

1351 .0226

000002

PAGE 1

TMA/Morcal

CHAIN OF CUSTODY

ORD # M3-08-128

RCVD: 08/27/93 DUE: 10/01/93

08/27/93 15:31:20

KEEP: 10/01/94 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY	
01A-S	B09363	ARLI	WH232	WH234
02A-S	B09364	ARLI	WH232	WH234
03A-S	B09365	ARLI	WH232	WH234
04A-S	B09366	ARLI	WH232	WH234
05A-S	B09367	ARLI	WH232	WH234
05C-S	B09367 MS	ARLI	WH232	WH234
05D-S	B09367 DUP	ARLI	WH232	WH234

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<u>E. Yamamoto</u>	<u>8/27/93</u>	<u>ARLI</u>	<u>8/27/93</u>	<u>G. Harris</u>	<u>8/30/93</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Westinghouse
Hanford
Company

CHAIN OF CUSTODY

Custody Form Initiator WV SETZER
 Company Contact WV SETZER Telephone 376-2413
 Project Designation/Sampling Locations 100-DR-2 Collection Date 8-24-93
 Ice Chest No. SML 94 Field Logbook No. EFL-1092
 Bill of Lading/Airbill No. 997 333 120 Offsite Property No. UA3-0-0667-39
 Method of Shipment OVERNIGHT AIR SERVICE
 Shipped to TMA/NORCAL
 Possible Sample Hazards/Remarks Maintain at 4 degrees Centigrade.

Sample Identification

1) B09363

- ✓ 1,250ml P:CLP;ICP/AA Metals,Hg
- ✓ 1,125ml G:Sulfate(EPA 375.4)
- ✓ 1,125ml G: Anions F(EPA 300.0)
- ✓ 1,125ml P/G: Anions NO2-NO3 (EPA 353.2)
- ✓ 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152, Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- ✓ 1,125ml Gs: Tritium (EA-48)

2) B09364

- ✓ 1,250ml P:CLP;ICP/AA Metals,Hg
- ✓ 1,125ml G:Sulfate(EPA 375.4)
- ✓ 1,125ml G: Anions F(EPA 300.0)
- ✓ 1,125ml P/G: Anions NO2-NO3 (EPA 353.2)
- ✓ 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152, Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC-25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- ✓ 1,125ml Gs: Tritium (EA-48)

3) B09365

- ✓ 1,250ml P:CLP;ICP/AA Metals,Hg
- ✓ 1,125ml G:Sulfate(EPA 375.4)
- ✓ 1,125ml G: Anions F(EPA 300.0)
- ✓ 1,125ml P/G: Anions NO2-NO3 (EPA 353.2)
- ✓ 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152, Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC-25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- ✓ 1,125ml Gs: Tritium (EA-48)

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

Relinquished by: <i>W.V. Setzer</i>	Received by: <i>KB Hulce</i>	Date/Time: <i>8-24-93 / 1435</i>
Relinquished by: <i>KB Hulce</i>	Received by: <i>W.V. Setzer</i>	Date/Time: <i>8-26-93 / 1116</i>
Relinquished by: <i>W.V. Setzer</i>	Received by: <i>Off. HARRIS</i>	Date/Time: <i>8-27-93 1:35</i>
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:
Comments:		

Westinghouse Hanford Company	<h2 style="margin: 0;">SAMPLE ANALYSIS REQUEST</h2>
---	---

Collector <i>W.U. SETZER</i> Company Contact <i>W.U. SETZER</i>	Date <i>8.25.93</i> Telephone <i>(504) 376-2413</i>
--	--

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
<i>B09363</i>	<i>S</i>	<i>8.24.93</i>	<i>1210</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09364</i>	<i>S</i>	<i>8.24.93</i>	<i>1230</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09365</i>	<i>S</i>	<i>8.24.93</i>	<i>1338</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)

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

Field Information *NONE*

Special Handling and/or Storage *STORED at 4°C*

Possible Sample Hazards *NONE OBSERVED*

Westinghouse
Hanford
Company

CHAIN OF CUSTODY

Custody Form Initiator WV SETZER
 Company Contact WV SETZER Telephone 376-2413
 Project Designation/Sampling Locations 100-DR-2 Collection Date 8-25-93
 Ice Chest No. SML 94 Field Logbook No. EFL-1092
 Bill of Lading/Airbill No. _____ Offsite Property No. W93-0-8667-39
 Method of Shipment OVERNIGHT AIR SERVICE
 Shipped to TMA/NORCAL
 Possible Sample Hazards/Remarks Maintain at 4 degrees Centigrade.

Sample Identification

1) B09366

- 1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr
- 1,125ml G:Sulfate(EPA 375.4)
- 1,125ml G: Anions F(EPA 300.0)
- 1,125ml P/G: Anions NO2-NO3 (EPA 353.2)
- 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-
 241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- 1,125ml Gs: Tritium (EA-48)

2) B09369

- ~~1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr WVS - 8-25-93~~
- ~~1,125ml G:Sulfate(EPA 375.4) WVS 8-25-93~~
- ~~1,125ml G: Anions F(EPA 300.0) WVS 8-25-93~~
- ~~1,125ml P/G: Anions NO2-NO3 (EPA 353.2) WVS 8-25-93~~
- 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241
 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- 1,125ml Gs: Tritium (EA-48) WVS 8-25-93

3) B09367

- 1,250ml P:TAL Metals,Hg,Cd,Pb,Cr
- 1,125ml G:Sulfate(EPA 375.4)
- 1,125ml G: Anions F(EPA 300.0)
- 1,125ml P/G: Anions NO2-NO3 (EPA 353.2)
- 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC-25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241
 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
- 1,125ml Gs: Tritium (EA-48)

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

Relinquished by: <i>WV Setzer</i>	Received by: <i>KB Hulse</i> <u>KB Hulse</u>	Date/Time: <u>8/25/93 1102</u>
Relinquished by: <i>KB Hulse</i>	Received by: <i>WV Setzer</i>	Date/Time: <u>8/26/93 1117</u>
Relinquished by: <i>WV Setzer</i>	Received by: <i>H. Narlice</i> <u>H. Narlice</u>	Date/Time: <u>8/27/93 1:35</u>
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method: _____ Disposed by: _____ Date/Time: _____

Comments:

Westinghouse Hanford Company	<h2 style="margin: 0;">SAMPLE ANALYSIS REQUEST</h2>
---	---

Collector <i>W.U. SETZER</i> Company Contact <i>W.U. SETZER</i>	Date <i>8-25-93</i> Telephone 509 <i>376-2413</i>
--	---

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
<i>B09366</i>	<i>S</i>	<i>8-25-93</i>	<i>0845</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09367</i>	<i>S</i>	<i>8-25-93</i>	<i>1020</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09369</i>	<i>S</i>	<i>8-25-93</i>	<i>1045</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) } <i>WUS 8-25-93</i> 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)

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

Field Information *SAMPLE B09369 ONLY HAS 1,1000ML BOTTLE WITH 400ML MATERIAL*

Special Handling and/or Storage *STORED @ 4°C*

Possible Sample Hazards *NONE OBSERVED*

9713512.0231

000002E

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-93-0200
Record of Disposition No.

DATE: 9/20/93

LABORATORY: TMA

PROJECT TITLE/NO.: 100-DR-2/93-237

NCR NO.: NA

SAMPLE IDENTIFICATION NUMBERS:

B09368, B09363, B09364, B09365, B09366, B09367, B097F0, B097F1, B097F2, B097F3, B097F4, B097F5, B097F6, B097F7, B097F8, B097F9, B097G0, B097G1, B097G2, B097G3, B097G4, B097G5, B097G8, B097G9, B097H0

RECEIVED
SEP 30 1993

DESCRIPTION OF EVENT:

EPA Method 375.4 for sulfate was specified on the Chain-of-Custody, Sample Analysis Request and Sample Authorization Form; however, TMA recommended using EPA Method 300.0.

DISPOSITION OF SAMPLES:

With consent form N. M. Naiknimbalkar, use EPA Method 300.0 for the sulfate analysis instead of EPA Method 375.4.

APPROVAL SIGNATURES:

W. E. Strohben / *W. E. Strohben*
OSM Project Coordinator (Print/Sign Name)

9/20/93
Date

N. M. Naiknimbalkar / *N. M. Naiknimbalkar*
Technical Representative (Print/Sign Name)

9/23/93
Date

N/A
Quality Assurance (Print/Sign Name)

Date



USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE TRACKING NUMBER 7289153723

3095M 7289153723

SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER 0941-5760-9 Date 8-27-93

From (Your Name) Please Print SAMPLE CONTROL Your Phone Number (Very Important) 510-235-2633

To (Recipient's Name) Please Print CAROLE HARRIS Recipient's Phone Number (Very Important) 818 357-3247

Company TMA/ARLI Department/Floor No. 160 TAYLOR STREET

Street Address 2030 WRIGHT AVE City RICHMOND State CA ZIP Required 94804

City MONROVIA, CA State CA ZIP Required 91016

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.) 2340-6406

IF HOLD FOR PICK-UP, Print FEDEX Address Here

PAYMENT 1 Bill Sender's Acct. No. 2 Bill Recipient's FedEx Acct. No. 3 Bill 3rd Party FedEx Acct. No. 4 Bill Credit Card

5 Cash/Check 6 Acct. Credit Card No.

City State ZIP Required

4 SERVICES (Check only one box)

11 OTHER PACKAGING 12 FEDEX PAK * 13 FEDEX BOX 14 FEDEX TUBE

51 OTHER PACKAGING 52 FEDEX PAK * 53 FEDEX BOX 54 FEDEX TUBE

30 ECONOMY * 46 GOVT LETTER 41 GOVT PACKAGE

70 OVERNIGHT FREIGHT ** 80 TWO-DAY FREIGHT **

5 DELIVERY AND SPECIAL HANDLING (Check services required)

1 HOLD FOR PICK-UP (Fill in Box H) 2 DELIVER WEEKDAY 3 DELIVER SATURDAY (Extra charge) (Not available to all locations) 4 DANGEROUS GOODS (Extra charge) 5 DRY ICE (Dangerous Goods Shipper's Declaration not required) 7 OTHER SPECIAL SERVICE 8 SATURDAY PICK-UP (Extra charge) 12 HOLIDAY DELIVERY (if offered) (Extra charge)

6 PACKAGES WEIGHT in Pounds Only 1 62

Total Total 1 62

DIM SHIPMENT (Chargeable Weight) lbs

Received At: 1 Regular Stop 3 Drop Box 2 On-Call Stop 4 J B S C 6 Station

7 Release Signature:

Emp. No. Date Federal Express Use

Cash Received Return Shipment Third Party Chg To Del Chg To Hold

Street Address City State Zip

Received By: X

Date/Time Received FedEx Employee Number

REVISION DATE 11/92 PART #137204 FXEM 3/93 FORMAT #155

155

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7289153723

DESTINATION COPY

7289153723

000004

TAA/ARU
The new Analytical Inc.

RADIATION DOSE RATE SURVEY FORM

Date 3/30/93 COMPANY Norc. (WHC) OTHER ORD # 7289153723

Surveyor's Name RL Kohlberg

Model No. HP-210 1 ESP-1 Model No. AC-22 1 ESP-1

Serial No. 710289 1 07619 Serial No. 407726 1 07628

Calibration Date 4/29/93 Calibration Date put for calibration

Instrument Calibration Factor 0.280 Instrument Calibration Factor -

Sample	Location	HP-210 CPM	HP-210 Factor	HP-210 DPM	AC-22 CPM	AC-22 Factor	AC-22 DPM	Volume of Sample	Activity of Sample
Background		36.0							
Consistency		7160	0.2764						
Smear DOE/NIPP		40.0							
Reported	White	14sa	each	150pc	lg				

Comments

All OK Approved RLK

Date 8/30/93

GENERAL CHEMISTRY RESULTS

CASE NO. 08-069

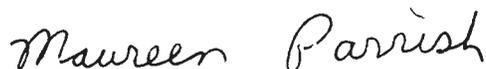
Soil Sample #:

B09363
B09366B09364
B09367

B09365

CASE NARRATIVE

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



Maureen Parrish

9713512.0236

TMA Inc.

REPORT

Work Order # A3-08-000007

Received: 08/27/93

10/19/93 11:44:01

REPORT Westinghouse Hanford Company
TO 2355 Stevens Dr., MSIN-H4-23
345 Hills Street/3000 Area
Richland, WA 99352

PREPARED Thermo Analytical, Inc.
BY 160 Taylor Street
Monrovia, CA 91016

Maureen Parrish

CERTIFIED BY

ATTEN Jeanette Duncan

ATTEN Ms. Carole Harris

PHONE 818-357-3247

CONTACT MKP CIH

CLIENT WHC SAMPLES 6
COMPANY Westinghouse Hanford Company
CILITY _____

This report is for the sole and exclusive use of the client
to whom it is addressed and represents only those samples
herein described. Samples not destroyed in testing are re-
tained a maximum of 30 days unless otherwise requested.

ORK ID 100-DR-2
TAKEN By Westinghouse Staff
TRANS Federal Express
TYPE Soil
P.O. # N3-08-128-SU-AR
NVOICE under separate cover

SAMPLE IDENTIFICATION

TEST CODES and NAMES used on this workorder

B09363
B09364
B09364 MS
B09365
B09365 Duplicate
B09366
B09367
Lab Blank
LCS

IC AN Anions Extraction Solids
S04 S Sulfate (in Solids)
WCCLPS Anions in Solids
WCLCS Lab Control Sample Summary
WCQCD Quality Control Summary
WCQCS Quality Control Summary
WF S Fluoride in Solids

9713512.0237

000009

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09363

FRACTION 01A

TEST CODE WCCLPS

NAME Anions in Solids

Date & Time Collected 08/24/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.5	mg/kg	1.0
Sulfate	300.0	12	mg/kg	5

FORM 1

9713512.0238

000010

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09364

FRACTION 02A

TEST CODE WCCLPS

NAME Anions in Solids

Date & Time Collected 08/24/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.6	mg/kg	1.0
Sulfate	300.0	12	mg/kg	5

FORM 1

9713512.0239

000011

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09365 FRACTION Q3A TEST CODE WCCLPS NAME Anions in Solids
Date & Time Collected 08/24/93 Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300.0	1.1	mg/kg	1.0
Sulfate	300.0	18	mg/kg	5

FORM 1

9713512.0240

000012

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09366

FRACTION 04A TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 08/25/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
fluoride	300.0	0.5	mg/kg	1.0
Sulfate	300.0	7	mg/kg	5

FORM I

9713512.0241

TMA Inc.

REPORT

Work Order # A3-08-869 000013

Received: 08/27/93

Results by Sample

SAMPLE ID B09367 FRACTION 05A TEST CODE WCCLPS NAME Anions in Solids
Date & Time Collected 08/25/93 Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.1	mg/kg	1.0
Sulfate	300.0	31	mg/kg	5

FORM 1

9713512.0242

Page 1

Skinner&Sherman

REPORT

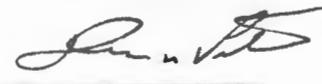
Work Order # S3-08-316

Received: 08/31/93

10/04/93 09:57:20

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

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


CERTIFIED BY

ATTEN Dan Steurmer

ATTEN Client Services

PHONE (617) 890-7200

CONTACT DP

CLIENT HANFORD NOR SAMPLES 6
COMPANY TMA/NORCAL Hanford
FACILITY Richmond, CA

WORK ID N3-08-128

TAKEN By Client

TRANS Fedex

TYPE 5 Soils NO3NO2

P.O. # N3-08-128

INVOICE under separate cover

SAMPLE IDENTIFICATION

TEST CODES and NAMES used on this workorder

- 01 B09363
- 02 B09364
- 03 B09365
- 04 B09366
- 05 B09367
- 05 B09367D
- 05 B09367S
- 06 LCSS

NITR S Nitrate/Nitrite in Soils



Thermo Analytical Inc.

Skinner & Sherman Laboratories Inc.

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

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

9713512.0243

Page 2

Skinner&Sherman

REPORT

Work Order # S3-08-316

Received: 08/31/93

Results by Sample

SAMPLE ID <u>B09363</u>	SAMPLE # <u>01</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>08/24/93</u> Category <u>SOIL</u>
NITR_S <u>30.4</u>	
mg N/kg	
SAMPLE ID <u>B09364</u>	SAMPLE # <u>02</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>08/24/93</u> Category <u>SOIL</u>
NITR_S <u>29.6</u>	
mg N/kg	
SAMPLE ID <u>B09365</u>	SAMPLE # <u>03</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>08/24/93</u> Category <u>SOIL</u>
NITR_S <u>27.2</u>	
mg N/kg	
SAMPLE ID <u>B09366</u>	SAMPLE # <u>04</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>08/25/93</u> Category <u>SOIL</u>
NITR_S <u><2.48</u>	
mg N/kg	
SAMPLE ID <u>B09367</u>	SAMPLE # <u>05</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>08/25/93</u> Category <u>SOIL</u>
NITR_S <u>21.9</u>	
mg N/kg	
SAMPLE ID <u>B09367D</u>	SAMPLE # <u>05</u> FRACTIONS: <u>B</u>
	Date & Time Collected <u>08/25/93</u> Category <u>SOIL</u>
NITR_S <u>17.7</u>	
mg N/kg	
SAMPLE ID <u>B09367S</u>	SAMPLE # <u>05</u> FRACTIONS: <u>C</u>
	Date & Time Collected <u>08/25/93</u> Category <u>SOIL</u>
NITR_S <u>37.8</u>	
mg N/kg	

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TMA**Thermo Analytical Inc.****Skinner & Sherman Laboratories Inc.**

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

9713512.0244

Page 3

Skinner&Sherman

REPORT

Work Order # S3-08-316

Received: 08/31/93

Results by Sample

SAMPLE ID <u>LCSS</u>	SAMPLE # <u>06</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>not specified</u> Category <u>SOIL</u>
NITR_S <u>2.28</u>	
mg N/L	

TMA

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Skinner & Sherman Laboratories Inc.

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9713512.0245

Page 5

Skinner&Sherman

REPORT

Work Order # S3-08-316

Received: 08/31/93

Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

The sample was extracted with deionized water and analyzed in accordance with Method for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1979, Method 353.2 (modified)

TMA
Thermo Analytical Inc.

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Skinner & Sherman Laboratories Inc.

