START 9713505.2262

B06M58-TMA-227

0045811

TMA
160
2

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OSM DMO

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

ORGANICS & GENERAL CHEMISTRY
Case No. 07-035
(TMA/ARLI Work Order # A2-07-035)

METALS
Case No. N2-07-054
(TMA/Skinner & Sherman W.O. # S2-07-111 & S2-07-114)

September 8, 1992

TMA Master Work Order # N2-07-054

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EDMC

9713505.2263

000002

Westinghouse Hanford Company

CHAIN OF CUSTODY

ARL 1

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-7619

Project Designation/Sampling Locations: 100-NR-2

Collection Date: 7-10-92

Ice Chest No.: Fry

Field Logbook No.: EFL-1034

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Possible Sample Hazards/Remarks: None detected with field instruments. Maintain at 4C.

Sample Identification

1) B06M58 1,120ml aG:CLP;VOA
~~1,250ml aG:CLP;ICP/AA Metals,Hg,Cn~~
1,1000ml aG:CLP;SEMI-VOA,PCB/PEST
300.0;Anions(SO4,F);353.3Anions(NO3)
~~1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241~~

2) 1,120ml aG:CLP;VOA
1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
1,1000ml aG:CLP;SEMI-VOA,PCB/PEST
300.0;Anions(SO4,F);353.3Anions(NO3)
1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

3) 1,120ml aG:CLP;VOA
1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
1,1000ml aG:CLP;SEMI-VOA,PCB/PEST
300.0;Anions(SO4,F);353.3Anions(NO3)
1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

CC 7-10-92

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	7-15-92 1100
Kermit Blum 7-15-92	C. Harris	7/16/92 9:00

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

9713505.2264

000003

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector C M Chance Date 7-10-92

Company Contact CM CHANCE Telephone (509)376-7619

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
B06M58	S	7-10-92	1038	~~1-250ml aG CLP;ICP/AA Metals,Hg,Cn~~ 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) ~~1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14~~ ~~U-235/238,Pu-239/240,Am-241~~
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-120ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
		CC 7-10-92		

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

Field Information FROM 100-NR-2 Drilling

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

A-6000-406 (06/91) WEF060

SAMPLE LOG-IN SHEET

LAB NAME : TMA/ARLI

PAGE : 1 OF 1

RECEIVED BY (PRINT NAME): CAROLE HARRIS

LOG-IN-DATE : 7/16/98

RECEIVED BY (SIGNATURE): Carole Harris

CASE NUMBER:

SAMPLE DELIVERY GROUP NO.:

SAS NUMBER:

REMARKS:

1. Custody Seal(s) Present/Absent* Intact/Broken
2. Custody Seal Nos: _____
3. Chain of Custody Records Present/Absent*
4. Traffic Reports or Packing List Present/Absent*
5. Airbill Airbill/Sticker Present/Absent*
6. Airbill No.: _____
7. Sample Tags Present/Absent*
8. Sample Tags Numbers Listed/Not Listed on Chain of Custody
9. Sample Condition: Intact/Broken*/Leaking
10. Does information on custody records, traffic reports, and sample tags agree Yes/No*
11. Date Recieved at Lab: 7/16/98
12. Temp of ice chest 4.1 °C
13. Time Recieved: 9:00 AM

SAMPLE TRANSFER

Fraction: _____

Area #: _____

By: _____

On: _____

EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC
	306m58	AD07-035-01	

* Contact SMO and attach record of resolution

Reviewed By: _____ Logbook No.: _____

Date: _____ Logbook Page No.: _____

FORM DC-1

TMA Inc. REPORT Work Order # A2-07-035

Received: 07/15/92

Results by Sample

SAMPLE ID B06M58 FRACTION Q1D TEST CODE WCCLPS NAME Anions in Solids - WM232

Date & Time Collected 07/10/92 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	3.1	mg/Kg	1.0
Sulfate	300	42	mg/Kg	10

FORM I

9713505.2267

000009

TMA Inc. REPORT Work Order # A2-07-035

Received: 07/15/92

Results by Sample

SAMPLE ID Wet Chemistry Blank FRACTION 02A TEST CODE WCCLPS NAME Anions in Solids - WM232

Date & Time Collected not specified Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300.0	<1	mg/Kg	1.
Sulfate	300.0	<10	mg/Kg	10.

FORM I

9713505.2268

TMA

Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

QUALITY ENVIRONMENTAL SERVICES

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Report for

TMA/Norcal

WORK ORDER #S207114

Scientific Services Since 1922

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

9713505.2269

000001

NB 9/29/

 Skinner&Sherman REPORT Work Order # S2-07-114

Received: 07/16/92 08/21/92 15:38:59

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

ATTEN Dan Steurmer

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

PREPARED TMA / Skinner & Sherman Labs.
BY 300 Second Avenue
P.O. Box 521
Waltham, MA 02254

ATTEN Client Services
PHONE (617) 890-7200

CERTIFIED BY

CONTACT DP

WORK ID N207054
TAKEN BY CLIENT
TRANS FED EX# 2521035075
TYPE SOIL FOR NO3NO2
P.O. # N207054
INVOICE under separate cover

SAMPLE IDENTIFICATION	
01	B06M58
01	B06M58D
01	B06M58S
02	LCSS

TEST CODES and NAMES used on this workorder

NO3NO2 Nitrate Plus Nitrite

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

Page 2 Skinner&Sherman REPORT Work Order # S2-07-114

Received: 07/16/92 Results by Sample

SAMPLE ID B06M58 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 <2.39
mg N/kg

SAMPLE ID B06M58D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 <2.35
mg N/kg

SAMPLE ID B06M58S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 19.0
mg N/kg

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

NO3NO2 1.89
mg N/L

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

9713505.2271

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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August 13, 1992

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 July 16, 1992 from Westinghouse/Hanford Company. The samples were analyzed for the USEPA CLP Target Analyte List metals and cyanide. The analysis were performed under TMA/Skinner and Sherman work order S207111.

Methodology
The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work 7/88 (CLP SOW788).

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

The antimony digestion spike recovery exceeded the control limit requirements.

The chromium, selenium, and vanadium duplicates exceeded the control limit requirements.

The zinc ICP serial dilution 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.

David N. Peterson
Assistant Laboratory Manager

9715505.2272

WESTINGHOUSE/HANFORD

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

SOW No.: 7/88

SAMPLE NUMBER:	Lab Sample ID.
B06M58	07111-01S
B06M58D	07111-01S2
B06M58S	07111-01DS

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I 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 contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name: David N. Peterson

Date: 8/13/92 Title: Asst. Laboratory Manager

9713505.2273

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M58

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Matrix (soil/water): SOIL Lab Sample ID: 07111-01S

Level (low/med): LOW Date Received: 07/17/92

% Solids: 94.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5090.00			P
7440-36-0	Antimony	3.30	U	N	P
7440-38-2	Arsenic	1.10	B		F
7440-39-3	Barium	72.10			P
7440-41-7	Beryllium	0.14	U		P
7440-43-9	Cadmium	1.50			P
7440-70-2	Calcium	6560.00			P
7440-47-3	Chromium	8.70		*	P
7440-48-4	Cobalt	9.90	B		P
7440-50-8	Copper	19.70			P
7439-89-6	Iron	18400.00			P
7439-92-1	Lead	3.10			F
7439-95-4	Magnesium	3920.00			P
7439-96-5	Manganese	296.00			P
7439-97-6	Mercury	0.06	B		CV
7440-02-0	Nickel	8.80			P
7440-09-7	Potassium	374.00	B		P
7782-49-2	Selenium	1.70		+*	F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	338.00	B		P
7440-28-0	Thallium	0.31	U		F
7440-62-2	Vanadium	42.40		*	P
7440-66-6	Zinc	39.70		E	P
	Cyanide	0.52	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

9713505.2274

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CASE NO. 07-035

DATA SUMMARY REPORT
ORGANICS

PREPARED BY:

TMA ARLI
160 TAYLOR ST.
MONROVIA CA 91016

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 07-035

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : July 15, 1992

1.0 DESCRIPTION OF CASE :

One soil sample was analyzed for TCL Organics-Volatiles, Semivolatiles, and Pesticice/PCBs according to the USEPA Contract Laboratory Program (CLP) Statement of Work for Organic Analysis, Revision OLM01.8.

2.0 SAMPLE LIST :

WESTINGHOUSE ID	LAB ID	ANALYSIS REQUESTED	MATRIX
B06M58	A2-07-035-01A	V	SOIL
B06M58 MS	A2-07-035-01B	V	SOIL
B06M58 MSD	A2-07-035-01C	V	SOIL
B06M58	A2-07-035-01D	SV & P	SOIL
B06M58 MS	A2-07-035-01E	SV & P	SOIL
B06M58 MSD	A2-07-035-01F	SV & P	SOIL

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

The samples were received unbroken 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 of the BFB tunes are injected directly into the GC/MS instrument.

3.2.2 SEMIVOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B06M58MSD had a surrogate recovery for Terphenyl d-14 above the QC limit. No further action was required by the protocol.

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

3.2.3 PESTICIDE/PCB ANALYSIS COMMENTS :

SEQUENCE NOTES :

The sequence was started on 7/29/92 and was analyzed in accordance with the EPA CLP SOW. The sequence met all of the QC limits specified in the CLP SOW.

The Chromatograms are presented in the manner consistent with the capabilities of the Nelson 2600 Data System which normalizes the largest peak to scale.

SAMPLE NOTES :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B06M58MSD had a percent difference (%D) between the two GC columns that exceeded the 25% limit for the spiked compound Dieldrin. The "P" qualifier reported on Form I, denotes that a target analyte has a greater that 25% difference for detected concentrations between the two GC columns.

Sample B06M58 had surrogate recoveries for TCX below the advisory QC limit. In accordance with protocol, no further action was required.

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

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

Nicole Roth
Nicole Roth
CLP Program Manager

Widayatini
Wida Ang
Organics Supervisor

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20720R06

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: not dec. 4 Date Analyzed: 07/20/92

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	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	39	B
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B06M58

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20720R06

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: not dec. 4 Date Analyzed: 07/20/92

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

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

Number TICs found: 1

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALCOHOL	6.67	6	BJ

9713505.2280

1B

000007

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01D

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	810	U

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01D

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01D

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 18

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	170	BJ
2.	Unknown alkene	4.83	240	BJ
3.	Unknown hydrocarbon	5.48	100	J
4.	Unknown ketone	5.68	240	BJ
5.	Unknown hydrocarbon	6.08	2500	BJ
6.	Unknown hydrocarbon	6.70	32000	BJ
7.	Unknown alkane	6.82	140	J
8.	Unknown hydrocarbon	6.93	240	BJ
9.	Unknown hydrocarbon	7.40	100	J
10.	Unknown hydrocarbon	8.00	810	BJ
11.	Unknown hydrocarbon	8.28	270	J
12.	Unknown ketone	8.38	68	J
13.	Unknown ketone	8.52	140	BJ
14.	Unknown alcohol	9.35	240	J
15.	Unknown alcohol	9.75	540	BJ
16.	Unknown acid	22.80	140	J
17.	Unknown carboxylic acid este	24.55	950	BJ
18.	Unknown carboxylic acid este	24.67	11000	BJ

9713505.2283

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix: (soil/water) SOIL Lab Sample ID: A207035-01D

ample wt/vol: 30.4 (g/mL) G Lab File ID:

Moisture: 4 decanted: (Y/N) N Date Received: 07/15/92

xtraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/17/92

oncentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/92

njection Volume: 1.00 (uL) Dilution Factor: 1.00

PC Cleanup: (Y/N) Y pH: 9.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.4	U
72-55-9	4,4'-DDE	3.4	U
72-20-8	Endrin	3.4	U
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	3.4	U
50-29-3	4,4'-DDT	3.4	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.4	U
7421-36-3	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	69	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	34	U
11096-82-5	Aroclor-1260	34	U

9713505.2284

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

September 25, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-07-065-7063

Mr. John Bourgeault
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Dear Mr. Bourgeault:

Enclosed on the Summary Data Section, are the gross alpha, gross beta, ^{14}C, ^{90}Sr, isotopic uranium, isotopic plutonium, ^{241}Am, and gamma scan results for the soil samples from 100-NR-2 Location, we received 17 July 1992. The QA/QC results are also given in the Summary Data Section.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/ss

Enclosures: Section 1 through 12
Appendices

SEP 1992
RECEIVED
OSM DMO

ia
7/9/94

9713505.2285

TMA NORCAL

REPORTING GROUP 7063

SDG 7063
Contact Dinkar Kharkar

SAMPLE SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID	MATRIX	CHAIN OF CUSTODY	COLLECTED	RECEIVED	SAMPLE WT/VOL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID	QC BATCH
B06M58	SOIL	EFL-1034	07/10/92	07/15/92		N207065-01	7063-001	7063
Reagent Blank	SOIL					N207065-03	7063-003	7063
Lab Control Sample	SOIL					N207065-02	7063-002	7063
Replicate (N207065-01)	SOIL		07/10/92			N207065-04	7063-004	7063

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-CS
Version 2.16
Report date 09/24/92

9713505.2286

TMA NORCAL

REPORTING GROUP 7063

N207065-01

DATA SHEET

B06M58

SDG 7063
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207065-01
Dept sample id 7063-001
Received 07/15/92
Client sample id B06M58
Matrix SOIL
Collected 07/10/92
Chain of custody id EFL-1034

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	12	8.2	9.0	10		80A
Gross Beta	Beta	11	4.2	5.9	15	J	80B
Uranium 233/234		0.46	0.15	0.12	0.30		U
Uranium 235	15117-96-1	0.015	0.059	0.11	0.30	U	U
Uranium 238	7440-61-1	0.52	0.18	0.093	0.30		U
Plutonium 238	13981-16-3	0.004	0.042	0.083	0.050	U	PU
Plutonium 239/240		-0.004	0.017	0.046	0.050	U	PU
Americium 241	14596-10-2	0.003	0.017	0.039	0.050	U	AM
Strontium 90	10098-97-2	-0.10	6.8	2.2	2.0	U	Y
Carbon 14	14762-75-5	-4.8	9.9	17	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.4	1.2				GAM
Iron 59		U		0.45		U	GAM
Chromium 51	14392-02-0	U		1.7		U	GAM
Cobalt 60	10198-40-0	U		0.080		U	GAM
Zinc 65	17982-39-3	U		0.23		U	GAM
Ruthenium 106	13967-48-1	U		0.72		U	GAM
Cesium 134	17967-70-9	U		0.090		U	GAM
Cesium 137	10045-97-3	U		0.075		U	GAM
Europium 152	14683-23-9	U		0.13		U	GAM
Europium 154	15585-10-1	U		0.084		U	GAM
Radium 226	13982-67-7	0.29	0.14				GAM
Thorium 228	14274-82-9	0.44	0.13				GAM
Thorium 232	7440-29-1	0.43	0.28				GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/24/92

TMA

SDG 7063	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Soil sample results from Location 100-NR-2 (TMA/Norcal Group 7063) are reported herein. TMA/Norcal Group 7063 is comprised of the one sample listed on the Chain-of-Custody documents and is identified as Sample 1.

1.1 CHAINS-OF-CUSTODY

This report includes data from the sample delivered under Chain-of-Custody documents Field Logbook No. EFL-1034.

1.2 SAMPLE VOLUME

1000 mL bottles of the sample was received for the analyses.

1.3 MISSING SAMPLES

The sample was accounted for in an undamaged condition.

1.4 HOLDING TIMES

The collection was made on 7/10/92 and the sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7063-2, 3, and 4.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

2.1 LABORATORY CONTROL SAMPLES

LCS recoveries for all nuclides were good and pass the 3 σ protocol limits.

2.2 BLANKS

MDA's for all the analyses meet the RDL requirements.

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The MDA's for strontium and ^{238}Pu are underlined in the data sheets because the MDA's exceed RDL, but are within average MDA's of 1.1 ± 1.5 and 0.051 ± 0.045 pCi/g respectively.

SDG 7063 Contact Dinkar P. Kharkar	Client Westinghouse Hanford Contract MBH-SVV-069262

CASE NARRATIVE

3.0 ANALYTICAL NOTES

3.1 Gross Alpha Analyses: The average MDA for gross alpha was 6.7 ± 5.0 pCi/g Positive gross alpha concentration above MDA was found in the sample.

3.2 Gross Beta Analyses: The average MDA for gross beta was 5.1 ± 1.2 pCi/g. Positive gross beta concentration above MDA was not found in the sample.

3.3 Carbon-14 Analyses: The average MDA was 18 ± 1.9 pCi/g. The result was less than MDA. No positive ^{14}C was found in the sample.

3.4 Strontium-90 Analyses: The average yield for four analyses was (67 ± 54%). The lowest yield was 27% and the highest was 85%. The average MDA was 1.1 ± 1.5 pCi/g. Positive ^{90}Sr concentration was not found in the sample. The sample result was below MDA.

3.5 Uranium-233, 234, 234, and 238 Analyses: The average yield for four analyses was (72 ± 13%). The lowest yield was 63% and the highest was 77%. The average MDA was 0.14 ± 0.026 pCi/g. Positive concentration of Uranium isotopes was not found in the sample.

3.6 Plutonium-238, 239/240 Analyses: The average yield for four analyses was (44 ± 34%). The lowest yield was 26% and the highest was 66%. The average MDA was 0.051 ± 0.045 Ci/g. Positive plutonium concentration was not found in the sample. The sample result was below MDA.

3.7 Americium-241 Analyses: The average yield for four analyses was (67 ± 31%). The lowest yield was 53% and the highest was 87%. The average MDA was 0.037 ± 0.022 pCi/g. Positive americium concentration was not found the sample. The sample result was below MDA.

3.8 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides.

2b 7/6/92

FORM OF PAYMENT

Check ☐ GBL ☐ FCCOD ☐

Bill to Shipper [X] Bill to Consignee ☐ Third Party Billing ☐

Shipper's Account Number: E 850281585

EMERY WORLDWIDE — A CF Company

SERVICES

UNITED STATES / CANADA: Same Day ☐ AM [X] Second Day ☐ PM ☐ Saturday Delivery ☐

INTERNATIONAL: Express ☐ Preferred ☐ Standard ☐ Business Documents ☐ Customs Clearance ☐ Delivery ☐

Date: 07-14-92 | Origin: PSC | Shipment Number: 250986821 8

From:
WESTINGHOUSE SHIPPING DEPT (509) 376-6665
U.S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA Canada ☐

To:
ROBERT FOX
TMA/NORCAL
2030 WRIGHT AVE
RICHMOND CA Canada ☐
Hold for Pick Up ☐

Tariff Dest. | Gateway

Check to Shipper $

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation.

Customer's Reference Numbers: W12200 PB7AE W92-0-0436#24
Zip: 99352
Consignee's Account Number: E
Zip: 94804

Description	Pcs.	L	W	H	Total Pieces	Total Weight (In Lbs.)
1 RUBBERMAID FRY POLYCOOLER SOIL SAMPLES	1	26	16	17	1	66

FOR INFORMATION OR RATES CALL 1-800 44 EMERY (1-800-443-6379)

Declared Value $

250986821 8

Remarks: OVERNIGHT DELIVERY

Shipper's Signature X [signature] 7-14-92

Zip Ship ☐
For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used
Urgent Letter 9X12 [X] Urgent Pack 12X15 [X]

International Shipments: Free Domicile ☐ Commodity Code

Third Party Account Number mandatory for Third Party Billing. Third Party Account Number: E

International Customs Value | International Insurance

Base Charge

Total Transportation Charges | Other Charges/Advance at Origin ☐ OC/AO- $

1-OAK A

Terms and Conditions on Back

9713505.2289

9713505.2290

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-7619

Project Designation/Sampling Locations: 100-NR-2

Collection Date: 7-10-92

Ice Chest No.: Fry

Field Logbook No.: EFL-1034

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Possible Sample Hazards/Remarks: None detected with field instruments. Maintain at 4C.

