TMA

JUL 1992
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DMO

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

METALS
Case No. N2-06-077
(Skinner & Sherman W.O.S2-06-136)

July 27, 1992

TMA Master Work Order N2-06-077

NOV 1996

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804-0040

(415) 235-2633 Fax No. (415) 235-0438

AUG 1992
RECEIVED
OSM DMO

August 18, 1992

Jeanette Duncan
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Reference: Metals Case N2-02-106
WHC Samples B01751, B01752, B01753, B01754, B01755 and B01756

Dear Jeannette:

This is to confirm that the WHC sample identification numbers referenced above should read as follows: B017S1, B017S2, B017S3, B017S4, B017S5 and B017S6.

Sincerely,

Dolores Sanchez

Dolores Sanchez
Program Coordinator

TMA
Thermo Analytical Inc.

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

July 21, 1992

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

Quality Control Narrative

Scope
Four (4) soil samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on April 6, 1992 from Westinghouse/Hanford Company. The samples were initially analyzed for the USEPA CLP ICP metals under work order S204103. Upon client request the samples were analyzed for GFAA metals under work order S206136. Due to insufficient sample volume, sample B01801 could not be analyzed.

Methodology
The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work 7/88 (CLP SOW788).

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

- The selenium digestion spike recovery exceeded the control limit requirements.
- The lead duplicate RPD 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.

Kirk D. Johnson
U.S. EPA Data Manager

WESTINGHOUSE/HANFORD

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01779

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: M2-06-0779SAS No.: SDG No.: B01779

Matrix (soil/water): SOIL Lab Sample ID: 06136-01

Level (low/med): LOW Date Received: 06/15/00

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	0.20			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	24.20		*	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	0.55	U	WN	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.92	B		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

801229

Lab Name: SKINNER & SHERMAN LABS Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-06-0229 SAS No.: SDG No.: 801229

Matrix (soil/water): SOIL Lab Sample ID: 06136-029

Level (low/med): LOW Date Received: 06/15/90

% Solids: 94.4

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	5.10			E
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	20.50		*	E
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	2.90	U	UN	E
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	1.40	B		E
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01900

Lab Name: SKINNER & SHERMAN LABS Contract: 68-D0-0109

Lab Code: SKINFR Case No.: 90-06-0775 SAS No.: SDG No.: 001779

Matrix (soil/water): SOIL Lab Sample ID: 06136-075

Level (low/med): LOW Date Received: 06/15/90

% 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				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	6.90		S	E
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	43.70		S*	E
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	0.57	U	UN	E
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	1.20	B		E
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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JUN 1992
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WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

METALS
Case No. N2-02-106
(TMA/Skinner & Sherman Work Order S2-04-103)

June 11, 1992

TMA Master Work Order N2-02-106

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01751~~
B017S1

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-00-0106

Lab Code: SKINER Case No.: N2-02-106 SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-039

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	417.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	6.10	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.20	B		P
7440-70-2	Calcium	4010.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.40	U		P
7440-50-8	Copper	6.00			P
7439-89-6	Iron	136.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1090.00			P
7439-96-5	Manganese	655.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.60	B		P
7440-09-7	Potassium	3520.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	23.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.55	B		P
7440-66-6	Zinc	65.90			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

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02

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01753

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0101

Lab Code: SKINER Case No.: N2-02-1065AS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-045

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	402.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	5.90	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.10	U		P
7440-70-2	Calcium	4000.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.41	U		P
7440-50-8	Copper	5.70			P
7439-89-6	Iron	129.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1070.00			P
7439-96-5	Manganese	652.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.40	B		P
7440-09-7	Potassium	3450.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	27.70	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.41	U		P
7440-66-6	Zinc	62.40			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01734
B01734

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-02-1065AS No.: SDG No.: B01734

Matrix (soil/water): SOIL Lab Sample ID: 04103-058

Level (low/med): LOW Date Received: 04/06/92

% Solids: 89.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	408.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	5.10	B		P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	3960.00			P
7440-47-3	Chromium	1.30	B		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	5.10	B		P
7439-89-6	Iron	126.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1080.00			P
7439-96-5	Manganese	648.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	3.40	B		P
7440-09-7	Potassium	3480.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	30.10	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.89	B		P
7440-66-6	Zinc	55.20			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01756~~ B01756

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: 801251

Matrix (soil/water): SOIL Lab Sample ID: 04103-065

Level (low/med): LOW Date Received: 04/06/92

% 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	117.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	116.00			P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	14600.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.40	U		P
7440-50-8	Copper	6.30			P
7439-89-6	Iron	185.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4020.00			P
7439-96-5	Manganese	90.80			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.00	U		P
7440-09-7	Potassium	2700.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	29.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.49	B		P
7440-66-6	Zinc	18.60			P
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01720

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

Lab Code: SKINFR Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-025

Level (low/med): LOW Date Received: 04/06/92

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	109.00			P
7440-36-0	Antimony	1.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	117.00			P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.21	U		P
7440-70-2	Calcium	14600.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	10.00			P
7439-89-6	Iron	177.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4020.00			P
7439-96-5	Manganese	90.30			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.00	U		P
7440-09-7	Potassium	22900.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	75.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.47	U		P
7440-66-6	Zinc	19.70			P
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01801

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0103

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-105

Level (low/med): LOW Date Received: 04/06/92

% Solids: 98.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8620.00			F
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	105.00			P
7440-41-7	Beryllium	0.20	U		F
7440-43-9	Cadmium	3.50			P
7440-70-2	Calcium	5870.00			F
7440-47-3	Chromium	21.40			P
7440-48-4	Cobalt	7.50	B		F
7440-50-8	Copper	38.00			P
7439-89-6	Iron	15200.00			F
7439-92-1	Lead				NR
7439-95-4	Magnesium	4930.00			F
7439-96-5	Manganese	659.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	22.70			P
7440-09-7	Potassium	1640.00			F
7782-49-2	Selenium				NR
7440-22-4	Silver	0.60	U		F
7440-23-5	Sodium	244.00	B		F
7440-28-0	Thallium				NR
7440-62-2	Vanadium	30.40			P
7440-66-6	Zinc	272.00			F
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

FORM I - IN

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B017Y7

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

Lab Code: SKINER Case No.: N2-02-1065AS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-015

Level (low/med): LOW Date Received: 04/06/92

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	398.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	5.70	B		P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.26	B		P
7440-70-2	Calcium	3890.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	15.00			P
7439-89-6	Iron	131.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1080.00			P
7439-96-5	Manganese	637.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.50	B		P
7440-09-7	Potassium	3450.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	22.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.71	B		P
7440-66-6	Zinc	71.40			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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

WORKORDER 92-04-103 CLIENT HANFORD-NOR No. SAMPLES:

PROTCL CLP **TURNARND** 33 day 6 (Soil) (Water) (Specify Other)

COOLER TEMP: 3 oC, or NA

CUSTODIAN Antonia Benney SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE NZ-04-106

SHIPER & # Fedex PO/CONTRACT# ↓

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

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

SAMPLE CONTAINERS INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO Samples may contain radioactive material

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

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

SHIPMENT DATES 04/06/92

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

UPDATE

~~DKA~~ A.B. 4.24.92

Samples 7-10 are updated to be run for ICP Mtls. only.

	CLIENT ID	MATRIX	RECEIVED	QC	TEST(S)	HOLD TIME UP
1	BQ1747	soil	04/06/92	D	ICP metals	
2	20	↓	↓	S	↓	
3	51	↓	↓	↓	↓	
4	53	↓	↓	↓	↓	
5	54	↓	↓	↓	↓	
6	56	↓	↓	↓	↓	
7	BQ1778	↓	↓	↓	↓	
8	BQ1779	↓	↓	↓	↓	
9	BQ1800	↓	↓	↓	↓	
10	BQ1801	↓	↓	↓	↓	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

COMP [illegible] 4/10/92 AB

SUBCONTRACT: YES/NO, TO: DATE:

REVIEWED Rev. 1.4 PAGE

Westinghouse Hanford Company

CHAIN OF CUSTODY

S&S

Custody Form Initiator: NA CADORET

Company Contact: NA CADORET

Telephone: 376-8107

Project Designation/Sampling Locations: 300-FF-5 TASK 7

Collection Date: 12/91

Ice Chest No.: NA

Field Logbook No.: BNW 52960 ~~BNW 53573~~ BNW 54497

Bill of Lading/Airbill No.: 248521817 5

Offsite Property No.: PNL 92-~~388~~

Method of Shipment: AIR

Shipped to: THA NORCAL

Possible Sample Hazards/Remarks: NONE DETECTED OR EXPECTED / PERIPHYTON (DRIED) + VEGETATION SAMPLES

Sample Identification

B01778	B01753.
B01779	B01754.
B01800	~~B01755~~
B01801	B01756.
B01747.	~~B01757~~
~~B01748~~	
~~B01749~~	
B01750.	
B01751.	
~~B01752~~	

☐ Field Transfer of Custody

CHAIN OF POSSESSION

(Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
NA CADORET	Kermit Blum	1-16-92 1430
Kermit Blum 4-3-92	[illegible]	04/06/92 9:30

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

80

A-6000-407 (12/90)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector NA CADORET Date Sampled 12/91 Time NA hours

Company Contact NA CADORET Telephone (509) 376-8107

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B01778	1 - GLASS	PERITHITON, DRIED	TAL METALS, ~~URANIUM~~.
B01779			
B01800			
B01801			
B01747	1 - GLASS	VEGETATION, DRIED + GROUND ~10g samples	ICP METALS
B01720			
B01751			
B01753			
B01754			
B01756			
~~B01748~~	~~1 - glass~~	Vegetation, dried ~~+ ground~~	~~URANIUM~~
~~B01749~~			
~~B01752~~			
~~B01755~~			
~~B01757~~			

Field Information** FROM 300-FF-5, TASK 7

Special Handling and/or Storage NA

Possible Sample Hazards NONE DETECTED

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 1-16-92

Analysis Required

81

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

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

A-6000-406 (05/90)

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

JUL 1992
RECEIVED
OSM DMO

July 13, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-01-111-7024

Mr. John Bourgeault
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Dear Mr. Bourgeault:

Enclosed on Attachment 1, are the total uranium results of the periphyton and vegetation samples from Hanford 300-FF-5 Location, we received 16 January 1992. The QA/QC results are shown on Attachments 2, 3, and 4.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

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

Sections 1 through 7
Appendices

MS 5/1/96

ATTACHMENT 1 DATA TABLE

Collection date: December 1991

Customer I.D.	TMA/Norcal Group No. 7024	Analysis	Results $\mu g/g \pm 2\ \sigma$	
B017Z8 (periphyton)	1	Total Uranium	(3.767 ± 0.9794)	E+00
B017Z9 (periphyton)	2	Total Uranium	(2.915 ± 0.7579)	E+00
B01800 (periphyton)	3	Total Uranium	(3.035 ± 0.7891)	E+00
B01801 (vegetation)	4	Total Uranium	(4.066 ± 1.057)	E+00
B017Y8 (vegetation)	5	Total Uranium	(0.572 ± 0.154)	E+00
B017Y9 (vegetation)	6	Total Uranium	(0.0236 ± 0.0779)	E+00
B017S2 (vegetation)	7	Total Uranium	(0.0393 ± 0.0110)	E+00
B017S5 (vegetation)	8	Total Uranium	(0.0281 ± 0.00814)	E+00
B017Z7 (vegetation)	9	Total Uranium	(0.373 ± 0.0971)	E+00

CASE NARRATIVE

1. Periphyton and vegetation samples from 300-FF-5 Location, (TMA/Norcal Group No. 7024 and 7036) were processed together and the results of the analyses are reported. The sample ID's are:

Customer Sample ID	TMA/Norcal Group No.	Customer Sample ID	TMA/Norcal Group No.
B017Z8 (periphyton)	7024-1	B01818 (vegetation)	7036-1
B017Z9 (periphyton)	7024-2	B01820 (vegetation)	7036-2
B01800 (periphyton)	7024-3	B01821 (vegetation)	7036-3
B01801 (periphyton)	7024-4	B01822 (vegetation)	7036-4
B017Y8 (periphyton)	7024-5	B01823 (vegetation)	7036-5
B017Y9 (periphyton)	7024-6	B01824 (vegetation)	7036-6
B017S2 (periphyton)	7024-7	B01825 (vegetation)	7036-7
B017S5 (periphyton)	7024-8	B01826 (vegetation)	7036-8
B017Z7 (periphyton)	7024-9	B01828 (vegetation)	7036-9

2. The analyses reported are:

PERIPHYTON & VEGETATION			
Analyte	Group # & Sample #	Analyte	Group # & Sample #
Total Uranium	7024-1 - 9	Total Uranium	7036-1 - 9

3. Results are reported μgm/gram dry material with 2 σ errors.

4. The QC samples consisting of a spike, a laboratory control, and a replicate were processed with this batch as shown on Table 1.

TABLE 1

Preparation Batch Samples Processed	Data Package
7024-1 through 9	Periphyton and Vegetation
7036-1 through 9	Vegetation

QC SAMPLES PROCESSED:

Sample I.D.	Type	Analyses	Reported with Data Package
7024-10 (QC 7695)	Spike	Total Uranium	X
7024-11 (QC 7696)	LCS	Total Uranium	X
7024-12 (QC 7697)	Replicate	Total Uranium	X
7036-10 (QC 7698)	Replicate	Total Uranium	X

6. Analyses, reanalyses, and reworks, etc.

Total Uranium Analyses: The results of the spike, the laboratory control sample, and the replicate were satisfactory. No abnormalties were encountered.