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

TMA/Skinner & Sherman Laboratories Sample Login Sheet

Workorder 5308316 Client Hanford, Nor Number/Type of Samples 5 soils
 Protocol W Turnaround 33 days Cooler Temp: 4 °C or N/A Cooler (Yes/No) (Yes)
 Custodian: Green, A. Shipper & # Fedex SDG/Batch# N/A
 Custody Seal: Present/Absent/Intact/Not Client Case# N308128
 Purchase Order/Contract# N308128 Client Contact Dolores Sanchez
 Tag#: Present/Absent/NA/(See COC) Chain of Custody: Present/Absent/NA,# _____

Sample Containers (Intact)/Broken Comment: _____
 Client Comment? Yes/No _____
 Sample labels agree with Chain of Custody Information? (Yes)/No (Comment) _____
 Client paperwork agrees with samples and Chain of Custody? (Yes)/No (Comment) _____
 Shipment Dates: 8/31/93 _____
 List any date with paperwork/shipment problems & specify the problem: _____

N/A

Client ID	Matrix	Received	pH*	Test(s) & QC	Holding Times
1 B09363	SOIL	8/31/93	N/A	N03N02	<u>DUE 9-21</u>
2 64	↓	↓	↓	↓	
3 65	↓	↓	↓	↓	
4 66	↓	↓	↓	↓	
5 67	↓	↓	↓	D, S ↓	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

CONG 8/31/93
 ASB

These samples are from a site known to have Radioactive Contamination: Yes _____ No ✓
 These samples have detectable amounts of Radioactive Material: Yes _____ No ✓

Subcontract: Yes/No, To: _____ Date: _____

Reviewed _____ Date _____

9715512.0247

PAGE 1

TMA/Morcal

CHAIN OF CUSTODY

ORD # M3-08-128

RCVD: 08/27/93 DUE: 10/01/93

08/27/93 15:31:10

KEEP: 10/01/94 DISP: S

DASH SAMPLE IDENTIFICATION STORED TESTS for FRACTIONS with work in DEPT: SU and CATEGORY

01B-S B09363	S&S	WH001	WH002	WH004
02B-S B09364	S&S	WH001	WH002	WH004
03B-S B09365	S&S	WH001	WH002	WH004
04B-S B09366	S&S	WH001	WH002	WH004
05B-S B09367	S&S	WH001	WH002	WH004
05E-S B09367 MS	S&S	WH001	WH002	WH004
05F-S B09367 DUP	S&S	WH001	WH002	WH004
05G-S L C S	S&S	WH001	WH002	WH004

No3No7



RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<u>iyamaamoto</u>	<u>8/30/93</u>	<u>Skinner</u>	<u>8/30/93</u>	<u>Al B</u>	<u>8/31/93</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

TMA

9713512.0248

Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

RECORD COPY



October 1, 1993

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

Quality Control Narrative

Scope

Five (5) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on August 31, 1993 from TMA/Norcal. The samples were analyzed for the USEPA CLP metals. The analysis were performed under TMA/Skinner and Sherman work order S308315.

Methodology

The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02.

Discussion

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

The digestion spike recovery for antimony exceeded the control limit requirement.

The laboratory duplicate for iron, manganese, vanadium, and zinc exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal
Steven R. Provencal
Lead Chemist

9713512.0249

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09363

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-01S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 92.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6600			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	3.0		S	F
7440-39-3	Barium	67.7			P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	0.32	U		P
7440-70-2	Calcium	8790			P
7440-47-3	Chromium	10.7			P
7440-48-4	Cobalt	8.4	B		P
7440-50-8	Copper	15.2			P
7439-89-6	Iron	17200		*	P
7439-92-1	Lead	6.8		S	F
7439-95-4	Magnesium	4610			P
7439-96-5	Manganese	289		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.1			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.76	U	W	F
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	240	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	43.4		*	P
7440-66-6	Zinc	37.7		*	P
	Cyanide				NR

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:
ROCKS

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09364

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-02S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 92.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6530			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	2.6			F
7440-39-3	Barium	68.4			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	0.31	U		P
7440-70-2	Calcium	9450			P
7440-47-3	Chromium	10.5			P
7440-48-4	Cobalt	9.2	B		P
7440-50-8	Copper	15.7			P
7439-89-6	Iron	17300		*	P
7439-92-1	Lead	6.2			F
7439-95-4	Magnesium	4630			P
7439-96-5	Manganese	294		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.4			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.77	U	W	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	252	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	42.0		*	P
7440-66-6	Zinc	38.4		*	P
	Cyanide				NR

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09365

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-03S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 95.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4530			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	1.6	B		F
7440-39-3	Barium	54.2			P
7440-41-7	Beryllium	0.43	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6690			P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	10.0			P
7440-50-8	Copper	15.2			P
7439-89-6	Iron	17100		*	P
7439-92-1	Lead	14.0			F
7439-95-4	Magnesium	3800			P
7439-96-5	Manganese	248		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	8.3			P
7440-09-7	Potassium	768	B		P
7782-49-2	Selenium	0.73	U	W	F
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	276	B		P
7440-28-0	Thallium	0.40	U		F
7440-62-2	Vanadium	41.7		*	P
7440-66-6	Zinc	35.8		*	P
	Cyanide				NR

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09366

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-04S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	77.8			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	0.60	B		F
7440-39-3	Barium	1.0	U		P
7440-41-7	Beryllium	0.24	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	16.8	U		P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	0.93	B		P
7439-89-6	Iron	128		*	P
7439-92-1	Lead	0.39	B		F
7439-95-4	Magnesium	11.3	B		P
7439-96-5	Manganese	0.38	B	*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	1.0	B		P
7440-09-7	Potassium	33.0	U		P
7782-49-2	Selenium	0.73	U	W	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	37.1	B		P
7440-28-0	Thallium	0.40	U		F
7440-62-2	Vanadium	0.52	U	*	P
7440-66-6	Zinc	0.74	U	*	P
	Cyanide				NR

Color Before: WHITE

Clarity Before:

Texture: FINE

Color After: WHITE

Clarity After:

Artifacts: YES

Comments:
ROCKS

9713512.0253

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09367

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-05S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 96.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5180			P
7440-36-0	Antimony	4.2	B	N	P
7440-38-2	Arsenic	1.4	B	W	F
7440-39-3	Barium	70.0			P
7440-41-7	Beryllium	0.24	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6210			P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	13.0			P
7440-50-8	Copper	16.6			P
7439-89-6	Iron	21600		*	P
7439-92-1	Lead	3.7			F
7439-95-4	Magnesium	4430			P
7439-96-5	Manganese	307		*	P
7439-97-6	Mercury	0.05	B		CV
7440-02-0	Nickel	9.4			P
7440-09-7	Potassium	877	B		P
7782-49-2	Selenium	0.77	U	W	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	394	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	58.9		*	P
7440-66-6	Zinc	49.5		*	P
	Cyanide				NR

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:
ROCKS

TMA/Skinner & Sherman Laboratories Sample Login Sheet

Workorder 5308315 Client Hanford-NCR Number/Type of Samples 5 soils
 Protocol CLP Turnaround 33 day Cooler Temp: 4 Cor N/A Cooler Yes/No
 Custodian: Benney, A. Shipper & # Fedex SDG/Batch# N/A
 Custody Seal: Present/ Absent/ Intact/ Not Client Case# N308128
 Purchase Order/Contract# N308128 Client Contact Dolores Sanchez
 Tag#: Present/ Absent/ N/A (See COC) Chain of Custody: Present/ Absent/ N/A, # _____

Sample Containers Intact/ Broken Comment: _____
 Client Comment? Yes/ No
 Sample labels agree with Chain of Custody Information? Yes/ No (Comment) _____
 Client paperwork agrees with samples and Chain of Custody? Yes/ No (Comment) _____
 Shipment Dates: 8/31/93
 List any date with paperwork/shipment problems & specify the problem: _____

N/A

Client ID	Matrix	Received	pH*	Test(s) & QC	Holding Times
1	B09363	8/31/93	N/A	TM	HGDUE 9-21
2	64	↓	↓	↓	
3	65	↓	↓	↓	
4	66	↓	↓	↓	
5	67	↓	↓	DS ↓	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

These samples are from a site known to have Radioactive Contamination: Yes No
 These samples have detectable amounts of Radioactive Material: Yes _____ No

Subcontract: Yes/ No, To: _____ Date: _____

Reviewed _____ Date _____

9713512.0255

PAGE 1

TMA/Norcal

CHAIN OF CUSTODY

ORD # M3-08-128

RCVD: 08/27/93 DUE: 10/01/93

08/27/93 15:31:10

KEEP: 10/01/94 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY		
01B-S	B09363	S&S	WH001	WH002	WH004
02B-S	B09364	S&S	WH001	WH002	WH004
03B-S	B09365	S&S	WH001	WH002	WH004
04B-S	B09366	S&S	WH001	WH002	WH004
05B-S	B09367	S&S	WH001	WH002	WH004
05E-S	B09367 MS	S&S	WH001	WH002	WH004
05F-S	B09367 DUP	S&S	WH001	WH002	WH004
05G-S	L C S	S&S	WH001	WH002	WH004

N03N07



RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<u>Yamamoto</u>	<u>8/30/93</u>	<u>Skinner</u>	<u>8/30/93</u>	<u>M-B</u>	<u>8/31/93</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

SDG: 7232
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7232

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7232 is comprised of the samples listed on the Chain-of-Custody documents below. This sample group was processed under the Westinghouse Hanford Company Statement of Work P.O. MBH-SVV-069262.

1.1 Chains-of-Custody

This report includes data for the six soil samples from location 100-DR-2 delivered under Field Logbook #EFL-1092. Chain-of-Custody numbers were not provided.

1.2 Sample Volume

One 1000 mL plastic bottle containing of each sample was received for the analyses.

1.3 Missing Samples

The samples listed on the Chain-of-Custody documents were received.

1.4 Holding Times

The samples were collected on August 24 and 25, 1993 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control sample, a blank, and a replicate. All original analyses were performed with QC samples 7232-07 through 7232-09.

The QC samples were prepared by the Quality Control Department. Copies of the QC notebook pages are included in this data package.

2.1 Laboratory Control Samples

The LCS recoveries for all nuclides were acceptable except iodine-129 and americium-241 which had recoveries of 83% and 78% respectively, and were below the 3σ recovery limits. However, the recoveries were within the statistical estimate of the errors. The MDA's of the results for all analyses met the RDL's except for iron-59 which was higher than the RDL due to slightly higher background and for americium-241 which was higher than the RDL due to high detector background.

2.2 Reagent Blanks

The MDA's of the results for all analyses met the RDL's. The error for strontium-90 was underlined because it was larger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity.

SDG: 7232
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7232

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

2.0 QUALITY CONTROL (cont'd)

2.3 Duplicates

Results were satisfactory for all duplicate analyses. The strontium-90 error for the duplicate of sample BO9363 was underlined because the 2σ counting errors were larger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity. The MDA's of the gamma nuclides were higher than the RDL's due to the small aliquot available for analyses.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses

The average MDA for gross alpha was (3 ± 1) pCi/g. Gross alpha activity above the RDL was found in sample BO9365.

3.2 Gross Beta Analyses

The average MDA for gross beta was (4 ± 2) pCi/g. Gross beta activity above the RDL was found in all of the samples except BO9366.

3.3 Tritium Analyses

The average MDA was (0.1 ± 0) pCi/g. Tritium activity above the RDL was found sample BO9367.

3.4 Carbon-14 Analyses

The average MDA was (10 ± 30) pCi/g. Carbon-14 activity above the RDL was not found in any of the samples. The carbon-14 results of samples BO9364, BO9365, BO9377, and BO9369 were underlined because they were less than the negative of their 2σ counting errors.

3.5 Nickel-63 Analyses

The average yield for nine analyses was $(70 \pm 35)\%$. The lowest yield was 26% and the highest was 88%. The average MDA was (3 ± 3) pCi/g. Nickel-63 activity above the RDL was found in sample BO9367.

3.6 Strontium-90 Analyses

The average yield for nine analyses was $(77 \pm 10)\%$. The lowest yield was 69% and the highest was 83%. The average MDA was (0.8 ± 0.1) pCi/g. Strontium-90 activity above the RDL was not found in any of the samples. The strontium-90 error was underlined in sample BO9364 because it was larger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity. The negative result of sample BO9366 was underlined because it was less than the negative of its 2σ counting error.

SDG: 7232
Contact: Dinkar Kharkar

TMA NORCAL
REPORTING GROUP 7232

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

3.0 ANALYSIS NOTES (cont'd)

3.7 Technetium-99 Analyses

The average yield for nine analyses was $(53 \pm 19)\%$. The lowest yield was 40% and the highest was 71%. The average MDA was (0.2 ± 0.07) pCi/g. Technetium-99 activity above the RDL was not found in any of the samples.

3.8 Iodine-129 Analyses

The average yield for nine analyses was $(84 \pm 16)\%$. The lowest yield was 67% and the highest was 92. The average MDA was (4 ± 10) pCi/g. Iodine-129 activity above the RDL was not found in any of the samples.

3.9 Plutonium-241 Analyses

The average yield for nine analyses was $(32 \pm 31)\%$. The lowest yield was 6% and the highest yield was 64%. The average MDA was (10 ± 20) pCi/g. The MDA of the result for BO9364, BO9366, and BO9369 were higher than the RDL due to low chemical recovery.

3.10 Americium-241 Analyses

The average yield for nine analyses was $(49 \pm 23)\%$. The lowest yield was 33% and the highest yield was 70%. The average MDA was (0.03 ± 0.03) pCi/g. Americium-241 activity above the RDL was found in sample BO9364.

3.11 Isotopic Uranium Analyses

The average yield for nine analyses was $(70 \pm 21)\%$. The lowest yield was 55% and the highest was 85%. The average MDA was (0.1 ± 0.2) pCi/g. Uranium-233/234 and uranium-238 activities above the RDL were found in all of the samples except BO9366.

3.12 Isotopic Plutonium Analyses

The average yield for nine analyses was $(35 \pm 28)\%$. The lowest yield was 24% and the highest was 69%. The average MDA was (0.05 ± 0.05) pCi/g. Plutonium-239 activity above the RDL was found in sample BO9367. The plutonium-238 MDA's for samples BO9364, BO9366, and BO9367 were higher than the RDL due to higher counter background.

3.13 Gamma Scan Analyses

Gamma scan analysis found positive cobalt-60, cesium-137, europium-152, europium-154 activity in sample BO9367. Natural potassium-40, radium-226, radium-228, thorium-228, and thorium-232 activity was found in all of the samples.

9713512.0259

TMA NORCAL
REPORTING GROUP 7232

N308130-01

DATA SHEET

B09363

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-01
Dept sample id 7232-001
Received 08/27/93
% moisture 6.7

Client sample id B09363
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	9.9	3.3	3	10	J	80A
Gross Beta	Beta	20	3.1	4	10		80B
Tritium	10028-17-8	0.028	0.070	0.1	0.5	U	H
Carbon 14	14762-75-5	-2.6	6.2	10	50	U	C
Nickel-63		4.5	5.0	3	20	J	NI
Strontium 90	10098-97-2	0.031	0.67	0.8	2	U	Y
Technetium 99	14133-76-7	0.091	0.077	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.58	1.1	2	2	U	I
Uranium 233/234		0.57	0.16	0.08	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.09	0.3	U	U
Uranium 238	7440-61-1	0.58	0.16	0.08	0.3		U
Plutonium 238	13981-16-3	-0.004	0.008	0.03	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Plutonium 241	14119-32-5	2.8	4.4	7	8	U	PU_L
Americium 241	14596-10-2	0.031	0.036	0.05	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.1		U	GAM
Potassium 40	13966-00-2	9.3	1.4				GAM
Manganese 54	13966-31-9	U		0.09		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.09		U	GAM
Cobalt 60	10198-40-0	U		0.08	0.05	U	GAM
Niobium 94	14681-63-1	U		0.08		U	GAM
Ruthenium 103	13968-53-1	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Tin 113	13966-06-8	U		0.08		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

028

9713512.0260

TMA NORCAL
REPORTING GROUP 7232

N308130-01

B09363

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-01
Dept sample id 7232-001
Received 08/27/93
% moisture 6.7

Client sample id B09363
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id NONE

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	U		<u>0.2</u>	0.1	U	GAM
Europium 154	15585-10-1	U		0.09	0.1	U	GAM
Europium 155	14391-16-3	U		0.2		U	GAM
Radium 226	13982-63-3	0.42	0.17				GAM
Radium 228	15262-20-1	0.76	0.35				GAM
Thorium 228	14274-82-9	0.61	0.12				GAM
Thorium 232	7440-29-1	0.76	0.35				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N308130-01	80A/80	7232-001		0.100 g	10/05/93	10/06/93	DPK
N308130-01	80B/80	7232-001		0.100 g	10/05/93	10/06/93	DPK
N308130-01	H	7232-001		20.1 g	09/10/93	09/24/93	DPK
N308130-01	C	7232-001	A1	0.103 g	10/13/93	10/19/93	DPK
N308130-01	NI	7232-001	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-01	Y	7232-001		1.00 g	09/17/93	09/24/93	DPK
N308130-01	TC	7232-001		2.03 g	09/22/93	09/24/93	DPK
N308130-01	I	7232-001		1.00 g	09/23/93	09/28/93	DPK
N308130-01	U	7232-001		1.00 g	09/17/93	09/24/93	DPK
N308130-01	PU	7232-001		1.00 g	09/23/93	09/28/93	DPK
N308130-01	PU_L	7232-001		1.00 g	10/05/93	10/15/93	DPK
N308130-01	AM	7232-001		1.00 g	09/22/93	09/24/93	DPK
N308130-01	GAM	7232-001		<u>226</u> g	09/10/93	09/17/93	DPK

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

029

9713512.0261

**TMA NORCAL
REPORTING GROUP 7232**

N308130-02

DATA SHEET

B09364

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-02
Dept sample id 7232-002
Received 08/27/93
% moisture 6.8

Client sample id B09364
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	8.8	4.1	3	10	J	80A
Gross Beta	Beta	51	5.7	5	10		80B
Tritium	10028-17-8	0.040	0.073	0.1	0.5	U	H
Carbon 14	14762-75-5	<u>-7.5</u>	5.5	9	50	U	C
Nickel-63		6.8	1.9	3	20	J	NI
Strontium 90	10098-97-2	-0.086	<u>1.3</u>	0.7	2	U	Y
Technetium 99	14133-76-7	0.060	0.067	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.43	1.0	2	2	U	I
Uranium 233/234		0.51	0.15	0.1	0.3		U
Uranium 235	15117-96-1	-0.013	0.026	0.1	0.3	U	U
Uranium 238	7440-61-1	0.38	0.13	0.08	0.3		U
Plutonium 238	13981-16-3	0.009	0.044	<u>0.08</u>	0.05	U	PU
Plutonium 239/240		0.004	0.018	0.03	0.05	U	PU
Plutonium 241	14119-32-5	1.3	5.4	<u>9</u>	8	U	PU_L
Americium 241	14596-10-2	0.063	0.025	0.02	0.05		AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	12	0.81				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		<u>0.1</u>	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.05		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

030

9713512.0262

TMA NORCAL
REPORTING GROUP 7232

N308130-02

B09364

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-02
Dept sample id 7232-002
Received 08/27/93
% moisture 6.8