Sample Identification

1) B06M58
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am24

2)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am24

3)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am24

CC 7-10-92

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	7-15-92 1100
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

9713505.2291

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector C M Chance Date 7-10-92

Company Contact CM CHANCE Telephone (509)376-7619

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Require
B06M58	S	7-10-92	1038	1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-120ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
		CC 7-10-92		

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

Field Information FROM 100-NR-2 Drilling

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

A-6000-406 (06/91) WEF060

SAMPLE STATUS REPORT FOR E 3552. E-BLANK BOBMSS TIME: 7/13/92 13:40
DISPATCHED: 7/ 1/92 13:45 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 7/13/92 12:43

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 PICI/G	N	Y	PS7AD

END OF REPORT

9713505.2293

VALIDATION SUMMARY

DATA QUALIFICATION SUMMARY

UNIT: 100-NR-2

DOCUMENT CONTROL NUMBER: WHC-SD-EN-TI-140

ANALYSES: Radiochemistry

RFW NO.: B06M58-TMA-227

SDG NO.: B06M58

QUALIFICATION SUMMARY:

SAMPLE NUMBERS: B06M58

GROSS ALPHA AND GROSS BETA DETERMINATION

INSTRUMENT CALIBRATION AND PERFORMANCE

Due to efficiencies below the QC minimum of 20%, all gross alpha sample results were rejected and flagged "R".

ALPHA SPECTROSCOPY

No Data Qualified.

GAMMA SPECTROSCOPY

No Data Qualified.

STRONTIUM-90

ACCURACY

Due to low chemical yields, all Strontium-90 results in SDG No. B06M58 were rejected and flagged "R".

CARBON-14

No Data Qualified.

9713505.2295

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-7619

Project Designation/Sampling Locations: 100-NR-2

Collection Date: 7-10-92

Ice Chest No.: Fry

Field Logbook No.: EFL-1034

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Possible Sample Hazards/Remarks: None detected with field instruments. Maintain at 4C.

Sample Identification

1) B06M58
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

2)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

3)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

CC 7-10-92

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	7-15-92 1100
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

9713505.2296

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-7619

Project Designation/Sampling Locations: 100-NR-2

Collection Date: 7-10-92

Ice Chest No.: Fry

Field Logbook No.: EFL-1034

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Possible Sample Hazards/Remarks: None detected with field instruments. Maintain at 4C.

Sample Identification

1) B06M58
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

2)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

3)
- 1,120ml aG:CLP;VOA
- 1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
- 1,1000ml aG:CLP;SEMI-VOA,PCB/PEST 300.0;Anions(SO4,F);353.3Anions(NO3)
- 1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

CC 7-10-92

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	7-15-92 1100
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

9713505.2297

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector C M Chance Date 7-10-92

Company Contact CM CHANCE Telephone (509)376-7619

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
B06M58	S	7-10-92	1038	1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-120ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
		CC 7-10-92		

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

Field Information FROM 100-NR-2 Drilling

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

A-6000-406 (06/91) WEF060

9713505.2298

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector C M Chance Date 7-10-92

Company Contact CM CHANCE Telephone (509)376-7619

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
BobM58	S	7-10-92	1038	1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-120ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
		CC 7-10-92		

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

Field Information FROM 100-NR-2 Drilling

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

A-6000-406 (06/91) WEF060

9713505.2299

TMA NORCAL
REPORTING GROUP 7063

N207065-01

DATA SHEET

B06M58

WC

SDG	7063	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N207065-01	Client sample id	B06M58
Dept sample id	7063-001	Matrix	SOIL
Received	07/15/92	Collected	07/10/92
		Chain of custody id	EFL-1034

list AD = 9/15/92

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Gross Alpha	Alpha	12	8.2	9.0	10	R	80A
Gross Beta	Beta	11	4.2	5.9	15	J	80B
Uranium 233/234		0.46	0.15	0.12	0.30		U
Uranium 235	15117-96-1	0.015	0.059	0.11	0.30	U	U
Uranium 238	7440-61-1	0.52	0.18	0.093	0.30		U
Plutonium 238	13981-16-3	0.004	0.042	0.083	0.050	U	PU
Plutonium 239/240		-0.004	0.017	0.046	0.050	U	PU
Americium 241	14596-10-2	0.003	0.017	0.039	0.050	U	AM
Strontium 90	10098-97-2	-0.10	6.8	2.2	2.0	~~UR~~	Y
Carbon 14	14762-75-5	-4.8	9.9	17	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.4	1.2				GAM
Iron 59		U		0.45		U	GAM
Chromium 51	14392-02-0	U		1.7		U	GAM
Cobalt 60	10198-40-0	U		0.080		U	GAM
Zinc 65	17982-39-3	U		0.23		U	GAM
Ruthenium 106	13967-48-1	U		0.72		U	GAM
Cesium 134	17967-70-9	U		0.090		U	GAM
Cesium 137	10045-97-3	U		0.075		U	GAM
Europium 152	14683-23-9	U		0.13		U	GAM
Europium 154	15585-10-1	U		0.084		U	GAM
Radium 226	13982-67-7	0.29	0.14				GAM
Thorium 228	14274-82-9	0.44	0.13				GAM
Thorium 232	7440-29-1	0.43	0.28				GAM

ett

yield low

RB 8/4/93

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.16
Report date	09/24/92

9713505.2300

TMA NORCAL

REPORTING GROUP 7063

N207065-01

B06M58

DATA SHEET

SDG 7063
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207065-01
Dept sample id 7063-001
Received 07/15/92

Client sample id B06M58
Matrix SOIL
Collected 07/10/92
Chain of custody id EFL-1034

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Gross Alpha	Alpha	12	8.2	9.0	10	R	80A
Gross Beta	Beta	11	4.2	5.9	15	J	80B
Uranium 233/234		0.46	0.15	0.12	0.30		U
Uranium 235	15117-96-1	0.015	0.059	0.11	0.30	U	U
Uranium 238	7440-61-1	0.52	0.18	0.093	0.30		U
Plutonium 238	13981-16-3	0.004	0.042	0.083	0.050	U	PU
Plutonium 239/240		-0.004	0.017	0.046	0.050	U	PU
Americium 241	14596-10-2	0.003	0.017	0.039	0.050	U	AM
Strontium 90	10098-97-2	-0.10	6.8	2.2	2.0	~~U~~ R	Y
Carbon 14	14762-75-5	-4.8	9.9	17	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.4	1.2				GAM
Iron 59		U		0.45		U	GAM
Chromium 51	14392-02-0	U		1.7		U	GAM
Cobalt 60	10198-40-0	U		0.080		U	GAM
Zinc 65	17982-39-3	U		0.23		U	GAM
Ruthenium 106	13967-48-1	U		0.72		U	GAM
Cesium 134	17967-70-9	U		0.090		U	GAM
Cesium 137	10045-97-3	U		0.075		U	GAM
Europium 152	14683-23-9	U		0.13		U	GAM
Europium 154	15585-10-1	U		0.084		U	GAM
Radium 226	13982-67-7	0.29	0.14				GAM
Thorium 228	14274-82-9	0.44	0.13				GAM
Thorium 232	7440-29-1	0.43	0.28				GAM

5/13/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/24/92

RADIOLOGICAL DATA VALIDATION CHECKLIST

PROJECT: Westinghouse – Hanford	REVIEWER: RB	DATE: 3/9/93
LABORATORY: TMA	CASE: N/A	SDG: B06M58
SAMPLES/MATRIX: One soil – B06M58		

6.1 COMPLETENESS CHECKS

Begin by examining the data package for completeness. Use the checklists included in the Appendices, but also refer to the Statement of Work (SOW) for the analytical laboratory. Items specified in the SOW may supplement or take precedence over the list of items in the checklists.

Evaluation Criteria and Actions

Verify that the items listed in the SOW, if available, and the Method Specific Appendices are included in the data package. These items may be recorded in various ways, and the data package may be organized differently than this procedure, so some searching may be required. Information that pertains to a requirement that is associated with an **R** qualifier, e.g., initial calibration, is classed as major, and its lack would be a major deficiency. A minor deficiency would result from a lack of information associated with a **J** qualifier, e.g., duplicates. The validator may have to use professional judgement to classify some deficiencies.

If minor deficiencies are encountered and can not be rectified by the laboratory, then generally all affected (associated) data must be qualified as estimated (J). Major deficiencies that can not be rectified will require that all affected data be qualified as unusable (R). The validator may use other qualifiers, but their definition must be included in the data validation report. If the validator concludes that no qualification is necessary, the reason must be included in the data validation report.

Indicate whether the following articles are present. Insert a "Y" if the corresponding item is in the data packet, an "N" if it is absent, or "N/A" if the item does not apply to the analysis:

Checklist:

✓ Case Narrative
✓ Chain of Custody

6.1.A COMPLETENESS CHECKLIST FOR ANALYSES USING GAS PROPORTIONAL COUNTERS

Analysis Results

- ✓ Results Report for Sample Analyses and Reanalyses
- ✓ Raw Data (Counting Logs, Printouts, Notebook Pages)
- ✓ Calculation Sheets
- ✓ Sample Identifications
- ✓ Detector Identification
- ✓ Analysis Date and Initials of Analyst
- ✓ Amounts of Samples Prepared or Counted
- ___ Weights of Solids Counted

Initial and Continuing Calibration

- ✓ Detector Identification
- ✓ Calibration Date(s) and Initials of Analyst
- ✓ Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
- ✓ Amount of (Check) Standard Used
- ✓ Raw Data including Counts and Count Duration for Standards
- ✓ Weights of Preparations
- ✓ Efficiencies
- ✓ Weights of Carriers Added, If Applicable
- ✓ Results of Statistical Tests Used to Evaluate Instrument Reliability and Efficiency Checks
- ✓ Raw Data of Background Counts and Count Duration
- ✓ Results of Statistical Test Used to Evaluate Instrument Background
- ✓ Control Limits for Check Source and Background Counts

Blanks

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ MDA of Method
- ✓ Amounts of Reagents Used in Blank

Radiometric and Gravimetric Yields

- ✓ Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
- ✓ Weights of Precipitates or Solids Counted
- ✓ Calculated Recoveries

Duplicates

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Aliquots of Samples
- ✓ Weights of Solids Counted
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Calculated Precision

Laboratory Control Samples

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Calculation of Recoveries
- ✓ Results of Analyses

6.1.B COMPLETENESS CHECKLIST FOR ANALYSES USING ALPHA SPECTROSCOPY

Analysis Results

✓ Results Report for Sample Analyses and Reanalyses
✓ Raw Data (Spectra, Printouts, Notebook Pages)
✓ Calculation Sheets
✓ Sample Identifications
✓ Detector Identification
✓ Analysis Date and Initials of Analyst
✓ Amounts of Samples Counted (Precipitated or Deposited)

Initial and Continuing Calibration

✓ Detector Identification
✓ Calibration Date(s) and Initials of Analyst
✓ Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
✓ Amount of (Check) Standard Used
✓ Raw Data including Spectra or Counts per Channel
✓ Kev/channel
✓ Count Duration for Standards
✓ Efficiencies
✓ Raw Data of Background Counts, Dates Counted, and Duration of Counts

Blanks

✓ Detector Identification
✓ Date of Analysis
✓ MDA of Method
✓ Amounts of Reagents Used in Blank

Duplicates

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Amounts of Samples Counted
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Calculated Precision

Radiometric and Gravimetric Yields

- ✓ Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
- ✓ Weights of Precipitates or Solids Counted
- ✓ Calculated Recoveries

Laboratory Control Samples

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Calculation of Recoveries
- ✓ Results of Analyses

6.1.C COMPLETENESS CHECKLIST FOR GAMMA SPECTROSCOPY

Analysis Results

- ✓ Results Report for Sample Analyses and Reanalyses
- ✓ Raw Data (Spectra, Printouts of Counts per Channel, Notebook Pages)
- ✓ Calculation Sheets
- ✓ Sample Identifications
- ✓ Detector Identification and Counting Position
- ✓ Analysis Date and Initials of Analyst
- ✓ Amounts of Samples Counted

Initial and Continuing Calibration

- ✓ Detector Identification
- ✓ Calibration Date(s) and Initials of Analyst
- ✓ Identification of Calibration and Check Standards including Radionuclides, Certification, Expiration Date, and Activity
- ✓ Amount of (Check) Standard Used
- ✓ Raw Data including Counts and Count Duration for Standards
- ✓ Efficiencies and/or Geometry and Matrix Factors
- ✓ Raw Data of Background Counts, Count Dates, and Duration of Counts
- ✓ Kev/Channel
- ✓ FWHM

Blanks

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ MDA of Method
- ✓ Amounts of Reagents Used in Blank
- ✓ Raw Data

Duplicates

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Amounts of Samples
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Results of Analyses and Calculated Precision
- ✓ Raw Data

Radiometric and Gravimetric Yields

- N/A Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
- ↓ Weights of Precipitates or Solids Counted
- ✓ Calculated Recoveries

Laboratory Control Samples

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Calculation of Recoveries
- ✓ Results of Analyses

6.1.F COMPLETENESS CHECKLIST - TRITIUM USING LIQUID SCINTILLATION COUNTING

Analysis Results

_____ Results Report for Sample Analyses and Reanalyses
_____ Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)
_____ Calculation Sheets
_____ Sample Identifications
_____ Instrument Identification
_____ Analysis Date and Analyst Initials
_____ Sample Weight

Initial and Continuing Instrument Calibration

_____ Instrument Identification
_____ Identification of Calibration Standards including Radionuclides, Certification, Issue or Expiration Date and Activity
_____ Amount of Standard Used for Calibration
_____ Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)
_____ Counting Efficiency Determination Method and Results
_____ Quench Correction Method

Blanks

_____ Instrument Identification
_____ Date of Analysis
_____ MDA of Method
_____ Amounts of Reagents Used
_____ Lot Numbers of Reagents Used
_____ Raw Data (Gross Counts, Count Duration, Background Count, Background Count Duration)
_____ Tritium Levels in Background Water

Duplicates

_____ Instrument Identification
_____ Date of Analysis
_____ Amounts of Samples
_____ Amount of Spike for Spiked Duplicates
_____ Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)

Radiometric Yields

_____ Amount of Tritium Standard Used for Radiometric Yield Determination
_____ Radiometric Yield Calculations and Results

Laboratory Control Samples

_____ Sample Identification
_____ Instrument Identification
_____ Date of Analysis
_____ Calculated Recoveries
_____ Results of Analyses

6.2 HOLDING TIMES

Answer each question with a "Y" for yes, "N" for no, or an "N/A" if the inquiry is not applicable.

Evaluation Criteria and Actions

Samples shall be analyzed within the period of 5 half-lives of the radionuclide of interest or six months, whichever comes first. Samples shall be properly contained and preserved (e.g., acidified) in accordance with laboratory standard procedures, to ensure that sample integrity is maintained.

Holding times for each radionuclide are established by comparing the sampling date on the Chain of Custody form with the dates of analysis found in the data package.

Analysis date - sample date = radionuclide holding time

Have the samples been analyzed within holding time? Yes No N/A

ACTION: If holding time or preservation requirements are not met, qualify all results > LLD as estimated detects (J) and results < LLD as estimated nondetects (UJ). Professional judgement must be used in the case of grossly exceeded holding times. One would expect smaller reported activities as the reviewer may determine that results < LLD are unusable (R).

6.3 CALIBRATION

Instruments must be calibrated in accordance with laboratory standard operating procedures and/or manufacturer's instructions initially and when a detector or other major system component is changed. Frequently thereafter, less extensive continuing calibration checks, which consist of background and check source counts, must be done.

Evaluation Criteria and Actions

a. Initial Calibration

Has the instrument been calibrated within the time period specified in the laboratory standard operating procedure or manufacturer's instructions, but not less than annually?

Yes No N/A

ACTION: If the instrument was not calibrated within the specified time period qualify the associated data as unusable (R). Associated data means, in this case, results for all the analyses for each run or day during the period for which no calibration is valid.

Compare the identifications of detectors calibrated against those used for all analyses to verify that each detector used was calibrated. Has each detector in multiple counting system been calibrated?

Yes No N/A

ACTION: If any detector was not calibrated qualify all associated data as unusable (R).

Review the certifications, including identification numbers, of the standard(s). Compare the identification numbers on the certificates with identification numbers on the instrument printouts. Have NIST, NIST traceable, or equivalent certified standards must be used for calibration?

Yes No N/A

ACTION: If the standards used for calibration are not certified or traceable, or cannot be positively identified, qualify all associated data as unusable (R).

Have the standards been used before their indicated expiration dates?

Yes No N/A

ACTION: If the standards were used past their expiration dates, or past five half-lives of the radionuclide of interest if no expiration date is provided, qualify all associated data as unusable (R).

6.3.A.1 Initial Calibration - Gas Proportional Counters

Evaluation Criteria and Actions

Depending upon the type of counter/system used review the results, as applicable, of the plateau determination, amount of alpha-beta crossover, random coincidence counts, and/or energy calibration. Review the efficiency determinations and self-absorption curves. Is the amount of sample counter within the range of the self-absorption curve?

Is a self-absorption curve present for each radionuclide of interest?

Yes No N/A

Are all efficiencies ≥20%?

RD 3/19/93

Yes No N/A

ACTION: If the field and QC sample preparations are outside the range of the self-absorption curves, qualify all associated data as estimated (J). If efficiencies are less than 20 %, qualify all associated data as unusable (R).

6.3.A.2 Continuing Calibration - Gas Proportional Counters

Evaluation Criteria and Actions

Have chi-square or other appropriate statistical tests been performed for the counters on a routine frequency at least weekly)?

Yes No N/A

ACTION: If a chi-square test was not performed, or results of the test show non-random behavior, then qualify all data as estimated (J).

Have stability verifications (e.g., plateau(s) or response(s) to the check sources) been made after each gas change? (Specific verifications may not be needed if check sources are used daily.)

Yes No N/A

ACTION: If stability verifications were not performed qualify all data as estimated (J).

6.3.B.1 Initial Calibration - Alpha Spectroscopy

Evaluation Criteria and Actions

Does calibration of the detector system cover the energy range of interest (i.e., are the radionuclides (peaks) used for calibration identical to and/or bound the energy range of the radionuclides of interest)?

Yes No N/A

ACTION: If the energy of the alpha particle(s) of the radionuclide(s) of interest falls outside the calibrated range of the detector, qualify all results as unusable (R).

Review the calibration spectrum or printout to verify that the resolution of the detector system provides accurate identification of each peak centroid. Do the peaks have sufficient counts?

Yes No N/A

Are the peaks separate and distinct from each other?

Yes No N/A

ACTION: If the centroids of the peaks used for calibration can not be determined from the spectrum or printout qualify all results as unusable (R).

Are FWHM values $\leq$20 KeV?

Yes No N/A

ACTION: If the resolution of the system is greater than 20 KeV (or corresponding number of number of channels) FWHM for any of the peaks used for calibration, qualify all results as estimated (J).

6.3.B.2 Continuing Calibration - Alpha Spectroscopy

Evaluation Criteria and Actions

Compare the efficiency obtained from the calibration to the efficiency obtained from the check source count(s) for the SDG. Are the efficiencies within 5%?

Yes No N/A

Compare the efficiency from the check source count for the SDG with the control charts. Are efficiencies within the control limits or 3 sigma?

Yes No N/A

Has the check source(s) been counted daily or as specified in the Appendices?

Yes No N/A

ACTION: If the daily check source is not performed qualify all associated results as unusable (R).