ATTACHMENT 4 QUALITY CONTROL RESULTS, REPLICATES

Nuclide	Results µg/g	
	No. 7024-12 Replicate	No. 7024-2 Original
QC 7697 Total U	(2.754 ± 1.047) E+00	(2.915 ± 0.758) E+00
	No. 7036-10 Replicate	No. 7036-2 Original
QC 7698 Total U	(0.178 ± 0.0710) E+00	(0.165 ± 0.0429) E+00

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator NA ADORET

Company Contact NA CADORET — Telephone [illegible]

Project Designation/Sampling Locations [illegible] TASK 7 — Collection Date 12/91

Ice Chest No. NA — Field Logbook No. [illegible]

Bill of Lading/Airbill No. 248 521 817 5 — Offsite Property No. PNL 92-[illegible]

Method of Shipment AIR

Shipped to TMA NORCAL

Possible Sample Hazards/Remarks NONE DETECTED OR EXPECTED PERIPHYTON (DRIED) VEGETATION SAMPLES

Sample Identification

B01728	B01753
B01729	B01754
B01800	B01755
B01801	B01756
B01747	B01757
B01748	
B01749	
B01750	
B01751	
B01752	

☐ Field Transfer of Custody — CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
NA CADORET	Kermit Blum	1-16-92 1430
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector NA CADORET Date Sampled 12/91 Time NA hours

Company Contact NA CADORET Telephone (509) 376-8107

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B01778	1 - GLASS	PERIMITON DRIED	TAL METALS, URANIUM
B01779			
B01800			
B01801			
B01747	1 - GLASS	VEGETATION, DRIED + GROUND 210g samples	ICP METALS
B01720			
B01751			
B01753			
B01754			
B01756			
B01748	1 - glass	vegetation, dried + ground	URANIUM
B01749			
B01752			
B01755			
B01777			

Field Information** FROM 300-FF-5, TASK 7

Special Handling and/or Storage NA

Possible Sample Hazards NONE DETECTED

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 1-16-92

Analysis Required

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

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

A-6000-406 (05/90)

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
PNL		PNL 92-388

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Environmental Sciences	Ecol. Resources & Assessment	Applied Ecology

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

Routing LMERY - 2nd Day ☒ Contractor ☐ Vendor

Shipped to	Off-site Custodian
TMA/NORCAL 2030 Wright Avenue Richmond, CA 94804	Robert Fox
	Full Title: Project Coordinator

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 15 ~~X~~	one cardboard box containing dried periphyton and vegetation samples. Samples are in glass jars - double-bagged and packed in vermiculite. Samples are non-hazardous. Samples Numbers: B01728, B01729, B01800, B01801, B017Y7, B017Y8, B017Y9, B017Z0, B01752, B01753, B01754, B01755, B01756, B01727, B01751	NA

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

Necessity for the Off-Site Use of this Property

To support 300-FF-5 Task 7

BILL OF LADING # 248 521 887 5

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

RM Clearance for Public Release	RM Survey No	Date
	120410	1-15-92

Location of Property (Area & Bldg.)	Contact	Phone
300, 331 Bldg/3000 Area	NA Cadoret	376-8107

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
1-14-92	PC2FA, Org Code D7D83	NA

Originated By	Date	Authorized By	Date
Relinquished By: NA Cadoret	1/15/92	HE Westerdahl	1-14-92
Signature and Name of Property Control	Custodian Date	Property Management Approval	Date

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date 1-15-92				

DISTRIBUTION

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

16

54-300[illegible]79 (09/89)

Radioactive Material Shipment Record

Shipped

Container

Dose mea
G/M surv
Ion cham
1 meter f

Labeling
none
rad. r
limite
excep
Low
White
Yellow
Yellow

ID #

Wipe tests:
local

radiation sp

FORM OF PAYMENT

Check ☐ GBL ☐ FCCOD ☐

Bill to Shipper ☒ Bill to Consignee ☐ Third Party Billing ☐

Shipper's Account Number: E 850282294

EMERY WORLDWIDE

A CF Company

SERVICES

UNITED STATES / CANADA: Same Day ☐ AM ☐ Second Day ☒ PM ☐ Saturday Delivery ☐

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

Date: 01-15-92 Origin: PBC Shipment Number: 248521817 5

From:
WESTINGHOUSE SHIPPING DEPT (509) 376-6665
US DEPARTMENT OF ENERGY C/O
BATTELLE NORTHWEST
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA Canada ☐

To:
ROBERT FOX
TMA/NORCAL
2030 WRIGHT AVENUE
RICHMOND CA 94804 Canada ☐ Hold for Pick Up ☐

Tariff Dest. Gateway

Check to Shipper $

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation

Customer's Reference Numbers: D7D83 PC2FA PNL 92-388

Zip: 99352

E Consignee's Account Number

Zip: 94804

Description	Dimensions Pcs	L	W	H	Total Pieces	Total Weight (In Lbs.)
1 F/B CTN CONTAINING DRIED PERIPHYTON AND VEGETATION SAMPLES PNL 92-388	1				1	15

Remarks

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

Declared Value $

248521817 5

Zip Ship ☐ For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used: Urgent Letter 9X12 ☒ Urgent Pack 12X15 ☒

Shipper's Signature: 1/15/92

International Shipments: Free Domicile ☐ Commodity Code

Third Party Account Number mandatory for Third Party Billing E Third Party Account Number

Base Charge

International Customs Value

International Insurance

Total Transportation Charges

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

1-OAK-

Terms and Conditions on Back

FORM NO. 80001-46

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-92-00065
Record of Disposition No.

DATE: 3/11/92

LABORATORY: TMA

PROJECT TITLE/NO.: 300-FF-5 Task 7 91-063

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

B017Y7, B017Y8, B017Y9, B017Z0, B017S1, B017S2, B017S3, B017S4, B017S5, B017S6, AND B017Z7.

DESCRIPTION OF EVENT:

Total activity documentation for the above sample numbers was not with the samples when they arrived at the TMA laboratory.

DISPOSITION OF SAMPLES:

Continue with the analysis on the above samples. These samples are standards that did not have total activities run on them (B017S1, B017S2, B017S3, B017S4, B017S5, B017S6, B017Z7, B017Y7, B017Y8, B017Y9, B017Z0). Per Natalie Cadoret, 3/6/92.

APPROVAL SIGNATURES:

Karl N. Pool / Karl N. Pool — 3/11/92

OSM Project Coordinator (Print/Sign Name) Karl Pool — Date

LC Hulstrom / LC Hulstrom — 3/17/92

Technical Representative (Print/Sign Name) Larry Hulstrom — Date

Janelle R McCallum / JR McCallum — 3/18/92

Quality Assurance (Print/Sign Name) — Date

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-92-00097
Record of Disposition No.

DATE: 4-27-92

LABORATORY: TMA

PROJECT TITLE/NO.: 300-FF-5

NCR NO.: B08333

SAMPLE IDENTIFICATION NUMBERS:

B01818	B01822	B01825
B01820	B01823	B01826
B01821	B01824	B01828

FEB. SAMPLE #'S

B017Z8	B01801
B017Z9	
B01800	

DESCRIPTION OF EVENT:

THE COC/SAR FORMS DID NOT LIST ALL ANALYSIS REQUIRED (ICP WAS THE ONLY ONE LISTED). HOWEVER THE LAB RECEIVED LABELED BOTTLE'S WITH ALL REQUIRED ANALYSIS ON THEM.

DISPOSITION OF SAMPLES:

PER LARRY HULSTROM THE LAB WAS INSTRUCTED TO PERFORM THE FOLLOWING ANALYSIS: ICP/GFAA METALS, MERCURY, AND TOTAL URANIUM BY LASER.THE PROCEEDING ANALYSIS WILL ALSO APPLY TO THE FOUR SAMPLES THAT ARRIVED IN FEBRUARY.

APPROVAL SIGNATURES:

Karl N. Pool / Karl N. Pool — 5/12/92
OSM Project Coordinator (Print/Sign Name) — Date

LC Hulstrom / L.C. Hulstrom — 6/8/92
Technical Representative (Print/Sign Name) — Date

Quality Assurance (Print/Sign Name) — Date

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-92-000143
Record of Disposition No.

DATE: 7-30-92	LABORATORY: TMA
PROJECT TITLE/NO.: 300-FF-5 Biota	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

B017Z8, B017Z9, B01800, B01801

DESCRIPTION OF EVENT:

1) Mercury holding times were missed for the 4 samples listed above.

2) Insufficient sample available to perform the GFAA metals on sample B01801.

DISPOSITION OF SAMPLES:

1) With concurrence from the ERE Project Coordinator (Larry Hulstrom 6/8/92) the Mercury analysis is to be canceled.

2) The request for GFAA metals will be removed for sample B01801.

APPROVAL SIGNATURES:

Karl N Pool / Karl N. Pool — 7/31/92
OSM Project Coordinator (Print/Sign Name) — Date

Larry Hulstrom / LC Hulstrom — 8/4/92
Technical Representative (Print/Sign Name) — Date

Quality Assurance (Print/Sign Name) — Date

DEA 8-18-92

Organics Case 05-056 and Metals Case N2-05-108

Sample B0GCV0 should be B06CV0
Sample B0GCV6 should be B06CV6
Sample B0GCW4 should be B06CW4
Sample B0GCT9 should be B06CT9
Sample B0GCV5 should be B06CV5
Sample B0GCW3 should be B06CW3

Organics Case 06-025

pH was requested on the COC but was not reported

Metals Case 10/14 (Received by lab on 10-14-91)

Sample B015L4 should be B015C4

Metals Case N1-07-266

Sample B00NY1 should be B00YN1

Organics Case 06-005

Sample B06CK7 was reported as B06CK4 on page 33 of the Data Summary Report and also on page 492 of the data package.

Metals Case N2-02-106 and Radiochemistry Case N2-01-111-7024

Sample B01751 should be B017S1
Sample B01752 should be B017S2
Sample B01753 should be B017S3
Sample B01754 should be B017S4
Sample B01755 should be B017S5
Sample B01756 should be B017S6

Radiochemistry Case N2-01-056-7001

Sample B01CG4 is reported on both page 3 and page 4 of Attachment 1 Data Table. It is possible that the one on page 4 should be B01CG6.

Organics Case 04-072 and Metals Case N2-04-130

Sample B062D0 should be B06200

TMA
Thermo Analytical Inc.

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

FACSIMILE COVER SHEET

TO:

NAME: Dan Edwards DATE: 2-24-92

COMPANY: FAX NO:

ADDRESS: TELE. NO:

FROM:

NAME: DOLORES COMPANY: TMA/NORCAL

FAX NO: (510) 235-0438 VERIFICATION NO: (510) 235-2633

NO. OF PAGES: (INCLUDING COVER SHEET)

COMMENTS:

Need Activity Report on the 44 samples from 302-FF-5, TASK 7

B017Y7	B017Y8
B017Z0	B017Y9
B017S1	B017S2
B017S3	B017S5
B017S4	B017Z7
B017S6	

Thanx

Battelle
Pacific Northwest Laboratories
Battelle Boulevard
P.O. Box 999
Richland, Washington 99352
Telephone (509)

DATE: 6 MARCH 92

TOTAL PAGES (EXCLUDING COVER PG): 4

TO: DAN EDWARDS

COMPANY: WHC

PHONE:

CITY/STATE: RICHLAND, WA

FACSIMILE: 373-3992

VERIFICATION:

ECOLOGICAL RESOURCES & ASSESSMENT SECTION

FROM: NA CADORET

PHONE: 376-8107

FACSIMILE: (509) 376-9201

VERIFICATION: (509) 376-7878

COMMENTS: B01751, B01752, B01753, B01754, B01755, B01756, B01777, B01747, B01748, B01749 + B01770 ARE WIST PINE + PEACH STANDARDS. WE DID NOT HAVE TOTAL ACTIVITY RUN ON THEM. ATTACHED ARE THE RESULTS FOR B01778, B01779, B01800, + B01801. I BELIEVE THESE WERE INCLUDED W/ THE SHIPMENT. PLEASE CALL IF YOU HAVE ANY QUESTIONS/COMMENTS.

- NATALIE CADORET
376-8107

IN 204-122

TMA

Thermo Analytical Inc.

CHAIN-OF-CUSTODY NON-CONFORMANCE NOTIFICATION FORM

WESTINGHOUSE HANFORD COMPANY
P.O.#: MBH-SVV-069262

Serial Number: 29 **Date:** 4-24-92

Samples Received: 4-23-92 **Fax #:** 11

Project/Location: 300-FF-5 Task 7

DESCRIPTION:

Biota samples received intact. Sample labels all list metals, gamma spec, and Sr 90. Analysis request sheet lists ICP metals only. Please clarify: which analyses are required?

RESOLUTION:

Spoke w/ Ted Washington on 4-27-92 regarding some disposition (follow-up). Was told to go ahead & analyze for what's in the labels (that is, MTLS, GAMMA & SR-90)

Hard copy to follow.