Client sample id B09364
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1		U	GAM
Radium 226	13982-63-3	0.55	0.084				GAM
Radium 228	15262-20-1	0.81	0.18				GAM
Thorium 228	14274-82-9	0.95	0.085				GAM
Thorium 232	7440-29-1	0.81	0.18				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-02	80A/80	7232-002		0.100 g	09/17/93	09/24/93	DPK
N308130-02	80B/80	7232-002		0.100 g	09/17/93	09/24/93	DPK
N308130-02	H	7232-002		20.0 g	09/10/93	09/24/93	DPK
N308130-02	C	7232-002	A1	0.112 g	10/14/93	10/19/93	DPK
N308130-02	NI	7232-002	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-02	Y	7232-002		1.00 g	09/17/93	09/24/93	DPK
N308130-02	TC	7232-002		2.01 g	09/22/93	09/24/93	DPK
N308130-02	I	7232-002		1.00 g	09/27/93	09/29/93	DPK
N308130-02	U	7232-002		1.00 g	09/17/93	09/24/93	DPK
N308130-02	PU	7232-002		1.00 g	09/22/93	09/29/93	DPK
N308130-02	PU_L	7232-002		1.00 g	10/05/93	10/15/93	DPK
N308130-02	AM	7232-002		1.00 g	09/24/93	09/28/93	DPK
N308130-02	GAM	7232-002		860 g	09/10/93	09/17/93	DPK

9713512.0263

TMA NORCAL
REPORTING GROUP 7232

N308130-03

B09365

DATA SHEET

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-03
Dept sample id 7232-003
Received 08/27/93
% moisture 4.7Client sample id B09365
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	11	3.2	2	10		80A
Gross Beta	Beta	17	3.0	4	10		80B
Tritium	10028-17-8	0.028	0.071	0.1	0.5	U	H
Carbon 14	14762-75-5	-11	5.6	10	50	U	C
Nickel-63		6.9	2.0	3	20	J	NI
Strontium 90	10098-97-2	0.052	0.22	0.9	2	U	Y
Technetium 99	14133-76-7	0.048	0.057	0.2	0.5	U	TC
Iodine 129	15046-84-1	1.2	1.1	2	2	U	I
Uranium 233/234		0.52	0.17	0.09	0.3		U
Uranium 235	15117-96-1	0.015	0.029	0.1	0.3	U	U
Uranium 238	7440-61-1	0.47	0.15	0.09	0.3		U
Plutonium 238	13981-16-3	0.006	0.017	0.03	0.05	U	PU
Plutonium 239/240		0.004	0.004	0.02	0.05	U	PU
Plutonium 241	14119-32-5	1.2	2.2	4	8	U	PU_L
Americium 241	14596-10-2	0.021	0.025	0.04	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	11	0.92				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

032

9715512.0264

TMA NORCAL
REPORTING GROUP 7232

N308130-03

B09365

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-03
Dept sample id 7232-003
Received 08/27/93
% moisture 4.7

Client sample id B09365
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1		U	GAM
Radium 226	13982-63-3	0.47	0.079				GAM
Radium 228	15262-20-1	0.74	0.18				GAM
Thorium 228	14274-82-9	0.65	0.053				GAM
Thorium 232	7440-29-1	0.74	0.18				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-03	80A/80	7232-003		0.100 g	09/17/93	09/24/93	DPK
N308130-03	80B/80	7232-003		0.100 g	09/17/93	09/24/93	DPK
N308130-03	H	7232-003		20.1 g	09/10/93	09/24/93	DPK
N308130-03	C	7232-003	A1	0.106 g	10/14/93	10/19/93	DPK
N308130-03	NI	7232-003	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-03	Y	7232-003		1.00 g	09/17/93	09/24/93	DPK
N308130-03	TC	7232-003		2.06 g	09/21/93	09/24/93	DPK
N308130-03	I	7232-003		1.00 g	09/27/93	10/12/93	DPK
N308130-03	U	7232-003		1.00 g	09/17/93	09/24/93	DPK
N308130-03	PU	7232-003		1.00 g	09/22/93	09/29/93	DPK
N308130-03	PU_L	7232-003		1.00 g	10/05/93	10/15/93	DPK
N308130-03	AM	7232-003		1.00 g	09/27/93	09/29/93	DPK
N308130-03	GAM	7232-003		786 g	09/10/93	09/17/93	DPK

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

030

9713512.0265

TMA NORCAL
REPORTING GROUP 7232

N308130-04

DATA SHEET

B09366

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-04
Dept sample id 7232-004
Received 08/27/93
% moisture 0.8Client sample id B09366
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	1.1	1.7	2	10	U	80A
Gross Beta	Beta	3.0	1.7	3	10	J	80B
Tritium	10028-17-8	0.026	0.069	0.1	0.5	U	H
Carbon 14	14762-75-5	<u>-11</u>	5.7	10	50	U	C
Nickel-63		15	5.3	8	20	J	NI
Strontium 90	10098-97-2	<u>-0.31</u>	0.23	0.9	2	U	Y
Technetium 99	14133-76-7	0.11	0.077	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.64	0.72	2	2	U	I
Uranium 233/234		0.10	0.078	0.1	0.3	J	U
Uranium 235	15117-96-1	0.031	0.062	0.1	0.3	U	U
Uranium 238	7440-61-1	0.064	0.077	0.1	0.3	U	U
Plutonium 238	13981-16-3	0	0.034	<u>0.06</u>	0.05	U	PU
Plutonium 239/240		0	0.014	0.03	0.05	U	PU
Plutonium 241	14119-32-5	-3.0	6.1	<u>10</u>	8	U	PU_L
Americium 241	14596-10-2	0.009	0.012	0.02	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.39	0.27				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		<u>0.06</u>	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.03		U	GAM
Cesium 134	13967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

031

9713512.0266

TMA NORCAL
REPORTING GROUP 7232

N308130-04

B09366

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-04
Dept sample id 7232-004
Received 08/27/93
% moisture 0.8

Client sample id B09366
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.06		U	GAM
Radium 226	13982-63-3	0.077	0.039				GAM
Radium 228	15262-20-1	0.15	0.068				GAM
Thorium 228	14274-82-9	0.091	0.021				GAM
Thorium 232	7440-29-1	0.15	0.068				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-04	80A/80	7232-004		0.100 g	09/18/93	09/24/93	DPK
N308130-04	80B/80	7232-004		0.100 g	09/18/93	09/24/93	DPK
N308130-04	H	7232-004		20.1 g	09/10/93	09/24/93	DPK
N308130-04	C	7232-004	A1	0.105 g	10/14/93	10/19/93	DPK
N308130-04	NI	7232-004	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-04	Y	7232-004		1.00 g	09/17/93	09/24/93	DPK
N308130-04	TC	7232-004		2.03 g	09/21/93	09/24/93	DPK
N308130-04	I	7232-004		1.00 g	09/29/93	10/04/93	DPK
N308130-04	U	7232-004		1.00 g	09/17/93	09/24/93	DPK
N308130-04	PU	7232-004		1.00 g	09/27/93	09/29/93	DPK
N308130-04	PU_L	7232-004		1.00 g	10/05/93	10/15/93	DPK
N308130-04	AM	7232-004		1.00 g	09/28/93	09/30/93	DPK
N308130-04	GAM	7232-004		870 g	09/10/93	09/17/93	DPK

9713512.0267

TMA NORCAL
REPORTING GROUP 7232

N308130-05

B09367

DATA SHEET

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-05
Dept sample id 7232-005
Received 08/27/93
% moisture 2.9Client sample id B09367
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	7.5	2.1	2	10	J	80A
Gross Beta	Beta	26	2.4	3	10		80B
Tritium	10028-17-8	5.0	0.20	0.1	0.5		H
Carbon 14	14762-75-5	4.1	7.3	9	50	U	C
Nickel-63		170	4.3	3	20		NI
Strontium 90	10098-97-2	0.85	0.27	0.8	2	J	Y
Technetium 99	14133-76-7	0.10	0.079	0.2	0.5	U	TC
Iodine 129	15046-84-1	-0.044	0.96	2	2	U	I
Uranium 233/234		0.37	0.087	0.05	0.3	B	U
Uranium 235	15117-96-1	0.011	0.023	0.04	0.3	U	U
Uranium 238	7440-61-1	0.38	0.087	0.04	0.3		U
Plutonium 238	13981-16-3	-0.027	0.044	0.1	0.05	U	PU
Plutonium 239/240		0.087	0.044	0.04	0.05		PU
Plutonium 241	14119-32-5	-1.1	4.7	8	8	U	PU_L
Americium 241	14596-10-2	0.036	0.021	0.02	0.05	J	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.4		U	GAM
Potassium 40	13966-00-2	11	0.87				GAM
Manganese 54	13966-31-9	U		0.1		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.1		U	GAM
Cobalt 60	10198-40-0	1.9	0.12		0.05		GAM
Niobium 94	14681-63-1	U		0.1		U	GAM
Ruthenium 103	13968-53-1	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Tin 113	13966-06-8	U		0.1		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	3.6	0.14		0.05		GAM

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
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Version 2.27
Report date 10/22/93

036

9713512.0268

**TMA NORCAL
REPORTING GROUP 7232**

N308130-05

B09367

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-05
Dept sample id 7232-005
Received 08/27/93
% moisture 2.9

Client sample id B09367
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	7.9	0.29		0.1		GAM
Europium 154	15585-10-1	0.88	0.22		0.1		GAM
Europium 155	14391-16-3	U		0.3		U	GAM
Radium 226	13982-63-3	0.41	0.14				GAM
Radium 228	15262-20-1	0.76	0.35				GAM
Thorium 228	14274-82-9	0.65	0.10				GAM
Thorium 232	7440-29-1	0.76	0.35				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-05	80A/80	7232-005		0.100 g	09/18/93	09/24/93	DPK
N308130-05	80B/80	7232-005		0.100 g	09/18/93	09/24/93	DPK
N308130-05	H	7232-005		20.1 g	09/10/93	09/24/93	DPK
N308130-05	C	7232-005	A1	0.111 g	10/14/93	10/19/93	DPK
N308130-05	NI	7232-005	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-05	Y	7232-005		1.00 g	09/17/93	09/24/93	DPK
N308130-05	TC	7232-005		2.04 g	09/21/93	09/24/93	DPK
N308130-05	I	7232-005		1.00 g	10/01/93	10/06/93	DPK
N308130-05	U	7232-005		1.00 g	09/18/93	09/24/93	DPK
N308130-05	PU	7232-005		1.00 g	09/27/93	09/29/93	DPK
N308130-05	PU_L	7232-005		1.00 g	10/05/93	10/15/93	DPK
N308130-05	AM	7232-005		1.00 g	09/24/93	09/28/93	DPK
N308130-05	GAM	7232-005		830 g	09/10/93	09/17/93	DPK

Lab id TMAN
Protocol WHC-HASM
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9713512.0269

TMA NORCAL
REPORTING GROUP 7232

N308130-06

DATA SHEET

B09369

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-06
Dept sample id 7232-006
Received 08/27/93
% moisture 3.9Client sample id B09369
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	7.4	2.0	2	10	J	80A
Gross Beta	Beta	16	2.1	3	10		80B
Tritium	10028-17-8	0.004	0.069	0.1	0.5	U	H
Carbon 14	14762-75-5	<u>-13</u>	5.8	10	50	U	C
Nickel-63		6.7	1.8	3	20	J	NI
Strontium 90	10098-97-2	0.087	0.24	0.8	2	U	Y
Technetium 99	14133-76-7	0.098	0.077	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.020	0.76	2	2	U	I
Uranium 233/234		0.47	0.11	0.05	0.3	B	U
Uranium 235	15117-96-1	0.030	0.044	0.06	0.3	U	U
Uranium 238	7440-61-1	0.46	0.11	0.05	0.3		U
Plutonium 238	13981-16-3	-0.009	0.017	0.05	0.05	U	PU
Plutonium 239/240		0.009	0.017	0.03	0.05	U	PU
Plutonium 241	14119-32-5	18	<u>50</u>	<u>40</u>	8	U	PU_L
Americium 241	14596-10-2	0.016	0.024	0.03	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.1		U	GAM
Potassium 40	13966-00-2	10	1.7				GAM
Manganese 54	13966-31-9	U		0.09		U	GAM
Iron 59	14596-12-4	U		<u>0.3</u>	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.1		U	GAM
Cobalt 60	10198-40-0	U		<u>0.1</u>	0.05	U	GAM
Niobium 94	14681-63-1	U		0.09		U	GAM
Ruthenium 103	13968-53-1	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Tin 113	13966-06-8	U		0.1		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		<u>0.1</u>	0.05	U	GAM

9713512.0270

TMA NORCAL
REPORTING GROUP 7232

N308130-06

B09369

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-06
Dept sample id 7232-006
Received 08/27/93
% moisture 3.9

Client sample id B09369
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Europium 155	14391-16-3	U		0.2		U	GAM
Radium 226	13982-63-3	0.78	0.21				GAM
Radium 228	15262-20-1	0.54	0.36				GAM
Thorium 228	14274-82-9	0.61	0.11				GAM
Thorium 232	7440-29-1	0.54	0.36				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N308130-06	80A/80	7232-006		0.100 g	09/18/93	09/24/93	DPK
N308130-06	80B/80	7232-006		0.100 g	09/18/93	09/24/93	DPK
N308130-06	H	7232-006		20.2 g	09/10/93	09/24/93	DPK
N308130-06	C	7232-006	A1	0.105 g	10/14/93	10/19/93	DPK
N308130-06	NI	7232-006	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-06	Y	7232-006		1.00 g	09/17/93	09/24/93	DPK
N308130-06	TC	7232-006		2.01 g	09/22/93	09/24/93	DPK
N308130-06	I	7232-006		1.00 g	10/04/93	10/06/93	DPK
N308130-06	U	7232-006		1.00 g	09/18/93	09/24/93	DPK
N308130-06	PU	7232-006		1.00 g	09/23/93	09/28/93	DPK
N308130-06	PU_L	7232-006		1.00 g	10/05/93	10/15/93	DPK
N308130-06	AM	7232-006		1.00 g	09/27/93	09/29/93	DPK
N308130-06	GAM	7232-006		207 g	09/11/93	09/17/93	DPK

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

039

Westinghouse
Hanford
Company

CHAIN OF CUSTODY

Custody Form Initiator WV SETZER
 Company Contact WV SETZER Telephone 376-2413
 Project Designation/Sampling Locations 100-DR-2 Collection Date 8-24-93
 Ice Chest No. SML 94 Field Logbook No. EFL-1092
 Bill of Lading/Airbill No. 997 333 120 Offsite Property No. WA3-0-0667-39
 Method of Shipment OVERNIGHT AIR SERVICE
 Shipped to TMA/NORCAL
 Possible Sample Hazards/Remarks Maintain at 4 degrees Centigrade.

Sample Identification

1) B09363

- 1, 250ml P:CLP; ICP/AA Metals, Hg
- 1, 125ml G: Sulfate (EPA 375.4)
- 1, 125ml G: Anions F (EPA 300.0)
- 1, 125ml P/G: Anions NO2-NO3 (EPA 353.2)
- 1, 1000ml P/G: Gross alpha/beta (EP-10), Gamma Spec to include, Co-60, Ru-106, Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618, EA-85, EA-85A), Ni-63 (RC-609-610), Sr-90 (RC-303-304-306-309) Tc-99 (RC-24, 304), I-129 (RC-25, 605), U-235, U-238 (EP-70, 71, 05), Pu-238, Pu-239/240 (EP-80, 81, 5), Pu-241 (EP-80, 81, 5, 108), Am-241 (EP-80, 90, 91, 92, 93, 5)
- 1, 125ml Gs: Tritium (EA-48)

2) B09364

- 1, 250ml P:CLP; ICP/AA Metals, Hg
- 1, 125ml G: Sulfate (EPA 375.4)
- 1, 125ml G: Anions F (EPA 300.0)
- 1, 125ml P/G: Anions NO2-NO3 (EPA 353.2)
- 1, 1000ml P/G: Gross alpha/beta (EP-10), Gamma Spec to include, Co-60, Ru-106, Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618, EA-85, EA-85A), Ni-63 (RC-609-610), Sr-90 (RC-303-304-306-309) Tc-99 (RC-24, 304), I-129 (RC-25, 605), U-235, U-238 (EP-70, 71, 05), Pu-238, Pu-239/240 (EP-80, 81, 5), Pu-241 (EP-80, 81, 5, 108), Am-241 (EP-80, 90, 91, 92, 93, 5)
- 1, 125ml Gs: Tritium (EA-48)

3) B09365

- 1, 250ml P:CLP; ICP/AA Metals, Hg
- 1, 125ml G: Sulfate (EPA 375.4)
- 1, 125ml G: Anions F (EPA 300.0)
- 1, 125ml P/G: Anions NO2-NO3 (EPA 353.2)
- 1, 1000ml P/G: Gross alpha/beta (EP-10), Gamma Spec to include, Co-60, Ru-106, Ru-106, Eu-152, Eu-154, Eu-155, Cs-137 (RC-30); C-14 (RC-618, EA-85, EA-85A), Ni-63 (RC-609-610), Sr-90 (RC-303-304-306-309) Tc-99 (RC-24, 304), I-129 (RC-25, 605), U-235, U-238 (EP-70, 71, 05), Pu-238, Pu-239/240 (EP-80, 81, 5), Pu-241 (EP-80, 81, 5, 108), Am-241 (EP-80, 90, 91, 92, 93, 5)
- 1, 125ml Gs: Tritium (EA-48)

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

Relinquished by: <i>W.V. Setzer</i>	Received by: <i>KB Hulse</i>	Date/Time: 8-24-93 / 1435
Relinquished by: <i>KB Hulse</i>	Received by: <i>W.V. Setzer</i>	Date/Time: 8-26-93 / 1116
Relinquished by: <i>W.V. Setzer</i>	Received by: <i>Off. MARCIS</i>	Date/Time: 8-27-93 1:35
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:
Comments:		

Westinghouse Hanford Company	<h1>SAMPLE ANALYSIS REQUEST</h1>
---	----------------------------------

Collector <i>W.U. SETZER</i>	Date <i>8.25.93</i>
Company Contact <i>W.U. SETZER</i>	Telephone <i>509) 376-2413</i>

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
<i>B09363</i>	<i>S</i>	<i>8.24.93</i>	<i>1210</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09364</i>	<i>S</i>	<i>8.24.93</i>	<i>1230</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09365</i>	<i>S</i>	<i>8.24.93</i>	<i>1338</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)

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

Field Information *NONE*

Special Handling and/or Storage *STORED at 4°C*

Possible Sample Hazards *NONE OBSERVED*

**Westinghouse
Hanford
Company**

CHAIN OF CUSTODY

Custody Form Initiator WV SETZER
 Company Contact WV SETZER Telephone 376-2413
 Project Designation/Sampling Locations 100-DR-2 Collection Date 8-25-93
 Ice Chest No. SML 94 Field Logbook No. EFL-1092
 Bill of Lading/Airbill No. _____ Offsite Property No. W93-0-0667-39
 Method of Shipment OVERNIGHT AIR SERVICE
 Shipped to TMA/NORCAL
 Possible Sample Hazards/Remarks Maintain at 4 degrees Centigrade.

