START 9613498.0098

B01971-TMA-454 160

0045495

TMA

Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

QUALITY ENVIRONMENTAL SERVICES

NAY 1993
RECEIVED
SDLA

OCT 1996
RECEIVED
EDMC

Report for

TMA/Norcal

WORK ORDER #S304071

Scientific Services Since 1922

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

1 8-1-96 SW

9613499.0099

DON'T SAY IT --- *Write It!*

DATE: February 8, 1994

TO: B01971-TMA-454

FROM: Pat Reich H4-19

Telephone: 372-2785

cc:

SUBJECT: DATA VALIDATION REPORT FOR THE 100-IU-4 SODIUM DICHROMATE ERA IN.

THE VALIDATION REPORT FOR THE 100-IU-4 PROJECT IS FILED IN THIS DATA PACKAGE FOR THE FOLLOWING DATA PACKAGES:

9304L118-WES-1098
9304L172-WES-1125
9304L213-WES-1131
11825-WES-1121
11074-WES-1122
11076-WES-1123
B01971-TMA-454
B01980-TMA-460
B01994-TMA-461

PAT REICH
FILE CLERK

9613498.0100

Westinghouse Hanford Company

NONCONFORMANCE REPORT

1. Page 1 of 1

2. Preprinted No. 050040

QA Log No. EQA-93-069

3. P. O., W. O., or Job Control No.	4. System/End Use	5. Item/Material	6. Dwg./Spec./Other No.	7. Rev.
N/A	ERA	SAMPLES	~~B088~~ RCS 4/12/93 B01980	N/A

8. Program/Project/Other	9. Safety Class	10. ASME Code Items
SODIUM DICHROMATE BARREL ERA / 93-045	N/A	☐ Yes ☒ No (If yes, notify authorized inspector)

11. Supplier Name/Address: ENVIRONMENTAL FIELD SAMPLING SERVICES

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

13. Code: Lot/Heat/Serial	14. Lot Size	15. Sample	16. Qty. Acc.	17. Inspection Criteria
N/A	1	1	0	☐ Dwg. ☐ Spec. ☐ Insp. Plan ☒ Other CII 510, Sec 6.1

18. Item	19. Description of Nonconformance (list serial no. where applicable)	22. Disposition, Justification, and Instructions
	HEIS NUMBER B01980 WAS ASSIGNED TO TWO DISTINCT SAMPLES. EACH SAMPLE MUST BE ASSIGNED A UNIQUE HEIS SAMPLE NUMBER.	INTERIM DISPOSITION: ENVIRONMENTAL DATA MANAGEMENT SHALL REVIEW THIS NON-CONFORMING CONDITION. IF PRACTICAL, THE SAMPLES INVOLVED SHALL BE REASSIGNED UNIQUE HEIS NUMBERS PROVIDED TRACEABILITY CAN BE MAINTAINED. EDM SHALL PROVIDE ENVIR. Q.A. A LETTER IDENTIFYING WHAT WILL BE OR HAS BEEN DONE REGARDING THESE SAMPLE NUMBERS FINAL DISPOSITION: USE AS IS (81360-93-TCL-011) attached. P.J. Valcich 7-19-93 (P.J. Valcich) Gary S. Corrigan 7-19-93 (G.S. Corrigan)

20. Originator's Signature	Date	23. Design Document Change Required?
R.C. SMITH R.C. Smith	4/12/93	☐ Yes, Doc. No. ☒ No
21. Cognizant QA Manager's Signature	**Date**	**24. Corrective Action Required?**
[signature]	4/12/93	☐ Yes, No. ☒ No

Disp. App.	25. Cognizant Engineer	Date	26. Technical Rep.	Date	Signature/Org.	Date
	PJ VALCICH P.J. Valcich	4/23/93	N/A		N/A	
	QA Engineer	Date	Signature/Org.	Date	Signature/Org.	Date
	~~R.L. HAND~~ G.S. Corrigan	4-23-93				

Close

27. Accept ✓ (1) Reject N/A Follow on NCR N/A

Gary Corrigan (G.S. Corrigan) 7-19-93
QA/C Personnel Date

A-7310-104 (10/91)

9613498.0101

Westinghouse Hanford Company | **Internal Memo**

From: Environmental Data Management 81360-93-TCL-011
Phone: 376-5889
Date: July 13, 1993
Subject: RESOLUTION NCR NUMBER 050040 SAMPLE NUMBERS B01980 & B01980A

To: G.C. Henckel H6-04
P.J. Valcich H6-02

cc: B.M. Colley H4-19
G.S. Corrigan H4-16
T.L. Bennington H4-16
R.D. Fox H6-07
J.G. Paetel H4-23
K.N. Pool H4-23
M.R. Schwab H6-07
R.C. Smith H4-23
R.T. Winward H4-16
wpdata\terri\81360-93-tcl-011

Nonconformance Report 050040 dated 04/12/93 R.C. Smith, Chain-of-Custody 003650 dated 04/06/93, and Chain-of-Custody 004195 dated 04/12/93.

DESCRIPTION OF PROBLEM: A soil sample for Project 100-IU-4 was collected on 04/02/93 and assigned HEIS sample number B01980. Another soil sample for the same project was collected on 04/08/93 and inadvertently assigned the same sample number B01980. Both of the samples were reported on separate Sample Analysis Request forms and Chains-of-Custody.

The sample collected on 04/02/93 was received by the TMA/Norcal laboratory on 04/06/93. The sample collected on 04/08/93 was assigned an "interim" HEIS number of B01980A. This sample was received by the TMA/Norcal Laboratory on 04/10/93.

Traceability of samples was maintained by the separate Sample Analysis Request forms and Chains-of-Custody. Traceability was also maintained due to the fact the second sample was taken after the date the Laboratory received the first sample.

RECOMMENDED SOLUTION: HEIS has assigned a new Sample Number as per Desk Instruction 5.10. Revise the following to reflect the Sample Number changes: SamTrac, Chain-of-Custody, Sample Analysis Request forms.

PREVIOUSLY ASSIGNED	NEWLY ASSIGNED
B01980A	B08XH9

Terri C. Longwell System Analyst
Environmental Data Management

Briana M. Colley Data Management Admin.
Hanford Analytical Services Management

9613498.0102

 Skinner&Sherman REPORT Work Order # S3-04-071

Received: 04/07/93 04/16/93 16:12:48

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

ATTEN Dan Steurmer

CLIENT HANFORD NOR SAMPLES 10
COMPANY TMA/NORCAL Hanford
FACILITY Richmond, CA

PREPARED TMA / Skinner & Sherman Labs.
BY 300 Second Avenue
P.O. Box 521
Waltham, MA 02254
ATTEN Client Services
PHONE (617) 890-7200

CERTIFIED BY

CONTACT DP

WORK ID RUSH!!! DUE 4/16/93 N3-04-020
TAKEN By Client
TRANS Fed Ex
TYPE Solid
P.O. # N3-04-020
INVOICE under separate cover

SAMPLE IDENTIFICATION		TEST CODES and NAMES used on this workorder	
01	B01971	CRHEXS	Hexavalent Chromium/Soil
02	B01972		
03	B01973		
04	B01974		
05	B01975		
06	B01976		
07	B01977		
08	B01979		
09	B01980		
09	B01980 DUPL		
09	B01980 SPIKE		
10	LCSS		

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. 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
1-800-4 LAB TEST FAX (617) 890-3883

Received: 04/07/93

Results by Sample

SAMPLE ID B01971 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.49
mg/kg

SAMPLE ID B01972 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01973 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01974 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01975 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01976 SAMPLE # 06 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01977 SAMPLE # 07 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

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

9613498.0104

Received: 04/07/93 Results by Sample

SAMPLE ID B01979 SAMPLE # 08 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01980 SAMPLE # 09 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01980 DUPL SAMPLE # 09 FRACTIONS: B
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50
mg/kg

SAMPLE ID B01980 SPIKE SAMPLE # 09 FRACTIONS: C
Date & Time Collected 04/02/93 Category SOIL

CRHEXS 0.49
mg/kg

SAMPLE ID LCSS SAMPLE # 10 FRACTIONS: A
Date & Time Collected not specified Category SOIL

CRHEXS 19.0
ug/L

TMA
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Skinner & Sherman Laboratories Inc.

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

Received: 04/07/93 04/16/93 16:12:48

TMA/NORCAL Hanford

QUALITY CONTROL

HEXAVALENT CHROMIUM

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S304071-09	<0.50 mg/kg	1.00 mg/kg	0.49 mg/kg	49.0

DUPLICATE

Sample ID	Sample Result	Duplicate Result	Relative % Difference
S304071-09	<0.50 mg/kg	<0.50 mg/kg	not calculable

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	% Recovery
LCS	20.0 ug/L	19.0 ug/L	95.0
Prep Blank	--	<10 ug/L	--

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

Received: 04/07/93

Test Methodology

TEST CODE CRHEXS NAME Hexavalent Chromium/Soil

The soil was digested in accordance with EPA Method 3020 and subsequently analyzed by for hexavalent chromium by EPA Method 7197.

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

9613498.0107

TMA
Thermo Analytical Inc.

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

April 15, 1993

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

Quality Control Narrative

Scope
Nine (9) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on April 7, 1993 from TMA/Norcal. The samples were analyzed for the USEPA CLP ICP metals. The analysis were performed under TMA/Skinner and Sherman work order S304072.

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 exception;

The iron laboratory duplicate exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

ia CAW 8-1-96

WESTINGHOUSE - ANFORD

SAMPLE NUMBER:

B01971

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!! SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-01S

Level (low/med): LOW Date Received: 04/07/93

% 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	5750			P
7440-36-0	Antimony	4.1	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	73.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	3540			P
7440-47-3	Chromium	86.7			P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	9.9			P
7439-89-6	Iron	17800		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	3540			P
7439-96-5	Manganese	286			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	8.3	B		P
7440-09-7	Potassium	1630			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	184	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	31.3			P
7440-66-6	Zinc	44.0			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

002

SAMPLE NUMBER

B01972

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-02S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 93.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7090			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	89.4			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6020			P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	9.3	B		P
7440-50-8	Copper	12.4			P
7439-89-6	Iron	18600		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4970			P
7439-96-5	Manganese	313			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.6			P
7440-09-7	Potassium	1470			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.98	U		P
7440-23-5	Sodium	262	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	41.7			P
7440-66-6	Zinc	45.3			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

003

SAMPLE NUMBER:

B01973

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0113

Lab Code: SKINER Case No.: RUSH!!! DAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-03S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 90.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6910			P
7440-36-0	Antimony	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	89.7			P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	6860			P
7440-47-3	Chromium	11.3			P
7440-48-4	Cobalt	9.5	B		P
7440-50-8	Copper	13.2			P
7439-89-6	Iron	18100		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5420			P
7439-96-5	Manganese	330			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	11.1			P
7440-09-7	Potassium	1540			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.94	U		P
7440-23-5	Sodium	285	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	37.0			P
7440-66-6	Zinc	45.9			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

SAMPLE NUMBER:

B01974

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH... DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-04S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 94.1

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	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	80.9			P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	9750			P
7440-47-3	Chromium	11.4			P
7440-48-4	Cobalt	8.3	B		P
7440-50-8	Copper	12.0			P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5050			P
7439-96-5	Manganese	306			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	1390			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.94	U		P
7440-23-5	Sodium	234	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	33.3			P
7440-66-6	Zinc	41.7			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

005

SAMPLE NUMBER:

B01977

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DWAS No.: SDG No.: B01977

Matrix (soil/water): SOIL Lab Sample ID: 04072-055

Level (low/med): LOW Date Received: 04/07/93

% Solids: 88.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6510			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	67.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	4860			P
7440-47-3	Chromium	13.9			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	11.9			P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4450			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	9.8			P
7440-09-7	Potassium	1300			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	228	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	39.2			P
7440-66-6	Zinc	46.9			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

