9613499.2797

START

B06M18-TMA-204

0045514

TMA
225
2

AUG 1992
RECEIVED
OSM DMO

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

ORGANICS & GENERAL CHEMISTRY
Case No. 06-008
(TMA/ARLI Work Order # A2-06-008)

METALS
Case Nos. N2-06-005
(TMA/Skinner & Sherman W.O. # S2-06-016 & S2-06-027)

August 4, 1992

OCT 1996
RECEIVED
EDMC

TMA Master Work Order # N2-06-005

7/16/96 KDB

9613499.2798

Westinghouse Hanford Company

NONCONFORMANCE REPORT

1. Page 1 of ___

2. Preprinted No. 051707

QA Log No. EQA-93-013

3. P. O., W. O., or Job Control No.	4. System/End Use	5. Item/Material	6. Dwg./Spec./Other No.	7. Rev.
N/A	RI/FS	WATER SAMPLE	N/A	N/A

8. Program/Project/Other
RCRA P.P. 100-HR-3/92-165
CERCLA 100-KR-4/92-398

9. Safety Class: N/A

10. ASME Code Items: ☐ Yes ☒ No (If yes, notify authorized inspector)

11. Supplier Name/Address
~~ENVIRONMENTAL~~ RCS 1/26/93
THERMO ANALYTICAL LAB

12. Notification of Potential Occurence Required: ☐ Yes ☒ No

13. Code: Lot/Heat/Serial	14. Lot Size	15. Sample	16. Qty. Acc.	17. Inspection Criteria
N/A	11 2-2-93	11 2-2-93	0	☐ Dwg. ☐ Spec. ☐ Insp. Plan ☒ Other CLP SOW

18. Item	19. Description of Nonconformance (list serial no. where applicable)	22. Disposition, Justification, and Instructions
	SAMPLE NUMBERS B06CH9, B06CJ0, B06CJ1, B06CJ4, B06CJ5, B06CJ6, B06CJ7, B06CL9, B06CM0, B06CM1 (100-HR-3) AND B06M18 (100-KR-4) WERE NOT STORED AT °4C ± °2C AS REQUIRED BY CLP STATEMENT OF WORK.	~~Analysis shall be performed. Data received from the analysis shall be flagged for all constituents.~~ RL 1/21/93 Use as is. These samples were not validated in a WHC Validation Report. Therefore, this NCR shall serve as the flag to identify potential problems with the data. R L Boggeustaff 12/17/93

20. Originator's Signature: R. C. SMITH — Date: 1/26/93

21. Cognizant QA Manager's Signature: W. Thackeberry for F.L. Bonnington — Date: 2-3-93

23. Design Document Change Required? ☐ Yes, Doc. No. ___ ☒ No

24. Corrective Action Required? ☐ Yes, No. ___ ☒ No

Disp. App.

25. Cognizant Engineer	26. Technical Rep.	Signature/Org.
JW Roberts J.W. Roberts 2/5/93	NA	NA
QA Engineer	**Signature/Org.**	**Signature/Org.**
GS Covington 2-5-93	NA	NA

Close

27. Accept 11 Reject 0 Follow on NCR NA

QA/C Personnel — Date 12-17-93

A-7310-104 (10/91)

9613499.2799

QUALITY ASSURANCE

NONCONFORMANCE REPORT DISTRIBUTION

1. FROM:	2. MSIN:	3. DATE:
G. S. Corrigan	H4-16	January 27, 1993

4. NCR No.:	5. Initiation, Disposition, or Closure (I, D, C):
051707 / EQA-93-013	I

	6. TO:	MSIN	I	D	C
Cognizant Engineer	J. W. Roberts	H6-02			
Cognizant Quality Engineer	G. S. Corrigan	H4-16			
Originator	R. C. Smith	H4-23			
Q. A. Manager	NA	NA			
Cognizant QE Manager	T. L. Bennington	H4-16			
Facility Manager	NA	NA			
Engineering Records	L. M. McDaniel	H6-08			
Safety	NA	NA			
QSDM	D. P. Trott	L4-86			
Other:					
JCS Package	NA	NA			
Q. C.	NA	NA			
Buyer (Procurement)	NA	NA			
P.O. File (Procurement)	NA	NA			
Vendor File (Procurement)	NA	NA			
EQA File		H4-16			
P. H. Butcher		H6-06			
~~[illegible]~~		H4-23			

FEB 1993

7. QST Codes

Subject:	Cause:	Contr. Factor:	PPG:
AD-08	PN-002		

8. Responsible Action Party:	Org Code:
J.W. Roberts	81310

A-6000-816 (09/91)

9613499.2800

Westinghouse Hanford Company

NONCONFORMANCE REPORT

1. Page 1 of 1

2. Preprinted No. 050525

QA Log No.

3. P. O., W. O., or Job Control No.	4. System/End Use	5. Item/Material	6. Dwg./Spec./Other No.	7. Rev.
N/A	RI/FS	Water Sample	N/A	N/A

8. Program/Project/Other	9. Safety Class	10. ASME Code Items
100-HR-3	N/A	☐ Yes ☒ No (If yes, notify authorized inspector)

11. Supplier Name/Address
Environmental Field Services
Thermo Analytical

12. Notification of Potential Occurence Required ☐ Yes ☒ No

13. Code: Lot/Heat/Serial	14. Lot Size	15. Sample	16. Qty. Acc.	17. Inspection Criteria
N/A	1	1	N/A	☐ Dwg. ☐ Spec. ☐ Insp. Plan ☒ Other See Below

18. Item	19. Description of Nonconformance (list serial no. where applicable)	22. Disposition, Justification, and Instructions
	1) one VOA vial for sample B06CM1 was received with bubbles present. Req. Violated: EII 5.8, App A, Sec. 5.0 2) Sample numbers B06CH9, B06CJ0, B06CJ1, B06CJ4, B06CJ5, B06CJ6, B06CJ7, B06CL9, B06CM0, B06CM1, and B06M18 were not stored at 4C. Req. Violated: CLP SOW B06M18 is 100-KR-4 project.	

20. Originator's Signature: [signature] Date 12/16/92

21. Cognizant QA Manager's Signature Date

23. Design Document Change Required? ☐ Yes, Doc. No. ☐

24. Corrective Action Required? ☐ Yes, No. ☐

Disp. App.

25. Cognizant Engineer	Date	26. Technical Rep.	Date	Signature/Org.
QA Engineer	Date	Signature/Org.	Date	Signature/Org.

Close

27. Accept _____ Reject _____ Follow on NCR _____ QA/C Personnel

A-7310-1(

9613499.2801

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

FACSIMILE COVER-SHEET

TO:
NAME: Tiel Washington
DATE: 6-4-92
COMPANY: OSM
FAX NO: 11
ADDRESS:
TELE. NO:

FROM:
NAME: DOLORES
COMPANY: TMA/NORCAL
FAX NO: (510) 235-0438
VERIFICATION NO: (510) 235-2633
NO. OF PAGES: 9 (INCLUDING COVER SHEET)

COMMENTS:

These are samples rec'd on Saturday (See attached Ice Chest Temp Log)
Had let sample out Temp was too High

Also, Job 100-HR-3 Samples are still being sent in triplicate for ICP/AA METALS & CN

Please remind them again !!!

Thanx

9613499.2802

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Project Designation/Sampling Locations 100-HR-3

Ice Chest No. RM#105

Bill of Lading/Airbill No. 2509868790

Method of Shipment EMERY

Shipped to TMA

Possible Sample Hazards/Remarks N/A

Telephone (509)376-5045

Collection Date 5-28-92

Field Logbook No. EFL-1018

Offsite Property No. W92-00399-92

Sample Identification

B06CH9

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) UNFILTERED
3, 1L, P, WATER, CLP-CYANIDE (NaOH)
3, 40ml, Gs, WATER, CLP-VOA
3, 2L, G, WATER, CLP-SEMI-VOA/PCB/PEST
1, 500ml, P, WATER, ANIONS, pH
1, 500ml, P, WATER, CONDUCTIVITY
2, 4L, P, WATER, GROSS ALPHA/BETA, GAMMA SPEC, ALPHA SPEC(U-234/235/238, Pu-238/239/240, Am-241), Sr-90, Tc-99
1, 500ml, P, WATER, C-14
1, 250ml, G, WATER, TRITIUM

B06CJ0

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) FILTERED

B06CJ1

3, 40ml, Gs, WATER, CLP-VOA

B06CT4

3, 40ml, Gs, water, CLP-VOA

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

Relinquished by:	Received by:	Date/Time:
C. Gilbert / C. GILBERT	Refrig	5/28/92 1500
	B. WHITTEN	5-29-92 07:30
B. WHITTEN	Kermit Blum	6-1-92 * 0800

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: * Arrived @ TMA/NORCAL 5-30-92; opened 6-1-92 - KB

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

9613499.2803

TASK NO 92-165

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector L. D. Walker/K. D. Lee Date Sampled 5-28-92 Time 0620 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0GCH9	3, 1L, P	W	CLP - ICP/AA Metals & Hg (HNO_3), unfiltered
	3, 1L, P	W	CLP - CN (NaOH)
	3, 40M, Gs	W	CLP - VOA
	3, 2L, G	W	CLP - Semi-VOA/PCB/Pest
	1, 500 ml, G	W	ANions, pH
	1, 500ml, G	W	Cond.
	2, 4L, P	W	Gross Alpha/Beta, Gamma Spec, Alpha Spec (U-234/235/238, Pa-238/239/240 Am-241), Sr-90, Tc-99
	1, 500ml, P	W	C-14
	1, 250 ml, G	W	Tritium
B0GCJ0	3, 1L, P	W	CLP-ICP/AA Metals & Hg (HNO_3) filtered
B0GCJ1	3, 40 ml, Gs	W	CLP-VOA
B0GCT4	3, 40mL, AG	W	CLP-VOA

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required

9613499.2804

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Telephone (509)376-5045

Project Designation/Sampling Locations 100-HR-3

Collection Date 5-28-92

Ice Chest No. SMZ-123

Field Logbook No. EFL-1018

Bill of Lading/Airbill No. 0507868790

Offsite Property No. W92-0-0399-14

Method of Shipment EMERY

Shipped to TMA

Possible Sample Hazards/Remarks N/A

Sample Identification

B06CJ5

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) UNFILTERED
3, 1L, P, WATER, CLP-CYANIDE (NaOH)
3, 40ml, Gs, WATER, CLP-VOA
3, 2L, G, WATER, CLP-SEMI-VOA/PCB/PEST
1, 500ml, G, WATER, ANIONS, pH
1, 500ml, G, WATER, CONDUCTIVITY
2, 4L, P, WATER, GROSS ALPHA/BETA, GAMMA SPEC, ALPHA SPEC(U-234/235/238, Pu-238/239/240, Am-241), Sr-90, Tc-99
1, 500ml, P, WATER, C-14
1, 250ml, G, WATER, TRITIUM

B06CJ6

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) FILTERED

B06CJ7

3, 40ml, Gs, WATER, CLP-VOA

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

Relinquished by:	Received by:	Date/Time:
L.V. Walker	Refrigerator	5/28/92 - 1450
	B. WHITTEN	5-29-92 07:30
B. WHITTEN	Kermit Blum	6-1-92 * 0800

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: * Arrived @ TMA / NORCAL 5-30-92; opened 6-1-92. KB

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

9613499.2805

TASK-NO 92-165

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector L. D. Walker/K. D. Lee Date Sampled 5-28-92 Time 1040 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B06CJ5	3, 1L, P	W	CLP - ICP/AA Metals & Hg (HNO_3), unfiltered
	3, 1L, P	W	CLP - CN (NaOH)
	3, 40M, Gs	W	CLP - VOA
	3, 2L, G	W	CLP - Semi-VOA/PCB/Pest
	1, 500 ml, G	W	ANions, pH
	1, 500ml, G	W	Cond.
	2, 4L, P	W	Gross Alpha/Beta, Gamma Spec, Alph Spec (U-234/235/238, Pa-238/239/24 Am-241); Sr-90, Tc-99
	1, 500ml, P	W	C-14
	1, 250 ml, G	W	Tritium
B06CJ6	3, 1L, P	W	CLP-ICP/AA Metals & Hg (HNO_3) filtered
B06CJ7	3, 40 ml, Gs	W	CLP-VOA

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required

9613499.2806

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Project Designation/Sampling Locations 100-HR-3

