

START

9613475.0002

BOOFH5-K25-078 1

MARTIN MARIETTA

0045235

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003  
OAK RIDGE, TENNESSEE 37831-7440

February 24, 1992

Ms. Joan Kessner  
Westinghouse Hanford Company  
Office of Sample Management  
2355 Stevens Drive  
Richland, Washington, 99352



Dear Ms. Kessner:

**Wet Chemistry Analytical Results Package on Project 91-001: 200-BP-1 Samples**

Attached are the analytical results of the wet chemistry analysis on the 200-BP-1 samples, SDG# BOOFH5, Project 91-001, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on March 31, and April 8, 1991. Also attached are copies of the AnaLis report forms, the Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported on CLP-type forms for the wet chemistry analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than the conditions detailed in the following forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Sincerely,

Deborah L. Amburgey  
Program Manager  
Hanford Support Program

Clarence R. Kirkpatrick  
Program Manager  
Waste Management Analysis

Roy W. Morrow  
Department Manager  
K-25 Site Analytical Chemistry Department

**Attachments**

cc/attach: D.L.Amburgey  
S.R.Smith - RC  
cc: H.H.Sullivan



**PROTOCOL UTILIZED FOR WET CHEMISTRY ANALYSES OF  
200-BP-1 SAMPLES**

<u>Analysis</u>	<u>Protocol</u>
A. Anions (Br, Cl, NO <sub>2</sub> , NO <sub>3</sub> , SO <sub>4</sub> )	EPA-300.0
B. Fluoride (SIE)	EPA-340.2
C. Conductivity	EPA-120.1
D. pH	EPA-150.1
E. Dissolved Solids	EPA-160.1
F. Turbidity	EPA-180.1
G. Alkalinity	EPA-310.1
H. Ammonia	EPA-350.3
I. Chemical Oxygen Demand (COD)	EPA-410.4
J. Total Organic Carbon (TOC)	EPA-415.1
K. Total Organic Halides (TOX)	EPA-9020

**SAMPLE IDENTIFICATION TABLE FOR SDG# BOOFH5**

**200-BP-1 SAMPLES**

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
3/31/91	BOOFH5	910403-102	water	
	BOOFH6	910403-103	water	No Wet Chemistry requested
	BOOFH5MS	910404-111	water	VOA matrix spike of BOOFH5 (910403-102)
	BOOFH5MSD	910404-112	water	VOA matrix spike duplicate of BOOFH5 (910403-102)
4/08/91	BOOF94	910408-029	water	
	BOOF95	910408-030	water	No Wet Chemistry requested
	BOOF94MS	910410-053	water	VOA matrix spike of BOOF94 (910408-029)
	BOOF94MSD	910410-054	water	VOA matrix spike duplicate of BOOF94 (910408-029)

COOLER RECEIPT FORM  
for SOP 2332File with receiving  
and C-O-C records.Date: 3-31-91 Shipper ID and Document No: 247 425 6653Cooler ID if noted on outside of cooler: Epsilon 5Project No: G-132 Subproject No: 001 Site Location: Hanford

Custody seal on cooler?	<input checked="" type="radio"/> Yes No	Custody seals dated and signed?	<input checked="" type="radio"/> Yes No
Condition of cooler acceptable?	<input checked="" type="radio"/> Yes No	Prog. Mgr. notified of receipt of cooler?	<input checked="" type="radio"/> Yes No
Radioactive labels?	Yes <input checked="" type="radio"/> No	Radioactivity recheck OK?	Yes No
Hazardous labels?	Yes <input checked="" type="radio"/> No	Samples properly labeled?	<input checked="" type="radio"/> Yes No
Custody form(s) inside of cooler?	<input checked="" type="radio"/> Yes No	Custody form(s) properly completed and signed?	Yes <input checked="" type="radio"/> No
Was cooler required to be maintained at 4 deg C?	<input checked="" type="radio"/> Yes No	Thermometer inside of cooler?	Yes <input checked="" type="radio"/> No
Sample containers intact?	<input checked="" type="radio"/> Yes No	Temperature of cooler: <u>4</u> deg C (X.X)	
Are containers those specified for requested parameters?	<input checked="" type="radio"/> Yes No	VOA containers free of bubbles?	<input checked="" type="radio"/> Yes No
Date of login: _____		Additional information needed from Prog. Mgr.?	<input checked="" type="radio"/> Yes No
Lab assigned ID No: _____			
Thru _____			

NOTE: Nitrite-N, Nitrate-N, o-Phosphate-o-Phosphate-P have 48-hour holding time. LOG IN THESE FIRST - ASAP

The lab numbers plus the project number are used for tracking purposes.

Comments:

Signed: J. D. Jones

Chain of custody not signed, dated, or timed.



MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

SAMPLING AND ENVIRONMENTAL SUPPORT DEPARTMENT

SES/COC NO. 000184

PROJECT NUMBER		PROJECT NAME			NO. OF CONTAINERS	REMARKS												
91-001		200-SP-1					CLP Metal, A/Sr/Su H <sub>2</sub> O <sub>2</sub> filtered 1, 1L, B, water, CLP-5cm, Uoa/Pest 1, 1L, P, water, CLP-en, NaOH 1, 1L, P, " , CLP-Metal, A/Sr/Su, <del>1, 250ml, H<sub>2</sub>O<sub>2</sub> &amp; unfiltered</del> 1, 250ml, G, water, TOC H <sub>2</sub> SO <sub>4</sub> 2, 1L, P, water, Anions, SO <sub>4</sub> , ALK, pH, Cond, TDS 1, 1L, P, water, NO <sub>2</sub> /NO <sub>3</sub> , Ammonia, Hard, H <sub>2</sub> SO <sub>4</sub> 1, 10L, P, water, Alpha, Beta, Ra, Sr-90, Cs-137, Co 60, Pu-238, Pu-239/240 H <sub>2</sub> O <sub>2</sub> 1, 1L, P, water, Total Uranium, Hcl 1, 250 ml, G, water, Tritium											
SAMPLERS (SIGNATURE)					DATE	TIME											SAMPLE TYPE	NO. OF CONTAINERS
L D Walker																		
CUSTOMER NUMBER		LAB NUMBER	SAMPLING		DATE	TIME	SAMPLE TYPE	NO. OF CONTAINERS	REMARKS									
			DATE	TIME														
800 FH5		910403-102	3/27/91	1130	H <sub>2</sub> O	* See	REMARKS *	* 3, 40 ml, G, water, CLP-Uoa *										
800 FH6		-103	3/27/91	1130	H <sub>2</sub> O	1	1L											
FH5MS		404-111																
FH5MSD		-112																
RELINQUISHED BY (Signature)		Date	Time	RECEIVED BY (Signature)		Date	Time	RELINQUISHED BY (Signature)		Date	Time	RECEIVED BY (Signature)						
				[Signature]		3-31-91	10:58											
RELINQUISHED BY (Signature)		Date	Time	RECEIVED BY (Signature)		Date	Time	RELINQUISHED BY (Signature)		Date	Time	RECEIVED BY (Signature)						

9613475.0005

COOLER RECEIPT FORM  
for SOP 2332File with receiving  
and C-O-C records.Date: 3-31-91 Shipper ID and Document No: 247475 665 3Cooler ID if noted on outside of cooler: WillisProject No: G132 Subproject No: 201 Site Location: ItanfordCustody seal on cooler?  Yes  NoCondition of cooler acceptable?  Yes  NoRadioactive labels? Yes  NoHazardous labels? Yes  NoCustody form(s) inside of cooler?  Yes  NoWas cooler required to be maintained at 4 deg C?  Yes  NoSample containers intact?  Yes  NoAre containers those specified for requested parameters?  Yes  No

Date of login: \_\_\_\_\_

Lab assigned ID No: \_\_\_\_\_

Thru \_\_\_\_\_

Custody seals dated and signed?  Yes  NoProg. Mgr. notified of receipt of cooler?  Yes  NoRadioactivity recheck OK? Yes  NoSamples properly labeled?  Yes  NoCustody form(s) properly completed and signed?  Yes  NoThermometer inside of cooler? Yes  NoTemperature of cooler: 4 deg C (X.X)VOA containers free of bubbles? None  Yes  NoAdditional information needed from Prog. Mgr.?  Yes  No

NOTE: Nitrite-N, Nitrate-N, o-Phosphate-o-Phosphate-P have 48-hour holding time. LOG IN THESE FIRST - ASAP

The lab numbers plus the project number are used for tracking purposes.

Comments:

Signed: [Signature]

FORM OF PAYMENT		SERVICES	
CASH <input type="checkbox"/>	GBL <input type="checkbox"/> CBI <input type="checkbox"/>	UNITED STATES / CANADA	INTERNATIONAL
PPD <input type="checkbox"/>	COL <input checked="" type="checkbox"/>	<input type="checkbox"/> Same Day <input checked="" type="checkbox"/> AM <input type="checkbox"/> Second Day	<input checked="" type="checkbox"/> O*NITE Express <input type="checkbox"/> PM <input type="checkbox"/> Saturday Delivery <input type="checkbox"/> Business Documents <input type="checkbox"/> Customs Clearance <input type="checkbox"/> Delivery
Shipper's Account Number <b>E 850281585</b>		<b>EMERY WORLDWIDE</b>  	
Date: <b>03-28-91</b>		Origin: <b>PSC</b>	Shipment Number: <b>247425665 3</b>
From: <b>WESTINGHOUSE SHIPPING DEPT (509) 376-6665</b>		To: <b>C R KIRKPATRICK K1004A DROP POINT A20</b>	
<b>U. S. DEPARTMENT OF ENERGY C/O</b>		<b>U. S. DEPARTMENT OF ENERGY</b>	
<b>WESTINGHOUSE HANFORD</b>		<b>MARTIN MARIETTA ENERGY SYSTEMS</b>	
<b>2355 STEVENS DRIVE</b>		<b>BLAIR ROAD HWY 58</b>	
<b>RICHLAND WA</b>		<b>OAK RIDGE TN</b>	
Customer's Reference Numbers <b>WB1233 ED3E1 W91-0-0145439</b>		Consignee's Account Number <b>E 37831</b>	
Dimensions: <b>2 2 8 15 1 6</b>		Total Pieces: <b>2</b>	
Total Weight: <b>126</b>		Declared Value: <b>\$</b>	
<b>2 POLYCOOLER ID EPSINOLS</b> <b>83 LB; 45 LB</b> <b>WATER SAMPLES</b> <b>COOLERS, FUEL HOODS</b> <b>OVERNIGHT DELIVERY</b> <b>SIGNATURE SECURITY SERVICE</b>		<b>FOR INFORMATION OR RATES</b> <b>CALL 1-800 HI EMERY</b> <b>(1-800-443-6379)</b>	
International Shipments Free Invoice <input type="checkbox"/>		<b>206</b>	
Third Party Account Number: <b>E</b>		<b>A</b>	
International Customs Value		International Insurance	
Total Transportation Charges		Other Charges/Advance at Origin: <b>\$</b>	
Base Charge		<b>Terms and Conditions on Back</b>	

9613475.0007



**MARTIN MARIETTA**

MARTIN MARIETTA ENERGY SYSTEMS, INC.

**CHAIN OF CUSTODY RECORD**

**SAMPLING AND ENVIRONMENTAL SUPPORT DEPARTMENT**

SFSCOC NO

000185

PROJECT NUMBER		PROJECT NAME				NO. OF CONTAINERS	REMARKS		
91-001		200-SP-1							
SAMPLERS (SIGNATURE)						NO. OF CONTAINERS	REMARKS		
LD Walker PH Butcher PH Butcher									
CUSTOMER NUMBER	LAB NUMBER	SAMPLING		SAMPLE TYPE	NO. OF CONTAINERS	REMARKS			
		DATE	TIME						
B00F94	910408-029	4/3/91	1400	H <sub>2</sub> O	1	3,40ml, G, Water, CLP-VOA			
B00F95	-030	4/3/91	1400	H <sub>2</sub> O	1	1,4L, G, Water, CLP Semi-VOA/Pest			
						1, 1L, P, Water, CLP-CU, NaOH			
						1, 1L, P, Water, CLP-Metal, Bi/Sr/Sr, HNO <sub>3</sub> , Unfiltered			
(B00F94MS)	910408-053					1, 250ml, G, Water, TOC, H <sub>2</sub> SO <sub>4</sub>			
(B00F94MSD)	-054					2, 1L, P, Water, Anions, SO <sub>4</sub> , ALK, pH, Cond.			
						1, 1L, P, Water, NO <sub>2</sub> /NO <sub>3</sub> , Ammonia, Hard, Hg S			
						1, 10L, P, Water, Alpha, Beta, Ra, Sr-90, Cs-137, Co-60, Pu-238, Pu-239/240, HNO <sub>3</sub>			
						1, 1L, P, Water, Total Uranium, HCl			
						1, 250ml, G, Water, Tritium			
RELINQUISHED BY (Signature)	Date	Time	RECEIVED BY (Signature)	Date	Time	RELINQUISHED BY (Signature)	Date	Time	RECEIVED BY (Signature)
<i>[Signature]</i>	4/4/91	1030	<i>[Signature]</i>	4/8/91	0600				
RELINQUISHED BY (Signature)	Date	Time	RECEIVED BY (Signature)	Date	Time	RELINQUISHED BY (Signature)	Date	Time	RECEIVED BY (Signature)

See Remarks  
CLP-Metal, Bi/Sr/Sr, HNO<sub>3</sub>, Filtered

9613475-0009

OPC # W91-0-0145 #43  
BOL # 247425 668 6

CHAIN OF CUSTODY			
Company Contact	B.H. FORD	Telephone	509-376-6465
Sample Collected by	L. WALKER	Date	4-3-91
Sample Locations	200-BP-1		
Ice Chest No.	EPSILON 6	Field Logbook and Page No.	-WHC-N-4461 / pg. 27
Remarks	N/A		
Bill of Lading No.	2474856686	Offsite Property No.	W91-0-0145743
Method of Shipment	EMERY		
Shipped to	WESTON Analytics		

SAMPLE IDENTIFICATION

<p>B00 F94</p> <ul style="list-style-type: none"> <li>3, 40ml, G, WATER, CLP-VOA</li> <li>2, 2L, G, WATER, CLP-SEMI-VOA/PEST</li> <li>1, 1L, P, WATER, CLP-CN, NaOH</li> <li>1, 1L, P, WATER, CLP-METAL/Bi/Sr/Sn, HNO3, UNFILTERED</li> <li>1, 250ml, G, WATER, TOC, H2SO4</li> <li>2, 1L, P, WATER, ANIONS, SO4, ALK, pH, COND, TDS</li> <li>1, 1L, P, WATER, NO2/NO3, AMMONIA, HARD, H2SO4</li> <li>3, 4L, P, WATER, ALPHA, BETA, Ra, Sr-90, Tc-90, Cs-137, Co-60, Pu-238, Pu-239/240, HNO3</li> <li>1, 1L, P, WATER, TOTAL URANIUM, HCl</li> <li>1, 250ml, G, WATER, TRITIUM</li> </ul> <p>B00 F95</p> <ul style="list-style-type: none"> <li>1, 1L, P, WATER, CLP-METAL/Bi/Sr/Sn, HNO3, FILTERED</li> </ul>
---

CHAIN OF POSSESSION

Relinquished by: L. Walker L.S. Walker	Received by: P. Hutchins	Date/Time: 4-3-91 5:00 PM
Relinquished by: P. Hutchins	Received by: J. DEMAREST	Date/Time: 4-4-91 11:38 AM
Relinquished by: J. DEMAREST	Received by: W. Adams	Date/Time: 4-5-91 6:00
Relinquished by:	Received by:	Date/Time:

OVERNIGHT DELIVERY

SIGNATURE SECURITY SERVICE

Contractor <b>WESTINGHOUSE HANFORD CO.</b>	<b>OFF-SITE! PROPERTY CONTROL</b>	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) <b>W91-0-0145 443</b>
---	---------------------------------------	--

PART I - TO BE COMPLETED BY ORIGINATOR

Department <b>ENV. ENG. &amp; TECH</b>	Section <b>GEOSCIENCES</b>	Unit <b>HYDROLOGY</b>
The following items are to be shipped from		<input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor
Routing <b>EMERY</b>		<input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor
Shipped to <b>US DEPT. OF ENERGY MARTIN MARIETTA ENERGY SYSTEM BLAIR RD. HW58 OAK RIDGE, TN 37831 Attn.: C. R. KIRPATRICK K1004A Drop Point A20</b>		Off site Custodian <b>CR KIRPATRICK</b>  Full Title <b>MANAGER</b>

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 91/135	<b>SAMPLE #:</b> <del>KRSXKXNXX</del> B00F94, B00F95 COOLER ID: EPSILON 6 POLYCOOLER, GROUNDWATER SAMPLE PACKED IN WET ICE AND VERMICULITE	N/A

Classified  Unclassified  Shipped Under DOE Contract  Shipped Under Contractor's Use Permit Contract

Necessity for the Off Site Use of this Property

*Sampling support N/F. work - this is done*

**BOL # 2474256686**

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING

RM Clearance for Public Release <i>[Signature]</i>	RM Survey No <b>710112</b>	Date <b>4-4-91</b>
Location of Property (Area & Bldg) <b>200-2P-1</b>	Contact <b>BH FORD</b>	Phone <b>(509) 376-6465</b>
Date Ready for Shipment <b>4/1/91</b>	Cust Code to be Charged <b>WB1231/ED3E1</b>	Approximate Date This Property will be Returned
Originated By <b>PH BUTCHER</b>	Date <b>4/1/91</b>	Authorized By <b>PH BUTCHER</b> <i>[Signature]</i> Date <b>4/1/91</b>
Signature and Name of Property Control	Custodian Date	Property Management Approver <i>[Signature]</i> Date <b>4/1/91</b>

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No	Date Issued	Purchase Order No	Date Issued
Date				

DISTRIBUTION

By Originator White - Green Yellow Pink - Property Management Goldenrod - Retain	Shipping Operation - Sign all Copies and Forward to White - Property Management Green - Property Control Custodian (Issuing Office) Yellow - Retain Pink - Originator
--	---

**FORM OF PAYMENT**

CASH  GBL  CBL   FCCOD

PPD  COL  OTH  COMAT

Shipper's Account Number  
**E 850281585**

**WESTINGHOUSE SHIPPING DEPT (509) 376-6665**  
**U. S. DEPARTMENT OF ENERGY C/O**  
**WESTINGHOUSE HANFORD**  
**BLDG 1149**  
**2355 STEVENS DRIVE**  
**RICHLAND**  
Customer's Reference Number  
**W81220 E32NA W91-071**  
Zip  
**9352**

**EMERY WORLDWIDE**

**EMERY COMPANY**

Date **04-04-91** Origin **PSC** Shipment Number **247425669 7**

**AM**  **AM**  **S.S.S.**  **Standard**  **Delivery**

Business Documents   
Customs Clearance   
Delivery

Tariff Dest. **A2C** Gateway

Check to Shipper \$

Account Number **37897740**

**FOR INFORMATION OF HATES**  
**CALL 1-800 HI EMERY**  
**(1-800-443-6377)**

**EMERY WORLDWIDE**  
collected consignee's check made payable only to the shipper for the value of the goods in the amount shown above.