Sample Identification

- 1) B09366
~~1,250ml~~ P:CLP;TAL Metals,Hg,Cd,Pb,Cr
~~1,125ml~~ G:Sulfate(EPA 375.4)
~~1,125ml~~ G: Anions F(EPA 300.0)
~~1,125ml~~ P/G: Anions NO2-NO3 (EPA 353.2)
~~1,1000ml~~ P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-
 241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
~~1,125ml~~ Gs: Tritium (EA-48)
- 2) B09369
~~1,250ml~~ P:CLP;TAL Metals,Hg,Cd,Pb,Cr WVS - 8.25.93
~~1,125ml~~ G:Sulfate(EPA 375.4) WVS 8.25.93
~~1,125ml~~ G: Anions F(EPA 300.0) WVS 9.25.93
~~1,125ml~~ P/G: Anions NO2-NO3 (EPA 353.2) WVS 8.25.93
~~1,1000ml~~ P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC-25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241
 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
~~1,125ml~~ Gs: Tritium (EA-48) WVS 8.25.93
- 3) B09367
~~1,250ml~~ P:TAL Metals,Hg,Cd,Pb,Cr
~~1,125ml~~ G:Sulfate(EPA 375.4)
~~1,125ml~~ G: Anions F(EPA 300.0)
~~1,125ml~~ P/G: Anions NO2-NO3 (EPA 353.2)
~~1,1000ml~~ P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,
 Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309)
 Tc-99 (RC-24,304),I-129 (RC-25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241
 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5)
~~1,125ml~~ Gs: Tritium (EA-48)

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

Relinquished by: <i>W.V. Setzer</i>	Received by: <i>KB Hulse</i>	Date/Time: <i>8/25/93 1102</i>
Relinquished by: <i>KB Hulse</i>	Received by: <i>W.V. Setzer</i>	Date/Time: <i>8/26/93 1117</i>
Relinquished by: <i>W.V. Setzer</i>	Received by: <i>H. NARUSE</i>	Date/Time: <i>8/27/93 1:35</i>
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method: _____ Disposed by: _____ Date/Time: _____

Comments: _____

Westinghouse Hanford Company	<h2 style="margin: 0;">SAMPLE ANALYSIS REQUEST</h2>
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Collector <i>W.U. SETZER</i> Company Contact <i>W.U. SETZER</i>	Date <i>8-25-93</i> Telephone 509 <i>376-2413</i>
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Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
<i>B09366</i>	<i>S</i>	<i>8-25-93</i>	<i>0845</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09367</i>	<i>S</i>	<i>8-25-93</i>	<i>1020</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)
<i>B09369</i>	<i>S</i>	<i>8-25-93</i>	<i>1045</i>	1,250ml P:CLP;TAL Metals,Hg,Cd,Pb,Cr 1,125ml G:Sulfate(EPA 375.4) 1,125ml G: Anions F(EPA 300.0) 1,125ml P/G: Anions NO2-NO3 (EPA 353.2) 1,1000ml P/G :Gross alpha/beta (EP-10),Gamma Spec to include,Co-60,Ru-106,Ru-106,Eu-152,Eu-154,Eu-155,Cs-137 (RC-30); C-14 (RC-618,EA-85,EA-85A),Ni-63 (RC-609-610),Sr-90 (RC-303-304-306-309) Tc-99 (RC-24,304),I-129 (RC25,605),U-235,U-238 (EP-70,71,05),Pu-238,Pu-239/240 (EP-80,81,5) ,Pu-241 (EP-80,81,5,108),Am-241 (EP-80,90,91,92,93,5) 1,125ml Gs: Tritium (EA-48)

WUS 8-25-93

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

Field Information *sample B09369 only has 1, 1000ml bottle with 400ml material*
 Special Handling and/or Storage *STORED @ 4°C*
 Possible Sample Hazards *NONE OBSERVED*

9713512.0276

Overnight Delivery

Contractor Westinghouse Hanford Company	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) W93-0-0667-39
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PART I - TO BE COMPLETED BY ORIGINATOR

Department Environmental	Section Env Field Services	Unit Env Charac & Sampling
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The following items are to be shipped from Contractor Vendor

Routing **Air** Contractor Vendor

Shipped to TMA/NORCAL 2030 WRIGHT AVE RICHMOND CA 94804	Off-site Custodian Delores Sanchez
	Full Title Project Coordinator

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
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1)	poly cooler. Contains soil samples that are double-bagged and packed in wet ice and vermiculite. Samples are nonhazardous. Sample #: 101303, 101304, 101305, 101306, 101307, 101309	N/A
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Classified Unclassified Shipped Under DOE Contract Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property
To support drilling and sampling at the 100 Areas

Bill of Lading 947 333 120

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

RM Clearance for Public Release <i>[Signature]</i>	RM Survey No. 125856	Date 12-1-89	
Location of Property (Area & Bldg.) 100 Area	Contact W. V. Setzer	Phone 376-2413	
Date Ready for Shipment 12-1-89	Cost Code to be Charged 81710/PA2B3	Approximate Date This Property will be Returned	
Originated By <i>[Signature]</i>	Date 12-1-89	Authorized By <i>[Signature]</i>	Date 12-1-89
Signature and Name of Property Control	Custodian Date	Property Management Approval <i>[Signature]</i>	Date 12-1-89

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient <i>[Signature]</i>	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date 12-1-89				

DISTRIBUTION

By Originator White, Green, Yellow, Pink - Property Management Goldenrod - Retain	Shipping Operation - Sign all Copies and Forward to: White - Property Management Yellow - Retain	Green - Property Control Custodian (Issuing Office) Pink - Originator
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087

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09363

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-01S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 92.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6600			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	3.0		S	F
7440-39-3	Barium	67.7			P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	0.32	U		P
7440-70-2	Calcium	8790			P
7440-47-3	Chromium	10.7			P
7440-48-4	Cobalt	8.4	B		P
7440-50-8	Copper	15.2			P
7439-89-6	Iron	17200		*	P
7439-92-1	Lead	6.8		S	F
7439-95-4	Magnesium	4610			P
7439-96-5	Manganese	289		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.1			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.76	U	W	F
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	240	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	43.4		*	P
7440-66-6	Zinc	37.7		*	P
	Cyanide				NR

NV
12/23/93 SC

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09364

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-02S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 92.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6530			P
7440-36-0	Antimony	3.2	U	X J	P
7440-38-2	Arsenic	2.6			F
7440-39-3	Barium	68.4			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	0.31	U		P
7440-70-2	Calcium	9450			P
7440-47-3	Chromium	10.5			P
7440-48-4	Cobalt	9.2	B		P
7440-50-8	Copper	15.7			P
7439-89-6	Iron	17300		*	P
7439-92-1	Lead	6.2			F
7439-95-4	Magnesium	4630			P
7439-96-5	Manganese	294		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.4			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.77	U	X J	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	252	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	42.0		X J	P
7440-66-6	Zinc	38.4		*	P
	Cyanide				NR

12/23/93

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

all other lab dup. results did meet WPC of limits.

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09365

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-03S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 95.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4530			P
7440-36-0	Antimony	3.1	U	<i>AJ</i>	P
7440-38-2	Arsenic	1.6	B		F
7440-39-3	Barium	54.2			P
7440-41-7	Beryllium	0.43	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6690			P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	10.0			P
7440-50-8	Copper	15.2			P
7439-89-6	Iron	17100		*	P
7439-92-1	Lead	14.0			F
7439-95-4	Magnesium	3800			P
7439-96-5	Manganese	248		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	8.3			P
7440-09-7	Potassium	768	B		P
7782-49-2	Selenium	0.73	U	<i>AJ</i>	F
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	276	B		P
7440-28-0	Thallium	0.40	U		F
7440-62-2	Vanadium	41.7		<i>AJ</i>	P
7440-66-6	Zinc	35.8		*	P
	Cyanide				NR

12/23/93

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

** All other hb dup. results did meet w/HC ac limits*

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09366

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-04S

Level (low/med): LOW

Date Received: 08/31/93

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	77.8			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	0.60	B		F
7440-39-3	Barium	1.0	U		P
7440-41-7	Beryllium	0.24	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	16.8	U		P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	0.93	B		P
7439-89-6	Iron	128		*	P
7439-92-1	Lead	0.39	B		F
7439-95-4	Magnesium	11.3	B		P
7439-96-5	Manganese	0.38	B	*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	1.0	B		P
7440-09-7	Potassium	33.0	U		P
7782-49-2	Selenium	0.73	U	W	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	37.1	B		P
7440-28-0	Thallium	0.40	U		F
7440-62-2	Vanadium	0.52	U	*	P
7440-66-6	Zinc	0.74	U	*	P
	Cyanide				NR

NV
12/23/93

Color Before: WHITE

Clarity Before:

Texture: FINE

Color After: WHITE

Clarity After:

Artifacts: YES

Comments:

ROCKS

9713512.0281

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B09367

Lab Name: SKINNER & SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-08-128SAS No.:

SDG No.: B09363

Matrix (soil/water): SOIL

Lab Sample ID: 08315-05S

Level (low/med): LOW

Date Received: 08/31/93

% Solids:

96.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5180			P
7440-36-0	Antimony	4.2	B	N	P
7440-38-2	Arsenic	1.4	B	W	F
7440-39-3	Barium	70.0			P
7440-41-7	Beryllium	0.24	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6210			P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	13.0			P
7440-50-8	Copper	16.6			P
7439-89-6	Iron	21600		*	P
7439-92-1	Lead	3.7			F
7439-95-4	Magnesium	4430			P
7439-96-5	Manganese	307		*	P
7439-97-6	Mercury	0.05	B		CV
7440-02-0	Nickel	9.4			P
7440-09-7	Potassium	877	B		P
7782-49-2	Selenium	0.77	U	W	F
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	394	B		P
7440-28-0	Thallium	0.41	U		F
7440-62-2	Vanadium	58.9		*	P
7440-66-6	Zinc	49.5		*	P
	Cyanide				NR

NV
12/23/93

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

9713512.0282

000009

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09363

FRACTION 01A TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 08/24/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.5	mg/kg	1.0
Sulfate	300.0	12	mg/kg	5

FORM 1

NV

12/23/93 SC

9715512.0283

000010

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09364

FRACTION 02A TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 08/24/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.6	mg/kg	1.0
Sulfate	300.0	12	mg/kg	5

FORM I

12/23/93 JC

9713512.0284

000011

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09365

FRACTION 03A TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 08/24/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300.0	1.1	mg/kg	1.0
Sulfate	300.0	18	mg/kg	5

FORM 1

12/23/93 SC

9713512.0285

000012

TMA Inc.

REPORT

Work Order # A3-08-069

Received: 08/27/93

Results by Sample

SAMPLE ID B09366

FRACTION 04A TEST CODE WCCLPS NAME Anions in Solids

Date & Time Collected 08/25/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Fluoride	300.0	0.5	mg/kg	1.0
Sulfate	300.0	7	mg/kg	5

FORM 1

NV
12/23/93 SC

9713512.0286

TMA Inc.

REPORT

Work Order # A3-08-000013

Received: 08/27/93

Results by Sample

SAMPLE ID B09367

FRACTION 05A TEST CODE MCCLPS NAME Anions in Solids

Date & Time Collected 08/25/93

Category _____

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Fluoride	300.0	1.1	mg/kg	1.0
Sulfate	300.0	31	mg/kg	5

FORM 1

12/23/93 SC

9713512.0287

Received: 08/31/93

Results by Sample

SAMPLE ID B09363 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 08/24/93 Category SOIL
NITR_S 30.4 NV 12/23/93 SC
mg N/kg

SAMPLE ID B09364 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 08/24/93 Category SOIL
NITR_S 29.6 ✓ 12/23/93 SC
mg N/kg

SAMPLE ID B09365 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 08/24/93 Category SOIL
NITR_S 27.2 ✓ 12/23/93 SC
mg N/kg

SAMPLE ID B09366 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 08/25/93 Category SOIL
NITR_S 2.48 ✓ NV 12/23/93 SC
mg N/kg

SAMPLE ID B09367 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 08/25/93 Category SOIL
NITR_S 21.9 NV 12/23/93 SC
mg N/kg

SAMPLE ID B09367D SAMPLE # 05 FRACTIONS: B
Date & Time Collected 08/25/93 Category SOIL
NITR_S 17.7
mg N/kg

SAMPLE ID B09367S SAMPLE # 05 FRACTIONS: C
Date & Time Collected 08/25/93 Category SOIL
NITR_S 37.8
mg N/kg

9713512.0288

Page 3

Skinner&Sherman

REPORT

Work Order # S3-08-316

Received: 08/31/93

Results by Sample

SAMPLE ID <u>LCSS</u>	SAMPLE # <u>06</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>not specified</u> Category <u>SOIL</u>
NITR_S <u>2.28</u>	
mg N/L	

9713512.0289

TMA NORCAL
REPORTING GROUP 7232

N308130-01

B09363

DATA SHEET

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-01
Dept sample id 7232-001
Received 08/27/93
% moisture 6.7

Client sample id B09363
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id NONE

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	9.9	3.3	3	10	J	80A
Gross Beta	Beta	20	3.1	4	10		80B
Tritium	10028-17-8	0.028	0.070	0.1	0.5	U	H
Carbon 14	14762-75-5	-2.6	6.2	10	50	U	C
Nickel-63		4.5	5.0	3	20	J	NI
Strontium 90	10098-97-2	0.031	0.67	0.8	2	U	Y
Technetium 99	14133-76-7	0.091	0.077	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.58	1.1	2	2	U	I
Uranium 233/234		0.57	0.16	0.08	0.3		U
Uranium 235	15117-96-1	0.024	0.048	0.09	0.3	U	U
Uranium 238	7440-61-1	0.58	0.16	0.08	0.3		U
Plutonium 238	13981-16-3	-0.004	0.008	0.03	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Plutonium 241	14119-32-5	2.8	4.4	7	8	U	PU_L
Americium 241	14596-10-2	0.031	0.036	0.05	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.1		U	GAM
Potassium 40	13966-00-2	9.3	1.4				GAM
Manganese 54	13966-31-9	U		0.09		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.09		U	GAM
Cobalt 60	10198-40-0	U		0.08	0.05	U	GAM
Niobium 94	14681-63-1	U		0.08		U	GAM
Ruthenium 103	13968-53-1	U		0.08		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Tin 113	13966-06-8	U		0.08		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.07	0.05	U	GAM

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

028

RBC
12-28-93 NV

9713512.0290

TMA NORCAL
REPORTING GROUP 7232

N308130-01

B09363

DATA SHEET, cont

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-01
Dept sample id 7232-001
Received 08/27/93
% moisture 6.7Client sample id B09363
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id NONE

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	U		0.2	0.1	U	GAM
Europium 154	15585-10-1	U		0.09	0.1	U	GAM
Europium 155	14391-16-3	U		0.2		U	GAM
Radium 226	13982-63-3	0.42	0.17				GAM
Radium 228	15262-20-1	0.76	0.35				GAM
Thorium 228	14274-82-9	0.61	0.12				GAM
Thorium 232	7440-29-1	0.76	0.35				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-01	80A/80	7232-001		0.100 g	10/05/93	10/06/93	DPK
N308130-01	80B/80	7232-001		0.100 g	10/05/93	10/06/93	DPK
N308130-01	H	7232-001		20.1 g	09/10/93	09/24/93	DPK
N308130-01	C	7232-001	A1	0.103 g	10/13/93	10/19/93	DPK
N308130-01	NI	7232-001	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-01	Y	7232-001		1.00 g	09/17/93	09/24/93	DPK
N308130-01	TC	7232-001		2.03 g	09/22/93	09/24/93	DPK
N308130-01	I	7232-001		1.00 g	09/23/93	09/28/93	DPK
N308130-01	U	7232-001		1.00 g	09/17/93	09/24/93	DPK
N308130-01	PU	7232-001		1.00 g	09/23/93	09/28/93	DPK
N308130-01	PU_L	7232-001		1.00 g	10/05/93	10/15/93	DPK
N308130-01	AM	7232-001		1.00 g	09/22/93	09/24/93	DPK
N308130-01	GAM	7232-001		226 g	09/10/93	09/17/93	DPK

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

029

RSC
12-28-93
NV

9713512.0292

TMA NORCAL
REPORTING GROUP 7232

N308130-02

B09364

DATA SHEET, cont

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-02
Dept sample id 7232-002
Received 08/27/93
% moisture 6.8Client sample id B09364
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Cerium 144	14762-78-8	U		0.2		U R	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1		U	GAM
Radium 226	13982-63-3	0.55	0.084				GAM
Radium 228	15262-20-1	0.81	0.18				GAM
Thorium 228	14274-82-9	0.95	0.085				GAM
Thorium 232	7440-29-1	0.81	0.18				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-02	80A/80	7232-002		0.100 g	09/17/93	09/24/93	DPK
N308130-02	80B/80	7232-002		0.100 g	09/17/93	09/24/93	DPK
N308130-02	H	7232-002		20.0 g	09/10/93	09/24/93	DPK
N308130-02	C	7232-002	A1	0.112 g	10/14/93	10/19/93	DPK
N308130-02	NI	7232-002	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-02	Y	7232-002		1.00 g	09/17/93	09/24/93	DPK
N308130-02	TC	7232-002		2.01 g	09/22/93	09/24/93	DPK
N308130-02	I	7232-002		1.00 g	09/27/93	09/29/93	DPK
N308130-02	U	7232-002		1.00 g	09/17/93	09/24/93	DPK
N308130-02	PU	7232-002		1.00 g	09/22/93	09/29/93	DPK
N308130-02	PU_L	7232-002		1.00 g	10/05/93	10/15/93	DPK
N308130-02	AM	7232-002		1.00 g	09/24/93	09/28/93	DPK
N308130-02	GAM	7232-002		860 g	09/10/93	09/17/93	DPK

DATA SHEETS
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SUMMARY DATA SECTION
Page 23Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