Review the result, including raw data, of all daily check source counts. Are the check source counts within the control limits provided by the laboratory, or within 3 standard deviations of the mean?

Yes No N/A

ACTION: If the check source counts are outside of the control limits, qualify all associated data as unusable (R). Associated data means here all the results for all the counts within the time period covered by the out of control counts. Use the raw data, or compare the raw data with the count log, to determine the affected time periods. Note any bias or trend in the data validation report.

Review the instrument printouts and counting logs to verify that the background counts were taken on the correct frequency. Have background counts been performed at least weekly and before and after all the field and QC samples in the SDG were taken?

Yes No N/A

ACTION: If the background counts were not performed qualify all associated results as unusable (R).

Are the background counts within control limits provided by the laboratory or within 3 standard deviations of the mean?

Yes No N/A

ACTION: If the background counts are outside of the control limits, qualify all associated data as unusable (R). Associated data means here all the results for all the field and QC samples counted within the time period during which the background counts were out of control. Use the raw data, or compare the raw data with the count log to determine the affected time periods. Note any bias or trend in the data validation report.

ACTION: If the check source efficiency is not within the limits, qualify all associated results as unusable (R).

6.3.C Calibration - Gamma Spectroscopy

Evaluation Criteria and Actions

Review the efficiency calibration curve and/or raw data.

ACTION: If the efficiency calibration does not approximate a smooth semi-log curve, then qualify all results as unusable (R).

Verify that geometry and matrix factors were accounted for in the analyses of all field and QC samples.

ACTION: If geometry and matrix factors are not used qualify all results as unusable (R).

The calibration of the detector system must cover the energy range of interest, but at least 0 to 2 MeV. Review the energy calibration and verify that the radionuclides (peaks) used for calibration are within and/or bound the energy range of the radionuclides of interest.

ACTION: If the energy of the radionuclides falls outside the calibrated range of the detector, qualify all results as unusable (R).

Review the calibration data to verify that the resolution of the detector system is sufficient for the radionuclides of interest, i.e., that accurate identification of peak centroid can be made, and the peaks are distinct and separate from each other. A nominal value of 5 channels FWHM is used to gauge resolution.

ACTION: If the resolution of the system is greater than 5 channels FWHM for any of the peaks used for calibration, qualify all results as estimated (J).

b. Continuing Calibration

Has the check source been identified by activity and radionuclide(s)?

Yes No N/A

ACTION: If the activity and identity of the radionuclide(s) used in the check source(s) are not provided qualify all associated data as estimated (J).

6.4 BLANKS

Evaluation Criteria and Actions

A reagent (or method) blank of the same aliquot size as the samples must be processed like a sample and analyzed with each SDG on the same detectors or detector system, or a field blank must be analyzed with each SDG on the same detectors or detector system, or both. Has at least one blank been analyzed with the SDG?

Yes No N/A

ACTION: If no blanks were analyzed with the SDG, or if the blanks were not analyzed on the same detectors or detector system, qualify all the results > LLD as estimated (J).

The net blank value, i.e., the results from the analysis of the blank corrected for background, should be less than the minimum detectable activity (MDA), which is the minimum quantity of radioactive material that can be detected in the sample at the 95% confidence level. Have contaminants been detected in the blanks?

Yes No N/A

ACTION: If contaminants are detected in any blank, associated sample results that are reported as statistically greater than background but < the minimum detectable activity (MDA), are qualified as nondetects (U). Any other sample result is qualified as an estimated detect (J) unless the sample result is 10 times the contaminant in the blank. Generally, no action is taken for radionuclides detected in a blank but not in a sample, although the validator must be vigilant for situations when a radionuclide in a blank but not in a sample may cause interference with other radionuclides of interest in the sample. Verify calculation or method of calculating the net blank value. Any blank with a negative result whose absolute value is > LLD must be carefully evaluated to determine its effect on sample data. Review all the QC data specific to the method to evaluate the possibility of false negatives.

6.5 DETECTION LIMITS AND SAMPLE RESULTS

Verify calculation or method of calculating the Lower Limit of Detection and the Minimum Detectable Activity. Methods must be equivalent to the following:

$$LLD = (4.66)\ (\text{Background Counts})^{1/2}$$

$$MDA = \frac{(4.66)\ (\text{Background Counts})^{1/2}}{(\text{Efficiency})\ (\text{Volume})\ (\text{Yield})\ (\text{Conversion Factors})}$$

Verify that all positive results (detects or results not qualified with a U) reported meet the detection limits stated in the SOW and are above the MDA for the analysis or method.

Can the detection limits (LLD and MDA) be verified? Yes No N/A

Verify the calculation of sample results by examining the raw data, i.e., spectra or printouts, for counts, counting time, efficiencies, and yields or recoveries, and data transcriptions, e.g., sample volumes.

ACTION: Correct any errors on the photocopied pages of the data package and include in the data validation report. Qualify all results for which the MDA and LLD calculations cannot be verified as estimated detects (J) or estimated nondetects (UJ).

6.6 RADIOMETRIC AND GRAVIMETRIC YIELDS

Evaluation Criteria and Actions

Has at least one spike, tracer, or chemical yield been analyzed in each SDG?

Yes No N/A

ACTION: If no or an inappropriate spike, tracer, or carrier was used qualify all associated results as unusable (R).

Samples identified as field blanks may not be used for spike, tracer, or chemical yield analysis. Look as chain-of-custody documents to find identifier. Has field blank been used for chemical yield analyses?

Yes No N/A

ACTION: If the field blank was used for spike, tracer, or chemical yield analysis, all other QC data must be carefully checked and professional judgement used when evaluating the data. Document if the field blank was used but don't qualify data on this alone.

Spike or tracer per cent recovery, or chemical yield must be within the control limits of 30-105 % for all radionuclides or as specified in the Appendices. If sample activity is > 4x the spike activity, recovery limits do not apply. Review the raw data for counts, activity, and aliquot of the tracer, spike, or carrier used. Have the per cent recoveries or yields been correctly calculated and reported?

Yes No N/A

Are percent recoveries within specified limits?

Yes No N/A

ACTION: Qualify associated sample results outside of the acceptable limits as estimated detects (J), estimated nondetects (UJ), or unusable (R) according to the following guidelines. Note any bias or trend in estimated results in the data validation report.

Yield (%R):	<30%	30-105%	>105%	>115%
Results < LLD:	R	acceptable	UJ	R
Results > LLD:	R	acceptable	J	R

6.6.A Radiometric Yields - Alpha Spectroscopy

Evaluation Criteria and Actions

Has tracer been used to spike each sample prior to analysis?

Yes No N/A

ACTION: If a sample did not have a tracer added, qualify the result as unusable (R).

The percent recovery of the tracer should be between 30 % and 105 %. Verify that the recovery is calculated from the applicable instrument efficiency. Check the calculation of recovery using the following formula:

% recovery = (net CPM tracer/DPM tracer added) (efficiency in DPM/CPM) (100)

Are percent recoveries within specification?

Yes No N/A

ACTION: Qualify results outside of the acceptable limits as estimated (J or UJ), or unusable (R) according to the following guidelines. Note any bias or trend in estimated results in the data validation report.

Yield (%R):	<30%	30-105%	>105%	>115%
Results < LLD:	R	acceptable	UJ	R
Results > LLD:	R	acceptable	J	R

6.7 DUPLICATE SAMPLES AND ANALYSES

Evaluation Criteria and Actions

Has at least one duplicate processing and analysis been performed for every ten samples in the SDG?

Yes No N/A

ACTION: If the number of duplicate analyses is not satisfactory then qualify all associated results as estimated (J).

Have samples identified as field blanks (look at chain-of-custody documents) been used for duplicate sample analysis?

Yes No N/A

ACTION: If the field blank was used for duplicate analysis, all other QC data must be carefully checked and professional judgement exercised when evaluating the data. Document if the field blank was used but don't qualify data on this alone.

Relative Percent Difference (RPD) between the sample and duplicate analysis of samples must be within the control limits of $\pm$ 35% for results > 5x the LLD). A control limit of $\pm$ 2x the LLD is applied if one or both of the sample values are < 5x the LLD. If both values are < LLD, no control limit is applicable. Review the data package and verify that results have been correctly calculated and reported and fall within the established control limits.

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

S = first sample value (original)

D = second sample value (duplicate)

Are all RPD values within specification?

Yes No N/A

ACTION: If duplicate analysis results for a particular radionuclide are outside the specified control limits, qualify results < LLD as estimated nondetects (UJ), and results > LLD as estimated detects (J) for that radionuclide in all samples of the SDG.

6.8 LABORATORY CONTROL SAMPLE (LCS)

Laboratory Control Samples may be prepared by the same laboratory performing the analyses or by a reference laboratory or agency. Laboratory control samples are equivalent to internal or external control samples. Laboratory Control Samples, or their equivalents, may be identified as QC samples, as samples from a particular agency, or as LCS.

Evaluation Criteria and Actions

All LCS results must be within the control limits. If control limits are not provided by the laboratory then use the control limits of 80-120 %R.

$$\text{LCS \%R} = \frac{\text{LCS found}}{\text{LCS true}} \times 100$$

LCS found = concentration or activity for each radionuclide measured in the LCS

LCS true = concentration or activity of each radionuclide in the LCS

Have all LCS results been correctly calculated?

Yes No N/A

Are all LCS results within established control limits?

Yes No N/A

ACTION: Qualify affected sample results as estimated detects (J), estimated nondetects (UJ), or unusable (R) for radionuclides that are outside control limits according to the following guidelines. Affected sample results may be all results for the SDG or just the results following an out-of-control LCS.

Radionuclide %R	<50%	50-79%	>120%
Results < LLD:	R	UJ	R
Results > LLD:	R	J	R

Note any bias or trend in estimated results.

Has at least one LCS been analyzed with the SDG?

Yes No N/A

ACTION: If the required LCS are not analyzed, qualify all results as estimated (J).

6.9 SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes No N/A

Were project-specific data quality objectives met for this analysis?

Yes No N/A

APPENDIX 3
Requirements for Tritium Liquid Scintillation Analyses

Scope

This Appendix provides supplemental information used for validating analytical data from the determination of tritium in water using liquid scintillation counting.

Applicability

The validation criteria in this appendix are intended to be applied in addition to those found in the body of the procedure. In cases where discrepancies exist between the requirements of the procedure and the appendix, the criteria in the appendix shall apply.

3.1 Calibration

Liquid scintillation counting systems are calibrated using NIST traceable external or internal standards. The chemical and physical matrix of the standards should resemble the samples as closely as possible in order to match light emission (scintillation) and quenching properties.

- If the matrix of the standard is not representative of that for the samples, qualify all associated results as estimated, (J).

Most automated liquid scintillation systems are capable of processing many more samples than is normally contained in an SDG. As a minimum, one calibration standard should be included with every analytical run of samples. An analytical run can be comprised of more than one SDG.

- If sample data lacks calibration standards qualify all associated results as unusable. (R).

The efficiency for detecting the tritium beta particle must be established for each counting system. The counting system is comprised of the liquid scintillation counter, scintillation solution, and sample matrix. The laboratory should provide detailed explanation of the method and results for determining the counting system efficiency. For automated systems employing computerized algorithms, copies of applicable pages from the instrument manuals should be submitted with the analytical results.

- If the method and results for counting efficiency determination are not provided, qualify all associated results as unusable, (R).

3.2 Blanks

Tritium in chemical reagents or water used for background determinations will interfere with sample results and reduce the method sensitivity. Tritium levels in reagents and background water should be less than the desired MDA for the method.

- If the tritium levels in reagents or background water exceed the desired MDA, qualify associated results less than 10X the background tritium level as estimated, (J).

- If blank samples are not analyzed to check potential contamination in each lot of chemical reagents, qualify associated results estimated, (J).\

3.3 References

1. U.S. Environmental Protection Agency, "Tritium in Drinking Water," in Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032, August 1980.

DATA QUALIFICATION SUMMARY

UNIT: 100-NR-2

DOCUMENT CONTROL NUMBER: WHC-SD-EN-TI-140

ANALYSES: VOC, BNA, Pest/PCB, Inorganics, Wet Chemistry

RFW NO.: B06M58-TMA-227

SDG NO.: B06M58

QUALIFICATION SUMMARY:

VOLATILES

SAMPLE NUMBERS: B06M58

BLANKS

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for acetone:

- Sample number B06M58 in SDG No. B06M58.

SEMIVOLATILES

SAMPLE NUMBERS: B06M58

No Data Qualified.

PESTICIDES/PCBS

SAMPLE NUMBERS: B06M58

SURROGATE RECOVERY

The surrogate recovery results for tetrachloro-m-xylene in sample number B06M58 in SDG No. B06M58 were slightly below Q limits. Therefore, all associated sample results were flagged "J" and are considered to be estimates.

INORGANICS

SAMPLE NUMBERS: B06M58

BLANKS

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for arsenic:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for cadmium:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for chromium:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for cobalt:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for copper:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for mercury:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for nickel:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for potassium:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for selenium:

- Sample number B06M58 in SDG No. B06M58.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for sodium:

- Sample number B06M58 in SDG No. B06M58.

ACCURACY

Matrix spike recoveries fell outside the quality control requirement for antimony in SDG No. B06M58.

All associated sample results were qualified as estimates and flagged "J".

PRECISION

The laboratory duplicate results fell outside the established QC limits for chromium in SDG No. B06M58.

The laboratory duplicate results fell outside the established QC limits for selenium in SDG No. B06M58.

The laboratory duplicate results fell outside the established QC limits for vanadium in SDG No. B06M58.

The ICP serial dilution results fell outside the established QC limits for zinc in SDG No. B06M58.

All associated sample results were qualified as estimates and flagged "J".

WET CHEMISTRY

SAMPLE NUMBERS: B06M58

No Data Qualified.

Westinghouse Hanford Company

CHAIN OF CUSTODY

S & S

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-7619

Project Designation/Sampling Locations: 100-NR-2

Collection Date: 7-10-92

Ice Chest No.: Fry

Field Logbook No.: EFL-1034

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Possible Sample Hazards/Remarks: None detected with field instruments. Maintain at 4C.

Sample Identification

1) B06M58 ~~1,120ml aG:CLP;VOA~~
1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
~~1,1000ml aG:CLP;SEMI-VOA,PCB/PEST~~
~~300.0;Anions(SO4,F);353.3Anions(NO3)~~
~~1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241~~

2) 1,120ml aG:CLP;VOA
1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
1,1000ml aG:CLP;SEMI-VOA,PCB/PEST
300.0;Anions(SO4,F);353.3Anions(NO3)
1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

3) 1,120ml aG:CLP;VOA
1,250ml aG:CLP;ICP/AA Metals,Hg,Cn
1,1000ml aG:CLP;SEMI-VOA,PCB/PEST
300.0;Anions(SO4,F);353.3Anions(NO3)
1,1000ml G:Gross alpha/beta,Gamma Spec,Sr-90,C-14,U-235/238,Pu-239/240,Am241

CC 7-10-92

[] Field Transfer of Custody

Chain of Possession		(Sign and Print Names)
Relinquished by: CM Chance [signature]	Received by: Kermit Blum	Date/Time: 7-15-92 1100
Relinquished by: Kermit Blum 7-15-92	Received by: Barbara Purvis	Date/Time: 7-16-92 10:15
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

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

9713505.2331

000023

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector C M Chance Date 7-10-92

Company Contact CM CHANCE Telephone (509)376-7619

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
B06M58	S	7-10-92	1038	1-250ml aG CLP;ICP/AA Metals,Hg,Cn ~~1-120ml aG CLP;VOA~~ ~~1-1000mlaG CLP;Semi-VOA,PCB/PEST~~ ~~300.0/353.2;Anions(F,SO4,NO3)~~ ~~1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14~~ ~~U-235/238,Pu-239/240,Am-241~~
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000mlaG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-250ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
				1-120ml aG CLP;ICP/AA Metals,Hg,Cn 1-120ml aG CLP;VOA 1-1000m aG CLP;Semi-VOA,PCB/PEST 300.0/353.2;Anions(F,SO4,NO3) 1-1000ml G Gross alpha/beta,Gamma Spec,Sr-90,C-14 U-235/238,Pu-239/240,Am-241
		CC 7-10-92		

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

Field Information FROM 100-NR-2 Drilling

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

A-6000-406 (06/91) WEF060

0000029

9713505.2332

1

From (Your Name) Please Print: SAMPLE CONTROL

Your Phone Number (Very Important): (510) 235-2613

Company: T M A

Department/Floor No.

Street Address: [illegible] HIGHT AVE

City: [illegible] CA

State

ZIP Required: [illegible]

2

To (Recipient's Name): SAMPLE CONTROL

Company: T M A / SKINNER & SHERMAN

Department/Floor No.

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 SECOND AVENUE

City: WALTHAM

State: MA

ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 2320-6406

H IF HOLD FOR PICK-UP, Print FEDEX Address Here

Street Address

City

State

ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct No 3 [ ] Bill 3rd Party FedEx Acct No 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)

11 [X] YOUR PACKAGING
16 [ ] FEDEX LETTER *
12 [ ] FEDEX PAK *
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon†)

51 [ ] YOUR PACKAGING
56 [ ] FEDEX LETTER *
52 [ ] FEDEX PAK *
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day†)

30 [ ] ECONOMY

Government Overnight (Restricted to authorized users only)

46 [ ] GOVT LETTER
41 [ ] GOVT PACKAGE

Freight Service (for Extra Large or any package over 150 lbs.)

70 [ ] OVERNIGHT FREIGHT ** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT **

† Delivery commitment may be later in some cases.
*Declared Value Limit $100
**Call for delivery schedule

5 DELIVERY AND SPECIAL HANDLING (Check services required)

1 [ ] HOLD FOR PICK-UP (If box H)
2 [X] DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) [ ]
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE ____ Lbs
7 [ ] OTHER SPECIAL SERVICE
8 [ ]
9 [ ] SATURDAY PICK-UP (Extra charge)
10 [ ]
11 [ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6 PACKAGES | WEIGHT in Pounds Only | YOUR DECLARED VALUE

Total 1 | Total 35 | Total

DIM SHIPMENT (Chargeable Weight) [ ] ____ lbs.

L x W x H =

Received At: 1 [ ] Regular Stop 3 [ ] Drop Box 4 [ ] BSC 2 [ ] On-Call Stop 5 [ ] Station

Emp. No. | Date

[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg To Dest [ ] Chg To Hold

Street Address

City | State | Zip

Received By: X

Date/Time Received: 7/16/92 9:30

FedEx Employee Number

7 Release Signature:

FedEx Emp. No.

Date/Time

For FedEx Express Use Only

Base Charges

Declared Value Charge

Other 1

Other 2

Total Charges

REVISION DATE 6/91
PART #137204 FXEM 4/92 *
FORMAT #099

099

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9713505.2333

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000005
EPA SAMPLE NO.