Response Required Yes [✓] No [ ]

BATCHED: 1/ 6/92 9:35 SAMPLE HAS NO [illegible]
RECEIVED: 1/ 6/92 11:42

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 PICI/G	N	Y	PC2FA

END OF REPORT

DISPATCHED: 1/ 6/92 9:35 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 1/ 6/92 11:42

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

END OF REPORT

SLE.STATUS REPORT FOR E 83. E-BLANK 301729 TIME: 1/ 7/92 8: 9
SPATCHED: 1/ 6/92 9:29 SAMPLE HAS NOT BEEN SLURPED
ECEIVED: 1/ 6/92 11:42

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 PICI/G	N	Y	PC2FA

END OF REPORT

PLE STATUS REPORT FOR E 82. E-BLANK 901726 TIME: 1/ 7/92 9: 9
SPATCHED: 1/ 6/92 9:29 SAMPLE HAS NOT BEEN SLURPED
ECEIVED: 1/ 6/92 11:42

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

END OF REPORT

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse Hanford Co.	REVIEWER: D. Anderson	DATE: 11/5/92
LABORATORY: Thermo Analytical Inc.	CASE: NZ-02-106	SDG: B017S1
SAMPLE/MATRIX: 6 soil samples		
B017S1, B017S3, B017S4, B017S6, B017S7, B017Z0		
~~6 validated~~		
10 ~~verified~~		
~~B017Z5, B017Z9, B018Z0, B018Z1~~ see		

1. DATA PACKAGE COMPLETENESS

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

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

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	☑	☐	☐
Reduction Formulae	☐	☑	☐
Instrument Run Logs	☐	☑	☐
Chemist notebook pages	☐	☑	☐

2. HOLDING TIMES (Form B-1)

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

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

3. INITIAL CALIBRATIONS (Form B-2)

Were all instruments calibrated daily, each set-up time and was the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995? unknown	Yes	No	N/A
Was a midrange cyanide standard distilled?	Yes	No	N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results >IDL as estimated (J) and results <IDL as estimated (UJ), if the correlation coefficient is <0.0995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION (Form B-2)

Are ICV and CCV percent recoveries within control limits?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

1. 5. ICP INTERFERENCE CHECK SAMPLE (Form B-2)

2. Has an ICS sample been analyzed at the proper frequency?	Yes	No	N/A
Are the AB solution %R values within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

6. LABORATORY BLANKS (Form B-3)

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

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

7. FIELD BLANKS (Form B-3)

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS (Form B-4)

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

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

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

9. LABORATORY CONTROL SAMPLE (Form B-4)

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSIS

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

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

11. DUPLICATE SAMPLE ANALYSIS (Form B-5)

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION (Form B-6)

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

15/16. FURNACE ATOMIC ABSORPTION QUALITY CONTROL (Form B-6)

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

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

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

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

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

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS (Form B-6)

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

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

18. OVERALL ASSESSMENT AND SUMMARY (Form B-7)

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

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

COMMENTS (attach additional sheets as necessary):

11.

12. Used 5X rule : Copper = 7.78
Vanadium = 5.32
Sodium = 43.77

HOLDING TIME SUMMARY - FORM B-1

SDG: B01751	REVIEWER: J. Reid	DATE: 11-5-92	PAGE___OF___
COMMENTS: Case N 2-02-106			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01751	ICP Metals	12-91 ~~12-12-92~~	4-27-92	4-29-92	180	151	NONE
B01753		12-91					
B01754							
B01756							
B01760							
B017Y7							

CALIBRATION DATA SUMMARY - FORM B-2

SDG: B01751	REVIEWER: JER	DATE: 11-5-92	PAGE____OF____		
COMMENTS: Case N2-02-106 All initial and continuing calibrations are acceptable					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT: ICP			
CALIB. DATE	COMPOUND	RF	~~RSD/%D/%R~~	SAMPLES AFFECTED	QUALIFIER
4/29/92	All No correlation coefficients provided			All	J

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B01751	REVIEWER: JCR	DATE: 11-5-92	PAGE___OF___
COMMENTS: Case N2-02-106 No Analytes Above CRQL detected in the blanks			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
B01751	Cd	~~1.3~~ 0.2	B		ug/L	1.0 ~~1.3~~	2.0	NONE	NONE
	Ba	6.1				30.5	61		
	Ni	2.6				13	26		
	Na	28.60				143	286		
	V	.55				2.75	5.5		

ACCURACY DATA SUMMARY - FORM B-4

SDG: B01751	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___	
COMMENTS: CAS No. N2-02-106				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B0170S	Antimony	91.7	none	none
	Barium	96.3		
	Beryllium	91.2		
	Cadmium	92.1		
	Chromium	98.5		
	Cobalt	93.0		
	Copper	92.5		
	Manganese	96.2		
	Nickel	94.0		
	Silver	90.4		
	Vanadium	95.5		
	Zinc	91.3		

PRECISION DATA SUMMARY - FORM B-5

SDG: B01T91	REVIEWER D. Anderson	DATE: 11/23/92	PAGE___OF___

COMMENTS: Cas NO. N2 - 02 - 106

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Aluminum	B017Y7	B017Y7D	3.5		
Barium			3.7		
Calcium			1.3		
Copper			26.4	All in SDG B0T1S1	J
Iron			1.2		
Magnesium			1.5		
Manganese			1.8		
Nickel			5.6		
Potassium			1.2		
Sodium			6.2		
Vanadium			0.7		
Zinc			15.1		
Cadmium			24.7		
Chromium			5.2		

CALCULATION SUMMARY - FORM B-6

SDG:	REVIEWER:	DATE:	PAGE___OF___
COMMENTS:			

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017S1	REVIEWER: DA	DATE: 11/23/92	PAGE___OF___
COMMENTS: Cns No. N2-02-106			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Copper	J	All in SDG	Duplicate RPD values
All	J or UJ	All	outside of control limits
			No Correlation Coefficient Provided MSA

TELEPHONE CONTACT SUMMARY - FORM B-8

REVIEWER:	DATE:	TIME:	PAGE___OF __
COMPANY:			
ADDRESS:			
PERSON CONTACTED:			
TELEPHONE:		FAX:	
PROJECT/CASE/SDG:			
REMARKS:			
ACTION:			

APPENDIX A1A
DATA VALIDATION DOCUMENTATION

Additional Biota Metals Analyses

Thermo Analytical Laboratories

Case Number N2-02-106

THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

Attachment 1 - Glossary of Data Qualifiers

This attachment is a glossary explaining all data qualifiers used in this data validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports (Form I)

This attachment is a copy of the sample concentration reports as received from the laboratory.

Attachment 3 - Summary of Data Qualifications (Form B-7)

This attachment is a complete summary of all qualifications used in this data validation.

Attachment 4 - As Qualified Data Summary

This attachment is a tabular summary of all data qualified for this validation.

Attachment 5 - Data Review Supporting Documentation

This attachment is a copy of the data validation checklists, data summary forms, telephone contact memoranda and other documents completed for this validation.

ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates that the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates that the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value may not accurately the sample quantitation limit.

J - Indicates that the compound or analyte was analyzed for and detected. The associated value is estimated but the data are useable for decision making processes.

R - Indicates that the compound or analyte was analyzed for and due to an identified quality control deficiency the data was unusable.

NJ - Indicates presumptive evidence of a compound at an estimated value.

N - Indicates presumptive evidence of a compound.

ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01751~~
B01751

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-035

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	417.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	6.10	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.20	B		P
7440-70-2	Calcium	4010.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.40	U		P
7440-50-8	Copper	6.00			P
7439-89-6	Iron	136.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1090.00			P
7439-96-5	Manganese	655.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.60	B		P
7440-09-7	Potassium	3520.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	28.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.55	B		P
7440-66-6	Zinc	65.90			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01753

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0103

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-04S

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	402.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	5.90	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	4000.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.41	U		P
7440-50-8	Copper	5.70			P
7439-89-6	Iron	129.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1070.00			P
7439-96-5	Manganese	652.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.40	B		P
7440-09-7	Potassium	3450.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	27.70	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.41	U		P
7440-66-6	Zinc	62.40			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01754
B01754

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-055

Level (low/med): LOW Date Received: 04/06/92

% Solids: 89.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	408.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	6.10	B		P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	3960.00			P
7440-47-3	Chromium	1.30	B		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	5.10	B		P
7439-89-6	Iron	126.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1080.00			P
7439-96-5	Manganese	648.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.40	B		P
7440-09-7	Potassium	3480.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	30.10	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.89	B		P
7440-66-6	Zinc	65.20			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01756~~ B01756

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-06S

Level (low/med): LOW Date Received: 04/06/93

% 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	117.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	116.00			P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	14600.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.40	U		P
7440-50-8	Copper	6.30			P
7439-89-6	Iron	185.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4020.00			P
7439-96-5	Manganese	90.80			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.00	U		P
7440-09-7	Potassium	22700.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	29.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.49	B		P
7440-66-6	Zinc	18.60			P
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B017Z0

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-02S

Level (low/med): LOW Date Received: 04/06/92

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	109.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	117.00			P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.21	U		P
7440-70-2	Calcium	14600.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	10.00			P
7439-89-6	Iron	177.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4020.00			P
7439-96-5	Manganese	90.80			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	1.00	U		P
7440-09-7	Potassium	22900.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	26.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.42	U		P
7440-66-6	Zinc	19.70			P
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01738

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-075

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

% Solids: 95.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Alumimum	7220.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	97.80			P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	4.50			P
7440-70-2	Calcium	4770.00			P
7440-47-3	Chromium	17.10			P
7440-48-4	Cobalt	6.30	B		P
7440-50-8	Copper	40.10			P
7439-89-6	Iron	12000.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4230.00			P
7439-96-5	Manganese	570.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	22.80			P
7440-09-7	Potassium	2770.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	306.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	23.80			P
7440-66-6	Zinc	316.00			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B017Z9

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-085

Level (low/med): LOW Date Received: 04/06/92

% Solids: 95.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9290.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	123.00			P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	4.30			P
7440-70-2	Calcium	5320.00			P
7440-47-3	Chromium	23.00			P
7440-48-4	Cobalt	7.90	B		P
7440-50-8	Copper	42.80			P
7439-89-6	Iron	15700.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5300.00			P
7439-96-5	Manganese	735.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	28.80			P
7440-09-7	Potassium	2290.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.59	U		P
7440-23-5	Sodium	323.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	29.10			P
7440-66-6	Zinc	340.00			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01800

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-095

Level (low/med): LOW Date Received: 04/06/92

% Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8650.00			P
7440-36-0	Antimony	2.10	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	111.00			P
7440-41-7	Beryllium	0.27	B		P
7440-43-9	Cadmium	4.80			P
7440-70-2	Calcium	5430.00			P
7440-47-3	Chromium	21.20			P
7440-48-4	Cobalt	7.40	B		P
7440-50-8	Copper	47.10			P
7439-89-6	Iron	14300.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	5010.00			P
7439-96-5	Manganese	696.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	22.80			P
7440-09-7	Potassium	2460.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.58	U		P
7440-23-5	Sodium	318.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	27.60			P
7440-66-6	Zinc	393.00			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01S01

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-10S

Level (low/med): LOW Date Received: 04/06/92

% Solids: 98.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8620.00			P
7440-36-0	Antimony	2.20	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	105.00			P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	3.50			P
7440-70-2	Calcium	5870.00			P
7440-47-3	Chromium	21.40			P
7440-48-4	Cobalt	7.50	B		P
7440-50-8	Copper	38.00			P
7439-89-6	Iron	15200.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	4930.00			P
7439-96-5	Manganese	659.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	22.70			P
7440-09-7	Potassium	1640.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	244.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	30.40			P
7440-66-6	Zinc	272.00			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B017Y7

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-015

Level (low/med): LOW Date Received: 04/06/90

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	398.00			P
7440-36-0	Antimony	2.30	U		P
7440-38-2	Arsenic				NR
7440-39-3	Barium	5.70	B		P
7440-41-7	Beryllium	0.21	U		P
7440-43-9	Cadmium	0.26	B		P
7440-70-2	Calcium	3890.00			P
7440-47-3	Chromium	1.00	U		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	15.00			P
7439-89-6	Iron	131.00			P
7439-92-1	Lead				NR
7439-95-4	Magnesium	1080.00			P
7439-96-5	Manganese	637.00			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.50	B		P
7440-09-7	Potassium	3450.00			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	22.60	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium	0.71	B		P
7440-66-6	Zinc	71.40			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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ATTACHMENT 3

Summary of Data Qualifications

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017S1	REVIEWER: DA	DATE: 11/23/92	PAGE___OF___
COMMENTS: Cns No. N2-02-106			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Copper	J	All in SDG	Duplicate RPD values
All	J or UJ	All	outside of control limits
			No Correlation Coefficient Provided MSA

ATTACHMENT 4

As Qualified Data Summary

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~801751~~ see B01751

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-035

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum	417.00			F	J
7440-36-0	Antimony	2.20	U		P	
7440-38-2	Arsenic				NR	—
7440-39-3	Barium	6.10	B		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	0.20	B		P	
7440-70-2	Calcium	4010.00			P	
7440-47-3	Chromium	1.00	U		P	
7440-48-4	Cobalt	0.40	U		P	
7440-50-8	Copper	6.00			P	~~not~~ U see
7439-89-6	Iron	136.00			P	J
7439-92-1	Lead				NR	—
7439-95-4	Magnesium	1090.00			P	
7439-96-5	Manganese	655.00			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	2.60	B		P	
7440-09-7	Potassium	3520.00			P	
7782-49-2	Selenium				NR	—
7440-22-4	Silver	0.61	U		P	
7440-23-5	Sodium	28.60	B		P	~~not~~ U see
7440-28-0	Thallium				NR	~~J~~
7440-62-2	Vanadium	0.55	B		P	~~not~~ U see
7440-66-6	Zinc	65.90			P	J
	Cyanide				NR	~~J~~

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01752~~ B01753

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0103

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-045

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifier
7429-90-5	Aluminum	402.00			P	J
7440-36-0	Antimony	2.20	U		P	
7440-38-2	Arsenic				NR	
7440-39-3	Barium	5.90	B		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	0.20	U		P	
7440-70-2	Calcium	4000.00			P	
7440-47-3	Chromium	1.00	U		P	
7440-48-4	Cobalt	0.41	U		P	
7440-50-8	Copper	5.70			P	~~UJ~~
7439-89-6	Iron	129.00			P	J
7439-92-1	Lead				NR	
7439-95-4	Magnesium	1070.00			P	
7439-96-5	Manganese	652.00			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	2.40	B		P	
7440-09-7	Potassium	3450.00			P	
7782-49-2	Selenium				NR	
7440-22-4	Silver	0.61	U		P	
7440-23-5	Sodium	27.70	B		P	~~UJ~~
7440-28-0	Thallium				NR	J
7440-62-2	Vanadium	0.41	U		P	
7440-66-6	Zinc	62.40			P	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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03