006

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01976

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-06S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 91.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6300			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	64.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	3930			P
7440-47-3	Chromium	16.6			P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	12.1			P
7439-89-6	Iron	15900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4290			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.2			P
7440-09-7	Potassium	1260			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.96	U		P
7440-23-5	Sodium	239	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	35.6			P
7440-66-6	Zinc	69.1			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

0007

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01977

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

Lab Code: SKINER Case No.: FLSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-07S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 90.8

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	4.1	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	73.1			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	4380			P
7440-47-3	Chromium	16.5			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	11.7			P
7439-89-6	Iron	16900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4490			P
7439-96-5	Manganese	277			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	1280			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	261	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	38.9			P
7440-66-6	Zinc	55.2			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

008

SAMPLE NUMBER:

B01979

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: 301971

Matrix (soil/water): SOIL Lab Sample ID: 04070-08S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6430			P
7440-36-0	Antimony	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	66.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	6340			P
7440-47-3	Chromium	11.0			P
7440-48-4	Cobalt	8.5	B		P
7440-50-8	Copper	11.7			P
7439-89-6	Iron	16900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4880			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	11.6			P
7440-09-7	Potassium	1250			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.95	U		P
7440-23-5	Sodium	267	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	38.9			P
7440-66-6	Zinc	41.9			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

009

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01980

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-09S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	48.4			P
7440-36-0	Antimony	3.7	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	0.51	B		P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.27	U		P
7440-70-2	Calcium	36.7	B		P
7440-47-3	Chromium	0.82	U		P
7440-48-4	Cobalt	0.62	U		P
7440-50-8	Copper	0.95	U		P
7439-89-6	Iron	452		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	12.8	U		P
7439-96-5	Manganese	0.80	B		P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	24.1	U		P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	49.0	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.78	U		P
7440-66-6	Zinc	4.5			P
	Cyanide				NR

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts: YES

Comments:
ROCKS

9613498.0117

TMA
Thermo Analytical Inc.

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

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MAY 1993
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SOLA

May 18, 1993

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

Quality Control Narrative

Scope
Nine (9) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on April 7, 1993 from TMA/NORCAL. The samples were analyzed for arsenic, selenium, lead and thallium by GFAA only. The analysis was performed under Skinner and Sherman work order S305051.

Methodology
The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02.1

Discussion
All quality control requirements were met for the samples with no exceptions.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01971

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-01S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 97.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.9		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	17.8			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.66	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01972

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-02S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.4	B	W	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.9			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.65	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.53	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01973

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-03S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.8		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.69	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.56	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01974

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-04S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.2		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.2			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.64	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.52	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01975

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-05S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.5	B	W	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.8			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.67	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

9613498.0123

WESTINGHOUSE/HANFORD

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01976

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-06S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 97.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.1		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.0			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.65	U	MW	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.53	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

007

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01977

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-07S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 87.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.4		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.74	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.60	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01979

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-08S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.0	B	E	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.66	U		F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01980

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-09S

Level (low/med): LOW Date Received: 04/07/93

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	0.48	U		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	0.34	B		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.63	U	W	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.52	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

010

9613498.0127

TMA
Thermo Analytical Inc.

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

APR 1993 RECEIVED OSM DMO

April 13, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N3-04-024-7177

Ms. Briana Colley
Westinghouse Hanford Company
2355 Stevens Drive
MSIN H4-23
345 Hills Street/3000 Area
Richland, WA 99352

Dear Ms. Colley:

Enclosed in the Summary Data Section, are the gamma scan results for the soil samples from SAF #930045 Location we received 6 April 1993. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 35, and the appendices are numbered pages 36 to 149. The samples were processed on a rush basis.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

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

DPK/ss

Enclosures: Section 1 and 2
Appendices

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i 5W 8-2-96

SDG	7177		Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar		Contract	MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

Soil sample results from SAF #930045 Location (TMA/Norcal Group 7177) are provided in this report. TMA/Norcal Group 7177 is comprised of the nine samples listed on the Chain-of-Custody documents below which are identified as samples 1 through 9.

1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. WHC-N-205-22.

1.2 SAMPLE VOLUME

One L plastic bottles containing the samples were received for the analyses.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

Samples were collected between 3/31/93 and 4/02/93 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, a blank, and a replicate. All original analyses were performed with QC samples 7177-10 through 7177-12.

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

2.1 LABORATORY CONTROL SAMPLES

The MDA of the result for ^{59}Fe was higher than the RDL due to slightly higher background. The LCS recoveries for gamma nuclides were satisfactory.

2.2 BLANKS

The MDA's of the results for all gamma scan analyses met RDL requirements.

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar P. Kharkar	Contract	MBH-SVV-069262

CASE NARRATIVE

2.1 LABORATORY CONTROL SAMPLES (cont'd)

2.3 REPLICATES

Results were satisfactory for all replicate analyses. The MDA's of the results for gamma nuclides for the replicate of sample number B01971 were higher than RDL because of the small aliquot available for analysis.

3.0 ANALYTICAL NOTES

3.10 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides in any of the samples analyzed except for ^{137}Cs in sample number B01971. The underlined sample MDA's were for ^{59}Fe, due to the short half-life of ^{59}Fe. The aliquot for sample number B01975 was smaller than the normal aliquot of 750 grams.

9613498.0130

N304024-12

TMA NORCAL

REPORTING GROUP 7177

REPLICATE

B01971

SDG 7177
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N304024-12
Dept sample id 7177-012

ORIGINAL
Lab sample id N304024-01
Dept sample id 7177-001
Received 04/06/93
% moisture 7.6

Client sample id B01971
Matrix SOIL
Collected 03/31/93
Chain of custody id 003650

PARAMETER	REPLICATE pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST	ORIGINAL pCi/G	2σ ERR (COUNT)	MDA pCi/G	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
GAMMA SCAN ANALYTES													
Potassium 40	13	2.2				GAM	13	0.96			0	43	
Iron 59	U		0.3	0.05	U	GAM	U		0.1	U	-		
Chromium 51	U		0.9		U	GAM	U		0.3	U	-		
Cobalt 60	U		0.2	0.05	U	GAM	U		0.05	U	-		
Zinc 65	U		0.3		U	GAM	U		0.1	U	-		
Ruthenium 106	U		1		U	GAM	U		0.3	U	-		
Cesium 134	U		0.1		U	GAM	U		0.05	U	-		
Cesium 137	U		0.2	0.05	U	GAM	0.094	0.046			72	212	
Europium 152	U		0.2	0.1	U	GAM	U		0.09	U	-		
Europium 154	U		0.1	0.1	U	GAM	U		0.06	U	-		
Radium 226	0.48	0.22				GAM	0.48	0.088			0	81	
Thorium 228	0.73	0.18				GAM	0.63	0.055			15	52	
Thorium 232	0.61	0.57				GAM	0.54	0.15			12	157	

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.23
Report date 04/13/93

9613498.0131

N304024-01

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01971

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-01	Client sample id	B01971
Dept sample id	7177-001	Matrix	SOIL
Received	04/06/93	Collected	03/31/93
% moisture	7.6	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.96				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	0.094	0.046		0.05		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
Radium 226	13982-63-3	0.48	0.088				GAM
Thorium 228	14274-82-9	0.63	0.055				GAM
Thorium 232	7440-29-1	0.54	0.15				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0132

N304024-02

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01972

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-02	Client sample id	B01972
Dept sample id	7177-002	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	6.5	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.97				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Radium 226	13982-63-3	0.51	0.092				GAM
Thorium 228	14274-82-9	0.70	0.053				GAM
Thorium 232	7440-29-1	0.91	0.21				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0133

N304024-03

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01973

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-03	Client sample id	B01973
Dept sample id	7177-003	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	10.0	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	0.93				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.4		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Radium 226	13982-63-3	0.59	0.096				GAM
Thorium 228	14274-82-9	1.2	0.093				GAM
Thorium 232	7440-29-1	0.87	0.23				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0134

N304024-04

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01974

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-04	Client sample id	B01974
Dept sample id	7177-004	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	6.1	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.0				GAM
Iron 59	14596-12-4	U		0.09	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	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
Radium 226	13982-63-3	0.59	0.085				GAM
Thorium 228	14274-82-9	0.82	0.059				GAM
Thorium 232	7440-29-1	0.89	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0135

N304024-05

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01975

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-05	Client sample id	B01975
Dept sample id	7177-005	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	11.9	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	1.1				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	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
Radium 226	13982-63-3	0.52	0.092				GAM
Thorium 228	14274-82-9	0.89	0.088				GAM
Thorium 232	7440-29-1	0.86	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0136

N304024-06

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01976

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-06	Client sample id	B01976
Dept sample id	7177-006	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	8.3	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	14	0.89				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	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
Radium 226	13982-63-3	0.48	0.089				GAM
Thorium 228	14274-82-9	0.89	0.093				GAM
Thorium 232	7440-29-1	0.86	0.21				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0137

N304024-07

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01977

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-07	Client sample id	B01977
Dept sample id	7177-007	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	8.4	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	1.0				GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	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
Radium 226	13982-63-3	0.50	0.088				GAM
Thorium 228	14274-82-9	0.73	0.058				GAM
Thorium 232	7440-29-1	0.61	0.21				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

N304024-08

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01979

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-08	Client sample id	B01979
Dept sample id	7177-008	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	4.3	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	13	0.92				GAM
Iron 59	14596-12-4	U		0.09	0.05	U	GAM
Chromium 51	14392-02-0	U		0.3		U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Radium 226	13982-63-3	0.53	0.086				GAM
Thorium 228	14274-82-9	0.76	0.053				GAM
Thorium 232	7440-29-1	1.0	0.20				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

N304024-09

TMA NORCAL
REPORTING GROUP 7177

DATA SHEET

B01980

SDG	7177	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N304024-09	Client sample id	B01980
Dept sample id	7177-009	Matrix	SOIL
Received	04/06/93	Collected	04/02/93
% moisture	0.3	Chain of custody id	003650

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	0.44	0.20				GAM
Iron 59	14596-12-4	U		0.04	0.05	U	GAM
Chromium 51	14392-02-0	U		0.2		U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Zinc 65	13982-39-3	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Cesium 134	13967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	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
Radium 226	13982-63-3	0.11	0.033				GAM
Thorium 228	14274-82-9	0.18	0.037				GAM
Thorium 232	7440-29-1	0.17	0.084				GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.23
Report date	04/13/93

9613498.0140

Westinghouse Hanford Company	CHAIN OF CUSTODY	003650

Custody Form Initiator M.L.MYERS

Company Contact R.C.SMITH/C.E.HEIDEN

Telephone 509-376-2640

Project Designation/Sampling Locations SAF#930045,ERA,SODIUM DICHROMATE SITE

Collection Date 3/31/93 & 4/2/93

Ice Chest No.

Field Logbook No. WHC-N-205-22

Bill of Lading/Airbill No. 970891806

Offsite Property No.

Method of Shipment BURLINGTON AIR EXPRESS OVERNIGHT

Shipped to TMA

Possible Sample Hazards/Remarks HAZARDS UNKNOWN, PRIORITY TURNAROUND, RCRA PROTOCOL, SEE SAMPLE ANALYSIS REQUEST FOR INDIVIDUAL BOTTLES AND ANALYSIS.