B06M58

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix: (soil/water) SOIL Lab Sample ID: A207035-01A

ample wt/vol: 5.0 (g/mL) G Lab File ID: 20720R06

evel: (low/med) LOW Date Received: 07/15/92

Moisture: not dec. 4 Date Analyzed: 07/20/92

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

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

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

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	39	~~B~~ U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

9713505.2334

000006

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B06M58

ıb Name: TMA/ARLI Contract: WHC

ıb Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ıtrix: (soil/water) SOIL Lab Sample ID: A207035-01A

ımple wt/vol: 5.0 (g/mL) G Lab File ID: 20720R06

:vel: (low/med) LOW Date Received: 07/15/92

Moisture: not dec. 4 Date Analyzed: 07/20/92

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

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

!umber TICs found: 1

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALCOHOL	6.67	6	~~BJ~~ U

1-20-93 SC

9713505.2335

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01D

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	810	U

9213525.2336

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix: (soil/water) SOIL Lab Sample ID: A207035-01D

ample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

evel: (low/med) LOW Date Received: 07/15/92

Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

oncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

njection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B06M58

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-01D

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

Level: (low/med) LOW Date Received: 07/15/92

% Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 18

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	170	BJ
2.	Unknown alkene	4.83	240	BJ
3.	Unknown hydrocarbon	5.48	100	J
4.	Unknown ketone	5.68	240	BJ
5.	Unknown hydrocarbon	6.08	2500	BJ
6.	Unknown hydrocarbon	6.70	32000	BJ
7.	Unknown alkane	6.82	140	J
8.	Unknown hydrocarbon	6.93	240	BJ
9.	Unknown hydrocarbon	7.40	100	J
10.	Unknown hydrocarbon	8.00	810	BJ
11.	Unknown hydrocarbon	8.28	270	J
12.	Unknown ketone	8.38	68	J
13.	Unknown ketone	8.52	140	BJ
14.	Unknown alcohol	9.35	240	J
15.	Unknown alcohol	9.75	540	BJ
16.	Unknown acid	22.80	140	J
17.	Unknown carboxylic acid este	24.55	950	BJ
18.	Unknown carboxylic acid este	24.67	11000	BJ

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ID

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

Name: TMA/ARLI Contract: WHC

Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

rix: (soil/water) SOIL Lab Sample ID: A207035-01D

ple wt/vol: 30.4 (g/mL) G Lab File ID:

oisture: 4 decanted: (Y/N) N Date Received: 07/15/92

raction: (SepF/Cont/Sonc) SONC Date Extracted: 07/17/92

centrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/92

ection Volume: 1.00 (uL) Dilution Factor: 1.00

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

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

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	1.7	UJ
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.4	U
72-55-9	4,4'-DDE	3.4	U
72-20-8	Endrin	3.4	U
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	3.4	U
50-29-3	4,4'-DDT	3.4	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.4	U
7421-36-3	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	UJ
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	69	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	34	U
11096-82-5	Aroclor-1260	34	U

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1-20-93

FORM I PEST 3/90

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M58

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Matrix (soil/water): SOIL Lab Sample ID: 07111-01S

Level (low/med): LOW Date Received: 07/17/92

% Solids: 94.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5090.00			P
7440-36-0	Antimony	3.30	U	~~A~~ J	P
7440-38-2	Arsenic	1.10	~~B~~	U	F
7440-39-3	Barium	72.10			P
7440-41-7	Beryllium	0.14	U		P
7440-43-9	Cadmium	1.50		U	P
7440-70-2	Calcium	6560.00			P
7440-47-3	Chromium	8.70		AUJ	P
7440-48-4	Cobalt	9.90	~~B~~	U	P
7440-50-8	Copper	19.70		U	P
7439-89-6	Iron	18400.00			P
7439-92-1	Lead	3.10			F
7439-95-4	Magnesium	3920.00			P
7439-96-5	Manganese	296.00			P
7439-97-6	Mercury	0.06	~~B~~	U	CV
7440-02-0	Nickel	8.80		U	P
7440-09-7	Potassium	874.00	~~B~~	U	P
7782-49-2	Selenium	1.70		~~*~~ UJ	F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	338.00	~~B~~	U	P
7440-28-0	Thallium	0.31	U		F
7440-62-2	Vanadium	42.40		* J	P
7440-66-6	Zinc	39.70		E J	P
	Cyanide	0.52	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

TMA Inc. REPORT Work Order # A2-07-035

ceived: 07/15/92

Results by Sample

MPLE ID B06M58 FRACTION 01D TEST CODE WCCLPS NAME Anions in Solids - VM232

Date & Time Collected 07/10/92 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	3.1	mg/Kg	1.0
Sulfate	300	42	mg/Kg	10

FORM I

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Page 2 Skinner&Sherman REPORT Work Order # S2-07-114

Received: 07/16/92 Results by Sample

SAMPLE ID B06M58 SAMPLE # 01 FRACTIONS: A

Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 <2.39 U

mg N/kg

method # 353.2

SAMPLE ID B06M58D SAMPLE # 01 FRACTIONS: B

Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 <2.35 U

mg N/kg

SAMPLE ID B06M58S SAMPLE # 01 FRACTIONS: C

Date & Time Collected 07/10/92 10:38:00 Category SOIL

NO3NO2 19.0

mg N/kg

SAMPLE ID LCSS SAMPLE # 02 FRACTIONS: A

Date & Time Collected not specified Category SOIL

NO3NO2 1.89

mg N/L

TMA
Thermo Analytical Inc.

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

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

APPENDIX A

DATA VALIDATION CHECKLISTS

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK0717S2

ıb Name: TMA/ARLI Contract: WHC

ıb Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ıtrix: (soil/water) SOIL Lab Sample ID: A207035-BLK

ımple wt/vol: 30.3 (g/mL) G Lab File ID: 20731N2

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

Moisture: _____ decanted: (Y/N) N Date Extracted: 07/17/92

ɔncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

ıjection Volume: 2.0(uL) Dilution Factor: 1.0

ᵖC Cleanup: (Y/N) Y pH: _____

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

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

000022
EPA SAMPLE NO.

SBLK0717S2

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix: (soil/water) SOIL Lab Sample ID: A207035-BLK

ample wt/vol: 30.3 (g/mL) G Lab File ID: 20731N2

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

Moisture: _____ decanted: (Y/N) N Date Extracted: 07/17/92

oncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

njection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	790	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	790	U
534-52-1	4,6-Dinitro-2-methylphenol	790	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	790	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	33	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	96	J
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

1-26 93 SE

EPA SAMPLE NO.

SBLK0717S2

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix: (soil/water) SOIL Lab Sample ID: A207035-BLK

ample wt/vol: 30.3 (g/mL) G Lab File ID: 20731N2

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

Moisture: _____ decanted: (Y/N) N Date Extracted: 07/17/92

oncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

njection Volume: 2.0(uL) Dilution Factor: 1.0

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

umber TICs found: 19

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	260	J
2.	Unknown alkene	4.85	330	J
3.	subst. propanedioic acid	5.37	200	J
4.	Unknown ketone	5.68	300	J
5.	Unknown hydrocarbon	6.08	2700	J
6.	Unknown hydrocarbon	6.72	32000	J
7.	Unknown hydrocarbon	6.95	200	J
8.	Unknown hydrocarbon	8.00	920	J
9.	Unknown hydrocarbon	8.28	260	J
10.	Unknown ketone	8.53	230	J
11.	unknown alcohol	9.77	660	J
12.	Unknown carboxylic acid este	24.53	960	J
13.	Unknown carboxylic acid este	24.70	12000	J
14.	Unknown alcohol	25.43	330	J
15.	Unknown alcohol	26.28	230	J
16.	Unknown hydrocarbon	28.47	200	J
17.	Unknown hydrocarbon	29.12	260	J
18.	Unknown hydrocarbon	29.78	260	J
19.	Unknown polynuclear aromatic	34.45	300	J

1-20-93 SC

VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: Westinghouse	REVIEWER: SC	DATE: 1-20-93
LABORATORY: TMA	CASE:	SDG: B06M58
SAMPLES/MATRIX: Soil		
B06 M58		

1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	✓			
Data Summary	✓			
Chain-of-Custody		✓		
QC Summary				
Surrogate report		✓		
MS/MSD report		✓		
Blank summary report	✓			
GC/MS tuning report	✓			
Internal standard summary report		✓		
Sample Data				
Sample reports	✓			
TIC reports for each sample		✓		
RIC reports for all samples		✓		
Raw and corrected spectra for all detected results		✓		
Raw and corrected library search data for all reported TIC	✓			
Quantitation and calculation data for all TIC	✓			
Standards Data				
Initial calibration report		✓		
RIC and quantitation reports for initial calibration		✓		
Continuing calibration reports	✓			
RIC and quantitation reports for cont. calibrations		✓		
Internal standard summary report		✓		
Raw QC Data				
Tuning report, spectra and mass lists	✓			
Blank analysis reports	✓			
TIC reports for all blanks		✓		
RIC and quantitation reports for blanks		✓		
Raw and corrected spectra for all detected results in blanks	✓			
Raw and corrected library search data for all reported TIC	✓			

Data Package Item	Present?:	Yes	No	N/A
Quantitation and calculation data for all TIC	✓			
MS/MSD report forms	✓			
RIC and quantitation reports for MS/MSD		✓		
Additional Data				
Moisture/% solids data sheets	✓			
Reduction formulae			✓	
Instrument time logs		✓		
Chemist notebook pages			✓	
Sample preparation sheets			✓	

2. HOLDING TIMES

Complete the holding time summary form listing all samples and dates of collection and analysis.

Were all samples analyzed within holding time? **Yes** No N/A

ACTION: If any holding times were exceeded, but not by greater than a factor of two, qualify associated samples as estimated (J for detects or UJ for non-detects), otherwise reject all non-detects (R) and qualify all associated detects as estimated (J).

3. INSTRUMENT CALIBRATION, TUNING AND PERFORMANCE CHECKS

3.1 GC/MS TUNING AND PERFORMANCE CHECKS

Is a BFB tune report present for each applicable 12h period? **Yes** No N/A

Do all tunes on all instruments meet the tuning criteria? **Yes** No N/A

Do all tunes on all instruments meet the expanded criteria? Yes No **N/A**

Has the laboratory made any calculation or transciption errors? Yes **No** N/A

Have the proper significant figures been reported? **Yes** No N/A

ACTION: If the mass calibration is out of specification but within the expanded criteria, qualify associated data as estimated (J for detects or UJ for non-detects). If all tuning criteria are missed, qualify all associated data as unusable (R).

3.2 INITIAL CALIBRATION

Is an initial calibration report provided for all instruments? **Yes** No N/A

Are all RSD values ≤30% (2/88 SOW)? Yes No **N/A**

Are all RRF values ≥0.05 (2/88 SOW)? Yes No **N/A**

Are all applicable RSD values ≤20.5% (3/90 SOW)?	Yes	No	N/A
Are all applicable RSD values ≤40% (3/90 SOW)?	Yes	No	N/A
Are all applicable RRF values within SOW limits (3/90 SOW)?	Yes	No	N/A
Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?	Yes	No	N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (J) and all non-detects as unusable (R). Making allowances for up to two TCL compounds, if any RSD value is out of specification qualify all associated data as estimated (J for detects or UJ for non-detects).

3.3. CONTINUING CALIBRATION

Is a continuing calibration report present for all 12h periods in which associated samples were analyzed ?	Yes	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	Yes	No	N/A
Are all %D values ≤25% (2/88 or 3/90 SOW)?	Yes	No	N/A
Are all %D values ≤40% (3/90 SOW)?	Yes	No	N/A
Are all RRF values within SOW limits (3/90 SOW)?	Yes	No	N/A
Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?	Yes	No	N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all associated detected results as estimated and all non-detects as unusable (R). Making allowances for up to two TCL compounds, if any %D is out of specification, qualify all associated results as estimated (J for detects or UJ for non-detects).

4. BLANKS

4.1 LABORATORY BLANKS

Has the laboratory conducted a method blank analysis per matrix for every 12h period in which samples were analyzed?	Yes	No	N/A
Are TCL compounds present in the laboratory blanks?	Yes	No	N/A

ACTION: Qualify all sample results < 10X the highest blank concentration for the common laboratory contaminants, as non-detects (U) or at the SQL if the result is < CRQL. Qualify all remaining sample results <5X the blank concentration in similar fashion.

4.2. FIELD BLANKS

Are TCL compounds present in the field blanks? Yes No N/A

ACTION: Qualify all detected sample results less than or equal to five times the amount in any valid field blank as non-detects (U) and note the field blank results in the validation narrative.

5. ACCURACY

5.1 SURROGATE/SYSTEM MONITORING COMPOUND RECOVERY

Are any surrogate recoveries out of specification? Yes No N/A

Are any surrogate recoveries less than 10%? Yes No N/A

Are any method blank surrogate recoveries out of specification? Yes No N/A

ACTION: Qualify all associated sample results as estimated (J for detects or UJ for non-detects) for surrogates out of specification but greater than 10%. Qualify all associated positive sample results as estimated (J) and all non-detect results as unusable (R) for all surrogates below 10%. If method blank surrogates are out of specification and the associated sample surrogates are acceptable no qualification is necessary, however, the laboratory should be contacted for an explanation.

5.2 MATRIX SPIKE RECOVERY

Has an MS/MSD analysis been conducted per matrix in the sample group? Yes No N/A

Are MS/MSD recoveries within specification? Yes No N/A

Are there any calculation errors? Yes No N/A

ACTION: If an MS/MSD analysis has not been conducted contact the laboratory for an explanation. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is greater than five times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

5.3 PERFORMANCE AUDIT SAMPLES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit sample in the validation narrative.

6. PRECISION

6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Are RPD values within specification? Yes No N/A

Are there any calculation errors? Yes No N/A

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and not the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are greater than five times the CRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

ACTION: Note the results of the field duplicate samples in the validation narrative.

6.3 FIELD SPLIT SAMPLES

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

ACTION: Note the results of the field split samples in the validation narrative.

7. SYSTEM PERFORMANCE

7.1 INTERNAL STANDARDS PERFORMANCE

Are any internal standard area counts outside the acceptance limits? Yes No N/A

Are retention times for any internal standard outside the ±30 second windows established by the most recent calibration check? Yes No N/A

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (J for detects or UJ for non-detects). If it is determined from the review that out of specification area counts and relative retention times are indicative of systematic problems within the laboratory the reviewer may consider rejection of all affected sample data (R).

8. COMPOUND IDENTIFICATION AND QUANTITATION

8.1 COMPOUND IDENTIFICATION

Are detected compounds within ±0.06 relative retention time units of the associated calibration standard? Yes No N/A

Are all ions at a relative intensity of ≥10% in the standard spectra present in the sample spectra? Yes No N/A

Do the relative intensities between the standard and sample spectra agree within 20%? Yes No N/A

Have all ions > 10% in the sample spectra that are not present in the standard spectra been reviewed for possible background contamination? Yes No N/A

Are molecular ions present in the reference specrum present in the sample spectrum? Yes No N/A

ACTION: If compound identification is in error and retention time and mass spectral criteria are exceeded qualify all affected positive results as unusable (R). If cross-contamination between analyses is suspected, qualify affected data as unusable (R). Note the results in the validation narrative.

8.2 REPORTED RESULTS AND QUANTITATION LIMITS

Has the laboratory used the correct RRF values and internal standard(s) for quantitation? Yes No N/A

Are results and quantitation limits calculated properly? Yes No N/A

Has the laboratory reported the sample quantitation limits within five times the CRQL values? Yes No N/A

ACTION: If the results and quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

8.3 TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

Has the laboratory conducted a spectral library search on all candidate TIC peaks in accordance with the analytical SOW? Yes No N/A

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

ACTION: If the laboratory has failed to search the minimum number of TIC peaks in the chromatogram contact the laboratory for submittal of the required data. Qualify as non-detects (U) all TIC compounds present in samples and blanks using the review criteria specified in the validation requirements. If TIC identification is in error sample results should be qualified as non-detects (U) or unusable (R). If TIC identifications are judged valid, qualify the results as presumptive and estimated (JN).

9. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW? Yes No N/A

Were project specific data quality objectives met for this analysis? Yes No N/A

ACTION: Summarize all the data qualifications recommended in the foregoing sections, and complete the data validation narrative according to the requirements of Section 10 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

SEMI-VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-2

PROJECT: Westinghouse	REVIEWER: SC	DATE: 1-20-93
LABORATORY: TMA	CASE:	SDG: B06M58
SAMPLES/MATRIX: Soil		
B06M58		

1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	✓			
Data Summary	✓			
Chain-of-Custody		✓		
QC Summary				
Surrogate report		✓		
MS/MSD report		✓		
Blank summary report	✓			
GC/MS tuning report	✓			
Internal standard summary report		✓		
Sample Data				
Sample reports	✓			
TIC reports for each sample		✓		
RIC reports for all samples		✓		
Raw and corrected spectra for all detected results		✓		
Raw and corrected library search data for all reported TIC	✓			
Quantitation and calculation data for all TIC	✓			
Standards Data				
Initial calibration report		✓		
RIC and quantitation reports for initial calibration		✓		
Continuing calibration reports	✓			
RIC and quantitation reports for cont. calibrations		✓		
Internal standard summary report		✓		
Raw QC Data				
Tuning report, spectra and mass lists	✓			
Blank analysis reports	✓			
TIC reports for all blanks		✓		
RIC and quantitation reports for blanks		✓		
Raw and corrected spectra for all detected results in blanks	✓			
Raw and corrected library search data for all reported TIC	✓			
Quantitation and calculation data for all TIC	✓			
MS/MSD report forms	✓			

Data Package Item	Present?:	Yes	No	N/A
RIC and quantitation reports for MS/MSD		✓		
Additional Data				
Moisture/% solids data sheets	✓	✓		
Reduction formulae			✓	
Instrument time logs		✓		
Chemist notebook pages			✓	
Sample preparation sheets			✓	

2. HOLDING TIMES

Were all samples extracted within holding time?	Yes	No	N/A
Were all samples analyzed within holding time?	Yes	No	N/A

ACTION: If any holding times were exceeded, but not by greater than a factor of two, qualify associated samples as estimated (J for detects or UJ for non-detects), otherwise reject all non-detects (R) and qualify all associated detects as estimated (J).

3. INSTRUMENT CALIBRATION, TUNING AND PERFORMANCE CHECKS

3.1 GC/MS TUNING AND PERFORMANCE CHECKS

Is a DFTPP tune report present for each applicable 12h period?	Yes	No	N/A
Do all tunes on all instruments meet the tuning criteria?	Yes	No	N/A
Do all tunes on all instruments meet the expanded criteria?	Yes	No	N/A
Has the laboratory made any calculation or transciption errors?	Yes	No	N/A
Have the proper significant figures been reported?	Yes	No	N/A

ACTION: If the mass calibration is out of specification but within the expanded criteria, qualify associated data as estimated (J for detects and UJ for non-detects). If all tuning criteria are not met, qualify all associated data as unusable (R).

3.2 INITIAL CALIBRATION

Is an initial calibration report provided for all instruments?	Yes	No	N/A
Are all RSD values ≤30% (2/88 SOW)?	Yes	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	Yes	No	N/A
Are all applicable RSD values ≤20.5% (3/90 SOW)?	Yes	No	N/A
Are all applicable RSD values ≤40% (3/90 SOW)?	Yes	No	N/A

Are all applicable RRF values within SOW limits (3/90 SOW)? Yes No N/A

Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)? Yes No N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (J) and all non-detects as unusable (R). Making allowances for up to four TCL compounds or surrogates, if any RSD value is out of specification qualify all associated data as estimated (J for detects or UJ for non-detects).

3.3. CONTINUING CALIBRATION

Is a continuing calibration report present for all 12h periods in which associated samples were analyzed? Yes No N/A

Are all RRF values ≥0.05 (2/88 SOW)? Yes No N/A

Are all %D values ≤25% (2/88 or 3/90 SOW)? Yes No N/A

Are all %D values ≤40% (3/90 SOW)? Yes No N/A

Are all RRF values within SOW limits (3/90 SOW)? Yes No N/A

Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)? Yes No N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all associated detected results as estimated and all non-detects as unusable (R). Making allowances for up to four TCL compounds or surrogates, if any %D is out of specification, qualify all associated results as estimated (J for detects or UJ for non-detects).

4. BLANKS

4.1 LABORATORY BLANKS

Has the laboratory conducted a method blank analysis per matrix for every extraction batch? Yes No N/A

Are compounds reported in the laboratory blanks? Yes No N/A

ACTION: Qualify all sample results < 10X the highest blank concentration for the common laboratory contaminants, as non-detects (U) or at the SQL if the result is < CRQL. Qualify all remaining sample results < 5X the blank concentration in similar fashion.