Declared Value

Dimensions	Total Pieces	Total Weight		
L	W	H		(In Lbs)
123	14	15	1	37

1 ICE CHEST  
SOIL SAMPLE  
W91-827

**EMERY**

**OVERNIGHT DELIVERY**

**OVERNIGHT SECURITY SERVICE**

Shipper's Signature *[Signature]*

Commodity Code **E**

Free Domicile

International

Base Charge

9613475.0012



Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
6-MAR-1992 16:37

AnalIS ID: 910403-102      Project: G132 001C      Customer Sample ID: BOOFH5  
Customer: KESSNER/BUTCHER      Requisition Number:  
Date Sampled: 27-MAR-1991      Date Sample Received: 31-MAR-1991  
Sampled By:      Date Sample Completed: 27-FEB-1992  
Material Description: WATER      Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)       : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Wet Chemistry Laboratory *****							
EPA-120.1	Conductivity	357		umho/cm	20453	91-14	8-APR-1991
EPA-150.1	pH	8.1		-	20453	91-39	8-APR-1991
EPA-160.1	Dissolved Solids	242		mg/L	RJ JONES	91-23	8-APR-1991
EPA-180.1	Turbidity	0.60		NTU	RJ JONES	91-22	8-APR-1991
EPA-300.0	Bromide	<1		mg/L	634812	91-421A	19-APR-1991
EPA-300.0	Chloride IC	7		mg/L	634812	91-421A	19-APR-1991
EPA-300.0	Nitrate	35		mg/L	634812	91-421A	19-APR-1991
EPA-300.0	Nitrite	<1		mg/L	634812	91-421A	19-APR-1991
EPA-300.0	Sulfate	37		mg/L	634812	91-421A	19-APR-1991
EPA-310.1	Alkalinity	105		mg/L	20453	91-13	8-APR-1991
EPA-335.2	Cyanide	<0.1		mg/L	DM OBANION	91-24	2-MAY-1991
EPA-340.2	Fluoride SIE	0.4		mg/L	HJ CULBERT JR	91-30	3-MAY-1991
EPA-350.3	Ammonia	<0.20		mg/L	900020	91-09	10-APR-1991
EPA-410.4	Chemical Oxygen Demand (COD)	<5		mg/L	RJ JONES	91-18	8-APR-1991
EPA-415.1	Total Organic Carbon (TOC)	<1		mg/L	CA SEDLACEK	91-26 D	13-APR-1991
EPA-9020	Total Organic Halides (TOX)	15		ug/L	900004	91-211	6-MAY-1991

Prep (BNA- CLP)

-----  
pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910408-252

Prep (Pest- CLP)

-----  
pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910408-150

Spike Recovery Data

-----  
Analysis      Unspike Amount      Spike      Amount      Percent  
Result      Spike      Result      Units      Recovered      Recovered

-----  
\*\*\*\*\* UnKnown Lab \*\*\*\*\*

CYANIDE	0.017	0.10	0.13 mg/L	0.11	113.0
PLUTONIUM-238		21306	18400 pCi/L	18400.	86.4
PLUTONIUM-239		21306	18400 pCi/L	18400.	86.4
TOTAL ORGANIC CARBON (TOC)	0	5	4 mg/L	4.	80.0
URANIUM ALPHA ACTIVITY	0.82	675	648 pCi/L	647.	95.9

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
6-MAR-1992 16:37

AnalIS ID: 910408-029      Project: G132 001C      Customer Sample ID: BOOF94  
Customer: KESSNER/BUTCHER      Requisition Number:  
Date Sampled: 3-APR-1991      Date Sample Received: 5-APR-1991  
Sampled By:      Date Sample Completed: 27-FEB-1992  
Material Description: WATER      Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)      [ ] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Wet Chemistry Laboratory *****							
EPA-120.1	Conductivity	430		umho/cm	20453	91-14	9-APR-1991
EPA-150.1	pH	8.1			RJ JONES	91-40	9-APR-1991
EPA-160.1	Dissolved Solids	298		mg/L	20453	91-23	10-APR-1991
EPA-180.1	Turbidity	0.53		NTU	RJ JONES	91-22	9-APR-1991
EPA-300.0	Bromide	<1		mg/L	634812	91-451A	19-APR-1991
EPA-300.0	Chloride IC	5		mg/L	634812	91-451A	19-APR-1991
EPA-300.0	Nitrate	66		mg/L	634812	91-451A	19-APR-1991
EPA-300.0	Nitrite	<1		mg/L	634812	91-451A	19-APR-1991
EPA-300.0	Sulfate	31		mg/L	634812	91-451A	19-APR-1991
EPA-310.1	Alkalinity	99		mg/L	20453	91-14	9-APR-1991
EPA-335.2	Cyanide	<0.1		mg/L	DM OBANION	91-25	2-MAY-1991
EPA-340.2	Fluoride SIE	0.9		mg/L	1802	91-35	22-MAY-1991
EPA-350.3	Ammonia	<0.20		mg/L	900020	91-09	10-APR-1991
EPA-410.4	Chemical Oxygen Demand (COD)	<5		mg/L	RJ JONES	91-19	10-APR-1991
EPA-415.1	Total Organic Carbon (TOC)	<1		mg/L	CA SEDLACEK	91-26 D	13-APR-1991
EPA-9020	Total Organic Halides (TOX)	<10		ug/L	900004	91-21I	21-MAY-1991

Prep (BNA- CLP)

-----  
pH = 6  
Date Extracted = 11-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910411-095

Prep (Pest- CLP)

-----  
pH = 6  
Date Extracted = 9-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910409-040

Spike Recovery Data

-----  
Analysis      Unspike Amount      Spike      Amount      Percent  
Result      Spike      Result      Units      Recovered      Recovered

96 03/25/2007

-----  
\*\*\*\*\* UnKnown Lab \*\*\*\*\*

CYANIDE	0.038	0.1	0.147 mg/L	0.109	109.0
TECHNETIUM-99	3.53E3	12420	16600 pCi/L	13070.	105.2

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003  
OAK RIDGE, TENNESSEE 37831 -7440

February 24, 1992

Ms. Joan Kessner  
Westinghouse Hanford Company  
Office of Sample Management  
2355 Stevens Drive  
Richland, Washington, 99352

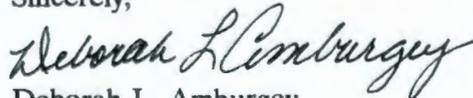
Dear Ms. Kessner:

**Organic Analysis CLP Package on Project 91-001: 200-BP-1 Samples**

Attached are the results of the organic analyses on the 200-BP-1 samples, SDG# BOOFH5, Project 91-001, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on March 31, and April 8, 1992. Also attached are copies of the Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported in CLP format for the organic analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than any conditions detailed in the forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

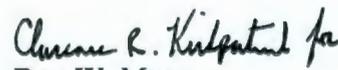
Sincerely,



Deborah L. Amburgey  
Program Manager  
Hanford Support Program



Clarence R. Kirkpatrick  
Program Manager  
Waste Management Analysis

  
Roy W. Morrow  
Department Manager  
K-25 Site Analytical Chemistry Department

## Attachments

cc/attach: D. L. Amburgey  
S. R. Smith - RC  
cc: D. C. Canada  
C. Meehan  
D. S. Zingg



**PROTOCOL UTILIZED FOR ORGANIC ANALYSES OF**

**200-BP-1 SAMPLES**

Analysis  
 A. Semi-Volatiles  
 B. Volatiles  
 C. Pesticides

Protocol  
 BNA CLP SOW  
 VOA CLP SOW  
 EPA-CLP

**SAMPLE IDENTIFICATION TABLE FOR SDG# BOOFH5**

**200-BP-1 SAMPLES**

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
3/31/91	BOOFH5	910403-102	water	
	BOOFH6	910403-103	water	
	BOOFH5MS	910404-111	water	VOA matrix spike of BOOFH5 (910403-102)
	BOOFH5MSD	910404-112	water	VOA matrix spike duplicate of BOOFH5 (910403-102)
4/08/91	BOOF94	910408-029	water	
	BOOF95	910408-030	water	
	BOOF94MS	910410-053	water	VOA matrix spike of BOOF94 (910408-029)
	BOOF94MSD	910410-054	water	VOA matrix spike duplicate of BOOF94 (910408-029)



Laboratory Name: MARTIN MARIETTA  
Case # : G132-001C  
SDG # : BOOFH5  
Contract # : 0288

Sample Identification in SDG batch BOOFH5:

EPA SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	MATRIX	COMMENT
Volatile water samples (SDG # BOOFH5)				
VBLK01	910405-039	>08656	water	method blank
BOOFH5	910403-102	>08657	water	assoc. unspiked samp
BOOFH5-MS	910404-111	>08658	water	matrix spiked sample
BOOFH5-MSD	910404-112	>08659	water	matrix spiked dup.
VBLK02	910410-052	VBK0410	water	method blank
BOOF94	910408-029	0408029	water	assoc. unspiked samp
BOOF94-MS	910410-053	0410053	water	matrix spiked sample
BOOF94-MSD	910410-054	0410054	water	matrix spiked dup

VOLATILE WATER SDG # BOOFH5:

Note: The case number is G132-001C. The case number may not have been transferred to all raw data sheets correctly.

All surrogate standards were within percent recovery acceptance criteria. All matrix spike and matrix spike duplicate relative percent deviation criteria were within acceptance limits. Five of twenty matrix spike components fell out of acceptance criteria for percent recovery. These matrix spike criteria failures only occurred on sample BOOFH5. The other matrix spiked sample (i.e., BOOF94) did not fail matrix spike criteria. All BFB tune criteria were within acceptance criteria. All "CCC" and "SPCC" components met acceptance criteria for both the initial and continuing calibration check samples. All internal standard areas were within acceptance criteria.

I certify that this data package is in compliance to the best of my knowledge with the terms and conditions of the 2/88 CLP SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

SIGNATURE David C. Canada DATE 6/17/91  
David C. Canada, Ph.D June 17, 1991  
Supervisor, Organic GC/MS

CASE NARRATIVE  
for BNA GC/MS data

Laboratory Name: MARTIN MARIETTA  
Case # : G132-001C  
SDG # : BOOFH5  
Contract # : 0288

Sample Identification in SDG batch BOOFH5:

EPA SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	MATRIX	COMMENT
=====	=====	=====	=====	=====

Semivolatile water samples (SDG # BOOFH5)

SBLKAR	910408-252	>11280	water	method blank
BOOFH5	910403-102	>11281	water	
SBLKMB	910411-095	>11310	water	
BOOF94	910408-029	>11311	water	

SEMIVOLATILE WATER SDG # BOOFH5:

NOTE: NO MATRIX SPIKE OR MATRIX SPIKE DUPLICATE SAMPLES WERE SUPPLIED WITH THIS BATCH. TWO METHOD BLANKS ARE INCORPORATED IN THIS BATCH. SBLKAR IS THE METHOD BLANK FOR SAMPLE BOOFH5 AND SBLKMB IS THE METHOD BLANK FOR SAMPLE BOOF94.

All surrogate standard parameters were within percent recovery acceptance criteria. All DFTPP tune parameters were within acceptance criteria. All "CCC" and "SPCC" components met acceptance criteria for both the initial and continuing calibration check samples. All standard areas were within acceptance criteria.

This data package is in compliance with the terms and conditions of the 2/88 CLP SOW to the best of my knowledge, both technically and for completeness, for other than any conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

SIGNATURE David C. Canada DATE 4/25/91  
 David C. Canada  
 Supervisor, Organic GC/MS  
 April 25, 1991

## CASE NARRATIVE FOR PESTICIDE CLP ANALYSIS OF BOOFH5 SAMPLES

LABORATORY NAME: MARTIN MARIETTA

LAB CODE: K-25

CASE No.:

SDG No.: BOOFH5

CONTRACT No.: 2/88

The following samples were analyzed according to EPA CLP Protocol by the K-25 Laboratory. The protocol followed was that contained in the 2/88 Version of the EPA Contract Laboratory Program Protocol.

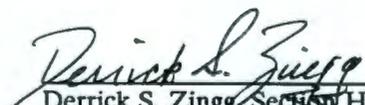
EPA SAMPLE ID	LAB SAMPLE ID	MATRIX	COMMENTS
PBLKMB	910409-040	Water	Method blank
PBLK-AR	910408-150	Water	Method blank
BOOFH5	910403-102	Water	Pest/PCB sample
B00F94	910408-029	Water	Pest/PCB sample

The only deviation from the 2/88 SOW was the use of dual wide bore capillary columns instead of the required packed columns. The two columns used were an Ohio Valley OV-5 and a J&W Scientific DB-1701. Column dimensions were 0.53 mm ID x 30 meters for both columns.

The data presentation format for this package allows data from both columns to be plotted on a single sheet with the integration data following on as many sheets as necessary. The chromatograms as well as the integration data are identified by a six character file name. The "F" and the "R" characters contained in the file name are the column identifier with the "F" corresponding to the OV-5 column and the "R" corresponding to the DB-1701 column.

All QC parameters associated with the gas chromatographic analysis of the above samples were within the limits specified in the EPA-CLP (2/88). Sample BOOFH5 was extracted after the contract specified 5 days from Verified Time of Sample Receipt had elapsed. All samples were analyzed within the contract specified 40 days after the completion of the extraction.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

  
 Derrick S. Zingg, Section Head  
 Gas Chromatography/Organic Sample Preparation

2/24/92  
 Date

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

800FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-0016

SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 5 (g/mL) ML

Lab File ID: &gt;08657

Level: (low/med) LOW

Date Received: 3/31/91

% Moisture: not dec. NA

Date Analyzed: 4/05/91

Column: (pack/cap) CAP

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10.	IU
74-83-9	Bromomethane	10.	IU
75-01-4	Vinyl Chloride	10.	IU
75-00-3	Chloroethane	10.	IU
75-09-2	Methylene Chloride	5.	IU
67-64-1	Acetone	10.	IU
75-15-0	Carbon Disulfide	5.	IU
75-35-4	1,1-Dichloroethene	5.	IU
75-34-3	1,1-Dichloroethane	5.	IU
540-59-0	1,2-Dichloroethene (total)	5.	IU
67-66-3	Chloroform	5.	IU
107-06-2	1,2-Dichloroethane	5.	IU
78-93-3	2-Butanone	10.	IU
71-55-6	1,1,1-Trichloroethane	5.	IU
56-23-5	Carbon Tetrachloride	5.	IU
108-05-4	Vinyl Acetate	10.	IU
75-27-4	Bromodichloromethane	5.	IU
78-87-5	1,2-Dichloropropane	5.	IU
10061-01-5	cis-1,3-Dichloropropene	5.	IU
79-01-6	Trichloroethene	5.	IU
124-48-1	Dibromochloromethane	5.	IU
79-00-5	1,1,2-Trichloroethane	5.	IU
71-43-2	Benzene	5.	IU
10061-02-6	trans-1,3-Dichloropropene	5.	IU
75-25-2	Bromoform	5.	IU
108-10-1	4-Methyl-2-pentanone	10.	IU
591-78-6	2-Hexanone	10.	IU
127-18-4	Tetrachloroethane	5.	IU
79-34-5	1,1,2,2-Tetrachloroethane	5.	IU
108-88-3	Toluene	5.	IU
108-90-7	Chlorobenzene	5.	IU
100-41-4	Ethylbenzene	5.	IU
100-42-5	Styrene	5.	IU
1330-20-7	Xylene (total)	5.	IU

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

800FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>6</sup>SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 5 (g/mL) ML

Lab File ID: >08657

Level: (low/med) LOW

Date Received: 3/31/91

% Moisture: not dec.NA

Date Analyzed: 4/05/91

Column: CAP

Dilution Factor: 1.00000

Number TICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

E00F94

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: 8132-2014 SAS No.: \_\_\_\_\_ SDG No.: B00FH5

Matrix: (soil/water) WATER Lab Sample ID: 910408-029

Sample wt/vol: 5.0 (g/mL, mL) Lab File ID: 0408029

Level: (low/med) LOW Date Received: 04/05/91

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 04/10/91

Column: (pack/cap) CAP Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/L</u>	
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	5	U
67-64-1	Acetone	4	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene(Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	2	BJ
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	1	BJ
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1320-20-7	Xylene (total)	5	U

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

800F91

Lab Name: MARTINMARIETTA Contract: 1288

Lab Code: K-88 Case No.: 1122-0016 CAS No.: \_\_\_\_\_ SDG No.: 800F91

Matrix: (soil/water) WATER Lab Sample ID: 210408-029

Sample wt/vol: 5.0 g/mL ML Lab File ID: 1408029

Level: (low/med) LOW Date Received: 04/05/91

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 04/10/91

Column (pack/cap) CAP Dilution Factor: 1.0

Number PICs found: 0

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: MARTIN MARIETTA

Contract: 0288

B00FH5

Lab Code: K25

Case No.: G132-001<sup>E</sup>SAS No.: NASDG No.: ~~NA~~ B00FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11281

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.0

BLK: 910408-252

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

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10.	IU
111-44-4	bis(2-Chloroethyl)Ether	10.	IU
95-57-8	2-Chlorophenol	10.	IU
541-73-1	1,3-Dichlorobenzene	10.	IU
106-46-7	1,4-Dichlorobenzene	10.	IU
100-51-6	Benzyl alcohol	10.	IU
95-50-1	1,2-Dichlorobenzene	10.	IU
95-48-7	2-Methylphenol	10.	IU
39638-32-9	bis(2-chloroisopropyl)ether	10.	IU
106-44-5	4-Methylphenol	10.	IU
621-64-7	N-Nitroso-Di-n-propylamine	10.	IU
67-72-1	Hexachloroethane	10.	IU
98-95-3	Nitrobenzene	10.	IU
78-59-1	Isophorone	10.	IU
88-75-5	2-Nitrophenol	10.	IU
105-67-9	2,4-Dimethylphenol	10.	IU
65-85-0	Benzoic acid	50.	IU
111-91-1	bis(2-Chloroethoxy)methane	10.	IU
120-83-2	2,4-Dichlorophenol	10.	IU
120-82-1	1,2,4-Trichlorobenzene	10.	IU
91-20-3	Naphthalene	10.	IU
106-47-8	4-Chloroaniline	10.	IU
87-68-3	Hexachlorobutadiene	10.	IU
59-50-7	4-Chloro-3-methylphenol	10.	IU
91-57-6	2-Methylnaphthalene	10.	IU
77-47-4	Hexachlorocyclopentadiene	10.	IU
88-06-2	2,4,6-Trichlorophenol	10.	IU
95-95-4	2,4,5-Trichlorophenol	50.	IU
91-58-7	2-Chloronaphthalene	10.	IU
88-74-4	2-Nitroaniline	50.	IU
131-11-3	Dimethylphthalate	10.	IU
208-96-8	Acenaphthylene	10.	IU
606-20-2	2,6-Dinitrotoluene	10.	IU

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001 SAS No.: NA

SDG No.: NA B00FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11281

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	ug/L
99-09-2	3-Nitroaniline	50.	IU
83-32-9	Acenaphthene	10.	IU
51-28-5	2,4-Dinitrophenol	50.	IU
100-02-7	4-Nitrophenol	50.	IU
132-64-9	Dibenzofuran	10.	IU
121-14-2	2,4-Dinitrotoluene	10.	IU
84-66-2	Diethylphthalate	10.	IU
7005-72-3	4-Chlorophenyl <sup>p</sup> -phenylether	10.	IU
86-73-7	Fluorene	10.	IU
100-01-6	4-Nitroaniline	50.	IU
534-52-1	4,6-Dinitro-2-methylphenol	50.	IU
86-30-6	N-Nitrosodiphenylamine (1)	10.	IU
101-55-3	4-Bromophenyl-phenylether	10.	IU
118-74-1	Hexachlorobenzene	10.	IU
87-86-5	Pentachlorophenol	50.	IU
85-01-8	Phenanthrene	10.	IU
120-12-7	Anthracene	10.	IU
84-74-2	Di-n-butylphthalate	10.	IU
206-44-0	Fluoranthene	10.	IU
129-00-0	Pyrene	10.	IU
85-68-7	Butylbenzylphthalate	10.	IU
91-94-1	3,3'-Dichlorobenzidine	20.	IU
56-55-3	Benzo(a)anthracene	10.	IU
218-01-9	Chrysene	10.	IU
117-81-7	bis(2-Ethylhexyl)phthalate	10.	IU
117-84-0	Di-n-octylphthalate	10.	IU
205-99-2	Benzo(b)fluoranthene	10.	IU
207-08-9	Benzo(k)fluoranthene	10.	IU
50-32-8	Benzo(a)pyrene	10.	IU
193-39-5	Indeno(1,2,3-cd)pyrene	10.	IU
53-70-3	Dibenz(a,h)anthracene	10.	IU
191-24-2	Benzo(g,h,i)perylene	10.	IU

(1) - Cannot be separated from Diphenylamine

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

800FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>c</sup>SAS No.: NA

SDG No.: ~~NA~~ 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11281

<sup>c</sup>  
4/12

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.00000

Number TICs found:  $\phi$

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

800F94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001C SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
108-95-2	Phenol	10.	IU
111-44-4	bis(2-Chloroethyl)Ether	10.	IU
95-57-8	2-Chlorophenol	10.	IU
541-73-1	1,3-Dichlorobenzene	10.	IU
106-46-7	1,4-Dichlorobenzene	10.	IU
100-51-6	Benzyl alcohol	10.	IU
95-50-1	1,2-Dichlorobenzene	10.	IU
95-48-7	2-Methylphenol	10.	IU
39638-32-9	bis(2-chloroisopropyl)ether	10.	IU
106-44-5	4-Methylphenol	10.	IU
621-64-7	N-Nitroso-Di-n-propylamine	10.	IU
67-72-1	Hexachloroethane	10.	IU
98-95-3	Nitrobenzene	10.	IU
78-59-1	Isophorone	10.	IU
88-75-5	2-Nitrophenol	10.	IU
105-67-9	2,4-Dimethylphenol	10.	IU
65-85-0	Benzoic acid	50.	IU
111-91-1	bis(2-Chloroethoxy)methane	10.	IU
120-83-2	2,4-Dichlorophenol	10.	IU
120-82-1	1,2,4-Trichlorobenzene	10.	IU
91-20-3	Naphthalene	10.	IU
106-47-8	4-Chloroaniline	10.	IU
87-68-3	Hexachlorobutadiene	10.	IU
59-50-7	4-Chloro-3-methylphenol	10.	IU
91-57-6	2-Methylnaphthalene	10.	IU
77-47-4	Hexachlorocyclopentadiene	10.	IU
88-06-2	2,4,6-Trichlorophenol	10.	IU
95-95-4	2,4,5-Trichlorophenol	50.	IU
91-58-7	2-Chloronaphthalene	10.	IU
88-74-4	2-Nitroaniline	50.	IU
131-11-3	Dimethylphthalate	10.	IU
208-96-8	Acenaphthylene	10.	IU
606-20-2	2,6-Dinitrotoluene	10.	IU

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

800F94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001C SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
99-09-2	3-Nitroaniline	50.	IU
83-32-9	Acenaphthene	10.	IU
51-28-5	2,4-Dinitrophenol	50.	IU
100-02-7	4-Nitrophenol	50.	IU
132-64-9	Dibenzofuran	10.	IU
121-14-2	2,4-Dinitrotoluene	10.	IU
84-66-2	Diethylphthalate	10.	IU
7005-72-3	4-Chlorophenyl-phenylether	10.	IU
86-73-7	Fluorene	10.	IU
100-01-6	4-Nitroaniline	50.	IU
534-52-1	4,6-Dinitro-2-methylphenol	50.	IU
86-30-6	N-Nitrosodiphenylamine (1)	10.	IU
101-55-3	4-Bromophenyl-phenylether	10.	IU
118-74-1	Hexachlorobenzene	10.	IU
87-86-5	Pentachlorophenol	50.	IU
85-01-8	Phenanthrene	10.	IU
120-12-7	Anthracene	10.	IU
84-74-2	Di-n-butylphthalate	10.	IU
206-44-0	Fluoranthene	10.	IU
129-00-0	Pyrene	10.	IU
85-68-7	Butylbenzylphthalate	10.	IU
91-94-1	3,3'-Dichlorobenzidine	20.	IU
56-55-3	Benzo(a)anthracene	10.	IU
218-01-9	Chrysene	10.	IU
117-81-7	bis(2-Ethylhexyl)phthalate	10.	IU
117-84-0	Di-n-octylphthalate	10.	IU
205-99-2	Benzo(b)fluoranthene	10.	IU
207-08-9	Benzo(k)fluoranthene	10.	IU
50-32-8	Benzo(a)pyrene	10.	IU
193-39-5	Indeno(1,2,3-cd)pyrene	10.	IU
53-70-3	Dibenz(a,h)anthracene	10.	IU
191-24-2	Benzo(g,h,i)perylene	10.	IU

(1) - Cannot be separated from Diphenylamine

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B00F94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>6</sup>SAS No.: NA

SDG No.: NA B00FHS

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11311

Level: (low/med) LDW

Date Received: 04/05/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1/2.00000

## CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
123-42-2	Diacetone Alcohol	6.17	8.0	JA

FORM I SU-TIC

1/87 Rev.

cm  
4/17/91

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOF94

Lab Name: Martin Marietta                      Contract: 2/88

Lab Code: K-25                      Case No.:                      SAS No.: N/A                      SDG No.: BOOFH5

Matrix (soil/water): Water                      Lab Sample ID: 910408-029

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

Level (low/med): low                      Date Received: 04/05/91

% Moisture: not dec.                      dec.                      Date Extracted: 04/09/91

Extraction (SepF/Cont/Sonc): SepF                      Date Analyzed: 05/06/91

GPC Cleanup (Y/N): N                      pH: 6                      Dilution Factor: 1