Sample Identification

B01971 (3)BOTTLES
B01972 (3)BOTTLES
B01973 (3)BOTTLES
B01974 (3)BOTTLES
B01975 (3)BOTTLES
B01976 (3)BOTTLES
B01977 (3)BOTTLES
B01979 (3)BOTTLES
B01980 (3)BOTTLES

MM 4.5.93

PRIORITY TURNAROUND

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
[illegible]	4/5/93	1200	[illegible]	4/5/93	1100

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

9613498.0141

COC # 003650

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector S.M.STEELE Date 4-2-93

Company Contact R.C.SMITH/C.E.HEIDEN Telephone (509) 376-2640

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
B01971	S	3/31/93	1530	✓ 250 ml g /Chromium VI SW-846 7197
				✓ 250 ml g/ICP,GFAA Metals,inc.Total Chrome CLP
				✓ 1000 ml p/ Gamma Spec. RC-30
B01972	S	4/2/93	1045	✓ 250 ml g /Chromium VI SW-846 7197
				✓ 250 ml g /ICP, GFAA Metals, inc. Total Chrome CLP
				✓ 1000 ml p/ Gamma Spec. RC-30
B01973	S	4/2/93	1115	✓ 250 ml g / Chromium VI SW-846 7197
				✓ 250 ml g /ICP,GFAA Metals, inc. Total Chrome CLP
				✓ 1000 ml p/Gamma Spec. RC-30
B01974	S	4/2/93	1105	✓ 250 ml g/ Chromium VI SW-846 7197
				✓ 250 ml g/ICP,GFAA Metals, inc.Total Chrome CLP
				✓ 1000 ml p/Gamma Spec. RC-30
B01975	S	4/2/93	1150	✓ 250 ml g / Chromiun VI SW-846 7197
				✓ 250 ml g /ICP,GFAA Metals, inc. Total Chrome CLP
				✓ 1000 ml p/Gamma Spec. RC-30
B01976	S	4/2/93	1140	✓ 250 ml g / Chromium VI SW-846 7197
				✓ 250 ml g/ICP,GFAA Metals, inc.Total Chrome CLP
				✓ 1000 ml p / Gamma Spec. RC-30
B01977	S	4/2/93	1140	✓ 250 ml g /Chromium VI SW-846 7197
				✓ 250 ml g/ICP,GFAA Metals, inc. Total Chrome CLP
				✓ 1000 ml p / Gamma Spec. RC-30
B01978 MLM 4-2-93	S	4/2/93	~~1140~~ 1118 MLM 4-2-93	✓ 250 ml g / Chromium VI SW-846 7197
				✓ 250 ml g /ICP,GFAA Metals, inc.Total Chrome CLP
				✓ 1000 ml p / Gamma Spec. RC-30

*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 SAF 93-045 SAMPLES ARE PRIORITY TURNAROUND

Special Handling and/or Storage SAMPLES TO BE KEPT AT 4 DEGREE C UNTIL ANALYSIS

Possible Sample Hazards

PRIORITY TURNAROUND

A-6000-406 (06/91) WEF060

9613498.0142

COC # 003650

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

Collector M.L.MYERS Date 4-2-93

Company Contact R.C.SMITH/C.E.HEIDEN Telephone (509)-376-2640

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Required
B01980	S	4-2-93	1015	1,250 ML GLASS,CR 6,SW-846-7197
				1, 250 ML GLASS,ICP GFAA METALS, INCLUDE TOTAL CHROME,CLP METHOD
				1, 1000 ML PLASTIC, GAMMA SPEC, METHOD RC-30

MM 4-5-93

*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 S.A.F. 93-045, RCRA PROTOCOL,PRIORITY TURNAROUND

Special Handling and/or Storage SAMPLES TO BE KEPT AT 4 DEGREES C UNTIL COMPLETION OF ANALYSIS ,HAZARDS UNKNOWN

Possible Sample Hazards SUBJECT TO TESTING

PRIORITY TURNAROUND

A-6000-406 (06/91) WEF060

039

9613498.0143

SAMPLE STATUS REPORT FOR E 8022. E-BLANK B01971 TIME: 4/ 2/93 8:37
DISPATCHED: 3/15/93 12:49 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 1/93 10:34

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

04/05/93 09:27 ☎373 3176 222S 3B 002

SAMPLE STATUS REPORT FOR E 8023. E-BLANK B01972 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 5

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

04/05/93 09:27 ☎373 3176 222S 3B 003

SAMPLE STATUS REPORT FOR E 8024. E-BLANK B01973 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 5

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

04/05/93 09:28 ☎373 3176 222S 3B 004

SAMPLE STATUS REPORT FOR E 8025. E-BLANK B01974 TIME: 4/ 5/93 8:50
DISPATCHED: 3/15/93 12:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 5

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

END OF REPORT

9613498.0144

SAMPLE STATUS REPORT FOR E 8026. E-BLANK B01975 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:51 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 5

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

04/05/93 09:28 ☎373 3176 222S 3B 006

SAMPLE STATUS REPORT FOR E 8027. E-BLANK B01976 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:51 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 5

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

04/05/93 09:29 ☎373 3176 222S 3B 007

SAMPLE STATUS REPORT FOR E 8028. E-BLANK B01977 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:52 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 6

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

END OF REPORT

04/05/93 09:29 ☎373 3176 222S 3B 009

SAMPLE STATUS REPORT FOR E 8030. E-BLANK B01979 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:52 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 6

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PE52L

END OF REPORT

SAMPLE STATUS REPORT FOR E 8031. E-BLANK B01980 TIME: 4/ 5/93 8:45
DISPATCHED: 3/15/93 12:53 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 5/93 8: 6

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	<.5.00000E 01 pCi/G	N	Y	PE52L

END OF REPORT

9613498.0146

AIR OVERNIGHT

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WESTINGHOUSE HANFORD		W93-0-0403 #6

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
ANALYTICAL LABORATORY	ANALYTICAL CHEMISTRY	SAMPLING & MOBILE LABORATORY

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

Routing ☒ Contractor ☐ Vendor

Shipped to
TMA/NORCAL
2030 WRIGHT AV.
RICHMOND CA 94804

Off-site Custodian: DELORES SANCHEZ

Full Title: N/A

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1	POLYCOOLER. SAMPLES ARE DOUBLE BAGGED AND STORED ON WET ICE.	
WEIGHT 65#	SAMPLE #"S:B01971,B01972,B01973,B01974,B01975,B01976,B01977, B01979,B01980	
	COOLER# SUL-SMILE	

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

Necessity for the Off-Site Use of this Property
SAMPLES REQUIRE ANALYSIS THAT ARE NOT AVAILABLE AT THIS SITE

SAF#93-045
COC#003650

PRIORITY TURNAROUND

BILL OF LADING # 978891806

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

RM Clearance for Public Release: [signature]	RM Survey No. 5-125589	Date 4-5-93
Location of Property (Area & Bldg.) 200WEST/2023	Contact M.L.MYERS	Phone 373-2640
Date Ready for Shipment 4/5/93	Cost Code to be Charged PE52L ORG. CODE:12910	Approximate Date This Property will be Returned N/A
Originated By M.L.MYERS	Date 4/5/93	Authorized By J.HYATT [signature] Date 4/5/93
Signature and Name of Property Control	Custodian Date	Property Management Approval [signature] Date 4/5/93

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Cliff Miller				
Date 4-5-93				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to: 043
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Green – Property Control Custodian (Issuing Office) Yellow – Retain Pink – Originator

54-3000-479 (09/89)

9613498.0147

Rush Due 4/16/93

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER 3304072 CLIENT Hanford Nor No. SAMPLES:

PROTCL CLP TURNARND 9 Day 9 (Soil) (Water) (Specify Other)

COOLER TEMP: 2 oC, or NA

CUSTODIAN B. Prowik SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N304020

SHIPER & # FedEx PO/CONTRACT# ↓

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D. SANCHEZ

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

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

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

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

SHIPMENT DATES 4/7/93

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

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	B01971	Soil	4/7/93	N/A	ICP metals	
2	B01972	↓	↓	↓	↓	
3	B01973	↓	↓	↓	↓	
4	B01974	↓	↓	↓	↓	
5	B01975	↓	↓	↓	↓	
6	B01976	↓	↓	↓	↓	
7	B01977	↓	↓	↓	↓	
8	B01979	↓	↓	↓	↓	
9	B01980	↓	↓	↓	D.S ↓	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						1175
27						

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

Samples have detectable amounts of Radioactive Material: YES NO ✓

SUBCONTRACT: YES/NO, TO: DATE: 4/7/93 BC

Complete

REVIEWED

* EPA/CLP required Rev 1.6 PAGE: 90

9613498.0148

Due 5/20/93

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER S305051 CLIENT HANFORD NOR No. SAMPLES:

PROTCL CLP TURNARND 14 DAY 9 (Soil) (Water) (Specify Other)

COOLER TEMP: 2 oC, or NA

CUSTODIAN B. BROOK SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N304020

SHIPER & # FedEx PO/CONTRACT# ✓

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D. SANCHEZ

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

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

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

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

SHIPMENT DATES 4/2/93

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

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	B01971	Soil	4/2/93	N/A	As, Se, Pb, TC	by AA
2	B01972	↓	↓	↓	↓	
3	B01973					
4	B01974					
5	B01975					
6	B01976					
7	B01977					
8	B01979					
9	B01980	✓	✓	✓	D.S ✓	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

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

Samples have detectable amounts of Radioactive Material: YES NO ✓

SUBCONTRACT: YES/NO, TO: DATE:

REVIEWED

complete 5/6/93 BP

* EPA/CLP required Rev 1.6 PAGE: 2

076

9613498.0149

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # N3-04-020

RCVD: 04/06/93 DUE: 04/16/93 04/06/93 13:06:12 KEEP: 07/15/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS		
01A-S	B01971	S&S	WH001	WH002	WH175
02A-S	B01972	S&S	WH001	WH002	WH175
03A-S	B01973	S&S	WH001	WH002	WH175
04A-S	B01974	S&S	WH001	WH002	WH175
05A-S	B01975	S&S	WH001	WH002	WH175
06A-S	B01976	S&S	WH001	WH002	WH175
07A-S	B01977	S&S	WH001	WH002	WH175
08A-S	B01979	S&S	WH001	WH002	WH175
09A-S	B01980	S&S	WH001	WH002	WH175
09B-S	B01980 MS	S&S	WH001	WH002	WH175
09C-S	B01980 DUP	S&S	WH001	WH002	WH175
09D-S	L C S	S&S	WH001	WH002	WH175

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
tyamamoto	4-6-93	Skinner	4-6-93	[illegible]	4/7/93

077

~~076~~

9613498.0150

VALIDATION SUMMARY

9613498.0151

Received: 04/07/93

Results by Sample

1/21/94 JM

SAMPLE ID B01971 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.49 mg/kg = 0.53 UJ

SAMPLE ID B01972 SAMPLE # 02 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.53 UJ

SAMPLE ID B01973 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.55UJ

SAMPLE ID B01974 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.53UJ

SAMPLE ID B01975 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.56 UJ

SAMPLE ID B01976 SAMPLE # 06 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.54 UJ

SAMPLE ID B01977 SAMPLE # 07 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL
CRHEXS <0.50 mg/kg = 0.55 UJ

TMA Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated 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

9613498.0152

Received: 04/07/93

Results by Sample

1/21/94 fn

SAMPLE ID B01979 SAMPLE # 08 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50 = 0.52 UJ
mg/kg

SAMPLE ID B01980 SAMPLE # 09 FRACTIONS: A
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50 = 0.50 UJ
mg/kg

SAMPLE ID B01980 DUPL SAMPLE # 09 FRACTIONS: B
Date & Time Collected 04/02/93 Category SOIL

CRHEXS <0.50 = 0.50 UJ
mg/kg

SAMPLE ID B01980 SPIKE SAMPLE # 09 FRACTIONS: C
Date & Time Collected 04/02/93 Category SOIL

CRHEXS 0.49 0.49
mg/kg

SAMPLE ID LCSS SAMPLE # 10 FRACTIONS: A
Date & Time Collected not specified Category SOIL

CRHEXS 19.0
ug/L

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.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc. 300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200

SAMPLE NUMBER:

B01971

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-01S

Level (low/med): LOW Date Received: 04/07/93

% 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	5750			P
7440-36-0	Antimony	4.1	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	73.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	3540			P
7440-47-3	Chromium	86.7			P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	9.9			P
7439-89-6	Iron	17800		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	3540			P
7439-96-5	Manganese	286			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	8.3	B		P
7440-09-7	Potassium	1630			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	184	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	31.3			P
7440-66-6	Zinc	44.0			P
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

002

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01971

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-01S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 97.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.9		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	17.8			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.66	U	J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER: B01972

