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

Verified [signature] 5/10/94

009

~~002~~

9613503.0115

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613503.0116

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

APR 1994
RECEIVED
SDLA

March 31, 1994

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

Quality Control Narrative

Scope
One (1) soil sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on March 2, 1994 from TMA/Norcal. The sample was analyzed for the USEPA CLP Target Analyte List metals, titanium and cyanide. The analysis were performed under TMA/Skinner and Sherman work order S403031.

Methodology
The sample was 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 sample with the following exceptions:

The matrix spike recovery for antimony exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. 5ML-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR # 19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

SPECIAL INSTRUCTIONS

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required			Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA	✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA	✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury	✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4	✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3	✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide	✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene	✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific		✓	

Chain of Possession (Sign and Print Names)

Relinquished By	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.K. Edwards
D.K. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

0012

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: BOBFF7-TMA-719	
VALIDATOR: [illegible]	LAB: TMA		DATE: 05/10/94
CASE:		SDG: BOBFF7-TMA-719	

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☒ CLP/Hg	☒ CLP/Cyanide	☒ Titrimetric-ICP 5/10/94	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX Soil

BOBFF7

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
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: See attached lab blank form for analytes detected in calibration and preparation blanks. Sample results < 5x blank conc. have been qualified as undetected (U).

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments: MS&R for antimony was 64%. Qualify assoc. result as estimated (UJ).

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: Sample locations are currently not available. Field QC will be evaluated in the final summary report.

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: As, Se, Pb, & Tl were analyzed by ICP.

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:

HOLDING TIME SUMMARY

BOBFF7-TMA-719

SDG:	VALIDATOR: [illegible]	DATE: 5/10/94	PAGE 1 OF 1
COMMENTS: Metals			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOBFF7	ICP	2/22/94		3/25/94		31	None
	As, Tl, Pb, Se			3/25/94		31	
	Hg			3/11/94		17	
	CN			3/07/94		13	

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WESTINGHOUSE/HANFORD

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D2-0039

Lab Code: SKINER Case No.: N4-03-002SAS No.: SDG No.: B0BFF7

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
							5x				
Aluminum	15.0	U	27.4	B	18.6	B	15.0	U	3.000	U	P
Antimony	12.2	U	12.2	U	12.2	U	12.2	U	2.440	U	P
Arsenic	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	P
Barium	0.8	U	0.8	U	0.8	U	2.3	B	0.442	B	P
Beryllium	0.3	U	0.4	B	0.3	U	2.0 0.4	B	0.060	U	P
Cadmium	1.7	U	1.7	U	1.7	U	1.7	U	0.340	U	P
Calcium	83.4	U	152.0	B	210.1	B	415.6	B	143.970	B	P
Chromium	2.5	U	2.5	U	2.5	U	2.5	U	0.500	U	P
Cobalt	2.9	U	2.9	U	2.9	U	2.9	U	0.580	U	P
Copper	40.0 8.0	B	9.8	B	16.5 3.3	B	1.6	U	1.81 0.362	B	P
Iron	13.4	U	17.3	B	21.4	B	33.3	B	8.242	B	P
Lead	1.8	U	1.8	U	1.8	U	1.8	U	0.360	U	P
Magnesium	32.2	U	33.5	B	32.2	U	98.8	B	29.390	B	P
Manganese	0.8	U	0.9	B	1.6	B	2.2	B	0.224	B	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	4.4	U	4.4	U	4.4	U	4.4	U	0.880	U	P
Potassium	58.8	U	58.8	U	58.8	U	58.8	U	28.640	B	P
Selenium	2.8	U	2.8	U	2.8	U	2.8	U	0.560	U	P
Silver	2.1	U	2.1	U	14.5 2.9	B	2.1	U	2.58 0.516	B	P
Sodium	39.6	U	39.6	U	39.6	U	3955 791.0	B	1767.2 353.440	B	P
Thallium	3.7	U	3.7	U	3.7	U	3.7	U	0.740	U	P
Vanadium	2.4	U	2.4	U	2.4	U	2.4	U	0.480	U	P
Zinc	4.6	U	4.6	U	5.7	B	4.6	U	0.920	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA
Titanium	1.2	U	1.2	U	1.6	B	3.4	B	0.240	U	P

Assoc. with B0BFF7

5/10/94

U018

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WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: B0BFF7S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D2-0039

Lab Code: SKINER Case No.: N4-03-002SAS No.: SDG No.: B0BFF7

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

% Solids for Sample: 90.4

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	68.3501		2.6462	U	106.36	64.3	N	P
Arsenic	75-125	418.7372		5.8654		425.46	97.0		P
Barium	75-125	434.9260		36.2159	B	425.46	93.7		P
Beryllium	75-125	10.6025		0.3644	B	10.64	96.2		P
Cadmium	75-125	10.3855		0.4642	B	10.64	93.2		P
Calcium									NR
Chromium	75-125	48.2322		8.2596		42.55	93.9		P
Cobalt	75-125	109.8132		8.7867	B	106.36	95.0		P
Copper	75-125	57.6498		7.7152		53.18	93.9		P
Iron									NR
Lead	75-125	106.6648		4.1233		106.36	96.4		P
Magnesium									NR
Manganese	75-125	278.3781		179.1927		106.36	93.3		P
Mercury	75-125	1.4139		0.8991		0.55	93.6		CV
Nickel	75-125	104.5843		5.4269	B	106.36	93.2		P
Potassium									NR
Selenium	75-125	402.8676		0.6073	U	425.46	94.7		P
Silver	75-125	11.2045		1.0932	B	10.64	95.0		P
Sodium									NR
Thallium	75-125	390.1251		0.8025	U	425.46	91.7		P
Vanadium	75-125	165.1059		63.7342		106.36	95.3		P
Zinc	75-125	133.3199		37.1183		106.36	90.4		P
Cyanide	75-125	26.3681		0.5423	U	25.85	102.0		CA
Titanium		2348.1110		2244.9245		106.36	97.0		P

Comments:

Qualify antimony result as estimated (UJ).