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

~~B01754~~ B01754

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-05S

Level (low/med): LOW Date Received: 04/06/92

% Solids: 89.5

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum	408.00			P	J
7440-36-0	Antimony	2.30	U		P	
7440-38-2	Arsenic				NR	
7440-39-3	Barium	6.10	B		P	
7440-41-7	Beryllium	0.21	U		P	
7440-43-9	Cadmium	0.50	B		P	
7440-70-2	Calcium	3960.00			P	
7440-47-3	Chromium	1.30	B		P	
7440-48-4	Cobalt	0.42	U		P	
7440-50-8	Copper	5.10	B		P	~~J~~ U
7439-89-6	Iron	126.00			P	J
7439-92-1	Lead				NR	
7439-95-4	Magnesium	1080.00			P	
7439-96-5	Manganese	648.00			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	2.40	B		P	
7440-09-7	Potassium	3480.00			P	
7782-49-2	Selenium				NR	
7440-22-4	Silver	0.63	U		P	
7440-23-5	Sodium	30.10	B		P	~~J~~ U
7440-28-0	Thallium				NR	J
7440-62-2	Vanadium	0.89	B		P	~~J~~ U
7440-66-6	Zinc	65.20			P	J
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: ~~B01756~~ B01756

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-065

Level (low/med): LOW Date Received: 04/06/92

% Solids: 93.9

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifier
7429-90-5	Aluminum	117.00			P	J
7440-36-0	Antimony	2.20	U		P	
7440-38-2	Arsenic				NR	
7440-39-3	Barium	116.00			P	
7440-41-7	Beryllium	0.28	B		P	
7440-43-9	Cadmium	0.20	U		P	
7440-70-2	Calcium	14600.00			P	
7440-47-3	Chromium	1.00	U		P	
7440-48-4	Cobalt	0.40	U		P	
7440-50-8	Copper	6.30			P	~~not~~ U see
7439-89-6	Iron	185.00			P	J
7439-92-1	Lead				NR	
7439-95-4	Magnesium	4020.00			P	
7439-96-5	Manganese	90.80			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	1.00	U		P	
7440-09-7	Potassium	22700.00			P	
7782-49-2	Selenium				NR	
7440-22-4	Silver	0.60	U		P	
7440-23-5	Sodium	29.60	B		P	~~not~~ U see
7440-28-0	Thallium				NR	J
7440-62-2	Vanadium	0.49	B		P	~~not~~ U see
7440-66-6	Zinc	18.60			P	J
	Cyanide				NR	J

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B017Z0

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-025

Level (low/med): LOW Date Received: 04/06/92

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M	qualifier
7429-90-5	Aluminum	109.00			P	J
7440-36-0	Antimony	2.30	U		P	
7440-38-2	Arsenic				NR	
7440-39-3	Barium	117.00			P	
7440-41-7	Beryllium	0.21	U		P	
7440-43-9	Cadmium	0.21	U		P	
7440-70-2	Calcium	14600.00			P	
7440-47-3	Chromium	1.00	U		P	
7440-48-4	Cobalt	0.42	U		P	
7440-50-8	Copper	10.00			P	UJ
7439-89-6	Iron	177.00			P	J
7439-92-1	Lead				NR	
7439-95-4	Magnesium	4020.00			P	
7439-96-5	Manganese	90.80			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	1.00	U		P	
7440-09-7	Potassium	22900.00			P	
7782-49-2	Selenium				NR	
7440-22-4	Silver	0.62	U		P	
7440-23-5	Sodium	26.00	B		P	U
7440-28-0	Thallium				NR	J
7440-62-2	Vanadium	0.42	U		P	
7440-66-6	Zinc	19.70			P	
	Cyanide				NR	

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B017Y7

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

Lab Code: SKINER Case No.: N2-02-106SAS No.: SDG No.: B01751

Matrix (soil/water): SOIL Lab Sample ID: 04103-015

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

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum	398.00			P	J
7440-36-0	Antimony	2.30	U		P	
7440-38-2	Arsenic				NR	
7440-39-3	Barium	5.70	B		P	
7440-41-7	Beryllium	0.21	U		P	
7440-43-9	Cadmium	0.26	B		P	
7440-70-2	Calcium	3890.00			P	
7440-47-3	Chromium	1.00	U		P	
7440-48-4	Cobalt	0.42	U		P	
7440-50-8	Copper	15.00			P	+ UJ
7439-89-6	Iron	131.00			P	J
7439-92-1	Lead				NR	
7439-95-4	Magnesium	1080.00			P	
7439-96-5	Manganese	637.00			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	2.50	B		P	
7440-09-7	Potassium	3450.00			P	
7782-49-2	Selenium				NR	
7440-22-4	Silver	0.62	U		P	
7440-23-5	Sodium	22.60	B		P	+ ~~UJ~~ U der
7440-28-0	Thallium				NR	J
7440-62-2	Vanadium	0.71	B		P	+ ~~UJ~~ J der
7440-66-6	Zinc	71.40			P	J
	Cyanide				NR	J

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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ATTACHMENT 5

Data Review Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse Hanford Co.	REVIEWER: D. Anderson	DATE: 11/5/92
LABORATORY: Thermo Analytical Inc.	CASE: N2-02-106	SDG: B017S1
SAMPLE/MATRIX: 6 soil samples		
B017S1, B017S3, B017S4, B017S6, B017S7, B017Z0		
~~6 validated~~		
10 ~~verified~~		
~~B017Z8, B017Z9, B018Q0, B018Q1~~ see		

1. DATA PACKAGE COMPLETENESS

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

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

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	☑	☐	☐
Reduction Formulae	☐	☑	☐
Instrument Run Logs	☐	☑	☐
Chemist notebook pages	☐	☑	☐

2. HOLDING TIMES (Form B-1)

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

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

3. INITIAL CALIBRATIONS (Form B-2)

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

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

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

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results >IDL as estimated (J) and results <IDL as estimated (UJ), if the correlation coefficient is <0.0995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION (Form B-2)

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

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

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

? 5. ICP INTERFERENCE CHECK SAMPLE (Form B-2)

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

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

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

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

6. LABORATORY BLANKS (Form B-3)

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

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

7. FIELD BLANKS (Form B-3)

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS (Form B-4)

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

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

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

9. LABORATORY CONTROL SAMPLE (Form B-4)

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSIS

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

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

11. DUPLICATE SAMPLE ANALYSIS (Form B-5)

Are RPD values acceptable? Cu Yes No N/A

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

12. ICP SERIAL DILUTION (Form B-6)

Cu

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

15/16. FURNACE ATOMIC ABSORPTION QUALITY CONTROL (Form B-6)

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

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

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

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

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

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS (Form B-6)

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

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

18. OVERALL ASSESSMENT AND SUMMARY (Form B-7)

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

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

COMMENTS (attach additional sheets as necessary):

11.

12. Used 5X rule : Copper = 7.78
Vanadium = 5.32
Sodium = 43.77

27
34

HOLDING TIME SUMMARY - FORM B-1

SDG: B01751	REVIEWER: J. Reid	DATE: 11-5-92	PAGE___OF___
COMMENTS: Case N 2-02-106			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B01751	ICP Metals	12-91 ~~10-12-92~~	4-27-92	4-29-92	180	151	NONE
B01753		12-91					
B01754							
B01756							
B01770							
B01Y7							

CALIBRATION DATA SUMMARY - FORM B-2

SDG: B017S1	REVIEWER: JER	DATE: 11-5-92	PAGE____OF____		
COMMENTS: Case N2-02-106 All initial and continuing calibrations are acceptable					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT: ICP			
CALIB. DATE	COMPOUND	RF	~~RSD/%D/%R~~	SAMPLES AFFECTED	QUALIFIER
4/29/92	All No correlation coefficients provided			All	J

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B01751 | REVIEWER: tcR | DATE: 11-5-92 | PAGE___OF___

COMMENTS: Case N2-02-106 No Analytes Above CRQL detected in the blanks

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
B01751	Cd	~~1.3~~ 0.2	B		ug/L	1.0 ~~1.3~~	2.0	NONE	NONE
	Ba	6.1				30.5	61		
	Ni	2.6				13	26		
	Na	28.60				143	286		
	V	.55				2.75	5.5		

ACCURACY DATA SUMMARY - FORM B-4

SDG: B01751	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___	
COMMENTS: CAS No. NZ-02-106				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B01Z05	Antimony	91.7	none	none
	Barium	96.3		
	Beryllium	91.2		
	Cadmium	92.1		
	Chromium	98.5		
	Cobalt	93.0		
	Copper	92.5		
	Manganese	96.2		
	Nickel	94.0		
	Silver	90.4		
	Vanadium	95.5		
	Zinc	91.3		

PRECISION DATA SUMMARY - FORM B-5

SDG: B01751	REVIEWER D. Anderson	DATE: 11/23/92	PAGE___OF___

COMMENTS: Cas NO. N2 - 02 - 106

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Aluminum	B017Y7	B017Y7D	3.5		
Barium			3.7		
Calcium			1.3		
Copper			26.4	All in SDG B0751	J
Iron			1.2		
Magnesium			1.5		
Manganese			1.8		
Nickel			5.6		
Potassium			1.2		
Sodium			6.2		
Vanadium			0.7		
Zinc			15.1		
Cadmium			24.7		
Chromium			5.2		

CALCULATION SUMMARY - FORM B-6

SDG:	REVIEWER:	DATE:	PAGE___OF___
COMMENTS:			

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017S1	REVIEWER: DA	DATE: 11/23/92	PAGE___OF___
COMMENTS: Cus No. N2-02-106			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Copper	J	All in SDG	Duplicate RPD values
All	J or UJ	All	outside of control limits
			No Correlation Coefficient Provided MSA

TELEPHONE CONTACT SUMMARY - FORM B-8

REVIEWER:	DATE:	TIME:	PAGE___OF ___
COMPANY:			
ADDRESS:			
PERSON CONTACTED:			
TELEPHONE:		FAX:	
PROJECT/CASE/SDG:			
REMARKS:			
ACTION:			

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse Hanford	REVIEWER: D. Anderson	DATE: 11/5/92
LABORATORY: Thermo Analytical Inc.	CASE: N2-06-077	SDG: ~~B01728~~ B01725 11/2/92 ~~B01728~~
SAMPLE/MATRIX: 3 ~~4~~ soil samples		
B01778, B01779, B01800, ~~B01801~~		

1. DATA PACKAGE COMPLETENESS

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

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

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	☑	☐	☐
Reduction Formulae	☐	☑	☐
Instrument Run Logs	☐	☑	☐
Chemist notebook pages	☑	☑	☐

2. HOLDING TIMES (Form B-1)

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

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

3. INITIAL CALIBRATIONS (Form B-2)

Were all instruments calibrated daily, each set-up time and was the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995? ~~UNKNOWN~~ JCR	Yes	No	N/A
Was a midrange cyanide standard distilled?	Yes	No	N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results >IDL as estimated (J) and results <IDL as estimated (UJ), if the correlation coefficient is <0.0995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION (Form B-2)

Are ICV and CCV percent recoveries within control limits?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

5. ICP INTERFERENCE CHECK SAMPLE (Form B-2)

Has an ICS sample been analyzed at the proper frequency?	Yes	No	N/A
Are the AB solution %R values within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

6. LABORATORY BLANKS (Form B-3)

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

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

7. FIELD BLANKS (Form B-3)

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS (Form B-4)

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

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

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

9. LABORATORY CONTROL SAMPLE (Form B-4)

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSIS

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

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

11. DUPLICATE SAMPLE ANALYSIS (Form B-5)

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION (Form B-6)

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

15/16. FURNACE ATOMIC ABSORPTION QUALITY CONTROL (Form B-6)

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

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

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

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

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

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS (Form B-6)

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

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

18. OVERALL ASSESSMENT AND SUMMARY (Form B-7)

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

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

COMMENTS (attach additional sheets as necessary):

Spike Sample Recovery - Selenium %R only 28%, R flag

Duplicate Sample Analysis - lead RPD outside control limits. J flag results.

HOLDING TIME SUMMARY - FORM B-1

SDG: B017Z8	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___
COMMENTS: Cas No. N2-06-077			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B017Z8	AA metals	1/16/92	6/30/92	7/20/92		163	None
B017Z9	↓	↓	↓	↓		↓	↓
B01800	↓	↓	↓	↓		↓	↓
~~B01801~~	~~↓~~	~~↓~~	~~↓~~	~~↓~~		~~↓~~	~~None~~

CALIBRATION DATA SUMMARY - FORM B-2

SDG: B017Z8	REVIEWER: D. Anderson	DATE: 11/23/92		PAGE____OF____	
COMMENTS: Case no. N2-06-077 Initial & Continuing Calibrations are acceptable					
CALIB. TYPE:	INITIAL CONTINUING	INSTRUMENT:			
CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
7/20/92					

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B01728	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___
COMMENTS: Case no. N2-06-077 All blank results were non detect.			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER

ACCURACY DATA SUMMARY - FORM B-4

SDG: B017Z8	REVIEWER: D. Anders	DATE: 11/23/92	PAGE____OF____	
COMMENTS: Case no. N2-06-077				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B017Z9S	Arsenic	79.5		
	Lead	75.6		
	Selenium	28.0	All in SDG	R
	Thallium	90.0		

PRECISION DATA SUMMARY - FORM B-5

SDG: B017Z8P	REVIEWER D. Anderson	DATE: 11/23/92	PAGE___OF___
COMMENTS: Cus. no. N2-06-077			

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Arsenic	B017Z8P	B017Z8	20.1		
Lead	↓	↓	62.4	All in SDG	J
Selenium			137.5	All in SDG	J, results actually rejected
Thallium	↓	↓	21.1		

CALCULATION SUMMARY - FORM B-6

SDG:	REVIEWER:	DATE:	PAGE___OF___
COMMENTS:			

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017Z8	REVIEWER: DAnderson	DATE: 11/23/9-	PAGE___OF___
COMMENTS: CAS No. N2-06-077			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	All in SDG	Duplicate RPD was outside of control limit
Selenium	R	All in SDG	Spike recovery %R only 28%

TELEPHONE CONTACT SUMMARY - FORM B-8

REVIEWER:	DATE:	TIME:	PAGE___OF ___
COMPANY:			
ADDRESS:			
PERSON CONTACTED:			
TELEPHONE:		FAX:	
PROJECT/CASE/SDG:			
REMARKS:			
ACTION:			

APPENDIX A1C
DATA VALIDATION DOCUMENTATION

Additional Biota Metals Analyses

Thermo Analytical Laboratories

Case Number N2-06-077

ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates that the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates that the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value may not accurately the sample quantitation limit.