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-02S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 93.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7090			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	89.4			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	6020			P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	9.3	B		P
7440-50-8	Copper	12.4			P
7439-89-6	Iron	18600		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4970			P
7439-96-5	Manganese	313			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.6			P
7440-09-7	Potassium	1470			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.98	U		P
7440-23-5	Sodium	262	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	41.7			P
7440-66-6	Zinc	45.3			P
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

003

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01972

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-02S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.4	B	W	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.9			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.65	U	W J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.53	U	J	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

B01973

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-03S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 90.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6910			P
7440-36-0	Antimony	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	89.7			P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	6860			P
7440-47-3	Chromium	11.3			P
7440-48-4	Cobalt	9.5	B		P
7440-50-8	Copper	13.2			P
7439-89-6	Iron	18100		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5420			P
7439-96-5	Manganese	330			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	11.1			P
7440-09-7	Potassium	1540			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.94	U		P
7440-23-5	Sodium	285	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	37.0			P
7440-66-6	Zinc	45.9			P
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

004

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01973

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-03S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.8		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.69	U	W J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.56	U	J	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94
CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

B01974

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-04S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 94.1

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	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	80.9			P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	9750			P
7440-47-3	Chromium	11.4			P
7440-48-4	Cobalt	8.3	B		P
7440-50-8	Copper	12.0			P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5050			P
7439-96-5	Manganese	306			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	1390			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.94	U		P
7440-23-5	Sodium	234	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	33.3			P
7440-66-6	Zinc	41.7			P
____ __	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

005

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01974

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-04S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.2		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.2			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.64	U	W J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.52	U	J	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94 CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01975

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

Lab Code: SKINER Case No.: RUSH!!! DUAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-05S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 88.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6510			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	67.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	4860			P
7440-47-3	Chromium	13.9			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	11.9			P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4450			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	9.8			P
7440-09-7	Potassium	1300			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	228	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	39.2			P
7440-66-6	Zinc	46.9			P
	Cyanide				NR

CH 1/11/94

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

006

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01975

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-05S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.5	B	W	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.8			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.67	U	W J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U	J	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94
CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER: B01976

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-06S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 91.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6300			P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	64.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	3930			P
7440-47-3	Chromium	16.6			P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	12.1			P
7439-89-6	Iron	15900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4290			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.2			P
7440-09-7	Potassium	1260			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.96	U		P
7440-23-5	Sodium	239	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	35.6			P
7440-66-6	Zinc	69.1			P
	Cyanide				NR

1/11/94-CH

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

007

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01976

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-06S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 97.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.1		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.0			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.65	U	MW J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.53	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94 CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

B01977

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-07S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 90.8

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	4.1	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	73.1			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	4380			P
7440-47-3	Chromium	16.5			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	11.7			P
7439-89-6	Iron	16900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4490			P
7439-96-5	Manganese	277			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	1280			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.99	U		P
7440-23-5	Sodium	261	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	38.9			P
7440-66-6	Zinc	55.2			P
	Cyanide				NR

1/11/94-CH

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

008

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01977

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-07S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 87.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.4		S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	4.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.74	U	J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.60	U	W	F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94
CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER: B01979

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-08S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 96.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6430			P
7440-36-0	Antimony	3.9	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	66.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.29	U		P
7440-70-2	Calcium	6340			P
7440-47-3	Chromium	11.0			P
7440-48-4	Cobalt	8.5	B		P
7440-50-8	Copper	11.7			P
7439-89-6	Iron	16900		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4880			P
7439-96-5	Manganese	275			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	11.6			P
7440-09-7	Potassium	1250			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.95	U		P
7440-23-5	Sodium	267	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	38.9			P
7440-66-6	Zinc	41.9			P
	Cyanide				NR

1/11/94 - CH

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROCKS

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01979

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-08S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	2.0	B	S	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	3.3			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.66	U	W J	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.54	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94
CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

SAMPLE NUMBER:

B01980

INORGANIC ANALYSIS DATA SHEET

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

Lab Code: SKINER Case No.: RUSH!!! DBAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 04072-09S

Level (low/med): LOW Date Received: 04/07/93

% Solids: 99.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	48.4			P
7440-36-0	Antimony	3.7	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	0.51	B		P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.27	U		P
7440-70-2	Calcium	36.7	B		P
7440-47-3	Chromium	0.82	U		P
7440-48-4	Cobalt	0.62	U		P
7440-50-8	Copper	0.95	U		P
7439-89-6	Iron	452		*	P
7439-92-1	Lead				NR
7439-95-4	Magnesium	12.8	U		P
7439-96-5	Manganese	0.80	B		P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	24.1	U		P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	49.0	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.78	U		P
7440-66-6	Zinc	4.5			P
	Cyanide				NR

1/11/94 CH

Color Before: WHITE Clarity Before: Texture: FINE

Color After: WHITE Clarity After: Artifacts: YES

Comments:
ROCKS

010

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B01980

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

Lab Code: SKINER Case No.: N3-04-020SAS No.: SDG No.: B01971

Matrix (soil/water): SOIL Lab Sample ID: 05051-09S

Level (low/med): LOW Date Received: 04/07/93

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	0.48	U		F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	0.34	B		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	0.63	U	WJ	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.52	U		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

1/11/94
CH

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

G10

9613498.0171

Filed w. 80197

Valdiation Reports 100-IU-4

DATA VALIDATION REPORT FOR THE 100-IU-4 OPERABLE UNIT SODIUM DISCHROMATE BARREL ERA 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-94-04
Kearney Project No. G954-27

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FEB 1994
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Document Control Number
WHC-SD-EN-TI-235, Rev. 0

February 1, 1994

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), one hundred percent of the total number of Sample Delivery Groups received by A.T. Kearney, Inc. from the 100-IU-4 Operable Unit Sodium Dichromate Barrel ERA 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.

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	Dibutylchlorendate
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-IU-4 Operable Unit Sodium Dichromate Barrel ERA Investigation sampling event:

B01971	B01978	B01985	B01992	B019B0
B01972	B01979	B01986	B01994	B019B1
B01973	B01980	B01987	B01995	B019B2
B01974	B01981	B01988	B01996	B019B3
B01975	B01982	B01989	B01997	B08XH9
B01976	B01983	B01990	B01998	
B01977	B01984	B01991	B01999	

Westinghouse-Hanford has requested that all of the Sample Delivery Groups be validated for the 100-IU-4 Operable Unit Sodium Dichromate Barrel ERA Investigation. Therefore, the data from the chemical analysis of thirty three 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. Sample number B01993, 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-IU-4 Sodium Dichromate Barrel ERA Investigation, report without this sample. Sample number B01980 was used to identify two samples. It was requested by Westinghouse-Hanford that sample B01980 sampled on 4/8/93 be changed to B08HX9. 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 are included in this report.

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B01971	S	9	Inorganics, Wet Chem
B01978	S	1	Inorganics, Wet Chem
B01990	S	1	Inorganics, Wet Chem
B01994	S	9	Inorganics, Wet Chem
B019B0	S	1	Inorganics, Wet Chem
B08XH9	S	12	Inorganics, Wet Chem

Thirty three samples were validated for radiochemical parameters by TMA and Teledyne. 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:

- Gamma spectroscopy

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B01971	S	9	Radiochemistry
B01978	S	1	Radiochemistry
B01990	S	1	Radiochemistry
B01994	S	9	Radiochemistry
B019B0	S	1	Radiochemistry
B08XH9	S	12	Radiochemistry

The radiochemical data summary tables can be found following Section 4.8.

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.

Three sets of split samples were submitted to WESTON Laboratories as shown below:

Set 1:

Sample No.	Split Sample No.	Location
B01976	B01978	IU-4 Test Pit E6

Set 2:

Sample No.	Split Sample No.	Location
B01988	B01990	IU-4 Test Pit C6

Set 3:

Sample No.	Split Sample No.	Location
B01998	B019B0	IU-4 Test Pit G4

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 duplicate. 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:

Sample No.	Duplicate Sample No.	Location
B01976	B01977	IU-4 Test Pit E6

Set 2:

Sample No.	Duplicate Sample No.	Location
B01988	B01989	IU-4 Test Pit C6

Set 3:

Sample No.	Duplicate Sample No.	Location
B01998	B01999	IU-4 Test Pit G4

The field duplicate 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 duplicate. The results fell within the required control limit. All results for the well locations appear in the summary tables within this report.

Four equipment blanks were submitted to TMA. The equipment blanks are identified as follows: B01971, B01980, B01994 and B08XH9, and were collected on 3/31/93, 4/02/93, 4/13/93 and 4/08/93 respectively.

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 location identifiers 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-IU-4 Operable Unit Sodium Dichromate Barrel ERA 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:

- Two sets of percent solids for each sample were used to calculate ICP and GFAA final results in two data packages. No explanation was provided by TMA Laboratory in their case narrative. Westinghouse-Hanford should address this issue with the laboratory.

- Selenium calibration correlation coefficients were less than 0.995 for three analysis runs. All associated results were qualified as estimates and flagged "J".

- Minor laboratory blank contamination was noted in the inorganics analysis. Associated results were flagged accordingly.

- The metals analysis showed minor matrix spike accuracy problems, analytical spike recoveries below the QC limits; laboratory duplicate RPD results outside of QC limits; and ICP serial dilution results outside of QC limits. Therefore, several metals results were flagged "J" due to these factors.

- GFAA analytical spikes were not performed for arsenic, lead, selenium and thallium in one data package. This is a significant deviation from the CLP protocol. All associated results were qualified as estimates and flagged "J".

- Hexavalent chromium soil sample holding times were exceeded in three data packages. All associated results were qualified as estimates and flagged "J".

- The matrix spike recovery fell outside the QC limits in one hexavalent chromium data package. All associated results were qualified as estimates and flagged "J".

- Due to lack of continuing calibration information, all gamma spectroscopy results were rejected "R".

- Due to lack of an annual calibration for Liquid Marinelli Detector #3, results in three data packages were rejected "R".

- All gamma spectroscopy results were qualified as estimates and flagged "J" due to the continuing calibration check source not being identified by nuclide and activity. The "J" qualifier was, however, superseded by the "R" qualifier as described above.

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.

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	INORGANICS
Test Pit E2	B01972	S	04/02/93	V	2-11
Test Pit E3	B01973	S	04/02/93	V	2-11
Test Pit E4	B01974	S	04/02/93	V	2-11
Test Pit E5	B01975	S	04/02/93	V	2-11
Test Pit E6	B01976 B01977 B01978	S S S	04/02/93 04/02/93 04/02/93	V V V	2-11 2-11 2-16
Test Pit E1	B01979	S	04/02/93	V	2-11
Test Pit D1	B01981	S	04/08/93	V	2-34
Test Pit D2	B01982	S	04/08/93	V	2-34
Test Pit C1	B01983	S	04/08/93	V	2-34
Test Pit C2	B01984	S	04/08/93	V	2-34
Test Pit C3	B01985	S	04/08/93	V	2-34
Test Pit C4	B01986	S	04/08/93	V	2-34
Test Pit C5	B01987	S	04/08/93	V	2-34
Test Pit C6	B01988 B01989 B01990	S S S	04/08/93 04/08/93 04/08/93	V V V	2-34 2-34 2-20
Test Pit C7	B01991	S	04/08/93	V	2-35
Test Pit C8	B01992	S	04/08/93	V	2-35
Test Pit G1	B01995	S	04/13/93	V	2-24
Test Pit G2	B01996	S	04/13/93	V	2-24
Test Pit G3	B01997	S	04/13/93	V	2-24
Test Pit G4	B01998 B01999 B019B0	S S S	04/13/93 04/13/93 04/13/93	V V V	2-24 2-24 2-30
Test Pit G5	B019B1	S	04/13/93	V	2-24
Test Pit G6	B019B2	S	04/13/93	V	2-24
Test Pit G7	B019B3	S	04/13/93	V	2-24

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	INORGANICS
EB	B01971	S	03/31/93	V	2-11
	B01980	S	04/02/93	V	2-11
	B01994	S	04/13/93	V	2-24
	B08XH9	S	04/02/93	V	2-34

2.0 INORGANIC DATA VALIDATION

2.1 DATA PACKAGE COMPLETENESS

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

B01971	B01990	B019B0
B01978	B01994	B08XH9

2.2 HOLDING TIMES

Analytical holding times for ICP metals and GFAA metals 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 six months for all ICP and GFAA 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 most cases.