U019

5/10/94

~~013~~

FORM V (Part 1) - IN ILM02.1

9613503.0125

MEMORANDUM

JUN 1994 RECEIVED TQD

TO: 200-UP-2 Project QA Record

June 9, 1994

FR: Susan Winter, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B0BFF7-TMA-719 (923-E418, Filename B0BFF7R.UP2)

INTRODUCTION

This memo presents the results of data validation on data package B0BFF7-TMA-719 prepared by the Thermo Analytical (TMA) laboratory. Information concerning the sample validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B0BFF7	02/22/94	SOIL	SEE NOTE 1

Note 1. Sample B0BFF7 was analyzed for gross alpha, gross beta, selenium-79, strontium-90, technetium-99, iodine-129, alpha spectroscopy (uranium 233/234, uranium 235, uranium-238, plutonium-238, plutonium-239/240, americium-241, and curium-244), total uranium, and gamma spectroscopy using WHC approved methods.

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

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

RECEIVED JUN 13 1994 VALIDATION DOCUMENTATIO SDLA

DATA QUALITY OBJECTIVES

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

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

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 results with the exception of the following analytes summarized in the table below. The detection limit goals were exceeded

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due to matrix interferences for total uranium and a limited sample amount for gamma spectroscopy analysis as well as a short-half life for iron 59.

SAMPLE ID	ANALYTE	MDA (pCi/g)	RDL (pCi/g)
B0BFF7	TOTAL URANIUM	0.2 (µg/g)	0.1 (µg/g)
	IRON-59	0.4	0.05
	COBALT-58	0.3	0.05
	COBALT-60	0.2	0.05
	EUROPIUM-152	3	0.1
	EUROPIUM-154	2	0.1
	EUROPIUM-155	3	0.1

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 35 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 Blank

- Neptunium-237 was present in the laboratory blank. Attachments 2 and 5 provide a summary of the affected sample result, data qualification applied and supporting documentation.

Precision

- Laboratory duplicate relative percent differences (RPD) for uranium-233/234, uranium-238, radium-228, and thorium-232 were unacceptable. Attachments 2 and 5 provide a summary of the affected sample results, data qualifications applied and supporting documentation.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY

SDG: B0BFF7-TMA-719	VALIDATOR: [illegible] DATE: June 2, 1994		PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NEPTUNIUM-237	J	B0BFF7	PRESENT IN BLANK AND SAMPLE RESULT < 5x BLANK CONCENTRATION
URANIUM-233/234	J	B0BFF7	DUPLICATE RPD > 35% AND RESULTS > 5xRDL
URANIUM-238	J	B0BFF7	DUPLICATE RPD > 35% AND RESULTS > 5xRDL
RADIUM-228	J	B0BFF7	DUPLICATE RPD > 35% AND RESULTS > 5xMDA
THORIUM-232	J	B0BFF7	DUPLICATE RPD > 35% AND RESULTS > 5xMDA

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: BOBFF7-TMA-719

	Samp#	BOBFF7	
	Date	2-22-94	
	Location	216-U-8	
	Type	SOIL	
	Comments	---	
Parameter	Units	Result	Q
GROSS ALPHA	pCi/g	14.000	
GROSS BETA	pCi/g	2400.000	
SELENIUM-79	pCi/g	4.000	U
STRONTIUM-90	pCi/g	7.900	
TECHNETIUM-99	pCi/g	1.500	
IODINE-129	pCi/g	2.000	U
URANIUM-233/234	pCi/g	5.600	J
URANIUM-235	pCi/g	0.540	
URANIUM-238	pCi/g	5.300	J
TOTAL URANIUM	ug/g	17.000	
NEPTUNIUM-237	pCi/g	0.038	J
PLUTONIUM-238	pCi/g	0.040	U
PLUTONIUM-239/240	pCi/g	0.970	
AMERICIUM-241	pCi/g	0.042	
CURIUM-244	pCi/g	0.010	U
SODIUM-22	pCi/g	0.200	U
POTASSIUM-40	pCi/g	11.000	
MANGANESE-54	pCi/g	0.300	U
IRON-59	pCi/g	0.400	U
COBALT-58	pCi/g	0.300	U
COBALT-60	pCi/g	0.200	U
NIOBIUM-94	pCi/g	0.300	U
RUTHENIUM-103	pCi/g	3.000	U
RUTHENIUM-106	pCi/g	10.000	U
TIN-113	pCi/g	3.000	U
CESIUM-134	pCi/g	0.300	U
CESIUM-137	pCi/g	2600.000	
CERIUM-144	pCi/g	7.000	U
EUROPIUM-152	pCi/g	3.000	U
EUROPIUM-154	pCi/g	2.000	U
EUROPIUM-155	pCi/g	3.000	U
RADIUM-226	pCi/g	2.000	U
RADIUM-228	pCi/g	1.200	J
THORIUM-228	pCi/g	3.000	U
THORIUM-232	pCi/g	1.200	J

Verified
[illegible] 6/06/94

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0008

9613503.0133

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

DATA SHEET

N403008-01

B0BFF7

SDG	7340	Client	Westinghouse Hanford
Contact	N. Joseph Verville	Contract	MBH-SVV-069262
Lab sample id	N403008-01	Client sample id	B0BFF7
Dept sample id	7340-001	Location/Matrix	216-U-8 Crib SOLID
Received	03/01/94	Collected	02/22/94
% moisture	5.3	Chain of custody id	006479