J - Indicates that the compound or analyte was analyzed for and detected. The associated value is estimated but the data are useable for decision making processes.

R - Indicates that the compound or analyte was analyzed for and due to an identified quality control deficiency the data was unusable.

NJ - Indicates presumptive evidence of a compound at an estimated value.

N - Indicates presumptive evidence of a compound.

ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01779

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-06-077SAS No.: SDG No.: B01779

Matrix (soil/water): SOIL Lab Sample ID: 06136-015

Level (low/med): LOW Date Received: 06/15/92

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	6.20			E
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	24.00		*	E
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	0.55	U	WN	E
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	0.92	B		E
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B01729

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-06-077SAS No.: SDG No.: B01729

Matrix (soil/water): SOIL Lab Sample ID: 06136-029

Level (low/med): LOW Date Received: 06/15/99

% Solids: 94.4

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	5.10			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	20.50			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	2.90	U	UN	F
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	1.40	B		F
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

FORM I - IN Rev. 6/89

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

801300

Lab Name: SKINNER & SHERMAN LABS. Contract: 69-D0-0109

Lab Code: SKINER Case No.: N2-06-0773AS No.: SDG No.: 801229

Matrix (soil/water): SOIL Lab Sample ID: 06136-03S

Level (low/med): LOW Date Received: 06/15/92

% Solids: 93.2

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	6.90		S	E
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	43.30		S*	E
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	0.57	U	UN	E
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium	1.20	B		E
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

FORM I - IN

ATTACHMENT 3

Summary of Data Qualifications

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017Z8	REVIEWER: DAnderson	DATE: 11/23/92	PAGE___OF___
COMMENTS: CAS No. N2-06-077			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	All in SDG	Duplicate RPD was outside of Control Limit
Selenium	R	All in SDG	Spike recovery %R only 28%

ATTACHMENT 4

As Qualified Data Summary

WESTINGHOUSE/HANFORD

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B01779

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0109

Lab Code: SKINER Case No.: N0-06-0775SAS No.: SDG No.: B01779

Matrix (soil/water): SOIL Lab Sample ID: 06136-015

Level (low/med): LOW Date Received: 06/15/90

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum				NR	J
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	6.20			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	24.20		*	F	J
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	0.55	U	WN	F	R
7440-22-4	Silver				NR	J
7440-23-5	Sodium				NR	
7440-28-0	Thallium	0.92	B		F	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc				NR	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

WESTINGHOUSE/HANFORD

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: R01720

Lab Name: SKINNER & SHERMAN LABS Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-06-0779SAS No.: SDG No.: R01729

Matrix (soil/water): SOIL Lab Sample ID: 06136-029

Level (low/med): LOW Date Received: 06/15/90

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum				NR	J
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	5.10			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	30.50		*	F	J
7439-95-4	Magnesium				NR	J
7439-96-5	Manganese				NR	
7439-97-6	Mercury				NR	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.90	U	UN	F	R
7440-22-4	Silver				NR	J
7440-23-5	Sodium				NR	
7440-28-0	Thallium	1.40	B		F	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc				NR	
	Cyanide				NR	

Color Before: GREEN Clarity Before: Texture: FINE

Color After: GREEN Clarity After: Artifacts:

Comments:

FORM I - IN Rev. 6/89

WESTINGHOUSE/HANFORD

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

801900

Lab Name: SKINNER & SHERMAN LABS Contract: 68-D0-0109

Lab Code: SKINER Case No.: N2-06-0779 SAS No.: SDG No.: 90-779

Matrix (soil/water): SOIL Lab Sample ID: 06136-039

Level (low/med): LOW Date Received: 06/15/90

% Solids: 93.2

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

CAS No	Analyte	Concentration	C	Q	M	Qualifiers
7429-90-5	Aluminum				NR	J
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	6.90		S	E	
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	43.30		E*	E	J
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	0.52	U	UN	E	R
7440-22-4	Silver				NR	J
7440-23-5	Sodium				NR	
7440-28-0	Thallium	1.20	B		E	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc				NR	
	Cyanide				NR	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

FORM I - IN

ATTACHMENT 5

Data Review Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: Westinghouse Hanford	REVIEWER: D. Anderson	DATE: 11/5/92
LABORATORY: Thermo Analytical Inc.	CASE: N2-06-077	SDG: ~~B01728~~ B01728 B01728 11/2/92
SAMPLE/MATRIX: 3 ~~4~~ soil samples		
B01728, B01729, B01800, ~~B01801~~		

1. DATA PACKAGE COMPLETENESS

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

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

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	☑	☐	☐
Reduction Formulae	☐	☑	☐
Instrument Run Logs	☐	☑	☐
Chemist notebook pages	DA ~~☑~~	☑	☐

2. HOLDING TIMES (Form B-1)

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

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

3. INITIAL CALIBRATIONS (Form B-2)

Were all instruments calibrated daily, each set-up time and was the proper number of standards used?	Yes	No	N/A
Are the correlation coefficients ≥0.995? ~~UNKNOWN~~ ICP	Yes	No	N/A
Was a midrange cyanide standard distilled?	Yes	No	N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results >IDL as estimated (J) and results <IDL as estimated (UJ), if the correlation coefficient is <0.0995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION (Form B-2)

Are ICV and CCV percent recoveries within control limits?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

5. ICP INTERFERENCE CHECK SAMPLE (Form B-2)

Has an ICS sample been analyzed at the proper frequency?	Yes	No	N/A
Are the AB solution %R values within control?	Yes	No	N/A
Are there calculation errors?	Yes	No	N/A

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

6. LABORATORY BLANKS (Form B-3)

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

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

7. FIELD BLANKS (Form B-3)

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

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

8. MATRIX SPIKE SAMPLE ANALYSIS (Form B-4)

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

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

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

9. LABORATORY CONTROL SAMPLE (Form B-4)

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

Are there calculation errors? Yes No N/A

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

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

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

10. PERFORMANCE AUDIT ANALYSIS

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

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

11. DUPLICATE SAMPLE ANALYSIS (Form B-5)

Are RPD values acceptable? Yes No N/A

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

12. ICP SERIAL DILUTION (Form B-6)

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

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

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

13. FIELD DUPLICATE SAMPLES

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

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

14. FIELD SPLIT SAMPLES

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

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

15/16. FURNACE ATOMIC ABSORPTION QUALITY CONTROL (Form B-6)

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

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

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

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

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

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

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS (Form B-6)

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

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

18. OVERALL ASSESSMENT AND SUMMARY (Form B-7)

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

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

COMMENTS (attach additional sheets as necessary):

Spike Sample Recovery - Selenium %R only 28%, R flag

Duplicate Sample Analysis - lead RPD outside control limits. J flag results.

HOLDING TIME SUMMARY - FORM B-1

SDG: B017Z8	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___
COMMENTS: Case No. N2-08-077			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B017Z8	HA metals	1/16/92	6/30/92	7/20/92		163	None
B017Z9	↓	↓	↓	↓		↓	↓
B01800	↓	↓	↓	↓		↓	↓
~~B01801~~	~~↓~~	~~↓~~	~~↓~~	~~↓~~		~~↓~~	~~None~~

CALIBRATION DATA SUMMARY - FORM B-2

SDG: B017Z8	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE____OF____
COMMENTS: Cas no. N2-06-077 Initial & Continuing Calibrations are acceptable			
CALIB. TYPE: INITIAL CONTINUING		INSTRUMENT:	

CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
7/20/92					

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B01728	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___

COMMENTS: Case no. N2-06-077 All blank results were non detect.

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER

ACCURACY DATA SUMMARY - FORM B-4

SDG: B017Z8	REVIEWER: D. Anderson	DATE: 11/23/92	PAGE___OF___	
COMMENTS: Case no. N2-06-077				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B017Z9S	Arsenic	79.5		
	Lead	75.6		
	Selenium	28.0	All in SDG	R
	Thallium	90.0		

PRECISION DATA SUMMARY - FORM B-5

SDG: B017Z8P	REVIEWER D. Anderson	DATE: 11/23/92	PAGE___OF___

COMMENTS: Case. no. N2-06-077

COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Arsenic	B017Z8P	B017Z8	20.1		
Lead	↓	↓	62.4	All in SDG	J
Selenium			137.5	All in SDG	J, results already Rejected
Thallium			21.1		

CALCULATION SUMMARY - FORM B-6

SDG:	REVIEWER:	DATE:	PAGE___OF___
COMMENTS:			

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B017Z8	REVIEWER: DAnderson	DATE: 11/23/9~	PAGE___OF___
COMMENTS: CAS No. N2-06-077			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	All in SDG	Duplicate RPD was outside of Control Limits
Selenium	R	All in SDG	Spike recovery % only 28%

TELEPHONE CONTACT SUMMARY - FORM B-8

REVIEWER:	DATE:	TIME:	PAGE___OF __
COMPANY:			
ADDRESS:			
PERSON CONTACTED:			
TELEPHONE:		FAX:	
PROJECT/CASE/SDG:			
REMARKS:			
ACTION:			

[illegible]-93-06/2978-50

WESTINGHOUSE HANFORD COMPANY
300-FF-5 RI DATA VALIDATION
DISTRIBUTION FORM

Document Title: Yrelim QA Records Title Case #N2-01-111-7024

Document Number: HCRL-WHC/ADD-L-92-057 Date: 12/17/92

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Project Files (1=Adm; 2=Corres; 3=Source Information; 4=Technical Data & Products)

1.1 File Index		2.1 Incoming Correspondence		4.4.5 Biota/Small Mammals	
1.2 Distribution Lists		2.2 Outgoing Correspondence	X	4.4.6 Surface Water/Sediments	
1.3 Project Procedures		2.3 Internal Correspondence		4.5 Data Val. & Qual. Summary Rpts.	
1.4 Project Modifications				4.5.1 Round 1 Groundwater	
1.5.1 Staff Resumes		3.1 Task Order		4.5.1.1 Internal Drafts/Comments/Resol.	
1.5.2 Staff Training		3.2 Sample Lists		4.5.1.2 WHC Review Draft/Comments/Resol.	
1.5.3 Auth./Former Site Employee		3.3 Data Validation Procedures		4.5.1.3 Final Report	
1.6.1 QA Manual		3.4 Original Chemical Data		4.5.2 Round 2 Groundwater	
1.6.2 QA Implementation		3.5 Original Radiochem Data		4.5.2.1 Internal Drafts/Comments/Resol.	
1.6.3.1 QA Audits-Deliverables				4.5.2.2 WHC Review Draft/Comments/Resol.	
1.6.3.2 QA Audits-Files		4.1 Task Plan		4.5.2.3 Final Report	
1.6.4.1 Audit Resps-Deliverables		4.2 Data Pkg. Completeness Verif.		4.5.3 Round 3 Groundwater	
1.6.4.2 Audit Resps-Files		4.2.1 Checklists - Round 1 GW		4.5.3.1 Internal Drafts/Comments/Resol.	
1.6.5 Training		4.2.2 Checklists - Round 2 GW		4.5.3.2 WHC Review Draft/Comments/Resol.	
1.6.6.1 QA Manual Doc Log		4.2.3 Checklists - Round 3 GW		4.5.3.3 Final Report	
1.6.6.2 Procedures Doc Log		4.2.4 Checklists - Round 4 GW		4.5.4 Round 4 Groundwater	
1.6.6.3 Plans Document Log		4.2.5 Checklists - Biota/Small Mam.		4.5.4.1 Internal Drafts/Comments/Resol.	
1.6.6.4 Deliverables Doc Log		4.2.6 Checklists - Surface Wtr./Sed.		4.5.4.2 WHC Review Draft/Comments/Resol.	
1.7.1 Downloads		4.3 Data Val. Calcs. Annotated DP		4.5.4.3 Final Report	
1.7.2 M-113s		4.3.1 Round 1 Groundwater		4.5.5 Biota/Small Mammals	
1.7.3 A-208s		4.3.2 Round 2 Groundwater		4.5.5.1 Internal Drafts/Comments/Resol.	
1.7.4 Budget Status		4.3.3 Round 3 Groundwater		4.5.5.2 WHC Review Draft/Comments/Resol.	
1.7.5 Invoices		4.3.4 Round 4 Groundwater		4.5.5.3 Final Report	
1.8.1 Requisitions		4.3.5 Biota/Small Mammals		4.5.6 Surface Water/Sediments	
1.9 Meeting Minutes		4.3.6 Surface Water/Sediments		4.5.6.1 Internal Drafts/Comments/Resol.	
1.10 Record of Telecons		4.4 Preliminary QA Records		4.5.6.2 WHC Review Draft/Comments/Resol.	
1.11 Progress Reports		4.4.1 Round 1 Groundwater		4.5.6.3 Final Report	
1.12 Subcontractor (HC)		4.4.2 Round 2 Groundwater	X	4.6 Weekly Status Reports	
		4.4.3 Round 3 Groundwater		4.7 Weekly Management Reports	
		4.4.4 Round 4 Groundwater			

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc
1201 Jadwin Avenue, Suite 204
Richland, WA 99352
FAX 509 946 4203
509 946 4344

2978-50

December 17, 1992

Mr. Larry Hulstrom
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

Subject: WHC Order No. MLW-SVV-037106
Task Order No. E-93-06
Preliminary Quality Assurance Record - 300-FF-5 RI/FS
TMA Case Number N2-01-111-7024

Dear Mr. Hulstrom:

Ebasco and Hart Crowser are pleased to provide you with the attached results of our review and validation of the subject data from the 300-FF-5 Operable Unit Remedial Investigation/Feasibility Study (RI/FS). The attached results are provided to you in partial fulfillment of Subtask 03 of our task plan dated November 6, 1992. The subject data package consisted of nine biota (periphyton and vegetation) samples submitted for total uranium analysis. The samples were analyzed by Thermo Analytical, Inc. according to requirements specified in the Analytical Laboratory Statement of Work issued by WHC. All sample results were selected for validation. These results, together with the data qualifiers assigned as a result of our review, are provided in Attachment 4.

