START 9613496.1182

BOOJ75-K25-089

MARTIN MARIETTA

0045467

1 of 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:

Wet Chemistry Analytical Results Package on Project 91-020: 200-BP-1 Samples

Attached are the analytical results of the wet chemistry analysis on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 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 by DLA
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

OCT 1996
RECEIVED
EDMC

PROTOCOL UTILIZED FOR WET CHEMISTRY ANALYSES OF

200-BP-1 SAMPLES

Analysis	Protocol
A. Anions (NO_3, SO_4, Ortho Phosphate)	EPA-300.0

SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	BOOJ75	910412-211	soil	
	BOOJ76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

9613496.1184

COOLER RECEIPT FORM
for SOP 2332

File with receiving and C-O-C records.

Date: 4-6-91 Shipper ID and Document No: 2474256686

Cooler ID if noted on outside of cooler: EA012

Project No: G132 Subproject No: 020 Site Location: Hanford

Custody seal on cooler?	(Yes) No	Custody seals dated and signed?	Yes (No)
Condition of cooler acceptable?	Yes (No)	Prog. Mgr. notified of receipt of cooler?	(Yes) No
Radioactive labels?	Yes (No)	Radioactivity recheck OK?	Yes No
Hazardous labels?	Yes (No)	Samples properly labeled?	Yes (No)
Custody form(s) inside of cooler?	(Yes) No	Custody form(s) properly completed and signed?	Yes (No)
Was cooler required to be maintained at 4 deg C?	(Yes) No	Thermometer inside of cooler?	Yes (No)
Sample containers intact?	(Yes) No	Temperature of cooler: 15 deg C (X.X)	
Are containers those specified for requested parameters?	Yes No	VOA containers free of bubbles?	NA ~~Yes No~~
Date of login:		Additional information needed from Prog. Mgr.?	(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. Dawson

* Custody seals not initialed and dated.
Custody form not signed.
Bottles not labeled for analyses.
Need clarification on number of containers for B00J7 B00J76.

4

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

ANALYTICAL CHEMISTRY DEPARTMENT

ACD/COC NO 1782

PROJECT NUMBER: 91-030

PROJECT NAME: 300-BP-1, Task 3

SAMPLERS: *(SIGNATURE)*

CUSTOMER NUMBER	ACD NUMBER	SAMPLING DATE	SAMPLING TIME	SAMPLE TYPE	NO. OF CONTAINERS	Anions[1] By IC	Cyanide	Bismuth (ICP)	Selenium (AA)	Radio-Chem[2]		REMARKS
B0015	910412-211	4/1/91		Soil		✓	✓	✓	✓	✓		[1] Nitrate, Phosphate, Sulfate
B0016	-212					✓	✓	✓	✓	✓		[2] Total Alpha, Total Beta, Tc-99, Sr-90, Cs-137, Co-60, Pu-238, Pu-239/240
												Total U
(B00575-MS)	910415-089											
(B00575-MSD)	-090											

RELINQUISHED BY: *(Signature)*	Date	Time	RECEIVED BY: *(Signature)*	Date	Time	RELINQUISHED BY *(Signature)*	Date	Time	RECEIVED BY *(Signature)*
			J. Dodson	4-6-91	1315				
RELINQUISHED BY *(Signature)*	Date	Time	RECEIVED BY: *(Signature)*	Date	Time	RELINQUISHED BY *(Signature)*	Date	Time	RECEIVED BY *(Signature)*

UCN-16691 (1 4-89)

DISTRIBUTION: ORIGINAL ACCOMPANIES SHIPMENT; COPY TO COORDINATOR OF FIELD FILES

9613496.1185

9513496.1186

Westinghouse Hanford Company

CHAIN OF CUSTODY

5

Custody Form Initiator: C.E. Heiden

Company Contact: Ron Mitchell Telephone: 376-5133

Project Designation/Sampling Locations: 300 BP-1 Collection Date: 4/1/91

Near Surface Soil Sampling Project #91-020

Ice Chest No. EA012 Field Logbook No.

Bill of Lading/Airbill No. 3474256669 7 Offsite Property No. W91-02

Method of Shipment: Emery

Shipped to: K-25 U.S. Department of Energy c/o Martin Marietta Energy Systems

Possible Sample Hazards/Remarks: N/A

Sample Identification

BCCJ75 }
BCCJ76 } Soil

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Nam

Relinquished by:	Received by:	Date/Time:
C.E. Heiden C.E. Heiden	J DEMAREST J. Demarest	4-4-91 11.50A
J. DEMAREST J. Demarest	J. Gadson J. Gadson	4-6-91 1315

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-40

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT
Westinghouse Hanford Co.		W91-0271

PART I - TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Environmental Engineering	Technical Baseline	

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing Emery ☐ Contractor ☐ Vendor

Shipped to K-25
U.S. Department of Energy
c/o Martin Marietta Energy Systems,
Oak Ridge Gaseous Diffusion Plant
Blair Road, Highway 58
Oak Ridge, TN 37831-740

Off-site Custodian
ATTN: C.R. Kirkpatrick, K-1004A droppoint A 2

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1	Poly Ice Chest - Glass jars of soil, packed in vermiculite and blue ice. - Sample # B00J75, B00J76 - Sample # B00HZ3 (Separate project, 91-013) Ice Chest EA013 (37 lbs)	

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

Necessity for the Off-Site Use of this Property
Program not available on-site.

Bill of Lading # 2474256697

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

RM Clearance for Public Release	RM Survey No	Date

Location of Property (Area & Bldg)	Contact	Phone
200 BP-1 / 300-FF-1	Ron Mitchell	376-5122

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
	E32NA 81230	n/a

Originated By	Date	Authorized By	Date
Ron Mitchell		RP Mitchell	4/4/91

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[illegible]	4/4/91

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No	Date Issued	Purchase Order No	Date Issued
J Lempriest Date 4-4-91				

DISTRIBUTION

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

54 3000 479.09

EMERY WORLDWIDE — A CF Company

SIGNATURE AND TALLY RECORD

60029-46 (8/89) Litho USA

DATE: 04-04-91 SHIPMENT NO.: 247425668 6
SHIPPER WESTINGHOUSE SHIPPING DEPT (509) 376-6665
REFERENCE NO.: W91-0-0145 #43

SHIPPER NAME AND ADDRESS	CONSIGNEE NAME AND ADDRESS
WESTINGHOUSE SHIPPING DEPT (509) 376-6665 62-06 U. S. DEPARTMENT OF ENERGY C/O WESTINGHOUSE HANFORD COMPANY 2355 STEVENS DRIVE PO BOX 1970 RICHLAND WA 99352	CR KIRPATRICK K1004A DROP POINT A20 US DEPARTMENT OF ENERGY MARTIN MARIETTA ENERGY SYSTEM BLAIR ROAD HWY 58 OAK RIDGE TN 37831

Pieces	Weight	Description/Marks	Emery Authorization No.
1	91 LBS	W91-0-0145 #43 BOOF94, BOOF95 COOLER ID: EPSILON 6 WATER SAMPLES	

EACH PERSON HANDLING OR TAKING CUSTODY OF THIS SHIPMENT MUST SIGN AND COMPLETE THE INFORMATION BELOW

Name of Person/Company	Transship Point/Destination	Signature of Person Accepting Custody	Time/Date
1 JOYCE DEMAREST WESTINGHOUSE SHIPPING 1167/1100	RICHLAND WA		/04-04-91
2.			
3.			
4.			
5.			
6.	HDY		2258 4/5
7. Jim Maurice	TYS		~~1345~~ 4/5
8. Luther Hackler	TYS		09:15 11/6

SPECIAL HANDLING INSTRUCTIONS — ACD K25 — CONSIGNEE COPY — 4-6-91 1255 — 4-6-91 1305

9613496-1188

8

#110 HWY #14941

FORM OF PAYMENT

CASH ☐ GBL/CBL ☐ FCCOD ☐

PP ☒ COL ☐ OTH ☐ COMAT ☐

EMERY WORLDWIDE — A CF Company

SERVICES

UNITED STATES / CANADA: ☐ Same Day ☒ O'NITE ☒ AM ☐ PM S.S.S. ☐ Second Day ☐ Saturday Delivery

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

E Shipper's Account Number: 850281585

Date: 04-04-91 Origin: PSC Shipment Number: 247425668 6

From:
WESTINGHOUSE SHIPPING DEPT (509) 376-9665
U. S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA Canada ☐

To:
CR KIRKPATRICK K1004A DROP POINT A20
US DEPARTMENT OF ENERGY
MARTIN MARIETTA ENERGY SYSTEM
BLAIR ROAD HWY 58 Hold for Pick Up ☐
OAK RIDGE TN Canada ☐

Tariff Dest. | Gateway

Charges to Origin $

EMERY WORLDWIDE will collect consignee check made payable only to the shipper for the value of the goods in the amount shown above.

Customer's Reference Numbers: W81231 ED3E1 W91-0-0145 #43 99352

E Consignee's Account Number: 37831

Description	Pcs	L	W	H	Total Pieces	Total Weight (lb/kg)
1 COOLER ID EPSILON 6 WATER SAMPLES B00F94 B00F95 W91-0-0145 #83	1	23	14	16	1	91

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

Declared Value $

TOBSR ☐ Hez Mat ☐ Edit ☐ A B C D E F G H I J K

1 2 3 4 5 6 7 8 9 0 1 2

OVERNIGHT DELIVERY
SIGNATURE SECURITY SERVICE

Envelope 9X12 ☐ Pack 12X15 ☐

Shipper's Signature X

International Shipments: Free Domicile ☐ Commodity Code

Third party Account Number mandatory for Third party billing. E Third Party Account Number

Base Charge

International Customs Value | International Insurance

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

tys A

Terms and Conditions on Back

96134961 1189

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

Date Printed:
10-FEB-1992 14:20

AnaLIS ID: 910412-211 Project: G132 0201 Customer Sample ID: B00J75
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	<0.41			ug/Kg	29175	10427A	27-JUN-19
***** Inductively Coupled Plasma Laboratory *****								
EPA-3050	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-19
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.93		+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
EPA-900.0	Alpha Activity	1.26		+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-900.0	Beta Activity	5.97		+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-906.0	Strontium	1.31		+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-19
IHA-485	Uranium Alpha Activity	3.66E-1		+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-19
TP-1628	Technetium	-1.54		+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-238	2.58E-2		+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-239	-2.58E-2		+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide	<0.1			ug/g	900019	91-29	20-MAY-19

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

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

Date Printed:
10-FEB-1992 14:22

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	<0.42			ug/Kg	29175	10427A	27-JUN-199
***** Inductively Coupled Plasma Laboratory *****								
EPA-3050	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-199
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	20.22		+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
EPA-900.0	Alpha Activity	3.27		+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	27.80		+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-906.0	Strontium	2.65		+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-199
IHA-485	Uranium Alpha Activity	4.45E-1		+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	48.10		+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-238	0.00		+/- 1.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-239	-2.58E-2		+/- 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-199
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-335.2	Cyanide	<0.1			ug/g	900019	91-29	20-MAY-199

Date Printed:
10-FEB-1992 14:23

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

AnaLIS ID: 910415-089 Project: G132 0201 Customer Sample ID: B00J75-MS
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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	N/A			ug/Kg			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-19
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
EPA-900.0	Alpha Activity	1.40E3		+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-900.0	Beta Activity	1.79E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-906.0	Strontium	2.13E4		+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-19
IHA-485	Uranium Alpha Activity	35.50		+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-19
TP-1628	Technetium	3.37E2		+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-238	1.35E-1		+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-239	11.00		+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	88			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	99			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Sulfate	176			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide				ug/g	MH FELLER	X	21-APR-19

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

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

Date Printed:
10-FEB-1992 14:2

AnaLIS ID: 910415-090 Project: G132 0201 Customer Sample ID: BOOJ75-MSD
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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 Completec
***** Spectrochemistry Laboratory *****								
	Selenium	N/A			ug/Kg			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-19
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
EPA-900.0	Alpha Activity	1.52E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-900.0	Beta Activity	1.84E3		+/- 29.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-906.0	Strontium	1.82E4		+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-19
IHA-485	Uranium Alpha Activity	37.90		+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-19
TP-1628	Technetium	3.27E2		+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-238	1.73E-1		+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-239	11.20		+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide	X			ug/g	MH FELLER	X	21-APR-19

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD
FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239.