4.2. FIELD BLANKS

Are compounds reported in the field blanks? Yes No N/A

ACTION: Qualify all detected sample results less than or equal to five times the amount in any valid field blank as non-detects (U) and note the results of the field blanks in the validation narrative.

5. ACCURACY

5.1 SURROGATE RECOVERY/SYSTEM MONITORING COMPOUND RECOVERY

Are any surrogate recoveries out of specification? Yes No N/A

Are any surrogate recoveries less than 10%? Yes No N/A

Are any method blank surrogate recoveries out of specification? Yes No N/A

ACTION: Qualify all associated data as estimated (J for detects and UJ for non-detects) if at least two semivolatile surrogates are out of specification. If any surrogate is below 10% recovery qualify associated detected results as estimated (J) and associated non-detect results as unusable (R). If method blank surrogates are out of specification and associated sample surrogates are acceptable no qualification is required, however, the laboratory should be contacted for an explanation.

5.2 MATRIX SPIKE RECOVERY

Has an MS/MSD analysis been conducted per matrix in the sample group? Yes No N/A

Are MS/MSD recoveries within specification? Yes No N/A

Are there any calculation errors? Yes No N/A

ACTION: If an MS/MSD analysis has not been conducted contact the laboratory for an explanation. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is greater than five times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

5.3 PERFORMANCE AUDIT SAMPLES

Are the results for the performance audit samples within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit samples in the validation narrative.

6. PRECISION

6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Are all RPD values within specification? Yes No N/A

Are there any calculation errors? Yes No N/A

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and not the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are greater than five times the CRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

ACTION: Note the results of the field duplicate samples in the validation narrative.

6.3 FIELD SPLIT SAMPLES

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

ACTION: Note the results of the field split samples in the validation narrative.

7. SYSTEM PERFORMANCE

7.1 INTERNAL STANDARDS PERFORMANCE

Are any internal standard area counts outside the acceptance limits? Yes No N/A

Are retention times for any internal standard outside the ±30 second windows established by the most recent calibration check? Yes No N/A

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (J for detects and UJ for non-detects. If it is determined from the review that out of specification area counts and relative retention times are indicative of systematic problems within the laboratory the reviewer may consider rejection of all affected sample data (R).

8. COMPOUND IDENTIFICATION AND QUANTITATION

8.1 COMPOUND IDENTIFICATION

Are detected compounds within ±0.06 relative retention time units of the associated calibration standard?	Yes	No	N/A
Are all ions at a relative intensity of ≥10% in the standard spectra present in the sample spectra?	Yes	No	N/A
Do the relative intensities between the standard and sample spectra agree within 20%?	Yes	No	N/A
Have all ions > 10% in the sample spectra that are not present in the standard spectra been reviewed for possible background contamination?	Yes	No	N/A
Are molecular ions in the reference spectrum present in the sample spectrum?	Yes	No	N/A

ACTION: If compound identification is in error and retention time and mass spectral criteria are exceeded qualify all affected positive results as unusable (R). If cross-contamination between analyses is suspected, qualify affected data as unusable (R).

8.2 REPORTED RESULTS AND QUANTITATION LIMITS

Has the laboratory used the correct RRF values and internal standards for quantitation?	Yes	No	N/A
Are results and quantitation limits calculated properly?	Yes	No	N/A
Has the laboratory reported the sample quantitation limits within five times the CRQL values?	Yes	No	N/A

ACTION: If the quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

8.3 TENTATIVELY IDENTIFIED COMPOUNDS

Has the laboratory conducted a spectral library search on all candidate TIC peaks in accordance with the analytical SOW?	Yes	No	N/A
Has the laboratory properly identified and coded all TIC?	Yes	No	N/A

ACTION: If the laboratory has failed to search the minimum number of TIC peaks in the chromatogram contact the laboratory for submittal of the required data. Qualify as non-detects (U) all TIC compounds present in samples and blanks using the review criteria specified in the validation requirements. If TIC identification is in error sample results should be qualified as non-detects (U) or unusable (R). If TIC identifications are judged valid, qualify the results as presumptive and estimated (JN).

9. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes	No	N/A
Were project specific data quality objectives met for this analysis?	Yes	No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

PESTICIDE/PCB DATA VALIDATION CHECKLIST - FORM A-3

PROJECT: Westinghouse	REVIEWER: SC	DATE: 1-20-93
LABORATORY: TMA	CASE:	SDG: B06M58
SAMPLES/MATRIX:		
Soil		
B06M58		

1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for re-submittal.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	✓			
Data Summary	✓			
Chain-of-Custody		✓		
QC Summary				
Surrogate report		✓		
MS/MSD report		✓		
Blank summary report	✓			
Sample Data				
Sample reports	✓			
Chromatograms		✓		
GC integration reports	✓			
Worksheets		✓		
UV traces from GPC		✓		
GC/MS confirmation spectra		✓		
Standards Data				
Pesticides Evaluation Standards Summary		✓		
Pesticides/PCB Standards Summary		✓		
Pesticides/PCB identification		✓		
Pesticides standard chromatograms		✓		
Raw QC Data				
Blank analysis report forms and chromatograms		✓		
MS/MSD report forms and chromatograms				

Data Package Item	Present?:	Yes	No	N/A
Additional Data				
Moisture/% solids data sheets	✓			
Reduction formulae			✓	
Instrument time logs		✓		
Chemist notebook pages			✓	
Sample preparation sheets		✓	✓	

2. HOLDING TIMES

Were all samples extracted within holding time? Yes No N/A

Were all samples analyzed within holding time? Yes No N/A

ACTION: If any holding times were exceeded, but not by greater than a factor of two, qualify associated samples as estimated (J for detects or UJ for non-detects), otherwise reject all non-detects (R) and qualify all associated detects as estimated (J).

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (2/88 SOW)

Are DDT retention times greater than 12 minutes? Yes No N/A

ACTION: If DDT retention time is < 12 minutes and resolution is ≤25% qualify associated data as unusable (R).

Is resolution between DDT peaks acceptable? Yes No N/A

ACTION: If resolution between DDT peaks is unacceptable qualify associated data as unusable (R).

Do all pesticide standards elute within the established retention time windows? Yes No N/A

ACTION: If the standards do not meet the retention time criteria and peaks are not present near or within the retention time windows no sample qualification is necessary. If peaks are near or within the retention time windows and the standards and matrix spikes do not fall within the expanded retention time windows calculated according to the validation requirements, qualify all associated sample results from the last in-control point as unusable (R).

Are DDT breakdowns <20%? Yes No N/A

ACTION: If the DDT percent breakdown exceeds 20%, qualify all detected results for DDT as estimated (J) and all non-detects as unusable (R) if DDD and DDE are detected. In addition qualify all results for DDD or DDE as presumptive and estimated (NJ).

Are endrin breakdowns <20%? Yes No N/A

ACTION: If the endrin breakdown exceeds 20%, qualify all detected results for endrin as estimated

(J) and all non-detects as unusable (R) if endrin aldehyde or endrin ketone are detected. In addition qualify all results for endrin ketone as presumptive and estimated (NJ).

Are DBC retention time differences within specification? Yes No N/A

ACTION: If DBC %D values are outside the limits and the shift is ocurring repeatedly in samples and standards, qualify affected sample results as unusable (R).

3.2 CALIBRATIONS (2/88 SOW)

Are RSD values for aldrin, endrin, DDT and DBC ≤10%? Yes No N/A

Have all standards been analyzed within 72 hours of any sample? Yes No N/A

Has a 3-point calibration been conducted for DDT or toxaphene? Yes No N/A

Have all standards been analyzed at the start of each 72h sequence? Yes No N/A

Have evaluation standards A, B, and C been analyzed within 72h of any sample? Yes No N/A

Has the confirmation standard mix been analyzed after every 5 samples? Yes No N/A

Has evaluation standard B analyzed every 10 samples? Yes No N/A

Are %D values for initial and subsequent standards ≤15% for quantitation standards and ≤20% for confirmation standards? Yes No N/A

ACTION: If the RSD criteria were exceeded or three point calibrations not conducted qualify associated detects as estimated (J). If all standards were not analyzed at the beginning of each 72h sequence qualify associated data as unusable (R). If the confirmation standards were not analyzed properly qualify associated detects as estimated (J). If the continuing calibration criteria were not met qualify associated quantitation data as estimated (J).

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Is peak resolution acceptable? Yes No N/A

ACTION: If the resolution criteria are not met, reject positive sample results generated after initial calibration (R).

Are DDT and endrin breakdowns ≤20.0% Yes No N/A

ACTION: If the breakdown criteria are not met qualify sample results as described in Section 5.3.1 of the validation requirements.

Are single component target compounds in the PEMs, INDA, INDB and the calibration standards within the retention time windows? Yes No N/A

ACTION: If the retention time criteria are not met and no peaks are present in the samples within two times the retention time windows (±0.04, ±0.05 for methoxychlor), no qualification is necessary. If peaks are present in samples within the retention time window a review is made of the raw data to determine expanded retention time windows (see Section 5.3.1 of the validation requirements). If all standards and matrix spikes fall within the expanded windows then no qualification of sample results is necessary. If all standards and matrix spikes do not fall within the expanded windows then all affected sample results are qualified as unusable (R).

Are the RPDs acceptable for the PEMs? Yes No N/A

ACTION: If the RPD criteria are not met qualify associated positive sample results as estimated (J).

Are the RSDs for the calibration factors < 10.0% (< 15.0% for the BHC series, DDT, endrin and methoxychlor)? Yes No N/A

ACTION: If the RSD criteria are not met qualify associated positive sample results as estimated (J).

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Have the analytical sequence requirements been met for the analysis of instrument blanks, PEMs, INDA and INDB mixes? Yes No N/A

ACTION: If the analytical sequence requirements are not followed and any of the resolution or retention time criteria listed below are exceeded, reject associated positive results (R).

Is peak resolution acceptable for PEMs, INDA and INDB mixes? Yes No N/A

ACTION: If the resolution criteria are not met reject positive sample results generated after a non-compliant standard analysis (R).

Are single component target compounds in the PEMs, INDA and INDB mixes within the retention time windows? Yes No N/A

ACTION: If the retention time criteria are not met and no peaks are present in the samples analyzed after the non-compliant standard within two times the retention time windows (±0.04, ±0.05 for methoxychlor), no qualification is necessary. If peaks are present in samples within the expanded windows rejected associated positive and non-detect results (R).

Are RPDs between the calculated and true amounts in the PEMs, INDA and INDB mixes ≤25.0%? Yes No N/A

ACTION: If the RPD criteria are not met qualify associated positive sample results as estimated (J).

Are DDT and endrin breakdowns in the PEMs ≤20.0% (≤30.0% total combined)? Yes No N/A

ACTION: If the breakdown criteria are not met qualify associated positive sample results in accordance with the criteria specified in Section 5.3.1.

4. BLANKS

4.1 LABORATORY BLANKS

Has the laboratory analyzed the method blanks at the required frequency? Yes No N/A

Has the laboratory analyzed a sulfur clean-up blank if required? Yes No N/A

Has the laboratory analyzed instrument blanks at the required frequency? Yes No N/A

Are target compounds present in the blanks? Yes No N/A

ACTION: Qualify all associated positive results as non-detects (U) that are <5X the highest concentration in any acceptable blank.

4.2 FIELD BLANKS

Are target compounds present in the field blanks? Yes No N/A

ACTION: If target compounds are present in the field blanks qualify all positive sample results <5X the highest valid field blank concentrations as non-detects (U) and note the results in the validation narrative.

5. ACCURACY

5.1 SURROGATE RECOVERY

Are any surrogate recoveries out of specification? Yes No N/A

Do any samples show non-detects for surrogates? Yes No N/A

Are any method blank surrogates out of specification? Yes No N/A

ACTION: Qualify all associated sample results as estimated (J for detects and UJ for non-detects) for surrogates out of specification. If the surrogate was not detected (0% recovery) in the sample qualify associated non-detects as unusable (R). If method blank surrogates are out of specification and sample surrogates are acceptable, no qualification is required however, the laboratory should be contacted for an explanation.

5.2 MATRIX SPIKE RECOVERY

Has the laboratory analyzed a MS/MSD per matrix for the the sample group? Yes No N/A

Are MS/MSD recoveries within specification? Yes No N/A

Are there any calculation or transcription errors? Yes No N/A

ACTION: If MS/MSD analyses have not been conducted contact the laboratory for clarification. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is greater than five times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results as estimated (J) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by the low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

5.3 PERFORMANCE AUDIT SAMPLES

Are performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit samples in the validation narrative.

6. PRECISION

6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATE SAMPLES

Are the RPD values within specification? Yes No N/A

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and note the results in the validation narrative. If MS/MSD RPD values are out of specification and sample results are greater than five times the CRQL qualify positive results as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

ACTION: Note the results of the field duplicate samples in the validation narrative.

6.3 FIELD SPLIT SAMPLES

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

ACTION: Note the results of the field split samples in the validation narrative.

7. COMPOUND IDENTIFICATION AND QUANTITATION

7.1 COMPOUND IDENTIFICATION

Do positive results meet the retention time window criteria? Yes No N/A

Were positive results analyzed on disimilar columns? Yes No N/A

If dieldrin and DDE were reported was a 3% OV-1 column used for confirmation (2/88 SOW data only)? Yes No N/A

Do retention times and relative peak height ratios match the expected patterns for multipeak compounds (PCB, toxaphene or chlordane)? Yes No N/A

Has GC/MS confirmation been conducted on sample extract concentrations > 10 ppm? Yes No N/A

ACTION: If positive results do not meet the retention time criteria qualify all detected results as non-detects as follows: If the misidentified peak is outside the retention time windows and no interferences are noted report the CRQL and if the misidentified peak interferes with a target peak then the report value is qualified as estimated and non-detected (UJ). If positive results were not confirmed on disimilar columns, reject affected results (R). If a 3% OV-1 was used to confirm dieldrin and DDE, reject the affected data (R). If PCB, chlordane or toxaphene identification is questionable qualify the results as presumptive and estimated (NJ). If GC/MS confirmation was not conducted contact the laboratory for explanation and note in the validation narrative.

7.2 REPORTED RESULTS AND QUANTITATION LIMITS

Are results and quantitation limits calculated properly?	Yes	No	N/A
Has the laboratory reported the sample quantitation limits within five times the CRQL values?	Yes	No	N/A

ACTION: If results and quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

8. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes	No	N/A
Were project specific data quality objectives met for this analysis?	Yes	No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

9713505.2371

2B

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

b Name: TMA/ARLI Contract: WHC

b Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

vel:(low/med) LOW

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	B06M58	102	103	98	0	0
02	B06M58MS	107	105	105	0	0
03	B06M58MSD	102	107	97	0	0
04	VBLK0720	96	98	94	0	0

		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(84-138)
SMC2 (BFB)	= Bromofluorobenzene	(59-113)
SMC3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

1-D-022

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

ɔ Name: TMA/ARLI Contract: WHC

ɔ Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

vel:(low/med) LOW

	EPA SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	S7 (2CP)#	S8 (DCB)#	TOT OUT
01	B06M58	65	74	82	72	76	68	72	80	0
02	B06M58MS	60	70	65	69	70	63	66	77	0
03	B06M58MSD	58	70	152 *	69	68	64	65	75	1
04	SBLK0717S2	65	72	64	71	69	53	68	81	0

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(23-120)	
S2 (FBP)	= 2-Fluorobiphenyl	(30-115)	
S3 (TPH)	= Terphenyl-d14	(18-137)	
S4 (PHL)	= Phenol-d5	(24-113)	
S5 (2FP)	= 2-Fluorophenol	(25-121)	
S6 (TBP)	= 2,4,6-Tribromophenol	(19-122)	
S7 (2CP)	= 2-Chlorophenol-d4	(20-130)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(20-130)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2F

SOIL PESTICIDE SURROGATE RECOVERY

ɔ Name: TMA/ARLI Contract: WHC

ɔ Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Column(1): DB-608 ID: 0.53(mm) GC Column(2): DB-1701 ID: 0.53(mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	PBLK0717S2	83	87	90	94			0
02	B06M58	13*	15*	69	68			2
03	B06M58MS	61	66	81	81			0
04	B06M58MSD	73	77	83	81			0

	ADVISORY QC LIMITS
TCX = Tetrachloro-m-xylene	(60-150)
DCB = Decachlorobiphenyl	(60-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

1-20-93 SC

9713505.2374

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix Spike - EPA Sample No.: B06M58 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	52.10	0	50.42	97	59-172
Trichloroethene	52.10	0	53.02	102	62-137
Benzene	52.10	0	53.65	103	66-142
Toluene	52.10	0	55.21	106	59-139
Chlorobenzene	52.10	0	56.04	108	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	52.10	48.23	93	4	22	59-172
Trichloroethene	52.10	51.25	98	4	24	62-137
Benzene	52.10	50.83	98	5	21	66-142
Toluene	52.10	53.75	103	3	21	59-139
Chlorobenzene	52.10	55.73	107	1	21	60-133

\# Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

1-21-13

COMMENTS: CLP,07035,,B06M58,L,S,A207035-01A,VOA,EPA PACK/2,20720R01,2BFB0720,20720R02

3D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix Spike - EPA Sample No.: B06M58 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	2580	0	1502	58	26- 90
2-Chlorophenol	2580	0	1430	55	25-102
1,4-Dichlorobenzene	1720	0	962.5	56	28-104
N-Nitroso-di-n-prop.(1)	1720	0	979.7	57	41-126
1,2,4-Trichlorobenzene	1720	0	924.7	54	38-107
4-Chloro-3-methylphenol	2580	0	1420	55	26-103
Acenaphthene	1720	0	972.8	57	31-137
4-Nitrophenol	2580	0	1605	62	11-114
2,4-Dinitrotoluene	1720	0	1004	58	28- 89
Pentachlorophenol	2580	0	1306	51	17-109
Pyrene	1720	0	1048	61	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	2560	1496	58	0	35	26- 90
2-Chlorophenol	2560	1394	54	2	50	25-102
1,4-Dichlorobenzene	1710	915.4	54	4	27	28-104
N-Nitroso-di-n-prop.(1)	1710	953.0	56	2	38	41-126
1,2,4-Trichlorobenzene	1710	867.6	51	6	23	38-107
4-Chloro-3-methylphenol	2560	1417	55	0	33	26-103
Acenaphthene	1710	935.9	55	4	19	31-137
4-Nitrophenol	2560	1680	66	6	50	11-114
2,4-Dinitrotoluene	1710	966.6	57	2	47	28- 89
Pentachlorophenol	2560	1397	55	8	47	17-109
Pyrene	1710	1124	66	8	36	35-142

(1) N-Nitroso-di-n-propylamine

1-20-93

Column to be used to flag recovery and RPD values with an asterisk
Values outside of QC limits

PD: 0 out of 11 outside limits
pike Recovery: 0 out of 22 outside limits

OMMENTS: CLP,07035,,B06M58,L,S,A207035-01D,BNA,EPA
CAP/.25,20731N1,2DFT0731N1,20731N2,20731N4,20731N5

3F

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

atrix Spike - EPA Sample No.: B06M58

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	17.100	0	13.6	80	46-127
Heptachlor	17.100	0	12.3	72	35-130
Aldrin	17.100	0	11.9	70	34-132
Dieldrin	34.300	0	24.1	70	31-134
Endrin	34.300	0	30.6	89	42-139
4,4'-DDT	34.300	0	28.8	84	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)	17.000	15.1	89	-11	50	46-127
Heptachlor	17.000	13.5	79	-9	31	35-130
Aldrin	17.000	13.1	77	-10	43	34-132
Dieldrin	34.100	22.8	67	4	38	31-134
Endrin	34.100	32.0	94	-5	45	42-139
4,4'-DDT	34.100	29.5	87	-4	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

Values outside of QC limits

1-20-93 SC

D: 0 out of 6 outside limits
ike Recovery: 0 out of 12 outside limits

MMENTS:

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK0720

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ab File ID: 20720R02 Lab Sample ID: SBLK0720R

ate Analyzed: 07/20/92 Time Analyzed: 0841

: Column: PACK ID: 2.00(mm) Heated Purge: (Y/N) Y

istrument ID: 4500

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD: ✓

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B06M58	A207035-01A	20720R06	1128
02	B06M58MS	A207035-01B	20720R08	1258
03	B06M58MSD	A207035-01C	20720R09	1337

MMENTS: CLP,,,VBLK0720,L,S,SBLK0720R,VOA,BLANK
PACK/2,20720R01,2BFB0720,,

1-20-1350

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK0720

b Name: TMA/ARLI Contract: WHC

b Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

trix: (soil/water) SOIL Lab Sample ID: SBLK0720R

mple wt/vol: 5.0 (g/mL) G Lab File ID: 20720R02

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

Moisture: not dec. ____ Date Analyzed: 07/20/92

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

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

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

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

120-93SC

9713505.2379

1E

000019

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

VBLK0720

ıb Name: TMA/ARLI Contract: WHC

ıb Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ıtrix: (soil/water) SOIL Lab Sample ID: SBLK0720R

ımple wt/vol: 5.0 (g/mL) G Lab File ID: 20720R02

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

Moisture: not dec. ____ Date Analyzed: 07/20/92

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

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

Number TICs found: 1

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALCOHOL	7.08	7	J

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ab File ID (Standard): 20720R01 Date Analyzed: 07/20/92

nstrument ID: 4500 Time Analyzed: 748

C Column: PACK ID: 2.00(mm) Heated Purge: (Y/N) Y

		IS1(BCM) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CBZ) AREA #	RT #
	12 HOUR STD	16953	7.87	72369	16.25	69652	20.34
	UPPER LIMIT	33906	8.37	144738	16.75	139304	20.84
	LOWER LIMIT	8476	7.37	36184	15.75	34826	19.84
	EPA SAMPLE NO.						
01	B06M58	12938	7.67	57049	16.25	52632	20.34
02	B06M58MS	13511	7.70	55598	16.25	52920	20.34
03	B06M58MSD	12979	7.67	54967	16.25	50205	20.34
04	VBLK0720	13607	7.92	55140	16.25	54408	20.34

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = + 100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = +0.50 minutes of internal standard RT.
RT LOWER LIMIT = -0.50 minutes of internal standard RT.