Ice Chest No. AUSTIN

Bill of Lading/Airbill No. 2509868790

Method of Shipment EMERY

Shipped to TMA

Possible Sample Hazards/Remarks N/A

Telephone (509)376-5045 LDW

Collection Date ~~5/19/92~~ 5/28/92

Field Logbook No. E.FL - 0057 p. 14

Offsite Property No. W92-0-0399-14

Sample Identification

B06CC9

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) UNFILTERED
3, 1L, P, WATER, CLP-CYANIDE (NaOH)
3, 40ml, Gs, WATER, CLP-VOA
3, 2L, G, WATER, CLP-SEMI-VOA/PCB/PEST
1, 500ml, G, WATER, ANIONS, pH
1, 500ml, G, WATER, CONDUCTIVITY
2, 4L, P, WATER, GROSS ALPHA/BETA, GAMMA SPEC, ALPHA SPEC(U-234/235/238, Pu-238/239/240, Am-241), Sr-90, Tc-99
1, 500ml, P, WATER, C-14
1, 250ml, G, WATER, TRITIUM

B06CM0

3, 1L, P, WATER, CLP-ICP/AA METALS & MERCURY (HNO3) FILTERED

B06CM1 **

3, 40ml, Gs, WATER, CLP-VOA

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

Relinquished by:	Received by:	Date/Time:
[illegible]	relinq to refrigerator	5/28/92 145
Relinquished by:	Received by: B. WHITEN	Date/Time: 5-29-92 07:30
Relinquished by: B. WHITEN	Received by: Hermit Blum	Date/Time: * 6-1-92 0800
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: * Arrived @ ~~TMA/NORCAL~~ TMA/NORCAL 5-30-92; opened 6-1-92. KB

** Upon arrival @ TMA/NORCAL, B06CM1 had air bubbles in one vial. KB

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

9613499.2807

TASK NO 92-165

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector L. D. Walker/K. D. Lee Date Sampled 5-28-92 Time 1225 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B06C69	3, 1L, P	W	CLP - ICP/AA Metals & Hg (HNO_3), unfiltered
	3, 1L, P	W	CLP - CN (NaOH)
	3, 40M, Gs	W	CLP - VOA
	3, 2L, G	W	CLP - Semi-VOA/PCB7Pest
	1, 500 ml, G	W	ANions, pH
	1, 500ml, G	W	Cond.
	2, 4L, P	W	Gross Alpha/Beta, Gamma Spec, Alph Spec (U-234/235/238, Pa-238/239/24 Am-241), Sr-90, Tc-99
	1, 500ml, P	W	C-14
	1, 250 ml, G	W	Tritium
B06CM0	3, 1L, P	W	CLP-ICP/AA Metals & Hg (HNO_3) filtered
B06CM1	3, 40 ml, Gs	W	CLP-VOA (bubble on one vial)

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required

9613499.2808

Icechest Temperature Log

Use one form per shipment.
Refer to Thermometer Correction Log for correction factor.

Customer: Hanford Date: 6/1/92

Icechest # or description	thermometer reading	thermometer number	correction factor	actual temperature *
SML.123	12°C	#116	0	12°C
Austin	12°C	#114	+1°C	13°C
RM.105	9°C	031	0	9°C
SML.24	8°C	#106	+1°C	9°C

* After 20 minutes if thermometer is not already present.
Temperature is in degrees centigrade.

Technician: _____

ICETEMP.TXT

9613499.2009

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: CMChance

Company Contact: CM CHANCE

Project Designation/Sampling Locations: 100-KR-4

Ice Chest No.: SMI-24

Bill of Lading/Airbill No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA/NORCAL

Telephone: 376-2084

Collection Date: 5-28-92

Field Logbook No.: EFL-1022

Offsite Property No.:

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

Sample Identification

1) G0bM18
- 1,1000ml P:CLP;ICP/AA Metals,Hg
- 1,1000ml G:CLP;Cn
- 3,40ml aG:CLP;VOA
- 3,2360ml aG:CLP;Semi-VOA,PCB,PEST
- 1,500ml P:300.0;Anions(F,SO4)
  - 9040;pH
  - 9050;Conductivity
- 1,500ml P:353.2;NO3
- * 2,4000ml ~~1,6000ml~~ P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241
- 1,1000ml P:Tc-99
- 1,500ml P:C-14
- 1,250ml Gs:Tritium

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

Relinquished by:	Received by:	Date/Time:
CMChance / Cory C Bell	Kermit Blum	** 6-1-92 0800
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: * One 4000 ml aliquot was approximately half-full when received @ TMA/Norcal. No obvious leaks, however. KB

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

** Received 5-30-92 @ TMA/Norcal; opened 6-1-92. KB

9613499.2810

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CMChance Date Sampled 5-28-92 Time 0940 hou

Company Contact CM CHANCE Telephone (509) 376-2084

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
	1-1000ml P	Water	CLP:ICP/AA Metals,Hg
	1-1000ml G	Water	CLP:Cn
	3-40ml aG	Water	CLP:VOA
	3-2360ml aG	Water	CLP:Semi-VOA,PCB/PEST
	1-500mlP	Water	300.0;Anions(F,SO4)
			9040;pH
B06M18			9050;Conductivity
	1-500ml P	Water	353.2;NO3
	2-4000ml P	Water	Gross alpha/beta,Gamma Spec,Sr-90,U-235/
			Pu-239/240,Am-241
	1-1000ml P	Water	Tc-99
	1-500ml P	Water	C-14
	1-250ml Gs	Water	Tritium

Field Information**

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required

9613499.2811

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE — Telephone: 376-2084

Project Designation/Sampling Locations: 100-KR-4 — Collection Date: 5-28-92

Ice Chest No.: SML-24 — Field Logbook No.: EFL-1D22

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) B06M18
1,1000ml P:CLP;ICP/AA Metals,Hg
1,1000ml G:CLP;Cn
3,40ml aG:CLP;VOA
3,2360ml aG:CLP;Semi-VOA,PCB,PEST
1,500ml P:300.0;Anions(F,SO4)
9040;pH
9050;Conductivity
1,500ml P:353.2;NO3
* 2,4000ml ~~1,6000ml~~ P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241
1,1000ml P:Tc-99
1,500ml P:C-14
1,250ml Gs:Tritium

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: CM Chance, Cory Chance	Received by: Kermit Blum	Date/Time: ** 6-1-92 0800
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: * One 4000 ml aliquot was approximately half-full when received @ TMA/NORCAL. No obvious leaks, however. KB

** Received 5-30-92 @ TMA/NORCAL; opened 6-1-92. KB

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

9613499.2812

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CMChance Date Sampled 5-28-92 Time 0940 hours

Company Contact CM CHANCE Telephone (509) 376-2084

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
	1-1000ml P	Water	CLP:ICP/AA Metals,Hg
	1-1000ml G	Water	CLP:Cn
	3-40ml aG	Water	CLP:VOA
	3-2360ml aG	Water	CLP:Semi-VOA,PCB/PEST
	1-500mlP	Water	300.0;Anions(F,SO4)
			9040;pH
B06M18			9050;Conductivity
	1-500ml P	Water	353.2;NO3
	2-4000ml P	Water	Gross alpha/beta,Gamma Spec,Sr-90,U-235/238
			Pu-239/240,Am-241
	1-1000ml P	Water	Tc-99
	1-500ml P	Water	C-14
	1-250ml Gs	Water	Tritium

Field Information**

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

9613499.2813

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-2084 ~~6-15-92~~

Project Designation/Sampling Locations: 100-KR-4

Collection Date: ~~6-15-92~~ 6-16-92

Ice Chest No.: Coleman - NOT + NJ BOUND

Field Logbook No.: EFL-1022

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) B06M22 1,1000ml P:CLP;ICP/AA Metals,Hg
(0850) 1,1000ml G:CLP;Cn
3,40ml aG:CLP;VOA
3,2360ml aG:CLP;Semi-VOA,PCB,PEST
1,500ml P:300.0;Anions(F,SO4)
9040;pH
9050;Conductivity
1,500ml P:353.2;NO3
2,4000ml P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241
1,1000ml P:Tc-99
1,500ml P:C-14
1,250ml Gs:Tritium

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	6-18-92 1130
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

9613499.2814

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CM Chance Date Sampled 6-16-92 Time 0850 hours

Company Contact CM Chance Telephone (509) 376-7619

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
1 ✓	1000ml P	Water ~~Soil~~ CLP-1694	CLP; ICP/AA metals, Hg
1 ✓	1000ml G		CLP; CN
3 ✓	40ml aG		CLP; VOA
3 ✓	236Dml aG		CLP; Semi-VOA, PCB/PEST
1 ✓	500ml P		Anions: (F, SO4) 300.0; pH 9040;
			Conductivity 9050
B06122 1 ✓	500ml P		NO3-353.2
2 ✓	4000ml P		Gross alpha/beta, Gamma Spec, Sr-90,
			U-235/238, Pu-239/240, Am-241
1 ✓	1000ml P		Tc-99
1 ✓	500ml P		C-14
1 ✓	250ml Gs	W	Tritium
	CL 6-16-92		

Field Information** _____

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-18-92

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

FORM OF PAYMENT

Check ☐ GBL ☐ FCCOD ☐

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

E Shipper's Account Number 850281585

EMERY WORLDWIDE — A CF Company

SERVICES

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

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

Date 05-29-92 | Origin PSC | Shipment Number 250986878 T

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 W92-0-0340#40

Zip: 99352

E Consignee's Account Number

Zip: 94804

Description	Dimensions Pcs.	L	W	H	Total Pieces	Total Weight (In Lbs.)
1 RUBBERMAIL SML-24 COLLER WATER SAMPLES BOGR18	1				1	80

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

Declared Value $

250986878 T

Remarks: SATURDAY DELIVERY

Shipper's Signature X

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. E Third Party Account Number

International Customs Value | International Insurance

Base Charge

Total Transportation Charges

Other Charges/Advance at Origin ☐ OC/AO- $

1-OAK SA

Terms and Conditions on Back

9613499-2815

9613499.2816

000004

TMA/ARLI
Thermo Analytical Inc.

RADIATION DOSE RATE SURVEY FORM

Date 6/2/92 COMPANY NORCAL (WHC) OTHER ORD # 2521033060

Surveyor's Name MARK S. McCray

Model No. HP-210 / ESP-1 Model No. AC-3-7 / ESP-1

Serial Nos. 710289 / 02619 Serial Nos. 407726 / 02628

Calibration Date 3/25/92 Calibration Date 11/15/91

Instrument Calibration Factor 0.280 Instrument Calibration Factor 0.177

Sample	Location	HP-210 CPM	HP-210 Factor	HP-210 DPM	AC-3-7 CPM	AC-3-7 Factor	AC-3-7 DPM	Spillage or Breakage?	Activity, nCi/mL or nCi/g
Background		35.0			1.0				
Consistency		7,400	0.2857		5,070	0.1863			
Smears: #1		31.0			2.0			NONE	
70 POC		43.0			1.0			NONE	
REPORTED (WHC)		10 SA. each			<50 pCi/gr.				

Comments:

All OK ✓ Approved

Not OK Date 6/2/92

Form: ARLI RA-01
Rev: 06

01/15/92

9613499.2817

TMA/ARLI
Thermo Analytical Inc.

000005

RADIATION DOSE RATE SURVEY FORM

Date 6/2/92 COMPANY NORCAL (WHC) OTHER ORD # 2521033060

Surveyor's Name MARK S. McCray

Model No. HP-210 / ESP-1 Model No. AC-3-7 / ESP-1

Serial Nos. 710289 / 02619 Serial Nos. 407726 / 02628

Calibration Date 3/25/92 Calibration Date 11/15/91

Instrument Calibration Factor 0.280 Instrument Calibration Factor 0.177

Sample	Location	HP-210 CPM	HP-210 Factor	HP-210 DPM	AC-3-7 CPM	AC-3-7 Factor	AC-3-7 DPM	Spillage or Breakage?	Activity, pCi/mL or pCi/g
Background		35.0			1.0				
Consistency		7,400	0.2857		5,070	0.1863			
Smears: #1		31.0			2.0				
70 POC		43.0			1.0				
REPORTED (WHC)		10 SA.	each		<50 pCi/gr.				