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	Q
Gross Alpha	Alpha	14	4.1	3	10		80A	
Gross Beta	Beta	2400	32	5	10		80B	
Selenium 79	15758-45-9	-0.37	2.2	4	10	U	SE_L	
Strontium 90	10098-97-2	7.9	1.5	0.5	1		Y	
Technetium 99	14133-76-7	1.5	0.11	0.2	0.5		TC	
Iodine 129	15046-84-1	0.14	0.96	2	2	U	I	
Uranium 233/234		5.6	0.43	0.08	0.3	—	U	U
Uranium 235	15117-96-1	0.54	0.10	0.03	0.3		U	
Uranium 238		5.3	0.41	0.07	0.3	—	U	U
Total Uranium (ug/g)	7440-61-1	17	3.4	0.2	0.1		U_T	
Neptunium 237	13994-20-2	0.038	0.015	0.004	0.2	~~BJ~~	NP	U
Plutonium 238	13981-16-3	0.023	0.024	0.04	0.05	U	PU	
Plutonium 239/240		0.97	0.096	0.02	0.05		PU	
Americium 241	14596-10-2	0.042	0.018	0.01	0.05	~~J~~	TP	
Curium 244	13981-15-2	0.005	0.006	0.01	0.05	U	TP	
GAMMA SCAN ANALYTES								
Sodium 22	13966-32-0	U		0.2		U	GAM	
Potassium 40	13966-00-2	11	2.4				GAM	
Manganese 54	13966-31-9	U		0.3		U	GAM	
Iron 59	14596-12-4	U		0.4	0.05	U	GAM	
Cobalt 58	13981-38-9	U		0.3	0.05	U	GAM	
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM	
Niobium 94	14681-63-1	U		0.3		U	GAM	
Ruthenium 103	13968-53-1	U		3		U	GAM	
Ruthenium 106	13967-48-1	U		10		U	GAM	
Tin 113	13966-06-8	U		3		U	GAM	
Cesium 134	13967-70-9	U		0.3		U	GAM	
Cesium 137	10045-97-3	2600	7.0		0.05		GAM	

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.30
Report date 05/03/94

~~23~~ 5/31/94

9613503.0134

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-01

DATA SHEET, cont

B0BFF7

SDG	7340	Client	Westinghouse Hanford
Contact	N. Joseph Verville	Contract	MBH-SVV-069262
Lab sample id	N403008-01	Client sample id	B0BFF7
Dept sample id	7340-001	Location/Matrix	216-U-8 Crib SOLID
Received	03/01/94	Collected	02/22/94
% moisture	5.3	Chain of custody id	006479

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	Q
Cerium 144	14762-78-8	U		7		U	GAM	
Europium 152	14683-23-9	U		3	0.1	U	GAM	
Europium 154	15585-10-1	U		2	0.1	U	GAM	
Europium 155	14391-16-3	U		3	0.1	U	GAM	
Radium 226	13982-63-3	U		2		U	GAM	
Radium 228	15262-20-1	1.2	0.84			—	GAM	B
Thorium 228	14274-82-9	U		3		U	GAM	
Thorium 232	7440-29-1	1.2	0.84			—	GAM	B

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.30
Report date 05/03/94

5/31/94

24

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

TMA/Norcal

Report N4-03-008-7340
Sample Delivery Group 7340

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

Case Narrative

May 4, 1994

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7340 is comprised of one soil sample designated as SAF #93-263, delivered under the following Chain-of-Custody document 006479.

One 1000 mL poly bottle containing the sample was received for analyses.

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses

No problems were encountered by the laboratory in the analyses.

2.2 Gross Beta Analyses

The relative percent difference in the results for sample B0BFF7 and its duplicate is 34% which just barely exceeds than the 3σ limit of 33%. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.3 Selenium-79 Analyses

The relative percent difference in the results for sample B0BFF7 and its duplicate is 200% which is greater than the 3σ limit of 176%. Both results are less than the RDL. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.4 Strontium-90 Analyses

No problems were encountered by the laboratory in the analyses.

2.5 Technetium-99 Analyses

The chemical yields for the original analysis of sample B0BFF7 and its duplicate were 7% and 18%, well below the 20-105% protocol limits. Both the sample and duplicate were reanalyzed and satisfactory yields of 42% and 40% were obtained. No cause could be determined for the poor initial yields.

2.6 Iodine-129 Analyses

No problems were encountered by the laboratory in the analyses.

2.7 Neptunium-237 Analyses

Reagent blank 7340-003 shows activity at 0.085 pCi/g which is above the 0.01 pCi/g MDA. Both the result and MDA are well below the RDL so there is no adverse impact on the data.

The relative percent difference in the results for sample B0BFF7 and its duplicate is 119% which is greater than the 3σ limit of 65%. Both results are less than the RDL. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.8 Uranium-233/234, 235 and 238 Analyses

The relative percent difference in the uranium-233/234, uranium-235, and uranium-238 results exceed the 3σ protocol limits. The high RPD's are likely the result of an inhomogeneity of the sample matrix.

2.9 Total Uranium Analyses

The MDA for sample B0BFF7 is 0.2 μg/g which is higher than the RDL of 0.1 μg/g because of extra dilutions required to eliminate matrix interferences. The result of the analysis is 85 times the MDA and therefore there is no adverse impact on the data.

2.10 Plutonium-238 and 239/240 Analyses

The relative percent difference in the plutonium-239/240 results for sample B0BFF7 and its duplicate is 43% which is greater than the 3σ limit of 23%. The high RPD is likely the result of an inhomogeneity of the sample matrix.