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

1-30 92 JC

9713505.2381

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Lab File ID (Standard): 20731N1 Date Analyzed: 07/31/92

Instrument ID: 4500N Time Analyzed: 1111

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	12487	10.04	51428	13.20	25339	17.85
	UPPER LIMIT	24974	10.54	102856	13.70	50678	18.35
	LOWER LIMIT	6244	9.54	25714	12.70	12670	17.35
	EPA SAMPLE NO.						
01	B06M58	13032	10.00	54756	13.17	27066	17.84
02	B06M58MS	12020	10.00	51873	13.17	24874	17.84
03	B06M58MSD	12381	10.15	55725	13.34	27593	18.00
04	SBLK0717S2	13691	10.02	57652	13.20	28343	17.85

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = + 100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = +0.50 minutes of internal standard RT.
RT LOWER LIMIT = -0.50 minutes of internal standard RT.

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

1-20-93 SC

FORM VIII SV-1 3/90

8C

SEMI . . . E INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Lab File ID (Standard): 20731N1 Date Analyzed: 07/31/92

Instrument ID: 4500N Time Analyzed: 1111

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	36380	21.04	35122	26.21	27719	31.62
	UPPER LIMIT	72760	21.54	70244	26.71	55438	32.12
	LOWER LIMIT	18190	20.54	17561	25.71	13860	31.12
	EPA SAMPLE NO.						
01	B06M58	40773	21.02	33118	26.14	19981	31.51
02	B06M58MS	37260	21.00	29538	26.11	19935	31.49
03	B06M58MSD	39531	21.17	33181	26.24	21066	31.57
04	SBLK0717S2	35199	21.02	34256	26.16	20819	31.47

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = + 100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = +0.50 minutes of internal standard RT.
RT LOWER LIMIT = -0.50 minutes of internal standard RT.

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

1-20-93-C

4B

EPA SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

SBLK0717S2

b Name: TMA/ARLI Contract: WHC

b Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

b File ID: 20731N2 Lab Sample ID: A207035-BLK

strument ID: 4500N Date Extracted: 07/17/92

trix: (soil/water) SOIL Date Analyzed: 07/31/92

vel:(low/med) LOW Time Analyzed: 1303

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	B06M58	A207035-01D	20731N3	07/31/92
02	B06M58MS	A207035-01E	20731N4	07/31/92
03	B06M58MSD	A207035-01F	20731N5	07/31/92

MMENTS: CLP,07035,,SBLK0717S#2,L,S,A207035-BLK,BNA,BLANK
CAP/.25,20731N1,2DFT0731N1

4C

PESTICIDE METHOD BLANK SUMMARY

EPA SAMPLE NO.

PBLK0717S2

Name: TMA/ARLI Contract: WHC

Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Sample ID: A207035-BLK Lab File ID:

rix: (soil/water) SOIL Extraction: (SepF/Cont/Sonc) SONC

fur Cleanup: (Y/N) N Date Extracted: 07/17/92

e Analyzed (1): 07/30/92 Date Analyzed (2): 07/30/92

e Analyzed (1): 2036 Time Analyzed (2): 2036

trument ID (1): H5890A Instrument ID (2): H5890B

Column (1): DB-608 ID: 0.53 (mm) GC Column (2): DB-1701 ID: 0.53 (mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	B06M58	A207035-01D	07/30/92	07/30/92
02	B06M58MS	A207035-01E	07/30/92	07/30/92
03	B06M58MSD	A207035-01F	07/30/92	07/30/92

MENTS:

9713505.2385

000025

EPA SAMPLE NO.

PESTICIDE ORGANICS ANALYSIS DATA SHEET

PBLK0717S2

Name: TMA/ARLI Contract: WHC

Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A207035-BLK

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

Moisture: _____ decanted: (Y/N) ___ Date Received: _____

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/17/92

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/92

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.2	U
72-55-9	4,4'-DDE	3.2	U
72-20-8	Endrin	3.2	U
33213-65-9	Endosulfan II	3.2	U
72-54-8	4,4'-DDD	3.2	U
1031-07-8	Endosulfan sulfate	3.2	U
50-29-3	4,4'-DDT	3.2	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.2	U
7421-36-3	Endrin aldehyde	3.2	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	32	U
11104-28-2	Aroclor-1221	65	U
11141-16-5	Aroclor-1232	32	U
53469-21-9	Aroclor-1242	32	U
12672-29-6	Aroclor-1248	32	U
11097-69-1	Aroclor-1254	32	U
11096-82-5	Aroclor-1260	32	U

1-70-735c

9713505.2386

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

o Name: TMA/ARLI Contract: WHC

o Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

trix: (soil/water) SOIL Lab Sample ID: A207035-01D

mple wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

vel: (low/med) LOW Date Received: 07/15/92

Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

ncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

jection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
218-01-9	Chrysene	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

.b Name: TMA/ARLI Contract: WHC

.b Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

.trix: (soil/water) SOIL Lab Sample ID: A207035-01D

mple wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

vel: (low/med) LOW Date Received: 07/15/92

Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

ncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

jection Volume: 2.0(uL) Dilution Factor: 1.0

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

mber TICs found: 18

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	170	BJ
2.	Unknown alkene	4.83	240	BJ
3.	Unknown hydrocarbon	5.48	100	J
4.	Unknown ketone	5.68	240	BJ
5.	Unknown hydrocarbon	6.08	2500	BJ
6.	Unknown hydrocarbon	6.70	32000	BJ
7.	Unknown alkane	6.82	140	J
8.	Unknown hydrocarbon	6.93	240	BJ
9.	Unknown hydrocarbon	7.40	100	J
10.	Unknown hydrocarbon	8.00	810	BJ
11.	Unknown hydrocarbon	8.28	270	J
12.	Unknown ketone	8.38	68	J
13.	Unknown ketone	8.52	140	BJ
14.	Unknown alcohol	9.35	240	J
15.	Unknown alcohol	9.75	540	BJ
16.	Unknown acid	22.80	140	J
17.	Unknown carboxylic acid este	24.55	950	BJ
18.	Unknown carboxylic acid este	24.67	11000	BJ

9713505.2388

1F

EPA SAMPLE NO.

B06M58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

b Name: TMA/ARLI Contract: WHC

b Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

trix: (soil/water) SOIL Lab Sample ID: A207035-01D

mple wt/vol: 30.8 (g/mL) G Lab File ID: 20731N3

vel: (low/med) LOW Date Received: 07/15/92

Moisture: 4 decanted: (Y/N) N Date Extracted: 07/17/92

ncentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/31/92

jection Volume: 2.0(uL) Dilution Factor: 1.0

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

mber TICs found: 18

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	170	BJ
2.	Unknown alkene	4.83	240	BJ
3.	Unknown hydrocarbon	5.48	100	J
4.	Unknown ketone	5.68	240	BJ
5.	Unknown hydrocarbon	6.08	2500	BJ
6.	Unknown hydrocarbon	6.70	32000	BJ
7.	Unknown alkane	6.82	140	J
8.	Unknown hydrocarbon	6.93	240	BJ
9.	Unknown hydrocarbon	7.40	100	J
10.	Unknown hydrocarbon	8.00	810	BJ
11.	Unknown hydrocarbon	8.28	270	J
12.	Unknown ketone	8.38	68	J
13.	Unknown ketone	8.52	140	BJ
14.	Unknown alcohol	9.35	240	J
15.	Unknown alcohol	9.75	540	BJ
16.	Unknown acid	22.80	140	J
17.	Unknown carboxylic acid este	24.55	950	BJ
18.	Unknown carboxylic acid este	24.67	11000	BJ

9713505.2389

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

Name: TMA/ARLI Contract: WHC

Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

rix: (soil/water) SOIL Lab Sample ID: A207035-01D

ple wt/vol: 30.4 (g/mL) G Lab File ID:

oisture: 4 decanted: (Y/N) N Date Received: 07/15/92

raction: (SepF/Cont/Sonc) SONC Date Extracted: 07/17/92

centrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/92

ection Volume: 1.00 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.4	U
72-55-9	4,4'-DDE	3.4	U
72-20-8	Endrin	3.4	U
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	3.4	U
50-29-3	4,4'-DDT	3.4	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.4	U
7421-36-3	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	69	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	34	U
11096-82-5	Aroclor-1260	34	U

9713505.2390

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M58

Name: TMA/ARLI Contract: WHC

Code: TMALA Case No.: 07035 SAS No.: NA SDG No.: NA

ix: (soil/water) SOIL Lab Sample ID: A207035-01D

le wt/vol: 30.4 (g/mL) G Lab File ID:

isture: 4 decanted: (Y/N) N Date Received: 07/15/92

action: (SepF/Cont/Sonc) SONC Date Extracted: 07/17/92

entrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/92

ction Volume: 1.00 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.4	U
72-55-9	4,4'-DDE	3.4	U
72-20-8	Endrin	3.4	U
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	3.4	U
50-29-3	4,4'-DDT	3.4	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.4	U
7421-36-3	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	69	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	34	U
11096-82-5	Aroclor-1260	34	U

X01466

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse - Hanford	REVIEWER: SC	DATE: 1-20-93
LABORATORY: TMA	CASE:	SDG: B06M58
SAMPLES/MATRIX: Soil		
B06M58		

1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	✓			
Cover Page		✓		
Traffic Reports		✓		
Sample Data				
Inorganic Analysis Data Sheets		✓		
Standards Data				
Initial and Continuing Calibration Verification	✓			
CRDL Standard for AA and ICP		✓		
QC Summary				
Blanks	✓			
ICP Interference Check Summary		✓		
Spike Sample Recovery		✓		
Post-Digestion Spike Sample Recovery				✓
Duplicate		✓		
Laboratory Control Sample		✓		
Standard Addition Results		✓		
ICP Serial Dilutions		✓		
Instrument Detection Limits		✓		
ICP Interelement Correction Factors	✓			
ICP Linear Ranges		✓		
Preparation Log		✓		
Analysis Run Log		✓		
Raw Data				
ICP Raw Data	✓			
Furnace AA Raw Data	✓			
Mercury Raw Data		✓		
Cyanide Raw Data		✓		
Additional Data				
Internal laboratory chain-of-custody	✓			
Laboratory Sample Preparation Records		✓		

Data Package Item	Present?:	Yes	No	N/A
Percent Solids Analysis Records		✓		
Reduction Formulae			✓	
Instrument Run Logs	✓			
Chemist Notebook Pages		✓		

2. HOLDING TIMES

Have all samples been analyzed within holding times? Yes No N/A

ACTION: If any holding times have been exceeded qualify all affected results as estimated (J for detects and UJ for non-detects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used? Yes No N/A

Are the correlation coefficients ≥0.995? Yes No N/A

Was a midrange CN standard distilled? Yes No N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results > IDL as estimated (J) and results < IDL as estimated (UJ), if the correlation coefficient is < 0.995 or the laboratory did not distill the midrange CN standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Are ICV and CCV percent recoveries within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

5. ICP INTERFERENCE CHECK SAMPLE

Has an ICS sample been analyzed at the proper frequency? Yes No N/A

Are the AB solution %R values within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes No N/A

ACTION: Qualify all associated sample results for any analyte <5X the amount in any laboratory blank as non-detected (U). If analyte concentrations in the blank are greater than the CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations less than 10x the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

Are target analytes present in the field blanks? Yes No N/A

ACTION: Qualify all sample results for any analyte <5X the amount in any valid field blank as non-detected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all non-detects as estimated (UJ). If spike recovery is <30%, reject all non-detects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results > IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field split samples in the validation narrative.

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required? Yes No N/A

Are MSA correlation coefficients $\geq$0.995? Yes No N/A

If no, was a second MSA analysis performed? Yes No N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for non-detects). If the analytical spike recovery is less than 40 percent qualify detects as estimated (J). If the analytical spike recovery is greater than or equal to 10% but less than 40 percent, qualify all non-detects as estimated (UJ) and if the analytical spike recovery is less than 10 percent, reject all non-detects (R). If the sample absorbance is less than 50% of the analytical spike absorbance and the analytical spike recovery is less than 85% or greater than 115%, qualify all results as estimated (J for detects and UJ for non-detects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was less than 0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly? Yes No N/A

Are results within the calibrated range of the instruments and within the linear range of the ICP? Yes No N/A

Are all detection limits below the CRQL? Yes No N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW? Yes No N/A

Were project specific data quality objectives met for this analysis? Yes No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10 of the data validation requirements.

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: Westinghouse	REVIEWER: SC	DATE: 1-20-93
LABORATORY: TMA	CASE:	SDG: B06M58
SAMPLES/MATRIX: SOIL		
B06M58		

1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	✓			
Cover Page		✓		
Traffic Reports/Chain-of-Custody		✓		
Sample Analysis Data Report Forms	✓			
Standards Data	✓			
QC Summary				
Blanks Summary Report Forms		✓		
Spike Sample Recovery Report Forms	✓			
Duplicate Sample Analysis Report Forms		✓		
Laboratory Control Sample Report Forms		✓		
Raw Data				
Ion Chromatograph Chromatograms	✓			
TOC and TOX Instrument Printouts			✓	
Laboratory Bench Sheets		✓		
Additional Data				
Laboratory Sample Preparation Logs	✓			
Instrument Run Logs	✓			
Internal Laboratory Chain-of-Custory	✓			
Percent Solids Analysis Records		✓		
Reduction Formulae			✓	
Chemist Notebook Pages		✓		

2. HOLDING TIMES

Were all samples analyzed within holding times? **Yes** No N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for non-detects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used? Yes No N/A

Are the correlation coefficients ≥0.995? Yes No N/A

Was a balance check conducted prior to the TDS analysis? Yes No N/A

Was the titrant normality checked? Yes No N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency? Yes No N/A

Are ICV and CCV percent recoveries within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

5. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes No N/A

ACTION: Qualify all associated sample results for any analyte <5X the amount in any laboratory blank as non-detected (U) and list the affected samples and analytes below.

6. FIELD BLANKS

Are target analytes present in the field blanks? Yes No N/A

ACTION: Qualify all sample results for any analyte <5X the amount in any valid field blank as non-detected (U).

7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits? Yes No N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are greater than the CRQL, qualify the data as estimated (J). If the spike recovery is less than 30% and the sample results are less then the IDL qualify the data as unusable (R).

8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results > IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

9. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit samples in the validation narrative.

10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits? Yes No N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

ACTION: Note the results of the field split samples in the validation narrative.

13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly? Yes No N/A

Are instrument detection limits below the CRDL? Yes No N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

14. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW? Yes No N/A

Were project specific data quality objectives met for this analysis? Yes No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

9713505.2401

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M58

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

atrix (soil/water): SOIL Lab Sample ID: 07111-01S

evel (low/med): LOW Date Received: 07/17/92

Solids: 94.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5090.00			P
7440-36-0	Antimony	3.30	U	N	P
7440-38-2	Arsenic	1.10	B		F
7440-39-3	Barium	72.10			P
7440-41-7	Beryllium	0.14	U		P
7440-43-9	Cadmium	1.50			P
7440-70-2	Calcium	6560.00			P
7440-47-3	Chromium	8.70		*	P
7440-48-4	Cobalt	9.90	B		P
7440-50-8	Copper	19.70			P
7439-89-6	Iron	18400.00			P
7439-92-1	Lead	3.10			F
7439-95-4	Magnesium	3920.00			P
7439-96-5	Manganese	296.00			P
7439-97-6	Mercury	0.06	B		CV
7440-02-0	Nickel	8.80			P
7440-09-7	Potassium	874.00	B		P
7782-49-2	Selenium	1.70		+*	F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	338.00	B		P
7440-28-0	Thallium	0.31	U		F
7440-62-2	Vanadium	42.40		*	P
7440-66-6	Zinc	39.70		E	P
	Cyanide	0.52	U		CA

olor Before: BROWN Clarity Before: Texture: MEDIUM

olor After: BROWN Clarity After: Artifacts: YES

omments:
STONES

9713505.2402

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M58

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

atrix (soil/water): SOIL Lab Sample ID: 07111-01S

evel (low/med): LOW Date Received: 07/17/92

Solids: 94.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5090.00			P
7440-36-0	Antimony	3.30	U	N	P
7440-38-2	Arsenic	1.10	B		F
7440-39-3	Barium	72.10			P
7440-41-7	Beryllium	0.14	U		P
7440-43-9	Cadmium	1.50			P
7440-70-2	Calcium	6560.00			P
7440-47-3	Chromium	8.70		*	P
7440-48-4	Cobalt	9.90	B		P
7440-50-8	Copper	19.70			P
7439-89-6	Iron	18400.00			P
7439-92-1	Lead	3.10			F
7439-95-4	Magnesium	3920.00			P
7439-96-5	Manganese	296.00			P
7439-97-6	Mercury	0.06	B		CV
7440-02-0	Nickel	8.80			P
7440-09-7	Potassium	874.00	B		P
7782-49-2	Selenium	1.70		+*	F
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	338.00	B		P
7440-28-0	Thallium	0.31	U		F
7440-62-2	Vanadium	42.40		*	P
7440-66-6	Zinc	39.70		E	P
	Cyanide	0.52	U		CA

olor Before: BROWN Clarity Before: Texture: MEDIUM

olor After: BROWN Clarity After: Artifacts: YES

omments:
STONES

TMA Inc. REPORT Work Order # A2-07-035

ceived: 07/15/92

Results by Sample

MPLE ID B06M58 FRACTION 01D TEST CODE WCCLPS NAME Anions in Solids - WN232

Date & Time Collected 07/10/92 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	3.1	mg/Kg	1.0
Sulfate	300	42	mg/Kg	10

FORM I

TMA Inc. REPORT Work Order # A2-07-035

eived: 07/15/92

Results by Sample

PLE ID B06M58 FRACTION 01D TEST CODE WCCLPS NAME Anions in Solids - WM232

Date & Time Collected 07/10/92 Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	3.1	mg/Kg	1.0
Sulfate	300	42	mg/Kg	10

FORM I

SAMPLE RESULTS

9713505.2406

000007

TMA Inc. REPORT Work Order # A2-07-035

eceived: 07/15/92 09/02/92 11:21:51

REPORT TO: Westinghouse Hanford Company
2355 Stevens Dr.
Richland,WA,99352
MO-346/200 West/T6-08
ATTEN: Jeanette Duncan

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016
ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

CERTIFIED BY: Ernesto Vaggy

CONTACT: EVV CIH

CLIENT: WHC SAMPLES: 2
COMPANY: Westinghouse Hanford Company
ACILITY:

This report is for the sole and exclusive use of the client to whom it is addressed and represents only those samples herein described. Samples not destroyed in testing are retained a maximum of 30 days unless otherwise requested.