910415-09 D

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

9613496.1195

MARTIN MARIETTA

1

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 91-020: 200-BP-1 Samples

Attached are the results of the inorganic analyses on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 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
Deborah L. Amburgey
Program Manager
Hanford Support Program

Clarence R. Kirkpatrick by
Clarence R. Kirkpatrick
Program Manager
Waste Management Analysis

Roy W. Morrow
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

	Analysis	Protocol
A.	ICP Metals (Bismuth only)	EPA-200.7
B.	AA Metals	
	Selenium	EPA-270.2
C.	Cyanide	EPA-335.2

SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	BOOJ75	910412-211	soil	
	BOOJ76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

July 29, 1991

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

Laboratory ID	EPA ID	Customer No.:
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 (XORNL22)
c. STD3 = SPEX Multielement Standard (XORNL18)
d. STD4 = SPEX Multielement Standard (XORNL19, XORNL20)
e. STD5 = SPEX Multielement Standard (XORNL24)
f. STD6 = SPEX Multielement Standard (XORNL25)
g. STD7 = SPEX Multielement Standard (XORNL26)
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

M.S. Dill, Methodology and QA

for

9613496.1199

5

February 21, 1992

Joan Kessner
Project Manager
Westinghouse Hanford Company
Richland, WA 99336

Dear Ms. Kessner,

On April 6, 1991 the Oak Ridge K-25 Site Analytical Chemistry Department (ACD) received 2 soil 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
910412-211	BOOJ75	BOOJ75
910412-212	BOOJ76	BOOJ76

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 pre-digest spike and both analytical spikes did not recover within the allowable QC limits and are flagged with the appropriate CLP data qualifier flags. The low concentration of selenium found in the samples did not warrent the use of standard additions for quantification, however the analytical spike data shows appreciable interferences present in the samples. 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 N930-0221

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

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

9613496.1201

ENVIROFORMS/CLP 788

9
SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

BOOJ75

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.: SDG No.: ~~BOOFH5~~ BOOJ75 SAS 2/25/9

Matrix (soil/water): SOIL Lab Sample ID: 910412-211

Level (low/med): LOW Date Received: 04/06/91

% Solids: 97.5

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.2	U	N	P
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

9613496.1202

U.S. EPA - CLP

10

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOJ75

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-211

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _97.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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_____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.41	U	WN	F_
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

9613496.1203

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J75

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412-211

Level (low/med): _____ Date Received: 4/6/91

% Solids: 97.5

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

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	< 0.1			

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

9613496.1204

ENVIROFORMS/CLP 788

SAMPLE NO. 12

1

INORGANIC ANALYSIS DATA SHEET

BOOJ76

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.: SDG No.: BOOFH5 J7

Matrix (soil/water): SOIL Lab Sample ID: 910412-212

Level (low/med): LOW Date Received: 04/06/91

% Solids: 94.9

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.0	U	N	P
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

9613496.1205

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13

BOOJ76

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-212

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _94.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.42	U	WN	F_
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

9613496.1206

U.S. EPA - CLP

14

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J76

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412.212

Level (low/med): low Date Received: 4/6/91

% Solids: 94.9

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

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	<0.1			

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

9613496.1207

COOLER RECEIPT FORM
for SOP 2332

File with receiving and C-O-C records.

Date: 4-6-91 Shipper ID and Document No: 2474256686

Cooler ID if noted on outside of cooler: EAC12

Project No: G132 Subproject No: 020 Site Location: Hanford

Custody seal on cooler?	(Yes) No	Custody seals dated and signed?	Yes (No)
Condition of cooler acceptable?	Yes (No)	Prog. Mgr. notified of receipt of cooler?	(Yes) No
Radioactive labels?	Yes (No)	Radioactivity recheck OK?	Yes No
Hazardous labels?	Yes (No)	Samples properly labeled?	Yes (No)
Custody form(s) inside of cooler?	(Yes) No	Custody form(s) properly completed and signed?	Yes (No)
Was cooler required to be maintained at 4 deg C?	(Yes) No	Thermometer inside of cooler?	Yes (No)
Sample containers intact?	(Yes) No	Temperature of cooler: 15 deg C (X.X)	
Are containers those specified for requested parameters?	Yes No	VOA containers free of bubbles?	NA ~~Yes No~~
Date of login:		Additional information needed from Prog. Mgr.?	(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. Dougherty

Custody seals not initialed and dated.
Custody form not signed.
Bottles not labeled for analyses.
Need clarification on number of containers for B00J75 B00J76.

12

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

ANALYTICAL CHEMISTRY DEPARTMENT

ACD/COC NO. 1782

PROJECT NUMBER: 91-020

PROJECT NAME: 300-BP-1, Task 3

SAMPLERS: (SIGNATURE)

CUSTOMER NUMBER	ACD NUMBER	SAMPLING DATE	SAMPLING TIME	SAMPLE TYPE	NO. OF CONTAINERS	Anions[1] By IC	Cyanide	Bismuth (ICP)	Selenium (AA)	Radio-Chem[2]		REMARKS
B00175	910412-211	4/1/91		Soil		✓	✓	✓	✓	✓		[1] Nitrate, Phosphate, Sulfate
B00176	-212					✓	✓	✓	✓	✓		[2] Total Alpha, Total Beta, Tc-99, Sr-90, Cs-137, Co-60, Pu-238, Pu-239/240 Total U
(B00575-MS)	910415-089											
(B00575-MSD)	-090											

RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)
			J. Dadson	4-6-91	1315				
RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)

UCN-16691 (1 4-89)

DISTRIBUTION: ORIGINAL ACCOMPANIES SHIPMENT, COPY TO COORDINATOR OF FIELD FILES

96134961208

9613496.1209

Westinghouse Hanford Company

CHAIN OF CUSTODY

128

Custody Form Initiator: C.E. Heiden

Company Contact: Ron Mitchell

Telephone: 376-5133

Project Designation/Sampling Locations: 300 BP-1

Collection Date: 4/1/91

Near Surface Soil Sampling Project #91-020

Ice Chest No. EA012

Field Logbook No.

Bill of Lading/Airbill No. 3474235669 7

Offsite Property No. W91-0271

Method of Shipment: Emery

Shipped to: K-25 U.S. Department of Energy c/o Martin Marietta Energy Systems

Possible Sample Hazards/Remarks: N/A

Sample Identification

BCCJ75
BCCJ76 } Soil

☐ Field Transfer of Custody

CHAIN OF POSSESSION

(Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
C.E. Heiden C.E. Heiden	J. DEMAREST J. Demarest	4-4-91 11:50A
J. DEMAREST J. Demarest	J. Gadson J. Gadson	4-6-91 1315

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/9

Next Day Service Signature Security

9613496.1210

12

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
Westinghouse Hanford Co.		~~W91-02271~~ W91-0271

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Environmental Engineering	Technical Baseline	

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing Emery ☐ Contractor ☐ Vendor

Shipped to K-25
U.S. Department of Energy
c/o Martin Marietta Energy Systems
Oak Ridge Gaseous Diffusion Plant
Blair Road, Highway 58
Oak Ridge, TN 37831-740

Off-site Custodian
ATTN: C.R. Kirkpatrick, K-1004A droppoint A 20

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1	Poly Ice Chest - Glass jars of soil, packed in vermiculite and blue ice. - Sample # B00J75, B00J76 - Sample # B00HZ3 (Separate project, 91-013) Ice Chest EA0121 (37 lbs)	

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

Necessity for the Off-Site Use of this Property
Program not available on-site.

Bill of Lading # 2474256669 7

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

RM Clearance for Public Release	RM Survey No	Date

Location of Property (Area & Bldg)	Contact	Phone
200 BP-1 / 300-FF-1	Ron Mitchell	376-5122

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
	E32NA 812310	n/a

Originated By	Date	Authorized By	Date
Ron Mitchell		RP Mitchell	4/4/91

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[illegible]	4/4/91

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No	Date Issued	Purchase Order No	Date Issued
[illegible]				
Date 4-4-91				

DISTRIBUTION

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

54 3000 479 (09 89)

130

EMERY WORLDWIDE — A CF Company

SIGNATURE AND TALLY RECORD

60029-46 (8/89) Litho USA

DATE: 04-04-91 SHIPMENT NO.: 247425668 6
SHIPPER RESTINGHOUSE SHIPPING DEPT (509) 376-6665
REFERENCE NO.: W91-0-0145 #43

SHIPPER NAME AND ADDRESS	CONSIGNEE NAME AND ADDRESS
WESTINGHOUSE SHIPPING DEPT (509) 376-6665 G2-06 U. S. DEPARTMENT OF ENERGY C/O WESTINGHOUSE HANFORD COMPANY 2355 STEVENS DRIVE PO BOX 1970 RICHLAND WA 99352	CR KIRPATRICK K1004A DROP POINT A20 US DEPARTMENT OF ENERGY MARIIN MARIETTA ENERGY SYSTEM BLAIR ROAD HWY 58 OAK RIDGE TN 37831

Pieces	Weight	Description/Marks	Emery Authorization No.
1	91 LBS	W91-0-0145 #43 B00F94, B00F95 COOLER ID: EPSILON 6 WATER SAMPLES	

EACH PERSON HANDLING OR TAKING CUSTODY OF THIS SHIPMENT MUST SIGN AND COMPLETE THE INFORMATION BELOW

Name of Person/Company	Transship Point/Destination	Signature of Person Accepting Custody	Time/Date
1 JOYCE DEMAREST WESTINGHOUSE SHIPPING 1167/1100	RICHLAND WA		1 04-04-91
2.			
3.			
4.			
5.			
6.	HDY		2258 4/5
7. Jim Maurer	TYS		1945 4/5
8. Luther Hackler	TYS	L. Hackler	09:15 4/6

SPECIAL HANDLING INSTRUCTIONS — ACD K25 — CONSIGNEE COPY — 4-6-91 1255 — 4-6-91 1305

9613496.1211

131

#110 HWT #14941

FORM OF PAYMENT

CASH ☐ GBL CBL ☐ FOCOD ☐

PP ☒ COL ☐ OTH ☐ COMAT ☐

E Shipper's Account Number 850281585

EMERY WORLDWIDE — A CF Company

SERVICES

UNITED STATES / CANADA: ☐ Same Day ☒ O'NITE ☒ AM ☐ PM S.S.S. ☐ Second Day ☐ Saturday Delivery

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

Date	Origin	Shipment Number
04-04-91	PSC	247425668 6

From:
WESTINGHOUSE SHIPPING DEPT (509) 376-9665
U. S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA
Canada ☐

To: CR KIRKPATRICK K1004A DROP POINT A20
US DEPARTMENT OF ENERGY
MARTIN MARIETTA ENERGY SYSTEM
BLAIR ROAD HWY 58
OAK RIDGE TN
Hold for Pick Up ☐ Canada ☐

Tariff Dest. | Gateway

Check to Payee $

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

Customer's Reference Numbers: W81231 ED3E1 W91-0-0145 #43 99352

E Consignee's Account Number: 37831

Description	Pcs.	L	W	H	Total Pieces	Total Weight (in lbs)
1 COOLER ID EPSILON 6 WATER SAMPLES BOOF94 BOOOF95 W91-0-0145 #43	1	23	14	16	1	91

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

Declared Value $

TOOSR ☐ Haz Mat ☐ Edit ☐ A B C D E F G H I J K

1 2 3 4 5 6 7 8 9 0 1 2

OVERNIGHT DELIVERY
SIGNATURE SECURITY SERVICE

Envelope 9X12 ☒ Pack 12X15 ☒

Shipper's Signature X

International Shipments: Free Domicile ☐ Commodity Code

Third party Account Number mandatory for Third party billing. E Third Party Account Number

Base Charge

International Customs Value | International Insurance

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

tYS A

Terms and Conditions on Back

9613496.1212

MARTIN MARIETTA

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:

Radiochemistry Analytical Results Package on Project 91-020: 200-BP-1 Samples

Attached are the analytical results of the radiochemical analysis on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 1991. Also attached are copies of the AnaLis report forms, the Chain of Custody records and sample receipt documentation for the samples, 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 by DLA

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

PROTOCOL UTILIZED FOR RADIOCHEMICAL ANALYSES OF

200-BP-1 SAMPLES

	Analysis	Protocol
A.	Alpha Activity	EPA-900.0
B.	Beta Activity	EPA-900.0
C.	Cesium-137	EC-134
D.	Plutonium (-238, -239)	TP-1635
E.	Strontium	EPA-906.0
F.	Technetium-99	EC-186 (TP-1628)
G.	Uranium Alpha Activity	IHA-485

SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	BOOJ75	910412-211	soil	
	BOOJ76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

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: B00J75
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	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.93		+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26		+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97		+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31		+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	3.66E-1		+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	-1.54		+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	2.58E-2		+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	-2.58E-2		+/- 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 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

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	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	20.22		+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	3.27		+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80		+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65		+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1		+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10		+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.00		+/- 1.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	-2.58E-2		+/- 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 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

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

Date Printed:
10-FEB-1992 14:23

AnaLIS ID: 910415-089 Project: G132 0201 Customer Sample ID: B00J75-MS
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-1991
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.40E3		+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.79E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.13E4		+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	35.50		+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	3.37E2		+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	1.35E-1		+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	11.00		+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	88			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	99			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	176			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide				ug/g	MH FELLER	X	21-APR-1991

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

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

Date Printed:
10-FEB-1992 14:24

AnaLIS ID: 910415-090 Project: G132 0201 Customer Sample ID: B00J75-MSD
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-199
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
EPA-900.0	Alpha Activity	1.52E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	1.84E3		+/- 29.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-906.0	Strontium	1.82E4		+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-199
IHA-485	Uranium Alpha Activity	37.90		+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	3.27E2		+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-238	1.73E-1		+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-239	11.20		+/- 1.1	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-199
EPA-300.0	Ortho Phosphate IC	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Sulfate	<20			ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-335.2	Cyanide	X			ug/g	MH FELLER	X	21-APR-199

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD
FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239.

910415-090

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

9615496.1220

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

For 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

7601 West Clearwater Avenue, Suite 450, Kennewick, Washington 99336
Other SAIC Offices: Albuquerque, Boston, Colorado Springs, Dayton, Huntsville, Las Vegas, Los Angeles, McLean, Oak Ridge, Orlando, Palo Alto, Seattle, Tucson

9613496.1221

Science Applications International Corporation
An Employee-Owned Company

1075-PKB.92
September 28, 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 Rev. D, 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 Summary Report for Data Package B00J75. This deliverable was prepared by Golder Associates with support from Ken Ridgway of SAIC under the direction of Kent M. Angelos.