031

Rbc
12-28-93

9713512.0293

TMA NORCAL
REPORTING GROUP 7232

N308130-03

B09365

DATA SHEET

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-03
Dept sample id 7232-003
Received 08/27/93
% moisture 4.7Client sample id B09365
Location/Matrix 100-DR-2 SOLID
Collected 08/24/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	11	3.2	2	10		80A
Gross Beta	Beta	17	3.0	4	10		80B
Tritium	10028-17-8	0.028	0.071	0.1	0.5	U	H
Carbon 14	14762-75-5	-11	5.6	10	50	U	C
Nickel-63		6.9	2.0	3	20	U	NI
Strontium 90	10098-97-2	0.052	0.22	0.9	2	U	Y
Technetium 99	14133-76-7	0.048	0.057	0.2	0.5	U	TC
Iodine 129	15046-84-1	1.2	1.1	2	2	U	I
Uranium 233/234		0.52	0.17	0.09	0.3	U	U
Uranium 235	15117-96-1	0.015	0.029	0.1	0.3	U	U
Uranium 238	7440-61-1	0.47	0.15	0.09	0.3	U	U
Plutonium 238	13981-16-3	0.006	0.017	0.03	0.05	U	PU
Plutonium 239/240		0.004	0.004	0.02	0.05	U	PU
Plutonium 241	14119-32-5	1.2	2.2	4	8	U	PU_L
Americium 241	14596-10-2	0.021	0.025	0.04	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	11	0.92				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

032

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12-28-93

9713512.0294

TMA NORCAL
REPORTING GROUP 7232

N308130-03

B09365

DATA SHEET, cont

SDG 7232 Client Westinghouse Hanford
 Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N308130-03 Client sample id B09365
 Dept sample id 7232-003 Location/Matrix 100-DR-2 SOLID
 Received 08/27/93 Collected 08/24/93
 % moisture 4.7 Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U ^R	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1		U	GAM
Radium 226	13982-63-3	0.47	0.079				GAM
Radium 228	15262-20-1	0.74	0.18				GAM
Thorium 228	14274-82-9	0.65	0.053				GAM
Thorium 232	7440-29-1	0.74	0.18				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-03	80A/80	7232-003		0.100 g	09/17/93	09/24/93	DPK
N308130-03	80B/80	7232-003		0.100 g	09/17/93	09/24/93	DPK
N308130-03	H	7232-003		20.1 g	09/10/93	09/24/93	DPK
N308130-03	C	7232-003	A1	0.106 g	10/14/93	10/19/93	DPK
N308130-03	NI	7232-003	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-03	Y	7232-003		1.00 g	09/17/93	09/24/93	DPK
N308130-03	TC	7232-003		2.06 g	09/21/93	09/24/93	DPK
N308130-03	I	7232-003		1.00 g	09/27/93	10/12/93	DPK
N308130-03	U	7232-003		1.00 g	09/17/93	09/24/93	DPK
N308130-03	PU	7232-003		1.00 g	09/22/93	09/29/93	DPK
N308130-03	PU_L	7232-003		1.00 g	10/05/93	10/15/93	DPK
N308130-03	AM	7232-003		1.00 g	09/27/93	09/29/93	DPK
N308130-03	GAM	7232-003		786 g	09/10/93	09/17/93	DPK

Lab id TMAN
 Protocol WHC-HASM
 Version Ver 1.0
 Form DVD-DS
 Version 2.27
 Report date 10/22/93

033

RBC
12-28-93

9713512.0295

TMA NORCAL
REPORTING GROUP 7232

N308130-04

B09366

DATA SHEET

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-04
Dept sample id 7232-004
Received 08/27/93
% moisture 0.8Client sample id B09366
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	1.1	1.7	2	10	U	80A
Gross Beta	Beta	3.0	1.7	3	10	J	80B
Tritium	10028-17-8	0.026	0.069	0.1	0.5	U	H
Carbon 14	14762-75-5	<u>-11</u>	5.7	10	50	U	C
Nickel-63		15	5.3	8	20	J	NI
Strontium 90	10098-97-2	<u>-0.31</u>	0.23	0.9	2	U	Y
Technetium 99	14133-76-7	0.11	0.077	0.2	0.5	U	TC
Iodine 129	15046-84-1	0.64	0.72	2	2	U	I
Uranium 233/234		0.10	0.078	0.1	0.3	J	U
Uranium 235	15117-96-1	0.031	0.062	0.1	0.3	U	U
Uranium 238	7440-61-1	0.064	0.077	0.1	0.3	U	U
Plutonium 238	13981-16-3	0	0.034	<u>0.06</u>	0.05	U	PU
Plutonium 239/240		0	0.014	0.03	0.05	U	PU
Plutonium 241	14119-32-5	<u>-3.0</u>	6.1	<u>10</u>	8	U	PU_L
Americium 241	14596-10-2	0.009	0.012	0.02	0.05	U	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.39	0.27				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		<u>0.06</u>	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.02		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.03		U	GAM
Cesium 134	13967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM

DATA SHEETS

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SUMMARY DATA SECTION

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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

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RBC
12-28-93
NV

9713512.0296

TMA NORCAL
REPORTING GROUP 7232

N308130-04

B09366

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-04
Dept sample id 7232-004
Received 08/27/93
% moisture 0.8

Client sample id B09366
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.06		U	GAM
Radium 226	13982-63-3	0.077	0.039				GAM
Radium 228	15262-20-1	0.15	0.068				GAM
Thorium 228	14274-82-9	0.091	0.021				GAM
Thorium 232	7440-29-1	0.15	0.068				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-04	80A/80	7232-004		0.100 g	09/18/93	09/24/93	DPK
N308130-04	80B/80	7232-004		0.100 g	09/18/93	09/24/93	DPK
N308130-04	H	7232-004		20.1 g	09/10/93	09/24/93	DPK
N308130-04	C	7232-004	A1	0.105 g	10/14/93	10/19/93	DPK
N308130-04	NI	7232-004	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-04	Y	7232-004		1.00 g	09/17/93	09/24/93	DPK
N308130-04	TC	7232-004		2.03 g	09/21/93	09/24/93	DPK
N308130-04	I	7232-004		1.00 g	09/29/93	10/04/93	DPK
N308130-04	U	7232-004		1.00 g	09/17/93	09/24/93	DPK
N308130-04	PU	7232-004		1.00 g	09/27/93	09/29/93	DPK
N308130-04	PU_L	7232-004		1.00 g	10/05/93	10/15/93	DPK
N308130-04	AM	7232-004		1.00 g	09/28/93	09/30/93	DPK
N308130-04	GAM	7232-004		870 g	09/10/93	09/17/93	DPK

DATA SHEETS
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SUMMARY DATA SECTION
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Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

035

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12-28-93
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9713512.0297

TMA NORCAL
REPORTING GROUP 7232

N308130-05

B09367

DATA SHEET

SDG <u>7232</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
Lab sample id <u>N308130-05</u>	Client sample id <u>B09367</u>
Dept sample id <u>7232-005</u>	Location/Matrix <u>100-DR-2 SOLID</u>
Received <u>08/27/93</u>	Collected <u>08/25/93</u>
% moisture <u>2.9</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	7.5	2.1	2	10	J	80A
Gross Beta	Beta	26	2.4	3	10		80B
Tritium	10028-17-8	5.0	0.20	0.1	0.5		H
Carbon 14	14762-75-5	4.1	7.3	9	50	U	C
Nickel-63		170	4.3	3	20		NI
Strontium 90	10098-97-2	0.85	0.27	0.8	2	J	Y
Technetium 99	14133-76-7	0.10	0.079	0.2	0.5	U	TC
Iodine 129	15046-84-1	-0.044	0.96	2	2	U	I
Uranium 233/234		0.37	0.087	0.05	0.3	B	U
Uranium 235	15117-96-1	0.011	0.023	0.04	0.3	U	U
Uranium 238	7440-61-1	0.38	0.087	0.04	0.3		U
Plutonium 238	13981-16-3	-0.027	0.044	0.1	0.05	U	PU
Plutonium 239/240		0.087	0.044	0.04	0.05		PU
Plutonium 241	14119-32-5	-1.1	4.7	8	8	U	PU_L
Americium 241	14596-10-2	0.036	0.021	0.02	0.05	J	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.4		U	GAM
Potassium 40	13966-00-2	11	0.87				GAM
Manganese 54	13966-31-9	U		0.1		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.1		U	GAM
Cobalt 60	10198-40-0	1.9	0.12		0.05		GAM
Niobium 94	14681-63-1	U		0.1		U	GAM
Ruthenium 103	13968-53-1	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Tin 113	13966-06-8	U		0.1		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	3.6	0.14		0.05		GAM

Lab id <u>TMAN</u>
Protocol <u>WHC-HASM</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>2.27</u>
Report date <u>10/22/93</u>

036

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12-24-93
NU

9713512.0298

TMA NORCAL
REPORTING GROUP 7232

N308130-05

B09367

DATA SHEET, cont

SDG 7232
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N308130-05
Dept sample id 7232-005
Received 08/27/93
% moisture 2.9

Client sample id B09367
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	7.9	0.29		0.1		GAM
Europium 154	15585-10-1	0.88	0.22		0.1		GAM
Europium 155	14391-16-3	U		0.3		U	GAM
Radium 226	13982-63-3	0.41	0.14				GAM
Radium 228	15262-20-1	0.76	0.35				GAM
Thorium 228	14274-82-9	0.65	0.10				GAM
Thorium 232	7440-29-1	0.76	0.35				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-05	80A/80	7232-005		0.100 g	09/18/93	09/24/93	DPK
N308130-05	80B/80	7232-005		0.100 g	09/18/93	09/24/93	DPK
N308130-05	H	7232-005		20.1 g	09/10/93	09/24/93	DPK
N308130-05	C	7232-005	A1	0.111 g	10/14/93	10/19/93	DPK
N308130-05	NI	7232-005	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-05	Y	7232-005		1.00 g	09/17/93	09/24/93	DPK
N308130-05	TC	7232-005		2.04 g	09/21/93	09/24/93	DPK
N308130-05	I	7232-005		1.00 g	10/01/93	10/06/93	DPK
N308130-05	U	7232-005		1.00 g	09/18/93	09/24/93	DPK
N308130-05	PU	7232-005		1.00 g	09/27/93	09/29/93	DPK
N308130-05	PU_L	7232-005		1.00 g	10/05/93	10/15/93	DPK
N308130-05	AM	7232-005		1.00 g	09/24/93	09/28/93	DPK
N308130-05	GAM	7232-005		830 g	09/10/93	09/17/93	DPK

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SUMMARY DATA SECTION
Page 29

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 10/22/93

037

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12-28-93
NU

9713512.0299

TMA NORCAL
REPORTING GROUP 7232

N308130-06

B09369

DATA SHEET

SDG 7232
Contact Dinkar KharkarClient Westinghouse Hanford
Contract MBH-SVV-069262Lab sample id N308130-06
Dept sample id 7232-006
Received 08/27/93
% moisture 3.9Client sample id B09369
Location/Matrix 100-DR-2 SOLID
Collected 08/25/93
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	7.4	2.0	2	10	JR	80A
Gross Beta	Beta	16	2.1	3	10	R	80B
Tritium	10028-17-8	0.004	0.069	0.1	0.5	UR	H
Carbon 14	14762-75-5	-13	5.8	10	50	UR	C
Nickel-63		6.7	1.8	3	20	JR	NI
Strontium 90	10098-97-2	0.087	0.24	0.8	2	UR	YT
Technetium 99	14133-76-7	0.098	0.077	0.2	0.5	UR	TC
Iodine 129	15046-84-1	0.020	0.76	2	2	UR	I
Uranium 233/234		0.47	0.11	0.05	0.3	BR	U
Uranium 235	15117-96-1	0.030	0.044	0.06	0.3	UR	U
Uranium 238	7440-61-1	0.46	0.11	0.05	0.3	UR	U
Plutonium 238	13981-16-3	-0.009	0.017	0.05	0.05	UR	PU
Plutonium 239/240		0.009	0.017	0.03	0.05	UR	PU
Plutonium 241	14119-32-5	18	50	40	8	UR	PU_L
Americium 241	14596-10-2	0.016	0.024	0.03	0.05	UR	AM
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.1		UR	GAM
Potassium 40	13966-00-2	10	1.7				GAM
Manganese 54	13966-31-9	U		0.09		U	GAM
Iron 59	14596-12-4	U		0.3	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.1		U	GAM
Cobalt 60	10198-40-0	U		0.1	0.05	U	GAM
Niobium 94	14681-63-1	U		0.09		U	GAM
Ruthenium 103	13968-53-1	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.8		U	GAM
Tin 113	13966-06-8	U		0.1		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.1	0.05	U	GAM

DATA SHEETS

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SUMMARY DATA SECTION

Page 30

Lab id TMAN
 Protocol WHC-HASM
 Version Ver 1.0
 Form DVD-DS
 Version 2.27
 Report date 10/22/93

035

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1-10-94

9713512.0300

TMA NORCAL
REPORTING GROUP 7232

N308130-06

B09369

DATA SHEET, cont

SDG <u>7232</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
Lab sample id <u>N308130-06</u>	Client sample id <u>B09369</u>
Dept sample id <u>7232-006</u>	Location/Matrix <u>100-DR-2</u> <u>SOLID</u>
Received <u>08/27/93</u>	Collected <u>08/25/93</u>
% moisture <u>3.9</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Cerium 144	14762-78-8	U		0.4		U R	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Europium 155	14391-16-3	U		0.2		U	GAM
Radium 226	13982-63-3	0.78	0.21				GAM
Radium 228	15262-20-1	0.54	0.36				GAM
Thorium 228	14274-82-9	0.61	0.11				GAM
Thorium 232	7440-29-1	0.54	0.36				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N308130-06	80A/80	7232-006		0.100 g	09/18/93	09/24/93	DPK
N308130-06	80B/80	7232-006		0.100 g	09/18/93	09/24/93	DPK
N308130-06	H	7232-006		20.2 g	09/10/93	09/24/93	DPK
N308130-06	C	7232-006	A1	0.105 g	10/14/93	10/19/93	DPK
N308130-06	NI	7232-006	A1	0.500 g	10/02/93	10/15/93	DPK
N308130-06	Y	7232-006		1.00 g	09/17/93	09/24/93	DPK
N308130-06	TC	7232-006		2.01 g	09/22/93	09/24/93	DPK
N308130-06	I	7232-006		1.00 g	10/04/93	10/06/93	DPK
N308130-06	U	7232-006		1.00 g	09/18/93	09/24/93	DPK
N308130-06	PU	7232-006		1.00 g	09/23/93	09/28/93	DPK
N308130-06	PU_L	7232-006		1.00 g	10/05/93	10/15/93	DPK
N308130-06	AM	7232-006		1.00 g	09/27/93	09/29/93	DPK
N308130-06	GAM	7232-006		207 g	09/11/93	09/17/93	DPK

Lab id <u>TMAN</u>
Protocol <u>WHC-HASM</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>2.27</u>
Report date <u>10/22/93</u>

039

RBC
10-94

9713512.0301

Kearney/Consultant Division
A.T. Kearney, Inc.
2952 Greenwood Station, 10th Fl.
Richland, Washington 99352
509.375.5167
Facsimile 509.375.5161

Management
Consultants

AT KEARNEY

January 21, 1993

Ms. Jeanette Duncan
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

Reference: Purchase Order No. No. 272980, Validation of
100 Area Data, Data Validation Report, Task
Order K-94-02

Internal: A.T. Kearney Project Number G954-26

Dear Ms. Duncan:

Enclosed are five copies of the following data validation
report:

- WHC-SD-EN-TI-233, Rev. 0 - 100-DR-2 Operable Unit
116-DR-7 Inkwell Crib Investigation

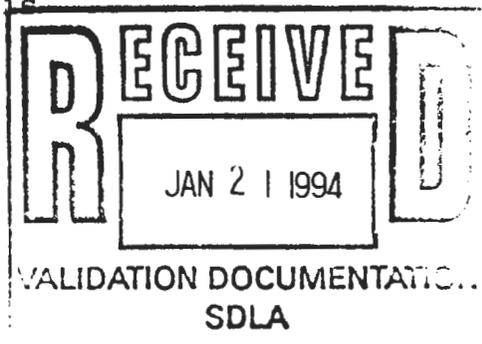
Please feel free to contact me at if you have any
questions.

Sincerely,

John W. Goode

John W. Goode, Ph.D
Task Order Manager

cc: R. Henckel, WHC
M. Schwab, WHC
K. Pool, WHC
J. Darabaris
H. Duncan
C. Reyes



Validation Reports 100-DR-2

**DATA VALIDATION REPORT
FOR THE
100-DR-2 OPERABLE UNIT
116-DR-7 INKWELL CRIB INVESTIGATION**

Submitted To:

Westinghouse Hanford Company
P.O. Box 1970
2355 Stevens Drive
Richland, WA 99352

Submitted By:

A.T. Kearney, Inc.
2952 George Washington Way
Richland, WA 99352

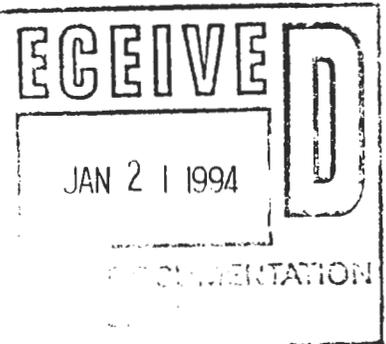
In Response To:

Purchase Order 272980
Task Order K-94-02



Document Control Number
WHC-SD-EN-TI-233, Rev. 0

January 1993



DISCLAIMER

This report is designated as Revision 0. The report covers a specific site for a specific sampling time frame. The report addresses only those samples that have been provided for data validation review.

At the request of Westinghouse Hanford Company (Westinghouse-Hanford), a minimum of 20% of the total number of Sample Delivery Groups received by A.T. Kearney, Inc. from the 100-DR-2 Operable Unit 116-DR-7 Inkwel Crib Investigation and their related quality assurance samples were reviewed and validated to verify that reported sample results were of sufficient quality to meet quality control objectives. The validated samples were chosen by Westinghouse-Hanford and reflect the overall character of samples within the unit. Findings are, however, insufficient to allow for extrapolation of these validation results to other unvalidated samples of Sample Delivery Groups within the 100-DR-2 Operable Unit.