Comments:

All OK ✓ Approved

Not OK Date 6/2/92

Form: ARLI RA-01
Rev: 06

01/15/92

9613499.2810

SAMPLE LOG-IN SHEET

000006

LAB NAME : TKA/ARLI

PAGE : 1 OF 1

RECEIVED BY (PRINT NAME): Tody BERNARD

LOG-IN-DATE : 6/2/98

RECEIVED BY (SIGNATURE): Tody Bernard

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.: 2521033060
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: 6/2/98
12. Temp of ice chest 4.0 °C
13. Time Recieved: 10:00 AM

SAMPLE TRANSFER

Fraction: _____

Area #: _____

By: _____

On: _____

EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC
	B0DM18	AZ-00-0080	

* Contact SMO and attach record of resolution

Reviewed By: _____ Logbook No.: _____

Date: _____ Logbook Page No.: _____

FORM DC-1

DOC2/LOGIN.TBL

GENERAL CHEMISTRY RESULTS

CASE NO. 06-008

Water Sample #:

B06M18

CASE NARRATIVE

The %RPD for the Fluoride analysis reported for the liquid sample B06M18 (A2-06-008-01) was 40%. The sample and duplicate results were near the instrument detection limit. These results are acceptable based on the level of Fluoride concentration.

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

Ernesto Vazquez

Ernesto Vazquez

TMA Inc. REPORT Work Order # A2-06-008

Received: 05/30/92 Results by Sample

SAMPLE ID B06M18 FRACTION 01G TEST CODE VCCLPL NAME Anions & Wet Chem. - VM043

Date & Time Collected 05/28/92 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	0.3	mg/L	0.1
Sulfate	300	11	mg/L	1
Elect. Conductivity	120.1	164	umho/cm	6
pH	150.1	8.7	pH	0.1

FORM I

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 06-008

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : June 1, 1992

1.0 DESCRIPTION OF CASE :

One water sample was analyzed for TCL Organics-Volatiles, Semivolatiles, and Pesticide/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	pH
B06M18	A2-06-008-01A	V	WATER	7
B06M18 MS	A2-06-008-01B	V	WATER	7
B06M18 MSD	A2-06-008-01C	V	WATER	7
B06M18	A2-06-008-01D	SV & P	WATER	
B06M18 MS	A2-06-008-01E	SV & P	WATER	
B06M18 MSD	A2-06-008-01F	SV & P	WATER	

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All samples were received unbroken and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL WATER :

The samples were analyzed 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 WATER :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B06M18MSD had a matrix spike recovery for 4-Nitrophenol slightly above the QC limit.

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

3.2.3 PESTICIDE/PCB ANALYSIS COMMENTS :

SEQUENCE NOTES :

The sequence was started on 6/22/92 and was analyzed in accordance with the EPA CLP SOW. The instrument blanks, PEMs and calibration verification standards all met the requirements established by the EPA CLP SOW.

SAMPLE NOTES :

LOW LEVEL WATER :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B06M18 had a DCB surrogate recovery on the DB-1701 column 1% below the advisory QC limit. 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
CLP Program Manager

Wida Ang
Organics Supervisor

9613499.2823

000004
EPA SAMPLE NO.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20605R03

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: not dec. ____ Date Analyzed: 06/05/92

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/L	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	20	
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

9613499.2824

000005
EPA SAMPLE NO.

B06M18

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20605R03

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: not dec. ____ Date Analyzed: 06/05/92

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

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

Number TICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

EPA SAMPLE NO.

B06M18

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

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

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	25	U

EPA SAMPLE NO.

B06M18

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

EPA SAMPLE NO.

B06M18

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	16	J
2.	Unknown hydrocarbon	7.37	9	BJ
3.	Unknown alcohol	7.98	3	BJ
4.	Unknown ketone	8.90	5	BJ
5.	Unknown alcohol	23.58	74	J
6.	Unknown alcohol	24.82	6	J

9613499.2828

000009
EPA SAMPLE NO.

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 06/01/92

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 06/03/92

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/25/92

Injection Volume: 2.50 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-36-3	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

9613499.2829

 Skinner&Sherman REPORT Work Order # S2-06-027

Received: 06/03/92 07/07/92 16:19:00

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 N2-06-005
TAKEN By Client
TRANS Fedex #0207839483
TYPE 1 Water NO3NO2
P.O. # N2-06-005
INVOICE under separate cover

SAMPLE IDENTIFICATION

01 B06M18
01 B06M18D
01 B06M18S
02 LCSW

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

9613499.2830

Received: 06/03/92 Results by Sample

SAMPLE ID B06M18 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 05/28/92 Category WATER

NO3NO2 <0.25
mg N/L

SAMPLE ID B06M18D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 05/28/92 Category WATER

NO3NO2 <0.25
mg N/L

SAMPLE ID B06M18S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 05/28/92 Category WATER

NO3NO2 1.57
mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category WATER

NO3NO2 1.91
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

9613499.2831

Received: 06/03/92 07/07/92 16:04:39

TMA/NORCAL

QUALITY CONTROL

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S206027-01	<0.25 mg/L	2.00 mg/L	1.57 mg/L	78.5

DUPLICATE

Sample ID	Sample Result	Duplicate Result	Relative % Difference
S206027-01	<0.25 mg/L	<0.25 mg/L	not calculable

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	% Recovery
LCS	2.00 mg/L	1.91 mg/L	95.5
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

9613499.2832

Received: 06/03/92

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

9613499.2833

TMA/Skinner & Sherman Labs **SAMPLE LOG-IN**

WORKORDER 52-06-027 CLIENT HANFORD-NOR No. SAMPLES:

PROTCL CLP TURNARND 33 days X → 1

COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)

CUSTODIAN Benney A. SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N2-06-005

SHIPER & # Fedex # 0207839483 PO/CONTRACT# ↓

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Dolores Sanchez

CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: NONE

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 6.3.92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	QC	TEST(S)	HOLD TIME UP
1	B06M18	WATER	6.3.92	D,J	NO3NO2, ~~DIEX~~ A.B. 6/3/92	Due 6.22.92
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

6.3.92

Samples are from a site known to have Rad-Contamination: YES ✓ NO __ N/A __

The samples have dectable amounts of Radioactive Material: YES __ NO ✓ N/A __

SUBCONTRACT: YES/NO, TO: _____ DATE: _____

REVIEWED _____

*EPA/CLP Required Rev. 1.6 PAGE:

TMA/ARLI
160 Taylor Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

TMA
Thermo Analytical Inc.

CHAIN OF CUSTODY

CLIENT Westinghouse
ADDRESS
PROJECT N2-06-005
SAMPLERS (SIGNATURE)

DATE 6/2/92 PAGE 1 OF 1

SAMPLE NO	DATE	TIME	LOCATION	ANALYSES	SAMPLE TYPE OR MATRIX (e.g. water soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
B06M18				N03		1	

1) RELINQUISHED BY: Signature	DATE	2) RECEIVED BY: Signature	DATE	3) RELINQUISHED BY: Signature	DATE	4) RECEIVED BY: Signature	DATE
C. Harris	6/2	[illegible]	6/3/92				
Printed Name C. HARRIS	TIME 1:30	Printed Name A. Benney	TIME 9:30	Printed Name	TIME	Printed Name	TIME
Company TMA/ARLI		Company TMA/Skinner		Company		Company	

5) RELINQUISHED BY: Signature	DATE	6) RECEIVED BY: Signature	DATE	7) RELINQUISHED BY: Signature	DATE	RECEIVED BY (Laboratory) Signature	DATE
Printed Name	TIME	Printed Name	TIME	Printed Name	TIME	Printed Name	TIME
Company		Company					

TOTAL NUMBER OF CONTAINERS 1

METHOD OF SHIPMENT Federal Express

SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS

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

FACSIMILE COVER SHEET

TO:
NAME: Antonia
DATE: 6-3-92
COMPANY: Skinner & Sherman
FAX NO:
ADDRESS:
TELE. NO:

FROM:
NAME: Yamamoto
COMPANY: TMA/NORCAL
FAX NO: (510) 235-0438
VERIFICATION NO: (510) 235-2633

NO. OF PAGES: 3 (INCLUDING COVER SHEET)

COMMENTS:
Here is the revised P.O. on Work Order # N2-96-005,
location: 100-KR-4.

9613499.2836

TMA
Thermo Analytical Inc.

300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

4
AUG 1992
RECEIVED
OSM BMS

July 2, 1992

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

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on June 02,1992 from Westinghouse Hanford Company. The samples were analyzed for the USEPA CLP metals and cyanide as indicated on the chain of custody. The analysis was performed under TMA/Skinner and Sherman work order S206016.

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 lead digestion spike recovery exceeded the control limit requirements.

The iron ICP serial dilution exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

7/16/96 Kdb

9613499.2857

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M18

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

Lab Code: SKINER Case No.: N2-06-005SAS No.: SDG No.: B06M18

Matrix (soil/water): WATER Lab Sample ID: 06016-01S

Level (low/med): LOW Date Received: 06/02/92

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	160.00	B		P
7440-36-0	Antimony	16.00	U		P
7440-38-2	Arsenic	1.30	B		F
7440-39-3	Barium	34.90	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	21100.00			P
7440-47-3	Chromium	3.00	U		P
7440-48-4	Cobalt	3.00	U		P
7440-50-8	Copper	4.30	B		P
7439-89-6	Iron	423.00		E	P
7439-92-1	Lead	2.40	B	WN	F
7439-95-4	Magnesium	4980.00	B		P
7439-96-5	Manganese	10.00	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	5.00	B		P
7440-09-7	Potassium	1080.00	B		P
7782-49-2	Selenium	4.00	U	W	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	2430.00	B		P
7440-28-0	Thallium	2.00	U	W	F
7440-62-2	Vanadium	2.40	B		P
7440-66-6	Zinc	13.60	B		P
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

FORM I - IN Rev.6/89

9613499.2858

TMA/Skinner & Sherman Labs **SAMPLE LOG-IN**

WORKORDER 52-06-016 CLIENT HANFORD NOR No. SAMPLES:

PROTCL CLP TURNARND 33 days

COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)

CUSTODIAN Benney, A. SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N2-06-005

SHIPER & # Fedex # 2521034261 PO/CONTRACT# ↓

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Dolores Sanchez

CHAIN OF CUSTODY: PRESENT/ABSENT/NA,# N/A COMMENTS: NONE

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 6.2.92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	QC	TEST(S)	HOLD TIME UP
1	B06M18	WATER	6.2.92	D.S	TM/CN	5.28.92
2	6.5.92					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

Complete 6/5/92 AB

Samples are from a site known to have Rad-Contamination: YES X NO __ N/A __

The samples have dectable amounts of Radioactive Material: YES __ NO X N/A __

SUBCONTRACT: YES/NO TO: DATE:

REVIEWED

*EPA/CLP Required Rev. 1.6

9613499.2839

TMA
Thermo Analytical Inc.

1

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

SEP 1992
RECEIVED
OSM DMO

September 28, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-06-008-7055

RECORD COPY

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, ^{3}H, ^{14}C, ^{90}Sr, ^{99}Tc, isotopic uranium, isotopic plutonium, ^{241}Am, and gamma scan results for the water samples from 100-KR-4 Location, we received 1 June 1992. The QA/QC results are also given in the Summary Data Section.

The raw data sheets are numbered 1 through 185.

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 14
Appendices

7/16/96 KDB

SDG 7055 Contact Dinkar P. Kharkar	Client Westinghouse Hanford Contract MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Water samples from Location 100-KR-4 (TMA/Norcal Group 7055) are reported herein. TMA/Norcal Group 7055 is comprised of the two samples listed on the Chain-of-Custody documents and are identified as Samples 1 and 2.

1.1 CHAINS-OF-CUSTODY

This report includes data from the samples delivered under Chain-of-Custody documents Field Logbook No. EFL-1022.

1.2 SAMPLE VOLUME

4000mL, 1000 mL, 500 mL, and 250 mL bottles of samples were received for the analyses.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

All collections were made between 5/28/92 and 6/16/92 and all 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 7055-3 through 6.

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, except for ^{14}C which was 45%, and does not pass the 3 σ protocol limits. The MDA's for all nuclides meet the RDL requirement.

2.2 BLANKS

MDA's for all the analyses meet the RDL requirements, except for ^{99}Tc and ^{241}Am.

SDG 7055	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The MDA's for ^{99}Tc is underlined in the data sheets because the MDA exceed RDL, but is within average MDA of 6.1 ± 2.8 pCi/L.

3.0 ANALYTICAL NOTES

3.1 Gross Alpha Analyses: The average MDA for gross alpha was 2.0 ± 0.93 pCi/L. Positive gross alpha concentration was not found in any sample. All the results were less than MDA.

3.2 Gross Beta Analyses: The average MDA for gross beta was 1.9 ± 0.35 pCi/L. Positive gross beta concentration was not found in any of the samples. All results were less than MDA.

3.3 Carbon-14 Analyses: The average MDA was 17 ± 17 pCi/L. All the results were less than MDA. No positive ^{14}C was found in the samples. The recoveries for ^{14}C LCS samples are still low, and the causes are still in investigation as part of TMA CAR NSD-289.