The calibration correlation coefficient for three selenium analyses was <0.995. Although laboratory instrument printouts showed the correlation coefficients to be >0.995, results were recalculated and verified to be at 0.9923, 0.9940 and 0.9907 respectively. In accordance with Westinghouse-Hanford Data Validation Guidelines, all associated results for selenium were flagged as estimates "J" in the following samples.

- All samples in SDG No. B01971.
- Sample numbers B01995, B01997, B01998, B0199B1, B0199B2 and B0199B3 in SDG. No. B01994.
- Sample numbers B08XH9, B01981, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991 and B01992 in SDG. No. B08XH9.

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. 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 sample was flagged "U" for barium:

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample numbers B01981, B01982, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991 and B01992 in SDG No. B08XH9.

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

- Sample number B01980 in SDG No. B01971.

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

- Sample numbers B08XH9, B01984, B01986, B01987, B01988, B01989, B01991 and B01992 in SDG No. B08XH9.

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

- Sample number B01994 in SDG No. B01994.

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

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample number B08XH9 in SDG No. B08XH9.

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

- Sample number B08XH9 in SDG No. B08XH9.
- Sample number B01994 in SDG No. B01994.

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 values that are less than ten times the absolute value of the preparation blank result are qualified as estimates and flagged "J".

Due to a negative calibration blank result greater than two times the sample result, the following samples were flagged "J" for thallium:

- Sample numbers B01972, B01973, B01974 and B01975 in SDG No. B01971.

No other 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 number B01978 in SDG No. B01978.
- Sample number B01990 in SDG No. B01990.
- All samples in SDG No. B01994.
- All samples in SDG No. B08XH9.

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

- Sample number B01978 in SDG No. B01978.
- Sample number B019B0 in SDG No. B019B0.

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

- All samples in SDG No. B01994.

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.

LCS solid samples for soil samples digested and analyzed by WESTON could not be verified as actual solid samples. According to the 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 as the LCS for the digestion and analysis of aqueous samples. A solid LCS provided by the EPA or a certified agent is required for soil samples.

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".

All 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 result was flagged "J" for barium in the following samples:

- Sample number B01978 in SDG No. B01978.

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

- Sample number B01978 in SDG No. B01978.
- All Samples in SDG No. B01994.
- Sample number B01990 in SDG No. B01990.
- Sample number B019B0 in SDG No. B019B0.

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 result was flagged "J" for selenium in the following sample:

- Sample number B01981 in SDG No. B08XH9.

Under the CLP 3/90 SOW for Inorganics, GFAA analysis requires that an analytical spike be run immediately following the associated sample and the percent recovery calculated to determine further action. The analytical spike was not performed for any of the GFAA metals in SDG No. B01990, therefore sample results for arsenic, lead, selenium and thallium in sample number B01990 were qualified as estimates and flagged "J".

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".

All 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 analysis does 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 ICSA/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.

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.

Percent solids for samples in SDG Nos. B01971 and B08XH9 submitted by TMA Laboratories were determined twice on two separate days. The percent recoveries determined on the first day were used to calculate final results from ICP analysis and percent recoveries determined on the second day were used to calculate final results from GFAA analysis. In several cases significant differences were noted between the two determinations. Below is a table of all samples which have two percent solids results. In accordance with Westinghouse-Hanford Data Validation Guidelines no action was taken to qualify samples based upon this discrepancy, however Westinghouse-Hanford should contact TMA for an explanation in order to determine the percent solids results' acceptability.

Sample	% Solids 4/12/93	% Solids 5/11/93
B01971	92.7	97.0
B01972	93.9	99.2
B01973	90.4	96.2
B01974	94.1	99.2

B01975	88.8	96.2
B01976	91.8	97.6
B01977	90.8	87.6
B01980	99.8	100.0

Sample	% Solids 4/20/93	% Solids 5/11/93
B08XH9	93.4	100.0
B01981	91.0	95.9
B01982	91.7	96.5
B01983	91.4	96.2
B01984	91.8	97.1
B01985	89.2	94.1
B01986	89.4	94.8
B01987	90.1	94.3
B01988	89.9	95.0
B01989	89.6	90.2
B01991	92.3	93.1
B01992	92.2	92.6

For samples analyzed by 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, 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 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 IC1 is the instrument being used for analysis while some of the IDL's of IC3 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 IC1.

LCS solid samples for soil samples digested and analyzed by WESTON could not be verified as actual solid samples. According to the 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 as the LCS for the 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 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.

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B01971																				
Sample Number		B01971		B01972		B01973		B01974		B01975		B01976		B01977		B01979		B01980			
Location		EB		TPE2		TPE3		TPE4		TPE5		TPE6		TPE6		TPE1		EB			
Remarks		EQP.Blank												Duplicate				EQP.Blank			
Sample Date		3/31/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93			
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	5750		7090		6910		6530		6510		6300		6600		6430		48.4			
Antimony	60	4.1	U	4.0	U	3.9	U	3.9	U	4.0	U	4.0	U	4.1	U	3.9	U	3.7	U		
Arsenic	10	2.9		1.4		2.8		2.2		1.5		2.1		2.4		2.0		0.48	U		
Barium	200	73.3		89.4		89.7		80.9		67.3		64.3		73.1		66.3		0.51			
Beryllium	5	0.19	U	0.19		0.18	U	0.26		0.19	U	0.19	U	0.19	U	0.19	U	0.18	U		
Cadmium	5	0.30	U	0.30	U	0.29	U	0.29	U	0.29	U	0.29	U	0.30	U	0.29	U	0.27	U		
Calcium	5000	3540		6020		6860		9750		4860		3930		4380		6340		36.7	U		
Chromium	10	86.7		12.1		11.3		11.4		13.9		16.6		16.5		11.0		0.82	U		
Cobalt	50	7.4		9.3		9.5		8.3		8.0		7.4		8.0		8.5		0.62	U		
Copper	25	9.9		12.4		13.2		12.0		11.9		12.1		11.7		11.7		0.95	U		
Iron	100	17800		18600		18100		16400		16400		15900		16900		16900		452			
Lead	3	17.8		3.9		4.3		4.2		3.8		4.0		4.3		3.3		0.34			
Magnesium	5000	3540		4970		5420		5050		4450		4290		4490		4880		12.8	U		
Manganese	15	286		313		330		306		275		275		277		275		0.80			
Mercury	0.2	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A			
Nickel	40	8.3		10.6		11.1		10.3		9.8		10.2		10.3		11.6		1.1	U		
Potassium	5000	1630		1470		1540		1390		1300		1260		1280		1250		24.1	U		
Selenium	5	0.66	UJ	0.65	UJ	0.69	UJ	0.64	UJ	0.67	UJ	0.65	UJ	0.74	UJ	0.66	UJ	0.63	UJ		
Silver	10	0.99	U	0.98	U	0.94	U	0.94	U	0.97	U	0.96	U	0.99	U	0.95	U	0.90	U		
Sodium	5000	184		262		285		234		228		239		261		267		49.0			
Thallium	10	0.54	U	0.53	UJ	0.56	UJ	0.52	UJ	0.54	UJ	0.53	U	0.60	U	0.54	U	0.52	U		
Vanadium	50	31.3		41.7		37.0		33.3		39.2		35.6		38.9		38.9		0.78	U		
Zinc	20	44.0		45.3		45.9		41.7		46.9		69.1		55.2		41.9		4.5			
Cyanide	10	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A			

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

9613498.0193

CALIBRATION DATA SUMMARY

SDG: B01971	REVIEWER: LM	DATE: 1/19/94		PAGE 1 OF 1	
COMMENTS: Correlation Coefficient					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT:			
CALIB. DATE	COMPOUND	Corr. Coeff.		SAMPLES AFFECTED	QUALIFIER
5/14/93	Selenium	0.9923		All	J

BLANK AND SAMPLE DATA SUMMARY

SDG: B01971	REVIEWER: CH			DATE: 1/11/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB	Calcium	101.4			ug/L	507	1014	B01980	U

BLANK AND SAMPLE DATA SUMMARY

SDG: B01971	REVIEWER: CH			DATE: 1/11/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	2X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB3	Thallium	-3.6			ug/L	-7.2	-36	B01972, B01973, B01974, B01975	J

9613498.0196

DATA QUALIFICATION SUMMARY

SDG: B01971	REVIEWER: CH	DATE: 1/11/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Selenium	J	All	Calibration Correlation Coefficent <0.995
Calcium	U	B01980	Lab Blank Contamination
Thallium	J	B01972, B01973, B01974, B01975	Negative Blank Results

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B01978																				
Sample Number		B01978																			
Location		TPE6																			
Remarks		Split																			
Sample Date		4/02/93																			
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	4680																			
Antimony	60	3.5	UJ																		
Arsenic	10	1.6																			
Barium	200	62.8	J																		
Beryllium	5	0.22	U																		
Cadmium	5	0.44	U																		
Calcium	5000	3740																			
Chromium	10	12.1																			
Cobalt	50	6.8																			
Copper	25	10.4																			
Iron	100	12600																			
Lead	3	5.2	J																		
Magnesium	5000	3610																			
Manganese	15	233																			
Mercury	0.2	N/A																			
Nickel	40	9.7																			
Potassium	5000	1090																			
Selenium	5	0.22	U																		
Silver	10	1.19																			
Sodium	5000	172																			
Thallium	10	0.44	U																		
Vanadium	50	18.8																			
Zinc	20	44.9	J																		
Cyanide	10	N/A																			

TP=Test Pit, N/A=Not Applicable

9613498.0198

ACCURACY DATA SUMMARY

SDG: B01978	REVIEWER: PG	DATE: 1/10/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B01978S	Antimony	65.8	B01978	J
B01978S	Lead	54.5	B01978	J

9613498.0199

PRECISION DATA SUMMARY

SDG: B01978	REVIEWER: PG	DATE: 1/10/94	PAGE 1 OF 1		
COMMENTS:					
COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Barium	B01978	B01978L	10.3	B01978	J
Zinc	B01978	B01978L	128.4	B01978	J

DATA QUALIFICATION SUMMARY

SDG: B01978	REVIEWER: PG	DATE: 1/10/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	B01978	Matrix Spike
Lead	J	B01978	Matrix Spike
Barium	J	B01978	ICP Serial Dilution
Zinc	J	B01978	ICP Serial Dilution

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Page__1__ of__1__

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B01990																				
Sample Number		B01990																			
Location		TPC6																			
Remarks		Split																			
Sample Date		4/08/93																			
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	4540																			
Antimony	60	2.7	UJ																		
Arsenic	10	1.6	J																		
Barium	200	67.9																			
Beryllium	5	0.34																			
Cadmium	5	0.25																			
Calcium	5000	3990																			
Chromium	10	12.5																			
Cobalt	50	7.1																			
Copper	25	9.6																			
Iron	100	12200																			
Lead	3	4.1	J																		
Magnesium	5000	3270																			
Manganese	15	254																			
Mercury	0.2	0.06	U																		
Nickel	40	12.6																			
Potassium	5000	1360																			
Selenium	5	0.11	UJ																		
Silver	10	0.33	U																		
Sodium	5000	129																			
Thallium	10	0.22	UJ																		
Vanadium	50	19.2																			
Zinc	20	29.3	J																		
Cyanide	10	N/A																			

TP=Test Pit, N/A=Not Applicable

WHC-SD-EN-TI-235, Rev. 0

ACCURACY DATA SUMMARY

SDG: B01990	REVIEWER: PG	DATE: 1/6/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B01990S	Antimony	57.5	B01990	J
B01990A	Arsenic	Analytical Spike not performed	B01990	J
B01990A	Lead	Analytical Spike not performed	B01990	J
B01990A	Selenium	Analytical Spike not performed	B01990	J
B01990A	Thallium	Analytical Spike not performed	B01990	J