ACRONYMS

%D	Percent difference
AA	Atomic absorption
BFB	Bromofluorobenzene
BNA	Base/neutral and acid (equivalent to semivolatiles)
CCB	Continuing calibration blank
CCV	Continuing calibration verification
CLP	Contract Laboratory Program
CRA	CRDL standard for AA
CRDL	Contract required detection limit
CRI	CRDL standard for ICP
CRII	CRDL standard for ICP initial
CRIF	CRDL standard for ICP final
CRQL	Contract required quantitation limit
DBC	Dibutylchloroendate
DFTPP	Decafluorotriphenylphosphine
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency
GC/MS	Gas chromatography/mass spectrometry
GC	Gas chromatography
GFAA	Graphite furnace atomic absorption
ICB	Initial Calibration Blank
ICP	Inductively coupled plasma emission spectrometry
ICS	ICP interference check sample
ICV	Initial calibration verification
IDL	Instrument detection limit
LCS	Laboratory control sample
LCSS	Laboratory control sample soil
LCSW	Laboratory control sample water
MSA	Method of standard addition
MS/MSD	Matrix spike/matrix spike duplicate
NV	Not Validated
PBS	Preparation blank soil
PBW	Preparation blank water
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RF	Response factor
RIC	Reconstructed ion chromatogram
RPD	Relative percent difference
RRF	Relative response factor
RRT	Relative retention time
RSD	Relative standard deviation
RT	Retention time
SDG	Sample delivery group
SOW	Statement of work
TAL	Target analyte list
TCL	Target compound list
TIC	Tentatively identified compounds
TOC	Total organic carbon
TOX	Total organic halides
V	Validated
VOC	Volatile organic compounds

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1.0 INTRODUCTION

The following samples were obtained from the 100-DR-2 Operable Unit 116-DR-7 Inkwell Crib Investigation sampling event:

B09363	B097F0	B097F6	B097G2	B097G8
B09364	B097F1	B097F7	B097G3	B097G9
B09365	B097F2	B097F8	B097G4	B097H0
B09366	B097F3	B097F9	B097G5	
B09367	B097F4	B097G0	B097G6	
B09369	B097F5	B097G1	B097G7	

Westinghouse-Hanford has requested that a minimum of 20% of the Sample Delivery Groups be validated for the 100-DR-2 Operable Unit 116-DR-7 Inkwell Crib Investigation. Therefore, the data from the chemical analysis of twelve samples from this sampling event and their related quality assurance samples were reviewed and validated to verify that reported sample results were of sufficient quality to support decisions regarding remedial actions performed at this site. All samples that were validated were specifically chosen by Westinghouse-Hanford. The samples chosen for validation do not include all field QA/QC samples, therefore, with the consent of Westinghouse-Hanford, not all field QA/QC samples were validated for this report. Sample number B09368, although included on the sample list was never submitted with any data packages. Therefore, A.T. Kearney was requested by Westinghouse-Hanford to submit the 100-DR-2, 116-DR-7 Inkwell Crib Investigation, report without this sample. The samples were analyzed by Thermo-Analytic Laboratories (TMA) and Roy F. Weston Laboratories (WESTON) using U.S. Environmental Protection Agency (EPA) CLP protocols.

Sample analyses included:

- Inorganics
- General chemical parameters.

The table below lists the Sample Delivery Groups (SDGs) that were validated for this sampling event. The validated data and the non-validated results for the remaining samples are included in this report.

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B09363	S	2	Inorganics, Wet Chem
B097F0	S	8	Inorganics, Wet Chem
B097G6	S	2	Inorganics, Wet Chem

In two data packages, SDG Nos. B097F0 and B097G6, the inorganic analyses requested included only cadmium, chromium, lead and mercury. Therefore, only these analyte results are presented in the summary tables within the report.

Twelve samples were validated for radiochemical parameters by TMA. Analytical protocols specified in the *Westinghouse Hanford Company Statement of Work for Nonradioactive Inorganic/Organic and Radiochemical Analytical Services* were used. Sample analyses included the following:

- Gross alpha and gross beta determination
- Alpha spectroscopy
- Gamma spectroscopy
- Strontium-90
- Technetium-99
- Carbon-14
- Tritium
- Nickel-63
- Iodine-129 X-ray.

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B09363	S	3	Radiochemistry
B097F0	S	8	Radiochemistry
B097G6	S	1	Radiochemistry

The radiochemical data summary tables can be found following Section 12.8.

Data quality was reviewed and analytical results validated using Westinghouse-Hanford procedures and related EPA CLP protocols and guidelines. Data were qualified based upon their quality and the guidance provided by these sources. In instances where the two protocols differed, the Westinghouse-Hanford guidance was followed.

Two sets of split samples were submitted to Roy F. Weston Laboratories as shown below:

Set 1:

<u>Sample No.</u>	<u>Split Sample No.</u>	<u>Well Location</u>
B097F6	B097G6	Sodium Dichromate Transfer Station, Test Pit 1

Set 2:

<u>Sample No.</u>	<u>Split Sample No.</u>	<u>Well Location</u>
B097G9	B097G7	105-DR Storage Basin Trench, Test Pit 2

The split sample results for the well locations were included in the validated data. The results were compared using the sample guidelines for determining the RPD between a sample and its split. The results fell within the required control limit. All results for the well locations appear in the summary tables within the report.

Three sets of field duplicate samples were submitted to TMA as shown below:

Set 1:

<u>Sample No.</u>	<u>Duplicate Sample No.</u>	<u>Well Location</u>
B09363	B09364	199-D5-30

The duplicate results for sample number B09364 in well location 199-D5-30 was included in the validated data. The sample results for sample number B09363 did not require validation, therefore, no judgment can be made on the data.

Two other sets of duplicate samples were submitted to TMA, however, these samples did not require validation. The other duplicate sample numbers were B097F7 and B097G1 in Sodium Dichromate Transfer Station, Test Pit 1. These samples were not identified by Westinghouse-Hanford for validation. Since these samples did not require validation, no judgments can be made on the data.

Three sets of equipment blanks were submitted to TMA as shown in the table below. The sets of equipment blanks were collected on 8/25/93, 9/11/93 and 9/12/93, and designated EB-1, EB-2 and EB-3, respectively.

Set 1:

Sample Number

B09366

Set 2:

Sample Number

B097F0

Set 3:

Sample Number

B097G2

Only sample number B097G2 required validation. It was requested by Westinghouse-Hanford that sample numbers B09366 and B097F0 were not to be validated.

Under EPA protocol, equipment blanks are water samples used to indicate whether or not decontamination procedures were adequate or that contamination was not inherent in the equipment used. The equipment blank information provided was inadequate to determine what contamination, if any, was a result of the equipment used. Equipment blanks require well number locations and associated sample numbers in order to make such a determination.

The report is broken down into sections for each chemical analysis and radiochemical analysis type. Each section addresses the data package completeness, holding time adherence, instrument calibration and tuning acceptability, blank results, accuracy, precision, system performance, as well as the compound identification and quantitation. In addition, each section has an overall assessment and summary for the data packages reviewed for the particular chemical/radiochemical analyses. Detailed backup information is provided to the reader by SDG No. and sample number. For each data package, a matrix of chemical analyses per sample number is presented, as well as data qualification summaries.

Laboratory and data validation personnel added qualifiers to the reported data based on specified data quality objectives. The data reporting qualifiers are summarized as follows:

- U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for dilutions and moisture content. It should be noted that the sample quantitation limit may be higher or lower than the contract or method required detection limit, depending on instrumentation, matrix and concentration factors.
- J - Indicates the analyte was analyzed for and detected. However, the associated value is considered to be an estimate due to identified QC deficiencies. Data flagged with a "J" may be usable for decision making purposes, depending upon the DQOs of the project.

Laboratories qualify all reported organic detects below CRQL with a "J" per the CLP procedures.

- UJ - Indicates the analyte was analyzed for and not detected. However, the associated detection limit is considered to be an estimate due to identified QC deficiencies. Detection limits flagged with a "UJ" may be usable for decision making purposes, depending upon the DQOs of the project.
- JN - Indicates the analyte was analyzed for and that there is presumptive evidence of the presence of the compound. The concentration reported is considered an estimate which should be used for informational purposes only.
- R - Indicates the analyte was analyzed for and due to a significant QC deficiency, the data are deemed unusable. Analytic results flagged "R" are invalid and provide no information as to whether or not the analyte is present.

It should be noted that, frequently, results will bear two qualifiers - one given by the laboratory and one given during the validation process. For example, a "U" qualifier is given by the laboratory when the compound has not been detected during the analysis, and a "J" qualifier may be added during the validation to qualify the result due to minor quality problems. Therefore, the resulting qualification is "UJ", where the "U" qualifier has been given by the laboratory and the "J" qualifier given by the validator.

The results of data validation performed for the 100-DR-2 Operable Unit 116-DR-7 Inkwell Crib Investigation are contained in the tables following each of the chapters in this report.

Several general quality trends which resulted in data qualification were observed. These included:

- The metals analysis showed minor matrix spike accuracy problems, analytical spike recoveries below the QC limit, MSA results outside of QC limits and ICP serial dilution and laboratory duplicate %D results outside of QC limits. Therefore, several metals results were flagged "J" due to these factors.
- Minor laboratory blank contamination were noted in the inorganics analysis. Associated results were flagged accordingly.
- The holding times for N03N02 analysis exceeded the QC requirements in one data package. All associated results were qualified as estimates and flagged "J".

- Due to calibration problems, several radiochemical results were rejected and flagged "R".
- Due to LCS recovery outside of QC limits and high radiometric yields, several alpha spectroscopy results were qualified as estimates and flagged "J".

In general, the protocol-specific QA/QC requirements were met for the samples analyzed in this investigation with the exceptions noted above and discussed in detail in the chapters to follow. All requested analyses were performed.

With the exceptions noted above, the protocol-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	INORGANICS
199-D5-30	B09363	S	08/24/93	NV	2-8
	B09364	S	08/24/93	V	2-8
	B09365	S	08/24/93	V	2-8
	B09367	S	08/25/93	NV	2-8
105-DR Storage Basin Trench, Test Pit 1	B097G3	S	09/12/93	NV	2-13
	B097G4	S	09/12/93	V	2-14
105-DR Storage Basin Trench, Test Pit 2	B097G5	S	09/12/93	NV	2-14
	B097G7	S	09/12/93	V	2-19
	B097G8	S	09/12/93	V	2-14
	B097G9	S	09/12/93	V	2-14
	B097H0	S	09/12/93	NV	2-14
Sodium Dichromate Transfer Station, Test Pit 1	B097F5	S	09/11/93	NV	2-12
	B097F6	S	09/11/93	V	2-12
	B097F7	S	09/11/93	NV	2-13
	B097F8	S	09/11/93	NV	2-13
	B097F9	S	09/11/93	NV	2-13
	B097G0	S	09/11/93	V	2-13
	G097G1	S	09/11/93	NV	2-13
	B097G6	S	09/11/93	V	2-19
Sodium Dichromate Transfer Station, Test Pit 2	B097F1	S	09/11/93	NV	2-12
	B097F2	S	09/11/93	V	2-12
Sodium Dichromate Transfer Station, Test Pit 3	B097F3	S	09/11/93	NV	2-12
	B097F4	S	09/11/93	V	2-12
EB-1	B09366	S	08/25/93	NV	2-8
EB-2	B097F0	S	09/11/93	NV	2-12
EB-3	B097G2	S	09/11/93	V	2-13

2.0 INORGANIC DATA VALIDATION

2.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and checked for completeness:

B09363

B097F0

B097G6

2.2 HOLDING TIMES

Analytical holding times for ICP metals, GFAA metals and CVAA mercury analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: samples must be analyzed within 28 days for mercury, 14 days for cyanide and within six months for all other metals.

All holding time requirements for all analytes in all data packages reviewed were met.

2.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Performance of specific instrument quality assurance and quality control procedures, including deficiencies noted during the quality assurance review, are outlined below.

Three calibration standards and a blank were analyzed for arsenic, lead, selenium and thallium by GFAA. The correlation coefficient of a least squares linear regression met the requirements for calibration in all cases.

Up to five calibration standards and a blank were analyzed for mercury by CVAA. The correlation coefficient of a least squares linear regression met the requirements for calibration.

At least one standard and a blank were analyzed by ICP for all other elements.

The above calibrations were each immediately verified with an ICV standard and a calibration blank. The ICV was prepared from a source independent of the calibration standards, at a mid-calibration range concentration. The ICV percent recovery must fall within the control limits of 90 to 110 percent for metals analyzed by ICP and GFAA, and 80 to 120 percent for mercury. Calibration linearity near the detection limit was

verified with a standard prepared at a concentration near the CRDL.

The ICVs met the recommended control limits in all cases.

The calibrations were subsequently verified at regular intervals using a CCV standard. The control windows for percent recovery of CCV standards are the same as the ICV windows described above.

The CCVs met the recommended control limits in all cases.

2.3.1 ICP Calibration

An ICS was analyzed at the beginning and end of each ICP sample run to verify the laboratory interelement and background correction factors. Results for the ICS solution must fall within the control limit of ± 20 percent of the true value.

The ICS has been analyzed at the proper frequency and all ICSAB solution percent recovery values fell within the control limit.

2.3.2 Atomic Absorption Calibrations

Duplicate injections are required for all GFAA analyses. The duplicate injections establish the precision of the individual analytical determinations. For sample concentrations greater than the CRDL, duplicate injections must agree within ± 20 percent RSD or CV. The AA calibration results are discussed further in Section 2.7 of this report.

2.4 BLANKS

2.4.1 Positive Blank Results

Samples with digestate concentrations (in ug/L) of less than five times ($< 5x$) the highest amount found in any of the associated blanks have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times ($> 5x$) the highest amount found in any of the associated blanks do not require qualification.

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

- Sample numbers B097G2, B097G4, B097G8 and B097G9 in SDG No. B097F0.

All other laboratory blank results were acceptable.

2.4.2 Negative Blank Results

In the case of negative blank results, if the absolute value of any calibration blank exceeds the IDL, all non-detects are qualified as estimates and flagged "J", and all positive results within two times the absolute value of the blank result are qualified as estimates and flagged "J". In the case of preparation blanks, if the absolute value exceeds the CRDL, all non-detects are rejected and flagged "R" and all detected that are less than ten times the absolute value of the preparation blank result are qualified as estimates and flagged "J".

No negative blank results were detected.

2.5 ACCURACY

2.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must generally fall within the range of 75 to 125 percent. Samples with a spike recovery of less than 30% and a sample value below the IDL were rejected and flagged "R". All other samples with a spike recovery outside the QC limits are qualified as estimates and flagged "J".

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for antimony in the following samples:

- Sample numbers B09364 and B09365 in SDG No. B09363.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for chromium in the following samples:

- Sample numbers B097G6 and B097G7 in SDG No. B097G6.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for lead in the following samples:

- Sample numbers B097F2, B097F4, B097F6, B097G0, B097G4, B097G8 and B097G9 in SDG No. B097F0.

All other matrix spike recovery results were acceptable.

2.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be digested or distilled and analyzed with every group of samples which have been prepared together. Sample recoveries less than 50% were rejected and flagged "R". All other samples with LCS recovery outside of QC limits are qualified as estimates and flagged "J".

One solid LCS was digested and analyzed for each of the cases in this report that contained soil samples. The results were compared against the established performance criteria and found to be acceptable.

All LCS results were found to be acceptable.

2.6 PRECISION

2.6.1 Laboratory Duplicate Samples

The laboratory duplicate results measures the precision of the method by measuring a second aliquot of the sample that is treated the same way as the original. Samples whose precision fell outside the quality control requirements were flagged as estimates "J".

The laboratory duplicate result fell outside the QC limits and the associated results were flagged "J" for chromium in the following samples:

- Sample numbers B097G6 and B097G7 in SDG No. B097G6.

The laboratory duplicate result fell outside the QC limits and the associated results were flagged "J" for lead in the following samples:

- Sample numbers B097F2, B097F4, B097F6, B097G0, B097G2, B097G4, B097G8 and B097G9 in SDG No. B097F0.
- Sample numbers B097G6 and B097G7 in SDG No. B097G6.

The laboratory duplicate result fell outside the QC limits and the associated results were flagged "J" for vanadium in the following samples:

- Sample numbers B09364 and B09365 in SDG No. B09363.

All other laboratory duplicate recovery results were acceptable.

2.6.2 ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to sample matrix. If sample concentration is ≥ 50 times the IDL for an analyte and the %D is outside the control limits the associated data must be qualified as estimates "J".

The ICP serial dilution result fell outside the QC limits and the associated results were flagged "J" for chromium in the following samples:

- Sample numbers B097G6 and B097G7 in SDG No. B097G6.

All other ICP serial dilution results were acceptable.

2.7 FURNACE AA QUALITY CONTROL

The post-digestion analytical spike is analyzed to determine the extent of interference in the digestate matrix. When the results of the analytical spike analyses exceeds the control window of 85 to 115 percent recovery and the absorbance of the sample is greater than fifty percent of the analytical spike absorbance, then the sample must be reanalyzed using the MSA. The duplicate injections and the analytical spike recoveries establish the precision and accuracy of the individual GFAA determinations.

2.7.1 Duplicate Injections

Each furnace analysis requires a minimum of two injections (burns), except for full MSA. For concentrations greater than CRDL, the duplicate injection readings must agree within 20% RSD or CV. If these requirements are not met, the analytical sample must be rerun once (i.e., two additional burns). If the readings are then still outside the QC limits, the result is qualified as an estimate and flagged "J".

All duplicate injection quality control requirements were met.

2.7.2 Analytical Spike Recoveries

For all samples whose analytical spike results are outside the 85 to 115 percent control limit, but whose absorbances are less than 50 percent of the analytical spike absorbance, the samples were flagged as estimates "J". In cases where the analytical spike recovery was 0.0 percent, the results were rejected and flagged "R".

The analytical spike recovery fell outside the established QC limits and the associated results were flagged "J" for selenium in the following samples:

- Sample numbers B09364 and B09365 in SDG No. B09363.

All other analytical spike recovery results were acceptable.

2.7.3 Method of Standard Addition Results

For all samples whose analytical spike results are outside the 85 to 115 percent control limit and whose absorbances are greater than 50 percent of the analytical spike absorbance an MSA is required. In cases where the MSA correlation coefficient was less than 0.995 the MSA analysis was repeated once. If the correlation coefficient was still less than 0.995, samples were flagged as estimates "J".

The MSA result for lead in sample number B097F2 in SDG No. B097F0 did not meet QC limits. The associated sample result was qualified as an estimate and flagged "J".

All other MSA results were acceptable.

2.8 ANALYTE QUANTITATION AND DETECTION LIMITS

Twenty percent of sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors.

The reviewer verified that the results and detection limits fell within the linear range of the instrument.

2.9 OVERALL ASSESSMENT AND SUMMARY

All samples were analyzed and reported under the 1990 CLP protocol (EPA 1990). Several inconsistencies and deviations from the protocol were observed. They are as follows:

A CCV and CCB must be analyzed immediately after the ICV and ICB. ICAP and Mercury do not follow this protocol. For ICAP analysis a CCV and CCB were run after the initial interference checks and CRI. This is incorrect because the ICASA/AB and CRII are considered analytical samples and according to the CLP protocol a CCV and CCB must be run prior to any analytical samples. For mercury, the CCV and CCB were analyzed for after the first ten samples. Refer to Sections E-11 paragraph 5b and E-15 paragraph 4a of the EPA CLP SOW 3/90 protocol.

Internal Chains of Custody lacked sufficient information such as interdepartmental transfers, i.e., from the sample

custodian to the technician responsible for sample preparation and the dates these transfers took place plus the EPA sample ID number. Without this information Internal Chains of Custody can not be verified as those belonging to samples in this report. Refer to Sections F-5, paragraph 1.5 and F-3, paragraph 1.4 of the EPA CLP SOW 3/90 protocol.