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

9613496.1222

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

for 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

OCT 1992 RECEIVED EDMC

RECEIVED OCT 01 1992 CORRESPONDENCE CONTROL

9613496.1223

Report To

Westinghouse Hanford Company
Richland, Washington

Data Validation Report
200-BP-1 RI/FS
Laboratory: Martin Marietta
Data Package: B00175
Sample Matrix: Soil
Analysis Type: Inorganics/Wet Chemistry

Prepared By

Golder Associates Inc.
Redmond, Washington

September 25, 1992

913-1719

9613196.1224

TABLE OF CONTENTS

	Page No.
1. INTRODUCTION	1
2. DATA QUALITY OBJECTIVES	1
3. QUALIFIED DATA	1
3.1 Major Deficiencies	1
3.2 Minor Deficiencies	1
3.2.1 Metals	2
3.2.2 Wet Chemistry	2
4. CONCLUSION	2
5. REFERENCES	2

LIST OF APPENDICES

APPENDIX A As-Qualified Data Summary
APPENDIX B Data Review Supporting Documentation, SDG B00J75

1. INTRODUCTION

This report presents the results of data validation on the following sample delivery group and sample numbers which were analyzed by the Martin Marietta K-25 - Oak Ridge, TN laboratory. The HEIS sample numbers associated with this group by SDG are:

Data Package ID	HEIS Sample Numbers	Matrix
SDG: B00J75	B00J75A, B00J76A	Soil

Sample identificaions, locations and sample dates are provided in the tabular data summary provided in Attachment 3. Data validation was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992).

2. DATA QUALITY OBJECTIVES

Completeness

The data package was complete for all requested analyses and met the data quality objectives of the work plan. Data quality objectives for the project specified the use of CLP methods for the TAL metals/cyanide analytes and the use of standard methods for all other parameters.

Sample Quantitation Limits

Sample quantitation limits were met with the exception of nitrate, ortho-phosphate, and sulfate. The contract required quantitation limit (CRQL) for these parameters is 4 mg/Kg and they were reported to a quantitation limit of 20 mg/Kg.

3. QUALIFIED DATA

This section presents a summary of the qualifications required based on validation of the subject data package.

3.1 Major Deficiencies

The following presents a summary of the rejected data.

Inorganics

Cyanide results were rejected due to a deficiency of standards used in the initial equipment calibration. At least three standards are required for initial calibration but only one was used.

Bismuth results were rejected due to the sample spike recovery being less than 30% and the sample result being less than the instrument detection limit (IDL).

9615946.1226

Wet Chemistry

No deficiencies were identified requiring rejection of data.

3.2 Minor Deficiencies

The following qualifications were required as a result of the validation. Attachment 2 provides a summary of the samples affected.

3.2.1 Metals

Correlation Coefficient

- The correlation coefficient for the initial calibration of the furnace atomic absorption analysis for selenium was less than .995. Selenium results have been qualified as estimated (UJ for non-detects).

Holding Times

- The holding time for cyanide was exceeded. No qualification was necessary as cyanide results have been rejected due to calibration deficiencies.

3.2.2 Wet Chemistry

Holding Times

- The holding time was exceeded for nitrate, ortho-phosphate, and sulfate. Associated sample results have been qualified as estimated (UJ for non-detects).

4. CONCLUSION

Sections 1 through 3 present a summary of the data quality for the subject data package. The results contained in this report are acceptable for use with the exception of the major deficiencies reported in Section 3.1.

The appendices provide supporting documentation and a tabular summary of the qualified data. The original, as-recieved data package is enclosed for submittal to the project QA record.

5. REFERENCES

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, Data Validation Procedures for Chemical Analyses, Westinghouse Hanford Company, Richland, Washington.

9613496.1227

APPENDIX A

AS QUALIFIED DATA SUMMARY

Laboratory Martin Marietta	SDG	B00J75			
Sample Number		B00J75A		B00J76A	
Remarks		total		total	
Sample Date		4-1-91		4-1-91	
Inorganic Analytes	CRQL	Result	Q	Result	Q
Aluminum	40	NR		NR	
Antimony	12	NR		NR	
Arsenic	2	NR		NR	
Barium	40	NR		NR	
Beryllium	1	NR		NR	
Cadmium	1	NR		NR	
Calcium	1000	NR		NR	
Chromium	2	NR		NR	
Cobalt	10	NR		NR	
Copper	5	NR		NR	
Iron	20	NR		NR	
Lead	1	NR		NR	
Magnesium	1000	NR		NR	
Manganese	3	NR		NR	
Mercury	0.04	NR		NR	
Nickel	8	NR		NR	
Potassium	1000	NR		NR	
Selenium	1	0.41	UJ	0.42	UJ
Silver	2	NR		NR	
Sodium	1000	NR		NR	
Thallium	2	NR		NR	
Vanadium	10	NR		NR	
Zinc	4	NR		NR	
Cyanide	5	0.1	R	0.1	R
Bismuth	10	10.2	R	10	R
Nitrate by IC	4	20	UJ	20	UJ
Phosphate by IC	4	20	UJ	20	UJ
Sulfate by IC	4	20	U	20	U

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APPENDIX B

DATA REVIEW SUPPORTING DOCUMENTATION

SDG: B00J75

Samples: B00J75, B00J76

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

9613496.1230

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the 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 an 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.

9613496.1231

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00J75	REVIEWER: S Schlicht	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
CN	R	B00J75A, B00J76A	1 blank + 1 std
			used for calibration
Bi	R	B00J75A, B00J76A	sample spike
			recovery <30%
Se	UJ	B00J75A, B00J76A	correlation coefficient
			<.995

9613496.1233

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00J75	REVIEWER: S. Schildt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO_3, PO_4, SO_4 SS 9-23-92	UJ	B00J75, B00J78	Holding time exceeded

9613496.1234

ATTACHMENT 3

AS QUALIFIED LABORATORY DATA

9613496.1235

ENVIROFORMS/CLP 788

9
SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

BOOJ75A
Near Surface 13 dry
BOOJ75
SDG No.: ~~BOOFH5~~ SCS 2/25/

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.:

Matrix (soil/water): SOIL Lab Sample ID: 910412-211

Level (low/med): LOW Date Received: 04/06/91

% Solids: 97.5

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.2	U	N	P R
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

FORM I - IN 7/88

9/17/92

9613496.1236

U.S. EPA - CLP

10

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOJ75A
Near Surface 13 dup

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-211

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _97.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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_____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.41	U	WN	F_ UJ
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

AHS 9/17/91

9613496.1237

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J75A Near Surface 13 day

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412-211

Level (low/med): _____ Date Received: 4/6/91

% Solids: 97.5

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

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	< 0.1		R	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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ENVIROFORMS/CLP 788

SAMPLE NO. 12

1

INORGANIC ANALYSIS DATA SHEET

BOOJ76A
Near Surface 17 du
J7

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): SOIL Lab Sample ID: 910412-212

Level (low/med): LOW Date Received: 04/06/91

% Solids: 94.9

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.0	U	N	P R
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

FORM I - IN 7/88

9/17/

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

13

EPA SAMPLE NO.

BOOJ76A
Near Surface 17 dup

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-212

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _94.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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_____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.42	U	WN	F_ US
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

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U.S. EPA - CLP

14

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J76A
Near Surface 17 dup

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412.212

Level (low/med): low Date Received: 4/6/91

% Solids: 94.9

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

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	<0.1		R	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN 3/90

9/17

9613496.1241

1-1
INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

Oak Ridge K-25 Site
Lab Name: Analytical Chemistry Department

Westinghouse
Contract: Hanford Company

Matrix (soil/water): Soil

SDG#: B00J75

ACD Sample ID Number: 910412-211

Customer Sample ID: B00J75A
Near surface 13 dup

Date Received: 6 April 1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			
Ammonia	N/A			
Bromide	N/A			
Chemical O2 Demand	N/A			
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20 UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20 UJ	ug/g	91-44IA	21-Apr-91
Sulfate	<20 UJ	ug/g	91-44IA	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides	N/A			
Turbidity	N/A			
pH	N/A			

Comments:

AH 9/12/91

9613496.1242

1-2

INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

Lab Name: Oak Ridge K-25 Site Analytical Chemistry Department

Contract: Westinghouse Hanford Company

Matrix (soil/water): Soil

SDG#: BOOJ75

ACD Sample ID Number: 910412-212

Customer Sample ID: BOOJ76A

Near surface 17 dup

Date Received: 6-April-1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			
Ammonia	N/A			
Bromide	N/A			
Chemical O2 Demand	N/A			
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20 UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20 UJ	ug/g	91-44IA	21-Apr-91
Sulfate	<20 UJ	ug/g	91-44IA	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides	N/A			
Turbidity	N/A			
pH	N/A			

Comments:

9/12/92

9613496.1243

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200-B P-1	REVIEWER: S. Schildt	DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE:	SDG: BOOJ75
SAMPLES/MATRIX: BOOJ75A, BOOJ76A/soil		

1. DATA PACKAGE COMPLETENESS

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

Data Package Item	Present?: Yes	No	N/A
Case Narrative	✓		
Cover Page	✓		
Traffic Reports/Chain-of-Custody	✓		
Sample Analysis Data Report Forms	✓		
Standards Data		✓	
QC Summary			
Blanks Summary Report Forms	✓		
Spike Sample Recovery Report Forms	✓		
Duplicate Sample Analysis Report Forms	✓		
Laboratory Control Sample Report Forms		✓	
Raw Data			
Ion Chromatograph Chromatograms	✓		
TOC and TOX Instrument Printouts			✓
Laboratory Bench Sheets	✓		
Additional Data			
Laboratory Sample Preparation Logs			✓
Instrument Run Logs	✓		
Internal Laboratory Chain-of-Custory	✓		
Percent Solids Analysis Records			✓
Reduction Formulae			✓
Chemist Notebook Pages		✓	

2. HOLDING TIMES

Were all samples analyzed within holding times? Yes (No) N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995?	Yes	No	N/A
Was a balance check conducted prior to the TDS analysis?	Yes	No	N/A
Was the titrant normality checked?	Yes	No	N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?	Yes	No	N/A
Are ICV and CCV percent recoveries within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

5. LABORATORY BLANKS

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

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U) and list the affected samples and analytes below.

6. FIELD BLANKS

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

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?	Yes	No	N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are >CRQL, qualify the data as estimated (J). If the spike recovery is <30% and the sample results are less then the IDL qualify the data as unusable (R).

8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

9. PERFORMANCE AUDIT ANALYSES

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

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

10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits? Yes No N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are instrument detection limits below the CRDL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

14. OVERALL ASSESSMENT AND SUMMARY

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

HOLDING TIME SUMMARY - FORM B-1

SDG: B00J75 REVIEWER: S. Schildt DATE: 9-17-92 PAGE 1 OF 1

COMMENTS: Wet Chemistry

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B00J75A	NO_3	4-1-91		4-21-91		20	J
	PO_4						J
	SO_4						~~J~~ none SSS 9-23-92
B00J76A	NO_3						J
	PO_4						J
	SO_4						~~J~~ none SSS 9-23-92

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWER: SSchildt	DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE: ~~B00J75~~ SSS 9/17/92	SDG: B00J75
SAMPLES/MATRIX: B00J75A, B00J76A/soil		

1. COMPLETENESS AND CONTRACT COMPLIANCE

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

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

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

Was a midrange cyanide standard distilled? Yes **(No)** N/A

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

Are there calculation errors? Yes **(No)** N/A

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

Are there calculation errors? Yes **(No)** N/A

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

6. LABORATORY BLANKS

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

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

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

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required?	Yes	No	N/A
Are MSA correlation coefficients $\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 correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes	No	N/A
Are all detection limits below the CRQL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

1. No cyanide distillation log provided.

2. 1 blank and 1 standard used for cyanide calibration.

HOLDING TIME SUMMARY - FORM B-1

SDG: B00J75	REVIEWER: S. Schildt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B00J75N78	Bi	4-1-91	7-14-91	7-16-91	104	106	none
	Se	↓	6-10-91	6-27-91	70	87	none
	CN	↓	NA	5-20-91	NA	50	J

ACCURACY DATA SUMMARY - FORM B-4

SDG: B00J75	REVIEWER: S Schlibt	DATE: 9-17-92	PAGE 1 OF 1	
COMMENTS: Spike Sample Recovery (ICP)				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B00J76S	Bismuth	9.9	B00J76A, B00J75A	R

9613496.1256

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B00J75	REVIEWER: S. Schilatt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB 2	Se	-2.1	B		mg/kg	10.5		None	

96134961257

9613496.1258

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

February 9, 1993

913-1719

9613496.1259

TABLE OF CONTENTS

	Page No.
1. INTRODUCTION	1
2. DATA QUALITY OBJECTIVES	2
2.1 Detection Limit and Sample Result Verification	2
2.2 Accuracy	2
2.3 Precision	2
2.4 Field Blanks	2
2.5 Completeness	2
3. QUALIFIED DATA	3
3.1 Major Deficiencies	3
3.2 Minor Deficiencies	3
4. CONCLUSION	3
5. REFERENCES	3

LIST OF APPENDICES

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

9613496.1260

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.

9615496.1261

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%.

9613496.1262

- 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.

9615496.1265

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

Date Printed:
23-MAR-1992 13:58

AnaLIS ID: 910403-102 Project: G132 001C Customer Sample ID: B00FH5
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	~~UR~~	+/- 1.4 J	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* UR~~	+/- .37 R	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 R	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 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~~	~~R~~ UR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-239	1.5 ~~0.00~~	~~R~~ UR	+/- 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

R 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

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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

9613496.1267

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: B00F94
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	~~R* 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	X ~~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	~~R~~ 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

MW 2/8/93

TK 1-19-93

(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

R* - Analyte detected but conditionally rejected due to missing data

UR - Analyte undetected but conditionally rejected 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

MW 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

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

9613496.1269

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: B00J75
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	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.93	R✓	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26	R✓	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97	R✓	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31	R✓	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	3.66E-1	R✓	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	13.9 ~~1.54~~	R UR	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.09 ~~2.58E-2~~	R ~~UR~~	+/- 8.9E-2 R	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
[illegible]35	Plutonium-239	0.09 ~~2.58E-2~~	R UR	+/- 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 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

RS 1-18-93

MAK 2/1/93

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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	Bismuth	<10.0			mg/Kg	EA HESTER	107168	16-JUL-1991
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	20.22	R*	+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	3.27	R*	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80	R*	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65	R*	+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1	R*	+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10	R*	+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.1 0.00	R~~UR~~	+/- 1.0E-1 R	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
35	Plutonium-239	0.09 ~~2.58E-2~~	RUK	+/- 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 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

FS 1-18-93

MW 2/1/93

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APPENDIX B

DATA REVIEW SUPPORTING DOCUMENTATION

SDG: B00J75

Samples: B00J75, B00J76

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

9613496.1272

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the 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 an 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.