PRECISION DATA SUMMARY

SDG: B01990	REVIEWER: PG	DATE: 1/6/94	PAGE 1 OF 1
COMMENTS:			

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Zinc	B01990	B01990L	14.7	B01990	J

DATA QUALIFICATION SUMMARY

SDG: B01990	REVIEWER: PG	DATE: 1/6/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	B01990	Matrix Spike
Arsenic	J	B01990	Analytical Spike not performed
Lead	J	B01990	Analytical Spike not performed
Selenium	J	B01990	Analytical Spike not performed
Thallium	J	B01990	Analytical Spike not performed
Zinc	J	B01990	ICP Serial Dilution

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B01994																				
Sample Number		B01994		B01995		B01996		B01997		B01998		B01999		B019B1		B019B2		B019B3			
Location		EB		TPG1		TPG2		TPG3		TPG4		TPG4		TPG5		TPG6		TPG7			
Remarks		EQP.Blank										Duplicate									
Sample Date		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93			
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	54.3		6850		6020		7220		6790		6330		6760		6880		7110			
Antimony	60	3.5	UJ	3.9	UJ	3.6	UJ	3.8	UJ	3.9	UJ	3.9	UJ	3.7	UJ	3.6	UJ	3.5	UJ		
Arsenic	10	0.49	U	2.1		2.1		2.0		1.5		2.2		1.9		1.8		1.9			
Barium	200	0.49	U	67.8		69.1		72.0		73.3		74.9		68.3		70.0		76.9			
Beryllium	5	0.10	U	0.34		0.31		0.33		0.33		0.34		0.32		0.33		0.32			
Cadmium	5	0.33	U	0.37	U	0.34	U	0.36	U	0.37	U	0.37	U	0.35	U	0.34	U	0.33	U		
Calcium	5000	29.4		4110		3870		4230		3670		3570		4030		3900		4320			
Chromium	10	1.1	U	15.1		18.8		13.2		23.8		31.2		16.9		15.2		10.2			
Cobalt	50	0.75	U	8.7		8.1		8.2		8.0		11.1		8.1		8.3		8.5			
Copper	25	0.83	U	11.8		10.6		12.0		11.1		13.4		11.5		12.8		11.2			
Iron	100	122		17000		15900		16800		16400		32800		16300		16900		17400			
Lead	3	0.31	U	4.5		4.3		4.7		4.5		5.2		5.9		4.1		4.3			
Magnesium	5000	9.1	U	4110		3740		4190		3950		3820		3990		3950		4460			
Manganese	15	0.41		291		272		314		292		342		290		283		304			
Mercury	0.2	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A			
Nickel	40	1.2	U	10.4		9.1		10.4		9.9		11.9		8.9		10.2		10.8			
Potassium	5000	36.9	U	1380		1270		1480		1630		1570		1420		1330		1450			
Selenium	5	1.0	J	0.70	UJ	0.70	UJ	0.72	UJ	0.73	UJ	0.74	UJ	0.7	UJ	0.72	UJ	0.70	UJ		
Silver	10	0.75	U	0.83	U	1.1		0.80	U	0.98		2.5		0.94		1.2		0.81			
Sodium	5000	24.7		195		170		181		163		158		181		170		171			
Thallium	10	0.24	U	0.25	U	0.25	U	0.26	U	0.26	U	0.27	U	0.26	U	0.26	U	0.25	U		
Vanadium	50	0.65	U	37.0		33.6		36.3		33.5		35.4		34.8		38.5		38.8			
Zinc	20	6.6	UJ	45.8	J	37.4	J	50.6	J	40.5	J	39.3	J	42.5	J	41.8	J	39.9	J		
Cyanide	10	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A			

TP=Test Pit, EB=Equipment Blank, N/A=Not Applicable

CALIBRATION DATA SUMMARY

SDG: B01994	REVIEWER: PG	DATE: 1/14/94		PAGE 1 OF 1	
COMMENTS: Correlation Coefficient					
CALIB. TYPE:		INSTRUMENT:			
CALIB. DATE	COMPOUND	CORR. COEFF.		SAMPLES AFFECTED	QUALIFIER
5/16/93	Selenium	.9940		B01995, B01997, B01998, B019B1, B019B2, B019B3	J

BLANK AND SAMPLE DATA SUMMARY

SDG: B01994	REVIEWER: PG			DATE: 1/13/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
PBS	Lead	1.56			ug/L	7.8	15.6	B01994	U
CCB	Zinc	15.0			ug/L	75.0	150	B01994	U

9613498.0208

ACCURACY DATA SUMMARY

SDG: B01994	REVIEWER: PG	DATE: 1/13/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B019B3S	Antimony	54.7	All	J
B019B3S	Selenium	74.5	All	J

9613498.0209

PRECISION DATA SUMMARY

SDG: B01994	REVIEWER: PG	DATE: 1/13/94	PAGE 1 OF 1		
COMMENTS:					
COMPOUND	SAMPLE ID:	SAMPLE ID:	%D	SAMPLES AFFECTED	QUALIFIER
Zinc	B019B3	B019B3L	42.1	All	J

DATA QUALIFICATION SUMMARY

SDG: B01994	REVIEWER: PG	DATE: 1/13/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	U	B01994	Lab Blank
Zinc	U	B01994	Lab Blank
Selenium	J	B01995, B01997, B01998, B019B1, B019B2, B019B3	Instrument Calibration
Antimony	J	All	Matrix Spike
Selenium	J	All	Matrix Spike
Zinc	J	All	ICP Serial dilution

9613498.0212

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B019B0																				
Sample Number		B019B0																			
Location		TPG4																			
Remarks		Split																			
Sample Date		4/13/93																			
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	7530																			
Antimony	60	5.4	U																		
Arsenic	10	1.3																			
Barium	200	82.3																			
Beryllium	5	0.47																			
Cadmium	5	0.45	U																		
Calcium	5000	4030																			
Chromium	10	32.3																			
Cobalt	50	11.4																			
Copper	25	11.8																			
Iron	100	20200																			
Lead	3	5.0	J																		
Magnesium	5000	4730																			
Manganese	15	335																			
Mercury	0.2	N/A																			
Nickel	40	13.7																			
Potassium	5000	2120																			
Selenium	5	0.22	U																		
Silver	10	1.7																			
Sodium	5000	169																			
Thallium	10	0.67	U																		
Vanadium	50	34.4																			
Zinc	20	46.0	J																		
Cyanide	10	N/A																			

TP=Test Pit, N/A=Not Applicable

ACCURACY DATA SUMMARY

SDG: B019B0	REVIEWER: PG	DATE: 1/5/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B019B0S	Lead	64.4	B019B0	J

9613498.0213

PRECISION DATA SUMMARY

SDG: B019B0	REVIEWER: PG	DATE: 1/5/94		PAGE 1 OF 1	
COMMENTS:					
COMPOUND	SAMPLE ID:	SAMPLE ID:	%D	SAMPLES AFFECTED	QUALIFIER
Zinc	B019B0	B019B0L	91.9	B019B0	J

DATA QUALIFICATION SUMMARY

SDG: B019B0	REVIEWER: PG	DATE: 1/5/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	B019B0	Matrix Spike
Zinc	J	B019B0	ICP Serial Dilution

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B08XH9																				
Sample Number		B08XH9		B01981		B01982		B01983		B01984		B01985		B01986		B01987		B01988		B01989	
Location		EB		TPD1		TPD2		TPC1		TPC2		TPC3		TPC4		TPC5		TPC6		TPC6	
Remarks		EQP. Blank																		Duplicate	
Sample Date		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93	
Inorganic Analytes	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	50.1		8360		8160		8010		7070		7800		6930		6660		7170		7620	
Antimony	60	3.8	UJ	3.9	UJ	3.9	UJ	3.8	UJ	3.9	UJ	4.1	UJ	3.9	UJ	3.8	UJ	4.1	UJ	4.1	UJ
Arsenic	10	0.45	U	3.1		2.5		2.5		2.1		2.8		2.5		2.3		2.3		2.4	
Barium	200	0.3	U	142		89.3		89.2		72.0		81.5		75.8		68.3		69.0		77.1	
Beryllium	5	0.06	U	0.30	U	0.32	U	0.28	U	0.27	U	0.34	U	0.30	U	0.31	U	0.26	U	0.28	U
Cadmium	5	0.29	U	0.30	U	0.29	U	0.29	U	0.29	U	0.31	U	0.29	U	0.29	U	0.31	U	0.31	U
Calcium	5000	19.3	U	4320		4450		5890		4550		4570		4470		4460		7030		4780	
Chromium	10	0.68	U	29.6		16.4		16.8		16.5		16.2		11.6		15.6		17.1		17.7	
Cobalt	50	0.60	U	18.3		9.2		8.7		8		8.6		7.6		7.5		7.8		7.8	
Copper	25	2.3	U	144		31.4		37.5		17.9	U	20.7		15	U	13.0	U	13.8	U	12.7	U
Iron	100	256		61800		20300		21200		17600		19700		16100		16000		16800		17300	
Lead	3	0.33		58.7		17.5		18.3		9.1		11.7		8.2		16.8		5.0		5.2	
Magnesium	5000	6.0	U	4400		4670		4550		4310		4340		4120		4150		4300		4450	
Manganese	15	0.25	U	592		345		328		277		307		283		269		269		279	
Mercury	0.2	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	40	0.86	U	42.2		12.8		13.3		10.4		11.3		9.6		10.1		10.3		11.2	
Potassium	5000	23.8	U	1690		1730		1560		1520		1590		1540		1470		1560		1620	
Selenium	5	0.64	UJ	0.67	UJ	0.90	U	0.67	UJ	0.67	UJ	0.69	UJ	0.66	UJ	0.69	UJ	0.65	UJ	0.71	UJ
Silver	10	0.68	U	4.5		0.85		1.3		0.86		0.73		0.68	U	0.678	U	0.73	U	0.72	U
Sodium	5000	15.6	U	910		196		382		236		263		254		195		213		227	
Thallium	10	0.50	U	0.53	U	0.51	U	0.53	U	0.53	U	0.55	U	0.52	U	0.55	U	0.51	U	0.56	U
Vanadium	50	0.44	U	37.6		40.8		40.5		37.1		39.9		35.3		34.9		38.5		38.1	
Zinc	20	2.9	U	247		90.3		145		61.6		83.4		50.7		46.0		38.1		38.1	
Cyanide	10	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

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9613498.0217

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B08XH9																				
Sample Number		B01991		B01992																	
Location		TPC7		TPC8																	
Remarks																					
Sample Date		4/08/93		4/08/93																	
Inorganic Analytes	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	6120		7720																	
Antimony	60	4.0	UJ	3.9	UJ																
Arsenic	10	2.2		2.2																	
Barium	200	61.3		75.0																	
Beryllium	5	0.26	U	0.32	U																
Cadmium	5	0.30	U	0.29	U																
Calcium	5000	5200		5190																	
Chromium	10	10.0		12.3																	
Cobalt	50	7.4		8.3																	
Copper	25	11.9	U	12.1	U																
Iron	100	15200		18200																	
Lead	3	3.4		4.2																	
Magnesium	5000	4290		4310																	
Manganese	15	250		286																	
Mercury	0.2	N/A		N/A																	
Nickel	40	10.2		10.5																	
Potassium	5000	1210		1640																	
Selenium	5	0.68	UJ	0.68	UJ																
Silver	10	0.71	U	0.70	U																
Sodium	5000	202		270																	
Thallium	10	0.53	U	0.53	U																
Vanadium	50	35.8		40.0																	
Zinc	20	35.1		36.4																	
Cyanide	10	N/A		N/A																	