The data sheets were manually entered and double-checked rather than by the automated data calculation routine. This leads to the slightly different format.

The raw data is from a slightly different protocol than usual due to the testing and evaluation we have been doing. The channels used from the LCS spectrum are 3.0 - 75 KeV. This corresponds to the "B" channel for the sample data and the "A" channel for the spiked sample data.

3.4 Strontium-90 Analyses: The average yield for five analyses was (72 ± 25%). The lowest yield was 59% and the highest was 88%. The average MDA was 0.81 ± 0.25 pCi/L. Positive ^{90}Sr concentration was not found in any sample. All sample results were below MDA.

3.5 Uranium-233, 234, 234, and 238 Analyses: The average yield for five analyses was (48 ± 25%). The lowest yield was 34% and the highest was 68%. The average MDA was 0.083 ± 0.098 pCi/L. Concentration of isotopic U above MDA was found in sample number 7055-1.

3.6 Plutonium-238, 239/240 Analyses: The average yield for five analyses was (64 ± 46%). The lowest yield was 33% and the highest was 87%. The average MDA was 0.030 ± 0.019 pCi/L. Positive plutonium concentration was not found in any of the samples. All sample results were below MDA.

SDG 7055	Client Westinghouse Hanford
Contact Dinkar P. Kharkar	Contract MBH-SVV-069262

CASE NARRATIVE

3.7 Americium-241 Analyses: The average yield for five analyses was (59 ± 26%). The lowest yield was 42% and the highest was 74%. The average MDA was 0.038 ± 0.029 pCi/L. Positive americium concentration was not found in any of the samples. All sample results were below MDA.

3.8 Technetium-99: The average yield for five analyses was (49 ± 23%). The lowest yield was 37% and the highest was 65%. the average MDA was 6.1 ± 2.8 pCi/L. Positive ^{99}Tc concentration was not found in any of the samples. All sample results were below MDA.

3.9 Tritium Analyses: Positive ^{3}H concentration was not found in any of the samples. All sample results were below MDA.

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

9613499.2843

N206008-01

TMA NORCAL
REPORTING GROUP 7055

DATA SHEET

B06M18

SDG 7055
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N206008-01
Dept sample id 7055-001
Received 06/01/92

Client sample id B06M18
Matrix WATER
Collected 05/28/92
Chain of custody id EFL-1022

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.25	1.2	1.9	3.0	U	80A
Gross Beta	Beta	1.3	1.2	1.8	4.0	U	80B
Uranium 233/234		3.8	0.31	0.065	0.20		U
Uranium 235	15117-96-1	0.34	0.077	0.032	0.20		U
Uranium 238	7440-61-1	3.6	0.30	0.055	0.20		U
Plutonium 238	13981-16-3	0.003	0.022	0.040	0.050	U	PU
Plutonium 239/240		0.008	0.017	0.026	0.050	U	PU
Americium 241	14596-10-2	0.004	0.018	0.032	0.050	U	AM
Strontium 90	10098-97-2	0.93	0.34	0.99	1.0	U	Y
Technetium 99	14133-76-7	0.40	2.0	7.1	5.0	U	TC
Tritium	10028-17-8	72	130	170	400	U	H
Carbon 14	14762-75-5	-20	30	24	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		140		U	GAM
Iron 59		U		98		U	GAM
Chromium 51	14392-02-0	U		510		U	GAM
Cobalt 60	10198-40-0	U		11		U	GAM
Zinc 65	17982-39-3	U		34		U	GAM
Ruthenium 106	13967-48-1	U		130		U	GAM
Cesium 134	17967-70-9	U		12		U	GAM
Cesium 137	10045-97-3	U		11		U	GAM
Europium 152	14683-23-9	U		23		U	GAM
Europium 154	15585-10-1	U		15		U	GAM
Radium 226	13982-67-7	U		20		U	GAM
Thorium 228	14274-82-9	U		19		U	GAM
Thorium 232	7440-29-1	U		53		U	GAM

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/28/92

9613499.2844

N206008-02

TMA NORCAL
REPORTING GROUP 7055

DATA SHEET

B06M22

SDG	7055	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N206008-02	Client sample id	B06M22
Dept sample id	7055-002	Matrix	WATER
Received	06/18/92	Collected	06/16/92
		Chain of custody id	EFL-1022

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.22	0.91	1.4	3.0	U	80A
Gross Beta	Beta	-0.12	1.3	2.2	4.0	U	80B
Uranium 233/234		0.18	0.063	0.071	0.20	J	U
Uranium 235	15117-96-1	0.025	0.034	0.047	0.20	U	U
Uranium 238	7440-61-1	0.13	0.042	0.027	0.20	J	U
Plutonium 238	13981-16-3	-0.002	0.010	0.024	0.050	U	PU
Plutonium 239/240		0.002	0.007	0.013	0.050	U	PU
Americium 241	14596-10-2	-0.006	0.017	0.040	0.050	U	AM
Strontium 90	10098-97-2	0.22	0.22	0.71	1.0	U	Y
Technetium 99	14133-76-7	1.9	2.2	6.9	5.0	U	TC
Tritium	10028-17-8	81	130	170	400	U	H
Carbon 14	14762-75-5	-0.84	27	22	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		260		U	GAM
Iron 59		U		77		U	GAM
Chromium 51	14392-02-0	U		350		U	GAM
Cobalt 60	10198-40-0	U		17		U	GAM
Zinc 65	17982-39-3	U		39		U	GAM
Ruthenium 106	13967-48-1	U		130		U	GAM
Cesium 134	17967-70-9	U		17		U	GAM
Cesium 137	10045-97-3	U		15		U	GAM
Europium 152	14683-23-9	U		23		U	GAM
Europium 154	15585-10-1	U		18		U	GAM
Radium 226	13982-67-7	U		28		U	GAM
Thorium 228	14274-82-9	U		23		U	GAM
Thorium 232	7440-29-1	U		68		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.16
Report date	09/28/92

9615499.2845

SEP 1992
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WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

ORGANICS & GENERAL CHEMISTRY
Case No. 06-056
(TMA/ARLI Work Order #A2-06-056)

METALS
Case No. N2-06-111
(TMA/Skinner & Sherman W.O. # S2-06-190 & S2-06-191)

August 18, 1992

TMA Master Work Order # N2-06-111

7/16/96 KDB

9613499.2846

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804-0040
(415) 235-2633 Fax No. (415) 235-0438

SEP 1992
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OSM DMO

September 9, 1992

Briana Colley
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Subject: TMA Master Work Order N2-06-111

Dear Briana:

Please replace the attached revised cover page for Master Work Order No. N2-06-111. The Case No. for the Organics & General Chemistry was incorrectly identified in the original submittal.

Thank you,

Dolores Sanchez
Program Coordinator

9613499.2847

TMA

AUG 1992
RECEIVED
OSM DMO

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

ORGANICS & GENERAL CHEMISTRY
Case No. 06-111
(TMA/ARLI Work Order #A2-06-056)

METALS
Case No. N2-06-111
(TMA/Skinner & Sherman W.O. # S2-06-190 & S2-06-191)

August 18, 1992

TMA Master Work Order # N2-06-111

9613499.2848

SAMPLE LOG-IN SHEET

000004

LAB NAME : TMA/ARLI

PAGE : 1 OF 1

RECEIVED BY (PRINT NAME): CAROLE HARRIS

LOG-IN-DATE : 6/19/90

RECEIVED BY (SIGNATURE): Carole Harris

CASE NUMBER:

SAMPLE DELIVERY GROUP NO.:

SAS NUMBER:

REMARKS:		EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC
			B0LM22	AZ 06-056-01	
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:	6/19/90				
12. Temp of ice chest	4.1 °C				
13. Time Recieved:	9:00 AM				
SAMPLE TRANSFER					
Fraction:					
Area #:					
By:					
On:					

* Contact SMO and attach record of resolution

Reviewed By: _____ Logbook No.: _____

Date: _____ Logbook Page No.: _____

FORM DC-1

DOC2/LOGIN.TBL

GENERAL CHEMISTRY RESULTS

CASE NO. 06-056

Water Sample #:

B06M22

CASE NARRATIVE

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

Ernesto Vazquez

Ernesto Vazquez

TMA Inc. REPORT Work Order # A2-06-056

Received: 06/18/92

Results by Sample

SAMPLE ID B06M22 FRACTION 01G TEST CODE WCCLPL NAME Anions & Wet Chem. - WN043

Date & Time Collected 06/16/92 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	0.2	mg/L	0.1
Sulfate	300	12	mg/L	1
Elect. Conductivity	120.1	118	umho/cm	6
pH	150.1	8.3	pH	0.1

FORM I

CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 06-056

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : June 18, 1992

1.0 DESCRIPTION OF CASE :

One water sample was analyzed for TCL Organics-Volatiles, Semivolatiles, and Pesticide/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	pH
B06M22	A2-06-056-01A	V	WATER	7
B06M22 MS	A2-06-056-01B	V	WATER	7
B06M22 MSD	A2-06-056-01C	V	WATER	7
B06M22	A2-06-056-01D	SV & P	WATER	
B06M22 MS	A2-06-056-01E	SV & P	WATER	
B06M22 MSD	A2-06-056-01F	SV & P	WATER	

3.0 COMMENTS :

3.1 SHIPPING AND DOCUMENTATION :

All samples were received unbroken and properly documented.

3.2 ANALYSIS

3.2.1 VOLATILE ANALYSIS COMMENTS :

LOW LEVEL WATER :

The samples were analyzed within the CLP SOW holding times. In the samples analyzed there was a peak detected between scans 155 and 157 that has been identified as carbon dioxide and therefore was not reported on Form 1E. 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 WATER :

The samples were extracted and analyzed within the CLP SOW holding times. Both the MS and MSD samples had matrix spike recoveries for 4-Nitrophenol above the QC limit. Also, the MS sample had spike recoveries above the QC limit for 4-Chloro-3-methylphenol and Pentachlorophenol. In accordance with the protocol, no further action was required.

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

3.2.3 PESTICIDE/PCB ANALYSIS COMMENTS :

SEQUENCE NOTES :

The sequence was started on 7/7/92 and was analyzed in accordance with the EPA CLP SOW. The instrument blanks, PEMs and calibration verification standards all met the requirements established by the EPA CLP SOW.

SAMPLE NOTES :

LOW LEVEL WATER :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B06M22 had DCB surrogate recoveries slightly below the advisory QC limit. 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
CLP Program Manager

Wida Ang
Organics Supervisor

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20623B11

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: not dec. ____ Date Analyzed: 06/23/92

GC Column: WIDE ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	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	10	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	1	BJ
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	1	BJ
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	1	BJ
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

9613499.2855

000006
EPA SAMPLE NO.

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20623B11

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: not dec. ____ Date Analyzed: 06/23/92

GC Column: WIDE ID: 0.530 (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/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	HALOGENATED ALKANE	4.43	5	BJ

9613499.2856

000007
EPA SAMPLE NO.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	25	U

9613499.2857

000008

EPA SAMPLE NO.

B06M22

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown alkene	4.22	27	BJ
2.	Unknown hydrocarbon	7.30	10	BJ

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 06/18/92

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 06/22/92

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/09/92

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-36-3	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

9613499.2860

11/02/92
DFS

000001

 Skinner&Sherman REPORT Work Order # S2-06-191

Received: 06/19/92 07/23/92 14:13:30

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 N2-06-111
TAKEN By Client
TRANS Fedex
TYPE 1 Water (NO3NO2)
P.O. # N2-06-111
INVOICE under separate cover

SAMPLE IDENTIFICATION

01 B06M22
01 B06M22D
01 B06M22S
02 LCSW

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 # S2-06-191

Received: 06/19/92 Results by Sample

SAMPLE ID B06M22 SAMPLE # 01 FRACTIONS: A

Date & Time Collected 06/16/92 Category WATER

NO3NO2 <0.25

mg N/L

SAMPLE ID B06M22D SAMPLE # 01 FRACTIONS: B

Date & Time Collected 06/16/92 Category WATER

NO3NO2 <0.25

mg N/L

SAMPLE ID B06M22S SAMPLE # 01 FRACTIONS: C

Date & Time Collected 06/16/92 Category WATER

NO3NO2 1.92

mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A

Date & Time Collected not specified Category WATER

NO3NO2 1.92

mg N/L

TMA
Thermo Analytical Inc.