9613496.1273

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00J75	REVIEWER: S Schulz	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
CN	R	B00J75A, B00J76A	1 blank + 1 std
			used for calibration
Bi	R	B00J75A, B00J76A	sample spike
			recovery <30%
Se	UJ	B00J75A, B00J76A	correlation coefficient
			<.995

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00J75	REVIEWER: S. Schildt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO_3, PO_4, ~~SO_4~~ SM a-2352	UJ	B00J75, B00J76	Holding time exceeded

9613496.1276

ATTACHMENT 3

AS QUALIFIED LABORATORY DATA

9613496.1277

ENVIROFORMS/CLP 788

9
SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

BOOJ75A
Near Surface 13

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.: SDG No.: ~~BOOFH5~~ BOOJ75

Matrix (soil/water): SOIL Lab Sample ID: 910412-211

Level (low/med): LOW Date Received: 04/06/91

% Solids: 97.5

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.2	U	N	P
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

FORM I - IN 7/88

9613496.1278

U.S. EPA - CLP

10

1

EPA SAMPLE NO.

INORGANIC ANALYSES DATA SHEET

BOOJ75A
Near Surface 13 dup

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-211

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _97.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.41	U	WN	F_
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

9/17/92

9613496.1279

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J75A
Near Surface 13 dy

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412-211

Level (low/med): _____ Date Received: 4/6/91

% Solids: 97.5

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

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	< 0.1		R	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

9/121

9613496.1280

ENVIROFORMS/CLP 788

SAMPLE NO. 12

1

INORGANIC ANALYSIS DATA SHEET

BOOJ76A
Near Surface 17 du
J7

Lab Name: MARTIN MARIETTA Contract:

Lab Code: K25 Case No.: SAS No.: SDG No.: BOOFH5

Matrix (soil/water): SOIL Lab Sample ID: 910412-212

Level (low/med): LOW Date Received: 04/06/91

% Solids: 94.9

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

CAS No.	Analyte	Concentration	C	Q	M
					NR
					NR
					NR
					NR
	Bismuth	10.0	U	N	P
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR
					NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:
K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

9/17/

9613496.1281

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13

BOOJ76A
Near Surface 17 dup

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOJ75

Matrix (soil/water): SOIL_ Lab Sample ID: 910412-212

Level (low/med): LOW__ Date Received: 04/06/91

% Solids: _94.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
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____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.42	U	WN	F_ US
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc____				NR
	Cyanide__				NR

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
ROCKS

FORM I - IN

3/90

AH 9/17/

9613496.1282

U.S. EPA - CLP

14

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00J76A
Near Surface 17 dup

Lab Name: Martin Marietta Contract: _____

Lab Code: K25 Case No.: _____ SAS No.: _____ SDG No.: B00J75

Matrix (soil/water): Soil Lab Sample ID: 910412.212

Level (low/med): low Date Received: 4/6/91

% Solids: 94.9

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

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	<0.1		R	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN 3/90

9/17

9613496.1283

1-1
INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

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

Matrix (soil/water): Soil
SDG#: B00J75

ACD Sample ID Number: 910412-211
Customer Sample ID: B00J75A
Near surface 13 dup
Date Received: 6 April 1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			
Ammonia	N/A			
Bromide	N/A			
Chemical O2 Demand	N/A			
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20 UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20 UJ	ug/g	91-44IA	21-Apr-91
Sulfate	<20 UJ SSD 9-23-94	ug/g	91-44IA	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides	N/A			
Turbidity	N/A			
pH	N/A			

Comments:

AH 9/13/9

9613496.1284

1-2
INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

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

Matrix (soil/water): Soil
SDG#: BOOJ75

ACD Sample ID Number: 910412-212
Customer Sample ID: BOOJ76A
Near surface 17 dup
Date Received: 6-April-1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			
Ammonia	N/A			
Bromide	N/A			
Chemical O2 Demand	N/A			
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20 UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20 UJ	ug/g	91-44IA	21-Apr-91
Sulfate	<20 UJ	ug/g	91-44IA	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides	N/A			
Turbidity	N/A			
pH	N/A			

Comments:

9/17/92

9613496.1285

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200-B P-1	REVIEWER: S Schild	DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE:	SDG: B00J75
SAMPLES/MATRIX: B00J75A, B00J76A/soil		

1. DATA PACKAGE COMPLETENESS

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

Data Package Item	Present?: Yes	No	N/A
Case Narrative	✓		
Cover Page	✓		
Traffic Reports/Chain-of-Custody	✓		
Sample Analysis Data Report Forms	✓		
Standards Data		✓	
QC Summary			
Blanks Summary Report Forms	✓		
Spike Sample Recovery Report Forms	✓		
Duplicate Sample Analysis Report Forms	✓		
Laboratory Control Sample Report Forms		✓	
Raw Data			
Ion Chromatograph Chromatograms	✓		
TOC and TOX Instrument Printouts			✓
Laboratory Bench Sheets	✓		
Additional Data			
Laboratory Sample Preparation Logs			✓
Instrument Run Logs	✓		
Internal Laboratory Chain-of-Custory	✓		
Percent Solids Analysis Records			✓
Reduction Formulae			✓
Chemist Notebook Pages		✓	

2. HOLDING TIMES

Were all samples analyzed within holding times? Yes (No) N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995?	Yes	No	N/A
Was a balance check conducted prior to the TDS analysis?	Yes	No	N/A
Was the titrant normality checked?	Yes	No	N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?	Yes	No	N/A
Are ICV and CCV percent recoveries within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

5. LABORATORY BLANKS

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

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U) and list the affected samples and analytes below.

6. FIELD BLANKS

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

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?	Yes	No	N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are >CRQL, qualify the data as estimated (J). If the spike recovery is <30% and the sample results are less then the IDL qualify the data as unusable (R).

8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

9. PERFORMANCE AUDIT ANALYSES

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

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

10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits? Yes No N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are instrument detection limits below the CRDL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

14. OVERALL ASSESSMENT AND SUMMARY

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

HOLDING TIME SUMMARY - FORM B-1

SDG: B00J75	REVIEWER: S. Schildt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Wet Chemistry			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B00J75A	NO_3	4-1-91		4-21-91		20	J
↓	PO_4	↓		↓		↓	J
↓	SO_4	↓		↓		↓	~~J~~ none 355 9-23-92
B00J76A	NO_3	↓		↓		↓	J
↓	PO_4	↓		↓		↓	J
↓	SO_4	↓		↓		↓	~~J~~ none 355 9-23-92

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INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWER: S.Schildt	DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE: ~~B00J75~~ SSS 9/17/92	SDG: B00J75
SAMPLES/MATRIX: B00J75A, B00J76A/soil		

1. COMPLETENESS AND CONTRACT COMPLIANCE

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

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

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

Was a midrange cyanide standard distilled? Yes **(No)** N/A

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

Are there calculation errors? Yes **(No)** N/A

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

Are there calculation errors? Yes **(No)** N/A

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

6. LABORATORY BLANKS

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

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

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

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required?	Yes	No	N/A
Are MSA correlation coefficients ≥0.995?	Yes	No	N/A
If no, was a second MSA analysis performed?	Yes	No	N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is ≥10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes	No	N/A
Are all detection limits below the CRQL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

1. No cyanide distillation log provided.

2. 1 blank and 1 standard used for cyanide calibration.

HOLDING TIME SUMMARY - FORM B-1

SDG: B00J75	REVIEWER: S. Schildt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B00J75N/76	Bi	4-1-91	7-14-91	7-16-91	104	106	none
	Se	↓	6-10-91	6-27-91	70	87	none
	CN	↓	NA	5-20-91	NA	50	J

9613496.1297

ACCURACY DATA SUMMARY - FORM B-4

SDG: B00J75	REVIEWER: S Schilbt	DATE: 9-17-92	PAGE 1 OF 1	
COMMENTS: Spike Sample Recovery (ICP)				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B00J76S	Bismuth	9.9	B00J76A, B00J75A	R

9613496.1298

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B00J75	REVIEWER: S. Schilatt	DATE: 9-17-92	PAGE 1 OF 1
COMMENTS: Inorganics			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB 2	Se	-2.1	B		mg/kg	10.5		None	

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9613496.1300

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

9613496.1301

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.

9615496.1302

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00FH5	REVIEWER: [illegible]	DATE: 8/15/92	PAGE 1 OF __
COMMENTS: VOA			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
~~All~~	~~UJ~~	~~B00FH5~~	~~Holding~~
			Time
Acetone	UJ	B00F94	CCal%D
12 Dichloroethane			>25
~~Carbon Tet.~~ ~~1112 TCA~~			
Vinyl Acetate			
Bromodichloro			
Methane			
Trans 13 Dichloro			
Propene			
Dibromochloro			
Methane			
112 TCA			
Bromoform			
4-Me-2-Pent	✓	✓	✓
Acetone	U	B00F94	Present in
2-Hexanone	✓	✓	Blank
1122 TCA	✓	✓	✓
2-Butanone	UJ	B00FH5	ICal%RSD>30
Acetone		B00F94	✓
Acetone		B00FH5	CCal%D>25
2-Butanone			
2-Hexanone	✓	✓	✓

8/15/92

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: 1300FH5	REVIEWER: KMB	DATE: 8/15/92	PAGE 1 OF __
COMMENTS: BNA			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
2,4,5-Trichloro	UJ	1300FH5	Cal %D>25
phenol			
			ICal %RSD>30
Bis-(2-chloroethyl)Ether	UJ	1300F94	~~Total %D>25~~ 30 UJ 8/15/92
3-Nitroaniline	UJ	"	"
Diethyl phthalate	UJ		
4-Chlorophenyl	UJ		
phenyl ether			
Fluorene	UJ		
2,4,5-Trichloro	UJ	1300F94	Cal %D
phenol			>25
4-Chlorophenyl-	UJ		
phenyl ether			
4,6-Dinitro-2-	UJ		
methyl phenol			
All	UJ	1300FH5	Holding
		and 1300F94	Times
			Missed
			for Prep.
Dimethyl Phthal	R	1300F94	Suspect
			Lab-Contaminant

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00FH5	REVIEWER: [illegible]	DATE: 8/13/92	PAGE 1 OF 1
COMMENTS: Pest / PCB			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	UJ	B00FH5	Holding Times Missed

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00FH5	REVIEWER: KMA	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	LCS %R <50%
Sodium	J	All	ICP Serial Dilution %D >10%
Aluminum	U	All	Present in Blanks
IRON	U	B00FH6 B00F95	↓
Thallium	~~B00FT~~ UJ	B00FH6	GFAA Spike %R <85%
Selenium	UJ	B00F94	GFAA Spike %R <85%

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00FH5	REVIEWER: KMA	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: Wet Chemistry			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Conductivity	J	B00FH5	Holding
TOX	↓	↓	Time
Turbidity	↓	↓	↓
pH	↓	↓	↓
Conductivity	J	B00F94	Holding
Fluoride	J	↓	Time
Nitrate	J	↓	↓
Nitrite	UJ	↓	↓
TOX	UJ	↓	↓
Turbidity	J	↓	↓
pH	J	↓	↓
TOX	J	B00FH5	%R <75%
TDS	J	B00FH5	Holding
Fluoride	J	↓	Time
Nitrate	J	↓	↓
Nitrite	UJ	↓	↓

9613496.1308

ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

9613496.1309

0100

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00FH5

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-0016 SAS No.: NA SDG No.: B00FH5

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.	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	10.	~~U~~ UJ
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~~ UJ
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
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
10061-02-6	trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-pentanone	10.	U
591-78-6	2-Hexanone	10.	~~U~~ UJ
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
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

9/14

BIK: 910405-039

9613496.1310

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00F94

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: 9130-1016 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		Q	
74-87-3	Chloromethane	10	U	UJ 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	10 ~~4~~	~~BJ~~ UJ	
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	UJ
78-93-3	2-Butanone	10	U	
71-55-6	1,1,1-Trichloroethane	5	U	UJ U
56-23-5	Carbon Tetrachloride	5	U	UJ
108-05-4	Vinyl Acetate	10	U	UJ
75-27-4	Bromodichloromethane	5	U	UJ
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	UJ
79-01-6	Trichloroethene	5	U	
124-48-1	Dibromochloromethane	5	U	UJ
79-00-5	1,1,2-Trichloroethane	5	U	UJ
71-43-2	Benzene	5	U	
75-25-2	Bromoform	5	U	UJ
108-10-1	4-Methyl-2-Pentanone	10	U	UJ
591-78-6	2-Hexanone	10 ~~2~~	~~BJ~~ U	
127-18-4	Tetrachloroethene	5	U	
79-34-5	1,1,2,2-Tetrachloroethane	5 ~~2~~	~~BJ~~ U	
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	

Mart 8/15/92

1B
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: >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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
108-95-2	Phenol	10.	~~UJ~~ UJ
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.

BOOFH5

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001 SAS No.: NA SDG No.: ~~NA~~ BOOFH5

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
99-09-2	3-Nitroaniline	50.	~~U~~ UJ
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

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00F94

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: B00FH5

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
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.