WORK ID: 100-NR-2
TAKEN: By Westinghouse Staff
TRANS: Federal Express
TYPE: Soil
P.O. #: N2-07-054-SU-AR
INVOICE: under separate cover

SAMPLE IDENTIFICATION

1	B06M58
1	B06M58 MS
1	B06M58 MSD
1	B06M58
1	B06M58 MS
1	B06M58 MSD
1	B06M58 Duplicate
2	Wet Chemistry Blank

TEST CODES and NAMES used on this workorder

BNCLPS	CLP Semivol. Soils
F S	Fluoride in Solids
IC AN	Anions Extraction Solids
MOIST	Moisture
PECLPS	CLP Pest\PCBs Soil - WH015
PH SOL	pH of Solids
SO4 S	Sulfate (in Solids)
VOCLPS	CLP Vol. Org.Soils
WCCLPS	Anions in Solids - WH232
WCQCD	Quality Control Summary
WCQCS	Quality Control Summary

TMA Inc. REPORT Work Order # A2-07-035

:ceived: 07/15/92 Results by Sample

MPLE ID Wet Chemistry Blank FRACTION 02A TEST CODE WCCLPS NAME Anions in Solids - WM232

Date & Time Collected not specified Category

ANIONS AND WET CHEMISTRY - SOLIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300.0	<1	mg/Kg	1.
Sulfate	300.0	<10	mg/Kg	10.

FORM I

QC RESULTS

TMA Inc. REPORT Work Order # A2-07-035

:ceived: 07/15/92 Results by Sample

.MPLE ID B06M58 MS FRACTION 01E TEST CODE VCQCS NAME Quality Control Summary

Date & Time Collected 07/10/92 Category

SPIKE QC SUMMARY

ANALYSIS	SAMPLE ID	SAMPLE RESULT	SPIKE RESULT	AMOUNT ADDED	% R
Fluoride	B06M58	3.1	110.5	100.00	107.4
Sulfate	B06M58	42	320	300.00	92.7

FORM V

TMA Inc. REPORT Work Order # A2-07-035

ceived: 07/15/92 Results by Sample

MPLE ID B06M58 Duplicate FRACTION 01G TEST CODE WCQCD NAME Quality Control Summary

Date & Time Collected 07/10/92 Category

DUPLICATE QC SUMMARY

ANALYSIS	SAMPLE ID	SAMPLE RESULT	DUPL. RESULT	RPD
Fluoride	B06M58	3.1	3.1	0.0
Sulfate	B06M58	42	43	2.4

FORM VI

9713505.2411

DRAFT

9/21/92

 Skinner&Sherman REPORT Work Order # S2-07-114

Received: 07/16/92 08/21/92 15:38:59

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

ATTEN Dan Steurmer

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

PREPARED TMA / Skinner & Sherman Labs.
BY 300 Second Avenue
P.O. Box 521
Waltham, MA 02254
ATTEN Client Services
PHONE (617) 890-7200

CERTIFIED BY

CONTACT DP

WORK ID N207054
TAKEN BY CLIENT
TRANS FED EX# 2521035075
TYPE SOIL FOR NO3NO2
P.O. # N207054
INVOICE under separate cover

SAMPLE IDENTIFICATION	TEST CODES and NAMES used on this workorder
01 B06M58	NO3NO2 Nitrate Plus Nitrite
01 B06M58D	
01 B06M58S	
02 LCSS	

TMA
Thermo Analytical Inc.

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

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

TMA/NORCAL

QUALITY CONTROL

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S207114-01	<2.39 mg/kg	19.0 mg/kg	15.4 mg/kg	81.1

DUPLICATE

Sample ID	Sample result	Duplicate Result	Relative % Difference
S207114-01	<2.39 mg/kg	<2.35 mg/kg	not calculable

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	Percent Recovery
LCS	2.00 mg/L	1.89 mg/L	94.5
Prep Blank		<0.25 mg/L	

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

Received: 07/16/92

Test Methodology

TEST CODE NO3NO2 NAME Nitrate Plus Nitrite

Methods for Chemical Analysis of Water and Wastes
EPA - 600/4-79-020 March 1979 Method 353.2 (modified)

TMA
Thermo Analytical Inc.

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

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

9713505.2414

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

nitial Calibration Source; EPA-LV

ontinuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1958.0	1941.10	99.1	25000.0	24836.00	99.3	25125.00	100.5	P
Antimony	978.0	999.11	102.2	2500.0	2441.90	97.7	2482.10	99.3	P
Arsenic	50.4	50.16	99.5	50.0	48.07	96.1	47.40	94.8	F
Barium	2078.0	2027.40	97.6	2500.0	2447.80	97.9	2484.30	99.4	P
Beryllium	508.0	496.57	97.8	500.0	503.12	100.6	514.92	103.0	P
Cadmium	516.0	499.11	96.7	2500.0	2429.60	97.2	2473.30	98.9	P
Calcium	51382.0	51353.00	99.9	25000.0	25101.00	100.4	25474.00	101.9	P
Chromium	514.0	500.06	97.3	2500.0	2462.10	98.5	2518.90	100.8	P
Cobalt	499.0	492.79	98.8	2500.0	2423.20	96.9	2462.30	98.5	P
Copper	525.0	506.74	96.5	2500.0	2421.70	96.9	2455.50	98.2	P
Iron	1981.0	1995.20	100.7	10000.0	10061.00	100.6	10293.00	102.9	P
Lead	98.4	103.90	105.6	50.0	48.38	96.8	51.18	102.4	F
Magnesium	25587.0	25804.00	100.8	25000.0	24961.00	99.8	25411.00	101.6	P
Manganese	509.0	499.63	98.2	2500.0	2443.80	97.8	2485.40	99.4	P
Mercury	5.0	4.28	85.6	2.0	1.87	93.5	1.83	91.5	CV
Nickel	504.0	499.02	99.0	2500.0	2417.00	96.7	2459.90	98.4	P
Potassium	50563.0	51622.00	102.1	25000.0	24650.00	98.6	24778.00	99.1	P
Selenium	50.3	51.97	103.3	50.0	48.31	96.6	47.57	95.1	F
Silver	517.0	535.79	103.6	500.0	502.72	100.5	507.89	101.6	P
Sodium	52348.0	51922.00	99.2	25000.0	24897.00	99.6	25250.00	101.0	P
Thallium	100.7	100.76	100.1	50.0	50.56	101.1	52.54	105.1	F
Vanadium	517.0	503.42	97.4	2500.0	2462.60	98.5	2504.80	100.2	P
Zinc	3052.0	2985.60	97.8	2500.0	2418.00	96.7	2446.50	97.9	P
Cyanide	94.0	83.70	89.0	200.0	201.07	100.5	202.05	101.0	CA

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

9713505.2415

WESTINGHOUSE/HANFORD

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

nitial Calibration Source: EPA-LV

ontinuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	25432.00	101.7			P
Antimony				2500.0	2509.00	100.4			P
Arsenic				50.0	46.01	92.0			F
Barium				2500.0	2508.20	100.3			P
Beryllium				500.0	518.68	103.7			P
Cadmium				2500.0	2515.50	100.6			P
Calcium				25000.0	25815.00	103.3			P
Chromium				2500.0	2548.40	101.9			P
Cobalt				2500.0	2506.30	100.3			P
Copper				2500.0	2479.90	99.2			P
Iron				10000.0	10381.00	103.8			P
Lead				50.0	47.03	94.1	45.03	90.1	F
Magnesium				25000.0	25807.00	103.2			P
Manganese				2500.0	2516.30	100.7			P
Mercury				2.0	1.94	97.0	1.88	94.0	CV
Nickel				2500.0	2502.40	100.1			P
Potassium				25000.0	25158.00	100.6			P
Selenium				50.0	45.63	91.3	46.14	92.3	F
Silver				500.0	511.32	102.3			P
Sodium				25000.0	25462.00	101.8			P
Thallium				50.0	50.92	101.8	49.12	98.2	F
Vanadium				2500.0	2536.00	101.4			P
Zinc				2500.0	2485.90	99.4			P
Cyanide				200.0	202.90	101.4			CA

1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

9713505.2416

WESTINGHOUSE/HANFORD

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

nitial Calibration Source: EPA-LV

ontinuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	53.48	107.0			F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

9713505.2417

WESTINGHOUSE/HANFORD

2B
CRDL STANDARD FOR AA AND ICP

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

.ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

.A CRDL Standard Source: SKINER

:CP CRDL Standard Source: SKINER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony				120.0	117.57	98.0	108.61	90.5
Arsenic	10.0	9.29	92.9					
Barium								
Beryllium				10.0	10.93	109.3	10.28	102.8
Cadmium				10.0	11.74	117.4	12.07	120.7
Calcium								
Chromium				20.0	27.22	136.1	23.92	119.6
Cobalt				100.0	98.47	98.5	101.30	101.3
Copper				50.0	51.74	103.5	50.30	100.6
Iron								
Lead	3.0	3.81	127.0					
Magnesium								
Manganese				30.0	30.88	102.9	30.68	102.3
Mercury								
Nickel				80.0	83.53	104.4	82.72	103.4
Potassium								
Selenium	5.0	10.31	206.2					
Silver				20.0	20.17	100.8	21.88	109.4
Sodium								
Thallium	10.0	10.76	107.6					
Vanadium				100.0	98.19	98.2	102.11	102.1
Zinc				40.0	49.88	124.7	46.29	115.7

006

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WESTINGHOUSE/HANFORD

3

BLANKS

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

reparation Blank Matrix (soil/water): SOIL

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	23.9	U	37.7	B	29.8	B	38.3	B	28.190	B	P
Antimony	16.3	U	16.3	U	16.3	U	16.3	U	16.300	U	P
Arsenic	2.2	U	2.2	U	2.2	U	2.2	U	0.440	U	F
Barium	4.6	U	4.6	U	4.6	U	4.6	U	4.600	U	P
Beryllium	0.7	U	0.7	U	0.7	U	0.7	U	0.700	U	P
Cadmium	1.5	U	3.2	B	3.0	B	3.6	B	1.500	U	P
Calcium	15.5	U	31.3	B	21.6	B	43.9	B	61.030	B	P
Chromium	4.9	U	6.0	B	4.9	U	4.9	U	4.900	U	P
Cobalt	3.5	U	4.0	B	3.5	U	3.5	U	3.500	U	P
Copper	3.8	U	4.3	B	3.8	U	4.3	B	7.180	B	P
Iron	7.6	U	8.7	B	19.8	B	7.6	U	8.700	B	P
Lead	2.2	U	2.2	U	2.2	U	2.2	U	0.440	U	F
Magnesium	40.1	U	54.4	B	40.1	U	40.1	U	40.100	U	P
Manganese	4.4	U	4.4	U	4.4	U	4.4	U	4.400	U	P
Mercury			0.1	U	0.1	U	0.1	U	0.070	B	CV
Nickel	3.9	U	3.9	U	3.9	U	3.9	U	3.900	U	P
Potassium	265.5	U	265.5	U	265.5	U	265.5	U	265.500	U	P
Selenium	2.8	U	2.8	U	2.8	U	2.8	U	0.560	U	F
Silver	4.8	U	4.8	U	4.8	U	4.8	U	4.800	U	P
Sodium	37.8	B	69.2	B	82.0	B	88.4	B	90.100	B	P
Thallium	1.6	U	1.6	U	1.6	U	1.6	U	0.320	U	F
Vanadium	2.5	B	4.5	B	3.0	B	3.0	B	2.400	U	P
Zinc	2.9	U	2.9	U	2.9	U	2.9	U	3.810	B	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA

1-70-(1-2) SC

007

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WESTINGHOUSE/HANFORD

3

BLANKS

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Preparation Blank Matrix (soil/water):

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic											NR
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.2	U							F
Magnesium											NR
Manganese											NR
Mercury			0.1	U	0.1	U					CV
Nickel											NR
Potassium											NR
Selenium			2.8	U	2.8	U					F
Silver											NR
Sodium											NR
Thallium			1.6	U							F
Vanadium											NR
Zinc											NR
Cyanide											NR

9713505.2420

WESTINGHOUSE/HANFORD

4

ICP INTERFERENCE CHECK SAMPLE

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

CP ID Number: P1 ICS Source: ICF-0590

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum	540055	536472	552970	546120.0	101.8	553300	553960.0	103.3
Antimony	0	0	-26	1.5		9	-1.7	
Arsenic								
Barium	0	502	10	502.1	100.0	11	507.2	101.0
Beryllium	0	480	0	478.8	99.8	1	487.5	101.6
Cadmium	0	907	-4	882.6	97.3	-4	896.2	98.8
Calcium	494040	512228	509280	502050.0	98.0	508010	508240.0	99.2
Chromium	21	529	40	489.4	92.5	39	487.8	92.2
Cobalt	0	477	2	486.7	102.0	2	494.0	103.6
Copper	0	543	5	495.1	91.2	1	496.2	91.4
Iron	206236	199845	194130	192270.0	96.2	195290	195800.0	98.0
Lead								
Magnesium	531358	527530	535710	528750.0	100.2	537530	537470.0	101.9
Manganese	34	496	31	500.8	101.0	31	507.7	102.4
Mercury								
Nickel	0	940	22	890.5	94.7	20	900.5	95.8
Potassium	0	0	115	12.8		73	-21.3	
Selenium								
Silver	0	960	3	993.5	103.5	3	1001.6	104.3
Sodium	0	0	1761	1747.4		1814	1765.4	
Thallium								
Vanadium	0	509	1	471.4	92.6	2	478.6	94.0
Zinc	216	1208	222	1162.0	96.2	221	1178.7	97.6

9713505.2421

WESTINGHOUSE/HANFORD

5A

SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: B06M58S

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

atrix: SOIL Level (low/med): LOW

Solids for Sample: 94.7

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	63.2503		3.3100	U	101.54	62.3	N	P
Arsenic	75-125	10.8960		1.1411	B	8.28	~~117.8~~		F
Barium	75-125	473.5602		72.0677		406.14	98.9		P
Beryllium	75-125	10.0439		0.1421	U	10.15	99.0		P
Cadmium	75-125	10.3607		1.5027		10.15	87.3		P
Calcium									NR
Chromium	75-125	46.1112		8.7097		40.61	92.1		P
Cobalt	75-125	105.8890		9.9159	B	101.54	94.5		P
Copper	75-125	65.1511		19.7100		50.77	89.5		P
Iron									NR
Lead	75-125	6.9188		3.1441		4.14	91.2		F
Magnesium									NR
Manganese	75-125	383.1736		295.8939		101.54	86.0		P
Mercury	75-125	0.4913		0.0634	B	0.46	93.0		CV
Nickel	75-125	104.8940		8.8092		101.54	94.6		P
Potassium									NR
Selenium	75-125	3.4740		1.7050		2.07	85.5		F
Silver	75-125	10.8277		0.9747	U	10.15	106.7		P
Sodium									NR
Thallium	75-125	10.2825		0.3100	U	10.35	99.3		F
Vanadium	75-125	136.5141		42.4295		101.54	92.7		P
Zinc	75-125	135.1251		39.7104		101.54	94.0		P
Cyanide	75-125	26.2583		0.5228	U	25.88	101.5		CA

omments:

010

9713505.2422

WESTINGHOUSE/HANFORD

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NUMBER: B06M58A

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Matrix: SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		103.48		16.30	U	120.0	86.2		P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

9713505.2423

WESTINGHOUSE/HANFORD

6
DUPLICATES

SAMPLE NUMBER:

B06M58D

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

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

Solids for Sample: 94.7 % Solids for Duplicate: 94.4

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		5093.8185		5984.4297		16.1		P
Antimony		3.3100	U	3.3750	U			P
Arsenic		1.1411	B	1.0598	B	7.4		F
Barium	40.6	72.0677		71.1349		1.3		P
Beryllium		0.1421	U	0.2733	B	200.0		P
Cadmium	1.0	1.5027		0.8551	B	54.9		P
Calcium		6560.5962		7403.5654		12.1		P
Chromium	2.0	8.7097		20.0385		78.8	*	P
Cobalt	10.2	9.9159	B	10.9468		9.9		P
Copper	5.1	19.7100		19.0426		3.4		P
Iron		18360.4094		21100.6895		13.9		P
Lead	0.6	3.1441		2.8112		11.2		F
Magnesium	1015.4	3923.1175		4296.3331		9.1		P
Manganese		295.8939		311.2616		5.1		P
Mercury		0.0634	B	0.0739	B	15.3		CV
Nickel	8.1	8.8092		13.4998		42.1		P
Potassium		873.8730	B	841.5015	B	3.8		P
Selenium	1.0	1.7050		0.5475	U	200.0	*	F
Silver		0.9747	U	0.9939	U			P
Sodium		337.6046	B	306.1888	B	9.8		P
Thallium		0.3100	U	0.3129	U			F
Vanadium	10.2	42.4295		54.9827		25.8	*	P
Zinc		39.7104		43.4499		9.0		P
Cyanide		0.5228	U	0.4934	U			CA

-012

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WESTINGHOUSE/HANFORD

7

LABORATORY CONTROL SAMPLE

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

olid LCS Source: QAL-0287

queous LCS Source:

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits	Limits	%R
Aluminum				325.0	298.4		225.0	424.0	91.8
Antimony				211.0	207.3		127.0	294.0	98.2
Arsenic				917.0	1131.9		635.0	1199.0	123.4
Barium				4.8	5.0	B	0.0	40.0	104.2
Beryllium				19.4	18.6		16.5	22.3	95.9
Cadmium				45.4	38.9		35.7	55.1	85.7
Calcium				196200.0	180784.0		166800.0	225600.0	92.1
Chromium				99.6	96.7		79.2	120.0	97.1
Cobalt				144.0	142.1		125.0	162.0	98.7
Copper				6910.0	6563.2		6006.0	7820.0	95.0
Iron				22430.0	21880.0		17770.0	27080.0	97.5
Lead				236.0	216.1		188.0	285.0	91.6
Magnesium				118100.0	116968.0		100400.0	129900.0	99.0
Manganese				208.0	204.5		177.0	239.0	98.3
Mercury				12.7	16.8		8.5	17.0	132.3
Nickel				60.9	55.9		49.2	72.6	91.8
Potassium				50.0	53.1	U	0.0	1000.0	0.0
Selenium				39.2	27.7		19.1	59.4	70.7
Silver				22.2	20.0		15.5	29.0	90.1
Sodium				50.0	39.9	B	0.0	1000.0	79.8
Thallium				39.0	39.0		24.6	53.5	100.0
Vanadium				65.8	68.0		51.7	79.9	103.3
Zinc				187.0	175.5		138.0	236.0	93.9
Cyanide				5.6	5.2		4.3	6.9	92.9