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

CALIBRATION DATA SUMMARY

SDG: B08XH9	REVIEWER: MH	DATE: 1/20/94		PAGE 1 OF 1	
COMMENTS: Correlation Coefficient					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT:			
CALIB. DATE	COMPOUND	Corr. Coeff.		SAMPLES AFFECTED	QUALIFIER
05/16/93	Selenium	.9907		B08XH9, B01981, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991, B01992	J

BLANK AND SAMPLE DATA SUMMARY

SDG: B08XH9	REVIEWER: MH			DATE: 1/11/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB	Barium	1.5			ug/L	7.5	15	B08XH9	U
CCB	Beryllium	.5			ug/L	2.5	5	B01981, B01982, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991, B01992	U
ICB	Copper	17.4			ug/L	87	174	B08XH9, B01984, B01986, B01987, B01988, B01989, B01991, B01992	U
CCB	Magnesium	38.6			ug/L	193	386	B08XH9	U
CCB	Manganese	1.7			ug/L	8.5	17	B08XH9	U
PBS	Potassium	99.6			ug/L	498	996	B08XH9	U
PBS	Sodium	109			ug/L	545	1090	B08XH9	U
ICB	Vanadium	3.0			ug/L	15	30	B08XH9	U
PBS	Zinc	14.1			ug/L	70.5	141	B08XH9	U

ACCURACY DATA SUMMARY

SDG: B08XH9	REVIEWER: MH	DATE: 1/11/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B01992S	Antimony	51.3	All	J
B01981A	Selenium	121	B01981	J

DATA QUALIFICATION SUMMARY

SDG: B08XH9	REVIEWER: MH	DATE: 1/20/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Selenium	J	B08XH9, B01981, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991, B01992	Corr. Coeff. <0.995
Barium	U	B08XH9	Lab Blank Contamination
Beryllium	U	B01981, B01982, B01983, B01984, B01985, B01986, B01987, B01988, B01989, B01991, B01992	Lab Blank Contamination
Copper	U	B08XH9, B01984, B01986, B01987, B01988, B01989, B01991, B01992	Lab Blank Contamination
Magnesium	U	B08XH9	Lab Blank Contamination
Manganese	U	B08XH9	Lab Blank Contamination
Potassium	U	B08XH9	Lab Blank Contamination
Sodium	U	B08XH9	Lab Blank Contamination
Vanadium	U	B08XH9	Lab Blank Contamination
Zinc	U	B08XH9	Lab Blank Contamination
Antimony	J	All	Matrix Spike
Selenium	J	B01981	GFAA Analytical Spike

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	WET CHEMISTRY
Test Pit E2	B01972	S	04/02/93	V	3-4
Test Pit E3	B01973	S	04/02/93	V	3-4
Test Pit E4	B01974	S	04/02/93	V	3-4
Test Pit E5	B01975	S	04/02/93	V	3-4
Test Pit E6	B01976 B01977 B01978	S S S	04/02/93 04/02/93 04/02/93	V V V	3-4 3-4 3-9
Test Pit E1	B01979	S	04/02/93	V	3-4
Test Pit D1	B01981	S	04/08/93	V	3-15
Test Pit D2	B01982	S	04/08/93	V	3-15
Test Pit C1	B01983	S	04/08/93	V	3-15
Test Pit C2	B01984	S	04/08/93	V	3-15
Test Pit C3	B01985	S	04/08/93	V	3-15
Test Pit C4	B01986	S	04/08/93	V	3-15
Test Pit C5	B01987	S	04/08/93	V	3-15
Test Pit C6	B01988 B01989 B01990	S S S	04/08/93 04/08/93 04/08/93	V V V	3-15 3-15 3-10
Test Pit C7	B01991	S	04/08/93	V	3-16
Test Pit C8	B01992	S	04/08/93	V	3-16
Test Pit G1	B01995	S	04/13/93	V	3-11
Test Pit G2	B01996	S	04/13/93	V	3-11
Test Pit G3	B01997	S	04/13/93	V	3-11
Test Pit G4	B01998 B01999 B019B0	S S S	04/13/93 04/13/93 04/13/93	V V V	3-11 3-11 3-14
Test Pit G5	B019B1	S	04/13/93	V	3-11
Test Pit G6	B019B2	S	04/13/93	V	3-11
Test Pit G7	B019B3	S	04/13/93	V	3-11

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	WET CHEMISTRY
EB	B01971	S	03/31/93	V	3-4
	B01980	S	04/02/93	V	3-4
	B01994	S	04/13/93	V	3-11
	B08XH9	S	04/02/93	V	3-15

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:

B01971	B01990	B019B0
B01978	B01994	B08XH9

3.2 HOLDING TIMES

Analytical holding times for hexavalent chromium were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are 24 hours for aqueous samples.

Although no specific holding times exist for soil samples, results that grossly exceeded the 24 hour holding time limit were qualified as estimates "J".

Holding times were exceeded for hexavalent chromium in SDG Nos. B01971, B01978, B01990, B01994, B019B0 and B08XH9. All associated sample results were qualified as estimates and flagged "J".

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 $\geq$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.

The CCV for analytical run dated 4/16/93 exceeded the 110% acceptance limit, however in accordance with Westinghouse-Hanford Data Validation Guidelines, no qualification was required because all sample results were less than the IDL.

All other 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. Matrix spike recoveries must generally fall within the range of 75 to 125 percent. Samples with a spike recovery of less tha 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 hexavalent chromium in the following samples:

- All samples in SDG No. B01971.

All other 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 hexavalent chromium for all samples in three data packages were exceeded and all associated results were qualified as estimates and flagged "J". The matrix spike percent recovery was exceeded for all samples in one data package 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.

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B01971																				
Sample Number		B01971		B01972		B01973		B01974		B01975		B01976		B01977		B01979		B01980			
Location		EB		TPE2		TPE3		TPE4		TPE5		TPE6		TPE6		TPE7		EB			
Remarks		Equip.BLK												Duplicate				Equip.BLK			
Sample Date		3/31/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93		4/02/93			
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	7197	0.53	UJ	0.53	UJ	0.55	UJ	0.53	UJ	0.56	UJ	0.54	UJ	0.55	UJ	0.52	UJ	0.50	UJ		

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

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HOLDING TIME SUMMARY

SDG: B01971	REVIEWER: LM			DATE: 1/21/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01971	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01972	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01973	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01974	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01975	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01976	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01977	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01979	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J
B01980	Hex. Chromium	4/02/93	4/15/93	4/16/93		24 Hours	J

CALIBRATION DATA SUMMARY

SDG: B01971	REVIEWER: LM	DATE: 1/21/94		PAGE 1 OF 1	
COMMENTS:					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT:			
CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
4/16/93	Hexavalent Chromium		113%	B01971, B01972, B01973, B01974, B01975, B01976, B01977, B01979, B01980	None

ACCURACY DATA SUMMARY

SDG: B01971	REVIEWER: LM	DATE: 1/21/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B01980	Hex. Chromium	49.0	B01971, B01972, B01973, B01974, B01975, B01976, B01977, B01979, B01980	J

DATA QUALIFICATION SUMMARY

SDG: B01971	REVIEWER: LM	DATE: 1/21/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hexavalent Chromium	J	All	Holding Time Exceeded
Hexavalent Chromium	None	All	CCV >110%
Hexavalent Chromium	J	All	Matrix Spike

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B01978																				
Sample Number		B01978																			
Location		TPE6																			
Remarks		Split																			
Sample Date		4/02/93																			
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	218.4	0.11	UJ																		

TP=Test Pit

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WHC-SD-EN-TI-235, Rev. 0

HOLDING TIME SUMMARY

SDG: B01978	REVIEWER: LM			DATE: 2/28/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01978	Hex. Chromium	4/02/93		4/14/93		24 Hours	J

DATA QUALIFICATION SUMMARY

SDG: B01978	REVIEWER: LM	DATE: 2/28/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hex. Chromium	J	B01978	Holding Time Exceeded

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B01990																				
Sample Number		B01990																			
Location		TPC6																			
Remarks		Split																			
Sample Date		4/08/93																			
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	218.4	0.11	UJ																		

TP=Test Pit

9613498.0235

HOLDING TIME SUMMARY

SDG: B01990	REVIEWER: LM			DATE: 2/28/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01990	Hex. Chromium	4/08/93		4/14/93		24 Hours	J

DATA QUALIFICATION SUMMARY

SDG: B01990	REVIEWER: LM	DATE: 2/28/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hex. Chromium	J	B01990	Holding Time Exceeded

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B01994																				
Sample Number		B01994		B01995		B01996		B01997		B01998		B01999		B019B1		B019B2		B019B3			
Location		EB		TPG1		TPG2		TPG3		TPG4		TPG4		TPG5		TPG6		TPG7			
Remarks		EQP.Blank										Duplicate									
Sample Date		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93		4/13/93			
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	7197	0.50	J	0.54	J	0.54	J	0.54	J	0.56	J	0.56	J	0.55	J	0.53	J	0.53	J		

EB=Equipment Blank, TP=Test Pit

9613498.0238

HOLDING TIME SUMMARY

SDG: B01994	REVIEWER: PG			DATE: 1/14/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01994	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B01995	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B01996	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B01997	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B01998	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B01999	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B019B1	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B019B2	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J
B019B3	Hex. Chromium	4/13/93	4/23/93	4/26/93		24 Hours	J

DATA QUALIFICATION SUMMARY

SDG: B01994	REVIEWER: PG	DATE: 1/14/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hexavalent Chromium	J	All	Holding time exceeded

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B019B0																				
Sample Number		B019B0																			
Location		TPG4																			
Remarks		Split																			
Sample Date		4/13/93																			
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	7197	0.11	UJ																		

TP=Test Pit

9613498.0241

HOLDING TIME SUMMARY

SDG: B019B0	REVIEWER: LM			DATE: 2/28/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B019B0	Hex. Chromium	4/13/93		4/19/93		24 Hours	J

9613498.0242

DATA QUALIFICATION SUMMARY

SDG: B019B0	REVIEWER: LM	DATE: 2/28/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hex. Chromium	J	B019B0	Holding Time Exceeded

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B08XH9																				
Sample Number		B08XH9		B01981		B01982		B01983		B01984		B01985		B01986		B01987		B01988		B01989	
Location		EB		TPD1		TPD2		TPC1		TPC2		TPC3		TPC4		TPC5		TPC6		TPC6	
Remarks		Equip.Blank																		Duplicate	
Sample Date		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93		4/08/93	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	7197	0.54	UJ	0.55	UJ	0.54	UJ	0.55	UJ	0.54	UJ	0.56	UJ	0.56	UJ	0.55	UJ	0.56	UJ	0.56	UJ

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

9613498.0244

9613498.0245

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B08XH9																				
Sample Number		B01991		B01992																	
Location		TPC7		TPC8																	
Remarks																					
Sample Date		4/08/93		4/08/93																	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	7197	0.54	UJ	0.54	UJ																

EB=Equipment Blank, TP=Test Pit, N/A=Not Applicable

HOLDING TIME SUMMARY

SDG: B08XH9	REVIEWER: LM			DATE: 1/21/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B08XH9	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01981	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01982	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01983	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01984	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01985	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01986	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01987	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01988	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01989	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01991	Hex. Chromium	4/8/93		4/26/93		24 Hours	J
B01992	Hex. Chromium	4/8/93		4/26/93		24 Hours	J

DATA QUALIFICATION SUMMARY

SDG: B08XH9	REVIEWER: LM	DATE: 1/21/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hex. Chromium	J	All	Holding Time Exceeded

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	RADIOCHEMISTRY
Test Pit E2	B01972	S	04/02/93	V	4-4
Test Pit E3	B01973	S	04/02/93	V	4-4
Test Pit E4	B01974	S	04/02/93	V	4-4
Test Pit E5	B01975	S	04/02/93	V	4-4
Test Pit E6	B01976	S	04/02/93	V	4-4
	B01977	S	04/02/93	V	4-4
	B01978	S	04/02/93	V	4-5
Test Pit E1	B01979	S	04/02/93	V	4-4
Test Pit D1	B01981	S	04/08/93	V	4-9
Test Pit D2	B01982	S	04/08/93	V	4-9
Test Pit C1	B01983	S	04/08/93	V	4-9
Test Pit C2	B01984	S	04/08/93	V	4-9
Test Pit C3	B01985	S	04/08/93	V	4-9
Test Pit C4	B01986	S	04/08/93	V	4-9
Test Pit C5	B01987	S	04/08/93	V	4-9
Test Pit C6	B01988	S	04/08/93	V	4-9
	B01989	S	04/08/93	V	4-9
	B01990	S	04/08/93	V	4-6
Test Pit C7	B01991	S	04/08/93	V	4-10
Test Pit C8	B01992	S	04/08/93	V	4-10
Test Pit G1	B01995	S	04/13/93	V	4-7
Test Pit G2	B01996	S	04/13/93	V	4-7
Test Pit G3	B01997	S	04/13/93	V	4-7
Test Pit G4	B01998	S	04/13/93	V	4-7
	B01999	S	04/13/93	V	4-7
	B019B0	S	04/13/93	V	4-8
Test Pit G5	B019B1	S	04/13/93	V	4-7
Test Pit G6	B019B2	S	04/13/93	V	4-7
Test Pit G7	B019B3	S	04/13/93	V	4-7

LOCATION AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	RADIOCHEMISTRY
EB	B01971	S	03/31/93	V	4-4
	B01980	S	04/02/93	V	4-4
	B01994	S	04/13/93	V	4-7
	B08XH9	S	04/02/93	V	4-9

4.0 GAMMA SPECTROSCOPY DATA VALIDATION

4.1 DATA PACKAGE COMPLETENESS

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

B01971 B01978 B01990 B01994 B019B0 B08XH9

4.2 HOLDING TIMES

Holding times are calculated from Chains-of-Custody 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 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.