B00F94

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: B00FH5

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

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.
B00F94

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: 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 ~~2~~.00000

Number TICs found: 1

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

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

FORM I SV-TIC 1/87 Rev.

8/15/92

cm 4/17/91

9613496.1316

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOFH5

ab Name: Martin Marietta Contract: 2/88

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

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

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

evel (low/med): low Date Received: 03/31/91

Moisture: not dec. dec. Date Extracted: 04/07/91

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

PC 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

8/15/92

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOF94

ıb Name: Martin Marietta Contract: 2/88

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

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

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

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

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

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

PC 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	R
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	J
	Strontium	185			P	
	Tin	37.8		*	P	R
7440-62-2	Vanadium	15.6	B		P	
7440-66-6	Zinc	7.3	B		P	

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

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH5

ab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

ab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOFH5

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

evel (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

8/15/92

olor Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

olor After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

omments:

FORM I - IN

9613496.1320

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00FH5

Lab Name: Martin Marietta Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: B00FH5

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

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

% Solids: N/A

Concentration Units (~~ug/L~~ SRS 3/8/92 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	<0.1			R

Mark 8/15/92

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

9613496.1321

ENVIROFORMS/CLP 788

SAMPLE NO.

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	u
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	R
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	u
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	J
	Strontium	186			P	
	Tin	30.0	~~U~~	~~*~~	P	R
7440-62-2	Vanadium	13.9	B		P	
7440-66-6	Zinc	1.3	B		P	

MAB 8/15/91

olor Before: COLORLESS Clarity Before: CLEAR Texture:

olor After: COLORLESS Clarity After: CLEAR Artifacts:

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

9613496.1322

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOOFH6

ab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

ab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: BOOFH5

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

evel (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
			_		

UJ

8/15/92

olor Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

olor After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

omments:

FORM I - IN

3/90

9613496.1323

ENVIROFORMS/CLP 788

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

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	U
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	R
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	J
	Strontium	214			P	
	Tin	30.0	~~U~~	~~*~~	P	R
7440-62-2	Vanadium	21.0	B		P	
7440-66-6	Zinc	1.0	U		P	

MAA 8/15/92

olor Before: COLORLESS Clarity Before: CLEAR Texture:

olor After: COLORLESS Clarity After: CLEAR Artifacts:

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

9613496.1324

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B00F94

Lab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

Lab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.: B00FH5

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_ UJ
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

MW 8/15/92

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

3/90

9613496.1325

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B00F94

Lab Name: Martin Marietta Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: B00F H5

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

Level (low/med): _____ Date Received: 8-Apr-1991

% Solids: N/A

Concentration Units (~~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	<0.1			R

8/15/92

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

9613496.1326

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	U
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	R
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	U
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	J
	Strontium	217			P	
	Tin	30.0	U	*	P	K
7440-62-2	Vanadium	19.7	B		P	
7440-66-6	Zinc	1.0	U		P	

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

9613496.1327

U.S. EPA - CLP

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

8/15/92

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

3/90

4-1-1
INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

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

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

ACD Sample ID Number: 910403-102
Customer 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	J	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	J	Mg/l	91-21I	6-May-91
Turbidity	0.60	J	NTU	91-22	8-Apr-91
pH	8.1	J		91-39	8-Apr-91

8/15/92

Comments:

9613496.1329

4-1-2
INORGANIC ANALYSES DATA SHEET
WET CHEMISTRY

Lab Name: Oak Ridge K-25 Site Analytical Chemistry Department

Contract: Westinghouse Hanford Company

Matrix (soil/water): Water

SDG#: BOOFH5

ACD Sample ID Number: 910408-029

Customer 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	J	umho/cm	91-14	9-Apr-91
Dissolved Solids	298		Mg/l	91-23	10-Apr-91
Fluoride SIE	0.9	J	Mg/~~g~~L	91-35	22-May-91
Nitrate	66	J	Mg/~~g~~L	91-45IA	10-Apr-91
Nitrate Nitrogen	N/A				
Nitrite	<1	UJ	Mg/~~g~~L	91-45IA	19-Apr-91
Nitrite Nitrogen	N/A				
Ortho Phosphate	N/A				
Sulfate	31		Mg/~~g~~L	91-45IA	19-Apr-91
Total Organic Carbon	<1		mg/l	91-260	13-Apr-91
Total Organic Halides	<10	UJ	ug/l	91-21I	21-May-91
Turbidity	0.53	J	NTU	91-22	9-Apr-91
pH	8.1	J		91-40	9-Apr-91

8/15/92

Comments:

9613496.1330

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: 200 BP1	REVIEWER: KMA	DATE:
LABORATORY: K-25	CASE: 300FH5	SDG: 300FH5
SAMPLES/MATRIX: 300FH5, ~~FH6~~ 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 submittal.

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

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

2. HOLDING TIMES

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

Were all samples analyzed within holding time? 9/15/92 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

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

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

3.2 INITIAL CALIBRATION

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

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

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (J) and all 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?	Yes	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	Yes	No	N/A
Are all %D values ≤25% (2/88 or 3/90 SOW)?	Yes	No	N/A
Are all %D values ≤40% (3/90 SOW)?	Yes	No	N/A
Are all RRF values within SOW limits (3/90 SOW)?	Yes	No	N/A
Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?	Yes	No	N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all associated detected results as estimated and all 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?	Yes	No	N/A
Are TCL compounds present in the laboratory blanks? Chloroform, 2-Hex, Acet, 2-Butanone, 1122-TCA	Yes	No	N/A

ACTION: Qualify all sample results ≤10 time 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 TCL compounds present in the field blanks? Yes No N/A

ACTION: Qualify all detected sample results ≤ 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 >5xCRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

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

6.3 FIELD SPLIT SAMPLES

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

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

7. SYSTEM PERFORMANCE

7.1 INTERNAL STANDARDS PERFORMANCE

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

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

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (J for detects or UJ for 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 ±0.06 relative retention time units of the associated calibration standard? Yes **No** N/A

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

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

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

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

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

8.2 REPORTED RESULTS AND QUANTITATION LIMITS

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

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

Has the laboratory reported the sample quantitation limits within 5xCRQL 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).

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.

HOLDING TIME SUMMARY - FORM B-I

SDG: 1300FH5	REVIEWER: K. Mott	DATE: 9/1/92	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
1300FH5	VOA	3/27/91	—	4/5/91	—	9	~~J/UJ~~ none MKM 4/14/92
1300F94	"	4/3/91	—	4/10/91	—	7	none

3A
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001 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 LIMITS REC.
1,1-Dichloroethene	50.00	0.00	36.00	72	61-145
Trichloroethene	50.00	0.00	31.00	61 *	71-120
Benzene	50.00	0.00	40.00	80	76-127
Toluene	50.00	0.00	36.00	72 *	76-125
Chlorobenzene	50.00	0.00	38.00	75	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50.00	33.00	65	10	14	61-145
Trichloroethene	50.00	28.00	55 *	10	14	71-120
Benzene	50.00	38.00	76	5	11	76-127
Toluene	50.00	33.00	66 *	8	13	76-125
Chlorobenzene	50.00	36.00	71 *	5	13	75-130

8/15/92

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 G132-001C AS No.: NA SDG No BOOFH5

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
RRF100=>08534 RRF150=>08535 RRF200=>08536

COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	$\overline{RRF}$	% 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	5.8*
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	3.8
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

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: MARTINMARIETTA Contract: _____

Lab Code: _____ Case No.: 6132-0016 SAS No.: _____ SDG No.: B00FH5

Instrument ID: 5100 Calibration Date(s): 03/08/91 03/08/91

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 = IC10308 RRF50 = IC20308
RRF100= IC30308 RRF150= IC40308 RRF200= IC50308

COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	$\overline{RRF}$	% RSD
Chloromethane #	3.076	3.177	3.012	2.926	3.010	3.040	3.1#
Bromomethane	2.007	1.899	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	3.522	3.426	3.395	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	0.355	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	0.788	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	0.817	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/B00FH5

Lab Name:MARTIN MARIETTA Contract:0288

Lab Code: K25 Case No.: G132-001 SAS No.: NA SDG No.: B00FH5

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

Lab File ID: >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

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7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: G132-001C SAS No.: _____ SDG No.: BOOFH5

Instrument ID: 5100 Calibration date: 04/10/91 Time: 0710

Lab File ID: VTD0410 Init. Calib. Date(s): 03/08/91 03/08/91

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%

Assoc w/ BOOFH4

COMPOUND		$\overline{RRF}$	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	J/UJ
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	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

0100
EPA SAMPLE NO.

VBLK02 116

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: G132-001 SAS No.: _____ SDG No.: B00FH5

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		Q
74-87-3	Chloromethane	1	J x5=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	x10=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 x5=15
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	1	J x5=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

BK 910410-052

FORM I VOA

8/15/92

1/87 Rev

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

PROJECT: 200 BP1	REVIEWER: KMA	DATE: 8/15/92
LABORATORY: K25	CASE: —	SDG: B00FH5
SAMPLES/MATRIX:		
B00FH5 / 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	✓		
Data Summary		✓	
Chain-of-Custody	✓		
QC Summary			
Surrogate report	✓		
MS/MSD report		✓	
Blank summary report	✓		
GC/MS tuning report	✓		
Internal standard summary report	✓		
Sample Data			
Sample reports	✓		
TIC reports for each sample	✓		
RIC reports for all samples	✓		
Raw and corrected spectra for all detected results	✓		
Raw and corrected library search data for all reported TIC			✓
Quantitation and calculation data for all TIC			✓
Standards Data			
Initial calibration report	✓		
RIC and quantitation reports for initial calibration	✓		
Continuing calibration reports	✓		
RIC and quantitation reports for cont. calibrations	✓		
Internal standard summary report	✓		
Raw QC Data			
Tuning report, spectra and mass lists	✓		
Blank analysis reports	✓		
TIC reports for all blanks	✓		
RIC and quantitation reports for blanks	✓		
Raw and corrected spectra for all detected results in blanks	✓		
Raw and corrected library search data for all reported TIC			✓
Quantitation and calculation data for all TIC			✓
MS/MSD report forms		✓	

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

2. HOLDING TIMES

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

ACTION: If any holding times were exceeded, but not by greater than a factor of two, qualify associated samples as estimated (J for detects or UJ for 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 transciption errors?	Yes	(No)	N/A
Have the proper significant figures been reported?	(Yes)	No	N/A

ACTION: If the mass calibration is out of specification but within the expanded criteria, qualify associated data as estimated (J for detects and UJ for 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 ≤30% (2/88 SOW)?	Yes	(No)	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	(Yes)	No	N/A
Are all applicable RSD values ≤20.5% (3/90 SOW)?	Yes	No	(N/A)
Are all applicable RSD values ≤40% (3/90 SOW)?	Yes	No	(N/A)

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

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

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (J) and all 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 ≥0.05 (2/88 SOW)? Yes No N/A

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

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

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

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

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all associated detected results as estimated and all 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 ≤ 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 >5xCRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

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

6.3 FIELD SPLIT SAMPLES

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

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

7. SYSTEM PERFORMANCE

7.1 INTERNAL STANDARDS PERFORMANCE

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

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

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (J for detects and UJ for 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 ±0.06 relative retention time units of the associated calibration standard?	Yes	No	N/A
Are all ions at a relative intensity of ≥10% in the standard spectra present in the sample spectra?	Yes	No	N/A
Do the relative intensities between the standard and sample spectra agree within 20%?	Yes	No	N/A
Have all ions > 10% in the sample spectra that are not present in the standard spectra been reviewed for possible background contamination?	Yes	No	N/A
Are molecular ions in the reference spectrum present in the sample spectrum?	Yes	No	N/A

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

8.2 REPORTED RESULTS AND QUANTITATION LIMITS

Has the laboratory used the correct RRF values and internal standards for quantitation?	Yes	No	N/A
Are results and quantitation limits calculated properly?	Yes	No	N/A
Has the laboratory reported the sample quantitation limits within 5xCRQL 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.