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8

STANDARD ADDITION RESULTS

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q
B06M58	SE	0.045	5.00	0.022	10.00	0.045	15.00	0.040	230.0	0.0945	+
B06M58	SE	0.020	5.00	0.021	10.00	0.050	15.00	0.045	8.8	0.8537	+

-014

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9

ICP SERIAL DILUTIONS

SAMPLE NUMBER: B06M58L

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

ab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

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

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ-ence	Q	M
Aluminum	25084.00		24343.50		3.0		P
Antimony	16.30	U	81.50	U			P
Arsenic							NR
Barium	354.89		346.05	B	2.5		P
Beryllium	0.70	U	3.50	U			P
Cadmium	7.40		10.55	B	42.6		P
Calcium	32307.00		31069.00		3.8		P
Chromium	42.89		48.90	B	14.0		P
Cobalt	48.83	B	52.45	B	7.4		P
Copper	97.06		86.30	B	11.1		P
Iron	90414.00		90610.00		0.2		P
Lead							NR
Magnesium	19319.00		19202.50	B	0.6		P
Manganese	1457.10		1428.95		1.9		P
Mercury							NR
Nickel	43.38		47.15	B	8.7		P
Potassium	4303.30	B	3863.55	B	10.2		P
Selenium							NR
Silver	4.80	U	24.00	U			P
Sodium	1662.50	B	1723.50	B	3.7		P
Thallium							NR
Vanadium	208.94		211.95	B	1.4		P
Zinc	195.55		227.45		16.3	E	P

-015

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WESTINGHOUSE/HANFORD

10

Instrument Detection Limits (Quarterly)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: Date: 07/15/92

Flame AA ID Number:

Furnace AA ID Number: F6

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	2.2	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	2.8	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F6: THERMO JARRELL-ASH VIDEO 21

-016

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WESTINGHOUSE/HANFORD

10

Instrument Detection Limits (Quarterly)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: Date: 07/15/92

Flame AA ID Number:

Furnace AA ID Number: F8

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	283.30	BS	3	2.2	F
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium	276.80	BS	10	1.6	F
Vanadium			50		NR
Zinc			20		NR

Comments:
F8: THERMO JARRELL-ASH VIDEO 21

-017

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WESTINGHOUSE/HANFORD

10

Instrument Detection Limits (Quarterly)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: Date: 07/16/92

Flame AA ID Number: M3

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
M3: LDC ANALYTICAL #050941

-018

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WESTINGHOUSE/HANFORD

10

Instrument Detection Limits (Quarterly)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: P1 Date: 07/15/92

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	23.9	P
Antimony	206.80		60	16.3	P
Arsenic			10		NR
Barium	493.40		200	4.6	P
Beryllium	313.00		5	0.7	P
Cadmium	226.50		5	1.5	P
Calcium	317.90		5000	15.5	P
Chromium	267.70		10	4.9	P
Cobalt	228.60		50	3.5	P
Copper	324.70		25	3.8	P
Iron	259.90		100	7.6	P
Lead			3		NR
Magnesium	279.00		5000	40.1	P
Manganese	257.60		15	4.4	P
Mercury			0.2		NR
Nickel	231.60		40	3.9	P
Potassium	766.40		5000	265.5	P
Selenium			5		NR
Silver	328.00		10	4.8	P
Sodium	588.90		5000	31.3	P
Thallium			10		NR
Vanadium	292.40		50	2.4	P
Zinc	213.80		20	2.9	P

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

-019

WESTINGHOUSE/HANFORD

11

ICP Interelement Correction Factors (Annually)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: P1 Date: 07/01/92

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	Cr
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0002100	0.0000000	0.0119500
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0001500	0.0000000	0.0000000
Calcium	317.90	0.0000000	0.0000000	-0.0003000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000300	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.70	0.0000000	0.0000000	-0.0001200	0.0000000	-0.0000800
Iron	259.90	0.0001400	0.0000000	0.0000000	0.0000000	0.0000000
Lead						
Magnesium	279.00	0.0000000	0.0000000	-0.0002400	0.0000000	0.0000000
Manganese	257.60	0.0000200	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0000000	-0.0001000	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000400	0.0000000	-0.0002000	0.0000000	-0.0051200
Zinc	213.80	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

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WESTINGHOUSE/HANFORD

11

ICP Interelement Correction Factors (Annually)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: P1 Date: 07/01/92

Analyte	Wave-length (nm)	Cu	Mn	Ni	V	__
Aluminum	308.20	0.0000000	0.0012800	0.0000000	0.0098400	
Antimony	206.80	0.0000000	0.0000000	-0.0023000	-0.0043600	
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.00	0.0000000	0.0000000	0.0000000	-0.0024900	
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.90	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	267.70	0.0000000	0.0000000	0.0000000	0.0015200	
Cobalt	228.60	0.0000000	0.0000000	-0.0000300	0.0000000	
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.90	-0.0001200	-0.0017500	0.0000000	0.0000000	
Lead						
Magnesium	279.00	0.0000000	-0.0004100	0.0000000	0.0000000	
Manganese	257.60	0.0000000	0.0000000	0.0000000	-0.0001000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	328.00	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	
Zinc	213.80	0.0017400	0.0000000	0.0045900	0.0000000	

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

-021

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WESTINGHOUSE/HANFORD

12

ICP Linear Ranges (Quarterly)

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

ICP ID Number: P1 Date: 07/15/92

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	
Antimony	5.00	25000.0	
Arsenic			
Barium	5.00	100000.0	
Beryllium	5.00	25000.0	
Cadmium	5.00	25000.0	
Calcium	5.00	1200000.0	
Chromium	5.00	200000.0	
Cobalt	5.00	100000.0	
Copper	5.00	250000.0	
Iron	5.00	1000000.0	
Lead			
Magnesium	5.00	1000000.0	
Manganese	5.00	200000.0	
Mercury			
Nickel	5.00	250000.0	
Potassium	5.00	1000000.0	
Selenium			
Silver	5.00	100000.0	
Sodium	5.00	1000000.0	
Thallium			
Vanadium	5.00	50000.0	
Zinc	5.00	150000.0	

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

-022

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WESTINGHOUSE/HANFORD

13

PREPARATION LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Method: CA

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B06M58	07/20/92	1.01	50
B06M58D	07/20/92	1.07	50
B06M58S	07/20/92	1.02	50
LCSS	07/20/92	1.00	50
PBS	07/20/92	1.00	50

FORM XIII - IN Rev.6/89

9713505.2435

WESTINGHOUSE/HANFORD

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PREPARATION LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B06M58	07/27/92	0.20	100
B06M58D	07/27/92	0.20	100
B06M58S	07/27/92	0.23	100
LCSS	07/27/92	0.02	100
PBS	07/27/92	0.20	100

FORM XIII - IN Rev.6/89

9713505.2436

WESTINGHOUSE/HANFORD

13
PREPARATION LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B06M58	07/29/92	1.09	200
B06M58D	07/29/92	1.08	200
B06M58S	07/29/92	1.02	200
LCSS	07/29/92	1.00	200
PBS	07/29/92	1.00	200

FORM XIII - IN Rev.6/89

9713505.2437

WESTINGHOUSE/HANFORD

13

PREPARATION LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
B06M58	07/29/92	1.04	200
B06M58D	07/29/92	1.02	200
B06M58S	07/29/92	1.04	200
LCSS	07/29/92	1.00	200
PBS	07/29/92	1.00	200

FORM XIII - IN Rev.6/89

-026

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WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: C1 Method: CA

Start date: 07/22/92 End date: 07/22/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1404																									X
S10	1.00	1405																									X
S40	1.00	1406																									X
S100	1.00	1407																									X
S200	1.00	1407																									X
S400	1.00	1408																									X
S400	1.00	1409																									X
S40	1.00	1410																									X
S40	1.00	1410																									X
ICV	1.00	1411																									X
ICB	1.00	1412																									X
CCV	1.00	1413																									X
CCB	1.00	1413																									X
ZZZZZZ	1.00	1414																									
ZZZZZZ	1.00	1415																									
ZZZZZZ	1.00	1416																									
ZZZZZZ	1.00	1416																									
ZZZZZZ	1.00	1417																									
ZZZZZZ	1.00	1418																									
ZZZZZZ	1.00	1419																									
ZZZZZZ	1.00	1419																									
ZZZZZZ	1.00	1420																									
ZZZZZZ	1.00	1421																									
CCV	1.00	1422																									X
CCB	1.00	1422																									X
PBS	1.00	1423																									X
LCSS	1.00	1424																									X
B06M58	1.00	1425																									X
B06M58D	1.00	1425																									X
B06M58S	2.00	1426																									X
B06M58A	1.00	1427																									
CCV	1.00	1428																									X

-027

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WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: C1 Method: CA

Start date: 07/22/92 End date: 07/22/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1428																									X

028

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WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: M3 Method: CV

Start date: 07/27/92 End date: 07/27/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1627																X									
S0.2	1.00	1632																X									
S1.0	1.00	1637																X									
S2.0	1.00	1642																X									
S5.0	1.00	1648																X									
ICV	2.00	1658																X									
CCB	1.00	1703																X									
CCV	1.00	1708																X									
CCB	1.00	1713																X									
ZZZZZZ	1.00	1718																									
ZZZZZZ	1.00	1724																									
ZZZZZZ	1.00	1729																									
ZZZZZZ	1.00	1734																									
ZZZZZZ	1.00	1739																									
ZZZZZZ	1.00	1744																									
ZZZZZZ	1.00	1749																									
ZZZZZZ	1.00	1755																									
ZZZZZZ	1.00	1800																									
ZZZZZZ	1.00	1805																									
CCV	1.00	1810																X									
CCB	1.00	1815																X									
ZZZZZZ	1.00	1820																									
ZZZZZZ	1.00	1825																									
ZZZZZZ	1.00	1831																									
ZZZZZZ	1.00	1836																									
ZZZZZZ	1.00	1841																									
ZZZZZZ	1.00	1846																									
ZZZZZZ	1.00	1851																									
ZZZZZZ	1.00	1856																									
CCV	1.00	1901																X									
CCB	1.00	1907																X									
PBS	1.00	1912																X									

029

9713505.2441

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: M3 Method: CV

Start date: 07/27/92 End date: 07/27/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALS	SBS	ABA	BEB	CDA	CAR	COU	CUE	FEB	PBG	MGN	MNG	HGI	NIK	SEG	AGA	NAL	TLN	VCN	ZCN	CN		
LCSS	1.00	1917													X											
B06M58	1.00	1922													X											
B06M58D	1.00	1927													X											
B06M58S	1.00	1932													X											
CCV	1.00	1937													X											
CCB	1.00	1943													X											

-030

9713505.2442

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F8 Method: F

Start date: 08/11/92 End date: 08/11/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1459													X												
S3	1.00	1503													X												
S50	1.00	1507													X												
S100	1.00	1512													X												
ICV	2.00	1517													X												
ICB	1.00	1522													X												
CRA	1.00	1526													X												
CCV	1.00	1530													X												
CCB	1.00	1535													X												
ZZZZZZ	1.00	1539																									
ZZZZZZ	1.00	1543																									
ZZZZZZ	1.00	1548																									
ZZZZZZ	1.00	1552																									
ZZZZZZ	1.00	1557																									
ZZZZZZ	1.00	1601																									
ZZZZZZ	1.00	1605																									
ZZZZZZ	1.00	1610																									
ZZZZZZ	1.00	1614																									
ZZZZZZ	1.00	1618																									
CCV	1.00	1623													X												
CCB	1.00	1627													X												
PBS	1.00	1705																									
PBSA	1.00	1710	143.5																								
ZZZZZ	5.00	1714																									
ZZZZZ	5.00	1719																									
LCSS	20.00	1723													X												
LCSSA	20.00	1727	75.0												X												
B06M58	1.00	1732													X												
B06M58A	1.00	1736	92.3												X												
B06M58D	1.00	1740													X												
B06M58DA	1.00	1745	100.8												X												
CCV	1.00	1749													X												

031

9713505.2443

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F8 Method: F

Start date: 08/11/92 End date: 08/11/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALSB	ASA	BAE	BED	CAR	CRO	COU	CUE	FEB	PBG	MGN	MNG	HNI	NK	SEG	AGA	NAL	TL	VN	ZN	CN
CCB	1.00	1754											X											
B06M58S	1.00	1758											X											
ZZZZZZ	1.00	1802																						
PBS	1.00	1827											X											
PBSA	1.00	1832	99.8										X											
ZZZZZZ	1.00	1836																						
ZZZZZZ	1.00	1840																						
CCV	1.00	1845											X											
CCB	1.00	1849											X											

-032

9713505.2444

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F8 Method: F

Start date: 08/11/92 End date: 08/11/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BEE	CDA	CAR	COU	CFE	PBG	MGN	HGI	NI	KSE	AGA	NAL	TL	VN	ZN	CN
S0	1.00	1459																	X			
S10	1.00	1503																	X			
S50	1.00	1507																	X			
S100	1.00	1512																	X			
ICV	2.00	1517																	X			
ICB	1.00	1522																	X			
CRA	1.00	1526																	X			
CCV	1.00	1530																	X			
CCB	1.00	1535																	X			
ZZZZZZ	1.00	1539																				
ZZZZZZ	1.00	1543																				
ZZZZZZ	1.00	1548																				
ZZZZZZ	1.00	1552																				
ZZZZZZ	1.00	1557																				
ZZZZZZ	1.00	1601																				
ZZZZZZ	1.00	1605																				
ZZZZZZ	1.00	1610																				
ZZZZZZ	1.00	1614																				
ZZZZZZ	1.00	1618																				
CCV	1.00	1623																	X			
CCB	1.00	1627																	X			
PBS	1.00	1705																	X			
PBSA	1.00	1710	106.5																X			
LCSS	5.00	1714																	X			
LCSSA	5.00	1719	103.0																X			
ZZZZZ	20.00	1723																				
ZZZZZ	20.00	1727																				
B06M58	1.00	1732																	X			
B06M58A	1.00	1736	104.0																X			
B06M58D	1.00	1740																	X			
B06M58DA	1.00	1745	110.7																X			
CCV	1.00	1749																	X			

-033

9713505.2445

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F8 Method: F

Start date: 08/11/92 End date: 08/11/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1754																						X			
B06M58S	1.00	1758																						X			
ZZZZZZ	1.00	1802																									
ZZZZZ	1.00	1827																									
ZZZZZ	1.00	1832																									
ZZZZZZ	1.00	1836																									
ZZZZZZ	1.00	1840																									
CCV	1.00	1845																						X			
CCB	1.00	1849																						X			

-034

9713505.2446

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F6 Method: F

Start date: 08/12/92 End date: 08/12/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1322				X																					
S10	1.00	1327				X																					
S50	1.00	1332				X																					
S100	1.00	1337				X																					
ICV	1.00	1349				X																					
ICB	1.00	1354				X																					
CRA	1.00	1359				X																					
CCV	1.00	1404				X																					
CCB	1.00	1409				X																					
PBS	1.00	1414				X																					
PBSA	1.00	1419	95.8			X																					
ZZZZZ	5.00	1424																									
ZZZZZ	5.00	1429																									
ZZZZZZ	1.00	1434																									
LCSS	200.00	1455				X																					
LCSSA	200.00	1500	68.8			X																					
ZZZZZZ	1.00	1505																									
B06M58S	1.00	1510				X																					
ZZZZZZ	1.00	1515																									
CCV	1.00	1520				X																					
CCB	1.00	1525				X																					
B06M58	1.00	1530				X																					
B06M58A	1.00	1535	88.8			X																					
B06M58D	1.00	1540				X																					
B06M58DA	1.00	1545	83.6			X																					
CCV	1.00	1550				X																					
CCB	1.00	1555				X																					

-035

9713505.2447

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F6 Method: F

Start date: 08/12/92 End date: 08/12/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	AN	TL	V	ZN	CN
S0	1.00	1322																			X						
S5	1.00	1327																			X						
S50	1.00	1332																			X						
S100	1.00	1337																			X						
ICV	1.00	1349																			X						
ICB	1.00	1354																			X						
CRA	1.00	1359																			X						
CCV	1.00	1404																			X						
CCB	1.00	1409																			X						
PBS	1.00	1414																									
PBSA	1.00	1419	198.8																								
LCSS	5.00	1424																			X						
LCSSA	5.00	1429	53.8																		X						
ZZZZZZ	1.00	1434																									
ZZZZZ	200.00	1455																									
ZZZZZ	200.00	1500																									
ZZZZZZ	1.00	1505																									
B06M58S	1.00	1510																									
ZZZZZZ	1.00	1515																									
CCV	1.00	1520																			X						
CCB	1.00	1525																			X						
B06M58	1.00	1530																									
B06M58A	1.00	1535	40.8																								
B06M58D	1.00	1540																									
B06M58DA	1.00	1545	100.9																								
CCV	1.00	1550																			X						
CCB	1.00	1555																			X						
PBS	1.00	1623																			X						
PBSA	1.00	1628	105.6																		X						
B06M58S	1.00	1633																			X						
ZZZZZZ	1.00	1638																									
B06M58	1.00	1643																									

036

9713505.2448

WESTINGHOUSE/HANFORD

14

ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: F6 Method: F

Start date: 08/12/92 End date: 08/12/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
B06M58A	1.00	1648	52.8																								
B06M58D	1.00	1653																			X						
B06M58DA	1.00	1658	69.2																		X						
CCV	1.00	1703																			X						
CCB	1.00	1708																			X						
B06M580	1.00	1719																			X						
B06M581	1.00	1722																			X						
B06M582	1.00	1725																			X						
B06M583	1.00	1728																			X						
B06M580	1.00	1741																			X						
B06M581	1.00	1744																			X						
B06M582	1.00	1747																			X						
B06M583	1.00	1750																			X						
ZZZZZZ	1.00	1803																									
ZZZZZZ	1.00	1806																									
CCV	1.00	1808																			X						
CCB	1.00	1811																			X						

-037

9713505.2449

WESTINGHOUSE/HANFORD

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ANALYSIS RUN LOG

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

Lab Code: SKINER Case No.: N207054 SAS No.: SDG No.: B06M58

Instrument ID Number: P1 Method: P

Start date: 08/06/92 End date: 08/06/92

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1714		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
S	1.00	1717		X						X				X		X				X			X				
S	1.00	1720			X		X	X	X		X	X	X				X		X						X	X	
S	1.00	1729																				X					
ICV	1.00	1732		X			X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICV	1.00	1735																									
ICV	1.00	1738			X																						
ICB	1.00	1741		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1743		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1746		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1749			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1751		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1754		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
PBS	1.00	1756		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ZZZZZZ	1.00	1759																									
LCSS	1.00	1802		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ZZZZZZ	1.00	1805																									
B06M58	1.00	1808		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
B06M58D	1.00	1810		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
B06M58S	1.00	1813			X		X	X	X		X	X	X				X		X			X			X	X	
B06M58L	5.00	1816		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
B06M58A	1.00	1829			X																						
CCV	1.00	1831		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1834		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1837		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1839		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1842			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1845		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1847		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

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