2.11 Americium-241/Curium-244 Analyses

No problems were encountered by the laboratory in the analyses.

2.12 Gamma Scan Analyses

Aliquot sizes for sample B0BFF7 and its duplicate were 135 and 144 grams which is smaller than the nominal 750 grams normally used for soil analyses. Several MDA's exceeded the RDL's as a result. The iron-59 MDA for laboratory control sample 7340-002 is higher than the RDL due to the short half-life of iron-59.

The cobalt-60 and cesium-137 recoveries of laboratory control sample 7340-002 are 76% and 74% which are slightly below the 3σ protocol limits of 79-121%. No cause could be determined for the low recoveries.

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

N4-02-05 008

006479

Collector R.T. Sickle
Company Contact C.A. Rowley
Telephone 372-3293
SAF No. 93-263
Project Designation 216-U-8 Vitrified Clay Pipeline
Sampling Locations 216-U-8 Crib
Ice Chest No. SML-426
Bill of Lading/Airbill No.
Offsite Property No. ORSR # 19707
Method of Shipment Air Overnight
Field Logbook No.
Shipped to TMA
Possible Sample Hazards/Remarks None Detected
Special Handling and/or Storage Keep cool

SPECIAL INSTRUCTIONS

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required			Preservative
BOBFF7	S	2-22-94	1410	(1) 250ml Gs	VOA	✓	CLP	
BOBFF7	S			(1) 250ml aG	Semi-VOA	✓	CLP	
BOBFF7	S			(1) ~~250ml~~ 500 Poly	Metals -CLP TAL Titanium Mercury	✓	CPL	
BOBFF7	S			(1) 125ml G	Anions F, Cl, SO_4	✓	EPA 300.0	
BOBFF7	S			(1) 125ml P/G	NO_2 NO_3	✓	EPA 353.2	
BOBFF7	S			(1) 125ml G	Cyanide	✓	CPL	
BOBFF7	S			(1) 125ml Gs	Kerosene	✓	8015M	
BOBFF7	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific	✓		

65

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By
R.T. Sickle R.T. SICKLE	2-28-94	0700	D.L. Edwards
D.L. Edwards	2-28-94	0907	Kermit Blum K. Blum
	3-1-94	1000	

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

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

0014

9413202.0130

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: B0BFF7-TMA-719	
VALIDATOR: [illegible]	LAB: TMA		DATE: 05/31/94
CASE:		SDG: B0BFF7-TMA-719	

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☒ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	x Sc-79
☒ Total Uranium	☐ Radium-22	☐ Tritium	☒ I-129	x Np-237	

6/2/94 SF

SAMPLES/MATRIX Soil

B0BFF7

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 6/2/94 SF

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

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

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

Comments: The initial calibration for the asso detectors was performed over one year from sample analysis. However, all 6/2/94 continuing cal checks are acceptable and no qualification is ~~acceptable~~ required. 6/2/94

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 gross beta SF control limits for detector GRB 116 (assoc. with the QC-LCS) was not provided, however, control limits of 0.9 to 1.1 were used in this case. All cal. checks are within the control limits and no qualification is required.

6/9/94

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: Np-237 and K-40 were present in the lab blank. The sample result for Np-237 < 5x blank conc and therefore was qualified as estimated (J). The sample result for K-40 > 5x blank result and therefore no qualification was required.

5. Matrix Spikes . . . . . ☒ N/A

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

Comments: LCS was performed instead of a matrix spike.

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: LCS %R for cobalt-60 and cesium-137 are 76% and 74%, respectively. These recoveries are out of the reported 3σ lab control limits. However, since they are within the DV requirements of 70% to 130%, no qualification is required.

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: No qualification is required for chemical/tracer recoveries.

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: Duplicate results for Uranium-233/234, Uranium-238, radium-228, and thorium-232 are unacceptable. Assoc. sample results have been qualified as estimated (J).

See last page of checklist for further comments.

9. Field QC Samples . . . . . ☒ N/A

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

Comments: Sample locations are currently not available. Field QC will be evaluated in the final summary report.

10. Holding Times

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

Comments: All analyses were performed within the required holding time of 180 days.

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 next page for comments.

Comments:

- Continued comment to item 8

The case narrative also states that the duplicate results for gross beta, selenium-79, uranium-235, neptunium-237, and plutonium-239/240 are out of control limits. However, these duplicate results are acceptable according to the data validation regulations and no qualification is required. 6/2/94

- Comment for item 11:

A) All MDA values meet the RDLs with the exception of the following; No qualification is required: 6/2/94

Sample ID	Parameter	MDA (pCi/g)	RDL (pCi/g)
B0BFF7	Total Uranium	0.2 ug/g	0.1 ug/g
	Iron-59	6/2/94 ~~0.5~~ 0.4	0.05
	Cobalt-58	0.3	0.05
	Cobalt-60	0.2	0.05
	Eu-152	3	0.1
	Eu-154	2	0.1
	Eu-155	3	0.1

6/2/94

B) The lab reported "BJ" and "J" qualifiers 6/2/94 for Np-237 and Am-241, respectively. These qualifiers have been crossed off the lab result form for classification purposes and are not considered appropriate for radiochemistry validation. 6/2/94