MJL
8/15/02

HOLDING TIME SUMMARY - FORM B-1

SDG: B0FH5	REVIEWER: KRA	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: SV			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0FH5	BNA	3/27/91	4/2/91	4/11/91	11	4	UJ
B0F94	↓	4/3/91	4/11/91	4/15/91	8	4	UJ

9613496.1353

9613496.1354

Assoc w/ BOOFH5

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-0~~31~~ 1C SAS No.: NA SDG No.: ~~NA~~ BOOFH5

Instrument ID: 70 #3 Calibration Date: 4/11/91 Time: 8:14 CM 4/22

Lab File ID: >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/UJ

8/15/92

9613496.1355

6B

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Assoc w/BOOFH4

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(*) = 30.0

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	20.4
bis(2-Chloroethyl)ether	2.642	1.959	1.643	1.263	1.165	1.734	34.5
2-Chlorophenol	2.153	1.651	1.517	1.630	1.442	1.679	16.6
1,3-Dichlorobenzene	1.907	1.496	1.319	1.338	1.308	1.474	17.2
1,4-Dichlorobenzene *	1.714	1.402	1.124	1.057	1.047	1.269	22.7
Benzyl_alcohol	1.075	.770	.871	.982	.836	.907	13.4
1,2-Dichlorobenzene	1.760	1.339	1.220	1.204	1.135	1.332	18.8
2-Methylphenol	2.166	1.516	1.413	1.595	1.608	1.659	17.7
bis(2-chloroisopropyl)ether	3.849	2.760	2.783	3.040	2.995	3.085	14.4
4-Methylphenol	1.779	1.181	1.332	1.471	1.640	1.480	16.1
N-Nitroso-di-n-propylamine #	1.876	1.325	1.727	1.924	1.738	1.718	13.7
Hexachloroethane	.722	.555	.561	.589	.527	.591	13.0
Nitrobenzene	.654	.525	.524	.596	.790	.618	17.9
Isophorone	1.394	1.094	1.183	1.297	1.335	1.261	9.6
2-Nitrophenol *	.337	.266	.280	.289	.296	.294	9.3
2,4-Dimethylphenol	.583	.461	.488	.538	.532	.520	9.1
Benzoic_acid	0.000	.259	.257	.300	.308	.281	9.4
bis(2-Chloroethoxy)methane	.878	.663	.726	.810	.824	.780	10.9
2,4-Dichlorophenol *	.425	.336	.325	.336	.326	.350	12.2
1,2,4-Trichlorobenzene	.424	.341	.313	.324	.286	.338	15.5
Naphthalene	1.151	1.029	.886	.885	.876	.965	12.6
4-Chloroaniline	.697	.559	.548	.602	.600	.601	9.8
Hexachlorobutadiene *	.207	.166	.155	.154	.139	.164	15.8
4-Chloro-3-methylphenol *	.564	.440	.461	.501	.499	.493	9.6
2-Methylnaphthalene	.773	.596	.958	.997	.594	.783	24.5
Hexachlorocyclopentadiene #	.360	.280	.281	.297	.257	.295	13.2
2,4,6-Trichlorophenol *	.535	.420	.430	.526	.482	.479	11.1
2,4,5-Trichlorophenol	0.000	.485	.390	.328	.266	.367	25.4
2-Chloronaphthalene	1.621	1.276	1.115	1.102	.967	1.216	20.7
2-Nitroaniline	0.000	.688	.712	.786	.773	.740	6.4
Dimethylphthalate	1.477	1.551	1.254	1.243	1.014	1.308	16.3
Acenaphthylene	2.434	1.936	1.495	1.437	1.135	1.687	30.0
2,6-Dinitrotoluene	.453	.377	.321	.356	.319	.365	15.0
3-Nitroaniline	0.000	.316	.344	.425	.182	.317	31.8
Acenaphthene *	1.412	1.190	1.023	.943	.802	1.074	21.9
2,4-Dinitrophenol #	0.000	.226	.266	.302	.289	.271	12.3
4-Nitrophenol #	0.000	.203	.211	.239	.231	.221	7.7

MJF 8/15/92

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

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 $\overline{RRF}$ for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0

LAB FILE ID: RRF20 =>11306 RRF50 =>11305
RRF80 =>11307 RRF120=>11308 RRF160=>11309

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
Dibenzofuran	2.129	1.721	1.480	1.561	1.287	1.636	19.4
2,4-Dinitrotoluene	.753	.597	.571	.616	.562	.620	12.5
Diethylphthalate	1.877	1.402	1.002	.874	.687	1.168	40.7
4-Chlorophenyl-phenylether	.712	.564	.360	.296	.196	.425	49.[illegible]
Fluorene	1.372	1.109	.790	.778	.659	.942	31.1
4-Nitroaniline	0.000	.402	.422	.526	.426	.444	12.5
4,6-Dinitro-2-methylphenol	0.000	.150	.138	.107	.081	.119	26.2
N-Nitrosodiphenylamine (1) *	.667	.528	.440	.405	.384	.484	23.9
4-Bromophenyl-phenylether	.260	.206	.183	.183	.177	.202	17.1
Hexachlorobenzene	.330	.265	.237	.230	.206	.254	18.7
Pentachlorophenol *	0.000	.199	.168	.182	.154	.176	11.0
Phenanthrene	1.073	1.033	.925	.977	.824	.967	10.1
Anthracene	1.174	.974	.730	.667	.629	.835	27.8
Di-n-butylphthalate	2.066	1.597	1.421	1.358	1.320	1.553	19.7
Fluoranthene *	1.392	1.098	.969	.978	.945	1.076	17.3
Pyrene	2.125	1.649	1.676	1.984	2.394	1.966	16.0
Butylbenzylphthalate	1.508	1.179	1.183	1.458	1.807	1.427	18.3
3,3'-Dichlorobenzidine	.314	.224	.232	.272	.270	.262	13.9
Benzo(a)anthracene	1.679	1.334	1.258	1.514	1.713	1.500	13.5
Chrysene	1.330	1.142	1.039	1.189	1.274	1.195	9.5
bis(2-Ethylhexyl)phthalate	1.980	1.572	1.559	1.701	1.849	1.732	10.5
Di-n-octylphthalate *	2.759	2.516	1.844	1.775	1.749	2.128	22.3
Benzo(b)fluoranthene	1.664	1.510	1.440	1.298	1.065	1.396	16.3
Benzo(k)fluoranthene	.893	.778	.584	.824	.672	.750	16.3
Benzo(a)pyrene *	1.262	1.106	.951	.967	.941	1.045	13.2
Indeno(1,2,3-cd)pyrene	.997	.907	.876	.923	.908	.922	4.9
Dibenz(a,h)anthracene	.546	.494	.476	.498	.499	.503	5.2
Benzo(g,h,i)perylene	.868	.796	.774	.842	.829	.822	4.5
Nitrobenzene-d5	.768	.595	.635	.673	.624	.659	10.2
2-Fluorobiphenyl	1.711	1.335	1.066	1.015	.813	1.188	29.2
Terphenyl-d14	1.285	1.019	.984	1.166	1.184	1.128	11.0
Phenol-d6	2.994	2.208	1.888	1.896	1.787	2.155	23.0
2-Fluorophenol	1.872	1.558	1.396	1.504	1.753	1.617	11.9
2,4,6-Tribromophenol	.198	.159	.131	.132	.124	.149	20.6

(1) Cannot be separated from Diphenylamine

8/15/92

9613496.1357

Assoc w/B00F94

7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: ~~NA~~ B00FH5

Instrument ID: 70 #3 Calibration Date: 4/15/91 Time: 6:31 CM 4/23/91

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	#

J/UJ

8/15/92

9613496.1358

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: ~~NA~~ B00FH5

Instrument ID: 70 #3 Calibration Date: 4/15/91 Time: 6:31

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	
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	J/UJ
Fluorene	.942	1.109	17.8	
4-Nitroaniline	.444	.402	9.5	
4,6-Dinitro-2-methylphenol	.119	.151	26.4	J/UJ
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	

(1) Cannot be separated from Diphenylamine

PESTICIDE/PCB DATA VALIDATION CHECKLIST - FORM A-3

PROJECT: 2021-BP-1	REVIEWER: [illegible]	DATE: 8/15/97
LABORATORY: K25	CASE: ———	SDG: BCDFH5
SAMPLES/MATRIX:		
BCDFH5 / FS4		

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	✓		
Data Summary		✓	
Chain-of-Custody	✓		
QC Summary			
Surrogate report	✓		
MS/MSD report		✓	
Blank summary report	✓		
Sample Data			
Sample reports	✓		
Chromatograms	✓		
GC integration reports	✓		
Worksheets		✓	
UV traces from GPC			✓
GC/MS confirmation spectra			✓
Standards Data			
Pesticides Evaluation Standards Summary	✓		
Pesticides/PCB Standards Summary	✓		
Pesticides/PCB identification		✓	
Pesticides standard chromatograms	✓		
Raw QC Data			
Blank analysis report forms and chromatograms	✓		
MS/MSD report forms and chromatograms		✓	

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

2. HOLDING TIMES

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

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

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

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (2/88 SOW)

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

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

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

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

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

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

Are DDT breakdowns $\leq$20%? **(Yes)** No N/A

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

Are endrin breakdowns $\leq$20%? **(Yes)** No N/A

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 ocurring repeatedly in samples and standards, qualify affected sample results as unusable (R).

3.2 CALIBRATIONS (2/88 SOW)

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

Have all standards been analyzed within 72 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 ≤15% for quantitation standards and ≤20% for confirmation standards? Yes No N/A

ACTION: If the RSD criteria were exceeded or three point calibrations not conducted qualify associated detects as estimated (J). If all standards were not analyzed at the beginning of each 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 ≤20.0% Yes No N/A

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

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

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

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

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

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

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

3.4 CALIBRATION VERIFICATION (3/90 SOW)

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

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

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

ACTION: If the resolution criteria are not met reject positive sample results generated after a 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 (±0.04, ±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 ≤25.0%? Yes No N/A

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

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

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

4. BLANKS

4.1 LABORATORY BLANKS

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

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

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

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

ACTION: Qualify all associated positive results as 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 >5xCRQL qualify positive results as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

6.2 FIELD DUPLICATE SAMPLES

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

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

6.3 FIELD SPLIT SAMPLES

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

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

7. COMPOUND IDENTIFICATION AND QUANTITATION

7.1 COMPOUND IDENTIFICATION

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

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

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

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

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

ACTION: If positive results do not meet the retention time criteria qualify all detected results as 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 disimilar columns, reject affected results (R). If a 3% OV-1 was used to confirm dieldrin and DDE, reject the affected data (R). If PCB, chlordane or toxaphene identification is questionable qualify the results as presumptive and estimated (NJ). If GC/MS confirmation was not conducted contact the laboratory for explanation and note in the validation narrative.

7.2 REPORTED RESULTS AND QUANTITATION LIMITS

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

Has the laboratory reported the sample quantitation limits within 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):

MS/MSD not performed due to insufficient sample supplied

[illegible]
8/15/96

HOLDING TIME SUMMARY - FORM B-1

SDG: 200FH5	REVIEWER: [illegible]	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: Pest / PCB			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
200FH5	Pest	3/27/91	4/7/91	5/6/91	11	29	J/UJ
200F94	Pest	4/3/91	4/9/91	↓	6	27	none

9613496.1368

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200BP1	REVIEWER: KWA	DATE: 8/15/92
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	✓	—	—
Cover Page	✓	—	—
~~Traffic Reports~~ Chain of Custody	✓	—	—
Sample Data			
Inorganic Analysis Data Sheets	✓	—	—
Standards Data			
Initial and Continuing Calibration Verification	✓	—	—
CRDL Standard for AA and ICP	✓	—	—
QC Summary			
Blanks	✓	—	—
ICP Interference Check Summary	✓	—	—
Spike Sample Recovery	✓	—	—
Post-Digestion Spike Sample Recovery	—	✓	—
Duplicate	✓	—	—
Laboratory Control Sample	✓	—	—
Standard Addition Results	✓	—	—
ICP Serial Dilutions	✓	—	—
Instrument Detection Limits	✓	—	—
ICP Interelement Correction Factors	✓	—	—
ICP Linear Ranges	✓	—	—
Preparation Log	✓	—	—
Analysis Run Log	✓	—	—
Raw Data			
ICP Raw Data	✓	—	—
Furnace AA Raw Data	✓	—	—
Mercury Raw Data	✓	—	—
Cyanide Raw Data	✓	—	—
Additional Data			
Internal laboratory chain-of-custody	—	✓	—
Laboratory Sample Preparation Records	✓	—	—

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

2. HOLDING TIMES

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

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

3. INITIAL CALIBRATIONS

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

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

Was a midrange cyanide standard distilled? Yes **(No)** N/A

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

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

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

Are there calculation errors? Yes **(No)** N/A

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

5. ICP INTERFERENCE CHECK SAMPLE

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

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

Are there calculation errors? Yes **(No)** N/A

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

6. LABORATORY BLANKS

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

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

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

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

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

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

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

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

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required? Yes No N/A

Are MSA correlation coefficients $\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 correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly? Yes No N/A

Are results within the calibrated range of the instruments and within the linear range of the ICP? Yes No N/A

Are all detection limits below the CRQL? Yes No N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

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

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

8/15/92

COMMENTS (attach additional sheets as necessary):

No comments

8/15/96

HOLDING TIME SUMMARY - FORM B-1

SDG: 300FH5	REVIEWER: [illegible]	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: Metals			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
300FH5/6	ICP	3/27/91	—	7/16/91	—	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
300F94/5	ICP	4/3/91	—	7/16/91	—	104	none
	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

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B00FH5	REVIEWER: [illegible]	DATE: 8/15/92	PAGE 1 OF 1
COMMENTS: Blanks			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
	Aluminum	35.3			ug/L	176.5		B00FH5	U
								B00FH6	U
								B00F94	U
								B00F95	U
	IRON	17.9			ug/L	89.5		B00FH6	U
								B00F95	U
	Magnesium	23.2			ug/L	116		None	—
	Sodium	112.9			"	564.5		None	—

96134996.1376

ENVIROFORMS/CLP 788

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 Level (low/med): LOW
% Solids for Sample: 0.0

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		1000.00	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		2000.00	107.0		P
Tin	75-125	2184.2000		37.8000		2000.00	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 Rejected
Gmt 8/15/92

Comments:

ENVIROFORMS/CLP 788

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) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	1000.0	1018.20	101.8	325.0	423.8		225.0	424.0	130.4
Antimony	1000.0	985.90	98.6	211.0	214.9		127.0	294.0	101.8
Barium	1000.0	992.50	99.2	4.8	6.7	B	0.0	40.0	139.6
Beryllium	1000.0	1022.50	102.2	19.4	19.9		16.5	22.3	102.6
Bismuth	200.0	199.50	99.8	400.0	63.6				15.9
Cadmium	1000.0	990.00	99.0	45.4	49.3		35.7	55.1	108.6
Calcium	1000.0	1020.40	102.0	196200.0	217895.9		166800.0	225600.0	111.1
Chromium	1000.0	1010.30	101.0	99.6	114.9		79.2	120.0	115.4
Cobalt	1000.0	988.80	98.9	144.0	158.9		125.0	162.0	110.3
Copper	1000.0	973.40	97.3	6910.0	7025.8		6006.0	7820.0	101.7
Iron	1000.0	1034.90	103.5	22430.0	23158.3		17770.0	27080.0	103.2
Magnesium	1000.0	1004.40	100.4	118100.0	115566.3		100400.0	129900.0	97.9
Manganese	1000.0	1011.20	101.1	208.0	227.7		177.0	239.0	109.5
Nickel	1000.0	1014.00	101.4	60.9	73.9		49.2	72.6	121.3
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	120.3
Sodium	1000.0	977.30	97.7	50.0	199.6	B	0.0	1000.0	399.2
Strontium	2000.0	2050.70	102.5						
Tin	2000.0	23.50	1.2	400.0	117.2				29.3
Vanadium	1000.0	1006.70	100.7	65.8	73.1		51.7	79.9	111.1
Zinc	1000.0	977.30	97.7	187.0	206.5		138.0	236.0	110.4