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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
S206191-01	<0.25 mg/L	2.00 mg/L	1.92 mg/L	96.0

DUPLICATE

Sample ID	Sample Result	Duplicate Result	Relative % Difference
S206191-01	<0.25 mg/L	<0.25 mg/L	not calculable

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	% Recovery
LCS	2.00 mg/L	1.92 mg/L	96.0
Blank	--	<0.25 mg/L	--

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

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

Received: 06/19/92 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

TMA/Skinner & Sherman Labs SAMPLE LOG-IN
WORKORDER 52-06-191 CLIENT Hanford-NOR No. SAMPLES:
PROTCL CLP TURNARND 33 days
COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)
CUSTODIAN A. Benney SDG/BATCH N/A
CUSTODY SEAL PRESENT/ABSENT/INTACT/NOT CLIENT CASE N2-06-111
SHIPER & # Fedex # 2521034936 PO/CONTRACT# ↓
TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Dolores Sanchez
CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: NONE

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO
SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)
CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 6.19.92
LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC		HOLD TIME UP
1	B06M22	WATER	6/19/92	1.9	NO3NO2	0.5	
2							
3							due
4							
5							7.13.92
6							
7							
8							
9							
10							
11							
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17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							

complete 6.27.92

Samples are from site known to have Rad-Contamination: YES ✓ NO
Samples have detectable amounts of Radioactive Material: YES ✗ NO ✓

SUBCONTRACT: YES/NO, TO: DATE:

REVIEWED

* EPA/CLP required Rev 1.6 PAGE:

000022

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL: PACKAGE TRACKING NUMBER 2521034736

2521034736

RECIPIENT'S COPY

1 Date

From (Your Name) Please Print: SAMPLE CONTROL

Your Phone Number (Very Important)

Company

Department/Floor No.

Street Address

City

State

ZIP Required

2 To (Recipient's Name) Please Print: SAMPLE CONTROL

Recipient's Phone Number (Very Important): (617) 890-7200

Company: TMA / 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 [ ] 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 ... * Declared Value Limit $100

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 [ ] HOLD FOR PICK-UP (Fill in Box H)
- 2 [X] DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra Charge) (Not available to all locations) [ ]
- 4 [ ] DANGEROUS GOODS (Extra charge)
- 5 [ ]
- 6 [ ] DRY ICE
- 7 [ ] OTHER SPECIAL SERVICE
- 8 [ ]
- 9 [ ] SATURDAY PICK-UP (Extra charge)
- 10 [ ]
- 11 [ ]
- 12 [ ] HOLIDAY DELIVERY (If offered)

6 PACKAGES | WEIGHT (In Pounds Only) | YOUR DECLARED VALUE

Total | Total | Total

DIM SHIPMENT (Chargeable Weight) [ ] lbs

___ x ___ x ___ = ___

Received At: 1 [ ] Regular Stop 3 [ ] Drop Box 4 [ ] BSC

Emp. No. | Date

[ ] Cash Received

[ ] Return Shipment

[ ] Third Party [ ] Chg. To Del [ ] Chg. To Hold

Street Address

City | State | Zip

Received By: X

Date/Time Received: 6-19-92 | FedEx Employee Number: 9:30

7 Release Signature:

FedEx Emp. No. | Date/Time

Federal Express Use

Base Charges

Declared Value Charge

Other 1

Other 2

Total Charges

REVISION DATE 6/91
PART #13/204 FXEM 4/92
FORMAT #099

099

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96 15999 2865

9613499.2866

TMA
Thermo Analytical Inc.

300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

AUG 1992
RECEIVED
OSM
DMO

July 21, 1992

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

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on June 19, 1992 from Westinghouse/Hanford Company. The samples were analyzed for the USEPA CLP Target Analyte List metals. The analysis was performed under Skinner and Sherman work order S206190.

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 sample with the following exceptions:

- The duplicate RPD exceeded the control limit requirements for selenium.
- The matrix spike recovery for selenium exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Kirk D. Johnson
EPA CLP Data Manager

7/16/96 KDb

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M22

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

Lab Code: SKINER Case No.: N2-06-111SAS No.: SDG No.: B06M22

Matrix (soil/water): WATER Lab Sample ID: 06190-01S

Level (low/med): LOW Date Received: 06/19/92

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	51.30	B		P
7440-36-0	Antimony	16.50	U		P
7440-38-2	Arsenic	2.40	U		F
7440-39-3	Barium	31.50	B		P
7440-41-7	Beryllium	0.40	U		P
7440-43-9	Cadmium	1.40	U		P
7440-70-2	Calcium	20400.00			P
7440-47-3	Chromium	3.70	U		P
7440-48-4	Cobalt	2.30	U		P
7440-50-8	Copper	2.40	U		P
7439-89-6	Iron	217.00			P
7439-92-1	Lead	2.60	B		F
7439-95-4	Magnesium	5240.00			P
7439-96-5	Manganese	5.90	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	6.00	U		P
7440-09-7	Potassium	949.00	B		P
7782-49-2	Selenium	7.40		+N*	F
7440-22-4	Silver	2.30	U		P
7440-23-5	Sodium	2640.00	B		P
7440-28-0	Thallium	4.30	U		F
7440-62-2	Vanadium	3.30	U		P
7440-66-6	Zinc	22.80			P
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613499.2868

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER 92-06-190 CLIENT Hanford-NOR No. SAMPLES:

PROTCL CLP TURNARND 33 days

COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)

CUSTODIAN Jeffrey A. SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N2-06-111

SHIPER & # Fedex #2521034736 PO/CONTRACT# ↓

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Dolores Sanchez

CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: NONE

SAMPLE CONTAINERS INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 6.19.92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH* (TM)	PH* (CN)	TEST(S) & QC		HOLD TIME UP
1	B06M22	WATER	6.19.92	2.1	11	TM/CN	0,5	CN due 6.29.92
2								
3								
4								Hg due 7.13.92
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

6-22-92

COMPLETE

Samples are from site known to have Rad-Contamination: YES ✓ NO ___

Samples have detectable amounts of Radioactive Material: YES ___ NO ✓

SUBCONTRACT: YES/NO, TO: ___ DATE: ___

REVIEWED ___

141

* EPA/CLP required Rev 1.6 PAGE: 000025

9613499.2869

VALIDATION SUMMARY

DATA QUALIFICATION SUMMARY

UNIT: 100-KR-4

DOCUMENT CONTROL NUMBER: WHC-SD-EN-TI-134

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

RFW NO.: B06M18-TMA-204

SDG NO.: B06M18

QUALIFICATION SUMMARY:

VOLATILES

SAMPLE NUMBERS: B06M18

No qualifiers added to data.

SEMIVOLATILES

SAMPLE NUMBERS: B06M18

No qualifiers added to data.

PESTICIDES/PCBS

SAMPLE NUMBERS: B06M18

INITIAL CALIBRATIONS

Due to initial calibration RSDs above the QC limits, the following were qualified as estimates and flagged "J":

- Alpha-BHC, delta-BHC, gamma-BHC, 4,4'-DDE, 4,4'-DDD, aldrin, dieldrin and methoxychlor for sample number B06M18 in SDG No. B06M18.

INORGANICS

SAMPLE NUMBERS: B06M18

BLANKS

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

- Sample number B06M18 in SDG No. B06M18.

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

- Sample number B06M18 in SDG No. B06M18.

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

- Sample number B06M18 in SDG No. B06M18.

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

- Sample number B06M18 in SDG No. B06M18.

MATRIX SPIKE RECOVERY

The matrix spike recoveries fell outside the QC limits for lead. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M18 in SDG No. B06M18.

ICP SERIAL DILUTION

The ICP serial dilution results fell outside the QC limits for iron. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M18 in SDG No. B06M18.

ANALYTICAL SPIKE RECOVERY

The analytical spike recoveries fell outside the QC limits for lead. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M18 in SDG No. B06M18.

The analytical spike recoveries fell outside the QC limits for selenium. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M18 in SDG No. B06M18.

The analytical spike recoveries fell outside the QC limits for thallium. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M18 in SDG No. B06M18.

WET CHEMISTRY

SAMPLE NUMBERS: B06M18

HOLDING TIMES

Holding times were exceeded for pH in SDG No. B06M18. All associated sample results were qualified as estimates and flagged "J".

9613499.2873

000002

Westinghouse Hanford Company	CHAIN OF CUSTODY	ARL1

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE — Telephone: 376-2084

Project Designation/Sampling Locations: 100-KR-4 — Collection Date: 5-28-92

Ice Chest No.: SML-24 — Field Logbook No.: EFL-1D22

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) E06M18 ~~1,1000ml P:CLP;ICP/AA Metals,Hg~~
~~1,1000ml G:CLP;Cn~~
3,40ml aG:CLP;VOA
3,2360ml aG:CLP;Semi-VOA,PCB,PEST
1,500ml P:300.0;Anions(F,SO4)
9040;pH
9050;Conductivity
1,500ml P:353.2;NO3
* 2,4000ml ~~1,6000ml P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241~~
~~1,1000ml P:Tc-99~~
~~1,500ml P:C-14~~
~~1,250ml Gs:Tritium~~

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: CM Chance / Cory Chance	Received by: Kermit Blum	Date/Time: ** 6-1-92 0800
Relinquished by: 6-1-92 Kermit Blum	Received by: Tody Bernard	Date/Time: 6/2/92 1000
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: * One 4000 ml aliquot was approximately half-full when received @ TMA/NORCAL. No obvious leaks, however. KB

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

** Received 5-30-92 @ TMA/NORCAL; opened 6-1-92. KB

9613499.2874

000003

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CMChance Date Sampled 5-28-92 Time 0940 hours

Company Contact CM CHANCE Telephone (509) 376-2084

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
	~~1-1000ml P~~	~~Water~~	~~CLP:ICP/AA Metals,Hg~~ ✓
	~~1-1000ml G~~	~~Water~~	~~CLP:Cn~~ ✓
	3-40ml aG	Water	CLP:VOA ✓
	3-2360ml aG	Water	CLP:Semi-VOA,PCB/PEST ✓
	1-500mlP	Water	300.0;Anions(F,SO4) ✓
			9040;pH
B06M18			9050;Conductivity
	1-500ml P	Water	353.2;NO3
	~~2-4000ml P~~	~~Water~~	~~Gross alpha/beta,Gamma Spec,Sr-90,U-235/238~~ ✓
			~~Pu-239/240,Am-241~~
	~~1-1000ml P~~	~~Water~~	~~Tc-99~~ ✓
	~~1-500ml P~~	~~Water~~	~~C-14~~ ✓
	~~1-250ml Gs~~	~~Water~~	~~Tritium~~ ✓

Field Information** _____

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

9613499.2875

000004
EPA SAMPLE NO.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20605R03

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: not dec. ____ Date Analyzed: 06/05/92

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/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	UJ
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	20	
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

12-29-92 MM

6/21/93

9613499.2876

000005

EPA SAMPLE NO.