DATA QUALITY OBJECTIVES SUMMARY

Data quality objectives for this data package were generally met. The only significant deficiency was in holding times. All holding times exceeded the maximum allowable time (6 months).

MAJOR DEFICIENCIES (REJECTED DATA)

All data in this package was accepted.

MINOR DEFICIENCIES (OTHER QUALIFIED DATA)

The only deficiency that resulted in qualifying the data was as a result of excessive holding times. All holding times were greater than six months, resulting in qualifying all data as estimated (J). Precision, accuracy, and blanks were all acceptable. All qualified data are discussed in Attachments 3 and 5.

We trust that these preliminary results meet your needs. Our qualifier assignments will be finalized at the time the summary report for this sampling round is published. The final qualifiers may vary from those presented here, reflecting any trends in data quality or laboratory performance observed over the course of the 300-FF-5 RI/FS. Please contact me if you have any questions with regard to our activities.

Sincerely,

HART CROWSER, INC.

D. MARK GERBOTH, P.E.
Project Manager
HC#130:RL1546.DOC

Attachments

cc: Mark Gerboth (w/o attachments)
Jeff Grover (w/o attachments)
Westinghouse EDMC
Project File - HCRL-WHC/9306-L-92-057

THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

Attachment 1 - Glossary of Data Qualifiers

This attachment provides a glossary explaining all data qualifiers applied as a result of the validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports

This attachment provides a copy of the as-received sample concentration reports. This may be a tabular summary similar to that provided in Attachment 4, or may be a copy of the laboratory reports.

Attachment 3 - Summary of Data Qualifications

This attachment provides a complete summary of all qualifications applied as a result of the validation.

Attachment 4 - As Qualified Data Summary

This attachment provides a tabular data summary of all data qualified from the validation.

Attachment 5 - Data Review Supporting Documentation

This attachment provides copies of the data validation checklists, data summary forms, telephone contact memoranda and other documentation completed as a result of the data validation.

ATTACHMENT 1

Glossary of Data Qualifiers

ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value reported may not accurately reflect the sample quantitation limit.

J - Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are useable for decision making processes.

R - Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

ATTACHMENT 1 DATA TABLE

Collection date: December 1991

Customer I.D.	TMA/Norcal Group No. 7024	Analysis	Results $\mu g/g \pm 2\sigma$	
B017Z8 (periphyton)	1	Total Uranium	(3.767 ± 0.9794)	E+00
B017Z9 (periphyton)	2	Total Uranium	(2.915 ± 0.7579)	E+00
B01800 (periphyton)	3	Total Uranium	(3.035 ± 0.7891)	E+00
B01801 (vegetation)	4	Total Uranium	(4.066 ± 1.057)	E+00
B017Y8 (vegetation)	5	Total Uranium	(0.572 ± 0.154)	E+00
B017Y9 (vegetation)	6	Total Uranium	(0.0236 ± 0.0779)	E+00
B017S2 (vegetation)	7	Total Uranium	(0.0393 ± 0.0110)	E+00
B017S5 (vegetation)	8	Total Uranium	(0.0281 ± 0.00814)	E+00
B017Z7 (vegetation)	9	Total Uranium	(0.373 ± 0.0971)	E+00

ATTACHMENT 3

Summary of Data Qualifications

Total U (CRDL=1ug/g)

Customer I.D. #	Reported Results	Q
BO17Z8	3.767	J
BO17Z9	2.915	J
BO18O0	3.035	J
BO1801	4.066	J
BO17Y8	0.572	J
BO17Y9	0.024	J
BO17S2	0.039	J
BO17S5	0.028	J
BO17Z7	0.373	J

ATTACHMENT 4

As Qualified Data Summary

ATTACHMENT 1 DATA TABLE

Collection date: December 1991

Customer I.D.	TMA/Norcal Group No. 7024	Analysis	Results µg/g ± 2 σ	
B017Z8 (periphyton)	1	Total Uranium	(3.767 ± 0.9794)	E+00
B017Z9 (periphyton)	2	Total Uranium	(2.915 ± 0.7579)	E+00
B01800 (periphyton)	3	Total Uranium	(3.035 ± 0.7891)	E+00
B01801 (vegetation)	4	Total Uranium	(4.066 ± 1.057)	E+00
B017Y8 (vegetation)	5	Total Uranium	(0.572 ± 0.154)	E+00
B017Y9 (vegetation)	6	Total Uranium	(0.0236 ± 0.0779)	E+00
B017S2 (vegetation)	7	Total Uranium	(0.0393 ± 0.0110)	E+00
B017S5 (vegetation)	8	Total Uranium	(0.0281 ± 0.00814)	E+00
B017Z7 (vegetation)	9	Total Uranium	(0.373 ± 0.0971)	E+00

RDL ~~MDA~~ 1 ug/kg

① All samples > MDA.

② Precision - OK

③ Holding Times - all > months - J

④ Accuracy - OK

⑤ Blank - OK

ATTACHMENT 5

Data Review Supporting Documentation

N2-01-111-7024

Total Uranium by kPA

Supplemental Requirements for Analyses Using kPA for Total Uranium

Analysis Results

✓ Results Reported for Sample Analyses
✓ Raw Data (including Prep Volume, Aliquot Volume, kPA output)
✓ Calculation Sheets
✓ Sample Identifications
✓ Detector Identification
✓ Analysis Date and Initials of Analyst

Initial and Continuing Calibration

✓ Detector Identification
✓ Calibration Date(s) and Initials of Analyst
✓ Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
✓ Amount of Standard Used
✓ Raw count/Activity data
✓ Determination of Calibration Equation

Blanks/Backgrounds

✓ Detector Identification
✓ Date of Analysis
✓ MDA of Method
✓ Amount of Reagent Used (Prep Volume)
✓ Count Durations

Duplicates

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

Matrix Spikes

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Amounts of Samples
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Results of Analysis and Calculated Precision
- ✓ Identification of Matrix Spike Radionuclide, Certification, Expiration Date, and Activity
- ✓ Amount of Matrix Spike Used
- ✓ Raw Data
- ✓ Results of Analysis and Comparison to Amount Added

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

JUL 1992
RECEIVED
OSM DMO

July 13, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-01-111-7024

Mr. John Bourgeault
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Dear Mr. Bourgeault:

Enclosed on Attachment 1, are the total uranium results of the periphyton and vegetation samples from Hanford 300-FF-5 Location, we received 16 January 1992. The QA/QC results are shown on Attachments 2, 3, and 4.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

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

Sections 1 through 7
Appendices

INDEX OF DOCUMENTS

SECTION 1	Data Report
SECTION 2	Case Narrative
SECTION 3	QC Summary
SECTION 4	Chains-of-Custody Copies
SECTION 5	Analytical Methods Used
SECTION 6	Aliquot Information
SECTION 7	Raw Data for Total Uranium

SEE NEXT PAGE FOR APPENDICES TO BE INCLUDED IN THE DATA PACKAGE

INDEX OF APPENDICES TO BE INCLUDED IN DATA PACKAGE

7024

____	Appendix 1 :	Tritium Standard Solution Certificate and Preparation Information.
____	Appendix 2 :	Isotopic Uranium Standard Solution Certificates and Preparation Information.
X	Appendix 3 :	Total Uranium Standard Solution Certificate and Preparation Information.
X	Appendix 4 :	Preparation Log For QC Samples.
____	Appendix 5 :	Am Standard Solution Certificate and Preparation Information.
____	Appendix 6 :	^{99}Tc Standard Solution Certificate and Preparation Information.
____	Appendix 7 :	^{90}Sr Stock Solution Certificate, Preparation and Dilutions Information.
____	Appendix 8 :	Yttrium Carrier Certificate, Preparation and Dilutions Information.
____	Appendix 10 :	Gamma Scan Spike
____	Appendix 12 :	Continuing Calibration Data for Tritium for LSC Counters 4 and 5.
____	Appendix 15 :	Raw Data for Continuing Calibration for Beta Counters.
____	Appendix 16 :	Primary Calibration References.

SECTION 1 Data Report

9 samples

SECTION 2 CASE NARRATIVE

CASE NARRATIVE

1. Periphyton and vegetation samples from 300-FF-5 Location, (TMA/Norcal Group No. 7024 and 7036) were processed together and the results of the analyses are reported. The sample ID's are:

Customer Sample ID	TMA/Norcal Group No.	Customer Sample ID	TMA/Norcal Group No.
B017Z8 (periphyton)	7024-1	B01818 (vegetation)	7036-1
B017Z9 (periphyton)	7024-2	B01820 (vegetation)	7036-2
B01800 (periphyton)	7024-3	B01821 (vegetation)	7036-3
B01801 (periphyton)	7024-4	B01822 (vegetation)	7036-4
B017Y8 (periphyton)	7024-5	B01823 (vegetation)	7036-5
B017Y9 (periphyton)	7024-6	B01824 (vegetation)	7036-6
B017S2 (periphyton)	7024-7	B01825 (vegetation)	7036-7
B017S5 (periphyton)	7024-8	B01826 (vegetation)	7036-8
B017Z7 (periphyton)	7024-9	B01828 (vegetation)	7036-9

2. The analyses reported are:

PERIPHYTON & VEGETATION

Analyte	Group # & Sample #	Analyte	Group # & Sample #
Total Uranium	7024-1 - 9	Total Uranium	7036-1 - 9

3. Results are reported μgm/gram dry material with 2 σ errors.

4. The QC samples consisting of a spike, a laboratory control, and a replicate were processed with this batch as shown on Table 1.

TABLE 1

Preparation Batch Samples Processed	Data Package
7024-1 through 9	Periphyton and Vegetation
7036-1 through 9	Vegetation

QC SAMPLES PROCESSED:

Sample I.D.	Type	Analyses	Reported with Data Package
7024-10 (QC 7695)	Spike	Total Uranium	X
7024-11 (QC 7696)	LCS	Total Uranium	X
7024-12 (QC 7697)	Replicate	Total Uranium	X
7036-10 (QC 7698)	Replicate	Total Uranium	X

6. Analyses, reanalyses, and reworks, etc.

Total Uranium Analyses: The results of the spike, the laboratory control sample, and the replicate were satisfactory. No abnormalties were encountered.

QUALITY CONTROL SUMMARY

Attachment 2, 3, and 4 gives the results of the QC samples. The recovery ratios were determined by the QC Officer based upon the final data obtained for each. The laboratory control samples were calculated with an aliquot of 1.00 and, therefore, the presented data cannot be compared directly with the sample data. To compare them directly, the laboratory control sample data would need to be divided by sample aliquots.

The results of the spike, the laboratory control sample, and the replicate for total uranium were satisfactory.