Tin Reported
[illegible]
2/15/92

ENVIROFORMS/CLP 788

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/NJ

8/15/92
Sodium estimated

9613496.1380

U.S. EPA - CLP

14
ANALYSIS RUN LOG

ab Name: MARTIN_MARIETTA_K25_SITE_ Contract: HANFORD___

ab Code: K25ACD Case No.: _____ SAS No.: _____ SDG No.:BOOFH5

nstrument ID Number: PE_5100_____ Method: F_

tart Date: 06/19/91 End Date: 06/19/91

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	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						
ICB	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~~ 86																		X						
BOOHF6S	1.00	1554	2-28-92																		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																									

FORM XIV - IN 3/90

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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																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	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			
ICB	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			
BOOHF6S	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			

8/15/92

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200 BP1	REVIEWER: [illegible]	DATE: 8/15/96
LABORATORY: K25	CASE: —	SDG: 1300FH5
SAMPLES/MATRIX: 1300FH5 / 1300F94		

1. DATA PACKAGE COMPLETENESS

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

Data Package Item	Present?: Yes	No	N/A
Case Narrative	✓	—	—
Cover Page	✓	—	—
Traffic Reports/Chain-of-Custody	✓	—	—
Sample Analysis Data Report Forms	✓	—	—
Standards Data	✓	—	—
QC Summary			
Blanks Summary Report Forms	✓	—	—
Spike Sample Recovery Report Forms	✓	—	—
Duplicate Sample Analysis Report Forms	✓	—	—
Laboratory Control Sample Report Forms	✓	—	—
Raw Data			
Ion Chromatograph Chromatograms	✓	—	—
TOC and TOX Instrument Printouts	✓	—	—
Laboratory Bench Sheets	✓	—	—
Additional Data			
Laboratory Sample Preparation Logs	✓	—	—
Instrument Run Logs	✓	—	—
Internal Laboratory Chain-of-Custory	—	✓	—
Percent Solids Analysis Records	—	—	✓
Reduction Formulae	—	✓	✓
Chemist Notebook Pages	✓	—	—

2. HOLDING TIMES

Were all samples analyzed within holding times? Yes (No) N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

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

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

Was a balance check conducted prior to the TDS analysis? 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 then the IDL qualify the data as unusable (R).

8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

9. PERFORMANCE AUDIT ANALYSES

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

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

10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits? Yes No N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits? Yes No N/A

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

13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly? Yes No N/A

Are instrument detection limits below the CRDL? Yes No N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

14. OVERALL ASSESSMENT AND SUMMARY

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

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

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

HOLDING TIME SUMMARY - FORM B-1

SDG: B00FH5 REVIEWER: KMA DATE: 8/15/92 PAGE 1 OF 2

COMMENTS: wet Chem.

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B00FH5	Alk.	3/27/91	—	4/8/91	—	12	none
	Amm.			4/10/91		14	
	COD			4/8/91		12	
	Cl			4/19/91		23	
	EC			4/5/91		9	J/UJ
	TDS			4/8/91		12	
	F			5/3/91		37	
	NO_3			4/19/91		23	
	NO_2			4/19/91		23	
	SO_4			4/19/91		23	~~J~~ none
	TOC			4/13/91		17	none
	TOX			5/6/91		40	J/UJ
	NTU			4/8/91		12	
	PH-Lab		—	4/8/91	—	12	

see status

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9613496.1387

HOLDING TIME SUMMARY - FORM B-1

SDG: 1300F94 REVIEWER: Kurt DATE: 8/15/92 PAGE 2 OF 2

COMMENTS: wet Chem.

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
1300F94	Alk.	4/3/91	—	4/9/91	—	6	none
	Amm.			4/10/91		7	
	COD			4/10/91		7	
	Cl			4/19/91		16	
	EC			4/9/91		6	J/UJ
	TDS			4/10/91		7	none
	F			5/22/91		49	J/UJ
	NO_3			4/10/91		7	J/UJ
	NO_2			4/19/91		16	J/UJ
	SO_4			4/19/91		16	none
	TOC			4/13/91		10	
	TOX			5/21/91		48	J/UJ
	NTU			4/9/91		6	
	PH-Lab		—	4/9/91	—	6	

4-2-1
INITIAL CALIBRATION VERIFICATION
WET CHEMISTRY

Oak Ridge K-25 Site
ab Name: Analytical Chemistry Department

Westinghouse
Contract: Hanford Company

)G#: BOOFH5

Analyte	Units	Batch No.	Initial Calibration True	Found	%R
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% J/UJ
Turbidity	NTU	91-22	9.0	9.1	101.1%
pH		91-39	7.0	7.01	100.1%

8/15/92

omments:

9613496.1389

4-3-1
BLANKS
WET CHEMISTRY

Oak Ridge K-25 Site
Lab Name: Analytical Chemistry Department

Westinghouse
Contract: Hanford Company

SDG#: BOOFH5

Analyte	Batch No.	Initial Calibration Blank	Units
Alkalinity	91-13		
Ammonia	91-08		
Bromide	N/A		
Chemical O2 Demand	91-18		
Chloride IC	91-42IA	<1	Mg/L
Conductivity	N/A		
Dissolved Solids	91-23		
Fluoride SIE	91-30	<0.1	Mg/L
Nitrate	91-42IA	<1	Mg/l
Nitrate Nitrogen	N/A		
Nitrite	91-42IA	<1	Mg/L
Nitrite Nitrogen	N/A		
Ortho Phosphate	N/A		
Sulfate	91-42IA	<1	Mg/L
Total Organic Carbon	91-26D	<1	Mg/l
Total Organic Halides	91-21I	1.06	ug/l
Turbidity	91-22		
pH	N/A		

TOX det. in blank
qualify results
as pf < 5X
No qual required

Comments:

4-3-2
BLANKS
WET CHEMISTRY

Oak Ridge K-25 Site
Lab Name: Analytical Chemistry Department

Contract: Westinghouse 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:

MLT 8/15/92
Qualify sgls < 5X blank as U
no qual. required

9613496.1391

APPENDIX B

DATA VALIDATION DOCUMENTATION

SDG: B00FH5

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Data Package ID: B00FH5 Laboratory: Martin-Marietta K-25

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

Analysis/Sample Identification/Matrix:

Alpha Beta	B00FH5	WATER 299-E33-05 (Split)
Cs-137, Co-60	" MS/MSD	"
Pu-238/239, U	B00F94	299-E33-07 (Split)
Sr-90, Tc-99, Rn-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 rejected since raw data not provided, though ICS's, MS, MSD, Blank, Replicate were reported for some analyses.

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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 (J).

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

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

Are check source counts within ±3S control limits? (Y/N/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)

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

Are background counts within ±3S control limits? (Y/N/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 9613496.1394

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 ~~Black~~ 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 (J) or estimated nondetects (UJ).

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

	B00HF5	B00F94
grs α		
grs β		
Tc^{99}		
Sr^{90}		
H-3		
Pu^{238}	X	X
Pu^{239}	X	
Ra-226	X	X
~~GAMMA~~		
Cs-137		
Co-60		

2-10-93

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

w the
ct. limit
quirement.

2-10-93

5. Radiometric and Gravimetric Yields 9613496 1396

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, Ra-226, and tritium.

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 valus ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the LLD? (Y/N/NA) Comment ②

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

Comments/Notes/Qualified Results:

① Duplicate analysis not performed for Cs-137, Co-60, Ra-226 and tritium.

② RPD values are above the 35% limit for gross alpha with Sample B00F94 and Sr-90 for sample B00FH5.

9613496.1398

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 (J).

Comments/Notes/Qualified Results:

		Instru. I.D	Qualifier	
Gross α	71%		~~✓~~ J/UJ	2-10-93
Gross β	136%		R	
Cs-137	99%	Detector 6	✓	
Cs-137	98%	" 1	✓	
Pu-238	93%		✓	
Pu-239	93%		✓	
Ra-226	148%		R	
Sr-90	124%		R	
H-3	99%		✓	
Total U	97%		✓	
Tc-99	106%		✓	

8. Holding Times 9613496.1399

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 (UJ). For gross exceedances (>2X criteria) qualify all associated results as unusable (R).

Comments/Notes/Qualified Results:

	B00FH5	Analysis	Days	Qualif.
gr α	3-27-91	5-23-91	58	–
" β		5-23	58	–
Tc-99		5-15	50	–
Sr-90		2-5-92	315	~~R~~ J/UJ
Cs-137		5-30-91	65	–
Co-60		5-31	66	–
Tot. U		5-30	65	–
Ra-226		4-18	23	–
H-3		5-3	38	–
Pu-238/239		5-29	64	–

	B00F94			
gr α	4-3-91	5-23-91	50	–
Cs-137		5-31	58	–
Co-60		5-31	58	–
gr β		5-23	50	–
Tc-99		5-15	42	–
Sr-90		2-5-92	307	~~R~~ J/UJ
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 (J).

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 (J).

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

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

Comments/Notes/Qualified Results:

(1) Gas proportional QC parameters are not available for verification.

9.2 Alpha Spectroscopy

9613496.1401

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 ±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 9613496.1402

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

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

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

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

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: C.of C.).

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

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 (UJ).

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.

9613496.1405

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 (J).

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 (J).

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 (J).

Comments/Notes/Qualified Results:

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

9.7 Fluorometric Analysis of Uranium 9613496 1406

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: 0613496.1407

No Comments [illegible] 1-19-93

9613496.1408

GAS PROPORTIONAL COUNTERS
LOW BACKGROUND BETA COUNTERS

Data Package ID: ECOFH5

Analysis: grs α, β, Sr-90, Tc-99

A.0 Completeness Checklist

✓ - Yes
X - No
N/A - Not Applicable

Analysis Results

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

Initial and Continuing Calibration

X 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 fo Check Source and Background Counts

Blanks

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

Radiometric and Gravimetric Yields

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

9613496.1409

Duplicates

X Detector Identification
✓ Date of Analysis
X Aliquots of Samples
N/A Weights of Solids Counted
X Count Durations
✓ Sample Identifications
X Calculated Precision

Laboratory Control Samples

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

Comments/Qualified Results:

No comments [illegible] 1-19-93

9613496.1400

ALPHA SPECTROSCOPY

Data Package ID: B00FH5

Analysis: Pu-238 / 239

B.0 Completeness Checklist

✓ - Yes
X - No
N/A - Not Applicable

Analysis Results

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

Initial and Contiuing Calibration

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

Blanks

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

Duplicates

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

Radiometric and Gravimetric Yields

X Amounts (Volumes, Concentrations, Activity) or Spikes, Tracers, or Carriers Used
X NIST Traceability of Spikes, Tracers or Carriers
N/A Weights of Precipitates or Solids Counted
X Calculated Recoveries

9613496.1411

Laboratory Control Samples

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

Comments/Qualified Results:

No comments [illegible] 1-19-93

9613496.1412

GAMMA SPECTROSCOPY

Data Package ID: B00FH5

C.0 Completeness Checklist

✓ - Yes
x - No
N/A - Not Applicable

Analysis Results

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

Initial and Continuing Calibration

X 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

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

Duplicates

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

Radiometric and Gravimetric Yields

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

9613496.1413

Laboratory Control Samples

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

Comments/Qualified Results:

Nuclide				Conditions

No comments [illegible] 4-9-93

ALPHA EMITTING RADIUM ISOTOPES USING SCINTILLATION COUNTING

Data Package ID: B00FH5

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)

9613496.1415

Radiometric and Gravimetric Yields

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

Laboratory Control Samples

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

Comments/Qualified Results:_____

9613496.1416

RADIUM-226 ANALYSIS USING SCINTILLATION (LUCAS) CELL COUNTING

Data Package ID: B00FH5

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)

9613496.1407

Radiometric and Gravimetric Yields

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

Laboratory Control Samples

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

Comments/Qualified Results:_____

961349 TRITIUM ANALYSIS USING
LIQUID SCINTILLATION COUNTING

Data Package ID: B00FH5

F.0 Completeness Checklist

✓ - Yes
X - No
N/A - Not Applic.

Analysis Results

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

Initial and Continuing Instrument Calibration

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

Blanks

X Instrument Identification
2-93 X ✓ Date of Analysis
X MDA of Method
X Amounts of Reagents Used
X Lot Numbers of Reagents Used
X Raw Data (Gross Counts, Count Duration, Background Count, Background Count Duration)
X Tritium Levels in Background Water

Duplicates

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

9613496.1419

FLUOROMETRIC ANALYSIS OF URANIUM

Data Package ID: B00FH5

G.0 Completeness Checklist

✓ - Yes
X - No
N/A - Not applicable

Analysis Results

1993
✓ Results Report for Sample Analyses and Reanalyses
X ✓ Raw Data (Fluorometer Readings, Notebook Pages, etc.)
X ✓ Calculation Sheets
✓ Sample Identifications
X ✓ Instrument Identification
✓ Analysis Date and Analyst Initials
✓ Sample Weight

Initial and Continuing Instrument Calibration

93
X ✓ Instrument Identification
X ✓ Calibration Dates and Analyse Initials
X ✓ Identification of Calibration Standards including Certification, Expiration Date and Concentration
X ✓ Amount of Standards Used for Calibration
X ✓ Raw Data (Fluorometer Readings, Notebook Pages, etc.)