B06M18

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20605R03

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: not dec. ____ Date Analyzed: 06/05/92

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

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

Number TICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

12-29-92
MY

9613499.2877

000006

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: ____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	25	U

6/21/92
12-29-92
MM

9613499.2878

000007
EPA SAMPLE NO.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: ____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

12-29-92
MY

6/21/93

9613499.2879

000008
EPA SAMPLE NO.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B06M18

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206008-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20622N09

Level: (low/med) LOW Date Received: 06/01/92

% Moisture: ____ decanted: (Y/N) ___ Date Extracted: 06/03/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/22/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown hydrocarbon	4.22	16	J
2.	Unknown hydrocarbon	7.37	9	~~BJ~~ U
3.	Unknown alcohol	7.98	3	~~BJ~~ U
4.	Unknown ketone	8.90	5	~~BJ~~ U
5.	Unknown alcohol	23.58	74	J
6.	Unknown alcohol	24.82	6	J

12-29-

6/21/93

000009
EPA SAMPLE NO.

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

B06M18

ab Name: TMA/ARLI Contract: WHC

ab Code: TMALA Case No.: 06008 SAS No.: NA SDG No.: NA

atrix: (soil/water) WATER Lab Sample ID: A206008-01D

ample wt/vol: 1000 (g/mL) ML Lab File ID: _____

Moisture: _____ decanted: (Y/N) ___ Date Received: 06/01/92

xtraction: (SepF/Cont/Sonc) CONT Date Extracted: 06/03/92

oncentrated Extract Volume: 10000 (uL) Date Analyzed: 06/25/92

jection Volume: 2.50 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-36-3	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

6/24/92

9613499.2881

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M18

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

Lab Code: SKINER Case No.: N2-06-005SAS No.: SDG No.: B06M18

Matrix (soil/water): WATER Lab Sample ID: 06016-01S

Level (low/med): LOW Date Received: 06/02/92

% Solids: 0.0

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

2/09/93 fm

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	160.00	B		P
7440-36-0	Antimony	16.00	U		P
7440-38-2	Arsenic	1.30	~~B~~	U	F
7440-39-3	Barium	34.90	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	21100.00			P
7440-47-3	Chromium	3.00	U		P
7440-48-4	Cobalt	3.00	U	U	P
7440-50-8	Copper	4.30	B		P
7439-89-6	Iron	423.00		~~E~~ J	P
7439-92-1	Lead	2.40	B	~~W~~ (J)	F
7439-95-4	Magnesium	4980.00	B		P
7439-96-5	Manganese	10.00	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	5.00	~~B~~	U	P
7440-09-7	Potassium	1080.00	B		P
7782-49-2	Selenium	4.00	U	~~W~~ UJ	F
7440-22-4	Silver	2.00	U		P
7440-23-5	Sodium	2430.00	B		P
7440-28-0	Thallium	2.00	U	~~W~~ UJ	F
7440-62-2	Vanadium	2.40	B		P
7440-66-6	Zinc	13.60	B		P
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

FORM I - IN

BJ 6/21/93

Rev.6/89

9613499.2882

000010

TMA Inc. REPORT Work Order # A2-06-008

Received: 05/30/92

Results by Sample

SAMPLE ID B06M18 FRACTION 01G TEST CODE WCCLPL NAME Anions & Wet Chem. - VN043

Date & Time Collected 05/28/92 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	0.3	mg/L	0.1
Sulfate	300	11	mg/L	1
Elect. Conductivity	120.1	164	umho/cm	6
pH	150.1	8.7 6	pH	0.1

J - Holding Time

FORM I

2/09/93 JM

6/21/93

9613499.2883

Received: 06/03/92

Results by Sample

SAMPLE ID B06M18 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 05/28/92 Category WATER

NO3NO2 <0.25 U
mg N/L

SAMPLE ID B06M18D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 05/28/92 Category WATER

NO3NO2 <0.25
mg N/L

SAMPLE ID B06M18S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 05/28/92 Category WATER

NO3NO2 1.57
mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category WATER

NO3NO2 1.91
mg N/L

2/09/93

6/21/93

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, [illegible] 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.

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

VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: Westinghouse Data Validation	REVIEWER: MJ	DATE: 12-29-92
LABORATORY: IMA	CASE: 06008	SDG: B06M18
SAMPLES/MATRIX: Water;		

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%~~ 25.0% (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) No TICs

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.

9613499.2891

COMMENTS (attach additional sheets as necessary):

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

PROJECT: Westinghouse Data Validation	REVIEWER: MY	DATE: 12-29-92
LABORATORY: JMA	CASE: 06008	SDG: B06M18
SAMPLES/MATRIX: Water; B06M18		

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%~~ 25.0% (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

No Detects

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.

9615999.2899

COMMENTS (attach additional sheets as necessary):

PESTICIDE/PCB DATA VALIDATION CHECKLIST - FORM A-3

PROJECT: Westinghouse Data Validation	REVIEWER: MY	DATE: 12-09-92
LABORATORY: JMA	CASE: 06808	SDG: B06M18
SAMPLES/MATRIX: WATER ; B06M18		

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

No Detects

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):

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X01341
100-KR-4

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse - Hanford	REVIEWER: LM	DATE: 2/09/93
LABORATORY: TMA	CASE:	SDG: B06M18
SAMPLES/MATRIX: B06M18		
1 Water Sample		

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 nondetects).

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 cyanide 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 cyanide 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 <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times 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 <5 times the amount in any valid field blank as nondetected (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 nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (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 ≥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 nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is ≥10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <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 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

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100-KR-4

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: Westinghouse-Hanford	REVIEWER: LM	DATE: 2/09/93
LABORATORY: TMA	CASE:	SDG: B06M18
SAMPLES/MATRIX: B06M18		
1 water sample		

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 nondetects).

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	not provided
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 <5 times the amount in any laboratory blank as nondetected (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 <5 times the amount in any valid field blank as nondetected (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 >CRQL, qualify the data as estimated (J). If the spike recovery is <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 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

ICV/CCV data has not been provided.
ICB/CCB

Laboratory Blank Data not provided.

LCS data not provided.

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X01341

100-KR-4

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: Westinghouse - Hanford	REVIEWER: LM	DATE: 2/09/93
LABORATORY: TMA	CASE:	SDG:
SAMPLES/MATRIX: B06M18		
1 water sample		

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 nondetects).

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 <5 times the amount in any laboratory blank as nondetected (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 <5 times the amount in any valid field blank as nondetected (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 >CRQL, qualify the data as estimated (J). If the spike recovery is <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 10.0 of the data validation requirements.

9613499.2924

COMMENTS (attach additional sheets as necessary):

DATA QUALIFICATION SUMMARY

UNIT: 100-KR-4

DOCUMENT CONTROL NUMBER: WHC-SD-EN-TI-134

ANALYSES: Radiochemistry

RFW NO.: B06M18-TMA-204

SDG NO.: B06M18

QUALIFICATION SUMMARY:

SAMPLE NUMBERS: B06M18, B06M22

GROSS ALPHA AND GROSS BETA DETERMINATION

No qualifiers added to data.

ALPHA SPECTROSCOPY

PRECISION

Due to high RPD results, Uranium-238 and Uranium-233/234 results for sample numbers B06M18 and B06M22 in SDG No. B06M18 were qualified as estimates and flagged "J".

GAMMA SPECTROSCOPY

No qualifiers added to data.

STRONTIUM-90

No qualifiers added to data.

TECHNETIUM-99

No qualifiers added to data.

CARBON-14

ACCURACY

Due to low LCS recovery results, Carbon-14 results in sample numbers B06M18 and B06M22 in SDG No. B06M18 were rejected and flagged "R".

TRITIUM

No qualifiers added to data.

9615499.2926

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE — Telephone: 376-2084

Project Designation/Sampling Locations: 100-KR-4 — Collection Date: 5-28-92

Ice Chest No.: SML-24 — Field Logbook No.: EFL-1D22

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) B06M18
- 1,1000ml P:CLP;ICP/AA Metals,Hg
- 1,1000ml G:CLP;Cn
- 3,40ml aG:CLP;VOA
- 3,2360ml aG:CLP;Semi-VOA,PCB,PEST
- 1,500ml P:300.0;Anions(F,SO4)
  - 9040;pH
  - 9050;Conductivity
- 1,500ml P:353.2;NO3
- * 2,4000ml ~~1,6000ml~~ P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241
- 1,1000ml P:Tc-99
- 1,500ml P:C-14
- 1,250ml Gs:Tritium

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: CM Chance, Cory Chance	Received by: Kermit Blum	Date/Time: ** 6-1-92 0800
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: * One 4000 ml aliquot was approximately half-full when received @ TMA/Norcal. No obvious leaks, however. KB

** Received 5-30-92 @ TMA/Norcal; opened 6-1-92. KB

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

9615499.2927

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CMChance Date Sampled 5-28-92 Time 0940 hours

Company Contact CM CHANCE Telephone (509) 376-2084

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
	1-1000ml P	Water	CLP:ICP/AA Metals,Hg ✓
	1-1000ml G	Water	CLP:Cn ✓
	3-40ml aG	Water	CLP:VOA ✓
	3-2360ml aG	Water	CLP:Semi-VOA,PCB/PEST ✓
	1-500mlP	Water	300.0;Anions(F,SO4) ✓
			9040;pH
B06M18			9050;Conductivity
	1-500ml P	Water	353.2;NO3
	2-4000ml P	Water	Gross alpha/beta,Gamma Spec,Sr-90,U-235/238
			Pu-239/240,Am-241
	1-1000ml P	Water	Tc-99 ✓
	1-500ml P	Water	C-14 ✓
	1-250ml Gs	Water	Tritium ✓

Field Information** _____

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-1-92

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

9613499.2928

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: CM Chance

Company Contact: CM CHANCE

Telephone: 376-2084

Project Designation/Sampling Locations: 100-KR-4

Collection Date: ~~6-15-92~~ 6-16-92

Ice Chest No.: Coleman - NOT + NJ BOUND

Field Logbook No.: EFL-1022

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) B06M22 (0850)
- 1,1000ml P:CLP;ICP/AA Metals,Hg
- 1,1000ml G:CLP;Cn
- 3,40ml aG:CLP;VOA
- 3,2360ml aG:CLP;Semi-VOA,PCB,PEST
- 1,500ml P:300.0;Anions(F,SO4)
  - 9040;pH
  - 9050;Conductivity
- 1,500ml P:353.2;NO3
- 2,4000ml P:Gross alpha/beta,Gamma Spec, Sr-90,U-235/238,Pu-239/240,Am-241
- 1,1000ml P:Tc-99
- 1,500ml P:C-14
- 1,250ml Gs:Tritium

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

Relinquished by:	Received by:	Date/Time:
CM Chance / Cory Chance	Kermit Blum	6-18-92 1130
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

9613499.2929

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector CM Chance Date Sampled 6-16-92 Time 0850 hours

Company Contact CM Chance Telephone (509) 376-7619

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
1 ✓	1000ml P	Water ~~Soil~~ CCB-169*	CLP; ICP/AA metals, Hg
1 ✓	1000ml G		CLP; CN
3 ✓	40ml aG		CLP; VOA
3 ✓	236Oml aG		CLP; Semi-VOA, PCB/PEST
1 ✓	500ml P		Anions: (F, SO4) 300.0; pH 9040;
			Conductivity 9050
06/22 1 ✓	500ml P		NO3-353.2
2 ✓	4000ml P		Gross alpha/beta, Gamma Spec, Sr-90,
			U-235/238, Pu-239/240, Am-241
1 ✓	1000ml P		Tc-99
1 ✓	500ml P		C-14
1 ✓	250ml Gs		Tritium
	CL 6-16-92		

Field Information**

Special Handling and/or Storage Maintain at 4C

Possible Sample Hazards NA

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 6-18-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

9615499.2950

N206008-01

TMA NORCAL
REPORTING GROUP 7055

DATA SHEET

B06M18

SDG 7055
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N206008-01
Dept sample id 7055-001
Received 06/01/92

Client sample id B06M18
Matrix WATER
Collected 05/28/92
Chain of custody id EFL-1022

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	0.25	1.2	1.9	3.0	U	80A
Gross Beta	Beta	1.3	1.2	1.8	4.0	U	80B
Uranium 233/234		3.8	0.31	0.065	0.20	J	U
Uranium 235	15117-96-1	0.34	0.077	0.032	0.20		U
Uranium 238	7440-61-1	3.6	0.30	0.055	0.20	J	U
Plutonium 238	13981-16-3	0.003	0.022	0.040	0.050	U	PU
Plutonium 239/240		0.008	0.017	0.026	0.050	U	PU
Americium 241	14596-10-2	0.004	0.018	0.032	0.050	U	AM
Strontium 90	10098-97-2	0.93	0.34	0.99	1.0	U	Y
Technetium 99	14133-76-7	0.40	2.0	7.1	5.0	U	TC
Tritium	10028-17-8	72	130	170	400	U	H
Carbon 14	14762-75-5	-20	30	24	50	UR	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		140		U	GAM
Iron 59		U		98		U	GAM
Chromium 51	14392-02-0	U		510		U	GAM
Cobalt 60	10198-40-0	U		11		U	GAM
Zinc 65	17982-39-3	U		34		U	GAM
Ruthenium 106	13967-48-1	U		130		U	GAM
Cesium 134	17967-70-9	U		12		U	GAM
Cesium 137	10045-97-3	U		11		U	GAM
Europium 152	14683-23-9	U		23		U	GAM
Europium 154	15585-10-1	U		15		U	GAM
Radium 226	13982-67-7	U		20		U	GAM
Thorium 228	14274-82-9	U		19		U	GAM
Thorium 232	7440-29-1	U		53		U	GAM

RB
2/2/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/28/92

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 13

RB
6/22/93

9613499.2931

N206008-02

TMA NORCAL
REPORTING GROUP 7055

DATA SHEET

B06M22

SDG 7055
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N206008-02
Dept sample id 7055-002
Received 06/18/92

Client sample id B06M22
Matrix WATER
Collected 06/16/92
Chain of custody id EFL-1022