D.P. Kharkar

Dinkar P. Kharkar, Ph.D.
TMA/Norcal Program Manager

ATTACHMENT 2 QUALITY CONTROL SAMPLE RESULTS, SPIKES AND BLANKS

TMA/Norcal Group No.	Nuclide	µg/Sample ± Error 2 σ Found	Added	Recovery Ratio Found/Added ± 2 σ
Spikes for Periphyton:				
7024-10				
QC-7695	Total U	(0.4484 ± 0.1704) E+00	(0.4067 ± 0.01626) E+00	1.10 ± 0.42

ATTACHMENT 3 QUALITY CONTROL SAMPLE RESULTS, LABORATORY CONTROL SAMPLES

TMA/Norcal Group No.	Nuclide	µg/Sample ± Error 2 σ Found	Added	Recovery Ratio Found/Added ± 2 σ
Laboratory Control Samples for Periphyton and Vegetation:				
7024-11 QC-7696	Total U	(0.00882 ± 0.00229) E+00	0	Satisfactory

ATTACHMENT 4 QUALITY CONTROL RESULTS, REPLICATES

TMA

Nuclide	Results µg/g	
	No. 7024-12 Replicate	No. 7024-2 Original
QC 7697 Total U	(2.754 ± 1.047) E+00	(2.915 ± 0.758) E+00
	No. 7036-10 Replicate	No. 7036-2 Original
QC 7698 Total U	(0.178 ± 0.0710) E+00	(0.165 ± 0.0429) E+00

SECTION 4 Chains-of-Custody Copies

Westinghouse Hanford Company	CHAIN OF CUSTODY

ody Form Initiator N A CADORET

npany Contact N A CADORET — Telephone [illegible]

ect Designation/Sampling Locations 300-FF-5 TASK 7 — Collection Date 12/91

Chest No. NA — Field Logbook No. [illegible]

of Lading/Airbill No. 248521817 5 — Offsite Property No. PNL 92-[illegible]

hod of Shipment AIR

pped to TMA NORCAL

ible Sample Hazards/Remarks NONE DETECTED UNEXPECTED / PERIPHERAL (DRIED) T VEGETATION SAMPLES

Sample Identification

B01778	B01783
B01779	B01784
B01800	B01785
B01801	B01786
B01777	B01787
B01749	
B01749	
B01780	
B01781	
B01782	

eld Transfer of Custody	CHAIN OF POSSESSION	(Sign and Print Names)
quished by: N A CADORET	Received by: Kermit Blum	Date/Time: 1-16-92 1430
quished by:	Received by:	Date/Time:
quished by:	Received by:	Date/Time:
quished by:	Received by:	Date/Time:

Final Sample Disposition

osal Method:	Disposed by:	Date/Time:

ments:

A-6000-407 (12/90)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

ollector NA CADORET Date Sampled 12/91 Time NA hours

ompany Contact NA CADORET Telephone (509) 376-8107

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
01778	1 - GLASS	PERIWINKLE, DRIED	TAL METALS, URANIUM
301779			
301800			
301801			
01747	1 - GLASS	VEGETATION, DRIED + GROUND ~100 g samples	ICP METALS
01720			
01751			
01753			
301754			
301756			
01748	1 - glass	vegetation, dried + ground	URANIUM
01749			
01752			
01755			
01757			

eld Information** FROM 300-FF-5, TASK 7

ecial Handling and/or Storage NA

ossible Sample Hazards NONE DETECTED

PART II: LABORATORY SECTION

eceived by Kermit Blum Title Sample Control Supervisor Date 1-14-92

nalysis Required

*Indicate whether sample is soil, sludge, water, etc.
**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

TMA/Norcal N2-01-111-7024

Biota

TotalU	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Sample #	7024 1		7024-2		7024 3		7024-4		7024-5		7024-6		7024-7		7024-8		7024-9	
3	Cust. I.D. #	BO17Z8		BO17Z9		BO18O0		BO1801		BO17Y8		BO17Y9		BO17S2		BO17S5		BO17Z7	
4	Type	Periphyton		Periphyton		Periphyton		Vegetation		Vegetation		Vegetation		Vegetation		Vegetation		Vegetation	
5	Final Result (ug/l)	47 08900		36 43600		37 94700		50 82700		7 15000		0 29500		0 49100		0 35100		4 66800	
6	Prep Volume (l)	0 02000		0 02000		0 02000		0 02000		0 02000		0 02000		0 02000		0 02000		0 02000	
7	Aliquot (g or l)	0 25000		0 25000		0 25000		0 25000		0 25000		0 25000		0 25000		0 25000		0 25000	
8	Reported Results (ug/unit aliquot)	3 76700		2 91500		3 03500		4 06600		0 57200		0 02360		0 03928		0 02808		0 37340	
9	Calclulated Results (ug/unit aliquot)	3 76712	OK	2 91488	OK	3 03576	OK	4 06616	OK	0 57200	OK	0 02360	OK	0 03928	OK	0.02808	OK	0.37344	OK
10	MDA	0 01100		0 01100		0 01100		0 01100		0 01100		0 01100		0 01100		0 01100		0 01100	
11	Results > MDA ?	YES		YES		YES		YES		YES		YES		YES		YES		YES	

TMA/Norcal N2-01-111-7024

Biota

Total U

	MDA	2xMDA	5xMDA	
	0.011	0.022	0.055	
Customer I.D. #	Original S	Duplicate D	RPD	Q
7024-12	3.915	2.754	~~34.818~~	ok
7036-10	0.165	0.178	7.580	ok

2.915

5.68

Printed on 14-Dec-92

SAMPLE NUMBER:	7024-5	7024-6	7024-7	7024-8	7024-9	7024-10	7024-11	7024-12
CUST ID NUMBER:	B017Y8	B017Y9	B017S2	B017S5	B017Z7	QC 7695	QC 7696	QC 7697
SAMPLE TYPE:	Periphyton	Periphyton	Periphyton	Periphyton	Periphyton	LCS	Blanks	Duplicate of
COLLECTION DATE:	12/91	12/91	12/91	12/91	12/91			
CHAIN OF CUSTODY:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92			
TOTAL URANIUM:								
DATE RUN:	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92

SAMPLE NUMBER:	7036-10
CUST ID NUMBER:	QC 7698
SAMPLE TYPE:	Duplicate of
COLLECTION DATE:	
CHAIN OF CUSTODY:	
TOTAL URANIUM:	
DATE RUN:	07/08/92

N2-01-111-7024

Total Uranium by kPA

Supplemental Requirements for Analyses Using kPA for Total Uranium

Analysis Results

✓ Results Reported for Sample Analyses
✓ Raw Data (including Prep Volume, Aliquot Volume, kPA output)
✓ Calculation Sheets
✓ Sample Identifications
✓ Detector Identification
✓ Analysis Date and Initials of Analyst

Initial and Continuing Calibration

✓ Detector Identification
✓ Calibration Date(s) and Initials of Analyst
✓ Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
✓ Amount of Standard Used
✓ Raw count/Activity data
✓ Determination of Calibration Equation

Blanks/Backgrounds

✓ Detector Identification
✓ Date of Analysis
✓ MDA of Method
✓ Amount of Reagent Used (Prep Volume)
✓ Count Durations

Duplicates

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

Matrix Spikes

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Amounts of Samples
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Results of Analysis and Calculated Precision
- ✓ Identification of Matrix Spike Radionuclide, Certification, Expiration Date, and Activity
- ✓ Amount of Matrix Spike Used
- ✓ Raw Data
- ✓ Results of Analysis and Comparison to Amount Added

HARTCROWSER

Hart Crowser, Inc.
1201 Jadwin Avenue, Suite 204
Richland, Washington 99352
FAX 509 946 4203
509 946 4344

Earth and Environmental Technologies

J-2978-50

July 22, 1993

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

Re: WHC Order No. MLW-SVV-037106
Task Order No. E-93-06
Return of Original Data for 300-FF-5 RI Samples

Dear Ms. Duncan:

Enclosed please find the 300-FF-5 Operable Unit Remedial Investigations (RI), Final Quality Assurance Reports (FQARs) listed on the attachment. Please contact me if you have any questions with regard to the materials being returned to you.

Sincerely,

HART CROWSER, INC.

D. MARK GERBOTH, P.E.
Task Manager

RECEIVED
JUL 22 1993
VALIDATION DOCUMENTATION
SDLA

cc: L. Hulstrom, Westinghouse Hanford
300-FF-5 Project File (HCRL-WHC/9306-L-93-148)
Attachment - Data Returned to Westinghouse Hanford, July 22, 1993

Data Returned to Westinghouse Hanford
July 22, 1993

Sample Delivery Group Number	Case Numbers	Project	Work Completed: Verified	Work Completed: Validated	Data included with this transmittal: ODP	VCL	PQAR	FQAR
B01842-TMA-299	N2-10--044-7100	300-FF-5	X	X				X
B07G70-TMA-300	N2-10-042-7098	300-FF-5	X	X				X
B012N5-TMA-115	N1-12-057-9575	300-FF-5	X	X				X
B012P5-TMA-114	N1-12-032-9571	300-FF-5	X	X				X
B01DT7-TMA-073	N1-12-031-9572	300-FF-5	X	X				X
B012N5-TMA-115	N1-12-056-9574	300-FF-5	X	X				X
B017X7-TMA-119	N2-01-111-7024	300-FF-5	X	X				X
B017Z1-TMA-236	N2-07-076-7058	300-FF-5	X	X				X
B01818-TMA-181	N2-05-029-7036	300-FF-5	X	X				X
B01370-TMA-149	N1-10-010-9546	300-FF-5	X	X				X

Notes:
ODP = Original Data Package
VCL = Verification Checklist
PQAR = Preliminary Quality Assurance Report
FQAR = Final Quality Assurance Record

RECEIVED
JUL 22 1993
VALIDATION DOCUMENTATION
SDLA

E-93-06/2978-50

WESTINGHOUSE HANFORD COMPANY
300-FF-5 RI DATA VALIDATION
DISTRIBUTION FORM

Document Title: Volum. QA Records Trip Case #N2-01-111-7024

Document Number: HCRL-WHC/GPN--L-92-057 Date: 12/17/92

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L. Hystad WHC	X	J. Shan HCSEA			

Project Files (1=Adm: 2=Corres: 3=Source Information: 4=Technical Data & Products)

1.1	File Index	2.1	Incoming Correspondence	4.4.6	Biota Small Mammals X
1.2	Distribution Lists	2.2	Outgoing Correspondence X	4.4.6	Surface Water Sediments
1.3	Project Procedures	2.3	Internal Correspondence	4.5	Data Val. & Qual. Summary Rpts.
1.4	Project Modifications			4.5.1	Round 1 Groundwater
1.5.1	Staff Resumes	3.1	Task Order	4.5.1.1	Internal Drafts/Comments/Resol.
1.5.2	Staff Training	3.2	Sample Lists	4.5.1.2	WHC Review Draft/Comments/Resol.
1.5.3	Auth./Former Site Employee	3.3	Data Validation Procedures	4.5.1.3	Final Report
1.6.1	QA Manual	3.4	Original Chemical Data	4.5.2	Round 2 Groundwater
1.6.2	QA Implementation	3.5	Original Radiochem Data	4.5.2.1	Internal Drafts/Comments/Resol.
1.6.2.1	QA Audits-Deliverables			4.5.2.2	WHC Review Draft/Comments/Resol.
1.6.2.2	QA Audits-Files	4.1	Task Plan	4.5.2.3	Final Report
1.6.4.1	Audit Resps-Deliverables	4.2	Data Rvw. Completeness Verif.	4.5.3	Round 3 Groundwater
1.6.4.2	Audit Resps-Files	4.2.1	Checklists - Round 1 GW	4.5.3.1	Internal Drafts/Comments/Resol.
1.6.5	Training	4.2.2	Checklists - Round 2 GW	4.5.3.2	WHC Review Draft/Comments/Resol.
1.6.6.1	QA Manual Doc Log	4.2.3	Checklists - Round 3 GW	4.5.3.3	Final Report
1.6.6.2	Procedures Doc Log	4.2.4	Checklists - Round 4 GW	4.5.4	Round 4 Groundwater
1.6.6.3	Plans Document Log	4.2.5	Checklists - Biota/Small Mam.	4.5.4.1	Internal Drafts/Comments/Resol.
1.6.6.4	Deliverables Doc Log	4.2.6	Checklists - Surface Wtr./Sed.	4.5.4.2	WHC Review Draft/Comments/Resol.
1.7.1	Downloads	4.3	Data Val. Calcs./Annotated QR	4.5.4.3	Final Report
1.7.2	M-113s	4.3.1	Round 1 Groundwater	4.5.5	Biota/Small Mammals
1.7.3	A-208s	4.3.2	Round 2 Groundwater	4.5.5.1	Internal Drafts/Comments/Resol.
1.7.4	Budget Status	4.3.3	Round 3 Groundwater	4.5.5.2	WHC Review Draft/Comments/Resol.
1.7.5	Invoices	4.3.4	Round 4 Groundwater	4.5.5.3	Final Report
1.8.1	Requisitions	4.3.5	Biota/Small Mammals	4.5.6	Surface Water/Sediments
1.9	Meeting Minutes	4.3.6	Surface Water Sediments	4.5.6.1	Internal Drafts/Comments/Resol.
1.10	Record of Telecons	4.4	Preliminary QA Records	4.5.6.2	WHC Review Draft/Comments/Resol.
1.11	Progress Reports	4.4.1	Round 1 Groundwater	4.5.6.3	Final Report
1.12	Subcontractor (HC)	4.4.2	Round 2 Groundwater X	4.6	Weekly Status Reports
		4.4.3	Round 3 Groundwater	4.7	Weekly Management Reports
		4.4.4	Round 4 Groundwater		

11/13/92

THIS APPENDIX CONSISTS OF FIVE ATTACHMENTS

Attachment 1 - Glossary of Data Qualifiers

This attachment provides a glossary explaining all data qualifiers applied as a result of the validation.

Attachment 2 - As Received Laboratory Sample Concentration Reports

This attachment provides a copy of the as-received sample concentration reports. This may be a tabular summary similar to that provided in Attachment 4, or may be a copy of the laboratory reports.

Attachment 3 - Summary of Data Qualifications

This attachment provides a complete summary of all qualifications applied as a result of the validation.

Attachment 4 - As Qualified Data Summary

This attachment provides a tabular data summary of all data qualified from the validation.

Attachment 5 - Data Review Supporting Documentation

This attachment provides copies of the data validation checklists, data summary forms, telephone contact memoranda and other documentation completed as a result of the data validation.

ATTACHMENT 1

Glossary of Data Qualifiers

ATTACHMENT 1

Glossary of Data Qualifiers

U - Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected. Due to quality control deficiencies identified during data validation the value reported may not accurately reflect the sample quantitation limit.

J - Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are useable for decision making processes.

R - Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

ATTACHMENT 2

As Received Laboratory Sample Concentration Reports

N2-01-11-7024

TMA

ATTACHMENT 1 DATA TABLE

Collection date: December 1991

Customer I.D.	TMA/Norcal Group No. 7024	Analysis	Results µg/g ± 2 σ	
BO17Z8 (periphyton)	1	Total Uranium	(3.767 ± 0.9794)	E+00
BO17Z9 (periphyton)	2	Total Uranium	(2.915 ± 0.7579)	E+00
BO18OO (periphyton)	3	Total Uranium	(3.035 ± 0.7891)	E+00
BO1801 (vegetation)	4	Total Uranium	(4.066 ± 1.057)	E+00
BO17Y8 (vegetation)	5	Total Uranium	(0.572 ± 0.154)	E+00
BO17Y9 (vegetation)	6	Total Uranium	(0.0236 ± 0.0779)	E+00
BO17S2 (vegetation)	7	Total Uranium	(0.0393 ± 0.0110)	E+00
BO17S5 (vegetation)	8	Total Uranium	(0.0281 ± 0.00814)	E+00
BO17Z7 (vegetation)	9	Total Uranium	(0.373 ± 0.0971)	E+00

ATTACHMENT 3

Summary of Data Qualifications

Total U (CRDL=1ug/g)

Customer I.D. #	Reported Results	Q
BO17Z8	3.767	J
BO17Z9	2.915	J
BO18O0	3.035	J
BO1801	4.066	J
BO17Y8	0.572	J
BO17Y9	0.024	J
BO17S2	0.039	J
BO17S5	0.028	J
BO17Z7	0.373	J

ATTACHMENT 4

As Qualified Data Summary

ATTACHMENT 1 DATA TABLE

Collection date: December 1991

Customer I.D.	TMA/Norcal Group No. 7024	Analysis	Results µg/g ± 2 σ	
B017Z8 (periphyton)	1	Total Uranium	(3.767 ± 0.9794)	E+00 J
B017Z9 (periphyton)	2	Total Uranium	(2.915 ± 0.7579)	E+00 J
B01800 (periphyton)	3	Total Uranium	(3.035 ± 0.7891)	E+00 J
B01801 (vegetation)	4	Total Uranium	(4.066 ± 1.057)	E+00 J
B017Y8 (vegetation)	5	Total Uranium	(0.572 ± 0.154)	E+00 J
B017Y9 (vegetation)	6	Total Uranium	(0.0236 ± 0.0779)	E+00 J
B017S2 (vegetation)	7	Total Uranium	(0.0393 ± 0.0110)	E+00 J
B017S5 (vegetation)	8	Total Uranium	(0.0281 ± 0.00814)	E+00 J
B017Z7 (vegetation)	9	Total Uranium	(0.373 ± 0.0971)	E+00 J

RDL ~~MDA~~ 1 ug/g

① All Samples > MDA.

② Precision - OK

③ Holding Times - all > months - J

④ Accuracy - OK

⑤ Blank - OK

ATTACHMENT 5

Data Review Supporting Documentation

N2-01-111-7024

Total Uranium by kPA

Supplemental Requirements for Analyses Using kPA for Total Uranium

Analysis Results

- ✓ Results Reported for Sample Analyses
- ✓ Raw Data (including Prep Volume, Aliquot Volume, kPA output)
- ✓ Calculation Sheets
- ✓ Sample Identifications
- ✓ Detector Identification
- ✓ Analysis Date and Initials of Analyst

Initial and Continuing Calibration

- ✓ Detector Identification
- ✓ Calibration Date(s) and Initials of Analyst
- ✓ Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
- ✓ Amount of Standard Used
- ✓ Raw count/Activity data
- ✓ Determination of Calibration Equation

Blanks/Backgrounds

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ MDA of Method
- ✓ Amount of Reagent Used (Prep Volume)
- ✓ Count Durations

Duplicates

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

Matrix Spikes

- ✓ Detector Identification
- ✓ Date of Analysis
- ✓ Amounts of Samples
- ✓ Count Durations
- ✓ Sample Identifications
- ✓ Results of Analysis and Calculated Precision
- ✓ Identification of Matrix Spike Radionuclide, Certification, Expiration Date, and Activity
- ✓ Amount of Matrix Spike Used
- ✓ Raw Data
- ✓ Results of Analysis and Comparison to Amount Added

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

JUL 1992
RECEIVED
OSM DMO

July 13, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-01-111-7024

Mr. John Bourgeault
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Dear Mr. Bourgeault:

Enclosed on Attachment 1, are the total uranium results of the periphyton and vegetation samples from Hanford 300-FF-5 Location, we received 16 January 1992. The QA/QC results are shown on Attachments 2, 3, and 4.

Please call if you have any questions concerning this data.

Sincerely,

D.P. Kharkar

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

Sections 1 through 7
Appendices

INDEX OF DOCUMENTS

SECTION 1	Data Report
SECTION 2	Case Narrative
SECTION 3	QC Summary
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SECTION 5	Analytical Methods Used
SECTION 6	Aliquot Information
SECTION 7	Raw Data for Total Uranium

SEE NEXT PAGE FOR APPENDICES TO BE INCLUDED IN THE DATA PACKAGE

INDEX OF APPENDICES TO BE INCLUDED IN DATA PACKAGE

7024

____	Appendix 1 :	Tritium Standard Solution Certificate and Preparation Information.
____	Appendix 2 :	Isotopic Uranium Standard Solution Certificates and Preparation Information.
X	Appendix 3 :	Total Uranium Standard Solution Certificate and Preparation Information.
X	Appendix 4 :	Preparation Log For QC Samples.
____	Appendix 5 :	Am Standard Solution Certificate and Preparation Information.
____	Appendix 6 :	^{99}Tc Standard Solution Certificate and Preparation Information.
____	Appendix 7 :	^{90}Sr Stock Solution Certificate, Preparation and Dilutions Information.
____	Appendix 8 :	Yttrium Carrier Certificate, Preparation and Dilutions Information.
____	Appendix 10 :	Gamma Scan Spike
____	Appendix 12 :	Continuing Calibration Data for Tritium for LSC Counters 4 and 5.
____	Appendix 15 :	Raw Data for Continuing Calibration for Beta Counters.
____	Appendix 16 :	Primary Calibration References.

SECTION 1 Data Report

9 samples

SECTION 2 CASE NARRATIVE

CASE NARRATIVE

1. Periphyton and vegetation samples from 300-FF-5 Location, (TMA/Norcal Group No. 7024 and 7036) were processed together and the results of the analyses are reported. The sample ID's are:

Customer Sample ID	TMA/Norcal Group No.	Customer Sample ID	TMA/Norcal Group No.
B017Z8 (periphyton)	7024-1	B01818 (vegetation)	7036-1
B017Z9 (periphyton)	7024-2	B01820 (vegetation)	7036-2
B01800 (periphyton)	7024-3	B01821 (vegetation)	7036-3
B01801 (periphyton)	7024-4	B01822 (vegetation)	7036-4
B017Y8 (periphyton)	7024-5	B01823 (vegetation)	7036-5
B017Y9 (periphyton)	7024-6	B01824 (vegetation)	7036-6
B017S2 (periphyton)	7024-7	B01825 (vegetation)	7036-7
B017S5 (periphyton)	7024-8	B01826 (vegetation)	7036-8
B017Z7 (periphyton)	7024-9	B01828 (vegetation)	7036-9

2. The analyses reported are:

PERIPHYTON & VEGETATION			
Analyte	Group # & Sample #	Analyte	Group # & Sample #
Total Uranium	7024-1 - 9	Total Uranium	7036-1 - 9

3. Results are reported μgm/gram dry material with 2 σ errors.

4. The QC samples consisting of a spike, a laboratory control, and a replicate were processed with this batch as shown on Table 1.

TABLE 1

Preparation Batch Samples Processed	Data Package
7024-1 through 9	Periphyton and Vegetation
7036-1 through 9	Vegetation

QC SAMPLES PROCESSED:

Sample I.D.	Type	Analyses	Reported with Data Package
7024-10 (QC 7695)	Spike	Total Uranium	X
7024-11 (QC 7696)	LCS	Total Uranium	X
7024-12 (QC 7697)	Replicate	Total Uranium	X
7036-10 (QC 7698)	Replicate	Total Uranium	X

6. Analyses, reanalyses, and reworks, etc.

Total Uranium Analyses: The results of the spike, the laboratory control sample, and the replicate were satisfactory. No abnormalties were encountered.

QUALITY CONTROL SUMMARY

Attachment 2, 3, and 4 gives the results of the QC samples. The recovery ratios were determined by the QC Officer based upon the final data obtained for each. The laboratory control samples were calculated with an aliquot of 1.00 and, therefore, the presented data cannot be compared directly with the sample data. To compare them directly, the laboratory control sample data would need to be divided by sample aliquots.

The results of the spike, the laboratory control sample, and the replicate for total uranium were satisfactory.

D.P. Kharkar

Dinkar P. Kharkar, Ph.D.
TMA/Norcal Program Manager

ATTACHMENT 2 QUALITY CONTROL SAMPLE RESULTS, SPIKES AND BLANKS

TMA/Norcal Group No.	Nuclide	µg/Sample ± Error 2 σ Found	Added	Recovery Ratio Found/Added ± 2 σ
Spikes for Periphyton:				
7024-10 QC-7695	Total U	(0.4484 ± 0.1704) E+00	(0.4067 ± 0.01626) E+00	1.10 ± 0.42

ok

ATTACHMENT 3 QUALITY CONTROL SAMPLE RESULTS, LABORATORY CONTROL SAMPLES

TMA/Norcal Group No.	Nuclide	µg/Sample ± Error 2 σ Found	Added	Recovery Ratio Found/Added ± 2 σ
Laboratory Control Samples for Periphyton and Vegetation:				
7024-11 QC-7696	Total U	(0.00882 ± 0.00229) E+00	0	Satisfactory

Ok

ATTACHMENT 4 QUALITY CONTROL RESULTS, REPLICATES

Nuclide	Results µg/g		
	No. 7024-12 Replicate	No. 7024-2 Original	
QC 7697 Total U	(2.754 ± 1.047) E+00	(2.915 ± 0.758) E+00	RDC 5.6% OK
	No. 7036-10 Replicate	No. 7036-2 Original	
QC 7698 Total U	(0.178 ± 0.0710) E+00	(0.165 ± 0.0429) E+00	7.5% OK

SECTION 4 Chains-of-Custody Copies

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator NA CADORET

Company Contact NA CADORET

Telephone 376-8107

Project Designation/Sampling Locations 300-FF-5 TASK 7

Collection Date 12/91

Ice Chest No. NA

Field Logbook No. BWCC 52960 ~~53573~~ BWCC 54497

Bill of Lading/Airbill No. 248521817 5

Offsite Property No. PNL 92-~~388~~

Method of Shipment AIR

Shipped to TMA NORCAL

Possible Sample Hazards/Remarks NONE DETECTED OR EXPECTED / PERIPHYTON (DRIED) + VEGETATION SAMPLES

Sample Identification

B01778	B01753
B01779	B01754
B01800	B01755
B01801	B01756
B01747	B01757
B01749	
B01749	
B01750	
B01751	
B01752	

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
NA CADORET	Kermit Blum	1-16-92 1430
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90)

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector NA CADORET Date Sampled 12/91 Time NA hours

Company Contact NA CADORET Telephone (509) 376-8107

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B01778	1 - GLASS	PERIPHITON, DRIED	TAL METALS, URANIUM.
B01779			
B01800			
B01801			
B01747	1 - GLASS	VEGETATION, DRIED + GROUND ~10g samples	ICP METALS
B01750			
B01751			
B01753			
B01754			
B01756			
B01748	1 - glass	vegetation, dried + ground	URANIUM
B01749			
B01752			
B01755			
B01757			

Field Information** FROM 300-FF-5, TASK 7

Special Handling and/or Storage NA

Possible Sample Hazards NONE DETECTED

PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 1-16-92

Analysis Required

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

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

A-6000-406 (05/90)

TotalU	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Sample #	7024-1		7024-2		7024-3		7024-4		7024-5		7024-6		7024-7		7024-8		7024-9	
3	Cust I.D. #	BO17Z8		BO17Z9		BO1800		BO1801		BO17Y8		BO17Y9		BO17S2		BO17S5		BO17Z7	
4	Type	Periphyton		Periphyton		Periphyton		Vegetation		Vegetation		Vegetation		Vegetation		Vegetation		Vegetation	
5	Final Result (ug/l)	47.08900		36.43600		37.94700		50.82700		7.15000		0.29500		0.49100		0.35100		4.66800	
6	Prep Volume (l)	0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000		0.02000	
7	Aliquot (g or l)	0.25000		0.25000		0.25000		0.25000		0.25000		0.25000		0.25000		0.25000		0.25000	
8	Reported Results (ug/unit aliquot)	3.76700		2.91500		3.03500		4.06600		0.57200		0.02360		0.03928		0.02808		0.37340	
9	Calculated Results (ug/unit aliquot)	3.76712	OK	2.91488	OK	3.03576	OK	4.06816	OK	0.57200	OK	0.02360	OK	0.03928	OK	0.02808	OK	0.37344	OK
10	MDA	0.01100		0.01100		0.01100		0.01100		0.01100		0.01100		0.01100		0.01100		0.01100	
11	Results > MDA ?	YES		YES		YES		YES		YES		YES		YES		YES		YES	

Total U

	MDA	2xMDA	5xMDA	
	0.011	0.022	0.055	
Customer I.D. #	Original S	Duplicate D	RPD	Q
7024-12	3.915	2.754	~~34.818~~	ok
7036-10	0.165	0.178	7.580	ok

2.915

5.68

SAMPLE NUMBER:	7024-5	7024-6	7024-7	7024-8	7024-9	7024-10	7024-11	7024-12
CUST ID NUMBER:	B017Y8	B017Y9	B017S2	B017S5	B017Z7	QC 7695	QC 7696	QC 7697
SAMPLE TYPE:	Periphyton	Periphyton	Periphyton	Periphyton	Periphyton	LCS	Blanks	Duplicate of
COLLECTION DATE:	12/91	12/91	12/91	12/91	12/91			
CHAIN OF CUSTODY:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92			
TOTAL URANIUM:								
DATE RUN:	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92	07/07/92

SAMPLE NUMBER:	7036-10
CUST ID NUMBER:	QC 7698
SAMPLE TYPE:	Duplicate of
COLLECTION DATE:	
CHAIN OF CUSTODY:	
TOTAL URANIUM:	
DATE RUN:	07/08/92