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
5103-71-9-----	alpha-Chlordane	0.50	U
5103-74-2-----	gamma-Chlordane	0.50	U
8001-35-2-----	Toxaphene	1.0	U
12674-11-2-----	Aroclor-1016	0.50	U
11104-28-2-----	Aroclor-1221	0.50	U
11141-16-5-----	Aroclor-1232	0.50	U
53469-21-9-----	Aroclor-1242	0.50	U
12672-29-6-----	Aroclor-1248	0.50	U
11097-69-1-----	Aroclor-1254	1.0	U
11096-82-5-----	Aroclor-1260	1.0	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOFH5

Lab Name: Martin Marietta Contract: 2/88  
 Lab Code: K-25 Case No.: SAS No.: N/A SDG No.: BOOFH5  
 Matrix (soil/water): Water Lab Sample ID: 910403-102  
 Sample wt/vol: 1000 (g/mL) ml Lab File ID:  
 Level (low/med): low Date Received: 03/31/91  
 % Moisture: not dec. dec. Date Extracted: 04/07/91  
 Extraction (SepF/Cont/Sonc): SepF Date Analyzed: 05/06/91  
 GPC Cleanup (Y/N): N pH: 7 Dilution Factor: 1

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

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
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	0.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.50	U
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003  
OAK RIDGE, TENNESSEE 37831 -7440

February 24, 1992

Ms. Joan Kessner  
Westinghouse Hanford Company  
Office of Sample Management  
2355 Stevens Drive  
Richland, Washington, 99352



Dear Ms. Kessner:

**Inorganic Analysis CLP Package on Project 91-001: 200-BP-1 Samples**

Attached are the results of the inorganic analyses on the 200-BP-1 samples, SDG# BOOFH5, Project 91-001, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on March 31, and April 8, 1992. Also attached are copies of the Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported in CLP format for the inorganic analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than any conditions detailed in the forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Sincerely,

Deborah L. Amburgey  
Program Manager  
Hanford Support Program

Clarence R. Kirkpatrick  
Program Manager  
Waste Management Analysis

Roy W. Morrow  
Department Manager  
K-25 Site Analytical Chemistry Department

## Attachments

cc/attach: D. L. Amburgey  
S. R. Smith - RC  
cc: N. P. Buddin  
D. C. Canada  
H. H. Sullivan

PROTOCOL UTILIZED FOR INORGANIC ANALYSES OF  
200-BP-1 SAMPLES

<u>Analysis</u>	<u>Protocol</u>
A. ICP Metals	EPA-200.7
B. AA Metals	
Arsenic	EPA-204.2
Lead	EPA-239.2
Selenium	EPA-270.2
Thallium	EPA-279.2
C. Mercury	EPA-245.5
D. Cyanide	EPA-335.2



SAMPLE IDENTIFICATION TABLE FOR SDG# BOOFH5

200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
3/31/91	BOOFH5	910403-102	water	
	BOOFH6	910403-103	water	
	BOOFH5MS	910404-111	water	VOA matrix spike of BOOFH5 (910403-102)
	BOOFH5MSD	910404-112	water	VOA matrix spike duplicate of BOOFH5 (910403-102)
4/08/91	BOOF94	910408-029	water	
	BOOF95	910408-030	water	
	BOOF94MS	910410-053	water	VOA matrix spike of BOOF94 (910408-029)
	BOOF94MSD	910410-054	water	VOA matrix spike duplicate of BOOF94 (910408-029)

July 29, 1991

Between March 31, 1991 and April 6, 1991 the K-25 (ORK25P) Analytical Chemistry Department received the following samples for analysis:

<u>Laboratory ID</u>	<u>EPA ID</u>	<u>Customer No.:</u>
910403-102	BOOFH5	BOOFH5
910403-103	BOOFH6	BOOFH6
910408-029	BOOF94	BOOF94
910408-030	BOOF95	BOOF95
910412-211	BOOJ75	BOOJ75
910412-212	BOOJ76	BOOJ76

The above samples were designated as ICP, SDG number BOOFH5. The Laboratory ID and Customer Sample Numbers are used internally for tracking purposes.

The following quality control solutions were used for the analysis of these samples:

ICP calibration verifications	SPEX Multielement Standards (SPEX7, SPEX19)
ICP interference check standards	EPA UNLV-QAL ICS-A(1089) and ICS-B(1089)
ICP aqueous laboratory control std	EPA UNLV-QAL Std.(0287)
ICP CRDL standard	Perkin Elmer Multielement CRDL Standard Mix
ICP Calibration Standards	
a. STD1 = Matrix Matched Standard Blank	
b. STD2 = SPEX Multielement Standard (XORN22)	
c. STD3 = SPEX Multielement Standard (XORN18)	
d. STD4 = SPEX Multielement Standard (XORN19, XORN20)	
e. STD5 = SPEX Multielement Standard (XORN24)	
f. STD6 = SPEX Multielement Standard (XORN25)	
g. STD7 = SPEX Multielement Standard (XORN26)	
h. STD8 = SPEX Single Element 1000 ppm Ag	

All associated QA/QC was within the criteria specified by CLP.

Sincerely



M.J. Scheuer

cc: M.S. Dill  
R.W. Morrow  
File - MJS - NoRC

This data has been reviewed and is approved for release.

  
R.W. Morrow, Dept. Head

 3/9/92  
M.S. Dill, Methodology and QA QC

February 21, 1992

Joan Kessner  
 Project Manager  
 Westinghouse Hanford Company  
 Richland, WA 99336

Dear Ms. Kessner,

On March 31, 1991 the Oak Ridge K-25 Site Analytical Chemistry Department (ACD) received 4 water samples from Westinghouse Hanford Company. The samples were grouped into a Sample Delivery Group following EPA CLP protocols. The K-25 sample identification numbers were assigned as follows:

Laboratory ID	Customer ID	EPA Sample Number
910403-102	BOOFH5	BOOFH5
910403-103	BOOFH6	BOOFH6
910408-029	BOOF94	BOOF94
910408-030	BOOF95	BOOF95

A narrative of the Atomic Spectrometry and Mercury Analysis laboratories experiences and problems in the preparation and analysis of the sample is given below:

The BOOFH6 sample and the pre-digestion spike of the sample for GFAAS arsenic were mistakenly switched in the autosampler tray prior to analysis. The error was not caught before the run was completed. The raw data for the run clearly show this mistake, but due to the CLP protocol, the pre-digest spike sample was not run with an analytical spike. Because of the switch, the BOOFH6 sample does not have an analytical spike associated with it. The EPA CLP 3/90 statement of work was used as the protocol for this SDG, and the lead analytical spikes are at the 3/90 levels of 20 µg/L. During the thallium run the CRA sample was run with an analytical spike due to a high RSD flag being sensed by the computer program used to run CLP samples. The CRA analytical spike is not required by CLP protocol. No other unusual problems were encountered with this sample set.

The following quality control solutions were used for the analysis of these materials:

GFAAS initial calibration verification	EPA ICV-2 (0590)
GFAAS continuing calibration verification	Perkin-Elmer CLP standard N930-0224
Hg calibration verification	Perkin-Elmer CLP standard N930-0221
Hg continuing calibration verification	EPA ICV-5 (0788)
	J.T. Baker Hg standard 6934-01

All values on all forms have been rounded to the appropriate number of significant figures in accordance with the 3/90 revision of the EPA CLP statement of work, SOW ILM01.0. All data qualifier flags, C and Q field, are consistent with requirements of the SOW. All calculated results shown on forms are derived from the rounded values given on the forms, not from the original raw data.

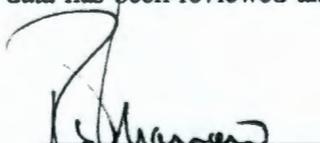
Sincerely,



Thomas J. Oatts

cc: D. C. Canada  
R. W. Morrow  
File - TJO - NoRC

This data has been reviewed and is approved for release.

  
\_\_\_\_\_  
R. W. Morrow, Dept. Head  
\_\_\_\_\_  
D. C. Canada, Methodology and QC





SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEET

BOOF94

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-029

Level (low/med): LOW

Date Received: 04/05/91

% 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	60.2	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	35100			P
7440-47-3	Chromium	22.3			P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	111			P
7439-95-4	Magnesium	10400			P
7439-96-5	Manganese	2.6	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	5720			P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	24200		E	P
	Strontium	214			P
	Tin	30.0	U	*	P
7440-62-2	Vanadium	21.0	B		P
7440-66-6	Zinc	1.0	U		P

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

## Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-029

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOF94

Lab Name: MARTIN\_MARIETTA\_K25\_SITE\_ Contract: HANFORD\_

Lab Code: K25ACD Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910408-029

Level (low/med): LOW\_ Date Received: 04/05/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	9.2	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.18	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR\_ Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR\_ Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: Martin Marietta Contract: \_\_\_\_\_

B00F94

Lab Code: \_\_\_\_\_ Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: H5

Matrix (soil/water): water

Lab Sample ID: 910408-029

Level (low/med): \_\_\_\_\_

Date Received: 8-Apr-1991

% Solids: N/A

Concentration Units (<sup>mg/L</sup> or mg/kg dry weight): mg/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium				
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium				
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc				
	Cyanide	<u>20.1</u>			

Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9613475.0046

## ENVIROFORMS/CLP 788

SAMPLE NO. 12

1  
INORGANIC ANALYSIS DATA SHEET

BOOF95

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-030

Level (low/med): LOW

Date Received: 04/05/91

% 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	20.7	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	35600			P
7440-47-3	Chromium	12.6			P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	28.8	B		P
7439-95-4	Magnesium	10400			P
7439-96-5	Manganese	1.1	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	6190			P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	27200		E	P
	Strontium	217			P
	Tin	30.0	U	*	P
7440-62-2	Vanadium	19.7	B		P
7440-66-6	Zinc	1.0	U		P

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

## Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-030

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOF95

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910408-030

Level (low/med): LOW Date Received: 04/05/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	8.7	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## ENVIROFORMS/CLP 788

SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEET

BOOFH5

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-102

Level (low/med): LOW

Date Received: 03/31/91

% 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	33.2	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	29.0	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	37100			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	138			P
7439-95-4	Magnesium	11300			P
7439-96-5	Manganese	6.6	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	4930	B		P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	16000		E	P
	Strontium	185			P
	Tin	37.8		*	P
7440-62-2	Vanadium	15.6	B		P
7440-66-6	Zinc	7.3	B		P

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

## Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-102

U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH5

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910403-102

Level (low/med): LOW Date Received: 03/31/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	5.5	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	9.6			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: Martin Marietta Contract: \_\_\_\_\_

BOOFH5

Lab Code: \_\_\_\_\_ Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: BOOFH5

Matrix (soil/water): water Lab Sample ID: 910403-102

Level (low/med): \_\_\_\_\_ Date Received: 3-31-91

‡ Solids: N/A

Concentration Units (<sup>SRS 3/1/92</sup> ~~ug/L~~ or mg/kg dry weight): mg/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium				
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium				
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc				
	Cyanide	<u>20.1</u>			

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

1  
INORGANIC ANALYSIS DATA SHEET

BOOFH6

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-103

Level (low/med): LOW

Date Received: 03/31/91

% 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	24.9	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	28.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	37100			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	28.7	B		P
7439-95-4	Magnesium	11400			P
7439-96-5	Manganese	3.8	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	4880	B		P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	16000		E	P
	Strontium	186			P
	Tin	30.0	U	*	P
7440-62-2	Vanadium	13.9	B		P
7440-66-6	Zinc	1.3	B		P

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

## Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-103

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH6

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910403-103

Level (low/med): LOW Date Received: 03/31/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	6.8	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

9613475.0053

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003  
OAK RIDGE, TENNESSEE 37831<sup>7440</sup>

February 24, 1992

Ms. Joan Kessner  
Westinghouse Hanford Company  
Office of Sample Management  
2355 Stevens Drive  
Richland, Washington, 99352



Dear Ms. Kessner:

**Radiochemistry Analytical Results Package on Project 91-001: 200-BP-1 Samples**

Attached are the analytical results of the radiochemical analysis on the 200-BP-1 samples, SDG# BOOFH5, Project 91-001, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on March 31, and April 8, 1991. Also attached are copies of the AnaLis report forms, Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported on DOE Environmental Survey forms for the radiochemistry analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than the conditions detailed in the following forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Sincerely,

*Deborah L. Amburgey*

Deborah L. Amburgey  
Program Manager  
Hanford Support Program

*Clarence R. Kirkpatrick*

Clarence R. Kirkpatrick  
Program Manager  
Waste Management Analysis

*Clarence R. Kirkpatrick for*

Roy W. Morrow  
Department Manager  
K-25 Site Analytical Chemistry Department

Attachments

cc/attach: D.L.Amburgey  
S.R.Smith - RC  
cc: N.P.Buddin

**PROTOCOL UTILIZED FOR RADIOCHEMICAL ANALYSES OF  
200-BP-1 SAMPLES**

<u>Analysis</u>	<u>Protocol</u>
A. Alpha Activity	EPA-900.0
B. Beta Activity	EPA-900.0
C. Cesium-137	EC-134
D. Plutonium (-238, -239)	TP-1635
E. Radium	EPA-903.0
F. Strontium	EPA-906.0
G. Technetium-99	TP-1628
H. Tritium	EPA-905.0
I. Uranium Alpha Activity	EPA-908.0
J. Cobalt-60	EC-134

**SAMPLE IDENTIFICATION TABLE FOR SDG# BOOFH5  
200-BP-1 SAMPLES**

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
3/31/91	BOOFH5	910403-102	water	
	BOOFH6	910403-103	water	No Radiochemistry requested
	BOOFH5MS	910404-111	water	VOA matrix spike of BOOFH5 (910403-102)
	BOOFH5MSD	910404-112	water	VOA matrix spike duplicate of BOOFH5 (910403-102)
4/08/91	BOOF94	910408-029	water	
	BOOF95	910408-030	water	No Radiochemistry requested
	BOOF94MS	910410-053	water	VOA matrix spike of BOOF94 (910408-029)
	BOOF94MSD	910410-054	water	VOA matrix spike duplicate of BOOF94 (910408-029)

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
23-MAR-1992 13:58

AnalIS ID: 910403-102    Project: G132 001C    Customer Sample ID: BOOFH5  
Customer: KESSNER/BUTCHER    Requisition Number:  
Date Sampled: 27-MAR-1991    Date Sample Received: 31-MAR-1991  
Sampled By:    Date Sample Completed: 19-MAR-1992  
Material Description: WATER    Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)    [] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.44		+/- 3.7	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.20E1		+/- 3.6E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.30		+/- 1.4	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.88E2		+/- 15.1	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	-.19		+/- .37	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.1E3		+/- 6.1E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	0.44		+/- 0.8	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	0.82		+/- 2.0	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.62E3		+/- 1.6E3	pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	0.00		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	0.00		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991

Prep (BNA- CLP)

-----  
pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910408-252

Prep (Pest- CLP)

-----  
pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910408-150

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
-----	-----	-----	-----
Technetium-99	3.62E3	4.6E3	23.8

## Spike Recovery Data

-----

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
-----						
***** UnKnown Lab *****						
CYANIDE	0.017	0.10	0.13	mg/L	0.11	113.0
PLUTONIUM-238		21306	18400	pCi/L	18400.	86.4
PLUTONIUM-239		21306	18400	pCi/L	18400.	86.4
TOTAL ORGANIC CARBON (TOC)	0	5	4	mg/L	4.	80.0
URANIUM ALPHA ACTIVITY	0.82	675	648	pCi/L	647.	95.9

-----

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
23-MAR-1992 13:58

ANALIS ID: 910408-029      Project: G132 001C      Customer Sample ID: BOOF94  
Customer: KESSNER/BUTCHER      Requisition Number:  
Date Sampled: 3-APR-1991      Date Sample Received: 5-APR-1991  
Sampled By:      Date Sample Completed: 19-MAR-1992  
Material Description: WATER      Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)      [ ] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	0.93		+/- 3.3	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.53E1		+/- 3.5E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.49		+/- 1.4	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.42E2		+/- 14.5	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	-.34		+/- .34	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.2E3		+/- 6.2E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	1.35		+/- 0.9	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	0.00		+/- 1.9	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.53E3		+/- 1.6E3	pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	0.00		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	0.87		+/- 1.2	pCi/L	900028	ENV-523	30-MAY-1991

Prep (BNA- CLP)

-----  
pH = 6  
Date Extracted = 11-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910411-095

Prep (Pest- CLP)

-----  
pH = 6  
Date Extracted = 9-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910409-040

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
Uranium Alpha Activity	0.00	0	0.0
Plutonium-238	0.00	0	0.0

## Spike Recovery Data

-----

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
-----	-----	-----	-----	-----	-----	-----
**** Unknown Lab ****						
CYANIDE	0.038	0.1	0.147	mg/L	0.109	109.0
TECHNETIUM-99	3.53E3	12420	16600	pCi/L	13070.	105.2

9613475.0059

Science Applications International Corporation  
An Employee-Owned Company

1043-PKB.92  
September 18, 1992

Mr. Mark A. Buckmaster  
Westinghouse Hanford Company  
P.O. Box 1970, MSIN H4-55  
Richland, WA 99352

Subject: Deliverable for 200-BP-1 Data Validation, Task Order S-92-19, WHC Contract No. MLW-SVV-073750

Dear Mr. Buckmaster:

Enclosed is the subject deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of the Data Validation Report for Data Package B00FH5. This deliverable was prepared by Golder Associates with support from Ken Ridgway of SAIC under the direction of Mr. Kent Angelos.

Should you have any questions, please do not hesitate to contact the following: Mr. Kent Angelos of Golder Associates at (206) 883-0777, Mr. Mike Hoxie or myself at (509) 943-3133.

Sincerely yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

  
P. K. Brockman  
Program Manager

PKB/mkc

Enclosures

cc w/encl:  
B. Bechtold, WHC  
LB/Task S-92-19 Deliv File

cc w/o encl:  
R. Henckel, WHC  
D. Martin, Albq  
D. Wilson, Whc

cc: w/encl (including original data package):  
D. Leech, WHC



1845 Terminal Drive, Suite 202, Richland, Washington 99352 (509) 943-3133

Other SAIC Offices: Albuquerque, Boston, Colorado Springs, Dayton, Huntsville, Las Vegas, Los Angeles, McLean, Oak Ridge, Orlando, Palo Alto, San Diego, Seattle, and Tucson

APPENDIX B

DATA VALIDATION DOCUMENTATION

SDG: B00FH5

SAMPLES: B00FH5, B00FH6, B00F94, B00F95

CONTAINS:

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS

ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA

ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

## ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

- B - Indicates the compound or analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL).
- U - Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected. Due to identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.
- R - Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.
- NJ - Indicates presumptive evidence of a compound at an estimated value.
- N - Indicates presumptive evidence of a compound.

9613475.0062

ATTACHMENT 2  
SUMMARY OF DATA QUALIFICATIONS



DATA QUALIFICATION SUMMARY - FORM B-7

SDG: BODFHS		REVIEWER: <i>Kmt</i>	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: BNA				
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON	
2,4,5-Trichloro phenol	UJ	BODFHS	Cal %D > 25	
			ICD (RSD) > 30	
2,4-Dichlorophenol	UJ	BODF94	Total %D > 25	
3-Nitroaniline	UJ	"	"	
Bis(4-chlorophenyl) ether	UJ	↓	↓	
4-Chlorophenol	UJ			
Fluorene	UJ			
2,4,5-Trichloro phenol	UJ	BODF94	Cal %D > 25	
4-Chlorophenyl-phenyl ether	UJ	↓	↓	
4,6-Dinitro-2-methyl phenol	UJ			
All	UJ	BODFHS and BODF94	Holding Times Missed for Prep.	
Pinacene Aldehyd	R	BODF94	Suspect Lab. Contamination	

*UJ 8/15/92*



## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: BCOFH5	REVIEWER: KMT	DATE: 8/15/92	PAGE 1 OF
COMMENTS: Metals / CN			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cyanide	R	All	Holding Time exceeded
Bismuth	R	All	Spike %R < 30%
Tin	R	All	LC5 %R < 50%
Sodium	J	All	ICP Serial Dilution %D > 10%
Aluminum	U	All	Present in Blanks
Iron	U	BCOFH6 BCOF95	↓
Strontium	<del>UJ</del> UJ	BCOFH6	GFAA Spike %R < 85%
Selenium	UJ	BCOF94	GFAA Spike %R < 85%

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: <i>BODFHS</i>	REVIEWER: <i>KMA</i>	DATE: <i>8/15/92</i>	PAGE <i>1</i> OF <i>1</i>
COMMENTS: <i>Water Chemistry</i>			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
<i>Conductivity</i>	<i>J</i>	<i>BODFHS</i>	<i>Holdings</i>
<i>TOX</i>	<i>J</i>	<i>J</i>	<i>Time</i>
<i>Turbidity</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>pH</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>Conductivity</i>	<i>J</i>	<i>BODF94</i>	<i>Holdings</i>
<i>Fluoride</i>	<i>J</i>	<i>J</i>	<i>Time</i>
<i>Nitrate</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>Nitrite</i>	<i>UJ</i>	<i>J</i>	<i>J</i>
<i>TOX</i>	<i>UJ</i>	<i>J</i>	<i>J</i>
<i>Turbidity</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>pH</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>TOX</i>	<i>J</i>	<i>BODFHS</i>	<i>%R &lt; 75%</i>
<i>TOX</i>	<i>J</i>	<i>BODFHS</i>	<i>Holdings</i>
<i>Fluoride</i>	<i>J</i>	<i>J</i>	<i>Time</i>
<i>Nitrate</i>	<i>J</i>	<i>J</i>	<i>J</i>
<i>Nitrite</i>	<i>UJ</i>	<i>J</i>	<i>J</i>

9613475.0068

ATTACHMENT 3  
AS QUALIFIED DATA SUMMARY

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

800FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-0016

SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 5 (g/mL) ML

Lab File ID: >08657

Level: (low/med) LOW

Date Received: 3/31/91

% Moisture: not dec. NA

Date Analyzed: 4/05/91

Column: (pack/cap) CAP

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
74-87-3	Chloromethane	10.	IU	
74-83-9	Bromomethane	10.	IU	
75-01-4	Vinyl Chloride	10.	IU	
75-00-3	Chloroethane	10.	IU	
75-09-2	Methylene Chloride	5.	IU	
67-64-1	Acetone	10.	IU	
75-15-0	Carbon Disulfide	5.	IU	
75-35-4	1,1-Dichloroethene	5.	IU	
75-34-3	1,1-Dichloroethane	5.	IU	
540-59-0	1,2-Dichloroethene (total)	5.	IU	
67-66-3	Chloroform	5.	IU	
107-06-2	1,2-Dichloroethane	5.	IU	
78-93-3	2-Butanone	10.	IU	
71-55-6	1,1,1-Trichloroethane	5.	IU	
56-23-5	Carbon Tetrachloride	5.	IU	
108-05-4	Vinyl Acetate	10.	IU	
75-27-4	Bromodichloromethane	5.	IU	
78-87-5	1,2-Dichloropropane	5.	IU	
10061-01-5	cis-1,3-Dichloropropene	5.	IU	
79-01-6	Trichloroethene	5.	IU	
124-48-1	Dibromochloromethane	5.	IU	
79-00-5	1,1,2-Trichloroethane	5.	IU	
71-43-2	Benzene	5.	IU	
10061-02-6	trans-1,3-Dichloropropene	5.	IU	
75-25-2	Bromoform	5.	IU	
108-10-1	4-Methyl-2-pentanone	10.	IU	
591-78-6	2-Hexanone	10.	IU	
127-18-4	Tetrachloroethane	5.	IU	
79-34-5	1,1,2,2-Tetrachloroethane	5.	IU	
108-88-3	Toluene	5.	IU	
108-90-7	Chlorobenzene	5.	IU	
100-41-4	Ethylbenzene	5.	IU	
100-42-5	Styrene	5.	IU	
1330-20-7	Xylene (total)	5.	IU	

28

Handwritten notes and signatures on the right side of the table, including a vertical line and various initials.