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Gross Alpha	Alpha	0.22	0.91	1.4	3.0	U	80A
Gross Beta	Beta	-0.12	1.3	2.2	4.0	U	80B
Uranium 233/234		0.18	0.063	0.071	0.20	J	U
Uranium 235	15117-96-1	0.025	0.034	0.047	0.20	U	U
Uranium 238	7440-61-1	0.13	0.042	0.027	0.20	J	U
Plutonium 238	13981-16-3	-0.002	0.010	0.024	0.050	U	PU
Plutonium 239/240		0.002	0.007	0.013	0.050	U	PU
Americium 241	14596-10-2	-0.006	0.017	0.040	0.050	U	AM
Strontium 90	10098-97-2	0.22	0.22	0.71	1.0	U	Y
Technetium 99	14133-76-7	1.9	2.2	6.9	5.0	U	TC
Tritium	10028-17-8	81	130	170	400	U	H
Carbon 14	14762-75-5	-0.84	27	22	50	UR	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		260		U	GAM
Iron 59		U		77		U	GAM
Chromium 51	14392-02-0	U		350		U	GAM
Cobalt 60	10198-40-0	U		17		U	GAM
Zinc 65	17982-39-3	U		39		U	GAM
Ruthenium 106	13967-48-1	U		130		U	GAM
Cesium 134	17967-70-9	U		17		U	GAM
Cesium 137	10045-97-3	U		15		U	GAM
Europium 152	14683-23-9	U		23		U	GAM
Europium 154	15585-10-1	U		18		U	GAM
Radium 226	13982-67-7	U		28		U	GAM
Thorium 228	14274-82-9	U		23		U	GAM
Thorium 232	7440-29-1	U		68		U	GAM

RB
2/2/93

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/28/92

RBJ
6/22/93

9613499.2952

N206008-01

TMA NORCAL
REPORTING GROUP 7055

DATA SHEET

WC

B06M18

SDG 7055
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N206008-01
Dept sample id 7055-001
Received 06/01/92

Client sample id B06M18
Matrix WATER
Collected 05/28/92
Chain of custody id EFL-1022

AD= 8/25/92

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	
Gross Alpha	Alpha	0.25	1.2	1.9	3.0	U	80A	
Gross Beta	Beta	1.3	1.2	1.8	4.0	U	80B	
Uranium 233/234		3.8	0.31	0.065	0.20	J	U	RPD out
Uranium 235	15117-96-1	0.34	0.077	0.032	0.20		U	
Uranium 238	7440-61-1	3.6	0.30	0.055	0.20	J	U	RPD out
Plutonium 238	13981-16-3	0.003	0.022	0.040	0.050	U	PU	
Plutonium 239/240		0.008	0.017	0.026	0.050	U	PU	RB
Americium 241	14596-10-2	0.004	0.018	0.032	0.050	U	AM	
Strontium 90	10098-97-2	0.93	0.34	0.99	1.0	U	Y	2/2/93
Technetium 99	14133-76-7	0.40	2.0	7.1	5.0	U	TC	
Tritium	10028-17-8	72	130	170	400	U	H	
Carbon 14	14762-75-5	-20	30	24	50	UR	C	LCS <50% rec
GAMMA SCAN ANALYTES								
Potassium 40	13966-00-2	U		140		U	GAM	
Iron 59		U		98		U	GAM	
Chromium 51	14392-02-0	U		510		U	GAM	
Cobalt 60	10198-40-0	U		11		U	GAM	
Zinc 65	17982-39-3	U		34		U	GAM	
Ruthenium 106	13967-48-1	U		130		U	GAM	
Cesium 134	17967-70-9	U		12		U	GAM	
Cesium 137	10045-97-3	U		11		U	GAM	
Europium 152	14683-23-9	U		23		U	GAM	
Europium 154	15585-10-1	U		15		U	GAM	
Radium 226	13982-67-7	U		20		U	GAM	
Thorium 228	14274-82-9	U		19		U	GAM	
Thorium 232	7440-29-1	U		53		U	GAM	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.16
Report date 09/28/92

9613499.2955

TMA NORCAL

REPORTING GROUP 7055

DATA SHEET

N206008-02

B06M22

WL

SDG	7055	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N206008-02	Client sample id	B06M22
Dept sample id	7055-002	Matrix	WATER
Received	06/18/92	Collected	06/16/92
		Chain of custody id	EFL-1022

PARAMETER	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	
Gross Alpha	Alpha	0.22	0.91	1.4	3.0	U	80A	
Gross Beta	Beta	-0.12	1.3	2.2	4.0	U	80B	
Uranium 233/234		0.18	0.063	0.071	0.20	J	U	RPD out of spec
Uranium 235	15117-96-1	0.025	0.034	0.047	0.20	U	U	
Uranium 238	7440-61-1	0.13	0.042	0.027	0.20	J	U	RPD out
Plutonium 238	13981-16-3	-0.002	0.010	0.024	0.050	U	PU	
Plutonium 239/240		0.002	0.007	0.013	0.050	U	PU	
Americium 241	14596-10-2	-0.006	0.017	0.040	0.050	U	AM	
Strontium 90	10098-97-2	0.22	0.22	0.71	1.0	U	Y	RB 2/2/93
Technetium 99	14133-76-7	1.9	2.2	6.9	5.0	U	TC	
Tritium	10028-17-8	81	130	170	400	U	H	
Carbon 14	14762-75-5	-0.84	27	22	50	UR	C	LCS<50%, w
GAMMA SCAN ANALYTES								
Potassium 40	13966-00-2	U		260		U	GAM	
Iron 59		U		77		U	GAM	
Chromium 51	14392-02-0	U		350		U	GAM	
Cobalt 60	10198-40-0	U		17		U	GAM	
Zinc 65	17982-39-3	U		39		U	GAM	
Ruthenium 106	13967-48-1	U		130		U	GAM	
Cesium 134	17967-70-9	U		17		U	GAM	
Cesium 137	10045-97-3	U		15		U	GAM	
Europium 152	14683-23-9	U		23		U	GAM	
Europium 154	15585-10-1	U		18		U	GAM	
Radium 226	13982-67-7	U		28		U	GAM	
Thorium 228	14274-82-9	U		23		U	GAM	
Thorium 232	7440-29-1	U		68		U	GAM	

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.16
Report date	09/28/92

9613499.2934

RADIOLOGICAL DATA VALIDATION CHECKLIST

PROJECT: WESTINGHOUSE - HANFORD	REVIEWER: RB	DATE: 2/2/93
LABORATORY: TMA	CASE: N/A	SDG: B06A18
SAMPLES/MATRIX: 2 waters		
B06M18		
B06M22		

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.D COMPLETENESS CHECKLIST - ALPHA-EMITTING RADIUM ISOTOPES USING 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
_____ Detector Identification and Counting Position
_____ Analysis Date and Analyst Initials
_____ Sample Weight

Initial and Continuing Instrument Calibration

_____ Detector Identification
_____ Calibration Dates and Analyst Initials
_____ Identification of Calibration Standards including Radionuclides, Certification, Issue or Expiration Data and Activity
_____ Amount of Standard Used for Calibration
_____ Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)
_____ Routine Control Charts

Blanks

_____ Detector Identification
_____ Date of Analysis
_____ MDA of Method
_____ Amounts of Reagents Used
_____ Lot Numbers of Reagents Used
_____ Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)

Duplicates

_____ Detector Identification
_____ Date of Analysis
_____ Sample Weight
_____ Amount of Spike for Spiked Duplicates
_____ Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)

Radiometric and Gravitimetric Yields

_____ Amount of Spike Used for Spiked Samples
_____ Amount of Radium Standard Used for Radiometric Yield Determination
_____ NIST Certification for Radium Standards
_____ Calculated Radiometric Yield
_____ Weight of Carrier Added for Gravitimetric Determination
_____ Weight of Carrier Recovered for Gravitimetric Determination
_____ Calculated Gravitimetric Yields

Laboratory Control Samples

_____ Sample Identification
_____ Detector Identification
_____ Date of Analysis
_____ Calculated Recoveries
_____ Results of Analyses
_____ Sample Weight

6.1.E COMPLETENESS CHECKLIST - RADIUM-226 USING SCINTILLATION (LUCAS) CELL 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
_____ Scintillation (Lucas) Cell Identification
_____ Analysis Date and Analyst Initials
_____ Amounts of Samples Counted
_____ Sample Weight

Initial and Continuing Instrument Calibration

_____ Scintillation (Lucas) Cell Identification
_____ Calibration Dates and Analyst Initials
_____ 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)
_____ Routine Control Charts

Blanks

_____ Scintillation (Lucas) Cell Identification
_____ Date of Analysis
_____ MDA of Method
_____ Amounts of Reagents Used
_____ Lot Numbers of Reagents Used
_____ Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)

Duplicates

_____ Scintillation (Lucas) Cell Identification
_____ Date of Analysis
_____ Sample Weight
_____ Amount of Spike for Spiked Duplicates
_____ Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)

Radiometric and Gravitimetric Yields

_____ Amount of Spike Used for Spiked Samples
_____ Weight of Carrier Added for Gravitimetric Determination
_____ Weight of Carrier Recovered for Gravitimetric Determination
_____ Calculated Gravitimetric Yields

Laboratory Control Samples

_____ Sample Identification
_____ Scintillation (Lucas) Cell Identification
_____ Date of Analysis
_____ Calculated 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

6.1.G COMPLETENESS CHECKLIST - FLUOROMETRIC ANALYSIS OF URANIUM

Analysis Results

_____ Results Report for Sample Analyses and Reanalyses
_____ Raw Data (Fluorometer Readings, Notebook Pages, etc.)
_____ Calculation Sheets
_____ Sample Identifications
_____ Instrument Identification
_____ Analysis Date and Analyst Initials
_____ Sample Weight

Initial and Continuing Instrument Calibration

_____ Instrument Identification
_____ Calibration Dates and Analyst Initials
_____ Identification of Calibration Standards including Certification, Expiration Date and Concentration Amount of Standards Used for Calibration
_____ Raw Data (Fluorometer Readings, Notebook Pages, etc.)

Blanks

_____ Instrument Identification
_____ Date of Analysis
_____ MDA of Method
_____ Amounts of Reagents Used
_____ Lot Numbers of Reagents Used
_____ Raw Data (Fluorometer Readings, Notebook Pages, etc.)

Duplicates

_____ Instrument Identification
_____ Date of Analysis
_____ Amounts of Samples
_____ Amount of Spike for Spiked Duplicates
_____ Raw Data (Fluorometer Readings, Notebook Pages, etc.)

Gravitimetric Yields

_____ Weight of Carrier Added for Gravitimetric Determination
_____ Weight of Carrier Recovered for Gravitimetric Determination
_____ Calculated Gravitimetric Yields

Laboratory Control Samples

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

N/A

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 $\geq$20%?
RB 2/2/93

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

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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 1
General Requirements for the Analysis of Alpha Emitting Radium Isotopes Using Liquid Scintillation

Scope

This Appendix provides additional criteria for validating analytical results from the determination of total soluble alpha emitting radioisotopes of radium (radium-223, radium-224 and radium-226) in water. The radium is collected by coprecipitation with a carrier and counted with an alpha scintillation counter. This method tends to overestimate specific isotope results (i.e., radium-226) when other alpha emitting species are present. The method is useful as a screening technique for determining the need for isotopic analysis.

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 procedure and the appendix, the criteria in the appendix shall apply.

1.1 Analytical Method

Specificity

The method is not specific for any given isotope of radium. Results will represent the activity of all soluble alpha-emitting radium isotopes present in the sample.

- Qualify all results attributed to a single radium isotope (specifically, Ra-223, Ra-224, or Ra-226) as estimated, (J), if the contribution to the total from individual isotopes is unknown.

Accuracy

Decay of Ra-226 present in samples will result in daughter products whose activity could lead to inaccurate results. The impact of the daughter ingrowth on the sample results is directly proportional to the elapsed time between the precipitation of the chemical carrier and counting the sample. The laboratory should provide evidence that: 1) Elapsed time from precipitation to counting is sufficiently short that daughter ingrowth effects are negligible, or 2) Sample results have been corrected for daughter ingrowth effects. Table 1-1 shows the factors to be divided into sample results to correct for Ra-226 daughter ingrowth.

two values are used to compute a recovery factor (LCS %R presented in Section 6.8).

- Qualify associated sample results according to the following criteria:

Method Accuracy Criteria

LCS %R

	<50%	50-69%	70-130%	>130%
Results <MDA	R	UJ	Acceptable	R
Results >MDA	R	J	Acceptable	R

1.5 Holding Times

Samples are to be presented by adjusting the pH < 2 with Nitric Acid. The following holding time requirements apply according to the time of preservation:

a. If the sample is preserved at the time of collection, Section 6.9 requirements apply.

b. If the sample is not preserved at the time of collection, these requirements are substituted for those in Section 6.9:

- Time from sampling to receipt at laboratory cannot exceed 5 days.
- Laboratory must preserve the sample upon receipt and hold for at least 16 days prior to analysis.