For samples analyzed by Roy F. Weston, incorrect ICP instrument detection limits (IDL's) are being used to report results down to the IDL. Two sets of IDL's (Form 10) are included in the data package for ICAP analysis, one for instrument IC1 and one for instrument IC3. According to the case narrative addendum, Roy F. Weston states that the highest IDL of the two instruments is used, as per Exhibit E, Section V, Item 10 (pg. E-53) of the EPA Statement of Work for Inorganics Analysis, Document Number ILM01.0. This is correct only when two instruments are being used to determine sample results within a data package. However, in this data package Roy F. Weston used only one ICP instrument to determine the sample results and therefore it is that instrument's IDL's which should be used to calculate results. According to the raw data and the Form XIV information IC3 is the instrument being used for analysis while some of the IDL's of IC1 are the ones reported on Forms 1-9. This can effect results flagged "U" or results which may be flagged "U" because of laboratory blank contamination. Results have been changed, where necessary, to reflect results based on IDLs from instrument IC3.

LCS solid samples for soil samples digested and analyzed by Roy F. Weston could not be verified as actual solid samples. According to the Roy F. Weston digestion logbooks, two milliliters of ICV were used for the LCS. However, according to Exhibit E, Section V, Item 8 (pg. E-19) of the USEPA Statement of Work for Inorganics Analysis, Document Number ILM01.0, the ICV can only be used for the LCS digestion and analysis of aqueous samples. A solid LCS provided by the EPA or a certified agent is required for soil samples.

All raw data associated with Roy F. Weston has not been labeled with the client (EPA) ID number. Results labeled with only the laboratory sample ID number is insufficient. Refer to Section B-10 of the EPA CLP SOW 3/90.

Except as noted in the preceding sections, all other validated data are usable for all purposes.

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case		SDG: B09363																			
Sample Number		B09363		B09364		B09365		B09366		B09367											
Location		199-D5-30		199-D5-30		199-D5-30		EB1		199-D5-30											
Remarks		NV		DUP				NV,EB		NV											
Sample Date		08/24/93		08/24/93		08/24/93		08/25/93		08/25/93											
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	6600		6530		4530		77.8		5180											
Antimony	60	3.3	U	3.2	UJ	3.1	UJ	3.1	U	4.2											
Arsenic	10	3.0		2.6		1.6		0.60		1.4											
Barium	200	67.7		68.4		54.2		1.0	U	70.0											
Beryllium	5	0.46		0.44		0.43		0.24	U	0.24	U										
Cadmium	5	0.32	U	0.31	U	0.30	U	0.30	U	0.30	U										
Calcium	5000	8790		9450		6690		16.8	U	6210											
Chromium	10	10.7		10.5		8.0		1.4		8.9											
Cobalt	50	8.4		9.2		10.0		0.50	U	13.0											
Copper	25	15.2		15.7		15.2		0.93		16.6											
Iron	100	17200		17300		17100		128		21600											
Lead	3	6.8		6.2		14.0		0.39		3.7											
Magnesium	5000	4610		4630		3800		11.3		4430											
Manganese	15	289		294		248		0.38		307											
Mercury	0.2	0.05	U	0.05	U	0.05	U	0.05	U	0.05											
Nickel	40	10.1		10.4		8.3		1.0		9.4											
Potassium	5000	1110		1110		768		33.0	U	877											
Selenium	5	0.76	U	0.77	UJ	0.73	UJ	0.73	U	0.77	U										
Silver	10	1.1	U	1.0	U	0.99	U	1.0	U	1.0	U										
Sodium	5000	240		252		276		37.1		394											
Thallium	10	0.41	U	0.41	U	0.40	U	0.40	U	0.41	U										
Vanadium	50	43.4		42.0	J	41.7	J	0.52	U	58.9											
Zinc	20	37.7		38.4		35.8		0.74	U	49.5											
Cyanide	10	NA		NA		NA		NA		NA											

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NV = Not Validated, DUP = Duplicate, EB = Equipment Blank, NA = Not Analyzed

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	WET CHEMISTRY
199-D5-30	B09363	S	08/24/93	NV	3-4, 3-5
	B09364	S	08/24/93	V	3-4, 3-5
	B09365	S	08/24/93	V	3-4, 3-5
	B09367	S	08/25/93	NV	3-4, 3-5
105-DR Storage Basin Trench, Test Pit 1	B097G3	S	09/12/93	NV	3-7, 3-10
	B097G4	S	09/12/93	V	3-8, 3-11
105-DR Storage Basin Trench, Test Pit 2	B097G5	S	09/12/93	NV	3-8, 3-11
	B097G7	S	09/12/93	V	3-12
	B097G8	S	09/12/93	V	3-8, 3-11
	B097G9	S	09/12/93	V	3-8, 3-11
	B097H0	S	09/12/93	NV	3-8, 3-11
Sodium Dichromate Transfer Station, Test Pit 1	B097F5	S	09/11/93	NV	3-6, 3-9
	B097F6	S	09/11/93	V	3-6, 3-9
	B097F7	S	09/11/93	NV	3-7, 3-10
	B097F8	S	09/11/93	NV	3-7, 3-10
	B097F9	S	09/11/93	NV	3-7, 3-10
	B097G0	S	09/11/93	V	3-7, 3-10
	G097G1	S	09/11/93	NV	3-7, 3-10
Sodium Dichromate Transfer Station, Test Pit 2	B097F1	S	09/11/93	NV	3-6, 3-9
	B097F2	S	09/11/93	V	3-6, 3-9
Sodium Dichromate Transfer Station, Test Pit 3	B097F3	S	09/11/93	NV	3-6, 3-9
	B097F4	S	09/11/93	V	3-6, 3-9
EB-1	B09366	S	08/25/93	NV	3-4, 3-5
EB-2	B097F0	S	09/11/93	NV	3-6, 3-9
EB-3	B097G2	S	09/11/93	V	3-7, 3-10

3.0 WET CHEMISTRY DATA VALIDATION

3.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

3.2 HOLDING TIMES

Analytical holding times for fluoride, sulfate and N03N02 were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are 28 days for fluoride, sulfate and N03N02.

Holding times were exceeded for N03N02 in SDG No. B097G6. All associated sample results were qualified as estimates and flagged "J".

Holding times for all other analytes reviewed met QC requirements.

3.3 CALIBRATIONS

3.3.1 Initial Calibration

The following calibration procedures must be conducted:

- At least a blank and three standards were used to establish the ion chromatography, ion selective electrode, spectrophotometer, calibrations prior to sample analysis and the correlation was ≥ 0.995 .

All initial calibration results were acceptable.

3.3.2 Continuing Calibration Verification

All CCV standards must be analyzed with the required frequency or every 20 samples. The percent recoveries must fall within the 90-110% acceptance windows.

All continuing calibration results were acceptable.

3.4 BLANKS

One laboratory preparation blank is analyzed at a frequency of one every 20 samples. All blank results must fall below the CRQL and if not, all associated data <5 times the amount found in the blank is qualified as non-detected and flagged "U".

All laboratory blank results were acceptable.

3.5 ACCURACY

3.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations.

All matrix spike results were acceptable.

3.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be prepared (e.g., digested or distilled) and analyzed with every group of samples which have been prepared together. The performance criteria for solid LCS samples are established through interlaboratory studies coordinated by a certifying agency (e.g., EPA or an independent commercial supplier).

All LCS results were found to be acceptable.

3.6 PRECISION

Analytical duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Field duplicate analyses are used to measure both the laboratory and the field sampling procedure precision.

All duplicate analyses results were acceptable for this data.

3.7 ANALYTE QUANTITATION AND DETECTION LIMITS

Sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors. In addition, the reviewer verified that the results fell within the linear range of the instrument.

3.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicate that instrument performance was adequate for all analyses. The holding times for N03N02 for two samples in one data package were exceeded and all associated results were qualified as estimates and flagged "J". Results that are qualified as estimates are usable for limited purposes. All other QC results are considered accurate within the standard error associated with the methods.

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	RADIO-CHEMISTRY
199-D5-30	B09363	S	08/24/93	NV	12-3
	B09364	S	08/24/93	V	12-3
	B09365	S	08/24/93	V	12-3
	B09367	S	08/25/93	NV	12-3
	B09369	S	08/24/93	V	12-3
105-DR Storage Basin Trench, Test Pit 1	B097G3	S	09/12/93	NV	12-5
	B097G4	S	09/12/93	V	12-6
105-DR Storage Basin Trench, Test Pit 2	B097G5	S	09/12/93	NV	12-6
	B097G7	S	09/12/93	V	12-7
	B097G8	S	09/12/93	V	12-6
	B097G9	S	09/12/93	V	12-6
	B097H0	S	09/12/93	NV	12-6
Sodium Dichromate Transfer Station, Test Pit 1	B097F5	S	09/11/93	NV	12-4
	B097F6	S	09/11/93	V	12-4
	B097F7	S	09/11/93	NV	12-5
	B097F8	S	09/11/93	NV	12-5
	B097F9	S	09/11/93	NV	12-5
	B097G0	S	09/11/93	V	12-5
	G097G1	S	09/11/93	NV	12-5
	B097G6	S	09/11/93	V	12-7
Sodium Dichromate Transfer Station, Test Pit 2	B097F1	S	09/11/93	NV	12-4
	B097F2	S	09/11/93	V	12-4
Sodium Dichromate Transfer Station, Test Pit 3	B097F3	S	09/11/93	NV	12-4
	B097F4	S	09/11/93	V	12-4
EB-1	B09366	S	08/25/93	NV	12-3
EB-2	B097F0	S	09/11/93	NV	12-4
EB-3	B097G2	S	09/11/93	V	12-5

4.0 GROSS ALPHA AND GROSS BETA DETERMINATION DATA VALIDATION

4.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

4.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

4.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the gas proportional counter used for gross alpha and gross beta determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination as a function of alpha or beta particle energy, and as a function of the mass of material submitted for counting. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Calibration certificates provided for detectors used for gross alpha and beta analysis in SDG Nos. B09363 and B097F0 were dated March 1990. However, the current Westinghouse-Hanford guidelines require an annual calibration for each detector used. Continuing calibration data for SDG Nos. B09363 and B097F0 did not include daily checksource counts, checksource identification or weekly background counts before and after sample analysis. Due to these deficiencies, all validated gross alpha and beta results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to background counts outside QC limits, all validated gross alpha and beta results in sample number B09365 in SDG No. B09363 were rejected and flagged "R".

The checksources used for continuing calibrations in SDG No. B097G6 were not identified by nuclide and activity, therefore,

all validated gross alpha and beta results were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

4.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of alpha or beta emitting radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. Acceptable accuracy of spiked sample data must fall within a range of 80 to 120 percent. If spiked sample results were outside this range, the associated data were qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All accuracy results were acceptable.

4.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with activities greater than five times the LLD and with an RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

4.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

4.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

4.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate for these analyses. All validated gross alpha and beta results in SDG Nos. B09363 and B097F0 were rejected and flagged "R" due to lack of calibration documentation. Rejected data are invalid and cannot be used for any purpose. Due to the checksource not being identified, all validated gross alpha and beta results in SDG No. B097G6 were qualified as estimates and flagged "J". Data qualified as estimated and flagged "J" are valid and usable for limited purposes only. All other validated QC data are considered to be acceptable and usable for all purposes.

5.0 ALPHA SPECTROSCOPY DATA VALIDATION

5.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

5.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

5.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the alpha spectroscopy system used is capable of producing acceptable and reliable analytical data. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis. The calibration consists of an instrument efficiency determination for each alpha radionuclide region of interest, and a system resolution assessment as measured by the full-width at half maximum for each peak.

Due to a lack of an annual calibration, daily checksource counts, checksource identification and weekly background checks before and after analysis, all validated alpha spectroscopy results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to the lack of daily checksource count and weekly background checks before and after analysis, all validated alpha spectroscopy results in SDG No. B097G6 were rejected and flagged "R".

Due to lack of weekly background checks, all validated results in SDG No. B097F0 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide and activity, all validated plutonium-241 results were qualified as estimates and flagged "J".

Peak width (resolution) in the continuing calibration was above the 20 KeV control limit for SDG No. B097G6, therefore, all validated alpha spectroscopy results were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

5.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of alpha emitting radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable matrix spike or Laboratory Control Sample recovery range is 80 to 120 percent, while that for radiometric yields is 30 to 105%. Spike sample results outside the above ranges resulted in qualification of the associated data as estimated and flagged "J/UJ".

Due to low LCS recovery results, all plutonium-241 results for all samples in SDG No. B097F0 and all uranium-235 results for all samples in SDG No. B097G6 were qualified as estimates and flagged "J".

Due to a lack of LCS data, all validated plutonium-238 results in all data packages and plutonium-241 results in SDG No. B097G6 were qualified as estimates and flagged "J".

Due to high LCS recovery results, all validated plutonium-239/240 results for all samples in SDG No. B097F0 were qualified as estimates and flagged "J".

Due to high radiometric yields, all nickel-63 results in sample number B097G8 in SDG No. B097F0 were qualified as estimates and flagged "J".

Due to low radiometric yields, all plutonium-241 results in sample number B09364 in SDG No. B09363, all plutonium results in sample number B097G8 in SDG No. B097F0, and all americium-241 results in sample number B097G7 in SDG No. B097G6 were rejected and flagged "R".

All missing data were requested but were not available.

All other accuracy results were acceptable.

5.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a

sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate samples. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

5.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

5.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

5.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of all QC and calibration data indicates that overall system performance was inadequate. Due to lack of annual calibration, daily checksource counts, checksource identification and weekly background checks, all validated alpha spectroscopy results were rejected and flagged "R". Due to low radiometric yields, all plutonium-241 results in sample number B09364 in SDG No. B09363, all plutonium results in sample number B097G8 in SDG No. B097F0, and all americium-241 results in sample number B097G7 in SDG No. B097G6 were rejected and flagged "R". Rejected data are unusable for all purposes. Due to peak width in the continuing calibration being above the control limit for SDG No. B097G6, all alpha spectroscopy results were qualified as estimates and flagged "J". Due to LCS recovery results outside of QC limits, alpha spectroscopy results in several validated samples were qualified as estimates and flagged "J". Due to continuing calibration checksource not being identified by nuclide and activity, all validated plutonium-241 results were qualified as estimates and flagged "J". All results qualified as estimates are usable for limited purposes only. All other QC data are considered to be acceptable and usable for all purposes.

6.0 GAMMA SPECTROSCOPY DATA VALIDATION

6.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

6.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

6.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the gamma spectroscopy system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each gamma radionuclide region of interest, and a system resolution assessment as measured by the full-width at half maximum for each peak. Initial calibration was performed for each counting geometry used during the analysis of Westinghouse-Hanford samples. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to a lack of daily checksource counts and weekly background counts before and after sample analysis, all associated gamma spectroscopy results were rejected and flagged "R".

Due to a lack of annual calibration data for Gamma Spectroscopy Liquid Marinelli Detector #3, all associated gamma spectroscopy results for sample numbers B097F2, B097F4 and B097G0 in SDG No. B097F0 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide and activity, all validated sample results in all data packages were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

6.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of gamma emitting radionuclides. The sample activity as determined by sample analysis is compared to the known activity to assess accuracy. The acceptable spiked recovery range is 80 to 120 percent. If spiked sample results were outside this range the associated data were qualified as estimated and flagged "J/UJ".

All accuracy results were acceptable.

6.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5xLLD$, a control limit of $2xLLD$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

6.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

6.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

6.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was inadequate for these analyses. Due to a lack of continuing calibration checksource and background counts, sample results in all data packages were rejected and flagged "R". Due to a lack of annual calibration data for Detector #3, results for sample numbers B097F2, B097F4 and B097G0 in SDG No. B097F0 were rejected and flagged "R". All rejected results are unusable for all purposes. Due to the continuing calibration checksource not being identified by nuclide and activity, all validated sample results in all data packages were qualified as estimates and flagged "J". Estimated data are considered usable for limited purposes only. All other validated QC data are considered to be acceptable and usable for all purposes.

7.0 STRONTIUM-90 DETERMINATION DATA VALIDATION

7.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

7.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

7.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background counting system used for strontium-90 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument detection efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to a lack of daily checksource counts and background checks the week before and after analysis, all validated strontium-90 results in SDG Nos. B09363 and B097F0 were rejected and flagged "R". In addition, due to a lack of a detector-specific annual calibration, all validated strontium-90 sample results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to background counts outside QC limits, all strontium-90 results in sample number B09365 in SDG No. B09363 were rejected and flagged "R".

Since the continuing calibration checksource was not identified by nuclide and activity, all validated strontium-90 results were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

7.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiotraced samples should show a radiometric yield or recovery between 30 and 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated "J".

All accuracy results were acceptable.

7.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with an RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

7.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

7.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

7.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was inadequate

for these analyses. Due to lack of calibration data, all validated strontium-90 results in SDG Nos. B09363 and B097F0 were rejected and flagged "R". Due to background counts outside of QC limits, the strontium-90 result in sample number B09365 in SDG No. B09363 was rejected and flagged "R". Rejected data are unusable for all purposes. Since the continuing calibration checksource was not identified by nuclide and activity, all validated strontium-90 results were qualified as estimates and flagged "J". Results qualified as estimates are usable for limited purposes. All other QC data are considered to be valid and usable for all purposes.

8.0 TECHNETIUM-99 DETERMINATION DATA VALIDATION

8.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

8.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

8.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background counting system used for technetium-99 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument detection efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to lack of a detector-specific annual calibration, daily checksource counts and background counts taken before and after analysis, all validated technetium-99 sample results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to checksource counts outside QC limits, all validated technetium-99 results in SDG No. B097G6 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide and activity, all validated technetium-99 results in all data packages were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

8.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiotraced samples should show a radiometric yield or recovery between 30 and 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated.

All accuracy results were acceptable.

8.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with an RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5xLLD$, a control limit of $2xLLD$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

8.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

8.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. All analyte quantitation and reported detection limits were acceptable.

8.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate for these analyses. Due to lack of detector-specific annual calibration, daily checksource counts and background counts taken before and after analysis, all validated technetium-99 results in two data packages were rejected and flagged "R". Due to checksource counts outside of QC limits, all validated technetium-99 results in one data package were rejected and

flagged "R". All rejected results are unusable for all purposes. Due to continuing calibration checksource not being identified by nuclide and activity, all validated technetium-99 in all data packages were qualified as estimates and flagged "J". All data qualified as estimates are usable for limited purposes only. All other QC data are considered to be acceptable and usable for all purposes.

9.0 CARBON-14 DETERMINATION DATA VALIDATION

9.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

9.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

9.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background liquid scintillation counting system used for carbon-14 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to lack of daily checksource counts, all validated carbon-14 results in SDG No. B097G6 were rejected and flagged "R".

Due to lack of daily checksource counts and weekly background counts, all validated carbon-14 results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide and activity, all validated carbon-14 results in all data packages were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

9.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiometric yields should fall within the range of 30 to 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated and flagged "J/UJ".