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

EOOF94

Lab Name: MARTINMARIETTA Contract: 0288  
 Lab Code: E-25 Case No.: 3132-2014 SAS No.: \_\_\_\_\_ SDG No.: BC05E5  
 Matrix: (soil/water) WATER Lab Sample ID: 910408-029  
 Sample wt/vol: 5.0 (g/mL, mL) Lab File ID: 0408029  
 Level: (low/med) LOW Date Received: 04/05/91  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 04/10/91  
 Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:

SAS NO.	COMPOUND	(ug/L or ug/Kg) ug/L	
74-87-3	Chloromethane	10	UT
74-83-9	Bromomethane	10	UT
75-01-4	Vinyl Chloride	10	UT
75-00-8	Chloroethane	10	UT
75-09-2	Methylene Chloride	5	UT
67-64-1	Acetone	10	UT
75-15-0	Carbon Disulfide	5	UT
75-35-4	1,1-Dichloroethene	5	UT
75-34-3	1,1-Dichloroethane	5	UT
540-59-6	1,2-Dichloroethene(Total)	5	UT
67-66-3	Chloroform	5	UT
107-06-2	1,2-Dichloroethane	5	UT
72-98-9	2-Butanone	10	UT
71-55-3	1,1,1-Trichloroethane	10	UT
63-23-8	Carbon Tetrachloride	10	UT
108-03-1	Vinyl Acetate	10	UT
75-27-4	Bromodichloromethane	10	UT
78-87-5	1,2-Dichloropropane	10	UT
10061-01-5	cis-1,3-Dichloropropene	10	UT
10061-02-6	Trans-1,3-Dichloropropene	10	UT
79-01-8	Trichloroethene	10	UT
124-48-1	Dibromochloromethane	10	UT
73-00-8	1,1,2-Trichloroethane	10	UT
71-43-2	Benzene	10	UT
75-25-2	Bromoform	10	UT
108-10-1	4-Methyl-2-Pentanone	10	UT
691-72-6	2-Hexanone	10	UT
127-18-4	Tetrachloroethene	10	UT
73-54-3	1,1,2,2-Tetrachloroethane	10	UT
102-38-8	Toluene	10	UT
108-90-7	Chlorobenzene	10	UT
100-41-4	Ethylbenzene	10	UT
100-42-5	Styrene	10	UT
1030-21-7	Xylene (total)	10	UT

10x2  
5-  
UT 5/15/92

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name: MARTIN MARIETTA

Contract: 0288

BOOFH5

Lab Code: K25

Case No.: G132-001 SAS No.: NA

SDG No.: NA BOOFH:

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11281

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.0

BLK: 910408-252

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(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
100-51-6	Benzyl alcohol	10.	U
95-50-1	1,2-Dichlorobenzene	10.	U
95-48-7	2-Methylphenol	10.	U
39638-32-9	bis(2-chloroisopropyl)ether	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
65-85-0	Benzoic acid	50.	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	50.	U
91-58-7	2-Chloronaphthalene	10.	U
86-74-4	2-Nitroaniline	50.	U
131-11-3	Dimethylphthalate	10.	U
208-96-8	Acenaphthylene	10.	U
606-20-2	2,6-Dinitrotoluene	10.	U

Handwritten initials/signature

Vertical handwritten notes and checkmarks on the right side of the table

Handwritten initials/signature on the bottom left

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

B00FH5

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001 SAS No.: NA

SDG No.: NA B00FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: &gt;11281

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
99-09-2	3-Nitroaniline	50.	✓
83-32-9	Acenaphthene	10.	✓
51-28-5	2,4-Dinitrophenol	50.	✓
100-02-7	4-Nitrophenol	50.	✓
132-64-9	Dibenzofuran	10.	✓
121-14-2	2,4-Dinitrotoluene	10.	✓
84-66-2	Diethylphthalate	10.	✓
7005-72-3	4-Chlorophenyl-phenylether	10.	✓
86-73-7	Fluorene	10.	✓
100-01-6	4-Nitroaniline	50.	✓
534-52-1	4,6-Dinitro-2-methylphenol	50.	✓
86-30-6	N-Nitrosodiphenylamine (1)	10.	✓
101-55-3	4-Bromophenyl-phenylether	10.	✓
118-74-1	Hexachlorobenzene	10.	✓
87-86-5	Pentachlorophenol	50.	✓
85-01-8	Phenanthrene	10.	✓
120-12-7	Anthracene	10.	✓
84-74-2	Di-n-butylphthalate	10.	✓
206-44-0	Fluoranthene	10.	✓
129-00-0	Pyrene	10.	✓
85-68-7	Butylbenzylphthalate	10.	✓
91-94-1	3,3'-Dichlorobenzidine	20.	✓
56-55-3	Benzo(a)anthracene	10.	✓
218-01-9	Chrysene	10.	✓
117-81-7	bis(2-Ethylhexyl)phthalate	10.	✓
117-84-0	Di-n-octylphthalate	10.	✓
205-99-2	Benzo(b)fluoranthene	10.	✓
207-08-9	Benzo(k)fluoranthene	10.	✓
50-32-8	Benzo(a)pyrene	10.	✓
193-39-5	Indeno(1,2,3-cd)pyrene	10.	✓
53-70-3	Dibenz(a,h)anthracene	10.	✓
191-24-2	Benzo(g,h,i)perylene	10.	✓

(1) - Cannot be separated from Diphenylamine

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

800F94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001C SAS No.: NA

SDG No.: 800FH5

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec.NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1.0

*MS*  
8/15/92

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

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
100-51-6	Benzyl alcohol	10.	U
95-50-1	1,2-Dichlorobenzene	10.	U
95-48-7	2-Methylphenol	10.	U
39638-32-9	bis(2-chloroisopropyl)ether	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
65-85-0	Benzoic acid	50.	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	50.	U
91-58-7	2-Chloronaphthalene	10.	U
88-74-4	2-Nitroaniline	50.	U
131-11-3	Dimethylphthalate	10.	U
208-96-8	Acenaphthylene	10.	U
606-20-2	2,6-Dinitrotoluene	10.	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOF94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001C SAS No.: NA

SDG No.: BOOFH5

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
99-09-2	3-Nitroaniline	50.	U
83-32-9	Acenaphthene	10.	U
51-28-5	2,4-Dinitrophenol	50.	U
100-02-7	4-Nitrophenol	50.	U
132-64-9	Dibenzofuran	10.	U
121-14-2	2,4-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	50.	U
534-52-1	4,6-Dinitro-2-methylphenol	50.	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	50.	U
85-01-8	Phenanthrene	10.	U
120-12-7	Anthracene	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	20.	U
56-55-3	Benzo(a)anthracene	10.	U
218-01-9	Chrysene	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate	10.	U
117-84-0	Di-n-octylphthalate	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.

BOOF94

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001 SAS No.: NA

SDG No.: NA BOOFHS

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec. NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 1.00000

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

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
123-42-2	Diacetone Alcohol	6.17	8.0	JA

FORM I SU-TIC

1/87 Rev.

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5/15/91

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4/17/91

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOFH5

Lab Name: Martin Marietta

Contract: 2/88

Lab Code: K-25

Case No.:

SAS No.: N/A

SDG No.: BOOFH5

Matrix (soil/water): Water

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) ml

Lab File ID:

Level (low/med): low

Date Received: 03/31/91

% Moisture: not dec. dec.

Date Extracted: 04/07/91

Extraction (SepF/Cont/Sonc): SepF

Date Analyzed: 05/06/91

GPC Cleanup (Y/N): N pH: 7

Dilution Factor: 1

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
5103-71-9-----	alpha-Chlordane	0.50	U
5103-74-2-----	gamma-Chlordane	0.50	U
8001-35-2-----	Toxaphene	1.0	U
12674-11-2-----	Aroclor-1016	0.50	U
11104-28-2-----	Aroclor-1221	0.50	U
11141-16-5-----	Aroclor-1232	0.50	U
53469-21-9-----	Aroclor-1242	0.50	U
12672-29-6-----	Aroclor-1248	0.50	U
11097-69-1-----	Aroclor-1254	1.0	U
11096-82-5-----	Aroclor-1260	1.0	U

UJ

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8/15/92

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOF94

Lab Name: Martin Marietta

Contract: 2/88

Lab Code: K-25

Case No.:

SAS No.: N/A

SDG No.: BOOFH5

Matrix (soil/water): Water

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) ml

Lab File ID:

Level (low/med): low

Date Received: 04/05/91

% Moisture: not dec. dec.

Date Extracted: 04/09/91

Extraction (SepF/Cont/Sonc): SepF

Date Analyzed: 05/06/91

GPC Cleanup (Y/N): N pH: 6

Dilution Factor: 1

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
5103-71-9-----	alpha-Chlordane	0.50	U
5103-74-2-----	gamma-Chlordane	0.50	U
8001-35-2-----	Toxaphene	1.0	U
12674-11-2-----	Aroclor-1016	0.50	U
11104-28-2-----	Aroclor-1221	0.50	U
11141-16-5-----	Aroclor-1232	0.50	U
53469-21-9-----	Aroclor-1242	0.50	U
12672-29-6-----	Aroclor-1248	0.50	U
11097-69-1-----	Aroclor-1254	1.0	U
11096-82-5-----	Aroclor-1260	1.0	U

ENVIROFORMS/CLP 788

SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEET

BOOFH5

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-102

Level (low/med): LOW

Date Received: 03/31/91

% 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	33.2	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	29.0	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	37100			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	138			P
7439-95-4	Magnesium	11300			P
7439-96-5	Manganese	6.6	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	4930	B		P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	16000		E	P
	Strontium	185			P
	Tin	37.8		*	P
7440-62-2	Vanadium	15.6	B		P
7440-66-6	Zinc	7.3	B		P

*Handwritten signature and date: 8/15/91*

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-102

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH5

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910403-102

Level (low/med): LOW Date Received: 03/31/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	5.5	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	9.6			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

*mt*  
8/15/92

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_  
 Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: Martin Marietta

Contract: \_\_\_\_\_

BOOFH5

Lab Code: \_\_\_\_\_

Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_

SDG No.: BOOFH5

Matrix (soil/water): water

Lab Sample ID: 910403-102

Level (low/med): \_\_\_\_\_

Date Received: 3-31-91

† Solids: N/A

Concentration Units (<sup>SRS 3/1/92</sup> ~~ug/L~~ or mg/kg dry weight): mg/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium				
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium				
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc				
	Cyanide	<u>20.1</u>			

*Handwritten:*  
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8/15/92  
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Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments:

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1  
INORGANIC ANALYSIS DATA SHEET

BOOFH6

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-103

Level (low/med): LOW

Date Received: 03/31/91

% 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	24.9	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	28.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	37100			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	28.7	B		P
7439-95-4	Magnesium	11400			P
7439-96-5	Manganese	3.8	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	4880	B		P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	16000		E	P
	Strontium	186			P
	Tin	30.0	U	*	P
7440-62-2	Vanadium	13.9	B		P
7440-66-6	Zinc	1.3	B		P

*MWB*  
0/15/02

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-103

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH6

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910403-103

Level (low/med): LOW Date Received: 03/31/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	6.8	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

*Handwritten signature and date: 8/15/92*

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

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ENVIROFORMS/CLP 788

SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEET

BOOF94

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-029

Level (low/med): LOW

Date Received: 04/05/91

% 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	60.2	B		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	U	N	P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	35100	-		P
7440-47-3	Chromium	22.3	-		P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	111	-		P
7439-95-4	Magnesium	10400	-		P
7439-96-5	Manganese	2.6	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	5720	-		P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	24200	E		P
	Strontium	214	-		P
	Tin	30.0	U	*	P
7440-62-2	Vanadium	21.0	B		P
7440-66-6	Zinc	1.0	U		P

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8/15/92

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-029

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOF94

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910408-029

Level (low/med): LOW Date Received: 04/05/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	9.2	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.18	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

WJ

MW 8/15/92

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: Martin Marietta

Contract: \_\_\_\_\_

B00F94

Lab Code: \_\_\_\_\_

Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_

B00FH5  
SDG No.: \_\_\_\_\_

Matrix (soil/water): water

Lab Sample ID: 910408-029

Level (low/med): \_\_\_\_\_

Date Received: 8-Apr-1991

‡ Solids: N/A

Concentration Units (<sup>mg/kg</sup>ug/L or mg/kg dry weight): mg/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium				
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium				
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc				
	Cyanide	<u>20.1</u>			

*MWA*  
*8/15/92*

*R*

Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments:

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1  
INORGANIC ANALYSIS DATA SHEET

BOOF95

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-030

Level (low/med): LOW

Date Received: 04/05/91

% 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	20.7	<del>B</del>		P
7440-36-0	Antimony	50.0	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	0.30	U		P
	Bismuth	50.0	<del>U</del> N		P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	35600			P
7440-47-3	Chromium	12.6			P
7440-48-4	Cobalt	5.0	U		P
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron	28.8	<del>B</del>		P
7439-95-4	Magnesium	10400			P
7439-96-5	Manganese	1.1	B		P
7440-02-0	Nickel	10.0	U		P
7440-09-7	Potassium	6190			P
7440-22-4	Silver	6.0	U		P
7440-23-5	Sodium	27200	<del>E</del>		P
	Strontium	217			P
	Tin	30.0	<del>U</del> *		P
7440-62-2	Vanadium	19.7	B		P
7440-66-6	Zinc	1.0	U		P

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J  
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8/15/91

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-030

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOF95

Lab Name: MARTIN\_MARIETTA\_K25\_SITE Contract: HANFORD

Lab Code: K25ACD Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): WATER Lab Sample ID: 910408-030

Level (low/med): LOW Date Received: 04/05/91

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	8.7	B		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.17	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	6.0	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

*Handwritten signature and date: 8/15/92*

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

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4-1-1  
INORGANIC ANALYSES DATA SHEET  
WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse  
Lab Name: Analytical Chemistry Department Contract: Hanford Company

Matrix (soil/water): WATER SDG#: BOOFH5

ACD Sample Customer  
ID Number: 910403-102 Sample ID: BOOFH5

Date Received: 10-May-1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	105	Mg/l	91-13	8-Apr-91
Ammonia	<0.20	Mg/l	91-09	10-Apr-91
Bromide	N/A			
Chemical O2 Demand	<5	Mg/l	91-18	8-Apr-91
Chloride IC	7	Mg/l	91-42IA	19-Apr-91
Conductivity	357 <i>J</i>	umho/cm	91-14	5-Apr-91
Dissolved Solids	242	Mg/l	91-23	8-Apr-91
Fluoride SIE	0.4	Mg/l	91-30	3-May-91
Nitrate	35	Mg/l	91-42IA	19-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	<1	Mg/l	91-42IA	19-Apr-91
Nitrite Nitrogen	N/A			
Ortho Phosphate	N/A			
Sulfate	37	Mg/l	91-42IA	19-Apr-91
Total Organic Carbon	<1	Mg/l	91-260	13-Apr-91
Total Organic Halides	15 <i>J</i>	Mg/l	91-21I	6-May-91
Turbidity	0.60 <i>J</i>	NTU	91-22	8-Apr-91
pH	8.1 <i>J</i>		91-39	8-Apr-91

*Met*  
5/15/92

Comments:

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4-1-2  
 INORGANIC ANALYSES DATA SHEET  
 WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse  
 Lab Name: Analytical Chemistry Department Contract: Hanford Company

Matrix (soil/water): Water SDG#: BOOFH5

ACD Sample Customer  
 ID Number: 910408-029 Sample ID: BOOF94

Date Received: 5-April-1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	99	Mg/l	91-14	9-Apr-91
Ammonia	<0.2	Mg/l	91-9	10-Apr-91
Bromide	N/A			
Chemical O2 Demand	<5	Mg/l	91-19	10-Apr-91
Chloride IC	5	Mg/l	91-45IA	19-Apr-91
Conductivity	430 <i>J</i>	umho/cm	91-14	9-Apr-91
Dissolved Solids	298	Mg/l	91-23	10-Apr-91
Fluoride SIE	0.9 <i>J</i>	Mg/gL	91-35	22-May-91
Nitrate	66 <i>J</i>	Mg/gL	91-45IA	10-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	<1 <i>UJ</i>	Mg/gL	91-45IA	19-Apr-91
Nitrite Nitrogen	N/A			
Ortho Phosphate	N/A			
Sulfate	31	Mg/gL	91-45IA	19-Apr-91
Total Organic Carbon	<1	mg/l	91-260	13-Apr-91
Total Organic Halides	<10 <i>UJ</i>	ug/l	91-21I	21-May-91
Turbidity	0.53 <i>J</i>	NTU	91-22	9-Apr-91
pH	8.1 <i>J</i>		91-40	9-Apr-91

*WWT*  
 8/15/92

Comments:

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9613475.0090

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: 200 BPI	REVIEWER: KMA	DATE:
LABORATORY: K-25	CASE: B00FH5	SDG: B00FH5
SAMPLES/MATRIX: B00FH5, FH0F94		

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		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Summary		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chain-of-Custody		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
QC Summary		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surrogate report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MS/MSD report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blank summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GC/MS tuning report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal standard summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIC reports for each sample		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC reports for all samples		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected spectra for all detected results		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected library search data for all reported TIC		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Quantitation and calculation data for all TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Standards Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Initial calibration report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for initial calibration		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuing calibration reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for cont. calibrations		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal standard summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw QC Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuning report, spectra and mass lists		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blank analysis reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIC reports for all blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected spectra for all detected results in blanks		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Raw and corrected library search data for all reported TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Data Package Item</u>	<u>Present?:</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Quantitation and calculation data for all TIC		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD report forms		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for MS/MSD		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Additional Data</b>				
Moisture/% solids data sheets		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reduction formulae		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Instrument time logs		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chemist notebook pages		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample preparation sheets		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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?

9/15/02  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 nondetects), otherwise reject all nondetects (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 bromofluorobenzene tune report present for each applicable 12-h 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 transcription 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 nondetects). 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  $\leq 30\%$  (2/88 SOW)?  Yes  No  N/A
- Are all RRF values  $\geq 0.05$  (2/88 SOW)?  Yes  No  N/A

Are all applicable RSD values $\leq 20.5\%$ (3/90 SOW)?	Yes	No	<u>N/A</u>
Are all applicable RSD values $\leq 40\%$ (3/90 SOW)?	Yes	No	<u>N/A</u>
Are all applicable RRF values within SOW limits (3/90 SOW)?	Yes	No	<u>N/A</u>
Are all erratic performance compound RRF values $\geq 0.01$ (3/90 SOW)?	Yes	No	<u>N/A</u>

**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 nondetects 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 nondetects).

### 3.3. CONTINUING CALIBRATION

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

**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 nondetects 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 nondetects).

## 4. BLANKS

### 4.1 LABORATORY BLANKS

Has the laboratory conducted a method blank analysis per matrix for every 12-h period in which samples were analyzed?	<u>Yes</u>	No	N/A
Are TCL compounds present in the laboratory blanks? <i>Chloro, 2-Hex, Acet, 2-Butanol, 1122 TLA</i>	<u>Yes</u>	No	N/A

**ACTION:** Qualify all sample results  $\leq 10$  times the highest blank concentration for the common laboratory contaminants, as nondetects (U) or at the SQL if the result is  $< CRQL$ . Qualify all remaining sample results  $\leq 5$  times 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  $\leq 5$  times the amount in any valid field blank as nondetects (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  $< 10\%$ ?

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 nondetects) for surrogates out of specification but  $> 10\%$ . Qualify all associated positive sample results as estimated (J) and all nondetect 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  $> 5$  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 note the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are  $> 5 \times \text{CRQL}$  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  $\pm 30$  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 nondetects). 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  $\pm 0.06$  relative retention time units of the associated calibration standard? Yes  No N/A

Are all ions at a relative intensity of  $\geq 10\%$  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 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). 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  $5 \times \text{CRQL}$  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 nondetects (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 nondetects (U) or unusable (R). If TIC identifications are judged valid, qualify the results as presumptive and estimated (JN).

9813175.0097

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 10.0 of the data validation requirements.