- Qualify associated sample results estimated, (J), if holding time requirements are not met.

1.6 References

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

2. ASTM, "Standard Test Method for Radionuclides of Radium in Water," in 1991 Annual Book of ASTM Standards, Volume 11.02, 1990.

3. U.S. Department of Energy Environmental Measurements Laboratory, "Radiochemical Determination of Radium-226," in EML Procedures Manual, HASL-300-Ed.25, 1982.

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Table 1-1: Correction Factors for Ra-226 Daughter Ingrowth

Time (From Precip. to Counting, Hrs.)	Ingrowth Correction Factor
0	1.00
1	1.02
2	1.04
3	1.06
4	1.08
5	1.10
6	1.12
24	1.49
48	1.91
72	2.25
96	2.54
120	2.78
144	2.99
192	3.29
240	3.51

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APPENDIX 2
General Requirements for Lucas Cell Ra-226 Analyses

Scope

This Appendix provides supplemental information for validating analytical results from the determination of radium-226 in water. The radium-226 is separated from interfering species and concentrated by coprecipitation. After allowing for the ingrowth of radon-222, the radon is purged and counted in a scintillation (Lucas) cell.

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 procedure and the appendix, the criteria in the appendix shall apply.

2.1 Calibration

A counting system consists of a scintillation cell and associated photomultiplier tube, electronics and scaler. Each counting system should be calibrated as a unit. Calibration consists of determining a calibration constant using a NIST traceable Ra-226 standard. The calibration constant includes the de-emanation efficiency of that system and the counting efficiency of the scintillation cell. The calibration constant should be established for a system at the beginning of each day that samples will be analyzed and each time the scintillation cell is replaced. The scintillation cell should be uniquely identified to allow its association with a specific counting system to be identified.

- If calibration data cannot be definitely associated with the specific counting system, qualify associated sample results unusable, (R).
- If the counting system is not calibrated each day that samples are analyzed, qualify associated results as estimated, (J).
- If the counting system is not calibrated upon replacing the scintillation cell, qualify associated results estimated, (J), if the cell has a previously determined calibration constant, or unusable, (R), if no constant is available for the replacement cell.

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2.2 Blanks

Most chemical reagents typically used in this procedure contain some levels of radium. It is prudent to analyze additional blank samples in the event that the batch or lot number of a reagent should change in the course of preparing a group of samples for analysis.

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

2.3 Holding Times

Samples are to be preserved by adjusting the pH < 2 with Nitric Acid. The following holding time requirements apply according to the time of preservation:

a. If the sample is preserved at the time of collection, Section 6.9 requirements apply.

b. If the sample is <u>not</u> preserved at the time of collection, requirements are substituted for those in Section 6.9.

   - Time from sampling to receipt at laboratory should not exceed 5 days.
   - The laboratory <u>must</u> preserve the sample upon receipt and hold for at least 16 days prior to analysis.

- Qualify associated sample results estimated, (J), if holding time requirements are not met.

2.4 References

1. U.S. Environmental Protection Agency, "Radium-226 in Drinking Water, Radon Emanation Technique," in <u>Prescribed Procedures for Measurement of Radioactivity in Drinking Water</u>, EPA-600/4-80-032, August 1980.

2. ASTM, "Standard Test Method for Radium-226 in Water," in <u>1991 Annual Book of ASTM Standards</u>, Volume 11.02, 1990.

3. U.S. Department of Energy Environmental Measurements Laboratory, "Emanation Procedure for Radium-226," in <u>EML Procedures Manual</u>, HASL-300-Ed.25, 1982.

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.

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APPENDIX 4
Requirements for Fluorometric Analyses of Uranium

Scope

This Appendix provides supplemental information for validating analytical data from the determination of uranium by fluorometry. The uranium is separated from interferences and concentrated by coprecipitation and purified by solvent extraction. The sample is fused with flux and analyzed with a fluorometer.

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 procedure and the appendix, the criteria in the appendix shall apply.

4.1 Analytical Method

Interferences

The fluorescence of uranium in the fluoride matrix can be either quenched or enhanced by the presence of cations or anions. When uranium is present in low concentrations, the interferences can be removed by various methods.

- The analytical laboratory should provide evidence that interference from cations or anions is negligible, or that steps have been taken to minimize their effects. If evidence is not provided, qualify associated results as estimated, (J).

Method Standardization

The fusion operation is the most critical step in the fluorometric procedure. Small variations in the duration of the fusion temperature of the fusion, and in the method of cooling the fused disk can cause large variations in the fluorescence yield. Each step of the fusion process should be standardized to obtain reproducible results.

- The analytical laboratory should provide a description of the method for fusion standardization. If the fusion process is not standardized, or information is not provided to allow the independent assessment of the standardization process, qualify associated results as estimated, (J).

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4.2 Calibration

In addition to the internal standard added to each sample, a calibration should be performed immediately prior to sample analysis to confirm the linear relationship between the fluorometer readings and uranium concentrations.

- If a calibration is not performed immediately prior to sample analysis to verify linear instrument response, qualify associated results estimated, (J).

4.3 References

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

2. ASTM, "Standard Test Method for Microquantities of Uranium in Water by Fluorometry," in 1991 Annual Book of ASTM Standards, Volume 11.02, 1990.

3. U.S. Department of Energy Environmental Measurements Laboratory, "Fluorometric Determination of Uranium in Urine," in EML Procedures Manual, HASL-300-Ed.25, 1982.

DATA QUALIFICATION SUMMARY

UNIT: 100-KR-4

DOCUMENT CONTROL NUMBER: WHC-SD-EN-TI-134

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

RFW NO.: B06M22-TMA-213

SDG NO.: B06M22

QUALIFICATION SUMMARY:

VOLATILES

SAMPLE NUMBERS: B06M22

BLANKS

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

- Sample number B06M22 in SDG No. B06M22.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for 1,1,1-trichloroethane:

- Sample number B06M22 in SDG No. B06M22.

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

- Sample number B06M22 in SDG No. B06M22.

SEMIVOLATILES

SAMPLE NUMBERS: B06M22

No qualifiers added to data.

PESTICIDES/PCBS

SAMPLE NUMBERS: B06M22

INITIAL CALIBRATIONS

Due to initial calibration RSDs above the QC limits, the following were qualified as estimates and flagged "J":

- Alpha-BHC, delta-BHC, gamma-BHC, 4,4'-DDE, 4,4'-DDD, and endrin ketone in sample number B06M22 in SDG No. B06M22.

SURROGATE RECOVERY

The surrogate recovery results for decachlorobiphenyl in sample number B06M22 in SDG No. B06M22 were slightly below QC limits. All associated results were qualified as estimates and flagged "J".

INORGANICS

SAMPLE NUMBERS: B06M22

BLANKS

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

- Sample number B06M22 in SDG No. B06M22.

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

- Sample number B06M22 in SDG No. B06M22.

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

- Sample number B06M22 in SDG No. B06M22.

MATRIX SPIKE RECOVERY

The matrix spike recoveries fell outside the QC limits for selenium. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M22 in SDG No. B06M22.

LABORATORY DUPLICATE SAMPLES

The laboratory duplicate results fell outside the QC limits for selenium. All associated results were qualified as estimates and flagged "J" for the following sample:

- Sample number B06M22 in SDG No. B06M22.

WET CHEMISTRY

SAMPLE NUMBERS: B06M22

No qualifiers added to data.

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000005

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20623B11

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: not dec. ____ Date Analyzed: 06/23/92

GC Column: WIDE ID: 0.530 (mm) Dilution Factor: 1.0

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

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

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	10	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 ~~1~~	~~B~~ U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10 ~~1~~	~~B~~ 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 ~~1~~	~~B~~ 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

2.17.2

6/22/93

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000006
EPA SAMPLE NO.

B06M22

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 20623B11

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: not dec. ____ Date Analyzed: 06/23/92

GC Column: WIDE ID: 0.530 (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/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	HALOGENATED ALKANE	4.43	5	~~BJ~~ U

2/17/
MY

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000007
EPA SAMPLE NO.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	25	U X

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6/23/93

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000008
EPA SAMPLE NO.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: ____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U X
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

2.17.92

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 20629N09

Level: (low/med) LOW Date Received: 06/18/92

% Moisture: ____ decanted: (Y/N) ___ Date Extracted: 06/22/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/29/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown alkene	4.22	27	~~BJ~~ U
2.	Unknown hydrocarbon	7.30	10	~~BJ~~ U

2.17
MM

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000010

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B06M22

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 06056 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A206056-01D

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 06/18/92

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 06/22/92

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/09/92

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-36-3	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

PGD 6/22/92

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06M22

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

Lab Code: SKINER Case No.: N2-06-111SAS No.: SDG No.: B06M22

Matrix (soil/water): WATER Lab Sample ID: 06190-01S

Level (low/med): LOW Date Received: 06/19/92

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	51.30	~~B~~	U	P
7440-36-0	Antimony	16.50	U		P
7440-38-2	Arsenic	2.40	U		F
7440-39-3	Barium	31.50	B		P
7440-41-7	Beryllium	0.40	U		P
7440-43-9	Cadmium	1.40	U		P
7440-70-2	Calcium	20400.00			P
7440-47-3	Chromium	3.70	U		P
7440-48-4	Cobalt	2.30	U		P
7440-50-8	Copper	2.40	U		P
7439-89-6	Iron	217.00			P
7439-92-1	Lead	2.60	~~B~~	U	F
7439-95-4	Magnesium	5240.00			P
7439-96-5	Manganese	5.90	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	6.00	U		P
7440-09-7	Potassium	949.00	B		P
7782-49-2	Selenium	7.40		~~UN*~~ J	F
7440-22-4	Silver	2.30	U		P
7440-23-5	Sodium	2640.00	B		P
7440-28-0	Thallium	4.30	U		F
7440-62-2	Vanadium	3.30	U		P
7440-66-6	Zinc	22.80		U	P
	Cyanide	10.00	U		CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: 2-25-93 SC

FORM I - IN 6/22/92 Rev. 6/89 002

9613499.2982

000008

TMA Inc. REPORT Work Order # A2-06-056

Received: 06/18/92 Results by Sample

SAMPLE ID B06M22 FRACTION 01G TEST CODE WCCLPL NAME Anions & Wet Chem. - WM043

Date & Time Collected 06/16/92 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300	0.2	mg/L	0.1
Sulfate	300	12	mg/L	1
Elect. Conductivity	120.1	118	umho/cm	6
pH	150.1	8.3	pH	0.1

FORM I

2-25-93 SC

BJ 6/22/93

Page 2 Skinner&Sherman REPORT Work Order # S2-06-191

Received: 06/19/92 Results by Sample

SAMPLE ID B06M22 SAMPLE # 01 FRACTIONS: A

Date & Time Collected 06/16/92 Category WATER

NO3NO2 <0.25 N
mg N/L

353.2 - Method #

SAMPLE ID B06M22D SAMPLE # 01 FRACTIONS: B

Date & Time Collected 06/16/92 Category WATER

NO3NO2 <0.25
mg N/L

SAMPLE ID B06M22S SAMPLE # 01 FRACTIONS: C

Date & Time Collected 06/16/92 Category WATER

NO3NO2 1.92
mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A

Date & Time Collected not specified Category WATER

NO3NO2 1.92
mg N/L

2-25-93 SC

BD 6/22/93

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VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: Westinghouse Data Validation	REVIEWER: MY	DATE: 2-17-93
LABORATORY: TMA	CASE: 06056	SDG: B06M22
SAMPLES/MATRIX: Water; B06M22		

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~~ 25.0% (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 Data Validation	REVIEWER: MY	DATE: 2-17-93
LABORATORY: JMA	CASE: 06056	SDG: B06M22
SAMPLES/MATRIX: Water; B06M22		

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%~~ 25.0% (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

No Detects

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 Data Validation	REVIEWER: MY	DATE: 2/17/93
LABORATORY: FMA	CASE: 06056	SDG: B06M22
SAMPLES/MATRIX: Water ; B06M22		

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):

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse	REVIEWER: SC	DATE: 2-26-93
LABORATORY: TMA	CASE:	SDG: B06M22
SAMPLES/MATRIX: Water		
B06M22		

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.

COMMENTS (attach additional sheets as necessary):

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: Westinghouse	REVIEWER: SC	DATE: 2-25-93
LABORATORY: TMA	CASE:	SDG: B06M22
SAMPLES/MATRIX: water		
B06M22		

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):