6/2/94

9613503.0145

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

SDG 7340
Contact N. Joseph Verville

WORK SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAS NO	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	#DAYS REVIEWED	BY	METHOD
B0BFF7			N403008-01	7340-001	80A/80		04/06/94	43		Gross Alpha in Soil
216-U-8 Crib		SOLID	02/22/94	7340-001	80B/80		04/05/94	42		Gross Beta in Soil
006479			03/01/94	7340-001	GAM		03/10/94	16		Gamma Scan
				7340-001	I		04/09/94	46		Iodine 129 in Soil
				7340-001	NP		03/31/94	37		Neptunium in Soil
				7340-001	PU		04/18/94	55		Plutonium, Isotopic in Soil
				7340-001	SE_L		04/06/94	43		Selenium 79 in Soil
				7340-001	TC	A1	04/11/94	48		Technetium 99 in Soil
				7340-001	TP		03/29/94	35		Americium 241/Curium in Solids
				7340-001	U		03/29/94	35		Uranium, Isotopic in Soil
				7340-001	U_T		03/31/94	37		Uranium, Total in Soil
				7340-001	Y		03/30/94	36		Strontium 90 in Soil
Reagent Blank			N403008-03	7340-003	80A/80		04/15/94			Gross Alpha in Soil
		SOLID		7340-003	80B/80		04/15/94			Gross Beta in Soil
				7340-003	GAM		03/10/94			Gamma Scan
				7340-003	I		04/07/94			Iodine 129 in Soil
				7340-003	NP		03/31/94			Neptunium in Soil
				7340-003	PU		03/29/94			Plutonium, Isotopic in Soil
				7340-003	SE_L		04/06/94			Selenium 79 in Soil
				7340-003	TP		03/29/94			Americium 241/Curium in Solids
				7340-003	U		03/30/94			Uranium, Isotopic in Soil
				7340-003	U_T		03/31/94			Uranium, Total in Soil
				7340-003	Y		03/30/94			Strontium 90 in Soil
Reagent Blank			N403008-06	7340-006	TC		04/12/94			Technetium 99 in Soil
		SOLID								
Lab Control Sample			N403008-02	7340-002	80A/80		04/05/94			Gross Alpha in Soil
		SOLID		7340-002	80B/80		04/05/94			Gross Beta in Soil
				7340-002	GAM		03/10/94			Gamma Scan
				7340-002	I		04/07/94			Iodine 129 in Soil
				7340-002	NP		03/31/94			Neptunium in Soil
				7340-002	PU		03/29/94			Plutonium, Isotopic in Soil
				7340-002	TP		03/30/94			Americium 241/Curium in Solids
				7340-002	U		03/29/94			Uranium, Isotopic in Soil
				7340-002	U_T		03/31/94			Uranium, Total in Soil
				7340-002	Y		03/30/94			Strontium 90 in Soil

5/3/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.30
Report date 05/03/94

9613503.0146

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-03

REAGENT BLANK

Reagent Blank

SDG 7340 Client Westinghouse Hanford
Contact N. Joseph Verville Contract MBH-SVV-069262

Lab sample id N403008-03 Client sample id Reagent Blank
Dept sample id 7340-003 Material/Matrix SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.99	2.8	5	10	U	80A
Gross Beta	Beta	2.7	3.6	6	10	U	80B
Selenium 79	15758-45-9	-4.2	1.1	2	10	U	SE_L
Strontium 90	10098-97-2	-0.005	0.76	0.8	1	U	Y
Iodine 129	15046-84-1	-0.15	0.64	1	2	U	I
Uranium 233/234		-0.014	0.028	0.1	0.3	U	U
Uranium 235	15117-96-1	0.017	0.033	0.1	0.3	U	U
Uranium 238		0	0.028	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	U		0.002	0.1	U	U_T
Neptunium 237	13994-20-2	0.085	0.023	0.01	0.2	J	NP
Plutonium 238	13981-16-3	0.009	0.012	0.02	0.05	U	PU
Plutonium 239/240		0.003	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0.007	0.013	0.02	0.05	U	TP
Curium 244	13981-15-2	0.007	0.007	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.03		U	GAM
Potassium 40	13966-00-2	0.29	0.26				GAM
Manganese 54	13966-31-9	U		0.01		U	GAM
Iron 59	14596-12-4	U		0.03	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.01	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.01		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.02		U	GAM
Cesium 134	13967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM
Cerium 144	14762-78-8	U		0.06		U	GAM
Europium 152	14683-23-9	U		0.02	0.1	U	GAM
Europium 154	15585-10-1	U		0.01	0.1	U	GAM

5/31/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.30
Report date 05/03/94

9613503.0147

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-04

B0BFF7

DUPLICATE

SDG 7340
Contact N. Joseph Verville
Client Westinghouse Hanford
Contract MBH-SVV-069262

DUPLICATE
Lab sample id N403008-04
Dept sample id 7340-004

ORIGINAL
Lab sample id N403008-01
Dept sample id 7340-001
Received 03/01/94
% moisture 5.3

Client sample id B0BFF7
Location/Matrix 216-U-8 Crib SOLID
Collected 02/22/94
Chain of custody id 006479