3A  
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>6</sup>SAS No.: NA

SDG No.: B00FH5

Matrix Spike - EPA Sample No.: B00FH5

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMIT REC.
1,1-Dichloroethene	50.00	0.00	36.00	72 ✓	161-14
Trichloroethene	50.00	0.00	31.00	61 * ✓	171-12
Benzene	50.00	0.00	40.00	80 ✓	176-12
Toluene	50.00	0.00	36.00	72 * ✓	176-12
Chlorobenzene	50.00	0.00	38.00	75 ✓	175-13

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD   REC.
1,1-Dichloroethene	50.00	33.00	65 ✓	10 ✓	14   161-14
Trichloroethene	50.00	28.00	55 * ✓	10 ✓	14   171-12
Benzene	50.00	38.00	76 ✓	5 ✓	11   176-12
Toluene	50.00	33.00	66 * ✓	8 ✓	13   176-12
Chlorobenzene	50.00	36.00	71 * ✓	5 ✓	13   175-13

*Met 8/15/08*

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

\* Values outside of qc limits

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

COMMENTS: \_\_\_\_\_

6A  
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No: G132-0016

AS No.: NA

SDG No: B00FH5

Instrument ID: 70 2 Calibration Date(s): 3/25/91 3/25/91

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min  $\overline{RRF}$  for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(\*) = 30.0

LAB FILE ID:	RRF20 =>08533	RRF50 =>08532					
IRRF100=>08534	RRF150=>08535	RRF200=>08536					
COMPOUND	IRRF20	IRRF50	IRRF100	IRRF150	IRRF200	$\overline{RRF}$	% RSD
Chloromethane_____#	.919	.888	.928	.900	.961	.919	3.1
Bromomethane_____	1.504	1.477	1.469	1.386	1.497	1.467	3.2
Vinyl_Chloride_____*	1.170	1.104	1.134	1.089	1.165	1.133	3.2
Chloroethane_____	.794	.784	.763	.757	.804	.781	2.5
Methylene_Chloride_____	1.642	1.598	1.626	1.566	1.507	1.588	3.4
Acetone_____	.162	.079	.125	.095	.101	.113	28.7
Carbon_Disulfide_____	2.960	2.973	2.660	2.512	2.692	2.760	7.3
1,1-Dichloroethene_____*	1.603	1.633	1.491	1.415	1.507	1.530	5.6
1,1-Dichloroethane_____#	2.963	2.878	2.965	2.883	3.160	2.970	3.8
1,2-Dichloroethene_(total)_	1.533	1.580	1.532	1.496	1.592	1.547	2.5
Chloroform_____*	3.448	3.404	3.365	3.273	3.556	3.409	3.1
1,2-Dichloroethane_____	1.648	1.611	1.675	1.612	1.763	1.662	3.6
2-Butanone_____	.092	.114	.058	.070	.059	.079	30.6
1,1,1-Trichloroethane_____	.628	.617	.652	.622	.636	.631	2.2
Carbon_Tetrachloride_____	.570	.571	.592	.561	.579	.574	2.0
Vinyl_Acetate_____	.092	.120	.136	.126	.129	.120	14.3
Bromodichloromethane_____	.749	.739	.809	.768	.784	.770	3.6
1,2-Dichloropropane_____*	.406	.412	.464	.413	.462	.431	6.7
cis-1,3-Dichloropropene_____	.587	.585	.631	.592	.592	.597	3.2
Trichloroethene_____	.509	.459	.461	.419	.433	.456	7.5
Dibromochloromethane_____	.615	.607	.658	.613	.625	.624	3.2
1,1,2-Trichloroethane_____	.357	.338	.372	.349	.359	.355	3.5
Benzene_____	.974	.924	1.016	.960	.984	.972	3.5
trans-1,3-Dichloropropene_____	.443	.462	.499	.470	.478	.470	4.4
Bromoform_____#	.402	.381	.419	.385	.411	.399	4.1
4-Methyl-2-pentanone_____	.272	.236	.253	.248	.256	.253	5.3
2-Hexanone_____	.142	.087	.148	.129	.139	.129	19.1
Tetrachloroethene_____	.465	.472	.438	.446	.430	.450	3.9
1,1,2,2-Tetrachloroethane_____	.521	.480	.565	.546	.586	.539	7.5
Toluene_____*	.790	.794	.772	.780	.774	.782	1.3
Chlorobenzene_____#	1.023	1.023	.989	1.008	1.020	1.012	1.4
Ethylbenzene_____*	.476	.472	.455	.459	.453	.463	2.3
Styrene_____	.788	.822	.784	.789	.810	.798	2.1
Xylene_(total)_____	.470	.474	.459	.463	.470	.467	1.3
Toluene-d8_____	1.204	1.122	1.116	1.203	1.165	1.162	3.6
Bromofluorobenzene_____	.689	.666	.628	.686	.693	.673	4.0
1,2-Dichloroethane-d4_____	1.457	1.325	1.368	1.433	1.496	1.416	4.9

Lab Name: MARTINMARIETTA Contract: \_\_\_\_\_Lab Code: \_\_\_\_\_ Case No.: G132-001C SAS No.: \_\_\_\_\_ SDG No.: BOOEHSInstrument ID: 5100 Calibration Date(s): 02/08/91 03/09/91Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(\*) = 30.0

LAB FILE ID:	RRF20 = <u>IC10308</u>	RRF50 = <u>IC20308</u>
RRF100 = <u>IC30308</u>	RRF150 = <u>IC40308</u>	RRF200 = <u>IC50308</u>

COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	RRF	% RSD
Chloromethane	3.076	3.177	3.012	2.926	3.010	3.040	3.1
Bromomethane	2.007	1.999	1.894	1.750	1.730	1.856	6.2
Vinyl Chloride	2.309	2.308	2.237	2.192	2.220	2.253	2.4
Chloroethane	1.099	1.098	1.075	0.996	0.983	1.050	5.4
Methylene Chloride	2.118	2.075	2.142	2.032	1.997	2.072	2.8
Acetone	4.823	1.245	2.018	0.789	0.727	1.820	51.9
Carbon Disulfide	3.268	0.522	3.426	3.385	3.240	3.370	3.5
1,1-Dichloroethene	1.530	1.462	1.482	1.398	1.330	1.440	5.4
1,1-Dichloroethane	3.975	4.156	4.429	4.346	4.411	4.263	4.6
1,2-Dichloroethene(Total)	1.569	1.603	1.657	1.588	1.570	1.597	2.3
Chloroform	3.641	3.684	3.843	3.714	3.695	3.715	2.1
1,2-Dichloroethane	3.214	3.151	3.300	3.166	3.145	3.195	2.0
2-Butanone	0.171	0.150	0.161	0.147	0.144	0.155	7.2
1,1,1-Trichloroethane	0.502	0.534	0.607	0.621	0.650	0.583	10.7
Carbon Tetrachloride	0.501	0.542	0.603	0.600	0.617	0.573	8.6
Vinyl Acetate	0.512	0.518	0.716	0.473	0.437	0.531	20.4
Bromodichloromethane	0.912	0.997	1.095	1.070	1.127	1.040	8.3
1,2-Dichloropropane	0.613	0.655	0.691	0.471	0.749	0.636	16.5
cis-1,3-Dichloropropene	0.525	0.630	0.749	0.753	0.804	0.692	16.4
Trans-1,3-Dichloropropene	0.377	0.439	0.547	0.580	0.641	0.517	20.7
Trichloroethene	0.347	0.338	0.372	0.356	0.358	0.354	3.6
Dibromochloromethane	0.749	0.818	0.920	0.907	0.928	0.864	9.0
1,1,2-Trichloroethane	0.463	0.467	0.516	0.498	0.511	0.491	5.0
Benzene	1.272	1.251	1.298	1.233	1.227	1.256	2.3
Bromoform	0.564	0.600	0.697	0.698	0.720	0.656	10.5
4-Methyl-2-Pentanone	0.347	0.362	0.423	0.419	0.442	0.399	10.4
2-Hexanone	0.675	0.622	0.763	0.591	0.532	0.637	13.8
Tetrachloroethene	0.482	0.441	0.470	0.435	0.418	0.449	5.8
1,1,2,2-Tetrachloroethane	0.716	0.672	0.747	0.737	0.757	0.726	4.6
Toluene	0.812	0.796	0.834	0.789	0.792	0.804	2.3
Chlorobenzene	1.011	0.971	1.034	0.975	0.967	0.992	3.0
Ethylbenzene	0.475	0.455	0.484	0.458	0.461	0.467	2.7
Styrene	0.317	0.803	0.872	0.825	0.817	0.827	3.2
Xylene (total)	0.485	0.480	0.516	0.486	0.481	0.490	3.1
Toluene-d8	1.023	1.033	1.072	1.016	1.010	1.031	2.4
Bromofluorobenzene	0.541	0.534	0.581	0.547	0.536	0.548	3.5
1,2-Dichloroethane-d4	2.442	2.433	2.559	2.460	2.415	2.462	2.3

7A  
VOLATILE CONTINUING CALIBRATION CHECK

*Assoc  
w/PROOFH5*

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>6</sup>SAS No.: NA

SDG No.: B00FH5

Instrument ID: 70 2 Calibration Date: 4/05/91 Time: 9:07

Lab File ID: &gt;08655 Init. Calib. Date(s): 3/25/91 3/25/91

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

Min RRF50 for SPCC(‡) = 0.300 (0.250 for Bromoform) Max %D for CCC(\*) = 25.0

COMPOUND	RRF	RRF50	%D
Chloromethane	.919	.826	10.2
Bromomethane	1.467	1.256	14.4
Vinyl Chloride	1.133	1.030	9.1
Chloroethane	.781	.756	3.2
Methylene_Chloride	1.588	1.420	10.6
Acetone	.113	.066	41.0
Carbon_Disulfide	2.760	2.023	26.7
1,1-Dichloroethene	1.530	1.418	7.3
1,1-Dichloroethane	2.970	2.783	6.3
1,2-Dichloroethene_(total)	1.547	1.344	13.1
Chloroform	3.409	3.057	10.3
1,2-Dichloroethane	1.662	1.567	5.7
2-Butanone	.079	.133	69.5
1,1,1-Trichloroethane	.631	.567	10.2
Carbon_Tetrachloride	.574	.508	11.6
Vinyl Acetate	.120	.097	19.1
Bromodichloromethane	.770	.663	13.9
1,2-Dichloropropane	.431	.400	7.2
cis-1,3-Dichloropropene	.597	.528	11.6
Trichloroethene	.456	.432	5.4
Dibromochloromethane	.624	.522	16.4
1,1,2-Trichloroethane	.355	.316	11.1
Benzene	.972	.840	13.5
trans-1,3-Dichloropropene	.470	.423	10.1
Bromoform	.399	.336	15.9
4-Methyl-2-pentanone	.253	.238	5.7
2-Hexanone	.129	.086	33.3
Tetrachloroethene	.450	.403	10.4
1,1,2,2-Tetrachloroethane	.539	.476	11.7
Toluene	.782	.732	6.4
Chlorobenzene	1.012	.943	6.8
Ethylbenzene	.463	.429	7.4
Styrene	.798	.741	7.2
Xylene_(total)	.467	.433	7.3
Toluene-d8	1.162	1.262	8.6
Bromofluorobenzene	.673	.710	5.5
1,2-Dichloroethane-d4	1.416	1.477	4.4

9613475.0103

7A

## VOLATILE CONTINUING CALIBRATION CHECK

91

Lab Name: MARTINMARIETTA Contract: 0288Lab Code: K-25 Case No.: G132-001 SAS No.: \_\_\_\_\_ SDG No.: BOOFH5Instrument ID: 5100 Calibration date: 04/10/91 Time: 0710Lab File ID: VTD0410 Init. Calib. Date(s): 03/08/91 03/08/91Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF50 for SPCC(#) = 0.300 (0.250 for Bromoform) Max %D for CCC(\*) = 25.0

COMPOUND	RRF	RRF50	%D
Chloromethane	# 3.040	2.822	7.2 #
Bromomethane	1.856	1.756	5.4
Vinyl Chloride	* 2.253	2.083	7.5 *
Chloroethane	1.050	1.130	-7.6
Methylene Chloride	2.072	1.891	8.7
Acetone	1.820	1.189	34.7
Carbon Disulfide	3.370	3.885	-15.3
1,1-Dichloroethene	* 1.440	1.425	1.0 *
1,1-Dichloroethane	# 4.263	4.034	5.4 #
1,2-Dichloroethene(Total)	1.597	1.452	9.1
Chloroform	* 3.715	3.498	5.8 *
1,2-Dichloroethane	3.195	2.356	26.3
2-Butanone	0.155	0.179	-15.5
1,1,1-Trichloroethane	0.583	0.439	24.7
Carbon Tetrachloride	0.573	0.384	33.0
Vinyl Acetate	0.531	0.680	28.1
Bromodichloromethane	1.040	0.714	31.4
1,2-Dichloropropane	* 0.636	0.538	15.4 *
cis-1,3-Dichloropropene	0.692	0.589	14.9
Trans-1,3-Dichloropropene	0.517	0.336	35.0
Trichloroethene	0.354	0.397	-12.2
Dibromochloromethane	0.864	0.526	39.1
1,1,2-Trichloroethane	0.491	0.348	29.1
Benzene	1.256	1.151	8.4
Bromoform	# 0.656	0.330	49.7 #
4-Methyl-2-Pentanone	0.399	0.190	52.4
2-Hexanone	0.637	0.490	23.1
Tetrachloroethene	0.449	0.380	15.4
1,1,2,2-Tetrachloroethane	# 0.726	0.570	21.5 #
Toluene	* 0.804	0.776	3.5 *
Chlorobenzene	# 0.992	0.919	7.4 #
Ethylbenzene	* 0.467	0.430	7.9 *
Styrene	0.827	0.889	-7.5
Xylene (total)	0.490	0.536	-9.4
Toluene-d8	1.031	1.154	-11.9
Bromofluorobenzene	0.548	0.538	1.8
1,2-Dichloroethane-d4	2.462	2.112	14.2

Assoc.  
w/ BOOFH5

J/MS

9613475.0104

0100  
EPA SAMPLE NO

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

VBLK02 **116**

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: G132-001 SAS No.: \_\_\_\_\_ SDG No.: BOOEH5

Matrix: (soil/water) WATER Lab Sample ID: 910410-052

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VBK0410

Level: (low/med) LOW Date Received: \_\_\_\_\_

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 04/10/91

Column: (pack/cap) CAP Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/L</u>	Q
74-87-3	-----Chloromethane	1	J $\times 5 = 5$
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	5	U
67-64-1	-----Acetone	18	$\times 10 = 180$
75-15-0	-----Carbon Disulfide	5	U
75-35-4	-----1,1-Dichloroethene	5	U
75-34-3	-----1,1-Dichloroethane	5	U
540-59-0	-----1,2-Dichloroethene(Total)	5	U
67-66-3	-----Chloroform	5	U
107-06-2	-----1,2-Dichloroethane	5	U
78-93-3	-----2-Butanone	3	J
71-55-6	-----1,1,1-Trichloroethane	5	U
56-23-5	-----Carbon Tetrachloride	5	U
108-05-4	-----Vinyl Acetate	10	U
75-27-4	-----Bromodichloromethane	5	U
78-87-5	-----1,2-Dichloropropane	5	U
10061-01-5	-----cis-1,3-Dichloropropene	5	U
10061-02-6	-----Trans-1,3-Dichloropropene	5	U
79-01-6	-----Trichloroethene	5	U
124-48-1	-----Dibromochloromethane	5	U
79-00-5	-----1,1,2-Trichloroethane	5	U
71-43-2	-----Benzene	5	U
75-25-2	-----Bromoform	5	U
108-10-1	-----4-Methyl-2-Pentanone	10	U
591-78-6	-----2-Hexanone	3	J $\times 5 = 15$
127-18-4	-----Tetrachloroethene	5	U
79-34-5	-----1,1,2,2-Tetrachloroethane	1	J $\times 5 = 5$
108-88-3	-----Toluene	5	U
108-90-7	-----Chlorobenzene	5	U
100-41-4	-----Ethylbenzene	5	U
100-42-5	-----Styrene	5	U
1330-20-7	-----Xylene (total)	5	U

RA

BK 910410-052

FORM I VOA

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8/15/91

1/87 Rev

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

PROJECT: 200 BP1	REVIEWER: KMA	DATE: 8/15/97
LABORATORY: K25	CASE: _____	SDG: BOOFH5
SAMPLES/MATRIX:		
BOOFH5 / F94 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		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Summary		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chain-of-Custody		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
QC Summary		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surrogate report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MS/MSD report		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Blank summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GC/MS tuning report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal standard summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIC reports for each sample		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC reports for all samples		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected spectra for all detected results		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected library search data for all reported TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Quantitation and calculation data for all TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Standards Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Initial calibration report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for initial calibration		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuing calibration reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for cont. calibrations		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal standard summary report		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw QC Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuning report, spectra and mass lists		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blank analysis reports		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIC reports for all blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RIC and quantitation reports for blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected spectra for all detected results in blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw and corrected library search data for all reported TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Quantitation and calculation data for all TIC		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD report forms		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<u>Data Package Item</u>	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 nondetects), otherwise reject all nondetects (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 transcription 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 nondetects). 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  $\leq 30\%$  (2/88 SOW)?

Yes  No  N/A

Are all RRF values  $\geq 0.05$  (2/88 SOW)?

Yes  No  N/A

Are all applicable RSD values  $\leq 20.5\%$  (3/90 SOW)?

Yes  No  N/A

Are all applicable RSD values  $\leq 40\%$  (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  $\geq 0.01$  (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 nondetects 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 nondetects).

### 3.3. CONTINUING CALIBRATION

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

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

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

Are all %D values  $\leq 40\%$  (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  $\geq 0.01$  (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 nondetects 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 nondetects).

## 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  $< 10$  times the highest blank concentration for the common laboratory contaminants, as nondetects (U) or at the SQL if the result is  $< CRQL$ . Qualify all remaining sample results  $< 5$  times 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  $\leq 5$  times the amount in any valid field blank as nondetects (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  $< 10\%$ ?

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 nondetects) 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 nondetect 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  $> 5$  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 note the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are  $> 5 \times \text{CRQL}$  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  $\pm 30$  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 nondetects). 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  $\pm 0.06$  relative retention time units of the associated calibration standard?

Yes No N/A

Are all ions at a relative intensity of  $\geq 10\%$  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  $5 \times \text{CRQL}$  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 nondetects (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 nondetects (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 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

No MS/MSD performed because  
insufficient sample supplied.

ML  
8/15/02



7B  
SEMIVOLATILE CONTINUING CALIBRATION CHECK

*Assoc  
w/ RRFHS*

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-031 SAS No.: NA

SDG No.: ~~HA~~ <sup>See FH5</sup>

Instrument ID: 70 #3

Calibration Date: 4/11/91

Time: 8:14

CM  
4/2

Lab File ID: &gt;11277

Init. Calib. Date(s): 03/25/91 03/25/91

Min RRF50 for SPCC(#) = 0.050

Max %D for CCC(\*) = 25.

COMPOUND	RRF	RRF50	%D
Phenol	1.999	2.108	5.4
bis(2-Chloroethyl)ether	1.752	2.088	19.2
2-Chlorophenol	1.494	1.636	9.5
1,3-Dichlorobenzene	1.374	1.537	11.9
1,4-Dichlorobenzene	1.231	1.366	11.0
Benzyl_alcohol	.907	.928	2.2
1,2-Dichlorobenzene	1.190	1.313	10.3
2-Methylphenol	1.310	1.550	18.3
bis(2-chloroisopropyl)ether	2.902	3.231	11.3
4-Methylphenol	1.246	1.208	3.0
N-Nitroso-di-n-propylamine	1.464	1.380	5.7
Hexachloroethane	.577	.578	.0
Nitrobenzene	.505	.517	2.3
Isophorone	1.092	1.128	3.4
2-Nitrophenol	.247	.258	4.4
2,4-Dimethylphenol	.452	.448	.8
Benzoic_acid	.226	.239	5.5
bis(2-Chloroethoxy)methane	.671	.710	5.8
2,4-Dichlorophenol	.332	.320	3.8
1,2,4-Trichlorobenzene	.323	.343	6.1
Naphthalene	.940	1.016	8.2
4-Chloroaniline	.517	.564	9.2
Hexachlorobutadiene	.166	.175	5.3
4-Chloro-3-methylphenol	.420	.427	1.6
2-Methylnaphthalene	.595	.608	2.1
Hexachlorocyclopentadiene	.304	.289	5.1
2,4,6-Trichlorophenol	.506	.425	16.1
2,4,5-Trichlorophenol	.339	.443	30.6
2-Chloronaphthalene	1.174	1.228	4.6
2-Nitroaniline	.651	.711	9.2
Dimethylphthalate	1.316	1.510	14.8
Acenaphthylene	1.609	1.842	14.5
2,6-Dinitrotoluene	.363	.355	2.2
3-Nitroaniline	.382	.296	22.5
Acenaphthene	1.111	1.148	3.3
2,4-Dinitrophenol	.252	.184	27.2
4-Nitrophenol	.164	.170	3.5

*J/UT  
Ref  
8/15/92*

6B  
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

*Assoc  
w/BOOFH5*

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No: G132-001C SAS No.: NA

SDG No: BOOFH5

Instrument ID: 70 #3 Calibration Date(s): 04/15/91 04/15/91

Min  $\overline{RRF}$  for SPCC(#) = 0.050

Max %RSD for CCC(\*) = 30.

LAB FILE ID:	RRF20 =>11306	RRF50 =>11305	RRF80 =>11307	RRF120=>11308	RRF160=>11309		
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
Phenol	2.659	1.796	1.813	1.786	1.700	1.951	20.
bis(2-Chloroethyl)ether	2.642	1.959	1.643	1.263	1.165	1.734	34.
2-Chlorophenol	2.153	1.651	1.517	1.630	1.442	1.679	16.
1,3-Dichlorobenzene	1.907	1.496	1.319	1.338	1.308	1.474	17.
1,4-Dichlorobenzene	1.714	1.402	1.124	1.057	1.047	1.269	22.
Benzyl_alcohol	1.075	.770	.871	.982	.836	.907	13.
1,2-Dichlorobenzene	1.760	1.339	1.220	1.204	1.135	1.332	18.
2-Methylphenol	2.166	1.516	1.413	1.595	1.608	1.659	17.
bis(2-chloroisopropyl)ether	3.849	2.760	2.783	3.040	2.995	3.085	14.
4-Methylphenol	1.779	1.181	1.332	1.471	1.640	1.480	16.
N-Nitroso-di-n-propylamine	1.876	1.325	1.727	1.924	1.738	1.718	13.
Hexachloroethane	.722	.555	.561	.589	.527	.591	13.
Nitrobenzene	.654	.525	.524	.596	.790	.618	17.
Isophorone	1.394	1.094	1.183	1.297	1.335	1.261	9.
2-Nitrophenol	.337	.266	.280	.289	.296	.294	9.
2,4-Dimethylphenol	.583	.461	.488	.538	.532	.520	9.
Benzoic_acid	0.000	.259	.257	.300	.308	.281	9.
bis(2-Chloroethoxy)methane	.878	.663	.726	.810	.824	.780	10.
2,4-Dichlorophenol	.425	.336	.325	.336	.326	.350	12.
1,2,4-Trichlorobenzene	.424	.341	.313	.324	.286	.338	15.
Naphthalene	1.151	1.029	.886	.885	.876	.965	12.
4-Chloroaniline	.697	.559	.548	.602	.600	.601	9.
Hexachlorobutadiene	.207	.166	.155	.154	.139	.164	15.
4-Chloro-3-methylphenol	.564	.440	.461	.501	.499	.493	9.
2-Methylnaphthalene	.773	.596	.958	.997	.594	.783	24.
Hexachlorocyclopentadiene	.360	.280	.281	.297	.257	.295	13.
2,4,6-Trichlorophenol	.535	.420	.430	.526	.482	.479	11.
2,4,5-Trichlorophenol	0.000	.485	.390	.328	.266	.367	25.
2-Chloronaphthalene	1.621	1.276	1.115	1.102	.967	1.216	20.
2-Nitroaniline	0.000	.688	.712	.786	.773	.740	6.
Dimethylphthalate	1.477	1.551	1.254	1.243	1.014	1.308	16.
Acenaphthylene	2.434	1.936	1.495	1.437	1.135	1.687	30.
2,6-Dinitrotoluene	.453	.377	.321	.356	.319	.365	15.
3-Nitroaniline	0.000	.316	.344	.425	.182	.317	31.
Acenaphthene	1.412	1.190	1.023	.943	.802	1.074	21.
2,4-Dinitrophenol	0.000	.226	.266	.302	.289	.271	12.
4-Nitrophenol	0.000	.203	.211	.239	.231	.221	7.