Due to a lack of daily check source counts and weekly background counts before and after sample analysis, all gamma results in all SDGs were rejected. Due to a lack of annual calibration data for Gamma Spectroscopy Liquid Marinelli Detector #3, results for the following samples were rejected "R": B01972, B01975 and B01979 in SDG No. B01971; B01981, B01984, B01987 and B01991 in SDG No. B08XH9; B01995, B01997, B019B1 and B019B3 in SDG No. B01994. All gamma sample results were qualified as estimated and flagged "J" due to the continuing calibration check source not being identified by nuclide and activity.

4.4 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 are qualified as estimated "J/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. A duplicate with a RPD less than 35 percent is acceptable. If sample and duplicate activities are both <5xLLD, a control limit of 2xLLD is used. If sample and duplicate 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 "J" or estimated non-detects "UJ".

All precision results were acceptable.

4.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to field and/or laboratory contamination.

Due to blank contamination, all Thorium-228 results in SDG Nos. B01978 and B01990 were qualified as estimated and flagged "J".

All other blank results were acceptable.

4.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitations 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.

4.8 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 information, all gamma results in all SDGs were rejected. Due to the lack of an annual calibration for Liquid Marinelli Detector

#3, all results in three SDGs were rejected. All validated sample results in all SDGs were qualified as estimated and flagged "J" due to the continuing calibration check source not being identified by nuclide and activity. Data qualified as estimated is valid and usable for limited purposes only. Rejected data is invalid and unusable for any purpose.

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																				
Laboratory: TMA																				
Case	SDG: B01971																			
Sample Number	B01971		B01972		B01973		B01974		B01975		B01976		B01977		B01979		B01980			
Location	EB		TPE2		TPE3		TPE4		TPE5		TPE6		TPE6		TPE1		EB			
Remarks	EB												DUP				EB			
Sample Date	03/31/93		04/02/93		04/02/93		04/02/93		04/02/93		04/02/93		04/02/93		04/02/93		04/02/93			
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Potassium-40	13	R	13	R	14	R	14	R	14	R	14	R	13	R	13	R	0.44	R		
Iron-59	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Chromium-51	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Cobalt-60	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Zinc-65	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Ruthenium-106	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Cesium-134	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Cesium-137	0.094	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Europium-152	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Europium-154	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R		
Radium-226	0.48	R	0.51	R	0.59	R	0.59	R	0.52	R	0.48	R	0.50	R	0.53	R	0.11	R		
Thorium-228	0.63	R	0.70	R	1.2	R	0.82	R	0.89	R	0.89	R	0.73	R	0.76	R	0.18	R		
Thorium-232	0.54	R	0.91	R	0.87	R	0.89	R	0.86	R	0.86	R	0.61	R	1.0	R	0.17	R		

EB = Equipment Blank, TP = Test Pit, DUP = Duplicate, N/D = Not Detected

9613498.0253

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																				
Laboratory: TELEDYNE																				
Case	SDG: B01978																			
Sample Number	B01978																			
Location	TPE6																			
Remarks	SPLIT																			
Sample Date	04/02/93																			
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Beryllium-7	<0.2	R																		
Potassium-40	14.7	R																		
Manganese-54	<0.02	R																		
Cobalt-58	<0.02	R																		
Iron-59	<0.05	R																		
Cobalt-60	<0.02	R																		
Zinc-65	<0.05	R																		
Zirconium-95	<0.03	R																		
Ruthenium-103	<0.02	R																		
Ruthenium-106	<0.2	R																		
Iodine-131	<0.08	R																		
Cesium-134	<0.03	R																		
Cesium-137	<0.02	R																		
Barium-140	<0.04	R																		
Cerium-141	<0.04	R																		
Cerium-144	<0.1	R																		
Europium-152	0.45	R																		
Europium-154	<0.07	R																		
Europium-155	<0.07	R																		
Radium-226	1.06	R																		
Thorium-228	0.579	R																		
Thorium-234	<0.4	R																		

TP = Test Pit

9613498.0254

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																				
Laboratory: TELEDYNE																				
Case	SDG: B01990																			
Sample Number	B01990																			
Location	TPC6																			
Remarks	SPLIT																			
Sample Date	04/08/93																			
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Beryllium-7	<0.2	R																		
Potassium-40	14.6	R																		
Manganese-54	<0.03	R																		
Cobalt-58	<0.02	R																		
Iron-59	<0.06	R																		
Cobalt-60	<0.02	R																		
Zinc-65	<0.06	R																		
Zirconium-95	<0.03	R																		
Ruthenium-103	<0.03	R																		
Ruthenium-106	<0.2	R																		
Iodine-131	<0.06	R																		
Cesium-134	0.030	R																		
Cesium-137	0.054	R																		
Barium-140	<0.04	R																		
Cerium-141	<0.04	R																		
Cerium-144	<0.1	R																		
Europium-152	<0.07	R																		
Europium-154	<0.08	R																		
Europium-155	<0.08	R																		
Radium-226	0.989	R																		
Thorium-228	0.664	R																		
Thorium-234	<0.5	R																		

TP = Test Pit

9613498.0255

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B01994																				
Sample Number	B01994		B01995		B01996		B01997		B01998		B01999		B019B1		B019B2		B019B3				
Location	EB		TPG1		TPG2		TPG3		TPG4		TPG4		TPG5		TPG6		TPG7				
Remarks	EB										DUP										
Sample Date	04/13/93		04/13/93		04/13/93		04/13/93		04/13/93		04/13/93		04/13/93		04/13/93		04/13/93				
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Potassium-40	0.36	R	13	R	12	R	13	R	13	R	13	R	11	R	13	R	13	R			
Iron-59	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Chromium-51	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Cobalt-60	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Zinc-65	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Ruthenium-106	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Cesium-134	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Cesium-137	N/D	R	N/D	R	0.048	R	N/D	R	0.086	R	0.089	R	N/D	R	N/D	R	N/D	R			
Cerium-144	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Europium-152	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Europium-154	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R			
Radium-226	0.094	R	0.46	R	0.50	R	0.44	R	0.51	R	0.42	R	0.48	R	0.45	R	0.51	R			
Thorium-228	0.098	R	0.82	R	0.66	R	0.64	R	0.96	R	0.69	R	0.74	R	1.0	R	0.72	R			
Thorium-232	0.12	R	0.78	R	0.66	R	0.59	R	0.71	R	0.78	R	0.87	R	0.67	R	0.97	R			

EB = Equipment Blank, TP = Test Pit, DUP = Duplicate, N/D = Not Detected

9613498.0256

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																				
Laboratory: TELEDYNE																				
Case	SDG: B019B0																			
Sample Number	B019B0																			
Location	TPG4																			
Remarks	SPLIT																			
Sample Date	04/13/93																			
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Beryllium-7	0.022	R																		
Potassium-40	13.8	R																		
Manganese-54	0.0025	R																		
Cobalt-58	0.013	R																		
Iron-59	0.010	R																		
Cobalt-60	0.0014	R																		
Zinc-65	0.016	R																		
Zirconium-95	0.0088	R																		
Ruthenium-103	0.0028	R																		
Ruthenium-106	0.0099	R																		
Iodine-131	0.011	R																		
Cesium-134	0.021	R																		
Cesium-137	0.0747	R																		
Barium-140	0.0022	R																		
Cerium-141	0.0037	R																		
Cerium-144	0.068	R																		
Europium-152	0.43	R																		
Europium-154	0.0065	R																		
Europium-155	0.014	R																		
Radium-226	0.969	R																		
Thorium-228	0.588	R																		
Thorium-234	0.099	R																		

TP = Test Pit

9613498.0257

9613498.0258

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD
Laboratory: TMA
Case SDG: B08XH9

Sample Number	B08XH9		B01981		B01982		B01983		B01984		B01985		B01986		B01987		B01988		B01989	
Location	EB		TPD1		TPD2		TPC1		TPC2		TPC3		TPC4		TPC5		TPC6		TPC6	
Remarks	EB																		DUP	
Sample Date	04/02/93		04/08/93		04/08/93		04/08/93		04/08/93		04/08/93		04/08/93		04/08/93		04/08/93		04/08/93	
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Potassium-40	0.29	R	14	R	13	R	14	R	14	R	15	R	13	R	14	R	13	R	14	R
Iron-59	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Chromium-51	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Cobalt-60	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Zinc-65	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Ruthenium-106	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Cesium-134	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Cesium-137	N/D	R	0.16	R	N/D	R	0.072	R	N/D	R	0.091	R	0.040	R	0.053	R	0.044	R	0.049	R
Cerium-144	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Europium-152	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Europium-154	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R	N/D	R
Radium-226	0.11	R	0.66	R	0.70	R	0.53	R	0.57	R	0.54	R	0.54	R	0.52	R	0.54	R	0.52	R
Thorium-228	0.18	R	0.82	R	1.2	R	0.68	R	0.70	R	1.0	R	0.85	R	0.75	R	0.92	R	0.94	R
Thorium-232	N/D	R	1.0	R	0.75	R	0.87	R	0.75	R	0.67	R	0.83	R	0.82	R	1.0	R	0.62	R

EB = Equipment Blank, TP = Test Pit, DUP = Duplicate, N/D = Not Detected

Project: WESTINGHOUSE-HANFORD																				
Laboratory: TMA																				
Case	SDG: B08XH9																			
Sample Number	B01991		B01992																	
Location	TPC7		TPC8																	
Remarks																				
Sample Date	04/08/93		04/08/93																	
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Potassium-40	14	R	13	R																
Iron-59	N/D	R	N/D	R																
Chromium-51	N/D	R	N/D	R																
Cobalt-60	N/D	R	N/D	R																
Zinc-65	N/D	R	N/D	R																
Ruthenium-106	N/D	R	N/D	R																
Cesium-134	N/D	R	N/D	R																
Cesium-137	N/D	R	N/D	R																
Cerium-144	N/D	R	N/D	R																
Europium-152	N/D	R	N/D	R																
Europium-154	N/D	R	N/D	R																
Radium-226	0.51	R	0.58	R																
Thorium-228	0.68	R	1.0	R																
Thorium-232	0.75	R	0.84	R																

EB = Equipment Blank, TP = Test Pit, DUP = Duplicate, N/D = Not Detected

96 3498.0259

9615498.0260

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