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	20	2.1	2	10		80A	14	4.1	3		35	59
Gross Beta	3400	38	6	10		80B	2400	32	5		34	33
Selenium 79	6.9	3.6	6	10	J	SE_L	-0.37	2.2	4	U	200	176
Strontium 90	8.5	1.8	1	1		Y	7.9	1.5	0.5		7	48
Technetium 99	1.5	0.22	0.2	0.5		TC	1.5	0.11	0.2		0	33
Iodine 129	0.18	0.60	1	2	U	I	0.14	0.96	2	U	-	
Uranium 233/234	8.2	0.61	0.1	0.3		U	5.6	0.43	0.08		38	20
Uranium 235	0.89	0.15	0.05	0.3		U	0.54	0.10	0.03		49	39
Uranium 238	7.7	0.58	0.09	0.3		U	5.3	0.41	0.07		37	20
Total Uranium (ug/g)	24	4.7	0.2	0.1		U_T	17	3.4	0.2		34	47
Neptunium 237	0.15	0.037	0.02	0.2	BJ	NP	0.038	0.015	0.004	BJ	119	65
Plutonium 238	0.039	0.026	0.04	0.05	U	PU	0.023	0.024	0.04	U	-	
Plutonium 239/240	1.5	0.13	0.03	0.05		PU	0.97	0.096	0.02		43	23
Americium 241	0.056	0.022	0.01	0.05		TP	0.042	0.018	0.01	J	29	88
Curium 244	0.004	0.007	0.01	0.05	U	TP	0.005	0.006	0.01	U	-	
GAMMA SCAN ANALYTES												
Sodium 22	U		0.1		U	GAM	U		0.2	U	-	
Potassium 40	10	1.7				GAM	11	2.4			10	53
Manganese 54	U		0.2		U	GAM	U		0.3	U	-	
Iron 59	U		0.4	0.05	U	GAM	U		0.4	U	-	
Cobalt 58	U		0.2	0.05	U	GAM	U		0.3	U	-	
Cobalt 60	U		0.1	0.05	U	GAM	U		0.2	U	-	
Niobium 94	U		0.2		U	GAM	U		0.3	U	-	
Ruthenium 103	U		2		U	GAM	U		3	U	-	
Ruthenium 106	U		8		U	GAM	U		10	U	-	
Tin 113	U		2		U	GAM	U		3	U	-	
Cesium 134	U		0.2		U	GAM	U		0.3	U	-	
Cesium 137	2700	5.0		0.05		GAM	2600	7.0			4	32

5/31/94

0023

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DUP
Version 2.30
Report date 05/03/94

9613503.0148

TMA NORCAL

SAMPLE DELIVERY GROUP 7340

N403008-04

B0BFF7

DUPLICATE, cont.

SDG	7340	Client	Westinghouse Hanford
Contact	N. Joseph Verville	Contract	MBH-SVV-069262
DUPLICATE		ORIGINAL	
Lab sample id	N403008-04	Lab sample id	N403008-01
Dept sample id	7340-004	Dept sample id	7340-001
		Received	03/01/94
		% moisture	5.3
Client sample id	B0BFF7		
Location/Matrix	216-U-8 Crib SOLID		
Collected	02/22/94		
Chain of custody id	006479		

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Cerium 144	U		5		U	GAM	U		7	U	-	
Europium 152	U		2	0.1	U	GAM	U		3	U	-	
Europium 154	U		1	0.1	U	GAM	U		2	U	-	
Europium 155	U		2	0.1	U	GAM	U		3	U	-	
Radium 226	U		2		U	GAM	U		2	U	-	
Radium 228	0.78	0.63				GAM	1.2	0.84			42	162
Thorium 228	U		2		U	GAM	U		3	U	-	
Thorium 232	0.78	0.63				GAM	1.2	0.84			42	162

QC 18029-38,18546 REP#1
QC 18029-18038 REP #1

The RDL values for radium-228 and thorium-232 have not been provided. Therefore, the MDA values associated with the lab blank have been applied in place of the RDL. The blank MDA values for both thorium-232 and radium-228 are 0.08 pCi/g ~~and for thorium-232 is 0.08 pCi/g~~.

5/3/94

0024

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DUP
Version 2.30
Report date 05/03/94

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

B0BFF7-TMA-719
Gross Alpha/Beta

Sample ID:	B0BFF7*	QC-LCS	QC-BLANK	B0BFF7-DUP*	B0BFF7*	B0BFF7-DUP*
Lab ID:	7340-001	7340-002	7340-003	7340-004	7340-001	7340-004
Aliquot:	0.10	0.10	0.10	0.10	0.10	0.10
Detector:	116	116	104	113	108	108
Count time:	100	100	100	611	100	100
Alpha cpm:	0.58	5.69	0.08	0.75	1.56	2.66
Alpha, Bkgd:	0.04	0.05	0.05	0.07	0.09	0.08
Alpha, Xtalk:	0.000	0.006	0.006	0.000	0.006	0.006
Alpha, Eff:	0.174	0.126	0.116	0.158	0.174	0.158
Alpha Result Calc.:	14	198	1	19.3	---	---
Alpha Result Rptd.:	14	197	1	19.7	---	---
Alpha MDA Calc.:	3	4	4	1.4	---	---
Alpha MDA Rptd.:	3	4	5	1.6	---	---
Beta cpm:	---	21.92	1.50	---	231.43	327.10
Bkgd:	---	1.14	1.25	---	1.12	1.11
Xtalk:	---	0.275	0.280	---	0.251	0.257
Eff:	---	0.42	0.42	---	0.42	0.42
Beta Result Calc.:	---	207	3	---	2443	3464
Beta Result Rptd:	---	207	3	---	2447	3432
Beta MDA Calc:	---	5	6	---	5	5.2
Beta MDA rptd:	---	5	6	---	5	5.6

* SEPARATE RUNS FOR GROSS ALPHA AND GROSS BETA ANALYSES WERE PERFORMED ON SAMPLES B0BFF7 AND B0BFF7 DUPLICATE. NO QUALIFICATION IS REQUIRED.