*not 8/15/92*

6C  
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

*APR 15/92*

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001C SAS No.: NA

SDG No.: B00FH5

Instrument ID: 70 #3 Calibration Date(s): 04/15/91 04/15/91

Min RRF for SPCC(%) = 0.050

Max %RSD for CCC(\*) = 30.1

LAB FILE ID:	RRF20 =>11306	RRF50 =>11305	RRF80 =>11307	RRF120=>11308	RRF160=>11309	RRF	% RSD
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	2.129	1.721	1.480	1.561	1.287	1.636	19.
2,4-Dinitrotoluene	.753	.597	.571	.616	.562	.620	12.
Diethylphthalate	1.877	1.402	1.002	.874	.687	1.168	40.
4-Chlorophenyl-phenylether	.712	.564	.360	.296	.196	.425	49.
Fluorene	1.372	1.109	.790	.778	.659	.942	31.
4-Nitroaniline	0.000	.402	.422	.526	.426	.444	12.
4,6-Dinitro-2-methylphenol	0.000	.150	.138	.107	.081	.119	26.
N-Nitrosodiphenylamine_(1)*	.667	.528	.440	.405	.384	.484	23.
4-Bromophenyl-phenylether	.260	.206	.183	.183	.177	.202	17.
Hexachlorobenzene	.330	.265	.237	.230	.206	.254	18.
Pentachlorophenol*	0.000	.199	.168	.182	.154	.176	11.
Phenanthrene	1.073	1.033	.925	.977	.824	.967	10.
Anthracene	1.174	.974	.730	.667	.629	.835	27.
Di-n-butylphthalate	2.066	1.597	1.421	1.358	1.320	1.553	19.
Fluoranthene*	1.392	1.098	.969	.978	.945	1.076	17.
Pyrene	2.125	1.649	1.676	1.984	2.394	1.966	16.
Butylbenzylphthalate	1.508	1.179	1.183	1.458	1.807	1.427	18.
3,3'-Dichlorobenzidine	.314	.224	.232	.272	.270	.262	13.
Benzo(a)anthracene	1.679	1.334	1.258	1.514	1.713	1.500	13.
Chrysene	1.330	1.142	1.039	1.189	1.274	1.195	9.
bis(2-Ethylhexyl)phthalate	1.980	1.572	1.559	1.701	1.849	1.732	10.
Di-n-octylphthalate*	2.759	2.516	1.844	1.775	1.749	2.128	22.
Benzo(b)fluoranthene	1.664	1.510	1.440	1.298	1.065	1.396	16.
Benzo(k)fluoranthene	.893	.778	.584	.824	.672	.750	16.
Benzo(a)pyrene*	1.262	1.106	.951	.967	.941	1.045	13.
Indeno(1,2,3-cd)pyrene	.997	.907	.876	.923	.908	.922	4.
Dibenz(a,h)anthracene	.546	.494	.476	.498	.499	.503	5.
Benzo(g,h,i)perylene	.868	.796	.774	.842	.829	.822	4.
Nitrobenzene-d5	.768	.595	.635	.673	.624	.659	10.
2-Fluorobiphenyl	1.711	1.335	1.066	1.015	.813	1.188	29.
Terphenyl-d14	1.285	1.019	.984	1.166	1.184	1.128	11.
Phenol-d6	2.994	2.208	1.888	1.896	1.787	2.155	23.
2-Fluorophenol	1.872	1.558	1.396	1.504	1.753	1.617	11.
2,4,6-Tribromophenol	.198	.159	.131	.132	.124	.149	20.

(1) Cannot be separated from Diphenylamine

*APR 15/92*

*Amor*  
*w/BOOF94*

7B  
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>C</sup>SAS No.: NA

SDG No.: ~~HA~~ **BOOFH5**

Instrument ID: 70 #3

Calibration Date: 4/15/91

Time: 6:31

*on*  
*4/23*

Lab File ID: >11305

Init. Calib. Date(s): 04/15/91 04/15/91

Min RRF50 for SPCC(#) = 0.050

Max %D for CCC(\*) = 25.0%

COMPOUND	RRF	RRF50	%D
Phenol	1.951	1.796	7.9*
bis(2-Chloroethyl)ether	1.734	1.959	13.0
2-Chlorophenol	1.679	1.651	1.7
1,3-Dichlorobenzene	1.474	1.496	1.5
1,4-Dichlorobenzene	1.269	1.402	10.5*
Benzyl_alcohol	.907	.770	15.1
1,2-Dichlorobenzene	1.332	1.339	.6
2-Methylphenol	1.659	1.516	8.7
bis(2-chloroisopropyl)ether	3.085	2.760	10.5
4-Methylphenol	1.480	1.181	20.3
N-Nitroso-di-n-propylamine_#	1.718	1.325	22.9 #
Hexachloroethane	.591	.555	6.0
Nitrobenzene	.618	.525	15.0
Isophorone	1.261	1.094	13.2
2-Nitrophenol	.294	.266	9.4*
2,4-Dimethylphenol	.520	.461	11.4
Benzoic_acid	.281	.259	7.7
bis(2-Chloroethoxy)methane	.780	.663	15.0
2,4-Dichlorophenol	.350	.335	4.0*
1,2,4-Trichlorobenzene	.338	.341	1.0
Naphthalene	.965	1.029	6.6
4-Chloroaniline	.601	.559	7.0
Hexachlorobutadiene	.164	.166	1.2*
4-Chloro-3-methylphenol	.493	.440	10.8*
2-Methylnaphthalene	.783	.596	24.0
Hexachlorocyclopentadiene_#	.295	.280	5.1 #
2,4,6-Trichlorophenol	.479	.420	12.3*
2,4,5-Trichlorophenol	.367	.485	32.0
2-Chloronaphthalene	1.216	1.276	4.9
2-Nitroaniline	.740	.688	7.0
Dimethylphthalate	1.308	1.551	18.6
Acenaphthylene	1.687	1.936	14.7
2,6-Dinitrotoluene	.365	.377	3.3
3-Nitroaniline	.317	.316	.2
Acenaphthene	1.074	1.190	10.8*
2,4-Dinitrophenol	.271	.226	16.6 #
4-Nitrophenol	.221	.203	8.3 #

*5/45*

*MSR*  
*8/15/92*

*Good  
w/COF94*

7C

## SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001<sup>C</sup>SAS No.: NASDG No.: ~~NA~~ 800FH5

Instrument ID: 70 #3

Calibration Date: 4/15/91

Time: 6:31

5  
4/23

Lab File ID: &gt;11305

Init. Calib. Date(s): 04/15/91 04/15/91

Min RRF50 for SPCC(#) = 0.050

Max %D for CCC(\*) = 25.0%

COMPOUND	RRF	RRF50	%D
Dibenzofuran	1.636	1.721	5.2
2,4-Dinitrotoluene	.620	.597	3.7
Diethylphthalate	1.168	1.402	20.0
4-Chlorophenyl-phenylether	.425	.564	32.5
Fluorene	.942	1.109	17.8
4-Nitroaniline	.444	.402	9.5
4,6-Dinitro-2-methylphenol	.119	.151	26.4
N-Nitrosodiphenylamine (1)*	.484	.527	8.9*
4-Bromophenyl-phenylether	.202	.206	2.2
Hexachlorobenzene	.254	.265	4.6
Pentachlorophenol*	.176	.199	13.1*
Phenanthrene	.967	1.033	6.9
Anthracene	.835	.974	16.7
Di-n-butylphthalate	1.553	1.597	2.9
Fluoranthene*	1.076	1.098	2.0*
Pyrene	1.966	1.649	16.1
Butylbenzylphthalate	1.427	1.179	17.4
3,3'-Dichlorobenzidine	.262	.223	14.8
Benzo(a)anthracene	1.500	1.334	11.1
Chrysene	1.195	1.142	4.4
bis(2-Ethylhexyl)phthalate	1.732	1.572	9.2
Di-n-octylphthalate*	2.128	2.516	18.2*
Benzo(b)fluoranthene	1.396	1.510	8.2
Benzo(k)fluoranthene	.750	.778	3.7
Benzo(a)pyrene*	1.045	1.106	5.8*
Indeno(1,2,3-cd)pyrene	.922	.907	1.6
Dibenz(a,h)anthracene	.503	.495	1.6
Benzo(g,h,i)perylene	.822	.796	3.1
Nitrobenzene-d5	.659	.595	9.7
2-Fluorobiphenyl	1.188	1.335	12.4
Terphenyl-d14	1.128	1.019	9.7
Phenol-d6	2.155	2.208	2.5
2-Fluorophenol	1.617	1.558	3.6
2,4,6-Tribromophenol	.149	.159	7.0

*J/US  
J/US**Used  
8/15/92*

(1) Cannot be separated from Diphenylamine

PESTICIDE/PCB DATA VALIDATION CHECKLIST - FORM A-3

PROJECT: 200-BP-1	REVIEWER: <i>[Signature]</i>	DATE: 8/15/97
LABORATORY: K25	CASE: _____	SDG: SCDFHS
SAMPLES/MATRIX:		
1300 FHS / F94		

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 resubmittal.

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



**ACTION:** If the endrin breakdown exceeds 20%, qualify all detected results for endrin as estimated (J) and all nondetects 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 occurring 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  $\leq 10\%$ ?

Yes  No  N/A

Have all standards been analyzed within 72 h 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 72-h sequence?

Yes  No  N/A

Have evaluation standards A, B, and C been analyzed within 72 h of any sample?

Yes  No  N/A

Has the confirmation standard mix been analyzed after every five 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  $\leq 15\%$  for quantitation standards and  $\leq 20\%$  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 72-h 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  $\leq 20.0\%$  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 ( $\pm 0.04$ ,  $\pm 0.05$  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 noncompliant 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 noncompliant standard within two times the retention time windows ( $\pm 0.04$ ,  $\pm 0.05$  for methoxychlor), no qualification is necessary. If peaks are present in samples within the expanded windows rejected associated positive and nondetect results (R).

Are RPDs between the calculated and true amounts in the PEMs, INDA and INDB mixes  $\leq 25.0\%$ ?

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  $\leq 20.0\%$  ( $\leq 30.0\%$  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 nondetects (U) that are  $< 5$  times 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  $< 5$  times the highest valid field blank concentrations as nondetects (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 nondetects 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 nondetects) for surrogates out of specification. If the surrogate was not detected (0% recovery) in the sample qualify associated nondetects 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 > 5 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  $> 5 \times \text{CRQL}$  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 dissimilar 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 nondetects 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 nondetected (UJ). If positive results were not confirmed on dissimilar 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 5xCRQL 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 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary): \_\_\_\_\_

*no MSD not performed due  
to insufficient sample supplied*

*Kim  
8/15/02*



INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200BP1	REVIEWER: KWT	DATE: 8/15/02
LABORATORY: K25	CASE: —	SDG: B00FH5
SAMPLES/MATRIX:		
B00FH5/6 B00F94/5		
waters		

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		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cover Page		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Reports <i>Chain of Custody</i>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inorganic Analysis Data Sheets		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standards Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Initial and Continuing Calibration Verification		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDL Standard for AA and ICP		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
QC Summary		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanks		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICP Interference Check Summary		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spike Sample Recovery		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post-Digestion Spike Sample Recovery		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duplicate		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory Control Sample		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard Addition Results		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICP Serial Dilutions		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instrument Detection Limits		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICP Interelement Correction Factors		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICP Linear Ranges		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparation Log		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analysis Run Log		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICP Raw Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Furnace AA Raw Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mercury Raw Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyanide Raw Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional Data		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal laboratory chain-of-custody		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory Sample Preparation Records		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Data Package Item</u>	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  $\geq 0.995$ ?  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 > 75% 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  $\geq 0.995$ ?

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 nondetects). If the analytical spike recovery is  $< 40\%$  qualify detects as estimated (J). If the analytical spike recovery is  $\geq 10\%$  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 correlation 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.

*Mut*  
8/15/02



HOLDING TIME SUMMARY - FORM B-1

SDG: 1308FHS		REVIEWER: <i>[Signature]</i>		DATE: 8/15/92		PAGE 1 OF 1		
COMMENTS: <i>Metals</i>								
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER	
1308FHS/6	ICP	3/27/91	/	7/14/91	/	111	none	
	Lead			6/14/91		79		
	Arsenic			6/18/91		83		
	Selenium			6/19/91		84		
	Thallium			6/20/91		85		
	Mercury			4/23/91		27		✓
	Cyanide			5/4/91		38		R
1308F94/5	ICP		4/3/91	/	7/16/91	/		104
	Lead		6/14/91		72			
	Arsenic		6/18/91		76			
	Selenium		6/19/91		77			
	Thallium		6/20/91		78			
	Mercury		4/23/91		20			✓
	Cyanide		5/4/91		31			R

B-1

WHC-SD-EN-SPP-002, Rev. 1

9613475.0135

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B00FH5		REVIEWER: <i>RMA</i>			DATE: <i>8/15/92</i>			PAGE <i>1</i> OF <i>1</i>	
COMMENTS: <i>Blowes</i>									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
	<i>Aluminium</i>	<i>35.3</i>			<i>ug/L</i>	<i>176.5</i>		<i>B00FH5</i>	<i>U</i>
					<i>/</i>	<i>/</i>		<i>B00FH6</i>	<i>U</i>
					<i>/</i>	<i>/</i>		<i>B00FH4</i>	<i>U</i>
					<i>/</i>	<i>/</i>		<i>B00F95</i>	<i>U</i>
	<i>IRON</i>	<i>17.9</i>			<i>ug/L</i>	<i>89.5</i>		<i>B00FH6</i>	<i>U</i>
					<i>/</i>	<i>/</i>		<i>B00F95</i>	<i>U</i>
	<i>Magnesium</i>	<i>23.2</i>			<i>ug/L</i>	<i>116</i>		<i>None</i>	<i>—</i>
	<i>Sodium</i>	<i>112.9</i>			<i>"</i>	<i>564.5</i>		<i>None</i>	<i>—</i>

9613475.0136

5A  
SPIKE SAMPLE RECOVERY

SAMPLE NO.

BOOFH5S

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER  
& Solids for Sample: 0.0

Level (low/med): LOW

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	1987.1000	33.2000	B 2000.00	97.7	/	P
Antimony	75-125	488.1000	50.0000	U 500.00	97.6	/	P
Barium	75-125	2006.2000	29.0000	B 2000.00	98.9	/	P
Beryllium	75-125	50.2000	0.3000	U 50.00	100.4	/	P
Bismuth	75-125	199.3000	50.0000	U 2000.00	10.0	N	P
Cadmium	75-125	49.9000	3.0000	U 50.00	99.8	/	P
Calcium							NR
Chromium	75-125	207.3000	10.0000	U 200.00	103.6	/	P
Cobalt	75-125	477.6000	5.0000	U 500.00	95.5	/	P
Copper	75-125	240.7000	4.0000	U 250.00	96.3	/	P
Iron	75-125	1161.6000	137.8000		102.4	/	P
Magnesium							NR
Manganese	75-125	506.5000	6.6000	B 500.00	100.0	/	P
Nickel	75-125	496.7000	10.0000	U 500.00	99.3	/	P
Potassium							NR
Silver	75-125	47.9000	6.0000	U 50.00	95.8	/	P
Sodium							NR
Strontium	75-125	2323.8000	184.7000		107.0	/	P
Tin	75-125	2184.2000	37.8000		107.3	/	P
Vanadium	75-125	521.3000	15.6000	B 500.00	101.1	/	P
Zinc	75-125	493.0000	7.3000	B 500.00	97.1	/	P

*Bi Reported  
Gust 8/15/02*

Comments:

## ENVIROFORMS/CLP 788

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7

## LABORATORY CONTROL SAMPLE

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Solid LCS Source: UNLV-QAL

Aqueous LCS Source: SPEX

Analyte	Aqueous (ug/L)			Solid (mg/kg)					%R
	True	Found	%R	True	Found	C	Limits	%R	
Aluminum	1000.0	1018.20	101.8	325.0	423.8	-	225.0	424.0	130.
Antimony	1000.0	985.90	98.6	211.0	214.9	-	127.0	294.0	101.
Barium	1000.0	992.50	99.2	4.8	6.7	B	0.0	40.0	139.
Beryllium	1000.0	1022.50	102.2	19.4	19.9	-	16.5	22.3	102.
Bismuth	200.0	199.50	99.8	400.0	63.6	-			15.
Cadmium	1000.0	990.00	99.0	45.4	49.3	-	35.7	55.1	108.
Calcium	1000.0	1020.40	102.0	196200.0	217895.9	-	166800.0	225600.0	111.
Chromium	1000.0	1010.30	101.0	99.6	114.9	-	79.2	120.0	115.
Cobalt	1000.0	988.80	98.9	144.0	158.9	-	125.0	162.0	110.
Copper	1000.0	973.40	97.3	6910.0	7025.8	-	6006.0	7820.0	101.
Iron	1000.0	1034.90	103.5	22430.0	23158.3	-	17770.0	27080.0	103.
Magnesium	1000.0	1004.40	100.4	118100.0	115566.3	-	100400.0	129900.0	97.
Manganese	1000.0	1011.20	101.1	208.0	227.7	-	177.0	239.0	109.
Nickel	1000.0	1014.00	101.4	60.9	73.9	-	49.2	72.6	121.
Potassium	10000.0	9232.90	92.3	50.0	619.2	B	0.0	1000.0	****
Silver	1000.0	982.20	98.2	22.2	26.7	-	15.5	29.0	120.
Sodium	1000.0	977.30	97.7	50.0	199.6	B	0.0	1000.0	399.
Strontium	2000.0	2050.70	102.5			-			
Tin	2000.0	23.50	1.2	400.0	117.2	-			29.
Vanadium	1000.0	1006.70	100.7	65.8	73.1	-	51.7	79.9	111.
Zinc	1000.0	977.30	97.7	187.0	206.5	-	138.0	236.0	110.

*Tin Rejected  
not  
2/15/88*

9  
ICP SERIAL DILUTIONS

SAMPLE NO.

BOOFH6L

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	24.90	B	100.00	U	100.0		P
Antimony	50.00	U	250.00	U			P
Barium	28.90	B	31.50	B	9.0		P
Beryllium	0.30	U	1.50	U			P
Bismuth	50.00	U	250.00	U			P
Cadmium	3.00	U	17.50	B			P
Calcium	37132.00		38148.50		2.7		P
Chromium	10.00	U	50.00	U			P
Cobalt	5.00	U	25.00	U			P
Copper	4.00	U	99.00	B			P
Iron	28.70	B	32.50	B	13.2		P
Magnesium	11353.10		11922.00	B	5.0		P
Manganese	3.80	B	5.50	B	44.7		P
Nickel	10.00	U	50.00	U			P
Potassium	4881.20	B	6434.00	B	31.8		P
Silver	6.00	U	30.00	U			P
Sodium	16035.60		19161.00	B	19.5	E	P
Strontium	186.40		193.00		3.5		P
Tin	30.00	U	150.00	U			P
Vanadium	13.90	B	25.00	U	100.0		P
Zinc	1.30	B	33.50	B	****		P

*J/MS*

*W/MS 8/15/92  
Sodium estimated*

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: MARTIN\_MARIETTA\_K25\_SITE\_

Contract: HANFORD\_

Lab Code: K25ACD Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: BOOFH5

Instrument ID Number: PE\_5100\_\_\_\_\_

Method: F\_

Start Date: 06/19/91

End Date: 06/19/91

EPA Sample No.	D/F	Time	% R	Analytes																											
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K	S E	A G	N A	T L	V	Z N	C N				
S0	1.00	1347																			X										
S5	1.00	1353																			X										
S100	1.00	1359																			X										
S200	1.00	1405																			X										
ZZZZZZ	1.00	1411																													
ICV	1.00	1417																			X										
TCB	1.00	1423																			X										
LA	1.00	1430																			X										
PBW	1.00	1436																			X										
PBWA	1.00	1443	86.0																		X										
LCSW	1.00	1449																			X										
LCSWA	1.00	1456	91.0																		X										
BOOFH5	1.00	1502																			X										
BOOFH5A	1.00	1509	107.0																		X										
BOOFH5D	1.00	1515																			X										
BOOFH5DA	1.00	1522	98.0																		X										
BOOFH6	1.00	1529																			X										
CCV1	1.00	1535																			X										
CCB1	1.00	1541																			X										
CCB1A BOOFH6A	1.00	1548	94.0																		X										
BOOFH6S	1.00	1554	78.0																		X										
BOOF94	1.00	1601																			X										
BOOF94A	1.00	1607	78.0																		X										
ZZZZZZ	1.00	1614																													
BOOF95	1.00	1620																			X										
BOOF95A	1.00	1627	97.0																		X										
CCV2	1.00	1633																			X										
CCB2	1.00	1639																			X										
ZZZZZZ	1.00	1645																													

off  
 Mark 8/15/92

U.S. EPA - CLP

14  
ANALYSIS RUN LOG

Lab Name: MARTIN\_MARIETTA\_K25\_SITE\_

Contract: HANFORD\_

Lab Code: K25ACD Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: BOOFH5

Instrument ID Number: PE\_5100\_

Method: F\_

Start Date: 06/20/91

End Date: 06/20/91

EPA Sample No.	D/F	Time	% R	Analytes																							
				A	S	A	B	B	C	C	C	C	F	P	M	M	H	N	K	S	A	N	T	V	Z	C	
				L	B	S	A	E	D	A	R	O	U	E	B	G	N	G	I		E	G	A	L		N	N
S0	1.00	1038																						X			
S10	1.00	1044																						X			
S100	1.00	1050																						X			
S200	1.00	1056																						X			
ZZZZZZ	1.00	1100																									
ICV	1.00	1108																						X			
TCB	1.00	1114																						X			
RA	1.00	1120																						X			
CRAA	1.00	1126	92.5																					X			
PBW	1.00	1132																						X			
PBWA	1.00	1139	99.5																					X			
LCSW	1.00	1145																						X			
LCSWA	1.00	1151	95.5																					X			
BOOFH5	1.00	1157																						X			
BOOFH5A	1.00	1204	84.5																					X			
BOOFH5D	1.00	1210																						X			
BOOFH5DA	1.00	1216	76.0																					X			
CCV1	1.00	1222																						X			
CCB1	1.00	1228																						X			
BOOFH6	1.00	1234																						X			
BOOFH6A	1.00	1240	76.0																					X			
BOOFH6S	1.00	1246																						X			
BOOF94	1.00	1252																						X			
BOOF94A	1.00	1258	105.0																					X			
BOOF95	1.00	1304																						X			
BOOF95A	1.00	1311	87.5																					X			
CCV2	1.00	1317																						X			
CCB2	1.00	1323																						X			

*Sub 8/15/92* FORM XIV - IN



## 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  $\geq 0.995$ ?

Yes No N/A

Was a balance check conducted prior to the TDS analysis? *Control run*

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 than 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.