Blanks

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

Duplicates

X Instrument Identification
1993 X ✓ Date of Analysis
X Amounts of Samples
X Amount of Spike for Spiked Duplicates
X 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

9613496.1420

Laboratory Control Samples

✓ Sample Identification
X Instrument Identification
✓ Date of Analysis
X Calculated Recoveries
19-93 ✓ X Results of Analyses

Comments/Qualified Results:

No comments FS 1-19-93

9613496.1421

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

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

-D (BNA- CLP)

H = 7
ate Extracted = 7-APR-1991
ample Volume Extracted (mL) = 1000.0
xtraction Method = Separatory Funnel
xtraction Solvent = Methylene Chloride
xtraction Cleanup = Sodium Sulfate
inal Volume of Extract (mL) = 1.0
ssociated Blank = 910408-252

1-19-93

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

1/25/93

rep (Pest- CLP)

H = 7
ate Extracted = 7-APR-1991
ample Volume Extracted (mL) = 1000.0
xtraction Method = Separatory Funnel
xtraction Solvent = Methylene Chloride
xtraction Cleanup = Sodium Sulfate
inal Volume of Extract (mL) = 10.0
ssociated Blank = 910408-150

Replicate Results of Analysis

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

pike Recovery Data

nalysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
-**** UnKnown Lab *****						
/ANIDE	0.017	0.10	0.13	mg/L	0.11	113.0
.UTONIUM-238		21306	18400	pCi/L	18400.	86.4
.UTONIUM-239		21306	18400	pCi/L	18400.	86.4
)TAL ORGANIC CARBON (TOC)	0	5	4	mg/L	4.	80.0
:ANIUM 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: B00F94
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

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

MWT 2/8/93

(BNA- CLP)

TK 1-19-93

= 6
te Extracted = 11-APR-1991
mple Volume Extracted (mL) = 1000
traction Method = Separatory Funnel
traction Solvent = Methylene Chloride
traction Cleanup = Sodium Sulfate
nal Volume of Extract (mL) = 1.0
sociated Blank = 910411-095

R* - Analyte detected but conditionally rejected due to missing data

UR - Analyte undetected but conditionally rejected due to missing data.

ep (Pest- CLP)

= 6
te Extracted = 9-APR-1991
mple Volume Extracted (mL) = 1000
traction Method = Separatory Funnel
traction Solvent = Methylene Chloride
traction Cleanup = Sodium Sulfate
nal Volume of Extract (mL) = 10.0
sociated Blank = 910409-040

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

9615496.1425

APPENDIX C

DATA VALIDATION DOCUMENTATION

SDG: B00J75

9613496.1426

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Data Package ID: B00J75A Laboratory: K-25

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

Analysis/Sample Identification/Matrix:

Alpha Beta	B00J75A	SOIL	Near Surface Duplic.
Cs-137, Pu-238/239	B00J76A		
Sr-90, Tc-99	B00J75A-MS/MSD		
Total U			

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 Standard integrity information is not available with this data package. All nuclide results are rejected until data is made available.

All data conditionally reported since LCS, MS/MSD, blank, tracer reported

1/25/93

9613496.1427

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 (J).

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

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

Are check source counts within ±3S control limits? (Y/N/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)

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

Are background counts within ±3S control limits? (Y/N/NA)

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

Comments/Qualified Results:

① Checksource and background count data is not available (see p 1)

[illegible]

1/25/[illegible]

3. Blanks 9613496.1428

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 show no documentation of a method blank being analyzed with the samples.
Cs-137 for Samples B00J75 and B00J76.
Th-234 " " " "

9613496.J429

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 (J) or estimated nondetects (UJ).

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 ③

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:

Rev 1-8-93

① MDAs & LLDs are not provided

~~② grs α results are positive and exceed the detect limits.~~

~~grs β " " " " " " "~~

Tc^{99}

Sr^{90}

Pu^{238}

Pu^{239}

GAMMA

② Positive results are reported for gross alpha but below the required detect limit, for B00J75 and B00J76. Tc-99 result for B00J75 is negative and RDL cannot be determined. Same for Pu-239 result for B00J75 & B00J76.

③ Raw data is not available and results cannot be verified.

9613496.1430

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) Comment ①

Verify the spike recoveries and qualify associated results as follows: comment ②

%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 recovery information was not provided and the raw data is missing, needed to calculate.

Qualified Results as follows:

	B00J75	B00J76
Tc 99	J/UJ	J/UJ
Gross β	J/UJ	J/UJ
Pu-238	R	R

11-18-93

② See Accuracy and Precision Table on following page.

9613496.1431

FILENAME: MS-K25.WK1

ANLYS.	HEIS #	SAMPLE RESULT	RPT Rslt	MS Rslt	MSD Rslt	SPK	MS %REC.	MSD %REC.	RPD
TC-99	B00J75	0.00	-1.54	337	327	301	112	109	3
SR-90	B00J75	1.31	1.31	21300	18200	24228	88	75	16
GR-A	B00J75	1.26	1.26	1400	1520	1628	86	93	8
GR-B	B00J75	5.97	5.97	1790	1840	1628	110	113	3
Cs-137	B00J75	2.93	2.93	NA	NA	NA	NA	NA	NA
Pu-238	B00J75	0.0258	0.0258	0.135	0.173	NA	NA	NA	25
Pu-238/239	B00J75	-0.0258	-0.0258	11.00	11.20	12.79	86	88	2
tot-U	B00J75	0.37	0.366	35.5	37.9	40.56	87	93	7

6. Duplicate Samples and Analyses 96 13 1996 1432

Has at least one duplicate analysis been performed for every 10 samples in the SDG? (Y/N/NA) _____

If NO, qualify all associated results as estimated (J). 1-18-93

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

Are RPD valus ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the LLD? (Y/N/NA) Comment ①

If NO, qualify associated results <LLD as estimated nondetects (UJ) and all associated results >LLD as estimated detects (J). ~~SDG: 59823~~ 1-18-93

Comments/Notes/Qualified Results: _____

① See summary of RPD on Accuracy & Precision Table of Report. 1-18-93

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 (J).

Comments/Notes/Qualified Results:

		Qualifier	
gross α	103%	✓	
" β	126%	R	
Cs-137	99.3%	✓	(Detector #3)
"	99.9%	✓	(" #1)
Pu-238	78.4%	J/UJ	
Pu-239	78.4%	J/UJ	
Sr-90	47%	R	
Tot. U	98.5%	✓	
Tc-99	103%	✓	

9613496.1434

8. Holding Times

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

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

Comments/Notes/Qualified Results:

B00J75 Sampled	4-1-91	Analyzed.	Days	Qualifier
1-18-93 ~~4-1-91~~				
Gross α	4-1-91	6-10-91	71	None
" β		6-10-91	71	
Strontium 90		5-29-91	59	
Tc-99		6-6-91	67	
Cs-137		6-6-91		
Plutonium		6-6-91		
Total U		4-28-91	27	

B00J76				
gross α	4-1-91	6-10	Same	None
β		6-10	as	
Sr-90		5-29	above	
Tc-99		6-6		
Cs-137				
Pu/238-239				
Total U		4-28		

Midpoint count times not provided.

1-18-93

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 (J).

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 (J).

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

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

Comments/Notes/Qualified Results:

① Gas proportional QC criteria was not provided.

9.2 Alpha Spectroscopy 9613496.1436

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

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 ±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) All isotopic plutonium QC criteria was not provided.

9.3 Gamma Spectroscopy 9613496.1437

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

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

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

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

Comments/Notes/Qualified Results:

(1) Gamma Spect. QC criteria was not provided.

9.4 Alpha Emitting Radium Isotopes

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

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):_____

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):_____

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

Are LCS recoveries with the control limits listed below? (Y/N/NA):_____

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):_____

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

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:_____

Not Analyzed

1-18-93

9613496.1439

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):_____

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

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:_____

Not Analyzed

1-18-93

9613496.1440

9.6 Tritium Analysis by Liquid Scintillation Counting

Do calibration standard matrices match the sample matrices? (Y/N/NA):_____

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

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 (J).

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 (J).

Comments/Notes/Qualified Results:_____

Not Analyzed. 1-18-93

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): N

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): N

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

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

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

Comments/Notes/Qualified Results:

(1) Analysis QC criteria was not provided and method description is not available.

9613496.1442

Comments/Notes/Qualified Results:

No comments

1-18-93

9613496.1443

GAS PROPORTIONAL COUNTERS
LOW BACKGROUND BETA COUNTERS

Data Package ID: B00J75A

Analysis: grs α, β, Tc-99, Sr-90

A.0 Completeness Checklist

✓ – Yes
x – No
N/A – Not Applicable

Analysis Results

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

Initial and Continuing Calibration

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

Blanks

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

Radiometric and Gravimetric Yields

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

9613496.1444

Duplicates

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

Laboratory Control Samples

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

Comments/Qualified Results:

Nuclide				Conditions
				Not Used. fk 1-18-93

9613496.1445

ALPHA SPECTROSCOPY

Data Package ID: B00J7#5 2-10-93

Analysis: Pu-238/239

B.0 Completeness Checklist

✓ – Yes
X – No
N/A – Not Applicable

Analysis Results

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

Initial and Contiuing Calibration

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

Blanks

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

Duplicates

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

Radiometric and Gravimetric Yields

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

9613496.1446

Laboratory Control Samples

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

Comments/Qualified Results:

No comments.

TS 1-18-93

9613496.1447

GAMMA SPECTROSCOPY

Data Package ID: B00J75

C.0 Completeness Checklist

✓ - Yes
X - No
N/A - Not Applicable

Analysis Results

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

Initial and Continuing Calibration

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

Blanks

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

Duplicates

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

Radiometric and Gravimetric Yields

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

9613496.1448

Laboratory Control Samples

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

Comments/Qualified Results:

No comments 1-18-93

ALPHA EMITTING RADIUM ISOTOPES USING SCINTILLATION COUNTING

Data Package ID: Not Used.

Analysis:

D.0 Completeness Checklist

1-18-93

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)

9613496.1450

Radiometric and Gravimetric Yields

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

Laboratory Control Samples

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

Comments/Qualified Results:_____

9613496.1451

RADIUM-226 ANALYSIS USING SCINTILLATION (LUCAS) CELL COUNTING

Not Used

Data Package ID:_____

PB 1-18-93

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)

9613496.1452

Radiometric and Gravimetric Yields

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

Laboratory Control Samples

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

Comments/Qualified Results:_____

9613496.1467

TRITIUM ANALYSIS USING LIQUID SCINTILLATION COUNTING

Not Used

Data Package ID:_____

F.0 Completeness Checklist

1-18-93

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)

96L3496.1454

FLUOROMETRIC ANALYSIS OF URANIUM

Data Package ID: B00J75

G.0 Completeness Checklist

✓ - Yes
x - No

Analysis Results

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

Initial and Continuing Instrument Calibration

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

Blanks

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

Duplicates

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

Gravimetric Yields

X Weight of Carrier Added for Gravimetric Determination
X Weight of Carrier Recovered for Gravimetric Determination
X Calculated Gravimetric Yields

9613496.1455

Laboratory Control Samples

✓ Sample Identification
X Instrument Identification
✓ Date of Analysis
X Calculated Recoveries
X Results of Analyses

Comments/Qualified Results:

No Comments 1-18-93

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: B00J75
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	Bismuth	<10.0			mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7								
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	2.93	R~~V~~	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26	R~~V~~	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97	R~~V~~	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31	R~~V~~	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	3.66E-1	R~~V~~	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	13.9 ~~-1.54~~	R~~V~~UR	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.09 ~~2.58E-2~~	R~~V~~UR	+/- 8.9E-2 R	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	0.09 ~~-2.58E-2~~	R~~V~~UR	+/- 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 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

RS 1-18-93

MW 2/1/93

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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 HESTER	107168	16-JUL-1991
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	20.22	R*	+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	3.27	R*	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80	R*	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65	R*	+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1	R*	+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10	R*	+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.1 0.00	RUR	+/- 1.0E-1 R	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	0.09 ~~2.58E-2~~	RUK	+/- 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 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

FS 1-18-93

MW 2/1/93

9613496.1458

AnaLis Reports

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

Date Printed:
10-FEB-1992 14:23

AnaLIS ID: 910415-089 Project: G132 0201 Customer Sample ID: B00J75-MS
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-1991
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.40E3		+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.79E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.13E4		+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	35.50		+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	3.37E2		+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
1635	Plutonium-238	1.35E-1		+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
635	Plutonium-239	11.00		+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
***** Wet Chemistry Laboratory *****								
EPA-300.0	Nitrate	88			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	99			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	176			ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide				ug/g	MH FELLER	X	21-APR-1991

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

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

Date Printed:
10-FEB-1992 14:24

AnaLIS ID: 910415-090 Project: G132 0201 Customer Sample ID: B00J75-MSD
Customer: KESSNER Requisition Number:
Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991
Sampled By: Date Sample Completed:
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			
***** Inductively Coupled Plasma Laboratory *****								
EPA-200.7(CLP)	Bismuth	NA			ug/Kg	MJ SCHEUER	NA	16-JUL-1991
***** Radiochemistry Laboratory *****								
EC-134	Cesium-137	NA		+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.52E3		+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.84E3		+/- 29.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.82E4		+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	37.90		+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	3.27E2		+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	1.73E-1		+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
635	Plutonium-239	11.20		+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
***** 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	X			ug/g	MH FELLER	X	21-APR-1991

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD
FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239.

910415-09 D

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.