9413503.0149

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Selenium-79			
Sample ID:	B0BFF7	QC-BLANK	0BFF7-DUP
Lab ID:	7340-001	7340-003	7340-004
Detector, LSC:	4	4	4
Count time:	150	150	150
Detector Eff:	0.575	0.73	0.38
Sample cpm:	13.73	10.85	15.57
Bkgd cpm:	13.88	13.88	13.88
Yield:	0.6189	0.8841	0.5796
Decay Corr:	1	1	1
Aliquot:	0.503	0.5	0.5024
Result calc:	-0.38	-4.2	6.9
Result rptd:	-0.37	-4.2	6.9
MDA calc:	3.6	2.0	5.8
MDA rptd:	3.6	2.0	5.8

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SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Strontium 90				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	208	211	204	202
Bkg:	0.512	0.5880	0.4280	0.4020
Count Time:	114.450	33.000	100.000	33.000
Y90 cpm:	7.34	10.648	-0.005	7.806
Elapsed Time, days:	35.442	0.000	0.000	35.442
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9976	1.0000	1.0000	0.9976
Yield:	0.7755	0.8427	0.8448	0.7695
PPT. corr.:	1	1	1	1
Aliquot:	1	1	1	1
Product:	0.7736	0.8427	0.8448	0.7676
C-zero:	9.4879	12.6356	-0.0059	10.1690
P-Factor:	1.859	1.859	1.859	1.859
Result, calc.:	7.945	10.58	-0.005	8.52
Result, rptd.:	7.945	10.58	-0.005	8.52
MDA, calc.:	0.34	0.62	0.30	0.56
MDA, rptd.:	0.52	0.81	0.80	1.12

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SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Technetium 99				
Sample ID:	B0BFF7	0BFF7-DU	QC-LCS	QC-BLANK
Lab ID:	7340-001	7340-004	7340-005	7340-006
Detector:	LBG 15	LBG 16	LBG 11	LBG 11
Net, cpm:	1.170	1.160	25.61	0.090
Days:	48.279	48.279	0	0
Lambda:	8.91E-09	8.91E-09	8.91E-09	8.91E-09
Decay:	1.0000	1.0000	1.0000	1.0000
Yield:	0.418	0.404	0.6774	0.6696
Aliquot:	2.000	2.010	2	2
P-Factor:	2.340	2.340	2.340	2.340
Count, time:	595.300	595.300	110.6	108.100
Bkg., cpm:	0.620	0.580	0.48	0.48
Result, calc.:	1.48	1.51	19.92	0.07
Result, rptd.:	1.48	1.51	19.92	0.07
MDA, calc.:	0.19	0.19	0.24	0.24
MDA, rptd.:	0.20	0.20	0.26	0.26

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Iodine-129				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	XSPEC 15	XSPEC 14	XSPEC 15	XSPEC 14
Count Time:	433.85	628.63	628.75	655.63
Gross cpm:	0.685	18.924	0.643	0.624
Bkg cpm:	0.828	0.941	0.893	0.682
% Bkg Std. Dev.:	15.31	12.17	12.32	13.94
Blank cpm:	-0.186	-0.125	-0.186	-0.126
% Blank Std. Dev.:	37.65	35.3	37.65	35.42
Net cpm:	0.043	18.108	-0.064	0.067
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	46.37	0.00	0.00	48.97
Decay:	1	1	1	1
Yield:	0.6661	0.8705	0.9226	0.7315
Aliquot:	1.03	1	1	1.03
PPT. Corr.:	1	1	1	1
Product:	6.86E-01	8.71E-01	9.23E-01	7.53E-01
P-factor:	4.87	4.57	4.87	4.57
Result Calc.:	0.14	42.82	-0.15	0.18
Result Rptd.:	0.14	42.82	-0.15	0.18
MDA Calc.:	2.17	1.36	1.45	1.35
MDA Rptd.:	2.18	1.36	1.45	1.35

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Uranium 233/4/5/8				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	SS-21	SS-23	SS-28	SS-24
Sample count time:	799.38	799.38	200.58	799.38
GMT count:	89.292	89.292	90.015	89.292
Zero time:	53.334	89.292	90.015	53.334
Corr. tracer dpm:	10.44	10.44	10.44	10.44
Bkgd count time:	2317.53	2317.53	2105.93	2317.53
Net tracer counts:	1273	1242	341	1174
Detector eff.:	0.2667	0.3205	0.4047	0.3208
Yield:	0.5719	0.4643	0.4024	0.4385
U-238, gross counts:	1449	1264	0	1948
U-238, bkgd counts:	1	4	0	1
tracer interference counts:	1	1	0	1
tracer std.dev.:	0	0	0	0
U-235 interference counts:	12	64	0	18
U-238, net counts:	1435	1195	0	1928
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13
U-238, Decay corr:	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	123	646	1	186
U-235, bkgd counts:	1	3	0	2
tracer interference counts:	1	1	0	1
tracer std.dev.:	0	0	0	0
U-235 interference counts:	0	0	0	0
U-235, net counts:	121	642	1	183
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12
U-235, Decay corr:	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826
U-233/4, gross counts:	1524	1227	0	2067
U-233/4, bkgd counts:	5	13	0	7
tracer interference counts:	2	2	1	2
tracer std.dev.:	0	0	0	0
U-235 interference counts:	13	71	0	20
U-233/4, net counts:	1504	1141	-1	2038
U-233/4, Lambda:	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
Aliquot:	1	1	1	1
U-238, result calc.:	5.30	4.52	0.00	7.72
U-238, result rptd:	5.30	4.53	0.00	7.72
U-238 MDA calc.:	0.07	0.16	0.04	0.09
U-238, MDA rptd.:	0.07	0.16	0.11	0.09
U-235, result calc.:	0.54	2.94	0.02	0.89
U-235, result rptd.:	0.54	2.94	0.02	0.89
U-235, MDA calc.:	0.03	0.04	0.13	0.04
U-235, MDA rptd.:	0.03	0.05	0.13	0.05
U-233/4, result calc.:	5.56	4.32	-0.01	8.16
U-233/4, result rptd.:	5.56	4.32	-0.01	8.17
U-233/4, MDA calc.:	0.08	0.17	0.04	0.11
U-233/4, MDA rptd.:	0.08	0.17	0.11	0.11