HOLDING TIME SUMMARY - FORM B-1

SDG: <i>502 FHS</i>		REVIEWER: <i>KWA</i>		DATE: <i>8/15/02</i>		PAGE <i>1</i> OF <i>2</i>	
COMMENTS: <i>met Chem.</i>							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
<i>502 FHS</i>	<i>Aik.</i>	<i>3/27/01</i>	<i>—</i>	<i>4/8/01</i>	<i>—</i>	<i>12</i>	<i>none</i>
	<i>Ammon.</i>			<i>4/10/01</i>		<i>14</i>	
	<i>COD</i>			<i>4/8/01</i>		<i>12</i>	
	<i>Cl</i>			<i>4/19/01</i>		<i>23</i>	<i>↓</i>
	<i>SC</i>			<i>4/5/01</i>		<i>9</i>	<i>J/UT</i>
	<i>TDS</i>			<i>4/8/01</i>		<i>12</i>	
	<i>F</i>			<i>5/2/01</i>		<i>37</i>	
	<i>NO3</i>			<i>4/19/01</i>		<i>23</i>	
	<i>NO2</i>			<i>4/19/01</i>		<i>23</i>	<i>↓</i>
	<i>SO4</i>			<i>4/19/01</i>		<i>23</i>	<i>↓ none</i>
	<i>TOL</i>			<i>4/13/01</i>		<i>17</i>	<i>none</i>
	<i>TOX</i>			<i>5/6/01</i>		<i>40</i>	<i>J/UT</i>
	<i>NTU</i>			<i>4/8/01</i>		<i>12</i>	<i>↓</i>
	<i>PH-Lab</i>	<i>✓</i>	<i>✓</i>	<i>4/8/01</i>	<i>✓</i>	<i>12</i>	<i>↓</i>

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*not started*

B-1

HOLDING TIME SUMMARY - FORM B-1

SDG: <i>600FMS</i>	REVIEWER: <i>KWA</i>	DATE: <i>8/15/92</i>	PAGE <i>2</i> OF <i>2</i>				
COMMENTS: <i>met Chem.</i>							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
<i>1300F94</i>	<i>ALK.</i>	<i>4/3/91</i>	<i>✓</i>	<i>4/9/91</i>	<i>✓</i>	<i>6</i>	<i>none</i>
	<i>Ammon.</i>	<i>✓</i>	<i>✓</i>	<i>4/10/91</i>	<i>✓</i>	<i>7</i>	<i>✓</i>
	<i>COD</i>	<i>✓</i>	<i>✓</i>	<i>4/10/91</i>	<i>✓</i>	<i>7</i>	<i>✓</i>
	<i>CD</i>	<i>✓</i>	<i>✓</i>	<i>4/19/91</i>	<i>✓</i>	<i>16</i>	<i>✓</i>
	<i>SC</i>	<i>✓</i>	<i>✓</i>	<i>4/9/91</i>	<i>✓</i>	<i>6</i>	<i>J/UT</i>
	<i>TDS</i>	<i>✓</i>	<i>✓</i>	<i>4/10/91</i>	<i>✓</i>	<i>7</i>	<i>none</i>
	<i>F</i>	<i>✓</i>	<i>✓</i>	<i>5/22/91</i>	<i>✓</i>	<i>49</i>	<i>J/UT</i>
	<i>NO<sub>3</sub></i>	<i>✓</i>	<i>✓</i>	<i>4/10/91</i>	<i>✓</i>	<i>7</i>	<i>J/UT</i>
	<i>NO<sub>2</sub></i>	<i>✓</i>	<i>✓</i>	<i>4/19/91</i>	<i>✓</i>	<i>16</i>	<i>J/UT</i>
	<i>JO<sub>4</sub></i>	<i>✓</i>	<i>✓</i>	<i>4/19/91</i>	<i>✓</i>	<i>16</i>	<i>none</i>
	<i>TOL</i>	<i>✓</i>	<i>✓</i>	<i>4/13/91</i>	<i>✓</i>	<i>10</i>	<i>✓</i>
	<i>TOX</i>	<i>✓</i>	<i>✓</i>	<i>5/21/91</i>	<i>✓</i>	<i>48</i>	<i>J/UT</i>
	<i>NTU</i>	<i>✓</i>	<i>✓</i>	<i>4/9/91</i>	<i>✓</i>	<i>6</i>	<i>✓</i>
	<i>PH-Lab</i>	<i>✓</i>	<i>✓</i>	<i>4/9/91</i>	<i>✓</i>	<i>6</i>	<i>✓</i>

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B-1

4-2-1  
 INITIAL CALIBRATION VERIFICATION  
 WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse  
 Lab Name: Analytical Chemistry Department Contract: Hanford Company

SDG#: BOOFH5

Analyte	Units	Batch No.	Initial Calibration		%R
			True	Found	
Alkalinity	Mg/l	91-13	200	208	104%
Ammonia	Mg/l	91-09	0.5	0.5	100%
Bromide	N/A				
Chemical O2 Demand	Mg/l	91-18	60	61	101.7%
Chloride IC	Mg/l	91-42IA	4.0	3.966	99.15%
Conductivity	umho/cm	91-14	2876	2860	99.4%
Dissolved Solids	Mg/l	91-23	500	512	102.4%
Fluoride SIE	Mg/L	91-30	2.0	2.0	100%
Nitrate	Mg/L	91-42IA	5.0	4.955	99.1%
Nitrate Nitrogen	N/A				
Nitrite	Mg/L	91-42IA	2.0	2.01	100.5%
Nitrite Nitrogen	N/A				
Ortho Phosphate	N/A				
Sulfate	Mg/L	91-42IA	50.0	50.159	100%
Total Organic Carbon	Mg/l	91-26D	5.0	5.131	102.6%
Total Organic Halides	ug/l	91-21I	100	74.1	74.1%
Turbidity	NTU	91-22	9.0	9.1	101.1%
pH		91-39	7.0	7.01	100.1%

*J/ucJ*

*MA  
8/15/02*

Comments:

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4-3-2  
BLANKS  
WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse  
Lab Name: Analytical Chemistry Department Contract: Hanford Company

SDG#: BOOFH5

Analyte	Batch No.	Initial Calibration Blank	Units
Alkalinity	91-14		
Ammonia	N/A		
Bromide	N/A		
Chemical O2 Demand	91-19		
Chloride IC	91-45IA	<1	Mg/L
Conductivity	N/A		
Dissolved Solids	91-23		
Fluoride SIE	91-35	<.1	Mg/L
Nitrate	91-45IA	<1	Mg/L
Nitrate Nitrogen	N/A		
Nitrite	91-45IA		
Nitrite Nitrogen	N/A		
Ortho Phosphate	N/A		
Sulfate	91-45IA	<1	Mg/L
Total Organic Carbon	91-26D	<1	Mg/l
Total Organic Halides	91-21I	1.69	ug/l
Turbidity	91-22		NTU
pH	N/A		

Comments:

*Met  
8/15/92  
Qualify eqts < 5X  
Blank as U  
no qual. req'd*

APPENDIX B  
DATA VALIDATION DOCUMENTATION

SDG: B00FH5

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Martin-Marietta

Data Package ID: BOOFH5 Laboratory: K-25

Data Validator: T. Stapp Date: Jan. 18, 1993

Analysis/Sample Identification/Matrix: \_\_\_\_\_

Alpha Beta	BOOFH5	WATER	299-E33-05 (Split)
Cs-137, Cs-60	" MS/MSD		"
Pu-238/239, U	BOOF94		299-E33-07 (Split)
Sr-90, Tc-99, Ra- H3	" MS/MSD		"

1. Completeness

1.1 Completeness Checklist (Complete the appropriate checklist for each analysis type and attach).

2. Calibration

2.1 Initial Calibration

Was instrument calibrated within specified time period or annually? (Y/N/NA) Comment ①

If NO, qualify all associated data as unusable (R).

Was each detector used for the associated data calibrated? (Y/N/NA) \_\_\_\_\_

If NO, qualify all associated data as unusable (R).

Are calibration standards NIST traceable or equivalent? (Y/N/NA) \_\_\_\_\_

If NO, qualify all associated data as unusable (R).

Were calibration standards expired? (Y/N/NA) \_\_\_\_\_

If YES, qualify all associated data as unusable (R).

Comments/Qualified Results: \_\_\_\_\_

① Calibration, Detector identification, standards traceability and standards integrity information is not available with this data package. All nuclide results are rejected until data is made available.

all data conditionally reported since raw data not provided, except Cs's, MS, MSD, Blank, replicates were reported for some analyses.

2.2 Continuing Calibration

Is check source identified by activity and radionuclides? (Y/N/NA) comment ①

If NO, qualify all associated data as estimated (E).

Has check source been counted daily? (Y/N/NA) NA

If NO, qualify all associated data as unusable (R).

Are check source counts within  $\pm 3S$  control limits? (Y/N/NA) NA

If NO, qualify all associated data as unusable (R).

Have background counts been performed at least weekly and before and after all field and QC samples associated with the SDG? (Y/N/NA) NA

If NO, qualify all associated results as unusable (R).

Are background counts within  $\pm 3S$  control limits? (Y/N/NA) NA

If NO, qualify all associated results as unusable (R).

Comments/Qualified Results:

① Check source and background count data is not available.

3. Blanks

Have reagent/method/field blanks been analyzed with the SDG? (Y/N/NA) Comment ①

If NO, qualify all results >LLD as estimated (J).

Are positive results reported in the reagent/method/field blanks? (Y/N/NA) \_\_\_\_\_

If YES, qualify positive results less than the MDA as nondetects (U). Qualify sample results <10X the blank value but greater than the MDA as estimated (J).

Can blank results be verified/calculated properly? (Y/N/NA): \_\_\_\_\_

Comments/Notes/Qualified Results: \_\_\_\_\_

① The following nuclides had no method-blank blank documented with the samples analyzed:

Cs-137 results for B00FH5 + B00F94.

Ra-226	"	"	"	"
Co-60	"	"	"	"

4. Detection Limits and Sample Results

Can LLDs and MDAs be verified? (Y/N/NA) Comment ①

If NO, qualify all results as estimated detects (D) or estimated nondetects (U).

Do reported results meet the detection limit requirements? (Y/N/NA) Comment ②

Note discrepancies in the validation report narrative under representativeness.

Can reported results be verified? (Y/N/NA) Comment ①

If NO, note missing data in the validation report. Correct results on the photocopied report forms and include in the validation report.

Comments/Notes/Qualified Results:

① MDA's + LLD's cannot be verified at this time.

grs $\alpha$		
grs $\beta$		
Tc 99	BOCHF5	BOOF94
Sr 90		
H-3		
Pu 238	X	X
Pu 239	X	
Ra-226	X	X
GAMMA-		
Cs-137		
Ce-60		

RS 2-10-93

② Sample results above marked with an "X" have results negative or zero reported results. The rest are not verifiable for detection limit requirements since MDAs are not reported.

RS 2-10-93

5. Radiometric and Gravimetric Yields

Were spikes/tracers/chemical yields analyzed in each SDG and/or sample as appropriate for the analytical method? (Y/N/NA) comment ①

If NO or if inappropriate tracers were used qualify associated results as unusable (R).

Was a field blank used for the spike/tracer/chemical yield analysis? (Y/N/NA) \_\_\_\_\_

If YES, note in the validation narrative.

Is spike/tracer/chemical yield recovery within the limits of 30-105% for sample results <4X the spike activity? (Y/N/NA) \_\_\_\_\_

Verify the spike recoveries and qualify associated results as follows:

%R: <30% 30-105% >105% >115%

<LLD R acceptable UJ R

>LLD R acceptable J R

Comments/Notes/Qualified Results: \_\_\_\_\_

① Chemical yields and tracer recoveries information was not provided and raw data needed for calculation is missing.

MS ~~in~~ for analysis was not provided for gross alpha, beta, Cs-137, Co-60, Ba-226 and tritium.

96-1-23

## 6. Duplicate Samples and Analyses

Has at least one duplicate analysis been performed for every

10 samples in the SDG? (Y/N/NA) comment (1)

If NO, qualify all associated results as estimated (J).

Has the field blank been used for duplicate or MS/MSD analysis? (Y/N/NA) \_\_\_\_\_

Are RPD values  $\leq 35\%$  for results  $> 5X$  the LLD and within  $\pm 2X$  the LLD for results  $< 5X$  the LLD? (Y/N/NA) comment (2)

If NO, qualify associated results  $< LLD$  as estimated nondetects (U) and all associated results  $> LLD$  as estimated detects (J).

Comments/Notes/Qualified Results: \_\_\_\_\_

- ① Duplicate analysis not performed for Cs-137, Cs-60, Rn-222 and tritium.
- ② RPD values are above the 35% limit for gross alpha with sample B00F94 and Sr-90 for sample B00F15.

7. Laboratory Control Samples

Are LCS results within the control limits of 80-120% (Y/N/NA): Data Below

If NO, qualify results as follows:

%R: <50% 50-79% >120%

Results < LLD: R UJ R

Results > LLD: R J R

Has at least one LCS been analyzed with the SDG? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as estimated (E).

Comments/Notes/Qualified Results: \_\_\_\_\_

		Instru. ID	Qualifier	
Q15 A	71%		J/UJ	2-10-93
Q15 B	136%		R	
CS-137	99%	Detector 6	✓	
CS-137	98%	" 1	✓	
Pu-238	93%		✓	
Pu-239	93%		✓	
R2-226	148%		R	
Sr-90	124%		R	
H-3	99%		✓	
Total U	97%		✓	
Tc-99	106%		✓	

8. Holding Times

Have all samples/analyses been completed within 5 half-lives or 180 days, whichever comes first? (Y/N/NA): Data Below

If NO, qualify all associated results >LLD as estimated detects (J) and all associated results <LLD as estimated non-detects (U). For gross exceedances (>2X criteria) qualify all associated results as unusable (R).

Comments/Notes/Qualified Results:

	BOOFH5	Analysis	Days	Qualif.
gms x	3-27-91	5-23-91	58	-
" B	}	5-23	58	-
Tc-99		5-15 ↓	50	-
Sr-90		2-5-92	315	R J/U
Cs-137		5-30-91	65	-
Co-160		5-31	66	-
Tot. U		5-30	65	-
Ra-226		4-18	23	-
H-3		5-3	38	-
Pu-238/239		5-29 ↓	64	-

	BOOF94	Analysis	Days	Qualif.
gms x	4-3-91	5-23-91	50	-
Cs-137	}	5-31	58	-
Co-160		5-31 ↓	58	-
gms B		5-23	50	-
Tc-99		5-15 ↓	42	-
Sr-90		2-5-92	307	R J/U
Tot. U		5-30-91	57	-
Ra-226		4-18	15	-
H-3		5-3	30	-
Pu 238/239		5-29 ↓	56	-

9. Method Specific and Other Quality Control

9.1 Gas Proportional Counters

Are field and QC sample preparations outside the range of the self absorption curves?

(Y/N/NA): \_\_\_\_\_ Comment ①

If YES, qualify all associated data as estimated (E).

Are initial detector efficiencies <20%? (Y/N/NA): \_\_\_\_\_

If YES, qualify all associated data as unusable (R).

Have statistical tests been performed routinely (at least weekly)? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated data as estimated (E).

Have stability verifications been performed after each gas change? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated data as estimated (E).

Comments/Notes/Qualified Results: \_\_\_\_\_

① Gas proportional QC parameters are not available for verification.

9.2 Alpha Spectroscopy

Has detector system been calibrated across the energy range of interest? (Y/N/NA): Comment ①

If NO, qualify all results as unusable (R).

Is detector resolution adequate to identify each peak centroid? (Y/N/NA): \_\_\_\_\_

If NO or if resolution cannot be determined, qualify all results as unusable (R).

Is resolution at least 20 keV FWHM? (Y/N/NA): \_\_\_\_\_

If NO, qualify all results as estimated (J).

Do check source efficiencies agree within 5% of initial calibration efficiencies or are they within the control limits or  $\pm 3S$  of the mean? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as unusable (R).

Was each sample spiked with a tracer? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as unusable (R).

Are tracer recoveries within the control limits of 30 to 105%? (Y/N/NA): \_\_\_\_\_

If NO, qualify all results as follows:

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

Comments/Notes/Qualified Results: \_\_\_\_\_

① Alpha Spect. QC parameters were not provided and verification cannot be done.

## 9.3 Gamma Spectroscopy

Does efficiency calibration approximate a smooth semi-log curve? (Y/N/NA): \_\_\_\_\_

If NO, qualify all results as unusable (R).

Have geometry or matrix factors been accounted for in all analyses? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as unusable (R).

Does the detector calibration cover the energy range of interest and at least 0 to 2 MeV? (Y/N/NA): \_\_\_\_\_

If NO, qualify all results outside the energy range as unusable (R).

Is resolution of the detector system adequate and less than 5 FWHM? (Y/N/NA): \_\_\_\_\_

If NO, qualify all results as estimated (E).

Comments/Notes/Qualified Results: \_\_\_\_\_

① Gamma spect. QC parameters not provided and verification is not possible.

9.4 Alpha Emitting Radium Isotopes

Have single radium isotopes (Ra-223, Ra-224, Ra-226) been reported? (Y/N/NA): Single isotope only

If YES, qualify all results attributed to a single radium isotope as estimated (J) if the contribution to the total from individual isotopes is unknown.

Can time from sample precipitation to counting be verified? (Y/N/NA): Raw data not available.

If NO, qualify all associated results >MDA as estimated (J).

Have barium interferences been identified and accounted for? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results with elevated barium levels as estimated (J).

Has counting efficiency for Ra-226 been determined for each SDG? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as unusable (R).

Have blanks been analyzed with each group to check for possible radium contamination in the reagents? (Y/N/NA): See page 3

If NO, qualify all associated results as estimated (J).

Are LCS recoveries with the control limits listed below? (Y/N/NA): See page 7.

If no, qualify sample results as follows:

%R: \_\_\_\_\_ <50% 50-69% 70-130% >130%

Results <MDA	R	UJ	Acceptable	R
Results >MDA	R	J	Acceptable	R

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? (Y/N/NA): Sample preserved HNO3 @ sampling (Re: (a)ofc.)

If NO, qualify results >LLD as estimated detects (J) and results < LLD as estimated non-detects (U).

If samples were not preserved, were samples received within 5 days of sampling? (Y/N/NA): \_\_\_\_\_

- Were samples preserved at the laboratory upon receipt? (Y/N/NA): \_\_\_\_\_
- Were samples held after preservation for at least 16 days? (Y/N/NA): \_\_\_\_\_

If NO, to any of the above, qualify associated sample results as estimated (J).

Comments/Notes/Qualified Results: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9.5 Radium 226 Analysis using Scintillation (Lucas) Cell Counting

Is calibration data present and can it be associated with the samples? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated sample results as unusable (R).

Was the counting system calibrated each day that samples were analyzed? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (J).

Was the counting system calibrated after replacing the scintillation cell? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (J) if the cell has a previously determined calibration constant and unusable (R) if no constant is available for the replacement cell.

Were blanks analyzed with each sample group to check for radium contamination in reagents? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (J).

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? (Y/N/NA): comment ①

If NO, qualify results >LLD as estimated detects (J) and results < LLD as estimated non-detects (U).

If samples were not preserved, were samples received within 5 days of sampling? (Y/N/NA): \_\_\_\_\_

• Were samples preserved at the laboratory upon receipt? (Y/N/NA): \_\_\_\_\_

• Were samples held after preservation for at least 16 days? (Y/N/NA): \_\_\_\_\_

If NO, to any of the above, qualify associated sample results as estimated (J).

Comments/Notes/Qualified Results: \_\_\_\_\_

① Unable to determine methodology used.  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

## 9.6 Tritium Analysis by Liquid Scintillation Counting

Do calibration standard matrices match the sample matrices? (Y/N/NA): \_\_\_\_\_ Comment (1)

If NO, qualify associated results as estimated (E).

Has at least one calibration standard been processed with the samples (Y/N/NA): \_\_\_\_\_

If NO, qualify results associated with runs lacking calibration standards as unusable (R).

Have results for counting efficiency determination been provided? (Y/N/NA): \_\_\_\_\_

If NO, qualify all associated results as unusable (R).

Do tritium levels in the blanks exceed the MDA? (Y/N/NA): \_\_\_\_\_

If YES, qualify associated results less than 10X the background tritium level (blanks) as estimated (E).

Have blanks been analyzed with each sample run to check for potential contamination in the chemical reagents? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (E).

Comments/Notes/Qualified Results: \_\_\_\_\_

(1) GC parameters for Tritium analysis were not provided. Unable to verify at this time.

9.7 Fluorometric Analysis of Uranium

Has the laboratory provided evidence that cation and anion interferences are negligible for the matrix or that matrix interferences have been accounted for? (Y/N/NA): Comment ①

If NO, qualify associated results as estimated (J).

Has the laboratory provided a description of the method of fusion standardization or provided data supporting fusion standardization? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (J).