All accuracy results were acceptable.

9.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5xLLD$, a control limit of $2xLLD$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

9.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

9.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

9.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument performance and calibration indicates that the overall system performance is inadequate. Due to lack of checksource counts, all validated carbon-14 results in SDG No. B097G6 were rejected and flagged "R". Due to lack of daily checksource counts and weekly background counts, all validated carbon-14 results in SDG Nos. B09363 and B097F0 were rejected and

flagged "R". Rejected data are unusable for all purposes. Due to the continuing calibration checksource not being identified by nuclide and activity, all validated carbon-14 results in all data packages were qualified as estimates and flagged "J". Data qualified as estimates are usable for limited purposes. All other QC data are considered to be acceptable and usable for all purposes.

10.0 TRITIUM DETERMINATION DATA VALIDATION

10.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

10.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

10.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background liquid scintillation counting system used for tritium determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to lack of daily checksource counts, all validated tritium results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to the continuing calibration data containing no reference to a particular instrument, all validated tritium results in SDG No. B097F0 were rejected and flagged "R".

Due to lack of weekly background checks, all validated tritium results in SDG No. B097F0 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide or activity, all validated tritium results in all data packages were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

10.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiometric yields should fall within the range of 30 to 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All accuracy results were acceptable.

10.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

10.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

10.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits and sample results were acceptable.

10.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument performance and calibration indicates that the overall system performance is inadequate. Due to lack of daily checksource counts, all validated tritium results in two data packages were rejected and flagged "R". Due to lack of weekly background checks, all validated tritium results in one data package were rejected and flagged "R". Due to the continuing calibration data containing no reference to a particular instrument, all validated tritium results in one data package were rejected and flagged "R". Rejected data are unusable for all purposes. Due to the continuing calibration checksource not being identified by nuclide or activity, all validated tritium results in all data packages were qualified as estimates and flagged "J". Estimated data are considered usable for limited purposes only. All other QC data are considered to be acceptable and usable for all purposes.

11.0 NICKEL-63 DETERMINATION DATA VALIDATION

11.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

11.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

11.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background liquid scintillation counting system used for nickel-63 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Due to a lack of daily checksource counts, all validated nickel-63 results in SDG No. B097G6 were rejected and flagged "R".

Due to a lack of weekly background counts, all validated nickel-63 results in SDG Nos. B09363 and B097F0 were rejected and flagged "R".

Due to the continuing calibration checksource not being identified by nuclide and activity, all validated nickel-63 results in SDG Nos. B09363 and B097F0 were qualified as estimates and flagged "J".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

11.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiometric yields should fall within the range of 30 to 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All accuracy results were acceptable.

11.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5xLLD$, a control limit of $2xLLD$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

11.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

11.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits and sample results were acceptable.

11.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument performance and calibration indicates that the overall system performance is inadequate. Due to a lack of daily checksource counts, all validated nickel-63 results in one data package were rejected and flagged "R". Due to a lack of weekly background counts, all validated nickel-63 results in two

data packages were rejected and flagged "R". Rejected data are unusable for all purposes. Due to the continuing calibration checksource not being identified by nuclide and activity, all validated nickel-63 results in two data packages were qualified as estimates and flagged "J". Data qualified as estimates are usable for limited purposes only. All other QC data are considered to be acceptable and usable for all purposes.

12.0 IODINE-129 X-RAY SPECTROSCOPY DATA VALIDATION

12.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09363

B097F0

B097G6

12.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

12.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the X-ray spectroscopy system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each radionuclide region of interest. Initial calibration was performed for each counting geometry used during the analysis of Westinghouse-Hanford samples. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

Due to a lack of calibration data, all validated iodine-129 x-ray spectroscopy sample results in all data packages were rejected and flagged "R".

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

12.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of X-ray emitting radionuclides. The sample activity as determined by sample analysis is compared to the known activity to assess accuracy. The acceptable spiked recovery range is 80 to 120 percent. If

spiked sample results were outside this range the associated data were qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All accuracy results were acceptable.

12.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If one or both duplicate activities are $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects and flagged "J" or estimated non-detects and flagged "UJ".

All precision results were acceptable.

12.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

12.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits and sample results were acceptable.

12.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was inadequate for these analyses. Due to a lack of calibration data, all validated iodine-129 results in all data packages were rejected and flagged "R". Rejected data are invalid and unusable for any purpose. All other QC data are considered to be acceptable and usable for all purposes.

Project: WESTINGHOUSE-HANFORD

Laboratory: TMA																	
Case	SDG: B09363																
Sample Number	B09363	B09364	B09365	B09366	B09367	B09369											
Location	199-D5-30	199-D5-30	199-D5-30	EB1	199-D5-30	199-D5-30											
Remarks	NV	DUP		NV,EB	NV												
Sample Date	08/24/93	08/24/93	08/24/93	08/25/93	08/25/93	08/24/93											
Radiochemistry Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Gross Alpha	9.9	J	8.8	R	11	R	1.1	U	7.5	J	7.4	R					
Gross Beta	20		51	R	17	R	3.0	J	26		16	R					
Tritium	0.028	U	0.040	R	0.028	R	0.026	U	5.0		0.004	R					
Carbon-14	-2.6	U	-7.5	R	-11	R	-11	U	4.1	U	-13.0	R					
Nickel-63	4.5	J	6.8	R	6.9	R	15	J	170		6.7	R					
Strontium-90	0.031	U	-0.1	R	0.052	R	-0.31	U	0.85	J	0.087	R					
Technetium-99	0.091	U	0.060	R	0.048	R	0.11	U	0.10	U	0.098	R					
Iodine-129	0.58	U	0.43	R	1.2	R	0.64	U	-0.044	U	0.020	R					
Uranium-233/234	0.57		0.51	R	0.52	R	0.10	J	0.37		0.47	R					
Uranium-235	0.024	U	-0.013	R	0.015	R	0.031	U	0.011	U	0.030	R					
Uranium-238	0.58		0	R	0.5	R	0.064	U	0.38		0.46	R					
Plutonium-238	-0.004	U	0.009	R	0.006	R	0	U	-0.027	U	-0.009	R					
Plutonium-239/240	0	U	0.004	R	0.004	R	0	U	0.087		0.009	R					
Plutonium-241	2.8	U	1.3	R	1.2	R	-3.0	U	-1.1	U	18	R					
Americium-241	0.031	U	0.063	R	0.021	R	0.009	U	0.036	J	0.016	R					
Sodium-22	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Potassium-40	9.3		12	R	11	R	0.39		11		10	R					
Manganese-54	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Iron-59	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Cobalt-58	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Cobalt-60	N/D	U	N/D	R	N/D	R	N/D	U	1.9		N/D	R					
Niobium-94	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Ruthenium-103	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Ruthenium-106	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Tin-113	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Cesium-134	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Cesium-137	N/D	U	N/D	R	N/D	R	N/D	U	3.6		N/D	R					
Cerium-144	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Europium-152	N/D	U	N/D	R	N/D	R	N/D	U	7.9		N/D	R					
Europium-154	N/D	U	N/D	R	N/D	R	N/D	U	0.88		N/D	R					
Europium-155	N/D	U	N/D	R	N/D	R	N/D	U	N/D	U	N/D	R					
Radium-226	0.42		0.55	R	0.47	R	0.077		0.41		0.78	R					
Radium-228	0.76		0.81	R	0.74	R	0.15		0.76		0.54	R					
Thorium-228	0.61		0.95	R	0.65	R	0.091		0.65		0.61	R					
Thorium-232	0.76		0.81	R	0.74	R	0.15		0.76		0.54	R					

NV = Not Validated, DUP = Duplicate, EB = Equipment Blank, N/D = Not Detected

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973512577
WHC-SD-EN-TI-233, Rev. 0

Project: WESTINGHOUSE-HANFORD														
Laboratory: TMA														
Case	SDG: B097F0													
Sample Number	B097F0		B097F1		B097F2		B097F3		B097F4		B097F5		B097F6	
Location	EB2		SDTS TP2		SDTS TP2		SDTS TP3		SDTS TP3		SDTS TP1		SDTS TP1	
Remarks	NV,EB		NV											
Sample Date	09/11/93		09/11/93		09/11/93		09/11/93		09/11/93		09/11/93		09/11/93	
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	0.80	U	3.4	U	3.1	R	3.7	U	7.9	R	6.6	J	7.6	R
Gross Beta	3.4	U	11		12	R	14		13	R	14		11	R
Tritium	0.14	J	0.076	U	0.032	R	0.085	U	0.028	R	0.054	U	0.002	R
Carbon-14	1.2	U	-1.9	U	-7.7	R	-7.8	U	-6.7	R	-5.0	U	-3.8	R
Nickel-63	0.86	U	-0.40	U	1.6	R	1.9	U	-0.96	R	1.2	U	-1.6	R
Strontium-90	0	U	-0.065	U	0.025	R	0.005	U	0.032	R	0	U	0.014	R
Technetium-99	0.47	U	0.40	J	0.31	R	0.36	U	0.48	R	0.57		0.46	R
Iodine-129	-0.063	U	-0.012	U	-0.001	R	-0.12	U	0.38	R	0.065	U	-0.46	R
Uranium-233/234	0.064	U	0.26	J	0.41	R	0.47		0.44	R	0.56		0.48	R
Uranium-235	-0.026	U	0.024	U	0	R	0.029	U	0.017	R	0.019	U	0.020	R
Uranium-238	0.021	U	0.36		0.39	R	0.40		0.54	R	0.34		0.49	R
Plutonium-238	0.008	U	0.006	U	0.003	R	0	U	0.011	R	0	U	0	R
Plutonium-239/240	0.004	U	0.003	U	0	R	0	U	0.051	R	0.005	U	0.006	R
Plutonium-241	5.4	J	2.5	U	2.0	R	4.0	J	3.6	R	2.0	U	1.4	R
Americium-241	0.010	U	0.010	U	-0.010	R	0.007	U	0.008	R	-0.007	U	0	R
Sodium-22	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Potassium-40	0.40		10		10	R	12		12	R	11		10	R
Manganese-54	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Iron-59	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Cobalt-58	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Cobalt-60	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Niobium-94	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Ruthenium-103	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Ruthenium-106	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Tin-113	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Cesium-134	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Cesium-137	N/D	U	0.30		N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Cerium-144	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Europium-152	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Europium-154	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Europium-155	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U	N/D	R
Radium-226	0.10		0.45		0.42	R	0.43		0.48	R	0.42		0.46	R
Radium-228	0.14		0.44		0.50	R	0.64		0.71	R	0.75		0.61	R
Thorium-228	0.10		0.49		0.55	R	0.79		0.64	R	0.62		0.63	R
Thorium-232	0.14		0.44		0.50	R	0.64		0.71	R	0.75		0.61	R

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975912-1079
 WHC-SD-EN-TI-233, Rev. 0

Project: WESTINGHOUSE-HANFORD														
Laboratory: TMA														
Case		SDG: B097F0												
Sample Number	B097F7		B097F8		B097F9		B097G0		B097G1		B097G2		B097G3	
Location	SDTS TP1		SDTS TP1		SDTS TP1		SDTS TP1		SDTS TP1		EB3		105DR SBT TP1	
Remarks	NV,DUP		NV		NV				NV,DUP		EB		NV	
Sample Date	09/11/93		09/11/93		09/11/93		09/11/93		09/11/93		09/12/93		09/12/93	
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	5.8	J	4.6	U	9.4	J	6.3	R	6.4	J	2.0	R	8.6	J
Gross Beta	12		14		14		12	R	11		1.5	R	15	
Tritium	0.008	U	0.002	U	-0.011	U	0.004	R	0.013	U	0.023	R	0.014	U
Carbon-14	-4.3	U	-7.3	U	-3.7	U	-6.8	R	-3.2	U	-4.3	R	-5.3	U
Nickel-63	1.3	U	-1.5	U	-1.1	U	-1.5	R	-1.8	U	-1.1	R	-1.2	U
Strontium-90	0.009	U	0.15	U	-0.85	U	-0.092	R	-0.15	U	0.057	R	-0.14	U
Technetium-99	0.48	J	0.37	U	0.64		0.63	R	0.61		0.42	R	0.49	J
Iodine-129	0.15	U	0.42	U	4.0	U	-0.13	R	-0.085	U	0.11	R	0.031	U
Uranium-233/234	0.45		0.56		0.39		0.43	R	0.31		0.021	R	0.38	
Uranium-235	0.061	U	0.13	U	0.040	U	0.018	R	-0.014	U	0	R	0.043	U
Uranium-238	0.43		0.50		0.39		0.35	R	0.33		0.063	R	0.48	
Plutonium-238	0	U	0	U	0	U	-0.003	R	-0.003	U	0.002	R	0	U
Plutonium-239/240	0.002	U	0	U	0.003	U	0	R	0	U	0.002	R	0.023	J
Plutonium-241	0.53	U	5.0	U	2.1	U	0.027	R	1.0	U	1.2	R	0.85	U
Americium-241	0.003	U	0.005	U	0.002	U	-0.010	R	0.008	U	0.016	R	0.010	U
Sodium-22	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Potassium-40	11		11		9.4		9.1	R	8.6		0.37	R	12	
Manganese-54	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Iron-59	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Cobalt-58	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Cobalt-60	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Niobium-94	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Ruthenium-103	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Ruthenium-106	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Tin-113	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Cesium-134	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Cesium-137	0.056		N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	0.63	
Cerium-144	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Europium-152	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Europium-154	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Europium-155	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U	N/D	R	N/D	U
Radium-226	0.49		0.47		0.40		0.33	R	0.42		0.093	R	0.50	
Radium-228	0.72		0.68		0.55		0.69	R	0.49		0.13	R	0.78	
Thorium-228	0.61		0.72		0.58		0.52	R	0.66		0.11	R	0.71	
Thorium-232	0.72		0.68		0.55		0.69	R	0.49		0.13	R	0.78	

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971512 0379 WMC-SD-EN-TI-233, Rev. 0

Project: WESTINGHOUSE-HANFORD										
Laboratory: TMA										
Case		SDG: B097F0								
Sample Number	B097G4		B097G5		B097G8		B097G9		B097H0	
Location	105DR SBT TP1		105DR SBT TP2		105DR SBT TP2		105DR SBT TP2		105DR SBT TP2	
Remarks	NV									
Sample Date	09/12/93		09/12/93		09/12/93		09/12/93		09/12/93	
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	9.4	R	2.6	U	4.0	R	3.9	R	6.0	J
Gross Beta	15	R	11		15	R	12	R	9.9	J
Tritium	0.044	R	0.016	U	0.038	R	0.094	R	0.054	U
Carbon-14	-4.4	R	-6.4	U	-2.9	R	-5.8	R	-6.0	U
Nickel-63	-0.50	R	-2.3	U	-1.6	R	-1.0	R	-1.8	U
Strontium-90	0.033	R	-0.037	U	0.070	R	-0.055	R	0	U
Techneium-99	0.57	R	0.39	J	0.47	R	0.53	R	0.40	J
Iodine-129	0.31	R	-0.56	U	0.45	R	-0.36	R	3.8	U
Uranium-233/234	0.61	R	0.33		0.36	R	0.56	R	0.37	
Uranium-235	0.041	R	0	U	0.029	R	0	R	0.050	U
Uranium-238	0.42	R	0.43		0.39	R	0.35	R	0.35	
Plutonium-238	0.002	R	0.008	U	0	R	0.012	R	0.006	U
Plutonium-239/240	0.002	R	0.003	U	0.004	R	0.009	R	0.004	U
Plutonium-241	1.9	R	0.044	U	4.0	R	1.6	R	0.94	U
Americium-241	-0.007	R	0.002	U	-0.002	R	0.024	R	0.006	U
Sodium-22	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Potassium-40	12	R	12		10	R	8.7	R	8	
Manganese-54	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Iron-59	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Cobalt-58	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Cobalt-60	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Niobium-94	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Ruthenium-103	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Ruthenium-106	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Tin-113	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Cesium-134	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Cesium-137	0.081	R	N/D	U	N/D	R	N/D	R	N/D	U
Cerium-144	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Europium-152	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Europium-154	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Europium-155	N/D	R	N/D	U	N/D	R	N/D	R	N/D	U
Radium-226	0.47	R	0.59		0.39	R	0.46	R	0.35	
Radium-228	0.75	R	0.69		0.53	R	0.49	R	0.44	
Thorium-228	0.74	R	0.84		0.48	R	0.58	R	0.66	
Thorium-232	0.75	R	0.69		0.53	R	0.49	R	0.44	

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9713512-0380
 WHC-SD-EN-TI-233, Rev. 0

Project: WESTINGHOUSE-HANFORD																	
Laboratory: TELEDYNE																	
Case	SDG: B097G6																
Sample Number	B097G6	B097G7															
Location	SDTS TP1	105DR SBT TP2															
Remarks	SPLIT	SPLIT															
Sample Date	09/11/93	09/12/93															
Radiochemistry Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Gross Alpha	7.3	J	1.7	J													
Gross Beta	27	J	19	J													
Strontium-90	0.066	J	0.076	J													
Technetium-99	0	R	0.37	R													
Carbon-14	0.23	R	0.41	R													
Nickel-63	0.0043	R	0.046	R													
Beryllium-7	0.085	R	0.053	R													
Potassium-40	11.2	R	10.5	R													
Manganese-54	0.0048	R	0.0024	R													
Cobalt-58	0.014	R	0.0019	R													
Iron-59	0.0069	R	0	R													
Cobalt-60	0.0051	R	0.0013	R													
Zinc-65	0.0014	R	0.017	R													
Zirconium-95	0.0035	R	0.0093	R													
Ruthenium-103	0.0070	R	0.0022	R													
Ruthenium-106	0.11	R	0.031	R													
Iodine-131	0.0029	R	0.26	R													
Cesium-134	0.033	R	0.029	R													
Cesium-137	0.014	R	0.0047	R													
Barium-140	0.042	R	0.079	R													
Cerium-141	0.0097	R	0.0029	R													
Cerium-144	0.053	R	0.054	R													
Europium-152	0.29	R	0.24	R													
Europium-154	0.032	R	0.014	R													
Europium-155	0.072	R	0.062	R													
Radium-226	0.756	R	0.664	R													
Thorium-228	0.505	R	0.484	R													
Thorium-234	0.090	R	0.17	R													
Tritium	0.0072		0.00014														
Uranium-235	0.0033	R	0.011	R													
Uranium-238	0.11	R	0.10	R													
Americium-241	0.00063	R	0.0013	R													
Plutonium-238	0.00048	R	0.00042	R													
Plutonium-239	0.00048	R	0.00033	R													
Plutonium-241	0	J	0.52	J													

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97352030
 WHC-SD-EN-TI-233, Rev. 0

SDTS TP = Sodium Dichromate Transfer Station Test Pit SBT TP = Storage Basin Trench Test Pit NV = Not Validated

13.0 REFERENCES

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- EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
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