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Total Uranium

Standard	Intensity	Sample ID:	Lab ID:	Intens.	ug/L Calc.	ug/L Rptd	Dilution	Amount of Sample	Prep. Volume	Calc Result	Rptd Result
0.049	361										
0.156	836	B0BFF7	7340-001	9864	1.98	2.12	100	0.25	0.02	16.970	16.970
0.521	2525	QC-LCS	7340-002	13252	2.66	2.82	10	0.25	0.02	2.26	2.26
0.976	4598	QC-BLANK	7340-003	42	0.01	0.03	1	0.25	0.02	0.002	0.002
2.603	12188	B0BFF7-DUP	7340-004	13919	2.79	2.96	100	0.25	0.02	23.69	23.69
4.881	22446										
16.27	69978										
Slope:	2.0E-04										

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SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Neptunium				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	SS-46	SS-47	SS-54	SS-49
Np239 cpm:	53.16	47.24	43.75	34.99
Inst. eff.:	0.721	0.721	0.721	0.721
Am243 added:	99.08	99.08	99.08	99.08
Yield:	0.7442	0.6613	0.6124	0.4898
Aliquot:	1.000	1.000	1.000	1.000
Count time:	1015.32	1015.32	1085.13	1015.32
Np237 gross counts:	26	2018	53	67
Np237 bkgd counts:	0	3	1	2
Np237 aspec. eff:	0.403	0.362	0.415	0.395
Np237 result calc.:	0.038	3.734	0.085	0.149
Np237 result rptd.:	0.038	3.734	0.085	0.149
Np237 MDA calc.:	0.004	0.020	0.012	0.022
Np237 MDA rptd.:	0.004	0.020	0.012	0.022

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SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Plutonium 238/239				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	SS-31	SS-39	SS-58	SS-35
Count time:	1020	803.1	802.72	1020
GMT, count:	109.087	89.294	89.294	109.087
Zero time:	53.334	89.294	89.294	53.334
Corr, tracer dpm:	4.86	4.86	4.86	4.86
Bkgd, count time:	2694.47	2104.95	2690.3	2694.47
Net, tracer counts:	1305	727	750	1363
Detector Eff:	0.4132	0.4095	0.4189	0.3962
Yield:	0.6371	0.4549	0.4589	0.6940
Pu239, gross counts:	578	374	2	971
Pu239, bkgd counts:	2	0	1	8
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08
Pu239 decay:	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	31	402	4	46
Pu238, bkgd counts:	17	7	1	22
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05
Pu238 decay:	0.9988	1.0000	1.0000	0.9988
Aliquot:	1	1	1	1
Pu239, Result calc.:	0.966	1.126	0.003	1.547
Pu239, Result rptd:	0.966	1.125	0.003	1.545
Pu239, MDA calc.:	0.013	0.023	0.022	0.021
Pu239, MDA rptd.:	0.016	0.023	0.022	0.026
Pu238, Result calc.:	0.024	1.189	0.009	0.039
Pu238, Result rptd.:	0.023	1.188	0.009	0.039
Pu238, MDA calc.:	0.032	0.037	0.022	0.035
Pu238, MDA rptd:	0.037	0.046	0.022	0.040

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SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Americium/Curium				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	SS-53	SS-52	SS-55	SS-56
Count Time:	802.72	720.28	802.72	802.72
GMT, count:	89.294	90.304	89.294	89.294
Zero time:	53.334	90.304	89.294	53.334
Tracer dpm:	4.85	4.85	4.85	4.85
Bkgd count time:	2690.3	2690.3	2690.3	2690.3
Net tracer counts:	1458	977	671	1201
Detector eff.:	0.4055	0.3961	0.3776	0.3834
Yield:	0.9236	0.7061	0.4564	0.8046
Aliquot:	1	1	1	1
Am241 gross counts:	32	385	3	34
Am241 bkgd. counts:	2	1	0	1
Tracer Interference Counts:	2	2	1	2
Tracer std. deviation:	0	0	0	0
Am241, Net counts:	28	382	2	31
Am-241, Lambda:	4.03E-06	4.03E-06	4.03E-06	4.03E-06
Am241 decay:	0.9999	1.0000	1.0000	0.9999
Cm244 gross counts:	5	322	2	4
Cm244 bkgd counts:	1	0	0	1
Tracer Interference Counts:	1	1	0	1
Tracer std. deviation:	0	0	0	0
Cm244, Net counts:	3	321	2	2
Cm-244, Lambda:	1.06E-04	1.06E-04	1.06E-04	1.06E-04
Cm244 decay:	0.9962	1.0000	1.0000	0.9962
Am241 result calc.:	0.042	0.854	0.007	0.056
Am241 result rptd.:	0.042	0.853	0.007	0.056
Am241 MDA calc.:	0.018	0.024	0.024	0.020
Am241 MDA rptd:	0.014	0.017	0.025	0.014
Cm244 result calc.:	0.005	0.718	0.007	0.004
Cm244 result rptd:	0.005	0.717	0.007	0.004
Cm244 MDA calc.:	0.014	0.016	0.009	0.017
Cm244 MDA rptd.:	0.012	0.017	0.025	0.014

SAMPLE RESULT CALCULATION SHEET, DATA PACKAGE B0BFF7-TMA-719

Gamma Spectroscopy				
Sample ID:	B0BFF7	QC-LCS	QC-BLANK	B0BFF7-DUP
Lab ID:	7340-001	7340-002	7340-003	7340-004
Detector:	G-1	G-1	G-1	G-1
Count Time:	104.68	100.5	123.12	184.37
Geometry:	100 ML	100 ML	100 ML	100 ML

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