Was calibration performed immediately prior to sample analysis? (Y/N/NA): \_\_\_\_\_

If NO, qualify associated results as estimated (J).

Comments/Notes/Qualified Results: \_\_\_\_\_

① Total uranium analysis method not determined.  
QC parameters cannot be verified.

Comments/Notes/Qualified Results:

Handwritten notes on lined paper, including a large curved line and a vertical line.

No Comments *R* 1-19-93

**GAS PROPORTIONAL COUNTERS  
LOW BACKGROUND BETA COUNTERS**

Data Package ID: ECOFH5

Analysis: grs  $\alpha$ ,  $\beta$ , Sr-90, Tc-99

**A.0 Completeness Checklist**

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  
 N/A Weights of Solids Counted

✓ - Yes  
 X - No  
 N/A - Not Applicable

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  
 N/A Weights of Precipitates or Solids Counted  
 Calculated Recoveries



## ALPHA SPECTROSCOPY

Data Package ID: BOOFH5Analysis: Pu-238 / 239

## B.0 Completeness Checklist

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)

✓ - Yes  
 X - No  
 N/A - Not Applicable

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) or Spikes, Tracers, or Carriers Used  
 NIST Traceability of Spikes, Tracers or Carriers  
 N/A Weights of Precipitates or Solids Counted  
 Calculated Recoveries



## GAMMA SPECTROSCOPY

Data Package ID: \_\_\_\_\_

BOOFH5

## C.0 Completeness Checklist

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

✓ - Yes  
 X - No  
 N/A - Not  
 Applicable

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

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



9613475.0174

ALPHA EMITTING RADIUM ISOTOPES  
USING SCINTILLATION COUNTING

Data Package ID: BOOFH5

Analysis: \_\_\_\_\_

D.0 Completeness Checklist

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 Precision
- \_\_\_\_\_ 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 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

- \_\_\_\_\_ 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)



RADIUM-226 ANALYSIS USING  
SCINTILLATION (LUCAS) CELL COUNTINGData Package ID: BOOFH5

## E.0 Completeness Checklist

Analysis Results

- \_\_\_\_\_ Results Reports 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 or Volume

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
- \_\_\_\_\_ Rad 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 Counts, 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)



TRITIUM ANALYSIS USING  
LIQUID SCINTILLATION COUNTINGData Package ID: BOOFH5

## F.0 Completeness Checklist

✓ - Yes

X - No

N/A - Not Applicable

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  
 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)

FLUOROMETRIC ANALYSIS OF URANIUM

Data Package ID: BOOFH5

G.0 Completeness Checklist

✓ - Yes  
 X - No  
 N/A - Not applicable

Analysis Results

(51-19-93  
 ↓

- 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

(51-19-93  
 ↓

- 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

(51-19-93  
 ↓

- 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

(51-19-93

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

Gravimetric Yields

- N/A Weight of Carrier Added for Gravimetric Determination
- Weight of Carrier Recovered for Gravimetric Determination
- Calculated Gravimetric Yields



Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
23-MAR-1992 13:58

AnalIS ID: 910403-102    Project: G132 001C    Customer Sample ID: BOOFH5  
Customer: KESSNER/BUTCHER    Requisition Number:  
Date Sampled: 27-MAR-1991    Date Sample Received: 31-MAR-1991  
Sampled By:    Date Sample Completed: 19-MAR-1992  
Material Description: WATER    Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)     : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
**** Radiochemistry Laboratory ****								
EC-134	Cesium-137	2.44	R*	+/- 3.7	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.20E1	R*	+/- 3.6E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.30	R*	+/- 1.4	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.88E2	R*	+/- 15.1	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	0.37	- .19 R*	+/- .37	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.1E3	R*	+/- 6.1E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	0.44	R*	+/- 0.8	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	0.82	R*	+/- 2.0	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.62E3	R*	+/- 1.6E3	pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	1.5	0.00 UR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	1.5	0.00 UR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991

Prep (BNA- CLP)

pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910408-252

*3-1-19-93*

*R\* - Detected and conditionally rejected due to missing data.  
UR - Undetected and conditionally rejected due to missing data.*

*1/25/93*

Prep (Pest- CLP)

pH = 7  
Date Extracted = 7-APR-1991  
Sample Volume Extracted (mL) = 1000.0  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910408-150

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
Technetium-99	3.62E3	4.6E3	23.8

## Spike Recovery Data

-----

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
-----	-----	-----	-----	-----	-----	-----
**** Unknown Lab ****						
CYANIDE	0.017	0.10	0.13	mg/L	0.11	113.0
PLUTONIUM-238		21306	18400	pCi/L	18400.	86.4
PLUTONIUM-239		21306	18400	pCi/L	18400.	86.4
TOTAL ORGANIC CARBON (TOC)	0	5	4	mg/L	4.	80.0
URANIUM ALPHA ACTIVITY	0.82	675	648	pCi/L	647.	95.9

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
23-MAR-1992 13:58

ANALIS ID: 910408-029    Project: G132 001C    Customer Sample ID: BOOF94  
Customer: KESSNER/BUTCHER    Requisition Number:  
Date Sampled: 3-APR-1991    Date Sample Received: 5-APR-1991  
Sampled By:    Date Sample Completed: 19-MAR-1992  
Material Description: WATER    Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)     : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	0.93	R*	+/- 3.3	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.53E1	R*	+/- 3.5E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.49	R*	+/- 1.4	J pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.42E2	R*	+/- 14.5	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	0.34	.34 UR	+/- .34	R pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.2E3	R*	+/- 6.2E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	1.35	R*	+/- 0.9	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	1.9	0.00 UR	+/- 1.9	UR pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.53E3	R*	+/- 1.6E3	R pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	1.5	0.00 UR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	0.87	R*	+/- 1.2	pCi/L	900028	ENV-523	30-MAY-1991

F (BNA- CLP)

pH = 6  
Date Extracted = 11-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 1.0  
Associated Blank = 910411-095

*Handwritten:* 1-19-93

*Handwritten:* R\* - Analyte detected but conditionally reported due to missing data

*Handwritten:* UR - Analyte undetected but conditionally reported due to missing data

Prep (Pest- CLP)

pH = 6  
Date Extracted = 9-APR-1991  
Sample Volume Extracted (mL) = 1000  
Extraction Method = Separatory Funnel  
Extraction Solvent = Methylene Chloride  
Extraction Cleanup = Sodium Sulfate  
Final Volume of Extract (mL) = 10.0  
Associated Blank = 910409-040

*Handwritten:* 1/25/93

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
Uranium Alpha Activity	0.00	0	0.0
Plutonium-238	0.00	0	0.0

## Spike Recovery Data

lysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** UnKnown Lab *****						
CYANIDE	0.038	0.1	0.147	mg/L	0.109	109.0
TECHNETIUM-99	3.53E3	12420	16600	pCi/L	13070.	105.2



Science Applications International Corporation  
An Employee-Owned Company

0034-PKB.93  
February 12, 1993

Mr. Mark A Buckmaster  
Westinghouse Hanford Company  
P. O. Box 1970 MSIN H4-55  
Richland, Washington 99352

Subject: Deliverable for 200-BP-1 Data Validation, Task Order S-92-19, WHC Contract  
No. MLW-SVV-073750

Dear Mr. Buckmaster:

Enclosed is a deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of Data Validation Summary Report for Data Packages BOOFH5, and BOOJ75. This deliverable was prepared by Golder Associates under the direction of Kent Angelos.

Should you have any questions, please do not hesitate to contact the following: Kent Angelos of Golder Associates at (206)883-0777, Michael Hoxie or myself at (509) 783-1446.

Sincerely yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

  
P. K. Brockman  
Program Manager

PKB/aps

Enclosure

cc w/encl:  
B. Colley, WHC  
B. Bechtold, WHC  
LB/Task 92-19 Deliv File

cc w/o encl:  
R. Henckel, WHC  
D. Wilson, WHC  
D. Caldwell, GAI

**Report To**

**Westinghouse Hanford Company  
Richland, Washington**

**Radiochemistry**

**Data Validation Summary Report  
200-BP-1 Operable Unit RI/FS**

**Data Packages: B00FH5 and B00J75**

**Laboratory: Martin Marietta K-25 Laboratory**

**Prepared By**

**Golder Associates Inc.  
Redmond, Washington**

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2. DATA QUALITY OBJECTIVES	2
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2.2 Accuracy	2
2.3 Precision	2
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3.2 Minor Deficiencies	3
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LIST OF APPENDICES

- A As-Qualified Data Summary and Laboratory Reports
- B Data Validation Documentation, SDG B00FH5
- C Data Validation Documentation, SDG B00J75

## 1. INTRODUCTION

This report presents a summary of data validation conducted on radiochemistry analyses performed on two groundwater and two soil samples collected for the 200-BP-1 Operable Unit remedial investigation/feasibility study (RI/FS) at the Hanford Site. The samples were analyzed for radiochemistry parameters by the Martin-Marietta K-25 laboratory in Oak Ridge, Tennessee. The following analyses were validated:

- Gross Alpha/Beta
- Strontium-90
- Technetium-99
- Alpha spectroscopy (Isotopic Plutonium)
- Tritium
- Radium-226 by Lucas Cell Counting
- Uranium (Laser Fluorometry)
- Gamma Spectroscopy (Cesium-137, Cobalt-60)

Data validation and verification was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992). Data verification was conducted by comparison of the reported results against the raw data and laboratory worksheets provided in the data packages, discrepancies noted were corrected on the laboratory report forms and tabular summary provided in Appendix A.

Data validation was documented using a checklist prepared according to the requirements listed in the validation procedures (WHC 1992). Copies of the checklists are provided in Appendix B.

Data validation qualifiers assigned to the sample results as a result of the validation are explained below:

- U The constituent was analyzed for, but was not detected above the Lower Limit of Detection (LLD).
- UR The constituent was analyzed for, but was reported as not detected above the Lower Limit of Detection (LLD). The associated result is conditionally rejected pending submittal of missing documentation.
- UJ The constituent was analyzed for, but its absence (non-detection) is estimated and may be inaccurate or imprecise.
- J The associated value is an estimated quantity and may not represent the amount actually present in the sample.
- R The associated value is unusable.
- R\* The constituent was analyzed for and detected. The associated result is conditionally rejected pending submittal of missing documentation.

## 2. DATA QUALITY OBJECTIVES

### 2.1 Detection Limit and Sample Result Verification

Sample results reported on the printed laboratory report forms were verified against the handwritten summary reports provided by the laboratory. No raw data were provided for any of the reported results, therefore minimum detectable activities and results could not be recalculated.

### 2.2 Accuracy

Accuracy as percent recovery of laboratory controls and matrix spike samples ranged from 70% to 148% for SDG B00FH5 and from 1% to 126% for SDG B00J75. The following analyses did not meet the work plan QA limits of 30 to 115% for accuracy:

- SDG B00FH5: gross beta, radium-226, strontium-90 and technetium-99.
- SDG B00J75: plutonium-238.

### 2.3 Precision

Precision as relative percent difference (RPD) between duplicate and matrix spike/matrix spike duplicates ranged from 2% to 200% for SDG B00FH5 and from 2% to 25% for SDG B00J75. The following analyses did not meet the work plan QA limits of 35%:

- SDG B00FH5: gross alpha and strontium-90.

### 2.4 Field Blanks

No field blanks were submitted as part of this data set.

### 2.5 Completeness

Completeness of this data set could not be determined since the raw data was not provided to fully validate the data packages.

## 3. QUALIFIED DATA

### 3.1 Major Deficiencies

The following major deficiencies were identified in both data packages:

- SDG B00FH5: radium-226, strontium-90 and technetium-99 have been rejected since laboratory control sample or matrix spike sample recoveries were greater than 115%.

- SDG B00J75: plutonium-238 has been rejected since matrix spike sample recoveries were less than 30%.
- Missing raw data for all analyses resulting in conditional rejection of all remaining results (UR for non-detects, R\* for detects).

### 3.2 Minor Deficiencies

The following minor deficiencies were identified in data package B00FH5:

- RPD values for duplicate analyses were greater than 35% for sample results greater than the detection limit for gross alpha, plutonium-239 and strontium-90. No qualification was applied since all results with the exception of those identified above have been conditionally rejected due to missing documentation.

## 4. CONCLUSION

Sections 1 through 3 present a summary of the data quality for the subject data set. The results contained in this report are acceptable for use as qualified with the exception of those sample results with major deficiencies as discussed in Section 3.1.

The appendices provide supporting documentation and a tabular summary of the qualified data. The original as-received data packages are being transmitted under separate cover for submittal to the project QA record.

## 5. REFERENCES

CDM, 1987, Data Quality Objectives for Remedial Response Activities, Development Process, March 1987, CDM Federal Programs Corporation, Annandale, Virginia.

WHC, 1991, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision A, November 1991. Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, Westinghouse Hanford Company, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 0, 1992. Westinghouse Hanford Company, Richland, Washington.

APPENDIX A

VALIDATED DATA SUMMARY AND QUALIFIED LABORATORY REPORTS

Table 1-1. Validated Radiochemistry Results  
SDGs: B00FH5 and B00J75

HEIS NO.:	B00FH5	B00F94	B00J75	B00J76
LABORATORY:	K25	K25	K25	K25
UNITS:	pCi/L	pCi/L	pCi/g	pCi/g
Cesium-137	2.44 R*	0.93 R*	2.93 R*	20.2 R*
Cobalt-60	12.0 R*	15.3 R*	NA	NA
Gross Alpha	2.3 J	2.49 J	1.26 R*	3.27 R*
Gross Beta	588 R*	542 R*	5.97 R*	27.8 R*
Radium-226	0.37 R	0.34 R	NA	NA
Tritium	4100 R*	4200 R*	NA	NA
Strontium-90	0.44 R	1.35 R*	1.31 R*	2.65 R*
Total Uranium	0.82 R*	1.9 UR	0.37 R*	0.45 R*
Technetium-99	3620 R	3530 R	13.9 UR	48.1 R*
Plutonium-238	1.5 UR	1.5 UR	0.09 R	0.1 R
Plutonium-239	1.5 UR	0.87 R*	0.09 UR	0.09 UR

NA - not analyzed.

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

ANALIS ID: 910403-102    Project: G132 001C    Customer Sample ID: BOOFH5  
 Customer: KESSNER/BUTCHER    Requisition Number:  
 Date Sampled: 27-MAR-1991    Date Sample Received: 31-MAR-1991  
 Sampled By:    Date Sample Completed: 19-MAR-1992  
 Material Description: WATER    Date Sample Approved:  
 Program Manager: DL AMBURGEY (# 28912)    ☐ : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
**** Radiochemistry Laboratory ****								
EC-134	Cesium-137	2.44 <del>RA</del>		+/- 3.7	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.20E1 <del>RA</del>		+/- 3.6E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.30 <del>RA</del>		+/- 1.4	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.88E2 <del>RA</del>		+/- 15.1	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	0.37 - .19 <del>RA</del>		+/- .37	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.1E3 <del>RA</del>		+/- 6.1E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	0.44 <del>RA</del>		+/- 0.8	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	0.82 <del>RA</del>		+/- 2.0	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.62E3 <del>RA</del>		+/- 1.6E3	pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	1.5 0.00 <del>UR</del>		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	1.5 0.00 <del>UR</del>		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991

Pr (BNA- CLP)  
 pH = 7  
 Date Extracted = 7-APR-1991  
 Sample Volume Extracted (mL) = 1000.0  
 Extraction Method = Separatory Funnel  
 Extraction Solvent = Methylene Chloride  
 Extraction Cleanup = Sodium Sulfate  
 Final Volume of Extract (mL) = 1.0  
 Associated Blank = 910408-252

*4-1-1993*

*FX - Detected and conditionally rejected due to missing data.  
 UR - Undetected and conditionally rejected due to missing data.*

*1/25/93*

Prep (Pest- CLP)  
 pH = 7  
 Date Extracted = 7-APR-1991  
 Sample Volume Extracted (mL) = 1000.0  
 Extraction Method = Separatory Funnel  
 Extraction Solvent = Methylene Chloride  
 Extraction Cleanup = Sodium Sulfate  
 Final Volume of Extract (mL) = 10.0  
 Associated Blank = 910408-150

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
Technetium-99	3.62E3	4.6E3	23.8

## Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** Unknown Lab *****						
CYANIDE	0.017	0.10	0.13	mg/L	0.11	113.0
PLUTONIUM-238		21306	18400	pCi/L	18400.	86.4
PLUTONIUM-239		21306	18400	pCi/L	18400.	86.4
TOTAL ORGANIC CARBON (TOC)	0	5	4	mg/L	4.	80.0
URANIUM ALPHA ACTIVITY	0.82	675	648	pCi/L	647.	95.9

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
23-MAR-1992 13:58

ANALIS ID: 910408-029 Project: G132 001C Customer Sample ID: BOOF94  
 Customer: KESSNER/BUTCHER Requisition Number:  
 Date Sampled: 3-APR-1991 Date Sample Received: 5-APR-1991  
 Sampled By: Date Sample Completed: 19-MAR-1992  
 Material Description: WATER Date Sample Approved:  
 Program Manager: DL AMBURGEY (# 28912)  : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	0.93 <del>RA</del>		+/- 3.3	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.53E1 <del>RA</del>		+/- 3.5E0	pCi/L	DK MANN		
EPA-900.0	Alpha Activity	2.49 <del>RA</del>		+/- 1.4 J	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.42E2 <del>RA</del>		+/- 14.5	pCi/L	900028	ENV-523	23-MAY-1991
EPA-903.0	Radium	0.34 <del>RA</del> <del>UR</del>		+/- .34 R	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.2E3 <del>RA</del>		+/- 6.2E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	1.35 <del>RA</del>		+/- 0.9	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1991
IHA-485	Uranium Alpha Activity	1.9 0.00 <del>RA</del> <del>UR</del>		+/- 1.9 <del>UR</del>	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.53E3 <del>RA</del>		+/- 1.6E3 R	pCi/L	900028	ENV-523	16-MAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	1.5 0.00 <del>RA</del> <del>UR</del>		+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	0.87 <del>RA</del>		+/- 1.2	pCi/L	900028	ENV-523	30-MAY-1991

(BNA- CLP)

pH = 6  
 Date Extracted = 11-APR-1991  
 Sample Volume Extracted (mL) = 1000  
 Extraction Method = Separatory Funnel  
 Extraction Solvent = Methylene Chloride  
 Extraction Cleanup = Sodium Sulfate  
 Final Volume of Extract (mL) = 1.0  
 Associated Blank = 910411-095

*Handwritten:* TR 1-17-93  
 2/18/93

*RA - Analyte detected but conditionally reported due to missing data*  
*UR - Analyte undetected but conditionally reported due to missing data*

Prep (Pest- CLP)

pH = 6  
 Date Extracted = 9-APR-1991  
 Sample Volume Extracted (mL) = 1000  
 Extraction Method = Separatory Funnel  
 Extraction Solvent = Methylene Chloride  
 Extraction Cleanup = Sodium Sulfate  
 Final Volume of Extract (mL) = 10.0  
 Associated Blank = 910409-040

*Handwritten:* 1/25/93

Replicate Results of Analysis

Analysis	Results	Replicate Results	RPD
Uranium Alpha Activity	0.00	0	0.0
Plutonium-238	0.00	0	0.0

## Spike Recovery Data

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ysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
-----						
**** Unknown Lab ****						
CYANIDE	0.038	0.1	0.147	mg/L	0.109	109.0
TECHNETIUM-99	3.53E3	12420	16600	pCi/L	13070.	105.2

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Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
25-FEB-1992 09:27

AnalIS ID: 910412-211    Project: G132 0201    Customer Sample ID: BOOJ75  
Customer: KESSNER    Requisition Number:  
Date Sampled: 1-APR-1991    Date Sample Received: 6-APR-1991  
Sampled By:    Date Sample Completed: 24-SEP-1991  
Material Description: SOIL    Date Sample Approved:  
Program Manager: DL AMBURGEY (# 28912)     : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Spectrochemistry Laboratory *****								
	Selenium	-----			ug/Kg	29175	10427A	27-JUN-199
***** Inductively Coupled Plasma Laboratory *****								
EPA-3050	Bismuth	<10.0			ng/Kg	EA HESTER	107168	16-JUL-199
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.93	R*	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
EPA-900.0	Alpha Activity	1.26	R*	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	5.97	R*	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-906.0	Strontium	1.31	R*	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-199
INA-485	Uranium Alpha Activity	3.66E-1	R*	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	13.9	<del>1.54</del> R*UR	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-238	0.09	<del>2.58E-2</del> R*UR	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
7 35	Plutonium-239	0.09	<del>2.58E-2</del> R*UR	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1			ug/g	900019	91-29	20-MAY-1991

Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
NITRATE	0	100	99	ug/g	99.	99.0
ORTHO PHOSPHATE IC	0	100	88	ug/g	88.	88.0
SULFATE	0	200	176	ug/g	176.	88.0

RE 1-18-93

2/1/93

Oak Ridge K-25 Site  
Analytical Chemistry Department  
Results of Analyses

Date Printed:  
25-FEB-1992 09:28

ANALIS ID: 910412-212      Project: G132 0201      Customer Sample ID: B00J76  
 Customer: KESSNER      Requisition Number:  
 Date Sampled: 1-APR-1991      Date Sample Received: 6-APR-1991  
 Sampled By:      Date Sample Completed: 24-SEP-1991  
 Material Description: SOIL      Date Sample Approved:  
 Program Manager: DL AMBURGEY (# 28912)       : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
----- Spectrochemistry Laboratory -----								
	Selenium	-----			ug/Kg	29175	10427A	27-JUN-1991
----- Inductively Coupled Plasma Laboratory -----								
EPA-3050 EPA-200.7	Bismuth	<10.0			mg/Kg	EA NESTER	107168	16-JUL-1991
----- Radiochemistry Laboratory -----								
EC-134	Cesium-137	20.22 <i>R*</i>		+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	3.27 <i>R*</i>		+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80 <i>R*</i>		+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65 <i>R*</i>		+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1 <i>R*</i>		+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10 <i>R*</i>		+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.1 0.00 <i>RHR</i>		+/- 1.0E-1 <i>R</i>	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
15	Plutonium-239	0.09 <del>2.50E-2</del> <i>RHK</i>		+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
----- Wet Chemistry Laboratory -----								
EPA-300.0	Nitrate	<20			ug/g	CA SEDLACEK	91-44 1A	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 1A	21-APR-1991
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 1A	21-APR-1991
EPA-335.2	Cyanide	<0.1			ug/g	900019	91-29	20-MAY-1991

*RS H-18-93*  
*2/11/93*